



Winchester Municipal Utilities – System Capacity Assurance Program (CAP)

May 14, 2010

CAP



System Capacity Assurance Program

- **Goals**
- **Definitions**
- **Components**
 - Model
 - Certification
 - Credit Program

Goals




- Identify where there is insufficient capacity
- Analyze places that impact SSOs
- Assess peak flow capacity of all major system components
- Enable WMU to authorize new sewer connections or increases in flow

Definitions

- Sewerbasin
- Collection System
- Transmission System
- Treatment System
- Peak Flow
- Average Daily Flow (ADF)
- Inflow/Infiltration (I/I)


Utilized Capacity During 2-year, 24-Hour Storm

CAP


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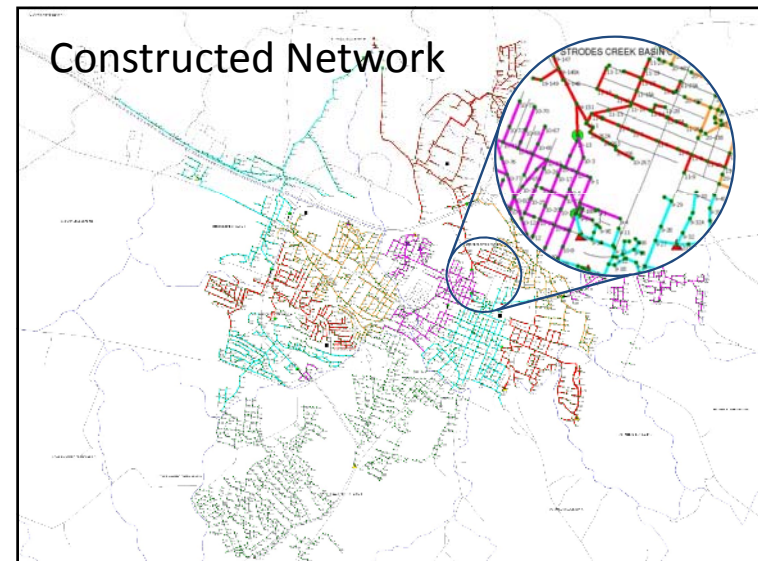
Hydraulic Model

- **InfoWorks**™ software
- Four phases:
 1. Network Construction
 2. Calibration
 3. Analysis
 4. Model Maintenance



Phase 1: Network Construction

- Build physical assets
 - Manholes – dimensions
 - Pipes – elevations, slopes, diameters
 - Lift stations – wet well dimensions, on/off elevations, pump curves or drawdown test results
 - Force mains – diameters and elevations

Phase 2: Calibration

- Gather Flow Information
 - Flow Monitoring & Rainfall Data
 - Basins 8, 13, 14 – 2009
 - Remaining Basins – 2010
 - Choose Locations
 - Install Flow Meters
 - Install Rain Gauges
 - Download data on days 1, 3, 7 and weekly
 - Eight Weeks of Data



Phase 2: Calibration

- Load data into the model
 - Dry weather flow
 - Wet weather flow
- Run Model / Simulate Flow
- Compare flow pattern seen in model with flow pattern observed in the field
- Adjust software settings
- Repeat



Phase 3: Analysis

- Introduce “design rainfall”
 - 2-year, 24-hour
 - 3.0 inches
- Model predicts flow




Phase 4: Model Maintenance

- In between calibrations
 - Keep sewer system changes up to date




Modeling Results

- Existing hydraulic capacity
- Required hydraulic capacity
 - Peak flow capacity required during design storm simulation, with a moderate level of surcharge allowed




Modeling Results Example

Line Segment	Service Area	Existing Diameter (inches)	Existing Length (feet)	Existing Capacity (MGD)	Required Capacity (MGD)
19-154 / 19-153	Strodes Creek Basin C	30	350	15	20.06
19-153 / 19-152	Strodes Creek Basin C	30	400	15	15.23
19-152 / 19-151	Strodes Creek Basin C	30	425	15	11.71



How Often to Model?


- Calibration is the only way to incorporate flow and rainfall data into the model.
- Every new calibration supersedes any prior calibration.
- Single basins can be recalibrated as needed.



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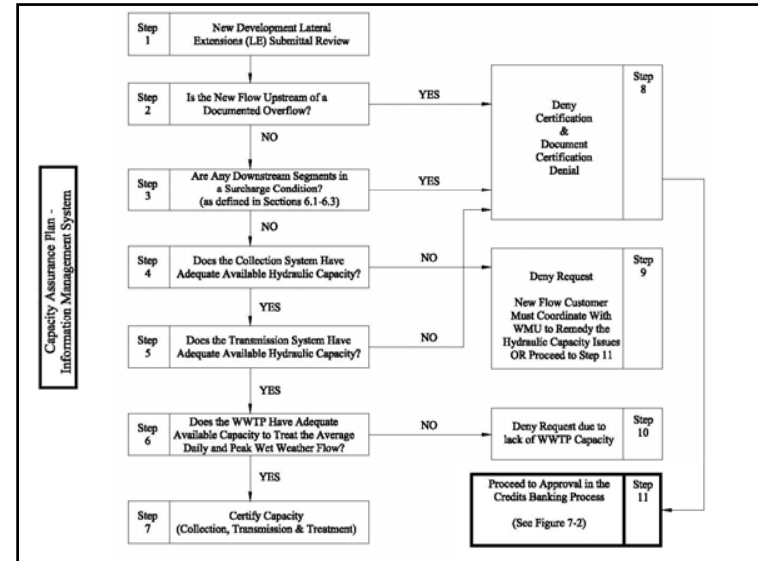
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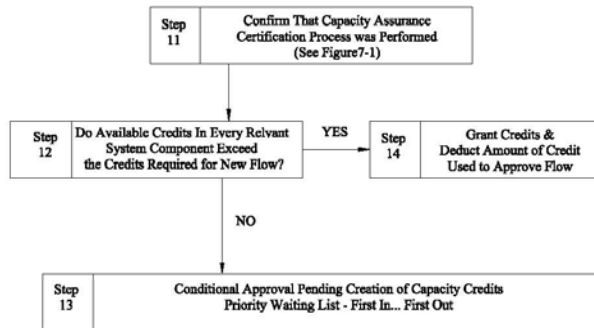
Certification

- Approval process when changes are to be made to the sewer system
 - Certified by Professional Engineer
 - Approved by General Manager



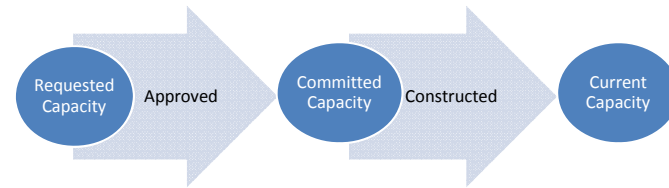
Credits Banking Process Step by Step

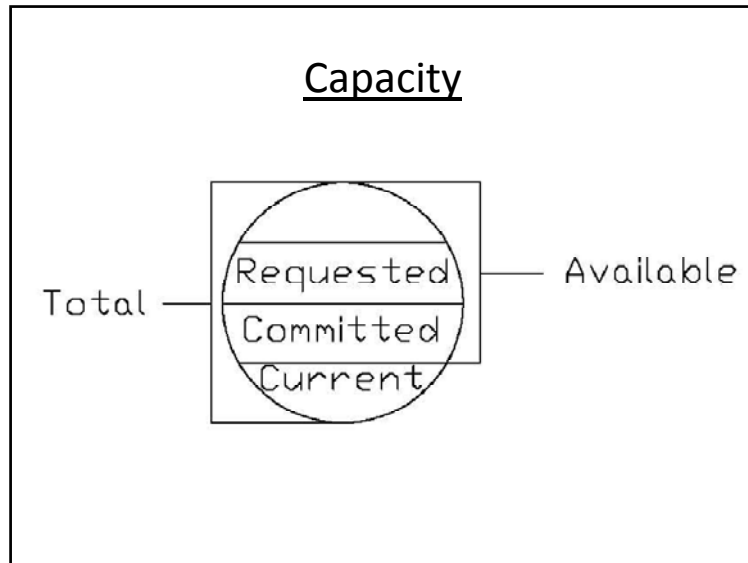
Figure 7-2



Credit Banking Process Definition:
 The Credit Banking Process is an "In Lieu of Certification" process which provides WMU an opportunity to earn credits upon completion of specific projects that will add sewer capacity or reduce peak flows to areas of the system with capacity deficiencies.

Capacity





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Credit Program

- Earn
- Track
- Use

Earn


- I/I Reduction via Rehabilitation Projects
 - Flow monitor before and after
 - Calculate I/I reduction using reference material
- Removal of Sewer Connections
 - Calculate ADF reduction from water metering
 - Flow monitor before and after

Track

Project Description	Location	Completion Date	Responsible Party	Hydraulic Credits		Determination (Flow, Infrastructure, or Historical)
				(+)	(-)	
Lynnway Drive 12-inch	Basins 8C & 8D	11/25/2008	WMU	454,133		Flow
New Development	Basin 8C		Developer		20,000	


Requested
Committed
Complete

Note: A system to track credits within InfoWorks™ is currently in development.



Use

- Project Related to an SSO
 - 3:1 ratio
- Project Not Related to an SSO
 - 2:1 ratio
- First come, first served
- Special Conditions



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