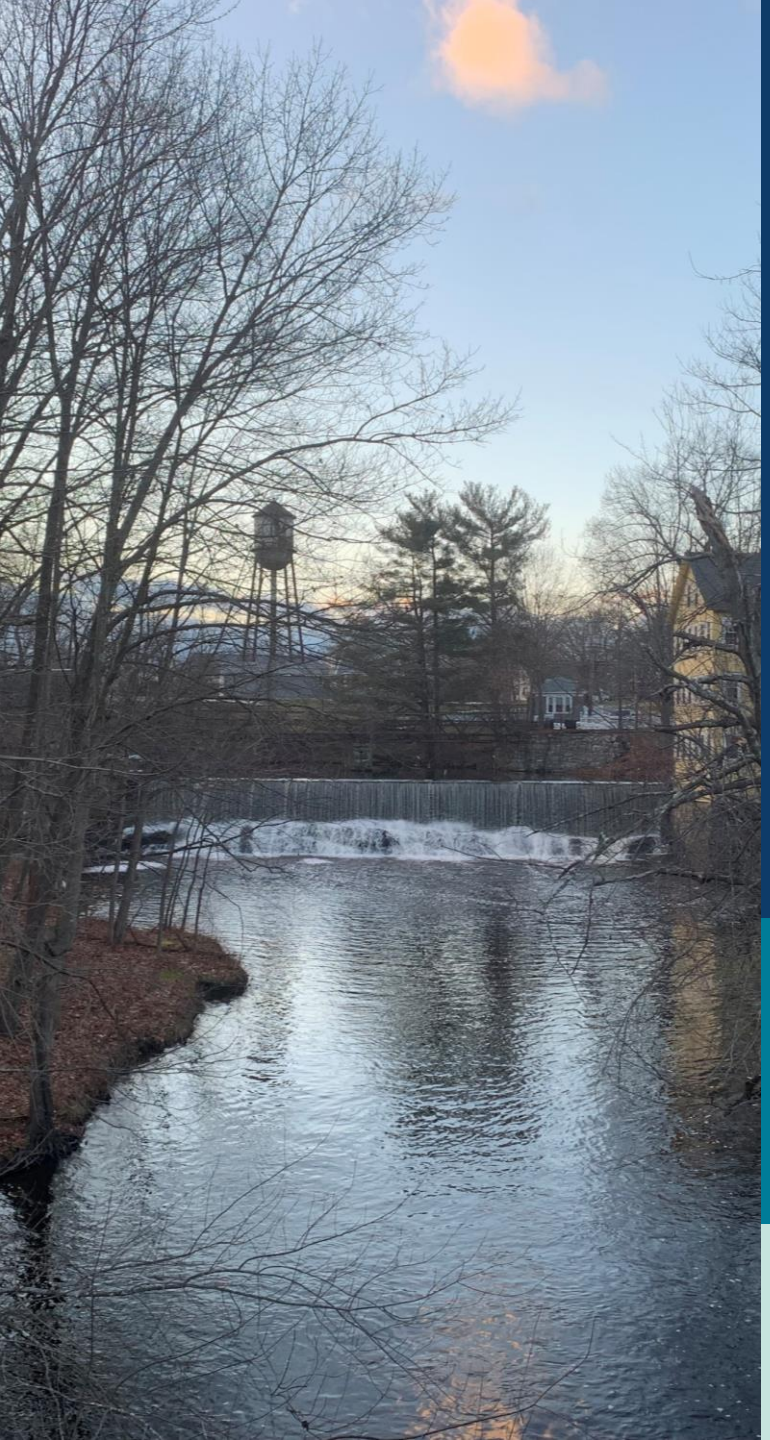


Understanding Flood Risks: Climate Data and Projections

Hatfield Comprehensive Plan Committee – Working Meeting #2

Hatfield Climate-Smart Comprehensive Plan

January 26, 2023

Presenters:

Rich Niles, W&C

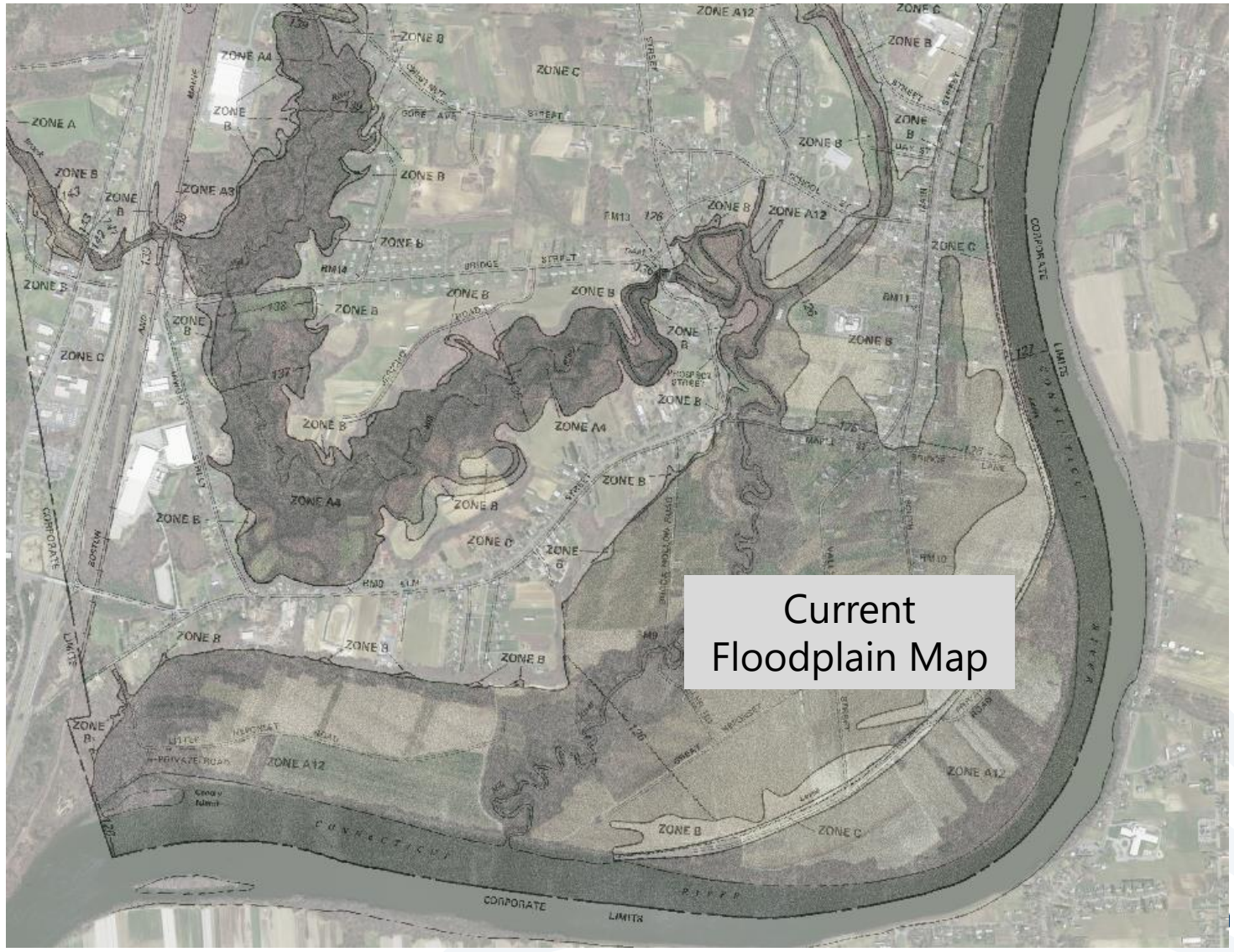
Joseph Kirby, W&C

Overview

- Current Conditions
  - Flood Risk
  - Levee
  - Critical Infrastructure
- FEMA Regulatory Context
  - Remapping Process
  - Potential Impacts
- Future Conditions
  - Climate Data
  - CT River Flows
- Upcoming Project Work

Current Conditions

- Flood Risk
  - 1978 FEMA Flood Insurance Rate Map (FIRM)
  - FEMA Base Flood Elevation (BFE) – commonly referred to as the "100-Year Floodplain"
  - **BFE is based on CT River flow of 180,000 cubic feet per second (cfs)**
  - BFE is basis for National Flood Insurance Program

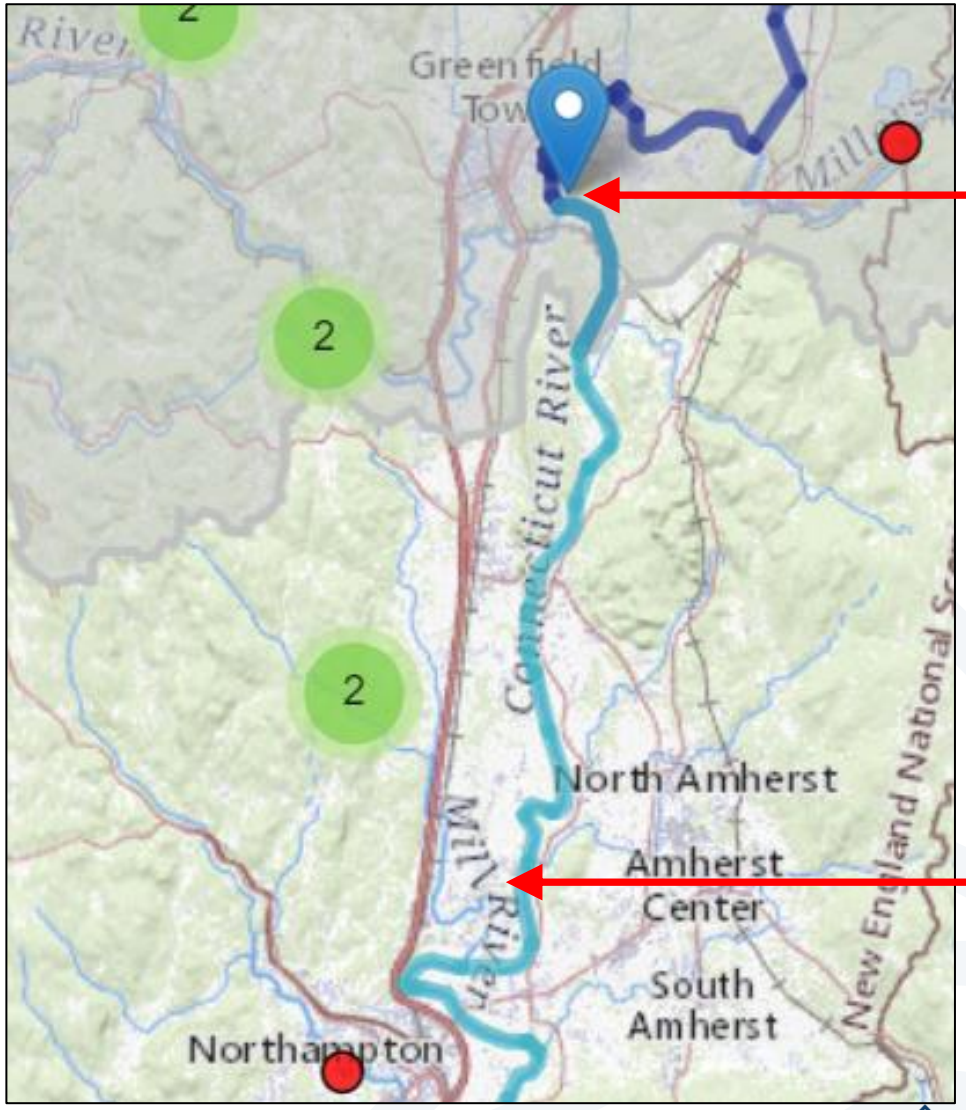


Current Floodplain Map

Current Conditions

- Flood Risk
  - Historic peak flows at Montague City river gage 01170500
  - USGS est. 1% AEP 181,000 0.2% AEP 218,000
  - FEMA Base Flood Flow = 180,000 cfs

Year	Highest Flow (cfs)
1936	236,000
1938	195,000
1928	179,000
1913	144,000
1984	143,000
1960	142,000
1949	139,000

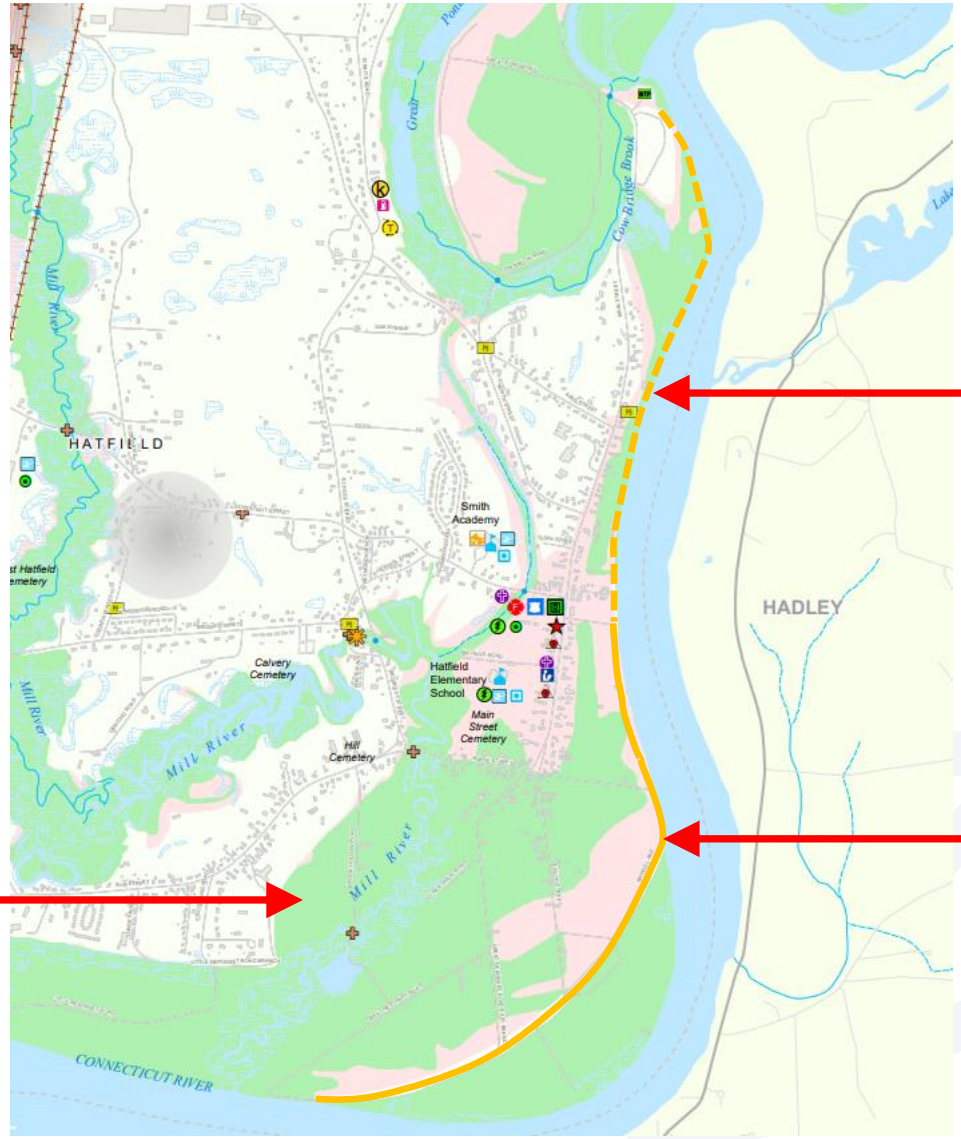


Current Conditions

- Levee along CT River

Current Conditions

- Levee
  - Constructed following 1936 and 1938 floods
  - Provides flood protection for a limited area
  - Mill River backwater floods behind levee



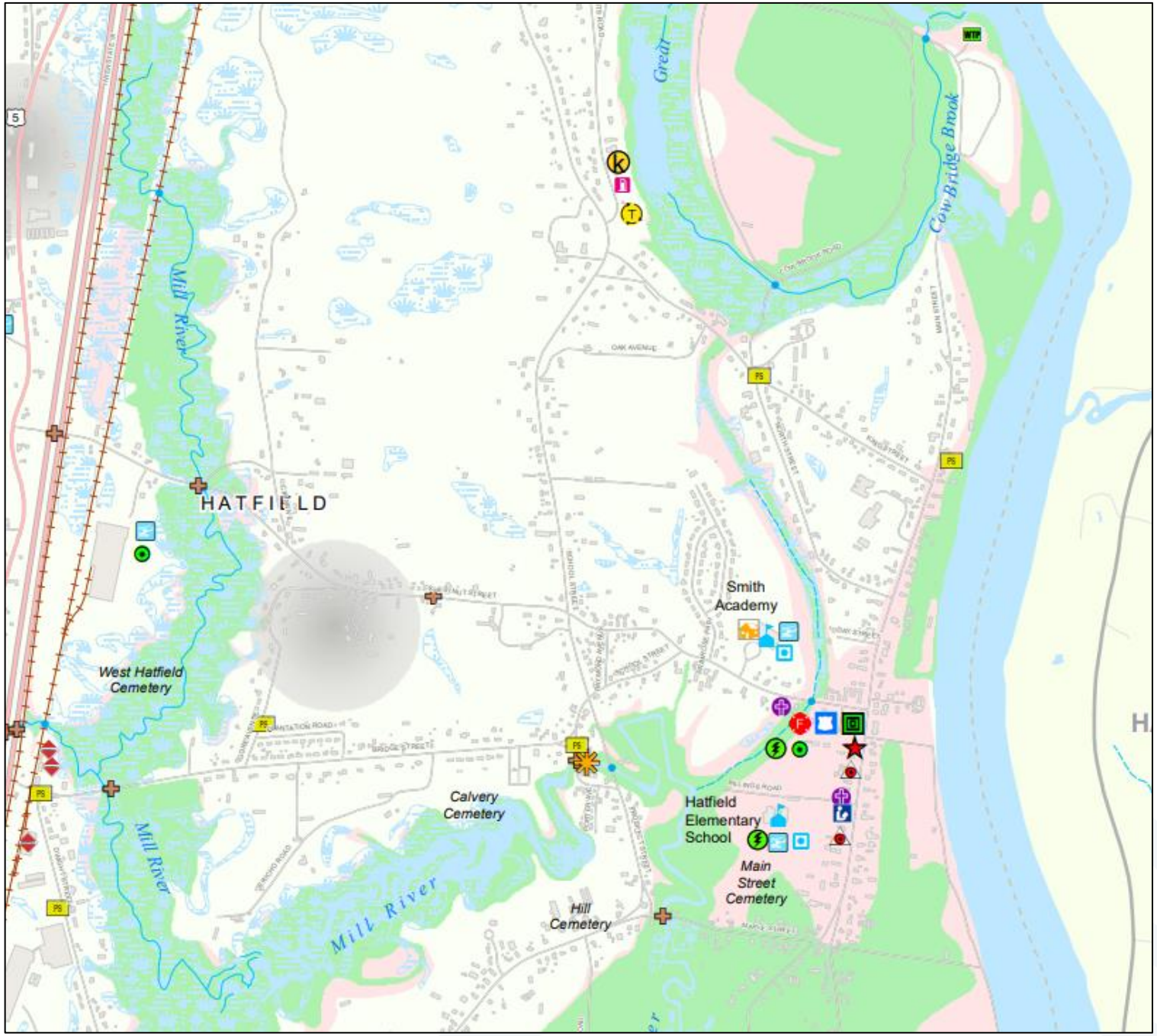
Levee-like Features

Levee from National Levee Database

Green = FEMA Base Flood

Current Conditions

- Critical Infrastructure From Hazard Mitigation Plan
  - Fire Station
  - Police
  - Primary Emergency Operations Center
  - Town Hall
  - Hatfield Elementary School
  - Library
  - Church
  - Helicopter Landing Zone
  - Utility Infrastructure
    - Emergency Electrical Power
    - Pumping Station
    - Culverts
  - Bridge
  - Significant Hazard Dam
  - Historic Place
  - Recreation Areas

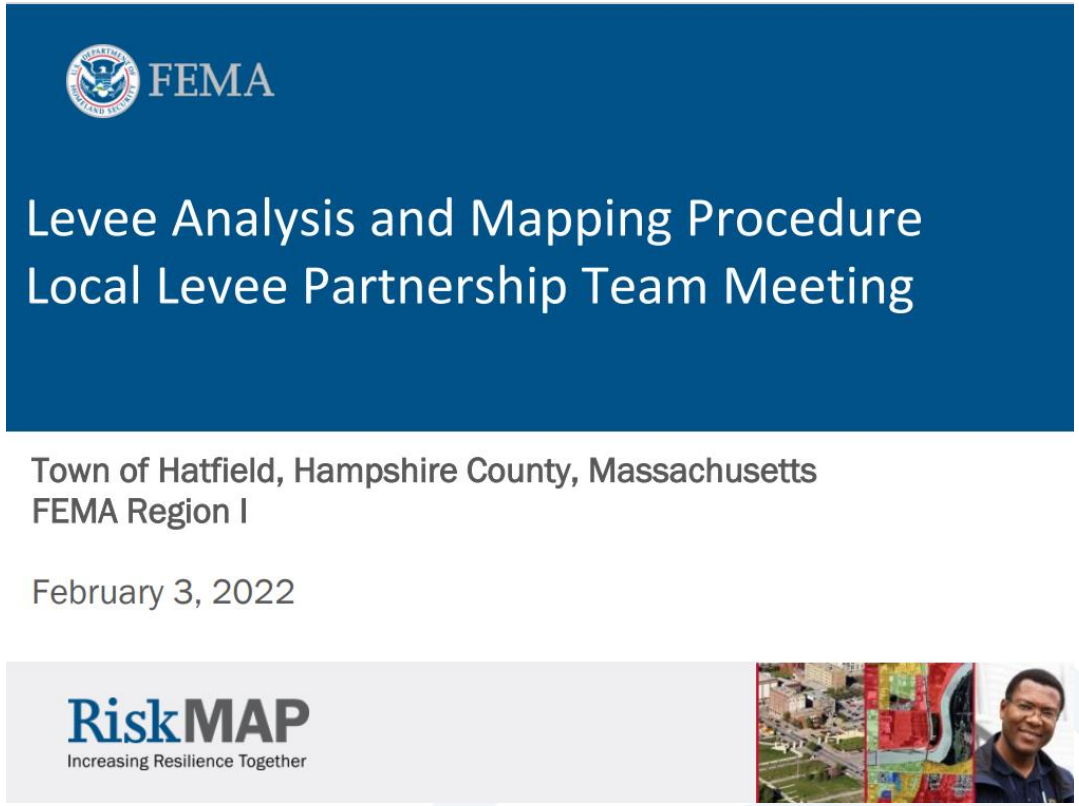


Current Conditions

- Critical Infrastructure (examples)
  - Wastewater Treatment Plant off Main Street
  - Pump station along Mill River at Bridge and School Street

FEMA Regulatory Context

- Remapping Process
  - Revised modeling for middle Connecticut River watershed
  - Ongoing study (started in 2018)
  - Hydrologic and hydraulic analysis
  - Consideration of levee
  - Update to FEMA base flood

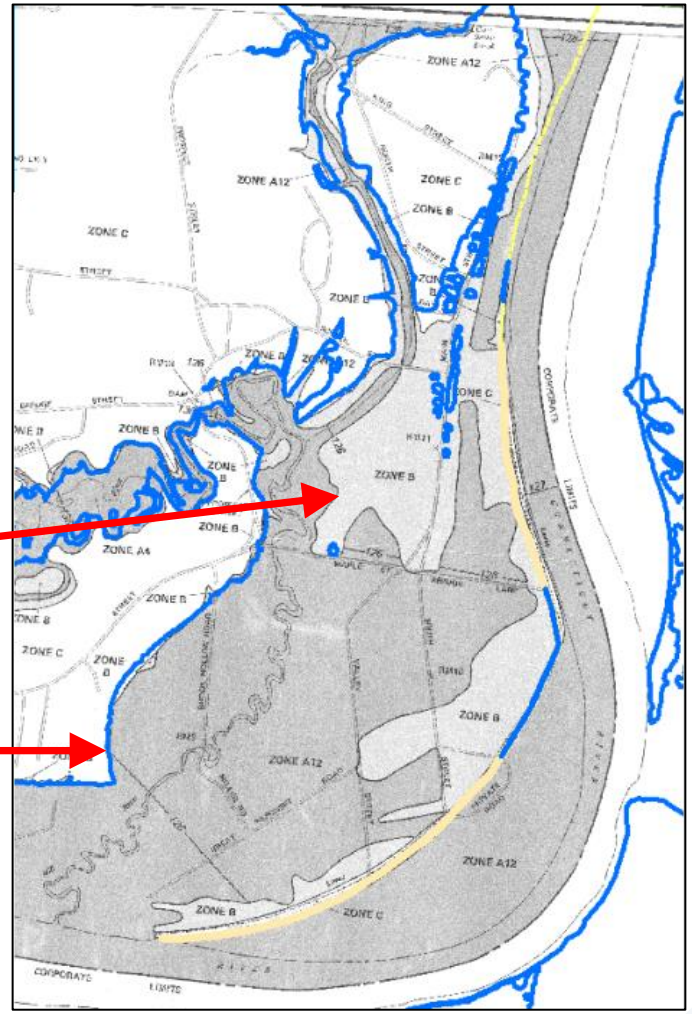


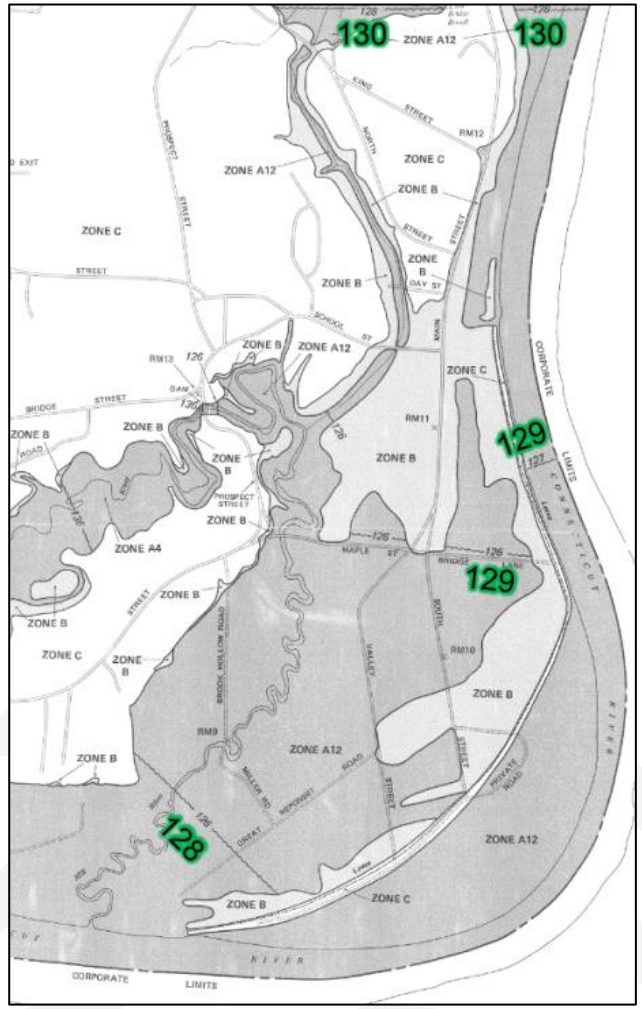
FEMA Regulatory Context

- Potential Impacts
  - Updated Base Flood Flow = 182,000 cfs
  - Levee does not offer protection
  - 2-to-3-foot increase in BFE

Current Base Flood Limit

Updated Base Flood Limit





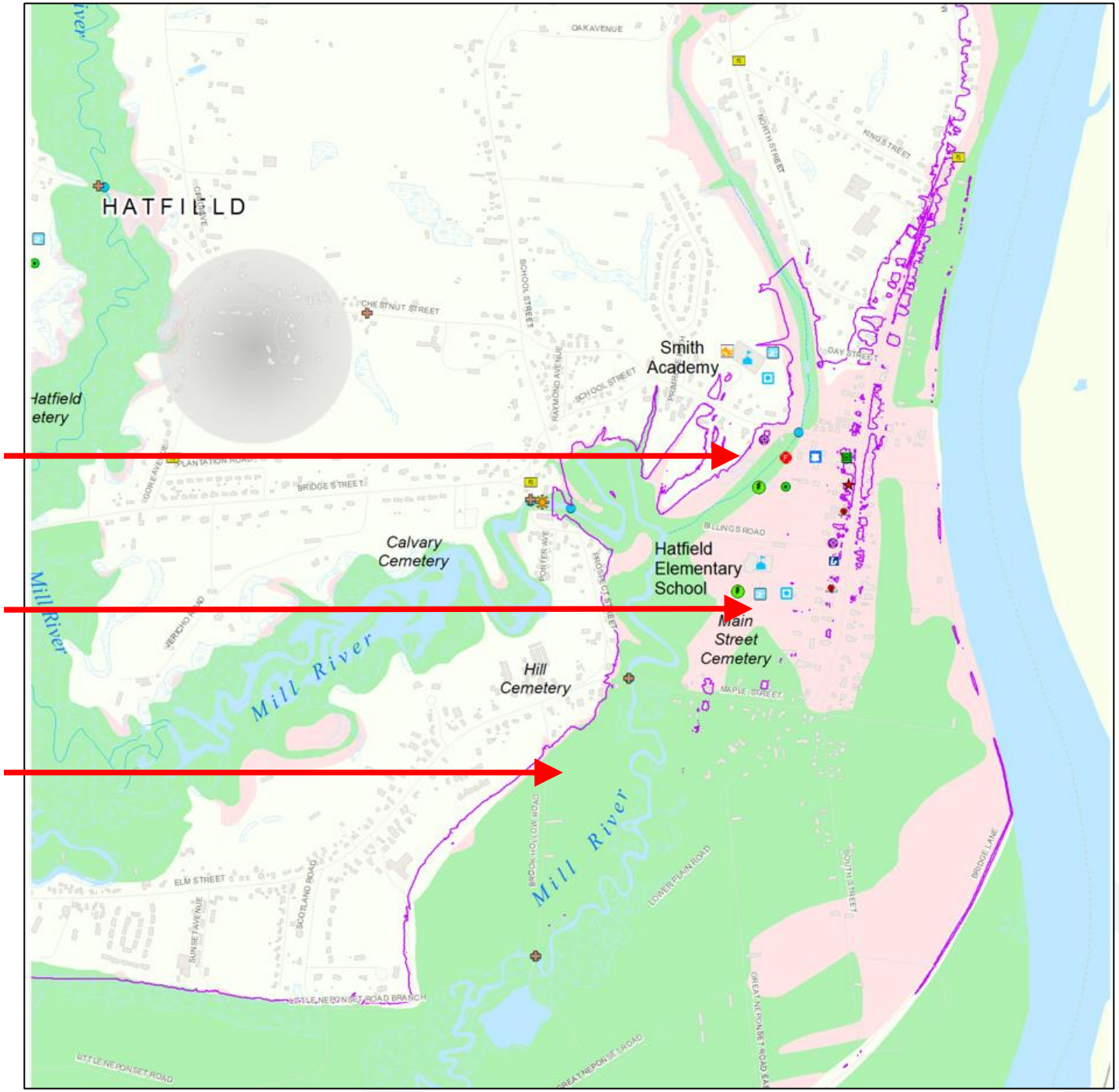
FEMA Regulatory Context

- Potential Impacts
  - Updated Base Flood Flow = 182,000 cfs

Updated Base Flood Limit

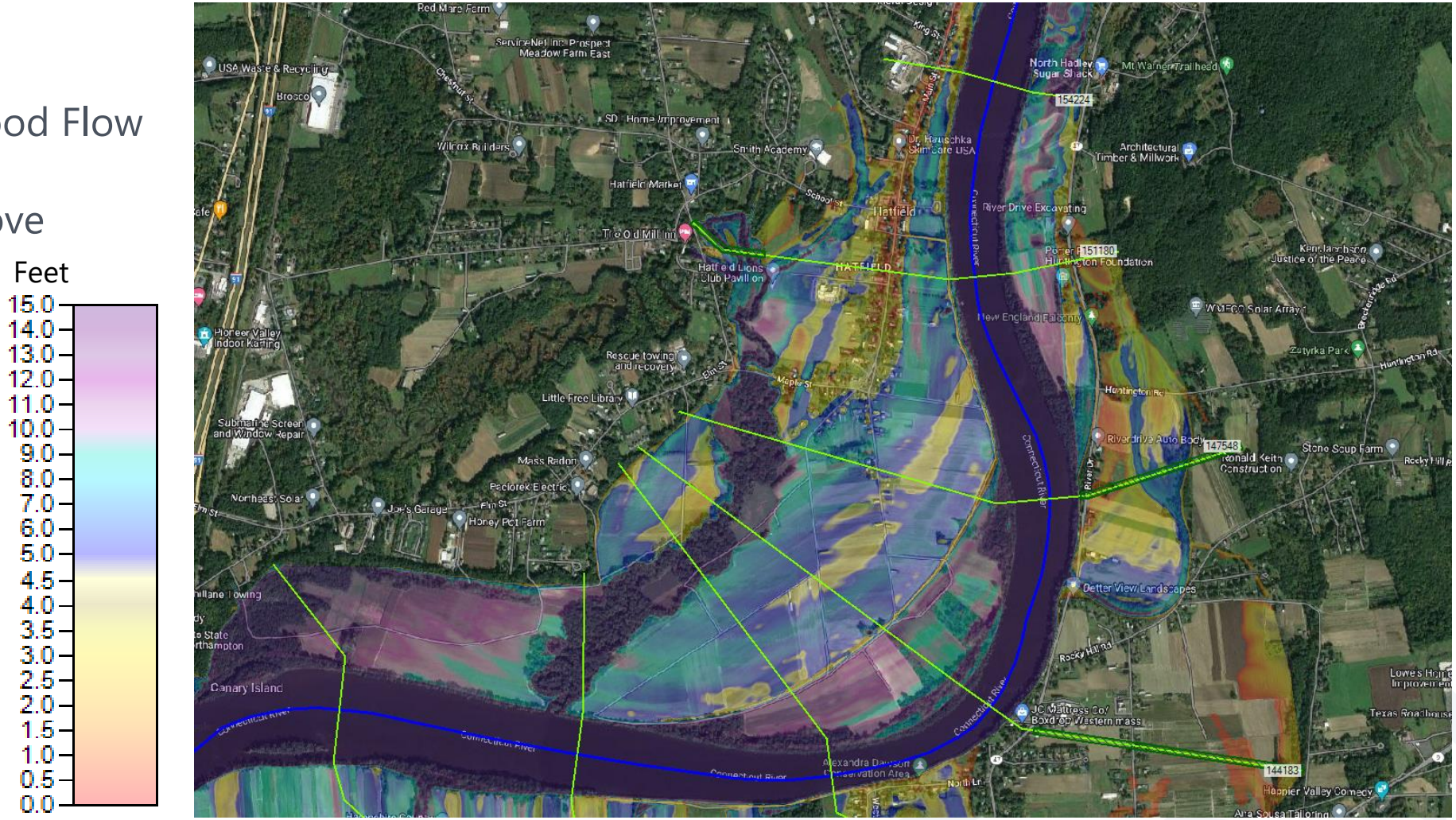
Entire Area within Base Flood Limit

Current Base Flood Limit



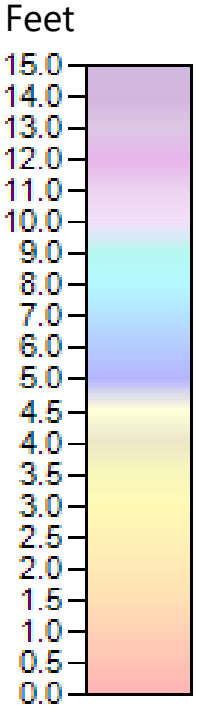
FEMA Regulatory Context

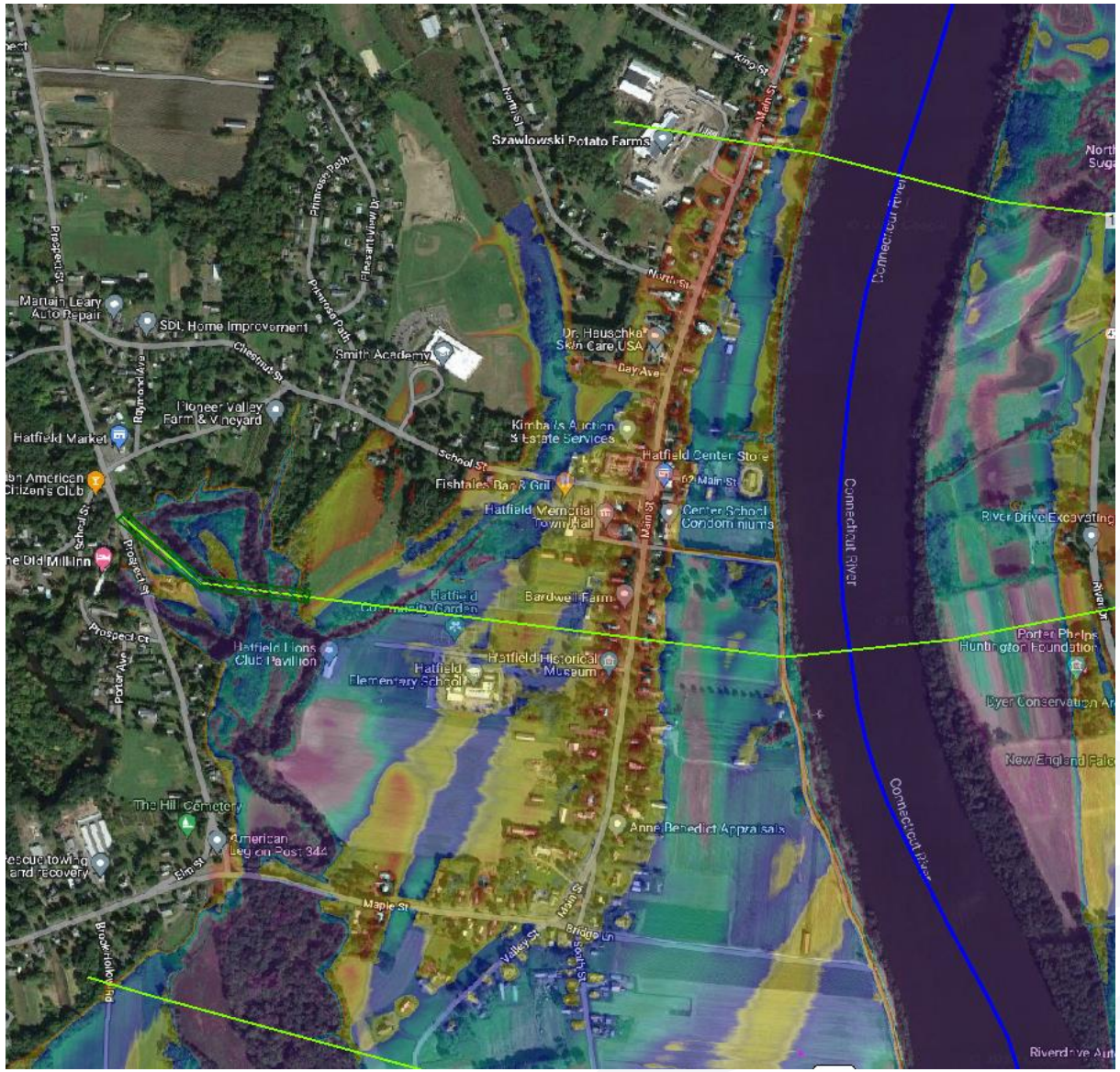
- Potential Impacts
  - Updated Base Flood Flow = 182,000 cfs
  - Flood depths above ground surface



FEMA Regulatory Context

- Potential Impacts
  - Updated Base Flood Flow = 182,000 cfs
  - Flood depths above ground surface



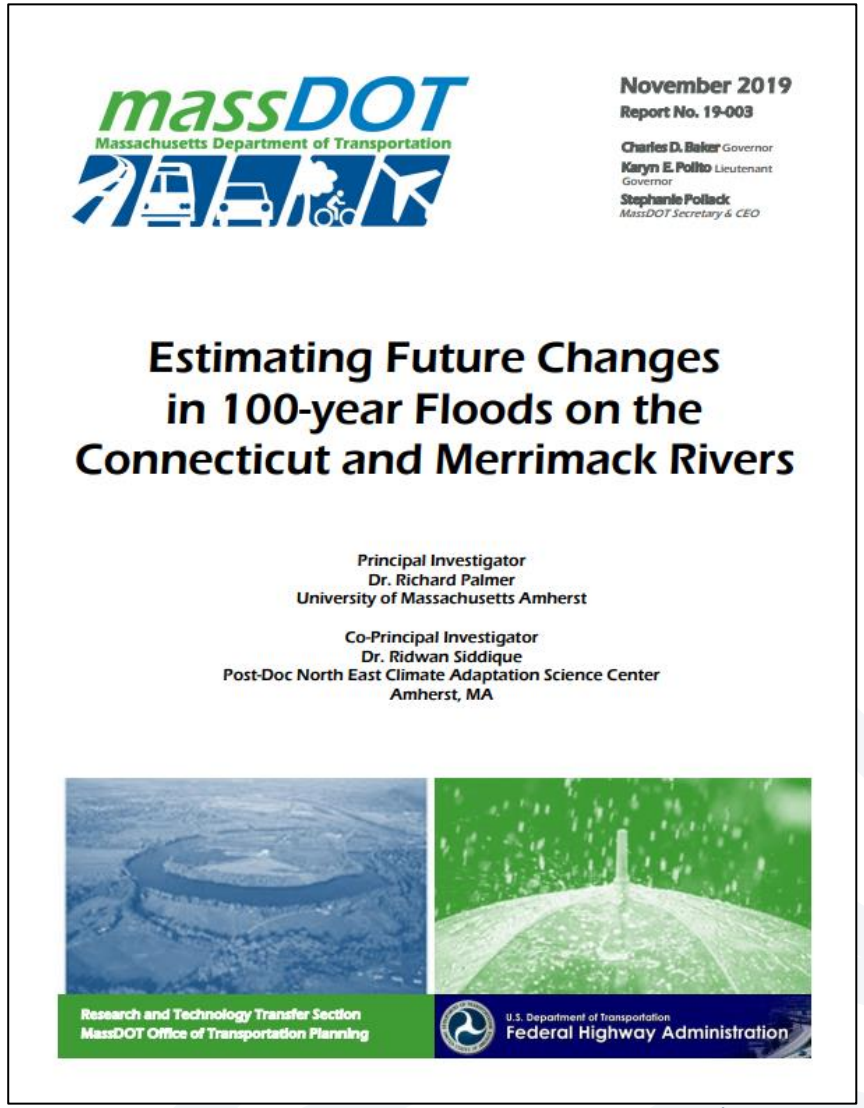


Town of Hatfield MASSACHUSETTS

Woodard & Curran

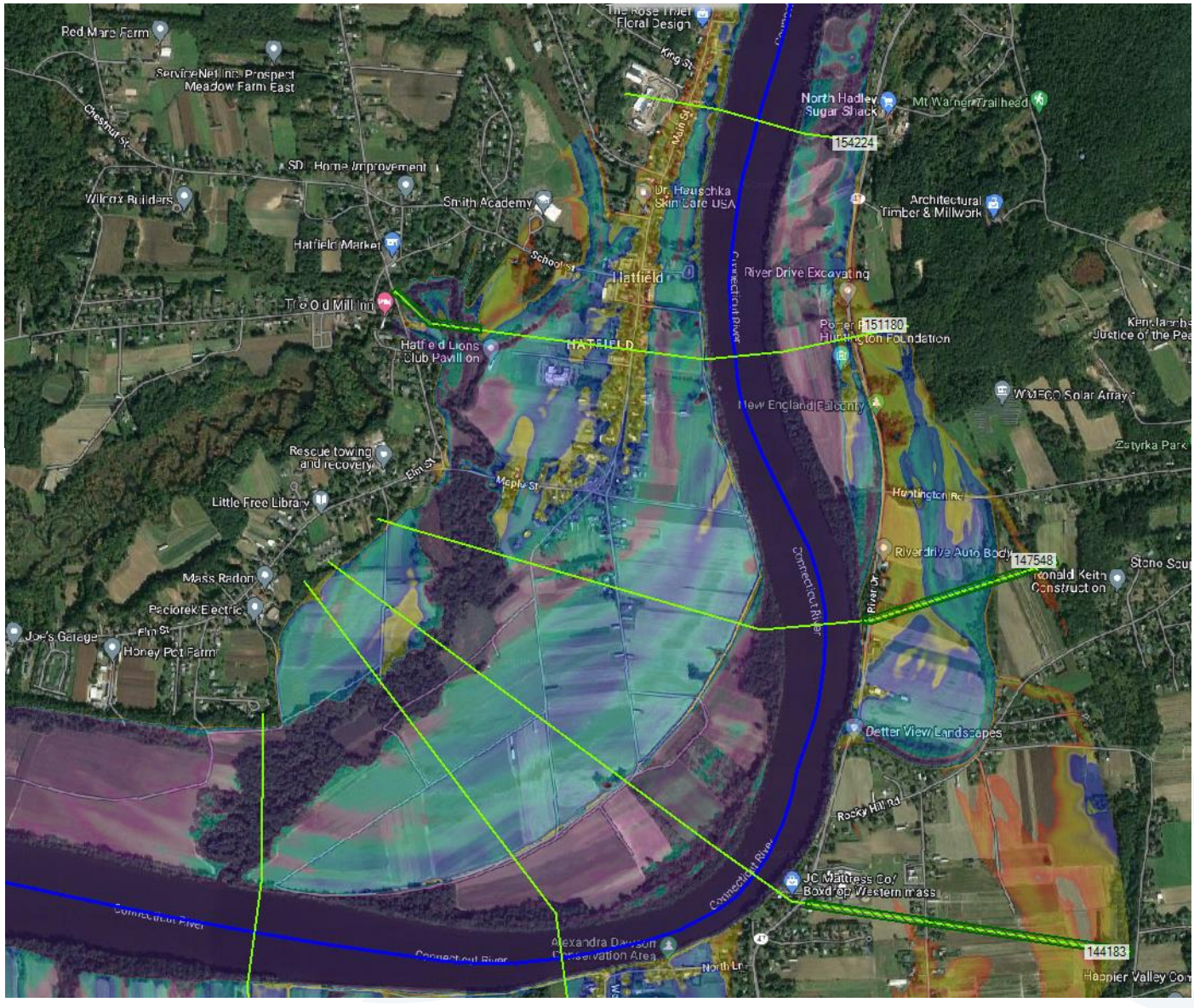
Future Conditions

- Most current, relevant data available
- Study by UMass Amherst and MassDOT
- Study focuses on CT River Valley
- Looks at climate projections through 2100
- Climate Data
  - Global Circulation Model (GCM) – designed to provide representations of future climate conditions based on variations in greenhouse gas emissions
  - Representative Concentration Pathway (RCP) 8.5 Scenario – global atmosphere experiences a net positive warming of 8.5 watts per square meter, resulting in a 3.2-5.4 ^{o}C change
  - Extreme precipitation events projected using the GCM and RCP scenarios



Future Conditions

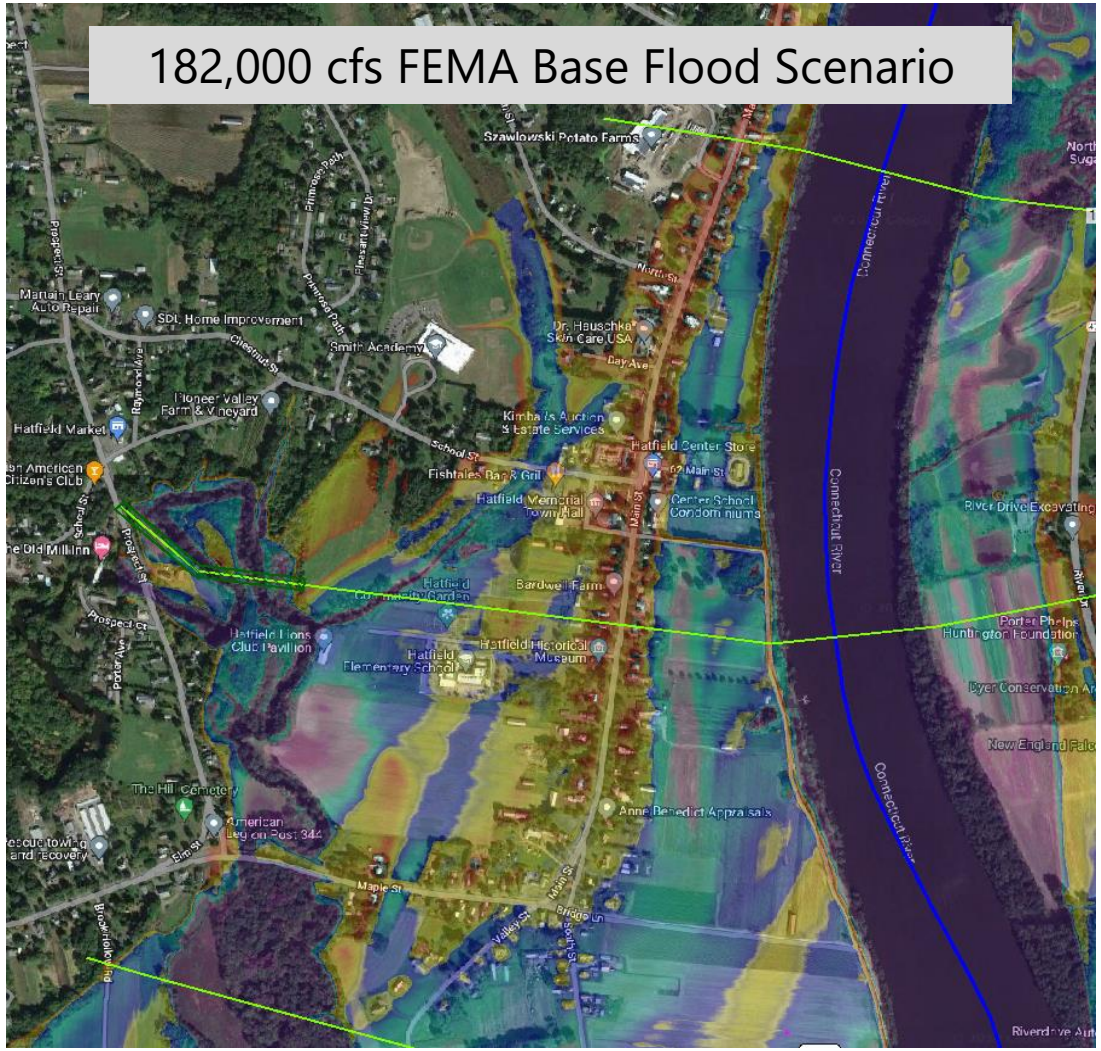
- Future flow consideration
  - 182,000 cfs = FEMA updated base flood flow
  - 15% increase in flows – using % change from 2019 UMass/MassDOT study
  - 209,300 cfs = future flow scenario



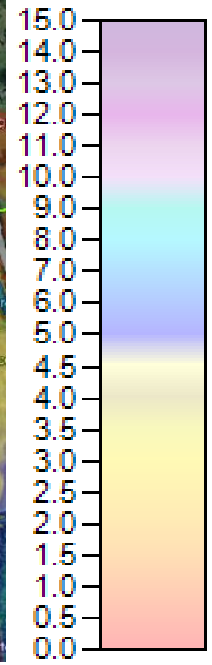
Future Conditions

Town of Hatfield MASSACHUSETTS

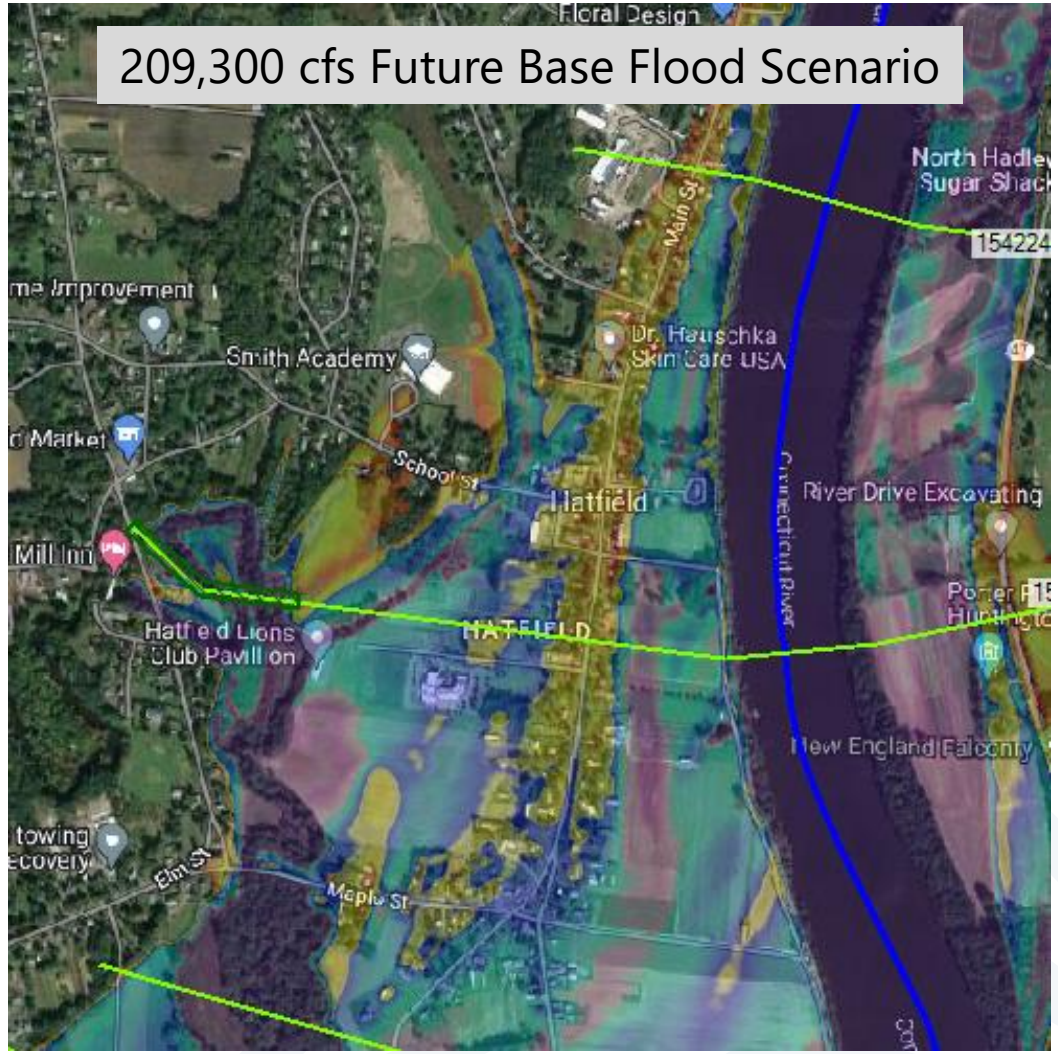
182,000 cfs FEMA Base Flood Scenario



Feet



209,300 cfs Future Base Flood Scenario



Woodard & Curran

Upcoming Project Work

- Technical evaluation:
  - Additional floodplain projections
  - Flood inundation depth updates
  - Incorporation of building floor elevations, if available
  - Cross-sections for critical areas
- Request for pictures, data, flood observation feedback
- At next meeting review:
  - Final results of future climate projections
  - Impacts on critical infrastructure
  - Alternatives

Clarifying Questions & Open Discussion

- Does this information make sense?
- Was anything new or different from what you have heard previously?
- Thoughts or concerns you'd like to share?

Project Team

Woodard & Curran
Rich Niles
Senior Project Manager, Principal
978-482-7891
rniles@woodardcurran.com

Woodard & Curran
Joseph Kirby, PE, CFM
Senior Technical Manager, Principal
207-558-3760
jkirby@woodardcurran.com

Woodard & Curran
Carly Quinn, PE
Project Engineer
401-226-0440
cnquinn@woodardcurran.com