Welcome
Selma Estates Community Meeting

2/10/2020
Agenda

• Overall project and findings of Wood Watershed Analysis
• Revisions to the FEMA floodplain maps
• Potential for additional structures to be removed from the floodplain boundary
• Revisions to Elevation Certificates based on new information
Wood Presentation
Scope

• Drainage Area Analysis
• Floodplain Modeling (develop 100-yr floodplain)
  o Updated aerial and ground survey
• Natural Resources Inventory
• Evaluation of Mitigation Alternatives
  o Berm (proposed by others)
  o Upsize stormwater system
  o Large Stormwater Pond with upsized stormwater system
  o Home Buyout
Study Area
Previous Mapped Floodplains Timeline

• 2001 Minor Floodplain
Previous Mapped Floodplains Timeline

- Floodplain developed 2002
Previous Mapped Floodplains Timeline

- Houses built 2013
- Flooding 2013 & 15
Previous Mapped Floodplains Timeline

- Letter of Map Revision (LOMR) effective June 2019
- Floodplain became regulatory
- Letter of Map Amendment (LOMA) Sept 2019
- 14 houses in floodplain
Previous Mapped Floodplains Timeline
Letter of Map Revision (LOMR)
LOMR

• A new floodplain is developed and a package is submitted to FEMA
  • Includes modeling, documentation, survey, etc.
• FEMA reviews the LOMR package
  • Back and forth between FEMA and engineers
• Once FEMA is satisfied with the LOMR package the case is issued (determination letter sent)
• FEMA officially revises the Flood Insurance Rate Map (FIRM) to reflect the new floodplain

*LOMR process involves additional steps not outlined above
Site Background
Site History

- Southern boundary of floodplain is at a lower elevation than the channel
Floodplain Cross Section

2002 Floodplain
Hydrology
Hydrology

HEC-HMS Result: 1300

Q100 (cfs)

- Maryland Regression Equation (2016)
  - Low Prediction Error: 651
  - High Prediction Error: 1258

- Virginia Regression Equation (2011)
  - Low Prediction Error: 1258
  - High Prediction Error: 1906

  - Low Prediction Error: 979
  - High Prediction Error: 1300

- Limestone Gage 17C Analysis and Drainage Area Projection
  - Low Prediction Error: 979
  - High Prediction Error: 1906
Hydraulics
Hydraulic Results: 2yr

- Estimated channel capacity: 121 Cubic Feet per Second
- 2yr Discharge: 136 Cubic Feet per Second
Hydraulic Results: 2yr Time Lapse Video
Hydraulic Results: 10yr
Hydraulic Results: 10yr Time Lapse Video
Hydraulic Results: 100yr
Hydraulic Results: 100yr Time Lapse Video
Previous Mapped Floodplains Timeline
Berkhamstead Place

Channel

Low Point of Floodplain
Natural Resources Inventory
Natural Resources Inventory

- Geophysical Survey
- Vegetation Survey
- Steep Slopes
- Soils Survey
Geophysical Survey

- Electric Resistivity (ER) survey locates underground voids and caverns
- Solution Channel detected at spoils pile
- Saturated fracture detected west of Trongate Ct (on existing berm)
Changing drainage patterns in karst can create sinkholes.

Loudoun County Zoning Ordinance: Section 4-1900 Limestone Overlay District

- Avoid damage to karst/sensitive environmental features
- Do not change natural drainage pattern
Vegetation Survey/Steep Slopes/Soils

- Identified jurisdictional streams and wetlands
- Located 3 different vegetation communities and 3 specimen trees
- Steep slopes (>15%) were typically man-made
- Erosive soils were identified on site
Evaluation of Proposed Alternatives by Others
Proposed Berm: Design
Proposed Berm: Items to Consider

- Overtops earthen berm and could potentially breach (model does not consider)
  - seepage, burrowing animals, settlement, debris, trees, climate change
- Not FEMA accredited
- Flooding relocated to adjacent properties north of the tributary
- Located in highly erosive soil
- Located on privately owned property
- Intersects the conservation easement
  - Any modification of the restrictive covenants must have the written approval and consent of the Owner, the USACE, and DEQ
- Contrary to Limestone Overlay District requirements
- Adverse impact to existing stream restoration project
- Removal of specimen trees
Proposed Berm: Items to Consider

• FEMA Accredited Levee Requirements (44 CFR § 65.10)
  o 3 ft of freeboard – 4 ft within 100 ft of a structure
  o embankment protection
  o embankment and foundation stability analysis
  o settlement analysis
  o interior drainage analysis
  o operation plan and maintenance plan
Proposed Berm: Modeled 100-yr Floodplain

MAPPED SINKHOLES

100-yr Floodplain: Proposed Berm
100-yr Floodplain: Existing Conditions
Potential Solutions
Upsized Culverts

- 1,000 ft+ of storm sewer upsizing
- 30” RCP to 68” elliptical replaced with 58” x 91” HEP
Upsized Culverts: Items to Consider

• Upsizing culverts had minimal impact (drainage area)

• Design requirements – minimum cover, easements, velocities

• Cost
Site Drainage

- Storm water infrastructure designed for under-sized drainage area

Map showing drainage areas:
- 354 acres
- 67 acres
- Existing Berm
- Updated Drainage Area to Trongate Berm

Legend:
- Original Drainage Area to Trongate Berm
- Updated Drainage Area to Trongate Berm
- Loudoun Street Centerline

Loudoun County, Virginia

LOUDOUN.GOV
Pond and Upsized Culverts

- 3.7 acre pond
- 1,000 ft storm sewer
Pond and Upsized Culverts: Items to Consider

- Reduces flooding of structures
- Solution channel and saturated fracture
- Homes in an unintentional spillway
- Cost
Buyout: Items to Consider

- Additional costs: demolition, conversion to green open space, lost tax revenue, potential relocation
- FEMA’s property acquisition program are strictly voluntary
- Homeowners in the vicinity of the floodplain boundary may want to be included in the buyout
- May attract attention from other homeowners with nuisance flooding
- Buyout only considered for the 100-year event
- Protection of Loudoun Water wastewater lift station
- FEMA grant opportunities for buyout
Summary
A buyout is the only evaluated option that removes flood risk and safety concerns associated with the 1%-annual-chance event (100-yr) as described in the report, with certainty.
Letter of Map Revision (LOMR)
LOMR

- Updates the FEMA maps
- Provides Base Flood Elevations
- Improved accuracy of assessing a structure’s risk to flooding
- Package sent to FEMA February 6th
- Property Owner Notification letters mailed
Letter Of Map Amendment (LOMA)
Process

- LOMR must be Effective prior to application submission
- County staff submits new LOMA package
- County staff updates Elevation Certificates
- It is anticipated that additional structures may be removed from the floodplain
  - This determination will be at FEMA’s discretion
Next Steps
Next Steps

- Private conversations with property owners with structures in the 100 year floodplain to gauge their interest in participating in a buy-out program.
- Finalize staff assessment of grant opportunities and developing the framework for a buy out program to be presented to the Board in this spring.
Questions?
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