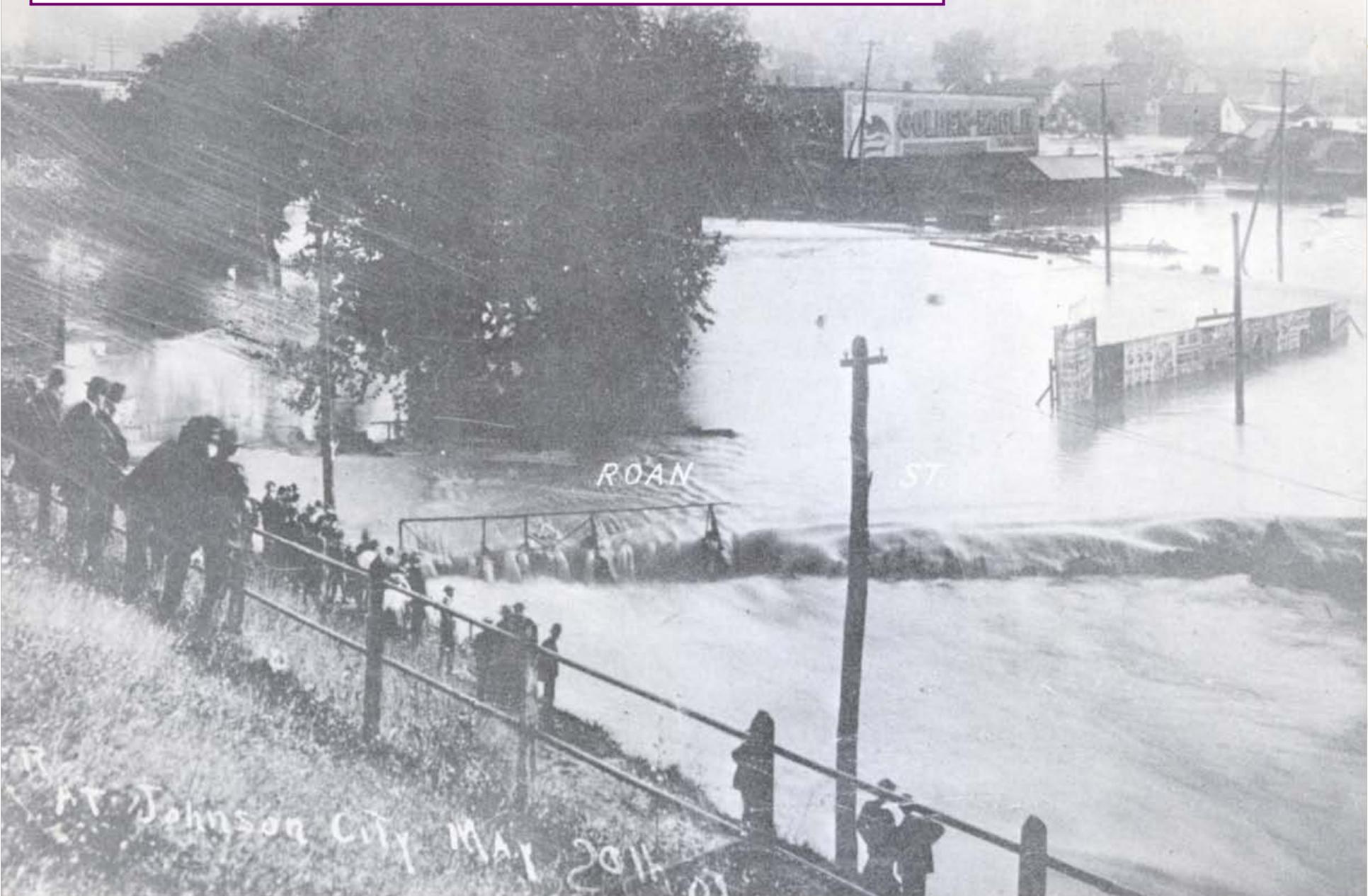


Downtown Drainage Improvements Study and Plan

Outline

- Flooding history and recent flooding
- Minimal expense flooding fix concept
- Structural evaluation of Old Brush Creek Culvert
- Performance of localized improvement concepts
- Performance of more regional concepts
 - Phased approach
- Opportunity to redevelop downtown along with drainage improvement
- Cost
- Financing

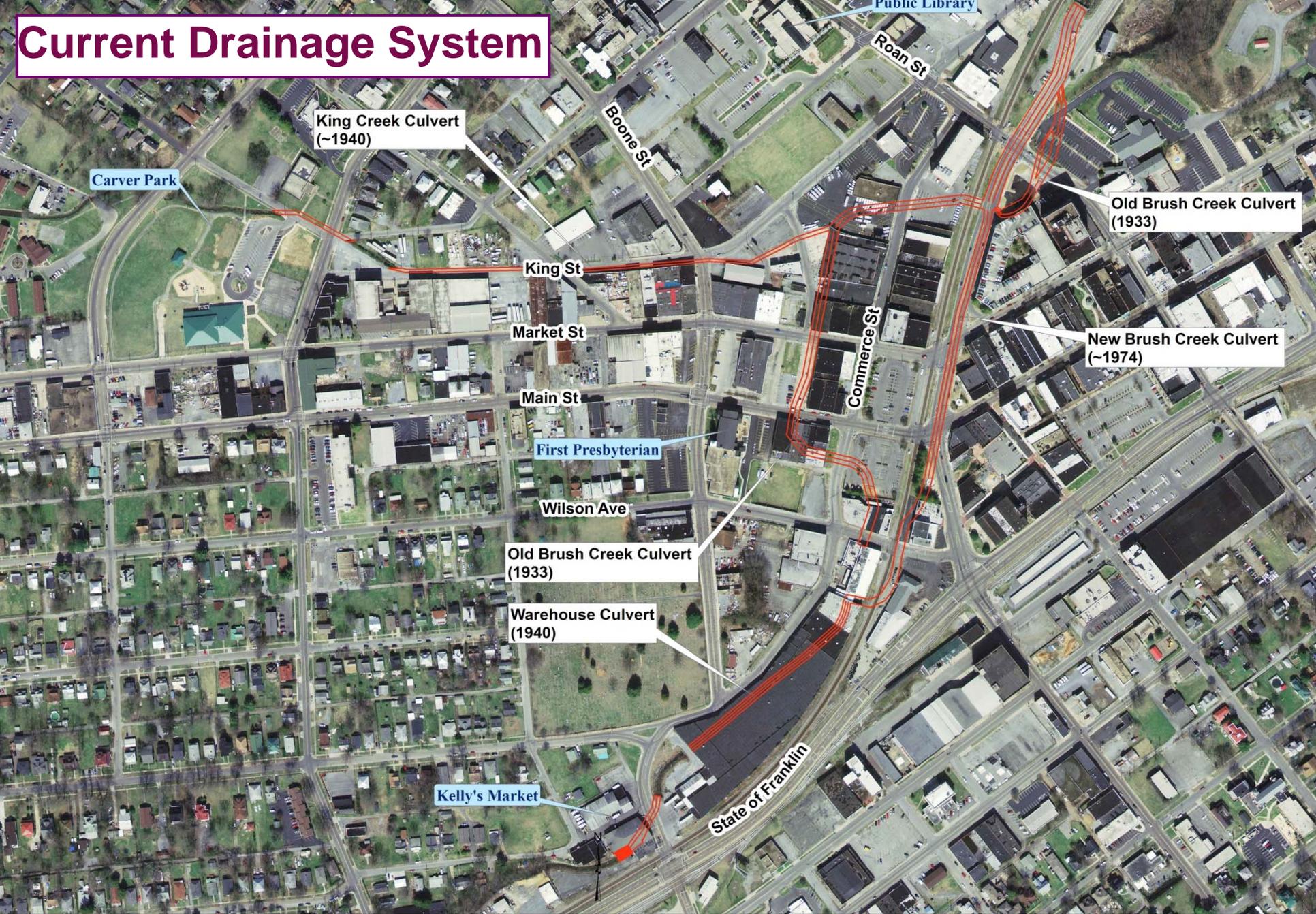
1908 Flood of Brush Creek at Roan Street



1932 Flood at Buffalo Street



Current Drainage System



King Creek Culvert (~1940)

Carver Park

Old Brush Creek Culvert (1933)

New Brush Creek Culvert (~1974)

King St

Market St

Main St

First Presbyterian

Wilson Ave

Old Brush Creek Culvert (1933)

Warehouse Culvert (1940)

Kelly's Market

Roan St

Boone St

Commerce St

State of Franklin

Public Library

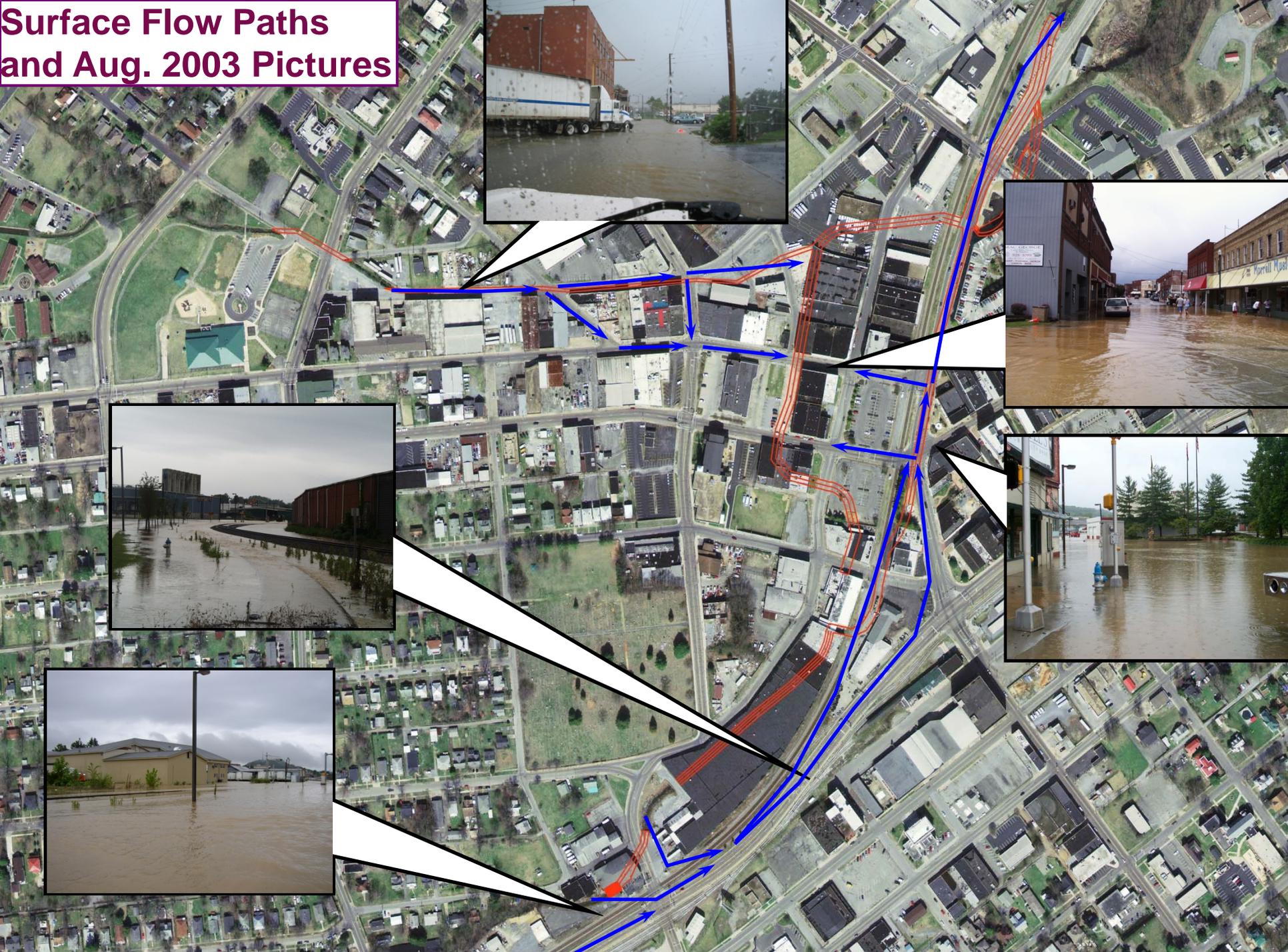


1 inch equals 100 feet

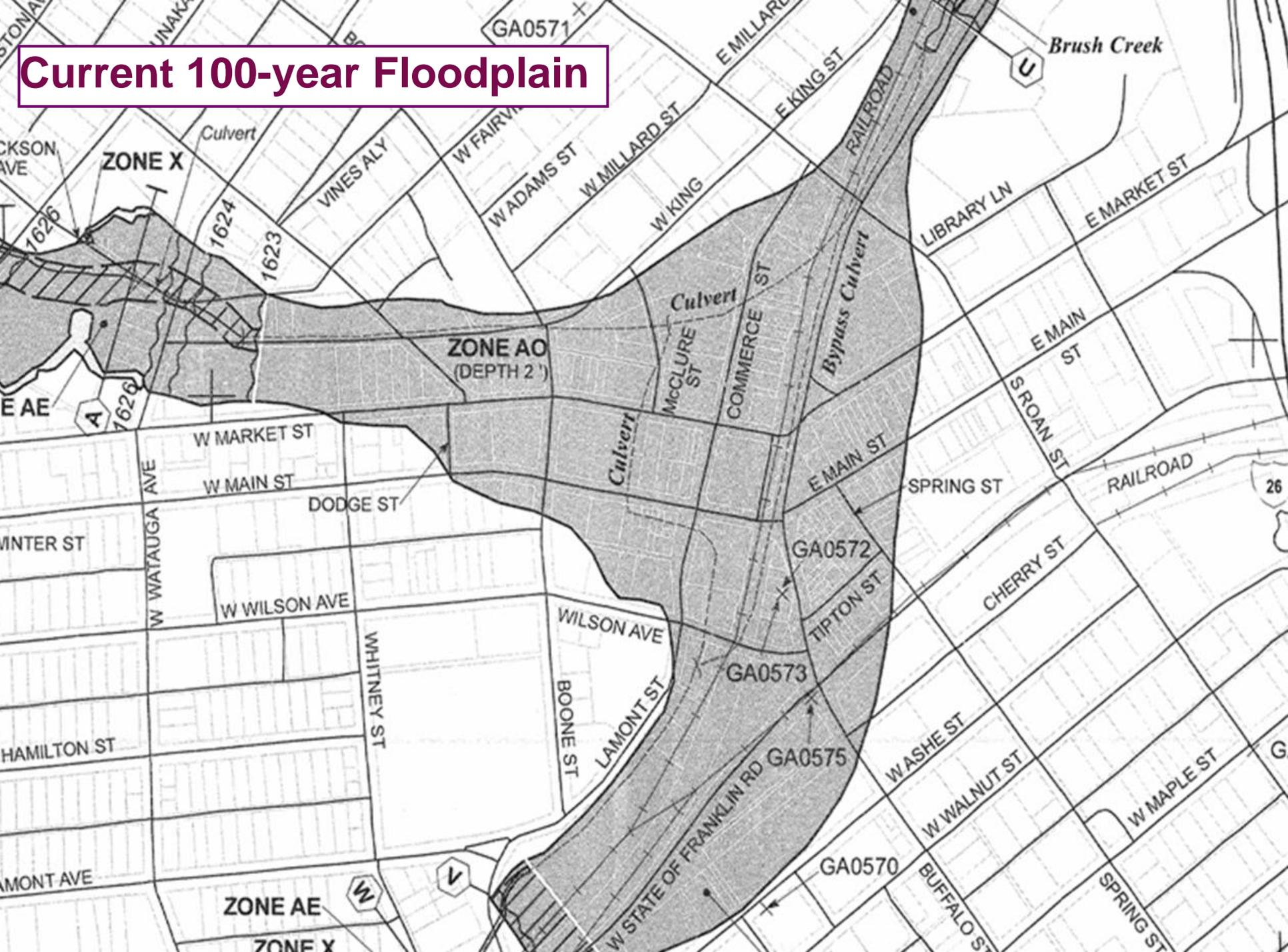
Causes of Flooding

- Upstream development after existing culverts were installed
- King Creek culvert is undersized
 - Flow enters King Street during a 2-year storm and flows into the depressed area of downtown
- Flow restrictions on Brush Creek, force flow into State of Franklin, and ultimately into downtown during a 5-year storm
- Backwater effects from downstream area

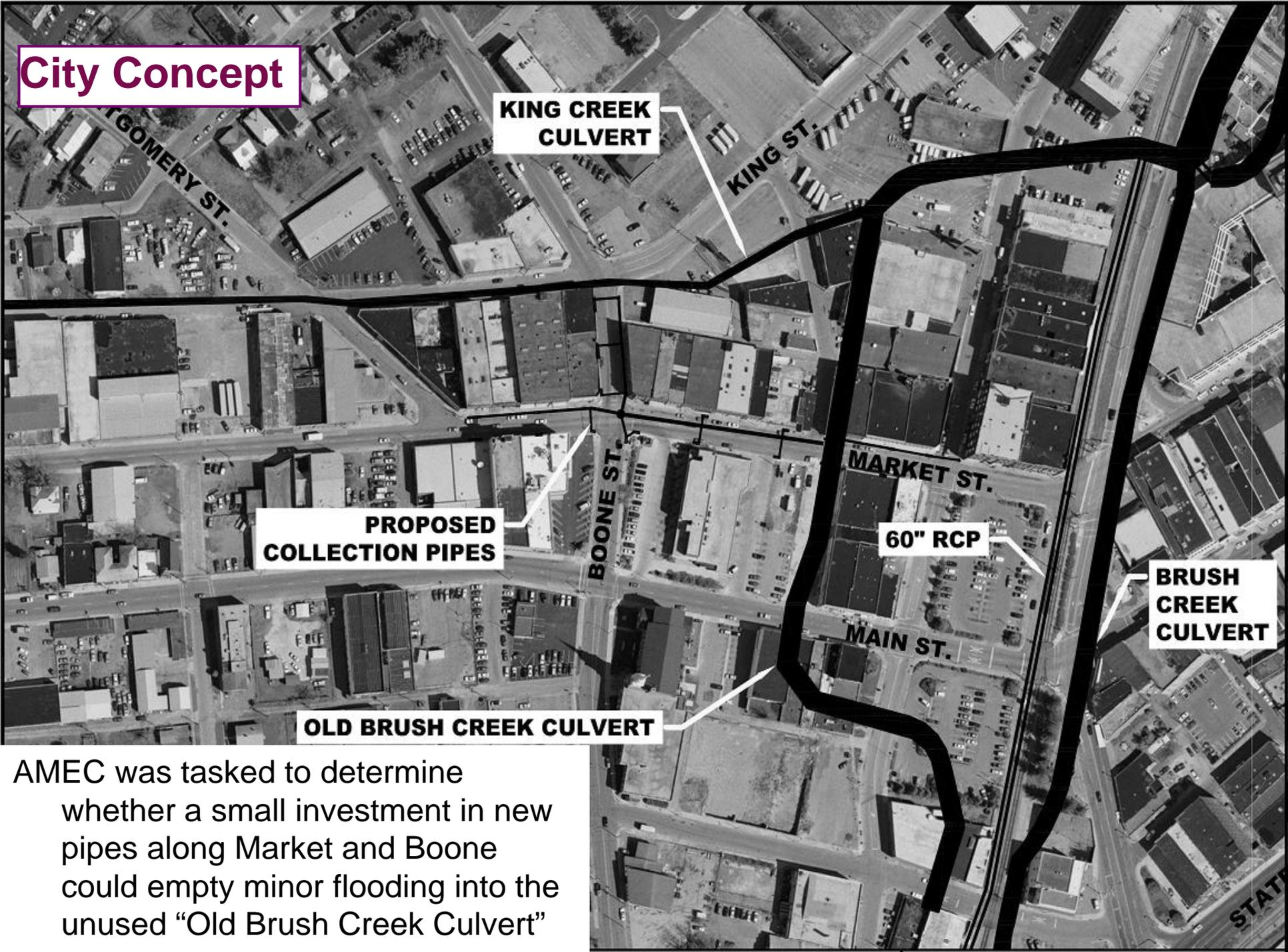
Surface Flow Paths and Aug. 2003 Pictures



Current 100-year Floodplain



City Concept



KING CREEK CULVERT

PROPOSED COLLECTION PIPES

60" RCP

BRUSH CREEK CULVERT

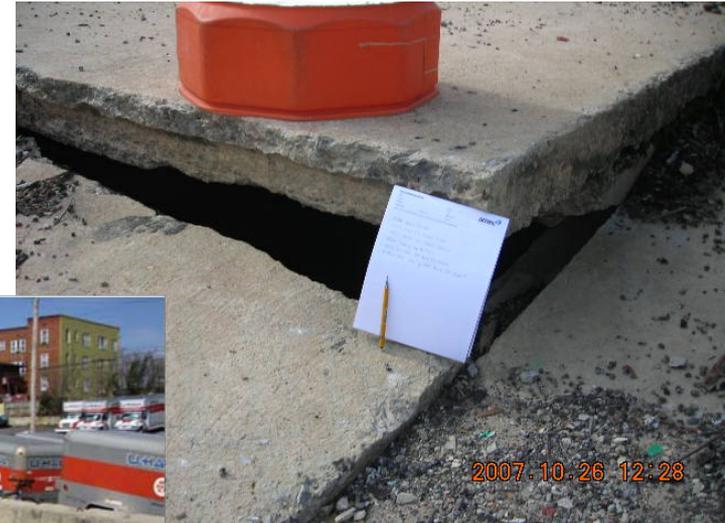
OLD BRUSH CREEK CULVERT

AMEC was tasked to determine whether a small investment in new pipes along Market and Boone could empty minor flooding into the unused "Old Brush Creek Culvert"

Structural Evaluation of Old Brush Creek Culvert



Collapsing Section at King/Old Brush Junction

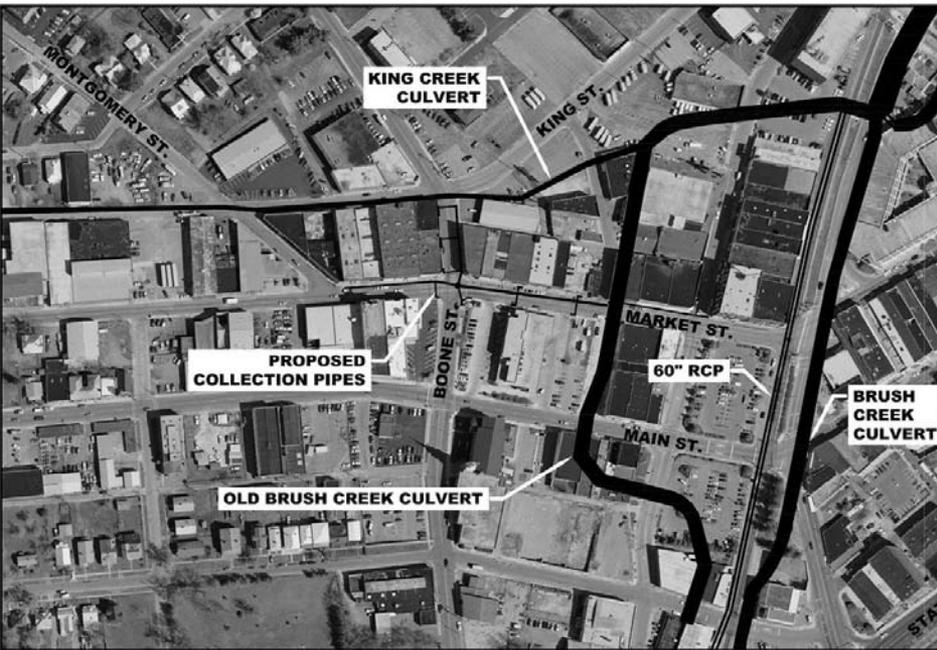
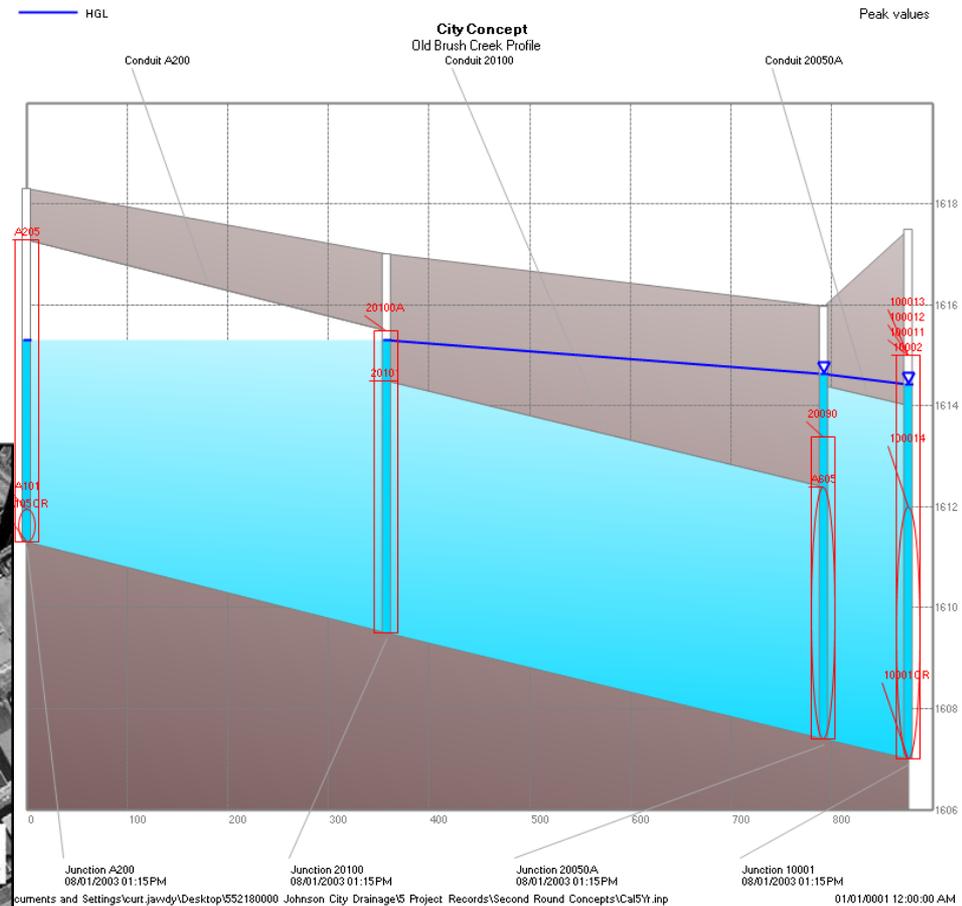


2007.10.26 12:23

08.12.2008 13:04

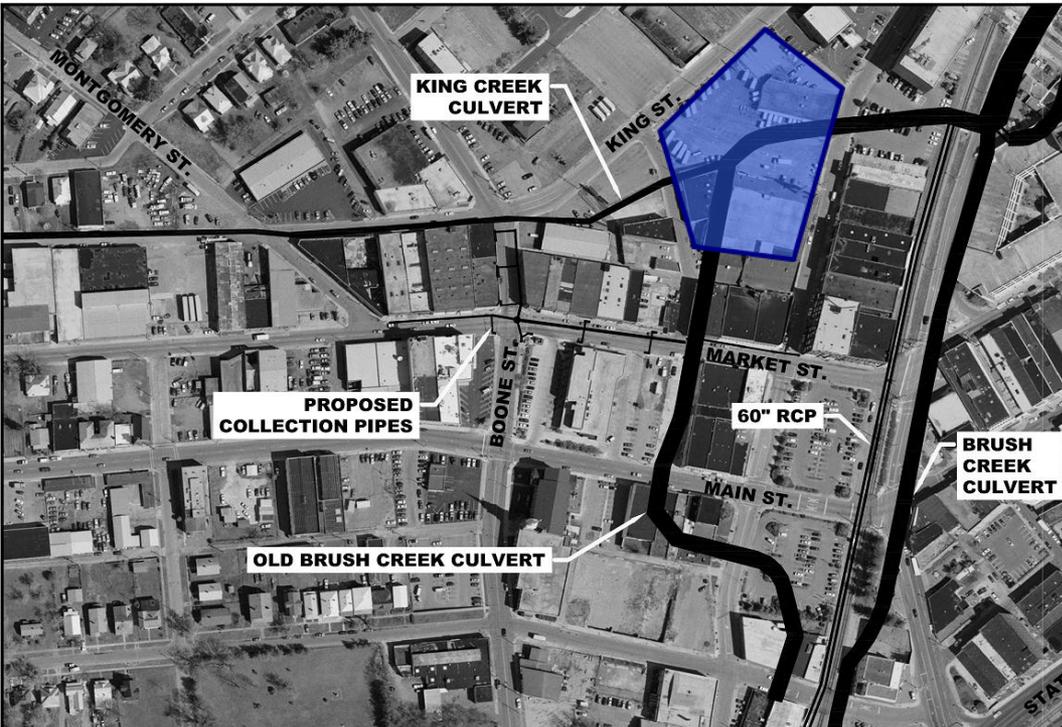
Original Concept Results

- Didn't work due to backwater effects
- Repairing the Old Brush Creek culvert would be difficult and costly
- Need for additional capacity downstream became obvious



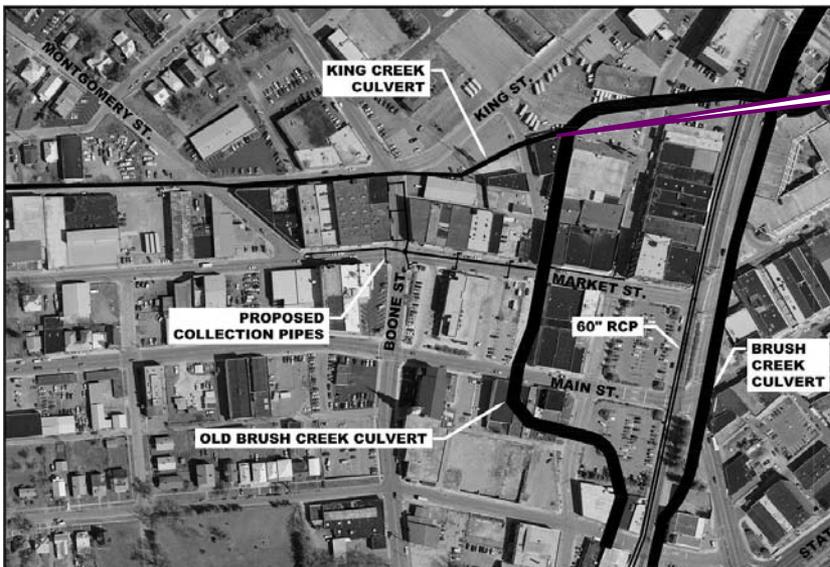
Original Concept with Pond at U-Haul Results

- Showed little flood depth improvement due to backwater effects
- Removed several buildings with flooding problems
- The pond would serve to capture surface flow much more effectively than a number of very large inlets



King Street Collapse Results

- Model was run to check what would happen if the culvert collapsed at the King/Old Brush junction
- Flood depths increased by up to ~2'



Possible collapse location

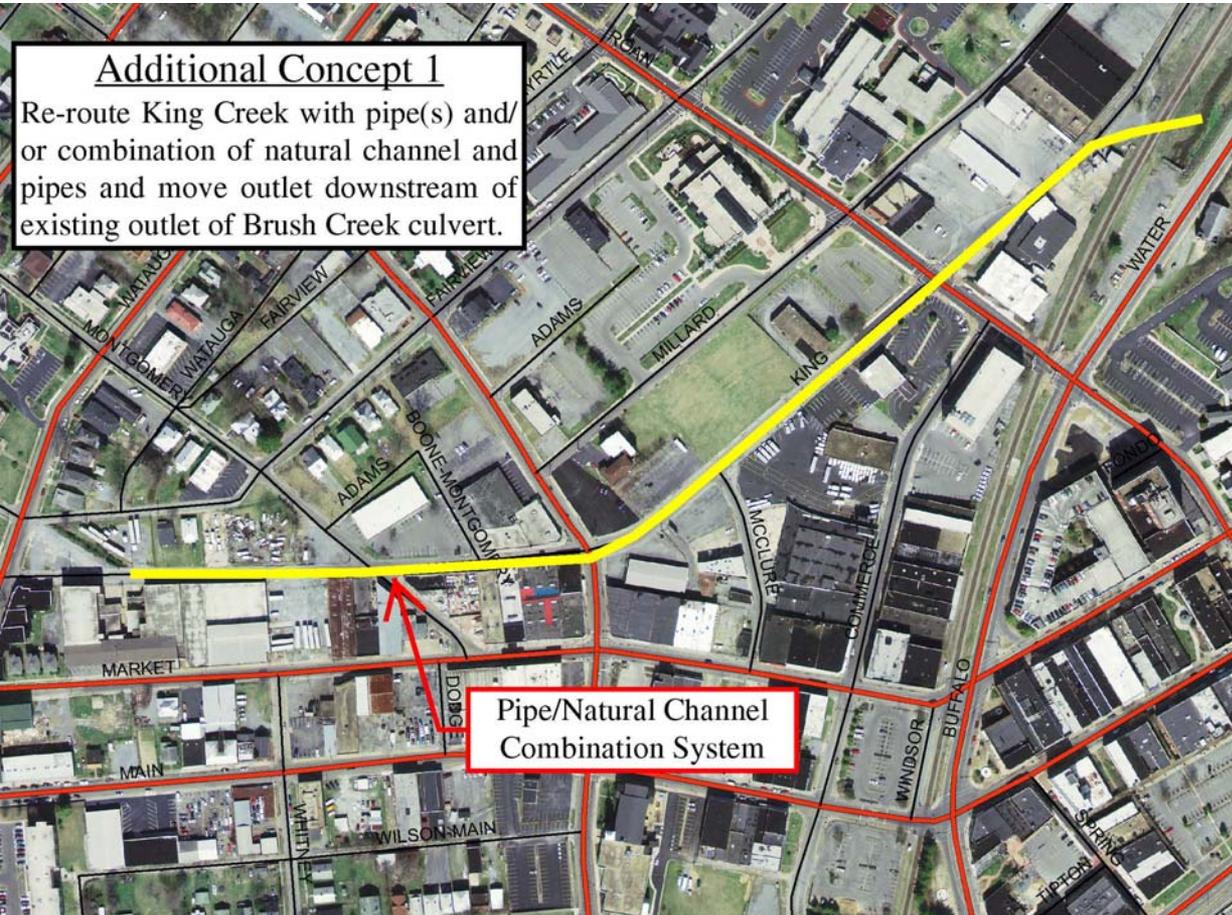
Additional Concepts

- Original concept was found to be ineffective
- Sent back to the drawing board to find a viable alternative
- The need for a bypass route was clear

Concept 1: King Creek Bypass Results

Additional Concept 1

Re-route King Creek with pipe(s) and/or combination of natural channel and pipes and move outlet downstream of existing outlet of Brush Creek culvert.

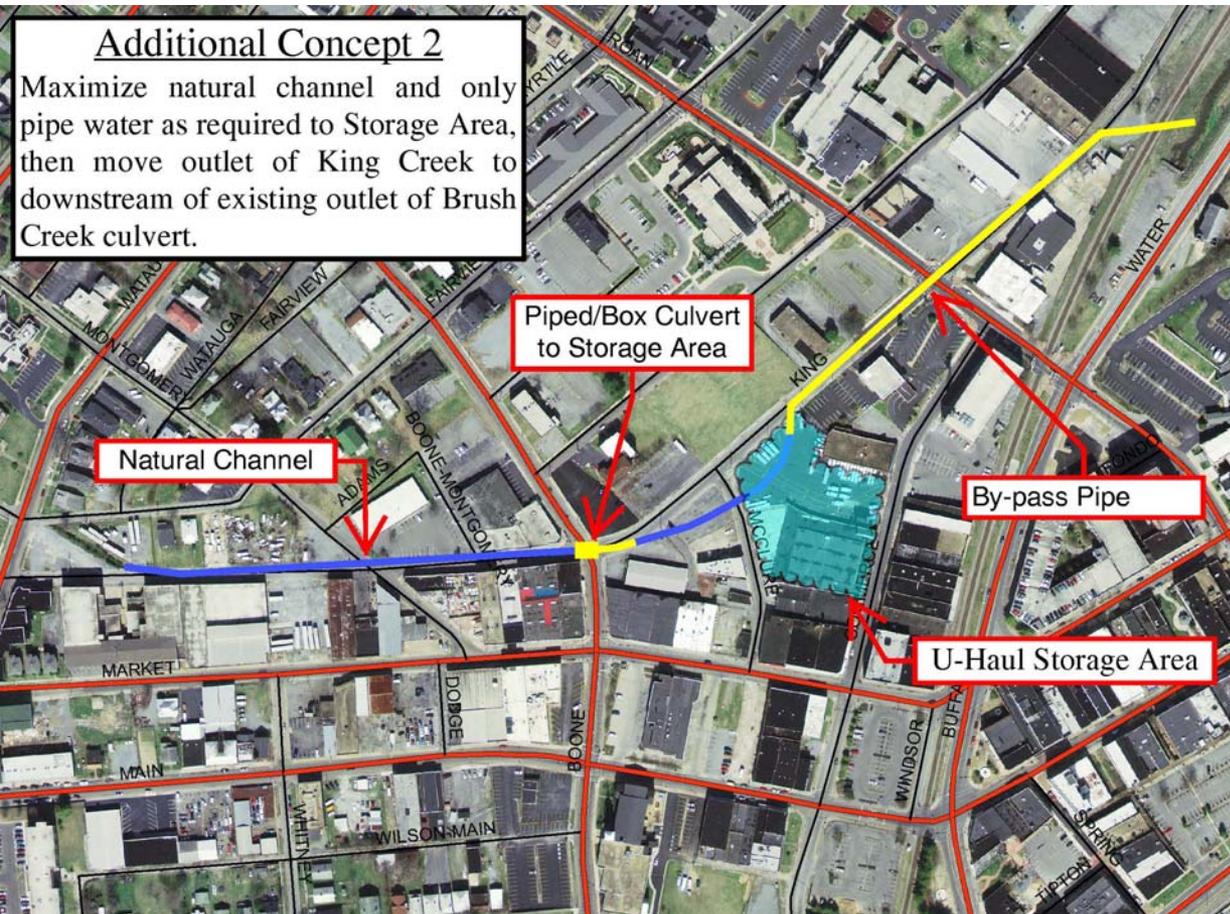


- Keeps downtown from flooding during 2-year storm by keeping flow from going overland at King Street and flowing into downtown

Concept 2: King Creek Bypass with Pond and Natural Channel Results

Additional Concept 2

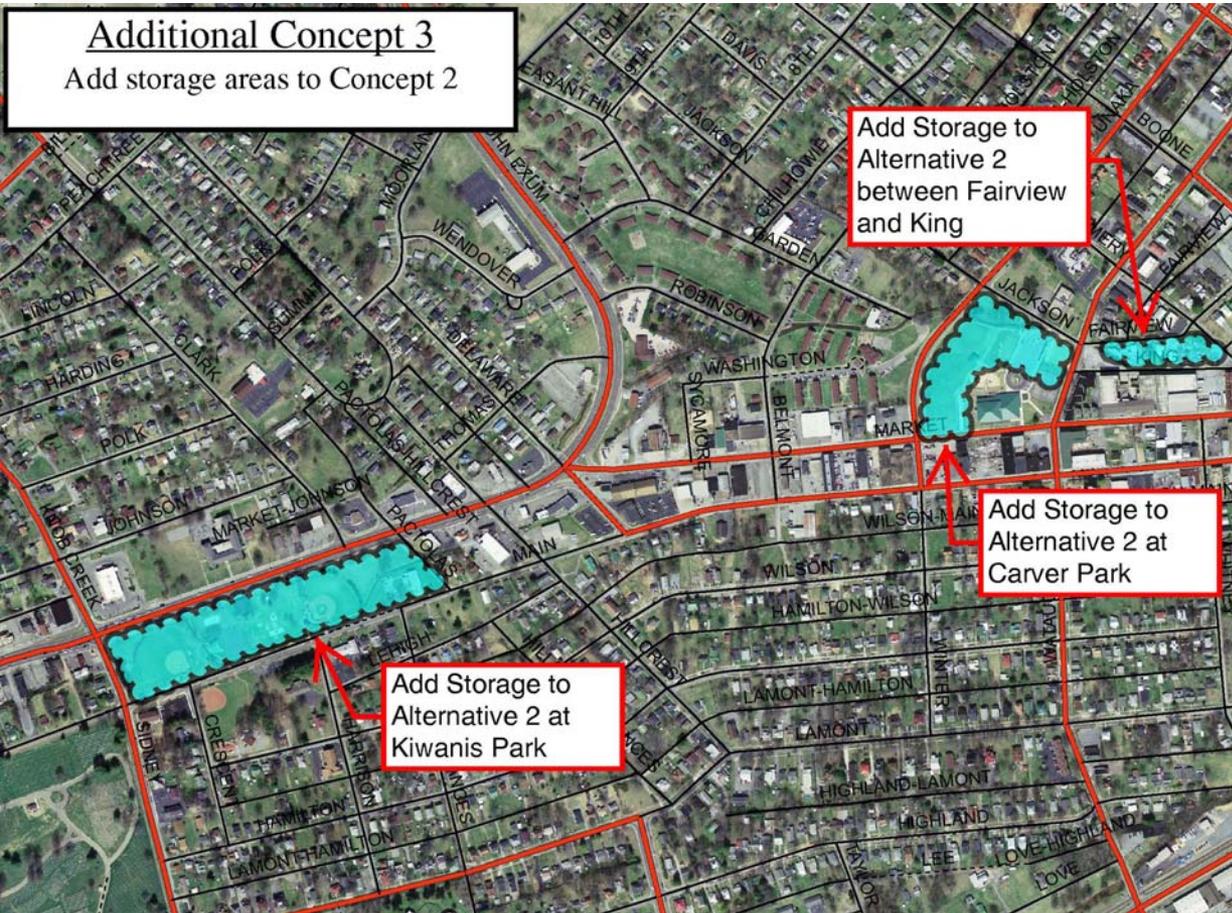
Maximize natural channel and only pipe water as required to Storage Area, then move outlet of King Creek to downstream of existing outlet of Brush Creek culvert.



- Additional storage and better capture of overland flow improve flood protection to the 5-year storm level

Concept 3: Add Storage to Concept 2 Results

Additional Concept 3
Add storage areas to Concept 2

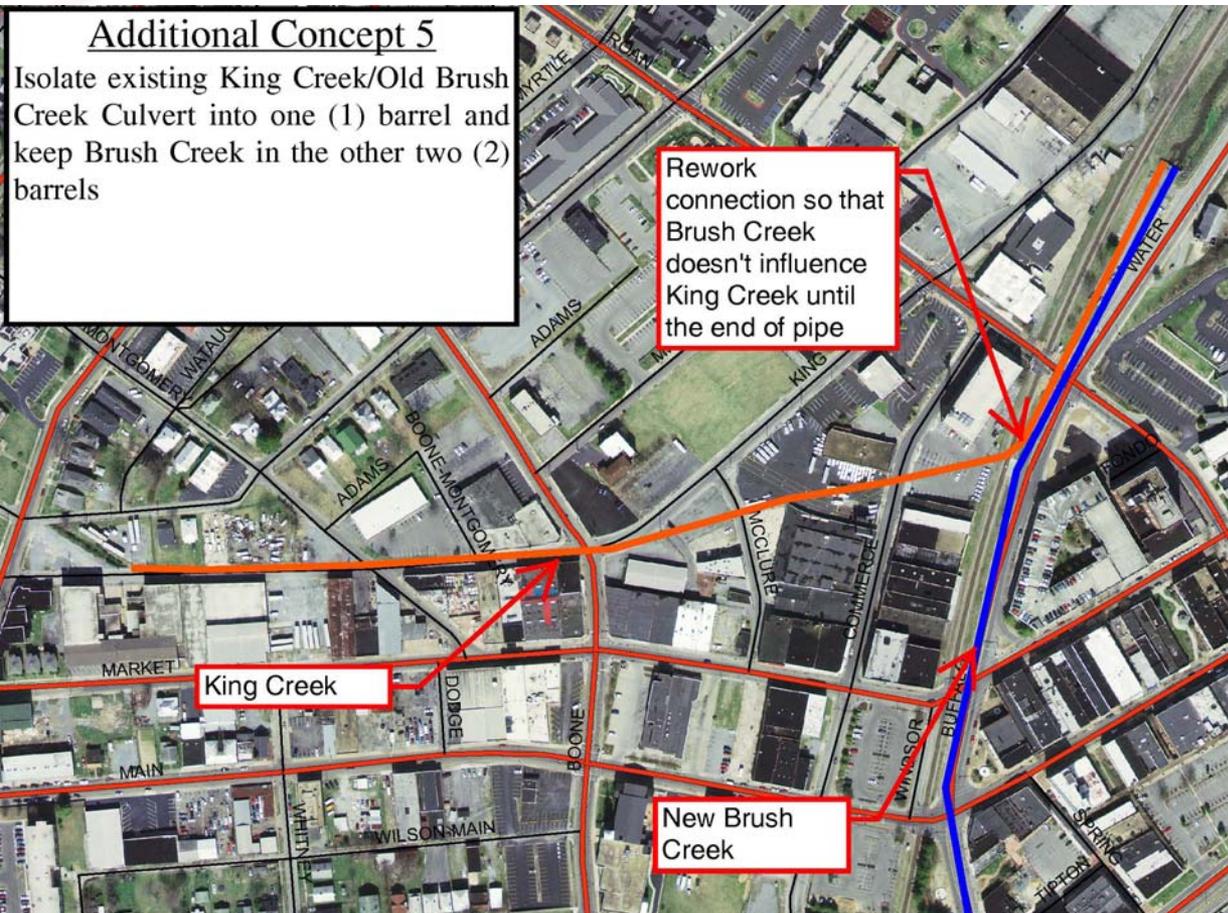


- The flood storage volume at Kiwanis Park, Carver Park, and King Street do not significantly improve upon the flood protection of Concept 2

Concept 5: Separate King and Brush Creeks at Main Junction Results

Additional Concept 5

Isolate existing King Creek/Old Brush Creek Culvert into one (1) barrel and keep Brush Creek in the other two (2) barrels



- No appreciable improvement in flood levels due to backwater

Further Refinement

- The King Creek bypass and U-Haul pond provide flood protection only up to ~5-year storm, at significant expense
- Further deterioration of the Old Brush Creek Culvert will necessitate significant expenditure for repair or removal in the near future
 - Take the opportunity to restore Brush Creek to its original streambed and provide for additional flood protection in downtown
- Redevelopment in the downtown area is necessary to justify the project expense
- Center a downtown revitalization effort around the newly restored stream and pond

- Solve drainage problem
- Financial responsibility
- Downtown blight

Recommended Approach

■ Phase I

- Install King Street bypass and new pond to serve as the focal point of redevelopment in the King St. area
- Attract tenants adjacent to the pond to begin the redevelopment
- Greenway connection to Carver Park
- Provide flood protection for ~5-year storm

■ Phase II

- Restore Brush Creek through downtown and use the stream corridor as a new greenway
- Work hand-in-hand with the private sector to ensure that City efforts coincide with restoration of properties adjacent to the corridor
- Provide flood protection for a ~25-year storm

■ Phase III

- Install three regional detention basins upstream of downtown that will serve double-duty in the park system
- Provide flood protection for a ~100-year storm

As-Is 5-Year Storm Structure Flooding

Carver Park

Public Library

Roan St

Boone St

King St

Market St

Main St

First Presbyterian

Wilson Ave

Commerce St

Kelly's Market

State of Franklin

| Legend | |
|---------|----------------------|
| 0005 | |
| 0005DEP | |
| Blue | -7.350000 - 0.000000 |
| Red | 0.000001 - 5.360000 |



1 inch equals 100 feet

Phase I 5-Year Storm Structure Flooding

Carver Park

Public Library

Roan St

Boone St

King St

Market St

Main St

First Presbyterian

Wilson Ave

Commerce St

Kelly's Market

State of Franklin

| Legend | |
|---------|----------------------|
| I005 | |
| I005DEP | |
| Blue | -8.254000 - 0.000000 |
| Red | 0.000001 - 5.360000 |

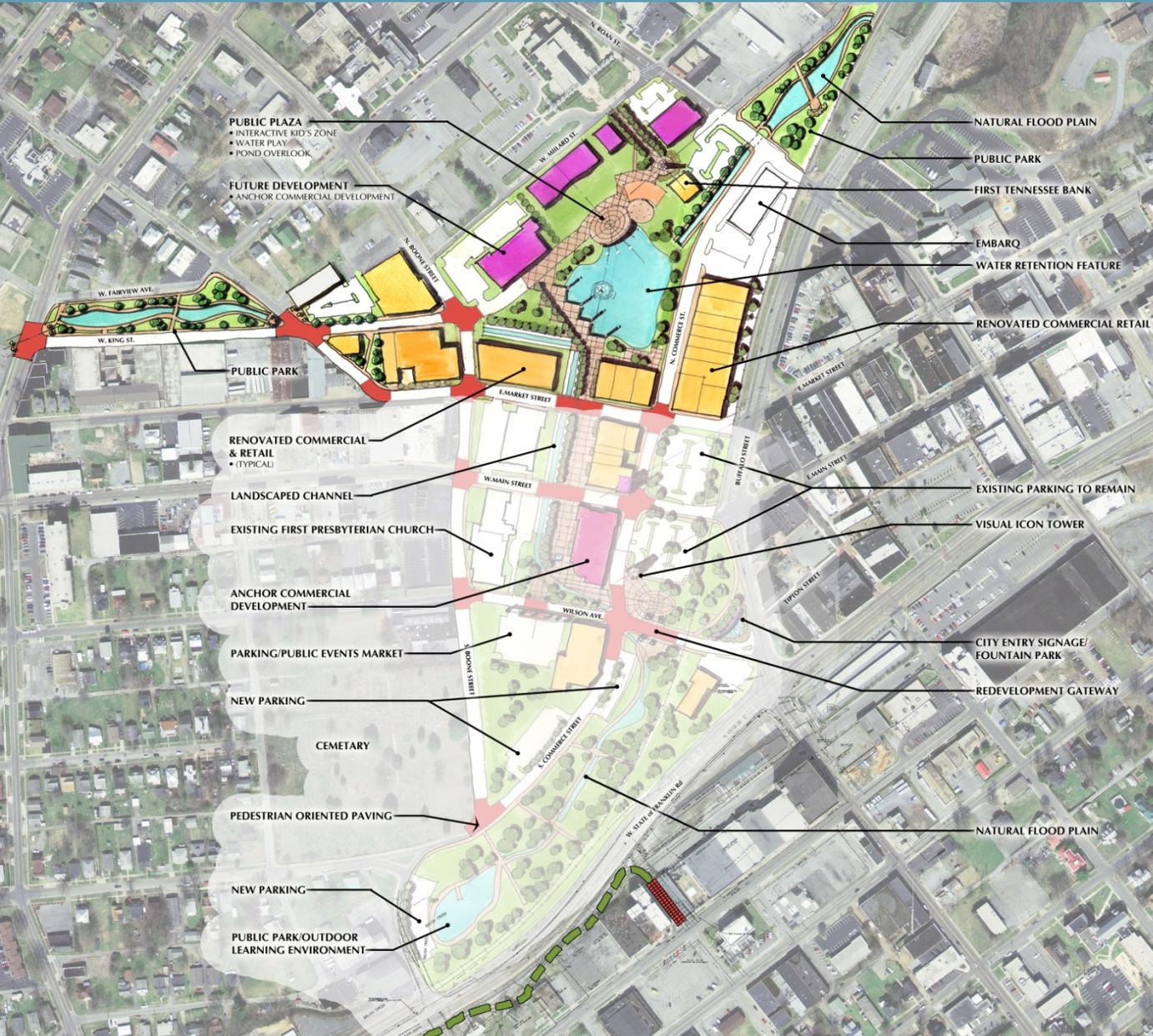


1 inch equals 100 feet

Phase 1 – Proposed Redevelopment Plan



Johnson
Architecture



PUBLIC PLAZA
• INTERACTIVE KID'S ZONE
• WATER PLAY
• POND OVERLOOK

FUTURE DEVELOPMENT
• ANCHOR COMMERCIAL DEVELOPMENT

PUBLIC PARK

RENOVATED COMMERCIAL & RETAIL
• (TYPICAL)

LANDSCAPED CHANNEL

EXISTING FIRST PRESBYTERIAN CHURCH

ANCHOR COMMERCIAL DEVELOPMENT

PARKING/PUBLIC EVENTS MARKET

NEW PARKING

CEMETARY

PEDESTRIAN ORIENTED PAVING

NEW PARKING

PUBLIC PARK/OUTDOOR LEARNING ENVIRONMENT

NATURAL FLOOD PLAIN

PUBLIC PARK

FIRST TENNESSEE BANK

EMBARQ

WATER RETENTION FEATURE

RENOVATED COMMERCIAL RETAIL

EXISTING PARKING TO REMAIN

VISUAL ICON TOWER

**CITY ENTRY SIGNAGE/
FOUNTAIN PARK**

REDEVELOPMENT GATEWAY

NATURAL FLOOD PLAIN

Phase 1 – Proposed Rendering



Johnson
Architecture

TREES HIDE A LOT - I WILL FADE THEM OUT AS THEY GO BACK TO NEW BUILDINGS FOR CLARITY

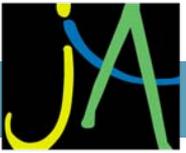
LIBRARY LAKE WILL ALSO BE MORE VISIBLE ONCE REFINED/COLORED NEW BLDGS - WILL BE EASIER TO SEE ONCE ARTICULATED/COLORED



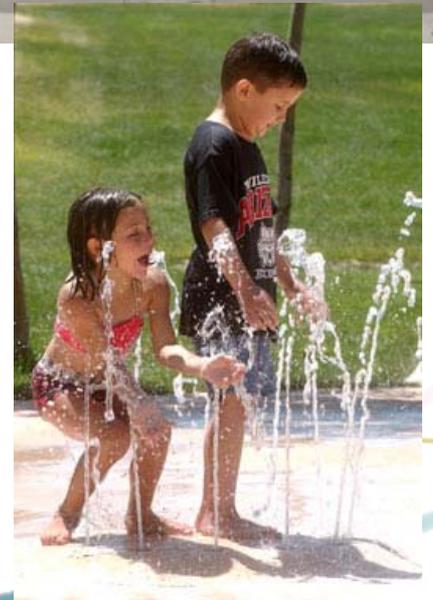
THIS VIEW SEEMS TO BE BEST TO CAPTURE SCALE OF EXIST. BLDGS TO REMAIN WHILE HAVING FOCAL POINT IN CENTER OF NEW BLDGS/LAKE/PLAZA/PEOPLE, ETC

Title text

Kid's Water Play Areas



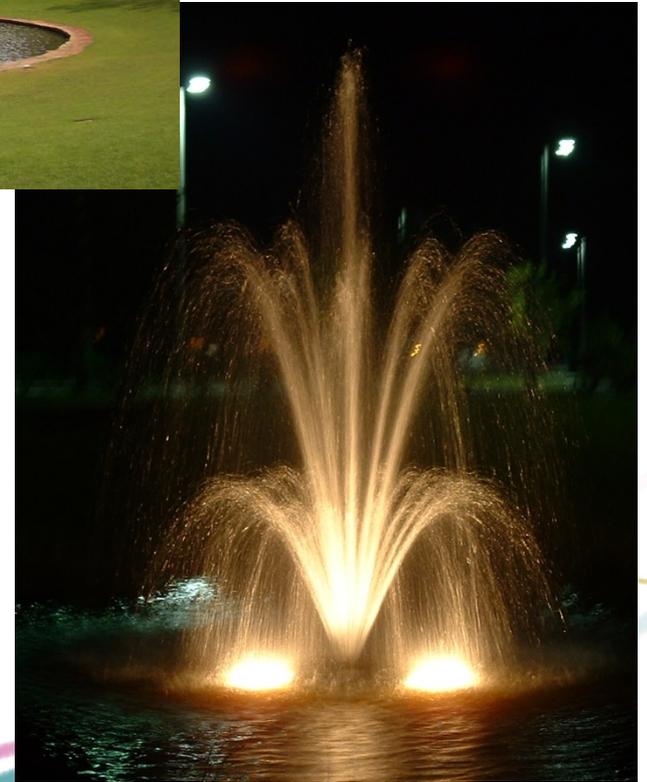
Johnson
Architecture



Water Retention Feature Examples



Johnson
Architecture



Title text

Phase I 25-Year Storm Structure Flooding

Carver Park

Public Library

Roan St

Boone St

King St

Market St

Main St

First Presbyterian

Wilson Ave

Commerce St

Kelly's Market

State of Franklin

| Legend | |
|---------|----------------------|
| I025 | |
| I025DEP | |
| Blue | -7.350000 - 0.000000 |
| Red | 0.000001 - 5.360000 |



1 inch equals 100 feet

Phase II 25-Year Storm Structure Flooding

Carver Park

Public Library

Roan St

Boone St

King St

Market St

Main St

First Presbyterian

Wilson Ave

Commerce St

Kelly's Market

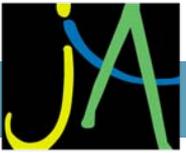
State of Franklin

| Legend | |
|----------|----------------------|
| II025 | -7.350000 - 0.000000 |
| II025DEP | 0.000001 - 5.360000 |



1 inch equals 100 feet

Phase 2 – Proposed Rendering

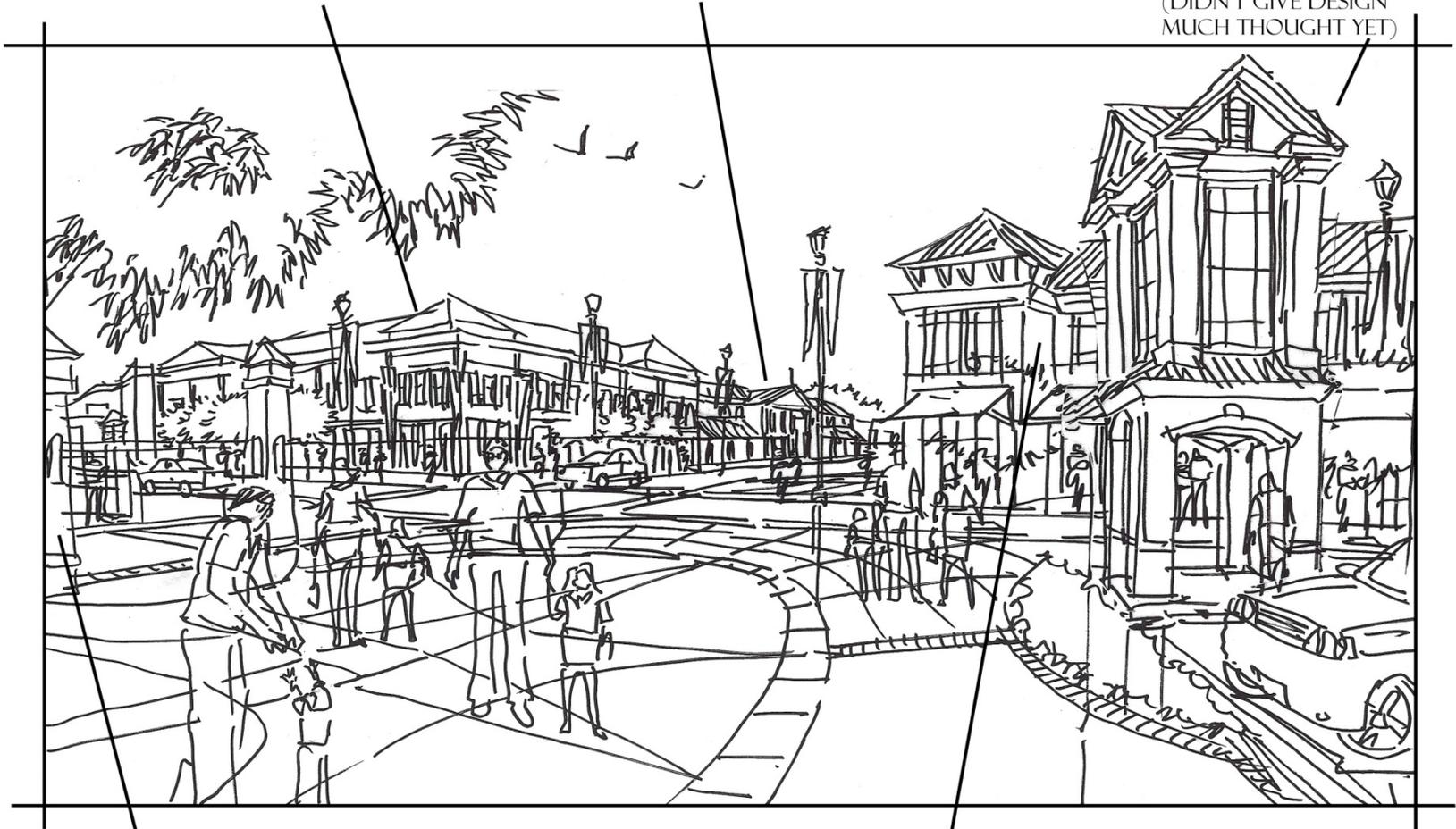


Johnson
Architecture

MAYBE ADD NEW ROOF TO EXIST. BLDG?

I WILL ADD MORE DETAIL TO FACADE OF MARKET

ICON TOWER??
(DIDN'T GIVE DESIGN
MUCH THOUGHT YET)



GATEWAY PIERS

NEW BUILDING/OFFICE OVER RETAIL?

Phase II 100-Year Storm Structure Flooding

Carver Park

Public Library

Roan St

Boone St

King St

Market St

Main St

First Presbyterian

Wilson Ave

Commerce St

Kelly's Market

State of Franklin

Legend
I1100
I1100DEP
-7.350000 - 0.000000
0.000001 - 5.360000



1 inch equals 100 feet

Phase III 100-Year Storm Structure Flooding

Carver Park

Public Library

Roan St

Boone St

King St

Market St

Main St

First Presbyterian

Wilson Ave

Commerce St

Kelly's Market

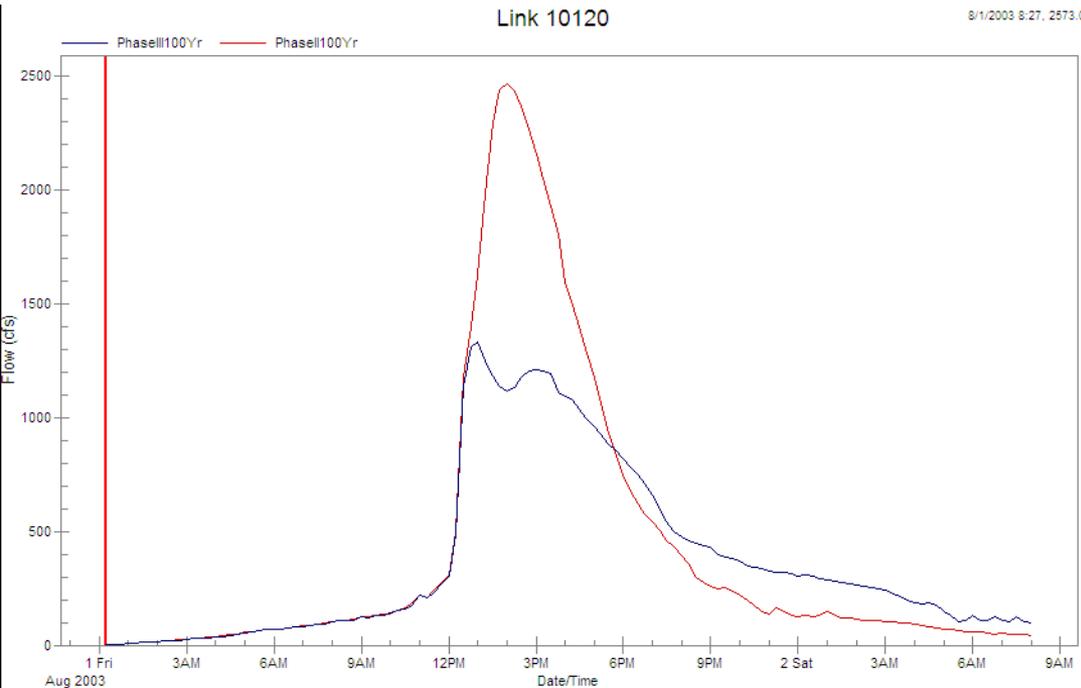
State of Franklin

| Legend | |
|-----------|----------------------|
| III100 | -7.350000 - 0.000000 |
| III100DEP | 0.000001 - 5.360000 |
| | |
| | |



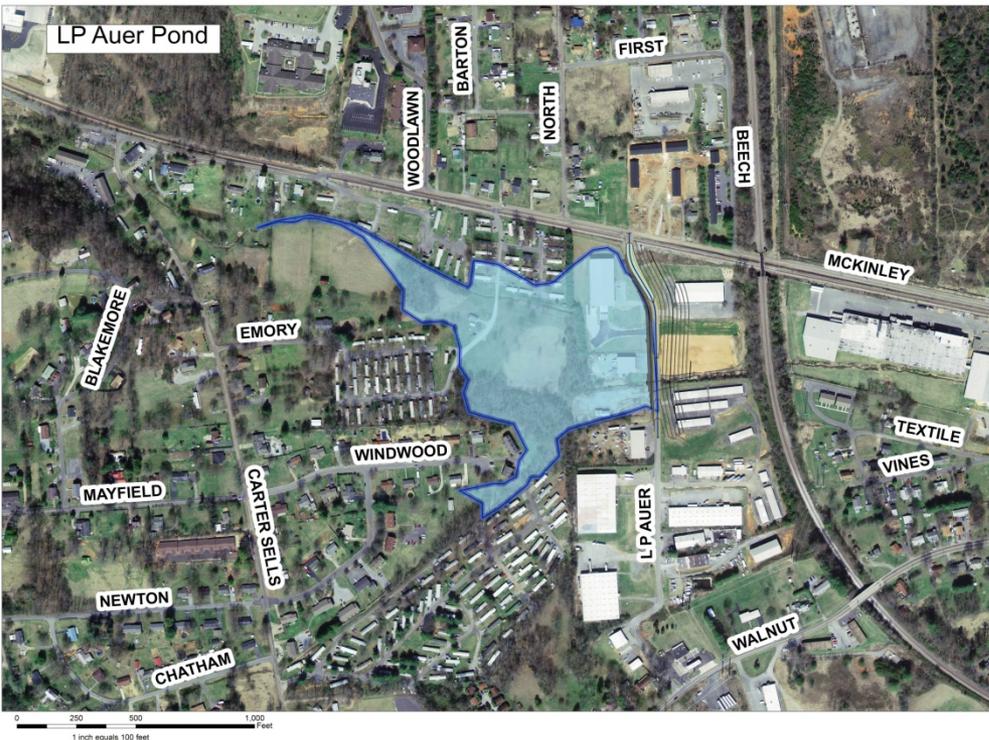
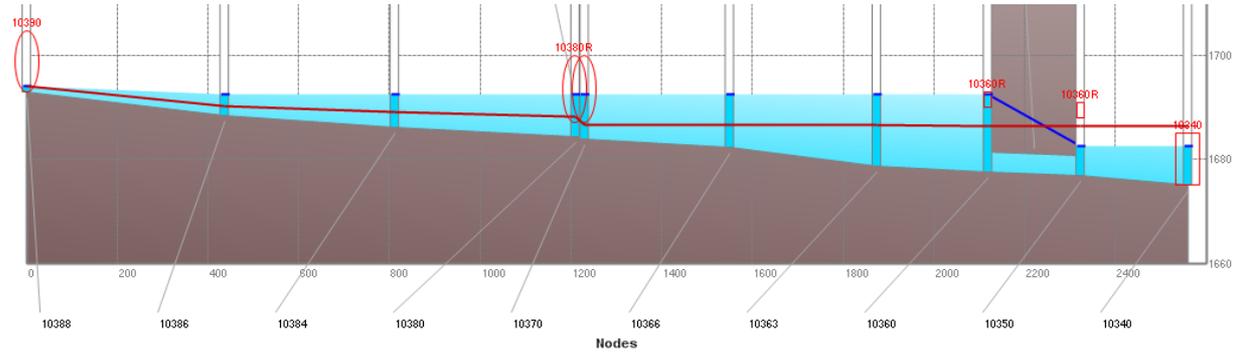
1 inch equals 100 feet

Phase III Ponds

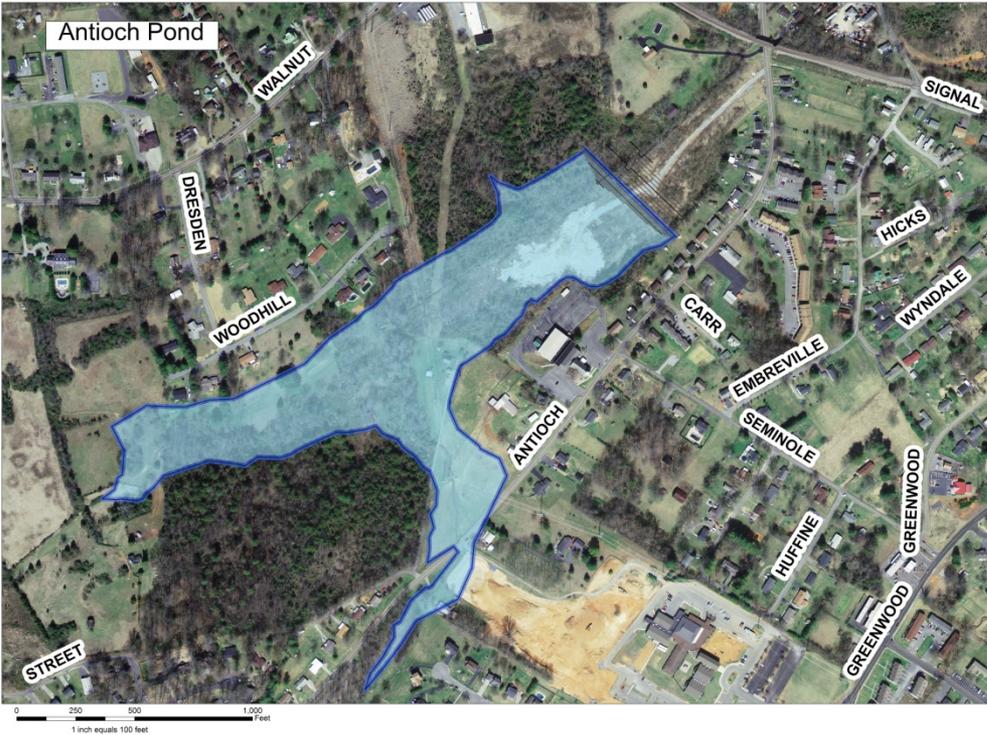
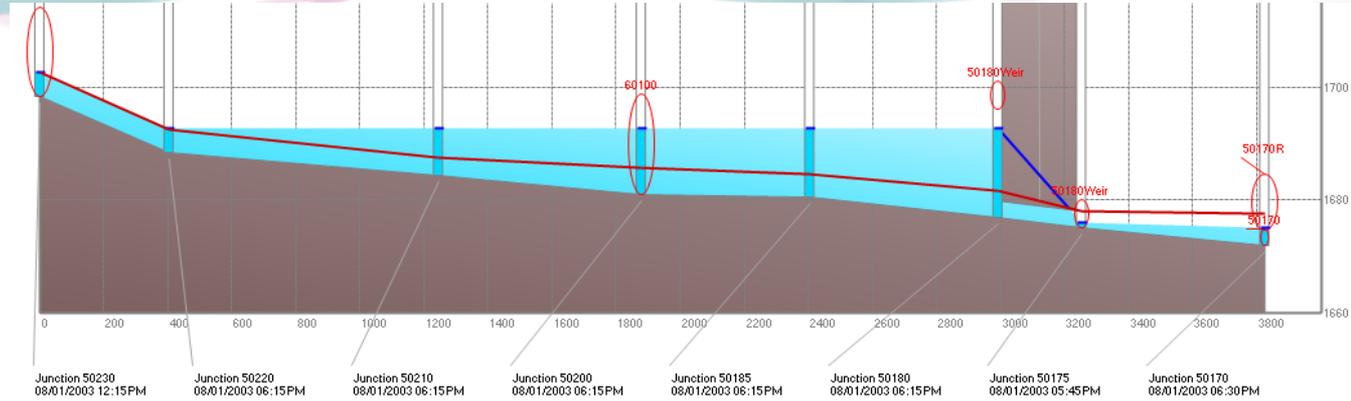


- Normal flow levels pass through
- Ponds are dry for all but the largest storms
- Reduce peak flows downstream
- Incorporate into the City park system

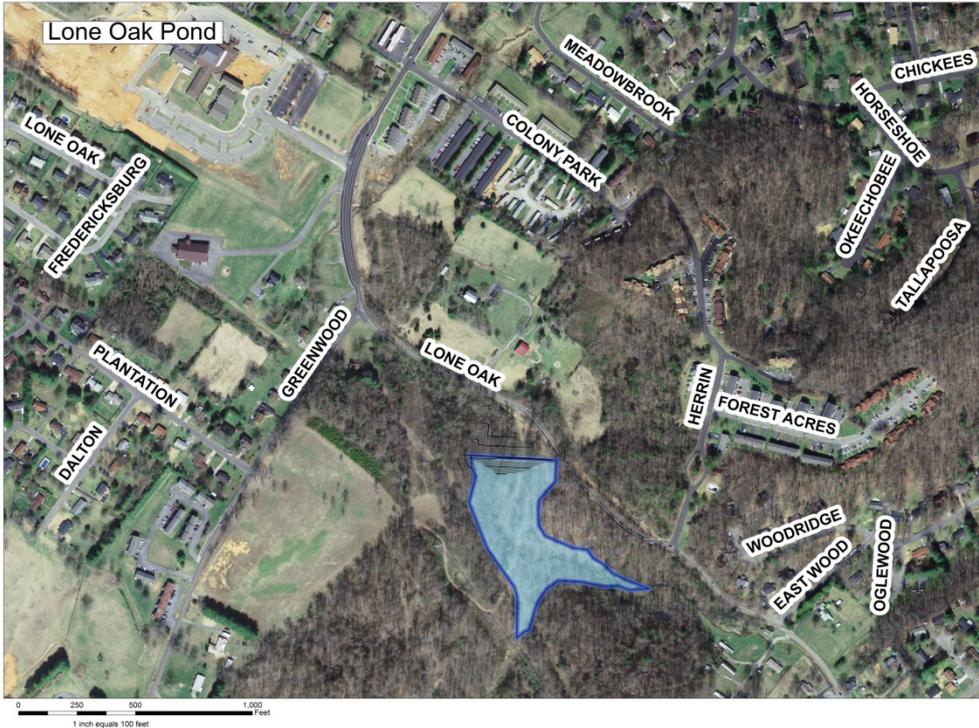
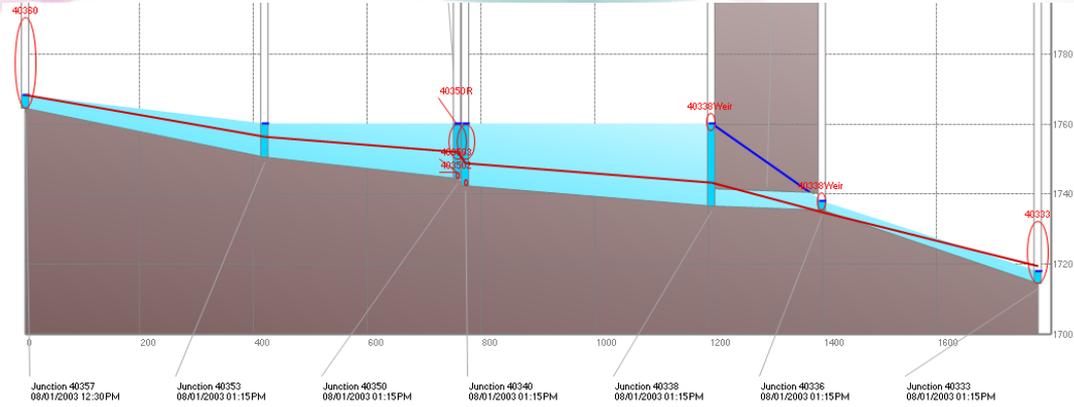
LP Auer Pond



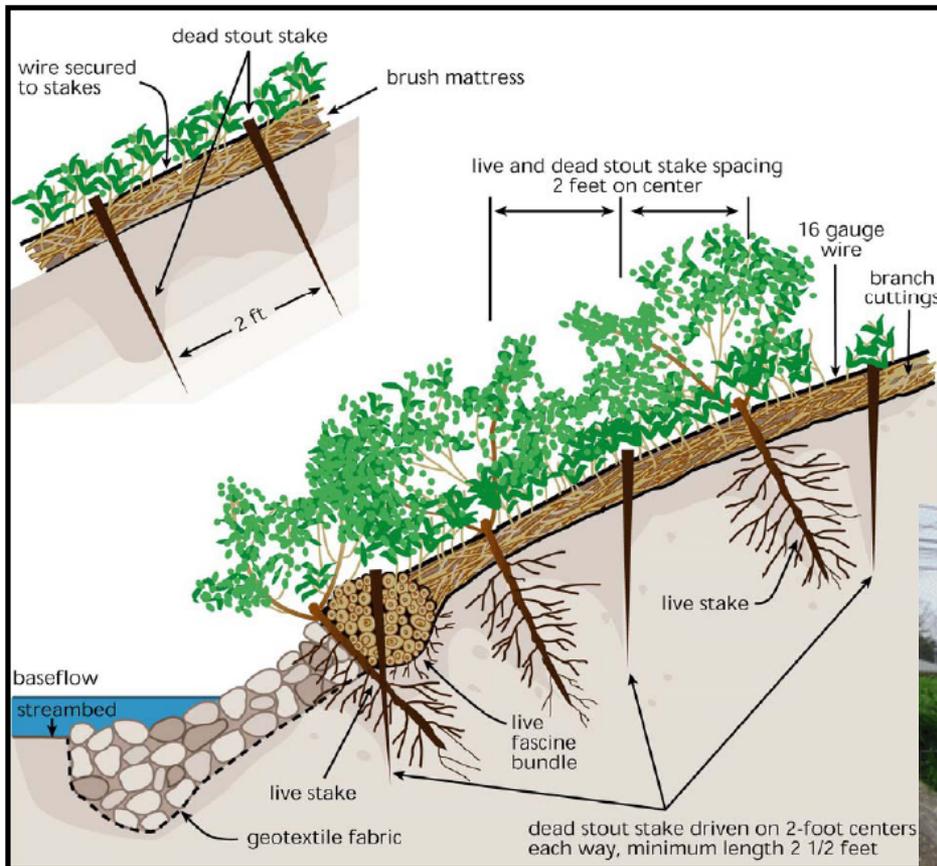
Antioch Pond



Lone Oak Pond



Stream Restoration



Examples of Restored Streams



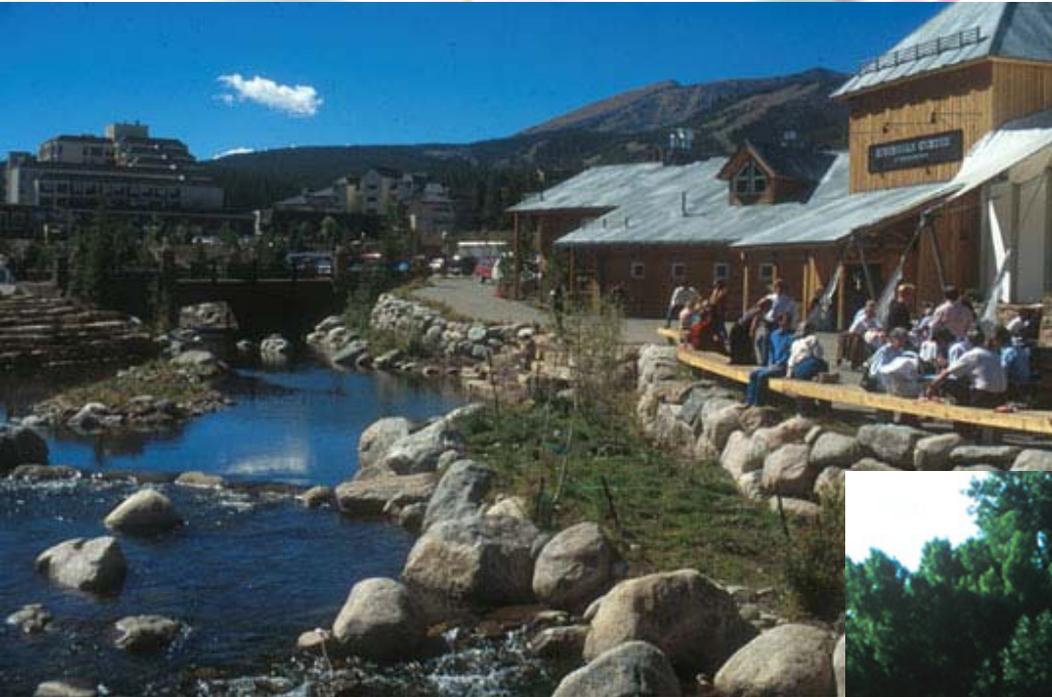
Examples of Restored Streams



Streams as Community Focal Points



Streams as Community Focal Points



Streams as part of the local Park System



Streams as Art



Maryville Greenway



Discovery Green - Houston



Cost and Benefits

- Phase I:
 - \$10M cost
 - XXX flood reduction benefit
 - Need XXX redevelopment tax base improvement
- Phase II:
 - \$10M cost
 - XXX flood reduction benefit
 - Need XXX redevelopment tax base improvement
- Phase III:
 - \$5M cost
 - XXX flood reduction benefit
 - Need XXX redevelopment tax base improvement

As-Is Land Use

Carver Park

Public Library

Roan St

Boone St

King St

Market St

Main St

First Presbyterian

Wilson Ave

Commerce St

Kelly's Market

State of Franklin

Legend

Phase 0
[light blue box] <all other values>

STATUSZERO

- [red box] COMMERCIAL
- [yellow box] EMPTY
- [orange box] NONPROFIT
- [green box] PARK
- [grey box] PARKING
- [pink box] RESIDENTIAL



1 inch equals 100 feet

Phase I Land Use

Carver Park

Public Library

Boone St

Roan St

King St

Market St

Main St

First Presbyterian

Wilson Ave

Commerce St

Kelly's Market

State of Franklin

Legend

Phase I
<all other values>

STATUSONE

- COMMERCIAL
- EMPTY
- NONPROFIT
- PARK
- PARKING
- RECOMMERCIAL
- RESIDENTIAL



1 inch equals 100 feet

Phase II Land Use

Carver Park

Public Library

Boone St

Roan St

King St

Market St

Main St

Commerce St

First Presbyterian

Wilson Ave

Kelly's Market

State of Franklin

Legend

Phase II

- <all other values>

STATUSTWO

- COMMERCIAL
- EMPTY
- NONPROFIT
- PARK
- PARKING
- RECOMMERCIAL
- RESIDENTIAL



1 inch equals 100 feet

Phase III Land Use

Carver Park

Public Library

Roan St

Boone St

King St

Market St

Main St

First Presbyterian

Wilson Ave

Commerce St

Kelly's Market

State of Franklin

Legend

Phase III

<all other values>

STATUS

- COMMERCIAL
- EMPTY
- NONPROFIT
- PARK
- PARKING
- RECOMMERCIAL
- RESIDENTIAL



1 inch equals 100 feet

Cost of Doing Nothing

- Flooded area continues to deteriorate due to lack of investment
- Culverts collapse, causing severe flooding
- Buildings over culverts become unstable and are condemned
- Continued water quality issues
- Tax base loss

Possible Grant Sources

■ FEMA

- Hazard Mitigation Grant Program (HMGP) after a declared disaster
- Flood Mitigation Assistance (FMA) and Pre-Disaster Mitigation (PDM) Programs to prevent future flooding
- Severe Repetitive Loss (SRL) Program to remove structures that flood often
- Property acquisition
- Flood protection measures
- Need to write a Hazard Mitigation Plan before FEMA will consider
- 75% Federal cost share

■ TDEC

- 319 water quality grants
- ~\$200M annually
- 60% Federal cost share

■ Clean Water State Revolving Fund (CWSRF) Loan Program

- Tennessee program loaned ~\$75M last year
- Current rate for Johnson City would be ~2.7% for 20 years

■ Corps

- Flood control measures
- Corps backlog is very large
- Study time and cost is significant
- Political

Public Comment Period

- Comments will be taken tonight
 - Forms are found on a table at the back
 - Completed forms can be left in the box or sent to:
 - Andy Best
 - Public Works Department
 - City of Johnson City, TN
 - P.O. Box 2150
 - 209 Water Street
 - Johnson City, TN 37605-2150

- abest@johnsoncitytn.org

- Comments must be received by next Wednesday to be incorporated into the Commission briefing packet

Overall Concept