

Thursday, August 02, 2018

Mr. Mark Brown, AICP, PTP
City of Coral Gables Public Works Department
Sustainable Public Infrastructure Division
2800 SW 72nd Avenue, Miami, FL 33155

Subject: Bike/Pedestrian Stress Assessment Study

Dear Mr. Brown,

Please accept our proposal for the City of Coral Gables' Bicycle/Pedestrian Stress Assessment Study. We are committed to delivering an assessment that addresses the City's needs and vision of providing a multimodal City by enhancing and expanding its existing multimodal transportation network. This assessment is based on our proven skillset and successes in applying the Level of Traffic Stress (LTS) methodology.

We are experienced in applying the LTS method to both bicycle and pedestrian networks and have been successful in developing innovative strategies that are context-sensitive. Our proposed staff have undertaken similar efforts in Florida and nationwide, including in Tampa, FL, Baltimore, MD, Hillsboro, OR, and Miami-Dade County. Building on our expertise, we will formulate recommendations that will address specific issues contributing to a high-stress bicycle and pedestrian environment, including high speeds and limited right-of-way.

Brett Concore, PE will serve as Project Manager for this task. Brett's transportation planning and engineering experience is focused on creating healthy, multimodal places. Brett has worked on and led a variety of active transportation projects as well as health impact assessments in Florida and nationwide, and is committed to enhancing infrastructure that serves the most vulnerable users of public space. Supporting Brett in his management role is Conor Semler, AICP. Conor is a senior planner highly regarded for leveraging creative multimodal concepts into design and implementation. Conor's expertise also includes contributing to the NACTO Urban Bikeway Design Guide and the FHWA Separated Bike Lane Planning and Design Guide.

Serving as technical advisor for this task is Caitlin Tobin (Doolin), PE. Caitlin is experienced in active transportation design and implementation, and has previously served as the Baltimore City Department of Transportation's Bicycle and Pedestrian Coordinator. Caitlin's practical knowledge of NACTO guidelines allowed her to provide proven analysis and recommendation strategies that led to successful implementations of many innovative bicycle and pedestrian facilities.

Also on the task team is Jennifer Musselman, EI. Jennifer's Florida-based experience in multimodal planning studies and the FDOT Context Classification system, in addition to traffic operations and analysis, allows her to undertake innovative approaches to bicycle and pedestrian analysis and implementation. Finally, Alia Awwad, PE, will assist on this task as the local contact, contract manager, and stakeholder involvement task lead. Alia's transportation planning and engineering background that includes both public and private sector experience provides a comprehensive approach to planning studies that is sensitive to local context and regulatory frameworks.

We are confident that our proposed team will deliver a state of the art level of stress assessment for the City's bicycle and pedestrian network that will produce data-driven, context-sensitive recommendations.

Please find attached the following documentation in support of our proposal:

- Section A – Proposed scope of work
- Section B – Terms and conditions
- Section C – Proposed budget
- Section D – Proposed schedule
- Section E – Relevant qualifications
- Section F – Bios and resumes of key staff

Please feel free to contact us for any questions you may have at 407.373.1112 or bboncore@kittelton.com. Thank you for your time and consideration.

Sincerely,

KITTELSON & ASSOCIATES, INC.



Brett Boncore, PE
Project Manager



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SECTION A - SCOPE OF WORK



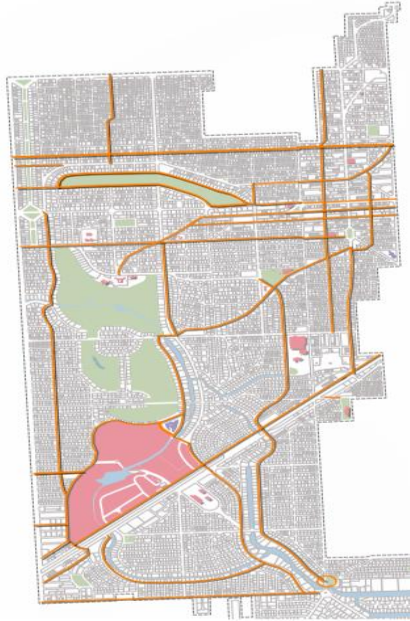
Project Understanding

In 2010, the City Commission approved investing \$400,000 in expanding bicycle facilities around the City. Simultaneously, the City also planned on repaving City streets and implementing traffic calming projects around the City. Following these commitments, a Citywide Bicycle/Pedestrian Plan was commissioned in 2014. The purpose of the Plan was to recommend projects that can be implemented with the initial investments in the short term, while also identifying future bicycle and pedestrian investments. In 2014, Coral Gables adopted a Bicycle and Pedestrian Master plan that proposed more than 27 miles of new or improved bikeways, sidewalk and crosswalk. The existing bicycle network, which consists of 10.5 miles, was proposed to be expanded to an additional 34 miles of new bikeways. Building upon this effort, this study will update the evaluations of arterial and collector corridors that was conducted in the 2014 Plan, categorize the corridors into high- and low-level stress bicycle and pedestrian facilities, and make corridor-specific recommendations that will ultimately achieve a more connected multimodal network.



The City has also fostered a goal to expand the bicycle network that will appeal to all users and motivate people to choose biking as a form of transportation for shorter trips and access to transit. The projects outlined in the 2014 plan also provide bicycle and pedestrian connections to major SMART plan Corridors proposed on either side of the City.

Kittelson has conducted system-wide evaluations of bicycle and pedestrian networks throughout Florida and the US. We also bring a comprehensive understanding to how these modes interact with traffic and the logical ways to make connections to major transit hubs. To be in line with the City's goal of assessing the comfort of the City's network and identifying all-age and ability appropriate facility recommendations, Kittelson proposes two methodologies that assess the bicycle and pedestrian comfort level.



Kittelson's approach will allow us to understand how the proposed corridors above will unlock the low-stress network and identify the necessary facilities to achieve the City's goal.

Our Team proposes applying the Level of Traffic Stress (LTS) methodology to evaluate the comfort level of the street network and existing bicycle facilities. Kittelson has applied this methodology in several cities, such as Tampa, FL, Baltimore, MD and Hillsboro, OR in the past year. We have developed an efficient GIS approach that allows us to quickly identify the low stress network. We are also equipped, within this budget, to identify the appropriate facility design. A major challenge we anticipate for the Coral Gables network is that many of the proposed facilities in the 2014 Plan are on streets that exceed 30 mph and there is limited right-of-way for a separated facility. We encountered this often in Hillsboro, OR and anticipate assisting the City in identifying and prioritizing appropriate treatments in these contexts.

Our team has also developed and applied intersection level assessments for the pedestrian accommodation. By linear feet, the majority of the City includes calm residential streets that are generally comfortable. However, many of the desired pedestrian paths will cross streets like U.S./Federal Hwy 1. Identifying appropriate treatments for key pedestrian crossings is crucial to building a continuous low stress environment for pedestrians and bicycles.

Coral Gables Challenges

Many of the streets proposed in the Coral Gables Bicycle / Pedestrian Plan have speed limits posted at 30 mph or higher and have limited right-of-way where the street only has one lane in each direction. These situations offer unique challenges to designing a low stress facility because the street speed is too high for mixed traffic conditions but is also too narrow for a separated facility. Kittelson proposes developing a bicycle facility design toolkit for these situations to outline supplemental roadway strategies that can reduce speeds based on the context of the street and help bring it into the low stress network.

Vision for the Study

We envision a final product developed as a supplement or addendum to the 2014 Plan that uses the Plan as a guide to make specific recommendations on the previously recommended corridors. This supplement will include (but is not necessarily limited to) these components:

- A map showing islands of low-stress bike and pedestrian connectivity
- A high-quality bike route map indicating current stress levels by segment
- A high-quality pedestrian stress level map indicating current stress levels by segment (Mostly arterial and collector streets, but may include some local streets if on a popular pedestrian route to establish the overall City network)
- A discussion on specific barriers to walking/cycling in Coral Gables. This should include a corridor-by-corridor assessment of major issues.

- Recommendations to create a low-stress pedestrian/cycling network in Coral Gables (short and long term). This should include corridor-by-corridor infrastructure recommendations and possible renderings of specific ped/bike infrastructure improvements (if budget allows)

Task 1. Project Management

Kittelson will provide oversight and coordination required to manage the project. This will include scheduling regular check in meetings, preparing monthly progress reports, and tracking the budget and scope.

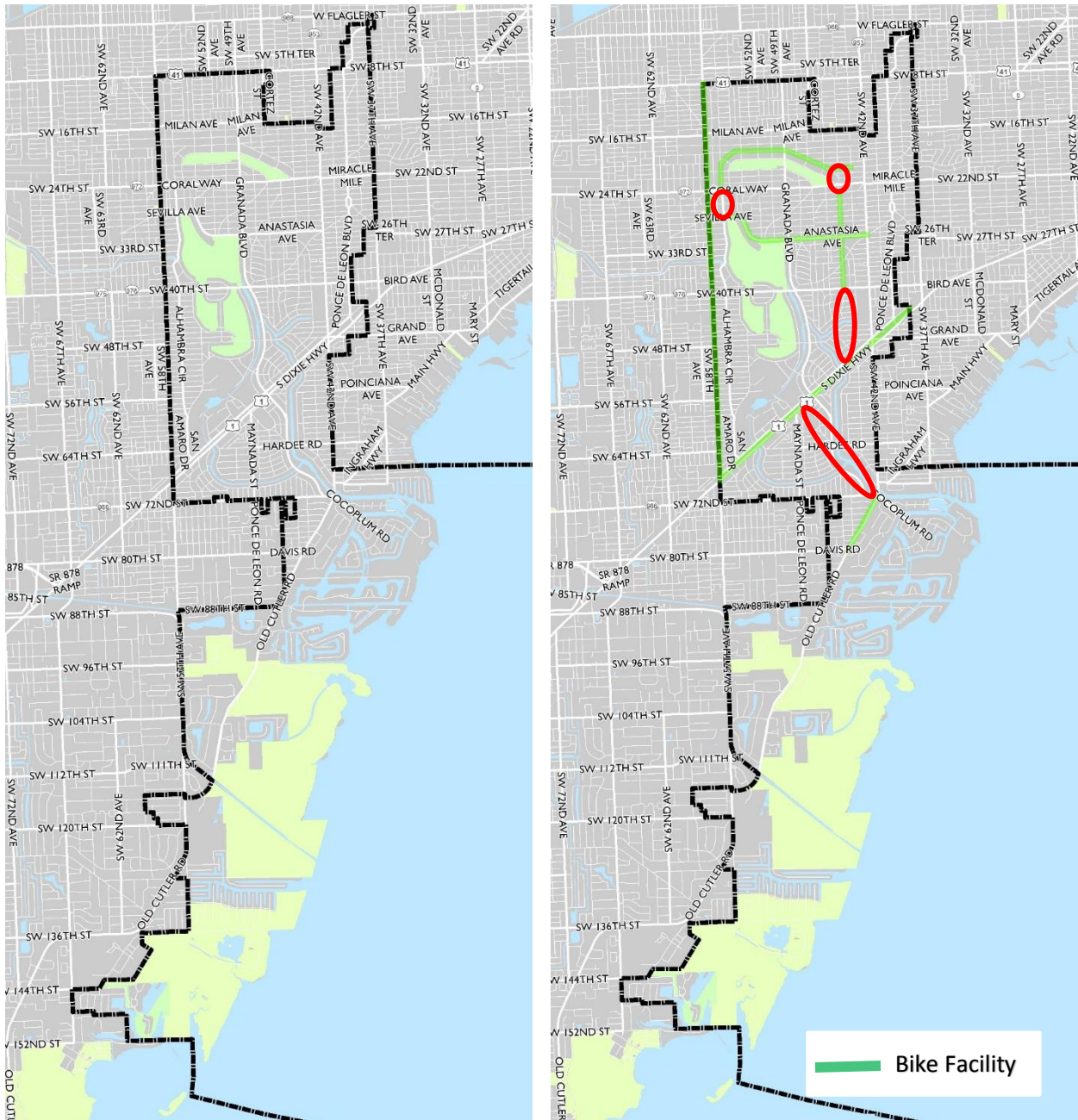
Task 2. Assessing the Comfort of the Bicycle Network

Fundamentally, people will only travel around Coral Gables in a way that gets them where they need to go and feels safe to them. When we design streets for cars, we honor these basic travel needs by having a connected street network and by following engineering and design standards that ensure that the streets both are safe and feel safe to drivers.

The way we traditionally plan bike facilities, however, often fails to meet one or both of these basic travel needs. Somewhere between the potential bike rider's home and the school, office, park, or grocery store that they're trying to reach, one of two things occur:

1. A lack of bicycle facilities, or gaps between bicycle facilities requires people on bikes to ride in mixed traffic on streets where that feels dangerous
2. The bicycle facilities that do exist are designed in such a way that they don't feel safe, either because they're too close to fast-moving traffic, they're frequently obstructed, or the doors of parked cars open into them.

Coral Gables has great bicycle assets running through the community, including the M-Path and bike lanes on Alhambra Circle. However, unlike the road network, these facilities lack continuous connection through the City. The map below on the left represents Coral Gables' entire roadway network. In general, you can access anywhere in the City by car due to the extensive network of streets. However, the map to the right shows Coral Gables' current bike infrastructure; which is made up of a series of orphaned facilities that do not connect.



Coral Gables' roadway network is built to allow cars to access nearly every part of the network (left). The bicycle network is a series of orphaned facilities that do not connect with major barriers preventing a continuous low stress trip.

The 2014 Plan seeks to fill these gaps, but in order to identify the appropriate bicycle facility treatment, the comfort of the traffic conditions interacting with bicyclist must first be assessed. Kittelson has had ample success in Florida and other states applying the LTS methodology for improving comprehensive bicycle planning so that it can better achieve the goal of allowing more people to travel by bike. This is achieved by:

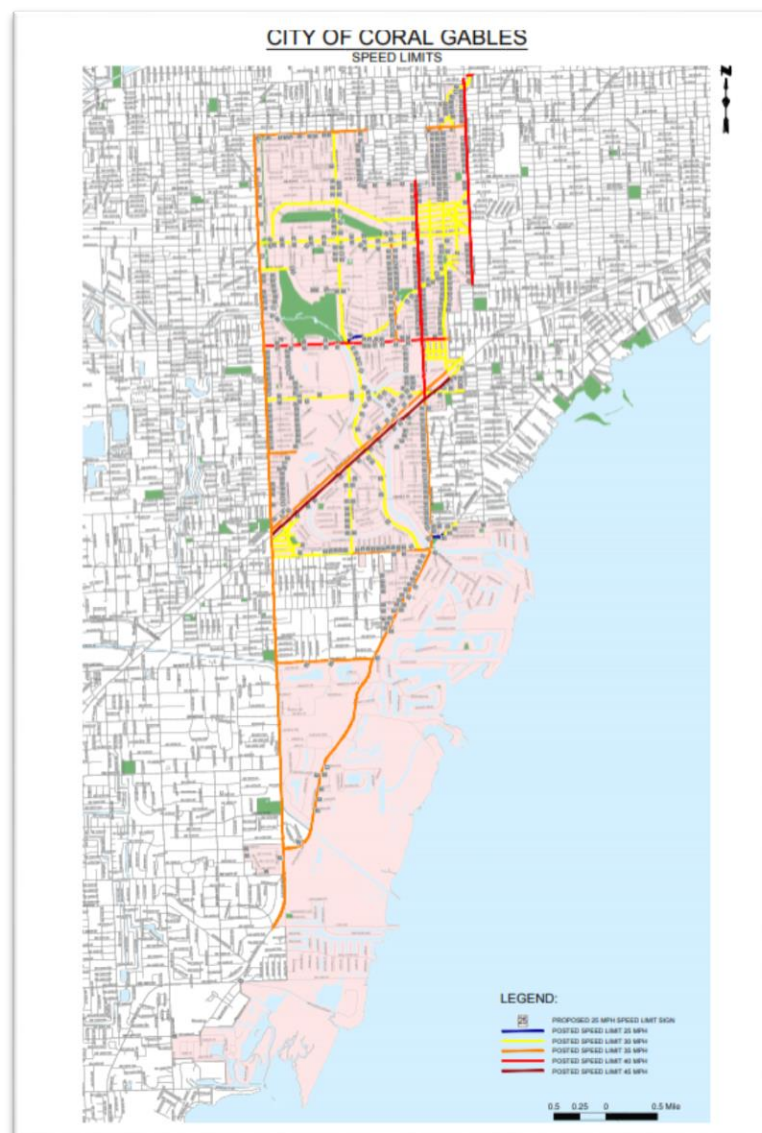
1. Identifying the network of “low stress” streets where people already feel safe riding bikes
2. Identifying strategic corridors that would connect places of interest most efficiently
3. Identifying the correct facility type to allow people riding bikes to feel safe on strategic corridors
4. Prioritizing construction of facilities on these strategic corridors based on how much of the existing low stress network they “unlock” to bike travel.
5. Prioritizing projects that connect other existing or planned facilities.

The City of Coral Gables’ 2014 Bicycle / Pedestrian Plan already identifies strategic corridors and general recommendations for these corridors. The application of the Level of Traffic Stress methodology outlined below will be used to understand the specific role these corridors play in unlocking the low stress bicycle network and identify the facility type necessary for the corridor to be part of the low stress network.

Task 2.1 Speed Data Collection

The LTS analysis detailed in Task 2.2 depends on the availability of speed data. In the absence of a GIS layer available with posted speed limit data of streets in the City, Kittelson will assemble a speed limit GIS layer based on assumptions by functional classification as well as incorporating the information from the mapping work completed to address the recently adopted Ordinance 655 to lower speed limits on certain streets to 25 mph. These streets are detailed in the City map to the right.

The speed limit data and presence of bicycle lanes are the most crucial data needed to screen the network. This will help us assess the majority of the network. For the streets where the presence of parking or width of the bike facility is needed, this data will be collected via a Google Earth desk audit. The details on how this data will be applied is described in Task 2.2.



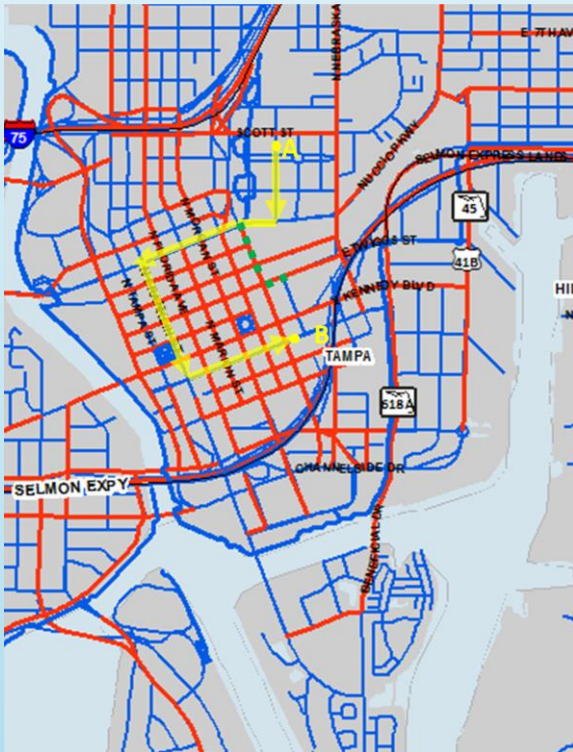
All other data needed for Task 2 is available on the Miami-Dade MPO website.

Task 2.2 Level of Traffic Stress Analysis

Based on linear distance, significant portions of Coral Gables' roadway network are local streets that have

low traffic speeds and volumes. These streets are already comfortable to bike on and do not need substantial infrastructure. However, most people will not bike unless they feel safe for their entire trip, creating a need for facilities on major roadways. Many of proposed bicycle facilities in the Coral Gables Bicycle / Pedestrian Plan are on constrained streets with speed limits of 30 mph or greater or intersect with an urban arterial or collector that is challenging to cross.

Kittelson Case Study: Hillsborough, FL



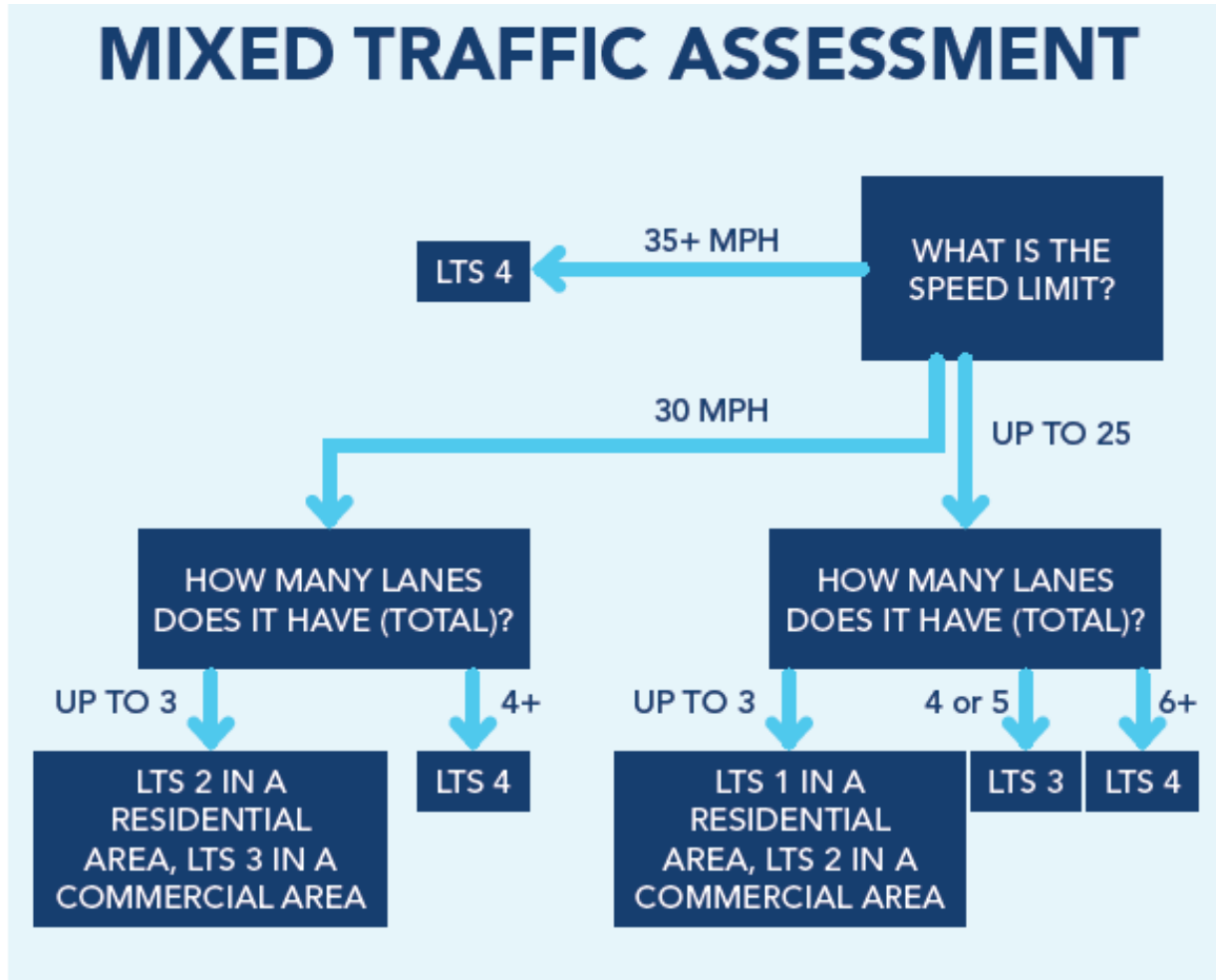
To demonstrate how we have successfully applied the approach in the past, above is a case study of an LTS analysis conducted in Tampa, FL. The above map shows the low stress network that is useful to the general population in blue (LTS 1 and 2, plus trails) and the barriers to the general population (LTS 3 and 4) in downtown Tampa. This map shows how the network breaks down for interested but concerned bicyclist. To get from point A to Point B via a low stress trip, bicyclist must travel 10 blocks out of their way. This can be reduced to a low stress 2-block diversion with the construction of a 4-block facility (green dashed lines) to connect the existing low

Kittelson proposes applying the Level of Traffic Stress (LTS) methodology through an efficient and innovative GIS mapping approach by combining roadway data, such as speeds and traffic volumes, to classify streets into four (4) "stress levels." An LTS score of 1 means the street or facility is comfortable for the general population and is suitable for an 8-year old child. An LTS score of 2 means the street is likely suitable for a child but warrants additional evaluation to ensure it is a low stress street. A score of LTS 3 is comfortable for confident bicycle riders and a score of LTS 4 is uncomfortable for even experienced bicycle riders.

Kittelson proposes a version of the LTS analysis that uses a "weakest link" method of assigning stress level; which reflects the reality that people on bikes experience at various types of traffic stress (speed of traffic, volume of traffic, degree of separation from

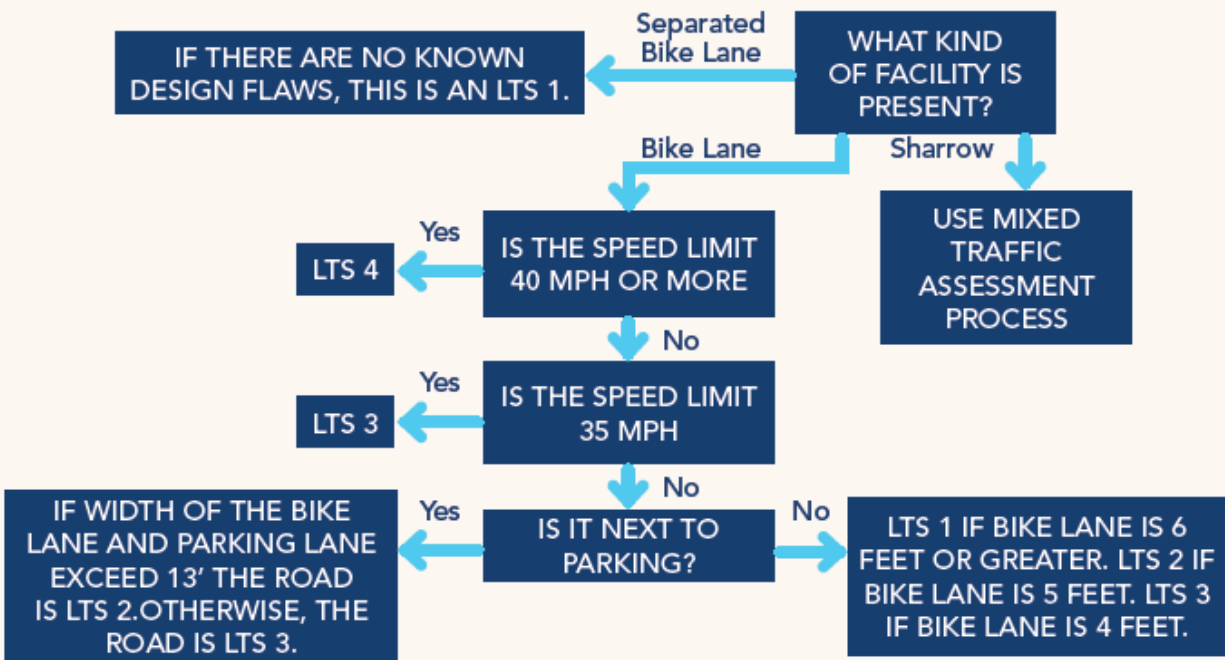
traffic, incursions into their space) simultaneously. If even one of these factors is excessive, the whole street segment is a high stress experience for most potential riders.

Kittelson will apply the methodology for streets with and without bike facilities. Signed routes and sharrow facilities will be assessed using the mixed traffic method, since they do not provide designated space for people on bikes. The process and data needed for an LTS assessment of streets where bikes are expected to operate in mixed traffic is shown in the below flow chart.



For streets with bicycle facilities, the first data type assessed will be whether the bike facility is physically separated from motor vehicle traffic or not. Streets with bike lanes or buffered bike lanes will be assessed based on speed and whether they are present next to parking.

BICYCLE FACILITY ASSESSMENT



It is anticipated there will be a handful of segments where there is a bike lane on streets with speed limits below 35 MPH. As shown in the flow chart, it is necessary to take the presence of a parking lane and its width into account. In these cases, Kittelson will conduct a desk audit of the parking lane presence and width of parking lane and adjacent bike lanes. Google Earth measurements are adequate in order to streamline this process

For shared use paths that are completely separated from traffic, it is assumed that there are no known design flaws, and an LTS 1 is assigned.

While the study is focused on recommended corridors from the 2014 Bicycle / Pedestrian Plan, Kittelson recommends completing this assessment for Coral Gables' entire roadway network for two reasons:

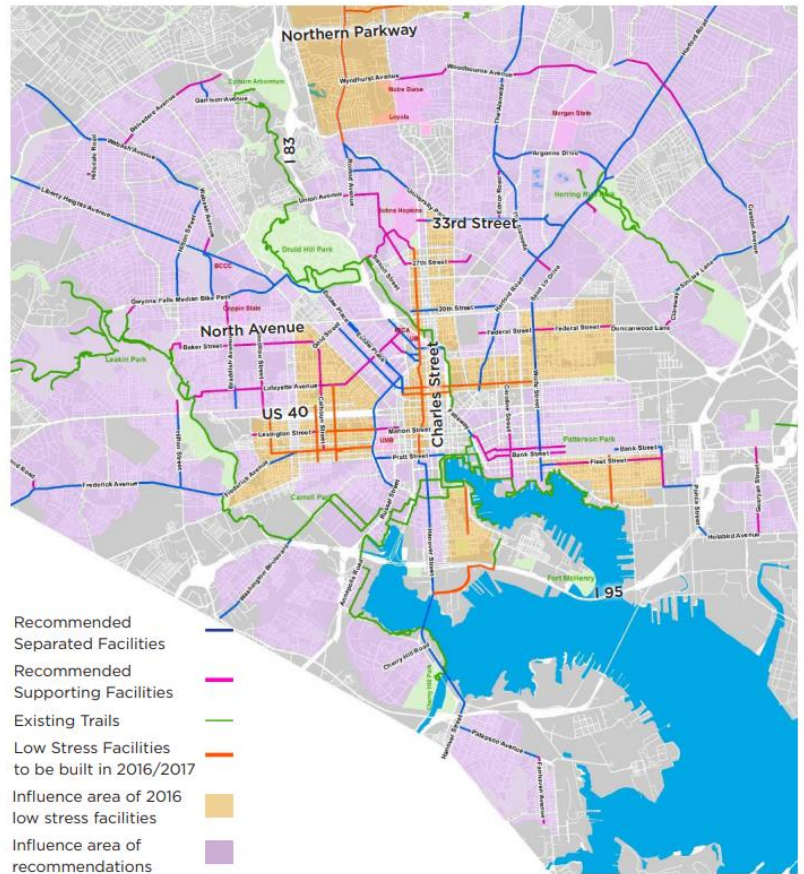
(1) The automated process developed by Kittelson requires the same level of effort for the entire roadway network assessment and the recommended corridor assessment

(2) While the final plan will not include recommendations for local roads or streets not already identified in the 2014 Plan, understanding where the low stress islands are and the recommended corridors' role in the network is crucial to the facility type decisions.

Task 2.3 Facility Selection

As part of the LTS analysis, Kittelson will leverage the LTS results to determine the appropriate facility recommendations. Kittelson will use the guiding design principals in the NACTO Urban Bikeway Design Guide and the FHWA Separated Bike lane Design Guide. Kittelson was a key author on both of these guides and team members' intimate knowledge of the guides will be critical to making facility recommendations that will be appropriate for all users.

Kittelson will make recommendations for the corridors identified in the 2014 Plan where it was necessary to have separated bike lanes and where supporting facilities, such as bicycle boulevards, wayfinding, and bike lanes were appropriate to enable access to the separated bike lanes. Kittelson will also demonstrate the specific network areas that were impacted by the facilities and how much of the overall network would be unlocked due to the construction.



In Baltimore, Kittelson made a series of recommendations where it was necessary to have separated bike lanes and where supporting facilities, such as bicycle boulevards, wayfinding, and bike lanes were appropriate to enable access to the separated bike lanes. Through a low stress Island analysis, the team was able to demonstrate the specific

Task 3. Assessing the comfort of the Pedestrian Network

Task 3.1 Sidewalk Gap Analysis

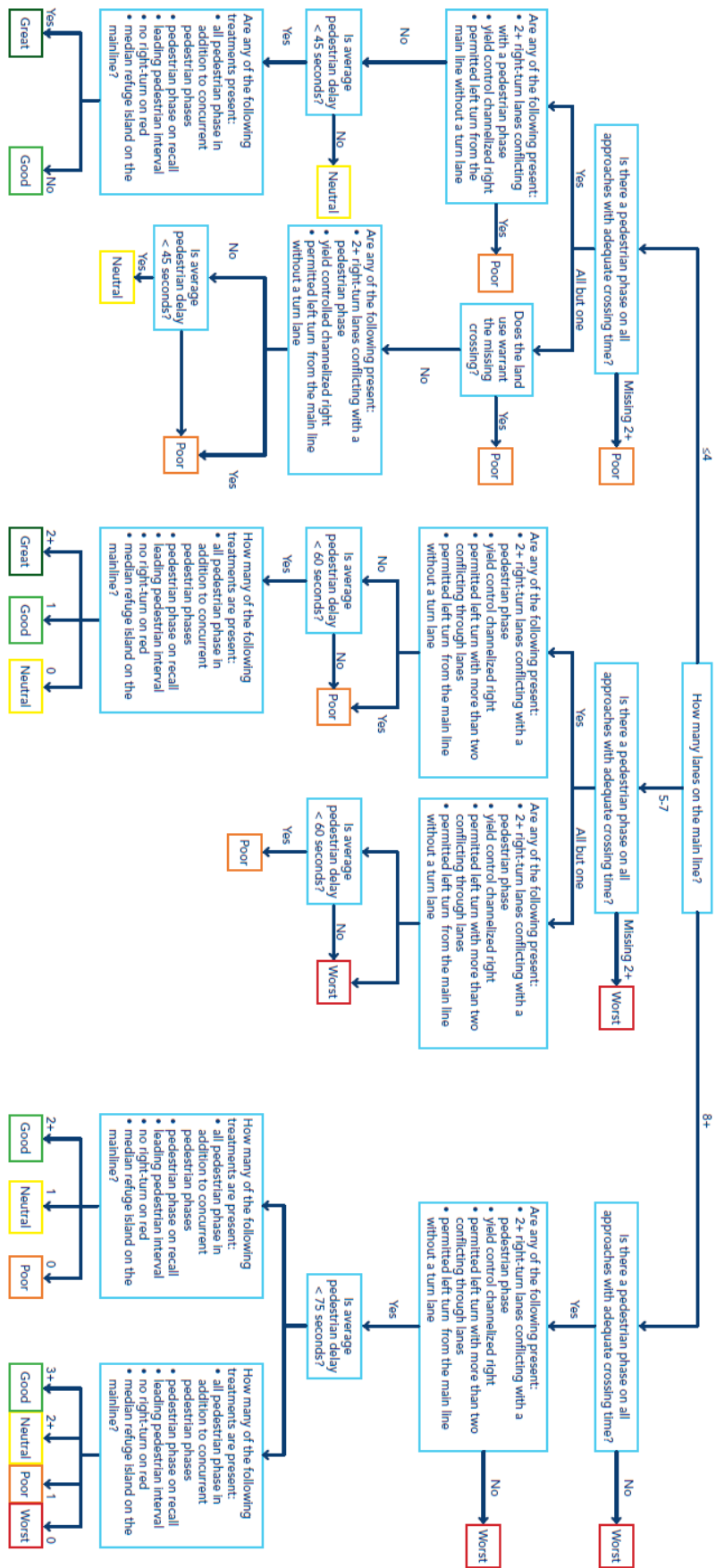
The pedestrian network in Coral Gables faces similar challenges to the bicycle network: lack of connected, dedicated facilities and limited right-of-way on many streets to add sidewalks. Kittelson proposes focusing the sidewalk gap analysis within a walkshed to existing and future transit hubs. Kittelson will conduct an audit and map critical sidewalks missing within a quarter-mile walkshed of major transit stops and future SMART corridors hubs. This mapping exercise can also take into account recommendations for advisory lanes or policy changes that can add walking space for locations where the right-of-way is too constrained to add a sidewalk.

Task 3.2 Pedestrian Intersection Accommodation

In order to accommodate high turning volumes at intersections, several of the major streets present uncomfortable conditions for crossing. Kittelson has successfully applied a pedestrian

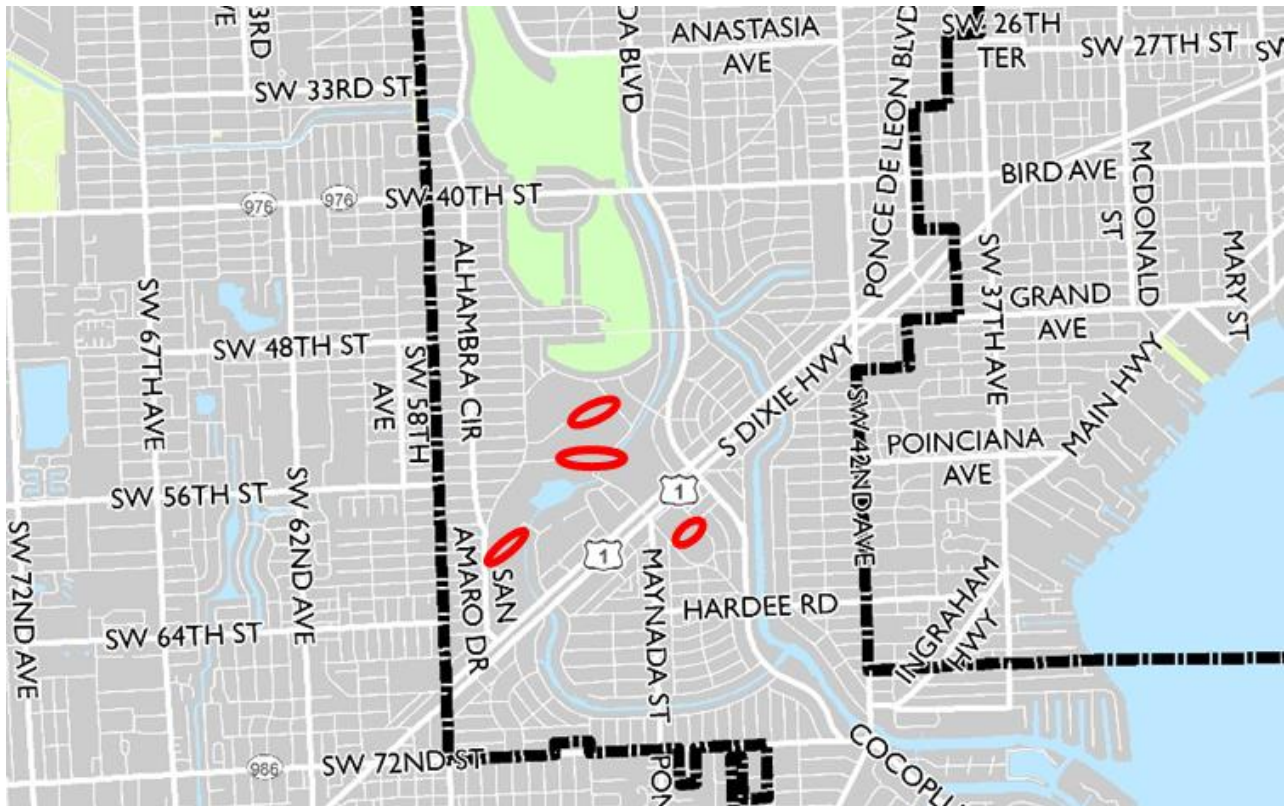
intersection accommodation methodology in Hillsborough, FL. Similar to the bicycle LTS and intersection accommodation, a weakest link threshold approach is applied based on the street context. The below decision tree outlines how accommodations for pedestrians at intersections are ranked based on the treatments applied. It also provides a clear path for how intersection accommodation can be improved based on the condition of the street.

Pedestrian Intersection Accommodation Methodology



Task 3.3 Pedestrian Connectivity Analysis

Coral Gables also has physical barriers such as waterways, the University of Miami campus, and the Metrorail that prevent easy pedestrian permeability through the network. This forces long detours and the suburban, cul-de-sac street pattern forces trips to concentrate on major through roads. However, some of these barriers can provide opportunities for pedestrian-only connections that expand the pedestrian network. Kittelson will conduct a connectivity analysis to identify locations where a pedestrian only connection may be added to expand the pedestrian network. This map will include an accompanying table that identifies the affected parcel, and implementation recommendations to implement the connection. This may come in the form of a ROW purchase, policy changes, or coordination with parks or institutions.



Task 4. Implementation Plan

Task 4.1 Implementation Plan and Planning Level Cost Estimates

A key part to taking the work from this study and the Coral Gables' Bicycle / Pedestrian Plan will be developing a detailed implementation plan with associated costs. The implementation plan will also take into careful consideration how bicycle and pedestrian projects will support the proposed SMART corridor. Kittelson's extensive experience in applying the proposed methodologies to assess the bicycle and pedestrian network and our ability to automate this process in GIS with most datasets available, will allow us to focus the majority of the budget on appropriate facilities. Kittelson's experience in advancing active transportation projects from network planning, to corridor planning and concept, to construction-ready design plans ensures a strong implementation and funding strategy.

2017			2018			2019		
Facility Type	Miles	Cost	Facility Type	Miles	Cost	Facility Type	Miles	Cost
Separated	6.27	\$1,881,000	Separated	9	\$4,500,000	Separated	9	\$4,500,000
Supporting	6.6	\$396,000	Supporting	6	\$600,000	Supporting	6	\$600,000
Total	12.87	\$2,277,000	Total	15	\$5,100,000	Total	15	\$5,100,000

2020			2021			2022		
Facility Type	Miles	Cost	Facility Type	Miles	Cost	Facility Type	Miles	Cost
Separated	12	\$6,000,000	Separated	10.5	\$5,250,000	Separated	12	\$6,000,000
Supporting	5	\$500,000	Supporting	5	\$500,000	Supporting	6	\$600,000
Total	17	\$6,500,000	Total	15.5	\$5,750,000	Total	18	\$6,600,000

Funding Type	Funding Source	2018	2019	2020	2021	2022
Local Funding	General Fund and CIP Allocation	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000
State Funding	MDOT Bikeways Grant Funding	\$856,000	\$856,000	\$1,160,000	\$800,000	\$1,196,000
Federal Funding	Transportation Alternatives Programs Grant	\$3,264,000	\$3,264,000	\$4,240,000	\$3,950,000	\$4,404,000
Total		\$5,100,000	\$5,100,000	\$6,500,000	\$5,750,000	\$6,600,000

In Baltimore, Kittelson estimated that 85 percent of the city would have access to a continuous, low stress bicycle trip. This included a 5-year implementation plan and a funding strategy to invest \$35 million by leveraging state and federal funding.

Task 4.2 Implementation Plan Impact Summary

A necessary part of an implementation plan is a compelling story on the beneficial impact the project will have on the community. Kittelson will develop a one-page, public-facing fact sheet that summarizes the impacts of implementing the proposed network improvements.

Task 5. Stakeholder Outreach

Kittelson recognizes there are partners in the City that will be critical to implementation and the success of the ultimate recommendations. Kittelson proposes forming a stakeholder group of sister agencies, key partners and community groups. Kittelson will work with the City to develop a stakeholder group to serve as a sounding board for the project and conduct two (2) workshops with stakeholders. The first workshop will be a kick-off meeting to review the scope of work, the project schedule, and also to collect feedback from the group on the proposals in the 2014 Plan and any considerations the group feels will be important to the study. The second workshop will take place after the completion of Task 2 and 3. In this workshop, Kittelson will work with stakeholders to ground truth and refine the proposed/planned improvements. The workshop will also seek to identify opportunities to coordinate these with ongoing local or regional initiatives/projects.



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SECTION B – TERMS AND CONDITIONS

The services described in the Scope of Work (Section A), shall be governed by all applicable terms, conditions and professional standards within the agreement executed May 16, 2018 between the City of Coral Gables and Kittelison & Associates, Inc. for Multimodal Transportation Planning & Engineering Consulting Services contract. This proposal is effective for thirty days.



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SECTION C – PROPOSED BUDGET

Project Name: City of Coral Gables' Bike Pedestrian Stress Assessment Study - Budget
Project Manager: Brett Boncore, PE
Date: 8/1/2018

Staff Category	Project Manager	Project Engineer	Traffic Engineer	Project Principal	Subtask Hours	Subtask Budget
Staff Names	Brett Boncore	Caitlin Tobin/Alia Awwad	Jennifer Musselman	Conor Semler		
Hourly Rate	\$ 140.12	\$ 146.64	\$ 119.68	\$ 178.83		
Task 1 Project Management						
Task 1 - Project Management & Coordination	15	12	6	3	36	\$5,116
Task 1 Total						\$5,116
Task 2 - Bicycle LTS Assessment						
Task 2.1: Speed Data Collection	12	20	30	3	65	\$8,741
Task 2.2: Level of Traffic Stress Analysis	24	36	48	8	116	\$15,817
Task 2.3: Facility Selection	16	24	40	5	85	\$11,443
Task 2 Total						\$36,001
Task 3 -Pedestrian LTS Assessment						
Task 3.1. Sidewalk Gap Analysis	8	16	24	3	51	\$6,876
Task 3.2. Pedestrian intersection Accomodation	16	24	38	6	84	\$11,382
Task 3.3. Pedestrian Connectivity Analysis	16	30	36	6	88	\$12,023
Task 3 Total						\$30,281
Task 4 - Implementation Plan						
Task 4.1. Implementation Plan and Planning Level Cost Estimates	16	24	24	6	70	\$9,707
Task 4.2. Implementation Plan Impact Summary	12	24	24	4	64	\$8,788
Task 4 Total						\$18,495
Task 5 - Stakeholder Involvement						
Task 5 - 2 meetings	16	28	20	6	70	\$9,814
Task 5 Total						\$9,814
	151	238			729	\$99,707



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SECTION D – PROPOSED SCHEDULE

City of Coral Gables' Bike Pedestrian Stress Assessment Study - Schedule

Month	Month 1				Month 2				Month 3				Month 4				Month 5				Month 6				Notes				
Week	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		1	2	3	4
Task 1- Project Management																													
Task 2- Assessing the Comfort of the Bicycle Network																													
Task 2.1. Speed data collection																													
Task 2.2. Level of Traffic Stress Analysis																													
Task 2.3. Facility Selection																													
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Task 4 - Implementation Plan																													
Task 4.1. Implementation Plan and Planning Level Cost Estimates																													
Task 4.2. Implementation Plan Impact Summary																													
Task 5 - Intergovernmental and Stakeholder Outreach																													

Overall Task Timeline	
Sub Task Timeline	
Deliverable	●
Monthly Project Management Meeting	P
Stakeholder meeting	◆

Kittelson anticipates adjusting recommendations based on the stakeholder feedback in the second workshop.

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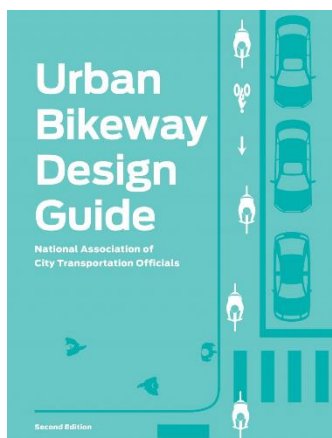
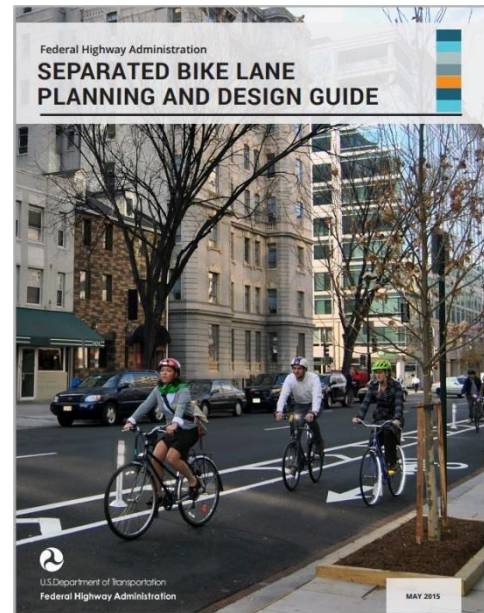
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SECTION E – RELEVANT QUALIFICATIONS

FHWA Separated Bike Lane Planning and Design Guide

Reference: Christopher Douwes, Community Planner, FHWA, (202) 366-5013, christopher.douwes@dot.gov

Kittelson was on the research team that developed the Federal Highway Administration's Separated Bike Lane Planning and Design Guide. Working with the Office of Human Environment's Livability Team, Kittelson researched best practices in planning and design of separated bike lanes, also known as cycle tracks. The project, which was led by the University of North Carolina's Highway Safety Research Center, engaged a Technical Working Group of representatives from cities, State DOTs, and MPOs throughout the US, as well as organizational representatives from the American Association of State Highway Transportation Officials, Institute of Transportation Engineers, National Association of City Transportation Officials, and the League of American Bicyclists' Equity Initiative. The Design Guide provides a robust and contemporary assessment of crash data for operational separated bike lanes in the US. By evaluating the full range of design options, safety studies, and qualitative input from practitioners, it also informs the planning, design, and safety outcomes of future separated bike lanes.



NACTO Urban Bikeway Design Guide

Reference: Matthew Roe, NACTO, Director, Designing Cities Initiative, 646-324-8352

Kittelson worked as part of the consultant team to develop a comprehensive Urban Bikeway Design Guide. Kittelson developed material for the Guide and offered engineering insight into the appropriateness and applicability of the cycling treatments.

Bicycle facilities covered by the Guide include a variety of innovative facilities, including bicycle signals, cycle tracks, bike boxes, and intersection improvements. Kittelson also developed supplemental material for the NACTO Urban Bikeway Design Guide related to bike boulevards and contextual guidance for selecting bike facilities. Kittelson provided technical review of supplemental content related to bike boulevards and contextual guidance.

This project is an excellent example of Kittelson's ability to integrate and evaluate innovative bicycle treatments within the context of other transportation system elements, such as vehicular and transit components. The results were a completed guidebook related to design in urban environments for bikeways including bike facilities such as signals, cycle tracks, bike boxes, intersection improvements and bike boulevards.

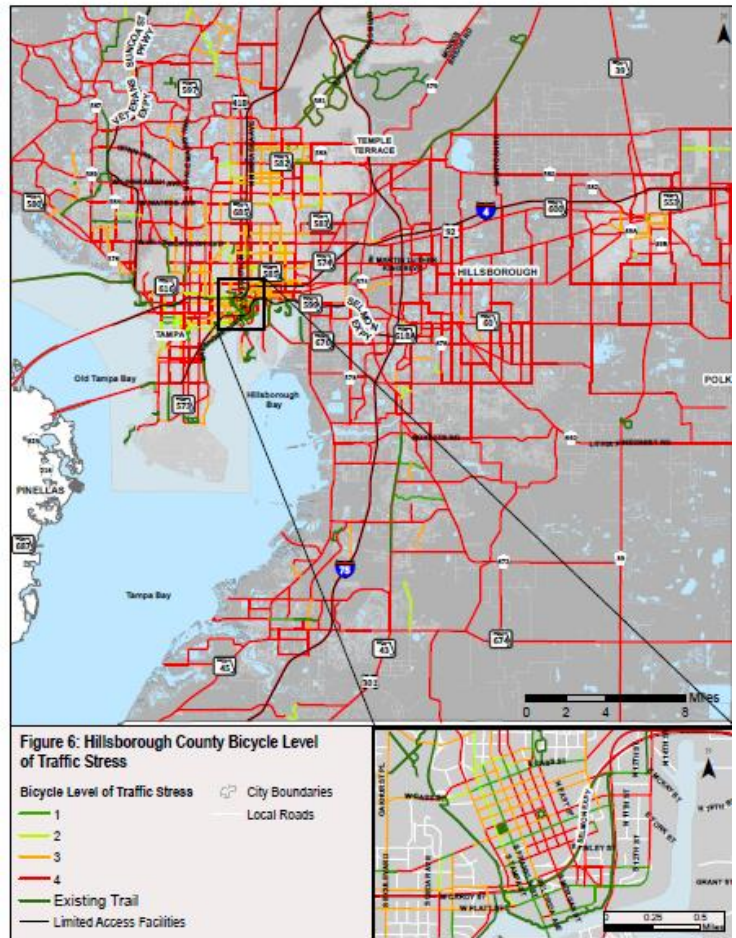
Hillsborough County Bicycle and Pedestrian Evaluation- Phase I

Reference: Sara McKinley, Hillsborough MPO, Principal Planner, 813-273-3774 ext. 382, MckinleyS@plan.com

As part of a two-phased effort, Kittelson lead a system wide evaluation of the bicycle and pedestrian conditions in Hillsborough County. This included applying the Level of Traffic Stress methodology to the entire county network through a GIS analysis of the roadway speed, presence of a bike lane, number of lanes and presence of parking. This inventory of the current conditions will help the MPO as they identify and prioritize projects and helped them identify existing bicycle facilities that are deficient for the general population. The analysis also included developing a methodology that leveraged the LTS scores to identify intersection crossing deficiencies for bikes in the network and identify the appropriate crossing treatment for future projects.

Kittelson also developed a methodology to evaluate the pedestrian accommodations at intersections in the County. Kittelson deveope dthis methodology into an easy-to-follow decision tree to assess the crossing conditions based on the context of the intersection. The decision tree also creates a clear path on changes to the intersection that would benefit the pedestrian experience.

Phase I of the project was completed in June 2018. As part of phase II, which began July 2018, Kittelson will develop a corridor level methodology to evaluate pedestrian accommodations at the corridor level.



BALTIMORE CITY DOT ONCALL TRAFFIC ENGINEERING SERVICES



Task : Transit Support:

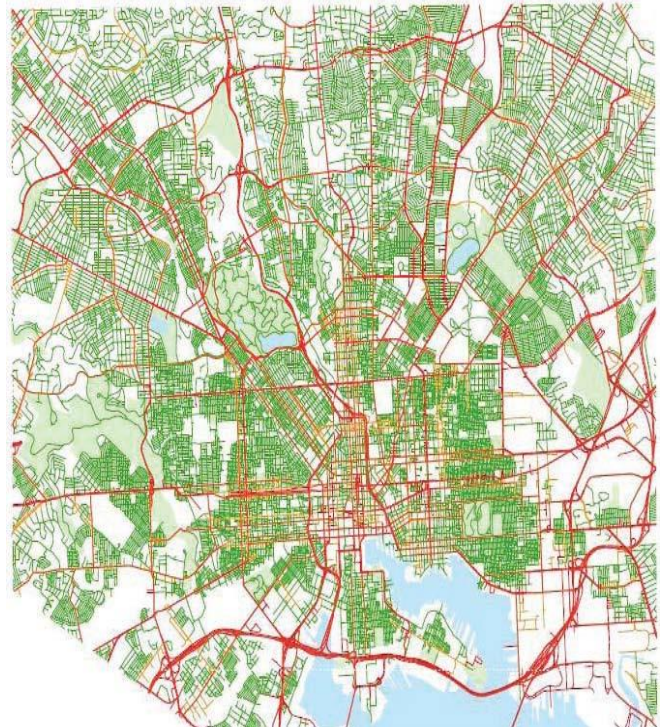
KAI is working with City of Baltimore Department of Transportation Transit Bureau staff to increase the efficiency and improve the operations of the popular Charm City Circulator, a network of four corridor based routes serving downtown and near in neighborhoods and

institutions. Kittelson has developed and is testing a series of system alternatives to the Circulator based on various funding level scenarios, and service needs established through a survey of riders, the demographics of residents

Task : Baltimore Separated Bike Facility Network Plan:

KAI led a Level of Traffic Stress analysis of the entire street network of Baltimore City. The Level of Traffic Stress methodology uses roadway cross section characteristics to predict how stressful a bicyclist will find it to ride on a given street. This analysis was supplemented with traffic data where available, in order to create a comprehensive map of where bicyclists currently feel safe riding and where there are barriers to bicycle travel. This holistic look at the bicycling environment was used, in close collaboration with City of Baltimore DOT staff and knowledgeable stakeholders, to make recommendations for a network of separated bike facilities and supporting facilities. The recommended network contained only a fraction of the mileage of projects identified in the 2015 Bike Master Plan network, but when constructed, this network would “unlock” the vast majority of the City to bicycle travel, entirely on low stress facilities and streets, with limited detours. Proactive engagement of stakeholders ranging from BCDOT planning and engineering staff to the Mayor’s Bicycle Advisory Commission and interested members of the public is helping to inform recommendations that will earn public buy-in and adoption as an official BCDOT planning document.

served, access to jobs, institutions, entertainment areas and other attractors, estimated cost per rider and per mile by route, as well as coordination with complementary transit service provided by the Maryland Transit Administration (MTA), the University of Maryland, Johns Hopkins University and other private operators. With the cancellation of the Red Line Light Rail project by the Maryland Transit Administration (MTA) in June 2015, KAI prepared a white paper outlining economic, equity and transit service impacts on City residents. Prior to work under this City contract, Kittelson staff helped to develop the concept of StationArea Advisory Committees (SAACs) as part of the Red Line Community Compact process for the Red Line Light Rail project. Also while under contract to the MTA, KAI prepared a daylong educational SAAC kickoff event called NewLinks Baltimore which showed strategies used to leverage rail investment for economic and community building private investment. The training strengthened transit advocacy among community and business members advising station area designers on Transit Oriented Development planning along the route.

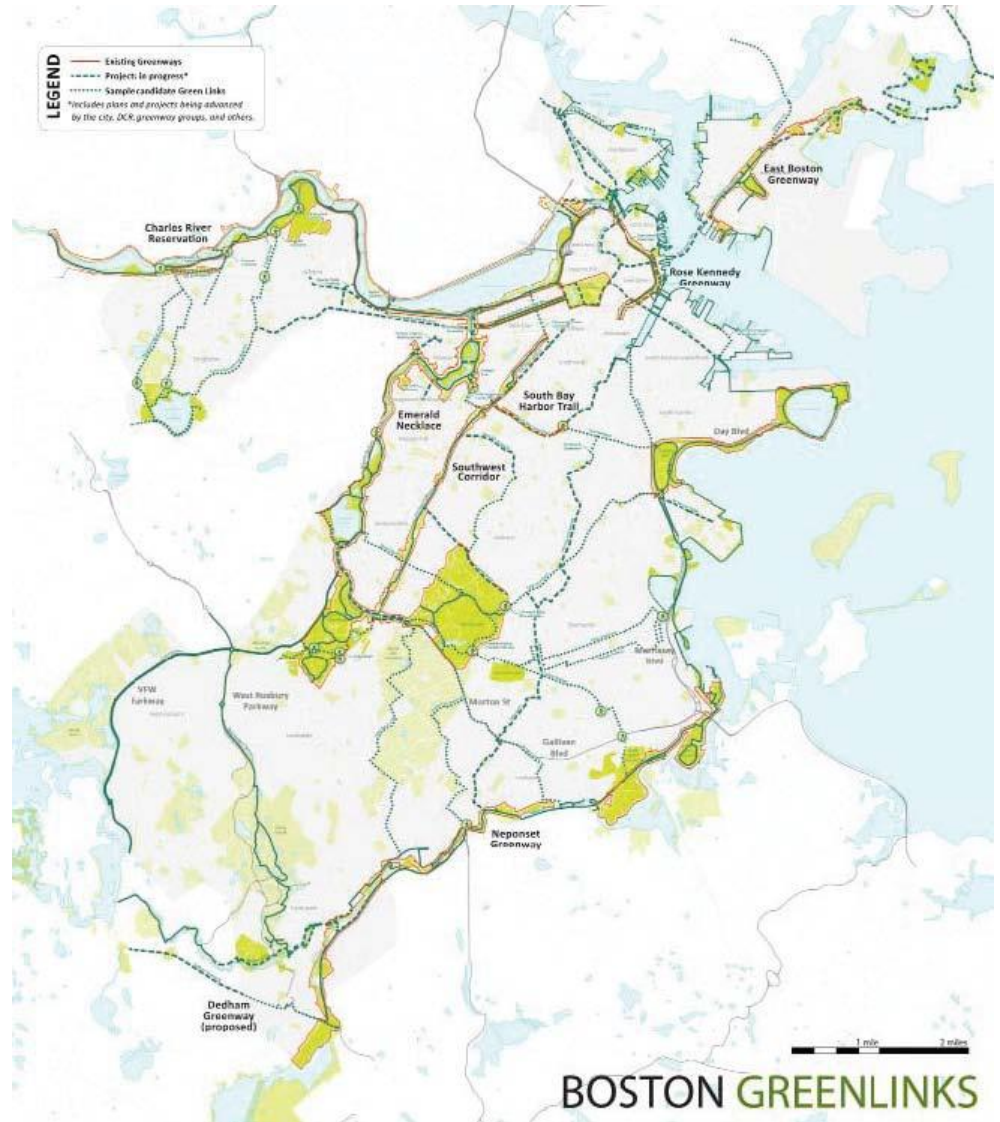


Reference: Ms. Veronica McBeth, Transit Chief, Baltimore City Department of Transportation 410. 396.6803

BOSTON GREEN LINKS PLAN

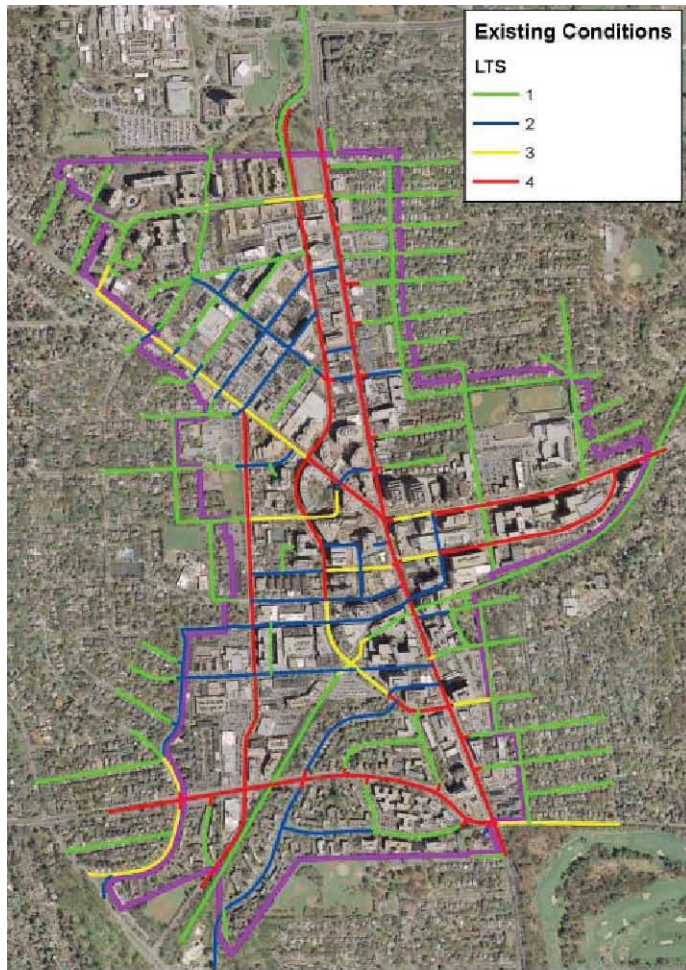
To better connect the City's residents to its parks, the Boston Transportation Department developed a Green Links Plan. Boston has a wealth of open space, including both large parks and miles of linear parks that provide pleasant conditions for walking and bicycling throughout the City. The City hired Kittelson & Associates, Inc. (as a member of the NBBJ team) to identify the best connections between neighborhoods and parks, with an emphasis on serving families and individuals with a wide range of abilities.

Our approach identified candidate links with low traffic speed and volume, or with excessive width from which protected facilities could be established. It also identified crossing barriers, such as inhospitable intersections or rail/river crossings. By solving these challenges at spot locations, the Plan will unlock the larger park network for Boston's residents.



Reference: Charlotte Fleetwood, Transportation Planner, Boston Transportation Department, 617.635.2462

MONTGOMERY COUNTY BICYCLE PLANNING GUIDANCE



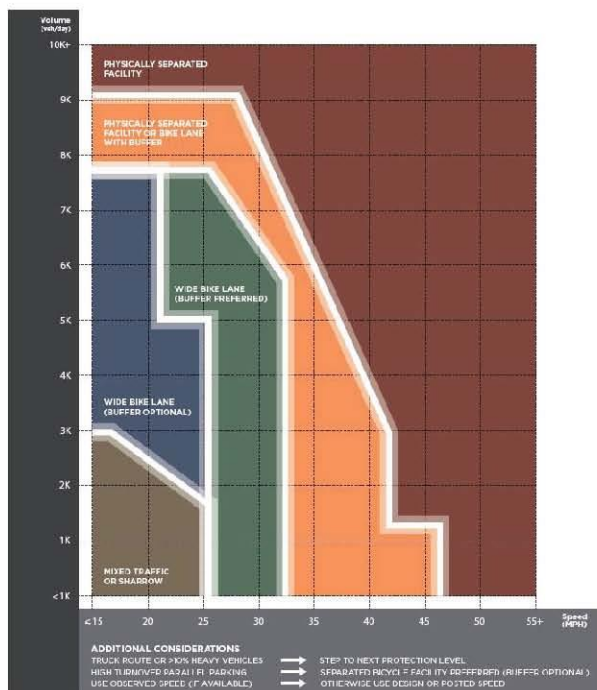
Montgomery County, Maryland received a grant through the Metropolitan Washington Council of Governments' (MWCOG) Transportation/Land Use Connections program to develop bicycle classification guidance for the County. KAI led a process with the Montgomery County Planning Department and its key stakeholders to advance bicycle planning to help build an attractive network for a broader portion of the County's population.

The Montgomery County Bicycle Planning Guidance (Attachment A) provides two tools for evaluating the needs of different bicycling groups. The first is a "pre-screening" tool that identifies those bicycle facilities that are most appropriate under different combinations of traffic speed and traffic volume. Separate prescreening tools were created for the "Interested but Concerned" and "Enthusiased and Confident" cyclist groups.

A second tool is the Level of Traffic Stress (LTS) methodology that assigns road segments and intersection crossings a level of traffic stress from 4 (highest) to 1 (lowest). These levels correspond to the Four Types of Transportation Cyclists typology:

- Level of Traffic Stress 4: Strong & Fearless
- Level of Traffic Stress 3: Enthused & Confident
- Level of Traffic Stress 2: Interested but Concerned
- Level of Traffic Stress 1: Appropriate for most children

The LTS tool was tested in Downtown Bethesda and identifies a number of deficiencies in the bicycling network for the "Interested but Concerned" population. The Bicycle Planning Guidance was developed with input from the Montgomery County Department of Transportation. It was also reviewed with a focus group of bicyclists in Montgomery County, representing a good distribution of geographic areas, tolerance for traffic stress, and gender.



Reference: David Anspacher, Montgomery County Planning Department; Metropolitan Washington Council of Governments (MWCOG), 301.495.2191

METROPLAN ORLANDO GENERAL PLANNING CONTRACT (GPC)

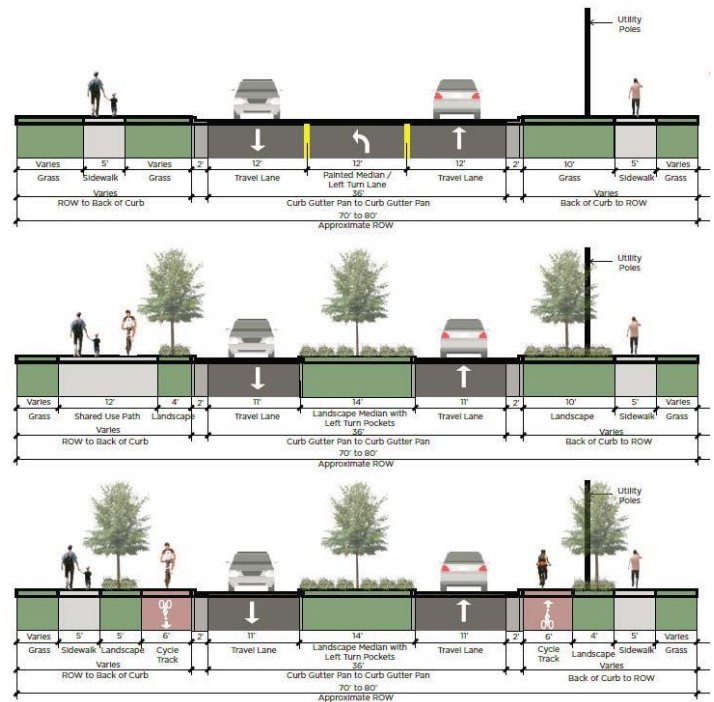
Prioritization Process

KAI reviewed MetroPlan Orlando’s current project prioritizations process and provide recommendations in order to create a process that is objective, comprehensive, and quantitative. KAI is currently working with MetroPlan to develop three sets of criteria that will evaluate Roadway, Bicycle/Pedestrian, and TSM&O projects with a similar level of scrutiny. Each set of criteria will include multimodal considerations in order to prioritize projects that will benefit a variety of user groups.

2015 Corridor Signal Retiming Study

KAI was selected to conduct a travel time study before and after the signal retiming of more than 30 corridors in the MetroPlan Orlando area. The purpose of the study was to assess the benefit-cost ratio of the corridor retiming program, which exceeded \$1.2M in funding. KAI utilized Bluetooth data collection devices to provide a higher capture of data points over multiple time periods and days. KAI summarized the before and after travel time information, including average travel speed and Level of Service, for each corridor. A benefit-cost ratio was

calculated for each corridor using the travel time data and the contractors’ signal retiming costs.



MAY 2016



Prepared for:
metroplan orlando
A REGIONAL TRANSPORTATION PARTNERSHIP

Prepared by:
KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERS

Complete Streets Program

KAI has assisted MetroPlan Orlando in the creation and execution of their Complete Streets program and formation of policy. KAI worked with the MetroPlan Orlando to develop a series of educational case studies that demonstrated the model process, purpose for, and elements of Complete Streets on three Central Florida corridors. The case studies included workshops with local staff from each community to gather input and formulate solutions within the specific political and cultural context of each city. In some cases, these workshops provided a

much needed communication platform, and recommendations were programmed for design and construction. As a result of this program, MetroPlan Orlando formally adopted a Complete Street policy and has a model process for how to conduct Complete Streets studies. Many of these municipalities are actively engaged with the MetroPlan in advancing Complete Streets implementation.

Reference: Eric Hill, MetroPlan Orlando, 407.481.5672

SPACE COAST TPO COMPLETE STREETS POLICY AND IMPLEMENTATION

In the last three years, Kittelson has assisted the Space Coast Transportation Planning Organization (TPO) as a General Planning Consultant in various capacities, from policy development to project implementation. Our work includes leading the development of the TPO's Complete Streets policy, programming, and prioritization; corridor planning and feasibility studies; and the development of the annual state of the system reports as part of the TPO's congestion management program. Kittelson first got engaged with the SCTPO on the Complete Streets by facilitating a series of internal and external workshops on behalf of the TPO to better engage local municipalities on a countywide Complete Streets vision. The workshops helped local staff understand the details of the initiative and also equipped them with draft Complete Street policy language, and a ready set of communication materials to help staff inform their community leaders and constituents. As a result of this series of training, the SCTPO and all 16 Brevard municipalities



have formally adopted a set of Complete Street guiding principles and formal policy and many are engaged with the TPO in advancing Complete Streets implementation. To implement this Complete Street vision, Kittelson helped the SCTPO launch a Complete Streets funding assistance program in 2011, which allocated a total of \$18 million for feasibility studies, design, and construction of complete streets projects to be spent by 2017. Kittelson developed a prioritization system to look holistically at Brevard County to identify candidate Complete Streets corridors, work with local governments to develop these opportunity corridors into projects, evaluate the feasibility of constructing the projects by 2017, and then prioritize those projects. Projects advanced through to this process are now going through project development for eventual implementation. Kittelson is currently leading the concept design and preliminary engineering

for three of the selected corridors.

Reference: Georganna Gillette, Space Coast TPO, georganna.gillette@brevardcounty.us



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SECTION F – BIOS AND RESUMES OF KEY STAFF

KEY TEAM MEMBERS

Brett Boncore, PE



Brett is a transportation planner and engineer whose career has focused on building livable, healthy communities through the planning and engineering of multimodal transportation infrastructure that serve the most vulnerable users of the public space and support the holistic goals of the community. He has project experience that includes health impact assessment, bike and pedestrian planning and training, transit corridor planning, and engineering traffic impact analyses. Brett has provided on-call support for the FDOT District Five's Bike and Pedestrian Coordination efforts, providing multimodal operations/safety expertise to ensure bicycle, pedestrian, and transit infrastructure are provided in all FDOT District Five project proposals. He has also managed a variety of Complete Streets and active transportation projects on network and corridor-level scales throughout Florida, most recently on the MetroPlan Orlando Complete Streets policy, Robinson Street Corridor Planning Study, and the development of a multimodal corridor project identification process for FDOT Modal Development Office. More recently, Brett has managed several transportation-related health impact assessments (HIA), including the most recent SR 436 HIA evaluating how BRT and station area Complete Streets investments can affect the physical, mental, and social health of residents and employees. A registered Professional Engineer in Florida, he also has broad experience in traffic engineering and has managed a number of operations and safety evaluations for agencies around the country.

Conor M. Semler, AICP



Conor is a senior planner who draws on his experience in urban planning, engineering, and technical research in complete streets design. Conor is highly regarded for his ability to leverage transportation design to create livable and healthy communities. His focus is on improving conditions for walking and bicycling through better evaluation and design. Conor is a national leader in the planning and design of innovative bicycle facilities. He was involved in the development of both the NACTO Urban Bikeway Design Guide and the FHWA Separated Bike Lane Planning and Design Guide. Conor's experience is informed by his role in leading research, contributing to designs, and working closely with cities to continually evolve and innovate safer, more inviting bicycle facilities.

Caitlin Tobin (Doolin), PE



Caitlin offers over 7 years of experience in active transportation, urban design and implementation. For several years, she served as the Bicycle and Pedestrian Coordinator for the Baltimore City Department of Transportation, where she led the implementation of Baltimore's first temporary protected bike lane. Caitlin also holds practical knowledge of the NACTO and national best practices on urban and interim design from NACTO webinars and workshops City employees are privy too. Finally, she led the design and construction of the first

3.5 miles of parking protected bike lanes, launch the largest pedal electric assist bike share system in North America, led the development of Baltimore's Separated Bike Network Plan and managed over \$9 million in active transportation planning, design and construction projects for the City of Baltimore. She also brings four years of experience as a consultant, where she has worked on corridor studies, traffic operations analysis and master planning efforts across 7 states and over 50 jurisdictions.

Jennifer Musselman, EI

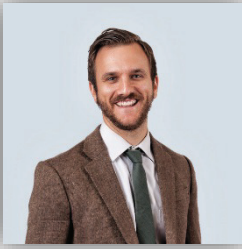


Jennifer is an Engineering Associate in the Kittelson & Associates, Inc. (KAI) Tampa office. She helped create the FDOT Context Classification system and has been applying it on corridors throughout the state, including Alt US 19 in Pinellas County. Jennifer has contributed to several Corridor Planning Studies in both urban and rural contexts through stakeholder involvement, identification of corridor needs and opportunities, and operational analysis. She helped facilitate Complete Streets training courses for FDOT staff and local partners. Her experience also includes transit planning, intersection operations, transit signal priority (TSP), and traffic impact analysis. Jennifer has practical knowledge in several software packages including: ArcGIS, AutoCAD, HCS, Synchro, and SIDRA.

Alia Awwad, PE



Alia is a transportation engineer and planner with a background in roadway and traffic signal design, traffic impact analysis, and local and regional transportation planning. Alia's brings in both public and private sector experience that offers a comprehensive perspective on planning, analysis, and implementation within regulatory frameworks. Specifically, Alia has been involved in conceptual, preliminary, and final design; performance measures analysis; traffic impact review and analysis; safety analysis; as well as regional-, city-, and corridor-level planning studies and plans. Alia has managed districtwide contracts, corridor studies, and major capital improvement projects throughout the south Florida region, and has led multimodal policy and implementation efforts and coordinated with stakeholders.



Mr. Boncore has a passion for seeing communities thrive through the development of multimodal transportation infrastructure that serves all users and supports the holistic goals of the community. He has contributed to a variety of multimodal systems planning, corridor improvement, mobility planning, traffic operations, and safety work. He offers a broad range of experience, having managed tasks for the Florida Department of Transportation (FDOT, and multiple MPO's and transit agencies providing unique abilities in transit, bike, and pedestrian coordination/planning; corridor studies; operational analyses; and public involvement strategies. He has been involved in multiple data collection efforts deploying and analyzing data from Bluetooth technology, Transit Automatic Passenger Count (APC) and Automatic Vehicle Location (AVL) systems, bike-ped counts, traffic counts, travel time runs, and spot speed studies. Mr. Boncore also has experience using several transportation design and planning software packages in a variety of contexts, including GIS, MicroStation V8, AutoCAD, HCS, Synchro, and AutoTurn.

**BRETT BONCORE,
PE**

Engineer

EDUCATION

BS Civil Engineering,
University of Florida, 2012

YEARS OF EXPERIENCE

5

LICENSES

PE: FL

AFFILIATIONS

American Society of Civil
Engineers, University of
Florida Chapter President

AWARDS

UF Department of Civil
and Coastal Engineering
Outstanding Leadership
and Service Award: Given
to one student in the CCE
department each year who
has exemplified excellent
leadership and service
within the Department
during their time at UF.

NORTHWEST HILLSBOROUGH COUNTY TRANSIT STUDY

Mr. Boncore worked with the Hillsborough MPO and HART to evaluate the existing transit service in the northwest portion of Hillsborough County and identify service improvements intended to tie into the Transit Development Plan (TDP). Northwest Hillsborough County has historically been characterized as suburban or rural-suburban. These less dense growth patterns present difficulties for providing transit services. The study considered improvements to existing transit service, new transit services, regional park-n-ride lots, and opportunities to implement on-demand transit service. Mr. Boncore's role included public involvement and community engagement about the existing and proposed conditions.

METROPLAN ORLANDO COMPLETE STREETS PROGRAM

In partnership with MetroPlan Orlando, KAI developed the first Complete Streets program for the Central Florida region. The program addressed policy, process, and funding/prioritization for Complete Streets projects and how this could interface and inform the MetroPlan prioritization process. Mr. Boncore evaluated existing local efforts and policies while formulating a regional strategy for Complete Streets to be implemented in the region. Mr. Boncore also led the regional network screening process, which used an integrated transportation and land use approach to identify corridors for low-hanging fruit Complete Streets projects. Mr. Boncore managed the resulting three Complete Streets case study projects, which led to informed discussions with all relevant local partners along the corridor, and educational materials for other local partners to use when conducting a Complete Streets study. In some cases, these case studies catalyzed local agency momentum towards Complete Streets projects/improvements along these corridors.

FDOT DISTRICT FIVE MODAL DEVELOPMENT CONTRACT

Mr. Boncore has experience managing the continuing services effort for the FDOT District Five's Modal Development Group, the multimodal arm of District Five. This group is responsible for various non-auto multimodal systems and subarea planning, Complete Streets planning and implementation, transit project development support, and bicycle and pedestrian planning and analysis. As part of this contract, Mr. Boncore helped develop a process for District Five to implement multimodal improvements on roadways and projects that are most in need. Mr. Boncore and the team used land use parameters (such as transit-dependent populations, population and employment densities, and supportive future land uses) and transportation parameters to screen The FDOT Five-Year Work Program for projects on roadways with the highest multimodal need and demand. Since these projects are now identified, Mr. Boncore is helping to coordinate with FDOT Planning and other internal groups to develop an implementation process and next steps for each of the identified Work Program projects. Mr. Boncore also provides on-call multimodal operations and safety expertise and training, in coordination with FDOT Production and Project Management to ensure that appropriate bicycle, pedestrian and transit infrastructure are included in the scope of services.

He has done this through FDOT's Electronic Review Commenting (ERC) system, direct coordination with FDOT and external partners at all stages of planning, project development, and design to ensure mobility of all users, in support of the FDOT's Complete Streets Policy. He has also worked with FDOT to educate staff on the operational abilities and limitations of transit modes, federal legislation dictating transit project development, infrastructure requirements of transit service and how they affect the mobility and accessibility needs of all users.

ROBINSON STREET CORRIDOR

FDOT District Five, in partnership with the City of Orlando, recently completed a corridor planning study on SR 526 (Robinson Street) to objectively evaluate possible improvements to the Robinson Street corridor to enhance safety and comfort of multimodal travel along and across the Corridor. Robinson Street is a key east-west corridor through Downtown Orlando. As part of this study, Mr. Boncore lead the alternatives development and coordinated the public involvement elements to better understand the existing needs and opportunities on the corridor. Mr. Boncore assisted in helping members of the public understand the multimodal trade-offs of the recommended lane reduction and addition of two-way cycle track in downtown Orlando and existing four-lane section with Complete Street spot improvements east of downtown, which was driven by a context-based approach.

The Kittelson Team are now working with District Five on concept development to implement and advance the solutions identified in the planning study.

HEALTH IMPACT ASSESSMENTS

Mr. Boncore has experience managing and conducting several transportation-related Health Impact Assessments (HIA). He has managed and conducted the first transportation-related HIAs in the Central (SR 50 HIA) and South Florida (US 1 HIA) regions. With the future introduction of premium transit and bike-ped investments in both of these locations, Mr. Boncore has helped MPOs and transit agencies identify health-related outcomes of such a change and how it affects the physical, mental, and social well-being of the community. As part of these studies, Mr. Boncore facilitated regional discussion among a sounding board of regional health industry experts, known as the HIA working group, on the tie between BRT, bike and pedestrian infrastructure, and community-specific health outcomes. In parallel to this working group, potential health outcomes and cause and effect relationships are mapped. As a result, health-specific recommendations were made, and at times, these HIAs have been successful at looping in health-related evaluation measures during active transportation alternatives evaluation. These HIAs have also provided MPOs, transit agencies, and community organizations with a clear understanding of how health can impact land use policy and transportation decisions in the long-term.

SUNRAIL BICYCLE AND PEDESTRIAN CONNECTIVITY STUDY

The Central Florida Commuter Rail line, known as "SunRail", is Central Florida's first fixed urban transit rail line to be implemented. Mr. Boncore and the KAI team worked with the FDOT on identifying and programming short, medium, and long-term bike and pedestrian connectivity improvements around most of the SunRail station areas. This work included a planning-level analysis of primary bicycling and pedestrian routes around the stations, a detailed identification of ADA and accessibility improvements to the bike-ped network, and supporting FDOT in the expedient programming and, in some cases, conceptual design of these improvements.

FDOT DISTRICT FIVE CORRIDOR PLANNING GUIDANCE TRAINING

In partnership with FDOT District Five, KAI conducted a series of workshop trainings on FDOT District Five's Corridor Planning Guidebook. Mr. Boncore assisted in the preparation and delivery of the workshop trainings which were conducted for District staff at all levels and led to the implementation of the Community Planning Workshops conducted in each of the District Five counties and the governments and agencies within them. These trainings laid out the appropriate Complete Streets planning processes to be used for all FDOT District Five corridor studies - addressing every step of the project development process from ideation to design and construction. Discussions between District staff and local governments were catalyzed by these trainings, leading to effective project coordination and implementation.

LYNX SR 50 ALTERNATIVES ANALYSIS

LYNX, the Central Florida Regional Transportation Authority, initiated a planning level strategic analysis to assess the development of premium transit services in 21 Primary corridors in the Central Florida region. SR 50, a major east-west arterial in Orlando, was one of the corridors identified for implementation of Premium Transit Service. This corridor experiences the existing highest ridership in the system and provides key connections to SunRail Commuter Rail, the University of Central Florida, several malls, hospitals, and major economic activity centers. The Alternatives Analysis identified and evaluated all viable transit alternatives including Bus Rapid Transit (BRT), Light Rail Transit (LRT), Express Bus, and Commuter Rail in order to come up with a Locally Preferred Alternative (LPA). Mr. Boncore deduced and analyzed the safety, traffic, and existing transit conditions along the corridor, performing extensive GIS transit

analysis utilizing Automatic Passenger Count (APC) transit data, and FDOT accident and traffic data. He also performed the technical alternative screening based on the needs, goals, and objectives of the study to arrive at the Locally Preferred Alternative (LPA) with a first phase of 11 miles of Bus Rapid Transit (BRT). He led the grassroots public involvement effort and reached out to over 35 corridor agencies, municipalities, neighborhoods, and interest groups to obtain stakeholder input on the implementation of the premium transit line. Throughout this study, Mr. Boncore was exposed to FTA grant application processes for the purposes of applying for implementation funds future the proposed transit service.



Conor Semler is a multimodal transportation planner with Kittelson & Associates, Inc. in Boston, Massachusetts. Mr. Semler recognizes transportation's value in creating livable and healthy communities and applies a multimodal perspective to all of his planning work. He has worked with communities around the country and internationally, including experience in Central Florida with FDOT. This breadth of experience informs his overall planning approach, which emphasizes the thorough understanding and appreciation of each community's goals and needs. Mr. Semler's experience incorporates technical engineering fundamentals and a high-level planning perspective on projects such as the NACTO *Urban Bikeway Design Guide* and the upcoming FHWA *Separated Bike Lane Planning and Design Guide*.

**CONOR SEMLER,
AICP**

Senior Planner

EDUCATION

MRP City and Regional Planning, Cornell University, 2007

BA Government, Colby College, 2005

YEARS OF EXPERIENCE

11

LICENSES

AICP

AFFILIATIONS

American Planning Association, Member

Association of Pedestrian and Bicycle Professionals, Member

Young Professionals in Transportation - Boston, Member

American Institute of Certified Planners (AICP), Member

PUBLICATIONS

With Coffel, K., et al. TCRP Report 153: Guidelines for Providing Access to Public Transportation Stations. Transit Cooperative Research Program, Transportation Research Board, National Academy of Sciences, Washington, D.C., 2013.

URBAN BICYCLE DESIGN

Mr. Semler contributed to the NACTO Urban Bikeway Design Guide which provides cities with state-of-the-practice solutions that can help create complete streets that are safe for bicyclists. Mr. Semler wrote and developed material for the Guide and offered engineering insight into the appropriateness and applicability of the cycling treatments. Bicycle facilities covered by the Guide include a variety of innovative facilities, including bicycle signals, cycle tracks, bike boxes, and intersection improvements. Mr. Semler also contributed to the FHWA Separated Bike Lane Planning and Design Guide, which offered the first federal guidance on planning and design for separated bike lanes (also known as cycle tracks). Mr. Semler has applied bicycle facility design across the U.S., including most recently in Portsmouth, New Hampshire, where he led the conceptual design of a separated bike lane on Route 1.

PLANNING GUIDANCE HANDBOOK, FDOT DISTRICT FIVE

Mr. Semler helped develop the Multimodal Corridor Planning Guidebook for the Florida Department of Transportation District Five. The Guidebook walks through the planning process while integrating the relationship between transportation and land use. Planners are encouraged to explicitly identify the purpose and need before identifying a solution. Mr. Semler also helped lead a series of training courses with FDOT D5 staff to walk through the contents of the Guidebook. Using actual and theoretical examples, the participants learned to approach transportation questions from a planning perspective which will help identify solutions that fit within the community context.

FHWA SEPARATED BIKE LANE PLANNING AND DESIGN GUIDE

Mr. Semler was a lead researcher and is coauthor of the FHWA Separated Bike Lane Planning and Design Guide. He was a task leader on the team conducting national research on separated bike lanes (also known as cycle tracks or protected bike lanes) on behalf of FHWA. The project featured an extensive literature review and case studies and interviews with agencies to learn about the experience of planning, designing, and implementing cycle tracks in the U.S. Together, the project team contacted every U.S. city that has implemented or is planning to implement cycle tracks to learn from their experience. The Guide incorporates the full range of design options, safety studies, and qualitative input from practitioners to inform the planning, design, and safety outcomes of future separated bike lanes.

NACTO URBAN BIKEWAY DESIGN GUIDE

Mr. Semler contributed to the NACTO Urban Bikeway Design Guide as a member of the consultant team. He wrote and developed material for the Guide and offered engineering insight into the appropriateness and applicability of the cycling treatments. Bicycle facilities covered by the Guide include a variety of innovative facilities, including bicycle signals, cycle tracks, bike boxes, and intersection improvements. The Guide has two major final products: a web-based version that includes a platform for discussion and information exchange, and a printed summary that will be updated regularly. The National Association of City Transportation Officials and its Cycling for Cities project funded the work which builds on its Emerging Best Practices Sheets.

ALMONO PHASE I SITE DEVELOPMENT PLAN

Mr. Semler led the transportation element of the preliminary development assessment for the Almono Site in Pittsburgh. He provided multimodal transportation expertise to the development, focusing on pedestrian, bicycle, and transit connections within and around the site. The work included a detailed parking and transportation demand management plan which leverages the existing transportation assets in the City to minimize vehicular access to the site and reduce the need for parking. The development plan established the framework for a model sustainable development in Pittsburgh.

HEALTHY AGING AND PUBLIC TRANSPORTATION, CAMBRIDGE, MA

Mr. Semler led a public engagement process in partnership with the Cambridge Community Development Department to interview senior citizens to identify barriers to access to the MBTA public transit service in the City. The project, which was funded through a grant from the Council on Aging, supports the City's ongoing Transit Strategic Planning Process and identified specific projects to improve seniors' access to transit. KAI planned and led four public meetings in Cambridge and developed a prioritized list of projects to improve senior mobility. Barriers to transit include damaged sidewalks, insufficient bus stop amenities, infrequent or unreliable service, and personal security concerns. The project is a key component of Cambridge's efforts to improve transit and mobility in the City. As a result of the work, Cambridge acquired and installed a real-time travel information screen at one of its busiest bus stops outside the City's senior center.

MONTGOMERY COUNTY BICYCLE PLANNING GUIDANCE, MONTGOMERY COUNTY, MD

Mr. Semler worked with Montgomery County through a MWCOG grant to develop a framework for planning bicycle facilities in the County. A "pre-screening" tool identifies the most appropriate bicycle facilities for different combinations of traffic speed and volume of a given street or intersection. Secondly, he performed a Level of Traffic Stress (LTS) analysis that assigns road segments and intersection crossings a stress level rating from 1 to 4. The LTS tool helps assess the transportation network for bicycling and identifies key gaps in the system that, if filled, can unlock access to broader segments of the County.

UNIVERSITY DRIVE MOBILITY IMPROVEMENTS PLANNING STUDY, BROWARD COUNTY, FL

Mr. Semler led the non-motorized evaluation components of the University Drive alternatives analysis in Broward County, Florida. The 23-mile corridor stretches north-south through most of the County and passes through a dozen towns and cities. Walkability and bikeability were seen as integral to preparing the corridor for improved transit service. Mr. Semler's work included an inventory of the pedestrian and bicycle obstacles, identifying recommended improvements, and developing alternatives for enhanced walkability and livability.

BICYCLE PAVEMENT MARKING DESIGN, RALEIGH, NC

The City of Raleigh received a grant to design and build 27 miles of bicycle facilities throughout the City. The project, which was limited to pavement markings only, identified opportunities for lane narrowing, road diets, parking removal, and shared lane markings the investments will extend the City's bicycle network into all of its neighborhoods. Mr. Semler led the development of a project prioritization process, developed materials for and participated in public meetings, and evaluated road diet candidates from a traffic operations perspective. He also worked with the project team to provide design expertise on bike lanes and transitions.

MARYLAND BICYCLE AND PEDESTRIAN MASTER PLAN UPDATE

Mr. Semler worked with Maryland DOT to update its Bicycle and Pedestrian Plan to improve conditions for walking and biking across the state. The plan focused on modifying State policies to help fund bicycle and pedestrian infrastructure, eliminate barriers to walking and biking, and introduce flexibility in design to create livable streets. Recognizing MDOT's role in transportation planning in Maryland, the Bicycle and Pedestrian Plan encourages leadership and vision from the top down to each of the modal administrations.

INNOVATIVE BICYCLE FACILITY EVALUATION, WASHINGTON, DC

Mr. Semler helped the DC Department of Transportation evaluate several recently-installed innovative bicycle facilities intended to improve cyclist comfort and safety. He analyzed the safety and operations of these facilities for all travel modes using before and after video data, multimodal level of service, and user surveys. These facilities include cycle tracks, bike boxes, bicycle signal heads, and contra-flow bike lanes, and the results of the analysis will be used to refine the existing designs, as well as provide guidance on best practices moving forward.

MULTIMODAL TRANSPORTATION PLANNING

Mr. Semler has conducted several major multimodal transportation planning projects in constrained urban environments. He developed recommendations for multimodal transportation improvements in the Rosslyn neighborhood of Arlington, VA, which will create a vibrant, walkable environment in an area currently dominated by vehicle traffic. He recently completed a Livability Study for

the Far Northeast neighborhood of Washington, DC to identify improvements for walking, cycling, and riding transit. Mr. Semler also helped the DC Office of Planning develop the transportation element of the Land Use Plan for the proposed DC Streetcar network. He conducted a Metro Station access study just outside of DC in Prince George's County, Maryland.



Ms. Doolin offers over 7 years of experience in active transportation, urban design and implementation. For several years, she served as the Bicycle and Pedestrian Coordinator for the Baltimore City Department of Transportation, where she served as the Baltimore City representative on the development of the NACTO Urban Bikeway Design Guide, Third Edition. She also understands national best practices in urban design from NACTO webinars and workshops City employees are privy too. Finally, she led the design and construction of the first 3.5 miles of parking protected bike lanes, led the final design of 6 miles of traffic calming and bicycle boulevards in West Baltimore, launch the largest pedal electric assist bike share system in North America, led the development of Baltimore's Separated Bike Network Plan and managed over \$9 million in active transportation planning, design and construction projects for the City of Baltimore. She also brings over four years of experience as a consultant, where she has worked on corridor studies, traffic operations analysis and master planning efforts across 7 states and over 50 jurisdictions.

**CAITLIN J. DOOLIN,
PE**

Senior Engineer

EDUCATION

MS Urban Planning, Oxford Brookes University (UK)

BS Civil and Environmental Engineering, Bucknell University

YEARS OF EXPERIENCE

7

LICENSES

PE: MD

AFFILIATIONS

Women in Transportation Seminar, board member Baltimore Chapter (2011-Present)

Association of Pedestrian and Bicycle Professionals, 2015-Present

AWARDS

2016 WTS-Baltimore Chapter Innovative Transportation Solution Award, Baltimore Bike Share, Project Manager and Recipient

2016 WTS-International Innovative Transportation Solution Award, Baltimore Bike Share, Project Manager and Recipient

BALTIMORE CITY DOT BICYCLE AND PEDESTRIAN COORDINATOR

During Ms. Doolin's tenure as the Bicycle and Pedestrian Coordinator for Baltimore City Department of Transportation, she managed the planning, design and implementation for over \$9 million in capital projects over two years. Due to her talent and diligence in securing state and federal transportation funding, she dramatically increased the capacity for active transportation improvements, securing \$3.6 million in new funding for Baltimore City. In under three years, Baltimore went from 1 mile of protected bike infrastructure to 4.5 miles. She also reviewed traffic impact analyses for on-going projects that involved implementing bicycle facilities. Ms. Doolin's expertise in traffic engineering and pedestrian and bicycle planning and design enables her to take a practical approach to project implementation for pedestrian and bicycle projects.

DOWNTOWN BICYCLE NETWORK PROJECT

Ms. Doolin was the lead engineer at Baltimore City Department of Transportation that oversaw the final design and construction of the \$3.1 million Downtown Bicycle Network Project. This project included over 10 miles of bike facilities, including 6 miles of buffered and protected bike lanes. She oversaw the final design and review Process with Maryland State Highway Administration, lead the procurement and contract award process to the contractor and conducted in the field meetings with the contractor over the course of the construction.

TRAFFIC OPERATIONS AND BICYCLE FACILITIES

Ms. Doolin has lead traffic analysis that supports walkable and bikeable solutions while maintaining acceptable traffic operations. She managed the traffic operations analysis and signal timing mitigations for the Maryland Avenue Protected Bike Lane (Baltimore, MD). She also lead the Synchro analysis that supported complete streets projects, such as a median on SR 916/NW 135th Street (Miami, FL) and a road diet on Forbes Avenue in Pittsburgh, PA. Ms. Doolin also worked with the District of Columbia Office of Operations and Planning to lead a traffic analysis that would support an alternatives analysis (AA) for Mount Vernon Square and identify short-term opportunities to make Mount Vernon Square more walkable and bikeable while maintaining acceptable traffic operations.

TRANSPORTATION MASTER PLANNING

Ms. Doolin led the planning process that delivered critical master plan documents such as the 2015 Bike Master Plan. This plan created a Commission, signed by Mayor's executive order, to oversee and coordinate the implementation of the master plan. Ms. Doolin served as an appointed member of this commission for 2 years. Ms. Doolin led the development of Baltimore's 2017 Separated Bike Network Plan, which propose 80 miles of new facilities over the next five years. Also, Ms. Doolin played a key role in the development of the Transportation section of the Birmingham Master Plan.

BALTIMORE BIKE SHARE

During Ms. Doolin's tenure as the Bicycle and Pedestrian Coordinator for Baltimore City Department of Transportation, she oversaw the duties of the Bike Share Coordinator and the 2016 launch of Baltimore Bike Share. She worked directly with multiple city agencies and divisions to ensure all design requirements were met for station plans. She also approved all final plans on behalf of DOT and moved them through the permitting process. She worked directly with communities, historical preservation entities and Bewegen on optimum station placement and design. She also played a key support role in the 6 workshops held in Baltimore to determine the station locations for the launch of the Baltimore Bike Share system in 2016 as well as "pop-up" Bike Share kick-off parties in various neighborhoods for better collaboration and education with communities. As a direct result of the committed work, the project received Women in Transportation Seminar's local and international Innovative Transportation Solutions Award in 2016.

FEDERAL AND STATE GRANT STRATEGY AND WRITING

Ms. Doolin led the award of 11 out of 12 federal and state grant applications she submitted for pedestrian and bicycle projects on behalf of the City of Baltimore. This resulted in over \$3.6 million in new funding for bicycle and pedestrian projects for the City. She was also on a team for 3 successful Tiger grants awarded to the City of Baltimore in 2014, 2015 and 2016. She was the lead liaison between Baltimore City DOT and Maryland Transit Administration on the North Avenue Rising Tiger Grant Application, submitted and awarded in 2016.

PEDESTRIAN & BICYCLE CONCEPT PLANNING

Ms. Doolin has supported a series of TCDI small area studies in the City of Philadelphia, PA to evaluate priority Intersections and locations and identify potential pedestrian, bicycle, traffic, and transit improvements. She provided support in identifying safety challenges at the intersections and developing conceptual short-term improvements. Ms. Doolin was also the prime analyst on the Carnegie Mellon University Pedestrian Safety Study, where she supported traffic operations analysis on two primary roadways that bisected the CMU campus. This analysis supported final recommendations for a road diet and recommended reallocating roadway space to promote complete streets and better accommodate pedestrians and bicyclists around campus.

WEST BALTIMORE BICYCLE BOULEVARDS, BALTIMORE, MD

At the City of Baltimore, Ms. Doolin was the project manager on the West Baltimore Bicycle Boulevard project. This included working with a consultant to develop 6 miles of bicycle boulevard treatments on a network of West Baltimore's low stress streets. This included determining intersection treatments for stressful crossing locations, identifying optimum locations for bike-friendly speed humps, signage and sharrows.

BIRMINGHAM, AL MASTER PLAN

Ms. Doolin played a lead role in the development of the transportation chapter of the 2012 Update to the Birmingham Master Plan. She led a multimodal analysis to evaluate how traffic, transit and active transportation was being served in the city and assisted the City in identifying congestion management strategies. She also assisted in the city-wide public workshop that was held in which over 200 people were in attendance.

PUBLIC OUTREACH

As a part of Ms. Doolin's work in planning, she has gained valuable experience from collaborating with the public. She has lead public engagement efforts as part of the design and construction of Baltimore's Downtown Bicycle Network Project, which includes the implementation of 6 miles of parking protected bike lanes. She also played a key support role in the 6 workshops held in Baltimore to determine the station locations for the launch of the Baltimore Bike Share system in 2016.



Ms. Musselman is an Engineering Associate in the Kittelson & Associates, Inc. (KAI) Tampa office. She helped create the FDOT Context Classification system and has been applying it on corridors throughout the state, including Alt US 19 in Pinellas County. Ms. Musselman has contributed to several Corridor Planning Studies in both urban and rural contexts through stakeholder involvement, identification of corridor needs and opportunities, and operational analysis. She helped facilitate Complete Streets training courses for FDOT staff and local partners. Her experience also includes transit planning, intersection operations, transit signal priority (TSP), and traffic impact analysis. Ms. Musselman has practical knowledge in several software packages including: ArcGIS, AutoCAD, HCS, Synchro, and SIDRA.

**JENNIFER
MUSSELMAN, EI**
Engineering Associate

EDUCATION

BS Civil and Environmental Engineering, University of Virginia, 2014

YEARS OF EXPERIENCE

3

LICENSES

EIT: VA

AFFILIATIONS

WTS Tampa – Board Member

HILLSBOROUGH MPO MULTIMODAL EVALUATIONS

Ms. Musselman worked with the Hillsborough MPO to evaluate different strategies to quantify multimodal experiences at the project level and county wide. The team explored options including calibrating the multi-modal level of service methodology to local conditions, conducting a countywide level of traffic stress analysis for bicyclists, and implementing procedures from the *Transit Capacity and Quality of Service Manual (TCQSM)*. Kittelson prepared a White Paper of different strategies for the MPO's Bicycle Pedestrian Advisory Committee. Kittelson is now working with the MPO to advance several strategies in the White Paper, including Level of Traffic Stress analysis.

FDOT CONTEXT CLASSIFICATION

KAI is currently working with FDOT Central Office and FDOT Districts to advance a statewide Complete Streets initiative. During this process, Ms. Musselman participated in input sessions in various FDOT Districts, INCLUDING DISTRICT SEVEN, to better understand the opportunities and challenges associated with the implementation of Complete Streets. Part of this work included the development of a context classification system that will allow FDOT to implement context-based design standards in the *FDOT Design Manual*. Ms. Musselman played a key role in developing the eight FDOT context classifications and the criteria for classifying state roadways. She has led context classification evaluations in FDOT Districts 1, 4, 6, and 7.

ALT US 19 PD&E – CONTEXT CLASSIFICATION EVALUATION

KAI is part of a team evaluating Alt US 19 in Pinellas County from Bellair Road to the Pasco County Line. Ms. Musselman is working to understand the planning context and create a corridor vision to support the PD&E study. Alt US 19 transitions through several contexts, from an urban character in Downtown Clearwater to a more rural character near the Pasco County Line. Ms. Musselman is implementing the FDOT Context Classification evaluation to understand the various land use contexts along the 20-mile corridor. This information will be used to inform the users present along the corridor and to tailor the transportation solutions to meet the needs of those users.

NORTHWEST HILLSBOROUGH COUNTY TRANSIT STUDY

Ms. Musselman worked with the Hillsborough MPO and HART to evaluate the existing transit service in the northwest portion of Hillsborough County and identify service improvements intended to tie into the Transit Development Plan (TDP). Northwest Hillsborough County has historically been characterized as suburban or rural-suburban. These less dense growth patterns present difficulties for providing transit services. The study considered improvements to existing transit service, new transit services, regional park-n-ride lots, and opportunities to implement on-demand transit service. Ms. Musselman's role included existing conditions analysis, public involvement, ridership forecasting, planning-level cost estimates, and alternatives evaluation.

ROBINSON STREET CORRIDOR PLANNING STUDY

FDOT District Five, in partnership with the City of Orlando, recently completed a corridor planning study on SR 526 (Robinson Street) to objectively evaluate possible improvements to the Robinson Street corridor to enhance safety and comfort of multimodal travel along and across the Corridor.

Robinson Street is a key east-west corridor through Downtown Orlando. As part of this study, Ms. Musselman coordinated and participated in more than 20 stakeholder interviews with local residents, business owners, and public agency partners to better understand the existing needs and opportunities on the corridor. Ms. Musselman analyzed the future conditions along the corridor to understand the capacity implications of a possible lane reduction.

Ms. Musselman and the Kittelson Team are now working with District Five on concept development to implement and advance the solutions identified in the planning study.

FDOT ROUNDABOUT FEASIBILITY

Ms. Musselman has worked on several roundabout feasibility and design traffic studies for FDOT District One. She developed roundabout concepts and analyzed design vehicle turning radii for the intersection of SR 31 at CR 74 in Charlotte County. Ms. Musselman prepared design traffic forecasts and operational analyses for two roundabouts on SR 64 in Manatee County. As part of the SR 64 study, Ms. Musselman performed existing conditions evaluations, future traffic development, and future operational and safety alternatives analysis. Ms. Musselman determined the necessary roundabout lane configurations for opening and design years and performed a benefit-cost analysis.

PUBLIC INVOLVEMENT ACTIVITIES

Ms. Musselman has experience in a variety of public involvement activities. She coordinated and helped facilitate stakeholder interviews for two major FDOT D5 Corridor Planning Studies: West SR 50 in Hernando, Sumter, and Lake Counties and Robinson Street in Downtown Orlando. As part of these Corridor Planning Studies, Jennifer helped facilitate Public Workshops to inform the public on the existing corridor constraints and opportunities and potential improvement alternatives. She helped plan and lead three Complete Streets Workshops in FDOT District One. The first workshop was held for District One staff the subsequent two workshops were held for local agency partners. She helped lead a grassroots public involvement effort for the LYNX SR 50 Alternatives Analysis to inform the public about Bus Rapid Transit and gather input on the preferred alternative.

FDOT DESIGN TRAFFIC

Ms. Musselman has participated in design traffic studies for FDOT District Five. She has participated in DDTM, ESAL, and TPS (EDTM) studies. She has collected field data for existing operations, signal timings, and existing land use. Ms. Musselman has analyzed the existing and future network conditions and has performed historical and model growth rate analyses for a variety of facilities throughout FDOT District Five.

LAKE-SUMTER MPO PROJECT APPLICATION

As part of an on-call contract with Lake-Sumter MPO, Ms. Musselman is providing assistance to MPO staff in completing and updating FDOT Project Information Application Forms required for each project on the MPO's List of Priority Projects. Ms. Musselman coordinates with the FDOT and local agencies to compile available information and prepare analysis, engineering screenings, and development of cost estimates.

DDOT TRANSIT SIGNAL PRIORITY

Ms. Musselman participated in a Transit Signal Priority (TSP) project for DDOT, working with DDOT to plan, design, and implement TSP at nearly 200 intersections with Washington, D.C. She conducted field reviews to determine existing transit infrastructure and helped identify intersections feasible for TSP implementation. Subsequent tasks included updates to DDOT timing sheets with TSP logic and timing. As part of this effort, Ms. Musselman helped create new logic diagrams for queue jumps locations. Once implemented, Ms. Musselman worked with the Kittelson Team to test the system to get full system acceptance for the Federal Transit Administration (FTA). DDOT gained full acceptance of the system in December 2016. Ms. Musselman is currently working on a before and after evaluation to assess the effectiveness of TSP implementation and recommended refinements to the system.

METROPLAN TRAVEL TIME AND DELAY STUDY

Over that past year, Ms. Musselman has worked with MetroPlan Orlando to assess the value of retiming traffic signals for 56 corridors throughout Orange, Osceola, and Seminole counties. The study consists of collecting Bluetooth travel time data and presenting motorized travel times and speeds. Based on the data collected, Ms. Musselman calculates average travel time and speed before and after signal retiming. Ms. Musselman then performs a benefit-cost analysis in order to effectively determine whether or not development and implementation of new coordinated timing plans were effective.



Ms. Awwad is a transportation engineer and planner with a background in roadway and traffic signal design, traffic impact analysis, and local and regional transportation planning. Specifically, Ms. Awwad has been involved in conceptual, preliminary, and final design; performance measures analysis; traffic impact review and analysis; safety analysis; as well as regional-, city-, and corridor-level planning studies and plans. Ms. Awwad joined Kittelson and Associates, Inc. in 2017, and has been involved in districtwide contracts, corridor studies, and major capital improvement projects throughout the south Florida region.

ALIA AWWAD, PE

Senior Engineer

EDUCATION

Master City and Regional Planning, Georgia Institute of Technology, 2010

BS Civil Engineering, University of Minnesota, 2003

YEARS OF EXPERIENCE

13

LICENSES

PE: FL (2013), GA (2010), AL (2008)

AFFILIATIONS

Institute of Transportation Engineers (ITE), Member

National Cooperative Research Program (NCHRP), Project 17-63, *Guidance for the Development and Application of Crash Modification Factors*, Panel Member

NCHRP, Project 03-112, *Operational and Safety Considerations in Making Lane Width Decisions on Urban and Suburban Arterials*, Panel Member

CITY OF FORT LAUDERDALE GENERAL PLANNING CONTRACT

Ms. Awwad is currently managing several task orders out of the City of Fort Lauderdale's General Planning Contract, including Development Review Committee traffic study peer reviews, mobility master plans, and policy-related traffic analysis tasks.

FDOT DISTRICT 4 GENERAL PLANNING CONTRACT

Ms. Awwad served as Project Manager for the districtwide general planning contract for FDOT's District 4. Responsibilities include serving as in-house consultant; managing right-of-way, interchange, traffic analysis, and development of regional impact reviews; as well as other tasks as needed, including lane elimination and mobility performance measures tasks.

CITY OF FORT LAUDERDALE'S TRAFFIC ENGINEER

Prior Experience: Ms. Awwad served as the City's traffic engineer at the City of Fort Lauderdale. At the City, responsibilities included reviewing and approving traffic impact studies for development and redevelopment efforts, serving as the traffic analysis lead for land use planning amendments, and recommending policy and code changes.

ATLANTA REGIONAL COMMISSION'S SAFETY PLANNER

Prior Experience: Ms. Awwad served as safety planner for the Atlanta Regional Commission. Key responsibilities included establishing a performance-based safety planning process, conducting crash analysis and preparing safety reports, prioritizing transportation projects, coordinating with stakeholders, presenting analysis results, and developing safety policies. Ms. Awwad was also involved in performance measures analysis, including managing environmental justice and public health performance measures.

MANAGED LANES FEASIBILITY STUDY

Prior Experience: Ms. Awwad was involved in the managed lane feasibility study for the major interstate highway systems in the metropolitan Atlanta region. Ms. Awwad was tasked with providing conceptual cost estimates for managed lane scenarios as part of the benefit-cost feasibility analysis.

INTERSECTION SAFETY IMPROVEMENT PROJECTS

Prior Experience: Ms. Awwad was involved in the design of multiple safety intersection improvement projects in the Atlanta region. Specific responsibilities included roadway and traffic signal design, including concept, preliminary and final design, as well as conducting field reviews and attending public meetings.