

SITE EVALUATION AND FEASIBILITY STUDIES

OVERVIEW

PRE-FEASIBILITY STUDY

- Preliminary investigation - hydrology, hydraulics, energy potential & potential site/development constraints
- Is it worthwhile to invest additional money for more detailed feasibility studies, licensing and design?

FULL FEASIBILITY STUDY

- More detailed study to firm up potential site configurations, development costs and energy prediction
- Develop proposal to a point where it can be submitted to FERC and VANR (401 WQC)

DESIGN

- Permitting
- Construction Bid Package



PRE-FEASIBILITY STUDY

LEVEL OF EFFORT

- **Site Review Using Best Available Information**
- **Supplement with Site Visit and Minor Surveying, if needed**

INFORMATION NEEDED

- **Hydrology and Hydraulics (Flow, Head)**
- **Potential Regulatory Constraints**
- **Existing Infrastructure and Site Data**

DELIVERABLE

- **Report/Memo on Potential Economic Feasibility**

PRE-FEASIBILITY STUDY

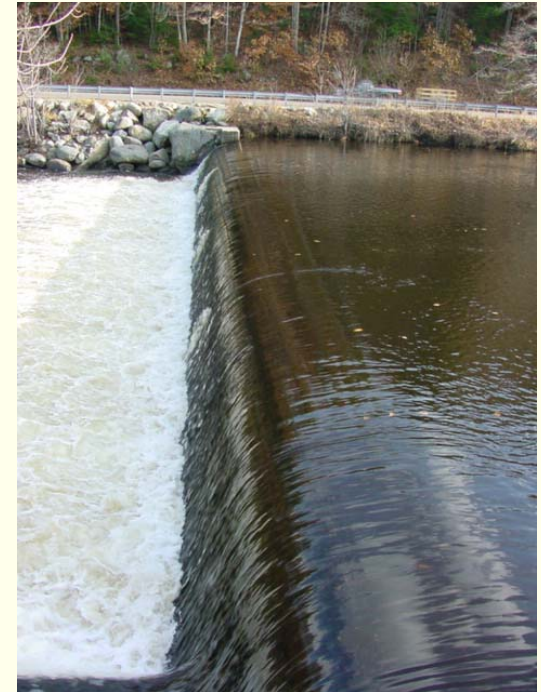
~ HYDROLOGIC ANALYSIS ~

TOTAL FLOW AVAILABLE AT SITE

- **Gaged Watershed -- Streamflow Data**
- **Ungaged Watershed -- Synthetic Methods Relate to a Gaged Watershed, considering**
 - ♦ **Drainage Areas**
 - ♦ **Land Use and Land Slopes**
 - ♦ **Precipitation**

FLOW AVAILABLE FOR DEVELOPMENT

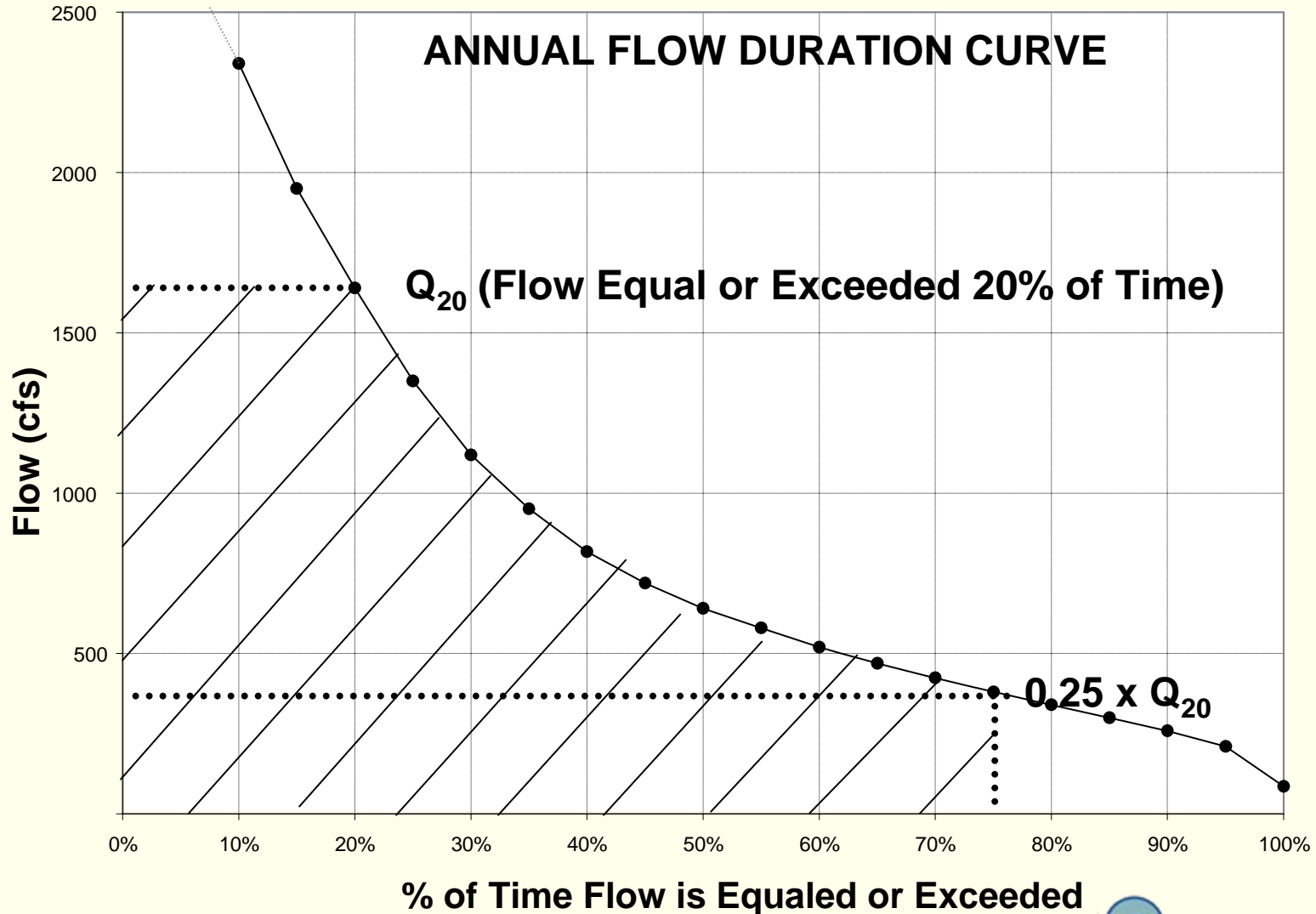
- **Water Use Constraints**
- **Infrastructure Constraints**



Henniker Dam West Henniker, NH

GENERATING CAPACITY - NO MINIMUM FLOW REQUIREMENT

- NO SITE INFRASTRUCTURE CONSTRAINTS



PRE-FEASIBILITY STUDY

~ CONSTRAINT ANALYSIS ~

CONSULT WITH REGULATORY AGENCIES TO DETERMINE POSSIBLE CONSTRAINTS

- **Minimum Flows for Other Uses**
 - Aesthetics**
 - Habitat**
 - Fish Passage**
 - Waste Assimilation**
- **Threatened or Endangered Species**
- **Historic Properties**
- **Hazardous Materials**
- **Public Use of River**



PRE-FEASIBILITY STUDY

PRELIMINARY COST OPINION

- **Turbine, Generator, Other Equipment/Components**
- **Civil Works**
- **Regulatory and Legal**
- **Engineering and Administration Costs**
- **Contingency Allowance**



~ ECONOMIC ANALYSIS AND REPORT ~

Engineering Economic Analysis Only

How long to see Payback

FEASIBILITY STUDY

More Detailed Reports

Fill in Data Gaps

- **DETAILED TOPOGRAPHY AND BATHYMETRY**

Firm up excavation quantities

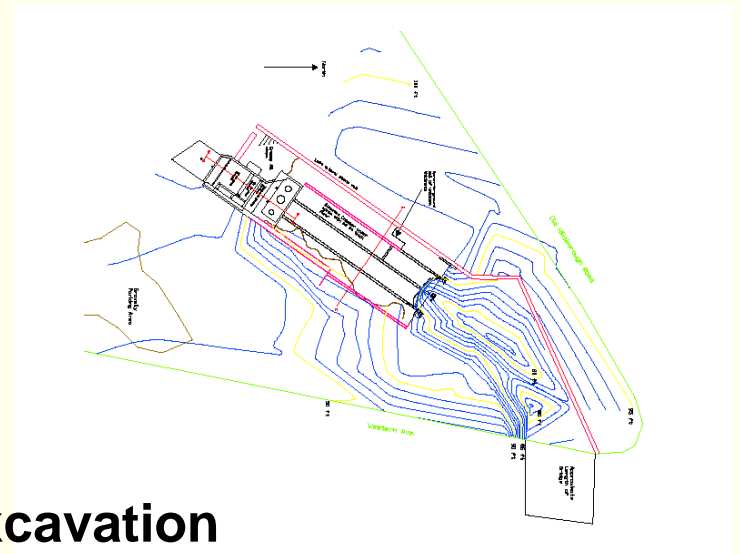
- **DETAILED HYDRAULIC ANALYSIS**

**Firm up head and tailwater
over a range of flows**

- **BORINGS & GEOTECHNICAL DATA**

Firm up type of material for excavation

- **RE-EXAMINE ENERGY AND
COST IN MORE DETAIL**



LICENSE APPLICATION

FINAL LEVEL OF DATA COMPILATION AND ASSESSMENT

•COMPETING WATER USES



- Other hydropower users
- Agricultural/Industrial users
- Water needed for aesthetics, fish habitat, fish passage and waste assimilation



•FISH PASSAGE STRUCTURES

•RECREATION ENHANCEMENTS



•HISTORIC AND ARCHAEOLOGICAL RESOURCES

DESIGN

- **Initiate at appropriate level of regulatory certainty**
- **30% completion – May initiate “permit” review**
- **90% completion – Full “permit” application & review**
- **100% Complete – Based on agency and owner comments, complete design for contractor bid package**

