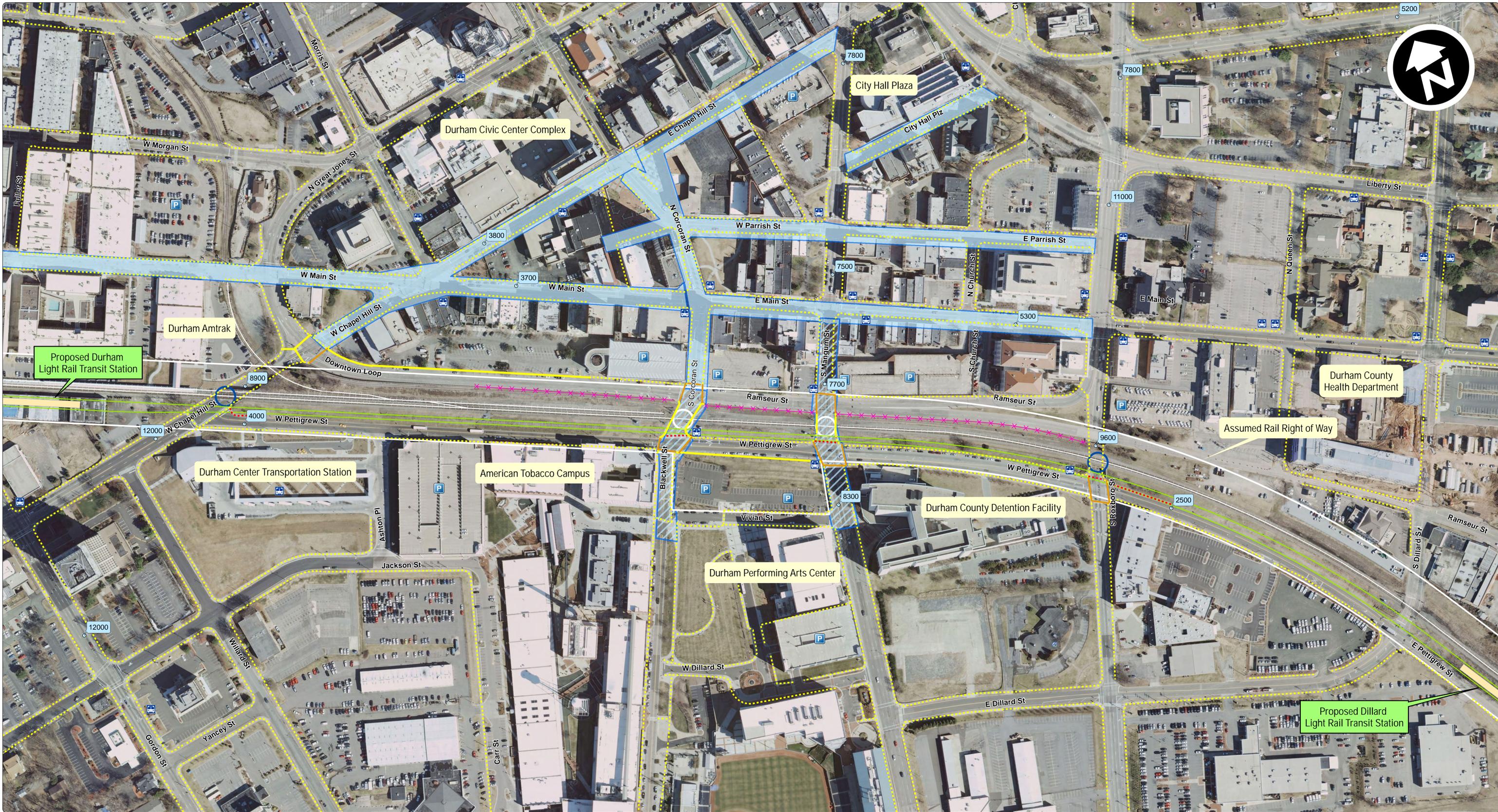


Appendix H – Downtown Durham Pedestrian Alternatives



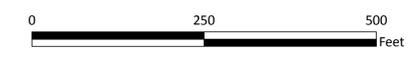
Legend

Parking Lot	Existing Sidewalk/Crosswalk	Existing Streetscape	At-Grade Crossing
Bus Stops	Proposed Sidewalk/Crosswalk	Proposed Streetscape	Grade-Separated Crossing
Existing Railroad	Reapplied Crosswalk	NCDOT 2009 AADT	
Assumed Rail Right of Way	Remove Sidewalk/Crosswalk		
	Proposed Decorative Fence		
	Proposed TTA Light Rail		

Durham Traffic Separation Study

Downtown Overview

Durham County, North Carolina
February 27, 2012





DURHAM TRAFFIC SEPARATION STUDY

Transportation Improvement Program Project No. P-3309D

Chapel Hill Street / Norfolk Southern Railroad Crossing Preliminary Recommendations

All preliminary pedestrian recommendations at this location are near-term improvements. Near-term improvements may be phased into the mid-term depending on funding availability.

Chapel Hill Street / Ramseur Street

Recommendation	Location
Apply new crosswalk markings	North/south across Chapel Hill Street between southwest corner and existing concrete median East/west across Downtown Loop/Ramseur Street between concrete island and northeast corner East/west across Downtown Loop/Ramseur Street right turn lane west onto Chapel Hill Street between northwest corner and existing concrete island
Mill pavement and resurface in and around crosswalk	East/west across Downtown Loop/Ramseur Street, south of the intersection
Reapply crosswalk markings	East/west across Downtown Loop/Ramseur Street, south of the intersection
Add raised concrete island as pedestrian refuge	On Downtown Loop/Ramseur Street, south side of the intersection in existing striped island
Construct pedestrian ramps	Northwest corner of intersection, facing east toward concrete median North side of concrete median, facing west North side of concrete median, facing east Northeast corner of intersection, facing west Southwest corner of intersection, facing north
Install pedestrian signal heads	On northwest corner facing new crosswalk to northeast corner across existing concrete island On northeast corner facing new crosswalk to northwest corner across existing concrete island On southwest corner facing new crosswalk to existing concrete island

Chapel Hill Street / Railroad Bridge

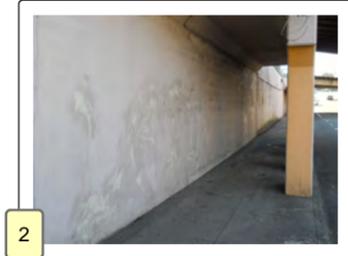
Sandblast and repaint	Walls, wingwalls, and bridges in active Norfolk Southern railroad tunnel
Repair support structure and wingwall	In active Norfolk Southern railroad tunnel
Repair sidewalk	In active Norfolk Southern railroad tunnel
Remove railroad tracks and bridges	For spur line and Duke Beltline
Improve landscaping	On east and west ends of railroad tunnels on top of the wingwalls
Add pedestrian lighting	In the railroad tunnel (the City is completing an agreement with NCRR and plans to install additional lights in the tunnel this spring)

Chapel Hill Street / Pettigrew Street

Reconstruct pedestrian ramp	Southwest corner facing north across Chapel Hill Street Southwest corner facing east across Pettigrew Street
Remove existing sidewalk	On north side of Pettigrew Street east of Chapel Hill Street to end of sidewalk



1 Repair Concrete Bridge Structure over Sidewalks



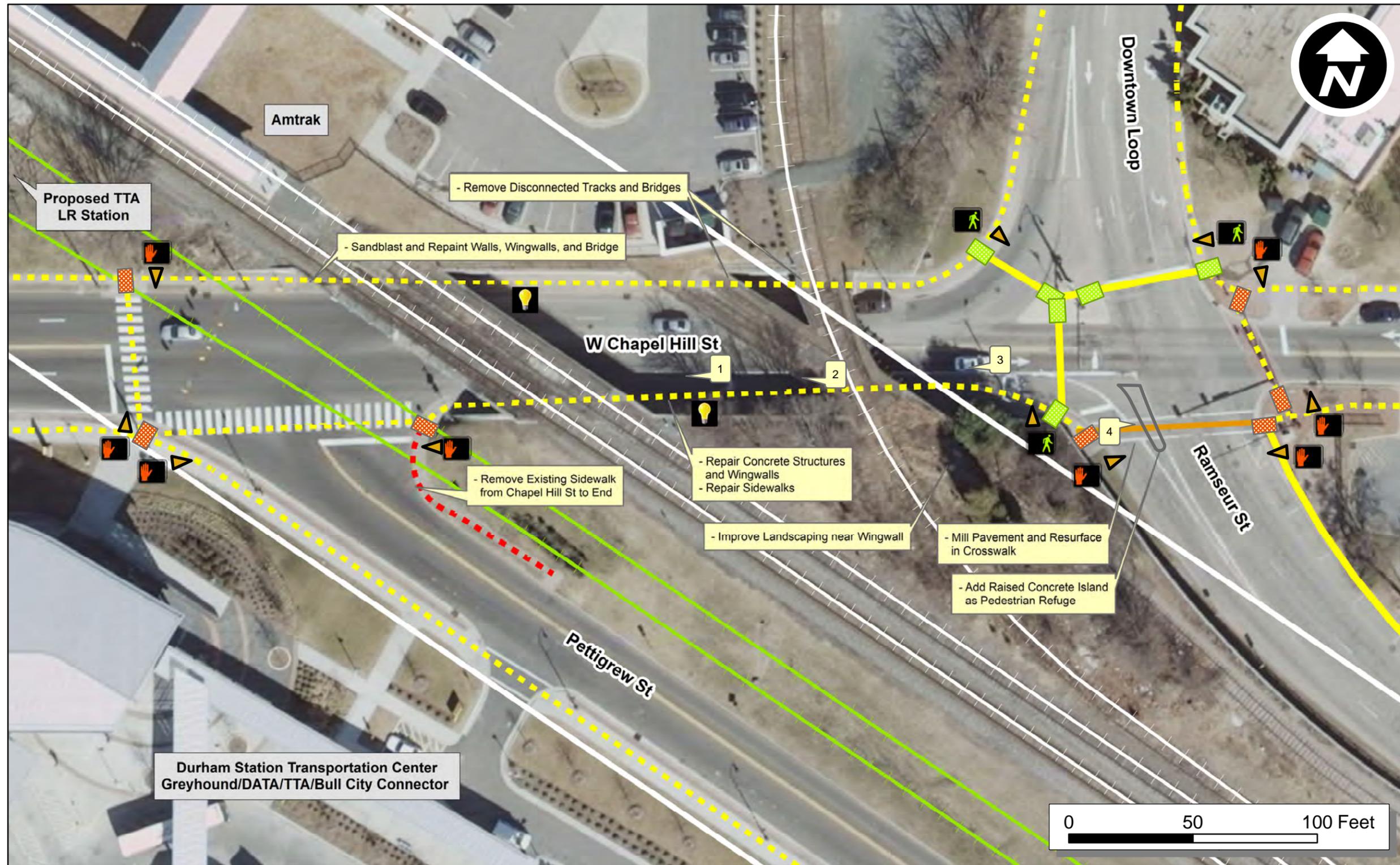
2 Paint Pedestrian Tunnel, Bridge, and Wingwalls



3 Repair Sidewalk in Underpass



4 Mill Pavement and Resurface / Repaint Crosswalk



Durham Traffic Separation Study
 Preliminary Pedestrian Recommendations
 Chapel Hill / Norfolk Southern RR Crossing
 Durham County, North Carolina
 February 27, 2012

Legend

- | | | | |
|-------------------------------|--------------------------------------|-----------------------------|---------------------------|
| Existing Pedestrian Signal | Proposed Lighting in Tunnel | Existing Sidewalk/Crosswalk | Existing Railroad |
| Proposed Pedestrian Signal | Existing Pedestrian Ramp | Proposed Sidewalk/Crosswalk | Assumed Rail Right of Way |
| Remove Pedestrian Signal | Proposed or Improved Pedestrian Ramp | Reapplied Crosswalk | Parking Lot |
| Pedestrian Signal Direction | Remove Pedestrian Ramp/Rebuild Curb | Remove Sidewalk/Crosswalk | Bus Stops |
| Proposed Streetscape Lighting | | Proposed Decorative Fence | |
| | | Proposed TTA Light Rail | |



DURHAM TRAFFIC SEPARATION STUDY

Transportation Improvement Program Project No. P-3309D

Blackwell/Corcoran Street / Norfolk Southern Railroad Crossing Preliminary Recommendations

All preliminary pedestrian recommendations listed below for this location are near-term improvements. Near-term improvements may be phased into the mid-term depending on funding availability.

Corcoran Street / Ramseur Street

Recommendation	Location
Mill pavement and resurface with stamped asphalt	Corcoran Street / Pettigrew Street intersection
Construct pedestrian ramps	Southeast corner of intersection Southwest corner of intersection
Reapply crosswalk markings (stamped asphalt)	East/west across Corcoran Street, north side of the intersection North/south across Ramseur Street, east side of the intersection North/south across Ramseur Street, west side of the intersection
Install streetscape lighting	Southeast corner of intersection Southwest corner of intersection

Blackwell/Corcoran Street / Railroad Crossing

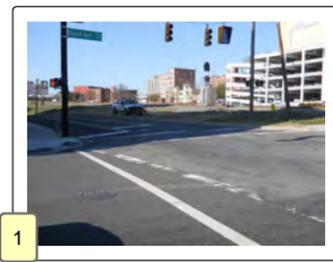
*Construct asphalt pedestrian crossing	East side of railroad crossing between gates West side of railroad crossing between gates
*Construct 2'-6" curb & gutter and concrete sidewalk with brick trim (minimum 10' from rails)	East side of railroad crossings outside gates between Ramseur Street and Pettigrew Street West side of railroad crossings outside gates between Ramseur Street and Pettigrew Street
*Install decorative fence	Along south side of Ramseur Street between Chapel Hill Street and Corcoran Street Along south side of Ramseur Street between Corcoran Street and Mangum Street
Construct restricted access for rail maintenance Vehicles including "No Parking" and "Private Property" signs	Northeast corner of rail crossing near proposed decorative fence
Add interconnect between traffic signals	Between Pettigrew Street/Blackwell Street and Ramseur Street/Corcoran Street intersections

Note: Provide restricted access for rail maintenance vehicles between decorative fence and railway

Blackwell Street / Pettigrew Street

Mill pavement and resurface with stamped asphalt	Blackwell Street / Pettigrew Street intersection
Remove crosswalk markings	East/west across Blackwell Street, north side of the intersection
Remove pedestrian ramps	Northwest corner of intersection, facing east Northeast corner of intersection, facing west
Remove pedestrian signals	Northwest corner of intersection, facing east Northeast corner of intersection, facing west
Reapply crosswalk markings (stamped asphalt)	North/south across Pettigrew Street, east side of the intersection North/south across Pettigrew Street, west side of the intersection East/west across Blackwell Street, south side of the intersection
Reconstruct pedestrian ramp	Northwest corner of intersection, facing south Northeast corner of intersection, facing south
Install streetscape lighting	Northeast corner of intersection Northwest corner of intersection
Construct sidewalk	South side of Pettigrew Street between Blackwell Street and Mangum Street
Street furniture: benches and trash cans	Along Blackwell Street between Pettigrew Street and Vivian Street, as appropriate
Retime traffic signals due to removed crosswalk	All directions

* Rail safety improvements



1 Repair Pavement / Repaint Crosswalk



2 Install Sidewalk for High Traffic Trail



3 Install Standard Asphalt Pavement over Tracks for Sidewalk Connectivity



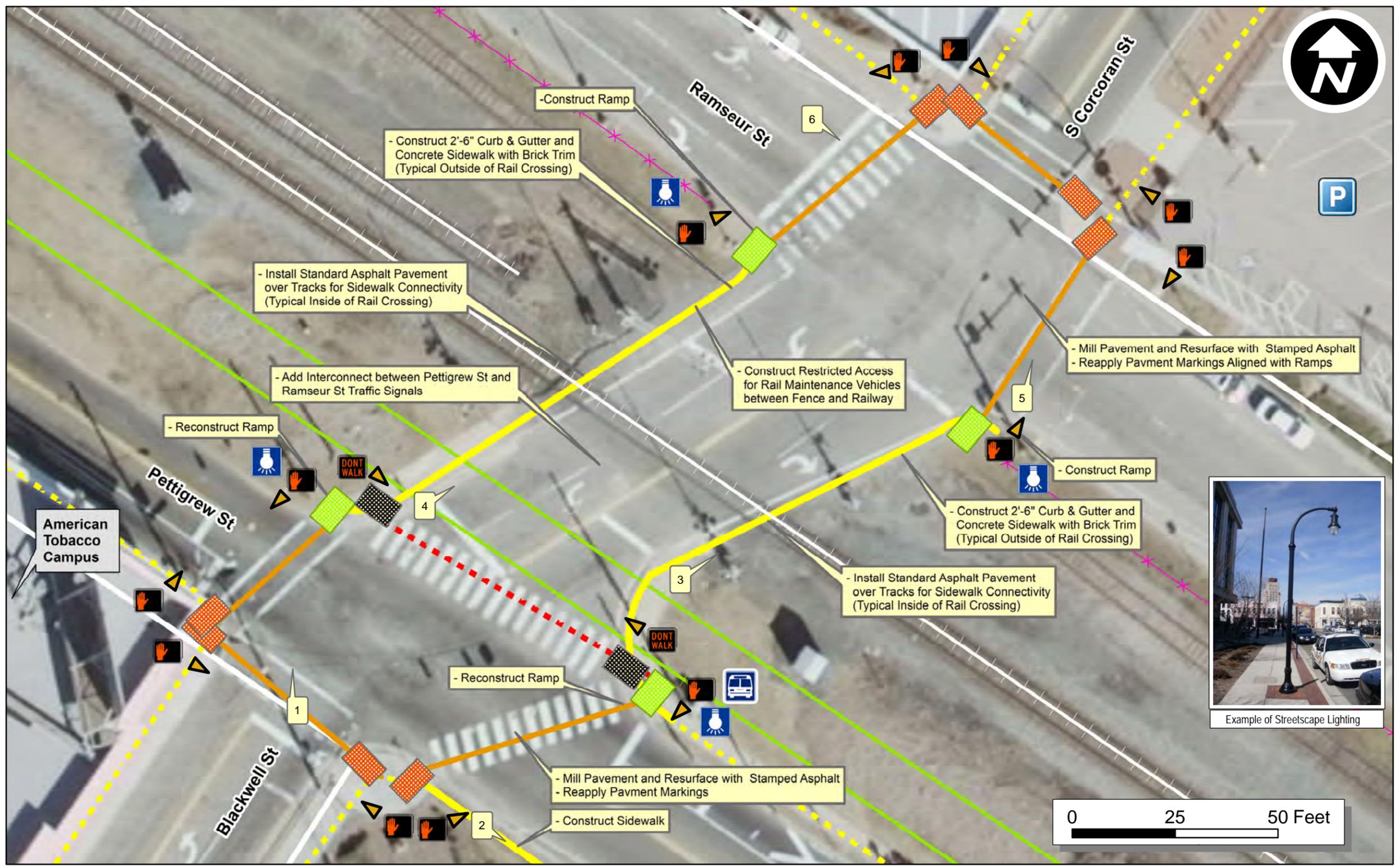
4 Construct 2'-6" Curb & Gutter and Concrete Sidewalk with Brick Trim



5 Reapply Crosswalk Marking to Align with Pedestrian Ramp



6 Mill Pavement and Resurface with Stamped Asphalt



Example of Streetscape Lighting

Durham Traffic Separation Study
 Preliminary Pedestrian Recommendations
 Blackwell / Norfolk Southern RR Crossing
 Durham County, North Carolina
 February 27, 2012

Legend

- | | | | |
|-----------------------------|--------------------------------------|-----------------------------|---------------------------|
| Existing Pedestrian Signal | Proposed Streetscape Lighting | Existing Sidewalk/Crosswalk | Existing Railroad |
| Proposed Pedestrian Signal | Proposed Lighting in Tunnel | Proposed Sidewalk/Crosswalk | Assumed Rail Right of Way |
| Remove Pedestrian Signal | Existing Pedestrian Ramp | Reapplied Crosswalk | Parking Lot |
| Pedestrian Signal Direction | Proposed or Improved Pedestrian Ramp | Remove Sidewalk/Crosswalk | Bus Stops |
| | Remove Pedestrian Ramp/Rebuild Curb | Proposed Decorative Fence | |
| | | Proposed TTA Light Rail | |



DURHAM TRAFFIC SEPARATION STUDY

Transportation Improvement Program Project No. P-3309D

Mangum Street / Norfolk Southern Railroad Crossing Preliminary Recommendations

All preliminary pedestrian recommendations listed below for this location are near-term improvements. Near-term improvements may be phased into the mid-term depending on funding availability.

Mangum Street / Ramseur Street

Recommendation	Location
Mill pavement and resurface with stamped asphalt	Mangum Street / Ramseur Street intersection
Reapply crosswalk markings	North/south across Ramseur Street, east side of the intersection North/south across Ramseur Street, west side of the intersection East/west across Mangum Street, north side of the intersection
Construct pedestrian ramps	Southeast corner of intersection, facing north Southwest corner of intersection, facing north
Upgrade bus stop: replace shelter	Northwest corner of intersection
Install streetscape lighting	Southeast corner of intersection Southwest corner of intersection
Realign crosswalk to match pedestrian ramps	East/west crosswalk across Mangum Street, north side of the intersection

Mangum Street / Railroad Crossing

*Construct concrete pedestrian pathway	East side of railroad crossing between gates West side of railroad crossing between gates
*Construct 2'-6" curb & gutter and concrete sidewalk with brick trim	East side of railroad crossings outside gates between Ramseur Street and Pettigrew Street West side of railroad crossings outside gates between Ramseur Street and Pettigrew Street
*Remove pedestrian path and railing	East of Mangum Street
*Install decorative fence	Along south side of Ramseur Street between Corcoran Street and Mangum Street Along south side of Ramseur Street between Mangum Street and Roxboro Street

Note: Provide restricted access for rail maintenance vehicles between decorative fence and railway

Mangum Street / Pettigrew Street

Mill pavement and resurface with stamped asphalt	Mangum Street / Pettigrew Street intersection
Remove crosswalk markings	East/west across Mangum Street, north side of the intersection
Remove pedestrian ramps	Northwest corner of intersection, facing east Northeast corner of intersection, facing west
Remove pedestrian signals	Northwest corner of intersection, facing east Northeast corner of intersection, facing west
Reapply crosswalk markings	East/west across Mangum Street, north side of the intersection East/west across Mangum Street, south side of the intersection North/south across Pettigrew Street, east side of the intersection North/south across Pettigrew Street, west side of the intersection
Reconstruct pedestrian ramp	Northwest corner of intersection, facing south Northeast corner of intersection, facing south Southeast corner of intersection, facing north and west Southwest corner of intersection, facing north and east
Install streetscape lighting	Northeast corner of intersection Northwest corner of intersection
Street furniture: benches and trash cans	Along Mangum Street between Pettigrew Street and Vivian Street, as appropriate
Construct sidewalk	Along south side of Pettigrew street between Blackwell Street and Mangum Street
Remove pedestrian path and railing	Northeast of intersection between Pettigrew Street and Norfolk Southern railroad
Upgrade bus stop: add shelter and bench	Southwest corner of intersection
Retime traffic signals due to removed crosswalk	All directions

* Rail safety improvements



1 Install Standard Asphalt Pavement over Tracks for Sidewalk Connectivity



2 Mill and Repave Crosswalk and Reapply Pavement Markings



3 Upgrade Bus Stop



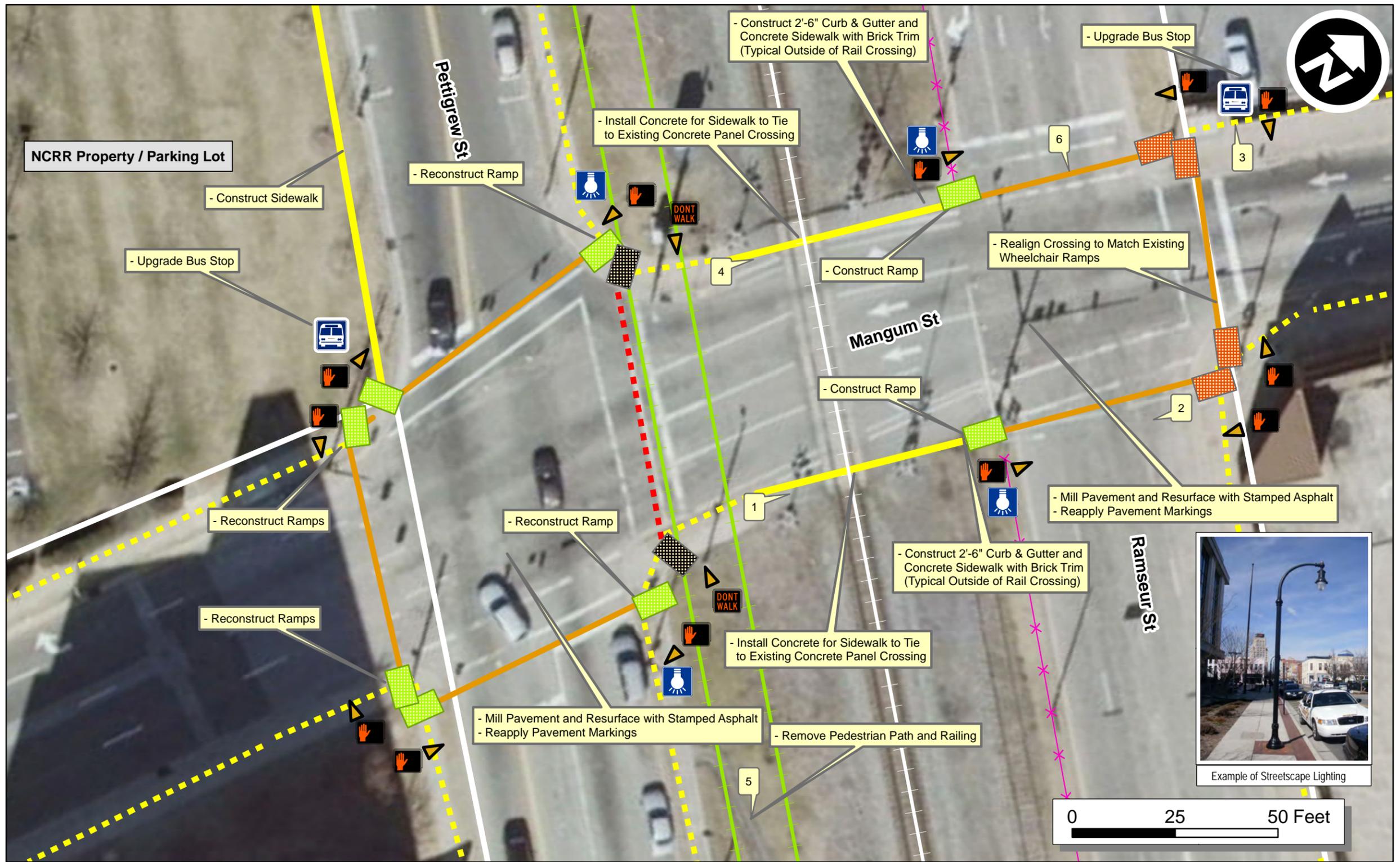
4 Install Standard Asphalt Pavement over Tracks for Sidewalk Connectivity



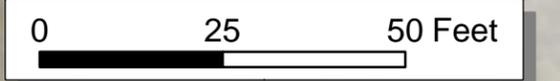
5 Remove Pedestrian Path and Railing



6 Mill Pavement and Resurface with Stamped Asphalt



Example of Streetscape Lighting



Durham Traffic Separation Study
 Preliminary Pedestrian Recommendations
 Mangum / Norfolk Southern RR Crossing
 Durham County, North Carolina
 February 27, 2012

Legend

Existing Pedestrian Signal	Proposed Lighting in Tunnel	Existing Sidewalk/Crosswalk	Existing Railroad
Proposed Pedestrian Signal	Existing Pedestrian Ramp	Proposed Sidewalk/Crosswalk	Assumed Rail Right of Way
Remove Pedestrian Signal	Proposed or Improved Pedestrian Ramp	Reapplied Crosswalk	Parking Lot
Pedestrian Signal Direction	Remove Pedestrian Ramp/Rebuild Curb	Remove Sidewalk/Crosswalk	Bus Stops
Proposed Streetscape Lighting		Proposed Decorative Fence	
		Proposed TTA Light Rail	



DURHAM TRAFFIC SEPARATION STUDY

Transportation Improvement Program Project No. P-3309D

Roxboro Street / Norfolk Southern Railroad Crossing Preliminary Recommendations

All preliminary pedestrian recommendations at this location are near-term improvements. Near-term improvements may be phased into the mid-term depending on funding availability.

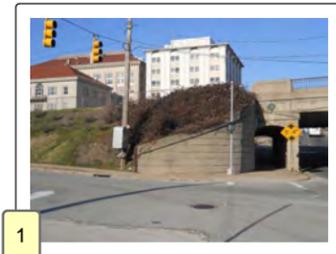
Roxboro Street / Railroad Bridge

Sandblast and paint	Walls, wingwalls, and bridges in Norfolk Southern railroad tunnel
Mill pavement and resurface	Roxboro Street under Norfolk Southern railroad
Repair support structure and wingwall	In Norfolk Southern railroad tunnel
Improve landscaping	On north and south ends of railroad tunnels on top of the wingwalls
Remove existing chain link fence	South of Norfolk Southern railroad
*Install decorative fence	Along south side of Ramseur Street between Mangum Street and Roxboro Street
Add pedestrian lighting	In the railroad tunnel (the City is completing an agreement with NCR and plans to install additional lights in the tunnel this spring)

Roxboro Street / Pettigrew Street

Mill pavement and resurface	Roxboro Street / Pettigrew Street intersection
Remove crosswalk markings	East/west across Roxboro Street, north side of the intersection
Remove pedestrian ramps	Northwest corner of intersection, facing east Northeast corner of intersection, facing west
Remove pedestrian signals	Northwest corner of intersection, facing east Northeast corner of intersection, facing west
Reapply crosswalk markings	North/south across Pettigrew Street, west side of intersection North/south across Pettigrew Street, east side of intersection East/west across Roxboro Street, south side of intersection
Reconstruct pedestrian ramp	Northwest corner of intersection, facing south Northeast corner of intersection, facing south Southeast corner of intersection, facing north and west Southwest corner of intersection, facing north and east
Remove existing sidewalk	On north side of Pettigrew Street east of Roxboro Street to end of sidewalk

* Rail safety improvements



1 Improve Landcaping on Top of Wingwalls



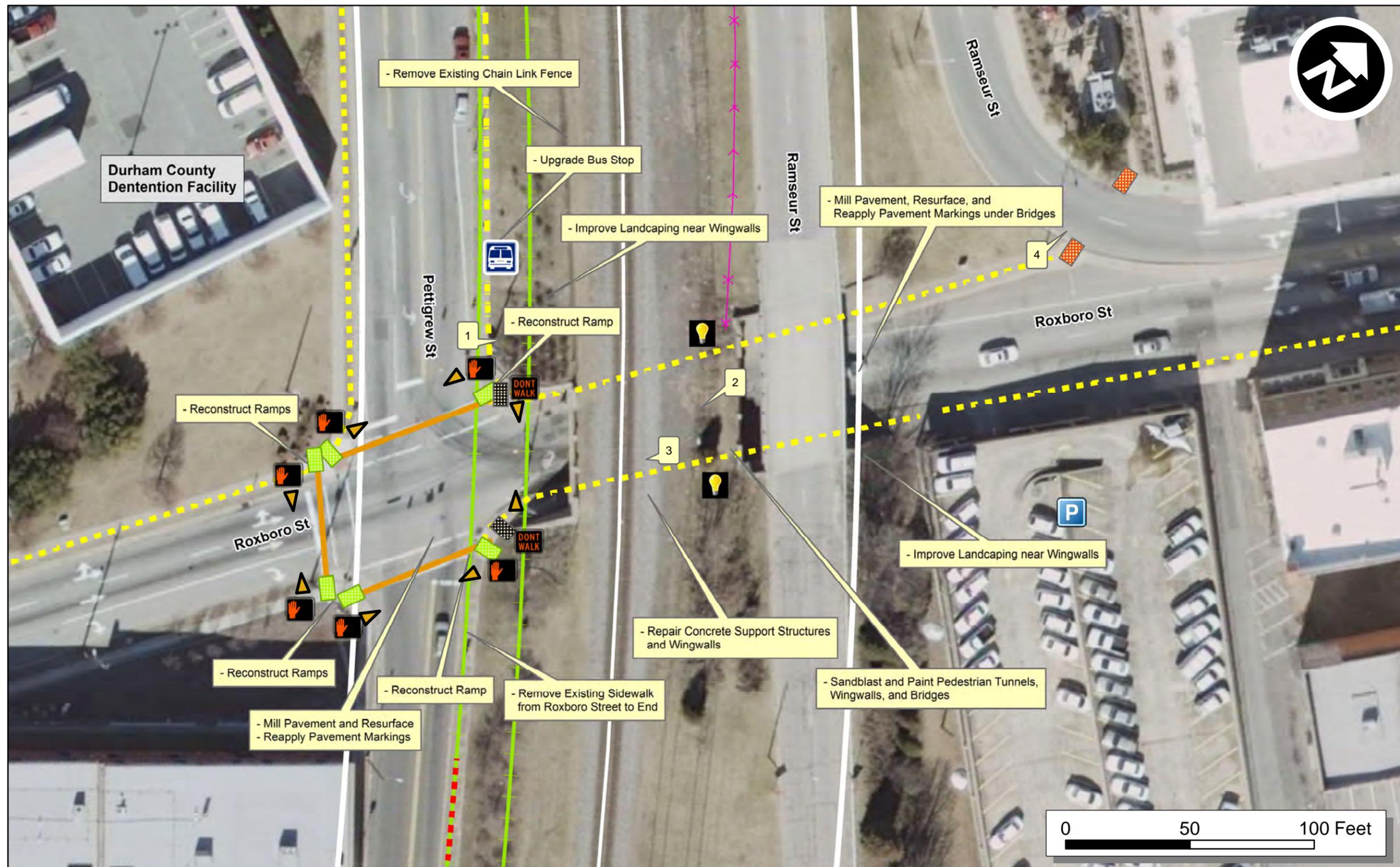
2 Mill and Resurface Roadway and Reapply Pavement Markings



3 Repair Concrete Support Structures and Wingwalls



4 Apply Crosswalk Markings



Durham Traffic Separation Study
Preliminary Pedestrian Recommendations
Roxboro / Norfolk Southern RR Crossing

Durham County, North Carolina
February 13, 2012

Legend

- | | | | |
|-------------------------------|--------------------------------------|-----------------------------|---------------------------|
| Existing Pedestrian Signal | Proposed Lighting in Tunnel | Existing Sidewalk/Crosswalk | Existing Railroad |
| Proposed Pedestrian Signal | Existing Pedestrian Ramp | Proposed Sidewalk/Crosswalk | Assumed Rail Right of Way |
| Remove Pedestrian Signal | Proposed or Improved Pedestrian Ramp | Reapplied Crosswalk | Parking Lot |
| Pedestrian Signal Direction | Remove Pedestrian Ramp/Rebuild Curb | Remove Sidewalk/Crosswalk | Bus Stops |
| Proposed Streetscape Lighting | | Proposed Decorative Fence | |
| | | Proposed TTA Light Rail | |