WAWTTAR

Water and Wastewater Treatment Technologies Appropriate for Reuse

SWIM OLC
on
Natural Treatment Systems

UNESCO-IHE
Institute for Water Education

WAWTTAR

- See Youtube presentation by Brad Finney from Humboldt State University, developer of WAWTTAR
https://www.youtube.com/watch?v=JAPNiRoDhdQ

Figure 3.2 Graphic Overview of Program Calculations
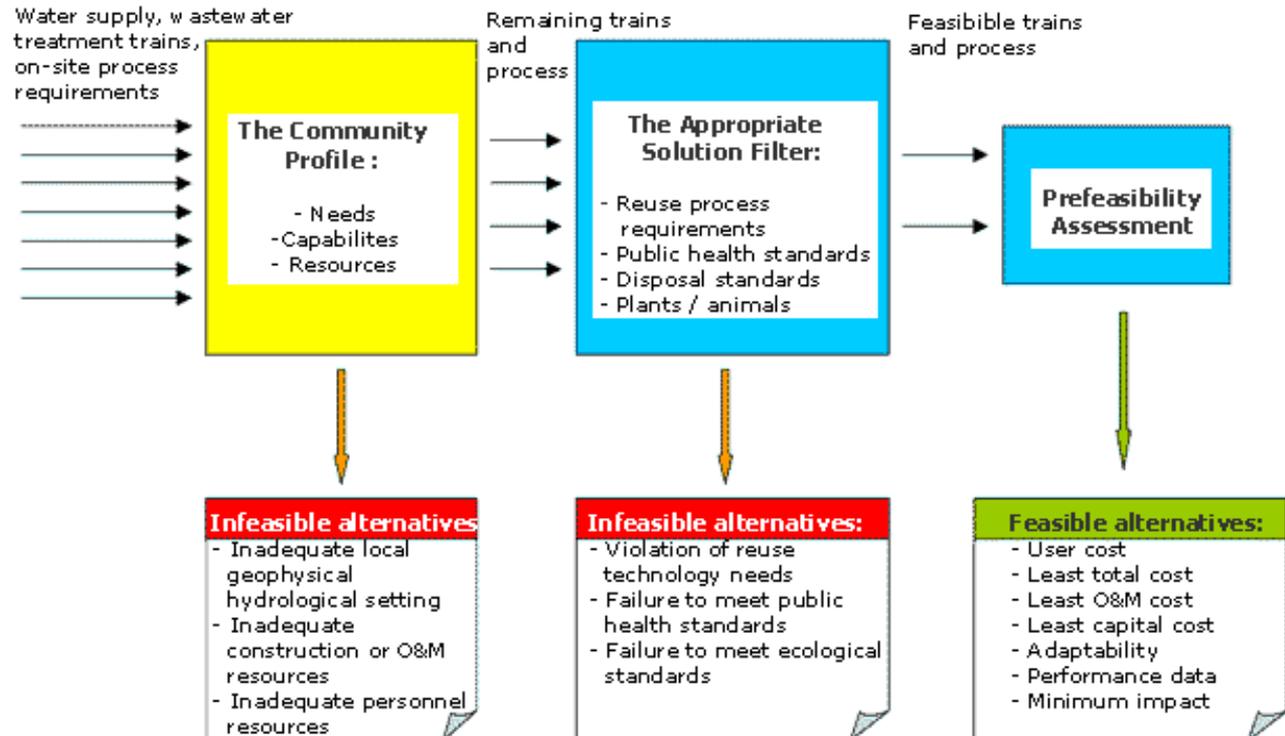
WAWTTAR

A Tool for Planning Water and Wastewater Treatment Facilities Appropriate for Reuse

- A free software tool (Humboldt State University, B. A. Finney and R. Gearheart) to assist in selecting suitable water and wastewater treatment options throughout the world

- Released in nineties

- Used at the pre-feasibility step in facility planning and/or infrastructure investment

- It has an extensive database of water and wastewater treatment processes (over 200 and user expandable) and a range of collection systems alternatives

- For engineers, planners, for evaluation of consultant or donor proposals

WAWTTAR Overall Objective

- Provide a tool for feasibility analysis of wastewater treatment technologies that

    - Focuses attention on the inherent value of treated wastewater effluent
    - Recognizes the reality that wastewater is reused
    - Identifies treatment technologies that are not appropriate for the target community

WAWTTAR Program Objectives

- Provide a large (and user expandable) database of treatment and reuse processes
- Provide localized cost estimates and performance of treatment technologies
- Incorporate target community resource availability and cultural considerations into the technology screening process
- Provide reference material to serve as an education tool for engineers and community planners

WAWTTAR Database Components

- Existing Components (but can be edited)
    1. Collection Systems Data
    2. Standards (Discharge)
    3. Train Descriptions (Treatment Trains)
    4. Process Data (Treatment/Reuse Processes)

- Problem Specific Component (user specified)
    5. Community Data

What does the components 1, 2 and 3 contain?

1. Collection Systems Data
   - Cost per unit area/Population Density
2. Standards
   - Discharge limits for water quality constituents
3. Train Descriptions
   - Collection of Treatment Processes in a specified sequence

4 Process Data

- Construction and O/M Resource Requirements
- Construction and O/M Costs
- Operational Requirements and Performance Adaptability
- Social, Economics, and Environmental Impacts
- Reference Materials

4 Process Data

- Construction and O/M Resource Requirements
    - Human - numerous labor categories
    - Social/Cultural
    - Materials
    - Land area
    - Site constraints

- Construction and O/M Costs
  - Costs per hydraulic, solids or organic loading
  - Costs broken down into fractions related to energy, chemicals, labor, earthwork, manufactured equipment, structures, concrete, steel, and piping

4 Process Data

- Operational Requirements
  - Limits on influent flow and quality
- Operational Performance
  - Percent constituent removal
- Adaptability to
  - upgrading
  - varying hydraulic loading
  - changes in influent quality

4 Process Data

- Potential Social, Economic and Environmental Impacts
- Reference Information
  - Text descriptions
  - Line drawings
  - Photos
- Seasonal Hydraulic Demand (Reuse Processes Only)

5 Community Data: user specific

- Demographics - Population, Land Area, and Per Capital Wastewater Generation
  - Current level and growth rate
- Economic Setting
  - Planning period length
  - Inflation rate and capital recovery factor
  - Local cost (relative to US.) for each construction and O/M cost category
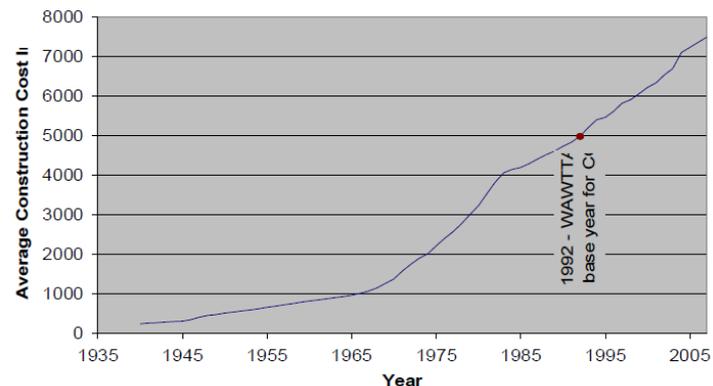
5 Community Data: user specific

- Site Characteristics
- Meteorological Characteristics
- Resource Availability
  - Human
  - Material
- Social/Cultural Considerations

Search for Feasible Treatment Trains
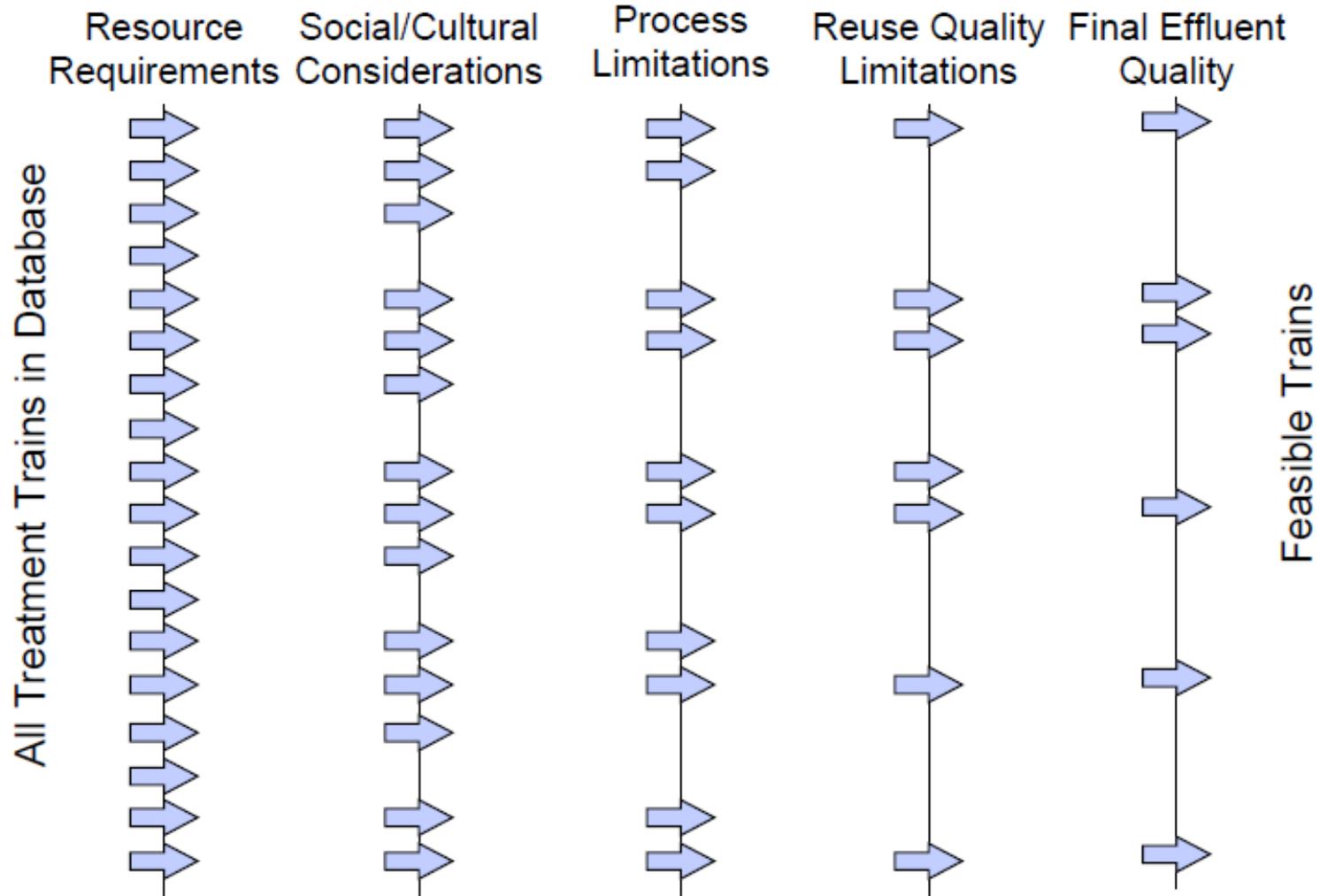
Treatment Process Selection Considerations

- Selecting among feasible treatment processes requires evaluating the characteristics and tradeoffs of each process

- Quantitative

  - Capital costs, O/M costs, useful life, salvage value, land area requirements

- Qualitative

  - Operational ease, reliability, ease of expansion, adaptability to reuse processes, esthetics

WAWTTAR Output

- List of infeasible treatment trains with limiting component identified

- Feasible treatment trains ranked by minimum capital, O/M, or total cost

- For each feasible treatment train
  - Effluent concentrations user specified quality constituents
  - Solids production
  - Adaptability index
  - Land area requirements
  - Reuse area satisfied with and without storage reservoir
  - Potential environmental and cultural impacts

WAWTTAR Users

- Designed for
  - Local engineers and planners (with wastewater training) doing community wastewater feasibility or facility planning (field use)
  - Government or NGO planners performing evaluations of consultant or donor proposals (office paper study)
  - Technical students, planners, government decision makers, and engineers (educational resource)

WAWTTAR Availability

- WAWTTAR Website
  - http://firehole.humboldt.edu/wawttar
  - Program and manual available for download
  - Opportunity to share info on new treatment processes