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RAINWATER HARVESTING REBATE

JULY 2023 PROGRAM UPATES

Training Outline

1. Review Program Changes
2. Review Best Design & Installation Practices
3. Roof area & basin sizing calculations
4. Online pre-approval form
5. Q&A

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RAINWATER HARVESTING REBATE

PROGRAM CHANGES AS OF JULY 1, 2023

Questions: email conservation@tucsonaz.gov or call 520-791-4331

Administrative Changes as of July 1, 2023

- Customers will be required to take an **eligible workshop before installation** of their system begins.
- Customers will **apply online** for the rainwater harvesting rebate.
- **Pre-approval** will be required before installation of a rainwater harvesting system. Pre-approval entails:
  - (1) first taking the required workshop,
  - (2) then submitting a site plan with system features and their estimated sizes.
  - (3) Upon approval by Tucson Water to proceed with installation, the customer will have one year to complete installation of their system. If customer does not install within one year, they will have to retake the workshop and reapply.
- **A Site Visit** will be required after installation, before rebate is approved.

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Rebate Pricing Changes as of July 1, 2023

- **Remove the $500 cap for passive systems** (basins & earthworks); All water harvesting features on a property can be combined and calculated to a maximum of $2000 rebate.
- Calculate the rebate for passive systems based on the size of the basin(s); the rebate for **passive systems will be $1.50/gallon, based on basin volume**, if the system is correctly sized (rebate amount accounts for basin infiltration of 1.5 times the measured volume).
- A rainwater harvesting system must **be sized to capture at least one inch of rainwater from the drainage area (usually roof area) to receive the full rebate amount** ($1/gallon active and $1.50/gallon passive). If a system is not sized large enough to capture the full one inch of rainfall, the customer will receive $0.50/gallon for all system features. A property can have multiple drainage areas.

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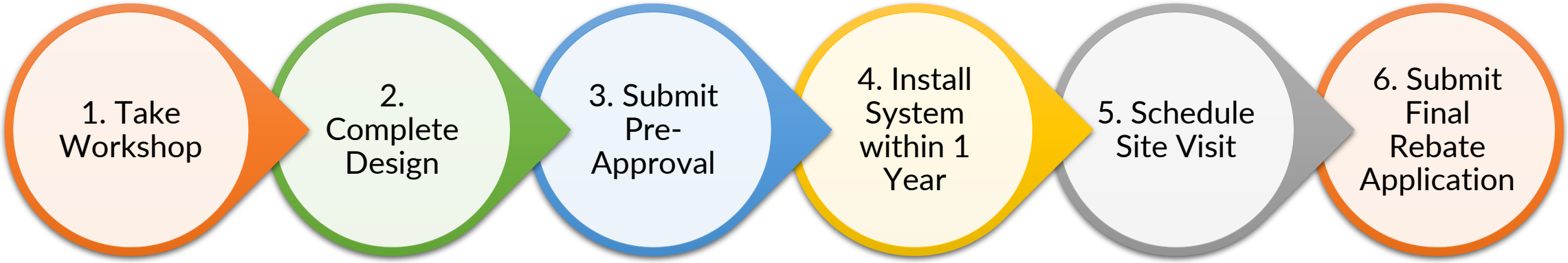
New Application Process



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RAINWATER HARVESTING REBATE

2023 PROGRAM GOALS

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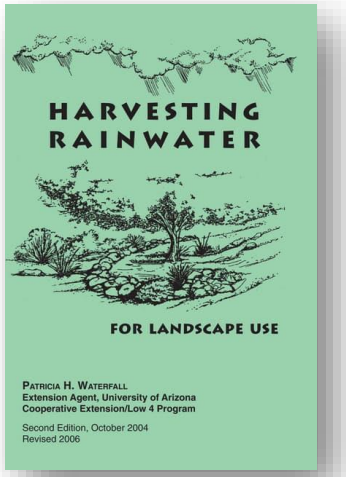
UPDATED GOALS of RWH rebate:

1. Capture onsite rainwater as a functional water source (aligning with OneWater goals to provide quantitative data estimates that previously have not been captured)
2. Utilize rainwater to grow landscape plants and the urban canopy, to yield:
    1. More vegetation without increasing potable use
    2. Decrease potable water use
3. Align 1” rainfall capture with regional stormwater retention requirements

Out of print: UArizona Cooperative Extension



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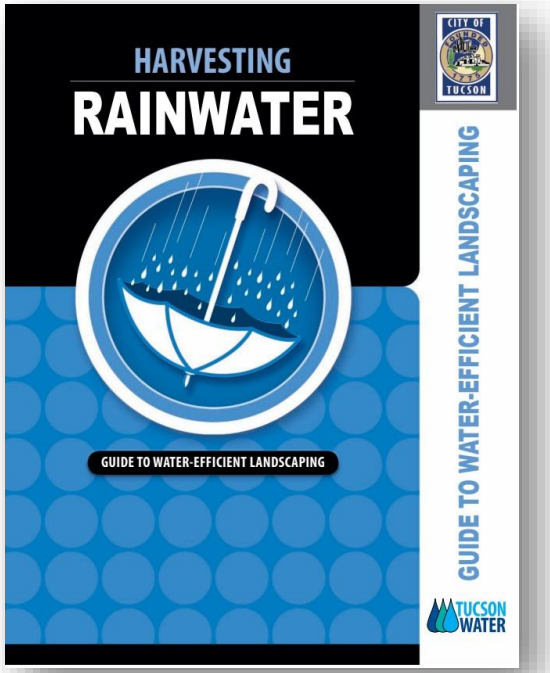
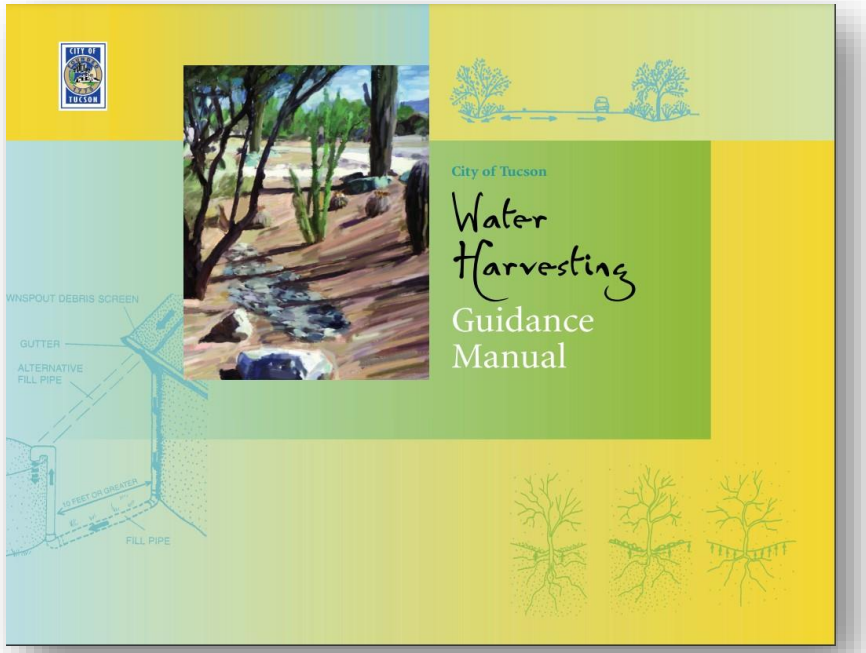
Revised printing of Patricia Waterfall brochure



Developed for public rights-of-way properties



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RAINWATER HARVESTING REBATE

Best Design & Installation Practices

Questions: email conservation@tucsonaz.gov or call 520-791-4331

Ensure all RWH Systems have:

- Correct sizing for high-intensity events (guttering, inflow & outflow/overflow)
    - Overflow rain gardens now count as part of system capacity
- Accurate measurement of slopes, elevations & where to place system components

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Ensure Active RWH Systems:

- Use high-quality materials (Schedule 40 PVC & ensure painted to withstand UV; sheet metal leaf catcher)
- Install closed systems (no light into tank, screen tanks)
- Install systems to minimize maintenance (accessible debris filters & first flush devices)
- Install tanks on level pads (concrete or compacted sand, not gravel)

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Guttering & Tanks

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Ensure Passive RWH Systems:

- Infiltrate all water within 24 hours
- Berm height > 4 inches above overflow
- Mulch should be at least 4 inches below overflow spillway elevation
- Berms 2 to 4 times as wide as they are tall
- Use organic mulch for infiltration areas
- Use rock mulch for conveyance areas if needed

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Armored Outfalls & Basins

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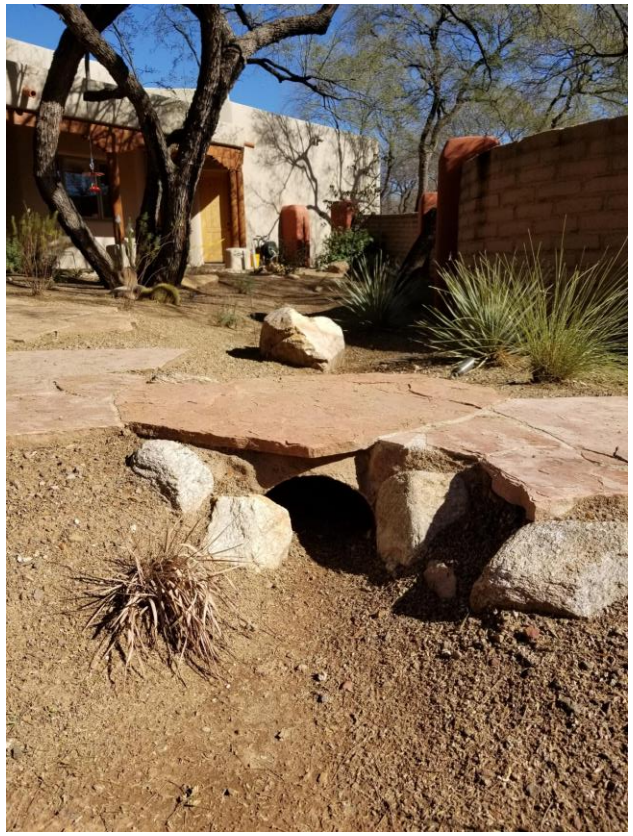
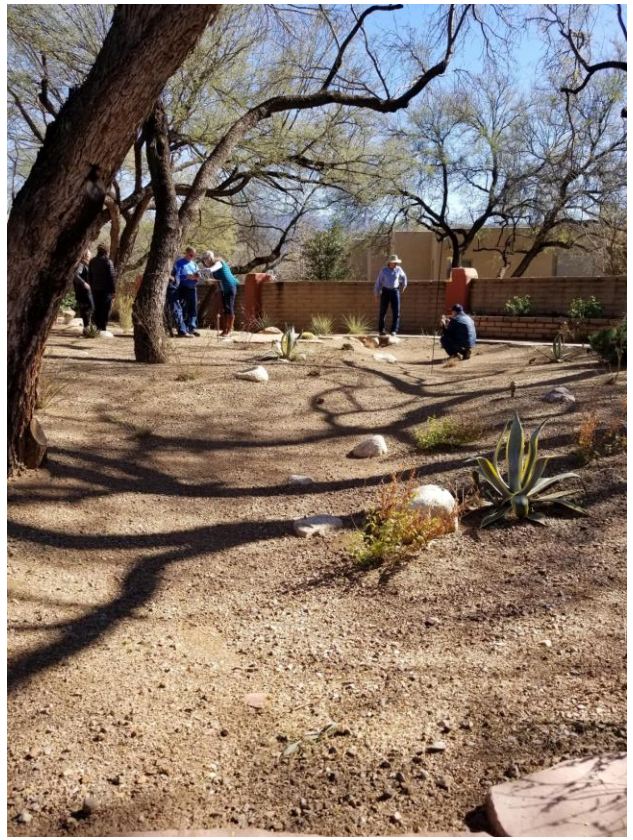
Basins & Swales





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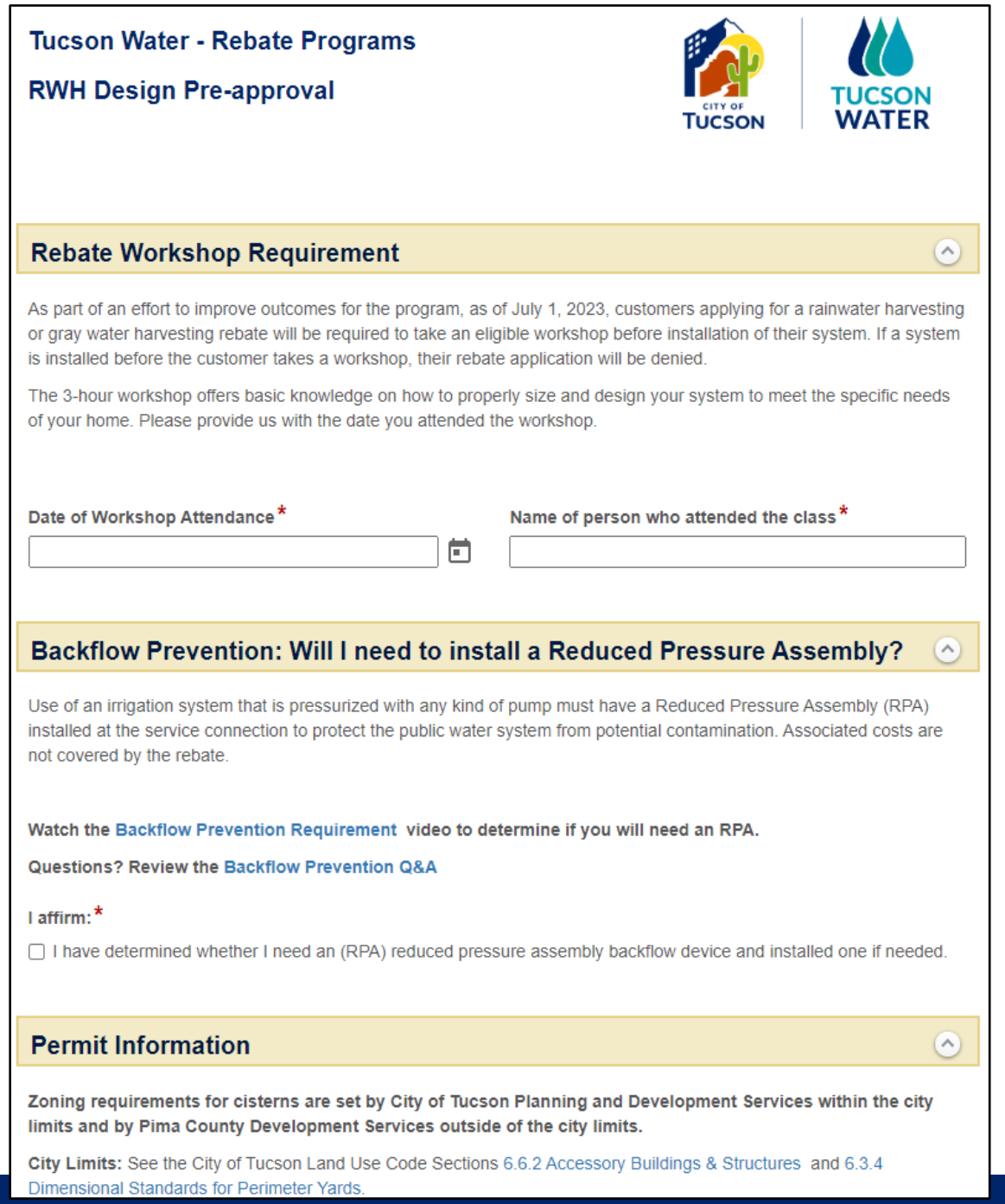
RAINWATER HARVESTING REBATE

Runoff Calculations & Site Elements

Questions: email conservation@tucsonaz.gov or call 520-791-4331

RWH Design Pre-Approval

- Overview of rainwater calculations for the online application submittal.
- Simple RWH system site elements that will need to be submitted for approval prior to installation.
- Detailed directions will be provided in the Rainwater Harvesting workshops.
- This is NOT a Design Tutorial



Tucson Water - Rebate Programs

RWH Design Pre-approval

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Rebate Workshop Requirement

As part of an effort to improve outcomes for the program, as of July 1, 2023, customers applying for a rainwater harvesting or gray water harvesting rebate will be required to take an eligible workshop before installation of their system. If a system is installed before the customer takes a workshop, their rebate application will be denied.

The 3-hour workshop offers basic knowledge on how to properly size and design your system to meet the specific needs of your home. Please provide us with the date you attended the workshop.

Date of Workshop Attendance *

Name of person who attended the class *

Backflow Prevention: Will I need to install a Reduced Pressure Assembly?

Use of an irrigation system that is pressurized with any kind of pump must have a Reduced Pressure Assembly (RPA) installed at the service connection to protect the public water system from potential contamination. Associated costs are not covered by the rebate.

Watch the Backflow Prevention Requirement video to determine if you will need an RPA.

Questions? Review the Backflow Prevention Q&A

I affirm: *

☐ I have determined whether I need an (RPA) reduced pressure assembly backflow device and installed one if needed.

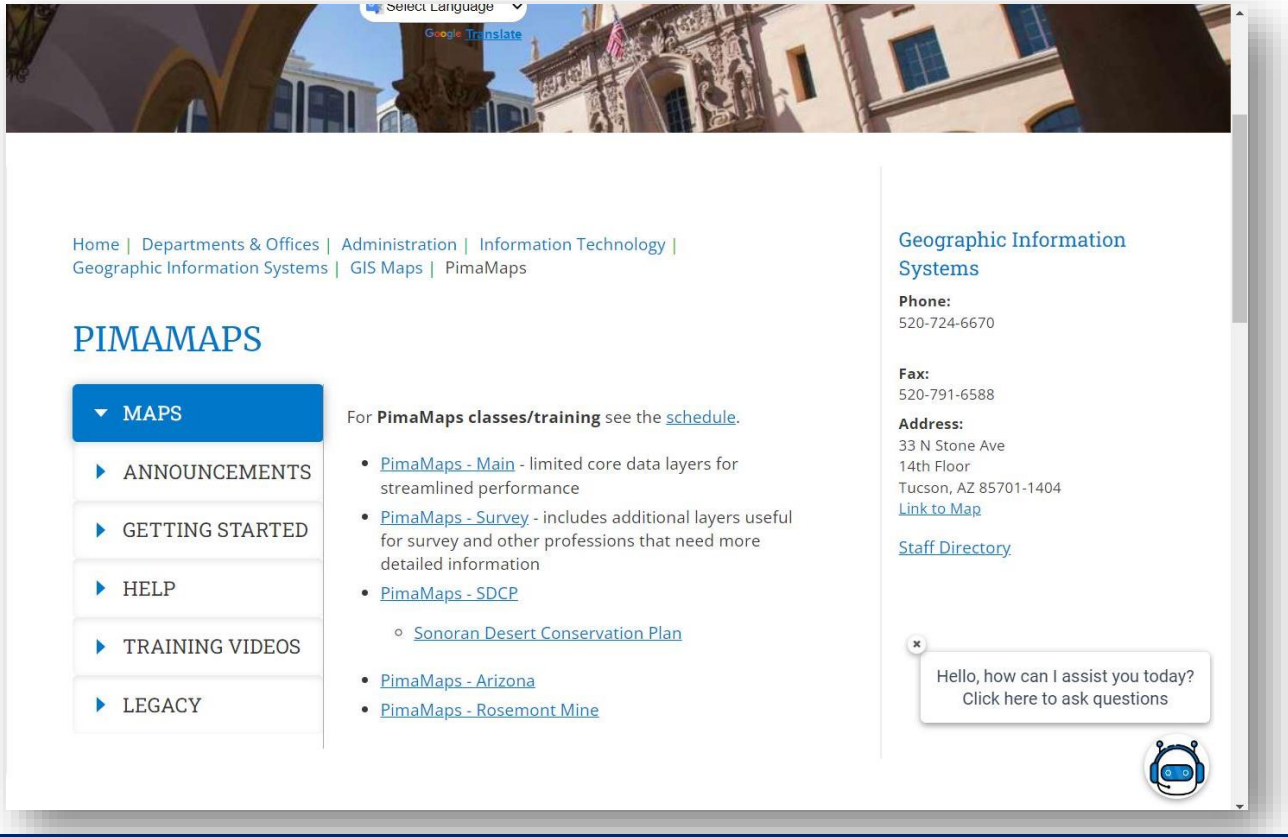
Permit Information

Zoning requirements for cisterns are set by City of Tucson Planning and Development Services within the city limits and by Pima County Development Services outside of the city limits.

City Limits: See the City of Tucson Land Use Code Sections 6.6.2 Accessory Buildings & Structures and 6.3.4 Dimensional Standards for Perimeter Yards.

Online Mapping Tools

- The following examples provide a quick overview of rainwater calculation for the online application submittal (can be submitted via Smart Phones or computers)
- A simple RWH system site elements map
  - *comprehensive directions will be provided in the Rainwater Harvesting workshops*
- Aerial map examples were captured from PimaMaps; link to online Training Videos on how to navigate PimaMaps and using the measuring tools
- Other site map tools can be used:
  - Google Earth Pro
  - Other property site map that can be scaled



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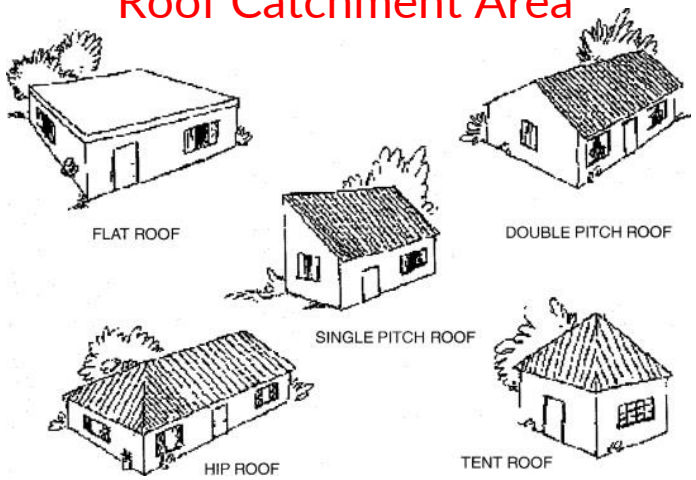
RWH Roof Runoff

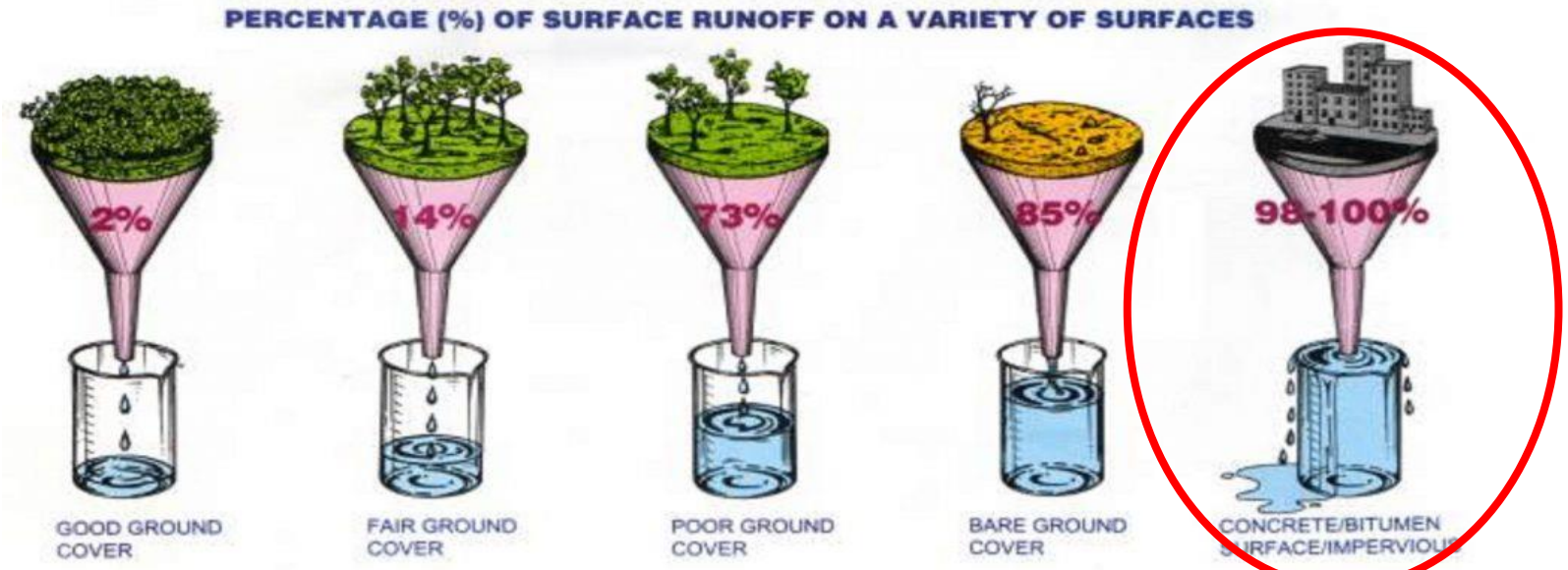
Roof Catchment Area



Graphic source: https://www.sciencedirect.com/topics/earth-and-planetary-sciences/catchment-area

Why consider roof capture only:

- Urban area residential: 30-50% of site is **impervious** (roofs, driveways, patios)
  - Catchment area for majority of urban residential is the first point of contact (roofs) for rainfall that will provide water to a RWH system;
- Impervious surfaces provide 90-100% of water running off surfaces
  - In urban residential areas, that would be the rooftop



Graphic source: https://beckleysanitaryboard.org/impervious-surface/

Urban residential impervious: rooftop and driveways

RWH Site Boundaries & Rooftops

- Largest area to collect greatest amount of rainwater runoff on typical urban residential property:
  - **Rooftop** (largest impervious surface on property) – the first point of contact for rainfall
  - This can include other rooftop structures on property (i.e., ramadas, dwelling unit, shed, etc)

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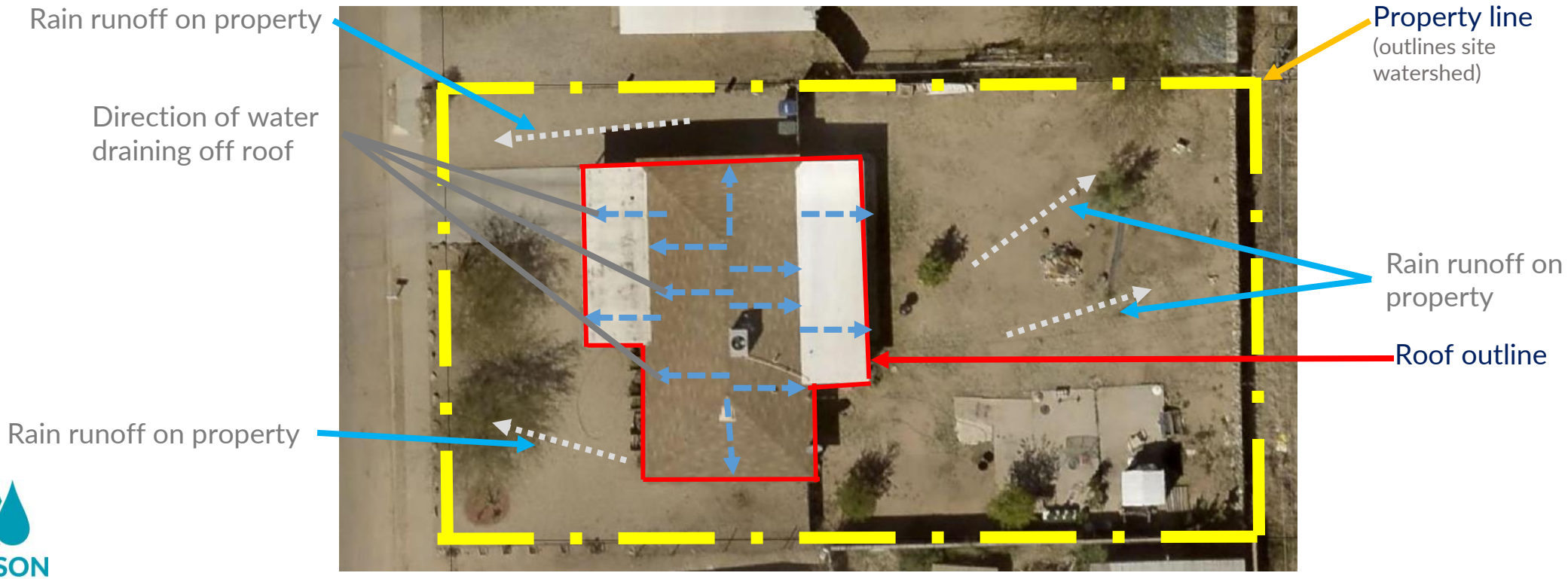
RWH Runoff Direction

- Determining direction of roof rain runoff (aerial site example captured from PimaMaps Guide)
  - Pitched roof – flow is direction of roof slope
  - General flow of rainwater on property



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RWH Runoff Determination

- Determining direction of roof rain runoff (aerial site example captured from PimaMaps Guide): front, back, side
  - Pitched roof – flow is direction of roof slope
  - Flat roof – locate scuppers or water drains & use aerial image to determine drainage directions (roof has slight pitch) : check with workshop instructor for assistance

Direction of water draining off roof

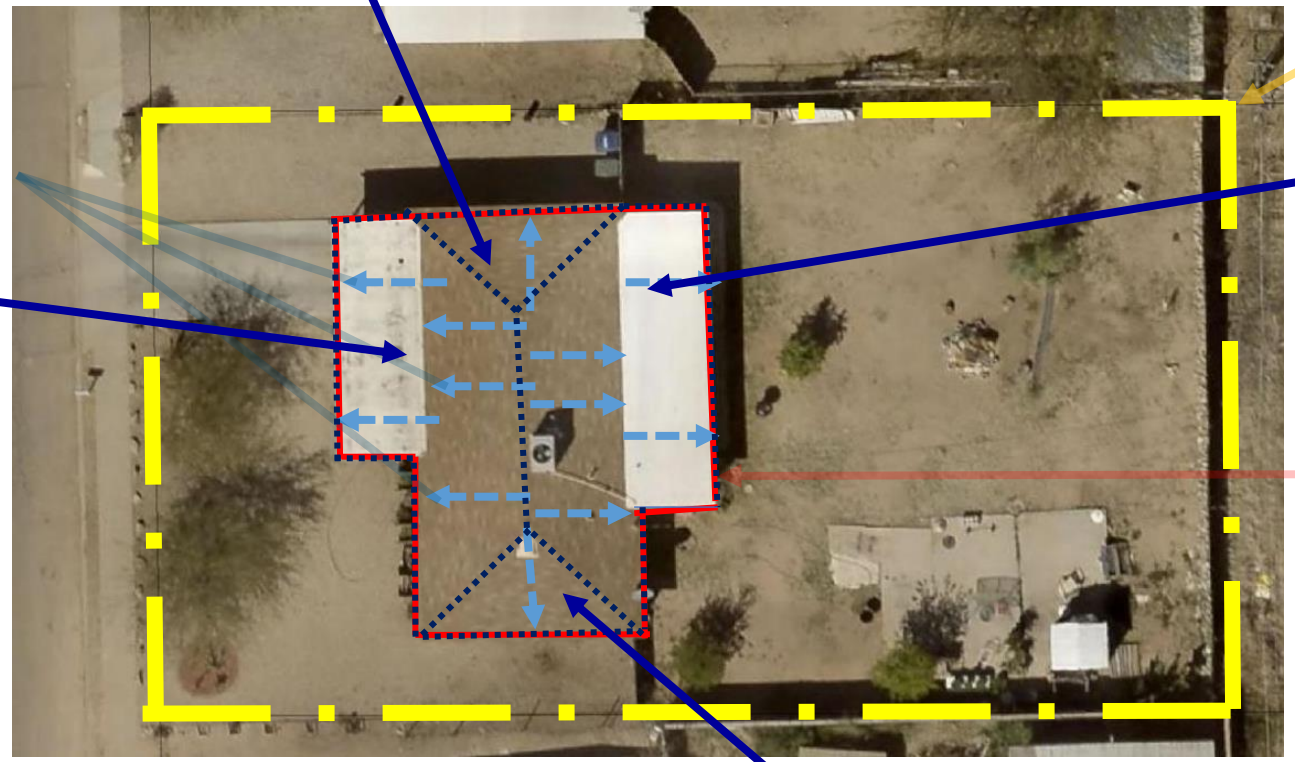
Property line (outlines site watershed)

Roof outline

Optional: Capturing other structure roof runoff; add to roof area total for backyard, along with associated RWH feature added in backyard

RWH Runoff: Roof Calculation

- Determining area of roof rain runoff (aerial site example captured from PimaMaps Guide; can use other site maps/aerials)
  - Pitched roof – flow is direction of roof slope
    - Select PimaMap's 'Tools'
    - Using Tools → Measurement → Area, outline area of roof sloping in same direction



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RWH Runoff: Roof Calculation

- Applicable roof drainage area will be entered in online application calculator : depends on placement of RWH system features (*possible to enter multiple roof areas if RWH features in front, side and/or back yards*)
  - cistern/tank : back and/or sideyard, exceptions to front yard (link on form) or
  - Basins : front, back, and/or sideyard

Direction of water draining off roof

Property line
(outlines site watershed)

Roof outline

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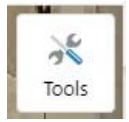
RWH Runoff: Front Yard Calculation

- Determining area of roof rain runoff: front roof
  - Select PimaMaps, 'Tools'
    - Front roof area automatically calculated using 'Area' Measurement Tool



Property line
(outlines site watershed)

Direction of water draining off roof

Front roof pitch area

740.07 ft² drainage area off frontside of roof

Roof outline

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RWH Runoff: Back Yard Calculation

- Determining area of roof rain runoff: back roof
  - Select PimaMap's 'Tools'
    - Back roof area automatically calculated using 'Area' Measurement Tool

Direction of water draining off roof

Property line (outlines site watershed)

Back roof pitch area

801.5 ft^2 drainage area off backside of roof

Roof outline

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RWH Runoff: Side Yard Calculation

- Determining area of roof rain runoff: side roof
- Select PimaMaps, 'Tools'
  - Side roof area automatically calculated using 'Area' Measurement Tool

Side roof pitch area

148.16 ft^2 drainage area off side pitch

Property line
(outlines site watershed)

Direction of water draining off roof

Roof outline

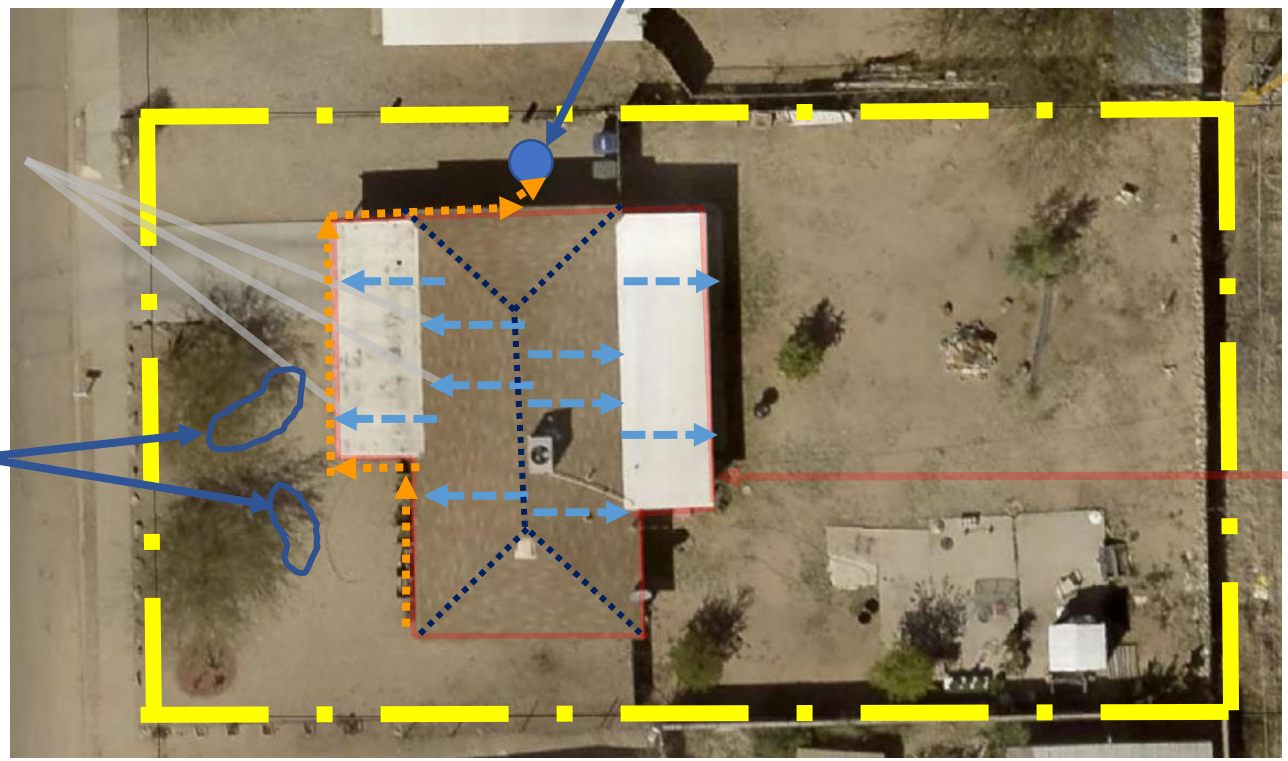
Side roof pitch area

130.34 ft^2 drainage area off side pitch

Site Plan: Front Roof Guttering

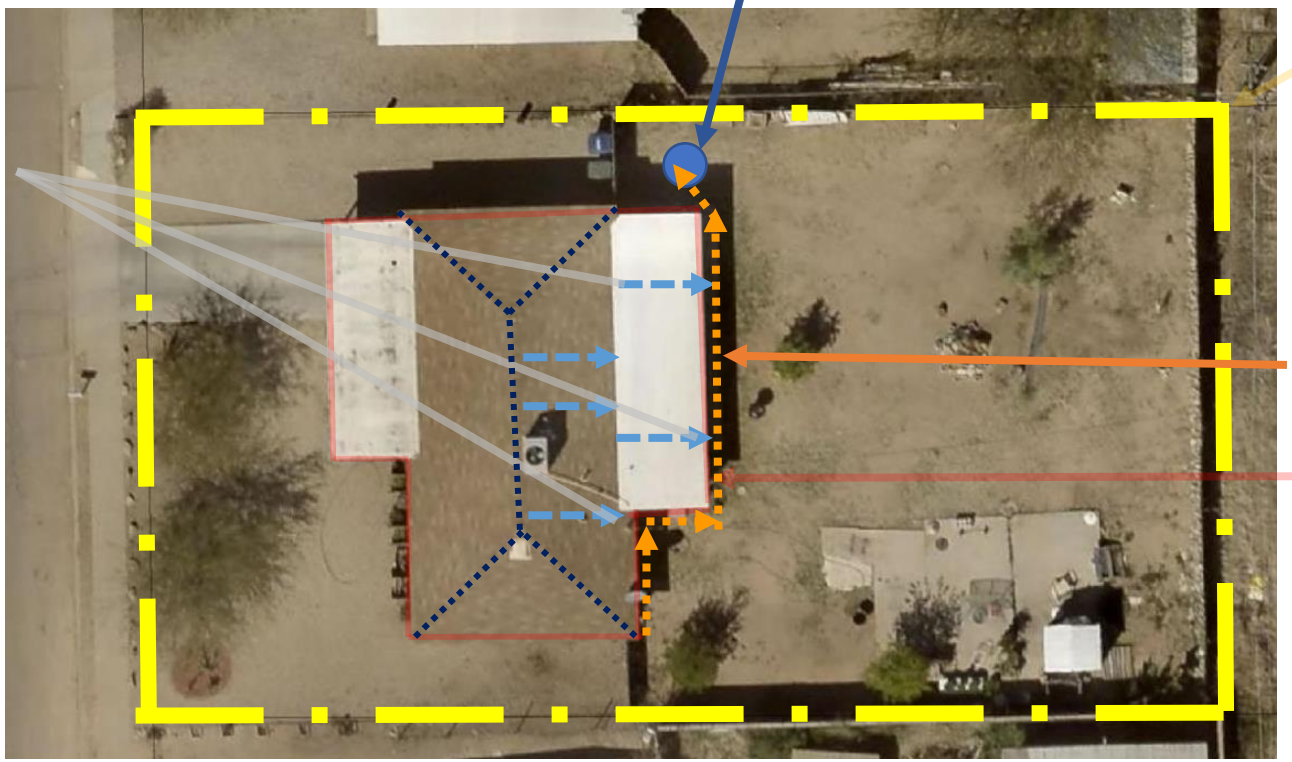
- Basin location – front yard
- If adding gutter to capture rainwater from front roof but cistern/tank in side/back yard
  - Add cistern to front yard calculations

    Note: size limitations if site plan shows front yard tank/cistern location



Site Plan: Back Yard Cistern/Tank

- Cistern/tank placement
  - Determine location of cistern (back and/or sideyard)
    - must be connected to a roof gutter system
    - If connecting front roof gutter to cistern/tank in Side/back yard, enter front roof area



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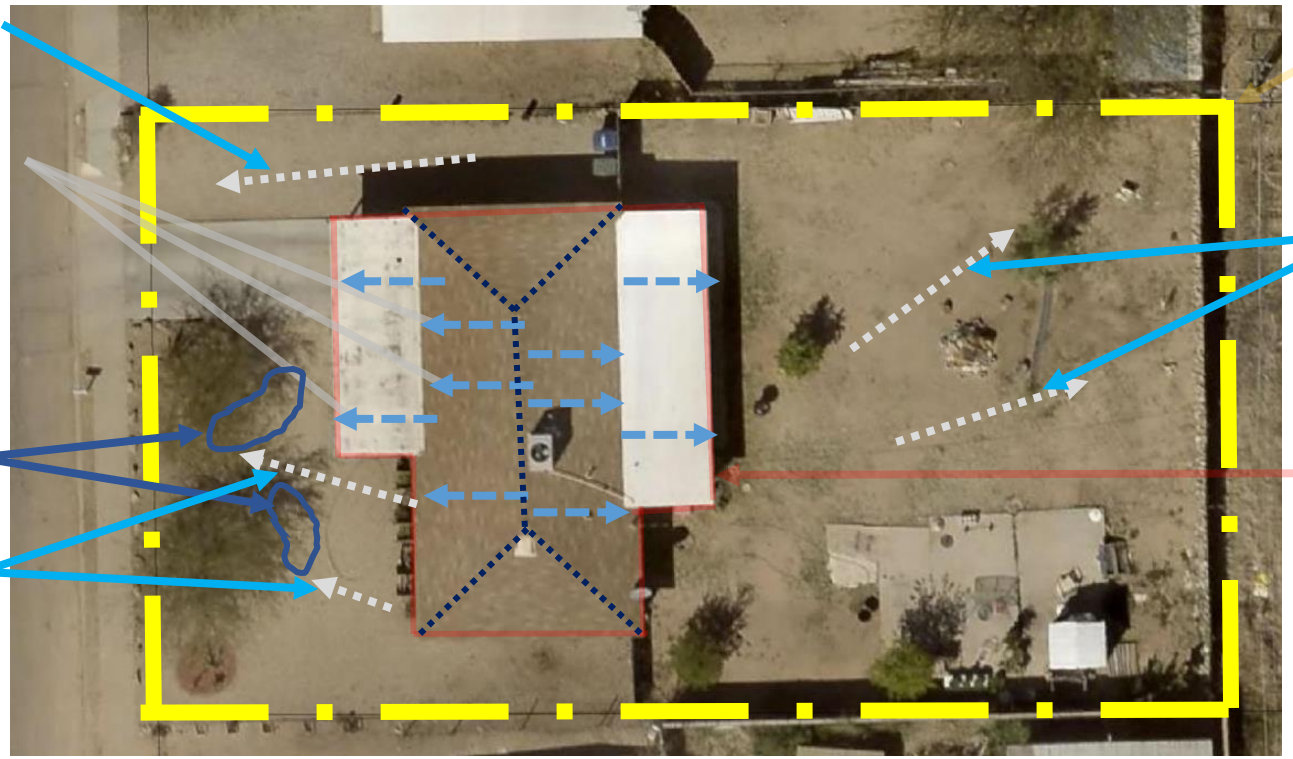
Site Plan: Front Yard Earthwork

- Basin location – front yard



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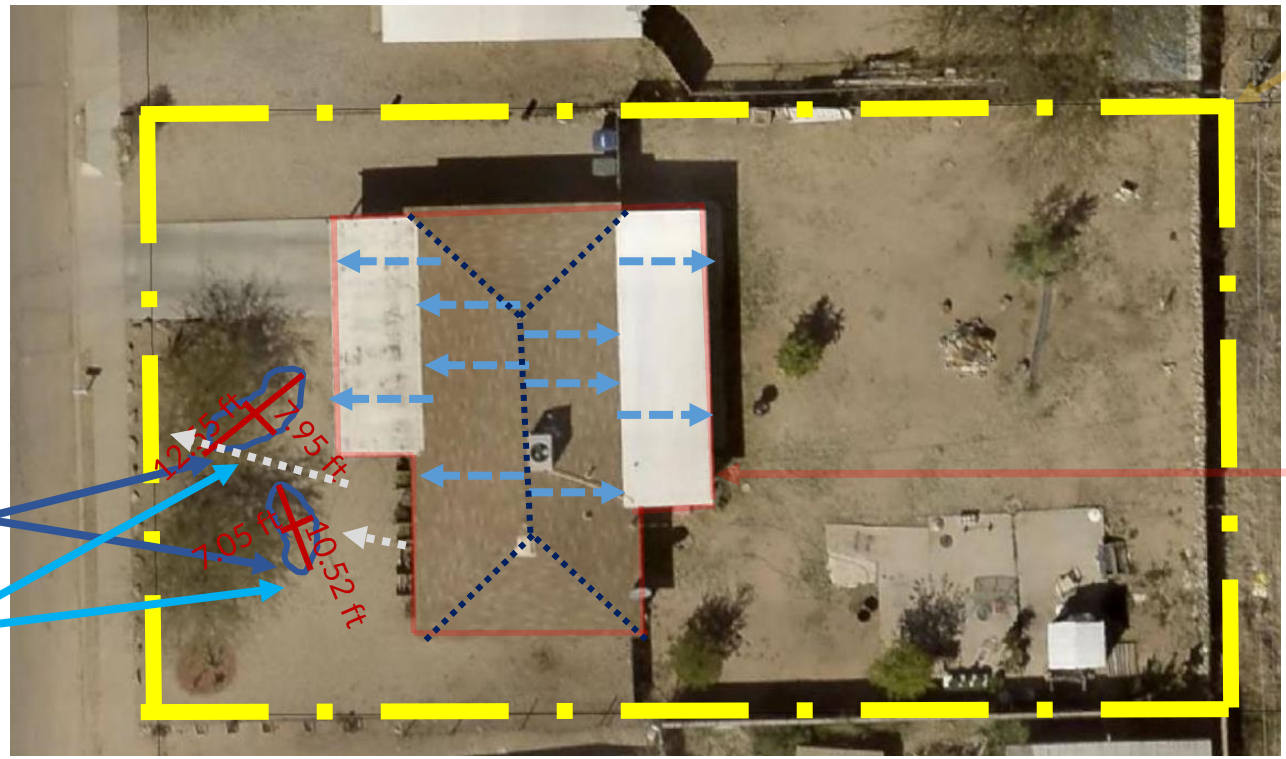
Site Plan: Measuring Basin – Front yard

- Cistern/tank placement
  - Determine location of cistern (back and/or sideyard)
    - must be connected to a gutter
- Basin location – front yard
- Basin measurements: select “Tools” → “Measurement” → “Line”
  - Longest length
  - Widest width, that is perpendicular to length
  - Enter in online application
- Default basin depth is 8”
  - 8” has been majority of residential installations
  - can be manually changed on form (i.e., swales may be shallower)
  - Depth over 3’ requires a permit



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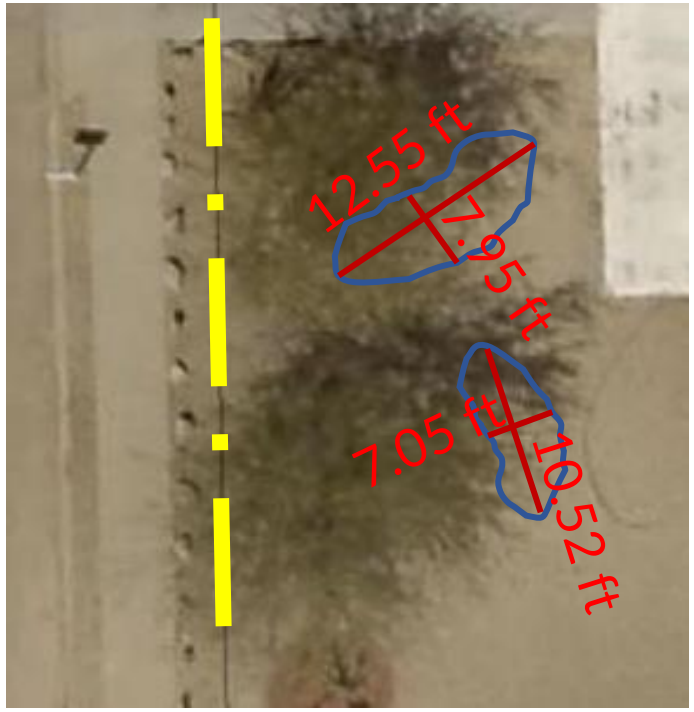
Site Plan: Measuring Basins – Front Yard Detail

- Longest length
- Widest width, that is perpendicular to length
- If basin more L-shaped, divide into 2 separate basins (i.e., swale connecting to basins)
- Basin measurements:
  - Longest length
  - Widest width, that is perpendicular to length
  - Enter in online application
- Default basin depth is 8” (0.67’)
  - 8” has been majority of residential installations
  - can be manually changed on form (i.e., swales may be shallower)
  - Depth over 3’ requires a permit



Front yard typical basin(s)

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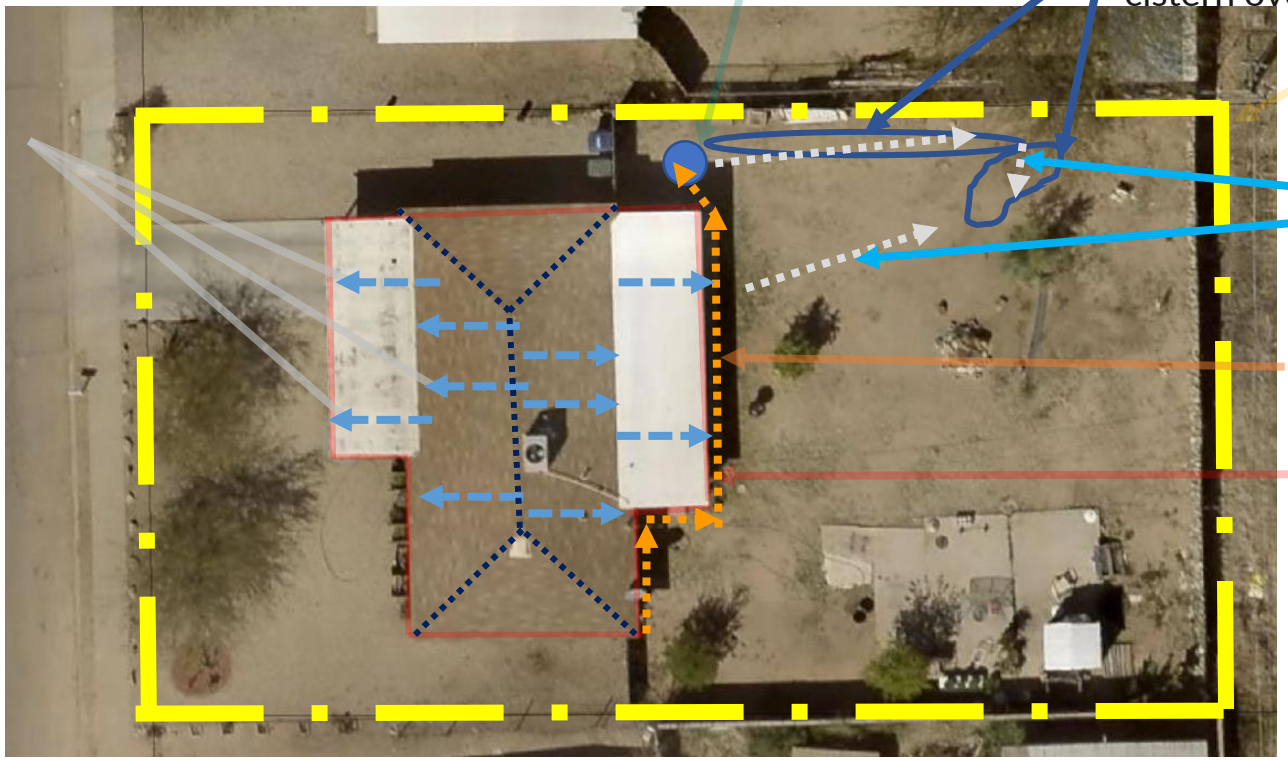
Site Plan: Back Yard Earthworks

- Cistern/tank placement
  - Determine location of cistern (back and/or sideyard)
    - must be connected to a gutter
- Basin location – back yard



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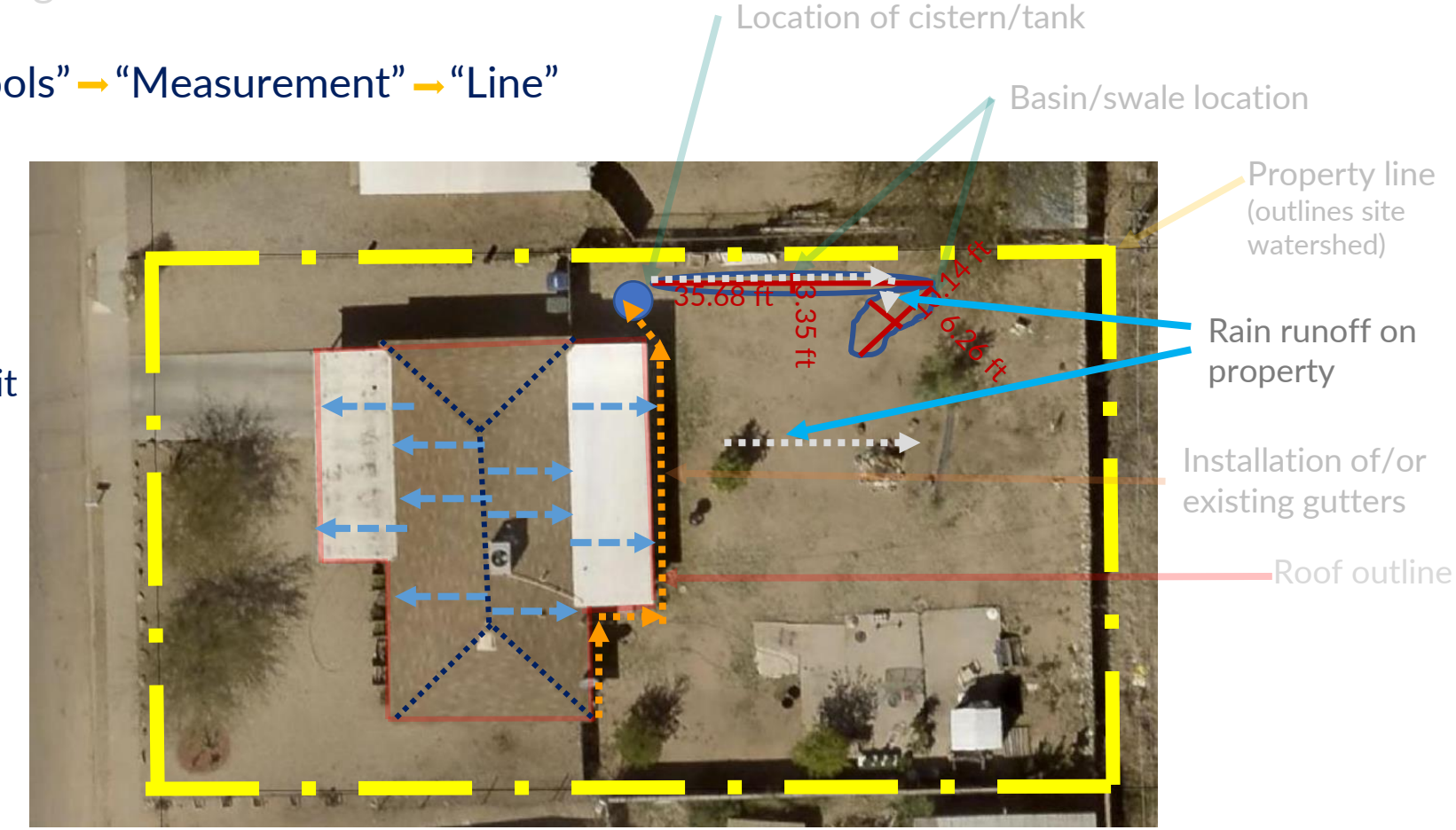
Site Plan: Measuring Basin – Back yard

- Cistern/tank placement
  - Determine location of cistern (back and/or sideyard)
    - must be connected to a gutter
- Basin location – back yard
- Basin measurements: select “Tools” → “Measurement” → “Line”
  - Longest length
  - Widest width, that is perpendicular to length
  - Enter in online application
- Default basin depth is 8” – can be manually changed on form
  - Depth over 3’ requires a permit



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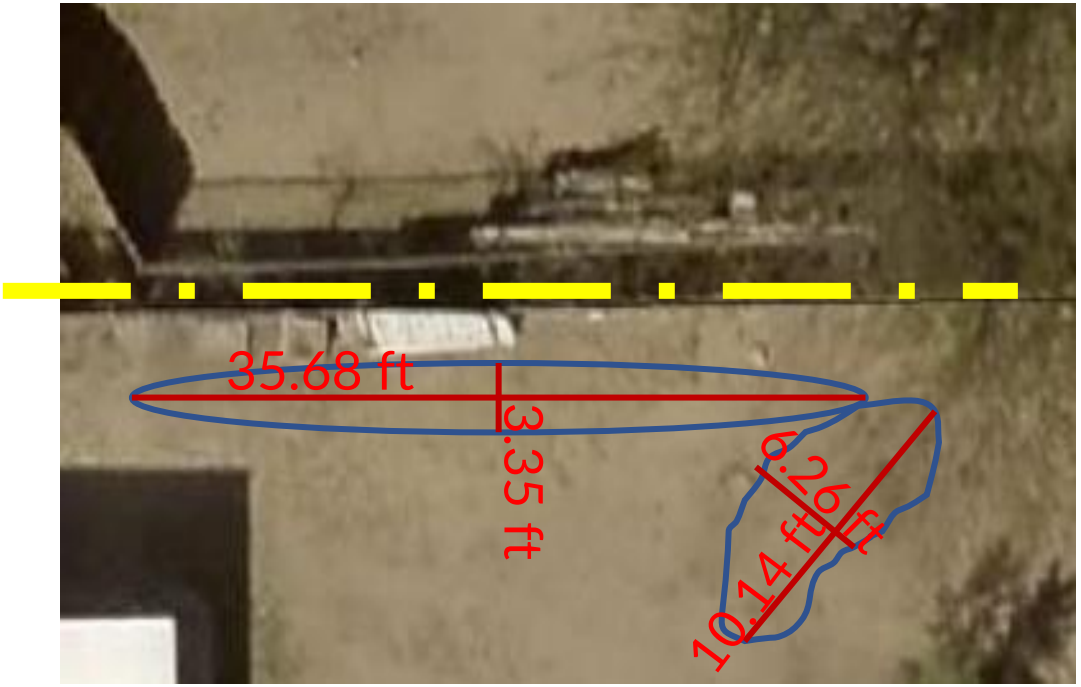
Site Plan: Measuring Basins – Back Yard Detail

- Longest length
- Widest width, that is perpendicular to length
- If basin more L-shaped, divide into 2 separate basins (i.e., swale connecting to basins)
- Basin measurements:
  - Longest length
  - Widest width, that is perpendicular to length
  - Enter in online application
- Default basin depth is 8” (0.65’)
  - 8” has been majority of residential installations
  - can be manually changed on form (i.e., swales may be shallower)
  - Depth over 3’ requires a permit



Back yard typical swale + basin

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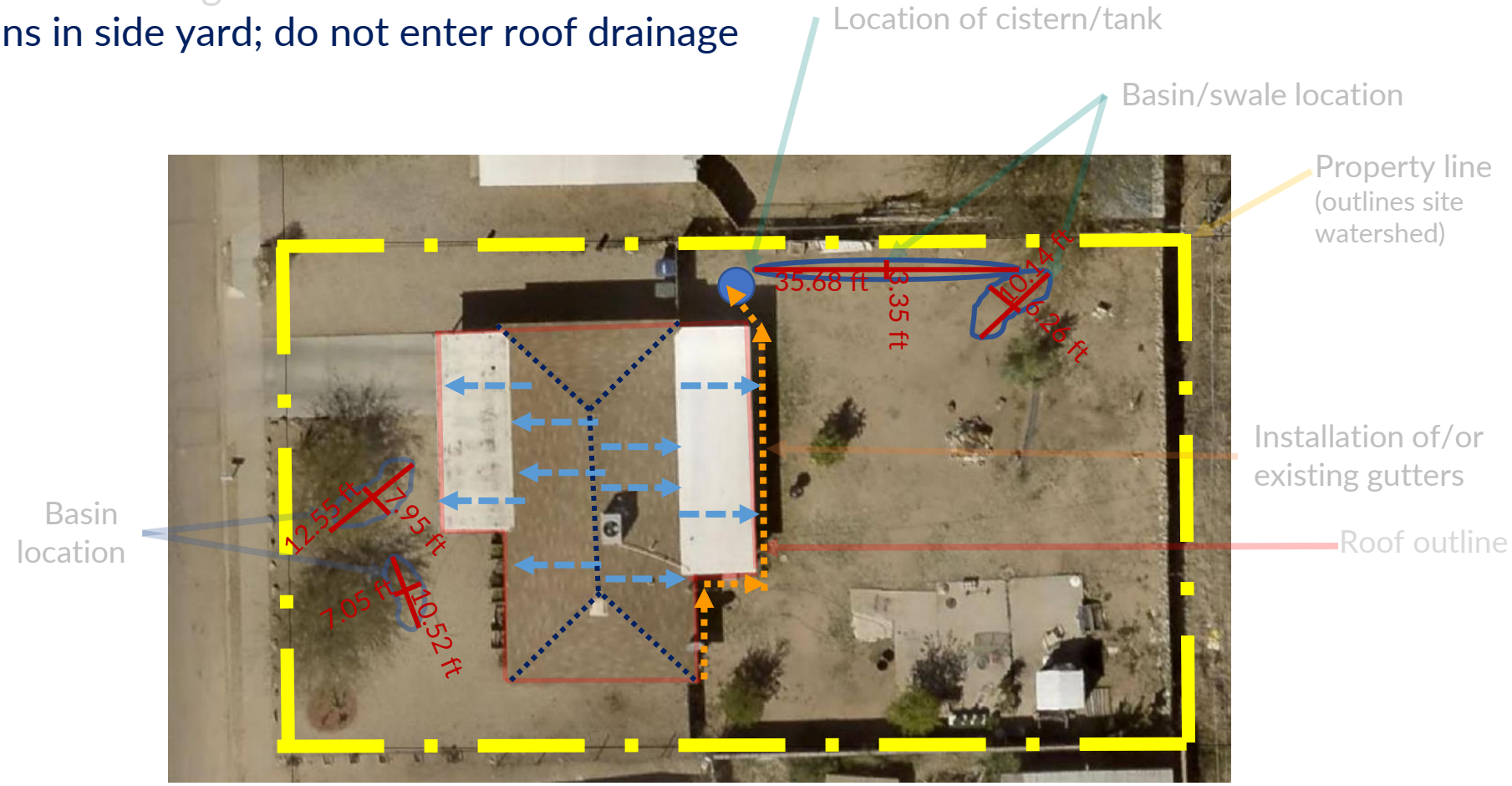
Site Plan: Measuring Basin – Side Yard

- Cistern/tank placement
  - Determine location of cistern (back and/or sideyard)
    - must be connected to a gutter
- This example: no basins in side yard; do not enter roof drainage



Site Elements: the calculation table behind the online application

Passive features receive $1.50/gallon of storage, calculated after dimensions entered.

This determines total basin storage & accounts for extra infiltration in sizing basins.

	A	B	C	D	E
1		***Sizing Calculator***			***Notes:***
2		**Enter Roof Area (sq ft) in yellow box:**	**1,300**		Enter roof area to calculate rainfall potential
3		Design storm, 1 inch*	**1.00**		COT guidance is to size for 1" rainfall
4		Volume runoff, cu ft	108		Calculation of runoff from 1 inch rainfall based on roof area (roof area x (1/12))
5		Required storage (gallons)	**810**		Conversion of runoff volume from cubic feet to gallons (cu ft x 7.48)
6					
7		***System Design Measurements***			
8		Depth (ft)	0.67		Can adjust via manual input, but default basin depth is 8 inches
9		Length (ft)	10		enter approximate length of basin
10		Top Width (ft)	14		enter approximate top width of basin
11		Basin cubic feet	93.8		Calculation of basin volume in cublic feet
12		Gallons of basin storage**	1052		Conversion of basin volume from cubic feet to gallons, includes 1.5 multiplier to account for infiltration ((cu ft x 7.48) x 1.5)
13		Gallons of tank storage	810		Enter tank size (only if also draining same roof area)
14		Total Storage in 1" storm	1862		Add gallons of storage combined passive & active
15					
16		Is system big enough?	YES		If total storage (#14) is at least required storage (row 5), then system is sized large enough
17		**Estimated Rebate**	**$ 1,862**		rebate is $1/gallon for active; passive $1.50 was accounted for via 1.5x credit for volume of basin
18					
19		Requires input			
20		Auto calculated			
21	*	1" design storm captures 95% of rain events in Tucson			
22	**	assuming capacity is 1.5 times the basin volume due to infiltration			
23					

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Required Site Plan Elements

The following elements are required for site plan submittal. Please label accordingly.

- ❑ **ROOF AREA(S)** - Include square foot **TOTALS** of areas of your roof you are planning to collect and re-direct runoff from.
- ❑ **TANK(S)** - Show placement and capacity of your tank(s).
- ❑ **BASIN(S)** - Show placement of basins and measurements. Show on-ground water flow direction towards basin(s).
- ❑ **GUTTER** – Show placement of gutter and direction of water flow.
- ❑ Show roof rainwater runoff flow direction.
- ❑ Note where the **FRONT** of the property is.

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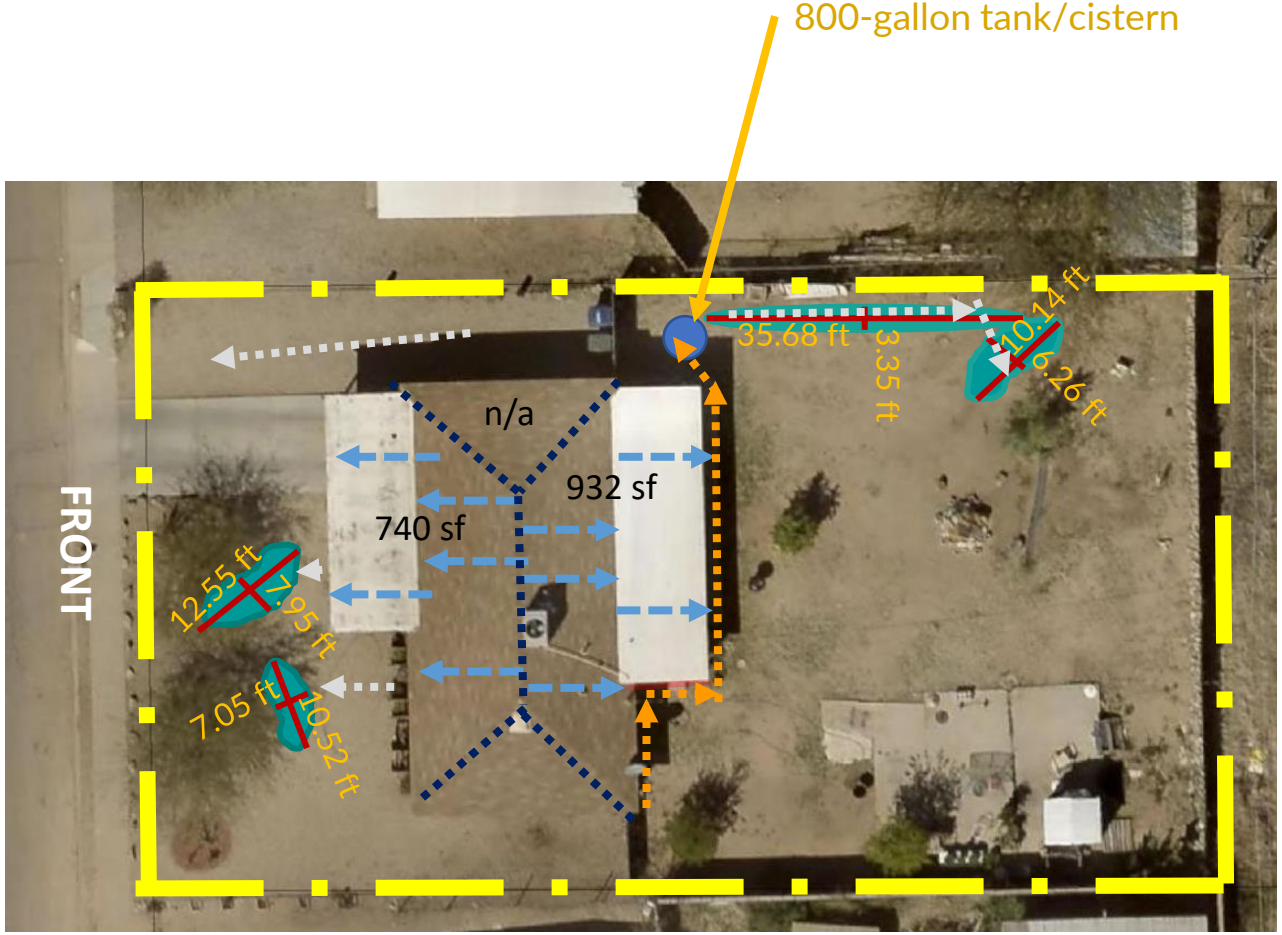
Site Plan Submittal

IMPORTANT:
* Include roof area square footage **totals** (only those you are collecting and re-directing runoff from)
* Note where the FRONT of the property is

- Example site plan for submittal
  - Site inspection will be based on submitted site design

Key

- Property line
- Roof rainwater flow direction
- Onsite rainwater runoff
- Gutter
- Basin
- Basin measurement lines
- Cistern/tank



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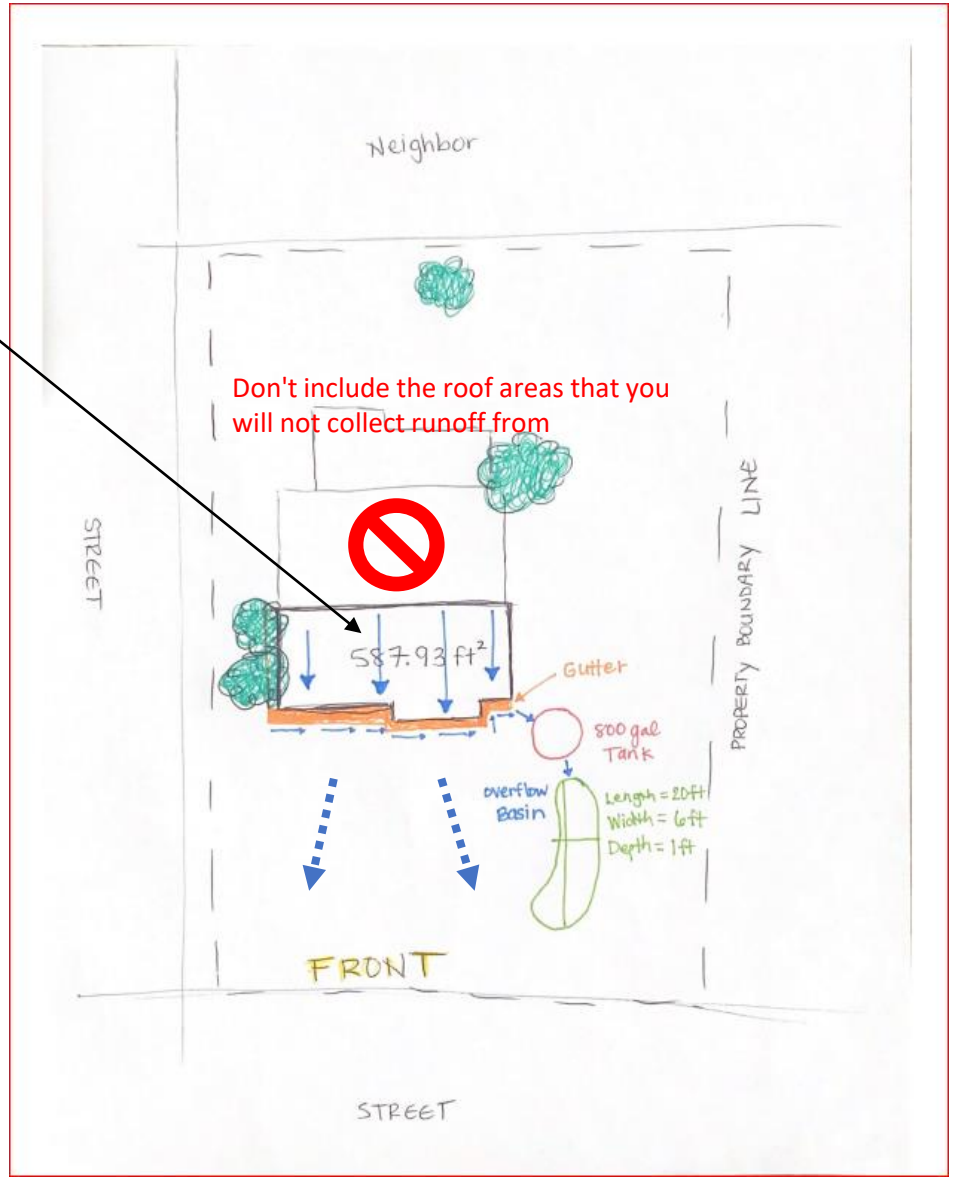
Hand-drawn Site Plan Example

- ☑ **ROOF AREA(S)** - Include square foot **TOTALS** of areas of your roof you are planning to collect and re-direct runoff from.
- ☑ **TANK(S)** - Show placement and capacity of your tank(s).
- ☑ **BASIN(S)** - Show placement of basins and measurements. Show on-ground water flow direction towards basin(s).
- ☑ **GUTTER** – Show placement of gutter and direction of water flow.
- ☑ Show roof rainwater runoff flow direction.
- ☑ Note where the **FRONT** of the property is



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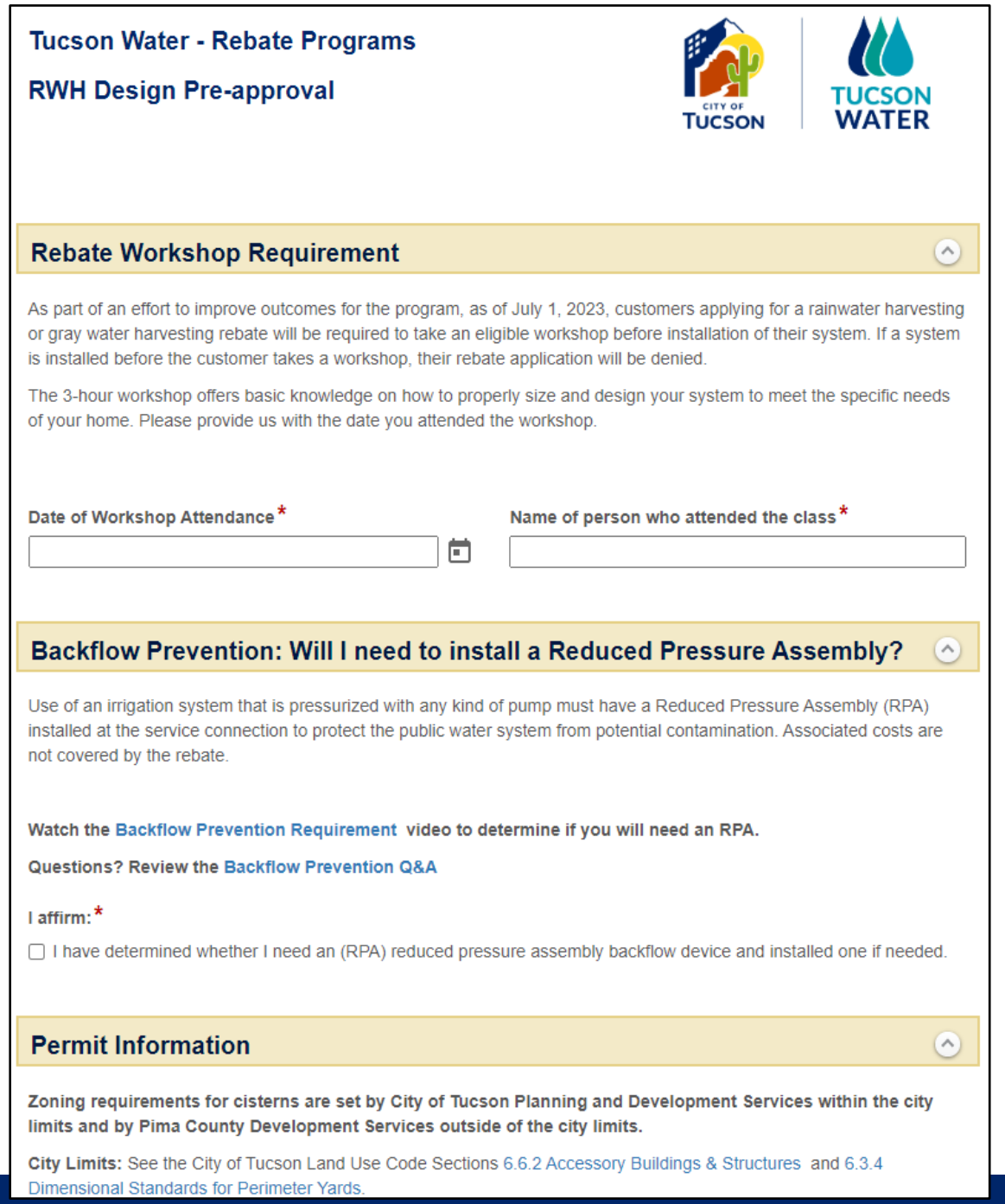
RAINWATER HARVESTING REBATE

Online Pre-Approval Form

Questions: email conservation@tucsonaz.gov or call 520-791-4331

RWH Design Pre-Approval

- Computer or phone compatible
- Need basic info & site plan ready for upload
- Labeled measurements must include:
  - All rooftop areas
  - Tank capacity for any tanks
  - Basin/swale dimensions for all passive features
- Tucson Water review ~2 weeks



Tucson Water - Rebate Programs

RWH Design Pre-approval

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Rebate Workshop Requirement

As part of an effort to improve outcomes for the program, as of July 1, 2023, customers applying for a rainwater harvesting or gray water harvesting rebate will be required to take an eligible workshop before installation of their system. If a system is installed before the customer takes a workshop, their rebate application will be denied.

The 3-hour workshop offers basic knowledge on how to properly size and design your system to meet the specific needs of your home. Please provide us with the date you attended the workshop.

Date of Workshop Attendance *

Name of person who attended the class *

Backflow Prevention: Will I need to install a Reduced Pressure Assembly?

Use of an irrigation system that is pressurized with any kind of pump must have a Reduced Pressure Assembly (RPA) installed at the service connection to protect the public water system from potential contamination. Associated costs are not covered by the rebate.

Watch the Backflow Prevention Requirement video to determine if you will need an RPA.

Questions? Review the Backflow Prevention Q&A

I affirm: *

☐ I have determined whether I need an (RPA) reduced pressure assembly backflow device and installed one if needed.

Permit Information

Zoning requirements for cisterns are set by City of Tucson Planning and Development Services within the city limits and by Pima County Development Services outside of the city limits.

City Limits: See the City of Tucson Land Use Code Sections 6.6.2 Accessory Buildings & Structures and 6.3.4 Dimensional Standards for Perimeter Yards.

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