Fitchrona Road and Goose Lake Watershed Study

PUBLIC INFORMATION MEETING #2

October 14, 2020

THE CITY OF Fitchburg

TOWN OF VERONA

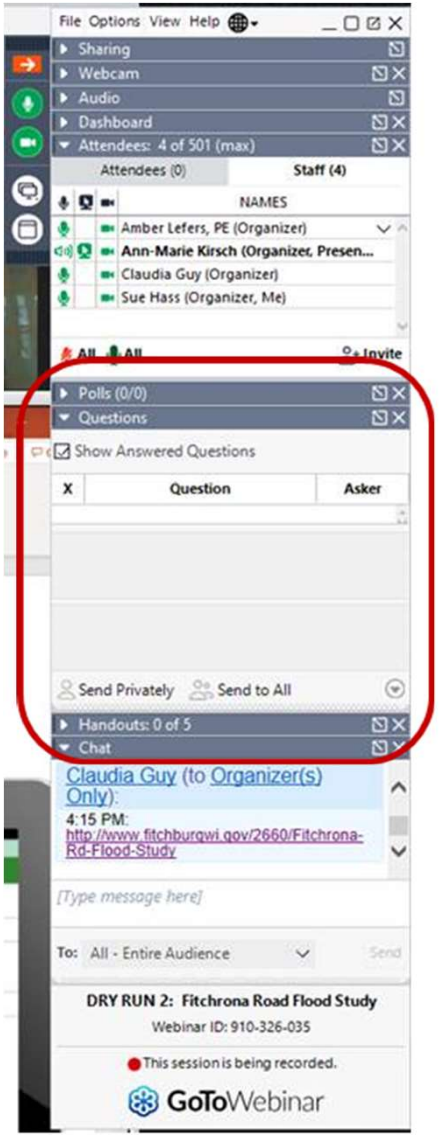
AE2S

TEAM INTRODUCTIONS

- **Ann-Marie Kirsch, PE** | AE2S Project Manager
- **Claudia Guy, PE** | City of Fitchburg Environmental Engineer
- **Chris Barnes, PE** | Town of Verona Public Works Project Manager
- **Amber Lefers, PE** | AE2S Water Resources Practice Leader

MEETING FORMAT AND Q&A

- GoToWebinar for access
- Questions can be asked
  - Electronically during or after the presentation using the **Question function**



MEETING FORMAT AND Q&A

- GoToWebinar for access
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  - Electronically during or after the presentation using the **Question function**

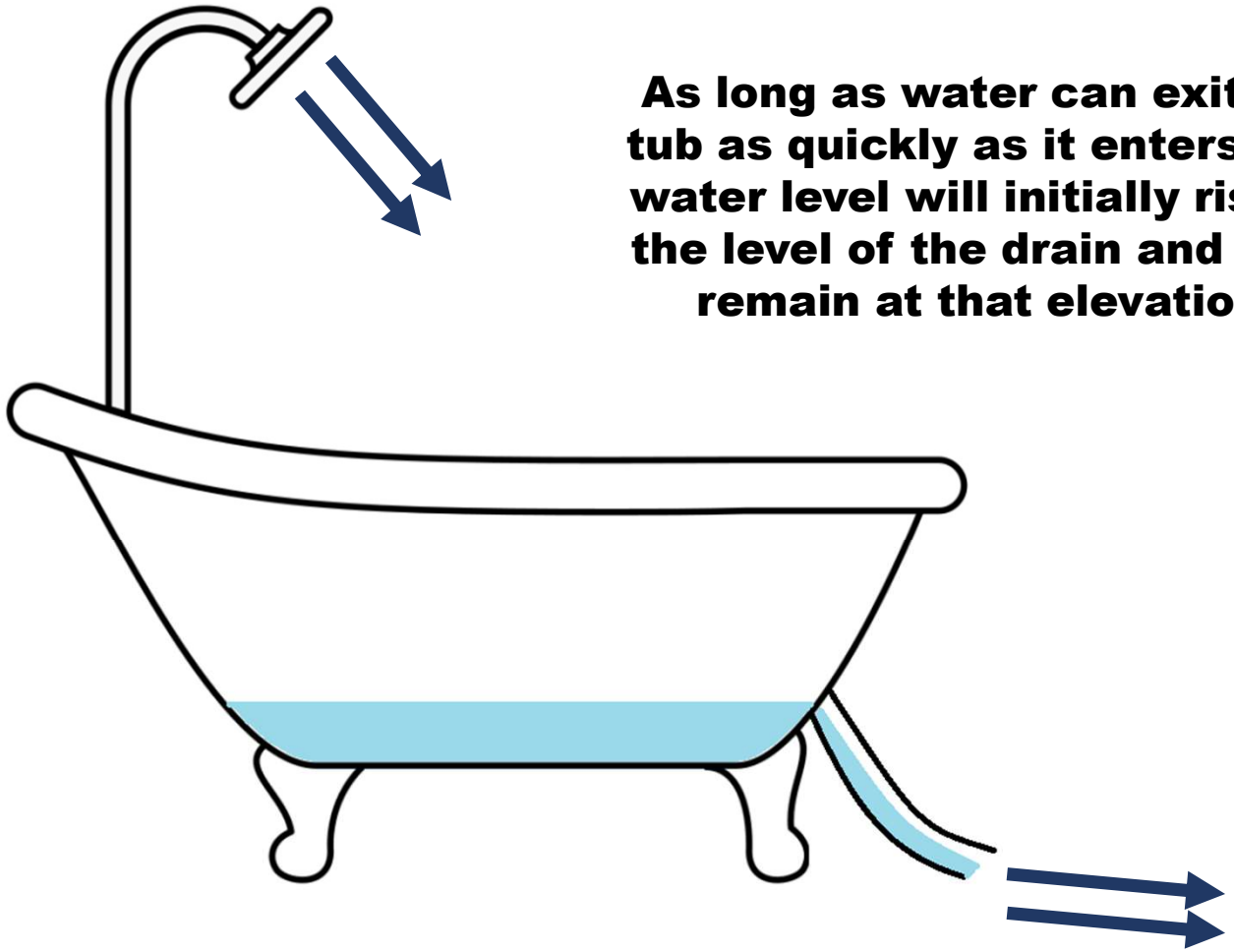
  - After the public meeting through **email** to
    Claudia Guy: Claudia.Guy@Fitchburgwi.gov
    Chris Barnes: Cbarnes@town.Verona.wi.us

PURPOSE OF STUDY

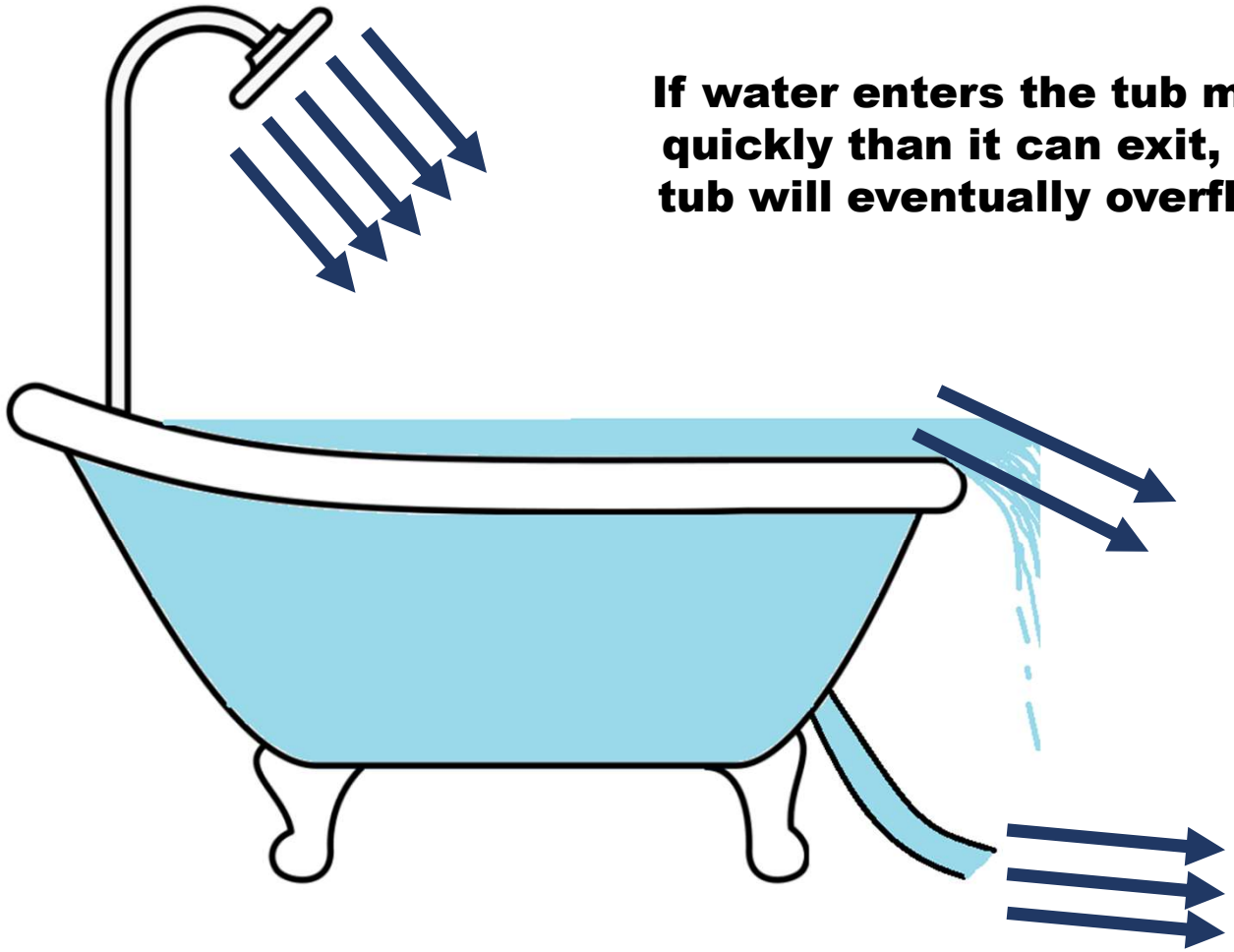
- Flooding closed Fitchrona Road to traffic in 2001, 2007, 2008, 2009, 2010, 2013, 2017, 2018, and 2019.
- Subsequent plans call for increased pipe capacity under Fitchrona Road.
- Suspected downstream “roadblocks” to adequate drainage.

Fitchrona Road, looking south to 18/151, photo taken June 26, 2013

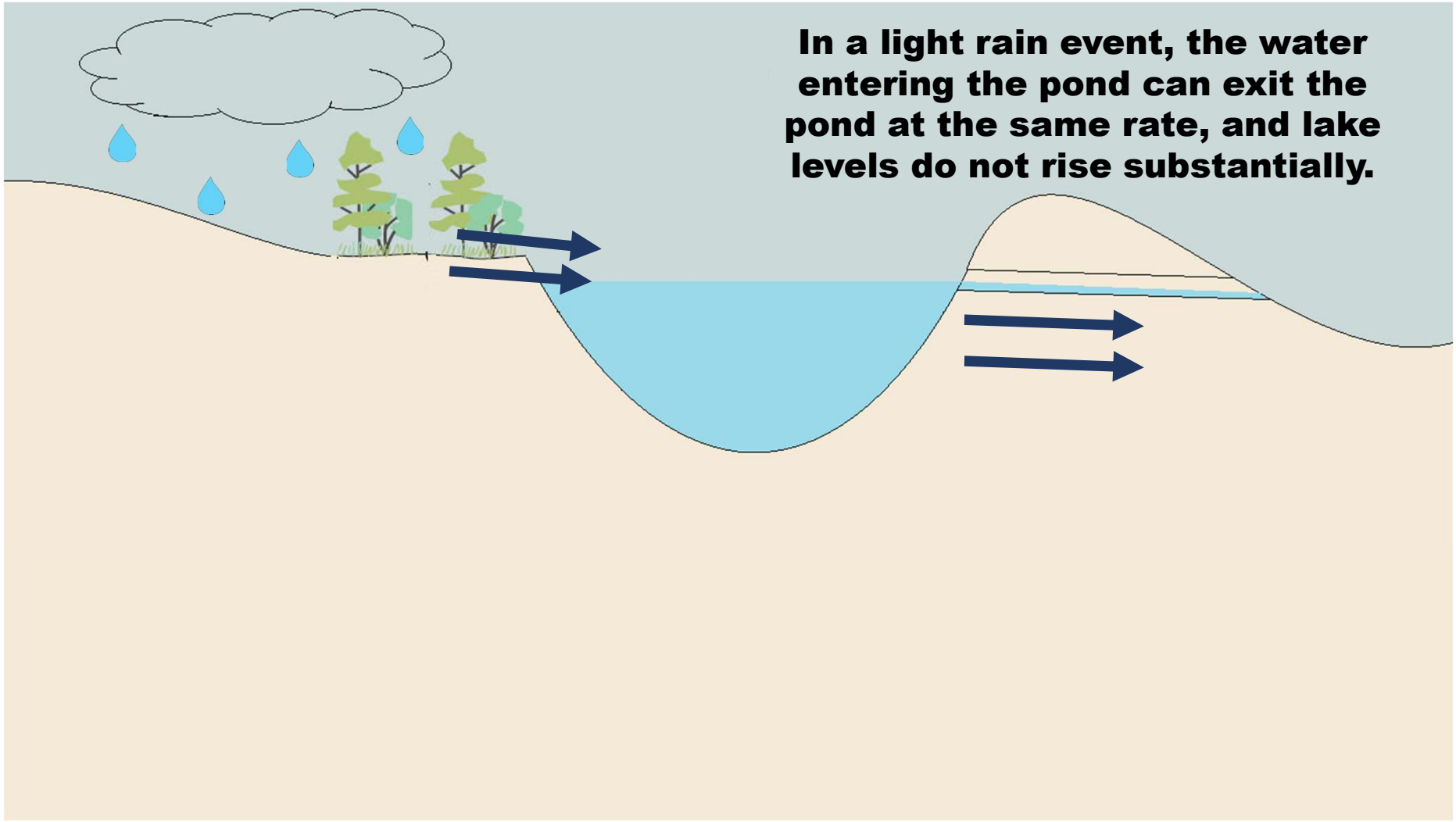
Background Information: Hydrology 101

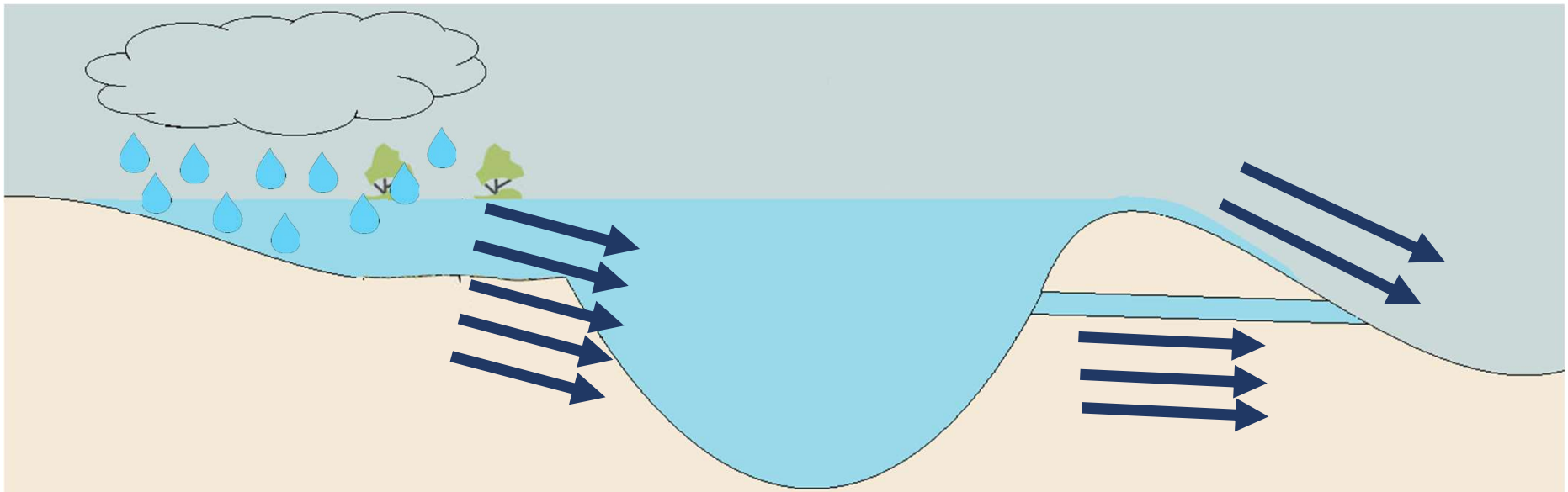


As long as water can exit the tub as quickly as it enters, the water level will initially rise to the level of the drain and then remain at that elevation.



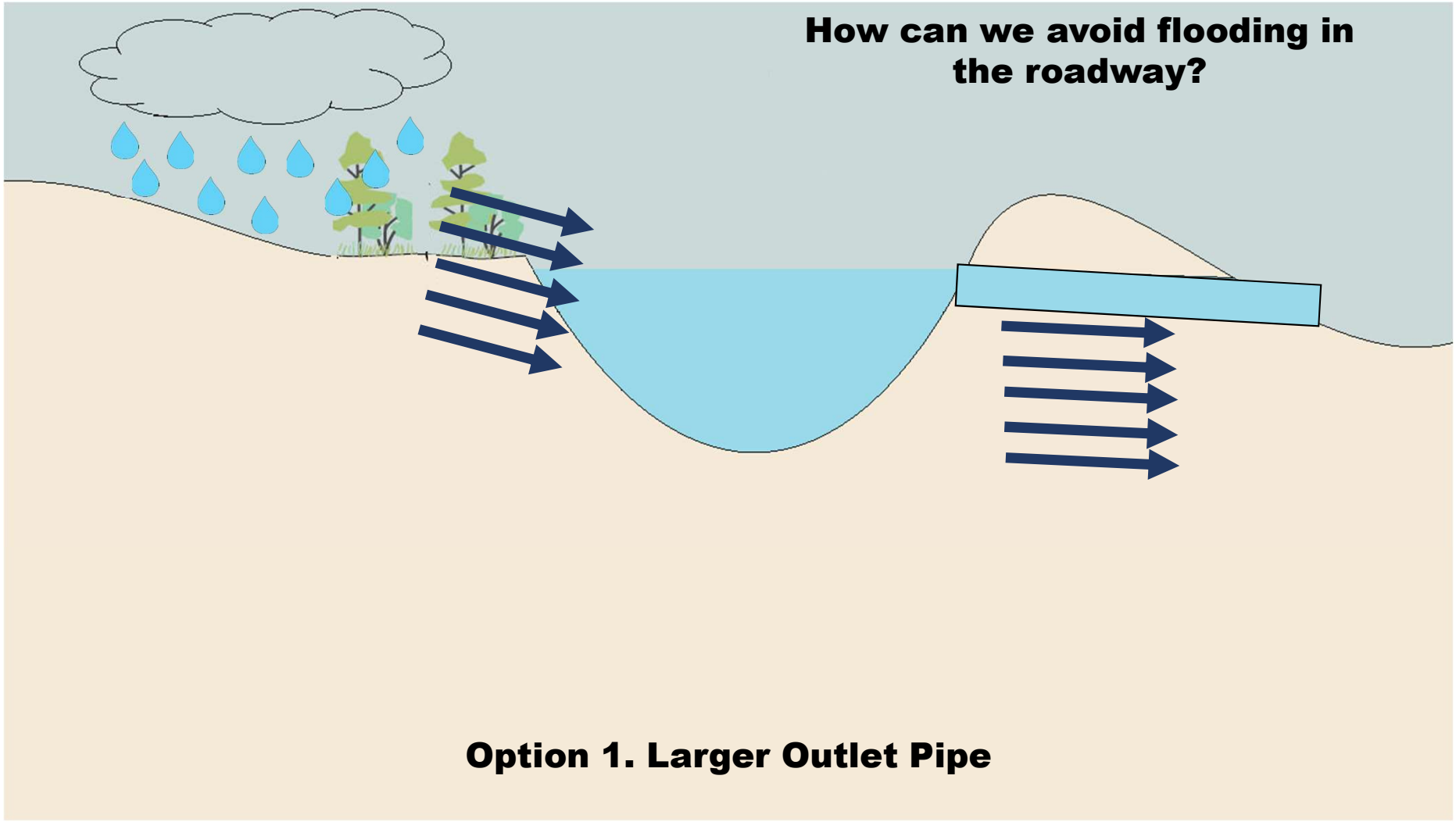
If water enters the tub more quickly than it can exit, the tub will eventually overflow.

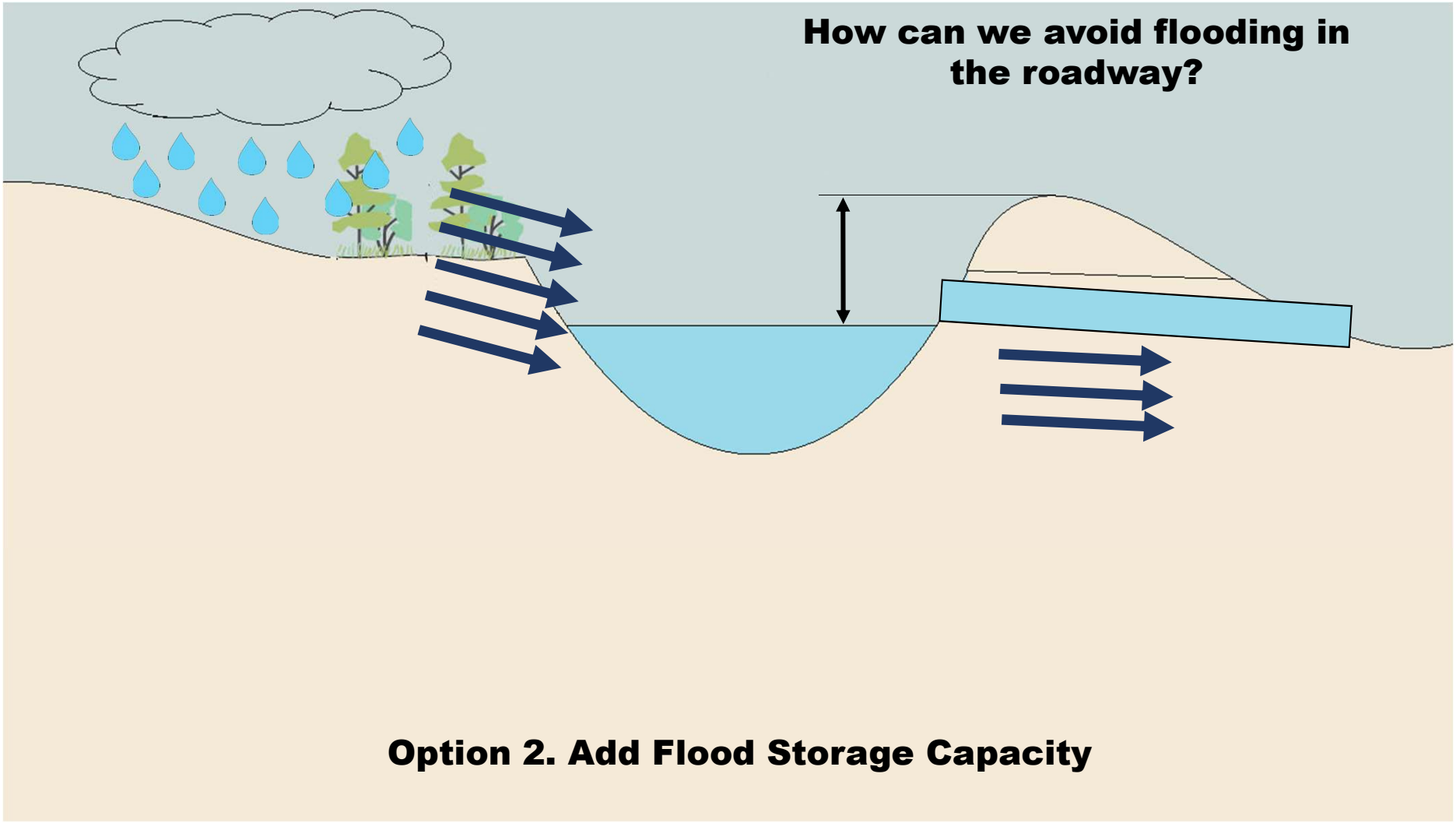

In a light rain event, the water entering the pond can exit the pond at the same rate, and lake levels do not rise substantially.

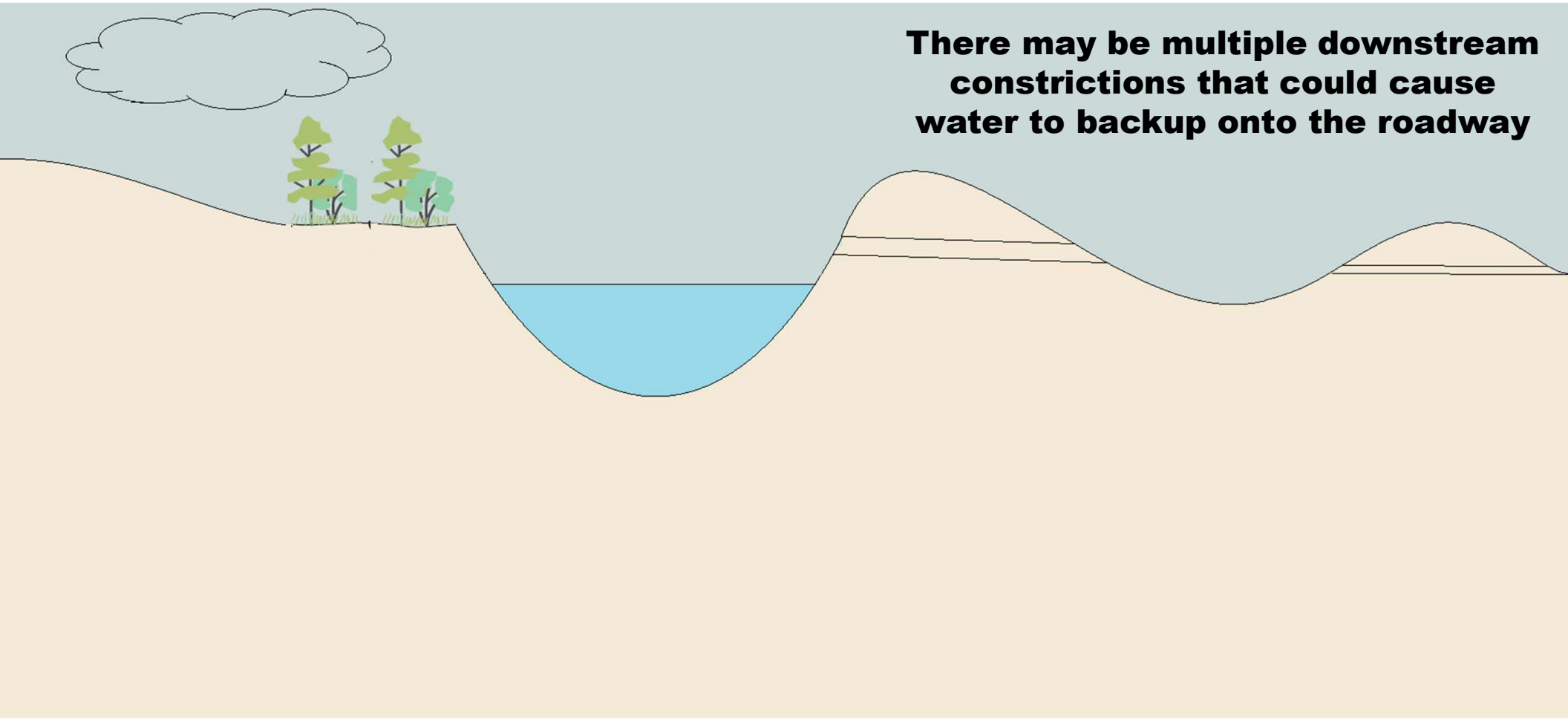


In a heavy rain event, water may enter the system more quickly than it can exit, causing water levels to rise.

Given enough time under these conditions, the system would eventually find an overflow path.

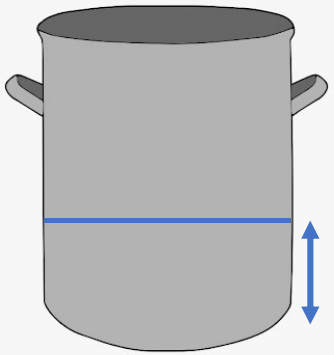

How can we avoid flooding in the roadway?
Option 1. Larger Outlet Pipe


How can we avoid flooding in the roadway?
Option 2. Add Flood Storage Capacity


There may be multiple downstream constrictions that could cause water to backup onto the roadway

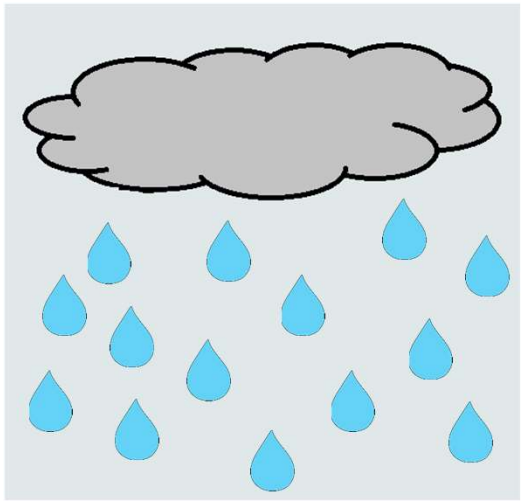
STORM FREQUENCY

How much did it rain?



2.49 inches
24-hours

1-year, 24-hr



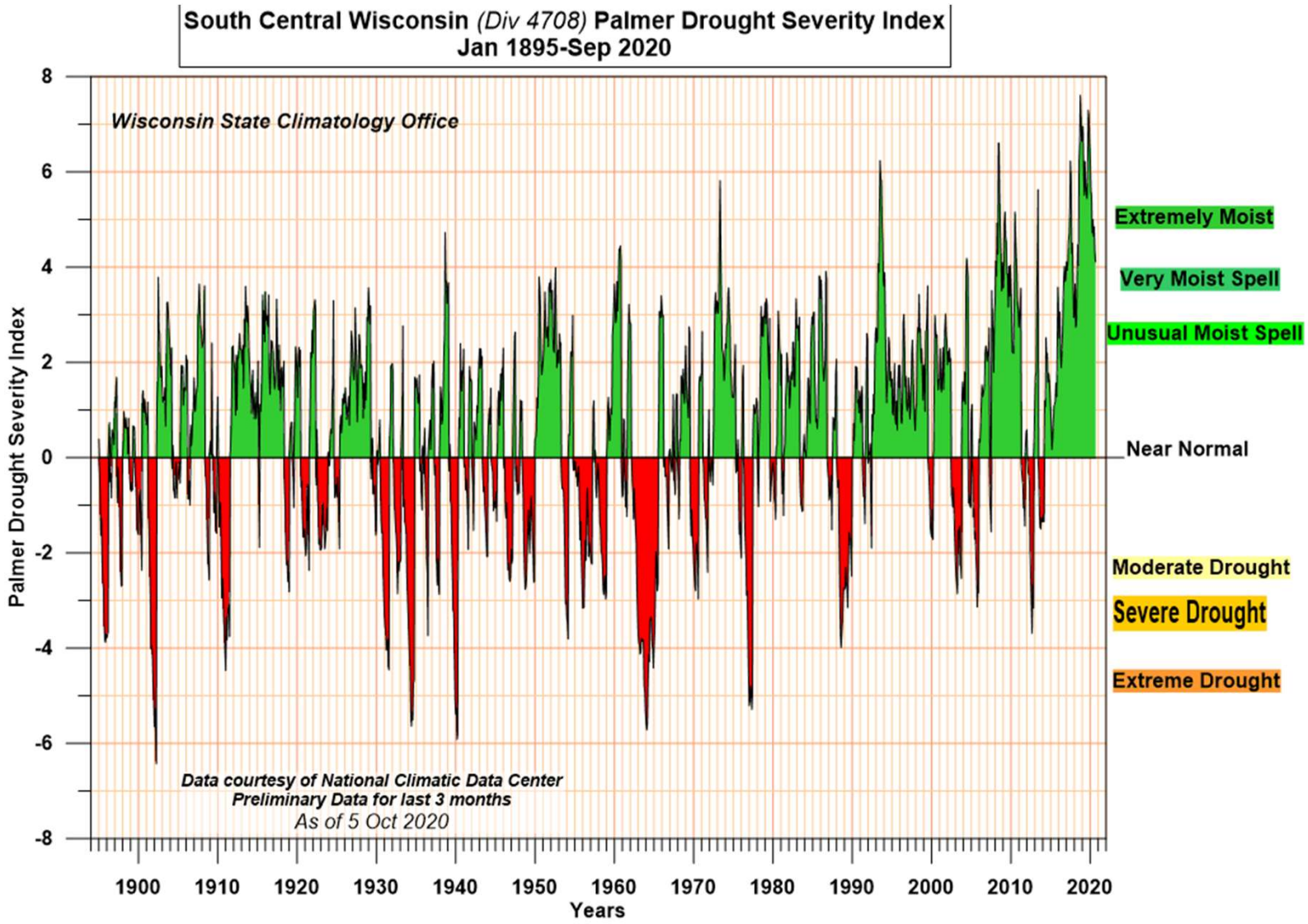
6.66 inches
24-hours

100-year, 24-hr

STORM FREQUENCY

What does "100-year storm" really mean?

- When we talk about "storm events" we mean what is the risk for a given rainfall total
  - The 100-year storm has a one percent chance of occurring in **any given year**
  - The 2-year storm has a 50 percent chance of occurring in **any given year**

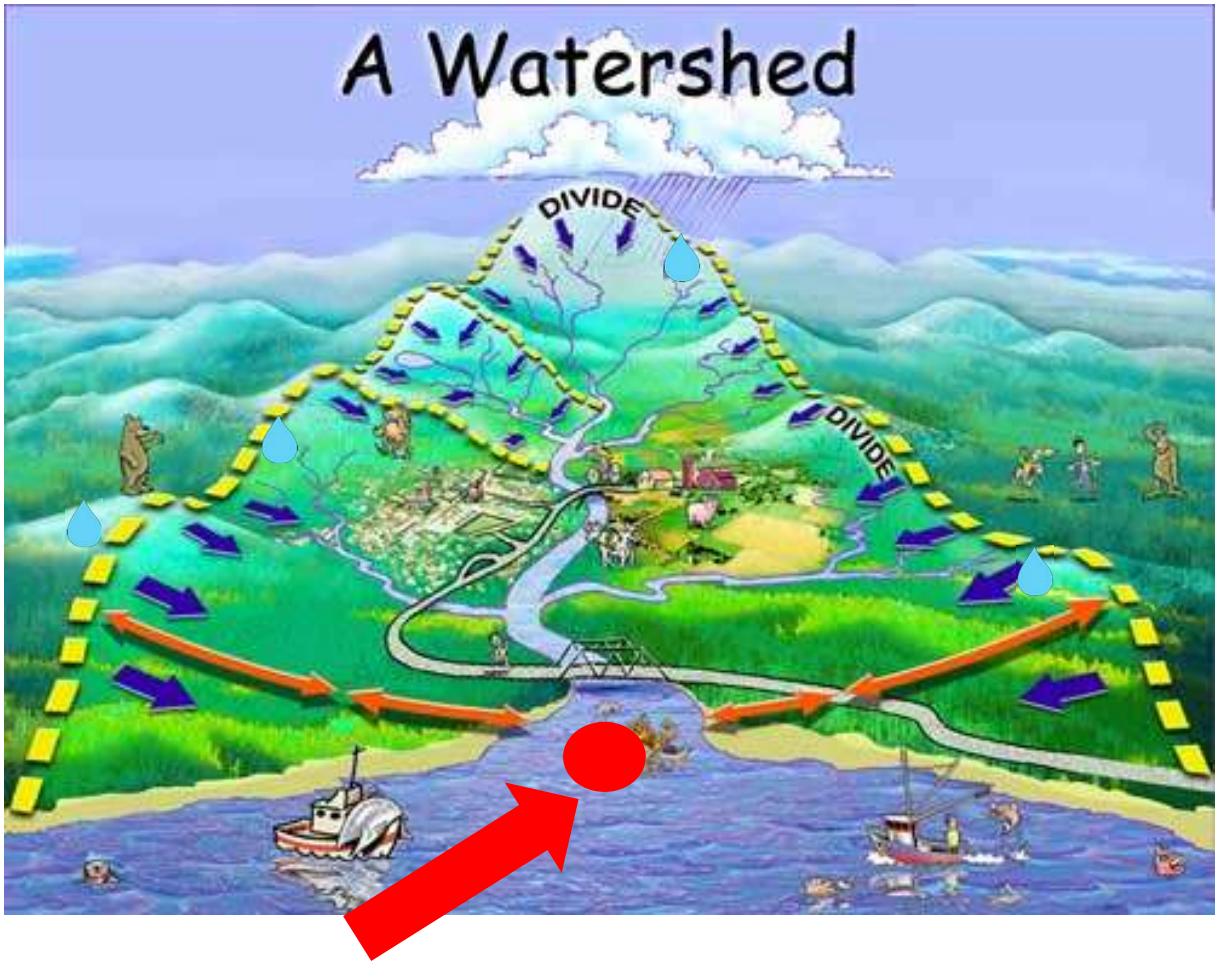

South Central Wisconsin (Div 4708) Palmer Drought Severity Index
Jan 1895-Sep 2020
Wisconsin State Climatology Office
Palmer Drought Severity Index
8
6
4
2
0
-2
-4
-6
-8
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2020
Years
Extremely Moist
Very Moist Spell
Unusual Moist Spell
Near Normal
Moderate Drought
Severe Drought
Extreme Drought
Data courtesy of National Climatic Data Center
Preliminary Data for last 3 months
As of 5 Oct 2020

WATERSHEDS 101

How much water is actually getting to the pond?

A watershed is the area of land that drains to a single point.

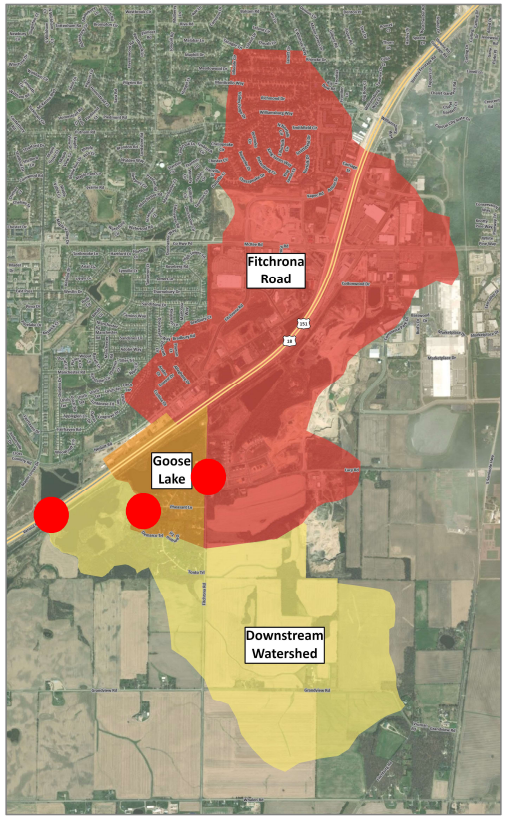
How much water is actually getting to the pond?



WATERSHEDS 101

How much water is actually getting to the pond?

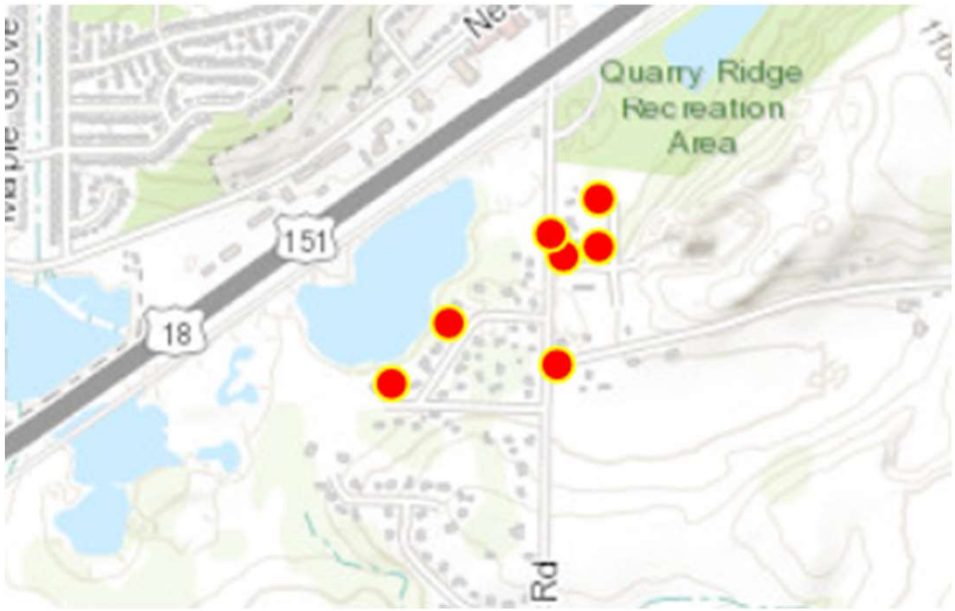
- Factors affecting runoff:
  - Drainage area size
  - Rainfall intensity, duration, and distribution
  - Soil types
  - Land use/level of imperviousness
  - Open channel or storm sewer
  - Slope of watershed (raindrop travel time)

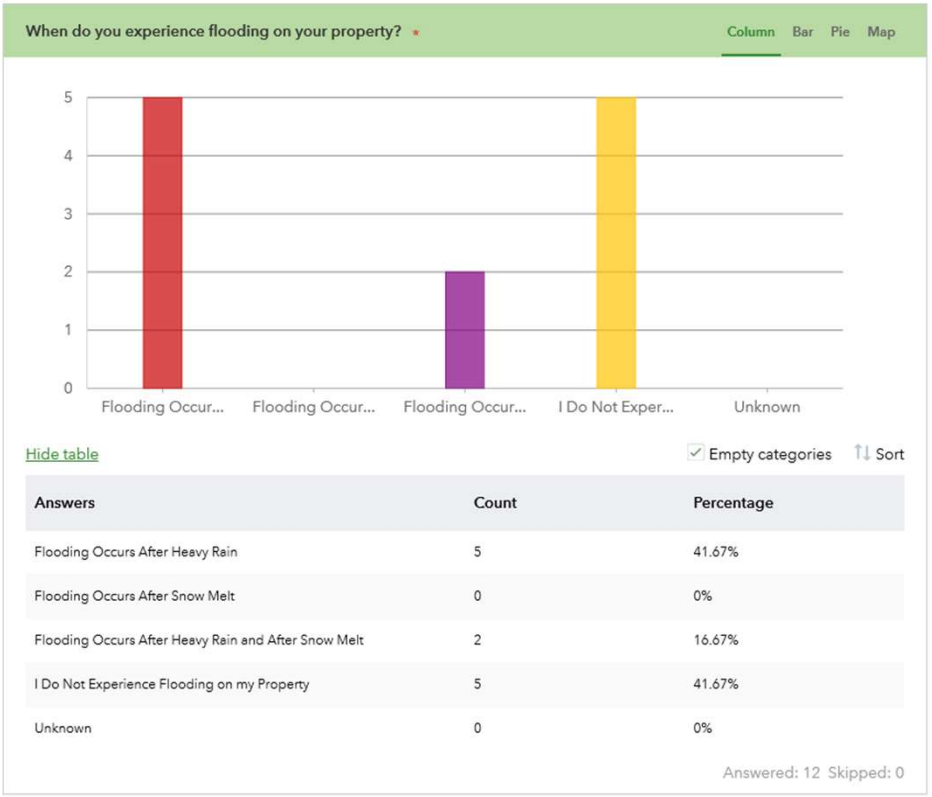


Project Update

SURVEY 123 RESULTS

Eleven Respondents—Seven Residing in Fitchrona Road Immediate Area

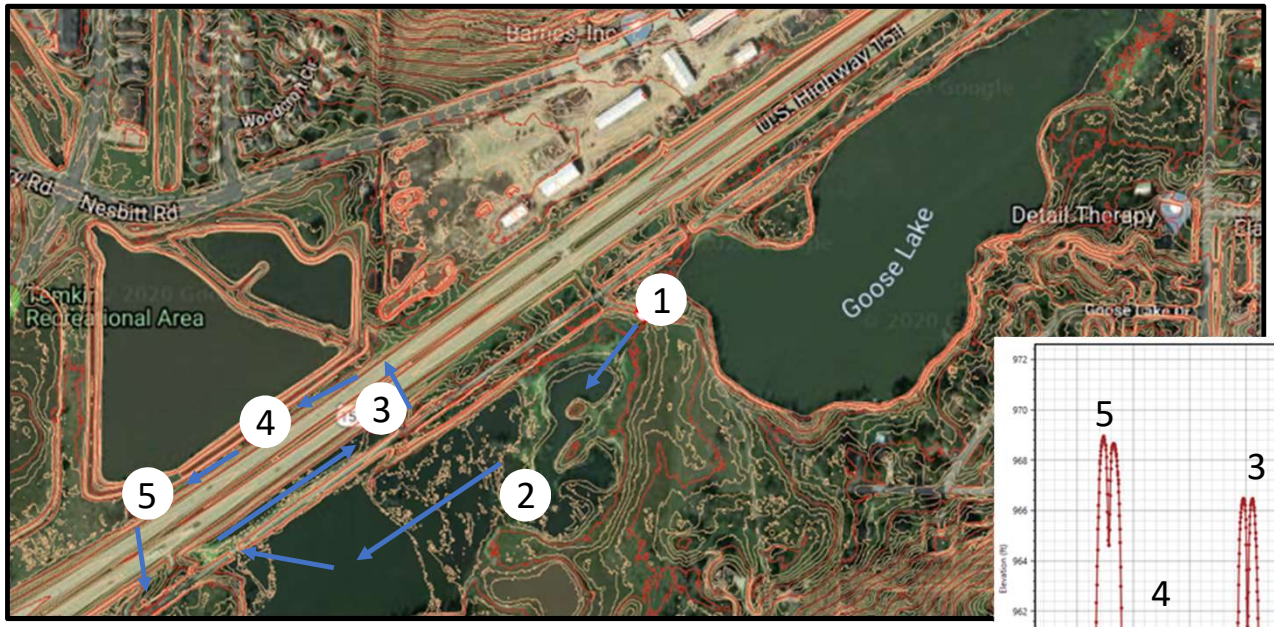




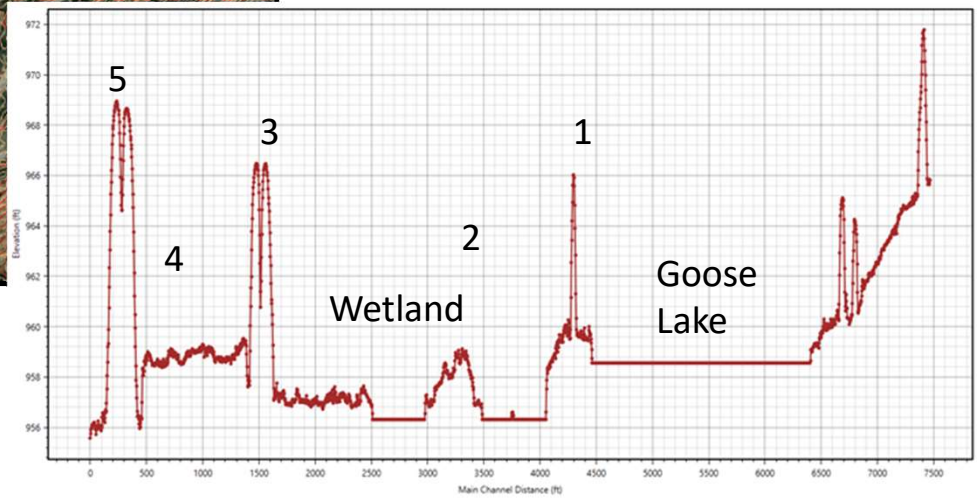
Answers	Count	Percentage
Flooding Occurs After Heavy Rain	5	41.67%
Flooding Occurs After Snow Melt	0	0%
Flooding Occurs After Heavy Rain and After Snow Melt	2	16.67%
I Do Not Experience Flooding on my Property	5	41.67%
Unknown	0	0%

Answered: 12 Skipped: 0

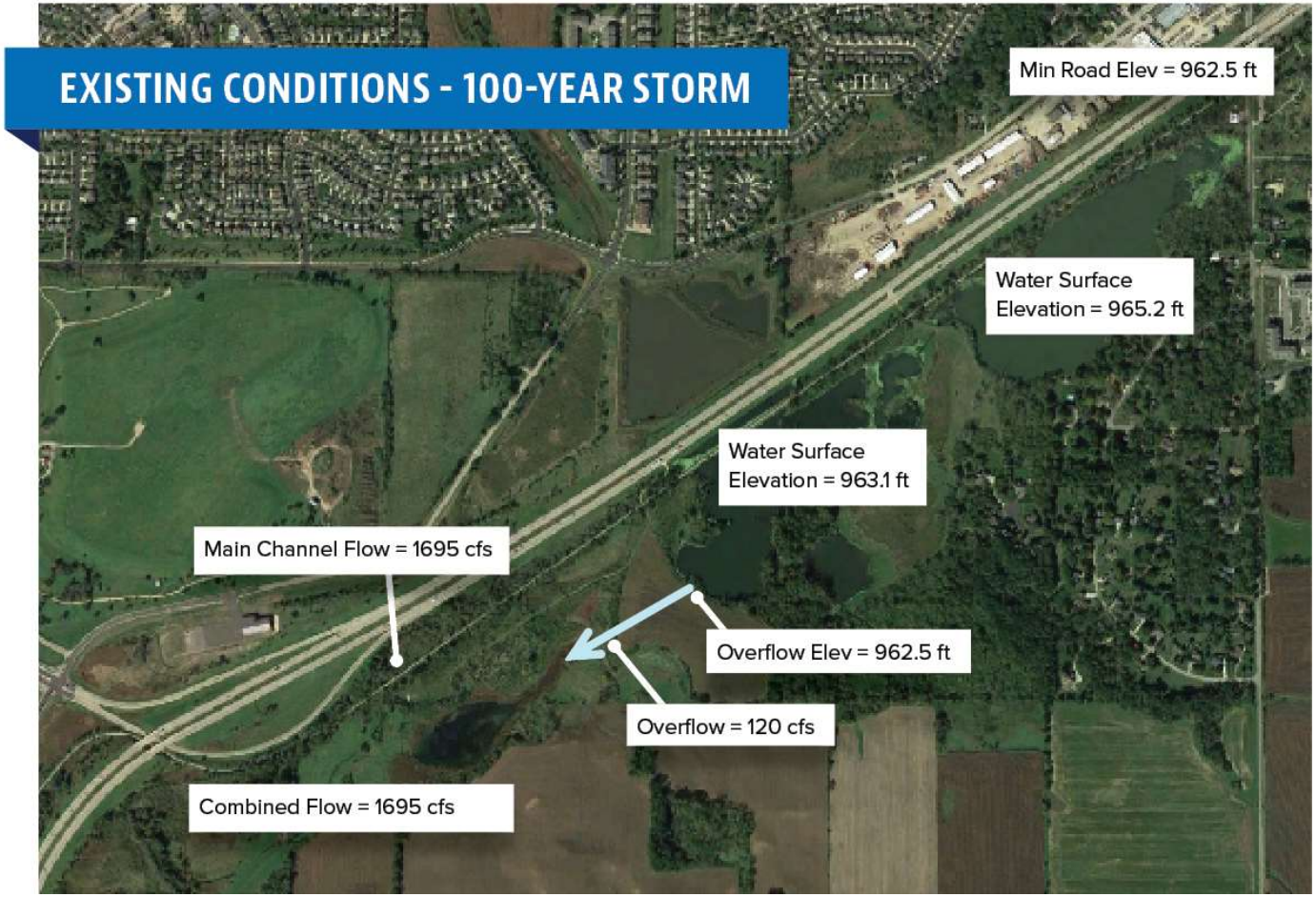
ROADBLOCKS DOWNSTREAM OF FITCHRONA ROAD



Flow Profile



EXISTING CONDITIONS



STORM EVENT COMPARISON

Goose Lake Water Surface Elevations

EVENT	EXISTING CONDITIONS
100-year	965.2
50-year	964.7
25-year	964.0
10-year	962.7
5-year	961.8
2-year	961.1

Fitchrona Road Floods

Road to Solutions

Recap of Issues from PIM #1

- Factors affecting runoff
- Bridge Clearance at USH 18/151
- Desire to minimize downstream impacts to the extent possible
- Regulatory considerations

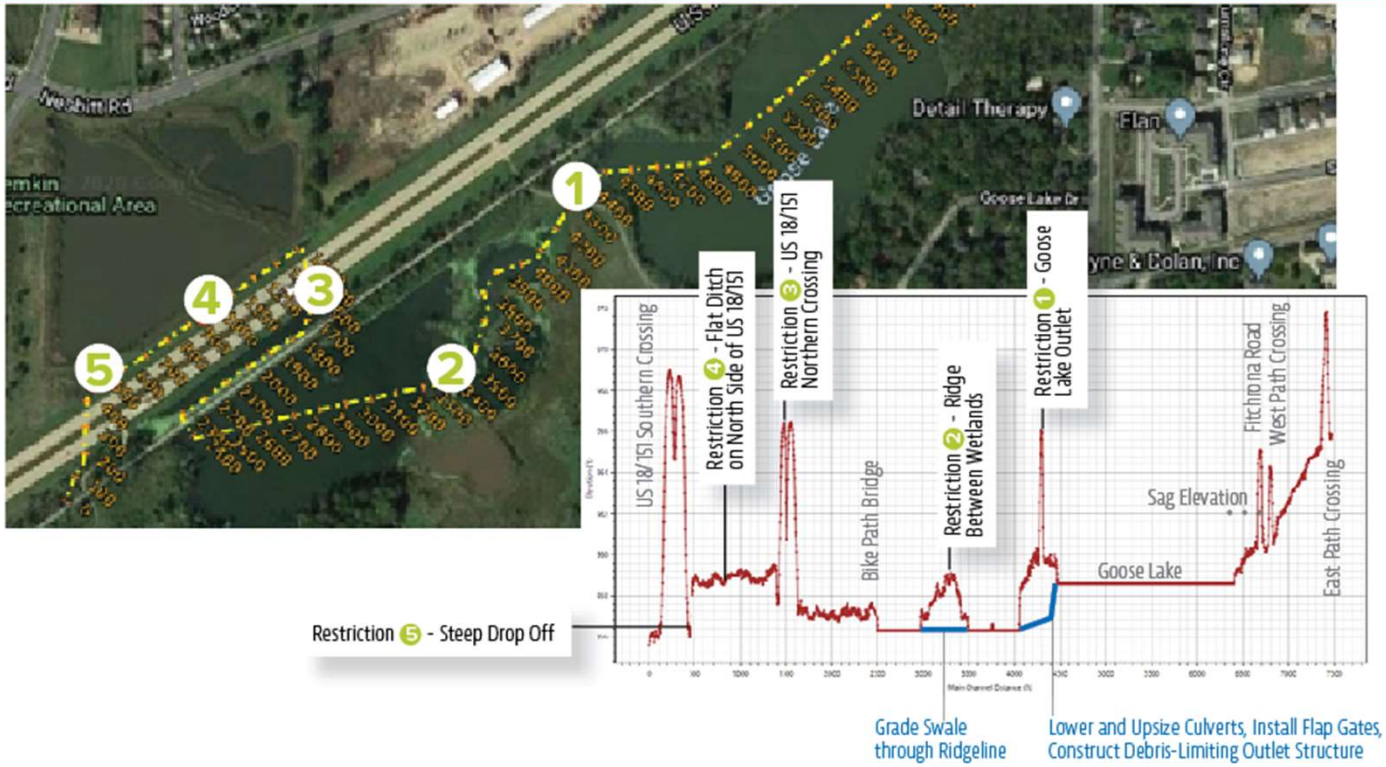
RECAP OF ORIGINAL ALTERNATIVES PRESENTED AT PIM #1

Original Alternative	Description of Alternative
1	Increase downstream conveyance
2	Increase downstream conveyance with shortcut
3	Increase storage in the system

ORIGINAL ALTERNATIVE 1

Increase downstream conveyance

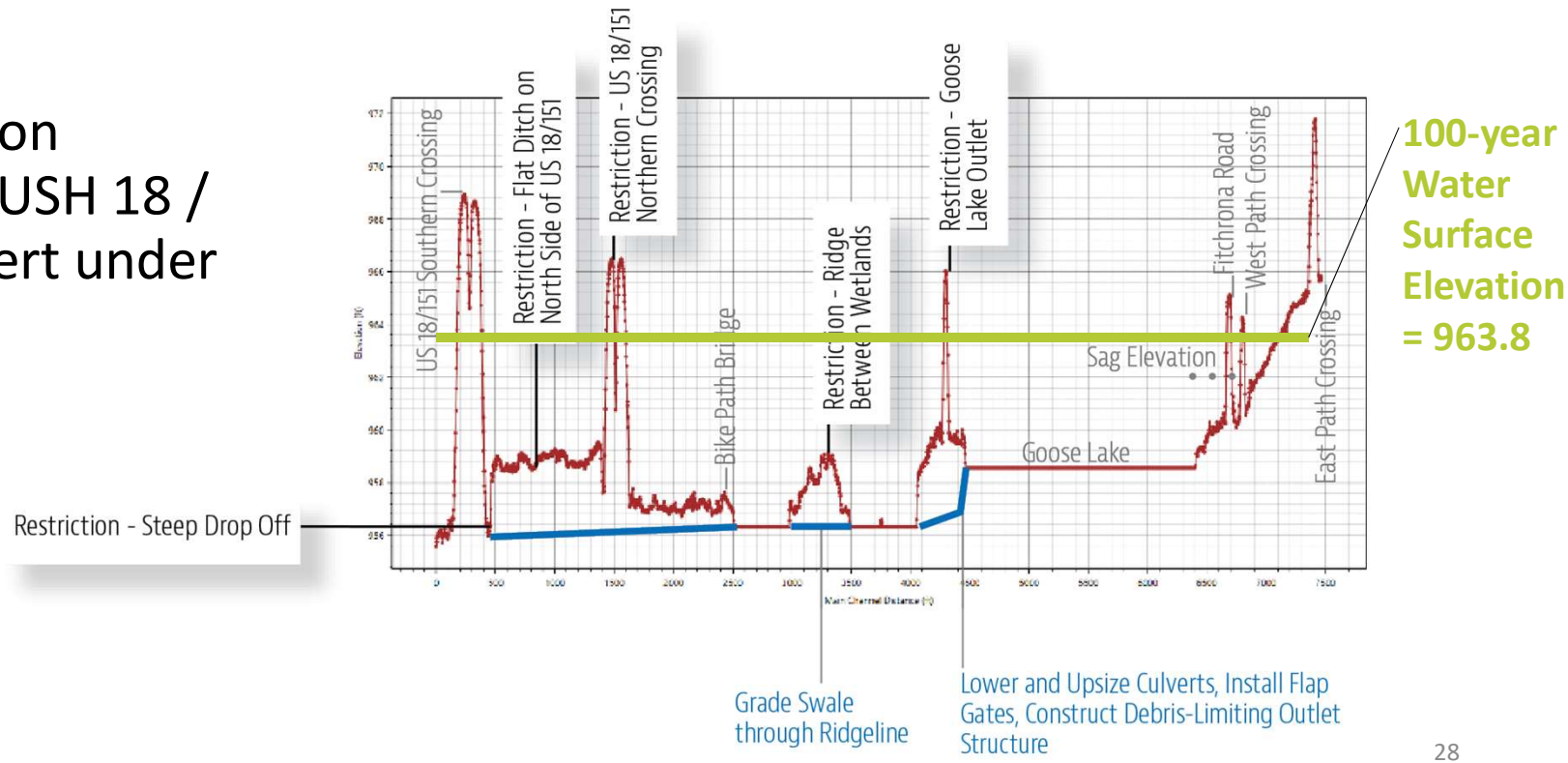
- Increase downstream conveyance
  - Larger culverts at locations 1 and 3
  - Grading at locations 2 and 4



ORIGINAL ALTERNATIVE 1

Increase downstream conveyance

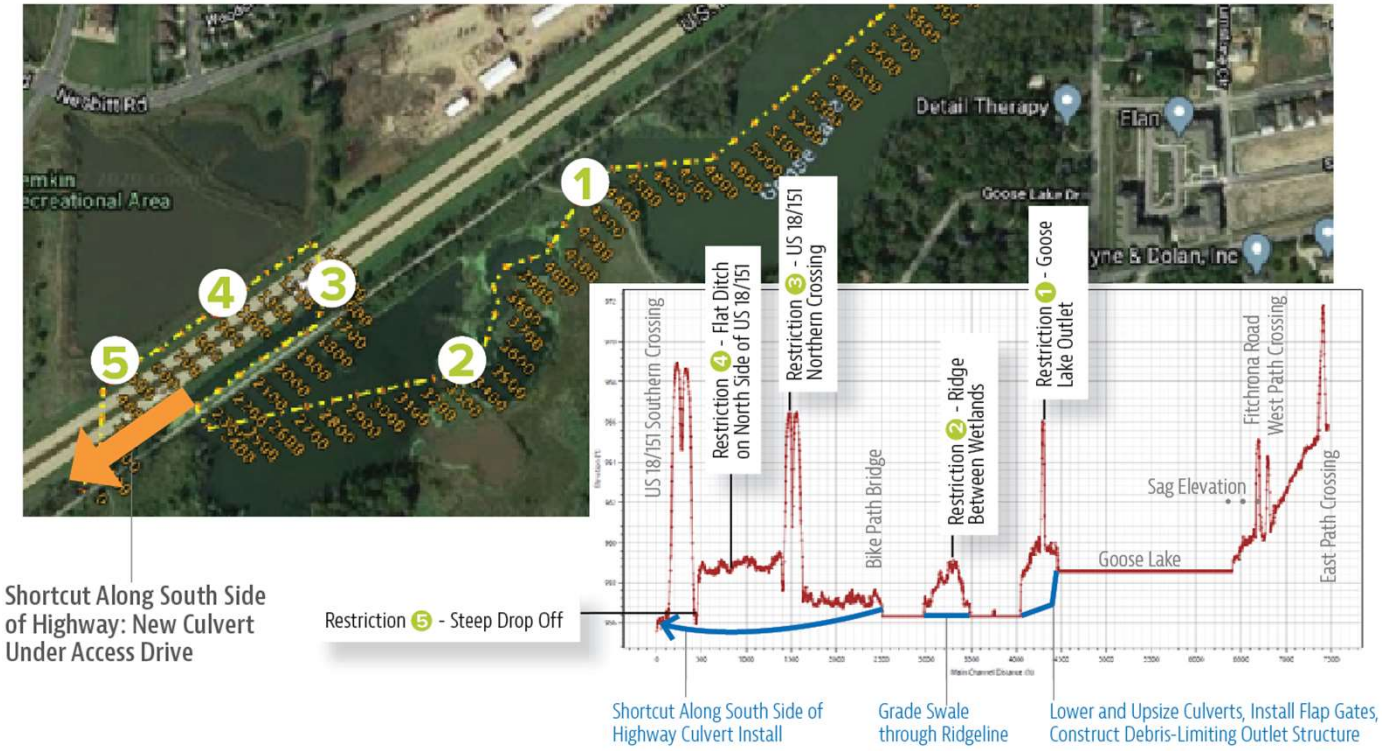
- Flood elevation upstream of USH 18 / 151 box culvert under is too high.



ORIGINAL ALTERNATIVE 2

Increase downstream conveyance with shortcut

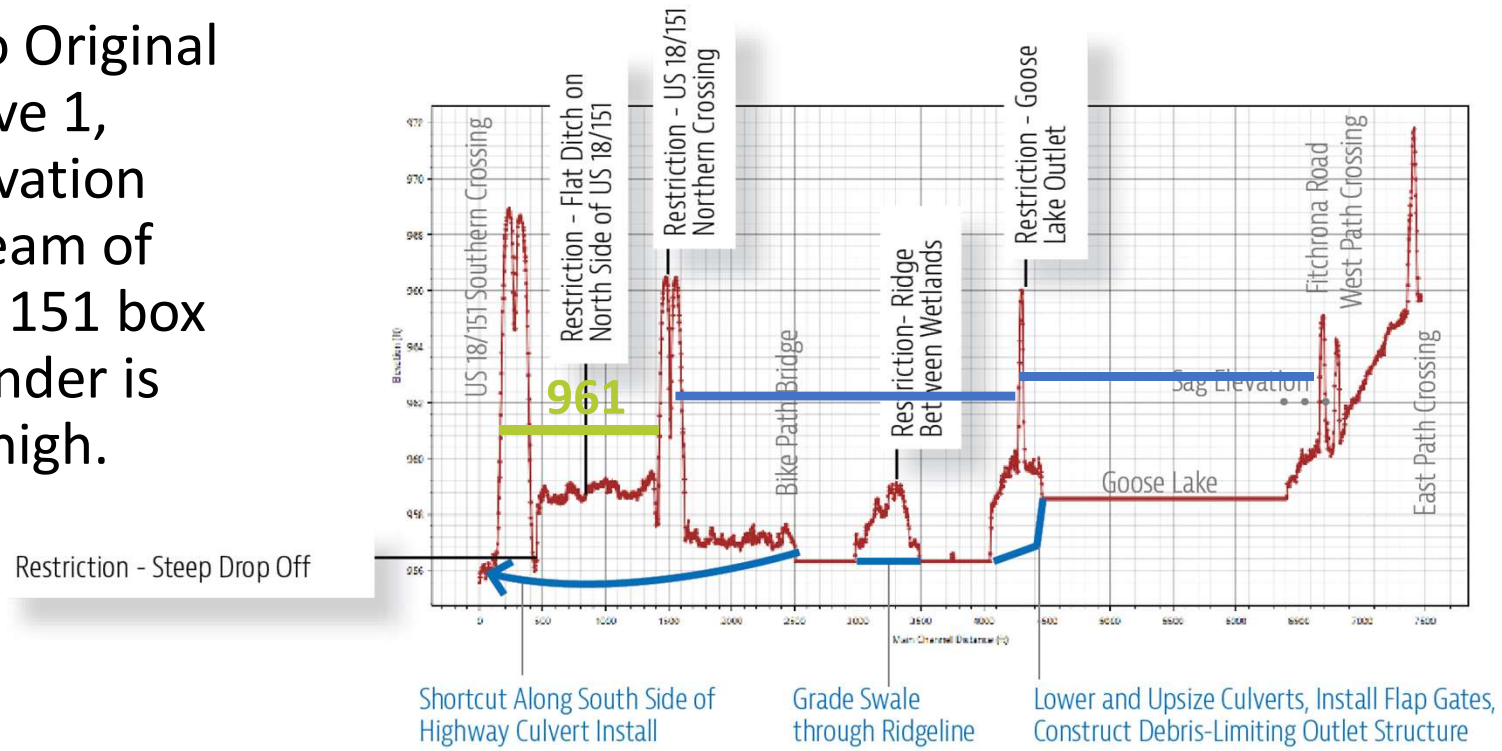
- "**Shortcuts**" the system through **new culvert** under driveway between highway and trail.
- Still requires larger culverts at location 1 and grading at location 2.



ORIGINAL ALTERNATIVE 2

Increase downstream conveyance with shortcut

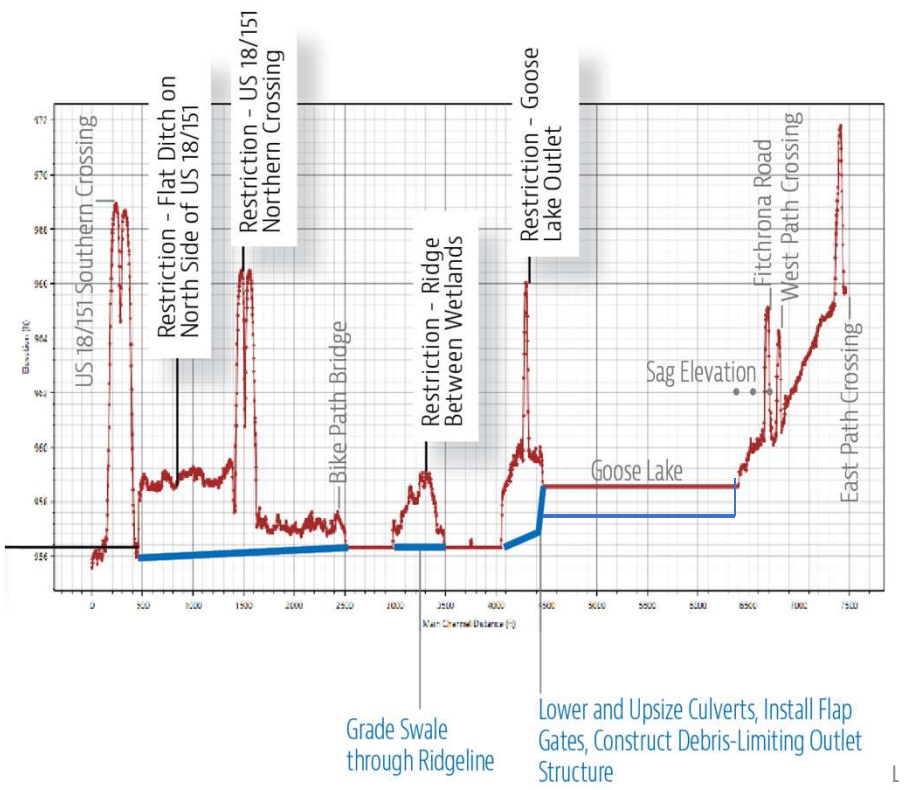
- Similar to Original Alternative 1, flood elevation downstream of USH 18 / 151 box culvert under is also too high.



ORIGINAL ALTERNATIVE 3

Increase storage in the system

- Increasing storage is part of the solution, but not the only part.
- Lower the normal water surface elevation without adversely impacting riparian landowners
- Still need to provide additional downstream conveyance



DOWNSTREAM IMPACTS REQUIRED A FRESH APPROACH

Original Alternative	Description of Alternative
1	Increase downstream conveyance—**"roadblock" upstream of USH 18/151 culvert**
2	Increase downstream conveyance with shortcut—**downstream water surface elevations still too high with energy losses through system**
3	Increase storage in the system—**part of the solution, but not the only part.**

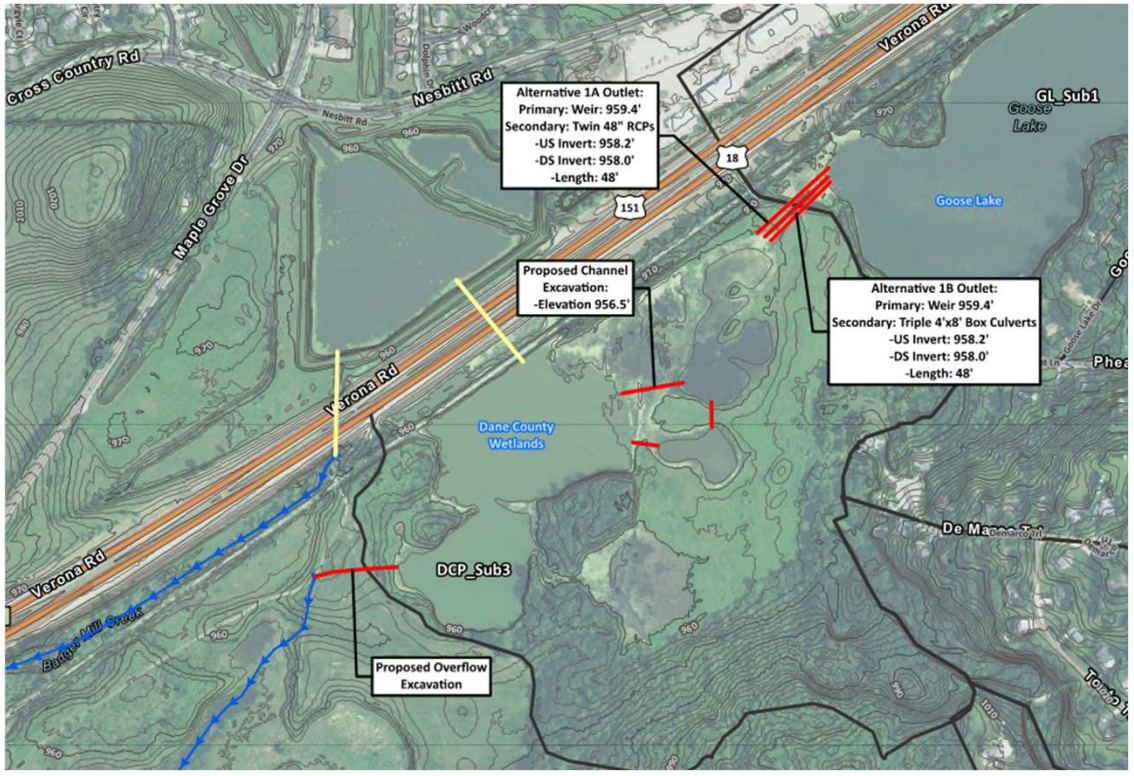
Questions so far?

Summary of Changes to Alternatives

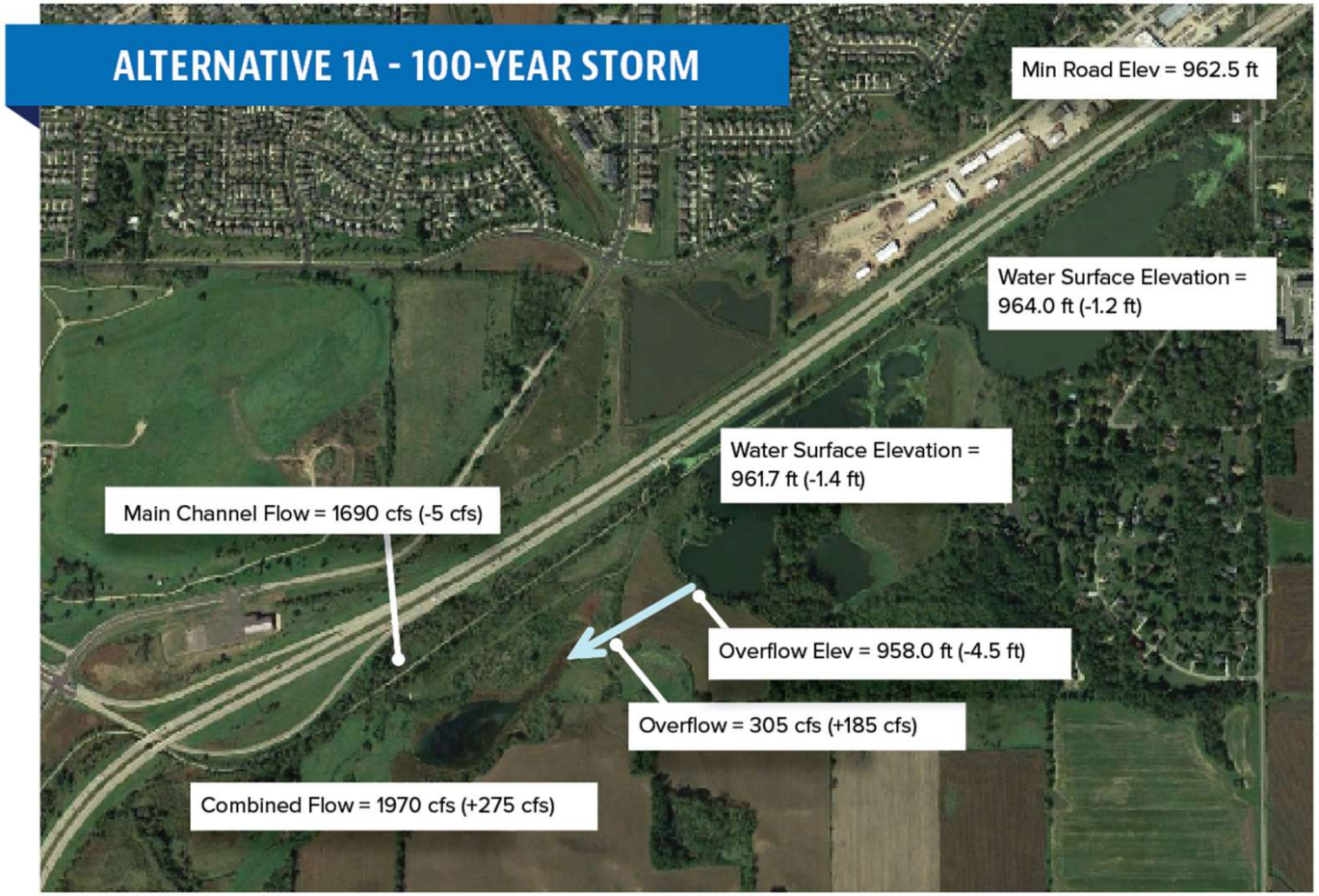
Alternative	Description of Alternative	Summary of Changes
1A	Increase downstream conveyance (larger pipes exiting Goose Lake)	Moderate increase to Goose Lake Outlet Capacity Grade Outlet Channels from Downstream Wetlands
1B	Increase downstream conveyance (much larger pipes exiting Goose Lake)	Same as 1A, but Significant Increase to Goose Lake Outlet Capacity

ALTERNATIVES 1A & 1B

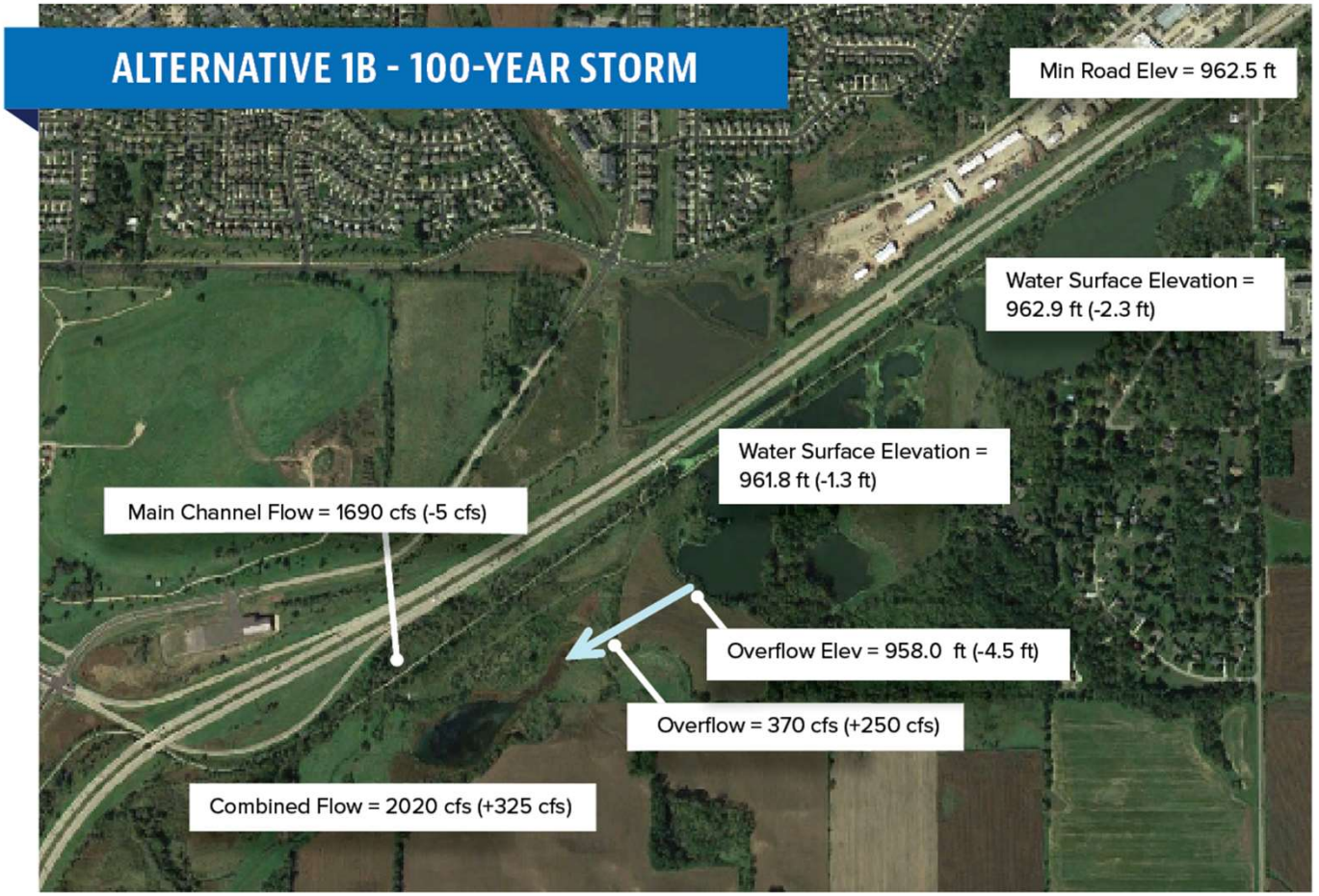
Increase downstream conveyance



ALTERNATIVES 1A CHANGES



ALTERNATIVES 1B CHANGES



STORM EVENT COMPARISON

Goose Lake Water Surface Elevations

EVENT	EXISTING CONDITIONS	ALTERNATIVE 1A	ALTERNATIVE 1B
100-year	965.2	964.0	962.9
50-year	964.7	963.3	962.4
25-year	964.0	962.5	961.8
10-year	962.7	961.5	961.1
5-year	961.8	960.8	960.6
2-year	961.1	960.2	960.1

Fitchrona Road Floods

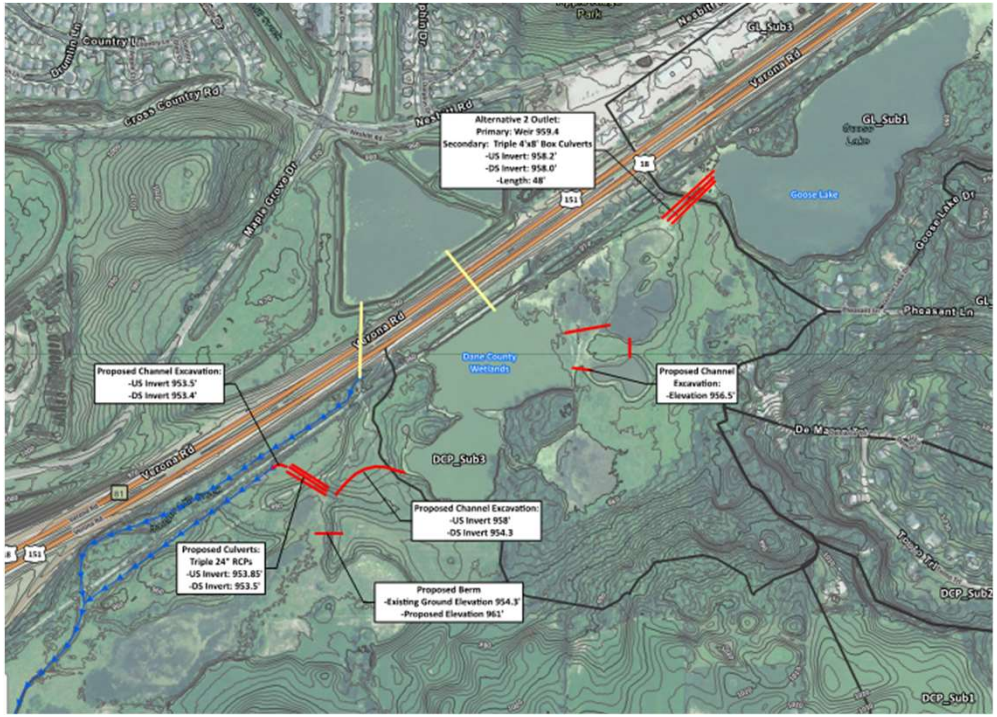
Summary of Changes to Alternatives

Alternative	Description of Alternative	Summary of Changes
1A	Increase downstream conveyance (larger pipes exiting Goose Lake)	Moderate increase to Goose Lake Outlet Capacity Grade Outlet Channels from Downstream Wetlands
1B	Increase downstream conveyance (much larger pipes exiting Goose Lake)	Same as 1A, but Significant Increase to Goose Lake Outlet Capacity
2	Increase downstream conveyance with flow along bike path to Badger Mill Creek	Same as 1B, but drainage along Military Ridge Trail

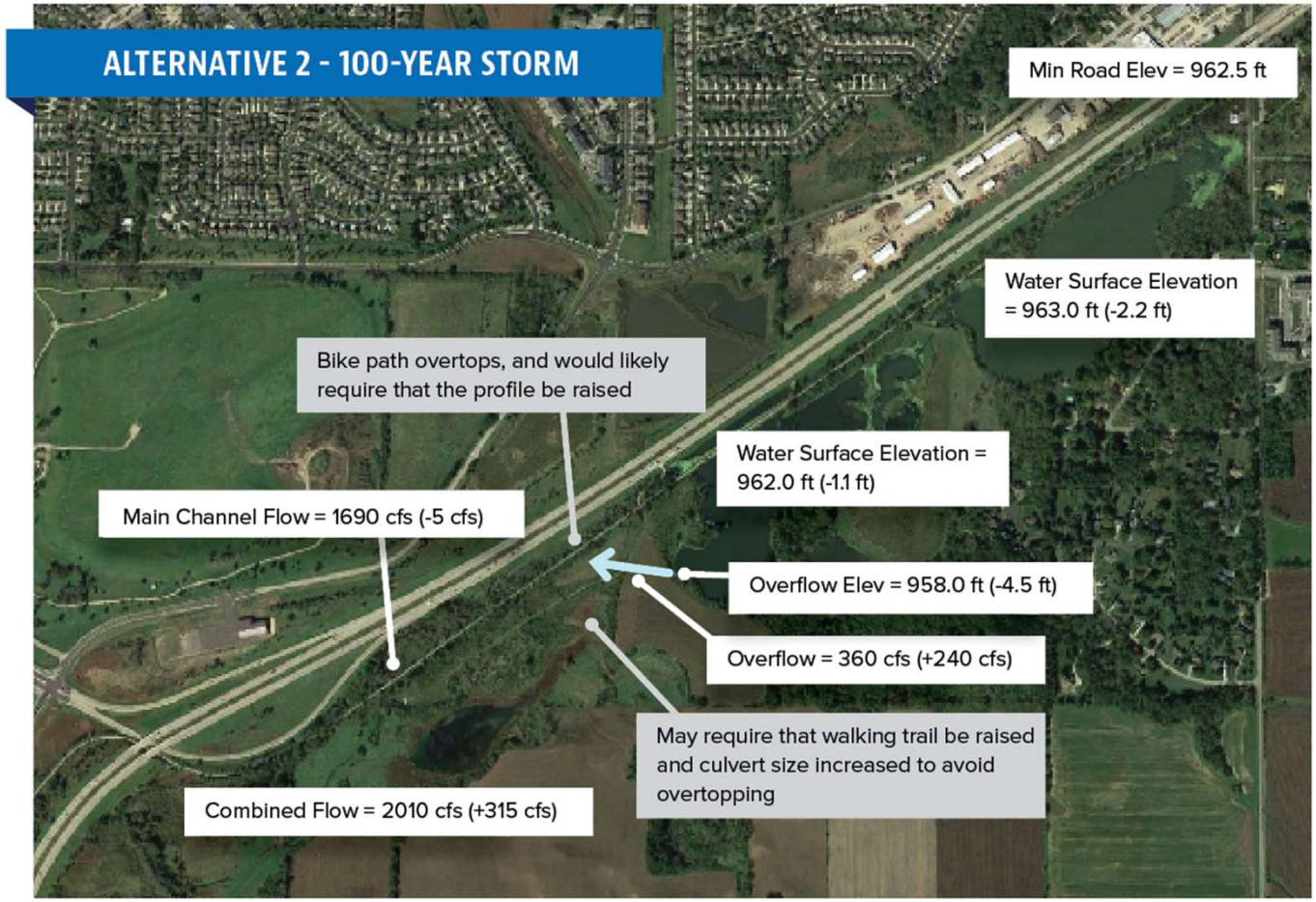
ALTERNATIVE 2

Increase downstream conveyance

- Similar to Alternative 1B but modifies overflow route.



ALTERNATIVE 2 CHANGES



FREQUENT EVENT COMPARISON

Goose Lake Water Surface Elevations

EVENT	EXISTING CONDITIONS	ALTERNATIVE 1A	ALTERNATIVE 1B	ALTERNATIVE 2
100-year	965.2	964.0	962.9	963.0
50-year	964.7	963.3	962.4	962.5
25-year	964.0	962.5	961.8	961.9
10-year	962.7	961.5	961.1	961.1
5-year	961.8	960.8	960.6	960.6
2-year	961.1	960.2	960.1	960.1

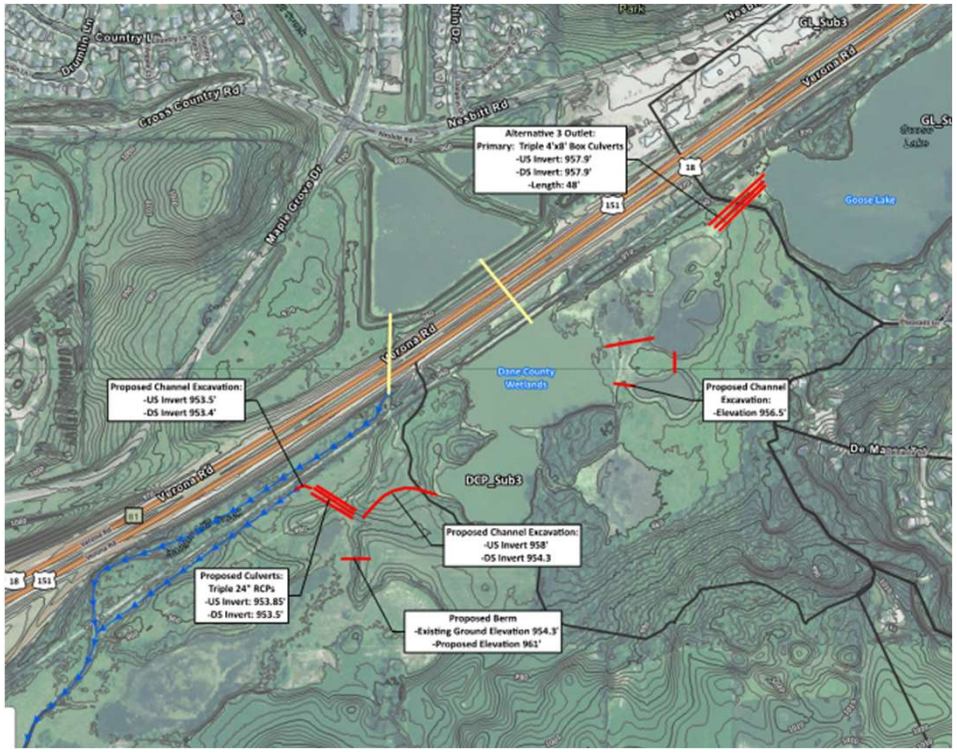
Fitchrona Road Floods

Summary of Changes to Alternatives

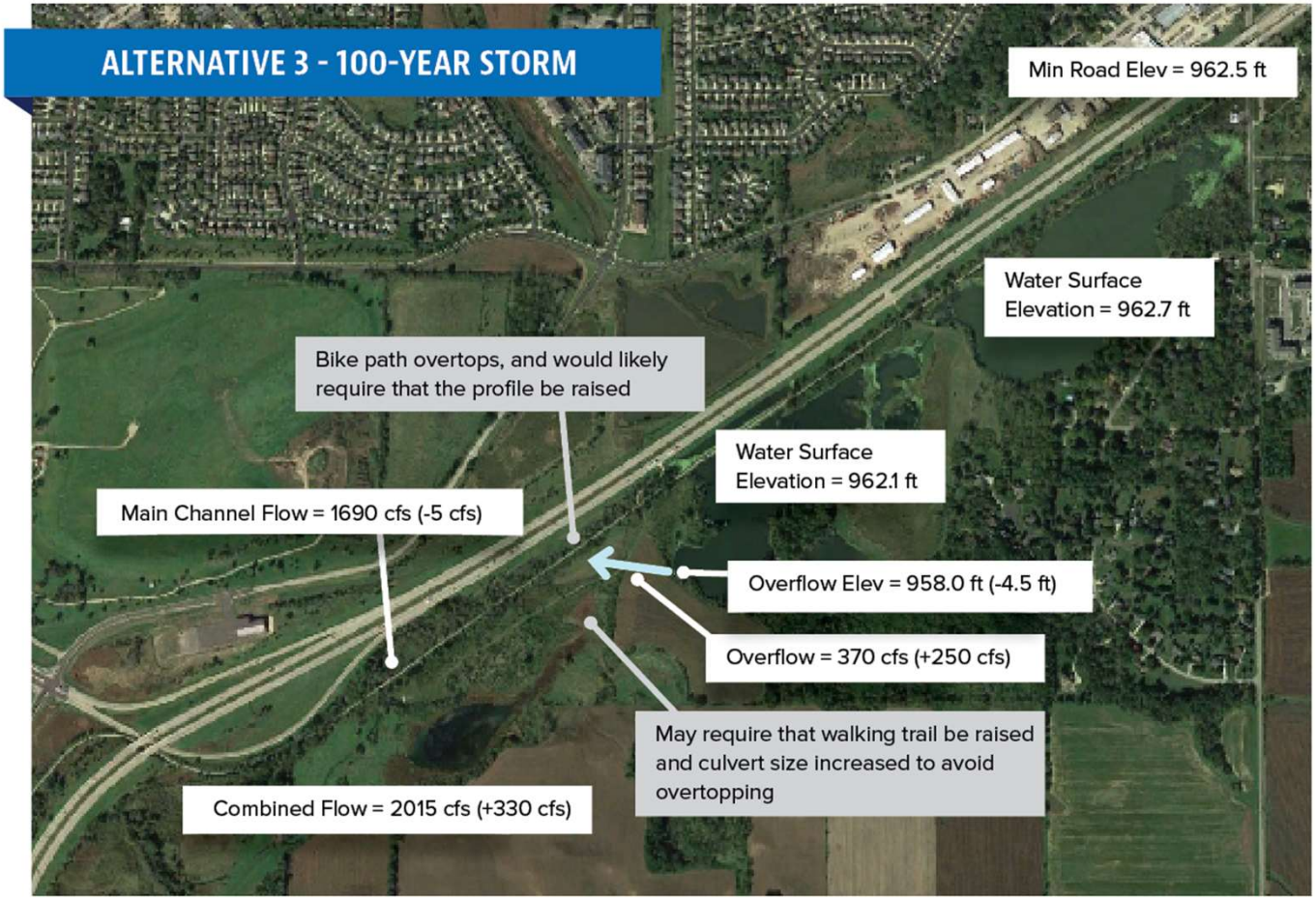
Alternative	Description of Alternative	Summary of Changes
1A	Increase downstream conveyance (larger pipes exiting Goose Lake)	Moderate increase to Goose Lake Outlet Capacity Grade Outlet Channels from Downstream Wetlands
1B	Increase downstream conveyance (much larger pipes exiting Goose Lake)	Same as 1A, but Significant Increase to Goose Lake Outlet Capacity
2	Increase downstream conveyance with flow along bike path to Badger Mill Creek	Same as 1B, but drainage along Military Ridge Trail
3	Increase storage in the system including downstream conveyance	Same as 2, but lowers Goose Lake Water Level

ALTERNATIVE 3

Downstream conveyance & Lower Goose Lake water surface



ALTERNATIVE 3 CHANGES



FREQUENT EVENT COMPARISON

Goose Lake Water Surface Elevations

EVENT	EXISTING CONDITIONS	ALTERNATIVE 1A	ALTERNATIVE 1B	ALTERNATIVE 2	ALTERNATIVE 3
100-year	965.2	964.0	962.9	963.0	962.7
50-year	964.7	963.3	962.4	962.5	962.1
25-year	964.0	962.5	961.8	961.9	961.5
10-year	962.7	961.5	961.1	961.1	960.6
5-year	961.8	960.8	960.6	960.6	959.9
2-year	961.1	960.2	960.1	960.1	959.2

Fitchrona Road Floods

PRELIMINARY PREFERRED PLAN

- Combination of Alternative 1A and 3
  - Overflow Route: Alt 1A
  - Outlet Capacity: Alt 1A
  - Lowering Goose Lake: Alt 3

LIKELY CONSTRUCTION COSTS

Alternative	Description of Alternative	Probable Costs
1A	Increase downstream conveyance (larger pipes exiting Goose Lake)	$301,500
1B	Increase downstream conveyance (much larger pipes exiting Goose Lake)	$522,700
2	Increase downstream conveyance with flow along bike path to Badger Mill Creek	$623,400
3	Increase storage in the system including downstream conveyance	$607,600
Preferred Combination	1A for conveyance, 3 for water level	$293,600

NEXT STEPS

- Confirm preferred option
- Evaluate Fitchrona Road drainage design based on preferred option
- Meet with Wisconsin DNR to review future permitting requirements
- Submit FEMA grant application
- Decision Point—stakeholder buy-in, funding sources
  - Capital Improvement Plan
  - Design and Construction

Questions?

http://www.fitchburgwi.gov/2660/Fitchrona-Rd-Flood-Study

THE CITY OF Fitchburg

TOWN OF VERONA

AE2S

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