March 4, 2016
Customer Meeting

Flow Monitoring & Modeling Update

Interceptor System Master Plan

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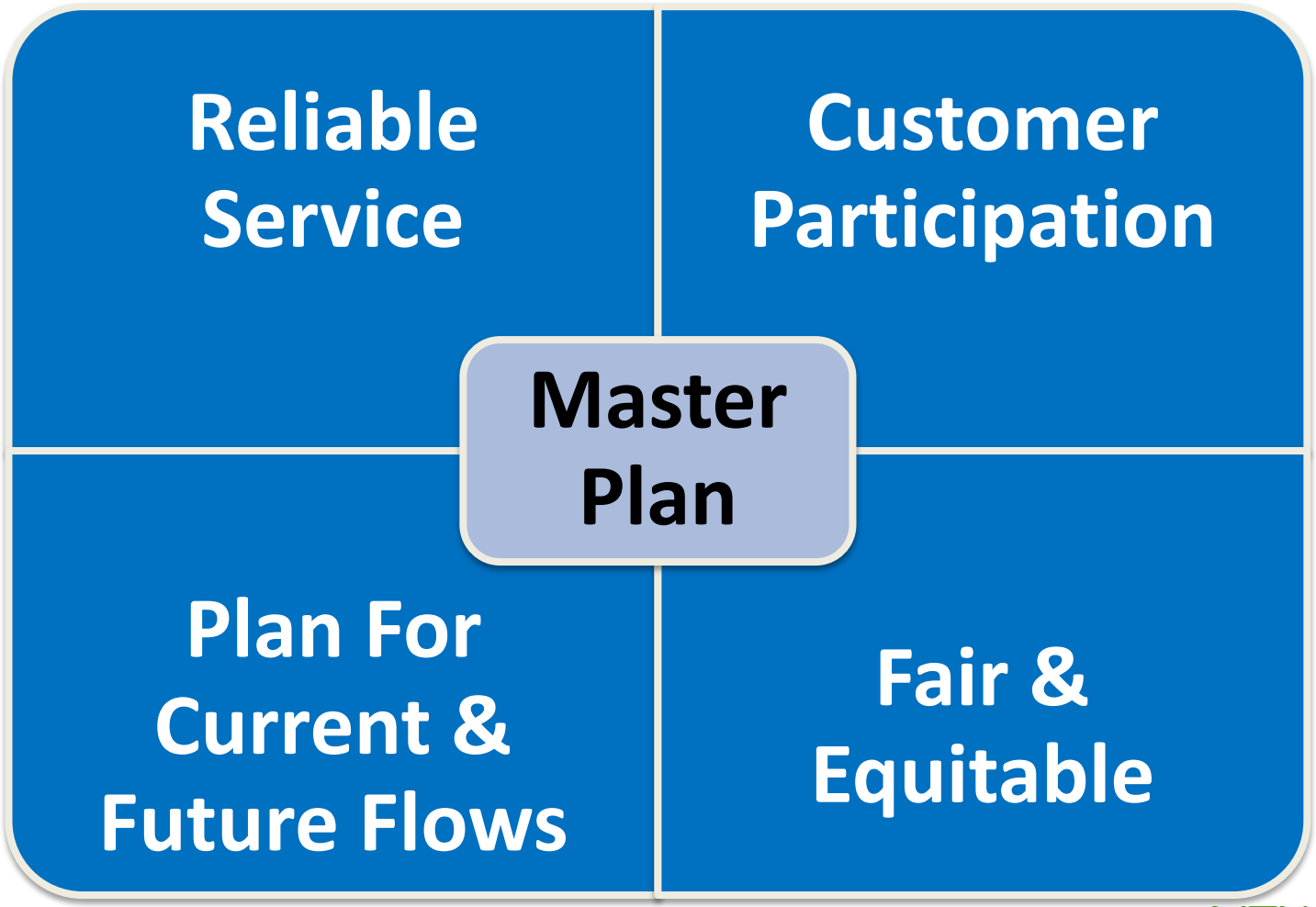
DONOHUE

Project Vision



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Project Plan – Phase I

- Climate Change Analysis
- Review Existing Records
  - Flow monitoring
  - Water billing records
  - Pipe condition
- Model Software Selection
- Flow Monitoring Plan

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Climate Change Analysis

- It is projected that annual average temperatures will increase by 5-6 degrees by 2055
- Annual rainfall has increased approximately 2-3” since 1950
  - Annual rainfall is expected to increase approximately 1” by 2055
- Storm intensity is projected to increase by approximately 20% by 2070

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Project Plan – Phase II

Task	Status
Flow Monitoring	COMPLETE
Inflow & Infiltration Analysis	DRAFT COMPLETE
Model Development / Calibration	90% COMPLETE
Alternative Analysis	5% COMPLETE
Capital Improvement Plan	NOT STARTED
Finalize Master Plan	**September 2016**

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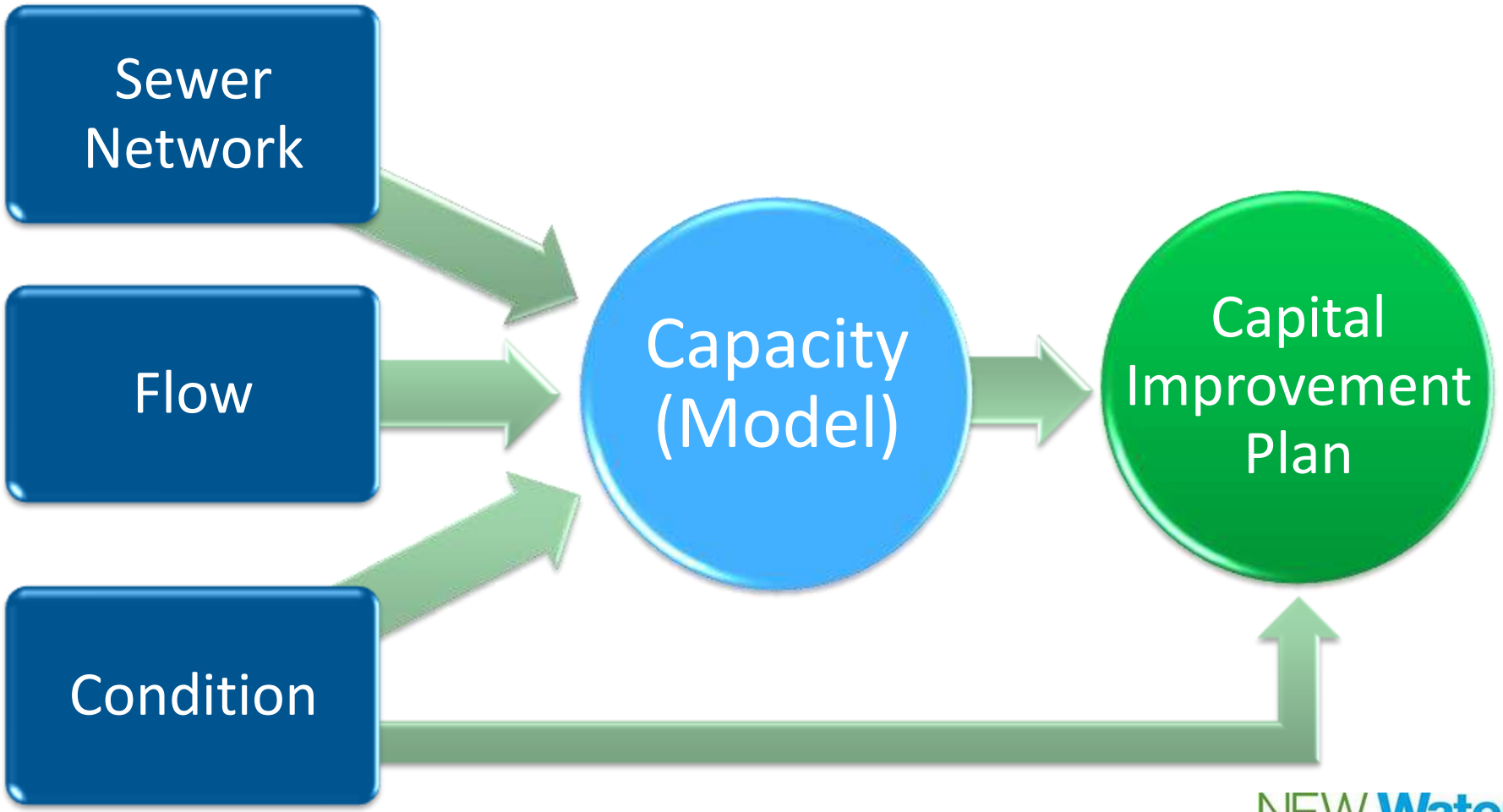
3 Major Components



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Condition Assessment

- Overall condition assessment from Phase I.
- What sewers might need to be replaced?
- System components that were analyzed include manhole condition and pipe defects

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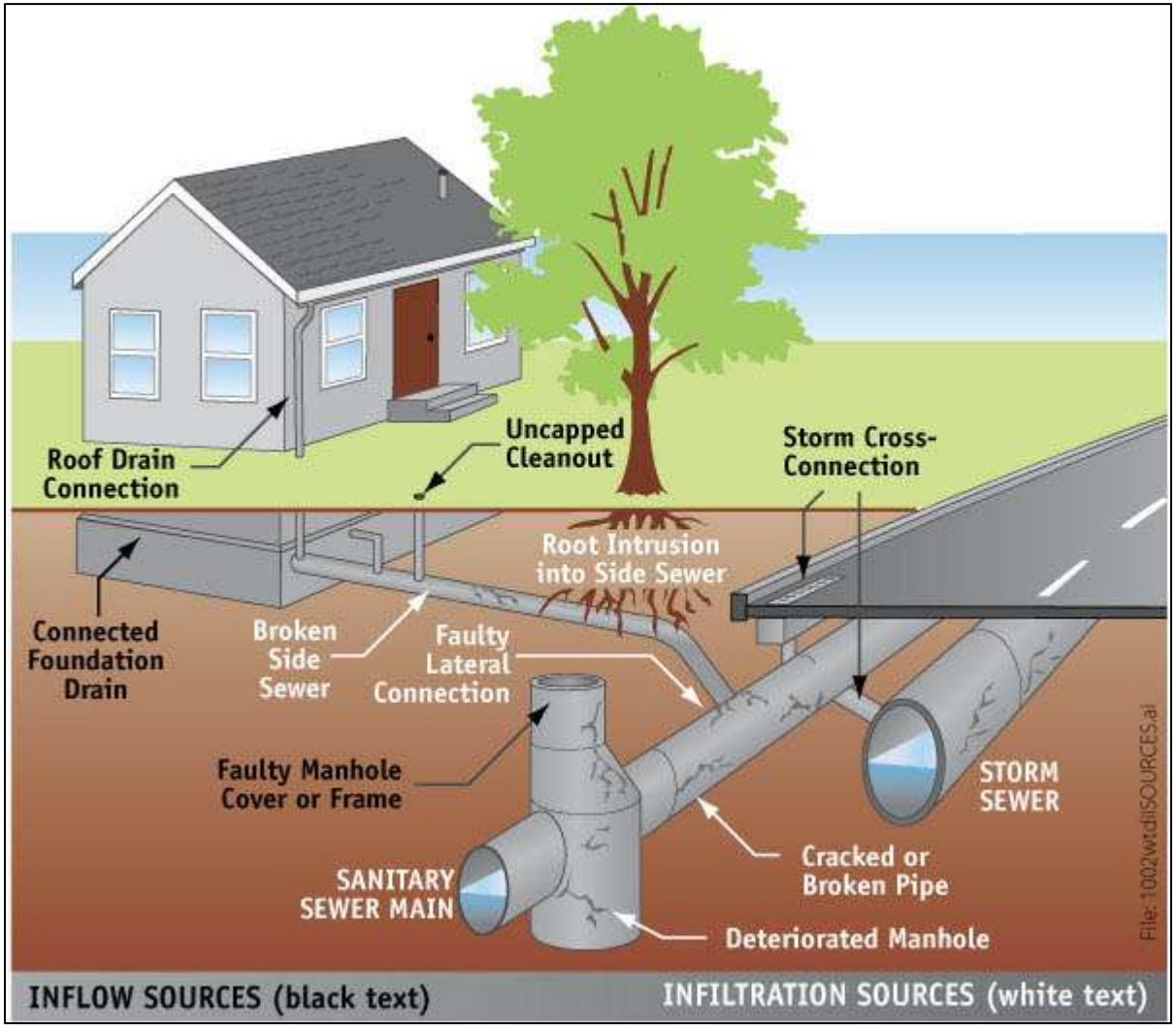
Inflow & Infiltration Analysis

Inflow & Infiltration Analysis



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Flow Monitoring

- Phase 1
  - 2009 – 2014
  - Permanent metering sites
  - Previous temporary meter locations
- Phase 2
  - Spring – Summer 2015
  - Temporary flow monitoring sites
  - Installed a total of 26 meters to help calibrate the model

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Dry Weather Flows

- Infiltration was analyzed during high groundwater (Spring)
- 2 separate metrics were evaluated for dry weather flow
  - **gpcd**: Gallons per capita per day
  - **gpd/IDM**: Gallons per day per inch*diameter*mile

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Wet Weather Flows

- Isolate flows during major storms
- Metrics
  - Volume → Capture coefficient:

$$r = \frac{RDI\ Volume}{(Rainfall\ Depth)(Area)}$$

  - Rate → Peaking factor:

$$PF = \frac{Peak\ Wet\ Weather\ Flow}{Average\ Dry\ Weather\ Flow}$$

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Model Development

Model Development

- Components of model development include:
  - Input of NEW Water interceptor system
  - Evaluation of flow information from permanent and temporary flow meters
  - Model calibration
  - Analysis of projected future flows

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Next Steps

Master Plan Next Steps

- Complete model calibration
- Estimate future flows
- Capital Improvement Plan
- Provide reliable service now and into the future

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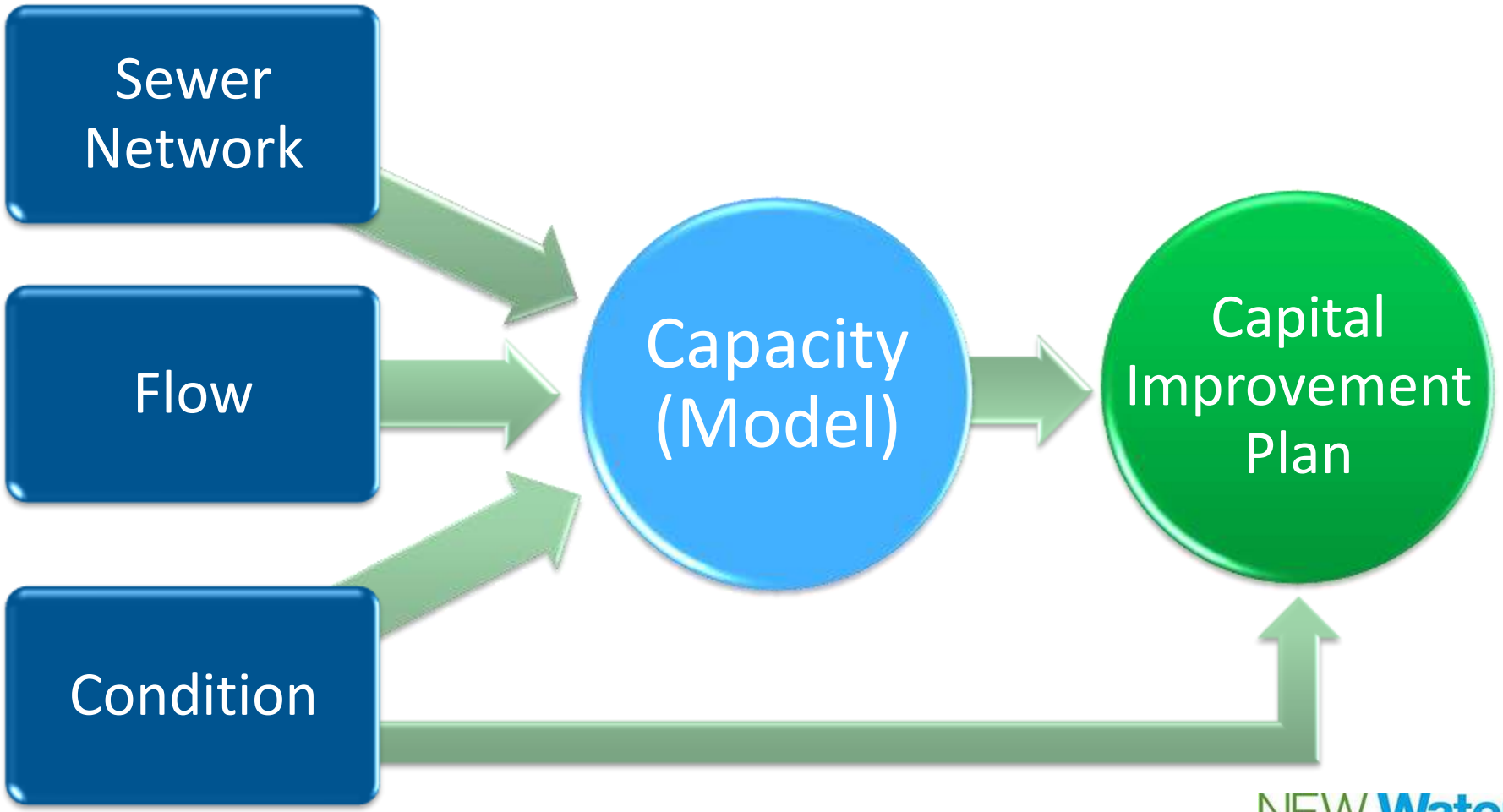
3 Major Components



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Questions?