Managing Flood Risk Without a Defined Floodplain

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• Agenda
  – Delaware Creek Watershed
  – History of Development and Flooding
  – Floodplain Study
  – Proposed Capital Improvements
  – Downstream Impacts
  – Key Takeaways
  – Questions
History of Watershed

- Developed in the ‘50s and ‘60s
- Storms of Record
- Unknown Risks

History of Watershed

- Known Anecdotal Flooding Problems
- Property/Vehicle Damages
- Drainage Complaints

Managing Flood Risk Without a Defined Floodplain

- Purpose of Project
  - Define limits of floodplain and risk for unstudied streams
  - Reduce floodplain limits to protect structures and roadways
  - Staying ahead of SH 183 Improvements
  - Improve failing drainage channels
  - Originally contracted to design for Delaware Creek
  - Expanded scope to analyze the tributaries due to SH 183 impact
Managing Flood Risk Without a Defined Floodplain

- Studied and Unstudied Streams
  - Embassy Channel
  - Delaware Creek
  - Farine Creek
  - Brockbank Channel

- Flooding Problems
  - Approx. 125 structures in FEMA floodplain
  - Approx. 375 structures in undefined floodplain

Channel Capacity Photos

- Flood Control – 4” (2-YR) storm on 1/25/12
Channel Capacity Photos

• Flood Control – 4” (2-YR) storm on 1/25/12

Existing Channel Problems

• Embassy Channel – Power Pole in Channel
Existing Channel Problems

- Embassy Channel

Failing Channels

- Embassy Channel – Failing Retaining Wall

- Brockbank Channel – Failing Channel Wall
Failing Channels

• Brockbank Channel – Structure Adjacent to Channel

Proposed Capital Improvements

• Proposed Modular Block Channel Improvements

Proposed Capital Improvements

• Project Elements
  – Construct deepened rectangular modular block channel
    • Generally maintain existing channel width
    • Deepen channel to an average of 10’
  – Remove roadway culvert crossings and replace with clear span bridge crossings
  – Estimated total construction cost of $37 Million!
Proposed Capital Improvements

• Typical Channel Design / Easements

Proposed Capital Improvements

• Benefits of Project
  – Flood Control
    • Proposed channel improvements protect approximately 150 structures and 11 roadways from floodplain south of SH 183
    • Accommodate future SH 183 improvements
  – Improved Aesthetics
  – Utility Upgrades

Similar Channel Improvement Project

• Similar Channel Project – Before Improvements
Similar Channel Improvement Project

- Similar Channel Construction – During Improvements

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Similar Channel Improvement Project

- After Channel Improvements

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Similar Channel Improvement Project

- Bridge/Culvert Construction – Before Improvements

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Similar Channel Improvement Project

• Bridge/Culvert Construction – After Improvements

Similar Channel Improvement Project

• Typical Channel Construction Photos

Similar Channel Improvement Project

• Typical Channel Construction
Similar Channel Improvement Project

• Typical Channel Construction

Similar Channel Improvement Project

• Modular Block Channel Wall

Similar Channel Improvement Project

• Improved Channel
Downstream Impacts

- Channelizing and reducing floodplain increases discharges downstream 50% to 80%
- Impacts due to reduction in storage and accelerated timing
- Downstream area mostly parkland with natural floodplain
- Ensure proposed capital improvements will not put people at risk downstream

Key Project Takeaways

- FEMA SFHAs aren’t complete delineation of flooding
- Modular block retaining walls allow improved channels within the existing footprint
- Be conscious of potential for downstream impacts
- A comprehensive watershed study gives the full story
QUESTIONS???