WATER AND LAND USE PLANNING CONNECTIONS: PHOENIX AS CASE STUDY

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WATER AND LAND USE PLANNING CONNECTIONS

• AGENDA
  • WHY IMPORTANT?
  • TYPES
    • LAND USE: WATER INFRASTRUCTURE
    • LAND USE: DEMAND AND SUPPLY
    • ECONOMY: WATER SUPPLY
WHY IMPORTANT?

• THE FINANCIAL SUSTAINABILITY OF THE UTILITY
  • UTILITIES FINANCES ARE CHANGING
    • MAINTENANCE OF OLDER INFRASTRUCTURE RISING
    • CIP SHIFTING FROM GROWTH TO MAINTENANCE

Phoenix Large Sewer Pipe

Phoenix % CIP Growth vs Maintenance

- % Maint./Env.
- % For Growth
WHY IMPORTANT?

• The financial sustainability of the utility
  • Utilities finances are changing
    • Maintenance of older infrastructure rising
    • CIP shifting from growth to maintenance
    • Revenues flat or declining because of decreasing demand
    • Minimal federal or state assistance
  • Need to be more financially strategic about water infrastructure and land use planning

• The sustainability of growth and economy
  • Water is essential for existing and future land use, yet supplies are limited
  • Need to be more strategic about demand (land use) and supply
LAND USE: WATER INFRASTRUCTURE

- SOME PLACES HAVE SPATIAL EXPLICIT WATER SUPPLIES
  - SURFACE WATER, GROUNDWATER, EFFLUENT
- SOME PLACES MORE COSTLY TO DELIVER AND COLLECT WATER
  - ELEVATION, LACK OF MAJOR INFRASTRUCTURE, DISTANCE
- JOINT STRATEGIC PLANNING OF LAND USE AND WATER INFRASTRUCTURE
  - WATER PLANNING TO IDENTIFY SPATIAL AND TEMPORAL STRATEGIES
  - GROWTH PLANNING TO SEQUENCE AND MINIMIZE INFRASTRUCTURE
PHOENIX: WATER AND LAND USE PLANNING
PHOENIX: WATER AND LAND USE PLANNING

• ANTICIPATORY PLANNING
• LAND USE SCENARIOS
  • COSTS
  • ROBUST FACILITIES
  • CONTINGENCIES
PHOENIX: WATER AND LAND USE PLANNING

• ANTICIPATORY PLANNING
• DROUGHT SCENARIOS
  • SLIGHT, MODERATE, SEVERE
  • AGGREGATED % DEFICIT
  • GROWTH STRATEGIES
LAND USE: WATER DEMAND AND SUPPLY

• ALL ABOUT THE PLANNING LANDSCAPES

![Household Water Use Chart]

**Inside and Outside Household Water Use**

Source: Mayer et al., 1999
LAND USE: WATER DEMAND AND SUPPLY

• ALL ABOUT THE PLANNING LANDSCAPES
  • DEVELOPMENT PLANNING AND REGULATION
    • BUILDING CODES
    • ZONING

• RESIDENTIAL DENSITY:
  • NON LINEAR AND HIGH VARIANCE
  • SPECIFIC TO CONTEXT OF THE COMMUNITY
LAND USE: WATER DEMAND AND SUPPLY

- HEAT: URBAN HEAT ISLAND AND EXTREME HEAT
  - HIGH INTENSITY LAND USE WITH LOW VEGETATION HEATS UP THE CITY
LAND USE: WATER DEMAND AND SUPPLY

• HEAT: URBAN HEAT ISLAND AND EXTREME HEAT
  • HIGH INTENSITY LAND USE WITH LOW VEGETATION HEATS UP THE CITY
  • CLIMATE CHANGE WILL INCREASE MAXIMUM AND LENGTH
  • CURRENT HEALTH ISSUE THAT WILL INCREASE IN IMPACT
  • BUT - COOLING WITH IRRIGATED LANDSCAPES AND WATER FEATURES INCREASES DEMAND
  • STRATEGIC URBAN DESIGN OF LANDSCAPES AND URBAN FORM CRITICAL
    • PRIORITIZE WATER IN MOST VULNERABLE AND HIGH IMPACT
    • STRUCTURAL SHADE ELSEWHERE
PHOENIX HEAT PLANNING

- LAND USE AND WATER PLANNING
  - DOWNTOWN ZONING AND URBAN FORM STANDARDS
- TREE AND SHADE PLAN
- WALKABLE URBAN CODE
- TRANSIT STOP PLANNING
- PUBLIC HOUSING DESIGN
- HEAT READY PLAN (FUTURE)
  - CAPITAL PROJECTS HEAT AND WATER REVIEW
  - PRIVATE SECTOR DEVELOPMENT HEAT INCENTIVES
ECONOMY: WATER SUPPLY

- Water is essential to current and future land use
  - Ability to meet current and future demand under stress
  - Availability of water supply to meet growth demands

- Image of water situation
  - Economic development
  - Bond ratings
PHOENIX STRATEGIC VIEW OF GROWTH

- **GROWTH AREAS**
  - Identified water and wastewater needs and issues
  - Land use strategies for managing growth to maximize financial sustainability
NORTH BLACK CANYON CORRIDOR

INFRASTRUCTURE LIMIT LINE

FIGURE 4: Infrastructure Limit Line and Phasing Overlay
North Gateway Village
INFill
Areas of Concern
and Planning
THANKS!
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ALTERNATIVE GROWTH SCENARIOS

General Plan
- 751 pipeline segments need relief/replacement
- 23\textsuperscript{rd} Avenue WWTP not expanded

Dispersed Multi-City Centers
- 755 pipeline segments need relief/replacement
- 23\textsuperscript{rd} Avenue WWTP not expanded above base

Strong Central City
- 1,361 pipeline segments need relief/replacement
- 23\textsuperscript{rd} Avenue WWTP expanded to 98 MGD

High Transportation Development
- 2,561 pipeline segments need relief/replacement
- 23\textsuperscript{rd} Avenue WWTP expanded to 145 MGD