2D Modeling in an Urban Environment

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Proposed Project

- Improvements to streets
- Create a pedestrian friendly environment
Proposed Project

• Removal of curb and gutter in many locations
• Protect existing and improved structures from flooding in the design event
• Loss of capacity in gutter requires additional capacity in storm sewer
Pre-Project Conditions
Pre Project Conditions

- Evaluate existing infrastructure
  - On ground survey of project area
  - Record drawing review
  - LiDAR of overall watershed
  - CCTV survey of storm sewer system
  - SUE

- Overall watershed size less than 130 acres
  - Rational Method
Pre Project Conditions

• Too close to existing structures to improve
• Photos of existing alley
• TV of culvert shows larger facility than anticipated
Modeling

- Watershed Area
- Boundary conditions of model
- Drainage area evaluation
  - Location of all of the inlets in the area
  - Location of roof drains that connect directly to storm sewer
- Build network
  - Inlets
  - Pipes
  - Tie in to 2D Surface
Pre-Project Conditions
Pre-Project Conditions
Pre-Project Conditions
Pre Project Conditions
Pre Project Conditions
Improvements

• Need to improve storm sewer capacity, remove capacity from gutters
• Revise the surface based on desired grading plan
• New inlets
• Try to use existing storm sewer alignment
  • Avoid conflicts
• Upsize main line to 3x2 box culvert
CBD DETAIL FOR SHALLOW DEPRESSION INLETS
Improvements
Improvements
Improvements
Improvements
Construction
Construction

• Identifying conflicts in the field and adjusting storm depths as required
• Changing assumptions for roof drains based on items uncovered during excavation
• Modifications to the XPSWMM modeling are happening throughout construction to guide changes
Takeaways

• 2D model is a great tool for identifying issues with significant grading alterations
• Modeling output only as good as the input it receives
  • Data collection is key. Record drawings are not enough
  • Aligning surface grade lines with curbs, changes in grade are key
• Things will change, so prepare early