A presentation to the
Tampa Bay Chapter Institute of Transportation Engineers (TBITE)
Quarterly Luncheon

The City of Lakeland’s Intersection of:
*Mobility Avenue; Parking Street; Safety for All Boulevard; and Economic Drive.*

June 18, 2019

Charles Barmby, Transportation & Development Review Manager
Angelo Rao, PE, Traffic Operations and Parking Services Manager
City of Lakeland, FL
City of Lakeland, FL
(Polk County)
Spring Training Information

- Orlando
- Lakeland
- Tampa
- Clearwater
- St. Petersburg
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The City of Lakeland’s Intersection of:
Mobility Avenue; Parking Street; Safety for All Boulevard; and Economic Drive.
June 18, 2019

Charles Barmby, Transportation & Development Review Manager
City of Lakeland, FL
Complete Streets & Connectivity

- **Partnerships!**
  - Engaged Public
  - Polk TPO
  - Florida DOT
  - Lakeland CRA
  - LAMTD/Citrus Connection
  - Development Community
  - Corporate Citizens
  - City Departments

- Appropriate facility for surrounding area
- Not just about moving cars...
- About “the last mile foot”
- Public right-of-way or private development
We must create a safer system...
Polk County Local Government

Complete Street Policy: Signed on
October 11, 2012 in Lakeland

Citywide Walkability Workshop with
Dan Burden: November 8, 2013
Lakeland’s Policy Framework
Lakeland’s Policy Framework
The Problem Presented to FDOT

- Narrow travel lane width (8.5 – 9 feet)
- Narrow sidewalks
- Inadequate transit facilities
- ADA compliance concerns
- Hindrance to economic development within Dixieland CRA Area
- Divides Downtown, Dixieland and adjacent neighborhoods
- Generally, discourages pedestrian and bicycle travel
- *South Florida Avenue can play greater role in corridor redevelopment and mobility – newer ideas*
Improve safety & economic development
Suntrust - 2016

Crash during bollard construction

Bomar Trophy - 2015
Imagining the Possibilities...

Roadway Capacity

Images by Treasure Coast RPC

Community Revitalization
City Commission
Resolution #5370

• Adopted on May 1, 2017

• Street does not adequately serve all users

• Significant safety concerns; does not contribute to CRA economic development objectives

• Study documents deficiencies and improvements

• Asks FDOT to evaluate alternatives, including road-diet

• Requested test period of at least one year
Road-Diet Test (Pilot)

PROPOSED TYPICAL SECTION SR 37 (FLORIDA AVE.)
LANE ELIMINATION

Source: Florida DOT
Road-Diet Test (Pilot)

Source: Florida DOT
Road-Diet Test (Pilot)

Source: Florida DOT
Prioritization request to Polk TPO

Re-Allocation of funding from other deferred Complete Street Project

Design Underway

Construction in 2020

Ariana to Lime Streets

Road-Diet Test (Pilot)
Transit Service Enhancements
Road-Diet Test (Pilot)

• **On-Going Topics**
  • Final design of test
  • Agency Responsibilities
  • Scale and limits of container planters
  • Maintenance
  • Restoration if test is unsuccessful
  • Public information and outreach
  • Transit improvements
  • *City Commission action on ultimate improvements*
Alternate Routes

➢ US 98/Bartow Road
➢ SR 563/Harden-Sikes

Roadway Safety Audits

➢ TPO: Ariana Street
➢ FDOT: Florida Avenue
Alternate Routes
Alternate Routes

Success Avenue – East of Florida Avenue
Alternate Routes

New York Avenue – West of Florida Avenue
Data Collection

• FDOT to collect pre-data at approx. 90 locations in study area (tube and TMCs)

• City purchased and installed bluetoads at 16 locations – already reporting

• Post data collection and analysis

• Data from other studies
A picture is worth a thousand words!
Lakeland Area Alternatives Analysis

• Outgrowth of proposed US 98 Re-Evaluation and Design for six-lane project

• Inconsistent with Comprehensive Plan and TPO Long-Range Transportation Plan

• Proximity to neighborhoods, community facilities and employment centers

• Specific study corridors
  • US 98/N. Florida Avenue
  • US 92/Memorial Boulevard
  • SR 33/Lakeland Hills Boulevard
  • SR 539/Kathleen Road
  • Local Roads
    • Providence Road
    • Dr. Martin Luther King Jr. Avenue
    • Tenth Street
PHASE 1: UNDERSTANDING THE VISION

STAKEHOLDER COMMENTS

- **Congestion**, 39
- **Pedestrian/Bicycle**, 53
- **Complete Streets**, 11
- **Intersection/Signals**, 26
- **Roadway**, 19
- **Freight**, 5
- **Transit**, 29
- **Aesthetics**, 10

Source: Florida DOT
Lakeland Area Alternatives Analysis

PHASE 2: IDENTIFYING THE CHALLENGES AND OPPORTUNITIES

ROAD SAFETY AUDITS
Six corridors
• 12.5 miles
• 27 participants
• 300+ issues identified

Source: Florida DOT
Lakeland Area Alternatives Analysis

PHASE 3: DEVELOPING STRATEGIES

US 98 - Bus Rapid Transit improves mobility options

Source: Florida DOT
Lakeland Area Alternatives Analysis

PHASE 3: DEVELOPING STRATEGIES

US 98 - Intersection improvements calm traffic and improve safety

Source: Florida DOT
Lakeland Area Alternatives Analysis

PHASE 3: DEVELOPING STRATEGIES

SR 33 – Roundabout at Parkview Place / 10th Street

Source: Florida DOT
Lakeland Area Alternatives Analysis

PHASE 3: DEVELOPING STRATEGIES
SR 539 – US 92 /Memorial Blvd Improved Connection

Source: Florida DOT
Lakeland Area Alternatives Analysis

PHASE 3: DEVELOPING STRATEGIES

US 98 – Gateway Features

Source: Florida DOT
Adopted on October 15, 2018

Supporting policies

On-going projects in study area

Establishes listing of priority projects

Request for funding strategy to support implementation

TPO Project Priorities adopted on June 6, 2019

Upcoming US 98 Resurfacing Project

CRA Transit Funding Agreement

Exhibit A (Page 1 of 2)

Lakeland Area Alternatives Analysis
Project Phase Priorities

SR 39/Lakeland Hills Boulevard
1. Complete Street (Parkview to Granada) programmed for FY 24 or FY 25
2. Event Management System (South of Bell’s View Street to Interstate 4) and Queue Detection System for southbound approach to Memorial Boulevard.
3. Roundabout at Lake Crago Drive Intersection
4. Tonnor Trail Connector to Lake Parker Parkway
5. PO&E/Alignment Study and Operational Analysis for Roundabout at Parkview Place

US 92/Memorial Boulevard
1. Concrete Reconstruction in 5-10 Years
   a. Lane Elimination between Walker Avenue and Florida Avenue
   b. Intersection Treatments at Martin Luther King, Florida and Lakeland Hills
2. Bicycle/Pedestrian Overpass over Kathleen Road/CSX Railroad

US 98 North
1. Pedestrian Plaza at Bryant Stadium
2. Bus Rapid Transit Feasibility Study (support Brightline Extension)
3. Gateway Treatments between Parkway and Interstate 4
4. Bicycle/Pedestrian improvements at Interstate 4 (upcoming resurfacing project)
5. PO&E/Alignment Study for Griffin Road/Pyramid Parkway Alternative

SR 51B/Kathleen Road
1. Feasibility Study for Kathleen Road/Memorial Boulevard Interchange
2. Pedestrian Complete Street Treatment between 8th Street and 14th Street
3. Operational Analysis to identify improvement options for 10th Street at Kathleen Road
4. PO&E/Alignment Study and Operational Analysis for Roundabout at Fantanks Street/Interstate Drive
5. PO&E Study for Kathleen Road/Memorial Boulevard Interchange

Providence Road
1. City Project in Curator – 10th to 14th Street and or Providence Reseau to Griffin Road
2. Complete Street Reconstruction between 14th Street and Griffin Road (w/ sidewalk in lieu of bike lanes)

Transmit (including any associated capital needs)
1. Extended hours of operation on key routes such as Routes #1 and #3
2. More frequent service within study area
3. Transit stop improvements on City collective streets
Citywide Pathways Plan
Three Parks Trail & Connector Trails

Connector Routes
New York Avenue “Cycle Track”

New York Avenue in Downtown Lakeland - Before

New York Avenue in Downtown Lakeland – Now!
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The City of Lakeland’s Intersection of:
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June 18, 2019

Angelo Rao, PE, Traffic Operations and Parking Services Manager
City of Lakeland, FL
Polk County Transportation Planning Organization (TPO)

Pledge to SLOW DOWN

I pledge to SLOW DOWN and drive safely because...
It’s all about **Potential** and Kinetic Energies!!
It’s all about Potential and **Kinetic** Energies!!
Kinetic Energy - Speed Kills!!

Hit by a vehicle traveling at 20
9 out of 10 pedestrians survive.

Hit by a vehicle traveling at 30
5 out of 10 pedestrians survive.

Hit by a vehicle traveling at 40
only 1 out of 10 pedestrians survives.
Kinetic Energy - Speed Kills!!

KE = \frac{1}{2} m v^2

Kinetic Energy

VELOCITY FORCES
Kinetic Energy - Speed Kills!!

\[ KE = \frac{1}{2} m v^2 \]

Kinetic Energy

Velocity Forces

Hit by a vehicle traveling at 40 mph:

only 1 out of 10 pedestrians survives.
Kinetic Energy - Speed Kills!!

KE = $\frac{1}{2} m v^2$

**Kinetic Energy**

**Velocity Forces**

Hit by a vehicle traveling at 30 mph:
- 5 out of 10 pedestrians survive.

Hit by a vehicle traveling at 40 mph:
- Only 1 out of 10 pedestrians survives.
Kinetic Energy - Speed Kills!!

KE = \( \frac{1}{2} m v^2 \)

**Hit by a vehicle traveling at 20 mph:**
- 9 out of 10 pedestrians survive.

**Hit by a vehicle traveling at 30 mph:**
- 5 out of 10 pedestrians survive.

**Hit by a vehicle traveling at 40 mph:**
- Only 1 out of 10 pedestrians survives.
Kinetic Energy - Speed Kills!!

\[ KE = \frac{1}{2} m v^2 \]

Given motorists tend to drive about 50 mph on major arterials........

Hit by a vehicle traveling at 50 mph, only 1 out of 10 pedestrians survives.
Walk / Bike SAFETY FOR ALL - SAM!!

- Safety,
- Accessibility, and
- Mobility

FOR ALL!!
Pedestrians get a 5-second head-start
Motorists & pedestrian
red
LPI
Motorists & pedestrian green LPI
About 2/3 reduction in pedestrian crashes
Up to 40% reduction in trendline vehicle-to-vehicle injury crashes
Virtually no cost to the City
Incorporates Accessible needs well
Walk / Bike **SAFETY FOR ALL - SAM!!**

**Speed reduction Program**

➢ Traffic Calming Program revised

<table>
<thead>
<tr>
<th>Candidate Roadway Attribute</th>
<th>Speed Differential (mph)</th>
<th>Traffic Volume (24 hours)</th>
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<tr>
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<td>[Speed limit - posted speed]</td>
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<tr>
<td>Sheet Name</td>
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<tr>
<td>From</td>
<td>0-3</td>
<td>Option 1</td>
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<td>To</td>
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<td>Pedestrians present?</td>
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<td>Community Facilities (pedestrian generation)</td>
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<td>Evidence of Cutthrough Traffic</td>
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<td>Crash history (3 years)</td>
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<tr>
<td>Existing mid-block pedestrian crossing?</td>
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<tr>
<td>Documentation that passive solutions (enforcement, signage, markings, speed feedback signs) were unsuccessful</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Option 1:** Traffic calming alternatives are generally not recommended. Passive solutions such as speed enforcement, traffic signage, and pavement markings are implemented first.

**Option 2:** Similar approach to Option 1 with additional consideration of deploying neighborhood radar speed trailers, pole-mounted speed feedback signs and/or establishment of the neighborhood speed watch program. Engineering judgement with consideration of roadway attributes may play a role in determining if traffic calming is recommended.

**Option 3:** Evaluate traffic calming alternatives/solutions.
Walk / Bike SAFETY FOR ALL - SAM!!
Speed reduction Program

➢ Lake Morton Drive ~ 5,000 vpd – “20 MPH” and “Parking Boxes”

The Swans are so obedient!!
Walk / Bike SAFETY FOR ALL - SAM!!
Rectangular Reflective Flashing Beacons – RRFB’s

W. Lime Street – RP Funding Center
(with Raised Crosswalks)
• Local studies:
  ➢ 38 out of 39 (97.4%) motorists did not yield/stop when the RRFB system was not activated;
  ➢ 35 out of 41 (85.4%) motorists did yield/stop when the RRFB system was activated.
• 16 RRFB’s
• 31 candidate site list for future consideration.
Utilizing “high visibility ladder” style crossing.

Where cost feasible, a “herring bone brick” accent is installed in between the crossing bars.

“Diagonal Pedestrian crosswalks” coupled with an “Exclusive Pedestrian” phase and “No Right-Turn on Red” phase.
Walk / Bike SAFETY FOR ALL - SAM!!
The Etcetera slides!!

Pedestrian/Bicycle Safety Technology:

Pedestrian/ Bicyclists’ electronic count stations (Eco counters):
Lk Hollingsworth/Three Parks Trail

Fully Remote
School Zone Activation Center
Enhancing Public Access to the Downtown Core by Encouraging and Promoting:

- **Turnover** – Share the space for current and future growth of the downtown

- **Operations** – Keep traffic moving for **ALL users** in a predictable and efficient manner

- **Public Education** - Be ambassadors to the public

- **Safety** – Provide a transportation environment where families feel secure
Action Plan Update:

Implement “Universal Valet” program with the CRA & LDDA 100% funded:

- December 2018
- Wed/Thurs./Fri 11am to 3 pm
- Fri/Sat evenings
- Text based – vehicle will be returned anywhere you are downtown
Operate/monitor new “Free After 3” Program in the lower level of the Main Street Garage (Cedar Entrance):

- Provide the opportunity for motorists to enjoy free parking after 3:00 pm (reduce on-street parking pressure for local restaurants and shops)
Action Plan Update:

Operate/monitor on-street parking “Zone 2725”:

• Up to 60 Spaces Available
• “NEW” $0.25/Hour
• Unlimited / First 2 hours free
Operate/monitor on-street parking “Zone 2725” Con't:

ZONE "2725" - WALK A LITTLE SAVE A LOT!
Action Plan Update:

Develop Integrated License Plate Recognition (LPR) Technology – and associated equipment:

- October 2018
- LPD Conversion of “Hand Written Citations” to electronic citations September 2019
- Membership hardwareless “Park n’ Play” parking plan
Parking garage P3:

- Police Department Property
- Wells Fargo/Colonial Lot
- Citrus Mutual Property
- Heritage Plaza Property
Recruit parking garage P3
Opportunity:

➢ Police Department Property
➢ Wells Fargo/Colonial Lot
➢ Citrus Mutual Property
➢ Heritage Plaza Property

✔ The day has come!!
**P3 Downtown Economic Development Approach – Heritage Plaza Property**

**Economic Opportunity** – Encourage potential developers/employers to relocate downtown:

- Encourage Public/Private Partnerships (P3)
- Create a “Blueprint” to attract new investment
- “Condominium Approach” to partnership – Two floors for the City
- Main Street Garage transition will provide additional spaces for downtown businesses
P3 Downtown Economic Development Approach – Heritage Plaza Property

The stats:
- 824 parking space garage investment
- Lower 2/3 of Lemon/Kentucky/Orange/Tennessee Block

- Partnership parking spaces distribution:
  - Lakeland Regional Health Systems: 125
  - MidFlorida Credit Union: 175
  - Heritage Plaza: 125
  - City of Lakeland: 399

Total: 824
Action Plan Update:

NEXT STEPS:
- Construction begins May/June 2019
- Temporary relocation of construction parking displacement
- Road closure requirements:
  - Kentucky Avenue
- Ribbon cutting – End of 2019
Heritage Plaza
This Time
Next Year!!
Heritage Plaza

This Time

Next Year!!
Walk / Bike SAFETY FOR ALL - SAM!!

Education

Pedestrian/Bicycle Education:
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**Charles Barmby, Transportation & Development Review Manager**

City of Lakeland, FL
...and then there’s the railroad crossing
Intelligent Rail Bypass System

• Project priority from FDOT’s Polk Rail Study

• Informs motorists of bypass route when gates are activated
Intelligent Rail Bypass System

Source: Florida DOT
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*City of Lakeland, FL*
Kinetic Energy - Speed Kills!!

KE = \( \frac{1}{2}mv^2 \)

**Velocity Forces**
- Hit by a vehicle traveling at 20 km/h:
  - 9 out of 10 pedestrians survive.
- Hit by a vehicle traveling at 30 km/h:
  - 5 out of 10 pedestrians survive.
- Hit by a vehicle traveling at 40 km/h:
  - Only 1 out of 10 pedestrians survives.
Almost nobody slows down to run a red light.....Enter.......  

The City of Lakeland’s:  

Intersection Collision Safety Program - iCASP
Intersection Collision Safety Program - iCASP

• Program to prevent Red Light Running (RLR) Crashes
• Predict RLR vehicle
• Extend “All-Red” phase
• Delay the “Green” walk/traffic phase
• Partnership study
Current operation:

• Currently study implemented at RLR video camera sites only
• Combination setting serves to prevent any “learning curve” of motorists taking advantage of the red light extension system;
• **Meta-data collection mode only**
• Four sites being studied:
  ➢ Memorial Boulevard and Dr. M.L. King Street;
  ➢ Memorial Boulevard and Massachusetts Avenue;
  ➢ **N. Crystal Lake Drive and US 98 Bartow Road**;
  ➢ S. Florida Avenue and Beacon Road.
Case Study Site
N. Crystal Lake Drive and
US 98 Bartow Road
Econolite – Cobalt Controller

Iteris – Vector Sensor
Intersection Collision Safety Program - iCASP

CLEARANCE INTERVAL ACTIVITY

Bartow Rd. /US. 98 & N. CRYSTAL LAKE (SIGNAL ID: 3)

Tuesday, April 16, 2019 12:00 AM - Wednesday, April 17, 2019 11:59 PM

- Dilemma Zone Trip Lines
- 45+ mph Trip Line
- 35-45 mph Trip Line
- 45+ mph Trip Line
- 35-45 mph Trip Line
- Dilemma Zone Trip Lines
Walk / Bike SAFETY FOR ALL

3.0 Intersection Collision Safety Program - iCASP

PHASES: 2, 6

(SB Thru, NB Thru)
Most drivers seem to behave themselves!!
N. Crystal Lake Drive / US 98 Barlow Rd
NB & SB Traffic 69 days (Mar/Apr/May 2019)

Perpendicular green is on!!!

0.20%
5,853
On red
(85/day)

0.13%
3,604
Beyond All red
(52/day)

2.11%
59,943
On yellow
(870/day)

NON – GREEN DRIVERS

Some drivers not so much!!

ALL DRIVERS

99.67%
Green & yellow!
97.56%
On green
0.13%
Beyond All red
0.20%
On red
2.11%
On yellow
Intersection Collision Safety Program - iCASP
Intersection Collision Safety Program - iCASP

CLEARANCE INTERVAL ACTIVITY

US. 98 & N. CRYSTAL LAKE (SIGNAL ID: 3)
Tuesday, April 16, 2019 12:00 AM - Wednesday, April 17, 2019 11:59 PM

PHASES: 2, 6
(S8 Thru, N8 Thru)

YELLOW PHASE

4.8 SECONDS
YELLOW TIME
Intersection Collision Safety Program - iCASP

CLEARANCE INTERVAL ACTIVITY

US. 98 & N. CRYSTAL LAKE (SIGNAL ID: 3)

Tuesday, April 16, 2019 12:00 AM - Wednesday, April 17, 2019 11:59 PM

PHASES: 2, 6
(S8 Thru, N8 Thru)

ALL-RED PHASE

1.0 SECONDS

ALL-RED
Intersection Collision Safety Program - iCASP

CLEARANCE INTERVAL ACTIVITY

US. 98 & N. CRYSTAL LAKE (SIGNAL ID: 3)

Tuesday, April 16, 2019 12:00 AM - Wednesday, April 17, 2019 11:59 PM

PHASES: 2, 6
(S8 Thru, N8 Thru)

7:11 AM 1.6 SECONDS AFTER ALL-RED

Perpendicular green is on!!!
Can iCASP end these Pedestrian safety concern events???
N. Crystal Lake Drive and US 98 Bartow Road
N. Crystal Lake Drive and US 98 Bartow Road
Iteris Red Extend with Vantage Vector
Specific Case Study:

N. Crystal Lake Drive at Bartow Road US 98
US 98 at N. Crystal Lake

Dilemma Zone Trip Lines

45+ mph Trip Line

35-45 mph Trip Line
Red Light Extension Scenarios / Protocol
Scenario 1: No Red Extend Detectors (Conventional Intersection)

1. Vehicle traveling 45 mph hits Advanced Detection Zone.
2. Vehicle clears the intersection on yellow
Scenario 2: **No Red** Extend Detectors (Conventional Intersection)

1. Vehicle traveling 45 mph is just in front of Advanced Detection Zone when the signal turns yellow.
2. Vehicle enters the intersection during Red Clearance
3. **Opposing green Phase has begun** while red-light runner is still in the intersection
Scenario 3: **With Red Extend** Detector (trip line) set 132’ back from Stop Bar with 4 second extension (set in Vector) Vector trip line activated by vehicles traveling 45 mph or greater

1. Vehicle going 45 mph is just in front of Advanced Detection Zone trip line when the signal turns yellow.
2. Vehicle going 45 mph hits trip line detector 132’ feet from the stop bar while signal is yellow.
3. Detector holds the call for 4 seconds.
4. When Red Clearance Starts – Red Extend Detector is TRUE.
5. Vehicle enters the intersection during Red Clearance.
7. Vehicle clears the intersection during Red Extension – **Collision Avoidance enhanced**.
Scenario 4: **With Red Extend** Detector (trip line) set 132’ back from Stop Bar with 4 second extension (set in Vector) Vector trip line activated by vehicles traveling 45 mph or greater

1. Vehicle going 45 mph is 460’ from the intersection when the signal goes yellow
2. Vehicle hits trip line detector 132’ feet from the stop bar as signal turns red
3. Detector holds the call for 4 seconds
4. **When Red Clearance Starts** – Red Extend Detector is TRUE
5. Red Extension in the controller extends the All Red period because Red Extend Detector is TRUE
7. Vehicle clears the intersection during **Red Extension**– Collision Avoidance enhanced.
Next Steps:

• Currently implemented at RLR video camera sites only (Combination setting serves to prevent any “learning curve” of motorists taking advantage of the red light extension system);

• Continue meta-data collection of four sites:
  ➢ N. Crystal Lake Drive and US 98 Bartow Road;
  ➢ Memorial Boulevard and Dr. M.L. King Street;
  ➢ Memorial Boulevard and Massachusetts Avenue;
  ➢ S. Florida Avenue and Beacon Road.

• Review data with FDOT District 1 to ensure appropriate solution;

• Consider test intersection and/or test at Traffic Engineering Research Lab (TERL) at FDOT Central Office (Tallahassee, FL) for more detailed study;

• **Extend the “All-Red” phase upon prediction of a red-light runner.**
“The City of Lakeland’s Intersection of: Mobility Avenue; Parking Street; Safety for All Boulevard; and Economic Drive.”

*Courtesy Promotes Safety:*

*Please SLOW DOWN and give pedestrians and bicyclists a BRAKE!*

For more information:
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