

City Watersheds of Sonoma Valley

Options to Address Flooding Along First Street West in the City of Sonoma

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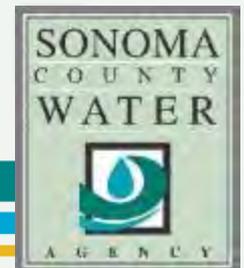
707-933-2230

Carlos Diaz, P.E.

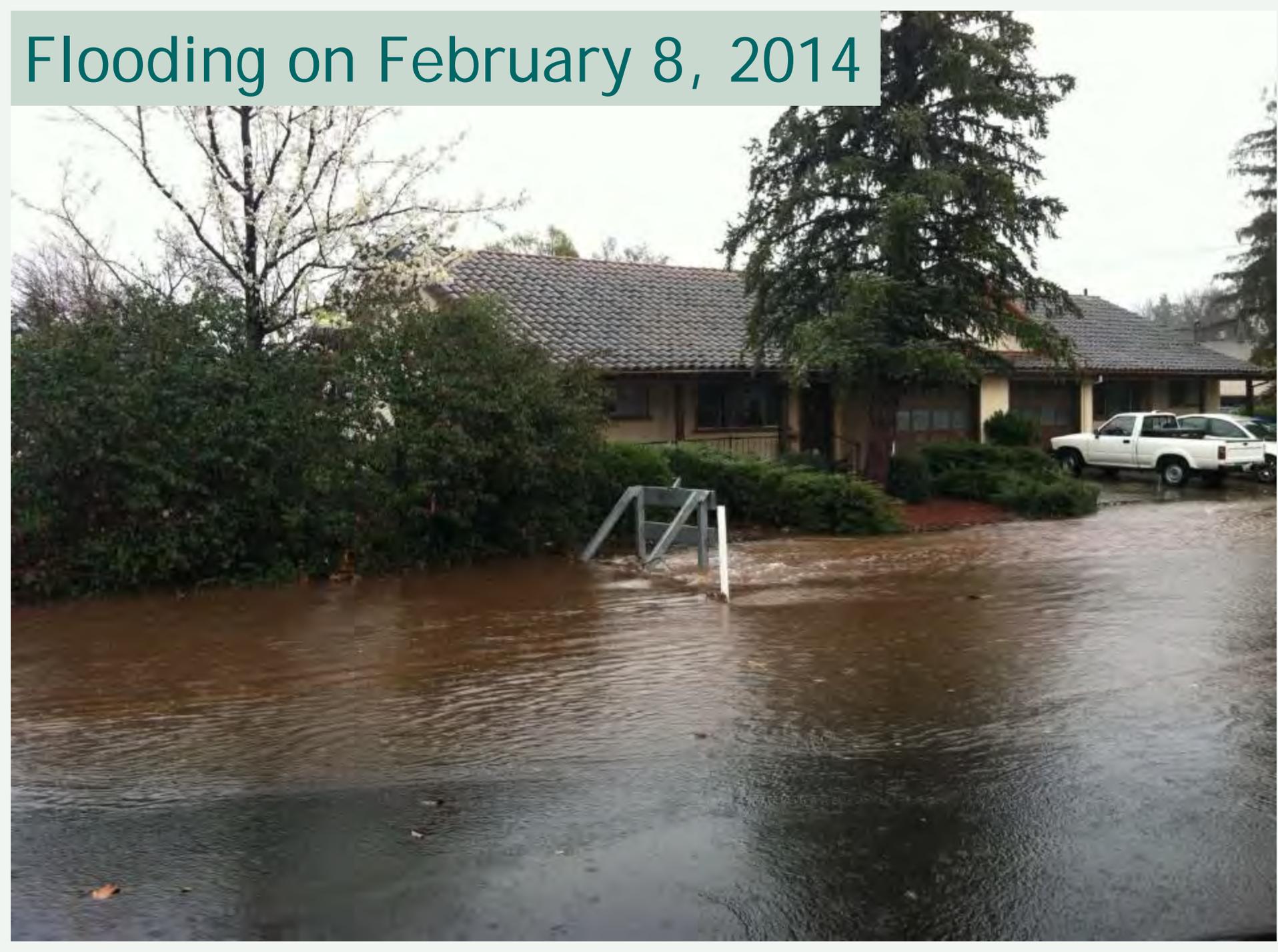
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Flooding on February 8, 2014



Trash Rack





Flooding on December 11, 2014



Undersized Culvert at Depot Park

Flooding on February 8, 2014



Channel Along Depot Park (looking upstream)





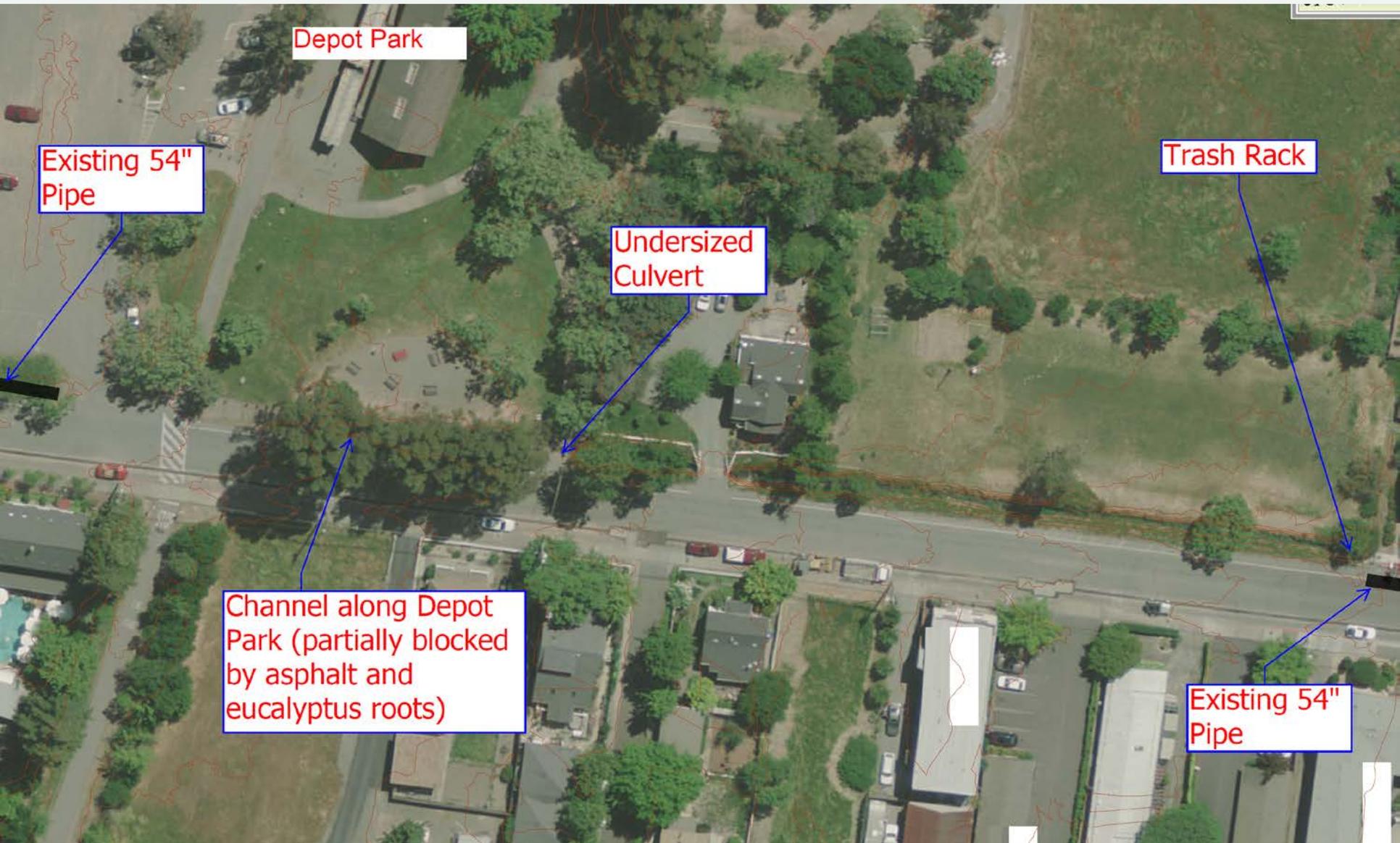
Flooding at corner of 1st St West
and Spain Street, February 8, 2014

First Street West

Existing Storm Drain System



Existing Conditions: Open-Channel Section



Depot Park

Existing 54" Pipe

Undersized Culvert

Trash Rack

Channel along Depot Park (partially blocked by asphalt and eucalyptus roots)

Existing 54" Pipe

Previously Proposed Flood Solution Alternatives

Alternative		Flood Protection Level
#	Name	
0	Existing Condition	~2-yr
1a	Full 54-inch Pipe + Pedestrian/bike Path + Bioswale	100-yr
1b	Full 54-inch Pipe + Smaller Channel	100-yr
2	Trash Rack + Channel Improvements & Swale at Depot Park	~25-yr
3	Trash Rack + Minor Channel Improvements at Depot Park	~10-yr

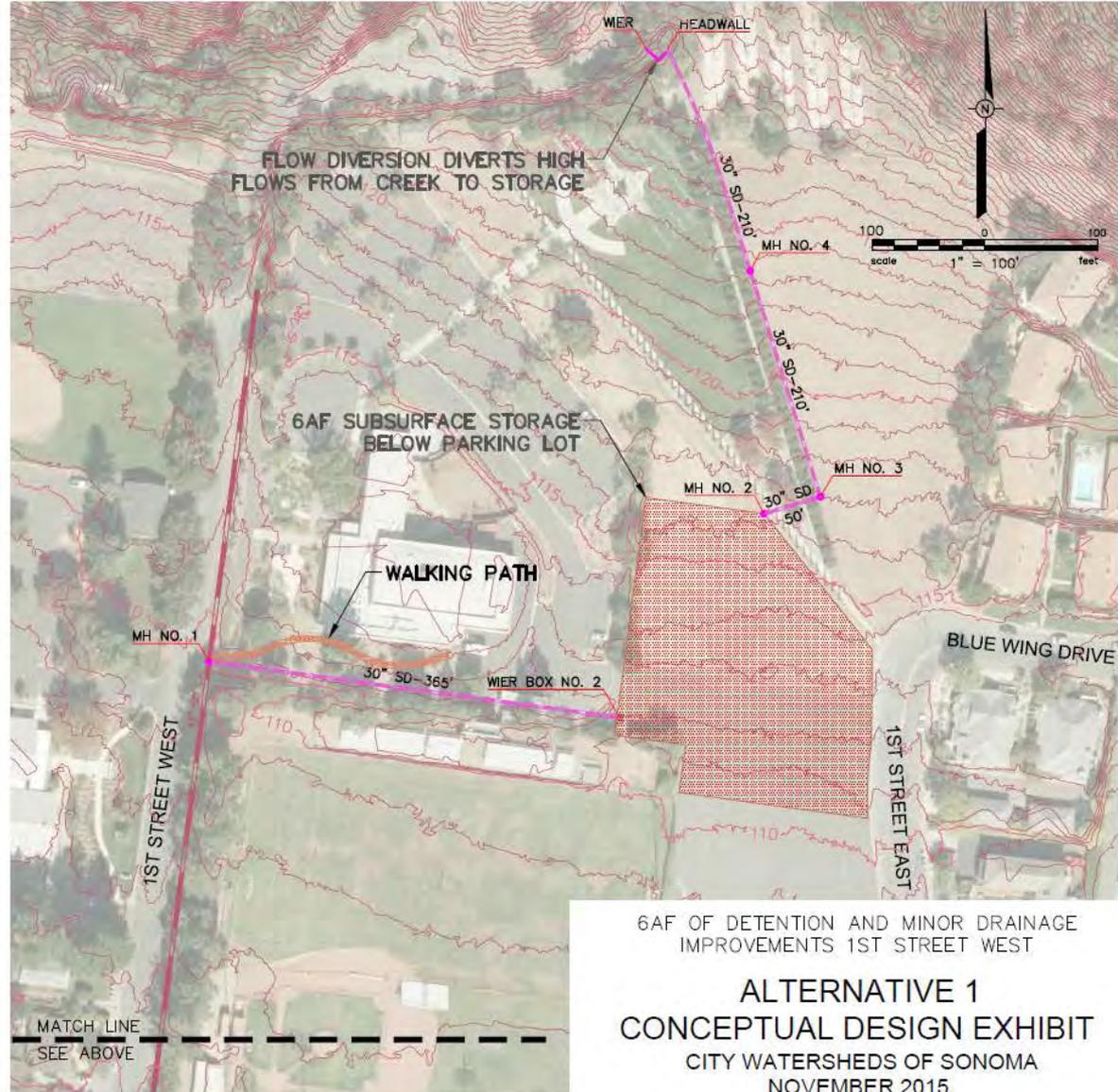
Input Received

- Confirmation that existing channel and flooding presents a safety and property damage risk
- Opposition to a pipe and sidewalk and desire to keep the existing channel and its habitat
- Support for a pipe to reduce flooding, increase safety, and facilitate pedestrian/bikeway improvements between plaza and Depot Park
- Desire for detention and ground water recharge options upstream
- Openness to removing eucalyptus trees
- Objections to swale in Depot Park lawn area
- Request to standardize model results
- Concerns of increasing downstream flooding

Revised Flood Solution Alternatives

#	Description
1	<ul style="list-style-type: none">• 6 acre-ft underground storage at Vet's Center• Minor channel improvements at Depot Park
2	<ul style="list-style-type: none">• 3 acre-ft underground storage at Vet's Center• 54-inch pipe between Depot Park and trash rack• Pedestrian/bike path + bioswale
3	<ul style="list-style-type: none">• 3 acre-ft underground storage at Vet's Center• Minor channel improvements along 1st St West

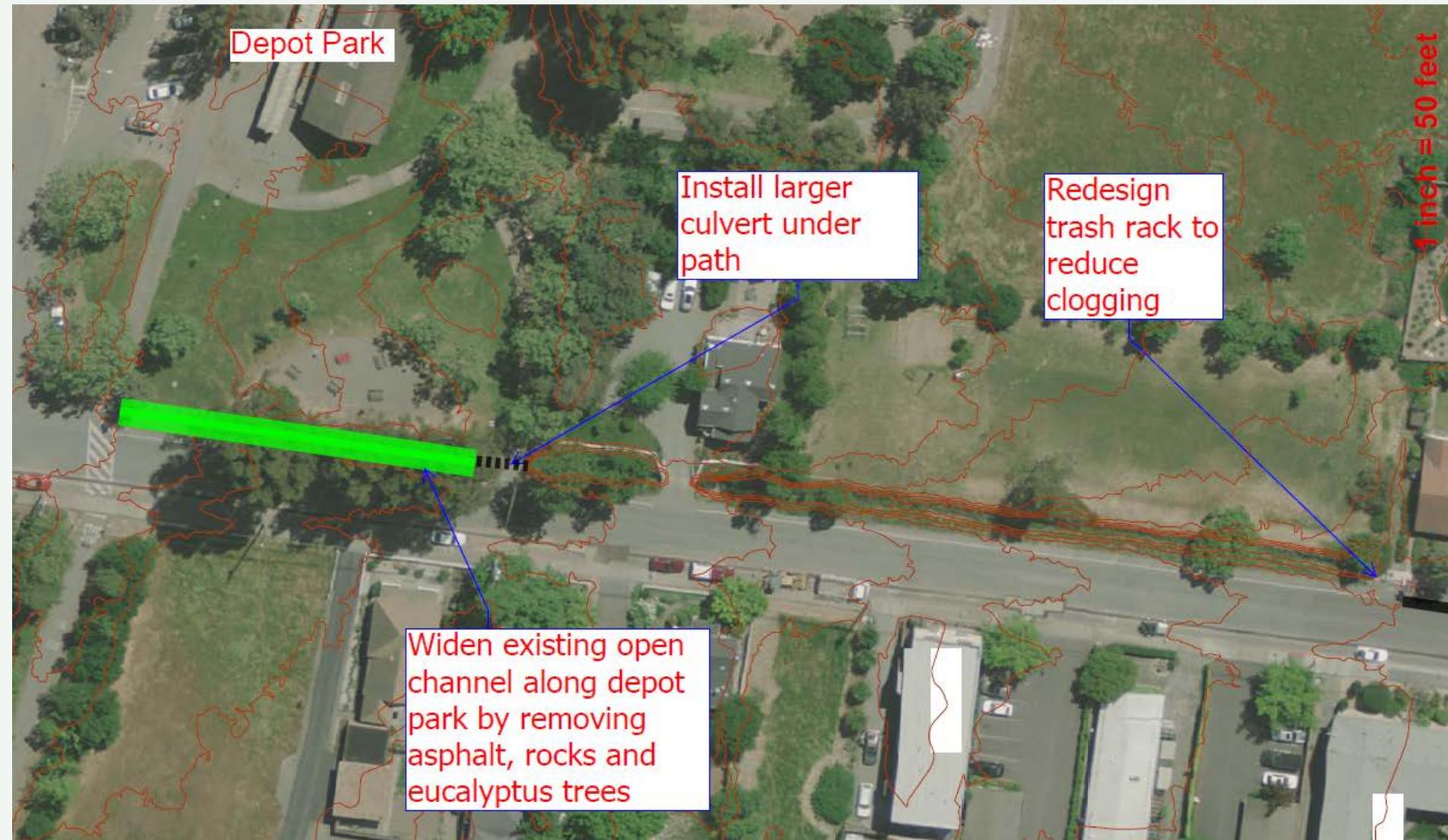
Alternative 1: 6 acre-ft underground storage



6AF OF DETENTION AND MINOR DRAINAGE IMPROVEMENTS 1ST STREET WEST

ALTERNATIVE 1
CONCEPTUAL DESIGN EXHIBIT
CITY WATERSHEDS OF SONOMA
NOVEMBER 2015

Alternative 1: 6 acre-ft underground storage, redesign trash rack, channel improvements at Depot Park



Underground Storage Systems

Stormtech Chambers

<http://www.stormtech.com>

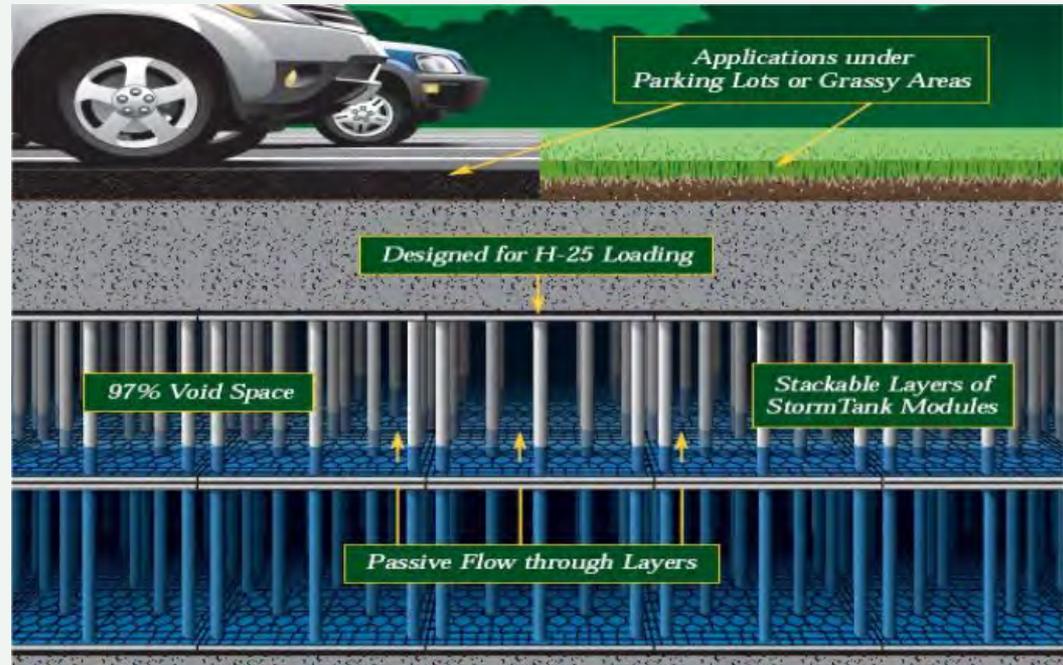


MC-4500

MC-3500

Stormtank Modules:

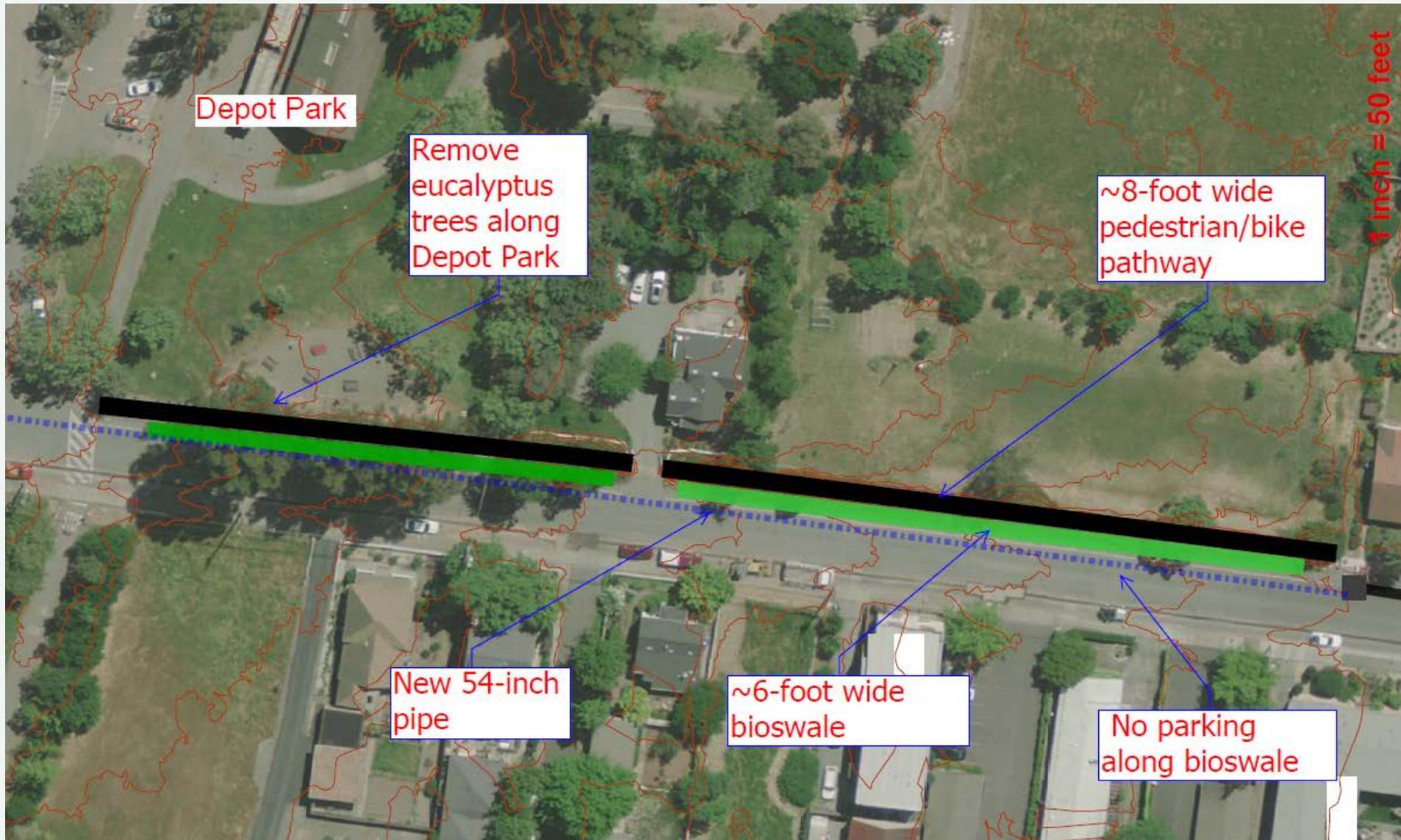
<http://www.brentwoodindustries.com/segments/stormwater/>



Pros and Cons: Alternative 1

Pros	Cons
100-yr flood protection	High cost
Minimizes disruption to existing channel	Safety issues at channel & trash rack remain
Potentially enhances ground water recharge	Trash rack clogging may improve but will remain a problem
	Increased space requirement
	Cleaning and maintenance of storage system
	No sidewalk for pedestrians

Alternative 2: 3 acre-ft underground Storage, 54-inch pipe, bioswale, pedestrian/bike path



Alternative 2: Pedestrian/bike path + bioswale



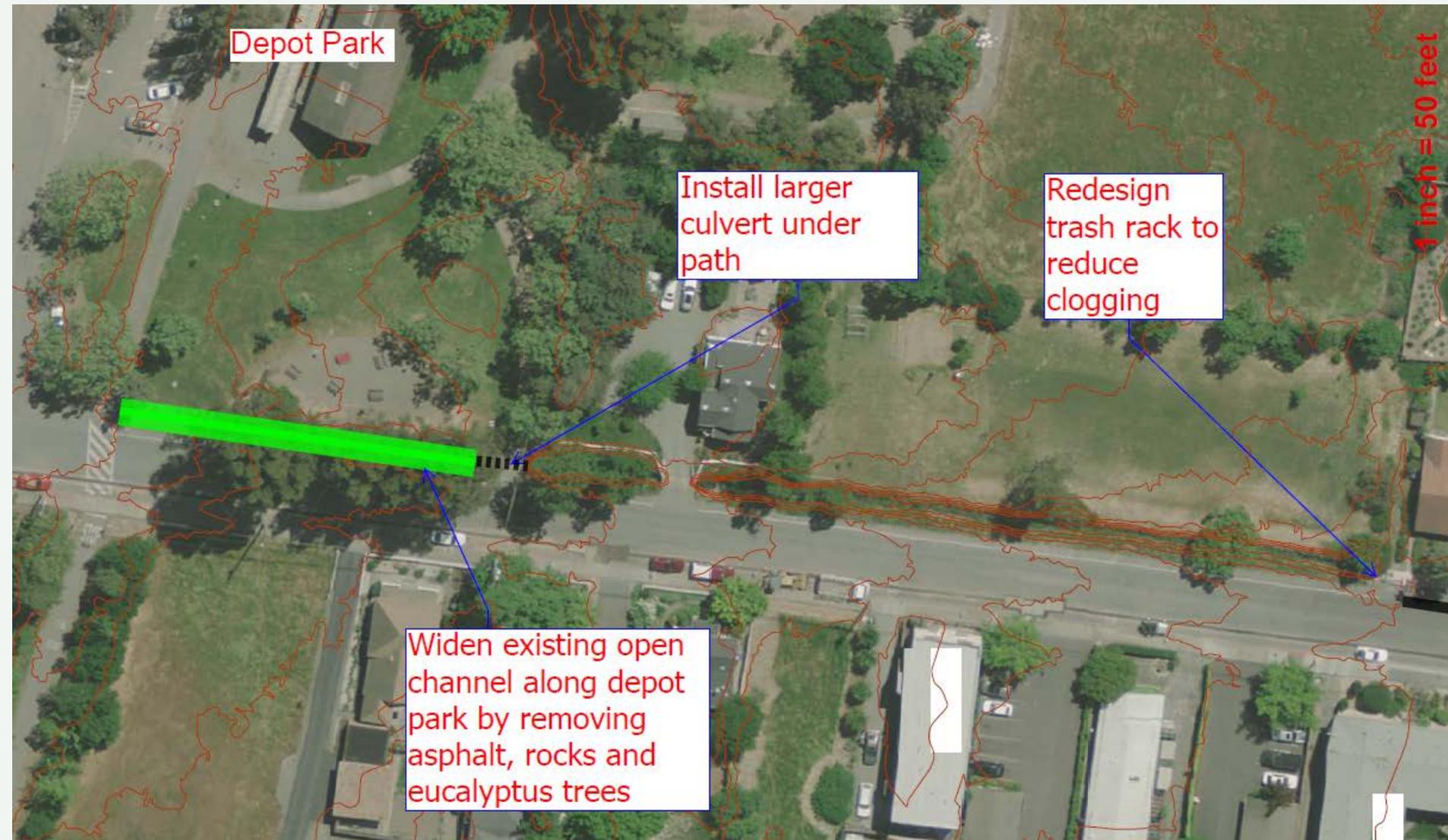
Alternative 2: Pedestrian/bike path + bioswale



Pros and Cons: Alternative 2

Pros	Cons
25-yr flood protection	High cost
Reduces safety hazards	May reduce net habitat value of channel
Eliminates trash rack clogging issues/maintenance effort	Cleaning and maintenance of storage system
Reduces utility conflicts with channel	
Provides pedestrian/bike pathway	
Street rehabilitation of First St. West	
Potentially enhances ground water recharge	

Alternative 3: 3 acre-ft underground storage, redesign trash rack, channel improvements at Depot Park



Channel Reshaping at Depot Park



Pros and Cons: Alternative 3

Pros	Cons
25-year flood protection	No sidewalk for pedestrians
Lower cost	Trash rack clogging may improve but will remain a problem
Minimal disturbance to existing channel and habitat	Safety hazard at channel & trash rack remains
Potentially enhances ground water recharge	

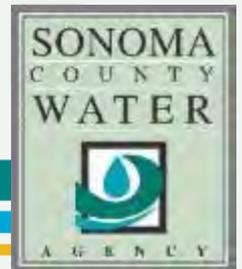
Flood Benefits and Costs

Alternative		Flood Protection Level	Approximate Cost ¹
#	Description	Recurrence Interval	\$
1	<ul style="list-style-type: none"> • 6 acre-ft underground storage • Minor channel improvements 	100-yr	~\$4.7M
2	<ul style="list-style-type: none"> • 3 acre-ft underground storage • 54-inch pipe • Pedestrian/bike path & bioswale 	~25-yr	~\$5.6M ²
3	<ul style="list-style-type: none"> • 3 acre-ft underground storage • Minor channel improvements 	~25-yr	~\$3.2M

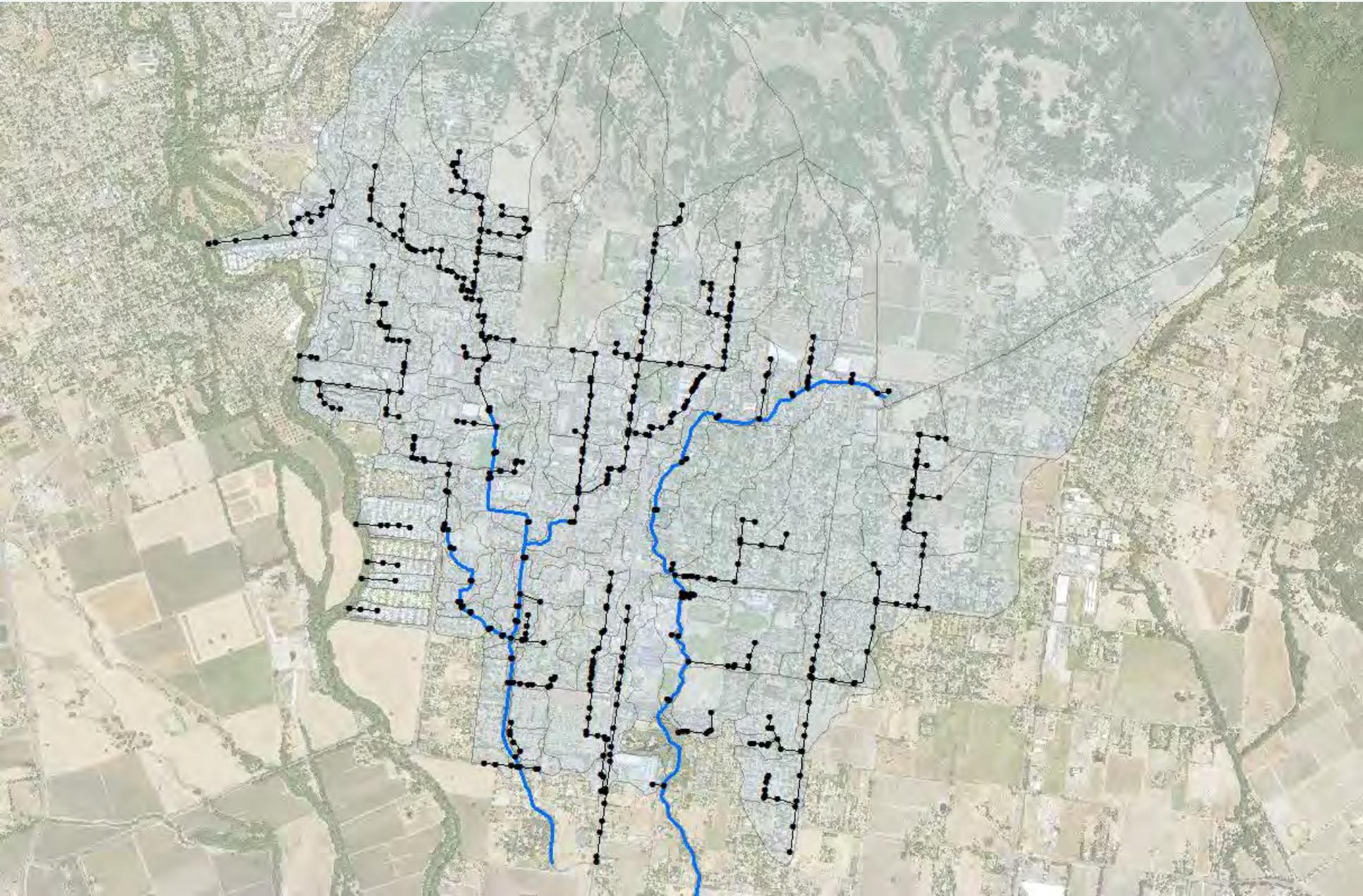
1. Each alternative includes \$350K for riparian habitat enhancement on Fryer Creek upstream of W MacArthur Street
2. Cost includes street improvements (bioswale, street trees, and pedestrian/bike path)

Hydraulic Modeling Methods and Results

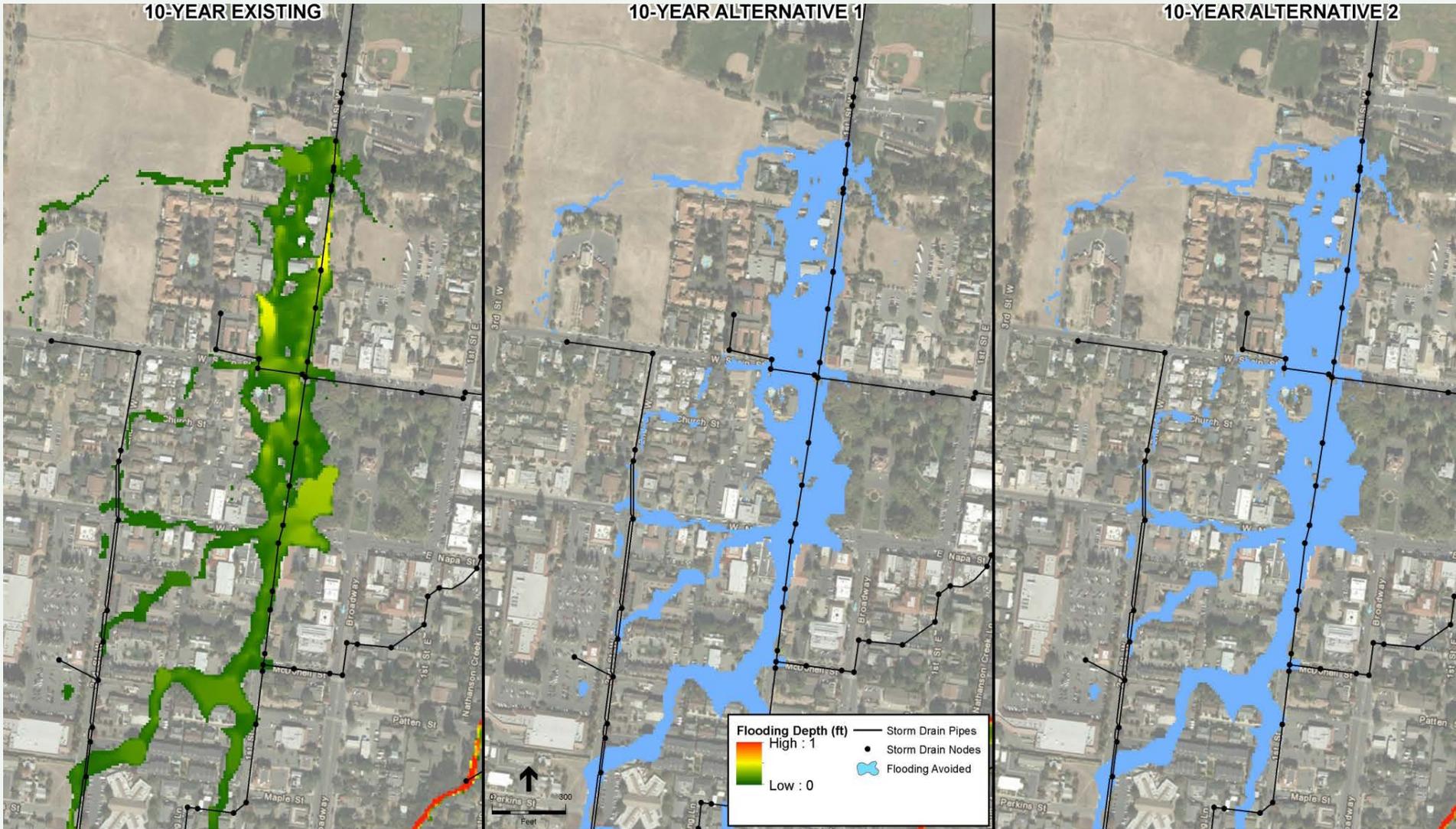
- Model background (2010 Sonoma SDMP)
- Objectives and constraints
- Model updates
- Preliminary focused modeling by SCWA
- Focused model to design storage systems
- Systemwide model to assess flood benefits



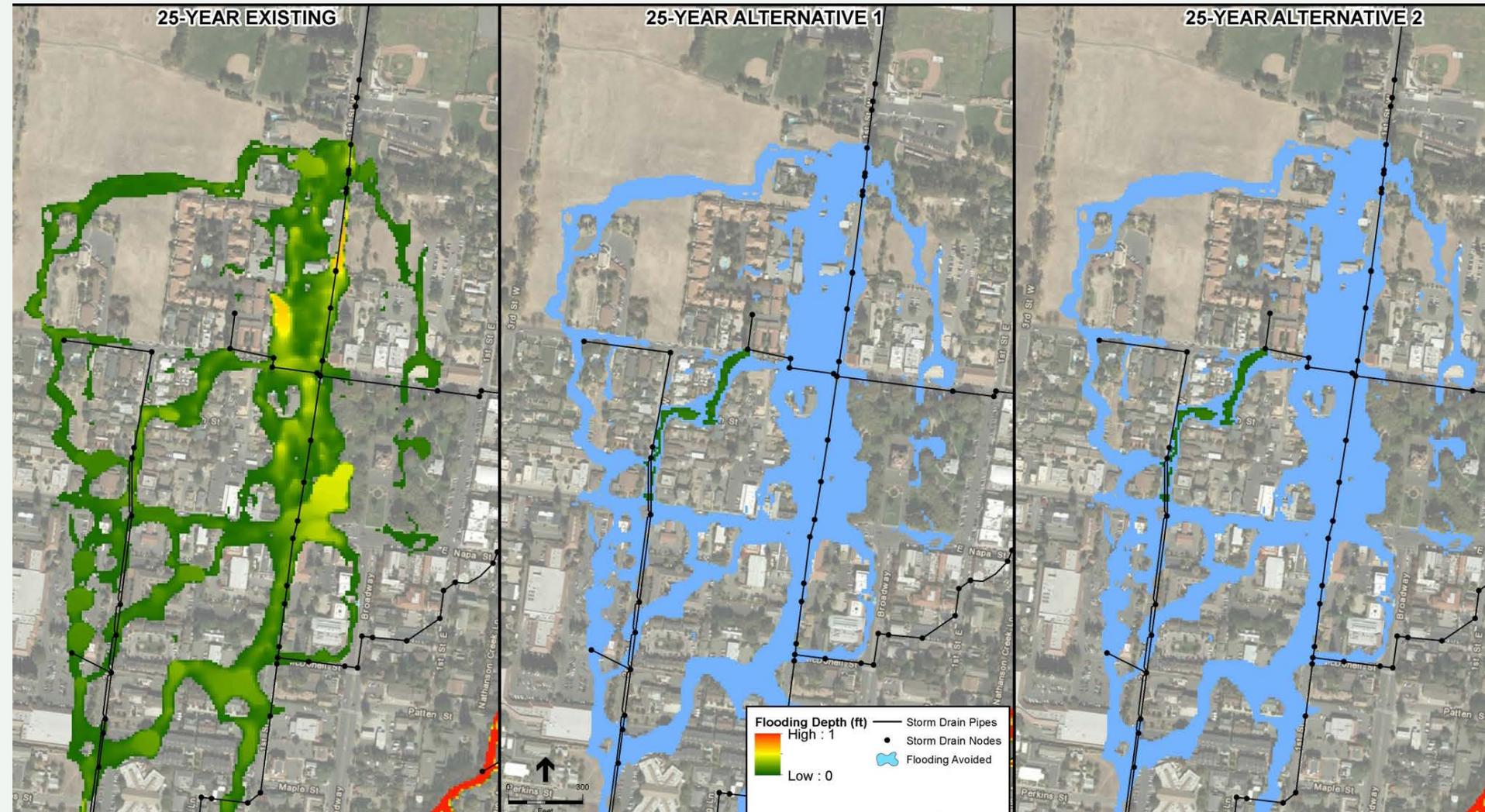
City of Sonoma Storm Drain Model Network



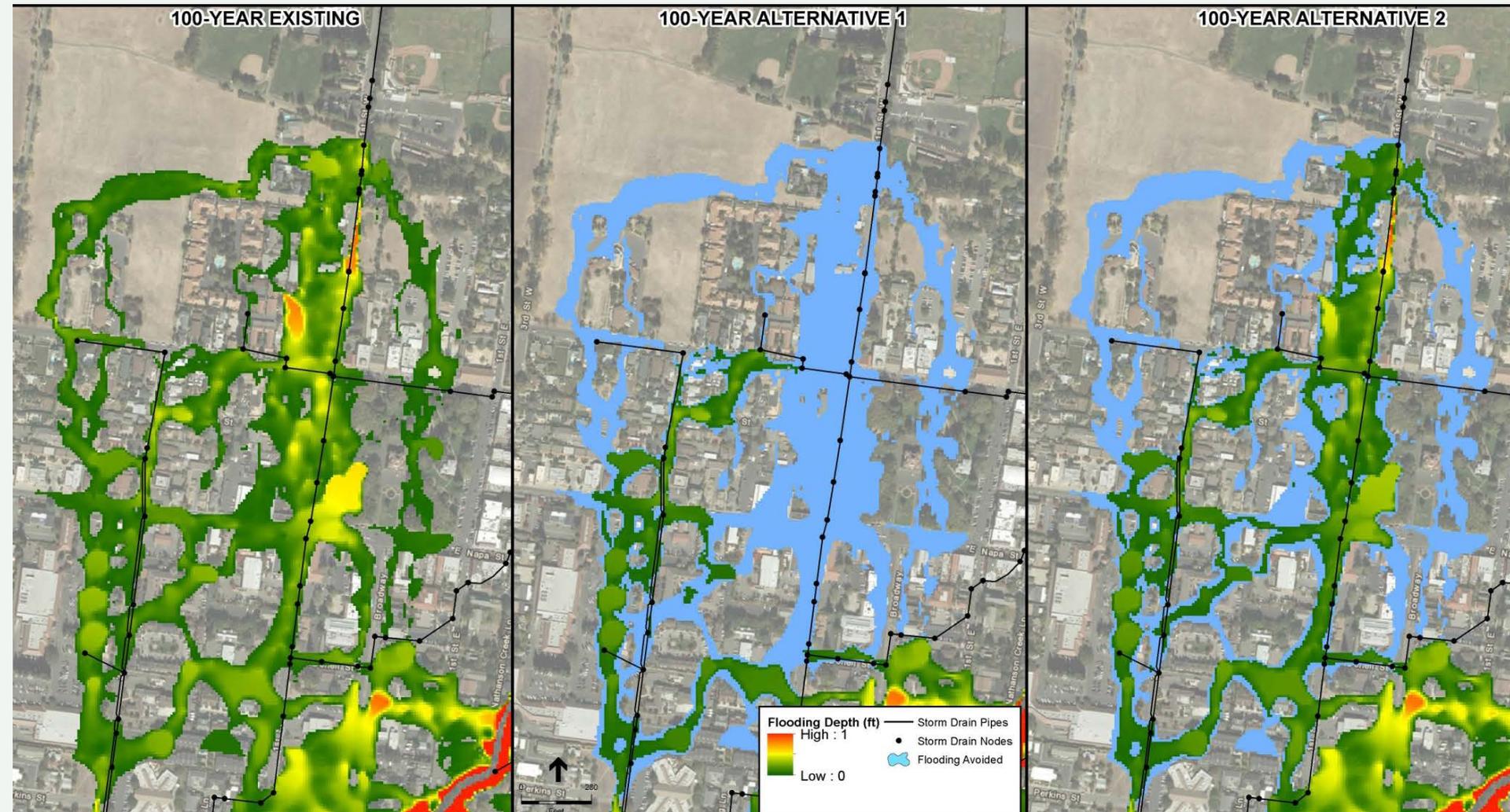
Hydraulic Modeling Results: (10-yr)



Hydraulic Modeling Results: (25-yr)



Hydraulic Modeling Results: (100-yr)



City of Sonoma First Street West Flooding

City Watersheds Project
Public Outreach Meeting
November 19, 2015

Concerns on First St. West

- Safety (*Pedestrians, City Staff, Vehicles*)
- Flooding
- Maintenance
- Pedestrian Accessibility
- Environmental Risk (*Exposed Sewer Lines*)



XING

SPEED LIMIT
25









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4W7636

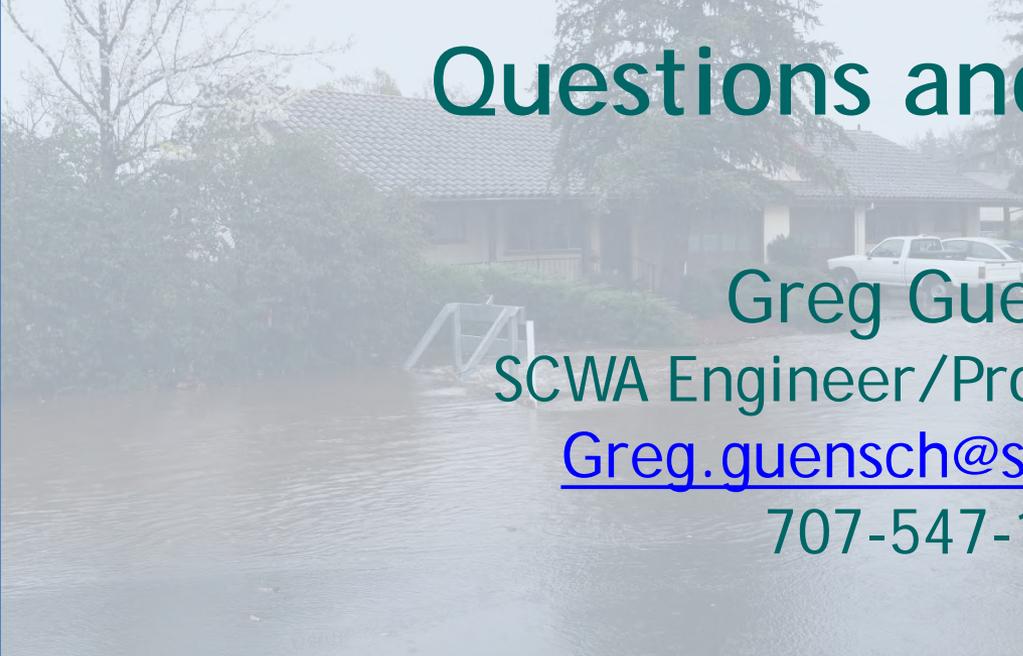




Benefits from Alternative 2

- Mitigated Safety Hazards
- Reduced Flooding
- Improved Groundwater Recharge
- Reduced Maintenance Effort
- Improved Pedestrian and Bike Accessibility
- Reduced Risk of Sewer Main Breaks
- Street Rehabilitation of First St. West

Questions and Comments



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