# Pedestrian and Bicycle Counting & Monitoring Program

H-GAC Workshop
March 21, 2013
9:30 AM to 11:30 AM
Conference Room B

# WHAT is this program?

- A plan for phased implementation of a system of regular pedestrian and bicycle counting and monitoring sites in the 8-county H-GAC Transportation Management Area

- Long-term data-collection program

# WHY are we doing this?

- **We need data to determine facility type and locations**
  *(what's being used, where it's being used, etc.)*
- **We do not currently have a regional comprehensive database of walking and biking data counts.**
- **Institutionalize collecting data that will give H-GAC and local governments adequate data to**:
  - Understand usage of ped/bike facilities in a variety of regional contexts;
  - Adjust calculations on estimated air quality benefits of pedestrian and bicyclist facilities based on data collected in the region on facility usage; and
  - Estimate demand or usage of planned or proposed pedestrian and bicyclist facilities for project evaluation and selection purposes.

# HOW do we count?

- **Pedestrian Counters**
  - H-GAC has three temporary "TRAFx" Infrared Trail counters
- **Bicyclist Counters**
  - Pneumatic tube traffic counters that cities or consultants already have/use, can be set-up to use to collect bicyclist counts
- **Use them individually or in tandem**

# WHEN and WHERE do we count?

- **Recommend routine collection:**
  - At least once a year if not twice a year
  - Could do every other year depending on resources
- **24/7 counts for at least one week at a time**
  - 1-3 weeks recommended
- **Recommend collecting in the same locations**
  - This helps to show trends, impacts of a new development or project, and consistency.

- *Detailed considerations on when/where will be discussed later.*

# WHO is involved?

- **Cities, counties, management districts, MUDs**
  - Public Works Department
  - Traffic Operations Departments
  - Planning Department
- **Consultants can assist as long as the city/county/entity is in agreement**

# DATA

- Data will be collected and placed into a regional database
- Data from both pedestrian and bicycle counters will be shared and accessible between local entity and H-GAC
- Data can be requested from H-GAC

# Pedestrian Counters

- **H-GAC has 3 TRAFx Infrared Trail Counters available to borrow**

*Handout*

# How to Loan Out Ped. Counters

- **Coordinate with H-GAC**
  - must sign up on the calendar
- **Interlocal agreement**
- **H-GAC gets the counters ready for city to use**
- **City is responsible for picking up counters from H-GAC**
- **City is responsible for physical deployment/installation and take-down of counters**
- **City brings back counters to H-GAC, then H-GAC downloads data and sends back to city**

# When and Where to do Counts: Considerations

- ***When* - Considerations**
  - A normal/typical week – 24/7 continuous counts
  - Usually not on/near a holiday, spring break, major event, etc.
  - Spring/Fall preferable
  - Consider the weather
  - Once or twice a year is preferable

*Handout*

# When and Where to do Counts: Considerations

- ***Where* - Considerations**
  - At a location where you want to understand pedestrian activity
  - Along a straightaway
    - Not at an intersection (people standing can skew results)
  - Need a static background for infrared, and face away from roadway traffic
  - Stray away from potential of congregating people
    - Example: do not point the counter at/near a school or church entrance
  - No direct sunlight
  - Not directed at moving vegetation (it can heat and be picked up by infrared)

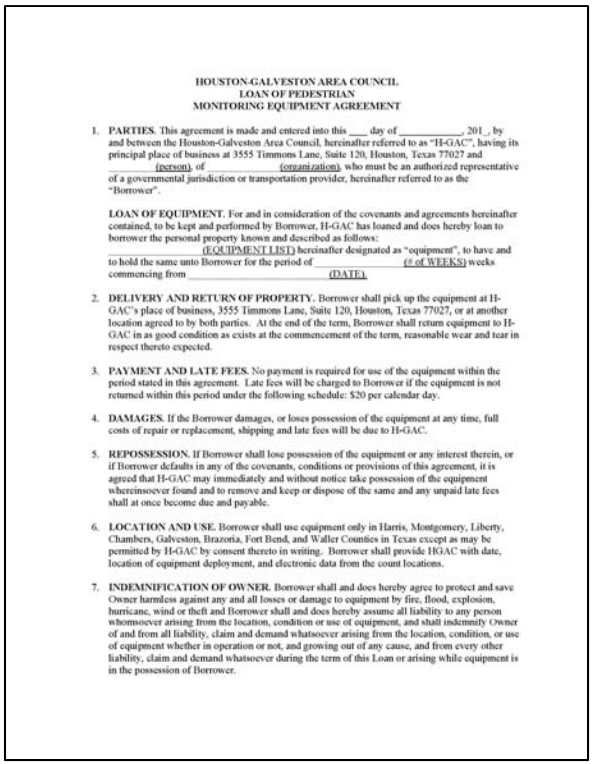
# In-Office Preparations (1)

- **Engage appropriate departments:**
  - Public Works
  - Planning
  - Traffic Operations
  - Legal (Interlocal Agreement)
  - Council (if needed for the Interlocal Agreement)
  - Police Department (heads-up about the locations)
  - Consultant (if needed)

*Handouts (2)*

# In-Office Preparations (2)

- **Execute Interlocal Agreement**
  - Work with legal
  - Work with H-GAC
  - Get approval by council if needed
  - Cannot receive counters without agreement



HOUSTON-GALVESTON AREA COUNCIL
LOAN OF PEDESTRIAN
MONITORING EQUIPMENT AGREEMENT

1. **PARTIES.** This agreement is made and entered into this ___ day of _____, 201_, by and between the Houston-Galveston Area Council, hereinafter referred to as "H-GAC", having its principal place of business at 3555 Timmons Lane, Suite 120, Houston, Texas 77027 and _____ (person), of _____ (organization), who must be an authorized representative of a governmental jurisdiction or transportation provider, hereinafter referred to as the "Borrower".

   **LOAN OF EQUIPMENT.** For and in consideration of the covenants and agreements hereinafter contained, to be kept and performed by Borrower, H-GAC has loaned and does hereby loan to borrower the personal property known and described as follows: _____ (EQUIPMENT LIST) hereinafter designated as "equipment", to have and to hold the same unto Borrower for the period of _____ (# of WEEKS) weeks commencing from _____ (DATE).

2. **DELIVERY AND RETURN OF PROPERTY.** Borrower shall pick up the equipment at H-GAC's place of business, 3555 Timmons Lane, Suite 120, Houston, Texas 77027, or at another location agreed to by both parties. At the end of the term, Borrower shall return equipment to H-GAC in as good condition as exists at the commencement of the term, reasonable wear and tear in respect thereto expected.

3. **PAYMENT AND LATE FEES.** No payment is required for use of the equipment within the period stated in this agreement. Late fees will be charged to Borrower if the equipment is not returned within this period under the following schedule: $20 per calendar day.

4. **DAMAGES.** If the Borrower damages, or loses possession of the equipment at any time, full costs of repair or replacement, shipping and late fees will be due to H-GAC.

5. **REPOSSESSION.** If Borrower shall lose possession of the equipment or any interest therein, or if Borrower defaults in any of the covenants, conditions or provisions of this agreement, it is agreed that H-GAC may immediately and without notice take possession of the equipment whereinsoever found and to remove and keep or dispose of the same and any unpaid late fees shall at once become due and payable.

6. **LOCATION AND USE.** Borrower shall use equipment only in Harris, Montgomery, Liberty, Chambers, Galveston, Brazoria, Fort Bend, and Waller Counties in Texas except as may be permitted by H-GAC by consent thereto in writing. Borrower shall provide HGAC with date, location of equipment deployment, and electronic data from the count locations.

7. **INDEMNIFICATION OF OWNER.** Borrower shall and does hereby agree to protect and save Owner harmless against any and all losses or damage to equipment by fire, flood, explosion, hurricane, wind or theft and Borrower shall and does hereby assume all liability to any person whomsoever arising from the location, condition or use of equipment, and shall indemnify Owner of and from all liability, claim and demand whatsoever arising from the location, condition, or use of equipment whether in operation or not, and growing out of any cause, and from every other liability, claim and demand whatsoever during the term of this Loan or arising while equipment is in the possession of Borrower.

*Handout*

# In-Office Preparations (3)

- **Determine count locations**
  - This can be determined in-office and/or in the field to check out potential locations.
  - *NOTE:* Remember the considerations of when and where to place the counters.

Installation Options:

# In-Office Preparations (4)

- **Field Data Inventory Sheet**
  - H-GAC sends this to you electronically
  - Begin filling this information out electronically, then **print** when it is ready to be used in the field for installation to fill out while in the field.

*Handout*

# In-Office Preparations (5)

- **Create sticker to place on counters with contact info**

# In-Office Preparations (6)

- Pick up equipment from H-GAC
  - According to the calendar/dates requested
  - Reference equipment checklist to ensure all equipment has been gathered

*Handout*

# In-Office Preparations (7)

- **Gather necessary equipment for installation:**
  - Safety gear
  - Clipboard, pencil, inventory sheet, map
  - Installation guide
  - Drill with 5/16$^{th}$ nut driver or slotted screw size
  - Measuring wheel (to determine ROW widths for inventory checklist)
  - Counter equipment (urban box with counter and infrared, G3 Dock, metal bands, padlock)
  - GPS or way to record latitude/longitude
  - Business card(s)
  - Camera

*Handout*

# In-Field Installation Steps

- As noted, you can determine the location(s) in the field prior to the installation day or you can determine exact post/location on the day of installation.

*Handout*

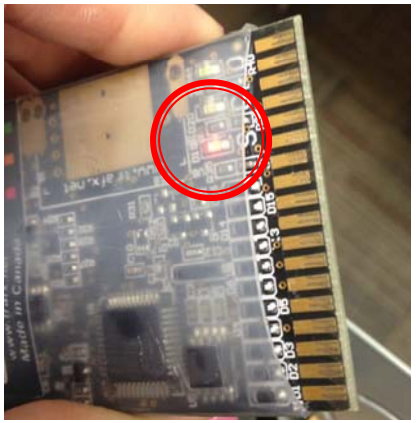
# In-Field Installation Steps (1)

- **"Launch" counter using G3 Dock in "Shuttle Mode"**


*Take G3 Dock and attach it to the counter.*


*Watch for red light to show "downloading". Wait for it to stop.*


*Green "Finished" light will show when it is ready.*



*Remove doc by pulling straight out (do not bend). Wait for red light to blink quickly on the counter.*

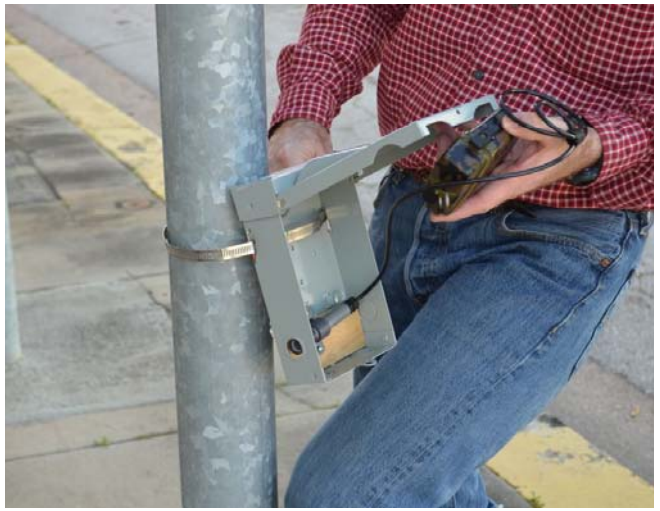
# In-Field Installation Steps (2)

- **Prepare the metal band and box for installation**

*Choose diameter of metal band appropriate for where counter will be secured (post, tree, etc).*

*Weave metal band through slits in metal box that hold the counter.*

*NOTE: It may be good to place your business card inside the metal box.*



*Wrap metal band attached to metal box around the post (tree, or whatever). Close the metal box before securing band.*

# In-Field Installation Steps (3)

- **Secure metal band around post (tree, etc.) using a drill or screw driver**

*Make sure infrared scope is pointed in the right direction and put counter at about **waist height**. Using a drill, secure the metal band with the counter box around the post.*

*There may be long ends sticking out.*

*Make sure to tuck the long ends of the metal band behind the box or through one of the box slits to secure them.*

# In-Field Installation Steps (4)

- **Lock and secure the counter.**

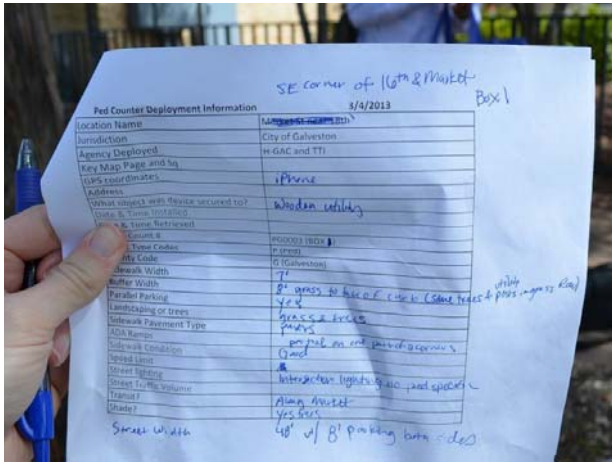
*Installed counter without a lock.*

*Installed counter secured using padlock provided with equipment.*

*If needed, depending on location, provide extra security to counter.*

# In-Field Installation Steps (5)

- **Record all information on the Field Data Inventory Sheet**




*Fill out Field Inventory Sheet*

*Measure widths of road, buffer, sidewalk, etc. for field inventory sheet.*


*Note any transit or multimodal connections.*

# In-Field Installation Steps (6)

- Take Photos of Surrounding Area (context)

# In-Field Installation Steps (7)

- **Record Exact Time after Installation**


***CRITICAL**: Be sure to write down an exact time after you have installed counter and filled out inventory sheet.*

***This marks exact time when we should observe data collected by the counter.***

# In-Field Installation Steps (8)

- Repeat all of these steps for each of the counters that will be installed.
- When you get back to your office, record all Field Data Inventory information in the electronic version, as to not lose any of the data collected.

# In-Field Steps to Take Down

- Do not take counters down prior to one-week of full 24/7 counts
- Record on the Field Data Inventory Sheet an exact time prior to removal of the counters.
- Return counters and digital Field Data Inventory Sheet to H-GAC ASAP
- H-GAC will process the data within two weeks and get back with you

*Handout*

# Data

- Once you return counter equipment to H-GAC, we will upload the data from the counters, save to our database, and send you back the summary tables including raw data.

*Example*

# Questions?

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# Bike Count Methods Using Standard Traffic Counters

# Outline

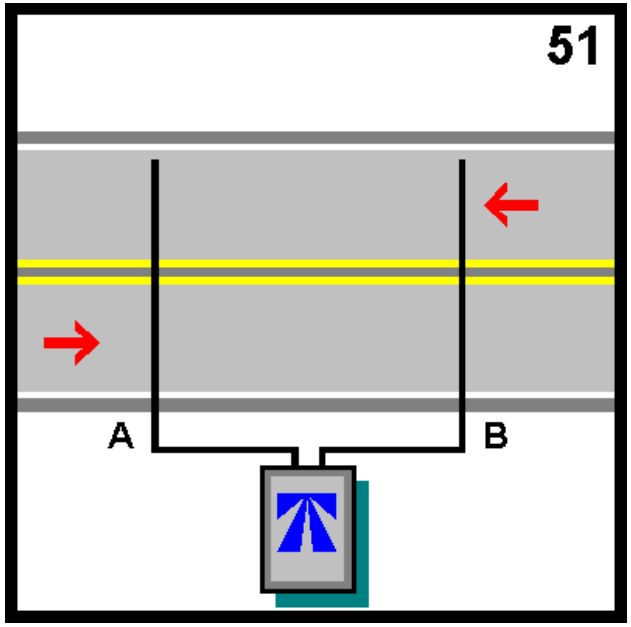
- **Counter Settings**
  - Sensitivity – Air switch setting
  - Dead time - Time between allowable tube strikes
  - Max/Min Speed – Max and Min vehicle speed allowed
  - Acceleration – Max allowable acceleration
- **Field Settings and Procedures**
  - 6 ft spacing
  - Bike Lane Classification
- **Bike Classification**
- **Case Study**
  - Counts
  - Speeds

# Purpose

- Data driven decisions
- Justify Investment
- No specialized equipment
- Make bike counts part of the normal count cycle with local agencies

# Tube Classification 101

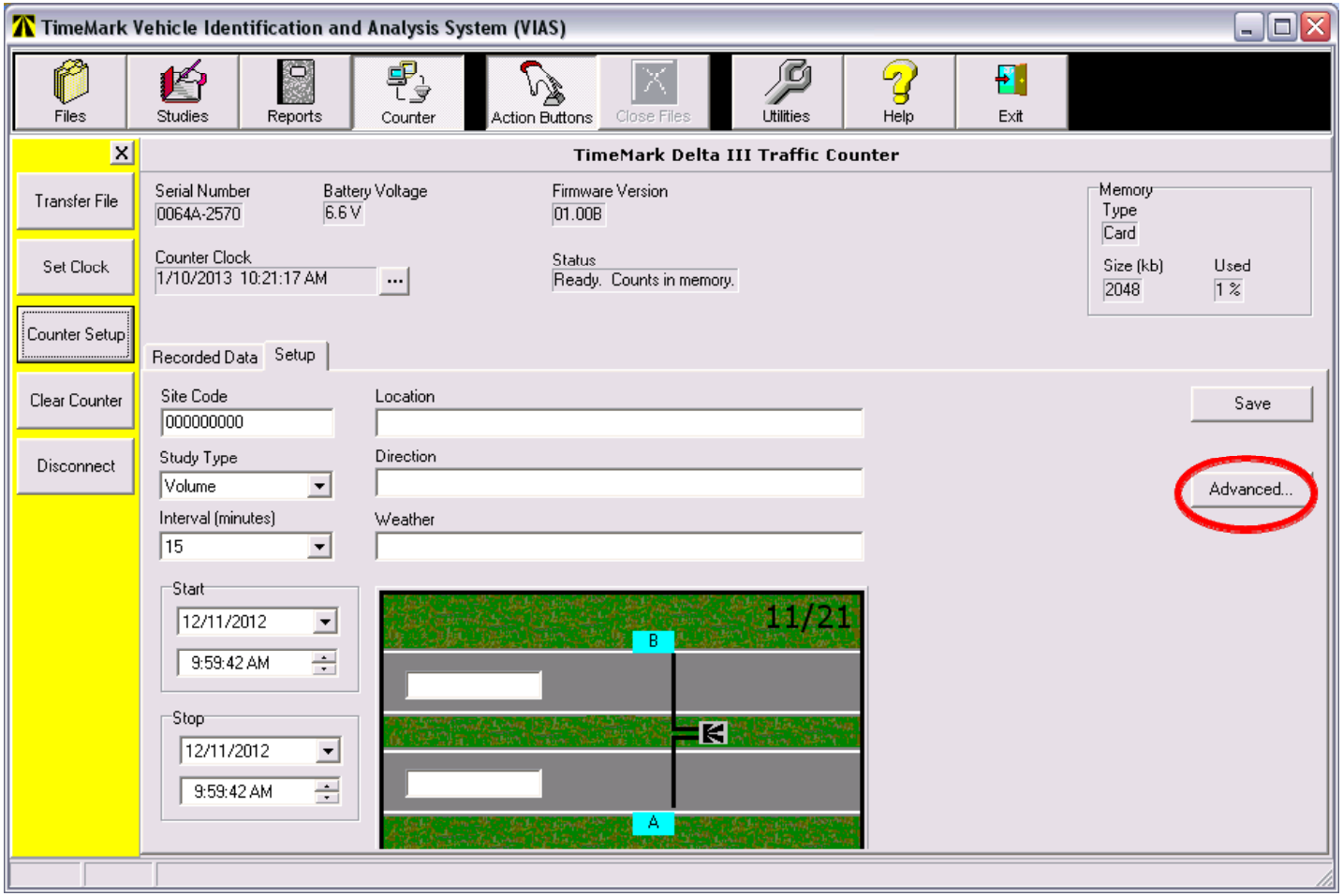
- Two time readings a know distance apart
- Calculate a speed A to A or B to B
- Knowing speed, axle spacing is calculated by knowing time to travel from A to B




# Challenges Counting Bikes

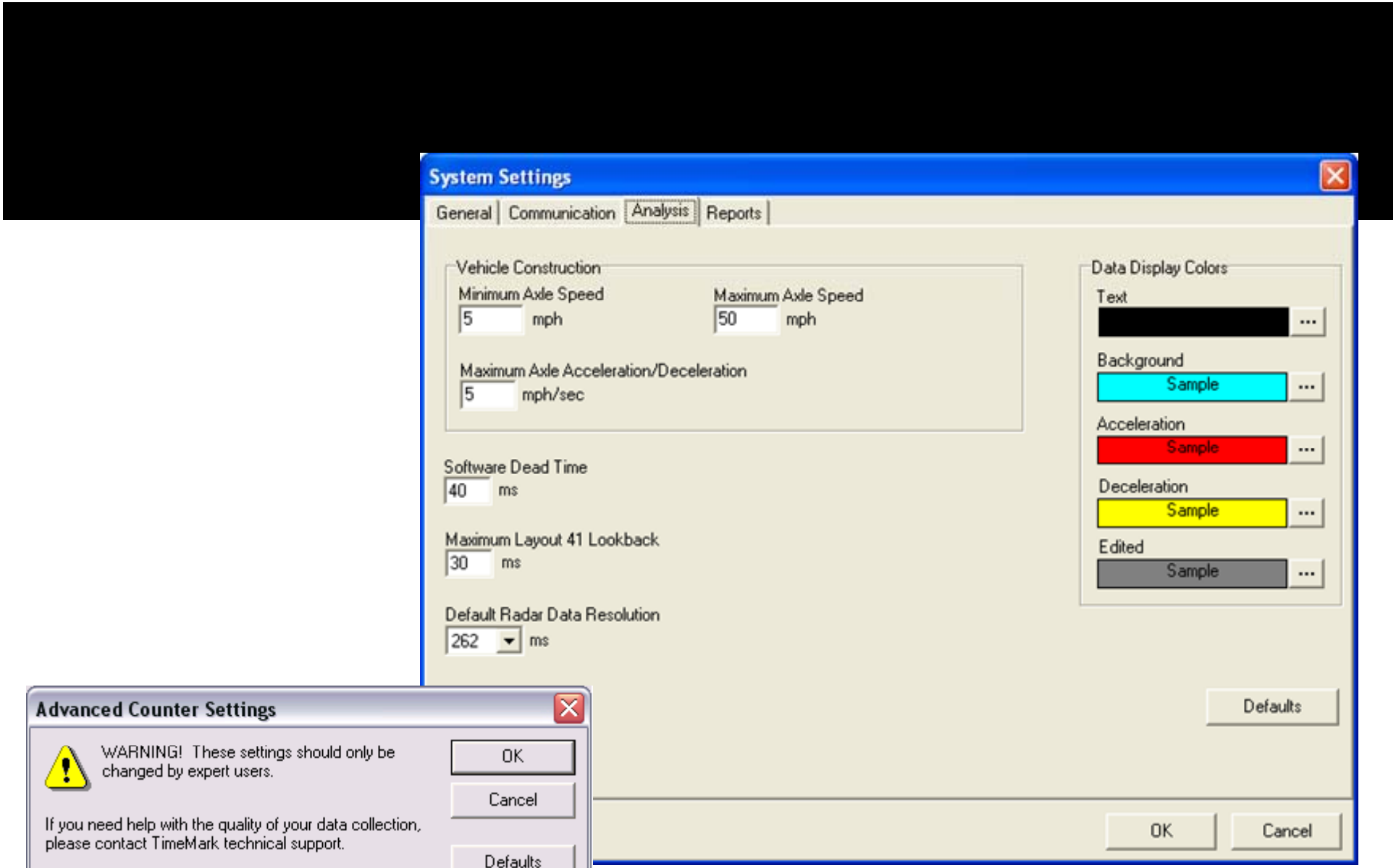
- Bikes Lighter than Cars
- Bike Slower than Cars
- Shorter Wheel Base
- No Previous Classification Scheme
- Do Not Always Ride on the Bike Facility

# Counter Set Up



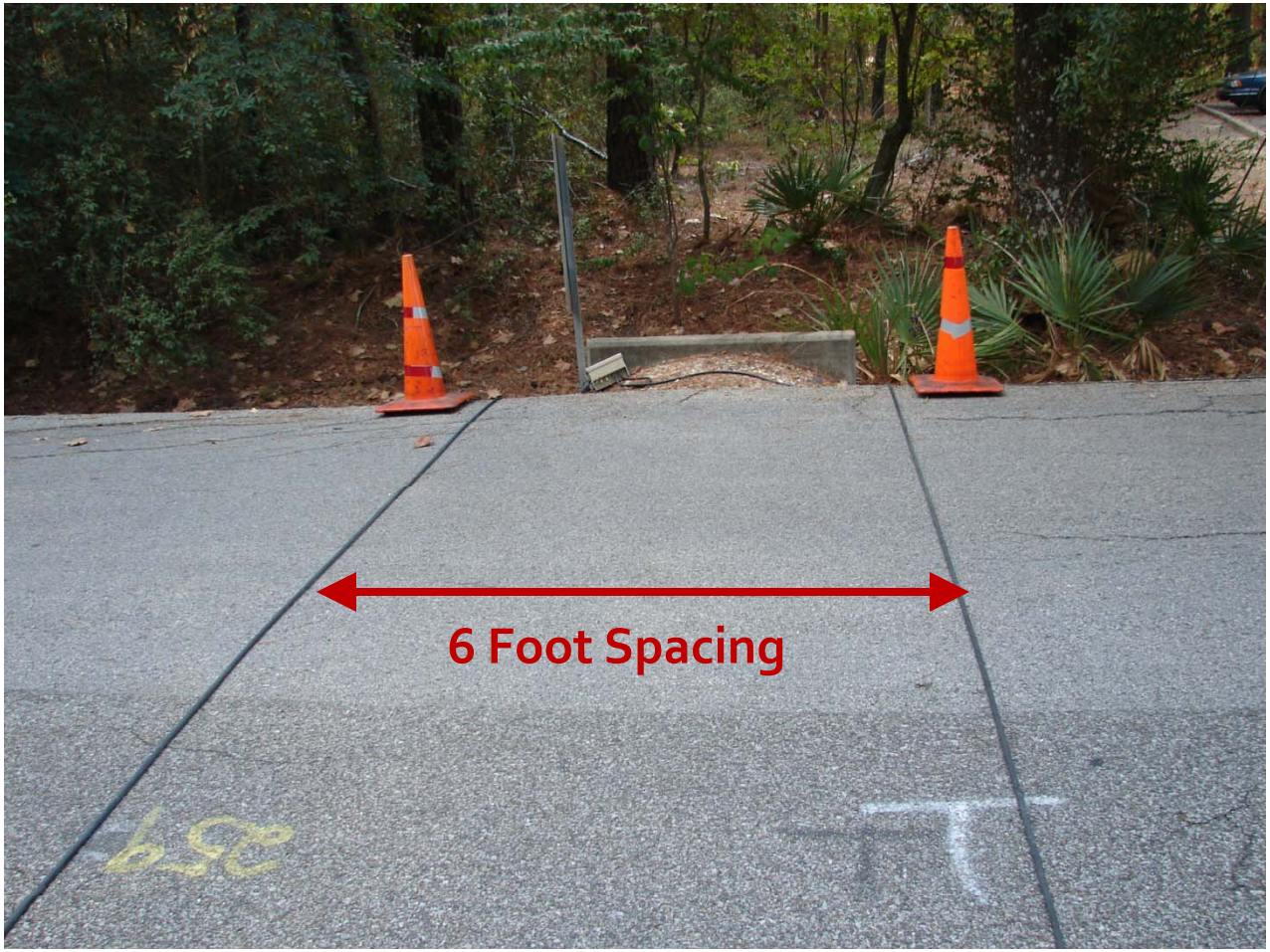
# Counter Settings

- Delta III Classifiers NOT NT versions (use 4)
- Dead time 20ms (10 ms default)
- Air Switch Sensitivity 15 ms (30 ms default)
- Max Speed 50 mph
- Min Speed 5 mph
- Max Acceleration 5 mph/s
- 6 Foot Tube Spacing


System Settings
General
Communication
Analysis
Reports
Vehicle Construction
Minimum Axle Speed
5
mph
Maximum Axle Speed
50
mph
Maximum Axle Acceleration/Deceleration
5
mph/sec
Software Dead Time
40
ms
Maximum Layout 41 Lookback
30
ms
Default Radar Data Resolution
262
ms
Data Display Colors
Text
Background
Sample
Acceleration
Sample
Deceleration
Sample
Edited
Sample
Defaults
OK
Cancel
Advanced Counter Settings
WARNING! These settings should only be changed by expert users.
OK
Cancel
If you need help with the quality of your data collection, please contact TimeMark technical support.
Defaults
Dead Time
20
Threshold
15

# Field Tips

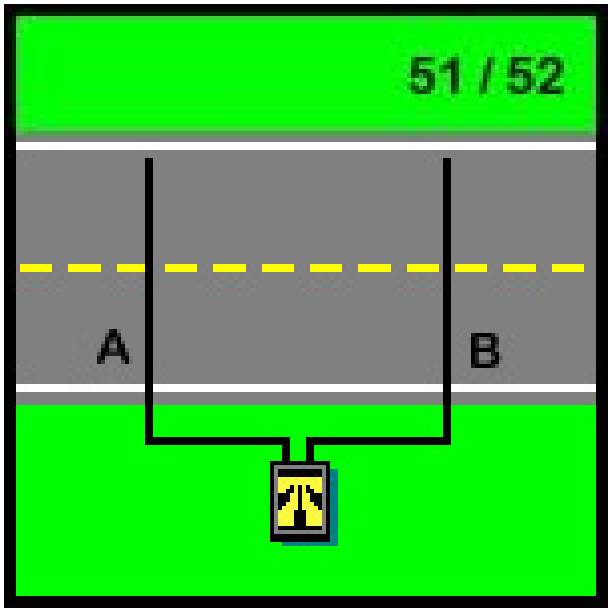
- Straight Away
- Mid Block (reduce turns and stops)
- Need Post to Secure the Counter to
- Same Length Tube (w/in 2") 25' on Bike Lane
- Six Foot Spacing
- Tube Stretch 10% (6" on a bike lane 1' on trail)

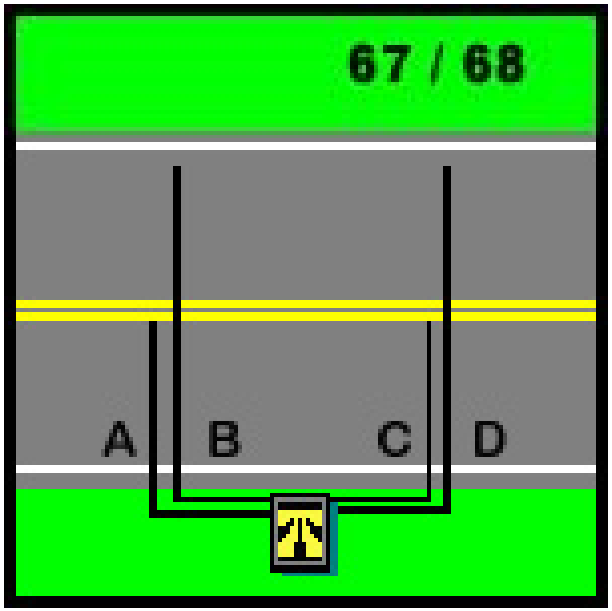

6 Foot Spacing

[redacted]

# Tube Layout

- Typical 10 - 16 ft. (3 - 5 m)
- Six (6) foot spacing was used



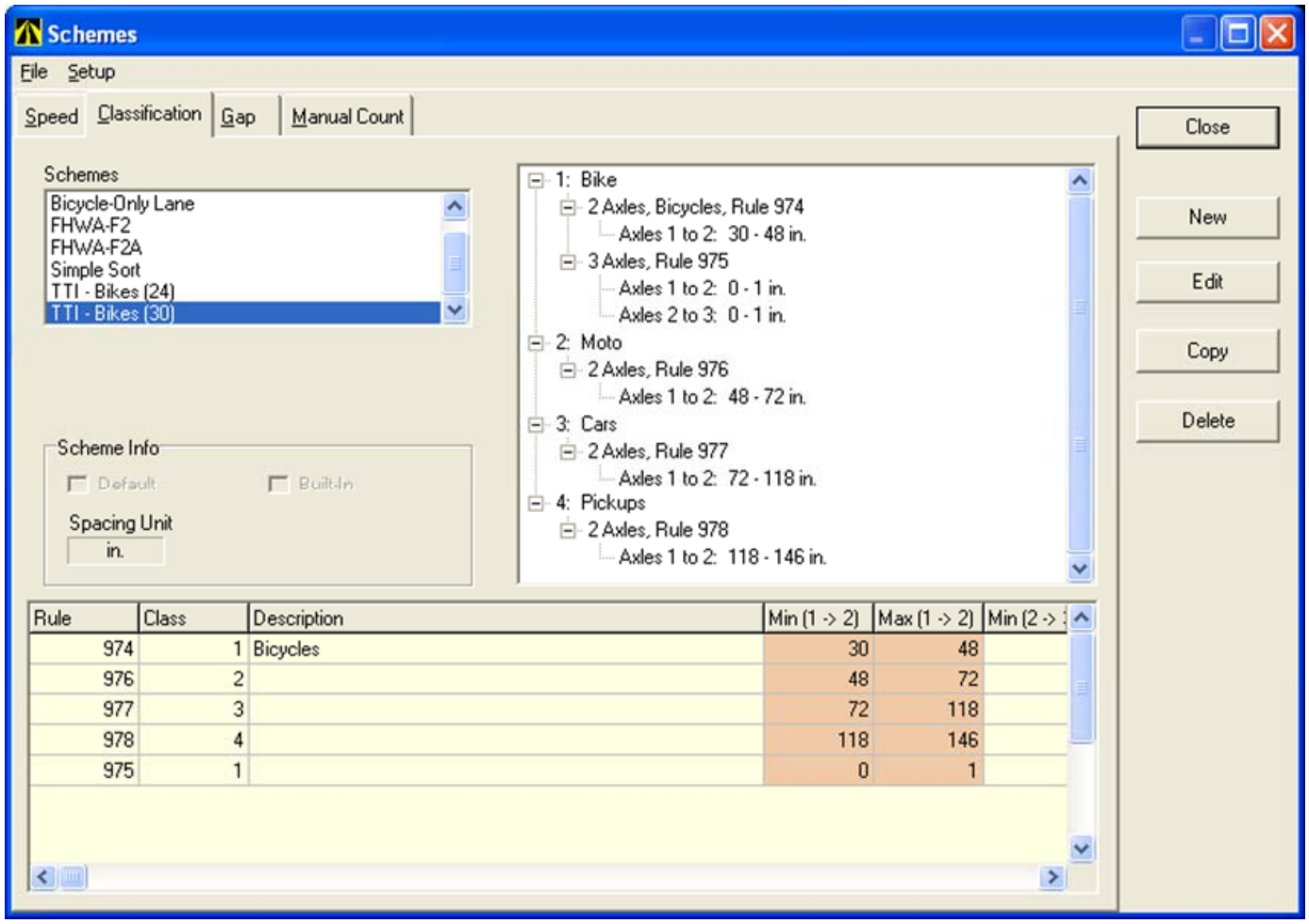



# Classification Types

- FHWA-F2 13 Classification (48 in to 72 in)
- TTI 24 Wheel Base (24 in to 48 in)
- TTI 30 Wheel Base (30 in to 48 in)

# Bike Classification

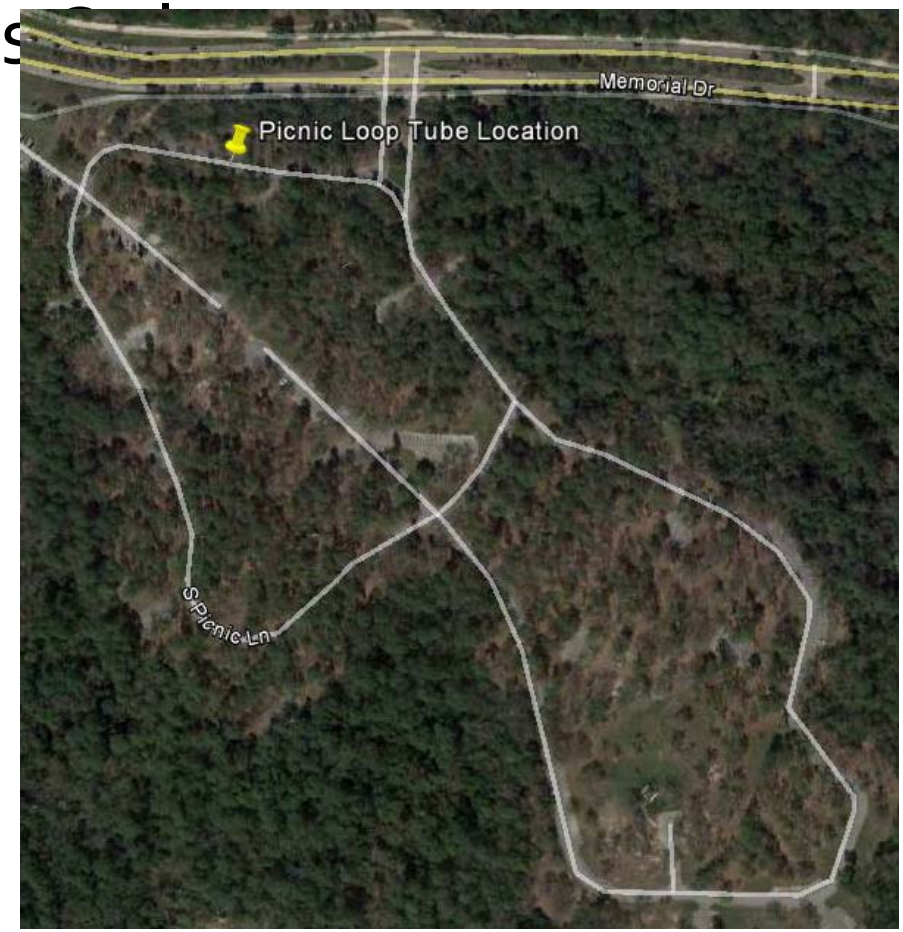
| Bike Type | Wheel Base | Wheel Size |
|---|---|---|
| Mountain Bike | 42 | 26 |
| Small Road Bike Orange | 41 | 25 |
| Road Bike 27" | 43 | 27 |
| Kid Mountain | 39 | 24 |
| Road Bike | 41 | 25 |
| Child Bike 20" | 34 | 20 |
| Child Bike 20" | 35 | 20 |
| Child Bike 12" | 20 | 12 |
| Tandem Cruzer | 67 | 26 |


Schemes
File
Setup
Speed
Classification
Gap
Manual Count
Close
Schemes
Bicycle-Only Lane
FHWA-F2
FHWA-F2A
Simple Sort
TTI - Bikes (24)
TTI - Bikes (30)
1: Bike
2 Axles, Bicycles, Rule 974
Axles 1 to 2: 30 - 48 in.
3 Axles, Rule 975
Axles 1 to 2: 0 - 1 in.
Axles 2 to 3: 0 - 1 in.
2: Moto
2 Axles, Rule 976
Axles 1 to 2: 48 - 72 in.
3: Cars
2 Axles, Rule 977
Axles 1 to 2: 72 - 118 in.
4: Pickups
2 Axles, Rule 978
Axles 1 to 2: 118 - 146 in.
New
Edit
Copy
Delete
Scheme Info
Default
Built-In
Spacing Unit
in.
Rule
Class
Description
Min (1 -> 2)
Max (1 -> 2)
974 1 Bicycles 30 48
976 2 48 72
977 3 72 118
978 4 118 146
975 1 0 1

# Case Study

# Memorial Park Picnic Loop

- Closed Course Most of the Day
- Bikers and Inline Skaters
- 1.1 Miles
- Packs of Bikes
- Closely Spaced
- Adults
- Multiple Tests
- No Problem with Bikes and Tubes



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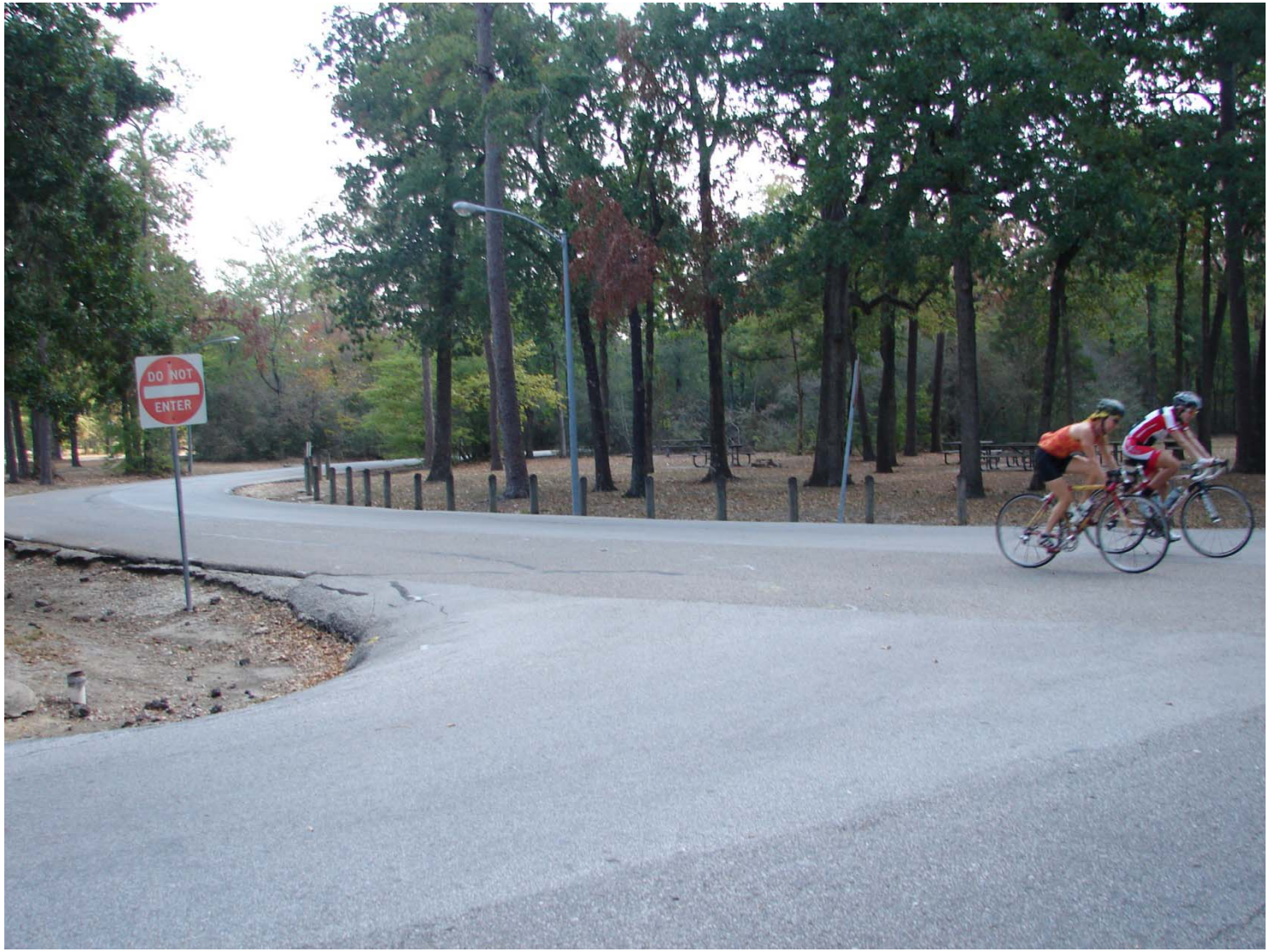
DO NOT
ENTER

# Test 3 System Settings

# 5-50-5-40

| Time Period | Manual Count | Axle/2 Count | Classified TTI - Bikes (24) | | Classified TTI - Bikes (30) | |
|---|---|---|---|---|---|---|
| | | | *Total Vehicles* | Bicycles | *Total Vehicles* | Bicycles |
| 9:00 – 10:00 AM | 28 | 32 | 28 | 28 | 28 | 28 |
| 4:00 – 5:00 PM | 204 | 202 | 189 | 187 | 187 | 187 |
| 5:00 – 5:30 PM | 120 | 116 | 106 | 105 | 106 | 106 |
| PM total 4:00 – 5:30 PM | 324 | 318 | 295 | 292 | 293 | 293 |

# Westview

# Westview

- 4 Lane Boulevard
- Bike Lane Width EB/WB 3.4/5.0
- Traffic Lane Width 11.8/14.9
- Speed Limit 35 mph
- No Parking
- Residential

| Weekday ADT | Weekend ADT | AM Peak | PM Peak |
|---|---|---|---|
| 6165 | 4233 | 579 | 524 |
| 5980 | 3873 | 380 | 816 |

# Westview

# Take Away

- Many bikers ride on sidewalks
- FHWA Classification misses bicycles
- Need to change settings to count bikes
- Increase sensitivity
- Speeds seem reasonable but were not verified
- Setting do make a difference
- Wheel Base 30 worked better than 24

# Collect Inventory Items

- Collect Inventory Items
  - Bike Facility Width
  - Roadway Width & Each Lane Width
  - Buffer Width
  - Parking
  - Area type (residential, retail, mixed, industrial)
  - (See Data Collection Sheets)……

# Suggestions

- Periodic counts
- Week long counts to determine weekly trends
- Same locations
- Mix of commuter and recreational

# Questions?

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