White Rock Creek Master Plan and Downstream Assessments

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History

• Prior to 2012
  • Frisco criteria required detention to single-family Rational Method conditions
  • Single-family development required no detention
History

- 2012 Design Criteria
  - Frisco criteria required detention to pre-development Rational Method conditions
  - In lieu of detention, provide a Downstream Assessment
  - If development is larger than 20 acres, required study of downstream system to evaluate capacity. Requires unit hydrograph study.
Downstream Assessment Issues

- Inconsistent studies between projects
- Complaints from community regarding requirements
- Increased review time
Watersheds and Downstream Assessments

• City prepares Master Plan base models for each watershed
• Provides developers with base models for downstream assessments
  • Consistency
  • Fully-developed conditions
  • Updated for new development
White Rock Creek Watershed

- Watershed has seen major changes in development over the past 30 years
- Storm sewer inadequacies have been noted by residents
- Special Flood Hazard Areas from new FEMA maps impact multiple properties
White Rock Creek Watershed
XPSWMM Modeling

- Storm sewer
- Channels and lakes
Storm Sewer Modeling

- Results show over 150 inlets that would surcharge in the 100-year existing event
- Only 2 additional inlets would be surcharged in fully-developed conditions
Channel and Pond Modeling

- Multiple existing structures were shown in the floodplain in existing conditions.
- Fully-developed conditions has little to no impact on properties in the northern portions of the watershed.
- Development in the southern portion of the watershed can result in increased flooding potential.
Downstream Assessments

- Results of the modeling can help focus requirements for downstream assessments.
- Development in the northern portions of the watershed will have little to no impact on flooding.
- As long as increased impervious over Future Land Use Plan is not anticipated, downstream assessment can just reference master plan.
- Southern portions of the watershed can update the model to anticipate impacts.
Downstream Assessments
Future Improvements

• Master Plan shows improvements to specific roadway crossings will impact existing residences
2D Modeling

• 2D modeling of areas where flow has escaped the banks of the channel can more accurately estimate the number of structures potentially impacted by the 1% annual chance of flood event