

# Calm Green Streets Two Project Examples

September 30, 2010  
TAPA/TSITE Conference  
Knoxville, Tennessee

# Presentation Outline

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1. Definitions and Concepts
  - A. Traffic Calming
  - B. Green Streets
  
2. Project # 1 – Grigsby Chapel Rd. Traffic Calming  
Project History, Design Specifics & Results
  
- 2A. Bonus Project – Route 50 Traffic Calming
  
3. Project # 2 – Blount Ave. “Streetscape”  
Project History, Design Specifics & Results

# Traffic Calming

## Definitions/Concepts

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**Traffic Calming** (“reverse traffic engineering”) is the common term given to a wide range of innovative techniques that are being used to address neighborhood street related problems that have plagued local engineers for years. These problems primarily result from traffic “cutting-thru” and speeding on residential streets.

Traffic Calming has historically been most commonly applied to local and collector streets, especially residential neighborhood streets. For this presentation, however, we will be considering traffic calming on higher classification, higher volume, higher speed roadways.

# Traffic Calming Definitions/Concepts

## **Objectives of Traffic Calming:**

- Limit prevailing traffic speeds\*
- Effectively discourage cut-thru traffic\*
- Improve safety for pedestrians, bicycles, and vehicles\*
- Reduce the need for police enforcement
- Reduce traffic-related noise
- Enhance the street environment
- Features are easily maintained
- Do not significantly increase construction cost

\* Primary Objectives

# Traffic Calming

## Definitions/Concepts

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### **Transitional Zone**

When considering traffic calming for higher classification/volume/speed roadways, it is important to provide transitional speed zones which possess explicit guidance and roadway features to inform and encourage drivers to gradually slow down before they reach the residential or other designated lower speed area. This is extremely important for unfamiliar drivers, as they must rely on roadway features to indicate changes in surroundings that require adjustment in their driving speed and behavior.

# Traffic Calming Definitions/Concepts

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## **Gateway**

A traffic calming strategy that consists of a physical or geometric landmark on an arterial or major collector street which indicates a change in environment from a major road to a lower speed residential or commercial district. The objective of a gateway treatment is to make it clear to motorists that they are entering a different road environment that requires a reduction in speed.

# Traffic Calming

## Definitions/Concepts



Do not underestimate the traffic calming effectiveness of the surrounding environment, (what's outside the roadway and beyond the curb). In fact, the emerging field of driver psychology has shown that just as a sign conveys certain information to drivers, so does the surrounding environment. This information may be in the form of subtle visual cues, but it can carry a very effective message.

# Traffic Calming Definitions/Concepts

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## **What type of roadside environment promotes traffic calming?**

European experience and ongoing U.S. research (NCHRP) has consistently shown that the “enclosed” roadside environment can provide effective traffic calming. Such an environment would be characterized by trees and buildings close to the roadway, trees overhanging the roadway, etc.

# Traffic Calming Definitions/Concepts

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While the idea of placing trees and buildings close to the roadway may run counter to the “forgiving roadside” concept, one must remember the history of this concept. It grew out of the early experiences of the interstate system, and thus primarily is a concept for higher speed roadways.

# Traffic Calming Definitions/Concepts

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In fact, European experience and ongoing American research is indicating that fewer run-off-road accidents occur on streets with enclosed settings, as compared to “typical” modern streets. This is apparently due to lower traffic speeds and a higher level of attention by drivers.

# Traffic Calming Definitions/Concepts

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In summary, the most effective traffic calming occurs when the roadway geometric design and the surrounding environment convey one consistent message to the driver. Such configurations are self-enforcing, with the traffic calming embedded into the fundamental fabric of both the street infrastructure and the roadside environment.

## Example of “Enclosed” Setting



# Green Streets

## Definitions/Concepts

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### **Green Streets**

A street that uses vegetated facilities to manage stormwater runoff at its source. A Green Street is a sustainable stormwater strategy that meets regulatory compliance and resource protection goals by using a natural systems approach to manage stormwater, reduce flows, improve water quality and enhance watershed health.

# Green Streets

## Definitions/Concepts

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**Green Streets** can include elements such as street trees, permeable pavements, bioretention and swales. Regardless of the elements used, the goals are the same: “source control of stormwater, limit its transport and pollutant conveyance to the collection system, restore predevelopment hydrology to the extent possible, and provide environmentally enhanced roads. Successful application of green techniques will encourage soil and vegetation contact, infiltration and retention of stormwater.”

Quote from Cory Horton of CED Engineering Pomona, NY

# Green Streets

## Definitions/Concepts

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**Green Street** design should consider the layout and design of the street network with respect to “the existing hydrologic functions of the land (preserve wetlands, buffers, high permeability soils, etc.) and to minimize the impervious area. If retrofitting or redeveloping a street, opportunities to eliminate unnecessary impervious area should be explored.”

Quote from Cory Horton of CED Engineering Pomona, NY

# Green Streets

## Definitions/Concepts

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### **Sustainability**

Meeting the needs of the present without compromising the ability of future generations to meet their needs.

This is a wide ranging term that can be applied to almost every facet of life. In Transportation it usually relates to efforts to reduce vehicle miles of travel, thereby resulting in reductions in fuel consumption and pollution.

# Green Streets

## Definitions/Concepts

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**Bioretention** is an up-land water quality and water quantity control practice that uses the chemical, biological and physical properties of plants, microbes, and soils for removal of pollutants from stormwater runoff. It is a “Green Streets” strategy.

(See [Bioretention.com](http://Bioretention.com) for detailed information)

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# Project Example Number 1

Grigsby Chapel Road Traffic Calming  
Town of Farragut, Tennessee

# Grigsby Chapel Road Traffic Calming

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## **Project History:**

This project was recommended as a result of a 2007 Town of Farragut Roadway Systems Planning Study, which identified Grigsby Chapel Road as a growing capacity issue requiring improvement. In addition, a major widening project on Campbell Station Road was pending construction, and significant diverted traffic to Grigsby Chapel Road was feared. This project was considered as a proactive measure to address these issues.



# Grigsby Chapel Road Traffic Calming



# Grigsby Chapel Road Traffic Calming

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## **Primary Project Goals:**

1. Reduce cut-thru traffic.
2. Reduce traffic speeds, especially the extremely high speeds.
3. Reduce/prevent vehicles passing in center lane.
4. Improve safety.

# Grigsby Chapel Road Traffic Calming

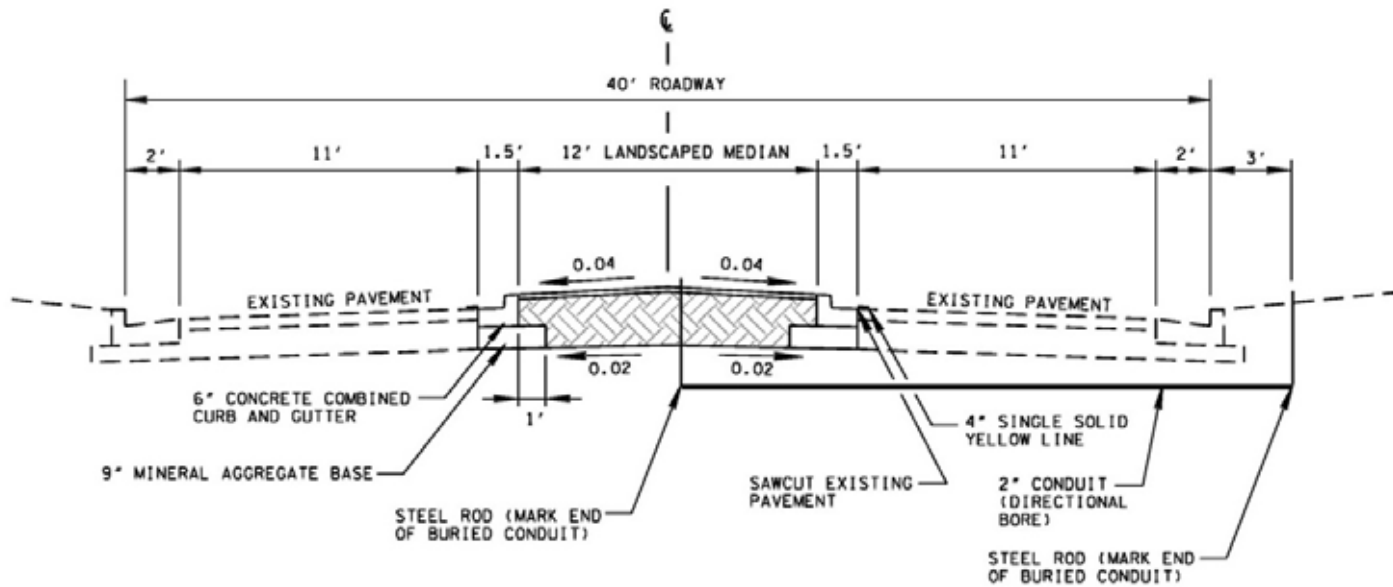
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## **Traffic Calming Features of Project:**

1. Through traffic lane widths narrowed from 12 feet to 11 feet.
2. Landscaped raised median islands at select locations, including Gateway islands.  
(8 total islands)
3. Street trees on islands.
4. Appropriate signage.

(See next slide for typical section)

# Grigsby Chapel Road Traffic Calming



TYPICAL SECTION - GRIGSBY CHAPEL ROAD  
FARRAGUT, TENNESSEE

# Grigsby Chapel Road Traffic Calming

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## **Island Placement Considerations:**

All islands were carefully located to maximize their number and length, but also to minimize their impact on turning movements to and from existing streets and driveways. Gateway islands were considered especially important. Their mission is to inform drivers that the character of the area entered is different, that it is more residential and should be driven accordingly.

# Grigsby Chapel Road Traffic Calming

East Gateway Island



# Grigsby Chapel Road Traffic Calming

## East Gateway Island





# Grigsby Chapel Road Traffic Calming

## West Gateway Islands



# Grigsby Chapel Road Traffic Calming

## West Gateway Islands



# Grigsby Chapel Road Traffic Calming

## Typical Island



# Grigsby Chapel Road Traffic Calming

Longest Island



# Grigsby Chapel Road Traffic Calming

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## Typical Island



# Grigsby Chapel Road Traffic Calming

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## **Primary Results:**

1. Initial public outcry. (“especially outsiders”)
2. “Locals” appear pleased, especially now that all landscaping and trees are complete.
3. Positive feedback received.
4. Speed reductions. (see next slide)

# Grigsby Chapel Road Traffic Calming

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## **Before/After Speed Data:**

	<u>Before</u>	<u>After</u>
85 <sup>th</sup> Percentile Speed	45 mph	42.5 mph
Percent above 50 mph	0.35%	0.18%

# Grigsby Chapel Road Traffic Calming

## **Lessons Learned:**

1. A little more “PR” would have been helpful, including obtaining the support of local neighborhood groups.
2. Maximize the number/length of islands.
3. Center lane pavement texturing would enhance the design.
4. Do all the island work at one time.
5. Avoid such projects during election season.

# Bonus Project

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## Route 50 Traffic Calming

Northern Virginia (35 – 50 miles west of D.C.)

VDOT – FHWA Demo Project

“Villages” of:

Upperville – Const. completed October 2008

Gilbert’s Corner – Four Roundabouts completed 2009

Aldie – Const. began Spring 2010

Middleburg – Apparently opted out of project

# Bonus Project

## Route 50 Traffic Calming

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### **Four Basic Principles of the Route 50 Traffic Calming Project:**

1. Inform travelers when arriving and leaving distinctive areas through the use of entrance features.
2. The “feel” of roads in villages will be distinctively different that the “feel” in rural areas. This helps make the entrance features meaningful.

# Bonus Project

## Route 50 Traffic Calming

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### **Four Basic Principles of the Route 50 Traffic Calming Project (continued):**

3. Maximum speed limits to be relatively low and consistent: Rural- 50mph, Transition Areas- 35mph, Villages- 25mph.
4. Traffic Calming in villages is not to impede traffic, but to help self-enforce the desired speeds and to accommodate pedestrians, bicycles and other non-motorized vehicles.

# Bonus Project

## Route 50 Traffic Calming

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### **Design Features for Route 50 Outside Villages:**

1. Paved roadways with grass shoulders (National Park Service standards)
2. Shrubbery & trees as close to pavement as possible
3. Steel-reinforced wood or stone-clad guardrail
4. Restore/Repair existing roadside stone walls

# Bonus Project

## Route 50 Traffic Calming

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### **Design Features for Route 50 Outside Villages (continued):**

5. Channelizing islands landscaped or white cobblestone
6. Historic markers where appropriate
7. Pull-off areas for emergency vehicle passing or scenic overlooks

# Bonus Project

## Route 50 Traffic Calming

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### **Design Features for Route 50 Within Villages:**

1. On approaches to entrance features, place transverse cobblestone pavers with decreasing spacing across roadway (35mph transition area)
2. Cluster trees/plantings just prior to entrance features
3. Road edges to have mountable curb (emergency pull-off) or paint edgeline replaced with white cobblestone pavers with grass shoulder

# Bonus Project

## Route 50 Traffic Calming

### **Design Features for Route 50 Within Villages (continued):**

4. Other appropriate traffic calming measures used such as raised intersections, raised crosswalks, tree-planted medians, traffic circles, various paving materials for driving, walking and parking surfaces.
5. Walking surfaces to be placed back from road.
6. Abundant strategically-placed greenery.

Each village is to have its own unique plan developed.

# Bonus Project

## Route 50 Traffic Calming



# Bonus Project

## Route 50 Traffic Calming



# Bonus Project

## Route 50 Traffic Calming



# Bonus Project

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# Bonus Project

## Route 50 Traffic Calming



# Bonus Project

## Route 50 Traffic Calming



# Bonus Project

## Route 50 Traffic Calming

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# Bonus Project

## Route 50 Traffic Calming



# Bonus Project

## Route 50 Traffic Calming



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## Project Example Number 2

West Blount Avenue “Streetscape”

City of Knoxville, Tennessee

# Blount Avenue "Streetscape"



# Blount Avenue "Streetscape"

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**Project Title:** Blount Avenue Reconstruction

**Client:** City of Knoxville South Waterfront Development Department

**Scope:** Reconstruct approx. 1600 LF of 2-lane urban collector roadway with upgrades.

**Design Goals:**

- Provide stormwater treatment by bioretention.
- No piped irrigation system for landscaped areas.
- Provide pedestrian facilities to connect to existing sidewalk on Chapman Highway.
- Add LED lighting and streetside parking.
- Aesthetic improvements (streetscape, relocate utilities from overhead to underground).

# Blount Avenue "Streetscape"

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## **Project History:**

- South Waterfront Vision Plan – adopted by the City of Knoxville in 2006.
- One of several projects planned as part of Phase I of the Vision Plan.
- First project to be constructed – ribbon cutting ceremony in October 2010.
- Construction plans and other documents available online at [www.cityofknoxville.org/southwaterfront/](http://www.cityofknoxville.org/southwaterfront/).

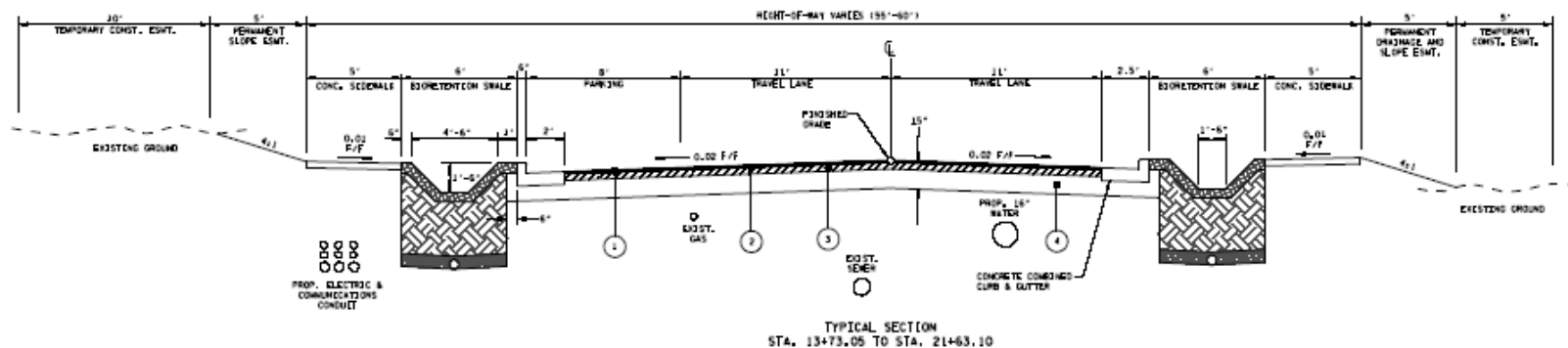
# Blount Avenue "Streetscape"



Rendering by Hargreaves & Associates, June 2007

# Blount Avenue "Streetscape"

- Right-of-way limited to 55' – 60'
- 2 – 11' travel lanes with 8' streetside parking
- 5' concrete sidewalk on both sides of roadway
- Bioretention swale – 6' width; Section from top down is erosion control matting, topsoil, treatment soil, aggregate underdrain.



# Blount Avenue "Streetscape"



# Blount Avenue "Streetscape"



# Blount Avenue "Streetscape"

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## **Blount Ave. Project – Bioretention Features**

- Curb cuts divert stormwater to bioretention swale; eliminates need for curb inlets and piped irrigation.
- Stormwater is treated by natural processes; the water infiltrates through special treatment soil and ultimately to an aggregate underdrain that is connected to the existing storm sewer system.

# Blount Avenue "Streetscape"



# Blount Avenue "Streetscape"



## Blount Avenue "Streetscape"

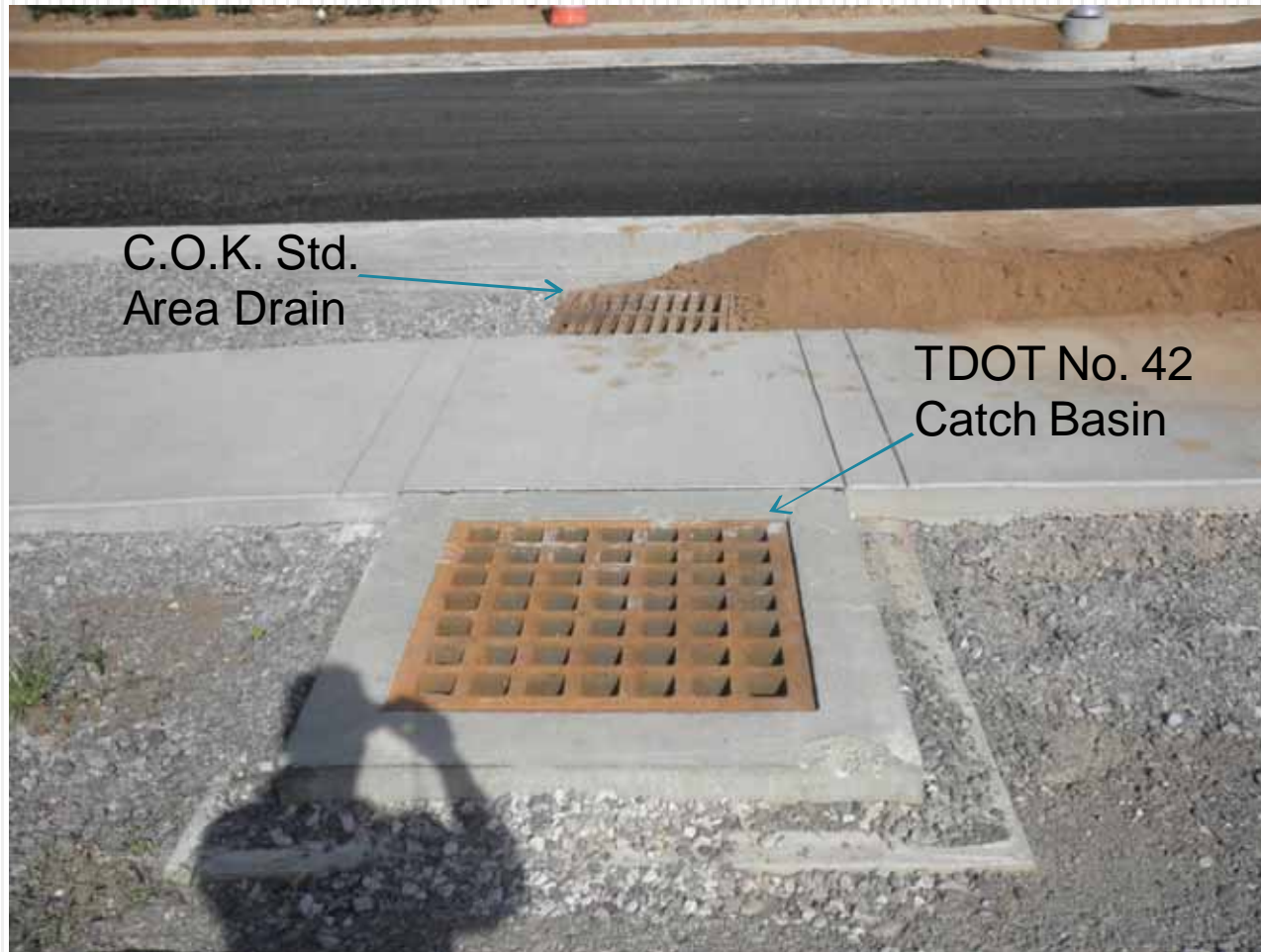
### **Blount Ave. Project – Bioretention Features (con't)**

- For larger storm events (>25 year), runoff will overflow into area drains that function as weirs, and then into the existing storm sewer trunk line.
- The bioretention swale contains vegetation that is drought resistant and also tolerant to excess moisture content.
  - Trees at 35' spacing - Littleleaf Linden
  - Ground cover - Daylily and Liriope

# Blount Avenue "Streetscape"



# Blount Avenue "Streetscape"



# Blount Avenue "Streetscape"

L.E.D. Fixture  
(LUMEC)



# Blount Avenue "Streetscape"



THANK YOU FOR YOUR ATTENTION!!

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