City of Raleigh
Engineering Services Department

Stormwater Management

Ramblewood Drainage Improvement Project
Public Meeting - Jaycee Park
June 14, 2017
Introductions

City of Raleigh Staff
- David Kiker, PE, Engineering Services
- Veronica High, PE, Engineering Services
- Kristin Freeman, Engineering Services
- Sarah Gentry, Real Estate

WK Dickson Staff
- Scott Sigmon, PE
- Miranda Smalling, PE
Presentation Overview

✓ Study Area
✓ Existing Drainage Issues
✓ Project Goals
✓ Stormwater Modeling
✓ Recommended Drainage Improvements
✓ Permitting
✓ Construction Expectations and Challenges
✓ Proposed Schedule
✓ Easement Acquisition Process
✓ Questions & Answers
✓ Break Out Sessions
Map of Existing Drainage Issues
Project Goals

- Minimize roadway flooding – Target 10-year storm event
- Minimize garage & crawl space flooding of home along the east tributary – 10-year flood event
- Stabilize banks of west tributary
- No adverse impacts downstream of Ramblewood (under home and at pond)
Discuss Modeling Options
- Steady State
- Dynamic Wave

Utilized EPA SWMM
- Dynamic wave equation-based hydraulic models are important to use when:
  - Portions of systems have flat slopes
  - Model results need to account for backwater effects
  - Transitions between closed system and open channel analysis flow is needed
  - Model results need to account for Storage/Sump areas
Recommended Improvements

- **East Tributary Improvements**
  - Remove existing 18" RCP
  - Grade open channel around house

**Locations**
- 4000 Cardigan Place
- 312 Ramblewood Drive
Recommended Improvements

West Tributary Improvements

OVERFLOW BYPASS

RAMBLEWOOD DRIVE

FLOW SPLITTER BOX

RAMBLEWOOD DRIVE

401 RAMBLEWOOD

West Tributary Improvements
Recommended Improvements

1. **Flow from Mall**: Raised open channel with retaining walls.
2. **Construction Entrance**: Proposed concrete vault structure.
3. **System Extension**: Closed system extension.
4. **Flow to Ramblewood Drive**: Rechaptered open channel with retaining walls.

West Tributary Improvements
Recommended Improvements

West Tributary Improvements
Recommended Improvements

- **West Tributary Improvements**
  - 48" RCP FROM MALL
  - RAISED OPEN CHANNEL WITH RETAINING WALLS
  - CLOSED SYSTEM EXTENSION
  - 48" RCP TO RAMBLEWOOD DRIVE
  - CONCRETE VAULT STRUCTURE
  - SELECT BACKFILL
  - 0.004 FT/FT SLOPE
  - PROPR. 34LF OF 48" RCP @ 0.97%
  - PROPR. 30LF OF 48" RCP
  - 135 LF PERMANENT IMPACT
  - 138 LF TEMPORARY IMPACT

West Tributary Improvements
Recommended Improvements

West Tributary Improvements
Model Results @ West Tributary – Flooding
## Model Results @ 401 Ramblewood Drive – Peak Flows

### Table H-2: Flows Under Home at 401 Ramblewood Drive – Existing Conditions

<table>
<thead>
<tr>
<th>2-Year Peak Flow (cfs)</th>
<th>10-Year Peak Flow (cfs)</th>
<th>25-Year Peak Flow (cfs)</th>
<th>50-Year Peak Flow (cfs)</th>
<th>100-Year Peak Flow (cfs)</th>
<th>Flow Capacity (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>145.0</td>
<td>217.9</td>
<td>270.2</td>
<td>308.7</td>
<td>352.5</td>
<td>439.1</td>
</tr>
</tbody>
</table>

### Table H-4: Flows Under Home at 401 Ramblewood Drive – Proposed Conditions

<table>
<thead>
<tr>
<th>2-Year Peak Flow (cfs)</th>
<th>10-Year Peak Flow (cfs)</th>
<th>25-Year Peak Flow (cfs)</th>
<th>50-Year Peak Flow (cfs)</th>
<th>100-Year Peak Flow (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>145.0</td>
<td>221.8</td>
<td>269.1</td>
<td>291.8</td>
<td>351.5</td>
</tr>
</tbody>
</table>

### Change in Peak Flows

<table>
<thead>
<tr>
<th>Ex. 500-Yr Peak Flow (cfs)</th>
<th>Prop. 500-Yr Peak Flow (cfs)</th>
<th>Change (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>427.3</td>
<td>423.7</td>
<td>3.6</td>
</tr>
</tbody>
</table>
### Table H-3: Water Surface Elevation at 401 Ramblewood Drive – Existing Conditions

<table>
<thead>
<tr>
<th>Location</th>
<th>Calculated Water Surface Elevation (feet NAVD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2-year storm</td>
</tr>
<tr>
<td>401 Ramblewood Drive – Low Chord (Elevation = 292.4’)</td>
<td>289.59</td>
</tr>
</tbody>
</table>

### Table H-5: Water Surface Elevation at 401 Ramblewood Drive – Proposed Conditions

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<th>Calculated Water Surface Elevation (feet NAVD)</th>
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</tbody>
</table>
## Schedule

<table>
<thead>
<tr>
<th>Task</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td>Complete 30% Design Plans</td>
<td>May 2017</td>
</tr>
<tr>
<td>Conduct Initial Public Meeting</td>
<td>June 2017</td>
</tr>
<tr>
<td>Complete 70% Design Plans</td>
<td>September 2017</td>
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<tr>
<td>Secure Environmental Permits + Easement Acquisition</td>
<td>Jan 2018</td>
</tr>
<tr>
<td>Finalize Design Plans</td>
<td>June 2018</td>
</tr>
<tr>
<td>Relocate Private Utilities</td>
<td>Nov 2017 – April 2018</td>
</tr>
<tr>
<td>Send Out to Bid</td>
<td>August 2018</td>
</tr>
<tr>
<td>Begin Construction</td>
<td>August 2018</td>
</tr>
</tbody>
</table>
Questions?

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