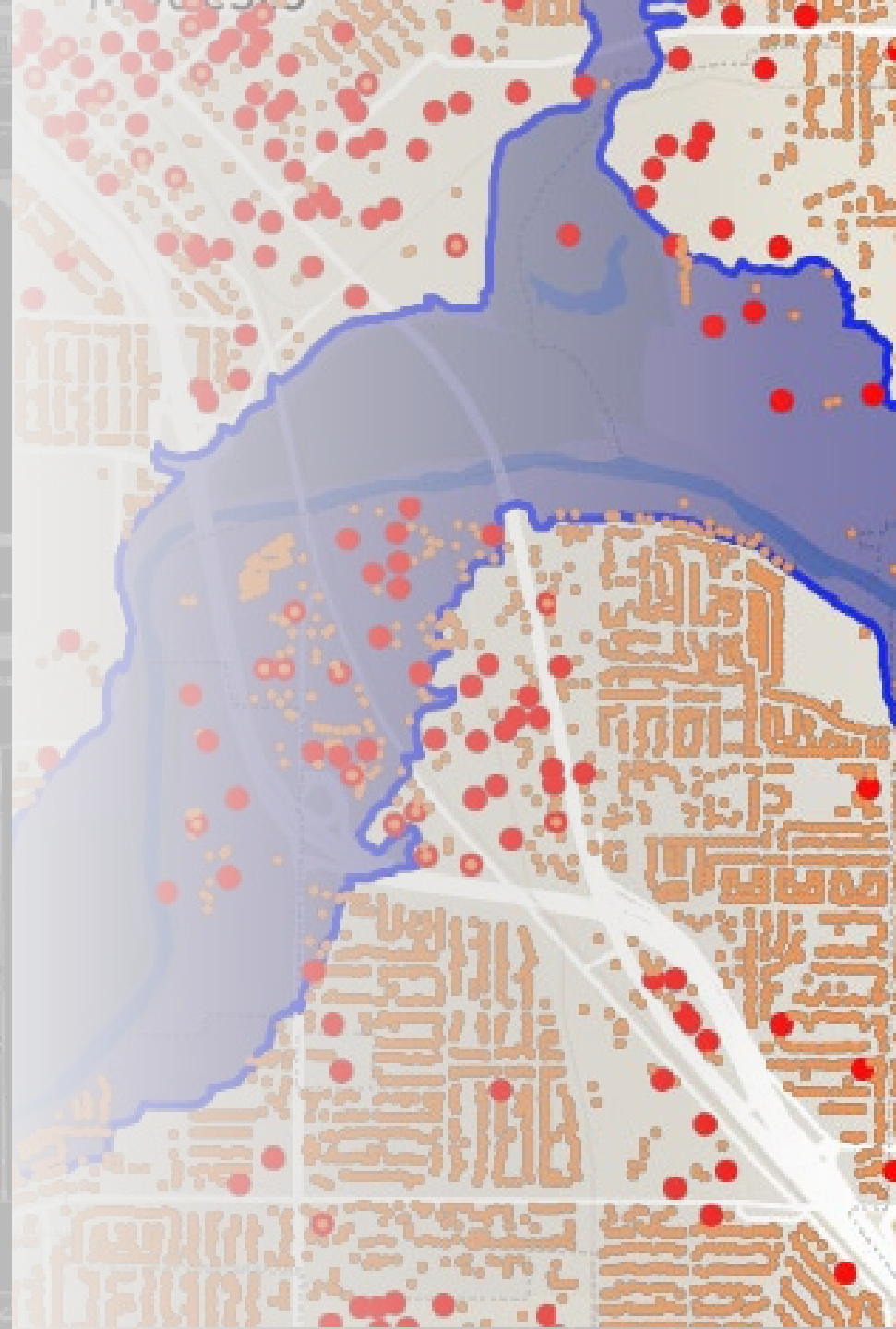
HEC-RAS and HEC-FDA Alignment with RAPID Workflows

Planning CoP Webinar

November 19, 2026

Kristy Riley, P.E., PMP
Eric Tichansky, P.E.
Brennan Beam, P.E.

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HEC-RAS 2025 Design Principles

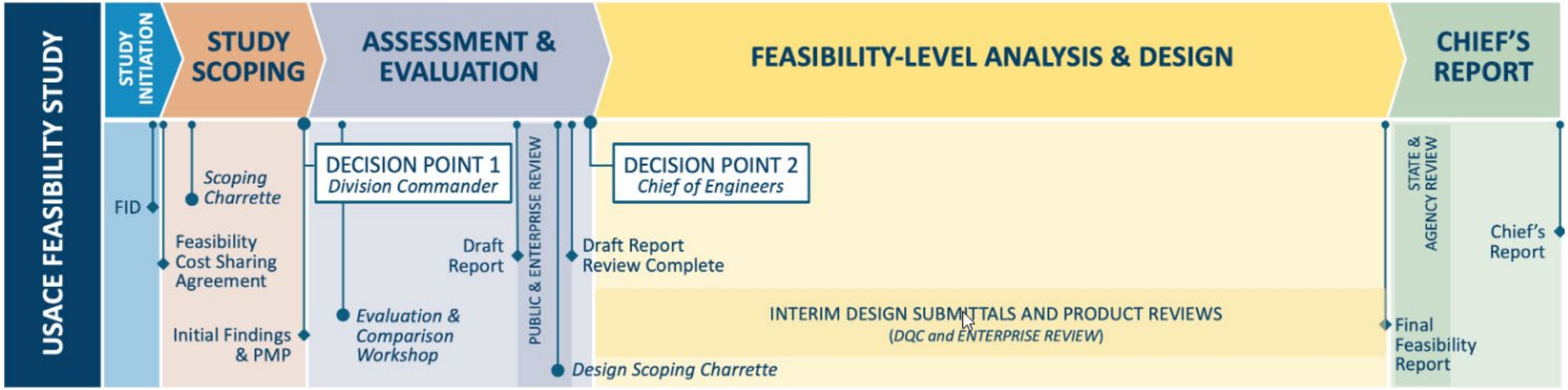
RAS 2025

RAPID FRAMEWORK

Fast	• Direct imports for model development • Automated tools/AI/ML Solutions • GPU & Runtime optimization
Stable	• Make changes without breaking the model • Adjustments don't cascade into instability or rework • Time goes to analysis, not chasing numerical problems
Scalable	• Mesh size and parameters adjust to the detail the study needs • Set globally, or refine locally where it matters • Same model runs at coarse screening or full resolution
Modular	• Use same model from screening to cost fidelity • Expand domain or clip to focus area • No duplication or rework
Accurate	HEC-RAS is trusted for *physics-based* hydraulic analysis that delivers high-accuracy results efficiently, giving leadership clear, defensible outputs for timely decisions



RAPID Framework



Federal Interest Determination (FID)

- What existing data can help you understand impact and interest with a day in the office and a day in the field?
- Foster collaborative discussion across disciplines to identify if there is sufficient federal interest to justify a feasibility study.
- Avoid Rework
  - Do your GIS recon and in the same platform you will scope and assess in
  - Import existing RAS results into that platform

STUDY INITIATION

» The USACE project delivery team has $100K of federal funding and 45 days to aggressively leverage existing data to answer the question: "Is there sufficient federal interest to justify a full feasibility study?"

» The **Federal Interest Determination (FID)**, signed by District Commander, requires ASA(CW) concurrence before the study moves forward.

» The signed **Feasibility Cost Sharing Agreement** with the non-federal sponsor and receipt of study funds starts the feasibility study's scoping phase.



Background and Model Data

Demo - Exploring Background Data and Downloads



Study Scoping

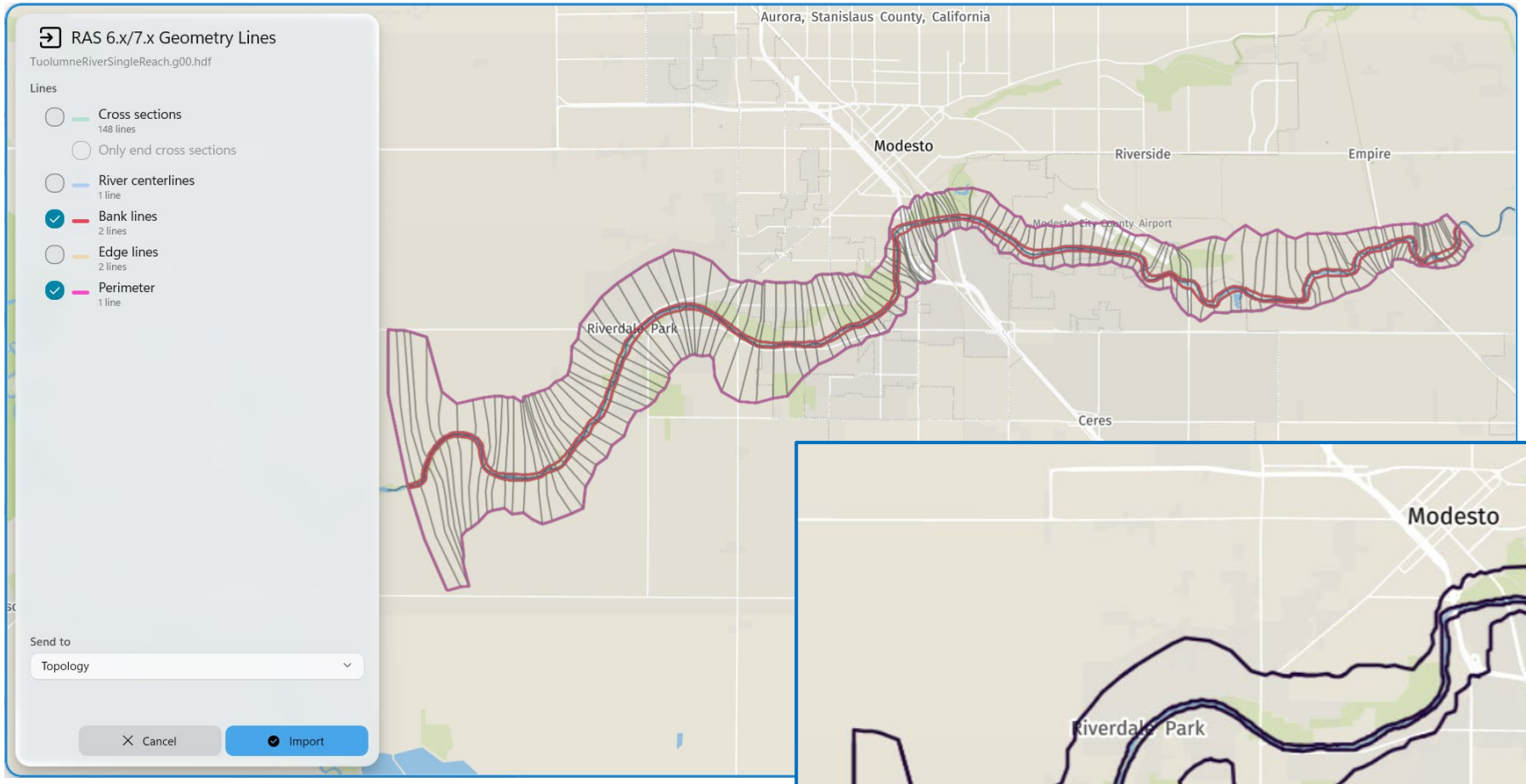
- Initial hydraulic model development for scoping

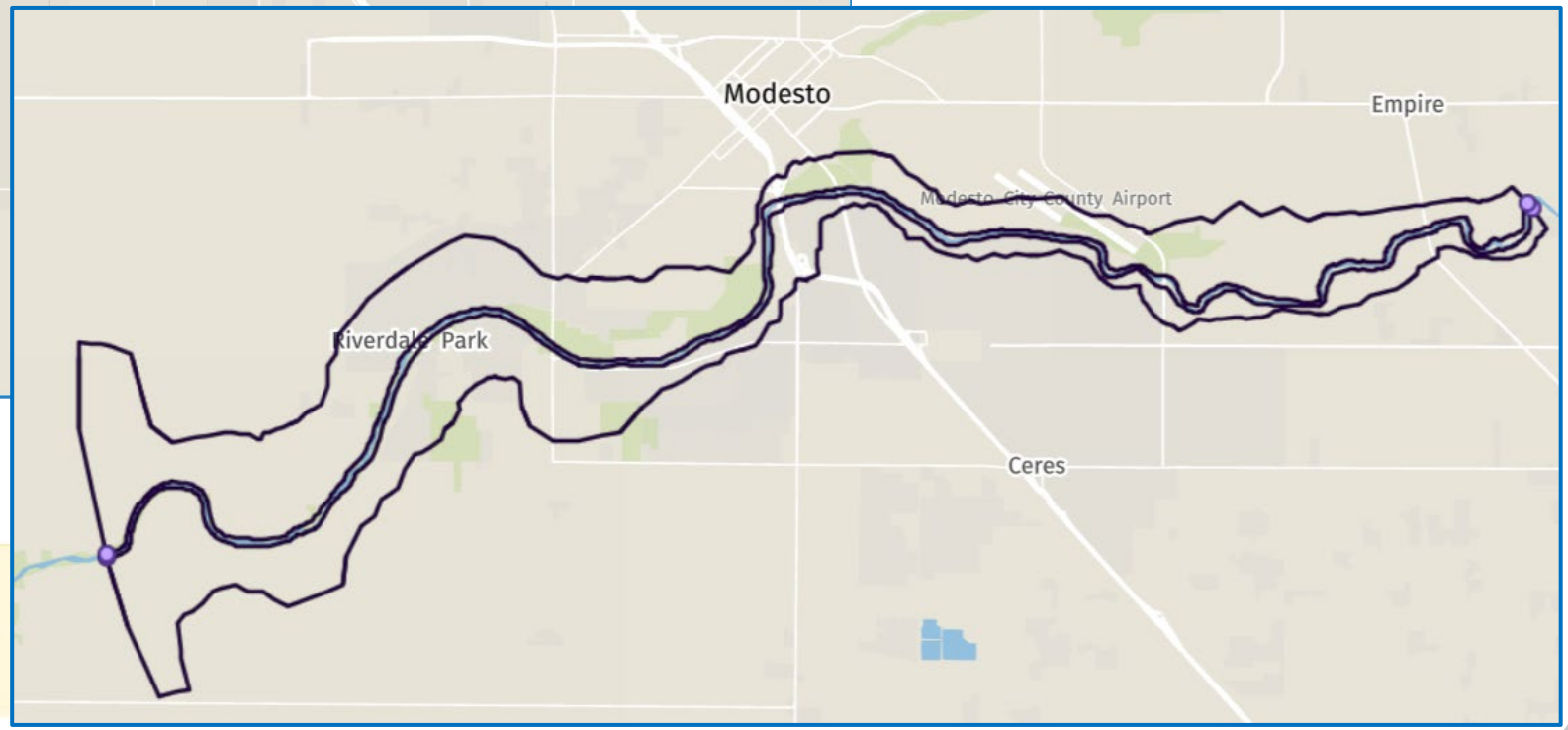
- Tools to Build Models
  - Using existing HEC-RAS 7 models - or -
  - Create NEW models in HEC-RAS 2025 with existing data

- Models built in HEC-RAS 2025
  - Quick to spin up for study scoping
  - Flexible meshing allows for creating and evaluating alternatives
  - Extensible for model refinement during feasibility and design



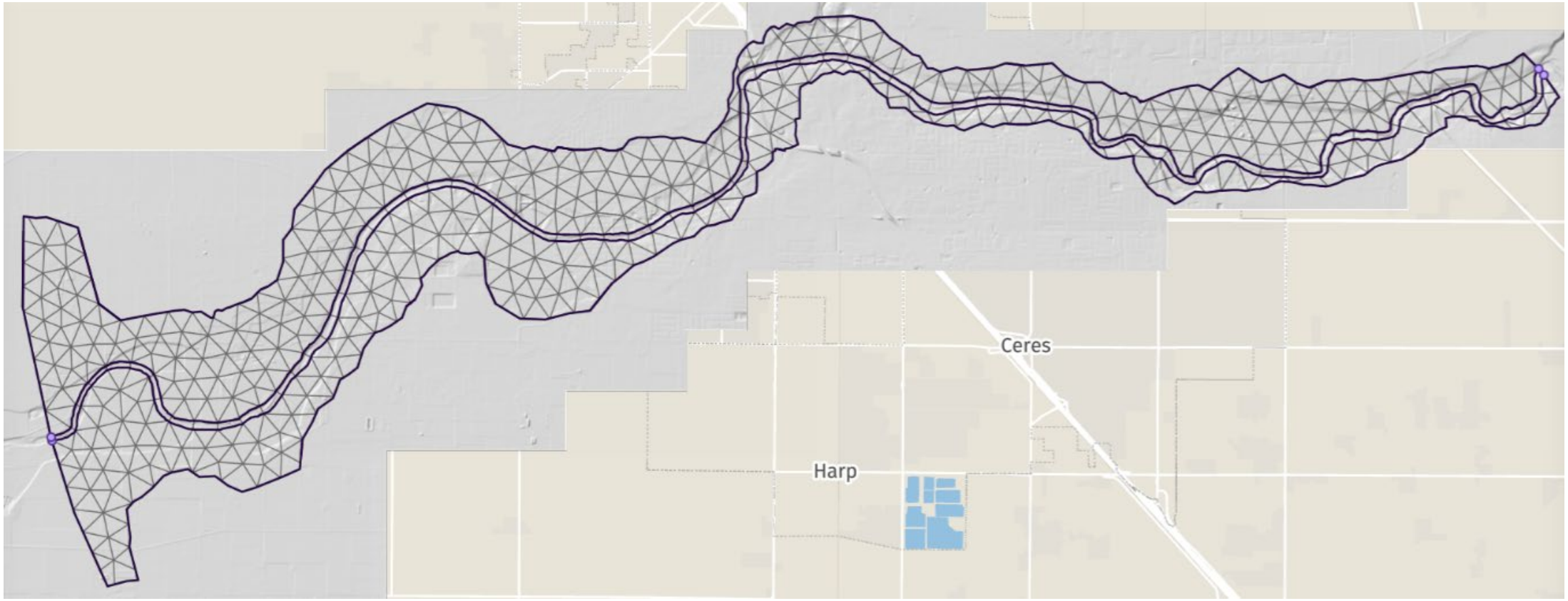
Existing Data - Geometry





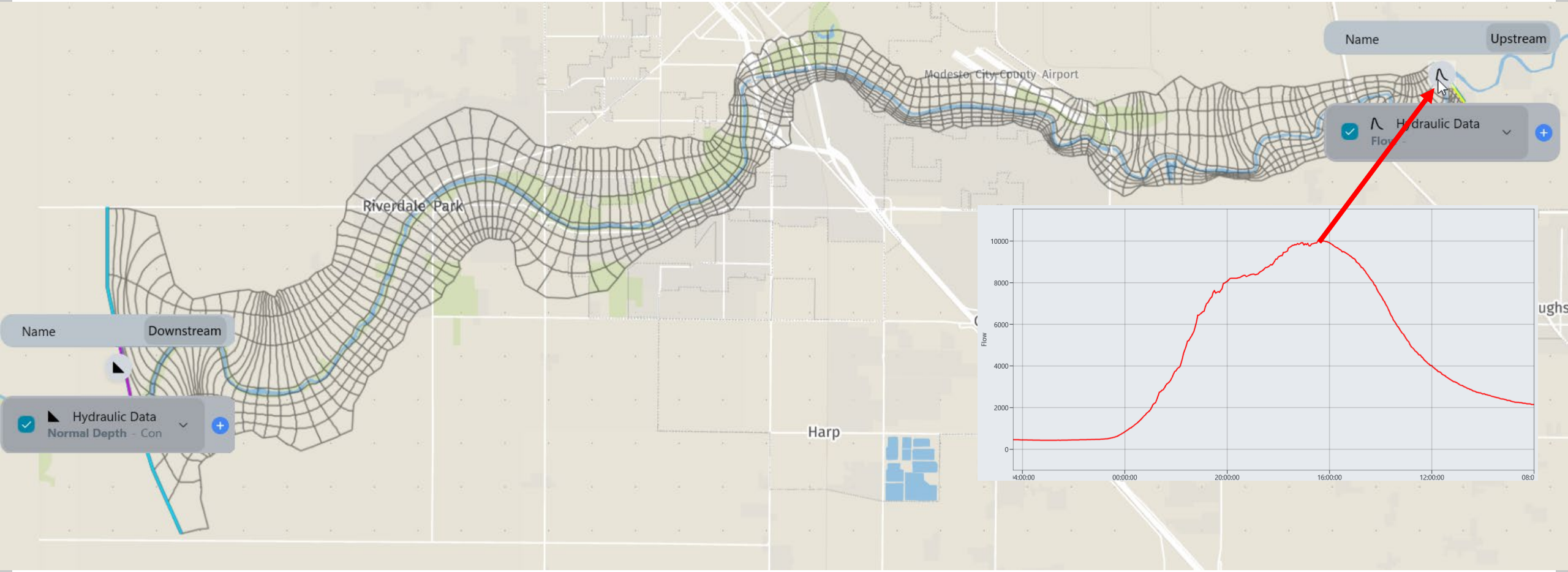


Existing Data - Mesh



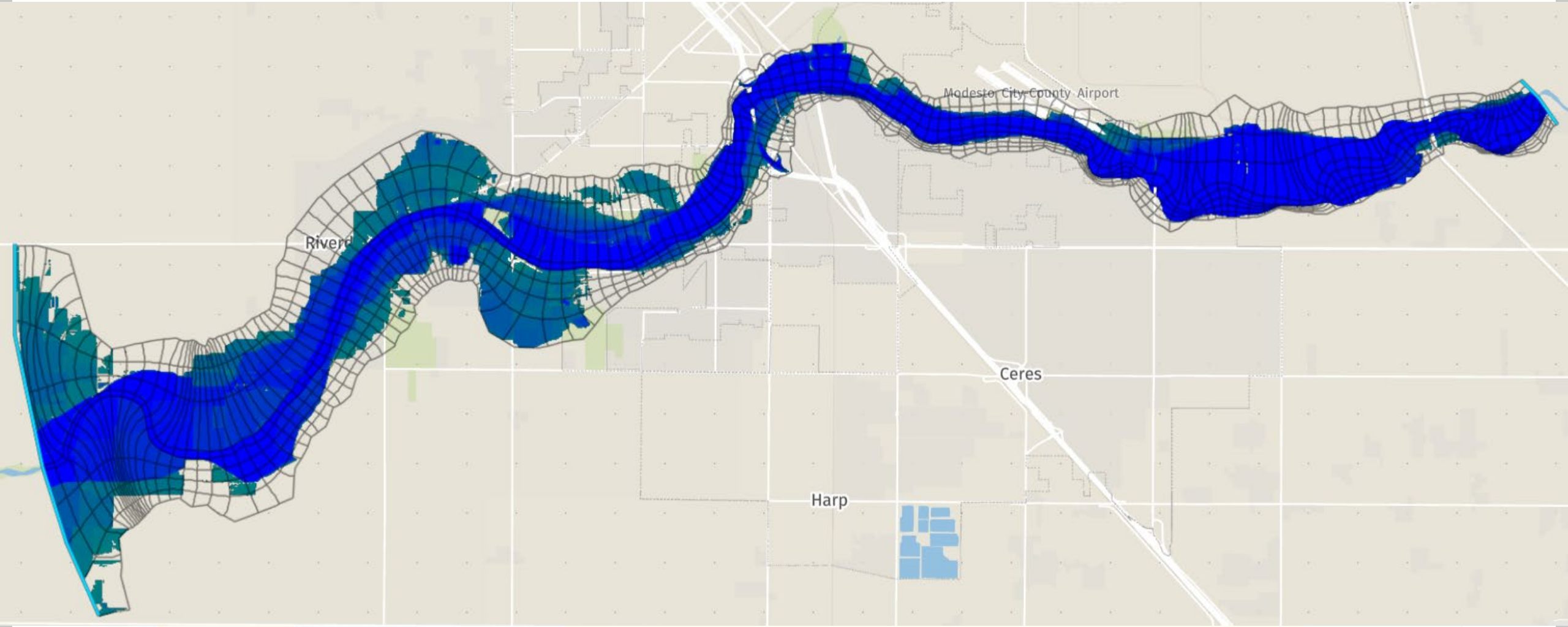
STUDY INITIATION | STUDY SCOPING | ASSESSMENT & EVALUATION | FEASIBILITY-LEVEL ANALYSIS & DESIGN | CHIEF'S REPORT

Existing Data - Flows



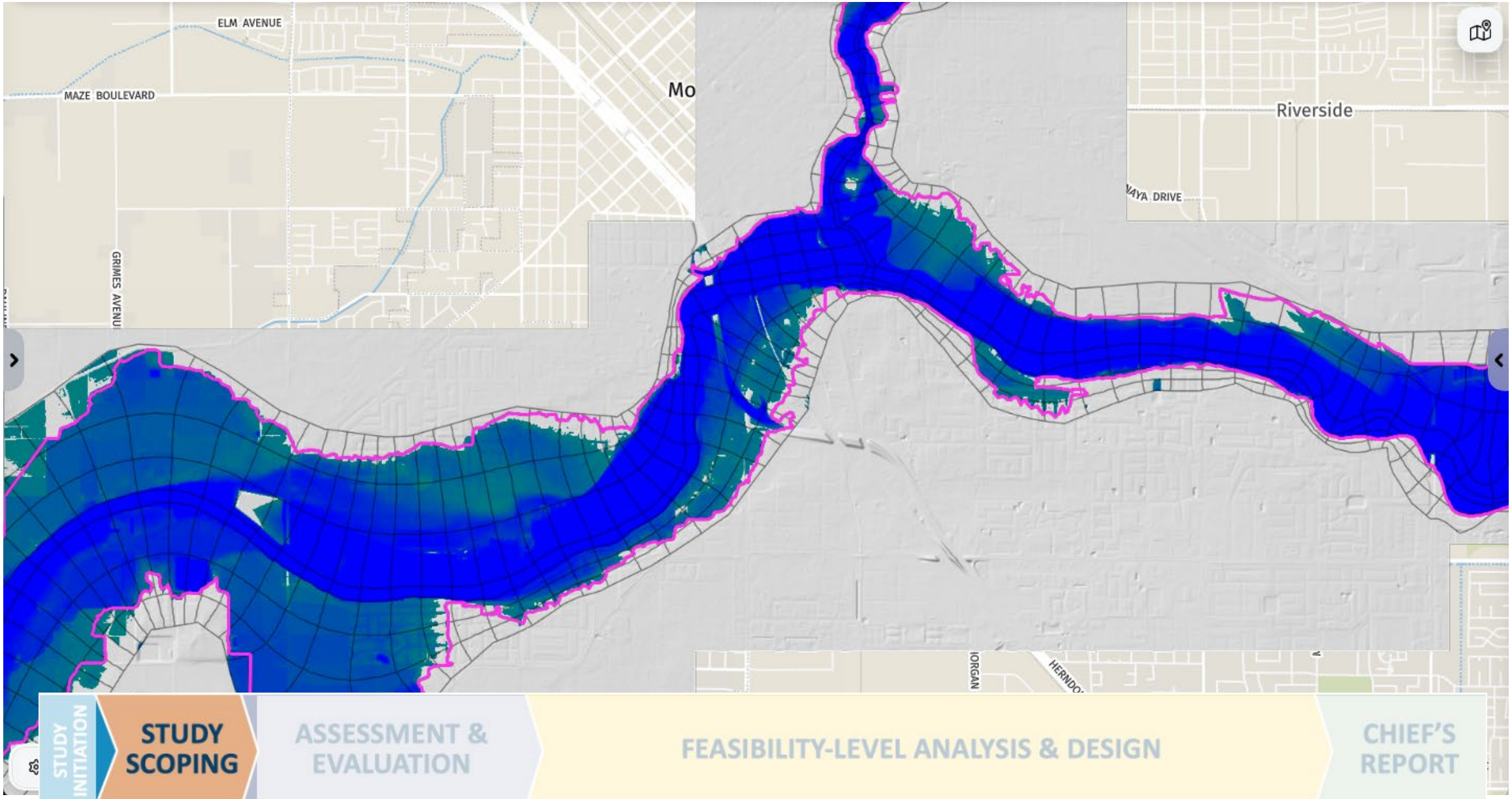
STUDY INITIATION | STUDY SCOPING | ASSESSMENT & EVALUATION | FEASIBILITY-LEVEL ANALYSIS & DESIGN | CHIEF'S REPORT

Base Model – Simulate

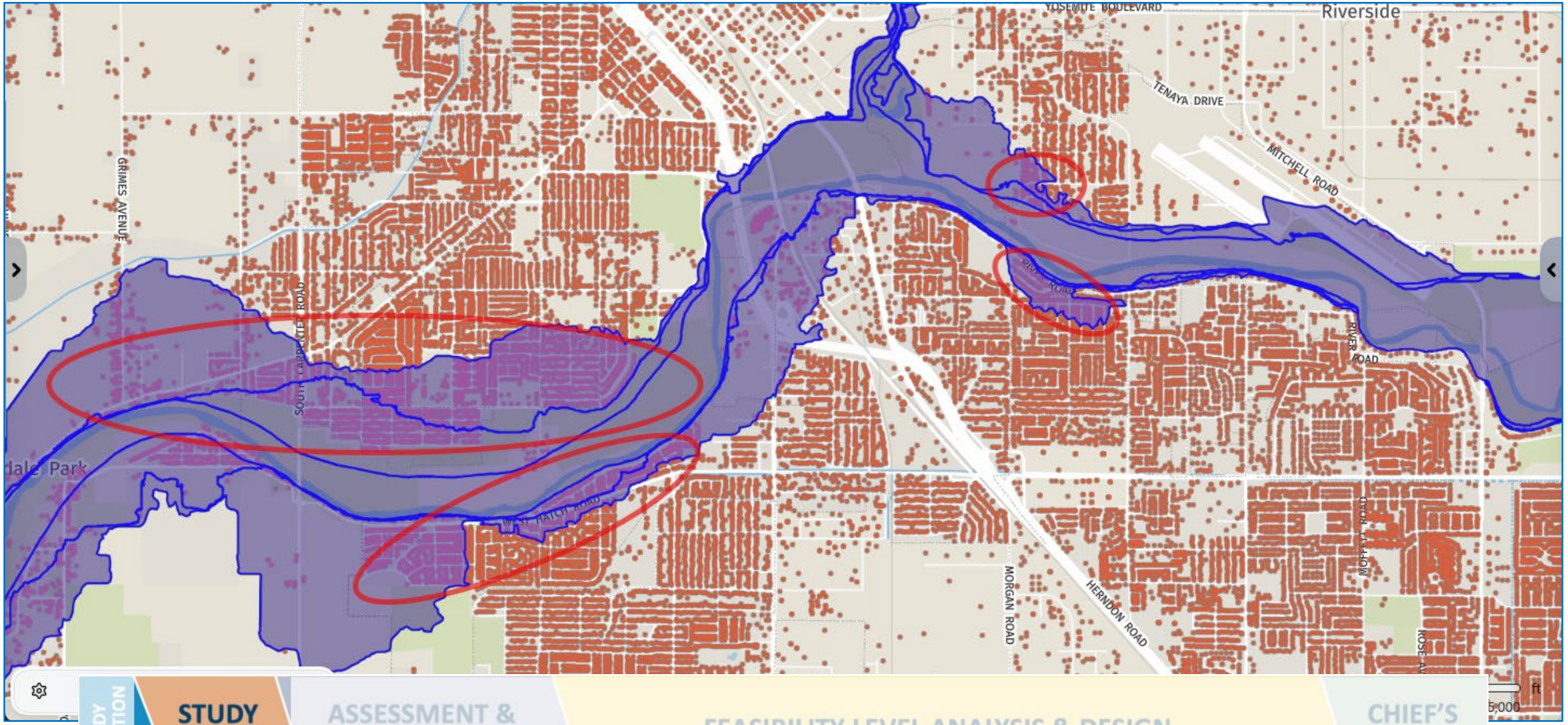


STUDY INITIATION | STUDY SCOPING | ASSESSMENT & EVALUATION | FEASIBILITY-LEVEL ANALYSIS & DESIGN | CHIEF'S REPORT

Base Model Comparison to Existing Data



Initial Alternative Screening

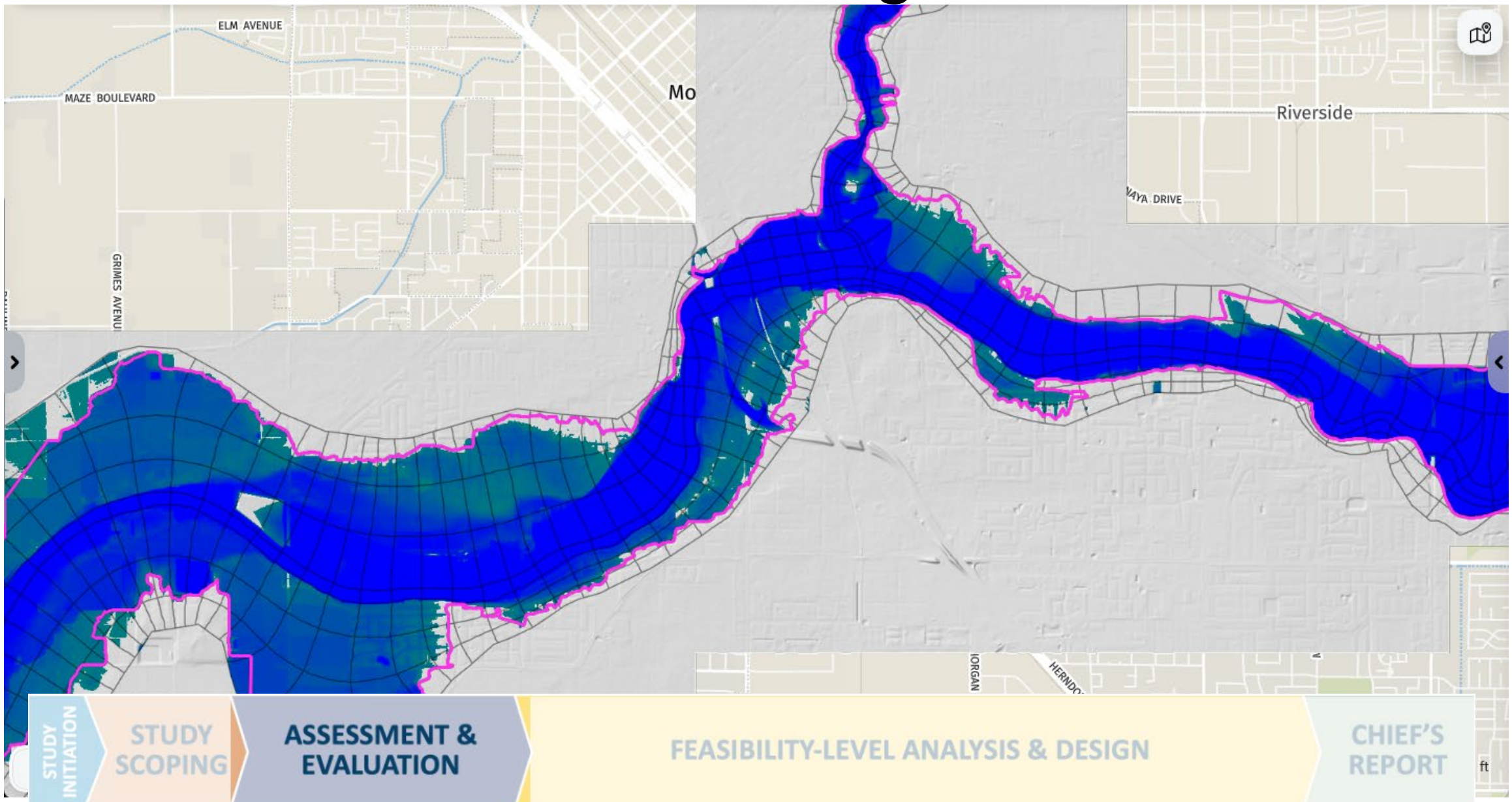


STUDY INITIATION | STUDY SCOPING | ASSESSMENT & EVALUATION | FEASIBILITY-LEVEL ANALYSIS & DESIGN | CHIEF'S REPORT

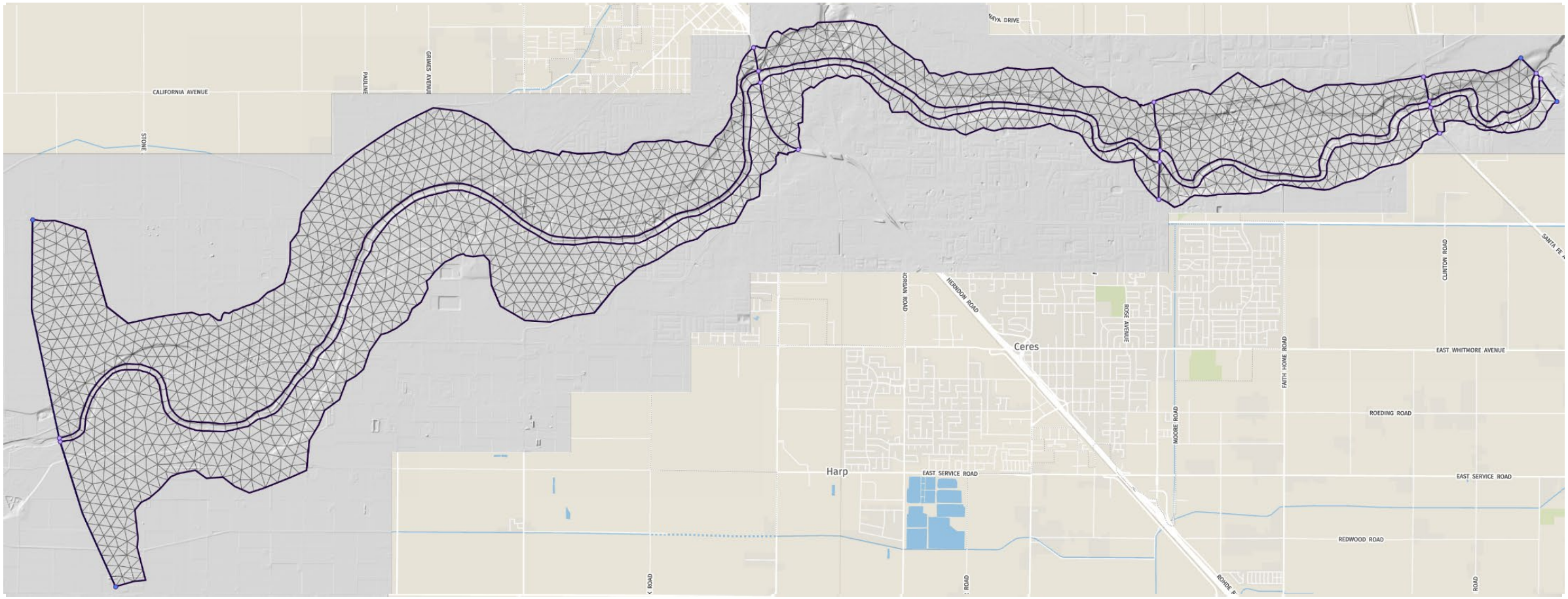
Demo – Building an HEC-RAS Model



Initial Alternative Screening

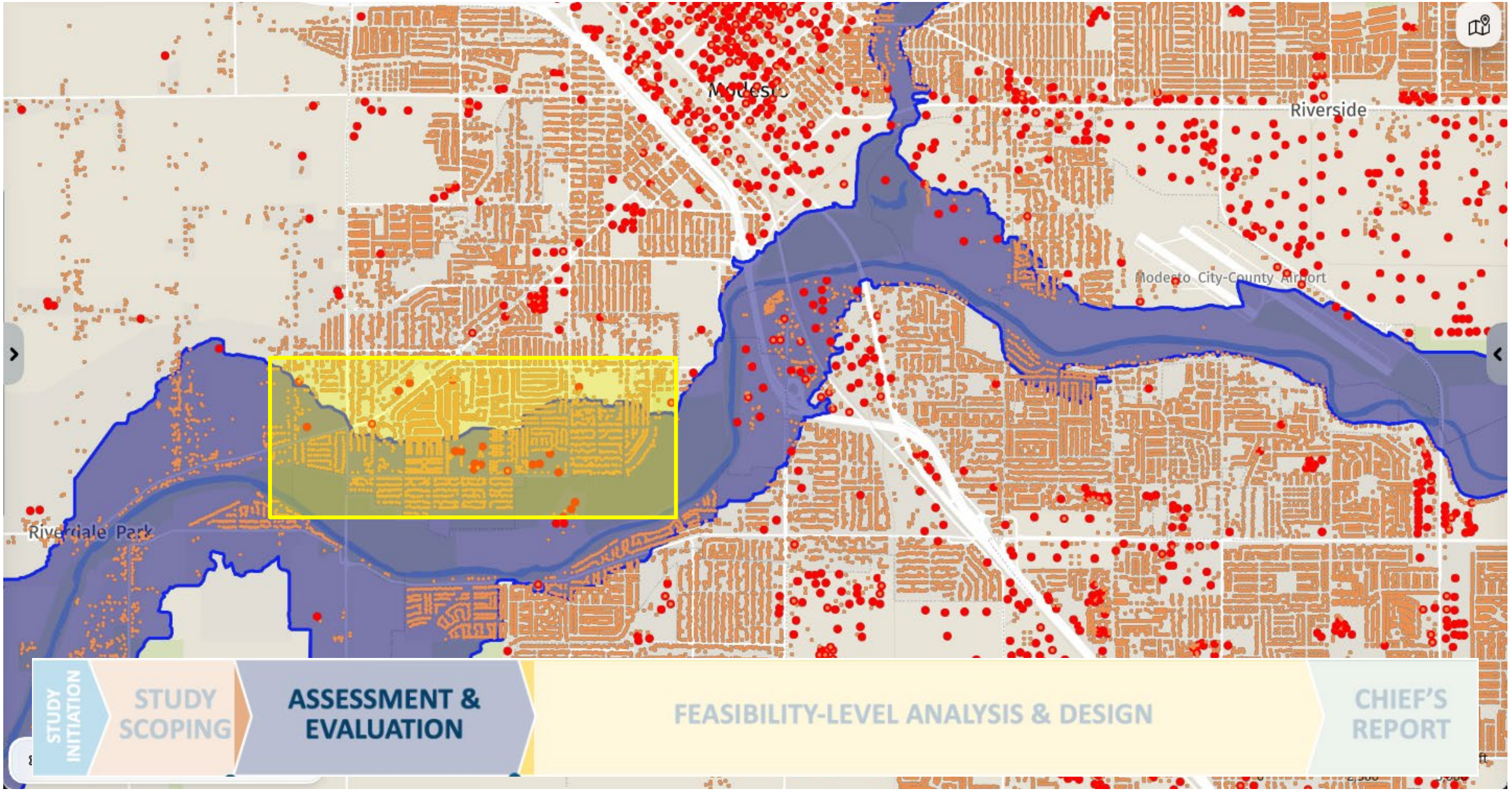


Model Refinement

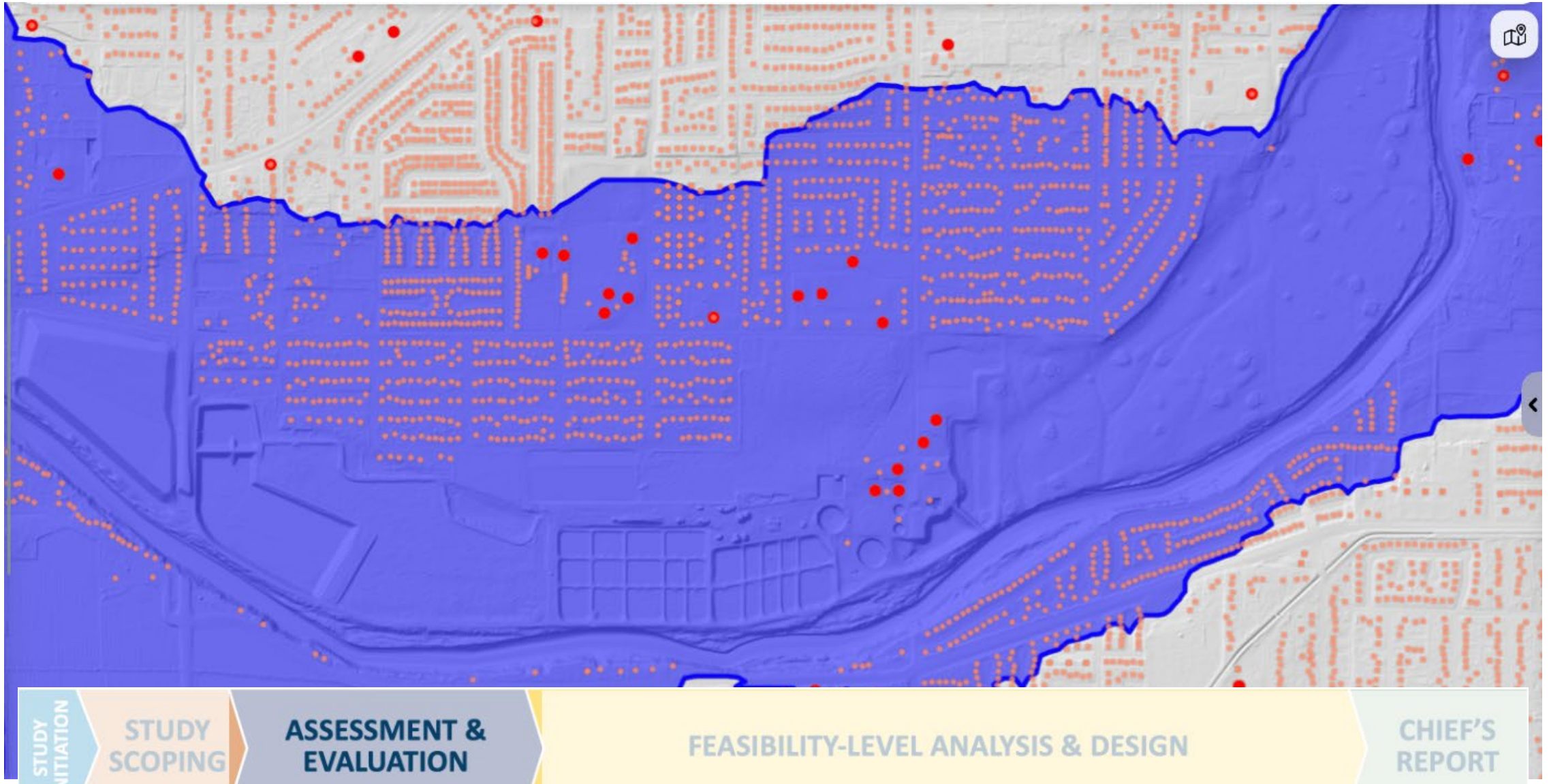


STUDY INITIATION | STUDY SCOPING | **ASSESSMENT & EVALUATION** | FEASIBILITY-LEVEL ANALYSIS & DESIGN | CHIEF'S REPORT

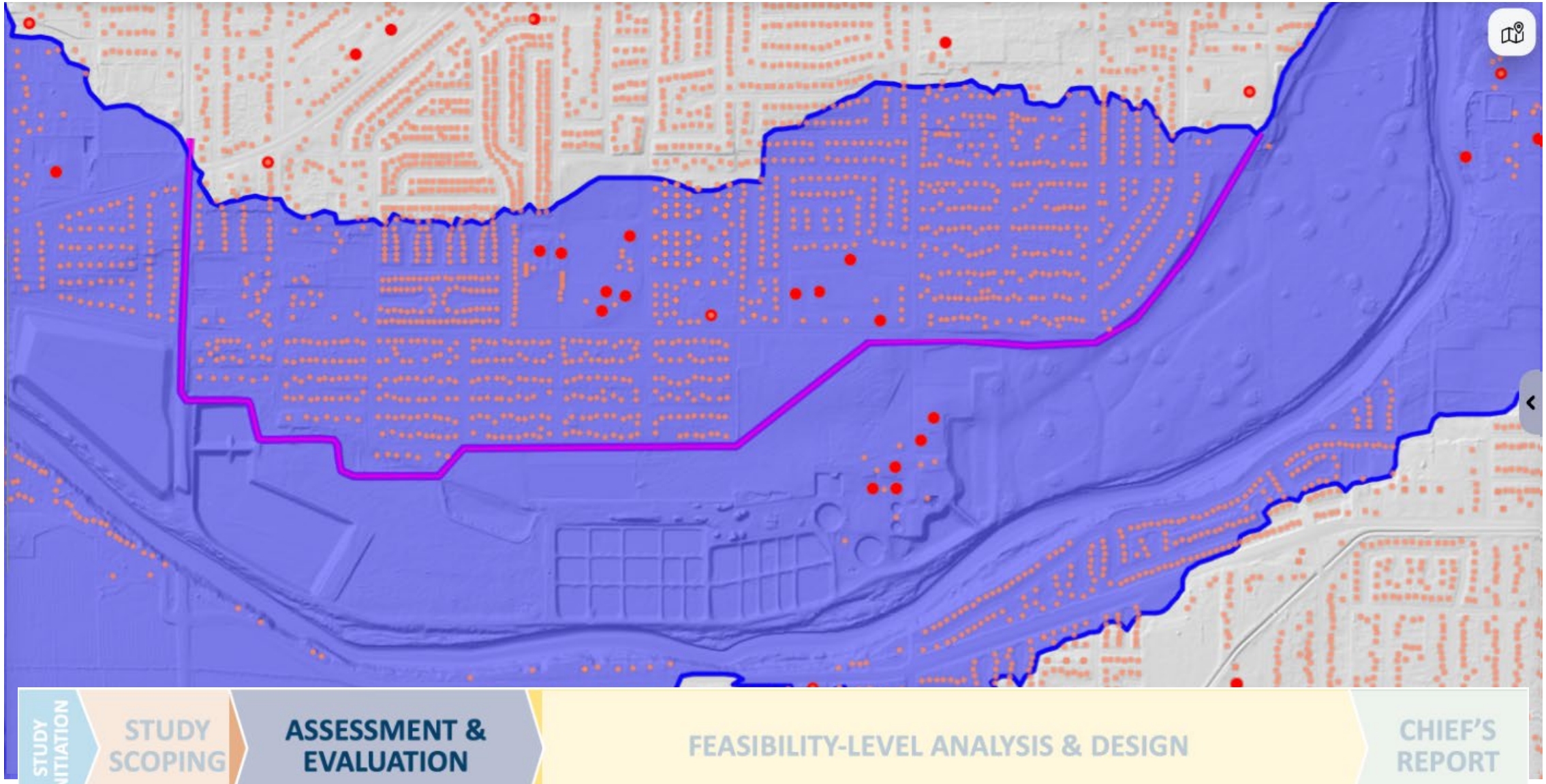
Initial Alternative Screening



Initial Alternative Screening



Initial Alternative Screening



Initial Alternative Screening

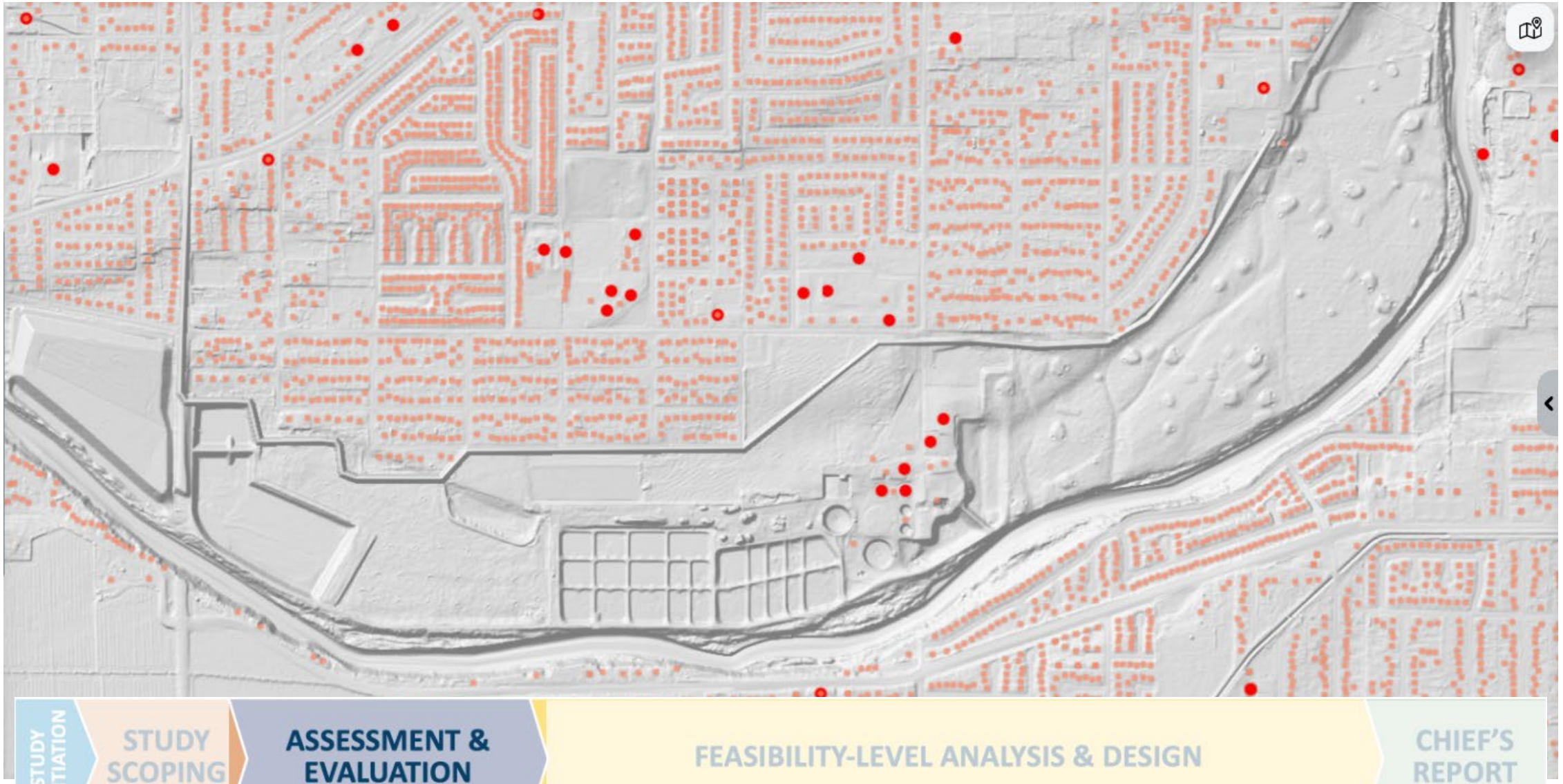


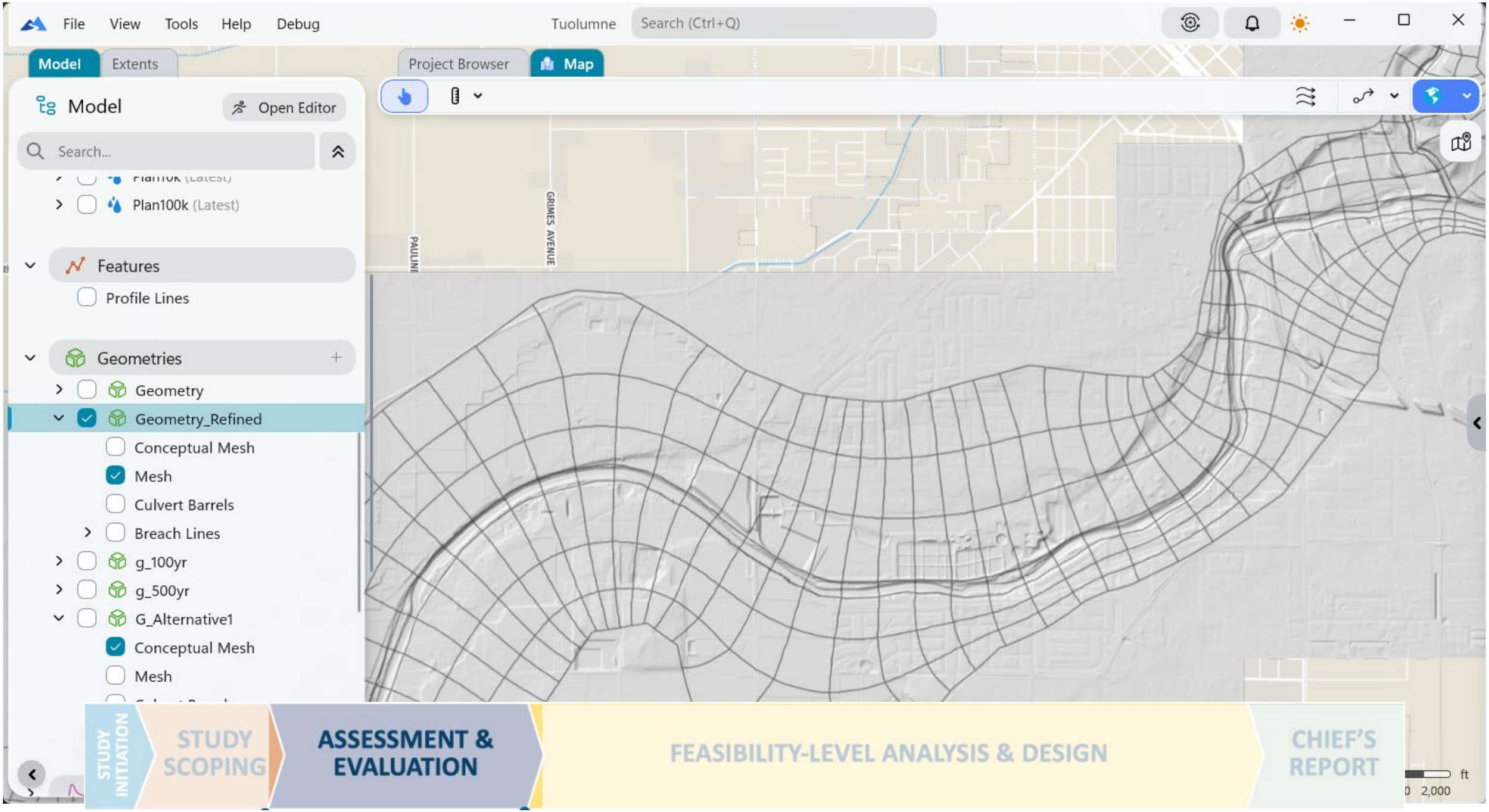
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Mode	Simple Fill
Top/Bottom Width	16
Left Side Slope (H:1)	4
Right Side Slope (H:1)	(same as left)
Left Width	40
Right Width	(same as left)
Modification Type	Take Higher

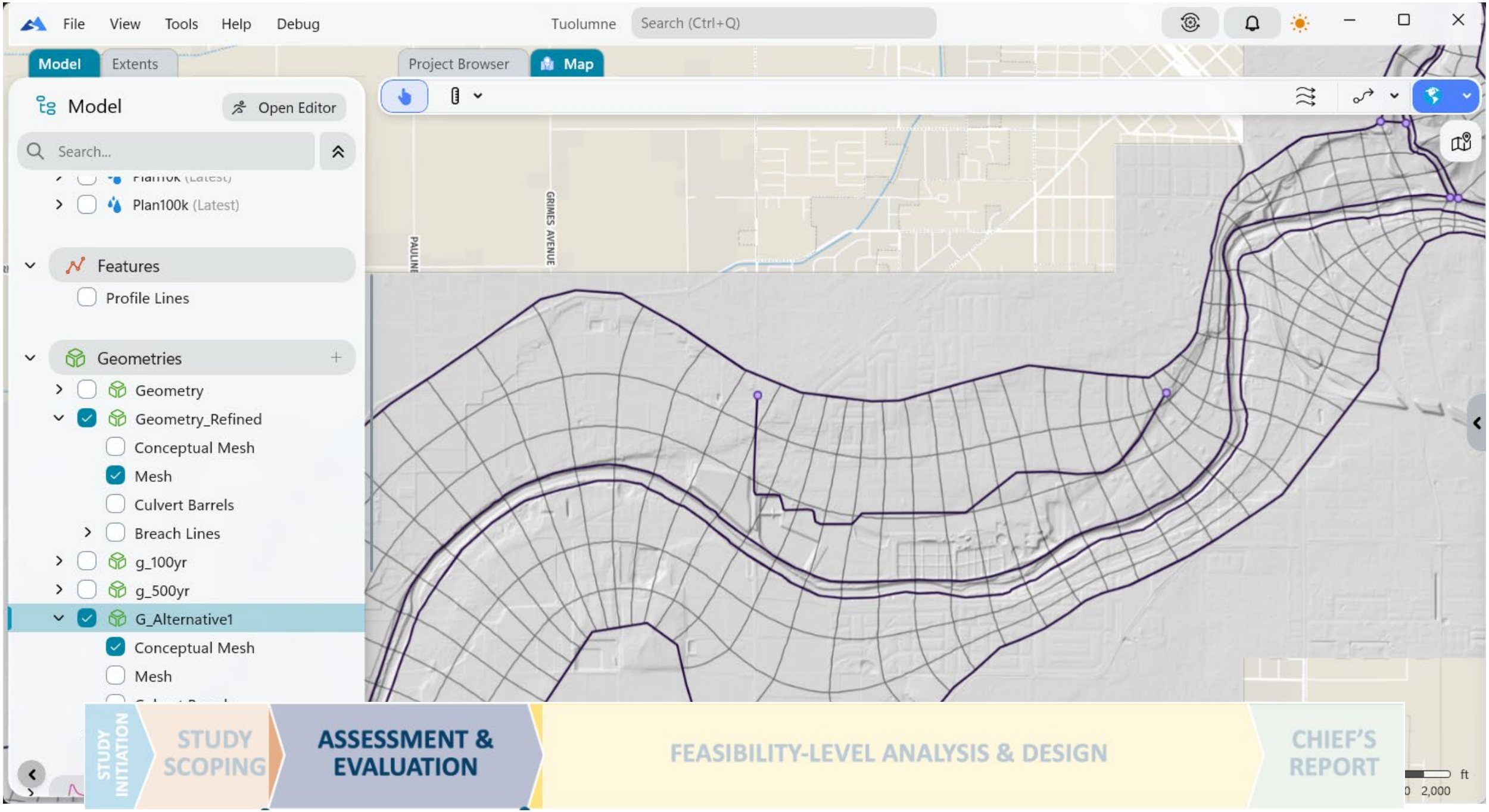


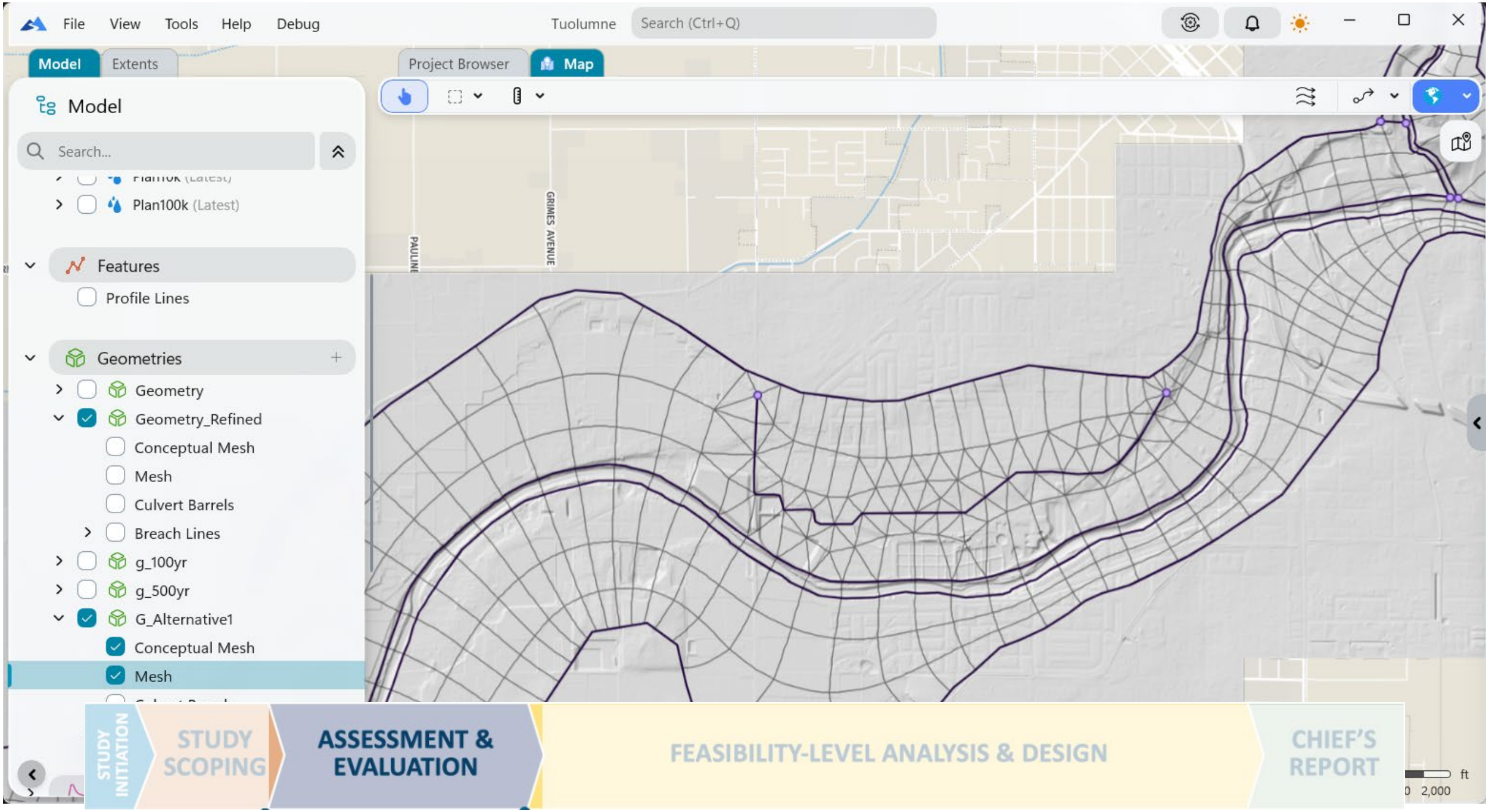
	Station	Elevation
0	0	82
1	11485	80

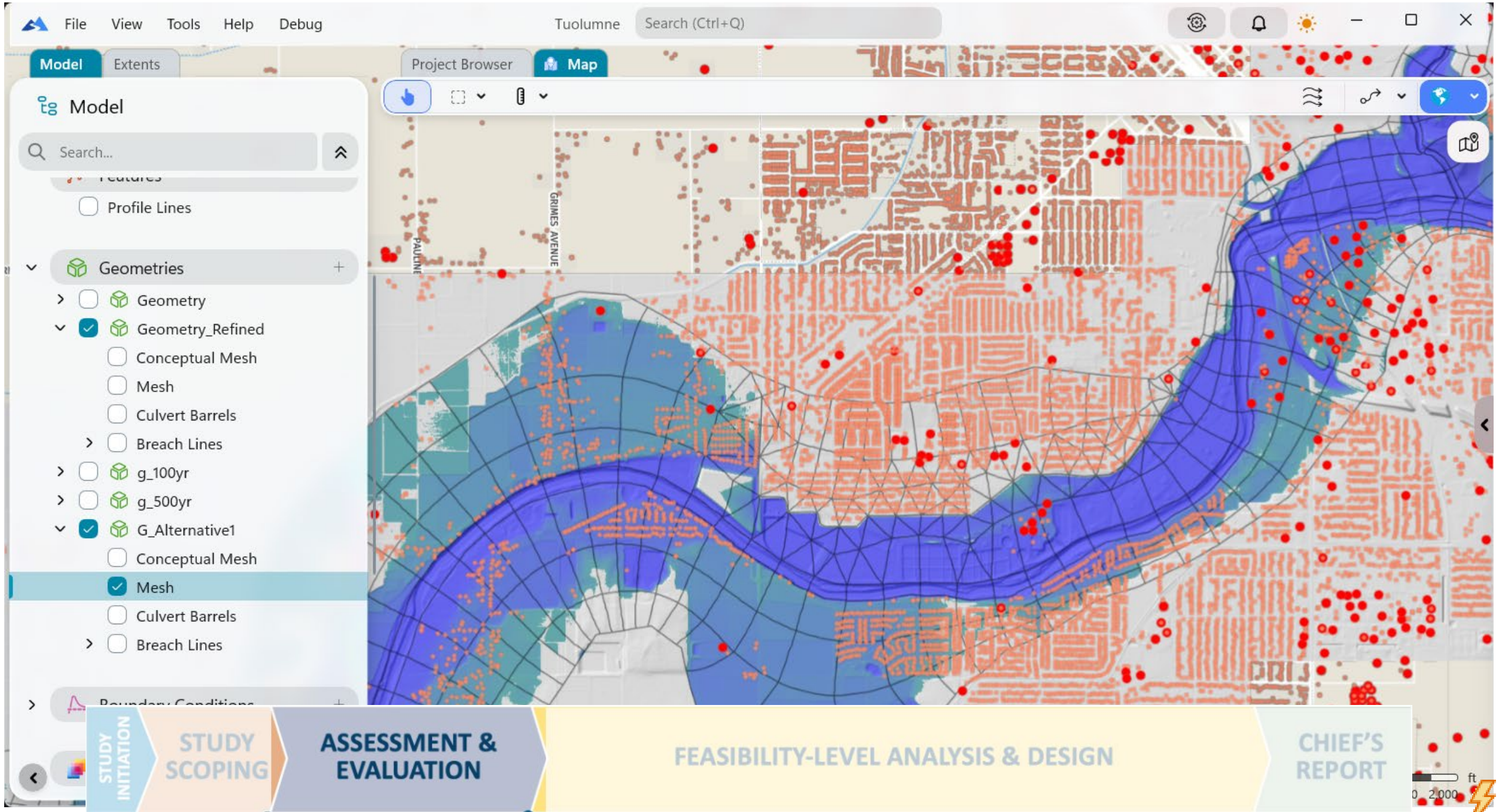
Initial Alternative Screening




File
View
Tools
Help
Debug
Tuolumne
Search (Ctrl+Q)
Model
Extents
Project Browser
Map
Model
Open Editor
Search...
Plan100k (Latest)
Features
Profile Lines
Geometries
Geometry
Geometry_Refined
Conceptual Mesh
Mesh
Culvert Barrels
Breach Lines
g_100yr
g_500yr
G_Alternative1
Conceptual Mesh
Mesh
PAULINE
GRIMES AVENUE
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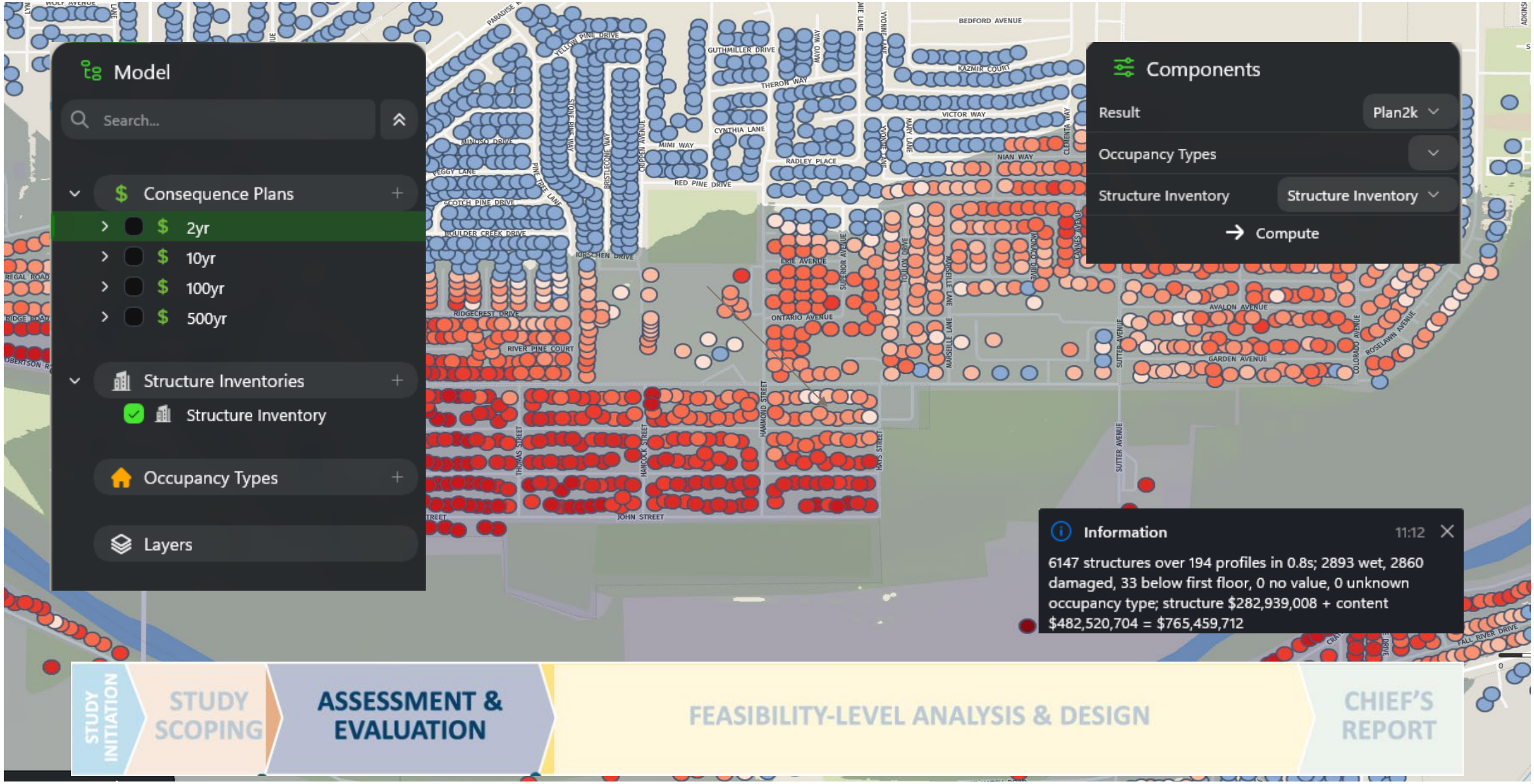

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CHIEF'S REPORT
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Mesh Refinement/Resolution

- Moving through the assessment phase and into feasibility, we want to improve answers and perform more detailed alternative analysis.
- HEC-RAS provides a framework for efficient Mesh Refinement
  - Each step in the modeling effort can contribute to the next
  - Previous efforts are not wasted – don't require "starting over"
- Lastly, this provides a consistent foundation to make decisions using risk-based consequence analysis



Consequence Compute



Consequences

- Evaluate directly the impacts of your refinements
  - Better Sensitivity Tests
- Establish your risk baseline – Existing Condition
  - Napkin Math EAD
- Evaluate and pilot your alternatives



Consequences

Demo – Consequence Computes



Tiers of Alternative Comparison

1
Visual review
Inundation extent + depth color ramp

2
Single Event Damages
Ex. .01 AEP

3
Multiple Event Damages
Ex. .002, .01, .1 AEP

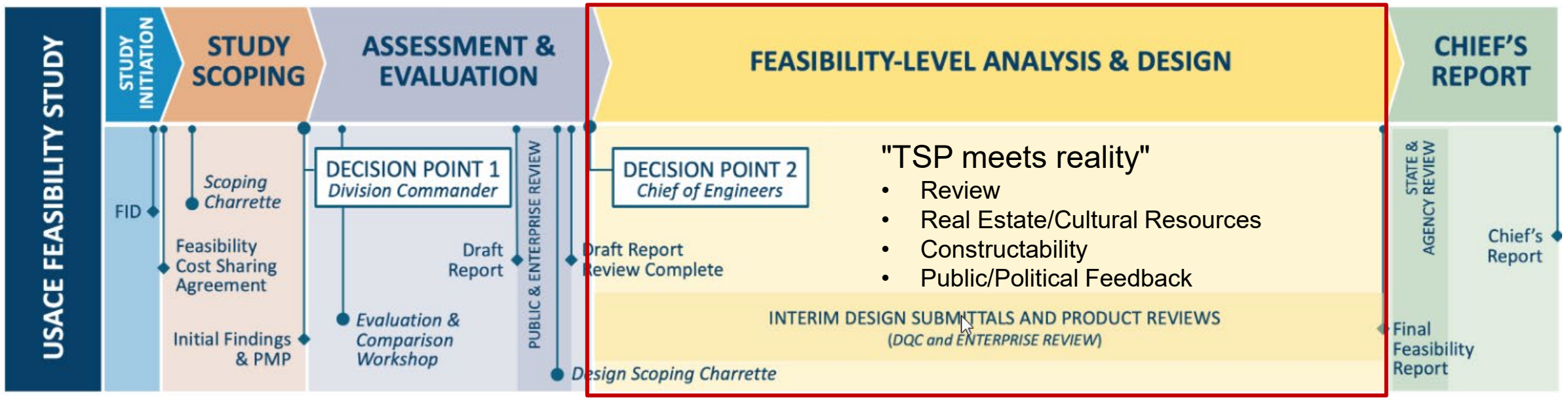
4
Deterministic EAD
Expected annual damage

5
EAD with uncertainty

6
Future years + EqAD
Equivalent annual damage



RAPID Framework



STUDY INITIATION	STUDY SCOPING	ASSESSMENT & EVALUATION	ANALYSIS & DESIGN	CHIEF'S REPORT
» The USACE project delivery team has $100K of federal funding and 45 days to aggressively leverage existing data to answer the question: "Is there sufficient federal interest to justify a full feasibility study?"	» A scoping charrette focuses collaborative discussions on the key drivers of problems for a shared understanding of objectives and potential path forward.	» An evaluation and comparison workshop is held for collaborative discussions on screening and decision criteria.	» The study team develops sequence of actionable elements of the recommended plan.	» The Chief's Report undergoes State and Agency Review.
» The Federal Interest Determination (FID), signed by District Commander, requires ASA(CW) concurrence before the study proceeds forward.	» The plan formulation process identifies a focused array of alternatives that can address the water resources problem.	» With the non-federal sponsor, the study team evaluates and compares the alternatives based on agreed-upon screening and decision criteria, identifying the tentatively selected plan (TSP).	» The study team develops the first actionable element to 35% level of design in all technical areas and develops a Class 3 Cost Estimate for project construction.	» The Chief's Report is signed by the Chief of Engineers and transmitted to Congress.
» The signed Feasibility Cost Sharing Agreement with the federal sponsor and receipt of study funds starts the feasibility study's scoping phase.	» At D… Commander endorses the focused array of alternatives forward for the study team to evaluate and c…	» The study te… releases it for public and agency review.	» The … Chief's Report is drafted.	» The Chief's Report is submitted to ASA(CW) for Administration review.
		» A design scoping charrette is held to identify the actionable elements of the TSP to recommend for authorization.	» The final feasibility report is signed by the District Commander and sent to Headquarters.	
		» This phase concludes with Decision Point 2, when the Chief of Engineers ende… TSP … commended plan and supports the identified actionable element(s).		

Inform "Engineering Intuition"

Simple Model: Enough Detail to to Identify Alternatives

Add Incremental Model Detail where needed to screen alternatives

Responsive Model Iterations

Feasibility: "Streamlining Analysis Iterations"

What we're hearing:

- Technical iterations take too long.

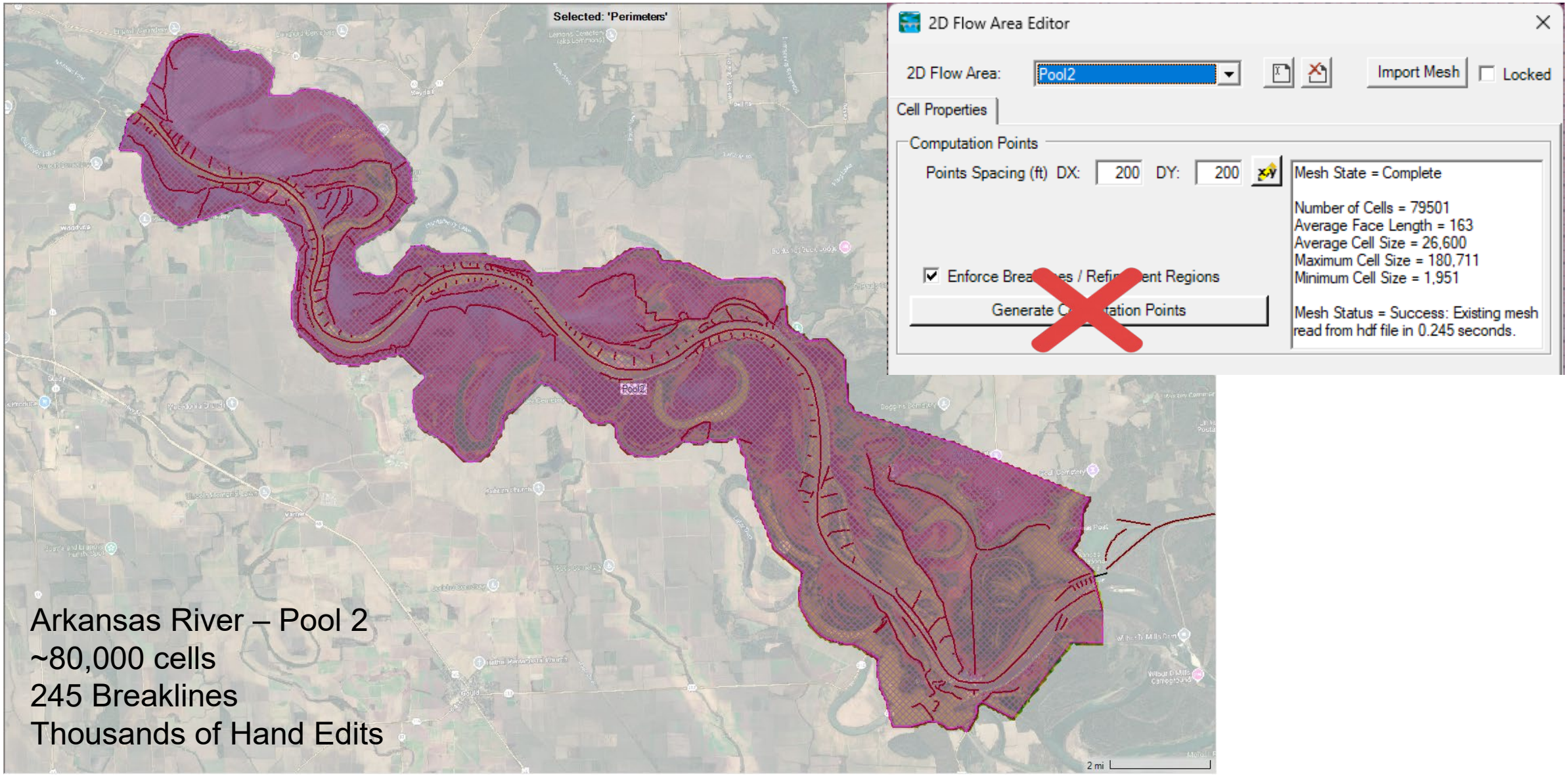
Main Hydraulic Obstacles to Responsive Iterations

- "Mesh Hardening"
  - "Mesh Debt"
- "Mesh Bankruptcy"
- The Verge of Stability
- Long Run Times

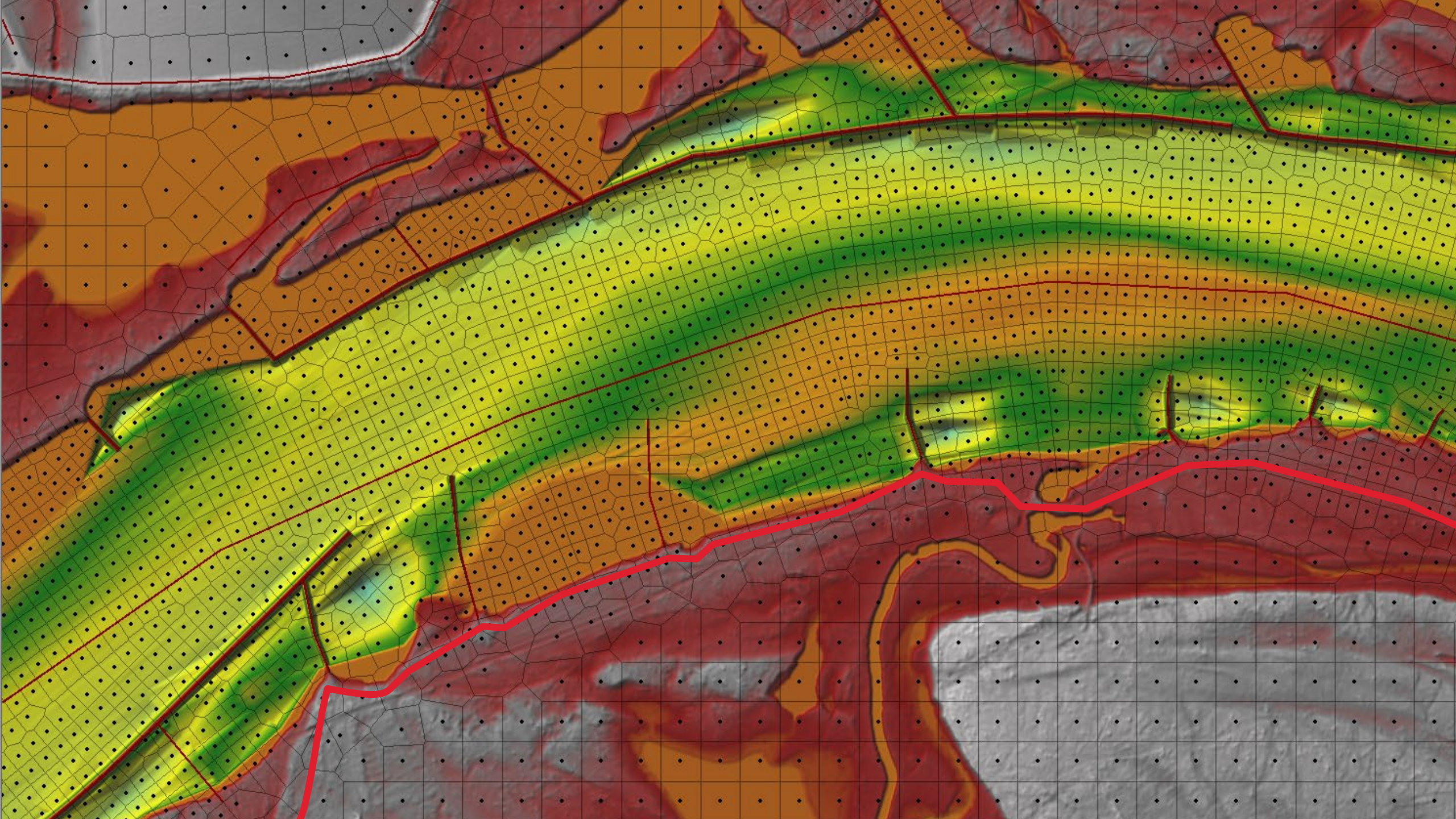


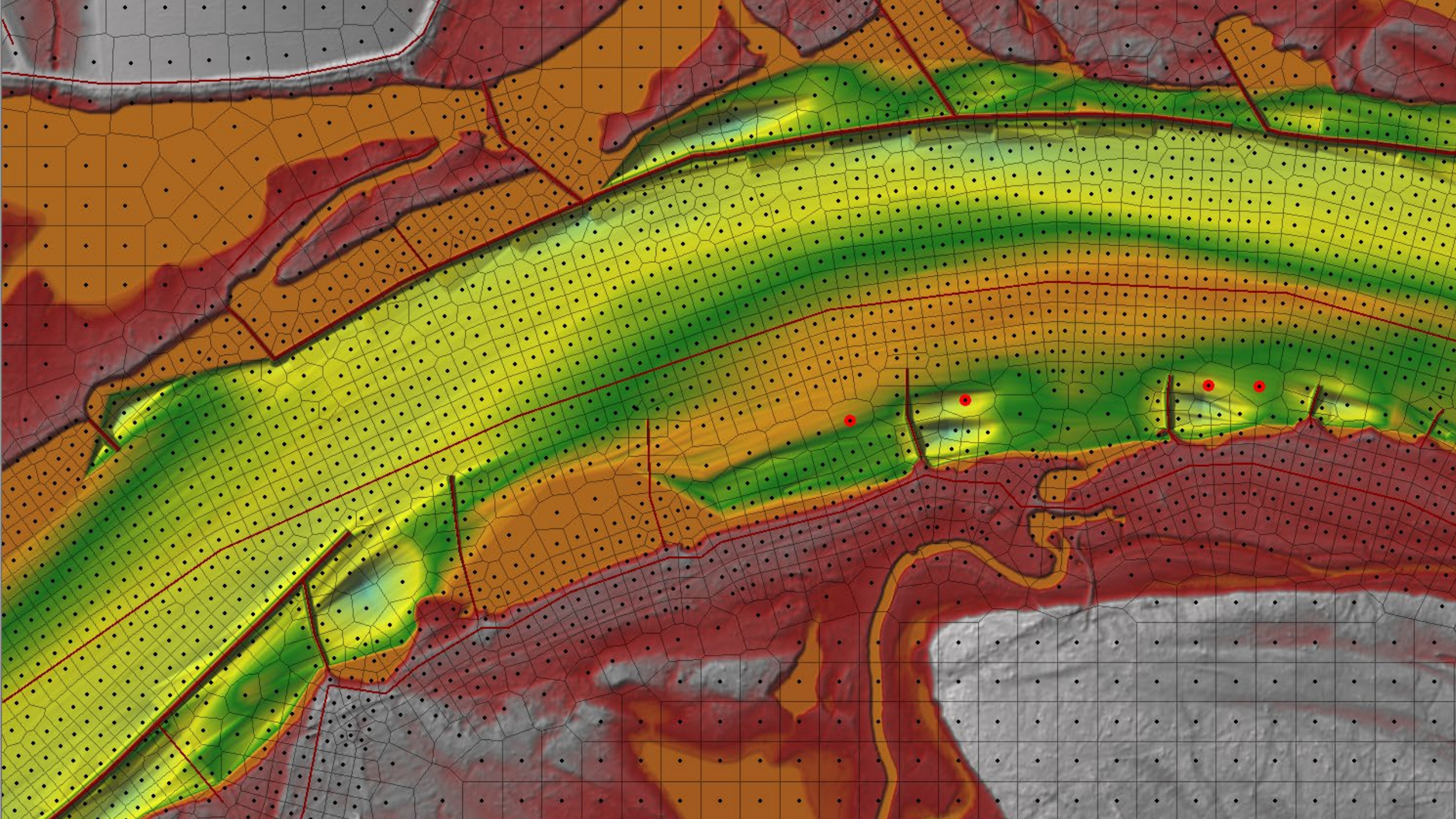


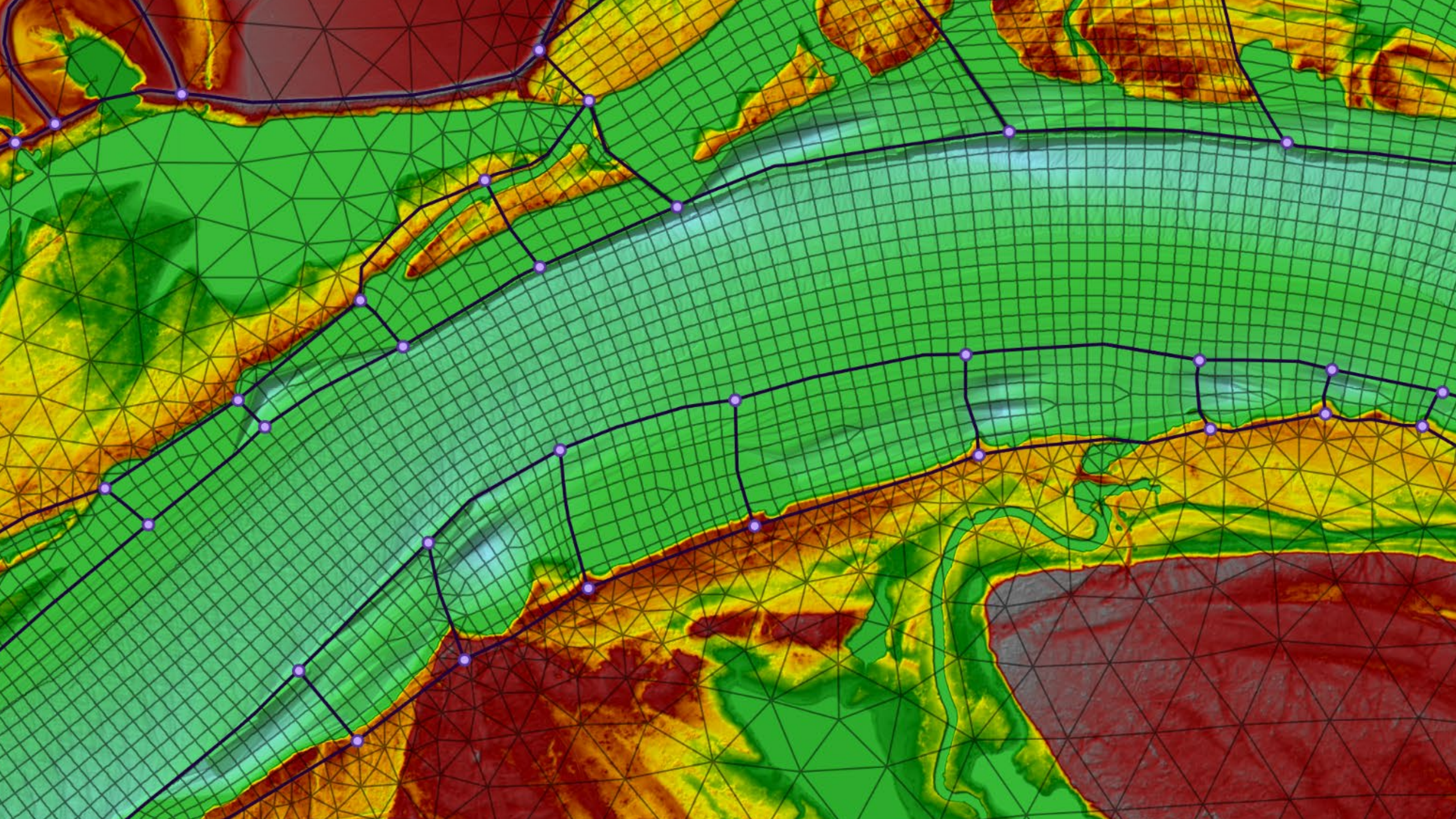
Feasibility: “Streamlining Analysis Iterations”

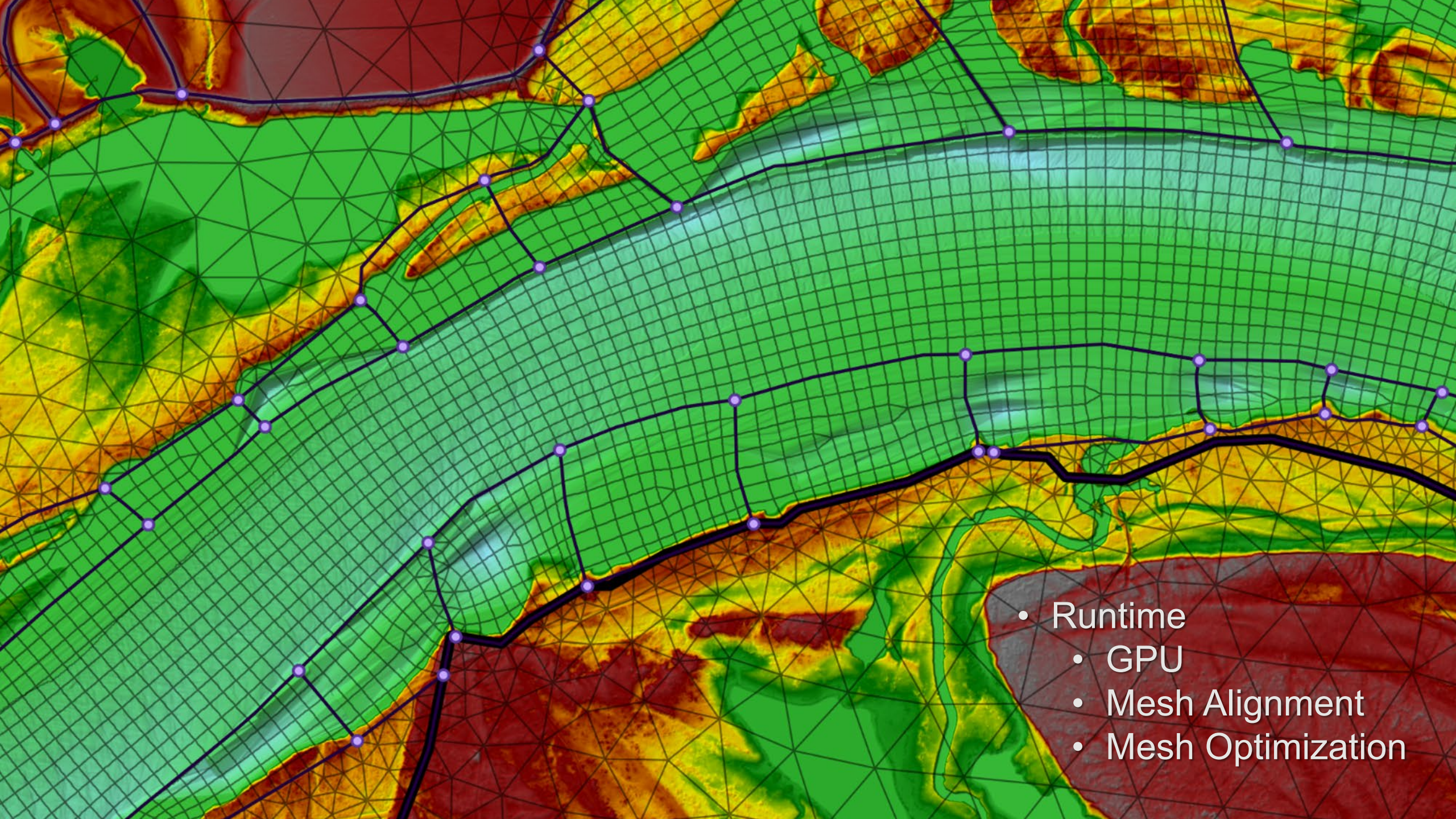


Arkansas River – Pool 2
~80,000 cells
245 Breaklines
Thousands of Hand Edits








• Runtime
• GPU
• Mesh Alignment
• Mesh Optimization

RAPID Framework

STUDY INITIATION	STUDY SCOPING	ASSESSMENT & EVALUATION	ANALYSIS & DESIGN	CHIEF'S REPORT

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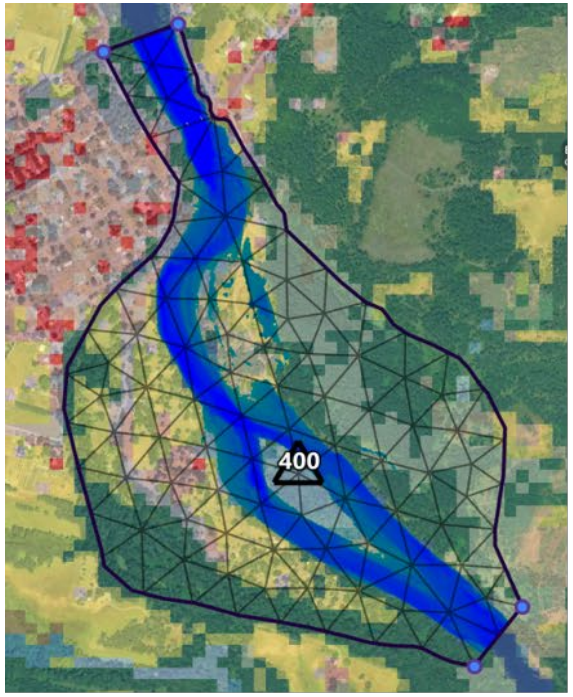
ALIGNED:
Ensuring teams are integrated and communicating from day one.

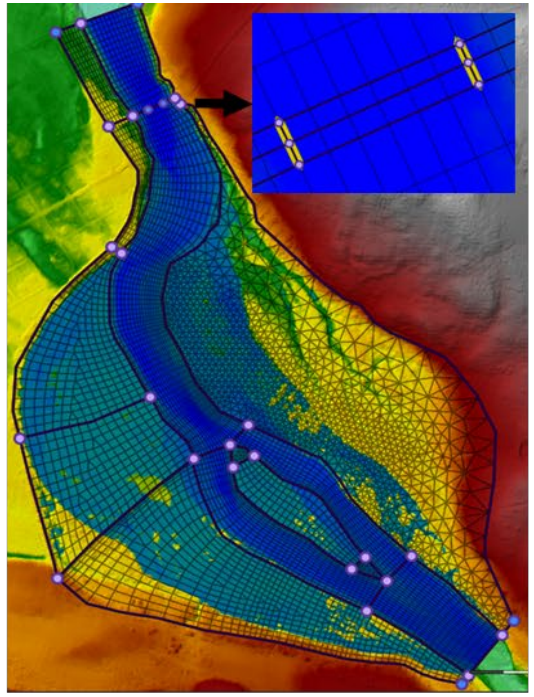
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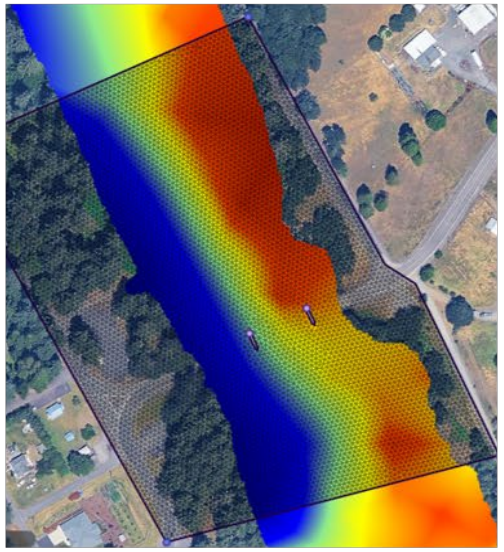
PROPORTIONAL:
The level of analysis will match the scope and cost of the project.

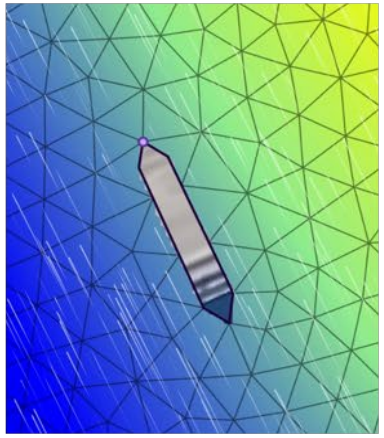
I

ITERATIVE:
Treating planning as a flexible cycle that adapts to new information.



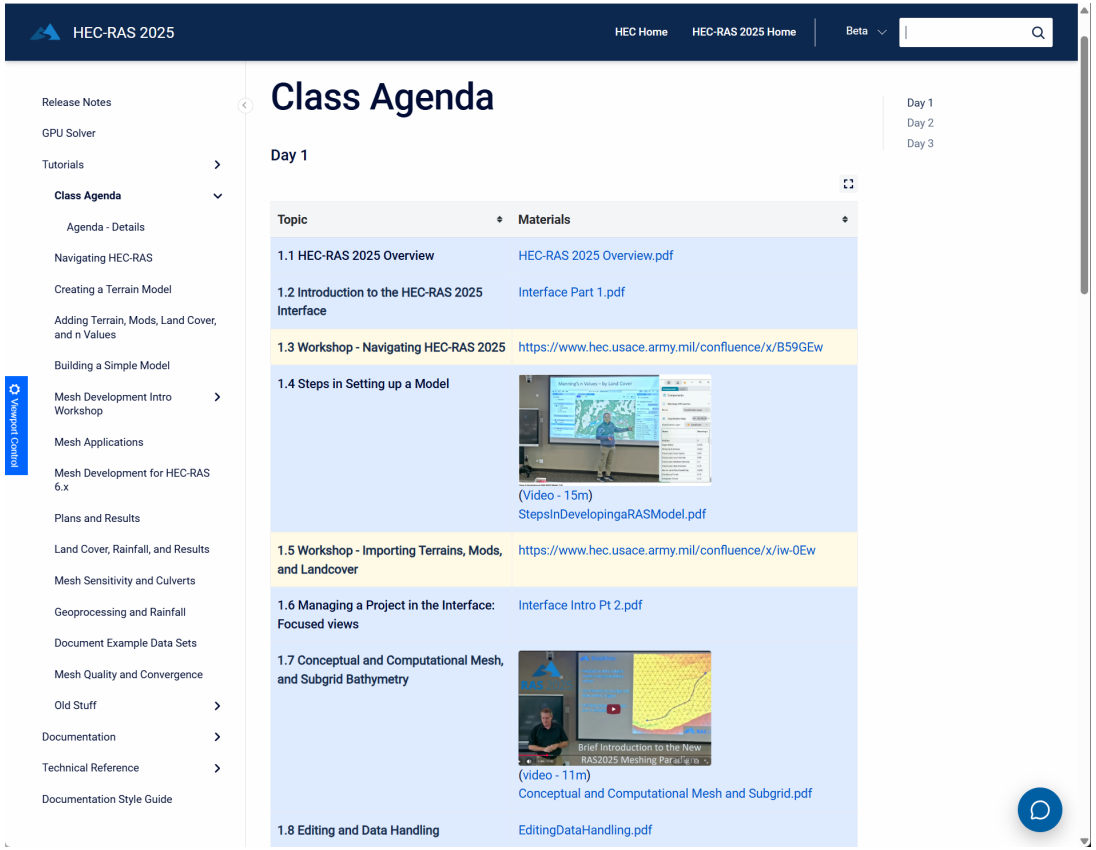




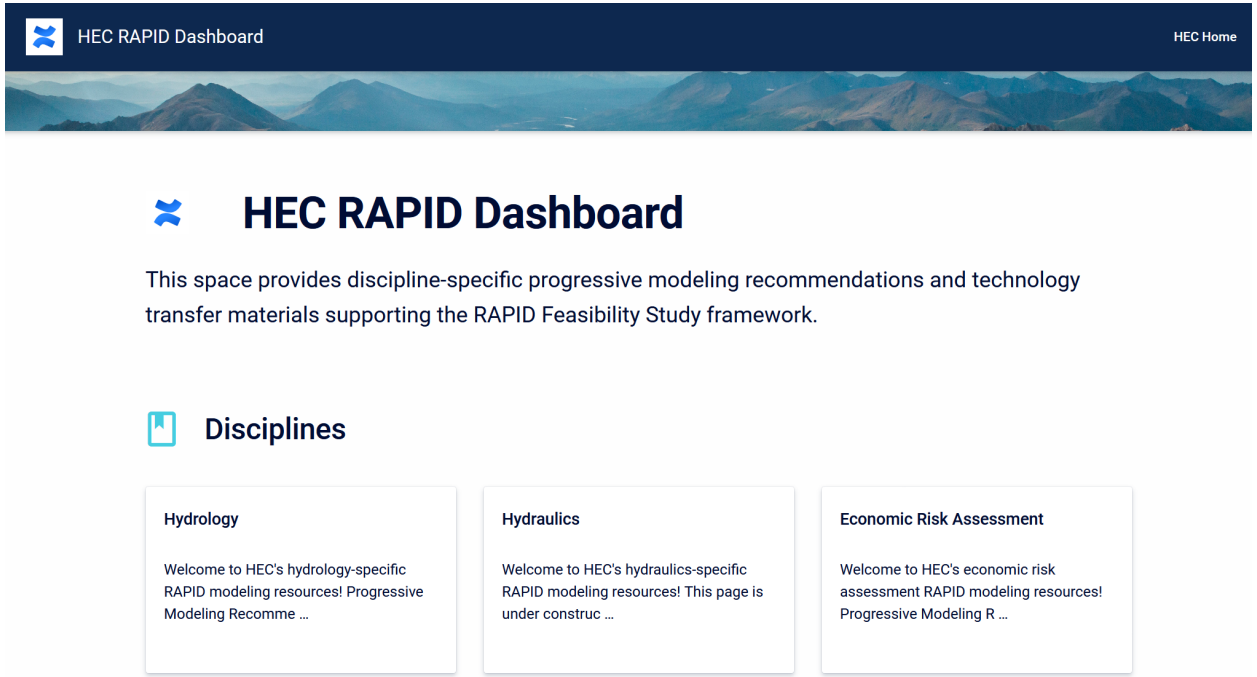


Resources

HEC-RAS 2025 Class Material & Videos



HEC RAPID Dashboard



~250 USACE Hydraulic Engineers attended the RAS 2025 training in FY26.

We're here to help!

Feel free to share any enhancement ideas that would help you support RAPID projects more effectively