

# **The Importance of Master Planning**

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# Words of Wisdom .....

**We have met the enemy and  
he is us**

Walt Kelly

**Adventure is just bad  
planning**

Roald Amundsen

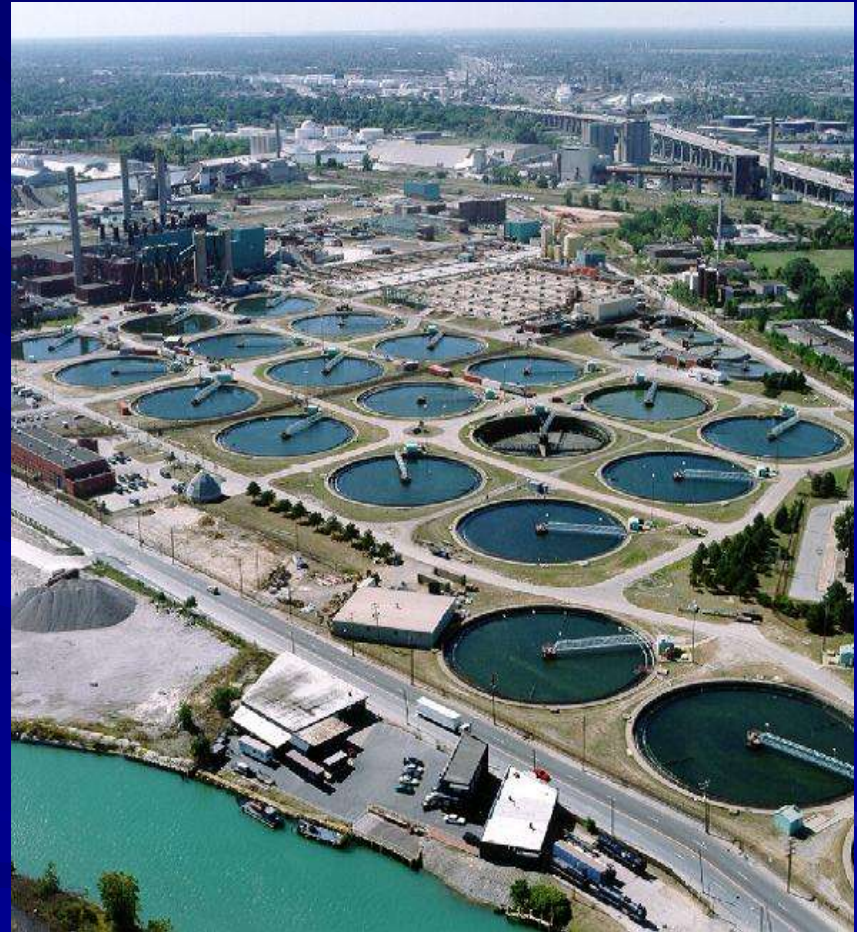
**Failing to plan is planning to  
fail**

Alan Lakein



# OVERVIEW

- This module covers Master Planning
- The topics covered are:
  1. Definition of a Master Plan
  2. Master Planning Issues
  3. Evaluation of Alternatives
  4. Program Development
  5. Master Plan Updating



# Definition of a Master Plan

## -Definition-

### Definition of a Master Plan

### Master Planning Issues

### Evaluation of Alternatives

### Program Development

### Master Plan Updating

- The Master Plan is the orderly planning of a system's future improvement program; it's the initial step before specific designs of parts of the system
- The Master Plan is often incorporated in the long-range capital improvement program
- The Master Plan identifies present and future needs and direction for developing the system's facilities



# Definition of a Master Plan

## - What is a Master Plan -

### Definition of a Master Plan

### Master Planning Issues

### Evaluation of Alternatives

### Program Development

### Master Plan Updating

- A Master Plan.....
  - is a plan to achieve a vision
    - Protect the environment, Improve Productivity, Performance
  - is a “Contract” between Interested Parties
    - Government, Engineers, Regulatory Agencies, End User, Public
  - looks at the big picture i.e.; the forest not the tree
    - Concentrates on a set of Projects not one Project (Program)
  - is a roadmap to bring pieces together
    - Brings all projects together to serve one vision

# Definition of a Master Plan

## - Who Needs a Master Plan -

### Definition of a Master Plan

### Master Planning Issues

### Evaluation of Alternatives

### Program Development

### Master Plan Updating

- Master Plans are developed for a:
  - Country
  - City or Town
  - Company or Facility
- Examples
  - Develop a plan to modernize a Water Treatment and Distribution network to sustain growth of a City
  - Upgrade a sewage system of a town to serve a growing population and protect the environment

# Master Planning Issues - Planning Periods -

Definition of a  
Master Plan

Master Planning  
Issues

Evaluation of  
Alternatives

Program  
Development

Master Plan  
Updating

A major capital investment program requires many years lead time to develop:

- Individual Project Planning
- Design
- Financial Arrangement
- Construction
- Training / Transition Period
- Operation and Maintenance



# Master Planning Issues

## - Planning Periods -

Definition of a  
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### ■ Planning Periods Vary Depending on Component

❖ For Water or Wastewater Treatment → 30 to 50 Years

❖ Phase I → 15 Years

❖ Phase II → 25 Years

❖ Phase III → Beyond



✓ Size Main Component

✓ Expandability

✓ Future Provisions

❖ Sewers, Water Intake Structures, Tunnels, Outfalls → 30-50 Years

❖ Treatment Units Processes → 15 to 25 Years

❖ Equipment → 10 to 15 Years



# Master Planning Issues - Population Growth -

Definition of a  
Master Plan

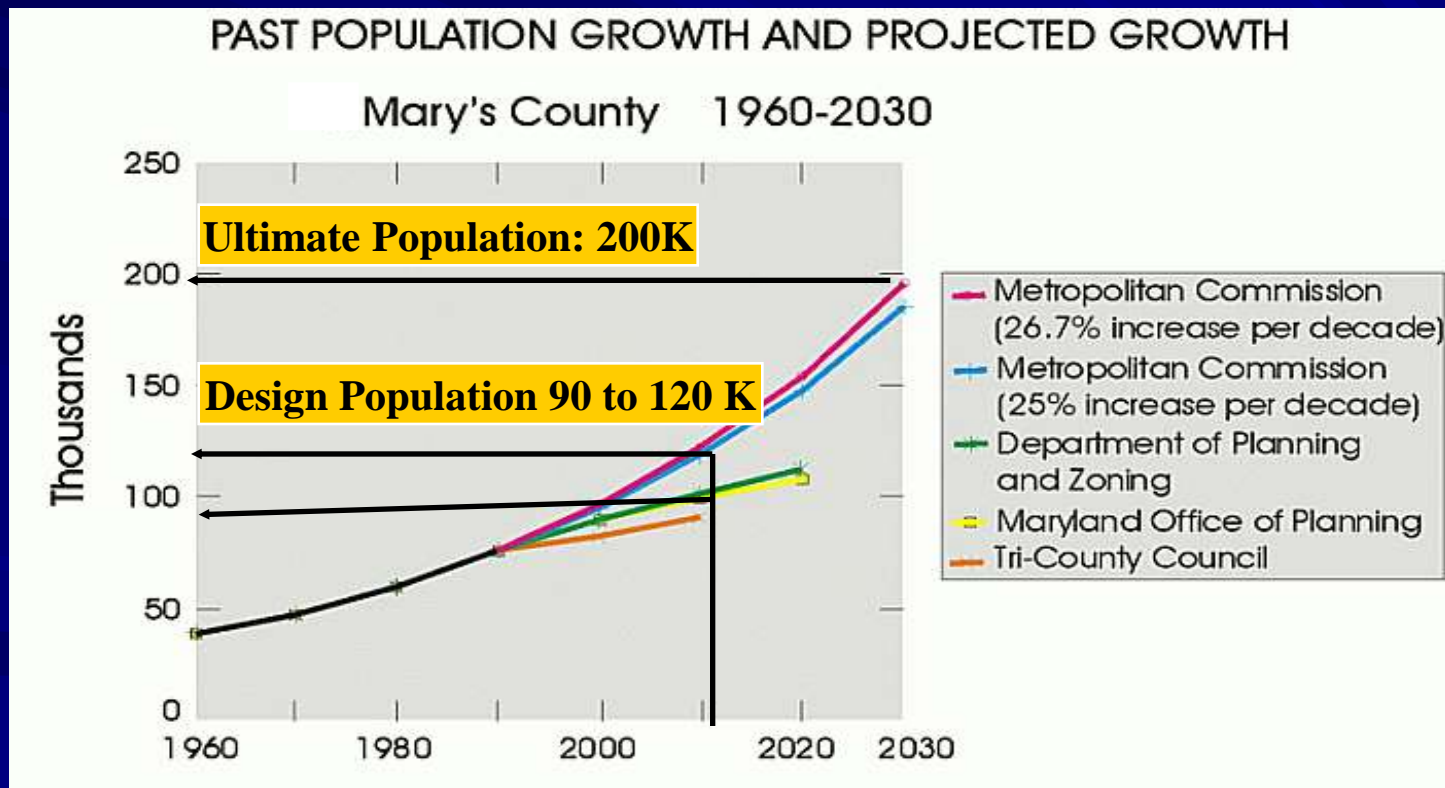
**Master Planning  
Issues**

Evaluation of  
Alternatives

Program  
Development

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It is important to identify the project area future Population.



# Master Planning Issues - Service Area -

Definition of a  
Master Plan

Master Planning  
Issues

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Example of Issues to be  
addressed:

- ❖ Land Use Changes
- ❖ Future Expansions
- ❖ Presently Serviced Areas
- ❖ Unconnected Areas
- ❖ Population Shifts
- ❖ Seasonal Pop. Shifts



# Master Planning Issues

## - Existing Components & Deficiencies -

Definition of a  
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Master Planning  
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A Master Plan Identifies Current System Components & Needs  
Example – Wastewater Treatment Plant (WWTP)

- ❖ Current connected population to WWTP 60 % → 300,000
- ❖ Projected Serviced Population → 525,000
- ❖ Projected Connected Population in 10 Years 85% + 2% Growth/year
- ❖ Need: 100 Km of Gravity Sewers, 6 Lift Stations (Project 1, 2, and 3)

- ❖ Existing Capacity of WWTP → 120,000 m<sup>3</sup>/day
- ❖ Projected Flow in 10 and 20 years → 160,000 and 200,000 m<sup>3</sup>/day
- ❖ Need: Expand WWTP in two phases (Project 4 and 5)

# Master Planning Issues

## - Existing Components & Deficiencies -

Definition of a  
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Master Planning  
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Identify Current System Components and Deficiencies –  
Example – Wastewater Treatment Plant (WWTP) - Continued

- ❖ Existing Treatment Type → Secondary
- ❖ Projected Effluent Requirements in 2018 → Tertiary
- ❖ Need: Build Tertiary Treatment at WWTP (Project 6)

- ❖ Ground Water Safe Yield For Irrigation → 90 million m<sup>3</sup> / Year
- ❖ Projected Irrigation Water Need → 180 million m<sup>3</sup> / Year
- ❖ Reuse Tertiary Treatment to Irrigation and Reuse
- ❖ Need: 90 Km of Lines, 9 Reservoirs, 2 Pump Stations (Project 7, 8, 9, 10)



# Evaluation of Alternatives

## - Identification of Solutions -

Definition of a  
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Master Planning  
Issues

Evaluation of  
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Evaluation of the alternatives includes

### ■ Technical Issues

- ❖ Identification of Solutions
- ❖ Evaluation of Process Alternatives
- ❖ Site and facility location and general arrangement
- ❖ Ease of Operation and Maintenance

### ■ Financial Issues

- ❖ Construction Costs
- ❖ Operations and Maintenance Costs
- ❖ Cost Effectiveness

### ■ Regulatory Constraints

- ❖ Environmental Impact
- ❖ Safety

# Evaluation of Alternatives

## - Identification of Solutions -

Definition of a  
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Identification of Solutions → To Meet Identified Deficiencies

Examples:

- ❖ Expand Facility OR Build New One
- ❖ Build Oxygen Generation Plant OR Use Oxygen Pipeline From Nearby Manufacturer



# Evaluation of Alternatives

## - Cost and Economic Analysis -

Definition of a  
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Master Planning  
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- ❖ Compare Alternatives in an Economic Evaluation Using Present Worth
- ❖ Bring all costs to present value and compare, the project with the lowest cost is the most cost effective solution.
  - Discount Factor
  - Lifecycle Period
  - Future Investment
  - Salvage Value
  - O&M Costs



# Program Development

Definition of a Master Plan

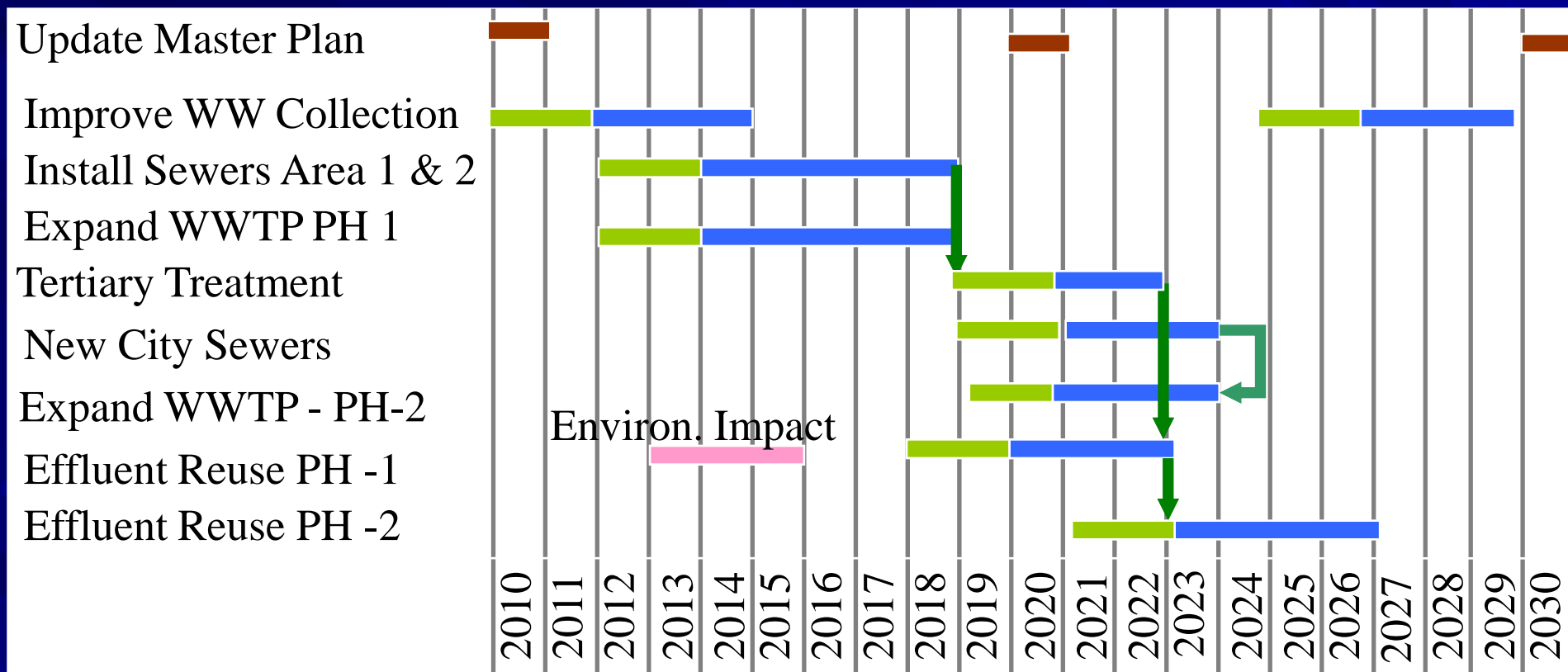
Master Planning Issues

Evaluation of Alternatives

**Program Development**

Master Plan Updating

→ Once all projects are identified, a Program is developed





# Master Plan Updating

Definition of a  
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- Many utility commissions keep an active Master Plan to anticipate systems upgrades/improvements
- Example of Items Affecting Master Plans
  - ❖ New Regulatory Requirements
    - Electrical Code, Environmental Issues, Safety
  - ❖ New City Developments
    - Major Population Shifts, New Needs
  - ❖ Operation and Maintenance Issues
    - Deteriorating Equipment, Frequent Shutdowns
  - ❖ New Technologies
    - More cost effective and Friendly Operation

# QUESTIONS.....