Pinnacle Peak West
Area Drainage Master Study

May 2015

The goal of the Pinnacle Peak West (PPW) Area Drainage Master Study (ADMS) is to reduce flood risk for residents in the study area. The first step toward this goal was to identify the current flood hazards and risks, which was completed during the first phase of the study.

The following flooding problems were identified, based on the technical analysis and input from the community about their flooding concerns.

KEY FINDINGS

- Many neighborhoods in the study area have some homes and roadways likely to flood during a major storm (4-5 inches of rainfall in 24 hours).
- Large floodplains, such as Rawhide Wash, may be more impacted than other areas.
- Nearly 2,000 buildings are at risk of flood damage—about seven percent of the 29,100 homes and businesses in the area.
- More than 60 percent of these at-risk properties are outside existing Federal Emergency Management Agency (FEMA) floodplains.
- One in five roadways in the study area will be dangerous or impassible during a major storm.
- Many residents have not experienced a major storm and don't believe they are at risk.

Now that flooding problems have been identified, informing residents about these hazards and risks and how to avoid or minimize them is an important strategy to help residents reduce their flood risk. Other options to reduce the community's flood risk include using updated information to regulate proposed development and, where feasible, implementing structural solutions to mitigate the flood hazards. The study team has developed a range of possible options to help reduce the community's flood risk. These options will be reviewed with residents and are discussed in more detail on pages 7 and 8.

Floodwaters block a community entrance in Scottsdale.

Public Meetings

Public meetings for the study will be held:

Northwest Watersheds Area
May 6; 6:00–8:00PM
Holland Community Center
34250 N. 60th St, Scottsdale

Rawhide Wash Area
May 11; 6:00–8:00PM
Grayhawk Golf Club, Fairway House
8620 E. Thompson Peak Pkwy, Scottsdale

Attendees can review identified flood risks and provide input on potential options to reduce these risks. Content for each meeting will be tailored to each study focus area; please attend the meeting for your area (see map on page 5).

Participate Online

fcd.maricopa.gov

WHAT WE HEARD FROM THE COMMUNITY

Residents in the two study focus areas–Rawhide Wash and the Northwest Watersheds (see map on page 5 for boundaries)–have different issues and perceptions regarding flooding.

Here is what we heard from residents in these areas during our outreach activities:

Northwest Watersheds Area

- Residents believe recent development upstream and inadequate wash maintenance by other property owners may have contributed to flooding in their neighborhoods.
- Roadways are flooded during storms, making travel difficult.
- Some are confused about who is responsible for addressing drainage and flooding issues or where to find answers.

Rawhide Wash Area

- Stormwater flooding is viewed as an inconvenience, not a problem.
- While some residents reported flooding issues, others have not seen major flooding of roadways or homes and believe their flood risk is low–even if they live in a designated floodplain.
- Residents want existing floodplains changed to reduce or eliminate requirements for flood insurance.

Throughout the Study Area

- Property flooding is viewed as a problem if homes or businesses are damaged. Approximately 80 percent said it's a problem if any homes are damaged from flooding. More than half believe flooding is a problem if businesses close for repairs.
- Street flooding is generally not considered a problem, unless the road is closed for several days or blocks school and emergency provider access.

Residents point out flooding concerns at a public meeting.

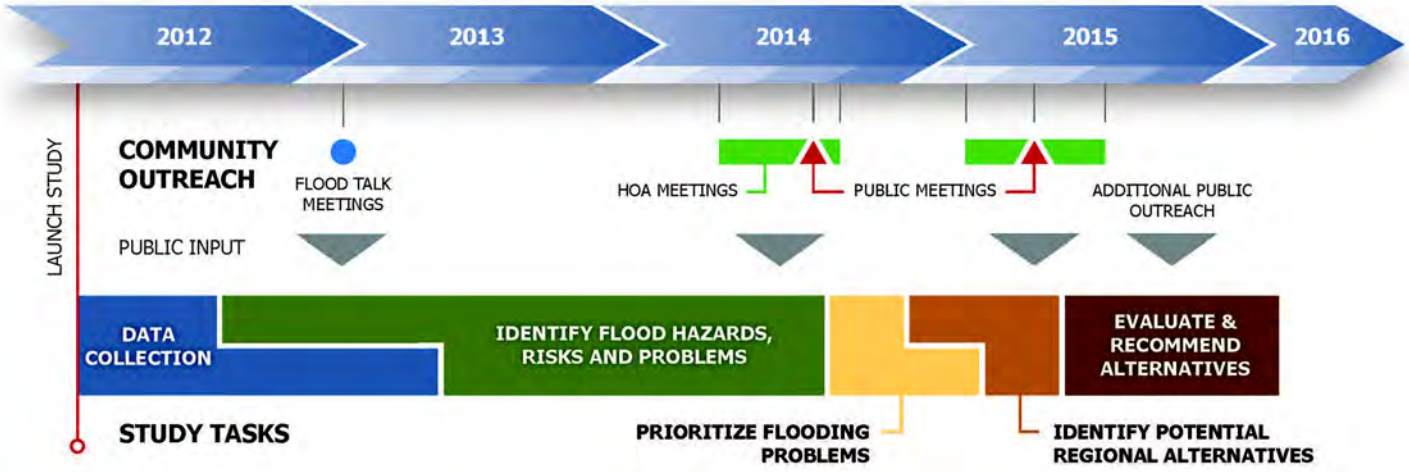
HUNDREDS PARTICIPATE IN OUTREACH ACTIVITIES

Approximately 350 people have participated in the study to date.

- The study team met with 133 residents from 15 homeowners associations representing almost 11,000 residents.
- Site visits and meetings were held with some homeowners who had flooding concerns.
- 117 people attended two public meetings in September 2014.
- Dozens of residents provided comments online at FloodTalk.org and uploaded flooding photos to ReportaFlood.org.
- Nearly 180 residents completed surveys indicating their tolerance to types of flooding.

Email updates were sent to homeowners associations and residents who signed up for the mailing list.

STUDY TIMELINE



FLOODING HAZARDS, RISKS AND PROBLEMS IDENTIFIED

New computer modeling and tools were used to predict where stormwater would flow and collect through the study area for three storm events:

- **10-year storm**
  2½-3 inches of rain in 24 hours
  10% chance of occurring within 1 year
- **25-year storm**
  3-4 inches of rain in 24 hours
  4% chance of occurring within 1 year
- **100-year storm**
  4-5 inches of rain in 24 hours
  1% chance of occurring within 1 year

While the 100-year storm is rare, nearly every year there is a 100-year storm somewhere in Maricopa County. It can also occur several times in a year in the same location.

A Risk Assessment was conducted to determine the level of potential flood risks to pedestrians, drivers and buildings, based on the location, depth and velocity of stormwater. Maps identifying the locations of these risks are shown on the following pages and are also available to view on-line at fcd.maricopa.gov.

THE BIG STORMS OF 2014

Putting Rainfall Totals in Perspective

On August 19, and September 8, 2014, two major monsoon storms occurred in Maricopa County. These storms produced record rainfall levels and significant flooding in some parts of the Valley. But neither storm hit the Pinnacle Peak West study area as hard as other areas, such as New River, Buckeye, Laveen, Mesa and Chandler.

Many news media reported these as 100-year storms, leading some at-risk residents in the study area to believe they are safe from flooding impacts in a large storm. Actually, the rainfall totals for these storms ranged from approximately 1¼ to 3½ inches throughout the study area–the equivalent of up to a 25-year storm.

Pedestrian Hazards and Risks

- There are **575 locations near homes, businesses and schools where floodwater will be deep and fast enough to knock a child off his or her feet** during a major storm.

School Hazards and Risks

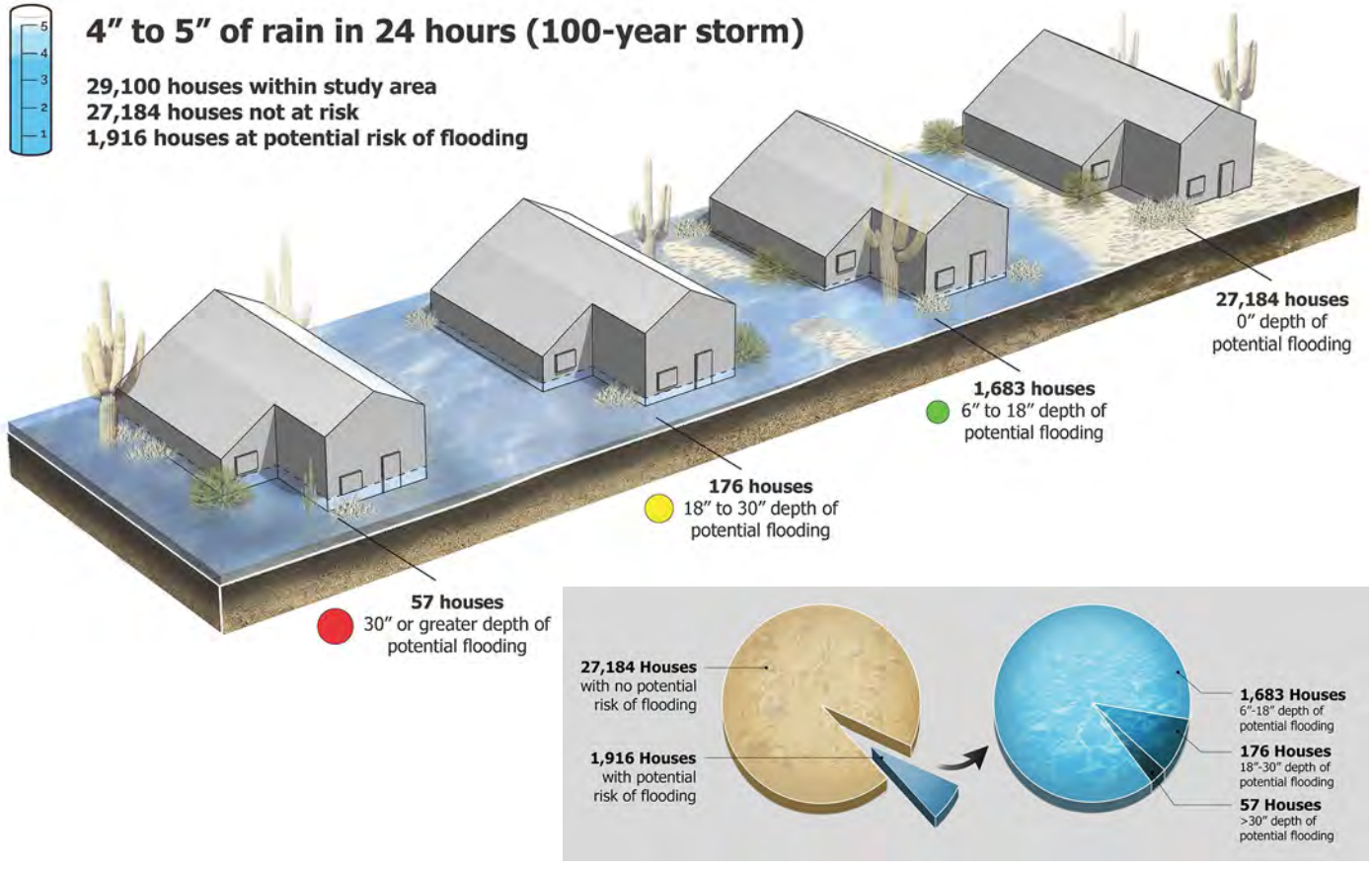
- Of the 14 schools in the study area, 10 have flooding hazards that could create transportation access issues and pose risks to children walking to school during major storms.
- The study team will be meeting with school representatives to provide more details about these hazards.

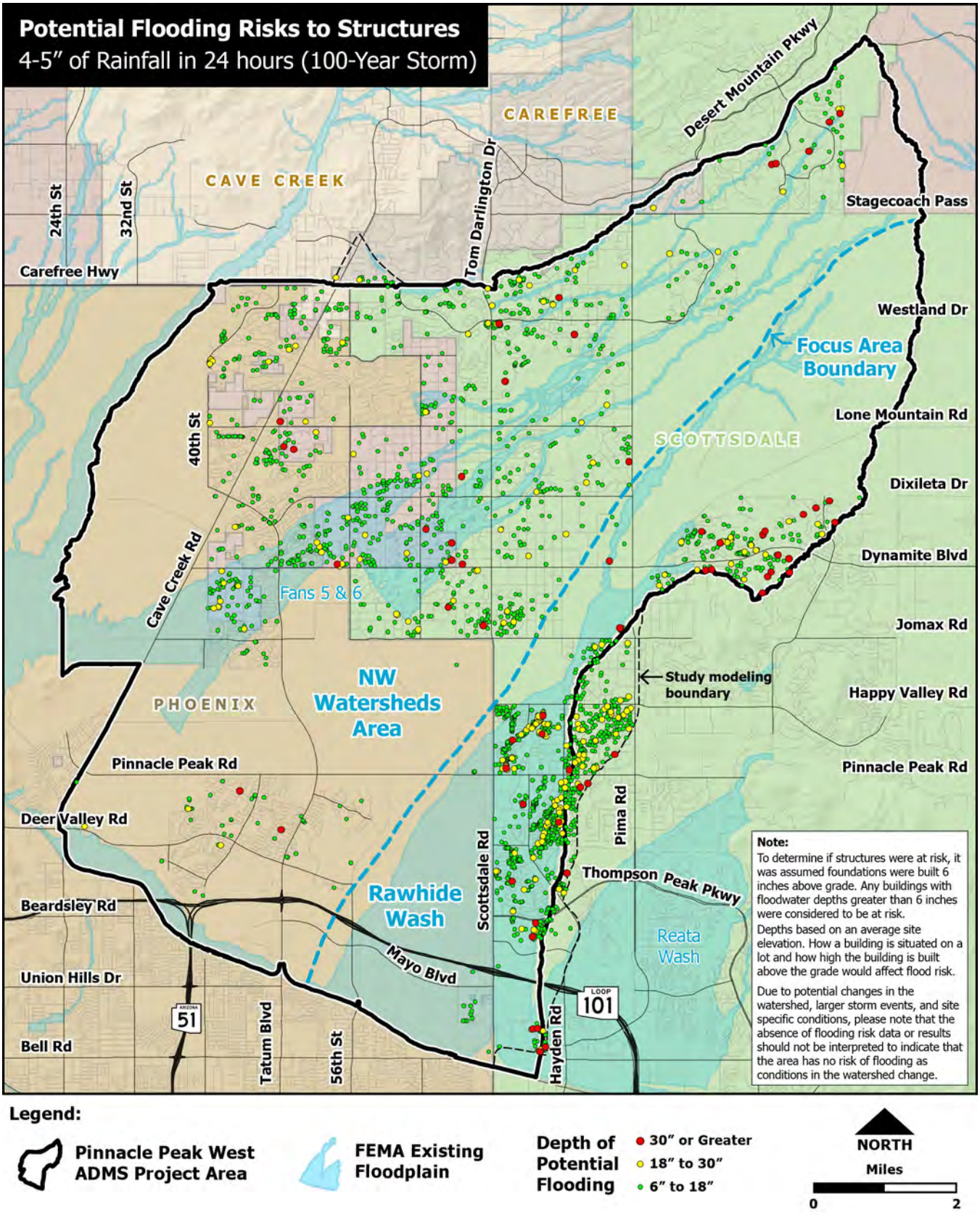
Flood Risks to Buildings

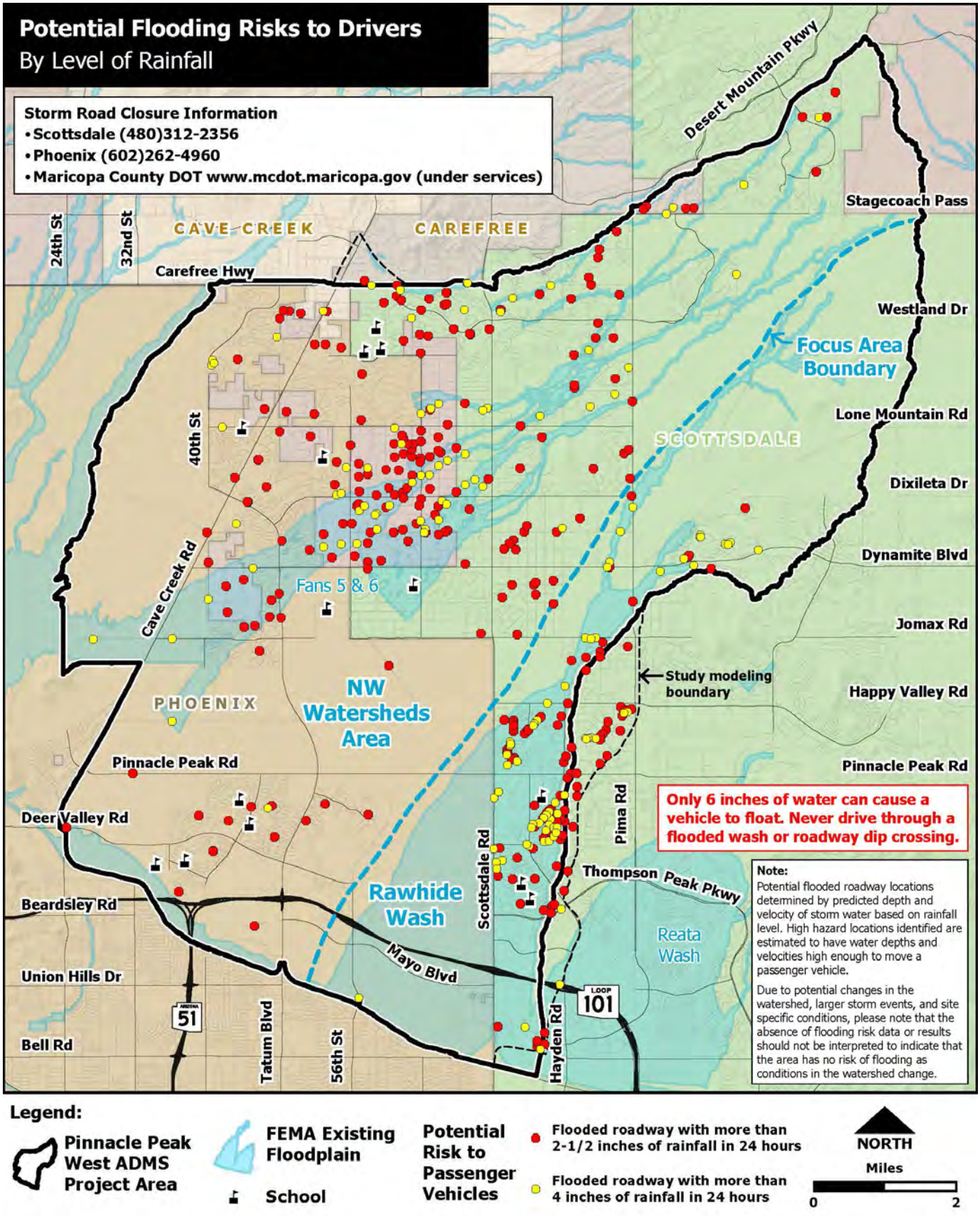
- **233 buildings are at high risk of flood damage from a 100-year storm.**
  - 57 of these could have more than 30 inches of flooding against the structure.
  - 176 could have 18-30 inches of flooding.
- Another 1,683 buildings are at lower risk of flooding but could still have 6-18 inches of floodwater against the structure–enough to cause damage.
- Any properties with flooding greater than 6 inches were considered to be at risk of damage, based on the assumption building foundations were built 6 inches above grade. How a building is elevated and situated on a lot will affect flood risk.

Transportation Hazards and Risks

- **There are significant flooding hazards on roads throughout the study area,** even during smaller storms.
  - More than 100 roadway locations could be impassible during a storm with 2½-3 inches of rain (a 10-year storm).
  - When it rains more than 4 inches, 387 roadway locations could have stormwater deep and fast enough to sweep away a vehicle.
- Flooding could cause temporary road closures of up to six hours. Some roads may be closed longer due to damage or debris.
- Standing water will also make driving dangerous on most roads.




Potential Flooding Risks to Structures
4-5" of Rainfall in 24 hours (100-Year Storm)
CAREFREE
CAVE CREEK
SCOTTSDALE
PHOENIX
Desert Mountain Pkwy
Stagecoach Pass
Tom Darlington Dr
24th St
32nd St
Carefree Hwy
Westland Dr
Focus Area Boundary
Lone Mountain Rd
40th St
Dixileta Dr
Cave Creek Rd
Dynamite Blvd
Fans 5 & 6
Jomax Rd
NW Watersheds Area
Study modeling boundary
Happy Valley Rd
Pinnacle Peak Rd
Pinnacle Peak Rd
Deer Valley Rd
Pima Rd
Scottsdale Rd
Thompson Peak Pkwy
Rawhide Wash
Beardsley Rd
Reata Wash
Mayo Blvd
Union Hills Dr
LOOP 101
ARIZONA 51
Tatum Blvd
56th St
Hayden Rd
Bell Rd
Note:
To determine if structures were at risk, it was assumed foundations were built 6 inches above grade. Any buildings with floodwater depths greater than 6 inches were considered to be at risk.
Depths based on an average site elevation. How a building is situated on a lot and how high the building is built above the grade would affect flood risk.
Due to potential changes in the watershed, larger storm events, and site specific conditions, please note that the absence of flooding risk data or results should not be interpreted to indicate that the area has no risk of flooding as conditions in the watershed change.
Legend:
Pinnacle Peak West ADMS Project Area
FEMA Existing Floodplain
Depth of Potential Flooding
30" or Greater
18" to 30"
6" to 18"
NORTH
Miles
0
2


Potential Flooding Risks to Drivers
By Level of Rainfall
Storm Road Closure Information
• Scottsdale (480)312-2356
• Phoenix (602)262-4960
• Maricopa County DOT www.mcdot.maricopa.gov (under services)
Desert Mountain Pkwy
Stagecoach Pass
CAVE CREEK
CAREFREE
24th St
32nd St
Carefree Hwy
Westland Dr
Focus Area Boundary
Lone Mountain Rd
40th St
SCOTTSDALE
Dixileta Dr
Cave Creek Rd
Fans 5 & 6
Dynamite Blvd
Jomax Rd
Study modeling boundary
NW Watersheds Area
PHOENIX
Happy Valley Rd
Pinnacle Peak Rd
Pinnacle Peak Rd
Deer Valley Rd
Only 6 inches of water can cause a vehicle to float. Never drive through a flooded wash or roadway dip crossing.
Pima Rd
Scottsdale Rd
Thompson Peak Pkwy
Rawhide Wash
Beardsley Rd
Reata Wash
Mayo Blvd
Union Hills Dr
LOOP 101
ARIZONA 51
Tatum Blvd
56th St
Hayden Rd
Bell Rd
Note:
Potential flooded roadway locations determined by predicted depth and velocity of storm water based on rainfall level. High hazard locations identified are estimated to have water depths and velocities high enough to move a passenger vehicle.
Due to potential changes in the watershed, larger storm events, and site specific conditions, please note that the absence of flooding risk data or results should not be interpreted to indicate that the area has no risk of flooding as conditions in the watershed change.
Legend:
Pinnacle Peak West ADMS Project Area
FEMA Existing Floodplain
School
Potential Risk to Passenger Vehicles
Flooded roadway with more than 2-1/2 inches of rainfall in 24 hours
Flooded roadway with more than 4 inches of rainfall in 24 hours
NORTH
Miles
0
2

REDUCING FLOOD RISK

Due to the wide variety and number of flooding problems identified in the study area, the Flood Control District of Maricopa County (District) is using a comprehensive approach to help residents reduce their flood risk.

A home in the study area floods after a 2014 storm.

Identification

- In the first phase of the study, the team identified flooding problems based on the technical analysis and input from the community.
- To reflect the results of the flood hazard identification, the District is proposing to re-map some of the FEMA regulated floodplains.
- If the revised floodplain study is approved by FEMA, this would reduce the size of the existing floodplains and eliminate the flood insurance requirements for some homeowners with mortgages.
- Map redelineation can be a lengthy process which typically takes many years to go into effect.
- Many of the identified flood hazards were outside the mapped FEMA floodplains.

Information

Awareness of existing flood risks and hazards is an important flood risk reduction strategy. The District will provide information to help residents understand their options and responsibilities for reducing their flood risk, such as maintaining washes and drainage structures, purchasing flood insurance and avoiding flooded roads.

Regulation

The study's computer modeling results provide the most current flood hazard data for this area.

These results will be used by Maricopa County and the cities of Scottsdale and Phoenix to regulate existing and future development.

Engineers working for developers and residents can use this data in their analyses to demonstrate that proposed changes to their properties will not negatively impact existing residents and infrastructure.

Mitigation/Remediation

The study team has prioritized problem areas for potential regional mitigation. Any decisions supporting flood control structures will be based on the level of flood risk and input from the community and study team partners.

For much of the study area, regional solutions to mitigate flooding are not feasible, since there are many isolated and local flooding issues in neighborhoods throughout the area.

Many of these local flooding issues could be addressed with smaller drainage projects, highway or road improvements, or measures property owners or homeowners associations could consider implementing. The District will provide data about these locations to the city study partners and interested parties to evaluate for potential future projects.

Carefree Highway floods after a 2014 storm.

POTENTIAL ALTERNATIVES BEING CONSIDERED

Regional solutions to minimize larger or more concentrated flooding problems will be part of the recommendations of this study.

Rawhide Wash Alternatives

One of the high-priority areas identified for possible regional flood control mitigation is Rawhide Wash (see map on page 5).

Aproximately 500 homes and other buildings within the Rawhide Wash floodplain are at potential risk of structural flooding during a 100-year storm. Based on the number of people at risk, the type of flood hazard, and the potential for a cost-effective option to minimize the flood risk, this is the only location in the study area where a regional flood control structure is currently being considered.

The District and city partners are evaluating three types of alternatives to address this hazard: build, no build and no action.

Build Options

A regional flood control structure is being considered to control the flow of stormwater at the apex of the wash near Happy Valley and Hayden roads and direct flows downstream. Four potential concepts have been developed that would mitigate most of the flood risks associated with Rawhide Wash. The floodplain would be re-delineated based on the projected condition with a structure in place. A separate Rawhide Wash Alternatives Fact Sheet with more details will be available at the public meetings and on the web page.

No Build

In this option, the District and partner cities would pursue a re-delineation of the existing floodplains through FEMA without construction of any new flood control structure. The flood hazard would not be mitigated and many houses would still be at risk of flooding. If selected as the preferred option and approved by FEMA, this could reduce the size of the existing floodplain but is not guaranteed.

No Action

This is the "business-as-usual" option in which nothing would change from today's conditions and the flood hazard would not be mitigated.

Northwest Watersheds Alternatives

Two FEMA regulatory floodplains, known as alluvial Fans 5 and 6, are located in the northwest portion of the study area. The study modeling results show a much smaller area prone to flooding than represented by the existing floodplain boundaries. The study team believes the current designations for these floodplains no longer represent actual flood hazards.

The District is pursuing a re-delineation of these two floodplains through FEMA. This will be done through a separate process outside of this study. Affected community members in this area will be informed how to participate in that process. If approved, it will result in smaller floodplains more accurately depicting flood hazards. This could eliminate flood insurance requirements for many homeowners, although a handful may see premiums increase.

NEXT STEPS

The District will hold public meetings in May to provide information and seek the community's input on the potential alternatives being considered to minimize flood risk. The study team will also be meeting with school representatives and homeowners associations in high-risk areas to provide information about specific hazards affecting them. Those who are unable to attend these meetings will be able to get more information about the options being considered and comment online on the District's Web site.

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