



RAINWATER HARVESTING REBATE

PROGRAM UPDATES FOR INSTALLERS &
CONTRACTORS

JUNE 27, 2023

Today's Agenda

1. Review Program Changes – 10 minutes (Candice)
2. Review Best Design & Installation Practices – 10 minutes (Angel)
3. Roof area & basin sizing calculations – 15 minutes (Candice)
4. Online pre-approval form – 10 minutes (Valeria)
5. Q&A



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



RAINWATER HARVESTING

REBATE

PROGRAM CHANGES AS OF JULY 1, 2023

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.
- Inspection will be required after installation, before rebate is approved.



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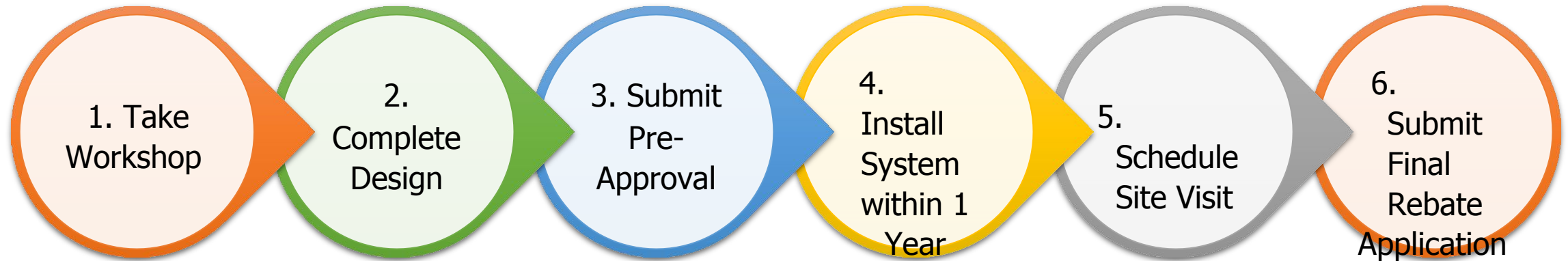
Rebate Pricing Changes as of July 1, 2023

- 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



Zoom Help Sessions

Weekly Zoom Help Sessions, starting Monday, June 26th
Mondays at 3pm and Thursdays at 12pm

<https://us06web.zoom.us/j/84335115426> Meeting

ID: 843 3511 5426 Dial-in: +1 253 205 0468 US



tucsonaz.gov/water/rainwater-harvesting-rebate



RAINWATER HARVESTING

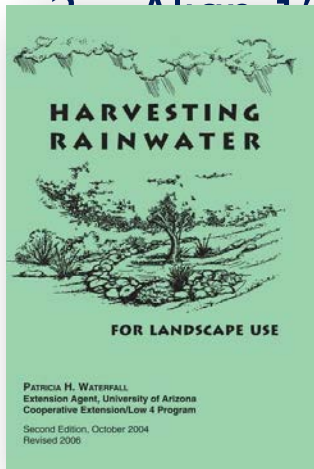
REBATE

2023 PROGRAM GOALS

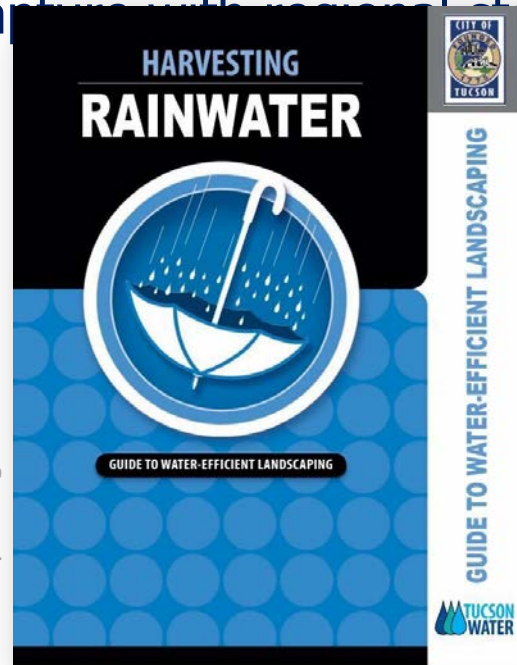
UPDATED GOALS of RWH rebate:

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 existing stormwater retention requirements

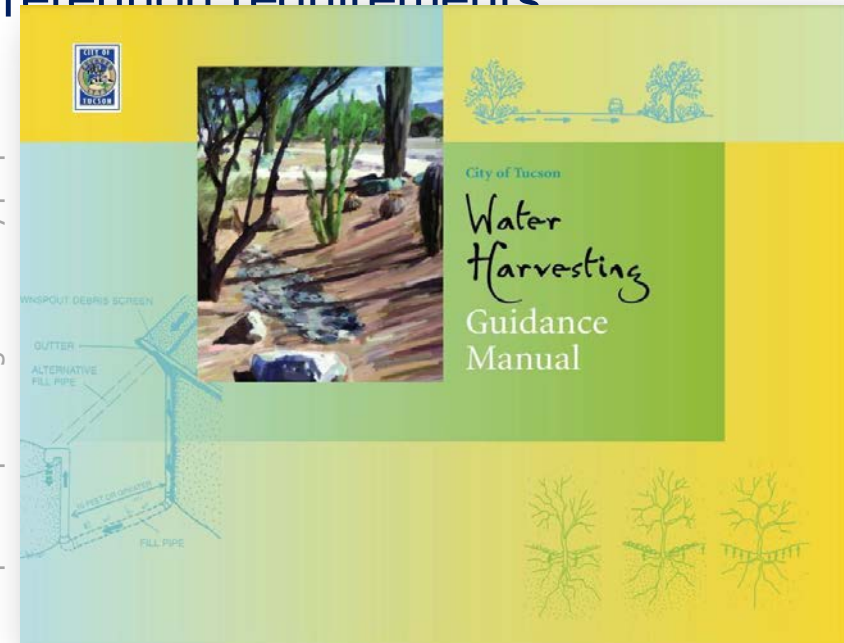
Out of print: UArizona Cooperative Extension



Revised printing of Patricia Waterfall brochure



Developed for public rights-of-way properties





RAINWATER HARVESTING REBATE

Best Design & Installation
Practices

Contractors should 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



Contractors should 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)



Guttering & Tanks

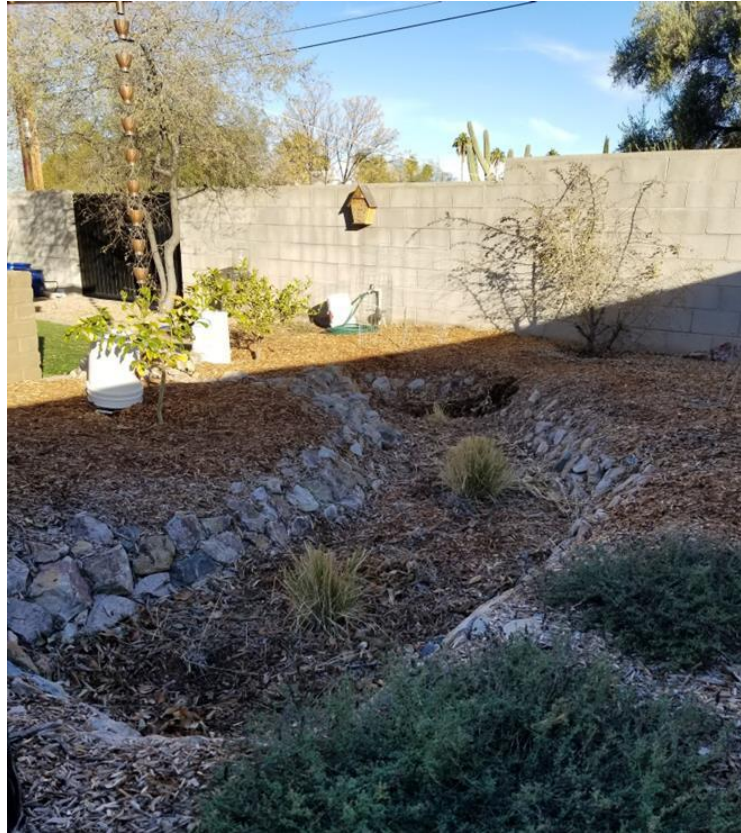


Contractors should ensure Passive RWH Systems:

- 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



Armored Outfalls & Best Management Practices



Basins & Swales





RAINWATER HARVESTING REBATE

Runoff Calculations & Site Elements

Rainwater Harvesting (RWH) Informational Tool

- 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 Design Submittal - Rainwater Harvesting



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

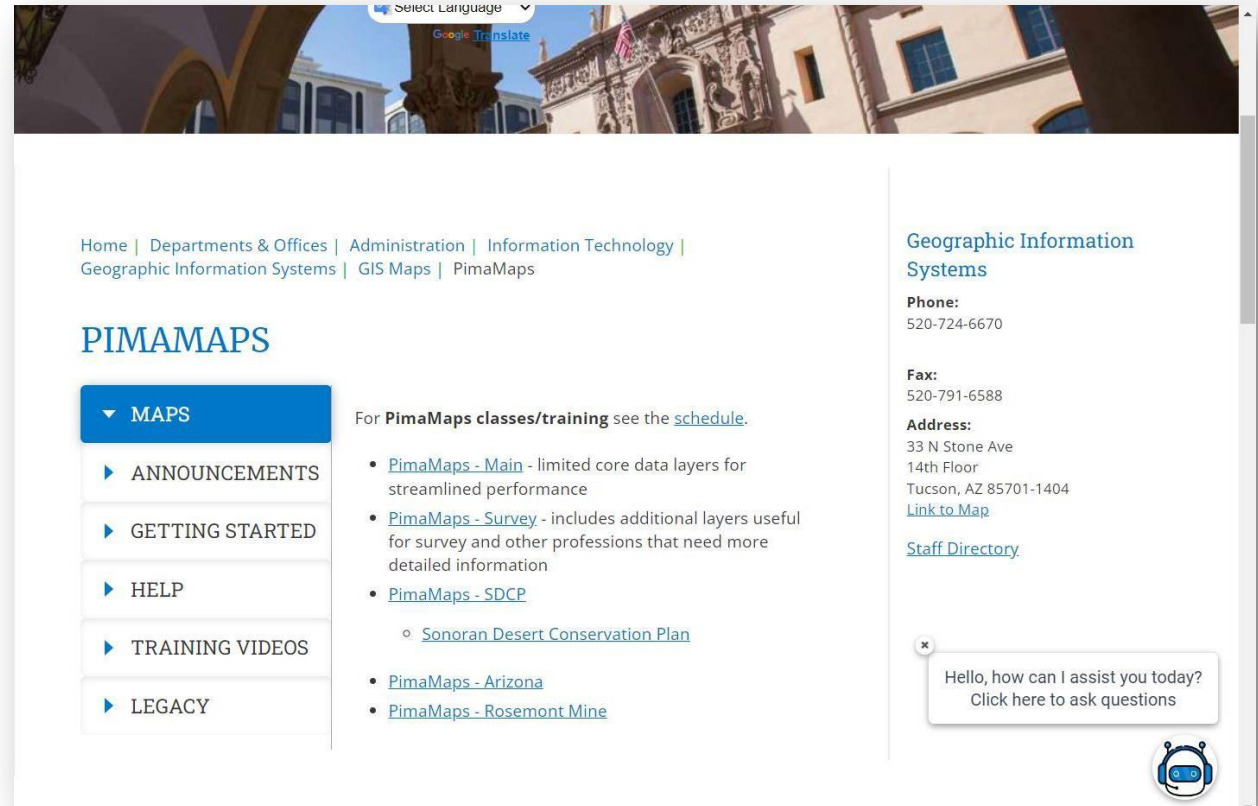
Zoning requirements for cisterns are set by City of Tucson Planning and Development Services within the city limits and by Pima County Development Services outside of the city limits.*Note that no permit is needed if cistern is

Rainwater Harvesting (RWH)

Informational Tool

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



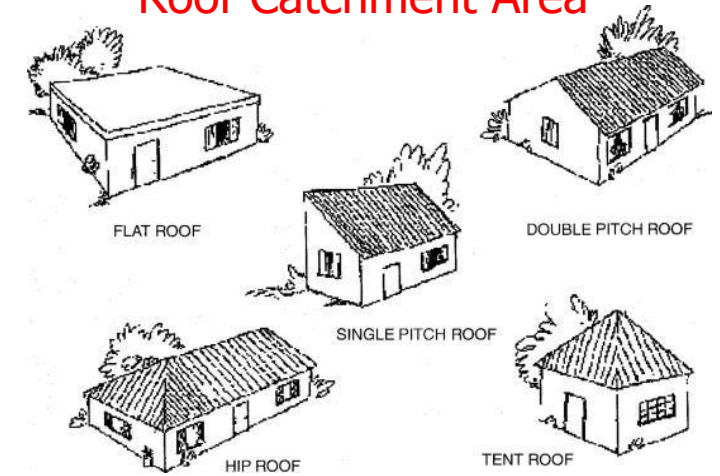
The screenshot shows the PimaMaps website. At the top, there is a navigation bar with links for Home, Departments & Offices, Administration, Information Technology, Geographic Information Systems, GIS Maps, and PimaMaps. Below this is a blue header for 'PIMAMAPS'. A left sidebar contains a menu with 'MAPS' (expanded), ANNOUNCEMENTS, GETTING STARTED, HELP, TRAINING VIDEOS, and LEGACY. The main content area features a 'For PimaMaps classes/training see the [schedule](#).' followed by a list of map layers: PimaMaps - Main (streamlined performance), PimaMaps - Survey (detailed information), PimaMaps - SDCP (Sonoran Desert Conservation Plan), PimaMaps - Arizona, and PimaMaps - Rosemont Mine. On the right, contact information for Geographic Information Systems is provided, including phone, fax, address, and a link to the map. A chatbot window is visible in the bottom right corner with the text 'Hello, how can I assist you today? Click here to ask questions'.

RWH Runoff Calculation

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

Roof Catchment Area



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

PERCENTAGE (%) OF SURFACE RUNOFF ON A VARIETY OF SURFACES



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

Urban residential
impervious roofs and driveways

RWH

Runoff

- 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)

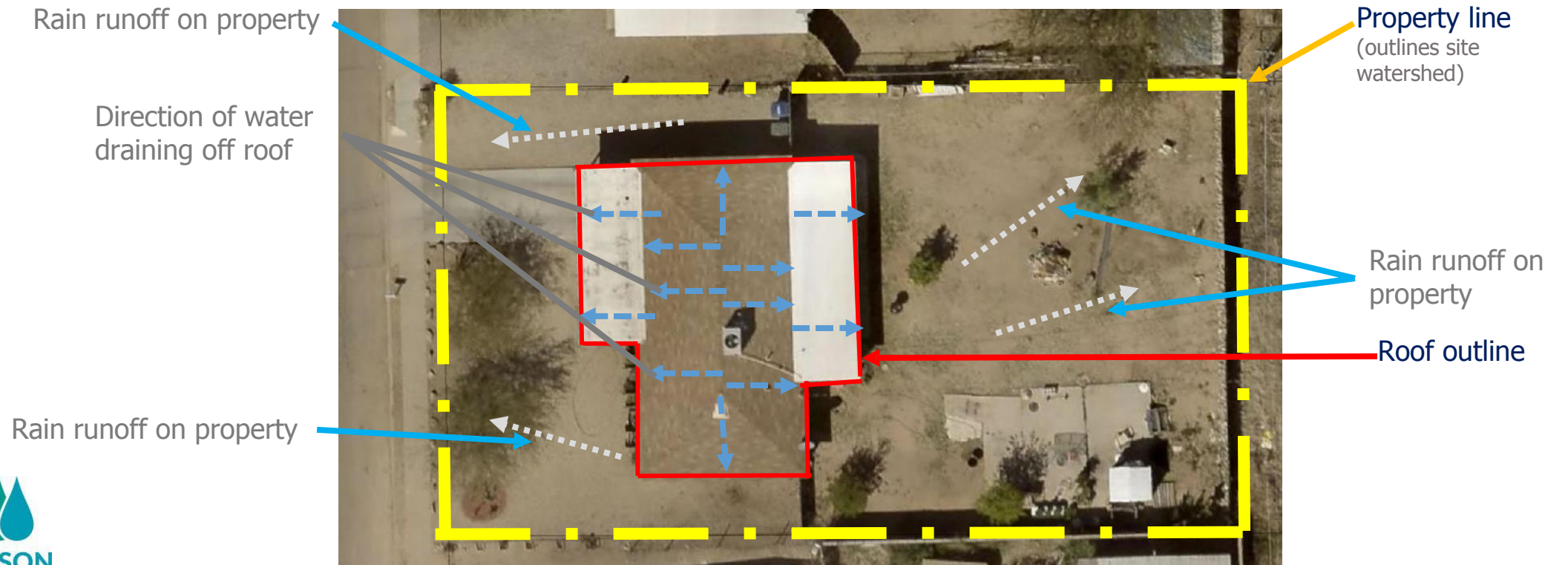


RWH

Runoff

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

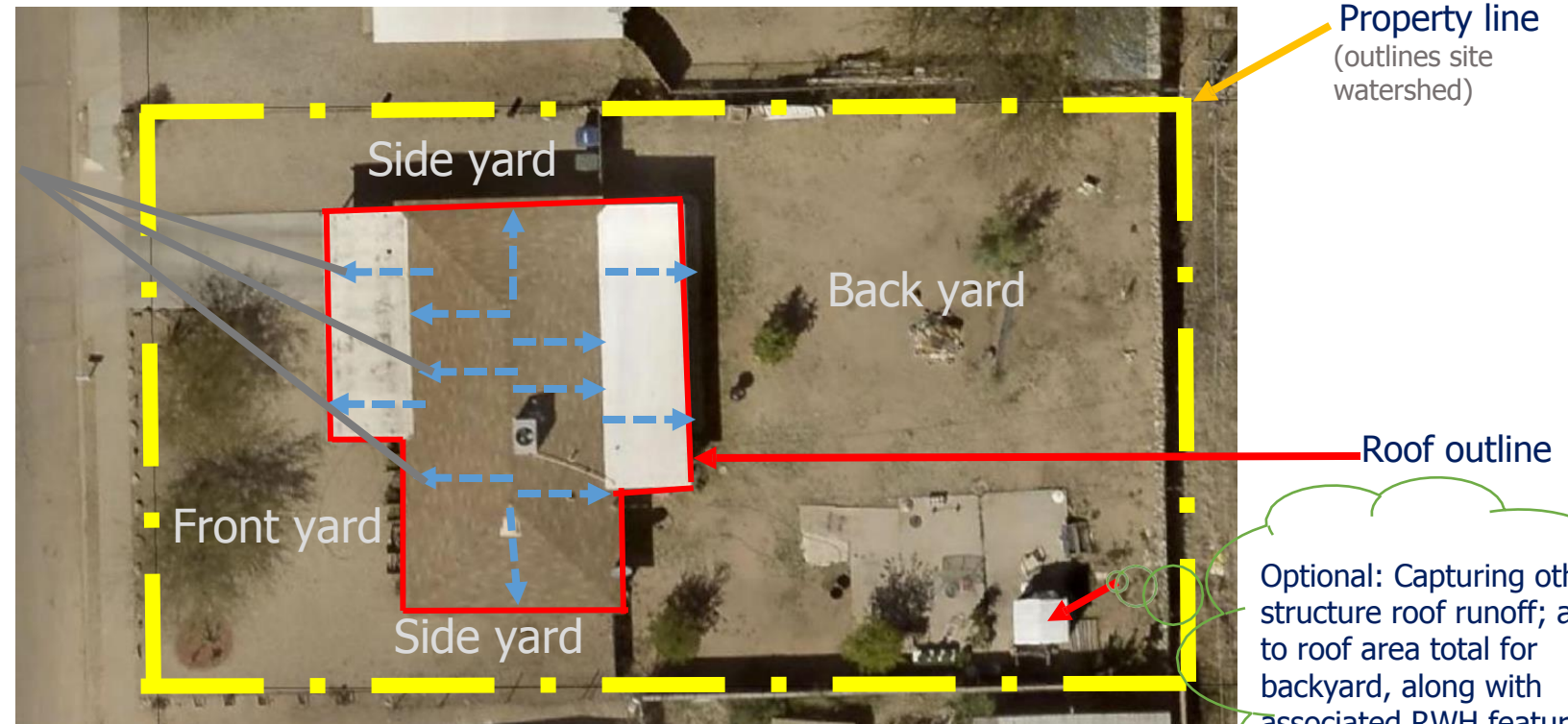


RWH Runoff Determination

- 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



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

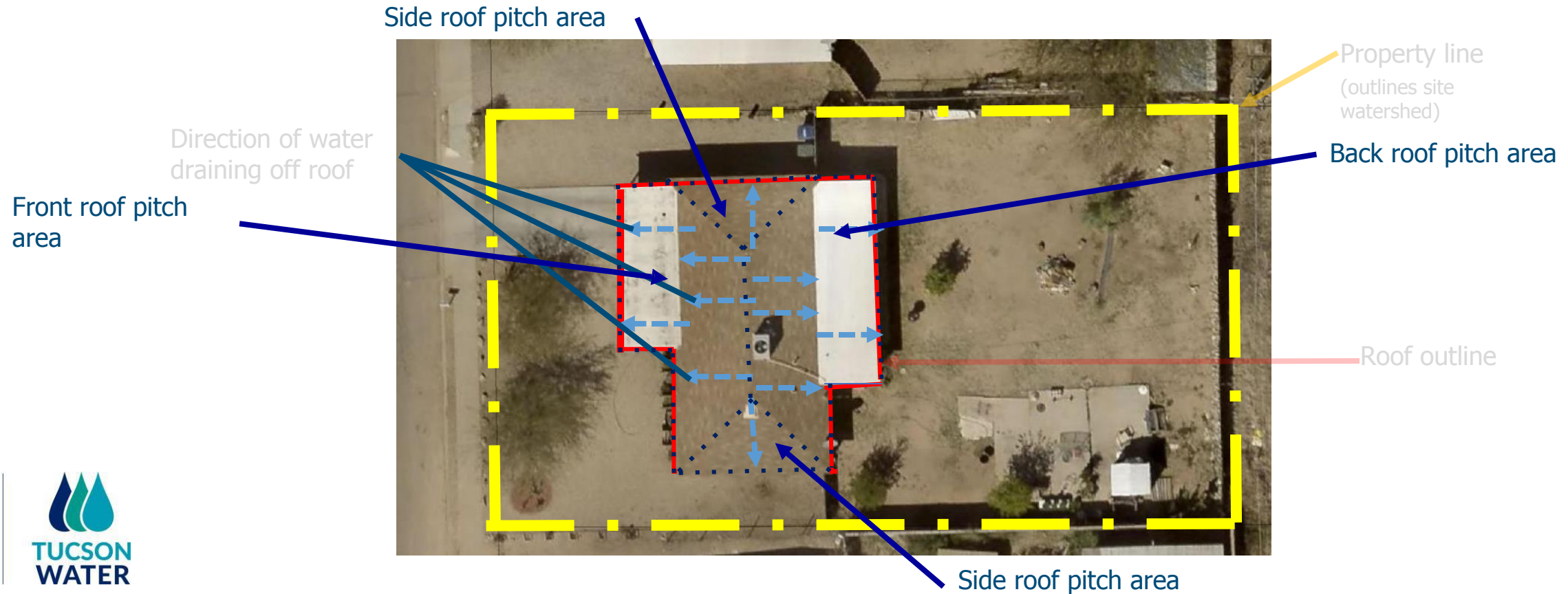
- Determining area of roof rain runoff (aerial site example captured from [PimaMaps](#) Guide; can use other site maps/aerials)

- Pitched roof – flow is direction of roof slope



- Select PimaMap's 'Tools'

- Using Tools → MeasurementArea, outline area of roof sloping in same direction



RWH Runoff 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



RWH Runoff: Front Yard

Determining area of roof rain runoff: front roof **Calculation**

- Select PimaMaps, 'Tools'



- Front roof area automatically calculated using 'Area' Measurement Tool



RWH Runoff: Back Yard

Determining area of 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 ft²
drainage area
off backside of
roof

Roof outline

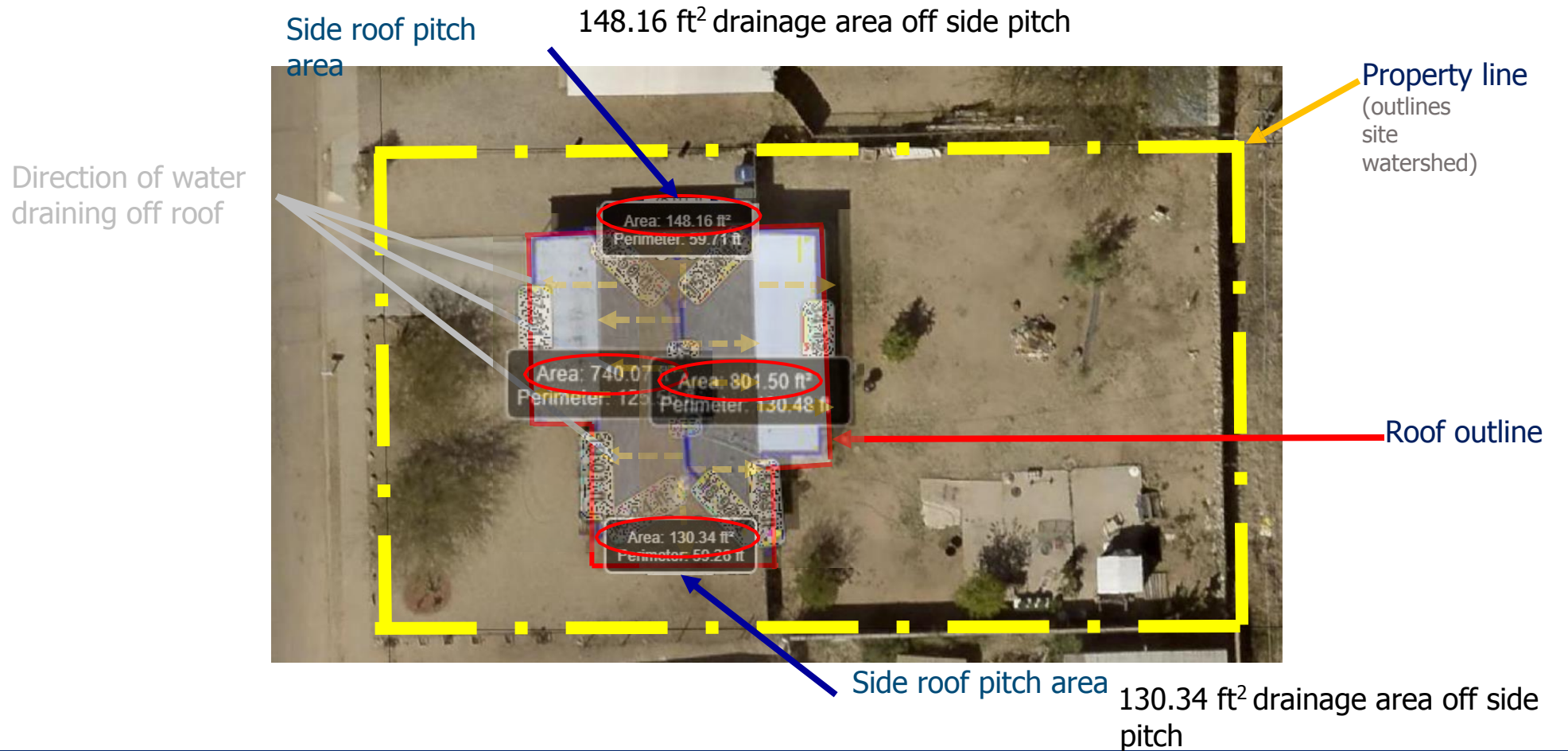
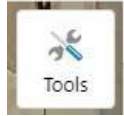


RWH Runoff: Side Yard

Calculation

Determining area of roof rain runoff: side roof

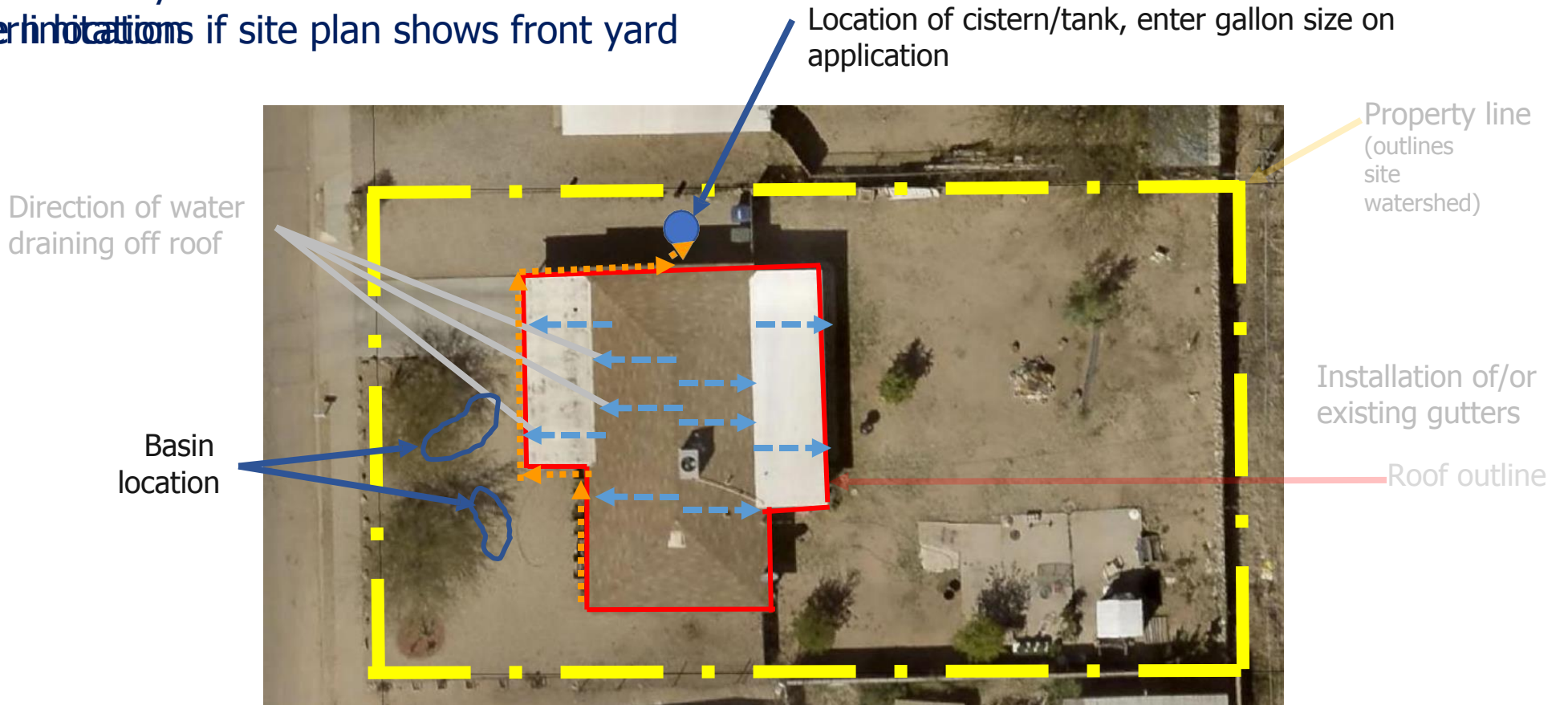
- Select PimaMaps, 'Tools'
- Side roof area automatically calculated using 'Area' Measurement Tool



Site Plan: Front Roof Guttering

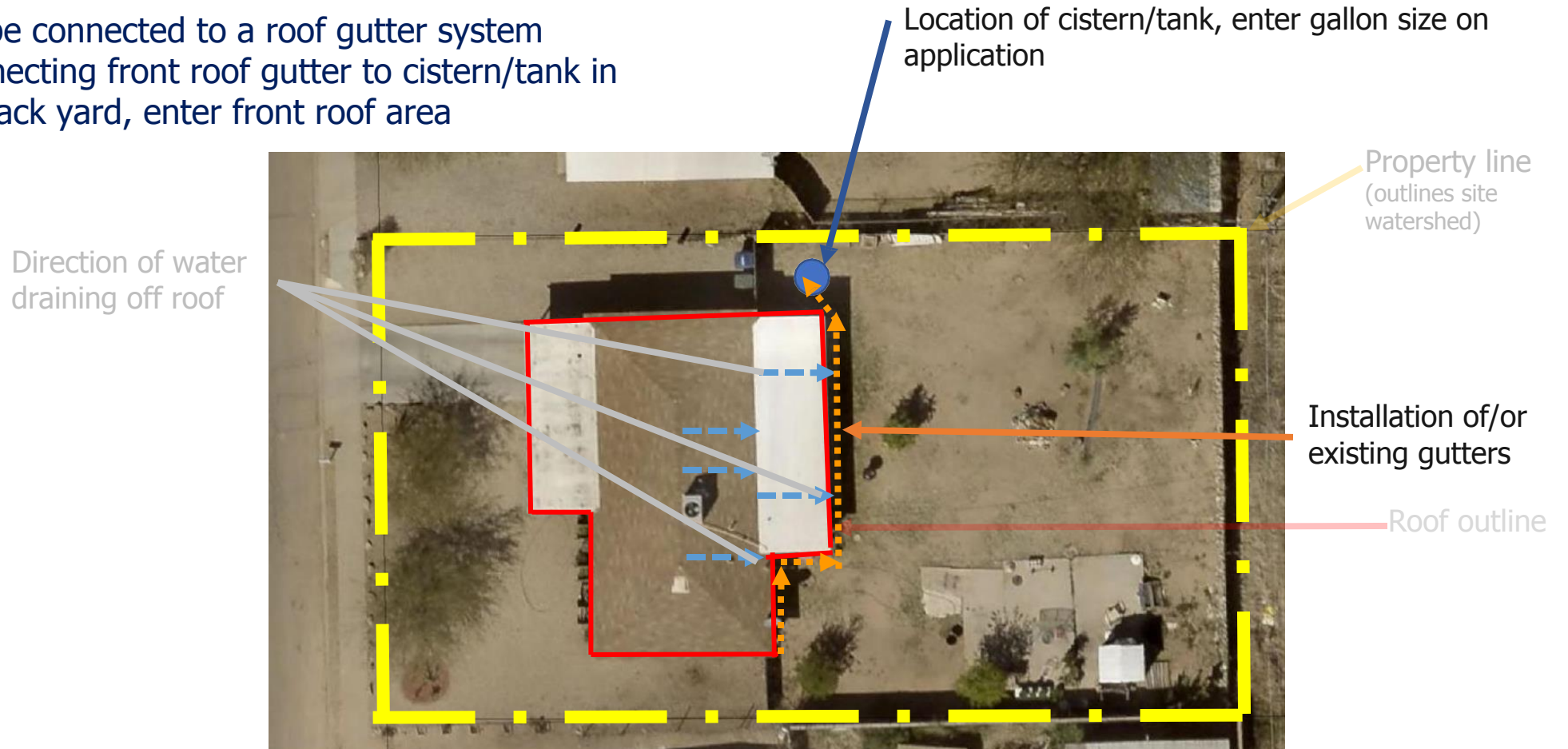
- Basin location – front yard
- If adding gutter to capture rainwater from front roof but cistern/tank in side/back yard
 - Add cistern to front yard calculations

Note: cistern location if site plan shows front yard



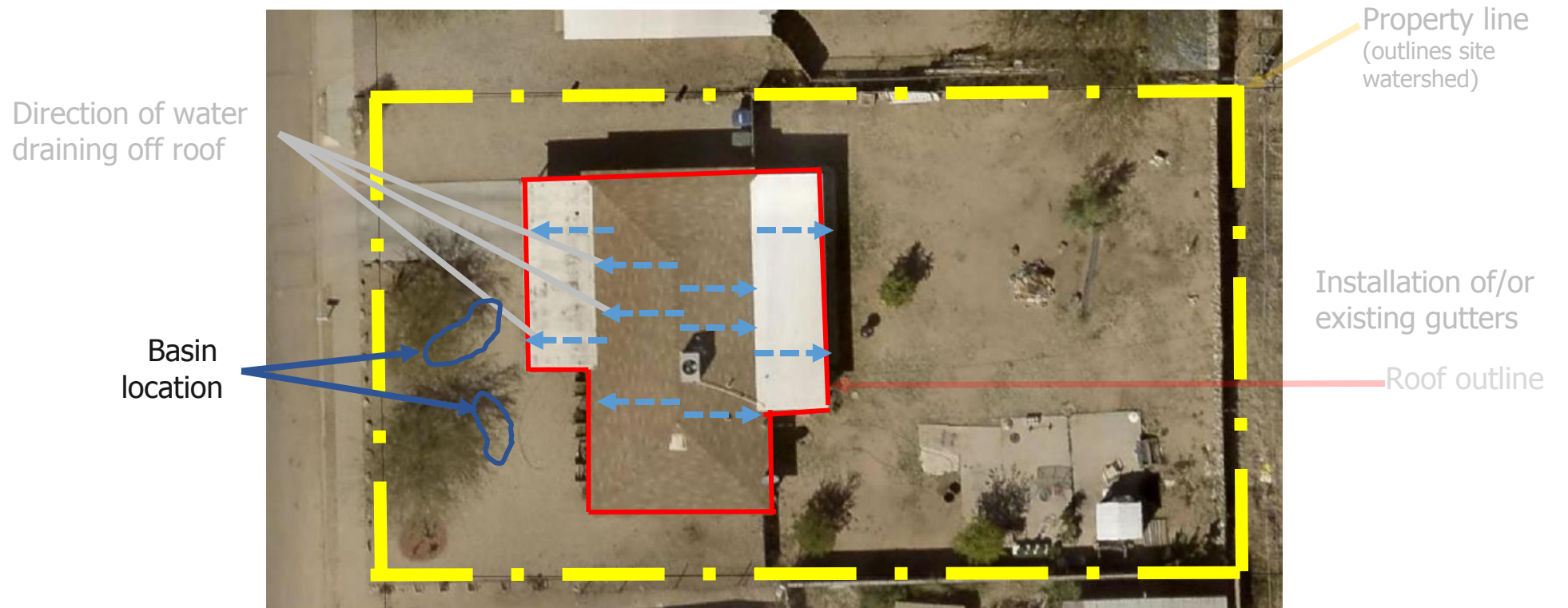
Site Plan: Back Yard Cistern/Tank

- 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



Site Plan: Front Yard Earthwork

- Basin location – front yard



Site Plan: Measuring Basin – Front yard

• Cistern/tank placement
• Determine location of cistern (back and/or sideyard)

- must be connected to a gutter

• Basin measurements: select “Tools”

- 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

→ “Measurement” →
“Line”



Property line
(outlines site watershed)

Roof outline



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

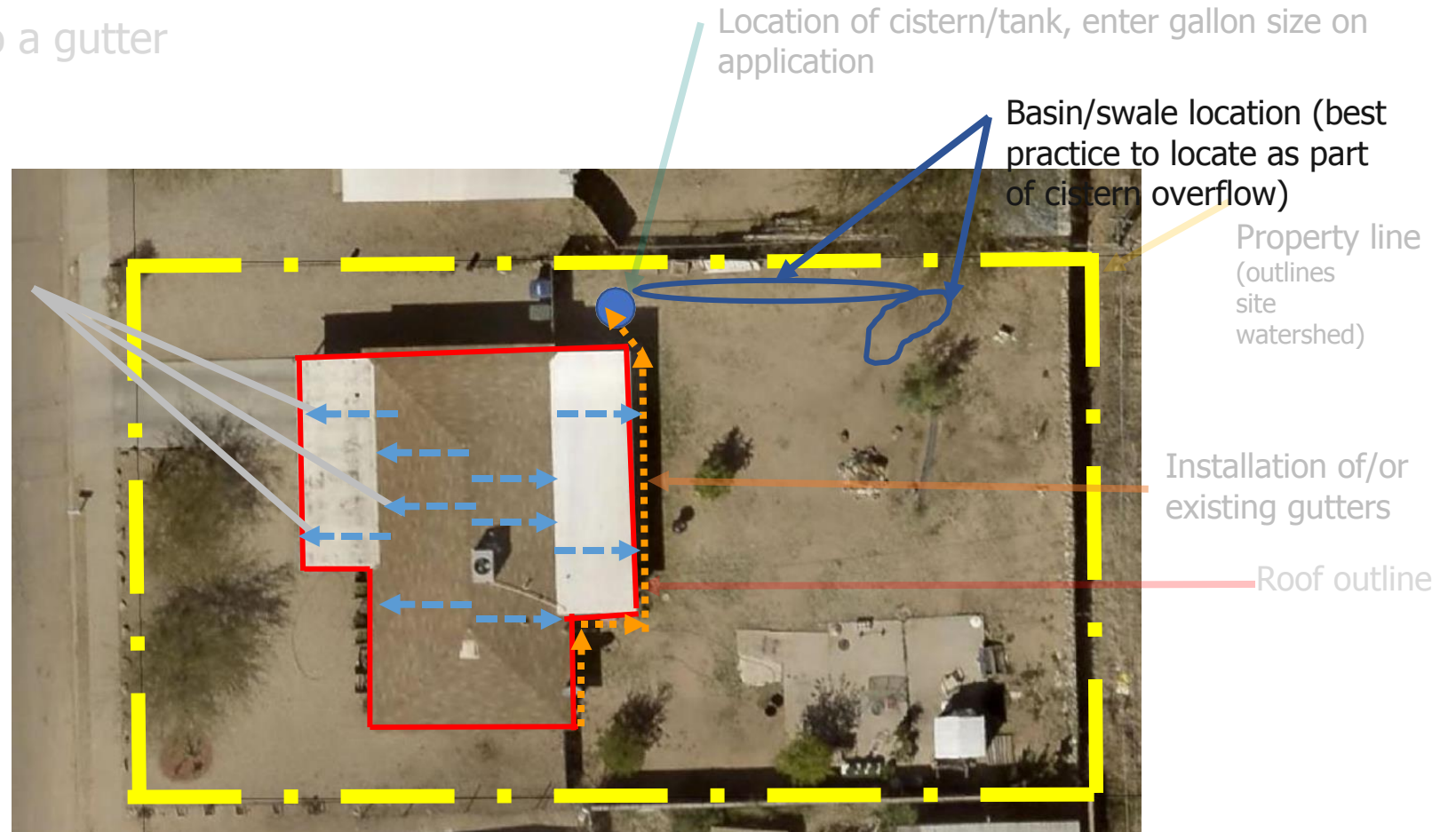


Front yard typical
basin(s)

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

Direction of water draining off roof



Site Plan: Measuring Basin – Back yard

• Cistern/tank placement
• Determine location of cistern (back and/or sideyard)

• Basin location – back yard to a gutter

• Basin measurements: select “Tools”

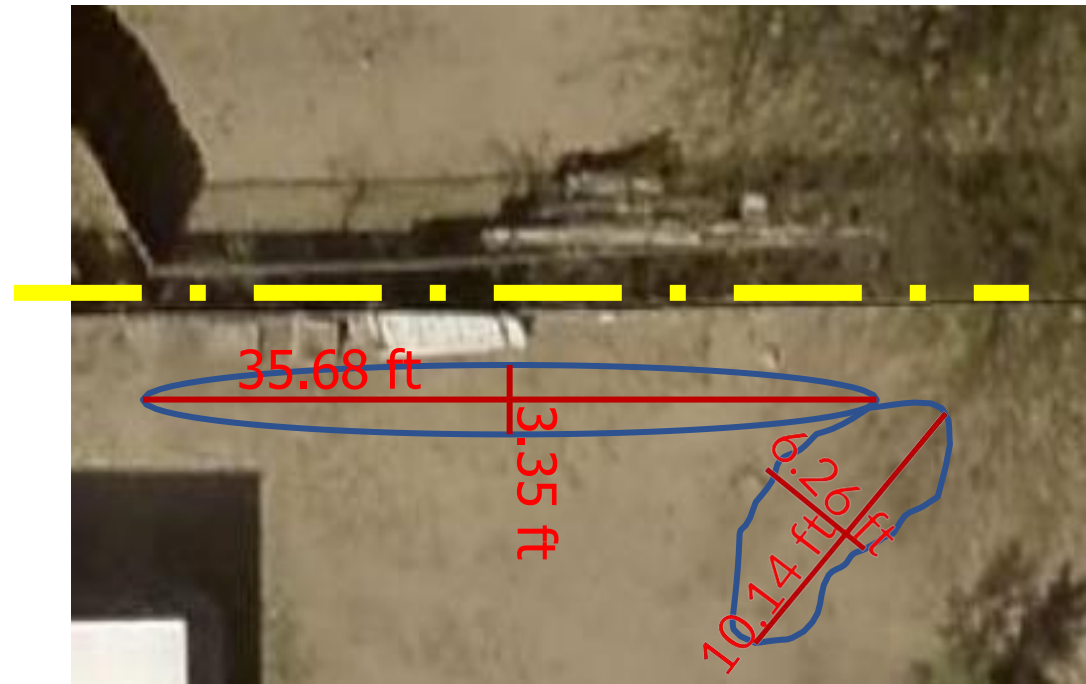
- Longest length
- Widest width, that is perpendicular to length
- Enter in online application
- Default basin depth is 8” – can be manually changed on form
 - Depth over 3’ requires a permit

→ “Measurement” →
“Line”



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')
 - can be manually changed on form
 - 8" has been majority of residential (i.e., swales may be shallower)
 - Depth over 3' requires a permit



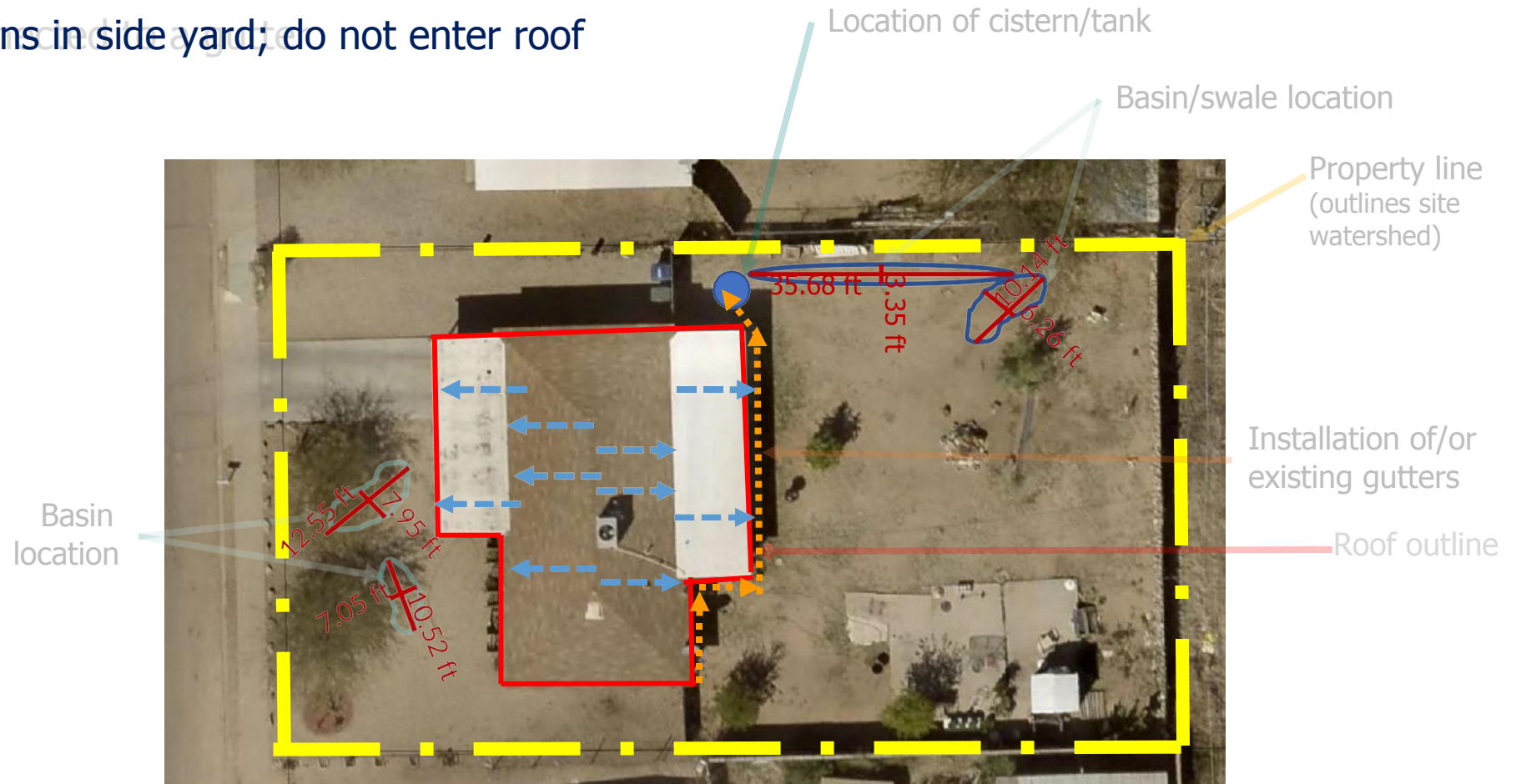
Back yard typical swale + basin

Site Plan: Measuring Basin – Side

Yard

Cistern tank placement
Determine location of cistern (back and/or sideyard)

- 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 cubic 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 | | | | | |

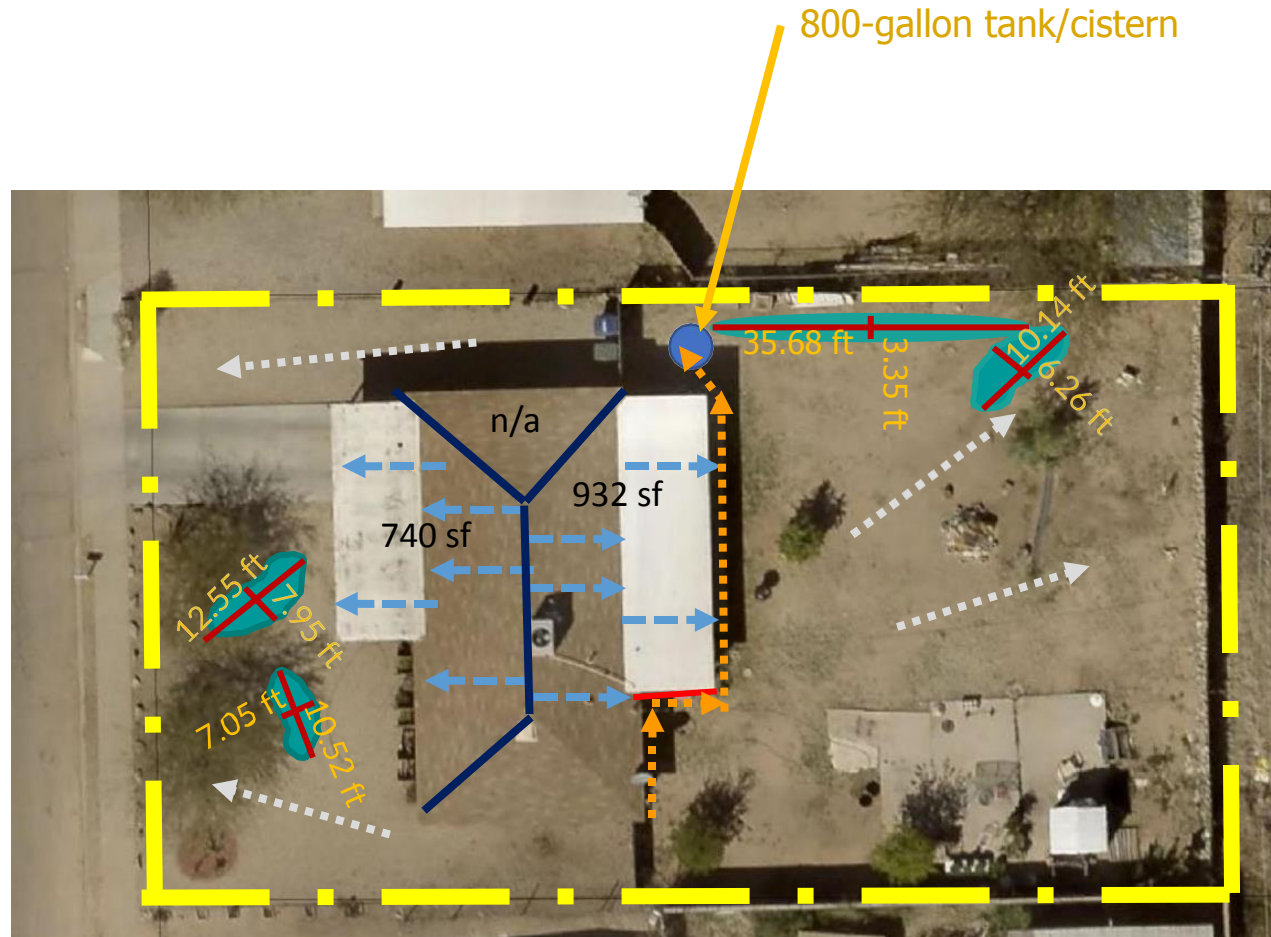


Site Plan Submittal

- 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
- Cistern/tank





RAINWATER HARVESTING REBATE

Online Pre-Approval Form



RAINWATER HARVESTING REBATE

Q&A