# Starting Together, Ending Together

## Multi-discipline Integration: Connecting Planning and Engineering

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# What we will cover today

Quick RAPID Refresh

Getting off on the right foot: Desktop Studies and Preliminary Analysis

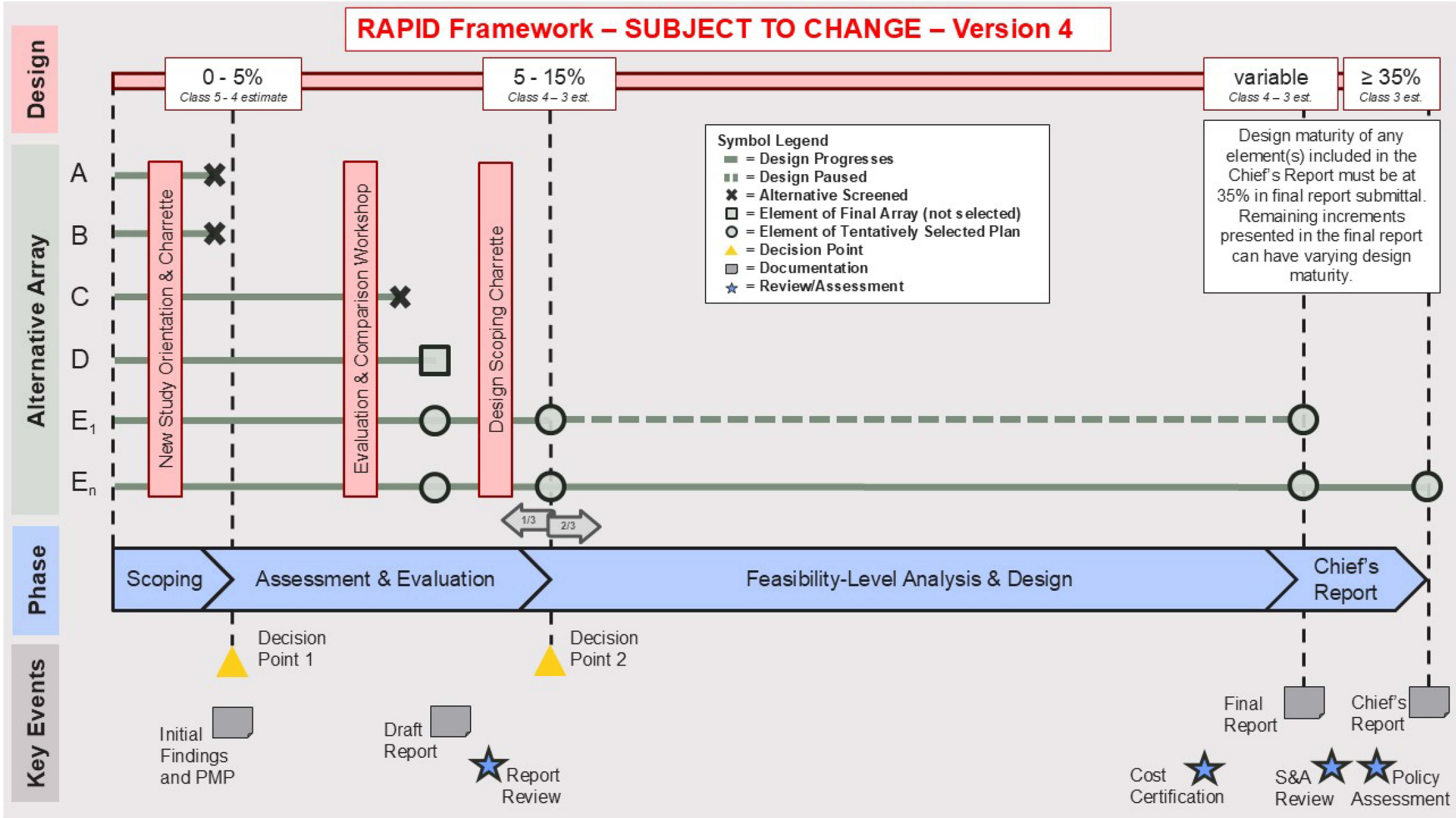
Progressive modeling: a hint at what's to come

Post-DP2: What is my role and what am I doing?

# FOUNDATIONAL PRINCIPLES OF THE RAPID FRAMEWORK

1. Get the Portfolio Right (Federal Interest)
2. Get the Study Team Right (PDT health)
3. **Start on the Right Foot** (Productivity)
4. **Move Decisions to the Left** (Productivity)
5. **Streamline Internal Reviews** (Reduce drag)
6. Clear Authority and Accountability (Reduce drag)
7. Eliminate Procedural Requirements (Reduce drag)

**Our goal is a Civil Works feasibility study process that will result in high quality implementable projects.**



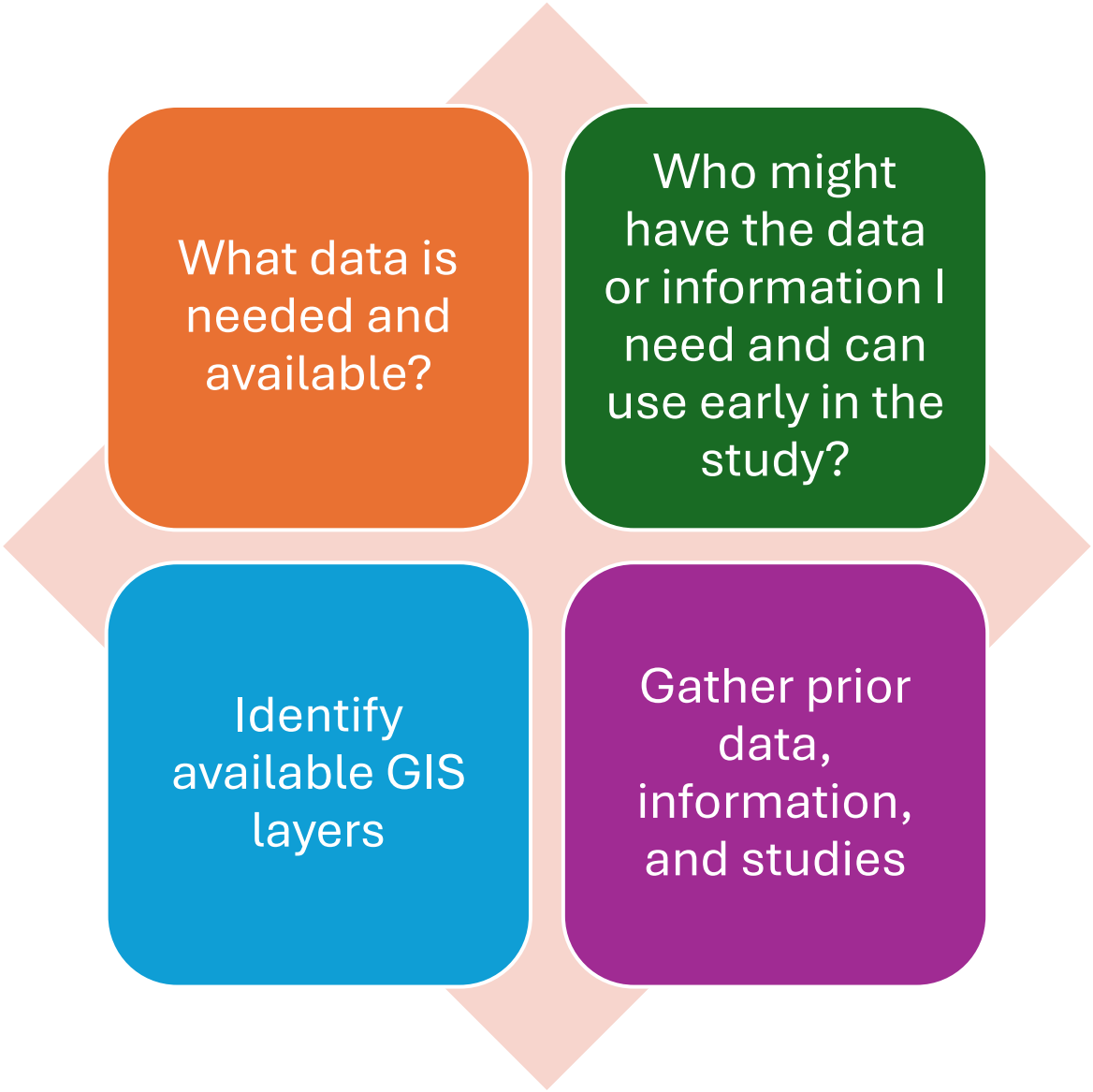

**RAPID Decision Framework Guide:**

https://usace.dps.mil/sites/KMP-PLAN/SitePages/RAPID-Feasibility-Study-Framework.aspx

# Initiating a Study: What am I doing?

- Desktop Study & Preliminary Analysis
  - Multi-disciplinary
  - Gather and review all existing data, information, and modeling
  - Preliminary data review
  - Perform preliminary analysis

# Gathering the Data and Information



# Preliminary Data Review

## Evaluate Relevance to Current Study

Assess Data Suitability

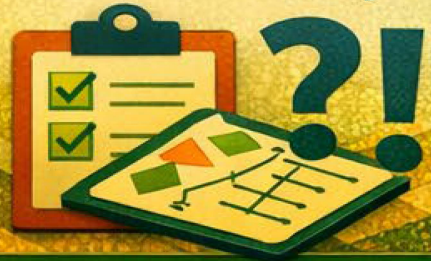
## Consolidate GIS Layers

Combine Spatial Data

## Identify Gaps & Risks

Find Limitations & Issues

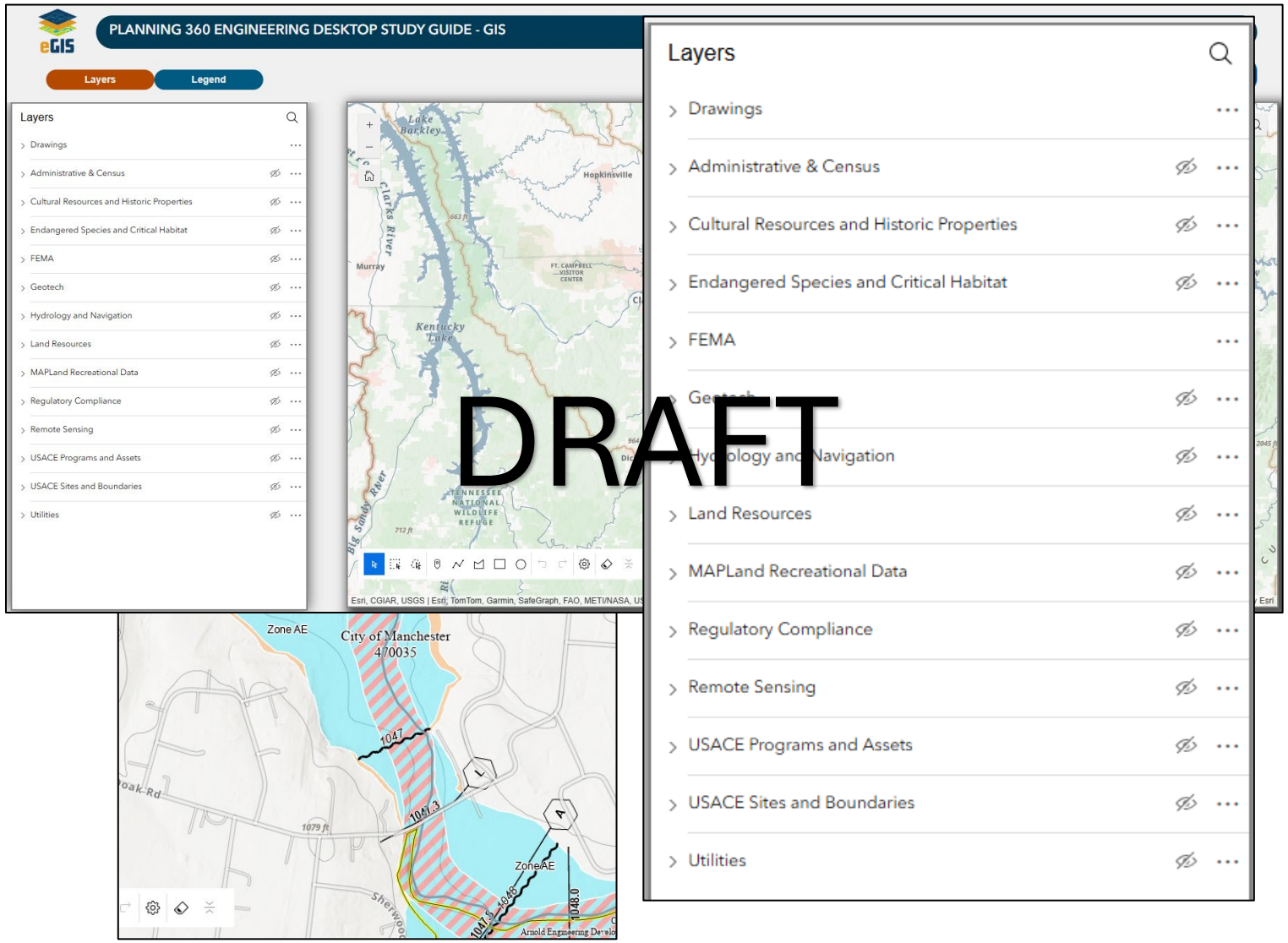
## Document Assumptions & Uncertainty



Begin Risk Identification

# RAPID – GIS Integrated Data Environment

- Not a new tool; leverages existing off-the-shelf software
- Integrator of spatial data across all PDT disciplines
- Readily-available repository of national-scale data
- Interactive to facilitate PDT interactions
- Ability to upload local, regional, and state-level spatial layers
- Investigating additional capability



# Using the information

## Informs the planning process and scope of work

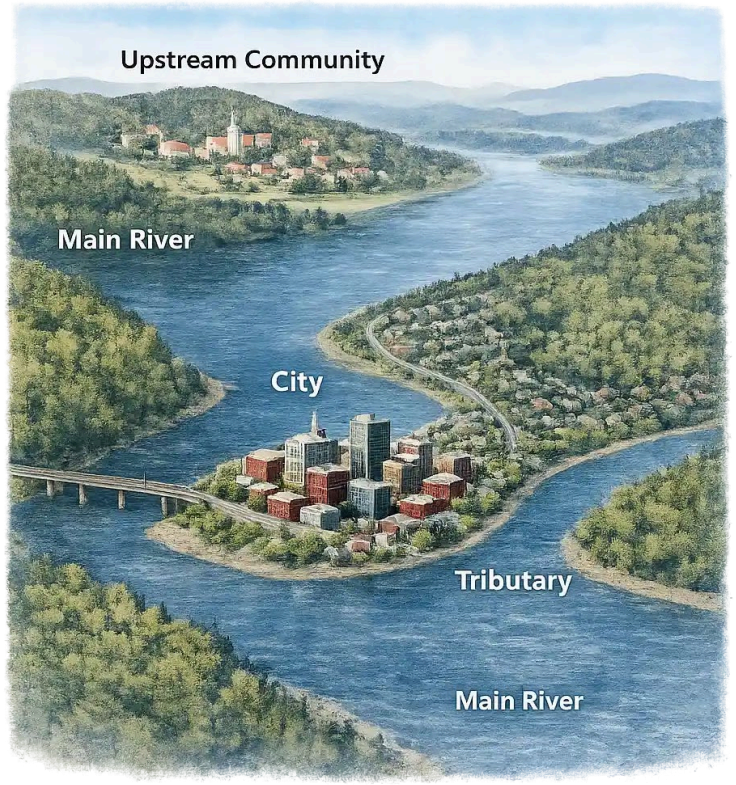
- Problems, opportunities, objectives, and constraints
- Initiate screening metric identification
- What gaps do we need to fill to meet the study requirements

## Preliminary analysis examples

- Early modeling – engineering, economics, environment, social effects
- Early environmental assessments – ESA, Critical habitat, known HTRW
- Cultural Resources – initial identification of historic structures
- Tribal Nations – Use of indigenous knowledge

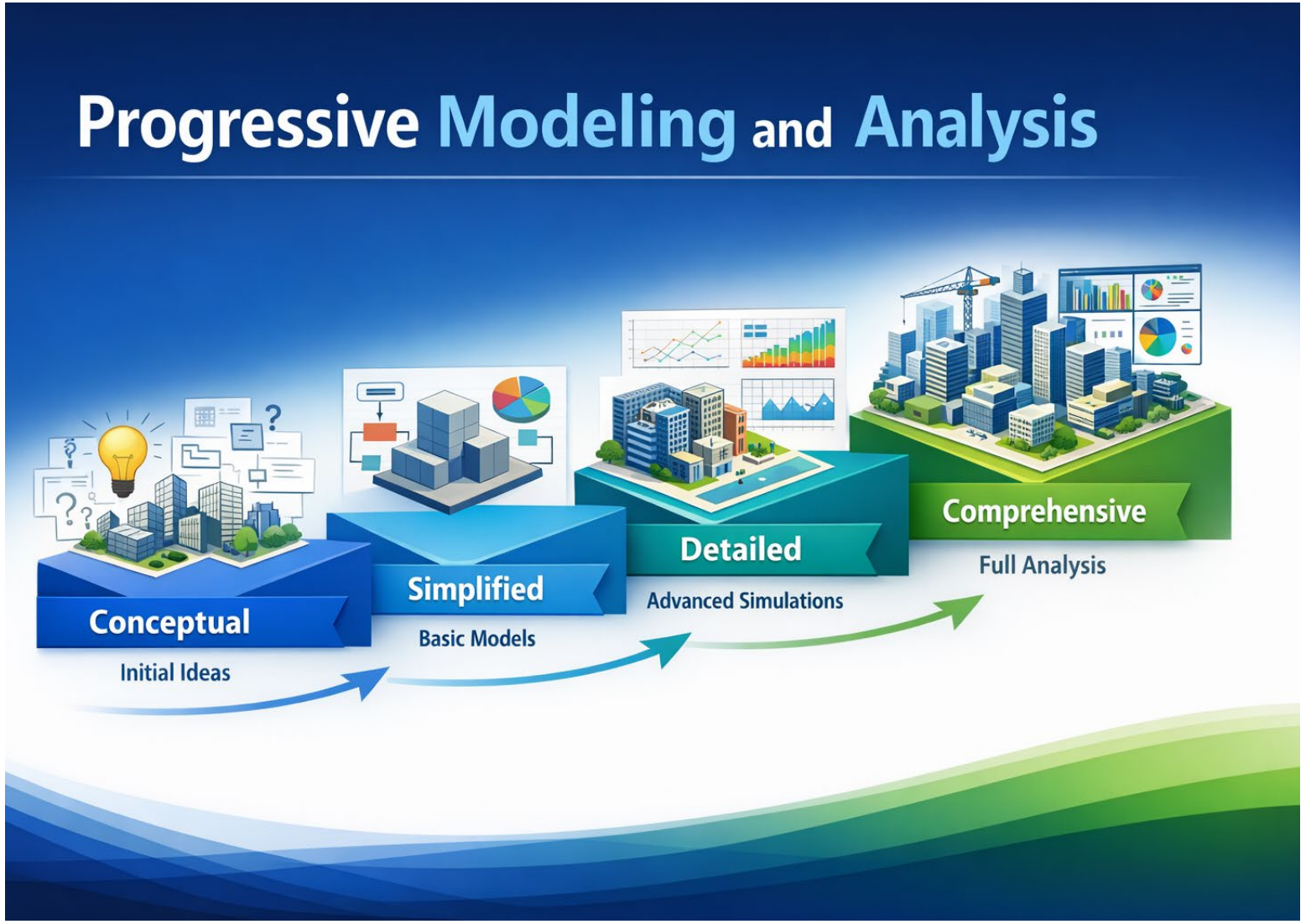
# Preliminary Analysis Example

- Flood Risk Management Study
  - 600 $mi^2$ watershed
  - Major urban area at the confluence of the mainstem river and a large tributary
  - A smaller upstream community on the mainstem river
- Available Data and Modeling
  - FEMA FIS Study
    - 1D HEC-RAS Model
    - HEC-1 Hydrology
  - NSI Structure Inventory
  - 1m LiDAR-derived terrain
- Preliminary H&H, Economics, & Consequences Analysis Options
  - 1D H&H Model -> Simplified Econ/Consequence Model
  - What if you have no modeling?



# Initiate Documentation and Scoping

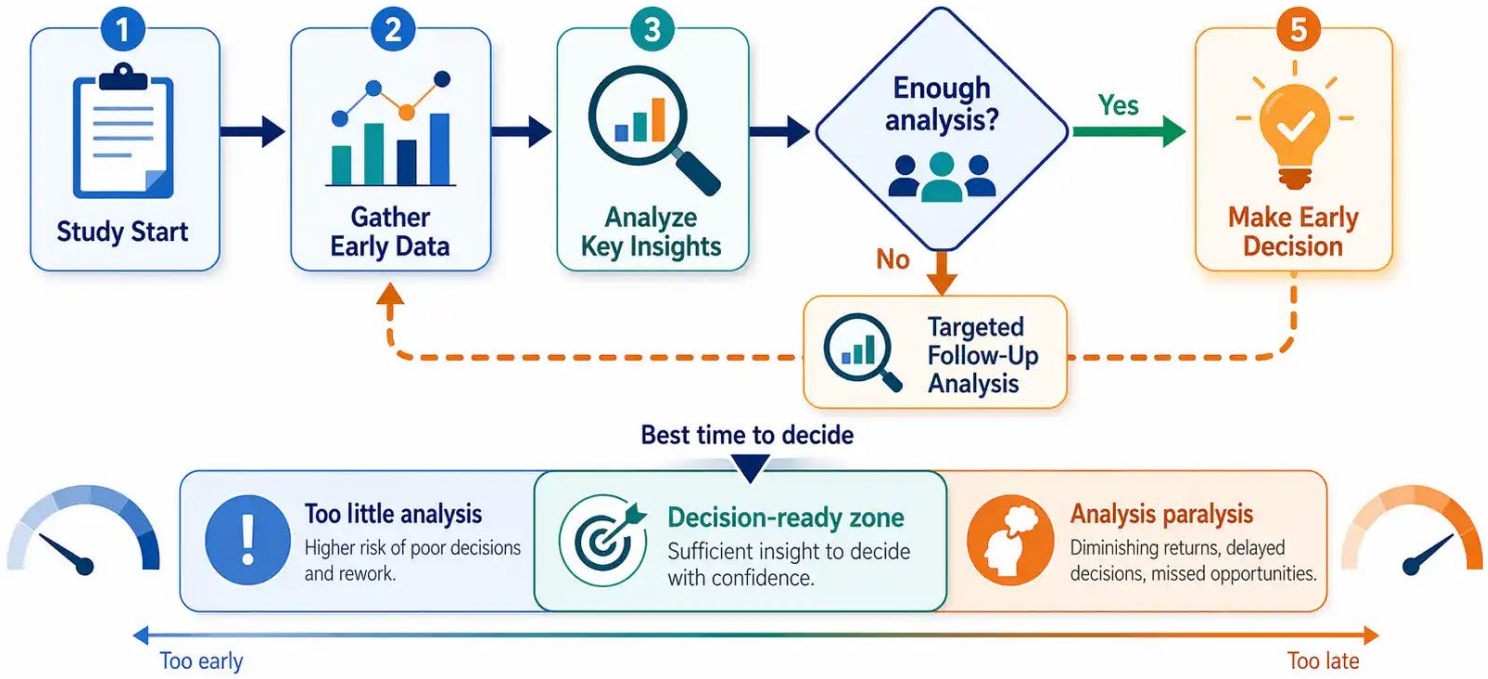
| | |
|---|---|
| Document | Start drafting the feasibility report, filling in the key information identified and developed from the FID, desktop study, and preliminary analysis |
| Develop | Develop initial data management plan |
| Establish | Establish the risk register |
| Include | Do not forget to Include relevant information provided by the sponsor, other agencies, and key sources |
| Scope | Scope proportional analysis required to compare viable alternatives and identify a plan to further analyze and design |




A preview of what is to come and when enough is enough

# BIG QUESTION: How much is enough?

- Build good screening criteria and leverage
- Bound risk and uncertainty to an acceptable level
- “Enough” depends on where you are in the study process
- “Enough” during Feasibility-Level Analysis and Design Phase



# Progressive Use of H&H Modeling Across Study Phases

*From Federal Interest Determination and Scoping to Assessment & Evaluation and Feasibility-Level Analysis & Design*

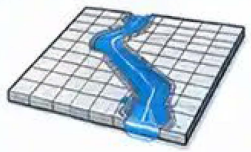
## 1 Federal Interest Determination & Scoping

**Existing mapping & geospatial analysis**

Use structure inventories, parcel data, and environmental layers to support economic analysis and other disciplines.

**Existing models for preliminary simulations**

Apply existing models with limited updates to generate outputs that support economic analysis and other disciplines.



**Rapid preliminary 2D HEC-RAS model**

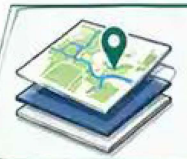
Quickly develop a preliminary 2D HEC-RAS model to support economic analysis and other disciplines.

**Supports early study decisions**

- Define problems, opportunities, objectives, and constraints (POOCs)
- Develop screening criteria
- Formulate and screen alternatives
- Develop an initial array of viable alternatives

## 2 Assessment & Evaluation

*Progressive advancement of Phase 1 modeling approaches*



**Enhanced geospatial analysis**

**Refined preliminary simulations**

**Improved preliminary H&H modeling**

Economic analysis + analysis of other disciplines

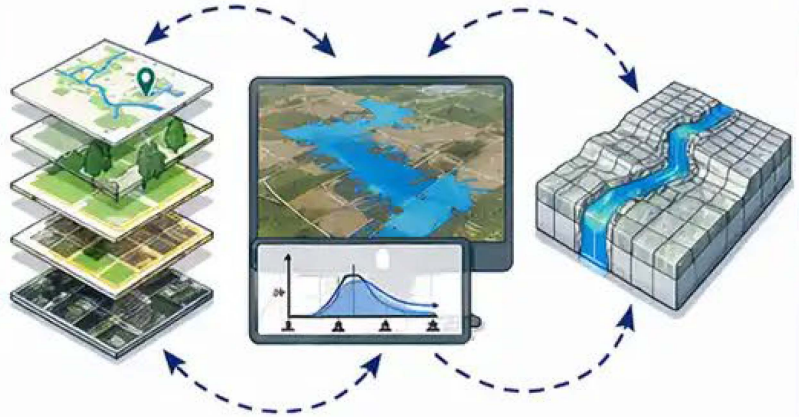
**Supports evaluation and selection**

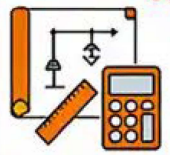
- Additional screening
- Evaluation of alternatives
- Comparison of alternatives
- Selection of an alternative to proceed

## 3 Feasibility-Level Analysis & Design

**More detailed modeling**

Develop detailed H&H modeling products to support engineering, economic analysis, and interdisciplinary evaluation.





**Supports design and cost development**

- Selected alternative advanced to feasibility-level analysis
- Supports 35% design
- Supports a Class 3 cost estimate

**Increasing model detail, integration, and decision support**

Define & Screen

Evaluate & Compare

Design & Estimate

## Hydrology

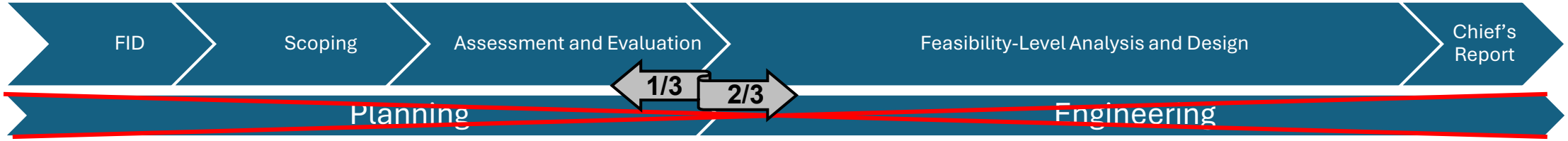
| | Scoping | Assessment & Evaluation | Feasibility-Level Analysis & Design | Chief's Report |
|---|---|---|---|---|
| Purpose of a Hydrologic Model | Qualitatively assess hydrologic with and without-project condition alternatives from a very high level<br><br>Answer general hydrology questions during a design charette | Quantitatively assess hydrologic with-project condition alternatives for use in economic evaluations<br><br>Focus on best estimate answers (expected probability) but do not quantitatively determine uncertainty; only qualitatively determine uncertainty (i.e., low, medium, high) | Quantitatively assess hydrologic considerations of the TSP<br><br>Refine TSP best estimate hydrology and quantitatively assess uncertainty and assurance for use in detailed designs | Develop figures and tables |
| Time to complete analysis | 16 hrs. | 2-3 mo. | 6 mo. | 1 mo. |
| % Design | 0-5% | 5-15% | Varies | ≥35% |
| Considerations | Has hydrologic analysis/modeling been | Utilize HEC-HMS project from existing | Refine existing HEC-HMS project from previous phases | |

## Hydraulics

| | Scoping | Assessment & Evaluation | Feasibility-Level Analysis & Design | Chief's Report |
|---|---|---|---|---|
| Estimated analysis time (investment to reduce risk) | 16 hrs. | 2-3 mo. | 6 mo. | 1 mo. |
| % Design | 0-5% | 5-15% | varies | ≥35% |
| Considerations | Are there existing models? Can they reasonably help? | HEC-RAS 2025 model with initial calibration. Can use data from existing models to expedite development | Refined HEC-RAS 2025 model. Calibrated with appropriate level of detail to capture uncertainties | |
| Level of Design Detail | An evaluation tool only to assess alternatives at a very high level for risk informed decision making and cull the list of viable alternatives. | • First pass calibration<br>• Add detail where sensitive<br>• Identify uncertain components, their potential range, and data that could reduce uncertainty.<br>• Sufficient analysis to confidently select TSP. | • Collect data to improve the model where results are sensitive to uncertain data.<br>• Refined model to finalize design maturity and cost fidelity. | |
| Highest Risk | Screening out a viable alternative. | Model and supporting data select wrong TSP. | Cost and schedule overruns. | |
| Review Considerations | Cursory, gut check review | Engineering review held carefully to the standard that work should be revisited only if it could change TSP.<br><br>Engage reviewer early to assess approach (to avoid schedule risk major errors found too late). | Review model components that affect cost fidelity. | |

# Post-DP2: What is my role?

# Post-DP2: What's Going On and Who is Doing What?!?




- RAPID promotes efficiency through multidiscipline coordination across the entire process
- Goal **before** DP2 is scaling analysis to select a plan
- Goal **after** DP2 is to perform the detailed analysis necessary to ensure cost fidelity – THIS INCLUDES ALL PDT DISCIPLINES
- Data often presents the greatest cost and schedule risk

# Busting Myths

Is there a role for planning, economics, environmental professionals during feasibility level analysis and design?

- YES! We anticipate that there will be additional analysis on the tentatively selected plan to include completing environmental compliance activities, more detailed evaluation of the economic, social, and environmental effects, and a need to integrate that information into the report.

# Busting Myths

**Am I expected to do the same amount or more work in a shorter period?**

- Generally, no.  The analysis will grow it over time, using judgement and available information at the start and progressively developing the modeling and analysis to reduce uncertainty and risks in support of decision making and feasibility level analysis and design.

# Busting Myths

**Are we making picking a plan without any models?**

- NO! There will be modeling between DP1 and DP2, enough to differentiate between alternatives. The idea is to progressively build our models and do analysis to support decision making.

# Resources:

| | |
|---|---|
| Check out the KMP! | https://usace.dps.mil/sites/KMP-PLAN/SitePages/RAPID-Feasibility-Study-Framework.aspx |
| Check out the RAPID E&C HUB! (new 21 Apr) | https://usace.dps.mil/sites/KMP-EC/SitePages/RAPID%20Engineering.aspx |
| RAPID Guidebook | https://usace.dps.mil/sites/KMP-PLAN/SitePages/RAPID-Feasibility-Study-Guidebook-TOC.aspx |
| PCOP Webinars | https://usace.dps.mil/sites/KMP-PLAN/SitePages/RAPID-Resources.aspx |