PLANNING WORKSHOP
Policy & Technical Committees
August 2012
Objectives
Recognizing the extent and diversity of opinions on the potential service design for the Urban Circulator, a workshop / mini-charrette provides the opportunity to engage the Technical and Policy Committees and interested stakeholders in a focused environment to discuss and reach general concurrence on key service aspects. Concurrence means there is agreement-in-principle, even though there may be details to be finalized. Objectives for the workshop are to:

- Provide information on the initial screening process (for route and mode);
- Allow participants to confer and discuss their ideas for service options, given design and financial constraints; and
- Concur on the general route that should be advanced.

Further analysis after the workshop will be needed to fine-tune the service design, but the intent of the workshop is to reach general concurrence. The workshop is intended to discuss routing options in detail, and also introduce discussion on the merits of various transit technologies (i.e. bus vs. streetcar). Many of the routing considerations to be discussed will apply to all modes; however, distinctions will be made for design constraints that are applicable only to a particular transit technology.

Logistics
Attendees: Technical and Policy Committees and other invited stakeholders (downtown business owners, developers, residents, etc.)
Venue: Wake Forest Biotech Place, 575 N. Patterson Avenue, Winston-Salem, NC 27101
Date: Wednesday, August 29, 2012
Time: 8:30 am to 3:00 pm, including working breakfast and lunch (other invited stakeholders participate during 12:00 pm to 3:00 pm session)

Agenda
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 – 9:30 am</td>
<td>Coffee / Doughnuts (consultant provides overview of workshop / brief presentation about what makes a good urban circulator street)</td>
</tr>
<tr>
<td>9:30 – 10:30 am</td>
<td>“Walkshop” focused on 4th St / 5th St; other areas as determined by interest (purpose is to discuss some of the initial screening findings in the context of the existing streetscape and landscape)</td>
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<tr>
<td>10:30 – 11:45 am</td>
<td>Initial Screening Presentation (consultant provides results of initial screening technical analysis)</td>
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<tr>
<td>11:45 – 12:00 pm</td>
<td>Break</td>
</tr>
<tr>
<td>12:00 – 1:00 pm</td>
<td>Boxed Lunch / Keys to a Successful Urban Circulator</td>
</tr>
<tr>
<td>1:00 – 1:15 pm</td>
<td>Design Constraints / Overview of Planning Exercise (review key findings of initial screening process and introduce participatory exercise)</td>
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<tr>
<td>Time</td>
<td>Activity</td>
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<td>--------------------------------------------------------------------------</td>
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</tbody>
</table>
| 1:15 – 2:00 pm | Routing Exercise  
(participants work in small groups to “design their own route” given design and financial constraints and initial screening summary results; strings of different lengths provided to illustrate general project lengths for general costs) |
| 2:00 – 2:45 pm | Table Report-Outs  
(each group reports on their discussion and preferred routes; general discussion follows to identify commonalities) |
| 2:45 – 3:00 pm | Wrap-up  
(consultant explains what we heard; review results of routing exercise; highlights remaining questions; reach general consensus on preferred route; and discuss next steps) |
The Legacy Comprehensive Plan is a guide for shaping the future of Winston-Salem and Forsyth County. The Legacy Plan was adopted in 2001 and is currently being updated. A diverse group of citizens participated in the planning process to establish a vision for Winston-Salem and Forsyth County to grow smarter and better by managing future development. This vision includes a more balanced, sustainable transportation system, concern for the environment balanced with economic development, and strengthening of downtown as a community focal point.

This local vision is supported by planning efforts at the regional, state, and national levels. These cooperative efforts to plan for housing, transportation and infrastructure investments will improve living choices and accessibility for people, while protecting the environment and helping ensure a sustainable future.

Transit is Part of the Vision

A multi-modal transportation system is a key part of the City’s vision for economic growth and environmental sustainability. The Winston-Salem Urban Circulator ties together a variety of ongoing public and private initiatives targeted to advancing the economic health and vitality of our community.

Building upon the 2006 Streetcar Feasibility Study, this Alternatives Analysis will further investigate opportunities to implement enhanced transit service (streetcar or bus) in downtown and surrounding neighborhoods. This study will consider a 3-mile corridor that extends east to west through downtown Winston-Salem and surrounding neighborhoods, from Wake Forest Baptist Medical Center through downtown to Winston-Salem State University. Previous studies identified this corridor as having the most activity centers and underutilized areas where development can be spurred. A north-south route connecting Wake Forest University, downtown, and the UNC School of the Arts has been identified as a longer-term goal. The study will result in a decision on the preferred transit route and technology for the initial corridor.

The Vision for Winston-Salem

In order to accommodate 120,000 new people and 66,000 jobs over the next twenty years, we need a new paradigm, the recognition that one of the major purposes of our transportation system is to move people as well as vehicles. We need to have an integrated, multi-modal, sustainably-designed transportation system that offers choices among modes.

- Legacy 2030 Update
WHY IS AN URBAN CIRCULATOR NEEDED?

The Urban Circulator supports the city’s vision for growth by enhancing economic competitiveness and increasing mobility options in the urban core. As such, these themes are the framework for project goals.

**PROJECT GOALS**

<table>
<thead>
<tr>
<th>Enhance Economic Competitiveness</th>
<th>Increase Mobility Options</th>
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</thead>
<tbody>
<tr>
<td>• Focus development and coordinate investments to maximize economic return and minimize sprawl</td>
<td>• Connect key destinations in urban core</td>
</tr>
<tr>
<td>• Encourage a mixture of uses including equitable and affordable housing</td>
<td>• Connect to local and regional transit to provide the “last mile” of service</td>
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<tr>
<td>• Protect and enhance the City’s distinct character</td>
<td>• Support existing communities and infrastructure</td>
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<td></td>
<td>• Extend pedestrian connectivity</td>
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</tbody>
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**ENHANCE ECONOMIC COMPETITIVENESS**

Winston-Salem is seeking a competitive edge for economic development, aiming to increase downtown densities, encourage new investment, and attract jobs. As part of a comprehensive development strategy, transit helps to focus growth in a sustainable, fiscally-responsible manner.

The city is ripe for this type of focused growth, and roughly 200 acres in downtown are being reclaimed to develop a new bio-medical campus known as Piedmont Triad Research Park. A wide range of employment, housing, and other uses are planned for the park and surrounding downtown area. Premium transit service would make the area more attractive to developers, helping to accelerate and focus growth.

**INCREASE MOBILITY OPTIONS**

An Urban Circulator could be a viable transit service circulating people to places within downtown and surrounding neighborhoods, supporting city efforts to develop downtown as a more vibrant and successful urban center. This transit service could connect:

- More than 11,000 Baptist Medical Center employees;
- An additional 20,000 employees and over 2,000 residents throughout greater downtown;
- Nearly 6,500 students attending Winston-Salem State University;
- Planned 6.1 million gross square feet of redevelopment space at Piedmont Triad Research Park;
- Downtown – regional business and arts center, home to special events venues;
- The Transportation Center, serving nearly 11,000 passengers per day; and
- Union Station, which is the planned destination for future commuter and intercity rail.

An Urban Circulator is not intended to be a regional transportation solution, but will instead function as a local mobility tool linking destinations within the central core of Winston-Salem. However, it also enhances regional connectivity as the “last mile of service” linking neighboring communities and regional transit services.
CONSIDERING BUS AND RAIL OPTIONS

Streetcars were specifically identified in the City’s *Downtown Plan* as a desired part of Winston-Salem’s transportation network. Both bus and rail technologies provide mobility benefits, but streetcars provide economic development and place-making benefits that have not been demonstrated with traditional buses. Existing streetcar lines in places such as Portland, OR; Tampa, FL; Little Rock, AR; Seattle, WA; and Kenosha, WI have proven that the certainty and “readability” of a fixed rail transit line makes them attractive to both customers and developers, supporting a vibrant urban environment. Urban Circulators complement other transit modes and can be an important part of an overall development and mobility strategy that integrates a variety of transit services.

Winston-Salem is now comparing the merits of streetcars and buses to identify the best way to shape the community by **enhancing economic competitiveness** and **increasing mobility options** as part of the overall effort to **grow smarter and better by managing future development**.

CONSIDERING ROUTE OPTIONS

Various transit route options have been identified based on the project goals, identified transit needs within the urban core, and public and stakeholder suggestions. Route options reflect current directional designations on one-way streets, although these designations may be re-evaluated in the future.
CASE STUDY : PORTLAND STREETCAR
• Rail-based streetcar travels in mixed traffic over a 4-mile route; original 2.4-mile route has been extended three times
• Fares same as local transit agency; “free rail zone” covers a portion of the route
• Service every 13 minutes between 5:30AM and 11:30PM most days (less frequent service during early and late hours)
• Has helped to stimulate $3.5 billion in new development (5 million square feet including 10,000 housing units)
• Density has increased over 40%
• Estimated to prevent 70 million miles of vehicle travel annually
• Spurred new streetcar manufacturing industry based locally

CASE STUDY : ORLANDO LYMMO
• Bus-based circulator travels in a dedicated lane and controls its own stoplights on 3-mile loop through downtown
• Connects to transit center and major downtown destinations
• Free service every 5-10 minutes
• Operates 6AM–10PM; extended hours until midnight on weekends
• System developed to allow people to “park once” and use transit to reach destinations
• Ridership increased dramatically after implementing enhancements such as a dedicated lane
• Cited as part of a larger redevelopment strategy for downtown

STUDY TIMELINE

- Initial Screening
- Stakeholder Input
- Conceptual Engineering
- Ridership Estimates
- Public Input

Spring 2012
Select a Route
ROUTE AND VEHICLE OPTIONS

Summer 2012
Select a Technology
ROUTE SELECTION

Fall 2012
Refine Route
TECHNOLOGY SELECTION / ROUTE REFINEMENT

Winter 2012
Review and Adoption
LOCALLY PREFERRED ALTERNATIVE

FOR MORE INFORMATION VISIT WWW.WINSTONSALEMCIRCULATOR.COM

GET INVOLVED!
Your feedback is needed to help us advance transit in central Winston-Salem. Please visit our website for up-to-date information on study progress, upcoming meetings, and other important information.
ROUTE DESIGN CONSIDERATIONS

**Put the circulator where the pedestrians will be**
Circulators should support walkability, not vice versa.

**Connect the maximum number of existing destinations**
Tie together key existing destinations to encourage ridership from the outset.

**Uncork the most development potential**
Serve areas that are primed for redevelopment, not just areas that are already developed.

**Remember “service” does not have to be at the front door**
Create visual connections and an overall sense of place to increase walkability.

**Follow an easy-to-understand, "readable" route**
The circulator route should be clear and direct, particularly for non-regular riders.

**Consider use of couplets**
Couplets offer an opportunity to expand the economic impact area.

**Position the route for future expansions**
Opportunities for connections to future extensions should be considered.
### STREET DESIGN CONSIDERATIONS

<table>
<thead>
<tr>
<th><strong>Street width</strong></th>
<th><strong>Grade</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Streetcars and buses are generally 8-9 feet wide, enabling them to fit in narrow streets. However, interaction with motor vehicles needs to be considered.</td>
<td>Streetcars and buses can typically operate on a grade up to 7% to 9%.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Utilities</strong></th>
<th><strong>Turning Radius</strong></th>
</tr>
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<tbody>
<tr>
<td>Consideration of impacts on underground utilities is paramount. Protection from stray current from the streetcar’s traction power system is required, and access to utilities from maintenance must be maintained. Bus-based systems do not have these constraints.</td>
<td>Typical streetcars require a 66-foot turning radius, whereas typical buses have a minimum turning radius of approximately 45 feet.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Bridges and structures</strong></th>
<th><strong>On-street parking</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridges, tunnels, and other structures may need to be structurally modified to accommodate the additional loading related to streetcar infrastructure. A particular concern on bridges is the added weight from any concrete track slab that may need to be constructed.</td>
<td>Depending on the location of the track within the street and the associated stop locations, existing on-street parking spaces may be impacted. Sidewalk bulb-outs are desirable for bus/streetcar stops.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Vertical clearance</strong></th>
<th><strong>Pedestrian/bicycle environment</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The streetcar and the overhead contact system must fit underneath any overhead bridges or other structures crossing the alignment. A clearance of 18’ is typically desired, though special design techniques can decrease this minimum height.</td>
<td>Bus/streetcar stops should be incorporated into the surrounding pedestrian environment; areas with narrow sidewalks and no room for sidewalk expansion should be avoided. Also, streetcar track design should consider interactions with bicyclists.</td>
</tr>
</tbody>
</table>
Corridor Conditions

1st STREET

Burke St.  Broad St.  Spruce St.  Church St.

W  E

Low-density uses with large setbacks

Traffic calming elements through the Historic Holly Avenue neighborhood

Wide streets abutted by large single-use parcels
Corridor Conditions

2nd STREET

Lower-density uses through the Historic Holly Avenue neighborhood

Wide streets abutted by large single-use parcels in downtown
Corridor Conditions

4th STREET

Wider and more auto-oriented street cross-section

Pedestrian-oriented streetscape with small parcels, no setbacks, wider sidewalks, and a single travel lane in each direction
5th STREET

Corridor Conditions

- **Broad St.**
  - Smaller parcels and no setbacks

- **Spruce St.**
  - Sizable parcels with larger setbacks

- **Church St.**

- **MLK Jr. Dr.**
  - Multi-family residential area with large setbacks
A route will be identified by selecting specific streets within each of the color-coded segments illustrated in the map above. The flowchart below shows possible combinations of streets that could be linked together to form a rational route.

**FLOWCHART FOR SEGMENT ANALYSIS**

- **Hospital**
  - 1st / 2nd / Spruce / 4th / 5th
  - 1st / 2nd / Liberty / Main

- **Downtown**
  - 1st / 2nd / Broad / 4th / 5th

- **Rail Corridor**
  - 3rd / 4th / 5th

- **PTRP / E. Winston**
  - 5th / Patterson / 3rd or 4th / Research Pk. Blvd. / Rams
  - 5th / Research Pk. Blvd. / Rams
  - 5th / MLK

- **WSSU / Union Station**
  - Main / Chestnut / 1st / Salem / Rams
## Project Goals and Performance Measures

<table>
<thead>
<tr>
<th>Goals</th>
<th>Performance Measures</th>
<th>Screening Illustrations (see Item 3D)</th>
<th>Distinguishing Characteristic for…</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus development and coordinate investments to maximize economic return</strong></td>
<td>• Development and revenue generation potential along route&lt;br&gt;• Development and revenue generation potential with transit technology</td>
<td>• Redevelopment Potential / Vacant and Underutilized Area</td>
<td>✓  ✓</td>
</tr>
<tr>
<td><strong>Encourage a mixture of uses including equitable and affordable housing</strong></td>
<td>• Amount of land conducive to transit-supportive development&lt;br&gt;• Consistency with land use goals for housing</td>
<td>• Zoning Map</td>
<td>✓  ✓</td>
</tr>
<tr>
<td><strong>Protect and enhance the City’s distinct character</strong></td>
<td>• Enhancement of the traditional downtown form and walkable grid&lt;br&gt;• Consistency with adopted plans&lt;br&gt;• Positive passenger experience&lt;br&gt;• Minimize potential environmental impacts</td>
<td>• Urban Character Map&lt;br&gt;• Historic Districts Map</td>
<td>✓  ✓</td>
</tr>
<tr>
<td><strong>Connect key destinations in urban core</strong></td>
<td>• Service to key activity centers and development sites&lt;br&gt;• Ridership potential&lt;br&gt;• System capacity&lt;br&gt;• Travel time&lt;br&gt;• Design constraints</td>
<td>• Activity Centers Map&lt;br&gt;• Walk Distance Map&lt;br&gt;• Constraints and Concerns Map</td>
<td>✓  ✓</td>
</tr>
<tr>
<td><strong>Connect to local and regional transit to provide the “last mile” of service</strong></td>
<td>• Integration with other transit service:&lt;br&gt;  — Access to Transportation Center&lt;br&gt;  — Link to future commuter rail&lt;br&gt;• Connectivity to potential extensions</td>
<td>• Potential Extensions Map</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Support existing communities and infrastructure</strong></td>
<td>• Minimization of conflict with existing utility &amp; street infrastructure&lt;br&gt;• Traffic and on-street parking impacts</td>
<td>• Parking and Traffic Issues Map</td>
<td>✓  ✓</td>
</tr>
<tr>
<td><strong>Extend pedestrian connectivity</strong></td>
<td>• Ability to support enhanced pedestrian connectivity and infrastructure</td>
<td>• Pedestrian and Bicycle Facilities Map</td>
<td>✓</td>
</tr>
</tbody>
</table>
VACANT AND UNDERUTILIZED PROPERTY

Legend

- Vacant or Underutilized Land (surface parking lots and parcels identified as "vacant" in tax assessor’s database)
- Parks

GOAL
Enhance Economic Competitiveness
Focus development and coordinate investments to maximize economic return
ZONING

Historic overlay governs design changes, but the uses and intensities allowed through the underlying zoning are still permitted.

“Pedestrian business” zone is intended to accommodate office, retail, service, institutional, and high-density residential uses. Building heights are restricted to a maximum of 60 feet.

“Central business” zone is intended for high-intensity, compact urban development accommodating a wide range of uses. There is no height limit.

“Central industrial” zone is intended to accommodate pedestrian-oriented mixture of office, retail, residential, and light manufacturing uses to support the primary research function of the zone.

“Limited office” areas have a maximum building height of 40 feet. Retail / restaurant / business services uses are severely restricted. Multifamily housing is limited to 12 units/acre.

Redevelopment of institutional uses is unlikely to occur.

Winston and MLK overlay districts encourage urban, pedestrian-oriented design.

GOAL

Encourage a mixture of uses including equitable and affordable housing

Comments

Zoning conducive to TOD
Zoning neutral for TOD
Zoning negative for TOD

Legend
Campus
Institutional
Residential
Office
Limited Office

Central Business
Business
Industrial
Central Industrial

Enhance Economic Competitiveness

Legend
Campus
Institutional
Residential
Office
Limited Office

Central Business
Business
Industrial
Central Industrial
URBAN CHARACTER

4th St. east of Spruce St. has pedestrian-oriented streetscape.

4th St. west of Spruce St. is wider and has a more auto-oriented design.

5th St. west of Spruce St. is home to larger parcels with little sidewalk frontage.

5th St. east of Spruce St. has smaller parcels and more sidewalk frontage.

1st and 2nd St. east of Spruce St. are wide streets abutted by large single-use parcels.

1st St. east of Burke has larger setbacks and lower-density uses than Burke St.

1st St. and 2nd St. west of Spruce St. include some traffic calming elements through the historic Holly Ave. neighborhood.

Winston-Salem State University

Enhance Economic Competitiveness

GOAL

Protect and enhance the City’s distinct character.
Transit technologies may impact historic resources:
• Visual impacts of infrastructure;
• Noise / vibration; and
• Property impacts.

Enhance Economic Competitiveness

GOAL
Protect and enhance the City’s distinct character
GOAL

Increase Mobility Options

Connect key destinations in urban core

Legend

Major employers
Campus / institutional
Special events venues
Civic facilities
Hotel / convention
Housing
Retail / restaurant cluster
Multi-family housing cluster

Major Employers (number of employees)

- WCU Baptist Medical Center: 13,000
- Wells Fargo Corporation: 3,700
- RJ Reynolds Tobacco Co.: 932
- GMAC: 800
- BB&T: 750
- Winston Tower Tenants: 36
- Magnolia Building: 461,500 rentable square feet

Special event venues (annual attendance)

- Milton Rhodes Center for the Arts: 46,150
- Sawtooth School: 30,000
- HanesBrands Theater: 66,455
- Stevens Center: 100,000
- Millennium Center: 253,297
- BB&T Ballpark: 293,297

Campus / institutional

- WSSU: 6,500 students
- Salem College: 1,100 students
- PTRP: 1.400 current employees
- Library Main Branch: 375,000 annual attendance
- Transportation Center: 10,000 passengers per day
- PART: 983 passengers per day
- WC owl: 315 rooms
- Embassy Suites: 146 rooms
- Hawthorne Inn: 156 rooms
- Wingate Inn: 112 rooms
WALK DISTANCE

Legend

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>Route Segments</td>
</tr>
<tr>
<td>Gray</td>
<td>5 minute walk</td>
</tr>
</tbody>
</table>

GOAL

Connect key destinations in urban core

Increase Mobility Options

Route Segments

1st / 2nd / Town Run / 4th / 5th
1st / 2nd / Liberty / Main
1st / 2nd / Broad / 4th / 5th
1st / 2nd / Liberty / 4th / 5th
1st / 2nd / Spruce / 4th / 5th
1st / 4th / 5th
CONRAINTS AND CONCERNS

Legend
- Streetcar will not be able to make turn
- Modifications needed for streetcar to make turn
- Dashed segments indicate design constraints for streetcar

Comments
- AI-Grade (problematic for streetcar)
- Inconsistent with PTRP plans
- 15’-7” vertical clearance under railroad bridge
- 9% grade along Research Park Blvd north of Rams Drive
- 15’-4” – 16’-0” vertical clearance

GOAL
Connect key destinations in urban core
Burke St. does not duplicate service on a future N/S route using the Main St. / Liberty St. corridor. Broad St. is ½ mile from Main / Liberty, which is an acceptable distance between initial and future circulator streets. Spruce St. is only ¼ mile from Main / Liberty, resulting in too close spacing with possible future N/S route using Main St. / Liberty St. The transportation center is a logical connecting point between the initial E/W route and future N/S route. Routing the circulator via Main St. / Church St. creates an opportunity to interline with future N/S route, but could result in circuitous routing for the initial E/W line.

All previous concepts for a future N/S route focus on the general Main St. / Liberty St. corridor. If initial E/W line uses the Town Run Corridor, then the future N/S route would also need to use the Town Run Corridor to avoid duplication. Routes using both Town Run Lane and Main St. / Liberty St. would be too close together.
Heavy traffic volume westbound on 5th St. in morning

Heavy left-turning traffic volume westbound on 1st St. at Hawthorne Rd. in morning

Heavy traffic volume westbound on 1st St. in afternoon

New traffic patterns emerging in study area with closing of ramps to US 52

Support existing communities and infrastructure
PEDESTRIAN AND BICYCLE FACILITIES

Legend
- Existing Greenway
- Proposed Greenway
- Parks
- Bike Routes
  (Winston-Salem Urban Area Bicycle Map)
- On-Street Bike Facilities

“Sharrows” are present on Burke St.

Bike lanes are present on Salem Ave.

No sidewalk

Opportunities for multimodal corridor through PTRP

GOAL
Extend pedestrian connectivity
Hospital

Initial Screening Summary (Downtown)

Focus development and coordinate investments to maximize economic return (ref: Vacant and Underutilized Area Map)

- Burke is largely developed, but there is opportunity for intensification
- Opportunities exist for development intensification west of Spruce and re-use of existing space east of Spruce
- Significant opportunity for development exists north of the ballpark along 1st, 2nd, and Broad St. (large surface parking lots)
- Significant opportunity for development exists north of the ballpark along 1st, 2nd, and Broad St. (large surface parking lots)
- Little redevelopment opportunity west of the ballpark or between Broad and Spruce

Encourage a mixture of uses including equitable and affordable housing (ref: Zoning Map)

- Most areas zoned for office, pedestrian business, or central business (all amenable to TOD)
- Institutional zoning on 5th west of Spruce may limit redevelopment opportunities
- Institutional zoning on 5th west of Spruce may limit redevelopment opportunities
- Most of the route along 4th, 5th, and Spruce is zoned as central business (amenable to TOD)
- Most of the route along 4th, 5th, and Town Run is zoned as central business (amenable to TOD)
- Most of the route along Liberty/Main is zoned as central business (amenable to TOD)

Protect and enhance the City’s distinct character (ref: Urban Character Map, Historic Districts Map)

- Burke streetscape is well-suited for a circulator (mixture of uses with sidewalk frontage)
- Urban character of 4th and 5th changes at Spruce St. (less ped-orientated west of Spruce)
- Urban character of 4th and 5th changes at Spruce St. (less ped-orientated west of Spruce)
- Half of the route along 4th, 5th, and Town Run is pedestrian-oriented (amenable to TOD)
- Most of the route along Liberty/Main is pedestrian-oriented (amenable to TOD)

Connect key destinations in urban core (ref: Activity Centers Map, Constraints and Concerns Map)

- Provides access to a greater number of activity centers than the 1st/2nd corridor
- Provides a closer connection to the ball park than Burke St.
- Provides a closer connection to the ball park than Burke St.
- Provides access to a greater number of activity centers than the 1st/2nd corridor
- Provides a closer connection to the ball park than Burke St.

- Does not directly serve the ballpark or large employment cluster at BB&T / Wells Fargo
- Provides closer access to the large employment cluster at BB&T / Wells Fargo
- Does not directly serve the large employment cluster at BB&T / Wells Fargo
- Misses several activity centers along the western end of 4th / 5th
- Misses the opportunity to incorporate alignment into future development plans at Park Vista

Connect to local and regional transit to provide the "last mile" of service (ref: Potential Extensions Map)

- Burke St. does not duplicate service on a future north/south route using the Main St. / Liberty St. corridor
- Broad St. is ½ mile from Main / Liberty (possible future north / south route), which is an acceptable distance between initial and future circulator streets
- Spruce St. Is only ½ mile from Main/Liberty (possible future north/south route), resulting in too close spacing between initial and future circulator streets
- Future north/south route would also need to use the Town Run corridor to avoid duplication. An initial route using Town Run Ln. and a future route using Main/Liberty would be too close together

Support existing communities and infrastructure (ref: Parking and Traffic Issues Map)

- Heavy utility impacts are anticipated on 4th / 5th
- On-street parking on 4th has heavy utilization
- On-street parking on 4th has heavy utilization
- Significant grade changes on 1st / 2nd St.
- Significant grade changes on 1st / 2nd St.

- Significant grade changes on 1st / 2nd St.
- Significant grade changes on 1st / 2nd St.
- Underground utilities are widespread on 2nd St., but are not as extensive on 1st St.
- As one-way pairs, 1st and 2nd St. have relatively high traffic volumes east of Peters Creek Parkway
- New alignment needed through the park at 4th St.

Enable pedestrian connectivity (ref: Pedestrian and Bicycle Facilities Map)

- 4th / 5th is not a designated bicycle route, which could reduce potential transit / bicycle conflicts
- 1st / 2nd is a designated bicycle route, which could create potential transit / bicycle conflicts
- 1st / 2nd is a designated bicycle route, which could create potential transit / bicycle conflicts
- 1st / 2nd is a designated bicycle route, which could create potential transit / bicycle conflicts
**Initial Screening Summary (Rail Corridor / PTRP / East Winston)**

**Goals**
- **3rd / 4th / 5th**: Hospital, Downtown, Rail Corridor
- **5th / Patterson / 3rd or 4th / Research Park / Rams**: Hospital, Downtown, Rail Corridor
- **5th / Research Park / Rams**
- **5th / MLK**

**Focus development and coordinate investments to maximize economic return (ref: Vacant and Underutilized Area Map, Constraints and Concerns Map)**
- Several surface parking lots are located north of 5th Street
- Connection is required to access the heart of PTRP
- Serves PTRP development parcels east of Salem Ave. and along Rams Dr.
- Salem Cemetery limits development options west of Salem Ave.
- Passes through the heart of PTRP, with numerous development parcels adjacent to the route
- Passes through the heart of PTRP, with numerous development parcels adjacent to the route
- There is little vacant land, and redevelopment of existing residential areas to create more mixed use and higher densities is unlikely

**Enhance Economic Competitiveness**
- "Central industrial" zoning is intended to accommodate a pedestrian-oriented mixture of office, retail, residential, and light manufacturing uses to support the primary research function of PTRP
- Supportive "central industrial" and "central business" zoning anchors much of the segment
- Redevelopment of parcels with campus zoning and existing industrial uses is unlikely
- "Central industrial" zoning is intended to accommodate a pedestrian-oriented mixture of office, retail, residential, and light manufacturing uses to support the primary research function of PTRP
- "Central industrial" zoning is intended to accommodate a pedestrian-oriented mixture of office, retail, residential, and light manufacturing uses to support the primary research function of PTRP
- Much of the segment east of US 52 is zoned as residential, limiting mixed use development opportunities
- The future MLK overlay district encourages pedestrian-oriented design

**Protect and enhance the City’s distinct character (ref: Urban Character Map, Historic Districts Map)**
- The connection across the railroad corridor has an urban feel with existing and emerging activity centers
- Although Salem Ave. has bicycle lanes, the lack of existing and potential development contributes to very little urban character
- The streets and development patterns through PTRP are planned to encourage walkability
- The route passes through the Winston-Salem Tobacco Historic District
- The route passes through the Winston-Salem Tobacco Historic District
- The streets and development patterns through PTRP are planned to encourage walkability
- The route passes through the Winston-Salem Tobacco Historic District
- As a major arterial with an interchange with Business 40, Martin Luther King, Jr. Drive is heavily trafficked and auto-oriented.
- The route passes through the Winston-Salem Tobacco Historic District and adjacent to the East Winston Historic District

**Connect key destinations in urban core (ref: Activity Centers Map, Constraints and Concerns Map)**
- Provides direct access to the heart of PTRP
- At-grade railroad crossings at 3rd and 4th Streets are problematic for streetcar (this is not an issue for buses)
- Low clearance at 5th St. will require special design considerations for streetcar (this is not an issue for buses)
- Circumvents the heart of PTRP
- 3rd and 4th Streets both have low clearances, which is a design challenge for streetcar (this is not an issue for buses)
- Roundabout at 3rd / Research Park Blvd. will require unique design for streetcar (this is not an issue for buses)
- Street 9% grade on a short segment of future Research Park Blvd.
- Low railroad clearance on Rams Drive (this is not an issue for buses)
- Serves the heart of PTRP
- 5th Street has a low clearance, which is a design challenge for streetcar (this is not an issue for buses)
- Roundabout at 3rd / Research Park Blvd. will require unique design for streetcar (this is not an issue for buses)
- Steep 9% grade on a short segment of future Research Park Blvd.
- Low railroad clearance on Rams Drive (this is not an issue for buses)
- Serves East Winston housing area
- Serves the northern portion of PTRP
- Overpasses at interchanges with US 52 and Business 40 are likely to be challenging from a design standpoint for streetcar (this is less of an issue for buses)
- Provides an opportunity to interline with a future possible north/south route on Main/Liberty
- Connects to Transportation Center via 5th St.
- Connects to Transportation Center via 5th St.
- Connects to Transportation Center via 5th St.
- Connects to Transportation Center via 5th St.

**Connect to local and regional transit to provide the "last mile" of service (ref: Potential Extensions Map)**
- Heavy traffic was observed westbound on 5th Street in the morning
- Significantly underground utilities are present in the vicinity of 15th St. and Chestnut
- Design treatments to accommodate streetcar at the Business 40 underpass are anticipated to be relatively minor in scope
- Significant underground utilities are present on Patterson St. south of 5th St.
- Significant infrastructure changes will be needed to accommodate the design challenges for streetcar (clearances, roundabout, steep grade)
- Significant infrastructure changes will be needed to accommodate the design challenges for streetcar (clearances, roundabout, steep grade)
- Traffic patterns are likely to change after planned closing of US 52 ramps goes into effect
- Significant infrastructure changes may be needed to accommodate the design challenges for streetcar at the overpasses at US 52 and Business 40

**Support existing communities and infrastructure (ref: Parking and Traffic Issues Map)**
- Bike lanes are present on Salem Ave., but the travel lanes are quite wide (14-16), minimizing conflicts between transit and bicycles
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- Bike lanes are present on Salem Ave., but the travel lanes are quite wide (14-16), minimizing conflicts between transit and bicycles
- 3rd and 4th are designated bicycle routes, which could create potential transit / bicycle conflicts
- 3rd and 4th are designated bicycle routes, which could create potential transit / bicycle conflicts
- 3rd and 5th are designated bicycle routes, which could create potential transit / bicycle conflicts
- 3rd and 6th are designated bicycle routes, which could create potential transit / bicycle conflicts

**Increase Mobility Options**
- Heavy traffic was observed westbound on 5th Street in the morning
- Significantly underground utilities are present in the vicinity of 15th St. and Chestnut
- Design treatments to accommodate streetcar at the Business 40 underpass are anticipated to be relatively minor in scope
- Significant underground utilities are present on Patterson St. south of 5th St.
- Significant infrastructure changes will be needed to accommodate the design challenges for streetcar (clearances, roundabout, steep grade)
- Significant infrastructure changes will be needed to accommodate the design challenges for streetcar (clearances, roundabout, steep grade)
- Traffic patterns are likely to change after planned closing of US 52 ramps goes into effect
- Significant infrastructure changes may be needed to accommodate the design challenges for streetcar at the overpasses at US 52 and Business 40

**Extend pedestrian connectivity (ref: Pedestrian and Bicycle Facilities Map)**
- 3rd and 6th are designated bicycle routes, which could create potential transit / bicycle conflicts
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WHAT MAKES for a **Successful Urban Circulator?**

**Economic Development**
(amount / value / type of development)

**Mobility**
(high ridership)

WHAT ENABLES A CIRCULATOR TO MAKE A **POSITIVE IMPACT ON DEVELOPMENT?**

**Demand**
- A real estate market that is ready for growth
- A development community that will embrace the project

**Supply**
- Service to areas conducive to development / redevelopment opportunities
- A significant, permanent investment in infrastructure

WHAT MAKES FOR A **HIGH-RIDERSHIP CIRCULATOR?**

**Demand**
- **People**
  - Need to serve existing and future activity centers

**Supply**
- **Effective and attractive service design**
  - Simple route
  - Frequent service
  - High visibility (vehicles, stations, other design features)
  - Sufficient capacity
  - Simple and low-cost fare structure
TRANSIT OPTION: MODERN STREETCAR

Streetcar Characteristics
• Uses rails embedded in the street
• Operates with automobiles in shared traffic lane
• Provides connections within a compact urban setting, not across a region
• Not intended for long-distance, high-speed travel
• Support neighborhoods as “walk extenders”
• Serves as district circulator and pedestrian accelerator
• Accelerates economic development and creates more livable, desirable places

WHAT OTHER CITIES HAVE STREETCARS?

Portland, Oregon
• Has generated $3.5 billion in private investment

Little Rock, Arkansas
• $400 million in new development within two blocks

Tacoma, Washington
• Provides important connection to regional rail system

Tampa, Florida
• Tourism focus, but has also generated $1 billion in new development

Seattle, Washington
• 12,500 jobs created along route since streetcar was announced

Kenosha, Wisconsin
• Historic trolley has helped fuel redevelopment

Other cities advancing streetcar design include Cincinnati, Tucson, Salt Lake City, Dallas, and Washington, DC.
STREETCAR INFRASTRUCTURE

Streetcar Station
- Raised platform (10” height) for vehicle boarding without steps
- Typically includes amenities such as shelters, benches, and passenger information
- Stations can be built into the adjacent sidewalk and placed in a parking lane
- Stations located every 660 feet on average
- Streetcar stations can be shared with buses

Streetcar Guideway
- Reinforced concrete slab with built-in rails provides smooth ride
- Rails are flush with street; cars also use the lane
- Concrete slab is 8 feet wide and 12 inches deep
- Utilities under the track slab may need to be relocated

Overhead Streetcar Power
- Powered by single wire above guideway
- Support poles placed every 120 feet
- Poles can be decorative or it may be possible to use existing poles

Modern Streetcar Vehicle
- 66 feet long (standard bus is 40 feet)
- 8 feet width (standard bus is 8 ½ feet)
- 12 feet high (standard bus is 9 ½ feet)
- Seated capacity = 29; standee capacity = 127

KEY IMPACTS

Construction
- Need to maintain business access during construction

Visual
- Overhead power system is minimally intrusive; stops can be simplified if desired

Noise
- "Wheel squeal" at tight corners

Air Quality
- Lack of vehicle emissions is positive for air quality
TRANSIT OPTION: ENHANCED BUS

Enhanced Bus Characteristics
- Upgrades local bus service by providing sleeker vehicles, substantial stations, unique branding, and other passenger amenities
- Operates with automobiles in shared traffic lane
- Can operate as urban circulator or regional connector
- Oriented more toward enhancing mobility options rather than accelerating economic development
- Has proven successful in attracting riders who would not otherwise use transit

WHAT OTHER CITIES HAVE ENHANCED BUS SERVICE?

Baltimore, Maryland
- Free downtown circulator includes branding and attractive vehicles

Las Vegas, Nevada
- Ridership increased 25% on initial BRT line compared to standard bus

Eugene, Oregon
- Enhancements to bus service led to 74% ridership increase

Orlando, Florida
- Three-mile loop through downtown in dedicated lanes; free service

Denver, Colorado
- Free circulator on downtown transit / pedestrian mall

Kansas City, Missouri
- 6-mile route experienced 50% increase in ridership after upgrade

Other cities with downtown circulators include Hartford, Philadelphia, Washington, DC, Louisville, and Austin.
ENHANCED BUS INFRASTRUCTURE

**Enhanced Bus Station**
- Raised platform (10" height) for vehicle boarding without steps
- Typically Includes amenities such as shelters, benches, and passenger information
- Stations can be built into the adjacent sidewalk and placed in a parking lane
- Stations located every 660 feet on average

**Enhanced Bus Guideway**
- Uses existing streets

**Enhanced Bus Power**
- Powered by engine on bus
- Many enhanced buses are hybrid-electric
- No overhead infrastructure

**Enhanced Bus Vehicle**
- 40'-60 feet long (standard bus is 40 feet)
- 8 ½ feet wide
- 9 ½ - 10 ½ feet high
- 40’ bus capacity: Seated = 42; standees = 43
- 60’ bus capacity: Seated = 59; standees = 57

KEY IMPACTS

**Construction**
- Construction is typically limited to the stations, as well as any desirable street upgrades

**Visual**
- No overhead power system; stops can be simplified if desired

**Noise**
- On-board engine generates some noise

**Air Quality**
- Some emissions, though hybrid engine is cleaner than pure diesel
1. Exercise Materials

- Map showing conceptual route alternatives
- Precut yellow ribbon – each piece is 0.5 mile, one direction
- Pushpins

2. Table Discussion

- Take a moment to discuss the Routing Exercise Checklist (*see Sheet 5B*) with the members at your table.
- Walk through the Initial Screening Summary (*see Sheet 3D*) and begin to identify route alternatives that you feel best meet the study goals.

3. Exercise

- Take a segment(s) of the ribbon and overlay it onto the working map to illustrate your table’s preferred route. Discuss and adjust the route as necessary.
- Add additional pieces of ribbon to complete your preferred route, recognizing the costs of additional segments (see below).
- Use pushpins to secure each segment of ribbon to the map.
- Designate routes in both directions (eastbound and westbound). Each piece of ribbon represents a single direction of travel.
- Use pink ribbon to indicate non-specific future extensions.

4. Calculate the Cost of Your Route

- Tally the number of yellow segments of ribbon that your table uses
- Fill in the lines below to calculate the cost of your route

| Estimated cost for streetcar operating on route: |
| # yellow pieces of ribbon x $12M = |

| Estimated cost for enhanced bus operating on route: |
| # yellow pieces of ribbon x $1.5M = |
Routing Exercise Checklist

Goal of Exercise: Identify a service design that addresses the goals of the project in an effective and cost-efficient manner

1. Start with Route Design Considerations
   (see Sheet 2A)
   ✓ Does the route serve key activity centers where ridership is likely?
     o Consider current and future activity centers
     o Connect strong anchors at both ends of the route
   ✓ Is the route simple and direct?
     o Direct routes are easier to understand, enable more frequent service without adding vehicles, and are more conducive to consistent and reliable service
     o Minimize turns and deviations, and avoid large loops
   ✓ Did you consider couplets? (use of different streets for opposing directions of travel)
     o Increases coverage, but may also increase complexity

2. Review Screening Maps to Address Project-Specific Goals
   (See Screening Maps)
   ✓ Does the route satisfactorily address the project goals for mobility and economic development?
     o Consider how route options mesh with urban character, zoning, development potential, etc.

3. Don’t Forget Design Constraints
   (see Constraints and Concerns Map)
   ✓ Are significant infrastructure changes needed for streetcar to be able to operate along the route?
     o For streetcar, avoid the at-grade rail crossings at 3rd St. and 4th St., and review the turning movements that are too tight

4. Calculate the Cost of Your Route
   ✓ Is the total implementation cost of the service reasonable?
     o For planning purposes, assume the following costs:

     | Service          | Cost                  |
     |------------------|-----------------------|
     | Enhanced Bus     | $3M per mile, per direction |
     | Streetcar        | $25M per mile, per direction |

5. Review and Revise if Necessary