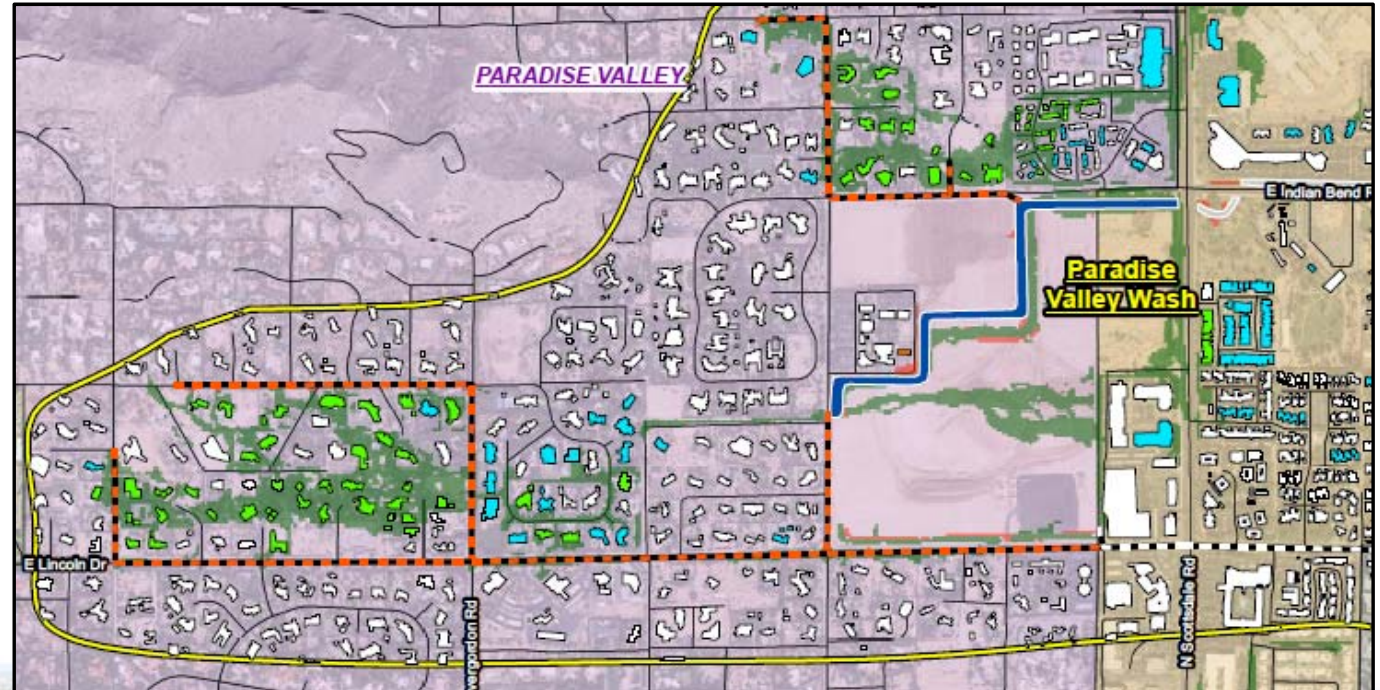




# FLOOD CONTROL DISTRICT STORMWATER PROJECTS COST BENEFIT ANALYSIS



April 12<sup>th</sup>, 2018

## TODAY'S GOAL

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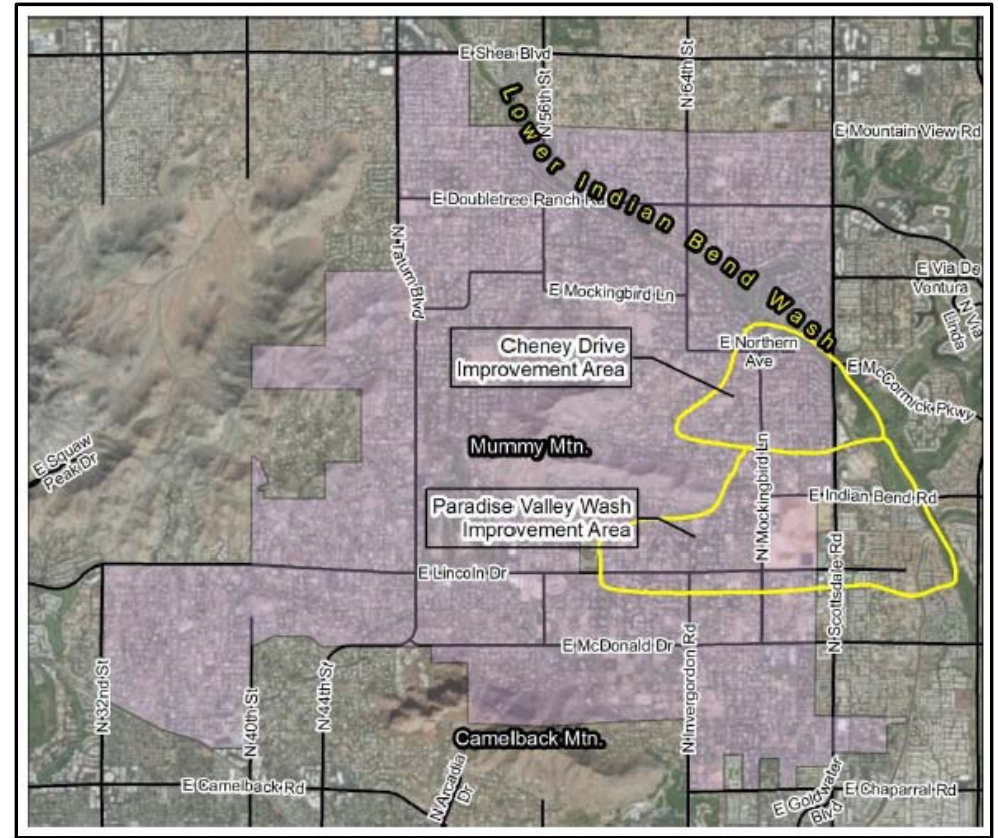
Answer the question:

Do you have enough information to move forward with the April 26<sup>th</sup> CIP discussion or is additional data needed?



# AGENDA

- Stormwater Policy
- Flood Control District Stormwater Projects
- Cost benefit analysis
- Impact to Roadway Projects Surrounding Ritz Development
- Additional Data Request (If Necessary)



April 12<sup>th</sup>, 2018



## STORMWATER POLICY

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- **Town Council Adopted Resolution 2017-08 on April 13<sup>th</sup>, 2017**
- **Resolution states that the Town will seek cost sharing opportunities for stormwater management projects and consider a cost benefit analysis for all proposed projects**
  - **Staff has requested Flood Control District funding for future Stormwater Projects**
  - **Completed the Cost Benefit Analysis of the first two proposed Stormwater Projects**

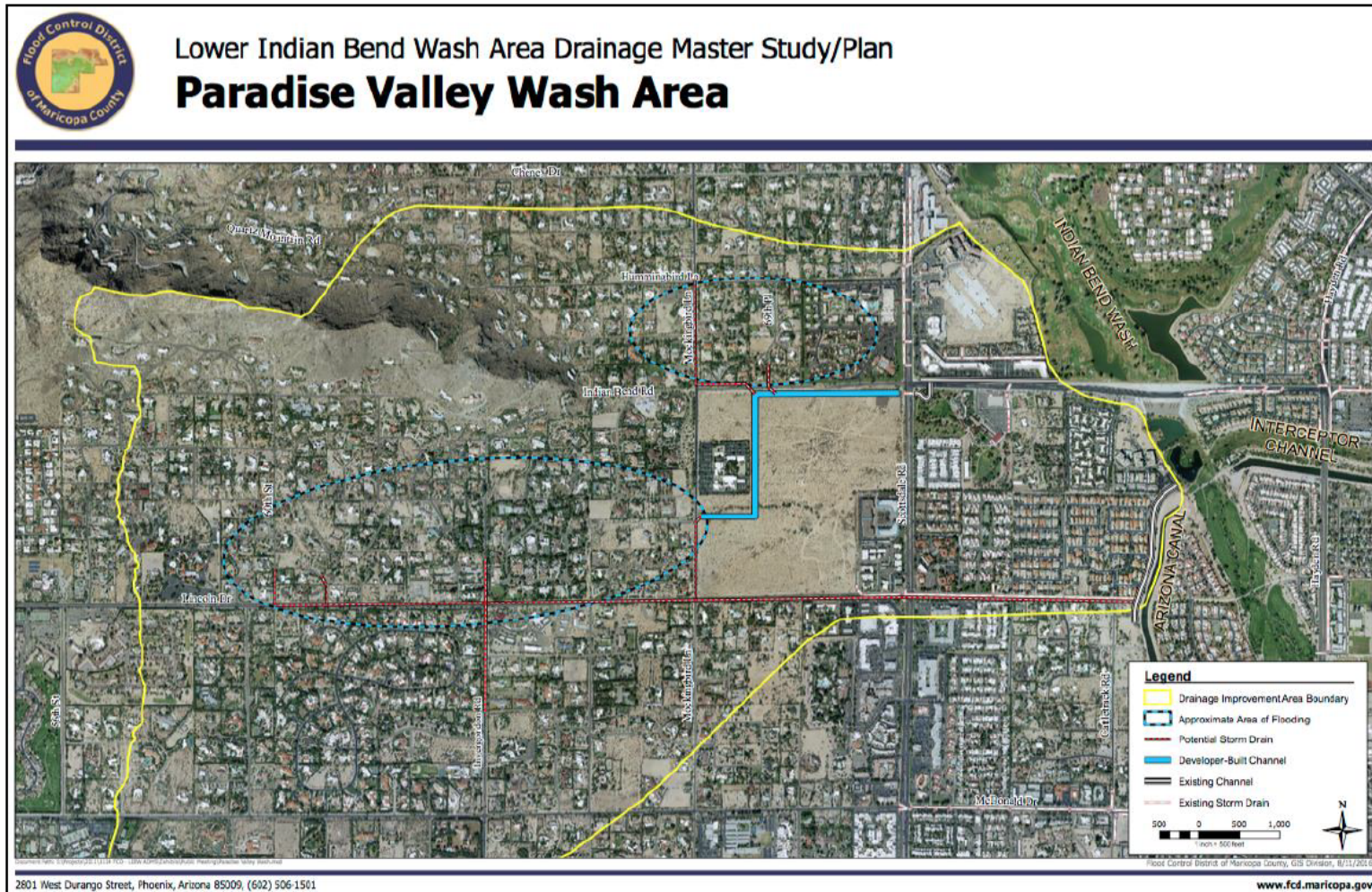
# FLOOD CONTROL DISTRICT PROJECTS

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- **Flood Control District completed their Lower Indian Bend Wash Area Drainage Master Study/Plan, identified three regional projects within the Town**
- **Town requested 50/50 cost sharing with Flood Control District on two projects:**
  1. **Paradise Valley Wash Improvements**
  2. **Cheney Improvements**
- **Required staff to apply to the Flood Control District to be included in their CIP**



# FLOOD CONTROL DISTRICT PROJECTS



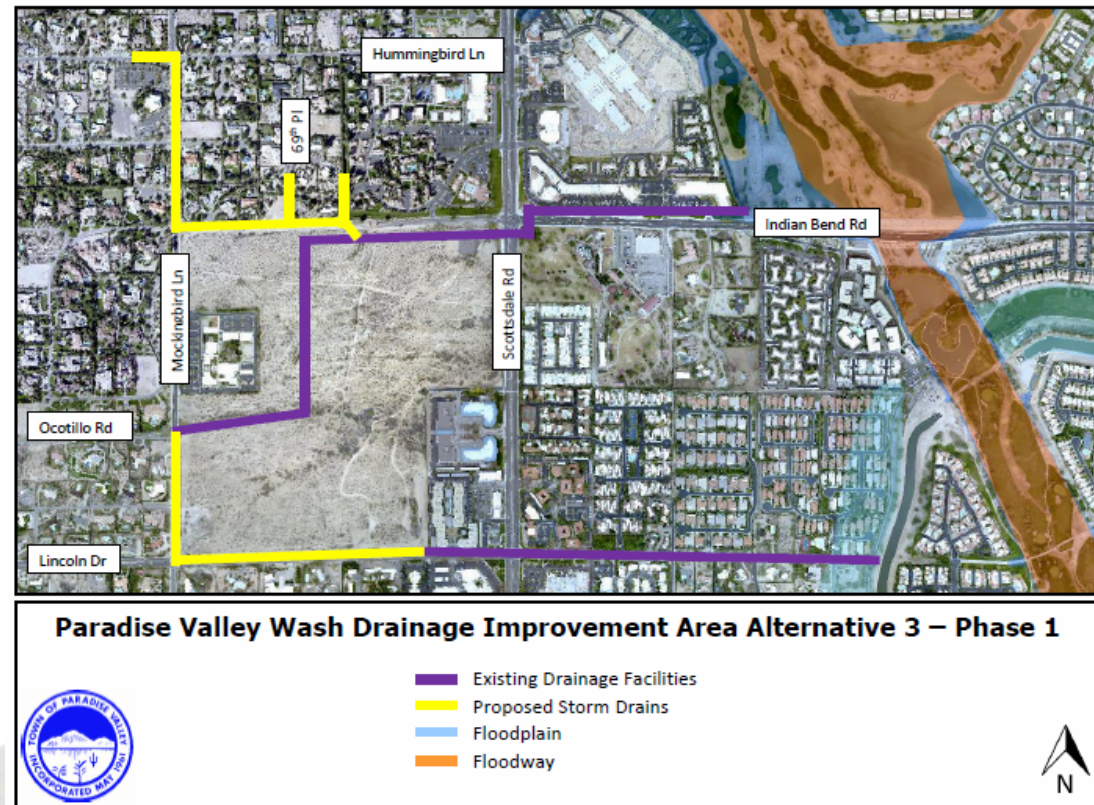
April 12<sup>th</sup>, 2018



# FLOOD CONTROL DISTRICT PROJECTS

## Paradise Valley Wash Phase 1 Improvements

- 48" storm drain in Mockingbird Lane from Mummy Mountain Wash to Indian Bend
- 48" storm drain in Indian Bend discharging into Ritz Channel
- 60" storm drain in Mockingbird Lane from Lincoln to PV Wash
- 90" storm drain in Lincoln from Mockingbird Lane to Town Limits



April 12<sup>th</sup>, 2018



# FLOOD CONTROL DISTRICT PROJECTS

## Paradise Valley Wash Phase 2 Improvements

- 60" storm drain in Lincoln Drive from 60<sup>th</sup> Street to Mockingbird Lane
- 30" storm drain laterals in 60<sup>th</sup> Street, 61<sup>st</sup> Street, and Invergordon Road to Lincoln Drive
- Total project cost for both phases is \$11,770,000



Paradise Valley Wash Drainage Improvement Area Alternative 3 – Phase 2



- Phase 1 Drainage Facilities
- Proposed Storm Drains
- Floodplain
- Floodway



April 12<sup>th</sup>, 2018





# FLOOD CONTROL DISTRICT PROJECTS



## Lower Indian Bend Wash Area Drainage Master Study/Plan Invergordon Road / Cheney Drive Area



2801 West Durango Street, Phoenix, Arizona 85009, (602) 506-1501

www.fcd.maricopa.gov

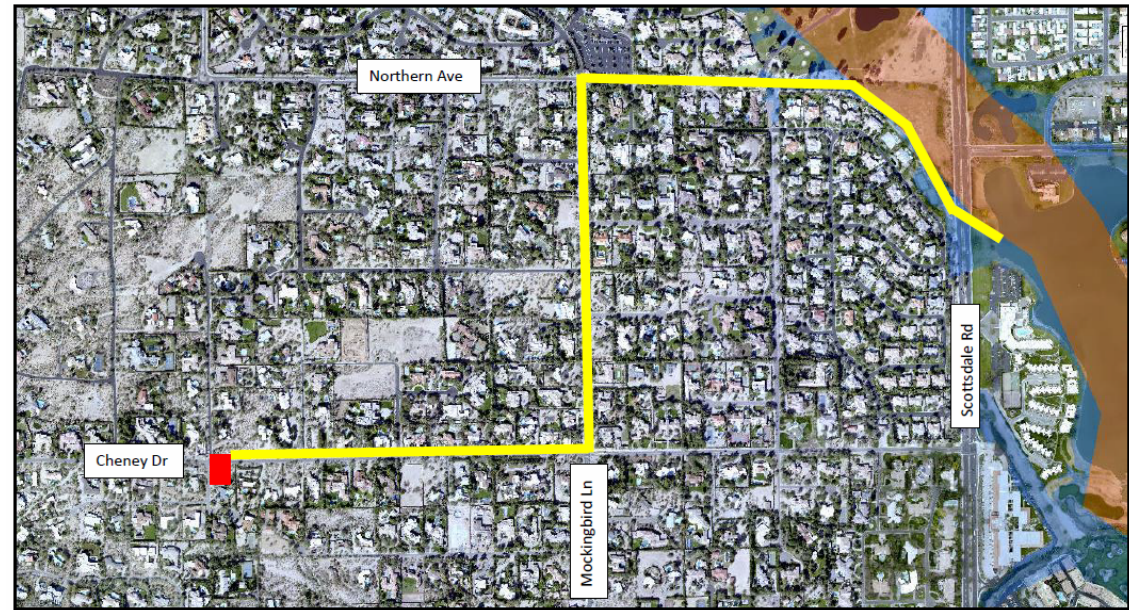
April 12<sup>th</sup>, 2018



# FLOOD CONTROL DISTRICT PROJECTS

## Cheney Improvements

- Sedimentation basin on the south side of Cheney Drive near 64<sup>th</sup> Street
- 60" storm drain in Cheney Drive to Mockingbird Lane
- 78" storm drain in Mockingbird Lane from Cheney Drive to Northern Avenue
- 72" storm drain in Northern Avenue from Mockingbird Lane to Indian Bend Wash
- Total project cost is \$7,430,000



**Cheney Improvement Area Alternative 1**



- Existing Drainage Facilities
- Proposed Storm Drains
- Proposed Sedimentation Basin
- Floodplain
- Floodway



April 12<sup>th</sup>, 2018



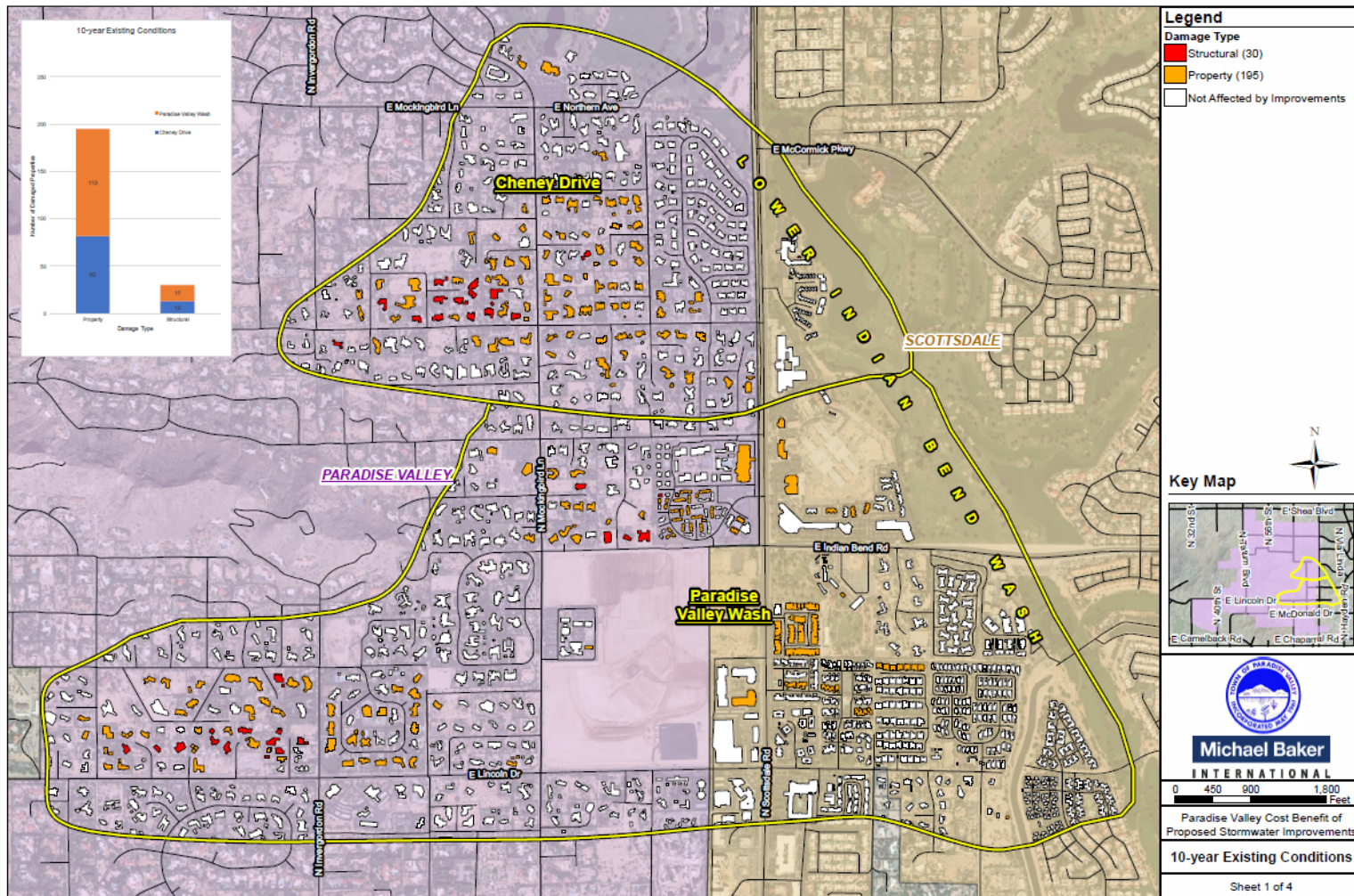
# COST BENEFIT ANALYSIS

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- **Utilize industry standard FEMA Hazus Software and Flood Control District Modeling**
  - **Identifies total potential economic loss for a single storm event using depth-damage curve**
  - **Utilized most conservative depth-damage curve for our analysis**
- **Building replacement costs determined by Maricopa County Assessor's office**
- **Finished floor elevations assumed to be slab on grade +3 inches**
- **Assuming 75 year lifespan of improvements, seven 10 year storm events**



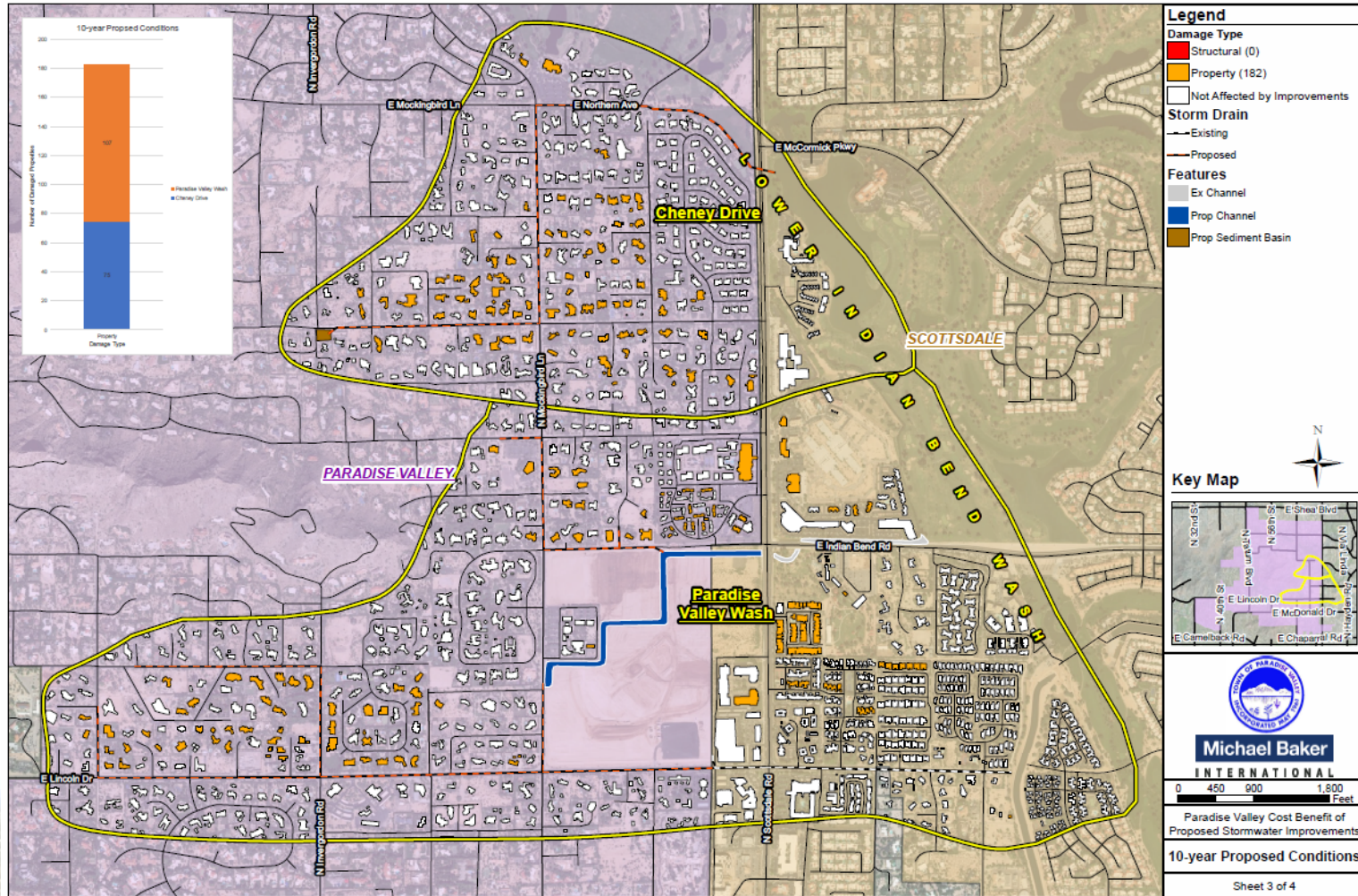
# COST BENEFIT ANALYSIS



April 12<sup>th</sup>, 2018



# COST BENEFIT ANALYSIS



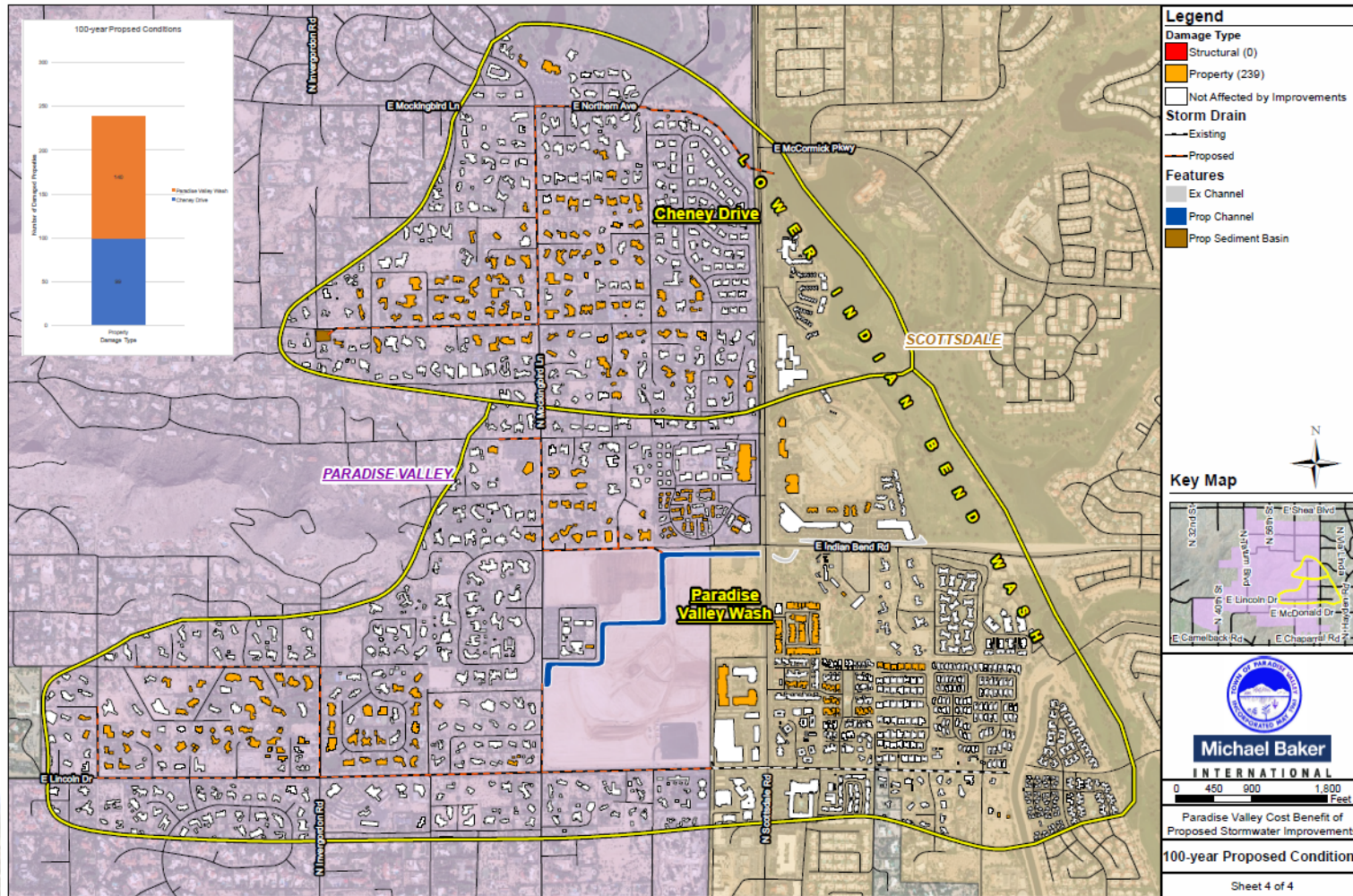
April 12<sup>th</sup>, 2018



**Michael Baker**  
INTERNATIONAL



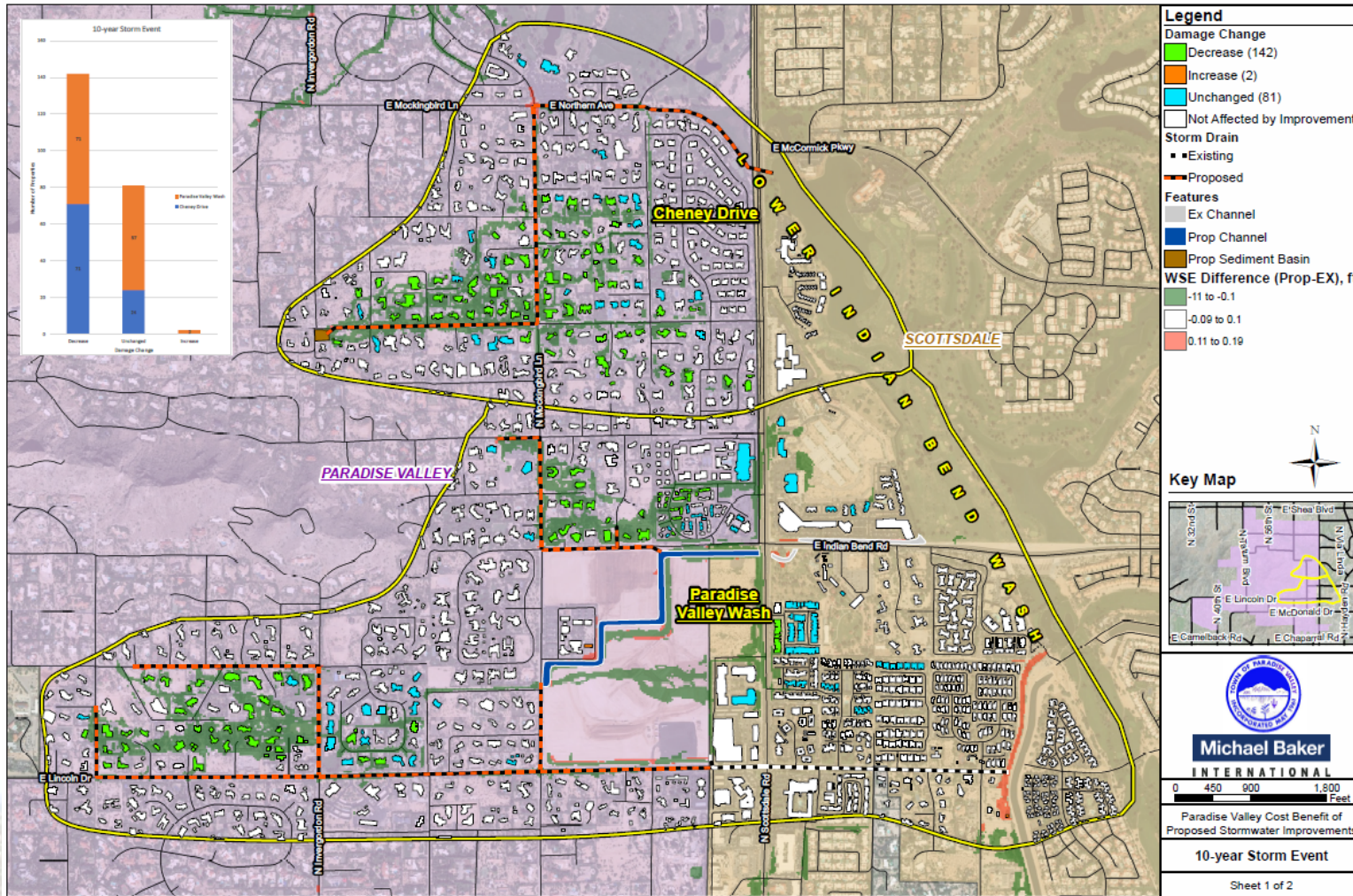
# COST BENEFIT ANALYSIS



April 12<sup>th</sup>, 2018



# COST BENEFIT ANALYSIS

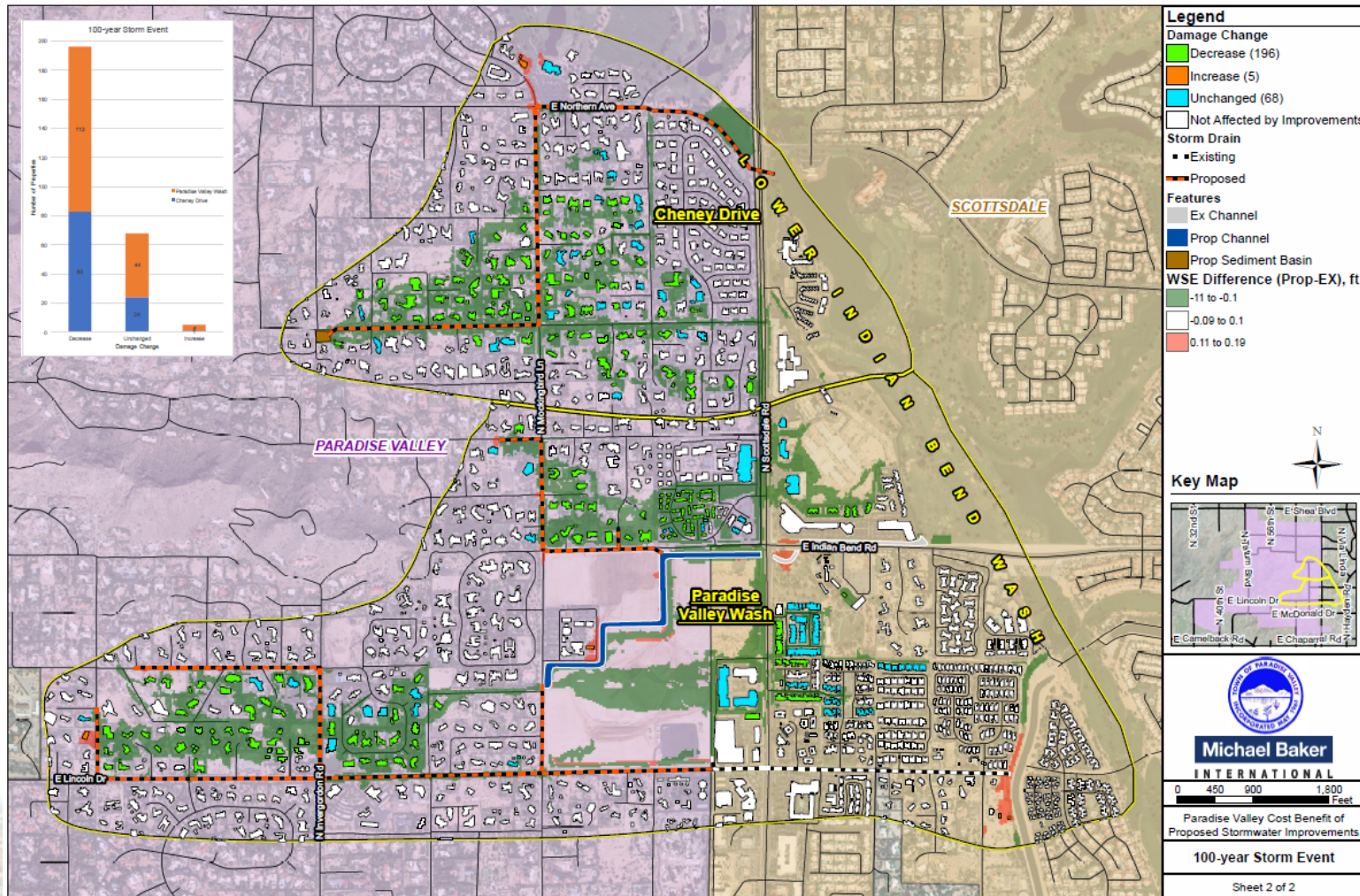


April 12<sup>th</sup>, 2018





# COST BENEFIT ANALYSIS



April 12<sup>th</sup>, 2018



# COST BENEFIT ANALYSIS

Table 7.2 Damage Type

Improvement Area	Damage Type	Number of Buildings			
		Existing		Proposed	
		10-year	100-year	10-year	100-year
Cheney Drive	Property	82	95	75	99
	Structural	13	13	0	0
Paradise Valley Wash	Property	113	142	107	140
	Structural	17	18	0	0
Total	Property	195	237	182	239
	Structural	30	31	0	0

Table 7.4: Total Potential and Prevented Economic Losses

Improvement Area	Total Potential Economic Loss, \$				Potential Prevented Economic Loss, \$ (Ex – Prop)	
	Existing		Proposed		10-year	100-year
	10-year	100-year	10-year	100-year		
Cheney Drive	\$5,496,000	\$6,248,000	\$2,448,000	\$3,229,000	\$3,048,000	\$3,019,000
Paradise Valley Wash	\$5,517,000	\$6,922,000	\$3,073,000	\$4,242,000	\$2,444,000	\$2,680,000
<b>Total</b>	<b>\$11,013,000</b>	<b>\$13,170,000</b>	<b>\$5,521,000</b>	<b>\$7,471,000</b>	<b>\$5,492,000</b>	<b>\$5,699,000</b>

Table 7.8: Building Damage Changes

Improvement Area	Building Damage Change from Existing Conditions	Number of Buildings	
		10-year	100-year
Cheney Drive	Decrease	71	83
	Unchanged	24	24
	Increase	0	1
Paradise Valley Wash	Decrease	71	113
	Unchanged	57	44
	Increase	2	4
Total	Decrease	142	196
	Unchanged	81	68
	Increase	2	5

Table 7.6: Benefit Cost Analysis

Improvement Area	BCR Paradise Valley (PV Structures Only)	BCR Overall (Paradise Valley and Scottsdale Structures)
Cheney Drive	3.05	
Paradise Valley Wash	1.46	1.47
<b>Total</b>	<b>2.05</b>	<b>2.06</b>

April 12<sup>th</sup>, 2018



## COST BENEFIT ANALYSIS

- Cost of Infrastructure
  - \$7,430,000 Cheney (\$3,715,000 Town Cost)
  - \$11,770,000 Paradise Valley Wash (\$5,885,000 Town Cost)
- Life Span of Infrastructure = 75 Years
- Economic Loss Prevented
  - \$3,048,000 Cheney per 10 year event
  - \$2,444,000 Paradise Valley per 10 year event
- BCR assumes 10- year event will happen 7.5 times
- BCR Assumes a 100- year event does not happen
- Cheney BCR = Prevented Loss ÷ Cost =  $(\$3.048 \times 7.5) \div \$7.43 = 3.07$
- Cheney BCR (for Town \$) = Benefit ÷ (Cost/2) =  $(\$3.048 \times 7.5) \div \$3.715 = 6.15$
- PV Wash BCR



## COST BENEFIT ANALYSIS

- Cheney BCR = Prevented Loss  $\div$  Cost =  $(\$3.048 \times 7.5) \div \$7.43 = 3.07$
- Cheney BCR (for Town \$) = Loss  $\div$  (Cost/2) =  $(\$3.048 \times 7.5) \div \$3.715 = 6.15$

**For the cost of \$3.7M, the Town prevents \$22.9M in loss**

- PV Wash BCR = Prevented Loss  $\div$  Cost =  $(\$2.444 \times 7.5) \div \$11.777 \approx 1.5$
- PV Wash (for Town \$) = Loss  $\div$  (Cost/2) =  $(\$2.444 \times 7.5) \div (\$5.89) \approx 3.0$

**For the cost of \$5.9M, the Town prevents \$18.3 in loss**



# RITZ ROADWAY PROJECTS IMPACT

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- **PV Wash Phase 1 Improvements directly abut the Ritz Carlton Site and fall within roadways the town is obligated to reconstruct per the Development Agreement**
- **This is our chance to include these stormwater improvements while the road is under construction**
- **Would require the town to move other projects in order to fund our share of the projects, primarily the reconstruction of Mockingbird Lane between Hummingbird and Northern**
- **CIP prepared for April 26<sup>th</sup> discussion reflects this change**



## STORMWATER PROJECTS ROI

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Do you have enough information to move forward with the April 26<sup>th</sup> CIP discussion or is additional data needed?



April 12<sup>th</sup>, 2018