

Stakeholder Meeting 1

Cumulative Impacts of Development on Flood Risk

*Presented by: Clair Davis, Engineering Manager
Ben Thompson, Professional Engineer*

April 18, 2023

Agenda

1. Housekeeping
 - Introductions
 - Scheduling next meetings
 - Any other items?
2. MITC Presentation: “Cumulative Impacts”:
 - Increased Impervious Cover – Greenfield & Infill Development
 - Loss of Valley Storage – Filling in the Floodplain, Channels
3. Review Loss of Valley Storage Options
4. Next Steps

Introductions

External Stakeholders

Bernie Malone - VP Monticello NA / CD7
Stacy Shores – Pres., Linwood NA
Travis Clegg – DAC Chair
Tom Davies – Hillwood / CD4
Mary Kelleher – Handley / CD5
Dawn Dean – Handley
Misty Christian – Kimley-Horn and Associates, Inc.
Anna Carrillo – Carrillo Engineering
Don Allen – Fort Worth Homebuilders Association
Larissa Knapp-Scott – LJA Engineering

Internal Stakeholders

Michael Crenshaw – 360Clarus / CFW Contractor
Daniel Leal – Development Services
Stephen Murray – Development Services
Stuart Campbell – Development Services
Eric Fladager – Planning & Data Analytics
Clair Davis – TPW Stormwater Management
Ben Thompson – TPW Stormwater Management
Royce Hansen – Legal

Scheduling Next Meetings

- **How did Doodle work for scheduling?**
- **Are Tuesdays better than Fridays?**
- **How does a monthly schedule work for you?**
- **Next likely meeting dates:**
 - May 16th or May 19th , 1:30-3:30
 - June 20th or June 23rd, 1:30-3:30
 - July 18th or July 21st, 1:30-3:30
 - August 15th or August 18th, 1:30-3:30
- **Hopefully finished by or before then**
- **Staff Coordination:** Council IR, City Plan Commission, Zoning BoA, and MITC

Briefing on Cumulative Impacts of Development on Flood Risk

Presented to: MITC

Presented by: Clair Davis, Engineering Manager

Ben Thompson, Professional Engineer

September 13, 2022

Why Are We Looking At This?

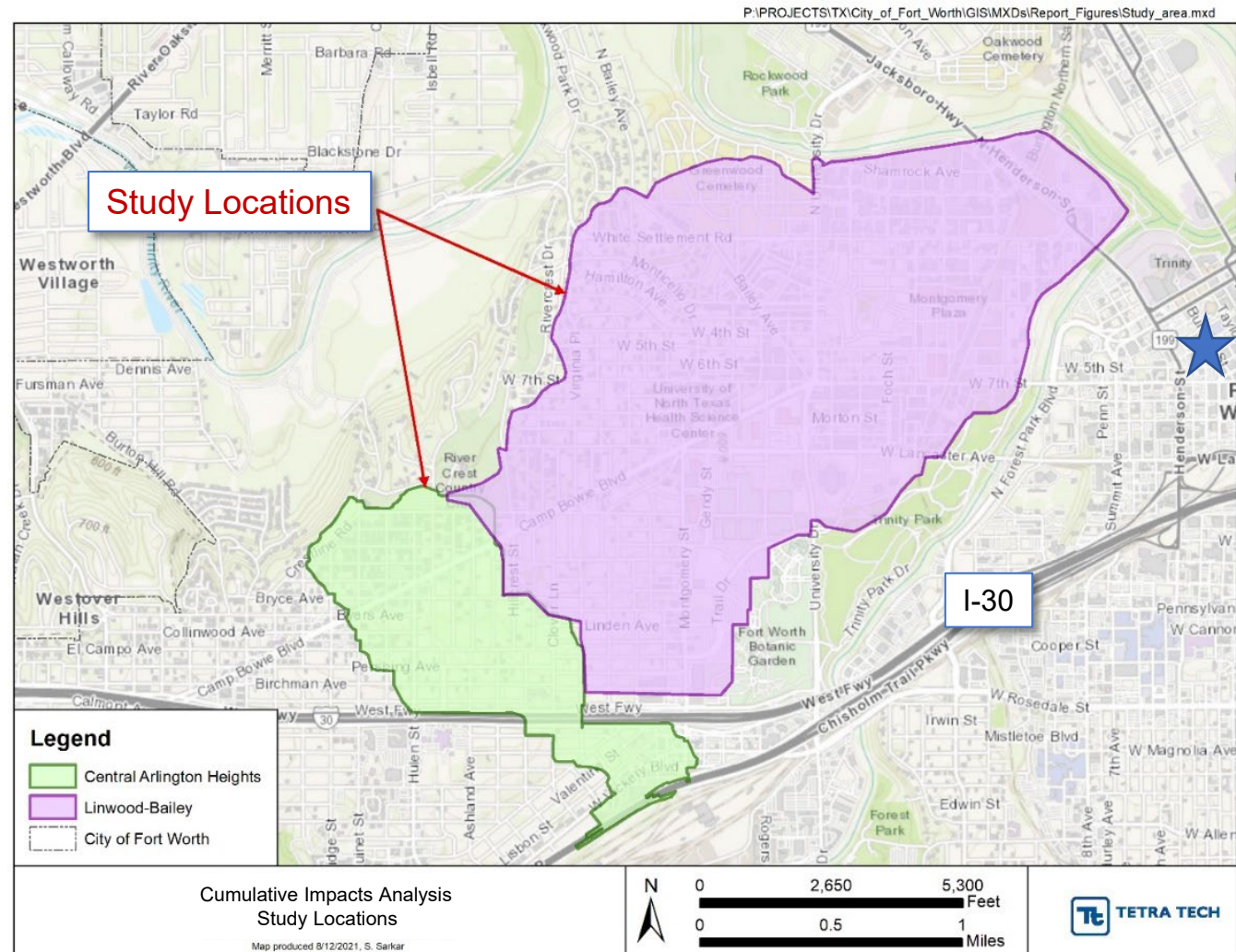
- Existing criteria:
 - Design criteria focuses on peak runoff rate not runoff volume changes
 - Zoning land uses can change, and may not reflect actual impervious cover
 - Impacts of loss of “valley storage” not fully assessed on smaller streams
- Not new concerns – frequently heard in public meetings and discussions with residents
 - Action item identified in 2016 Floodplain Management Plan
 - Level 1 Priority in the 2018 strategic Stormwater Program Master Plan
- Common issue across the Metroplex
- Evaluate our existing standards to make sure they are appropriate

Focus of analysis – How much greater is the runoff, and does it create a problem?

Purpose: Analyze the resulting cumulative impacts of development on stormwater with respect to land use and valley storage changes over time in an urban infill watershed (Central Arlington Heights/Linwood Bailey) and a suburban/riverine watershed (Whites Branch).

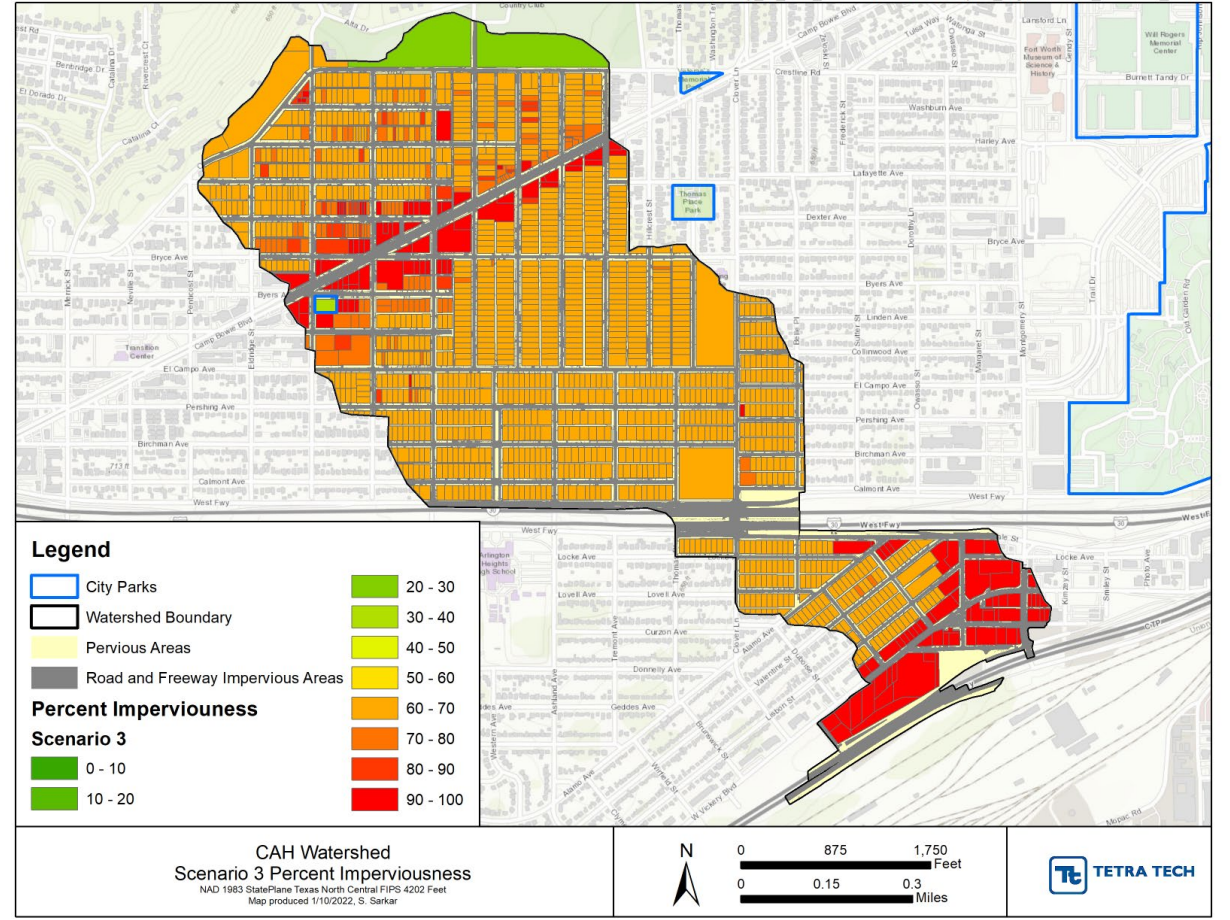
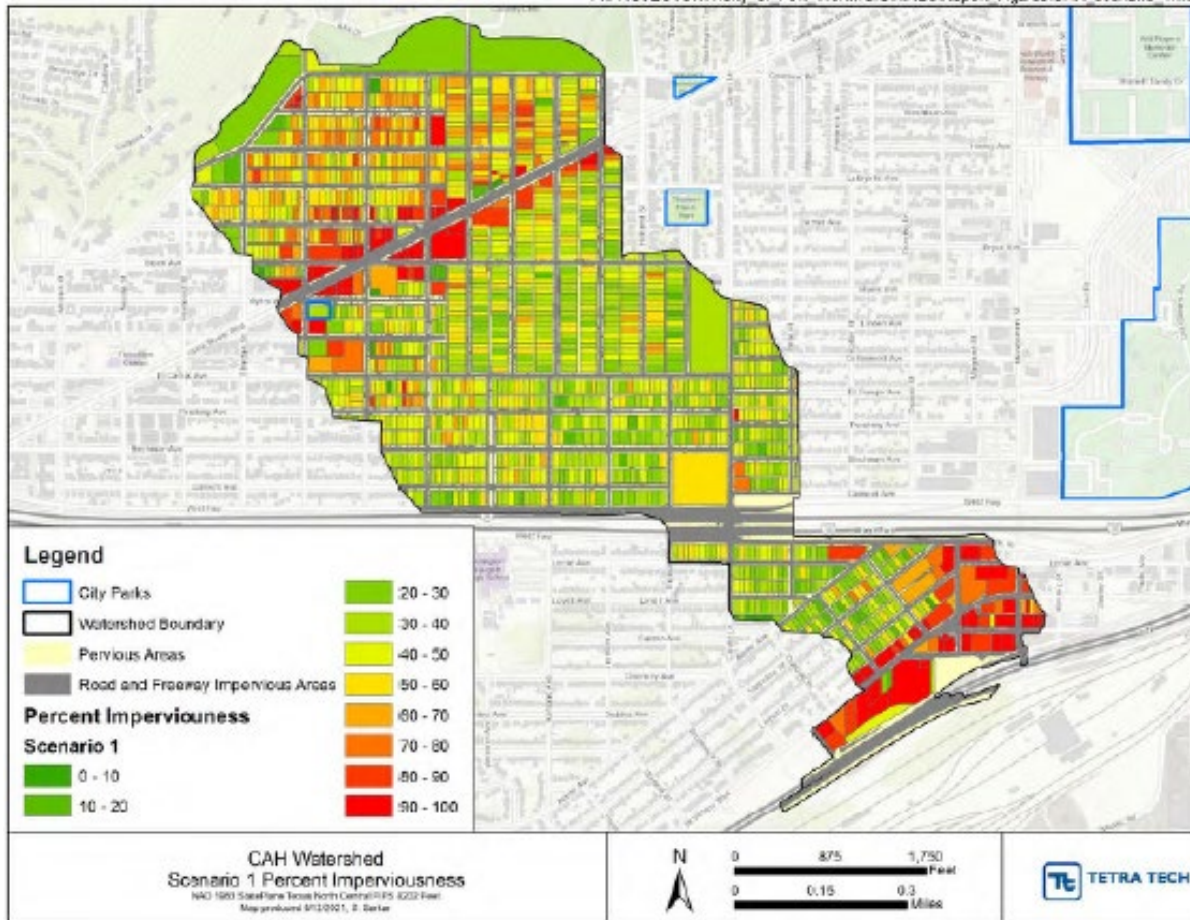


- Impervious Cover Development
 - Existing conditions
 - Stormwater Criteria Manual
 - Full buildout (potential)
- Hydrology and Hydraulics Modeling
 - Multiple rainfall events
 - Pipe network capacity
 - Overflow down streets



Land Use in Central Arlington Heights Existing vs. Full Buildout

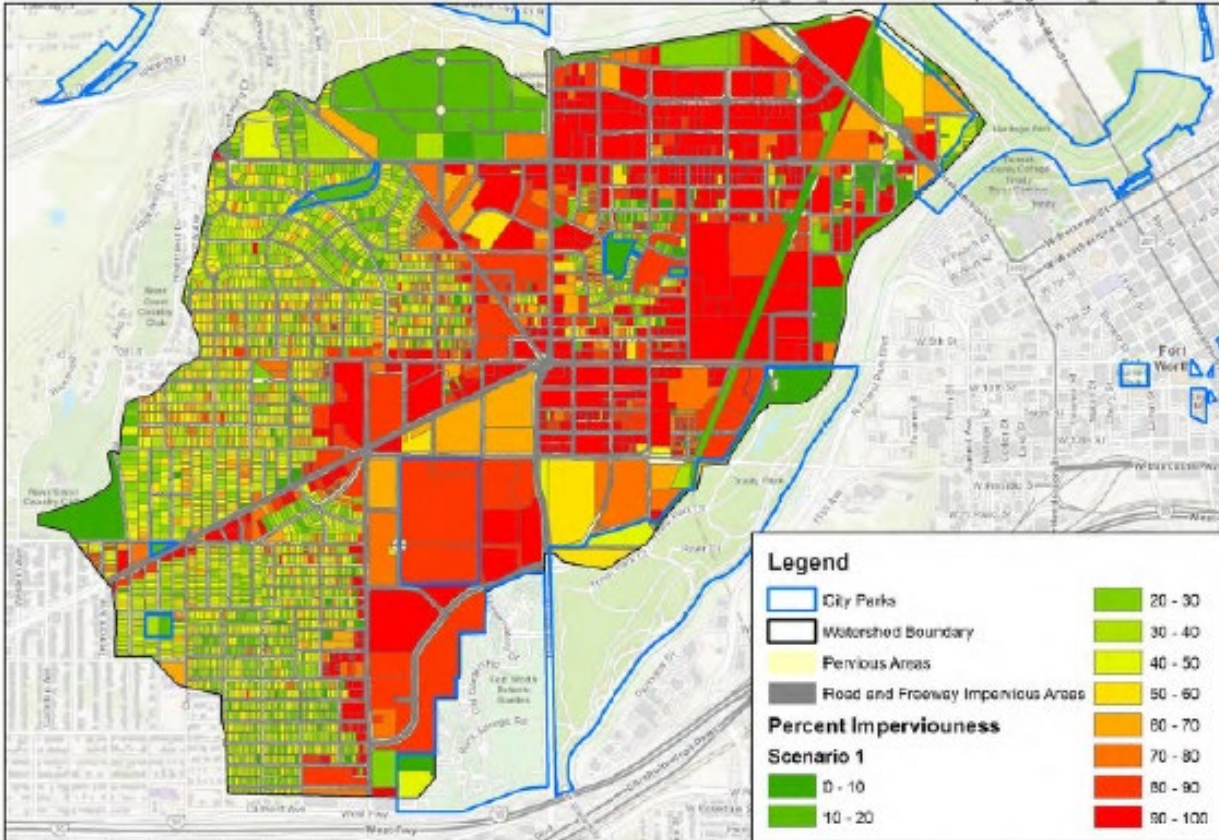
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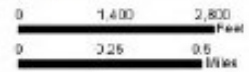
Land Use in Linwood / Bailey

Existing vs. Full Buildout

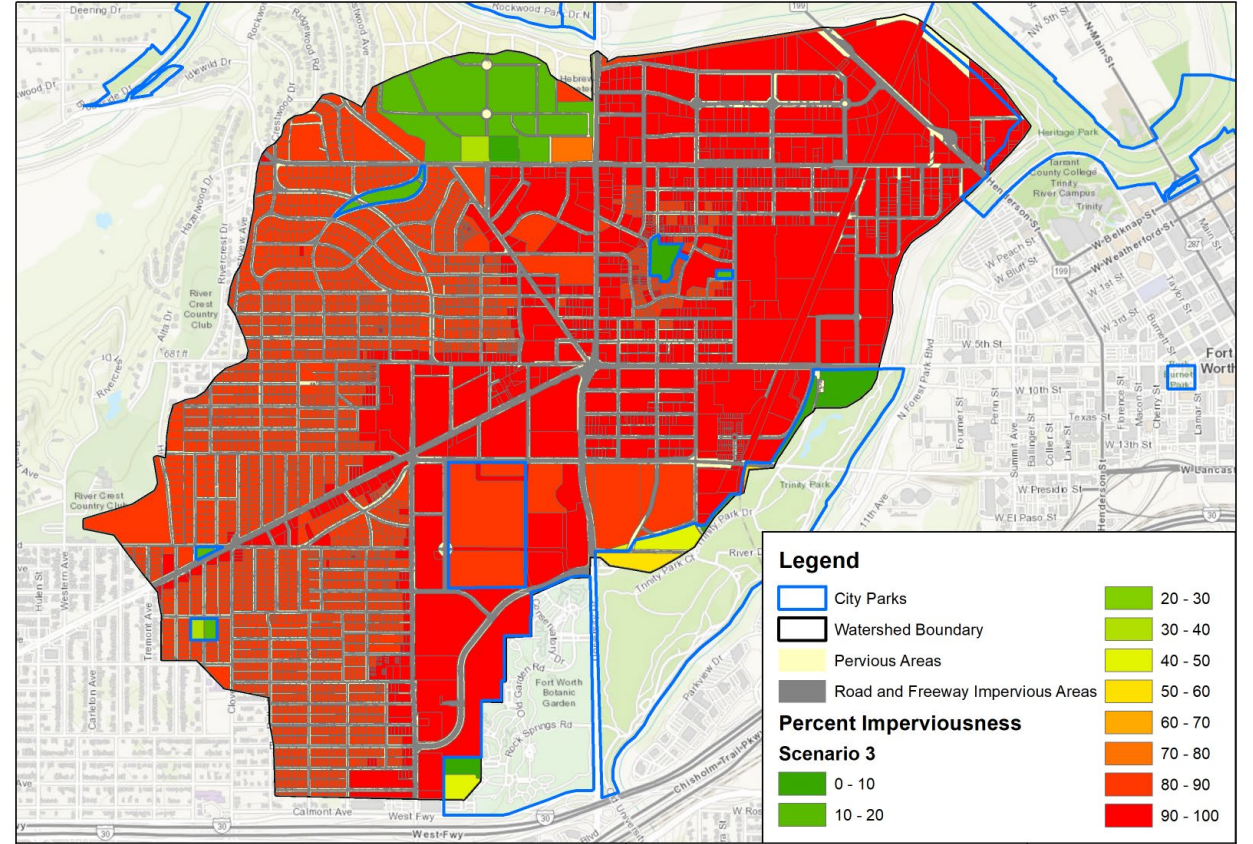
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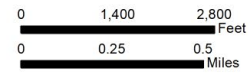
LB Watershed
Scenario 1 Percent Imperviousness
NAD 1983 StatePlane Texas North Central FIPS 4202 Feet
Map produced 8/13/2021, S. Sarkar



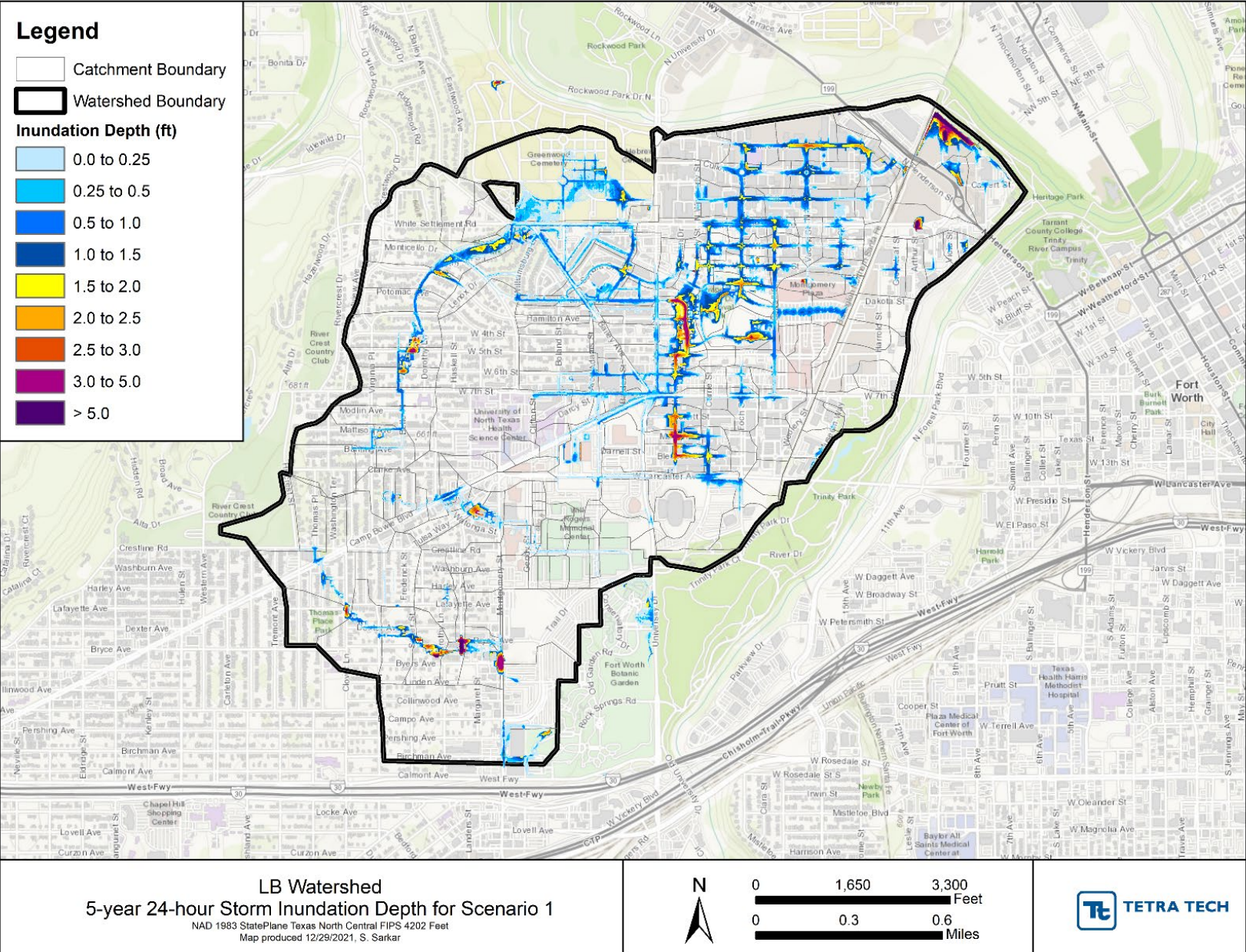
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LB Watershed
Scenario 3 Percent Imperviousness
NAD 1983 StatePlane Texas North Central FIPS 4202 Feet
Map produced 1/10/2022, S. Sarkar



Inundation Depths for 5-yr Storm - Existing



Linwood Basin Results

Indicator	1-year 24-hour			5-year 24-hour			100-year 24-hour		
	Scn 1	Scn 2	Scn 3	Scn 1	Scn 2	Scn 3	Scn 1	Scn 2	Scn 3
Acres of inundation	122.4	229.0	513.5	135.0	242.8	523.5	149.1	253.3	530.8
Number of flood prone properties	522	573	623	882	917	948	1315	1323	1330
Number of flood prone properties with increased inundation depths	n/a	533	618	n/a	870	933	n/a	1245	1317

Scenario 1 – Existing Conditions Today

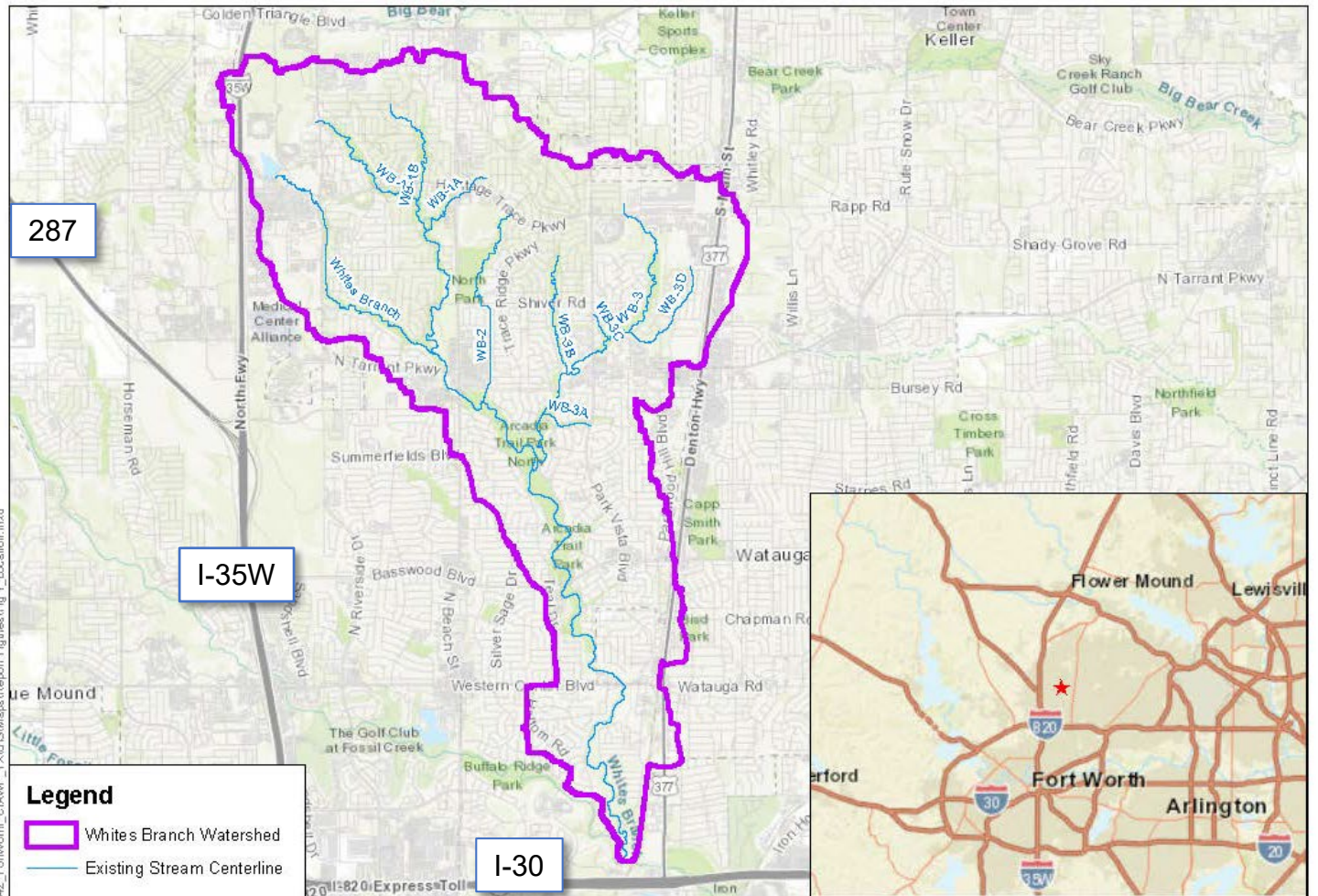
Scenario 2 – Future Buildout per Zoning and Criteria Assumptions

Scenario 3 – Anticipated Buildout Under Allowable Impervious Coverage & Development Trends

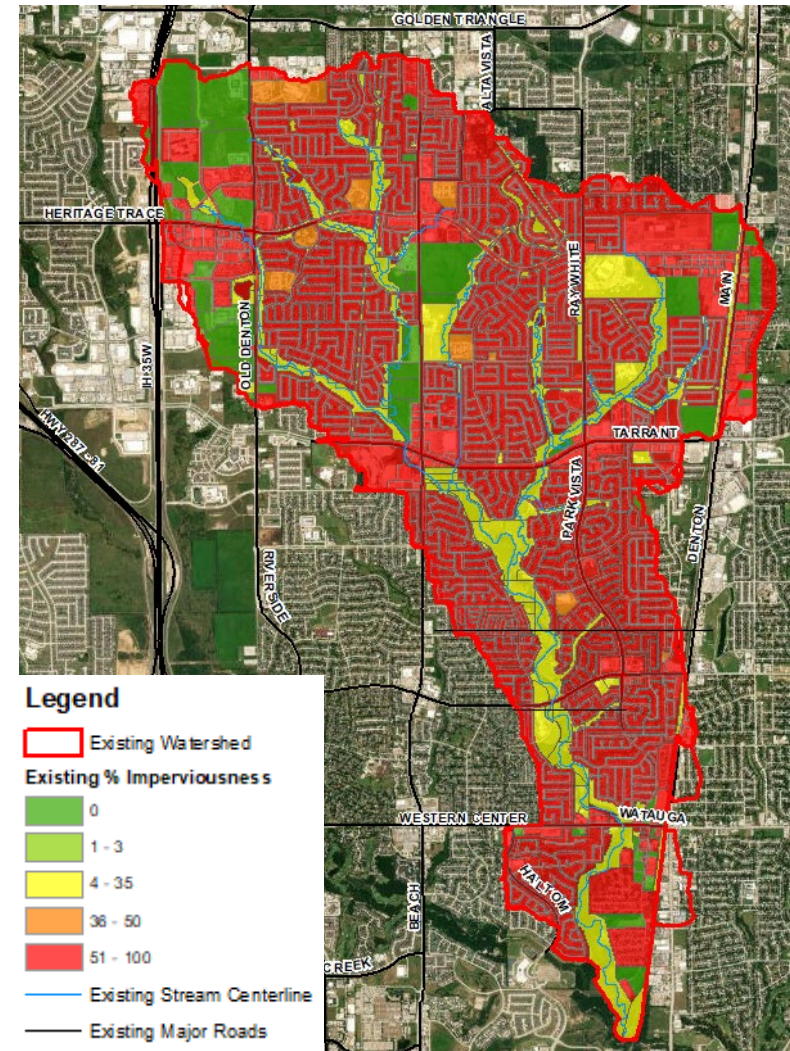
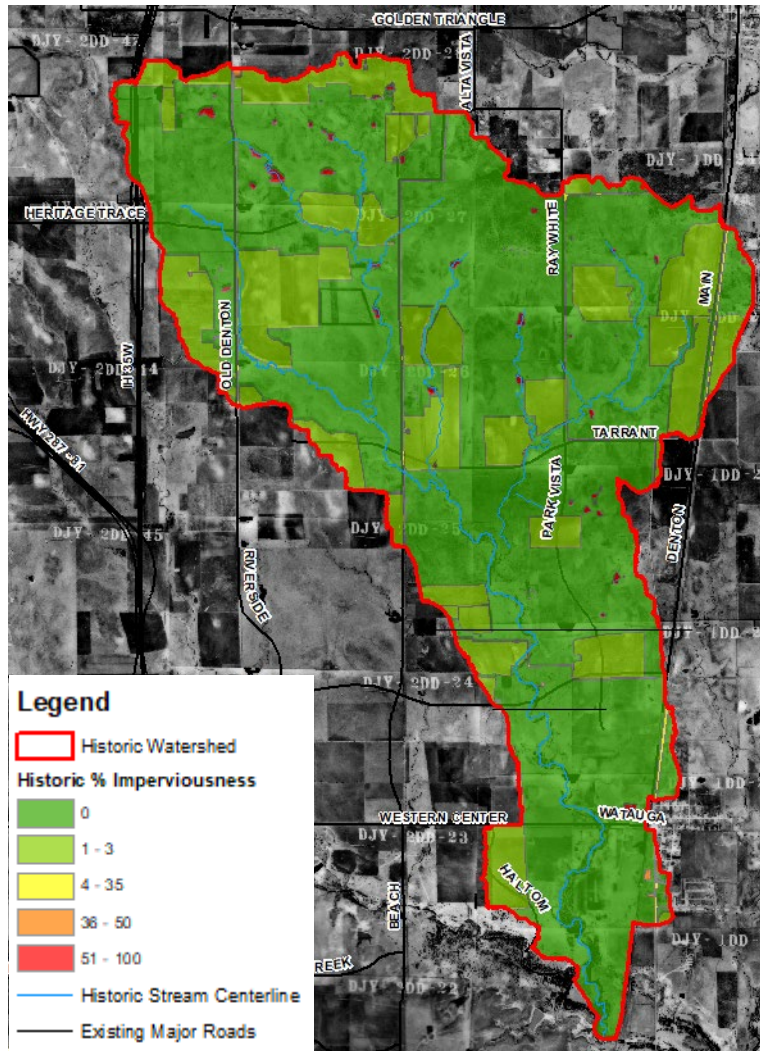


Evaluate current City of Fort Worth iSWM design criteria effectiveness by:

- *Analyzing the cumulative impacts to peak flows & runoff volumes*
- *Focus on changes in land use and valley storage*
- *Consider Revisions to iSWM design criteria*



Land Use in Whites Branch Baseline (1963) vs. Existing



Site Assessments

Storm Event	Baseline Historic Flows (cfs)	Revised Existing Flows (cfs)	%Change
50% / 2-YR	287	467	63%
10% / 10-YR	688	839	22%
4% / 25-YR	934	1089	17%
2% / 50-YR	1142	1290	13%
1% / 100-YR	1367	1515	11%
0.2% / 500-YR	2192	2056	-6%



Summary of Findings and Draft Recommendations

Findings

- Increases in impervious cover associated with development resulted in increased runoff volume and peak flows
- Some portions of the study areas have already exceeded design impervious assumptions
- Decreases in valley storage have resulted in increases in peak flows, particularly with more frequent storms
- Existing detention was shown to mitigate peak flows for large storm events, but was less effective on smaller storms.

Recommendations

- Adjust engineering & land use assumptions to reflect reality
- Prohibit impervious cover above a certain point
- Allow increased impervious cover with mitigation measures
- Determine if there is a reasonable threshold for review

Potential Concepts to Consider

- Corridor Development Certificate goals
- Regional Detention
- Micro / Site Detention
- Revisions to Existing Detention Criteria
- Green Infrastructure
- Low Impact Design
- Increased Pervious Surfaces
- Limits to Impervious Cover
- Adjustment to Design Standards
- Establish Ultimate Development FFE Buffer
- Urban Forestry Exemptions / Incentives for canopy preservation

Next Steps

- Finalize Recommendations for Flood Storage Impact Mitigation
- Kick Off Impervious Cover Discussions
- Launch / Update Cumulative Impacts Web Page
- ? Other Topics ?