

North Carolina's Non-Motorized Volume Data Program Update: Lessons Learned

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NC STATE UNIVERSITY

NCDOT Sponsored Project





Learning Outcomes

At the end of this presentation, you should be able to:

- Generally understand NC's Non-Motorized Volume Data Program (NMVDP)
- Name at least 2 elements of NCDOT's program.
- Describe at least three lessons learned through the pilot phase





Project Objective

- Pilot: Design and test a bicycle and pedestrian count collection protocol
- Pilot: Recommend how to replicate the methodology across North Carolina
- Phase II - Expand program into next region
 - Replicate and/or modify methods



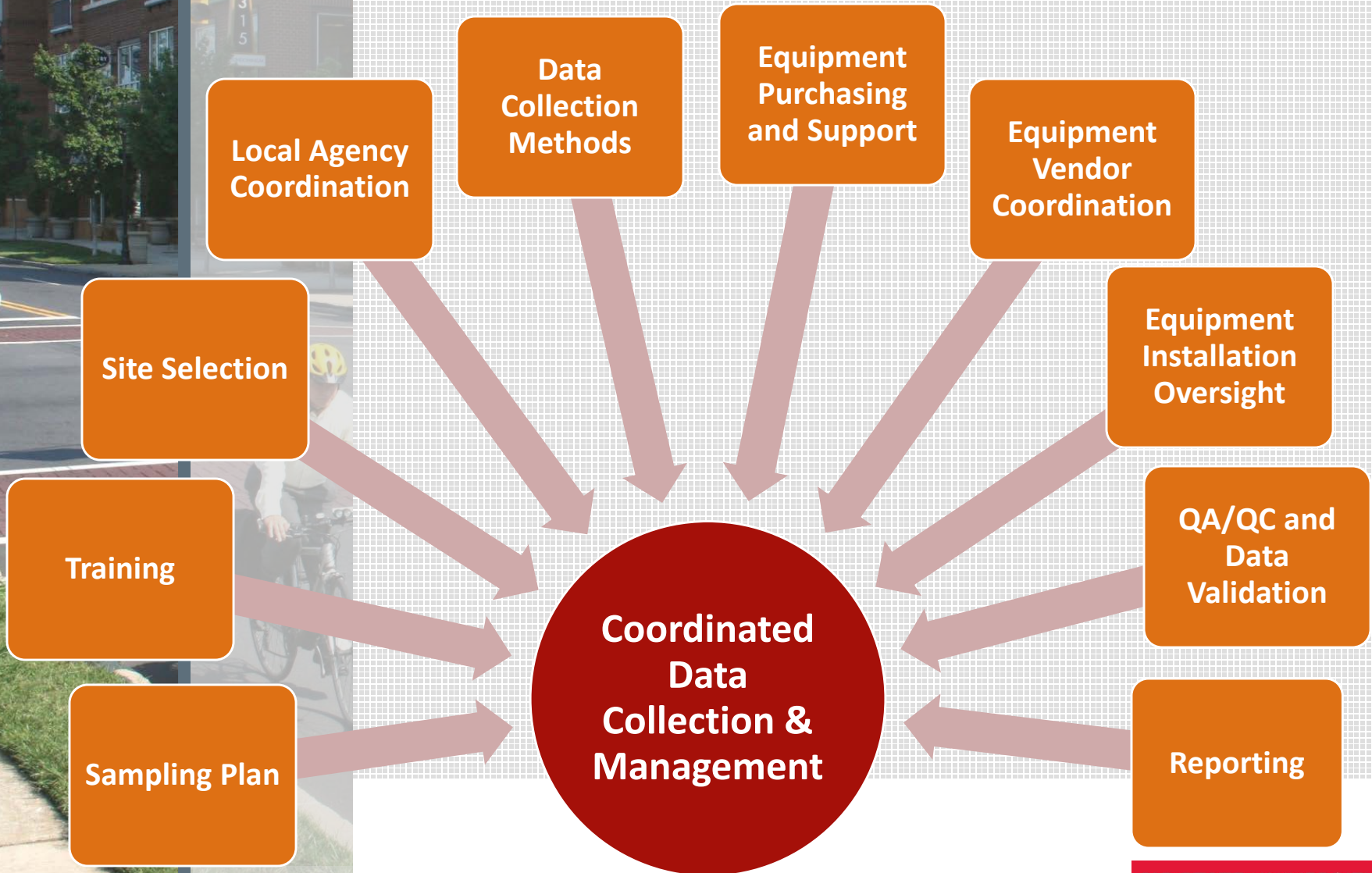
Background Motivation

- Need a common, consistent system to measure volume to:
 - Understand current trends
 - Model future usage
 - Evaluate at different levels (site, corridor, region)
- Use of AADT estimations
 - Project Prioritization and Funding
 - Planning Decisions
 - Complete Streets Policy Implementation
 - Operations and Maintenance
 - Environmental studies (air quality, water quality)
 - Public Health Outcomes (Physical activity, obesity, health risk factors)

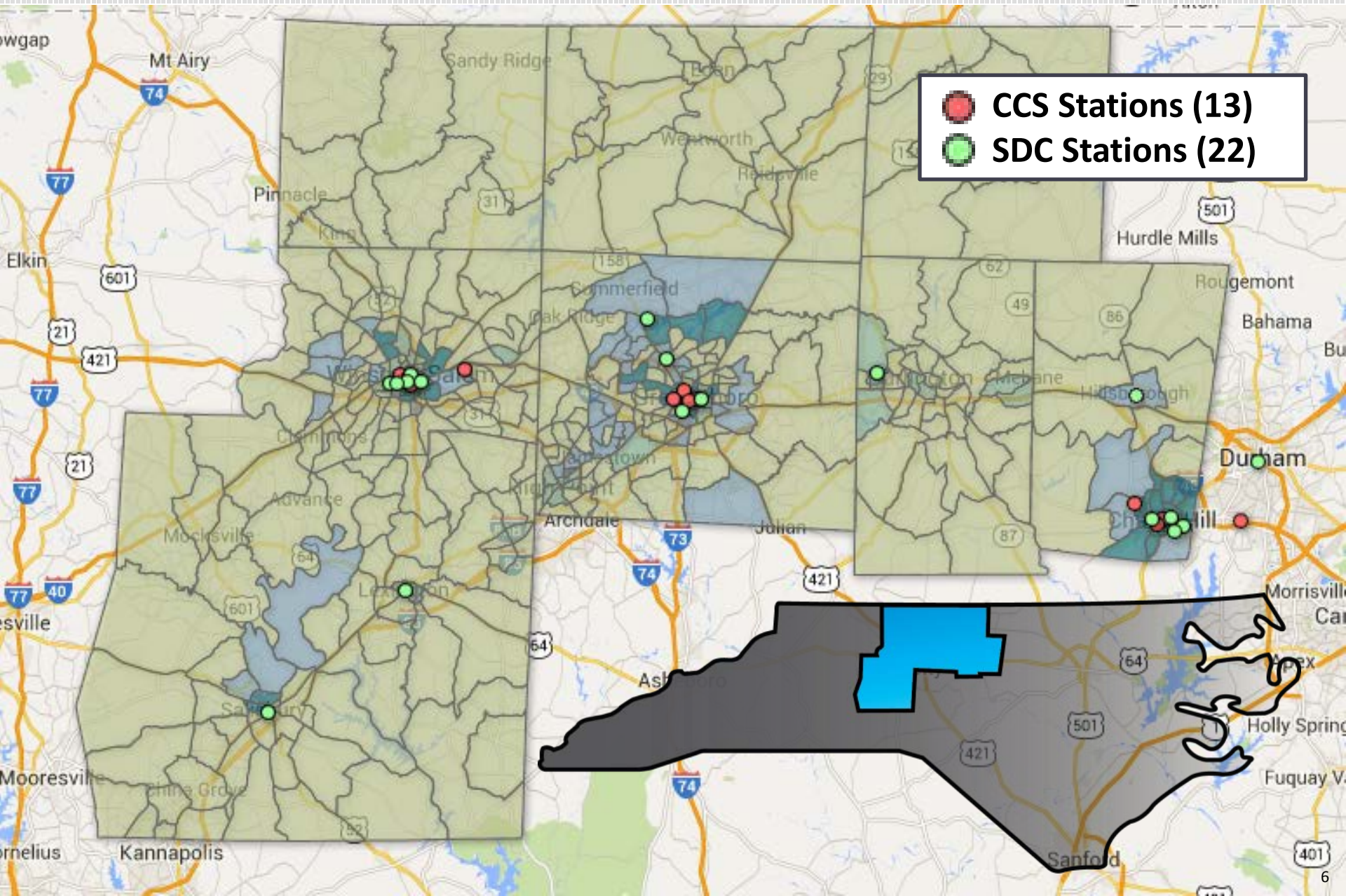
**What get measured, gets done
If you're not counted, you don't count!**



NON-MOTORIZED TRAFFIC MONITORING PROGRAM ELEMENTS



Pilot Region





Local Agency Coordination

- What's In It For Agency?
 - Equipment
 - Technical assistance / Training
 - Access to data
- What's In It For NCDOT?
 - Critical local knowledge
 - Installation assistance
 - Monitoring/maintenance assistance
 - Established relationships



*Continuous Count Station Collecting Data
Martin Luther King Blvd, Chapel Hill, NC*





Local Agency Coordination

- What's In It For Agency?
 - Equipment
 - Technical assistance / Training
 - Access to **validated, cleaned** data
- What's In It For NCDOT?
 - Critical local knowledge
 - Installation assistance
 - Monitoring/maintenance assistance
 - Established relationships



*Continuous Count Station Collecting Data
Martin Luther King Blvd, Chapel Hill, NC*





Training and Resources

- 1-Day Workshop
 - Audience: bike/ped coordinators, planners, greenway/parks and recreation managers, engineers, transportation professionals
- Installation Video
 - Audience: local coordinators, public works staff, contractors
- **Informational Webinar**



Pilot Project Training , Site Selection Field Visit Greensboro, NC





Site Selection Process

- Survey local agencies for candidate sites
- Virtual Site Audit
- Prioritize for a mix
 - Geographic distribution
 - Count type (bicycle or pedestrian)
 - Volume group (low, medium, high)
 - Travel pattern (commute, recreation)
 - Area type (urban, rural, university)



Site Selection Process – Field Visits

- Verify site feasibility
- Make observations (facility and behavioral)
- Check for interference
- Determine equipment specification/configuration needs
- **Collect preliminary counts**



*Field Visit Includes Testing for Interference
Old NC 86 – Carrboro, NC*



Select Short Duration Count Sites

- Lower ranked sites naturally lend themselves to being considered as SDC Sites:
 - Not enough money to install all the desired CCS Stations
 - Seasonal activity only
 - Not enough information to make investment in CCS
 - Specific need for non-intrusive technology
 - Factor group satisfied
 - Coverage: The majority of sites in a volume data program are Short Duration Count Sites





Spring Garden St. Site

- Location: Greensboro, NC (GUAMPO)
- Area Type: University
- Anticipated Travel Pattern: Mixed
- Count Type: Pedestrian (Sidewalk) and Bicycle (Roadway)
- Install Type
 - 2 Infrared + 4 Loops
 - 2 Urban Post
 - No loop interference
 - Parking utilization high – so locate loops in street outside of parking zone





Get Those Counts!

- Retrieve / compile data
 - Monitor equipment
- Conduct validation study
 - Precision and accuracy of the count
- **Contract out SDC needs**
 - Assign sites
 - Check collected data

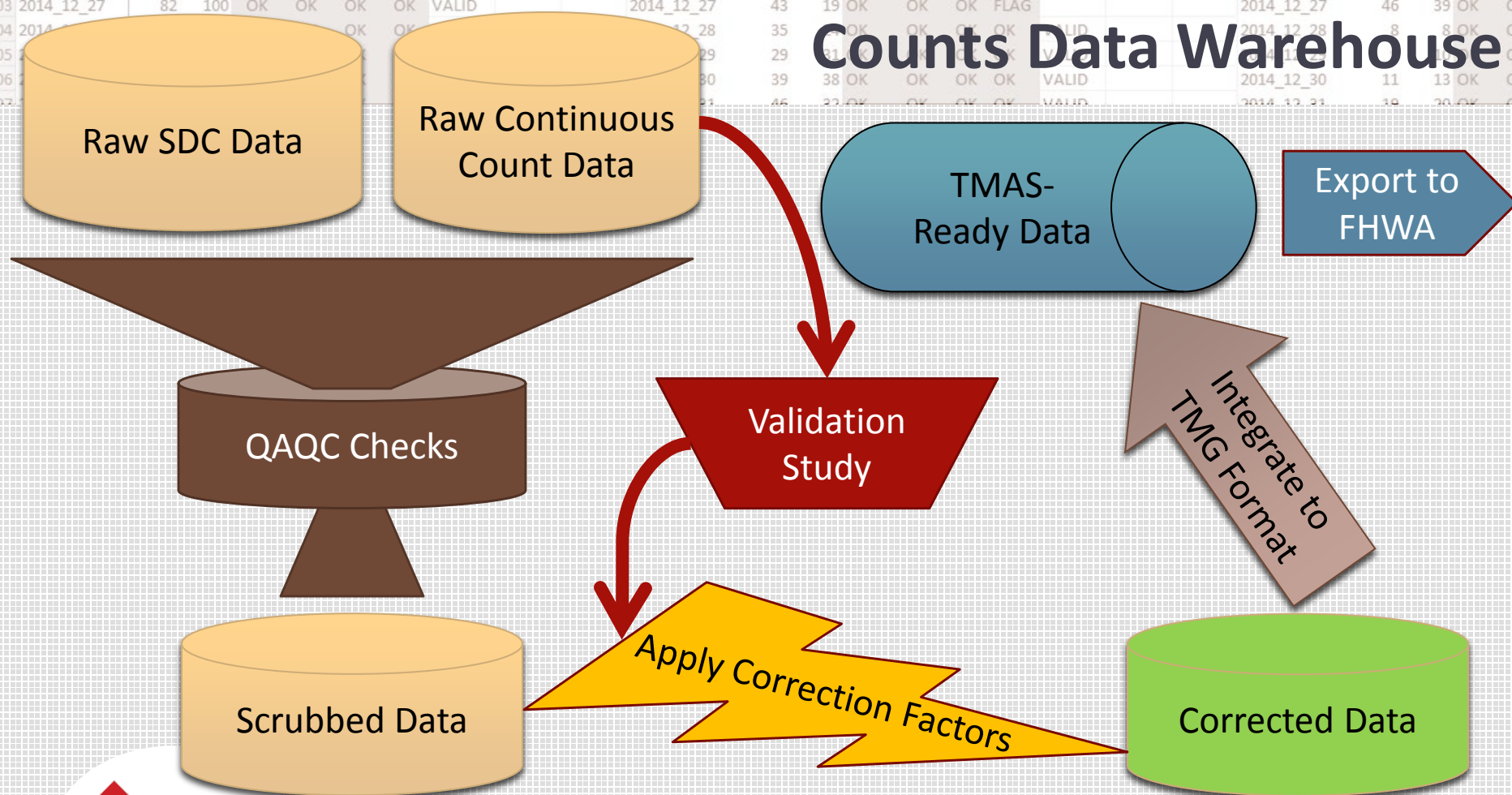


*Installed Continuous Count Station
Lake Daniel Greenway,
Greensboro, NC*



1	Row Labels	Sum of P_G	Sum of P_G	GAP	ZERO SB	ZERO NB	P DIR SAME	ACTION	INITIALS	Row Labels	Sum of P_G	Sum of P_G	GAP	ZERO SB	ZERO NB	P DIR SAME	ACTION	INITIALS	Row Labels	Sum of B_G	Sum of B_G	GAP	ZERO SB
98	2014_12_22	70	73	OK	OK	OK	OK	VALID		2014_12_22	52	32	OK	OK	OK	OK	VALID		2014_12_22	14	21	OK	OK
99	2014_12_23	72	70	OK	OK	OK	OK	VALID		2014_12_23	40	42	OK	OK	OK	OK	VALID		2014_12_23	12	7	OK	OK
100	2014_12_24	57	55	OK	OK	OK	OK	VALID		2014_12_24	20	18	OK	OK	OK	OK	VALID		2014_12_24	5	8	OK	OK
101	2014_12_25	64	64	OK	OK	OK	OK	VALID		2014_12_25	21	11	OK	OK	OK	FLAG			2014_12_25	10	5	OK	OK
102	2014_12_26	59	59	OK	OK	OK	OK	VALID		2014_12_26	25	28	OK	OK	OK	OK	VALID		2014_12_26	21	15	OK	OK
103	2014_12_27	82	100	OK	OK	OK	OK	VALID		2014_12_27	43	19	OK	OK	OK	FLAG			2014_12_27	46	39	OK	OK
104	2014_12_28	35	35	OK	OK	OK	OK	VALID		2014_12_28	8	8	OK	OK	OK	OK	VALID		2014_12_28	8	8	OK	OK
105	2014_12_29	29	29	OK	OK	OK	OK	VALID		2014_12_29	31	31	OK	OK	OK	OK	VALID		2014_12_29	11	11	OK	OK
106	2014_12_30	39	38	OK	OK	OK	OK	VALID		2014_12_30	11	13	OK	OK	OK	OK	VALID		2014_12_30	11	13	OK	OK
107	2014_12_31	46	46	OK	OK	OK	OK	VALID		2014_12_31	38	20	OK	OK	OK	OK	VALID		2014_12_31	38	20	OK	OK

Counts Data Warehouse





Spring Garden St. Site

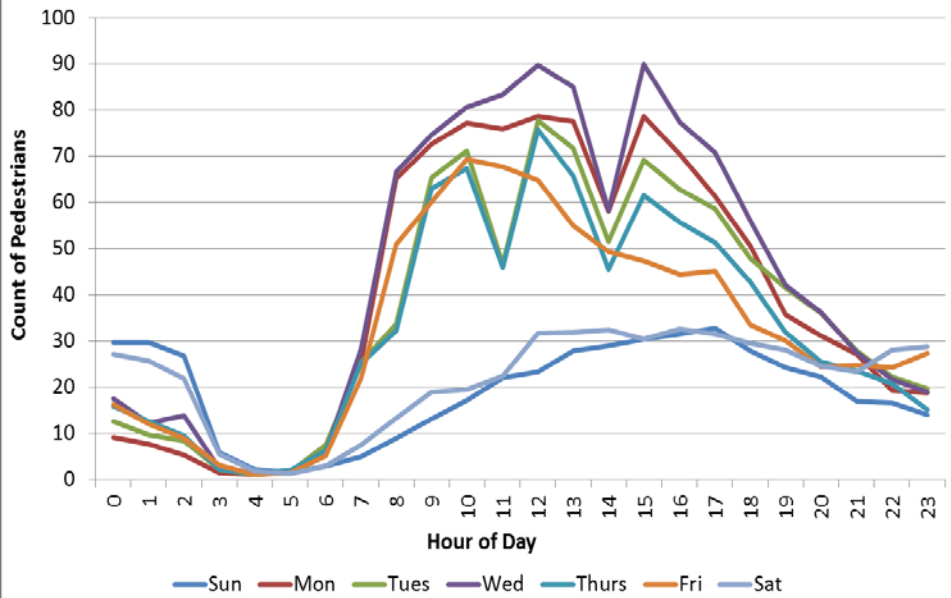
- Location: Greensboro, NC (GUAMPO)
- Area Type: University
- Anticipated Travel Pattern: Mixed – **College Commute?**
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99	2014_12_23	72	70	OK	OK	OK	OK	VALID		2014_12_23	40	42	OK	OK	OK	OK	VALID		2014_12_23	12	7	OK	OK
100	2014_12_24	57	55	OK	OK	OK	OK	VALID		2014_12_24	20	18	OK	OK	OK	OK	VALID		2014_12_24	5	8	OK	OK
101	2014_12_25	64	64	OK	OK	OK	OK	VALID		2014_12_25	21	11	OK	OK	OK	FLAG			2014_12_25	10	5	OK	OK
102	2014_12_26	59	58	OK	OK	OK	OK	VALID		2014_12_26	35	28	OK	OK	OK	OK	VALID		2014_12_26	21	16	OK	OK
103	2014_12_27	82	100	OK	OK	OK	OK	VALID		2014_12_27	43	19	OK	OK	OK	FLAG			2014_12_27	46	39	OK	OK
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105	2014_12_29	54	53	OK	OK	OK	OK	VALID		2014_12_29	29	27	OK	OK	OK	OK	VALID		2014_12_29	10	10	OK	OK
106	2014_12_30	66	65	OK	OK	OK	OK	VALID		2014_12_30	35	38	OK	OK	OK	OK	VALID		2014_12_30	11	13	OK	OK

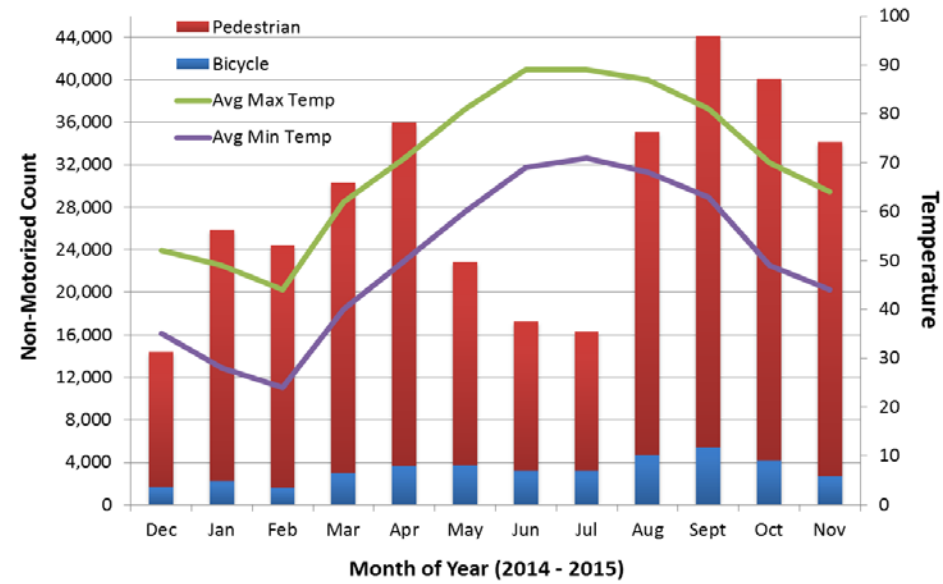
Interesting Data – College Commute Factor?

Average Daily Pedestrian Volume by Hour of Day
Spring Garden Street, Greensboro, NC
12/01/2014 - 11/30/2015



Average Daily Ped Volumes by Hour of Day

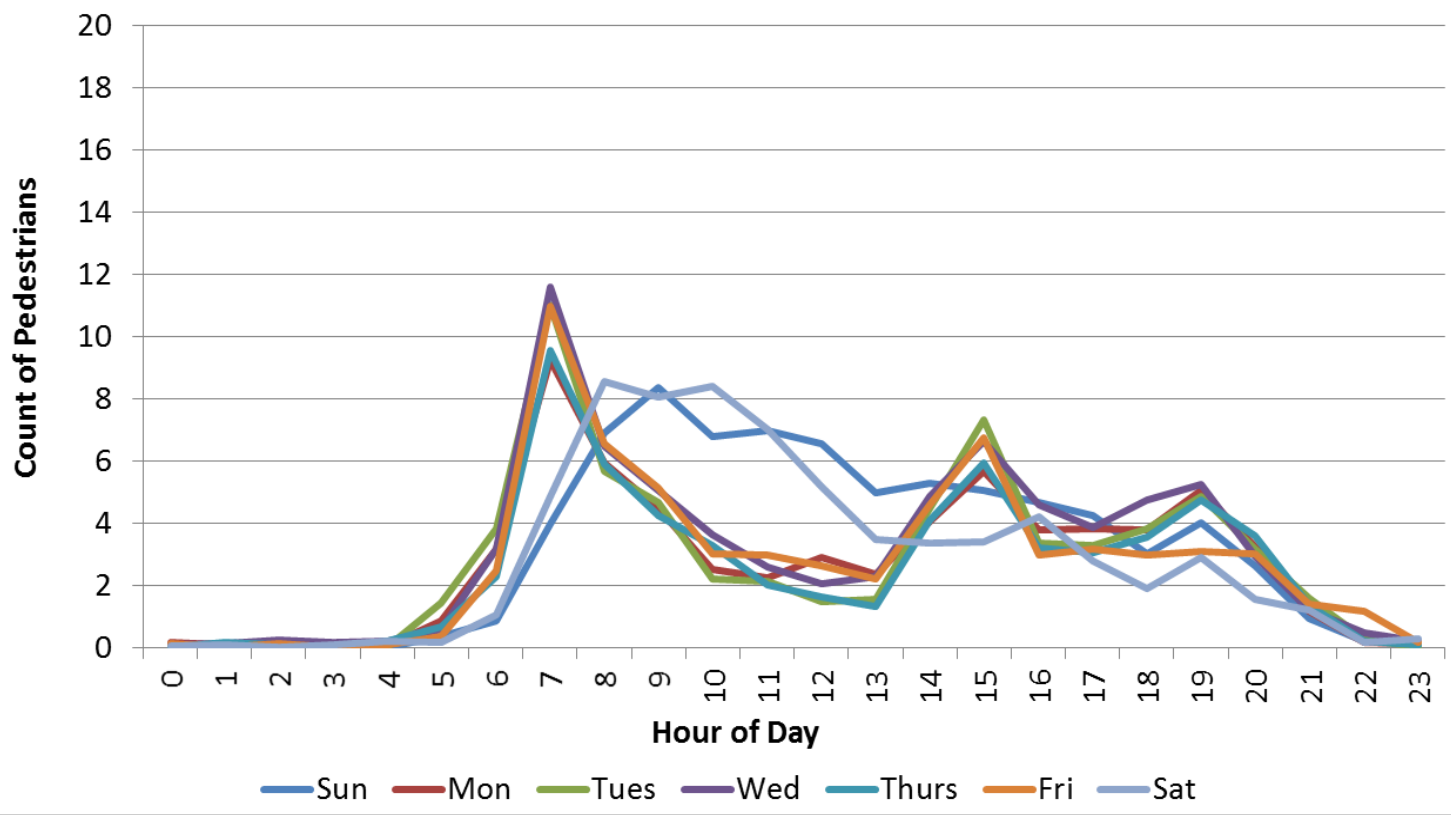
Count of Bicyclists and Pedestrians by Month
Spring Garden Street, Greensboro, NC
12/01/2014 - 11/30/2015



Counts by Month and Temperature

Interesting Data – School Factor?

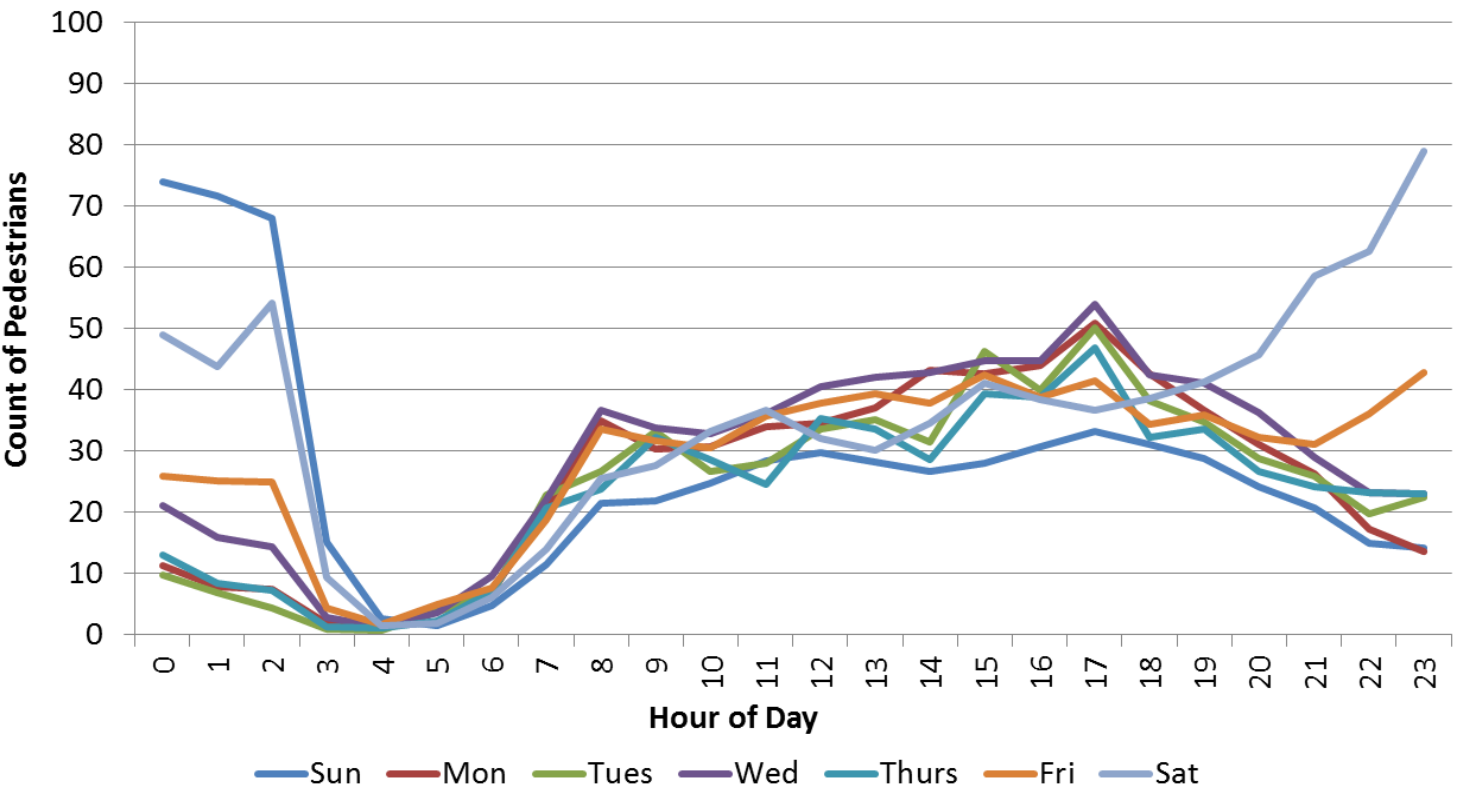
Average Daily Pedestrian Volume by Hour of Day
 Old NC 86, Carrboro, NC
 12/12/2014 - 11/30/2015



Average Daily
 Ped Volumes
 by
 Hour of Day

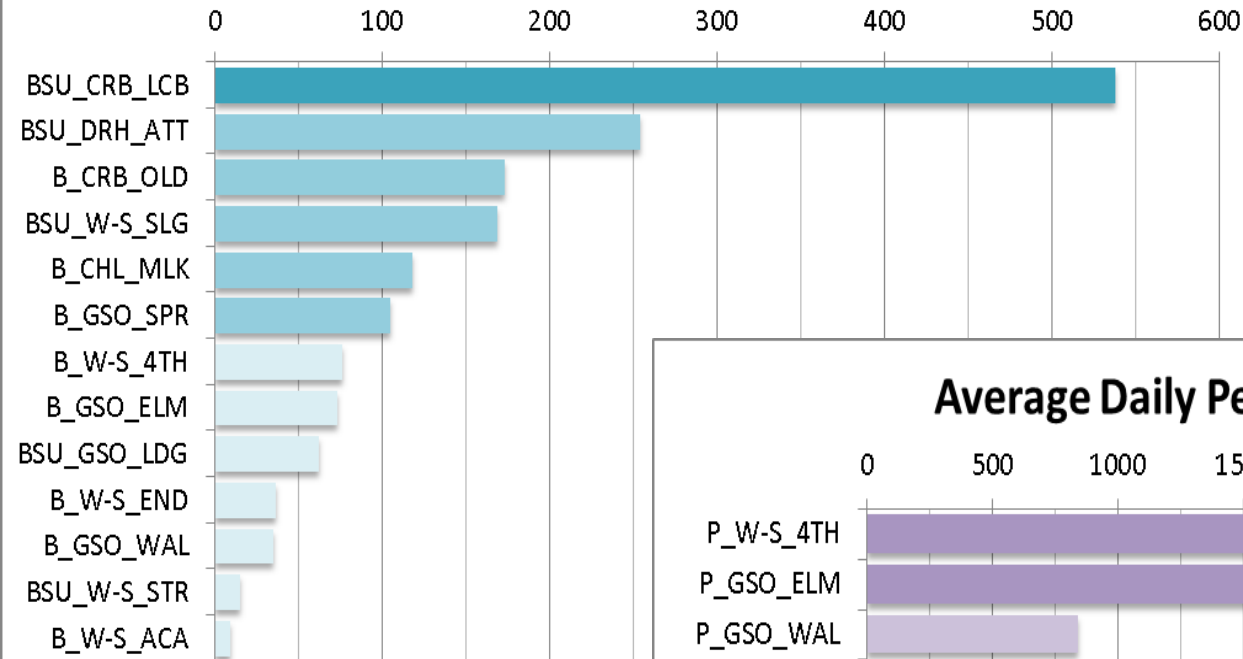
Interesting Data – Entertainment District Factor?

Average Daily Pedestrian Volume by Hour of Day
 Martin Luther King Blvd, Chapel Hill, NC
 12/11/2014 - 11/30/2015



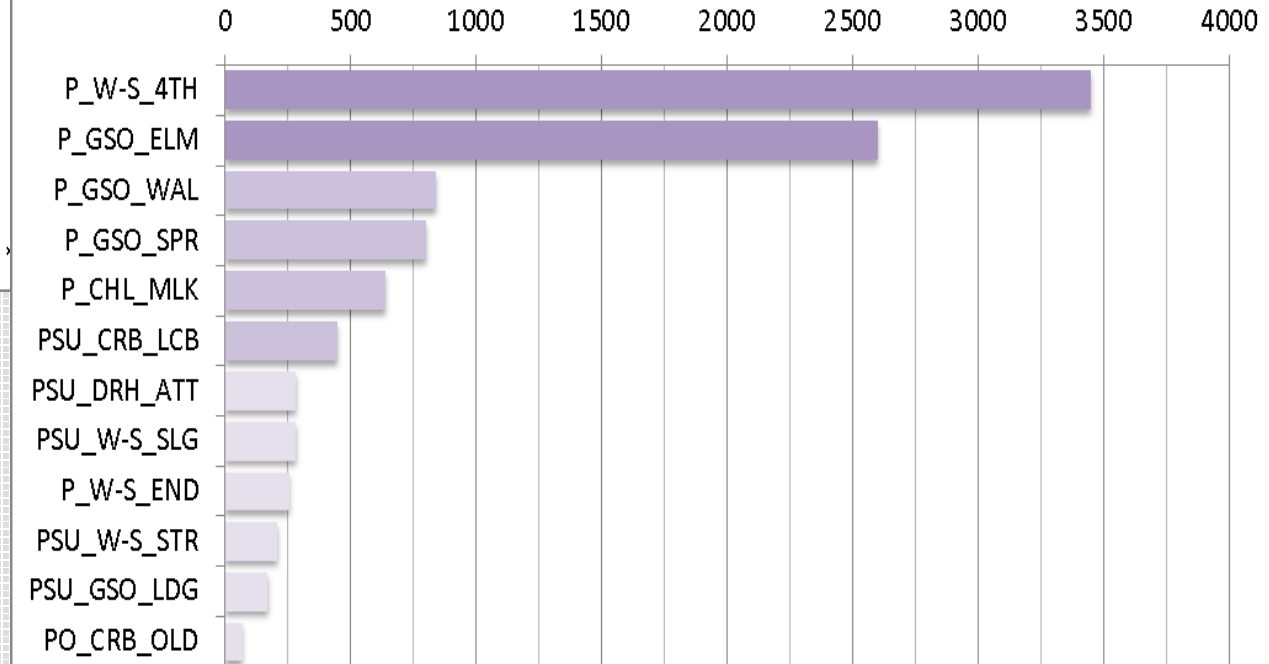
Average Daily
 Ped Volumes
 by
 Hour of Day

Average Daily Bicyclists* (Q1 - Q4)



ACTION	INITIALS	Row Labels	Sum of B_G	Sum of B_G	GAP	ZERO SB
VALID		2014_12_22	14	21	OK	OK
VALID		2014_12_23	12	7	OK	OK
VALID		2014_12_24	5	8	OK	OK
		2014_12_25	10	5	OK	OK
		2014_12_26	21	16	OK	OK
		2014_12_27	46	39	OK	OK
		2014_12_28	8	8	OK	OK
		2014_12_29	9	10	OK	OK
		2014_12_30	11	13	OK	OK
		2014_12_31	18	20	OK	OK

Average Daily Pedestrians* (Q1 - Q4)



*Data Source: NMVDP 12 Mo Raw Scrubbed Data



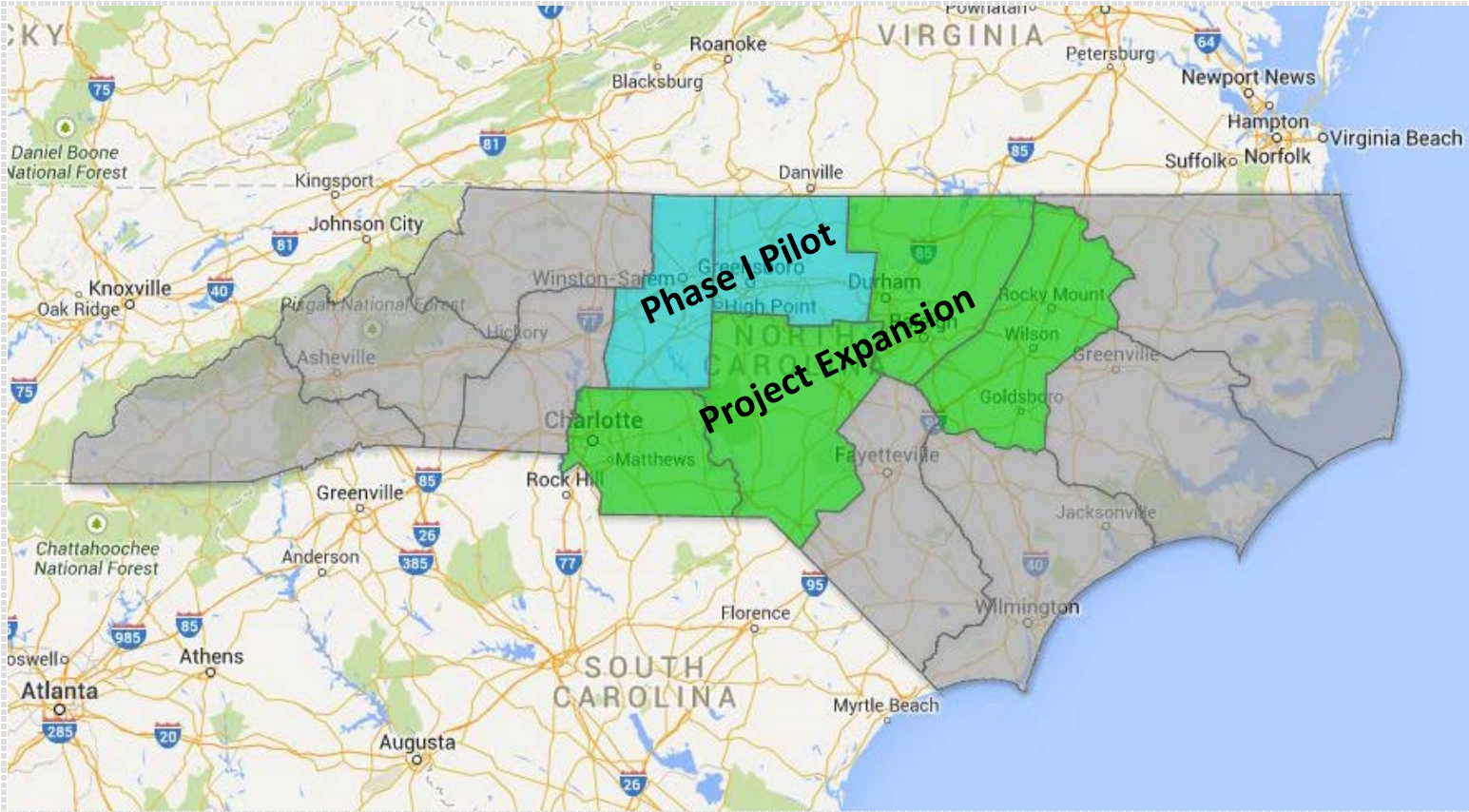
1	Row Labels	Sum of P_G	Sum of P_G	GAP	ZERO SB	ZERO NB	P DIR SAME	ACTION	INITIALS	Row Labels	Sum of P_G	Sum of P_G	GAP	ZERO SB	ZERO NB	P DIR SAME	ACTION	INITIALS	Row Labels	Sum of B_G	Sum of B_G	GAP	ZERO SB
98	2014_12_22	70	73	OK	OK	OK	OK	VALID		2014_12_22	52	32	OK	OK	OK	OK	VALID		2014_12_22	14	21	OK	OK
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101	2014_12_25	64	64	OK	OK	OK	OK	VALID		2014_12_25	21	11	OK	OK	OK	FLAG			2014_12_25	10	5	OK	OK
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105	2014_12_29	65	65	OK	OK	OK	OK	VALID		2014_12_29	31	31	OK	OK	OK	OK	VALID		2014_12_29	9	10	OK	OK
106	2014_12_30	66	65	OK	OK	OK	OK	VALID		2014_12_30	39	38	OK	OK	OK	OK	VALID		2014_12_30	11	13	OK	OK
107	2014_12_31	55	52	OK	OK	OK	OK	VALID		2014_12_31	45	22	OK	OK	OK	OK	VALID		2014_12_31	18	20	OK	OK

Pilot Region Work To-Do's

- Derive adjustment factors from continuous count data
- Develop AADT numbers
 - Apply adjustment factors
 - Apply error correction factors
 - Extrapolate observed SDC's counts to annual data
- Explain any statistical uncertainties

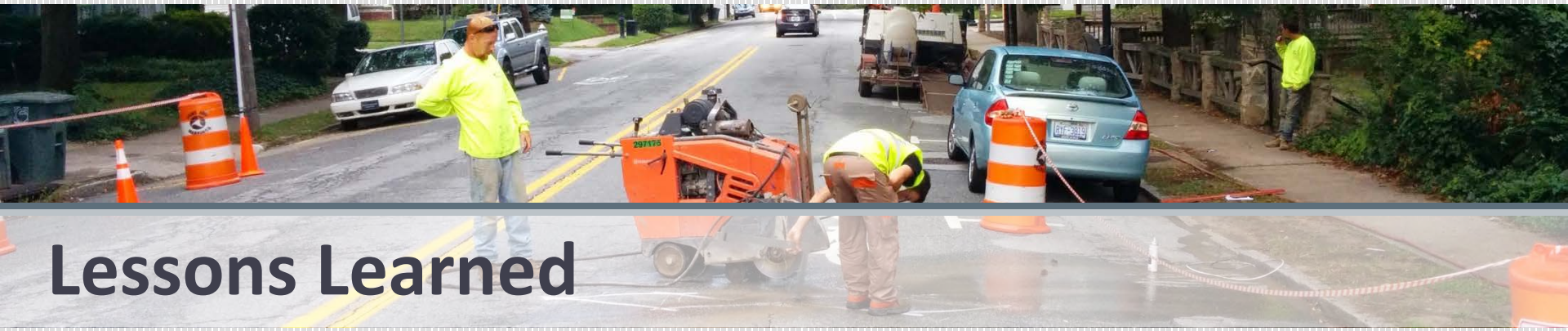


Next Steps - Program Expansion



2015 Project Expansion: NCDOT Divisions 4, 5, 8 and 10





Lessons Learned

- Tweaked the Site Selection Process
 - When to engage local agencies
 - How / when to teach them the ‘bigger picture’ of travel monitoring
 - Don’t let equipment dictate sites – sites should dictate equipment
- Integrate Validation with Installation
- Improve QA/QC
 - Installation and onboarding checklists, equipment field testing
 - Weekly visual checks of data
 - Develop QC checks for the hourly level?
- Maintenance, Maintenance, Maintenance





Lessons Learned (continued)

- Short Duration Counts
 - Coverage Program needs start-up time to complement Continuous Count Program
 - More research needed:
 - Developing (new) factor groups and adjustment factors
 - How low is too low?
 - How much data is enough?
 - Improved format for data submission template
 - Collect to inform site selection process





Program Expansion Considerations

- Data Warehouse, Data Sharing, Data Visualization
 - State repository for all non-motorized data
 - How do we decide who's data will be accepted?
 - How do we set data quality standards?
 - Will all data housed be submitted to FHWA/TMAS?
 - How can NCDOT best share existing data?
 - How can Site Narratives be dynamically displayed?
 - How can we use data visualization to tell the site story, station story and story of bicycling and walking in a region or across the state?
- Geographic Expansion – CCS's



Questions?

Thank You!

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