EXHIBIT C

(URBAN ENGINEERS RESPONSE TO COS RFQ NO. 704)

REQUEST FOR QUALIFICATIONS

STAMFORD TRAFFIC SIGNAL SYSTEM OPTIMIZATION

SUBMITTED TO:
CITY OF STAMFORD
PURCHASING DEPARTMENT
888 WASHINGTON BOULEVARD
STAMFORD, CT 06904

SUBMITTED BY:
URBAN ENGINEERS, INC.
280 TRUMBULL STREET
14TH FLOOR
HARTFORD, CT 06103

AUGUST 2016

URBAN ENGINEERS

Contractor's Statement

Pursuant to Section 103.1 of the Stamford Code of Ordinances, I hereby provide the following:

If a joint venture, trustee, partnership, limited liability company or partnership, the names and addresses of all joint venturers, beneficiaries, partners or members:

____

____

____

____

If a corporation, the names and addresses of all officers and the names and addresses of all parties owning over 10% of its common stock or over 10% of its preferred stock. If any of said stockholders is a holding corporation, the names and addresses of all persons owning a beneficial interest in over 10% of the common or preferred stock of said holding company.

Urban Engineers, Inc. is 100% owned by its employees as part of an Employee Stock Ownership Plan (ESOP). Urban Engineers, Inc. 530 Walnut Street, Philadelphia, PA 19106

____

____

____

The names and positions of all persons listed hereinabove who are elected or appointed officers or employees of the City of Stamford.

____

____

____

____

Name of Bidder/Proposer: Urban Engineers, Inc.

Signature of Bidder/Proposer: [signature]

Title: President & CEO

Company Name: Urban Engineers, Inc.

Address: 280 Trumbull Street, 14th Floor
Hartford, CT 06103

TABLE OF CONTENTS

1. *Letter of Transmittal*

2. *Technical Response*

- Project Understanding
- Project Approach and Methodology

3. *Consultant Qualifications*

- Prior Similar Project Experience
- Project Organization and Staffing
- Management Plan
- Financial Capabilities

1. LETTER OF TRANSMITTAL

URBAN ENGINEERS
250 Trumbull Street, 14th Floor
Hartford, CT 06103
860.246.7200

August 4, 2016

Beverly Aveni, Purchasing Agent
City of Stamford – Purchasing Department
888 Washington Boulevard
Stamford, CT 06901

Re: RFQ Stamford Traffic Signal System Optimization

Dear Ms. Aveni:

The Institute of Transportation Engineers (ITE) reports that more than 75% of the 300,000 traffic signals in the United States could be improved by updating signal equipment and/or adjusting the timings. ITE also has evidence that signal retiming programs can reduce overall travel time by up to 13%, delays by 37%, and fuel use by 9%. These findings demonstrate that traffic signal retiming is one of the most cost-effective ways to improve traffic flow, safety, and the environment and air quality.

For this project, the City of Stamford (City) has targeted all 207 City signals, which includes 13 key corridors and the Central Business District (CBD), for signal optimization. Urban Engineers, Inc. (Urban) understands the challenges associated with these areas, which serve as vital connections for both local residents and commuters. We worked with the City on the Route 1 corridor and are familiar with the congestion on the roads around I-95 and the downtown area, as well as routes into downtown. We've encountered challenging conditions, similar to those on this project, on many of our past signal system optimization corridor projects. We thrive on the challenges that are presented by a complicated corridor where the problems are not always obvious and the solutions require in-depth knowledge of local travel patterns, driver interactions, and signal control systems.

Although Urban is a full-service design firm that could complete all of the tasks outlined in the RFQ, we have teamed with several subconsultants to augment our expertise and provide best value to the City. Our Team includes firms with working knowledge of the corridor and surrounding area. Each firm has unique experience with similar projects. Together, we have the experience, personnel, knowledge, and drive to provide the City with the high-level traffic engineering, public involvement, and field signal timing implementation services required for this project.

Here are some of the key reasons to select the Urban Team for this assignment:

- **An Experienced Project Manager – Scott Diehl, PE, PTOE,** has more than 20 years of transportation engineering experience. In the last few years, Mr. Diehl has helped improve the operations of more than 250 signals throughout the region and has trained agency staff, including NJDOT, on best practices for retiming efforts. Mr. Diehl has managed signal timing projects in a number of states with municipalities, MPOs, and DOTs. He is currently completing Congestion Mitigation and Air Quality Improvement (CMAQ) projects, which included signal timing improvements on two corridors (40 intersections) in Southern New Jersey. Locally, he is working with the Town of Greenwich on re-timing two section of Route 1 and on the Arch Street Corridor Adaptive Signal System Project.

- **An Experienced Project Team** – Mr. Diehl is supported by a Team that specializes in signal optimization. **Chris Burke, PE, PTOE,** leads Urban's signal optimization team and has worked closely with staff from several agencies on signal retiming projects. He recently developed signal timing improvements for several southern New Jersey counties as well as for the Town of Greenwich. Mr. Burke uses the latest signal optimization programs, including Synchro/SimTraffic, VISSIM, and Tru-Traffic. What differentiates him from many traffic engineers is his experience with both analyses and implementation. He has measured the impact of improvements and, as a result, has a more nuanced view of traffic signal projects and the elements by which they are affected.

- **Leaders in Signal Optimization** – The members of our Team are developing innovative approaches to signal optimization. In just the past few years, we have planned and implemented over 250 signal timing updates for a variety of clients. Signal timing and phasing modifications that Urban developed for a seasonal corridor project on Route 72 in Stafford Township, NJ, reduced peak hour travel times by 66% (45 minutes to 15 minutes). This essentially eliminated a seven-mile backup along an eight-mile route to the beach.

Locally, Urban is working with the Town of Greenwich to optimize signal timings and remove exclusive pedestrian phasing on two sections of Route 1. Urban is also working with Greenwich to develop an adaptive signal system to handle congestion at the I-95 Exit 3 Arch Street Corridor. And, we are finalizing signal plans for signal and intersection upgrades at 14 intersections in the Town of Norwalk, as part of a CMAQ grant.

Our Team offers more than signal optimization expertise. We are also skilled at presenting signal optimization projects and processes at local, regional, and national conferences; training agency staff and consultants on best practices for signal optimization and signal design; and developing agency manuals and procedures for signal optimization and signal design. Mr. Diehl and Mr. Burke recently provided two-day training sessions on signal optimization practices to NJDOT and Ocean County staff.

- **Strong Teaming Partners – Fitzgerald & Halliday, Inc. (FHI)**, a well-known certified Women-Owned Small Business Enterprise (W/SBE) with expertise in public involvement and community planning, will lead the public involvement effort. **The RBA Group (RBA)** will provide data collection assistance by using video (Miovision) collection units to complete traffic counts. **Connecticut Counts** and **RHS Consulting Design**, who are both well-known DBEs, will support RBA. Together these firms possess more than 50 Miovision cameras. Substantial data collection is required for this project. With access to this large equipment inventory, we can collect data on multiple corridors simultaneously, and the data collection work will be faster and more economical. **New England Traffic Solutions (NETS)** will implement and fine tune the signal timing. NETS staff are familiar with the equipment in Stamford and are working with the City to upgrade the traffic signal controllers to 980 NEMA models and the traffic central management system to ATMS.now.
- **Proven Quality Management** – Urban is one of only a few engineering firms in the country to maintain **ISO 9001:2008 Certification**; the definitive quality standard for consulting firms. This certification verifies that Urban's quality management system complies with the requirements of the International Organization for Standardization.

Urban is committed to offering high-quality, cost-effective, and timely services. Our Team was designed to maximize the services and benefits available to the City of Stamford during this signal optimization effort. If you have any questions about this proposal, please contact our proposed Project Manager, **Scott J. Diehl, PE, PTOE**, Urban's Chief Traffic Engineer, by phone at **(860) 246-7200 x1990**, or by email at **sjdiehl@urbanengineers.com**. Kenneth R. Fulmer, PE, President & CEO, has authorized Urban to commit to this contract. He can be reached at **corporate_development@urbanengineers.com** or by phone at **215-922-8080**. Thank you for considering Urban for this important project.

Very truly yours,
URBAN ENGINEERS, INC.

Kenneth R. Fulmer

Kenneth R. Fulmer, PE
President & CEO

2. TECHNICAL RESPONSE

PROJECT UNDERSTANDING

PROJECT UNDERSTANDING

Stamford, CT has grown over the past decade. A rising population and surges in employment have increased the number of daily commuters and demand for all modes of transportation. Various planning efforts are underway to help improve transportation and mobility in and around the City. Some of these ongoing and completed efforts are listed below. These projects all recognize the need to integrate all modes of travel into the urban design of Stamford.

- Long Ridge/High Ridge Corridors Study (2015)
- West Side Transportation Study (2015)
- Stamford Bus and Shuttle Study (ongoing)
- Stamford Bicycle and Pedestrian Master Plan (ongoing)
- Stamford Transportation Center Master Plan (2010)
- Stamford Transportation Center Transit Oriented Development (TOD) (ongoing)
- Atlantic Avenue Bridge Reconstruction (construction beginning)
- Stamford Urban Transitway (complete)
- Veteran's Memorial Park/Atlantic Square Master Plan (2015)
- Glenbrook/Springdale TOD Feasibility Study (2015)
- Mill River Park and Greenway (ongoing)
- Route 1 Corridor Study Greenwich/Stamford (2011)

Signal optimization and corridor progression are efficient methods to meet traffic demands and maximize the capacity of city streets. The tools can also improve safety by controlling speeds and managing conflicts. Applied properly, signal timing can help strike a balance between safety and efficient movement that benefits all road users.

Crossing the street is often difficult for pedestrians, especially in downtown Stamford, where road widths and crosswalk distances are long. Significant time is required for people to cross the street and turning vehicles often create safety hazards. This likely contributed to Stamford's decision to use "no-turn-on-right" signs (some flashing) and leading walk signals.

Traditionally dominated by automobile use, Stamford's downtown is transforming into a more walkable, live-work-play environment. The South End exemplifies this transformation, while increased residential and mixed-use development are redefining the Central Business District.

Stamford has a substantial transit market, including inbound rail commuters from points east and New York City. Commuters travel by foot, bus, and private shuttles. These transportation modes compose the area's heavily congested multimodal network, which is centered on the overlay of I-95, the Stamford Transportation Center, and the downtown street grid. Signal optimization has the potential to improve efficiency in several key corridors, including Washington Boulevard, North and South State Streets, and Atlantic Street, and others listed below. Peak congestion in these corridors spills back through the grid, while off-peak conditions are often free flowing. Optimizing signal timing and patterns to respond to daily changes in travel demand can encourage safer travel, reduce frustration, decrease emissions, and address chronic congestion.

Key corridors in Stamford include:

- Washington Boulevard
- East Main Street/Tresser Boulevard/West Main Street
- Bedford Street
- Summer Street
- Hope Street
- Strawberry Hill Avenue/Newfield Avenue/Grove Street/Elm Street
- High Ridge Road
- Long Ridge Road
- Broad Street
- Cortland Avenue/Glenbrook Road
- South State Street
- North State Street
- Main Street/Elm Street

Signal optimization requires more than "pushing" the optimization button. It demands experience and engineering judgment, along with clear understanding of client goals. Our team understands the context of Stamford and its many neighborhoods. We know that Stamford's future relies on a balanced transportation system that offers safe, convenient, and comfortable choices for all people – no matter who they are or how they travel. Signal optimization must consider the interaction between people and cars and find ways to best use limited capacity while improving safety and accessibility.

PROJECT APPROACH AND METHODOLOGY

PROJECT APPROACH & METHODOLOGY

The Urban Team's project approach will follow the tasks outlined in Section 2 of the RFQ. Below is a description of Urban's technical approach to each task. Based on our past experience with traffic signal system optimization and implementation projects we have included recommendations on scope that may improve the project or add value.

Task 2.2: Project Management

Urban Engineers is committed to the City of Stamford and signal system optimization projects. The Urban Team's Project Manager, Scott J. Diehl, PE, PTOE, is passionate about signal optimization and achieving significant travel time, delay, and emissions improvements. Mr. Diehl is responsible for managing all signal optimization projects companywide for Urban and will provide key staff from Urban Engineers that will be dedicated to this project. We have included strong partners on our Team: FHI for public involvement; RBA, CT Counts; and RHS Consulting Design for data collection; and New England Traffic Solutions for implementation and fine tuning.

PROJECT STAFFING

As shown on the organization chart, Mr. Diehl and Mr. Burke will serve as the Project Manager and Deputy Project Manager, respectively, for the project. Mr. Diehl will serve as the primary point of contact for the City. Mr. Diehl and Mr. Burke will manage the work for each of the task areas. Each primary Task Leader has a number of support staff, identified in the organizational chart, who are committed to working on the project.

Each firm has additional staff that can be made available if needed to expedite a particular task or the project as a whole. As the prime, Urban is ultimately responsible for the work completed and submitted to the City. We understand the importance of that responsibility and have developed numerous QA/QC procedures to provide the highest quality product for our clients.

COMPUTER HARDWARE & SOFTWARE

Urban maintains numerous copies of the traffic software that would potentially be used as part of this project (Sycnhro, Tru-Traffic, HCS, VISSIM, etc.). As such, project staff will have the necessary computer software and hardware resources.

PROJECT MEETINGS

Urban believes good coordination and communication from the onset of the project leads to smooth, efficient and successful projects.

The meetings suggested by the City (bi-weekly, project kick-off meetings, public input meetings, and semi-final report) are an excellent approach. We would recommend including key project milestones; e.g. completion of data collection, calibrated existing conditions models, and optimization of models and recommended signal timings, as part of the bi-weekly meetings.

PROJECT DOCUMENTATION

Project Documentation is essential on a signal optimization project. It provides a record of why decisions were made that is useful for future questions or legal needs. Urban will prepare meeting agendas and minutes, action reports, design methodologies, project reports, etc. All material will be easily accessible to the City at any time via a secure file transfer site which we will maintain. Urban is familiar with many different file formats (Word, PDF, excel, PowerPoint, etc.) and will coordinate with the City on the format needed for each task and items within each task. Urban will also prepare electronic copies of project materials and maintain a project binder with project files. These files will be provided to the City at any time requested during the course of the project and will be delivered along with the final report at the end of the project.

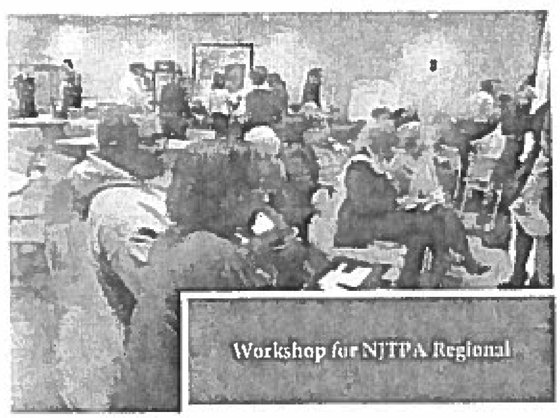
PROJECT SCHEDULE & TIMELINE

With extensive experience in signal optimization projects, we are familiar with the time required to perform the tasks necessary to complete this project. We have develop the Urban Team with more than sufficient resources and staff available to meet the City's desired schedule.

Task 2.3: Public Involvement & Participation

The Urban Team will engage Stamford's local communities, stakeholders, and the traveling public from the early stages of the project and continue to gather and provide feedback. Our goal is to capture public sentiment, make sure we understand public sentiment correctly, and consider public concerns as alternatives are developed.

Community engagement will inform the project in meaningful ways. We will define project goals and objectives that reflect the needs of all users, not just motorists. Although the traffic signal system is probably most crucial for motorists, the needs of pedestrians, cyclists, transit, and shuttle riders as well as freight transporters cannot be ignored. Throughout the public outreach process, the Urban Team will take advantage of every opportunity to interface with community members and build consensus on a desired project outcome.



Workshop for NJTPA Regional

Our Team will develop a Public Involvement Plan (PIP) that outlines a schedule and activities to encourage participation. The PIP will be flexible so we can take advantage of opportunities that arise during the course of the study. The Urban Team believes in the power of creative and innovative methods, such as crowdsourcing, to collect input and data from stakeholders and share that data with the public. Information on road users' route choices, delay, and overall experiences could be collected via smartphone apps and web-based tools, including survey tools, time- or mileage-tracking apps, or crowd-sourced mapping tools. These tools could be distributed and advertised publicly or by invitation only. Stipends could be offered to improve participation, accuracy and coverage. The Urban Team will work with a Technical Working Group to develop a data collection strategy that delivers high-quality input in a cost-effective and useful manner. These tools could potentially be used to gather data during future projects.

MEETINGS

Technical Working Group (TWG) Meetings

The Urban Team will work with the City to define members of the technical working group who will guide and inform project development and review technical analyses. The TWG will meet at key project milestones associated with task deliverables (e.g., data collection, model calibration, recommended timings, draft report).

Public Outreach Meetings

As indicated in the RFQ, three civic engagement opportunities are anticipated over the course of the study. The Urban Team will work with the TWG to identify the best types of outreach meetings. This may include a combination of in-person meetings, online virtual workshops, or other innovative ways to gather public feedback. However, considering the technical nature of this study, we believe it may be difficult to get the public to attend conventional public meetings or get excited about the project from these meetings. Instead, we recommend an approach focused on virtual meetings and pop-up events.

Virtual workshops offer participation opportunities in an online environment, typically incorporated on a project website. Participants can provide input from the comfort of their own home, mobile device, or library terminal and at a time that is most convenient to them. Workshop-style exercises, including the placement of pins on maps, survey questionnaires, and presentation materials can be included. A web-based meeting provides the opportunity for ADA readability compliance, and translation using Google Translate. Participants can be asked to provide demographic and contact information. This type of meeting may spur participation of a larger and more diverse group than a traditional in-person meeting for this project would.

Should in-person meetings be deemed important and necessary, venues will be in locations that are familiar to the communities, easily accessed by walking or transit, and ADA accessible. We will schedule meetings at times that are appropriate for working people and provide onsite interactive activities for children so that parents do not need to find childcare to participate in the meetings. Refreshments and language interpretation services will be available to establish a welcoming environment. Participants will be greeted at a 'Welcome' sign-in desk and asked to participate in ice-breaker exercises to encourage participation.

Children's Coloring Corner NJTPA Regional Transportation Planning Public Workshop

Public Meeting #1

The first public meeting is anticipated to be held as an in-person pop-up outreach activity and a supporting online virtual workshop. The goal of these events is to validate assumptions of existing conditions with respect to traffic and safety issues and to help identify congested corridors and bottle-necks.

The Urban Team recommends an early pop-up outreach activity to gather input on existing conditions. The Team has found that bringing the meeting to the public at a community event, such as a farmer's market or cultural festival, gives people who do not traditionally attend public meetings an opportunity to hear about the study and to provide their input. With this innovative meeting format the study team hosts an information table with mapping boards and asks the public to provide input on congested corridors and bottlenecks by placing dots and post-it comments on the


Pop-up outreach event for the I-84 Hartford CT project

maps. This is similar to activities that will occur in the virtual workshop. The Team would distribute information about the project and website and encourage interested people to sign up to receive notices about future meetings or opportunities to participate in travel time data collection activities.

The virtual workshop would support the pop-up activity by providing an online resource for participants who want more information, want to provide additional input, or missed the initial pop-up outreach event. The website address and information on the virtual workshop would be distributed electronically to stakeholders identified by the TWG. This workshop may include a 'primer in multimodal corridor planning and traffic signal optimization' that provides examples of how other communities have solved similar issues, as well as mapping exercises, and vision and goal-statement exercises.

Citizen Participation in Data Collection

It is envisioned that the public will be invited to assist with collection of travel time data in the "Before" and "After" scenarios for selected corridors. The Urban Team will capitalize on recent work we conducted in the corridor and coordinate with the TWG and other entities, including business and community groups, to develop a list of stakeholders that would be invited to participate in this activity. We will then issue invitations that explain the purpose of the study and the exercise. We will strive to solicit participation from a mix of users, including pedestrians, motorists, cyclists, and transit users of all ages abilities. It's important to collect input from all standpoints.

We will hold a focus group with stakeholders who accept the invitation to further explain the process and provide training on data collection. Participants will be asked to log travel times on identified corridors over an identified time period before and after a test traffic signal optimization scenario is implemented using a smartphone application or web-based platform. The Urban Team will work with stakeholders before, during, and after the scenario implementation process via virtual meetings (e.g., GoToMeeting), to provide support while implementing the tool, collecting data, and compiling or reporting results. Stakeholder data collection will be supplemented with results from travel data collection mechanisms, such as BlueTOAD and/or Wi-Fi readers installed on select corridors.

Public Meeting #2

The second public meeting will take place after timings have been implemented. The meeting could be held in-person or via virtual workshop. We will present a comparison of "before" and initial "after" stakeholder travel time journal results for review and discussion. Participants will have the opportunity to provide feedback on their experience, post implementation. The goal of the public meeting is to gain insight on how to fine tune or adjust the implemented signal timings.

Public Meeting #3

The last public meeting will be held as a public open house to unveil the results of the timing implementation plan and collect the final round of public input. We will brief key stakeholders and elected officials in advance of this meeting. Presentation boards for selected corridors will be on display. Participants can drop in at their convenience to view boards and speak with program team members to provide input. The meeting boards will also be presented on the project website.

Outreach Tools

We will apply various methods to engage a diverse group of public stakeholders throughout the course of the project:

Online Applications

Online applications work well for populations who use computers and smart phones to get information. Applications will be an integral virtual method to communicate study information to the community and collect input.

- A project-dedicated website will be developed for the twelve-month study period. Visitors can follow study progress, read study documents, find out ways to get involved, and provide online comments to the project team on topics that include route choices, congestion points, bottleneck locations and geometric issues.
- An interactive map will be a component of the project website. Visitors can pin issues to the map virtually, including congestion points, bottlenecks for traffic, and pedestrian crossing point concerns.
- A travel-time reporting smartphone application could be used to gather travel time and delay information from the traveling public.

Stakeholder Mailing Lists

The Team will log and maintain email and mailing addresses on a database throughout the course of the study. These lists will be used to send notifications for upcoming public outreach events as well as study updates.

Comment Log

The Team will log and maintain a stakeholder comment log throughout the course of the study for use as alternatives and recommendations are developed. This log will be incorporated into the study record.

Media

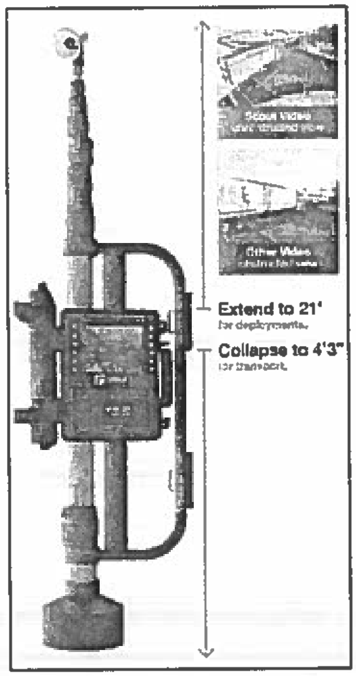
We will employ various media to spread the word on the study, including social media announcements and press releases. We will also harness relationships with media representatives who will follow the program development from study initiation to final recommendations. The Urban Team will coordinate with the TWG to gain advance approval of all media activities.

Task 2.4: Data Collection

Data collection is essential on traffic signal system optimization projects for several reasons. Inaccurate data can lead to a poorly calibrated existing conditions model and resulting poor signal timings. The timing may include cycle lengths that are too high or too low, phase splits that are inadequate for actuated and side street movements, poor offset progression on arterials, and closely spaced downtown grid networks. Prior to the actual data collection event, Urban will generate a Data Collection Plan (DCP) based on input from public meetings, the website, or application; City and other stakeholder input; and Urban's experience collecting data for signal optimization projects. The DCP will include each data type to be collected, methods of collection, schedule, data formats, police and other authority contacts, and quality control and quality assurance plans. Proper communication with local police and other applicable authorities ensures a smooth data collection process. The DCP will also include any relevant data from our document review of recently completed studies. This includes traffic count data that could potentially be used to reduce the number of counts required for this project or check/validate traffic data collected as part of this project.

Task 2.4.A: Volumetric Data

Collecting data for over 200 signals in 14 separate zones requires an efficient and organized approach. It is imperative that we collect as much data as possible within each zone during the same time period to maintain homogenous data for closely spaced signals within each zone. The volumetric data task of the data collection effort includes intersection turning movement counts, mid-block directional classification counts, and travel time and delay studies.



Miovision Scout Unit

TURNING MOVEMENT COUNTS (TMC)

The Urban Team will review all available documentation provided by the City to determine if recent TMCs were performed at any intersections in the City. We want to avoid repeating TMCs if they aren't necessary.

The City is interested in a non-intrusive method for data collection. The Urban Team is proposing all TMCs be completed using Miovision Scout video collection units temporarily mounted off the roadway to signal, utility or lighting poles. From a hardware perspective, the Scout units provide a number of benefits:

(1) 72-hour batter life and up to seven days with additional battery power packs

(2) Color LCD screen to ensure video unit is capturing the entire intersection

(3) Extends up to 21 feet enabling one unit to collect an entire intersection without trucks and large vehicles obstructing the cameras view.

Benefits from a software perspective include the following:

1) Record up to 64 GB of video, or approximately 19 days
2) Ability to schedule recordings (e.g., 6-9 AM and 4-7 PM) and leave the unit in the field for multiple days
3) Select the time periods you want analyzed to reduce processing time and costs
4) Recordings are saved and can be re-processed for additional time periods at a later date
5) Videos are helpful during model calibration to understand driving behavior at intersections
6) Videos can be utilized for saturation flow rate studies for efficiency and cost savings

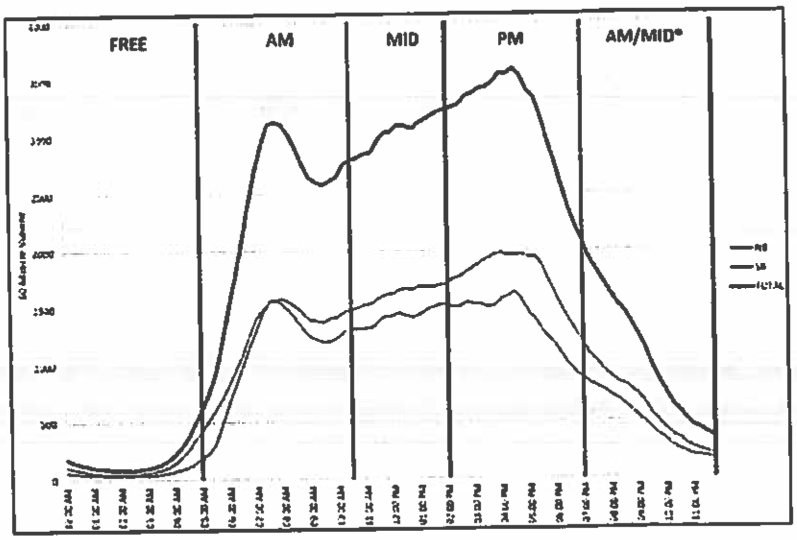
A key benefit of the Scout software is the ability to select the time periods you want analyzed. This is a highly efficient method for data processing. The Urban Team generally leaves the Scout units at an intersection for several weekday days (e.g., Tuesday to Thursday) and can then select which weekday to be processed back in the office. This helps reduce "poor" data collection days that include weather events, traffic incidents, and any other events that could result in unusual traffic patterns. Another benefit is the ability to process peak periods, such as 6-9 AM and 4-7 PM, for key intersections within a sub-zone, determine the zone peak hour (7-8 AM), and then process just the 7-8 AM zone peak hour for the remaining intersections within the zone. When there are over 200 signals in the project area, this four hour processing savings per intersection at all non-key intersections adds up to significant cost savings. Note that video for all intersections is indefinitely saved and additional time period processing can occur any time during the project, or even after the project is complete.

As previously mentioned, it is important to collect as much data as possible within each zone during the same time period to maintain homogenous data for closely spaced signals within each zone. With over 85 signals just in the Central Business District (CBD) zone it is important to have Miovision Scout capacity to count as many intersections as possible at the same time, and experience with deploying the units and processing the data. Urban has included the RBA Group and Gordon Meth, PE, PTOE on the team to lead the Data Collection task. RBA has 34 Scout cameras in their inventory and have performed thousands of intersection counts. They regularly perform counts in cities, including New York City and Norwalk, and under congested and complex conditions such as Port Authority of New York and New Jersey-managed bridges and roads. To support RBA, the Urban Team included Connecticut Counts and RHS Consulting Design for the data collection effort. Both firms have worked on projects in the City of Stamford and are DBE certified in Connecticut. Connecticut Counts and RHS Consulting Design have over 20 Scout units combined. The entire data collection team has a capacity of over 50 Miovision Scout units and with approximately 85 signals in the largest CBD zone, the Urban Team envisions this large zone to be collected over two or three data collection period weeks. The remaining 13 zones have less than 20 signals in each; therefore, multiple zones will be collected during the same week. Based on a preliminary investigation, we could collect TMCs on all of the city's 200 signals, if needed, in just four to five weeks.

Zone	App. Signals	Data Collection				
		Week 1	Week 2	Week 3	Week 4	Week 5
1	18			X		
2	9			X		
3	87	X	X			
6	19				X	
7	7				X	
9	14			X		
10	3				X	
11	8				X	
12	10					X
13	7				X	
15	10					X
16	9					X
17	3					X
19	9					X
TOTAL		44	43	41	44	41

MID-BLOCK DIRECTIONAL CLASSIFICATION COUNTS

Classification counts are important to understand not only the types and quantities of vehicles on the roadway, but also the directional travel patterns throughout the day. Classification counts help develop the heavy vehicle percent which is used to calibrate the existing conditions model and has a significant impact on saturation flow rate and the number of vehicles each intersection can process. The directional travel patterns from the classification counts help to develop the amount of Time-Of-Day patterns and hours for each plan; e.g. AM Plan from 5:00-10:30 AM.



The Miovision Scout units discussed for the TMCs can also be used for the mid-block directional classification counts. This is another example of non-intrusive data collection. Miovision processing provides full vehicle classifications and their seven day battery life provides a non-intrusive alternative to conventional road tubes. In addition to dedicated Scout units at mid-block locations for directional classification counts, the Scout units utilized for TMCs can also export four legs of directional classification counts from a 24-hour intersection count. This provides additional data for a minor cost.

TRAVEL TIME and DELAY STUDIES

Travel time and delay studies serve two key purposes for signal system optimization projects:

1) Travel time between intersections and along principal roads is the primary measure utilized during model calibration
2) Travel time data provides the best measure for comparing "before" and "after" conditions to show real world benefits of optimizing signal timings.

The City's suggestion for citizen volunteers for travel time data collection continues the multi-modal optimization theme, keeps the public involved in the project, and provides a larger and more diverse sample of data. The Urban Team will complete travel time and delay studies with a three pronged approach that is non-intrusive:

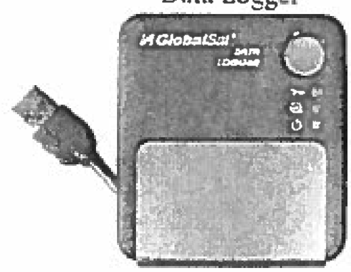
1) The Urban Data Collection team will perform GPS-based studies with the Tru-Traffic software collecting second-by-second data.
2) Citizen volunteers, as suggested by the City, will participate.
3) Bluetooth-based readers.

The GPS-based travel time data from the Urban Data Collection team will be focused on the 13 selected corridors from the RFQ. Post-processing of the field travel time data using the Tru-Traffic software program provides measure of effectiveness (MOEs) such as travel time, delay in travel time, average speed, stops, emissions (CO, HC, and NO_x) and fuel consumption. The Tru-Traffic emissions output data is based on the Comprehensive Modal Emission Model (CMEM) from NCHRP Project 25-11. GPS-based travel time data can also be imported into Google Earth as a .kml file to visually show the existing corridors for a Pre and Post comparison. The GPS-based method is highly cost effective. It does not require multiple staff members or several field trips, as other model calibration methods do. Whenever a model does not appear to reflect field conditions, the model results can be viewed side by side with the field data. This method is further enhanced when used in combination with dashboard-mounted video cameras to document conditions (See Figure to the right). Field videos can be reviewed after the data collection event to understand congestion, driving behavior, and any other incidents that may have occurred during the travel time and delay studies.

Dash mounted camera/GPS travel time

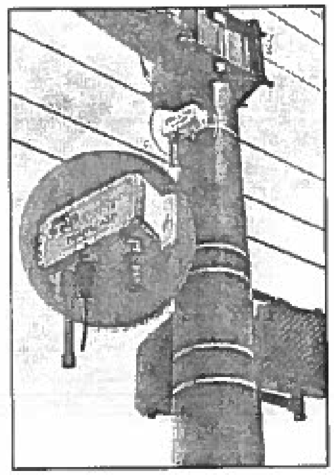
As noted in Task 2.3 Public Involvement & Participation, the citizen volunteers completing the travel time and delay studies could be accomplished using a travel time app with the data uploaded to the project website. In addition to the option of logging travel time information into a website, the Urban Team owns several Globalsat DG100 data loggers, which citizens can place in their car and while they travel on desired or directed routes. The data can be uploaded to the project website. The data logger data is processed using the Tru-Traffic software and can provide the same MOEs described above.

Data Logger

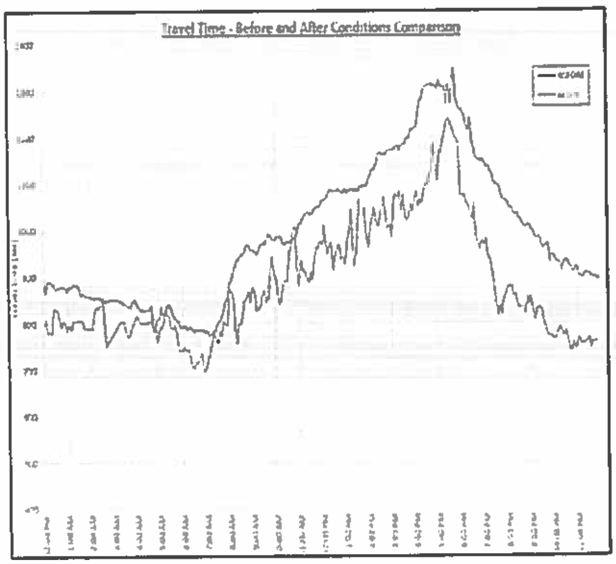


In addition to the travel time data collection methods described above with GPS data, the Urban Team has completed travel time studies in the past using Bluetooth data from TrafficCast's BlueTOAD units. These units are temporarily attached to signal, utility, or light poles. They anonymously detect MAC addresses from Bluetooth devices within their detection zone 24 hours a day while the units are on. The system calculates travel time by matching the MAC addresses at other Bluetooth units placed throughout the corridor.

Benefits of the Bluetooth-based method include a larger sample size and 24 hour/day data collection, compared to the GPS-based method. The recently released BlueTOAD Spectra Detector combines "Discoverable" and "Non-Discoverable" Bluetooth for average sample rates of 40 percent, which provides for large data sets and more accurate travel times on lower volume roads. The charts below are an example of "before and after" results from a BlueTOAD system Urban used on a signal system optimization in Ocean County, NJ. The Urban Team will work with the City to identify the routes which should have data collected using Bluetooth technology. Wi-Fi readers are an alternative to Bluetooth readers. They work in a similar manner.

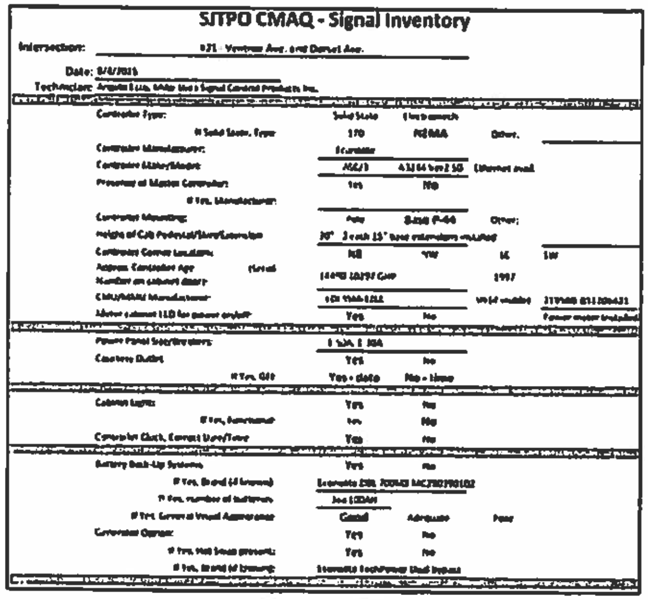


BlueTOAD unit



TASK 2.4.B: INTERSECTION INVENTORIES

The Urban Team has completed intersection inventories for large project areas, including developing spreadsheets, databases and online web-based maps to organize information and photos collected in the field. Prior to starting the intersection inventory task the Urban Team will provide Stamford with the intersection inventory spreadsheet template for review and comment on all items that will be collected in the field.


SJTPO CMAQ - Signal Inventory

Intersection:

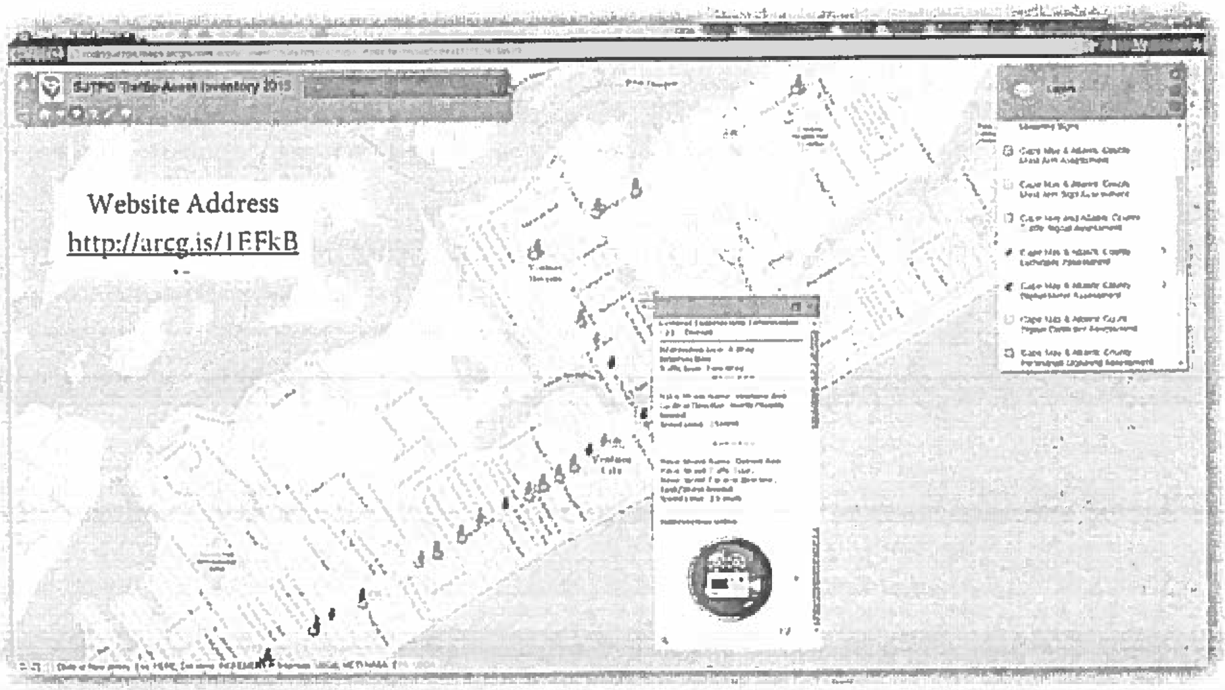
Date:

Technician:

A two-person field crew will perform the intersection inventory at intersections to be identified by the City. The inventory will include the following features listed in the RFQ: signal controller, controller cabinet, detection, communication lines and devices, signal supports and displays, pedestrian equipment and intersection signs. The data collection team will use checklists and a custom tablet application with GPS logging to record the data in the field. Signal timings will also be field-verified with any discrepancies between signal timing plans and field timings noted. Field data will be reviewed and processed in the office and compiled into Excel spreadsheets. Saturation flow rate studies will be completed at a minimum of one location per sub-zone with additional study locations per sub-zone as needed or agreed up between the City and the Urban Team. Saturation flow rate studies can be completed in the field or by using the Miovision Scout video unit data.

The Team will develop intersection schematics, including geometric conditions, lane configurations, vehicular and pedestrian clearance distances, and posted speed limits. These schematics will expedite the vehicular and pedestrian clearance interval task and provide documentation for proposed intervals times.

INNOVATIVE: **The Urban Team can also develop an ArcGIS Online web map that can be shared with the City and other respective agencies and used to facilitate collaboration as well as review the project data. The web map can be used to view and track project status and access the data collected in the field. Notes, digital photos, and reports can be linked to the respective features and accessible via a simple web interface. An Excel database can be developed with the intersection inventory data. This data can be spatially enabled for use in GIS software, such as Esri ArcGIS. The data collected in the field will be imported into the database after data collection and quality control is complete. On the following page is a sample ArcGIS Online web map that organized and displayed all data collected during the intersection inventory.**



ArcGIS Online Web Map

Task 2.5: Data Analysis & Modeling

TASK 2.5.A: DATA ANALYSIS

The data collected during Task 2.4 will be processed in preparation for the system modeling. First, mid-block directional classification data will be processed. We will use input from the City and draw from our experience with signal system coordination to identify preliminary coordination sub-zones. Within these sub-zones, the processed turning movement count (TMC) data will be utilized to develop sub-zone peak hours. The Urban Team uses sub-zone peak hours because peak hours could be drastically different between the State Street area in the CBD and other corridors in northern Stamford. Using intersection peak hours for analysis purposes could cause varying peak hours for closely spaced intersections and therefore large volume imbalances.

As stated in the RFQ, a minimum of three Time-of-Day (TOD) pattern plans will be developed, including AM, PM and OFF-PEAK. The Urban Team generally develops the OFF-PEAK plan based on mid-day peak hour data as the travel patterns are generally not directional and peak hour volumes are less than the AM or PM periods. The number of peak periods; e.g. AM/PM/SAT to be analyzed during system modeling will be zone-specific and based on the classification data, TMC data, engineering judgment, and input from the City and public participants. For example, the CBD area may require a dedicated weekend plan based on unique travel patterns or peak characteristics, whereas for non-CBD corridors the OFF-PEAK plan may be appropriate for the weekend period.

Once the number and hours of each peak period for each sub-zone are set, peak hour volumes figures will be developed. The volume figures will be a valuable resource for the system modeling effort. Urban has developed custom volume figure spreadsheets which export the volumes into a CSV format that can be directly imported into Synchro using the UTDF Database Access. With over 200 signalized intersections, this feature will not only improve the Urban Team's efficiency, but minimize errors related to manually inputting turning movement count volumes into the Synchro software.

Lastly, the field travel time data will be processed and summary tables will be developed. The summary tables will include a travel time summary for the entire peak period (e.g., AM period from 6 to 9 AM), and a peak hour summary (e.g., AM peak from 7 to 8 AM). Travel time is a key MOE during the system modeling and existing condition calibration process. Including outlying travel time runs not completed near the peak hour could inappropriately reduce the peak hour field travel time that is to be compared to modeled travel times. For example, travel times at 6:00 AM are often significantly less than 7:30 AM, and including the 6:00 AM travel time run in the travel time summary will artificially reduce the reported "peak hour" travel time value. The system modeling is based on peak hour data; therefore, the field travel time data being compared to modeled travel times should also be peak-hour based.

Task 2.5.B: System Modeling

We recommend using the Synchro Studio suite, including Synchro for macroscopic analysis and SimTraffic for microscopic simulation analysis, to complete the signal optimization system modeling task for most of the corridors. Synchro is a widely used, industry standard program that provides a solid platform to develop calibrated existing conditions models and optimized timings and test various geometric and phasing scenarios. Synchro and SimTraffic can accurately model the applications listed in the RFQ, with the exception of Transit Signal Priority (TSP) intersections and complex geometric conditions and interactions between I-95 and North and South State Street's in the CBD. For the complex and TSP locations, Urban recommends using the microscopic simulation program VISSIM to complete the modeling. The Urban Team has extensive experience using VISSIM to model various complex geometric scenarios at signalized intersections, and is very familiar with the Ring Barrier Controller (RBC) module in VISSIM, which will be used to model TSP.

The Urban Team has extensive real-world signal optimization project experience with Synchro. We have also provided classroom training for State and County agencies on the Synchro Studio software suite and signal optimization methodology and best practices. Key staff members Scott Diehl, Chris Burke and Orla Pease have provided numerous Synchro and SimTraffic training classes to public agencies and private consultants. Ms. Pease was certified as an official Trafficware trainer for the Synchro Studio suite. The Synchro Studio suite is a Trafficware product and will integrate seamlessly with the City's current transition to Trafficware/Naztec 980 NEMA controllers and ATMS.now central management software. Trafficware's adaptive signal control software, SynchroGreen, or any of the other Trafficware modules can take advantage of the city-wide Synchro model that will developed as part of this project.

The system modeling task will be composed of three tasks: Existing Conditions, No Build Conditions, and Alternative Scenarios. The Existing Conditions analysis will setup the base models and calibrate to field conditions. The No Build Conditions analysis will update the vehicular and pedestrian clearance intervals and add in any known development traffic to provide an "apples-to-apples" comparison for the Alternative Scenarios analysis. The three Alternative Scenarios listed in the RFQ will be analyzed for comparison to the No Build analysis results.

Existing Conditions Analysis

The Existing Conditions Base models will be developed in Synchro 8 or 9 based on the City's preference, and the entire project area, all 207 signals, will be included in one Synchro file, rather than multiple files. The Synchro Base model will be developed with correct geometry, signal timings which match field conditions during data collection, peak hour traffic volumes, saturation flow rate data and other appropriate model data. The calibration process will fine tune the models to match field conditions. Travel time, queuing observations, and general field observations will be the key measures for calibration.

Calibration is an iterative process where differences between field and model data are identified and resolved based on further investigation of the field data. Specific model parameters have an impact and can generate a more realistic driver behavior, including lane alignment through an intersection, turning speeds, lane change distances, headway factors and entering blocked intersections. Adjustment of these parameters helps bridge the gap between field and model data to enable model calibration. We follow Federal Highway Administrations' Guidelines for Applying Traffic Microsimulation Modeling Software for calibration and include three key targets:

1) modeled versus observed travel times within 15%
2) modeled versus observed vehicles processed within 5%
3) visually acceptable queuing

Note that Urban runs the model numerous times using the "batch" feature to account for the variability in traffic. Typically, we use 10-15 runs to generate results that are statistically significant.

In addition to the typical MOEs, including delay and Level of Service (LOS), the Urban Team will also provide travel times and other MOEs by sub-zone as well as additional system-wide performance measures such as total delay, average stops, fuel consumption, and emissions (HC, CO, NOx). In the past, agencies we have worked with have used the Synchro and SimTraffic output to assist in Congestion Mitigation and Air Quality (CMAQ) federal funds applications. Urban has developed post-processing spreadsheets for both Synchro and SimTraffic that allow for efficient and accurate processing of output data text files from both models.

No Build Conditions Analysis

Prior to the Alternative Scenarios analysis the Urban Team recommends developing a No Build model. We will develop this model by updating the Existing Conditions calibrated models with vehicle and pedestrian clearance calculations and any known development-site-generated traffic. Clearance calculations for each intersection will be completed using policies and formats accepted by the City. By updating the Yellow Change, Red Clearance and pedestrian intervals in the Synchro models an "applies-to-apples" comparison can be made to the Alternative Scenarios for percent improvement in the MOEs. Without a No Build model, the comparison would be between the Existing Conditions and Alternatives Scenarios, which have different vehicle and pedestrian clearance intervals.

Alternative Scenarios Analysis

The four Alternative Scenarios identified in the RFQ are below:

1. Existing operations simulation (base-line)
2. Optimum timings given existing geometry and phasing
3. Optimum timings given existing geometry and optimum phasing
4. Optimum timings given optimum geometry and optimum phasing

Scenario 1, Existing Conditions, is described earlier in this Task 2.5.B, System Modeling. The Urban Team recommends completing a No Build model prior to Scenarios 2 through 4, as described above.

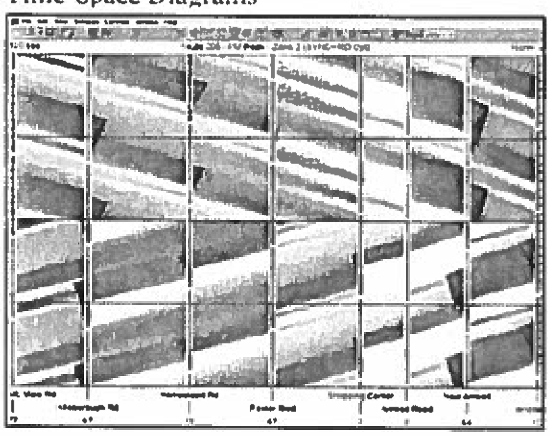
For Scenario 2, the Urban Team will take the No Build models and optimize signal timings by each coordinated sub-zone. Urban has extensive experience in optimizing signal timings with the process being refined over time due to lessons learned from field implementation and fine tuning, before and after study results, and software program improvements. Urban's signal optimization process revolves around iterative testing of multiple combinations of cycle length, phase splits, and offsets for each coordinated sub-zone. Our experience and efficiency with signal optimization software tools and post-processing spreadsheets allows us to test many Cycle-Split-Offset (CSO) combinations for each sub-zone and develop optimal timing plans.

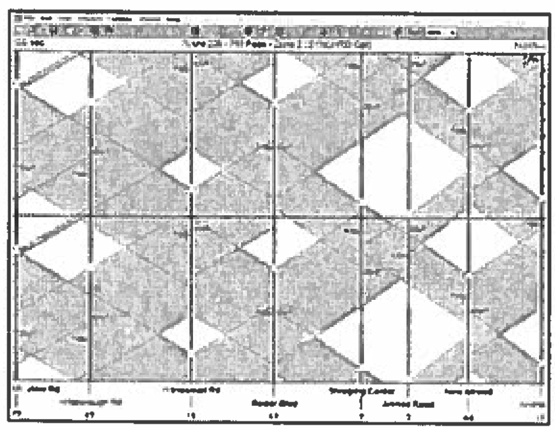
Cycle: The first "evaluation" of existing signal systems will be that of cycle length. The Urban Team understands that the selection of an appropriate cycle length for each period and zone analyzed can be the determining factor for successful timings. A cycle length that is too short will result in cycle failures and poor progression, but a cycle that is too long results in queuing, and impatient side street motorists and pedestrians. The Synchro software provides suggested optimized cycle lengths based on Performance Index (PI), which is based on total delay and vehicle stops. The Tru-Traffic software program, which is discussed in more detail in the Offsets section below, also suggests optimal cycle lengths but is based mainly on arterial progression. We will consider the recommended cycle lengths form these two programs and draw from our experience and judgment to develop the cycle lengths to be tested in Synchro and SimTraffic.

Splits: After we select the cycle lengths to be tested for each sub-zone, we will setup the phase splits. The initial goal is to match Green Time to Cycle Length ratios (g/C) from the No Build model to the Optimized model. This is key to ensure side-street split percentages are not significantly reduced automatically by Synchro when changing cycle lengths. Once the g/C ratio for all movements are approximately the same as the No Build model, adjustments are made based on Existing and No Build Synchro/SimTraffic results, field notes and engineering judgment, in an effort to minimize arterial travel time without significant impact to the side streets. Adjusting splits is an iterative process where simulation results are tabulated and simulation runs are visually watched to ensure traffic operations on the arterial mainline and side streets are operating as intended without left turn pocket spillback or starvation, excessive queuing, or negative impact to arterial travel time.

Offsets: After the phase splits for each intersection within the sub-zone are determined, the Urban Team has historically developed offsets using a combination of optimized offsets from the Synchro and Tru-Traffic programs. Optimized offsets from both programs are developed, visualized, reviewed and adjusted, if necessary, using the Tru-Traffic interface. There are advantages to using the Tru-Traffic interface over Synchro for optimizing offsets, including diagram type (Time-Space, Platoon-Progression, and Time-Location – see below figures), directional weighting factors, optimization of sections of a zone, and a more user-friendly interface. Time-Space diagrams can be viewed by the City per model and sub-zone, as opposed to the Synchro Time-Space diagram which can only display several intersections at a time and is not printer friendly. The Urban Team was trained on the Tru-Traffic program by the developer, Greg Bullock, during a two-day event. We have used the program for offset optimization since 2011. The Urban Team will develop and submit Time-Space diagrams using the Synchro interface, if that is the preferred method.

Time-Space Diagrams





The same MOEs from the Existing and No Build models will be reported for the Optimized models. In addition to these MOEs, Time-Space diagrams can be submitted for each model and sub-zone.

For Scenario 3, the phasing sequence for each signal in each sub-zone will be analyzed, optimized, and tested in Synchro and SimTraffic. The Urban Team's approach for Scenario 3 and phase optimization will be multi-modal focused. From a traffic operations perspective, phase optimization includes investigation into lead-lag left turn phases, reordering split phase movements, and general reorganization of phases. The Synchro software will suggest intersections where changing left turn phasing to lead-lag will benefit progression, and the Urban Team has experience in adjusting phase orders and subsequent benefits realized from past projects.

From a multi-modal perspective, phasing will be evaluated based on the safety of each phase from a vehicular, pedestrian, and bicycle point of view. The Urban Team will work with the City and other applicable stakeholders to develop criteria for when a permitted left turn phase should be converted to protected-only phasing. In addition to heavy pedestrian and bicycle volumes, the Urban Team recommends using crash history as a criteria warranting protected-only left turn phasing. The Team will test all adjustments to phasing; compare the results reported from Synchro and SimTraffic to Scenario 2 (optimized), and provide a description of the phasing changes. Negative impacts to vehicle operations may have to be considered in situations where phasing changes significantly benefit the other modes of transportation from a safety perspective. In addition to protected only left turn phasing, leading pedestrian interval (LPI) could be implemented at specific locations with concurrent pedestrian phasing to provide pedestrians with a three-second to seven-second head start when entering the intersection.

For Scenario 4, the Urban Team will examine geometric improvements at intersections identified by the City, public participants, and other stakeholders, including analyses using Syncho and SimTraffic. Geometric improvements include extending or adding a turn pocket, adding auxiliary lanes near signalized intersections, changing lane alignment, and making any other intersection or corridor improvements. We will develop tables comparing Scenario 4 results to No Build, Scenario 2 and Scenario 3 results.

TASK 2.5.C: TIMING INTERVALS

After the Alternative Scenarios are complete and the final optimized timings and phasing are determined for each sub-zone, the Urban Team will convert the timings from Synchro into usable formats for local timing charts, coordination values and phase sequencing diagrams. Hard copies will be provided for reference and timings will be converted into an electronic format for direct controller input via USB, serial port, or laptop. All local timing chart and coordination values identified in the RFQ will be specified in the hard copy and electronic formats.

The City is currently comprised of a mix of PEEK and Naztec/Trafficware controllers with current transition to all Naztec controllers. Electronic formats for each controller manufacturer and model will be developed and approved by the City. Urban's subconsultant New England Traffic Solutions (NETS) is intimately familiar with City's signal system, including all existing controllers and planned Naztec 980 NEMA controllers. NETS has provided manual (keypad) and direct signal timing implementation at the controller for all PEEK and Naztec controller models. The City's current central traffic management software control is a STDWIN based application which is being converted to Trafficware's ATMS.now system. NETS is completing this central software conversion for the City and is familiar with inputting signal timings into both the existing STDWIN and ATMS.now central systems. All formats for signal timing direct implementation will be approved by the City.

As specified in the RFQ, a minimum of three TOD pattern plans will be developed, including AM, PM and OFF-PEAK periods. Task 2.5.A, Data Analysis, has more detail on the number of TOD plans that the Urban Team will develop for the City. The number of plans will be sub-zone based and established after the field data has been processed and with input from the City, public participants, and other applicable stakeholders.

Task 2.6: Timing Implementation

After the timing plans are developed in electronic and hard copy formats approved by the City, field implementation will begin. The timing implementation task will be completed by Urban's sub-consultant, NETS. As mentioned in Task 2.5, NETS is working with the City to replace existing PEEK controllers with Naztec/Trafficware controllers and updating the central management software to Trafficware's ATMS.now system. NETS has also developed the City's traffic management display center and has extensive knowledge of the City's fiber and copper communication network. Addendum one to the RFQ removed the IMSA certification requirement, but the NETS staff who will be completing the field and central software implementation are all IMSA II or III certified and familiar with PEEK and Naztec controllers, and STDWIN and ATMS.now central software management systems.

NETS and Urban will develop a detailed implementation plan focused on off-peak implementation times and completing as many timings within each sub-zone as possible between peak periods. For larger sub-zones, such as the CBD zone with approximately 87 signals, implementation will be completed along entire key corridors between peak periods to ensure minimal impact to traffic operations. The implementation plan will be broken down by sub-zone, key corridors within each sub-zone, and the date, time and approximate duration at each intersection. The Urban Team will provide the City with a blank template of the implementation plan for comment prior to developing the actual implementation plan. Urban will address any comments from the City prior to implementation.

The Urban Team will work with the public and law enforcement to provide transparency about the project. Coordination and cooperation is key to a smooth implementation for a large network with 200+ signals. The public will be kept informed through public announcements, project website updates, and public outreach meetings. The City's law enforcement team will be integral in developing the implementation plan and schedule for corridors (e.g., identifying time periods where implementation is allowed). We will provide email and cell phone contact information for an on-call NETS local staff member who can address any issues or concerns 24/7. They will be able to respond within 2 hours.

Task 2.7: Fine-Tuning

As timing implementation is completed for each sub-zone the Urban Team will verify that signal timing input into the controllers and central software match the developed timing plans. The timing items to be field verified for each TOD pattern include the following:

- Phasing sequence
- Maximum green times
- Yellow change
- Red clearance
- Pedestrian walk, flashing don't walk, and don't walk intervals
- Cycle length
- Offset

The field signal timing verification task will be completed by Urban staff subsequent to each sub-zone completed by NETS; therefore, the timing implementation and field signal timing verification tasks will essentially run concurrent from a schedule standpoint. Any discrepancies between proposed timing plans and field checked timings will be documented with NETS fixing any issues within five business days, or sooner if significant traffic issues are identified. Diligent documentation during this field signal timing verification task will ensure the signals in the field are operating as intended based on the signal timing optimization simulation analysis.

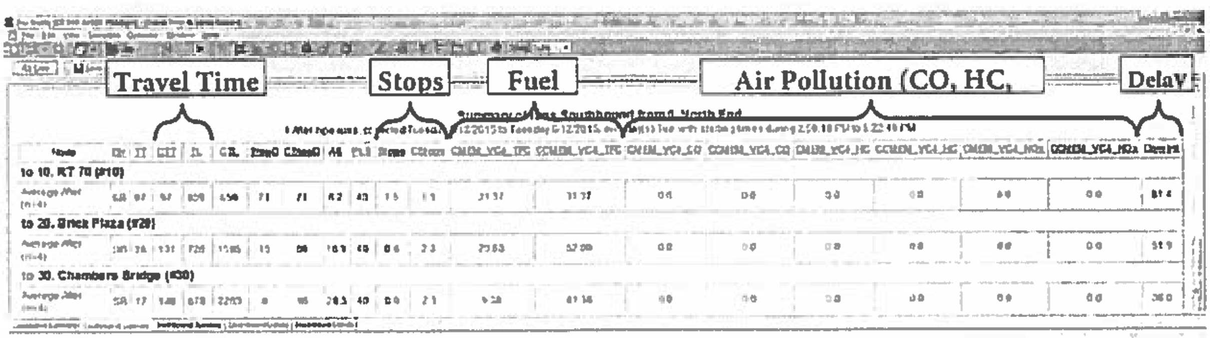
As Urban Staff are reviewing the field timings after implementation, fine-tuning adjustments to phase lengths or offsets may be required. The software programs are extremely helpful in developing optimal signal timings, but field adjustments are occasionally necessary to address conditions the software programs can't account for, such as off-peak traffic surges from a business, natural fluctuations in demand, and City preferences.

Additional fine-tuning will occur based on public feedback from Public Meeting #3. The open house style public meeting will encourage citizens to note any issues with the initially implemented optimized signal timings. All citizen and City issues will be logged and investigated by Urban or NETS staff. A separate technical memo will be submitted including all logged issues, results of the Urban Team's investigation, and any adjustments made at the subject location. If no changes are to be made the Urban Team will provide explanations as to why. The City will review the technical memo and, once approved, the After travel time study will begin.

Task 2.8: Before & After Study

After the optimized signal timings have been implemented and the fine tuning task is complete, the Urban Team, with help from public participants, will complete the After study for comparison to the Before study results prior to signal system optimization. Task 2.4.A, Volumetric Data, describes how the Before travel time and delay studies will be completed, and the After studies will be completed in the same manor on the same 13 selected corridors identified in the RFQ. The Urban Team has provided Before and After travel time study results with the MOEs identified in the RFQ for signal optimization projects in the past using the Tru-Traffic software program to process field data and provide summary tables (see sample table below). The Cost to Motorist MOE identified in the RFQ can be manually calculated using Road User Cost Manuals, gas price estimates, and pollutant (CO, HC, NOx) unit prices.

All MOEs will be summarized in comparison tables between the Before and After conditions with percent improvements highlighted.



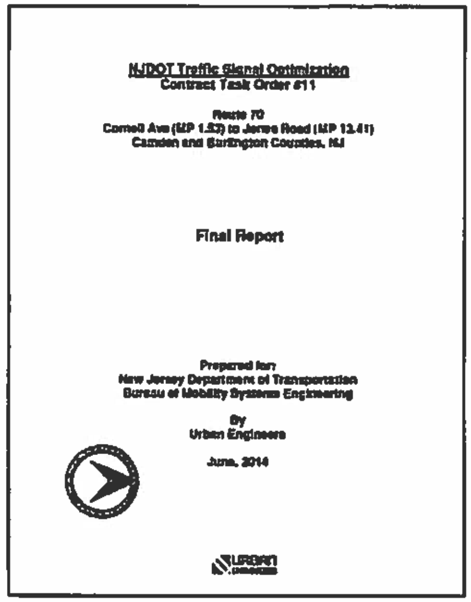
Tru-Traffic Travel Time Summary Table

INNOVATIVE: Task 2.4.A, Volumetric Data, discussed Bluetooth-based methods for collecting field travel time data. The Urban Team has completed Before and After studies in the past using Bluetooth-based travel time units spaced throughout key arterials. Bluetooth-based or Wi-Fi-based methods provides a larger sample size over a 7-10 day period compared to GPS-based, but with additional costs per unit placed. The Urban Team recommends selecting several key corridors in the City and strategically placing the units to collect the most important routes and movements. We've learned from experience that placement of these units is key to their effectiveness. These technologies project a radius where the Bluetooth or Wi-Fi device is picked up, and it is important to place the units at mid-block locations where vehicles are moving at free flow speeds. Placing these units at intersections causes inconsistencies with data due to varying times when vehicles enter the units' radius of capture.

TrafficCast's Bluetooth Spectra detector is the company's newest technology that can capture Bluetooth devices in "Discoverable" and "Non-Discoverable" modes, which increases the sample rate to nearly 40%. Sensys Networks provides the FlexID Wi-Fi travel time reader with Access Point Controller Card (APCC) that has sample rates between 25% and 30%. Both of these technologies anonymously detect MAC addresses at each unit in the corridor with post-processing software programs calculating travel times between each unit and for the entire selected corridor.

Task 2.9: Final Report

The Urban Team will develop a two-volume Final Report covering all aspects of the project, from the Public Involvement phase through Implementation and Fine Tuning. As stated in the RFQ, the first volume will encompass all project-related items and the second volume will contain all the project data. Both volumes will be provided as stated in the RFQ and electronic version will be provided on disks and thumb drives. For the NJDOT Signal Optimization contract the Urban Team created two-volume Final Reports, similar to those requested in this RFQ, for all nine corridors. The general report format follows:



NJDOT Traffic Signal Optimization
Contract Task Order #11

Route 70
Cornell Ave (MP [illegible]) to Jones Road (MP 13.41)
Camden and Burlington Counties, NJ

Final Report

Prepared for:
New Jersey Department of Transportation
Bureau of Mobility Systems Engineering

By
Urban Engineers

June, 2014

- Executive Summary
- Project Purpose and Background
- Before Conditions Data Collection
- Existing Conditions Analysis
- Signal Optimization
- Implementation & Fine Tuning
- After Conditions Data Collection
- Anticipated Benefits Analysis
- Future Geometric Recommendations

The Public Involvement tasks will be added for this project after Project Purpose and Background, and other sections can be added or modified as necessary.

3. CONSULTANT QUALIFICATIONS

PRIOR SIMILAR PROJECT EXPERIENCE

PRIOR SIMILAR PROJECT EXPERIENCE

Firm History

Urban has provided signal retiming and signal optimization in a wide range of traffic conditions and corridors for numerous agencies throughout the northeast. Our projects range from citywide retiming in Philadelphia and statewide signal optimization corridor studies in New Jersey to update of timing and signal plans along Route 1 in Greenwich and County Route signal retiming in Ocean, Cape May and Atlantic Counties in New Jersey. We have two ongoing signal upgrade projects in the neighboring communities of Greenwich and Norwalk. In addition to our signal optimization and signal design project experience, Urban staff have trained agencies and consultants to use signal optimization software and perform signal optimization. Details on Urban's signal optimization and similar project experience is provided below.

Similar Past Projects

Urban Engineers

The Urban key staff proposed for this project (Scott Diehl, Chris Burke and Orla Pease) held key roles in the following projects.

Route 1 Signal Optimization, Town of Greenwich, CT

Urban is developing and implementing signal timing improvements on two sections of Route 1 (8 signals) in the Town of Greenwich, CT. The project entails updating signal plans to convert pedestrian operation from exclusive to concurrent operations and optimizing signal timing plans for multiple time periods. Additionally, the project involves updating existing traffic signal plans to current CTDOT standards and to reflect actual field conditions. Work includes data collection; development of calibrated Synchro/SimTraffic models for multiple peak hours, vehicular and pedestrian clearance intervals, and optimized signal timing plans using Tru-Traffic for offset optimization; preparation of revised signal plans and results summary; submission to CTDOT and resolution of comments; and preparation of final plans. Sections along Route 1 include Orchard/Mead to Strickland/Taylor/Cross and Western Junior Highway to Valley Drive.

NJDOT Traffic Signal Optimization

Urban completed a task-order agreement for NJDOT to develop and implement optimized traffic signal timings for congested signalized corridors and networks in the state. The project involved data collection, including GPS-based travel time studies; field investigations, including MUTCD compliance analysis; update of signal plans; model calibration and simulation analysis for multiple peak periods; signal optimization; implementation and field adjustments; and post implementation analysis, including cost/benefit analysis.

Urban has analyzed and optimized nine corridors and more than 150 signals under this contract, ranging from seven signals in a grid system to 30 signals along a major shore community arterial:

- RT 42 Monroe and Washington Townships, 6 miles and 12 signals
- RT 45 Gloucester County, 7 miles and 19 signals
- RT 30 Galloway Township and Absecon City, 4 miles and 12 signals
- RT 72 Stafford Township and Ship Bottom, 9 miles and 14 signals
- RT 9 Atlantic County, 11 miles and 30 signals
- RT 47 Cumberland County, 9 miles and 20 signals
- RT 206 Hillsborough Township, 5 miles and 13 signals

- RT 70 Camden and Burlington Counties, 12 miles and 25 signals
- RT 47/9 Middle Township, 2 miles and 7 signals

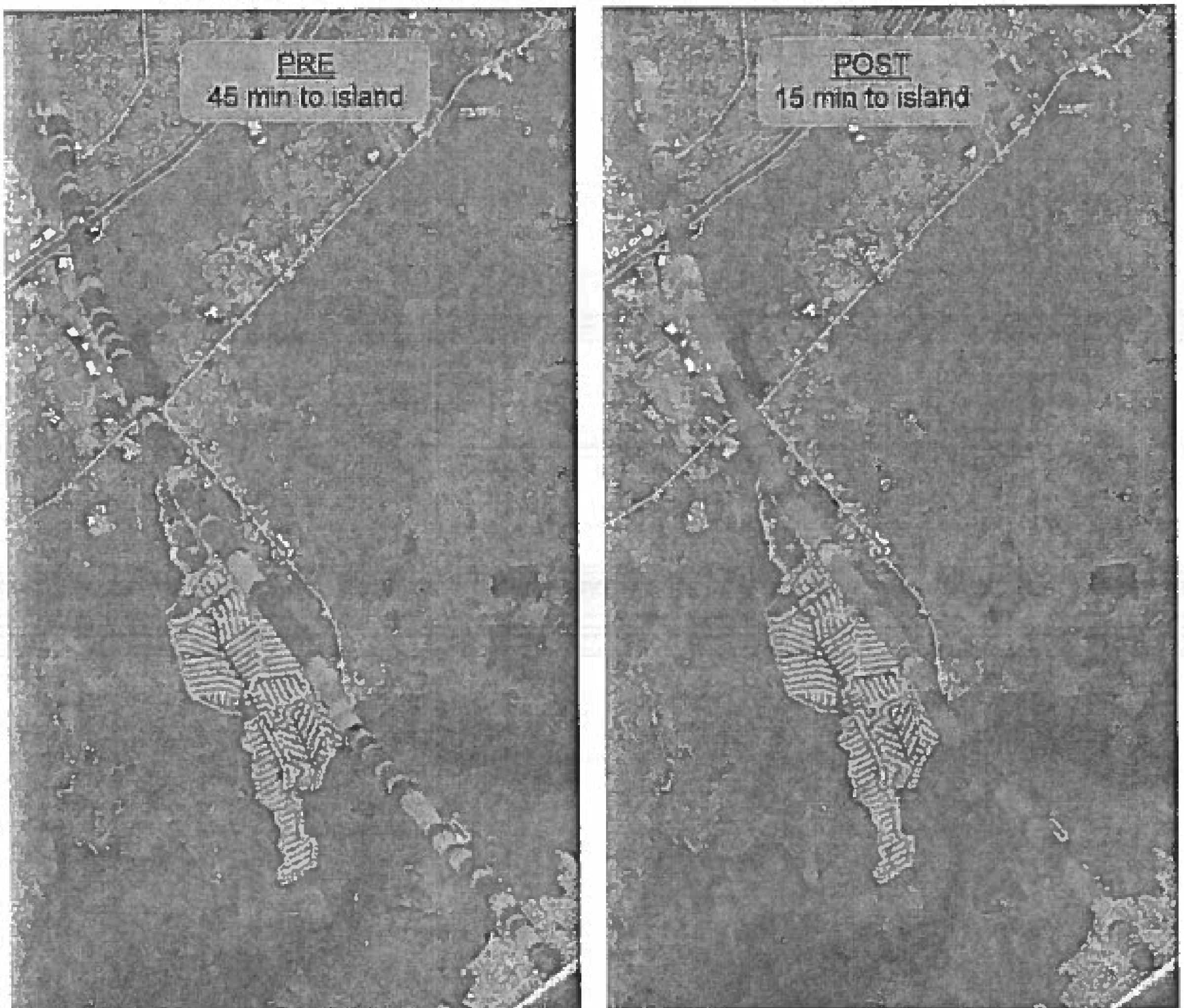
We analyzed and tracked the corridor improvements for this contract. The average corridor improvements to date, are below.

- Field travel time: Reduced by 10%-15%
- Modeled stops per vehicle: Reduced by 5%-20%
- Modeled network delay: Reduced by 10%-20%

The Route 72 corridor entering Long Beach Island in Ocean County, NJ was a challenging corridor, which housed14 signals with separate signal timing plans developed for "Inbound," "Outbound," and "Combination" directional summer peaks. Urban developed a unique signal timing scheme for this corridor, approaching the shore community, that provided a 66% improvement in travel time during the summer inbound periods and reduced a 7-mile backup down to several hundred feet. Urban's optimization strategies for the Route 72 corridor were presented at the 2014 ITE Northeastern District Annual Meeting in Long Brach, NJ.

The graphic on the following page shows a comparison of travel times on Route 72 Eastbound on a summer Saturday afternoon before and after the optimization. Urban used Tru-Traffic software program to perform the field travel time runs for the Pre and Post conditions. We then exported into Google Earth .kml files. By exporting the field travel time runs to Google Earth, you can visualize the impacts of the traffic signal optimization improvements.

Condition shown is a Summer Saturday at 12:30 PM



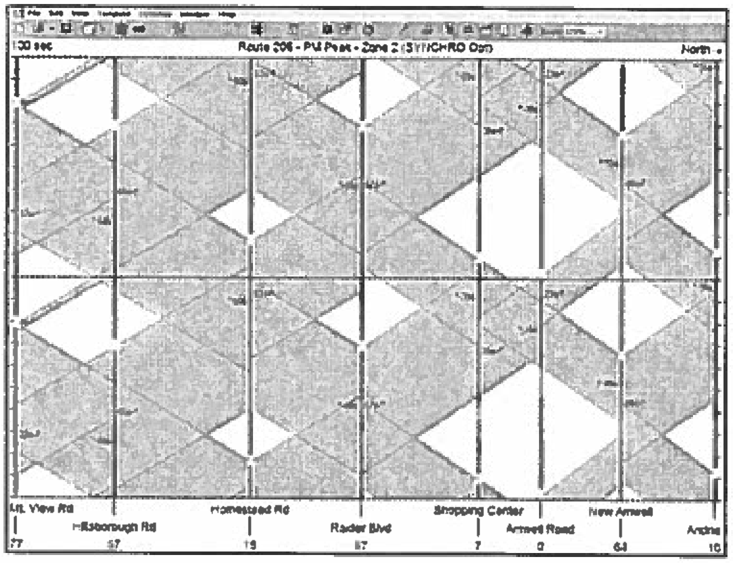
The above figures show Tru-Traffic GPS travel time runs within Google Earth. Each colored "bubble" represents each second of the travel time run. Each bubble shows the travel time run name, type, peak period, date, time and speed. Bubble designations are shown on the right.

As Percentage of
Posted Speed Limit

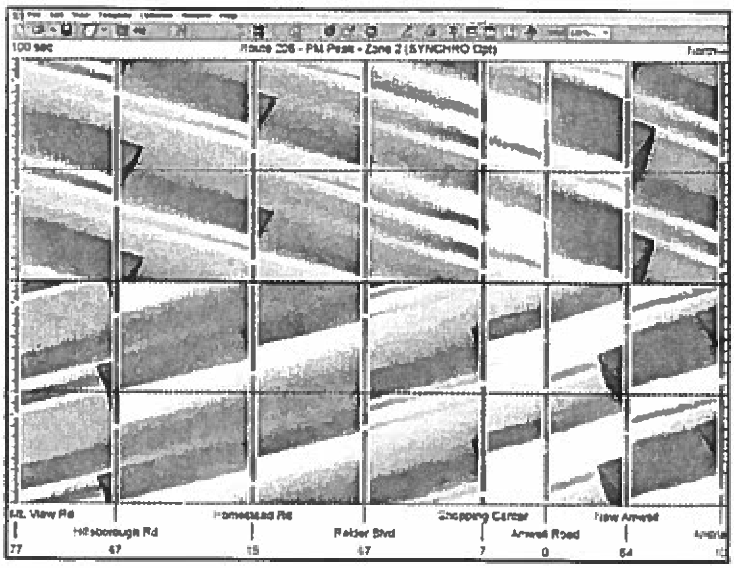
- *≥ 90%*
- *66 to 89%*
- *33 to 66%*
- *< 33 %*

Building on the Tru-Traffic software program used for the NJDOT Signal Optimization contract, below are two figures showing the Time-Space and Platoon-Progression diagrams created in the Tru-Traffic interface for the Route 206 corridor in Somerset County, NJ. To facilitate the use of Tru-Traffic, the model directly imports the inputs from the previously developed Synchro model, including signal timing, traffic volumes, intersection locations, speed limits, and geometry via Synchro's Combined Data CSV File; therefore, no model input duplication is required when moving from Synchro to Tru-Traffic. The Tru-Traffic interface for Time-Space diagrams, as compared to Synchro, is far superior from a graphical standpoint, and also has several enhanced features such as offset optimization by sections of zone, directional weighting factors, and the ability to handle crossing arterials. Both of these diagrams help the designer develop offsets that provide maximum two-way arterial progression.

Tru-Traffic Time-Space Diagram



Tru-Traffic Platoon-Progression Diagram



City of Philadelphia

Urban provided the City of Philadelphia with comprehensive on-call services pertaining to planning, design, and implementation of traffic engineering and ITS related items. As part of the contract, Urban worked with the city to retime signals at over 150 signals ranging from existing individual signalized intersection to arterial corridors and urban grid networks. Urban complete retiming along the following eight corridors:

- Frankford Avenue – 5.9 miles, 43 signals
- Bartram Avenue – 1.7 miles, 8 signals
- Hunting Park Avenue West – 1.9 miles, 15 signals
- Hunting Park Avenue East – 2.6 miles, 18 signals
- Lindbergh Boulevard – 2.4 miles, 14 signals
- 5th Street – 2.0 miles, 17 signals
- Spruce Street – 2.4 miles, 24 signals
- Grant Avenue/Welsh Street – 5.1 miles, 18 signals

Data collection for the corridors included turning movement counts, automatic traffic recorders, GPS-based travel time, and field signal timings. We completed existing conditions calibration using Synchro 8 and SimTraffic, and signal timing optimization using a combination of Synchro/SimTraffic and Tru-Traffic. Tru-Traffic is the optimal tool used for developing arterial timing diagrams and optimizing offsets. We also prepared an after study report to document the improvement in travel times and reduction in vehicle emissions.

Arch Street Adaptive Signal Project, Greenwich, CT

Urban is working with the Town of Greenwich to develop a state-of-the-art adaptive signal control technology (ASCT) signal system to address the Town's most congested intersections. Today, the traffic along Arch Street frequently backs-up through multiple intersections and onto I-95 ramps and the mainline. Heavy pedestrian traffic to local businesses, exclusive pedestrian phasing at all project area intersections, and access to the Greenwich Metro-North train station exacerbates the congestion. To understand the underlying issues with the existing traffic signal system, Urban completed a comprehensive data collection program, including an O-D study using Bluetooth technology. To identify appropriate adaptive signal systems, Urban completed a systems engineering analysis, including the development of a concept of operations and system requirement report. As part of the traffic analysis, we created a Synchro/SimTraffic traffic model to evaluate the effects of changes to the existing signal system. Preliminary design is complete and semi-final design is anticipated to start in August 2016.

U.S. Route 1 Greenwich/Stamford Operational Improvements Study, Greenwich, CT

Urban completed a coordinated plan to improve traffic operations on Route 1, improve pedestrian safety, manage access, accommodate transit, and enhance the corridor's economic potential for the South Western Regional Planning Agency (SWRPA). A significant data collection effort took place throughout the corridor, including turning movement counts, travel time information, pedestrian/bicyclist counts, transit stops, queuing and vehicles processed. We developed a calibrated Synchro/SimTraffic model w for the 8-mile corridor, which spans two municipalities with more than 35 signalized intersections.

Ocean County Hooper Ave. (CR 549/631) Signal Optimization, Ocean County, NJ

Signal timing improvements that Urban developed at 39 intersections on CR 549/CR 631 (Hooper Ave./Brick Blvd.) in Brick and Toms River Townships, Ocean County, NJ, were recently implemented. The project entailed data collection, including GPS-based and Bluetooth travel time studies; field investigations, including MUTCD compliance analysis; updating (red-lining) signal plans; calibrating models; analyzing simulations for multiple peak periods; optimizing signals. Urban oversaw implementation and field adjustments, and provided post implementation analysis. In May 2015, the directives were implemented and after studies were completed.

SJTPO FY 2016 Local Safety & CMAQ Project Development, SJTPO, Atlantic and Cape May Counties, NJ

This project included the inventory and optimization of 40 signals along two corridors in Atlantic and Cape May Counties. Project tasks included the development of a detailed calibrated Synchro/SimTraffic model, vehicular and pedestrian clearance intervals, and optimized timing directives as well as field implementation, including fine tuning as necessary. The project also included the development of an intersection improvements report identifying potential benefits from changes at the intersections; e.g phasing, detection. GPS-clocks were installed at many of the 40 intersections to maintain coordination between the signals. The GPS-clocks and proposed signal timing directives were implemented in May 2016. The MPO, SJTPO, is currently utilizing the intersection improvement report and optimized model results to secure CMAQ funding for intersection improvements, including curb ramps, pedestrian signal heads, and controller upgrades.

SJTPO FY 2015 Local Safety & CMAQ Project Development, SJTPO, City of Vineland and Cumberland County, NJ

This project included the optimization of 39 signals in the City of Vineland and Cumberland County, New Jersey. Urban developed a detailed calibrated Synchro/SimTraffic model, vehicular and pedestrian clearance intervals, and t optimized timing directives. The project also entailed the development of an intersection improvements report identifying potential benefits of changes at the intersections; e.g. phasing, detection. We submitted a draft intersection improvement report and optimized simulation model and timings in April 2015. The MPO, SJTPO, has submitted the intersection improvement report and is awaiting CMAQ funding award for new curb ramps, pedestrian and vehicular signal heads, and controller upgrades.

Synchro and SimTraffic Training, Rutgers University, New Brunswick, NJ

Urban developed and presented a two-day Synchro and SimTraffic training course at Rutgers University's Center for Advanced Infrastructure and Transportation, in September 2013. NJDOT employees, Rutgers students, and consultants attended. The training covered multiple software tools, existing model calibration, problem solving and troubleshooting software tools, and production of a final product ready for field implementation. The training was spread out over several weeks to allow students to ask the instructors questions and work through pre-determined issues during the existing model calibration process, optimization, and final signal timing directive preparation. We provided a "homework" assignment to students.

Synchro and SimTraffic Training, Ocean County, NJ

Urban developed and presented a multi-day Synchro, SimTraffic, and signal optimization training course for Ocean County engineering staff in January 2016. The training included introduction and intermediate courses on Synchro and SimTraffic, and completed with general guidance on signal optimization from data collection to field implementation and fine tuning of signal timings. A "homework" assignment was provided to the students to complete between the training sessions to allow them to work at their own pace and ask questions along the way.

Fitzgerald & Halliday (FHI)

Stamford West Side Transportation Study, Stamford, CT

FHI led a study for the City of Stamford to develop policies and recommendations to improve multi-modal mobility within the West Side Neighborhood and to improve connections to the Stamford Intermodal Transportation Center and to the Downtown. Stamford's West Side neighborhood is the locus of significant redevelopment activity including a $450 million dollar expansion of Stamford Hospital, the designation of the Vita Health and Wellness District, a village commercial rezoning, and the creation of Mill River Park.

The West Side Transportation Study recognized the ongoing redevelopment activity and identify the key multi- modal transportation related constraints on economic and community development in the neighborhood.

The study embraced a collaborative approach that builds on previous planning studies and initiatives. FHI engaged stakeholders including residents, commuters, and businesses through a variety of outreach methods including public meetings and workshops, electronic surveys, and other means for public input. The study included the development of scenarios that will offer varied public infrastructure investment strategies for the neighborhood.

Stamford Bus and Shuttle System Study, Stamford, CT

FHI is the lead consultant for a multi- faceted study of public and private transportation services in Stamford, CT. The study begins with a detailed investigation of public and private shuttles, assessing impacts of the shuttle services on network operations and traffic circulation in and around the Stamford Transportation Center (STC) and providing governance and operating scenarios for efficient, coordinated delivery of transit service at the STC for employers and commuters. As scenarios are refined and advanced, more detailed analyses will test their potential against the existing network structure.

Following the initial focus on private shuttles and the potential for improvements to the current shuttle operations, the subsequent study phase will develop strategies to enhance additional components of the urban transit and transportation network including CTTransit services, roadway operations in the vicinity of the STC and along bus routes, last-mile connectivity improvements, and non-motorized access to, from and through the transportation center hub.

The study is conducted with support and participation from the Connecticut Department of Transportation, the City of Stamford, CTTransit, and the Stamford business community

RBA, Inc.

Port Authority of New York and New Jersey 2010-2013 Fall and 2016 Spring Data Collection Contracts

RBA conducted the 2010, 2011, 2012, and 2013 Fall and 2016 Spring Data Collection programs for the Port Authority of New York and New Jersey, which included counts of westbound Hudson River crossings each year, a bus study at the Lincoln Tunnel in 2010, 2012, and 2016, an HOV study at the Lincoln Tunnel, Holland Tunnel, and George Washington Bridge in 2010, 2011, 2012, 2013 and 2016, and a count of some eastbound crossings in 2011 and 2013. For this study, we utilized state of the art data collection techniques, including MioVision video imaging units for many of the counts. Said technology can count and classify bicycles and pedestrians, as well as motorcycles, cars, trucks, and buses. Specific work efforts also included conducting over Automatic Traffic Recorder (ATR) counts.

Statewide Machine and Manual Traffic Counts, MDSHA HISD (BCS 98-35A, BCS 98-19A, and BCS 2002-01, BCS 2004-09C, BCS 2007-22C)

RBA was awarded five (5) consecutive open-end State contracts with MDSHA to provide traffic data collection services. Work efforts included traffic volume counts, vehicle classification counts, turning movement counts, travel time studies, vehicle occupancy studies, and origin-destination studies. Work efforts include over 100 Automatic Traffic Recorder (ATR) counts, 50 Automatic Vehicle Classification (AVC) counts, and 50 manual turning movement counts per year. MioVision machines were used for their non-intrusive capabilities.

References

The following section contains references for Urban. Please see the Similar Past Projects Section on pages 23-29 for a detailed project description.

Reference	Associated Projects
Melissa Evans Traffic Operations Coordinator Town of Greenwich Department of Public Works 101 Field Point Road Greenwich, CT 06830 Phone: (203) 622-6487 Email: melissa.evans@greenwichct.org	**Arch Street Adaptive Signal Project** Contract value: $200,000 Duration: 2014 – present **Route 1 Signal Optimization** Contract value: $20,000 Duration: 2014 – 2016 **U.S. Route 1 Greenwich/Stamford Operational Improvements Study** Contract value: $374,000 Duration: 2009 - 2012
Mark Jehnke Traffic Engineer Ocean County Engineering Department 101 Hooper Avenue Toms River, NJ 08754 Phone: (732) 929-2183 Email: MJehnke@co.ocean.nj.us	**Ocean County Hooper Ave. (CR 549/631) Signal Optimization, Ocean County, NJ** Contract value: $270,000 Duration: 2014 – 2015 **Synchro and SimTraffic Training** Contract value: $5,000 Duration: 2015 to 2016
Rich Montanez, PE Traffic & Street Lighting Chief Engineer City of Philadelphia Traffic Engineering Division 1401 John F. Kennedy Blvd., Suite 900 MSB Phone: (215) 686-5515 Email: richard.montanez@phila.gov	**City of Philadelphia On-Call Traffic Engineering** Contract value: $800,000 Duration: 2014-2015

Reference	Associated Projects
Ahsan Ali, EIT Senior Engineer Bureau of Mobility and Systems Engineering New Jersey Department of Transportation 1035 Parkway Avenue Trenton, NJ 08625-600 Phone: 609-530-2938 Email: Ahsan.Ali@dot.nj.gov **Jeevanjot Singh, PMP** Principal Engineer, Traffic Contract Manager, SPR & ITS – Resource Center Transportation Systems Management New Jersey Department of Transportation Phone: 609-530-8327 Email: Jeevanjot.Singh@dot.nj.gov	**NJDOT Traffic Signal Optimization (Statewide)** Contract Value: $1,900,000 Duration: 2010-2014
Jennifer Marandino, PE Acting Executive Director South Jersey Transportation Planning Organization 782 South Brewster Road, Unit B6 Vineland, NJ 08361 Phone: (856) 794-1941 Fax: (856) 794-2549 Email: jmarandino@sjtpo.org **Andrew Tracy** Transportation Engineer South Jersey Transportation Planning Organization 782 South Brewster Road, Unit B6 Vineland, NJ 08361 Phone: (856) 794-1941 Fax: (856) 794-2549 Email: atracy@sjtpo.org	**FY 2016 Local Safety & CMAQ Project Development, SJTPO, Atlantic and Cape May Counties, NJ** Contract Value: $230,000 Duration: 2015-2016 **FY 2015 Local Safety & CMAQ Project Development, SJTPO, City of Vineland & Cumberland County, NJ** Contract Value: $193,000 Duration: 2014-2015

PROJECT ORGANIZATION AND STAFFING

PROJECT ORGANIZATION AND STAFFING

This section is comprised of the following:

- Team Overview and Qualifications
- Organizational Chart
- Key Staff Resumes
- Key Staff Connecticut State Certifications and Licenses

Urban has extensive experience in traffic engineering. Our signal system optimization and signal design projects date back more than 20 years, with projects at the municipal, county, and state levels. Urban worked on an open-end signal optimization contract with NJDOT between 2010 and 2014, during which we completed optimization on nine state arterial corridors with a total of more than 150 signalized intersections. Urban has completed similar signal optimization project for the Town of Greenwich, CT; City of Philadelphia, PA; Ocean County, NJ; and South Jersey Transportation Planning Authority (SJTPO). We have also provided in-classroom signal optimization software and methodology training to State, County, and private agencies. Urban has a passion for signal optimization projects and strives to provide the best possible signal timings based on client and location-specific needs.

Urban has added Fitzgerald & Halliday (FHI) to the team to lead the vital Public Involvement and Participation task. FHI staff have expertise in community planning and engagement, and provide unique perspectives and approaches to engaging the public and getting them involved in the project. The RBA Group will lead Data Collection task, which involves collecting data at over 200 intersections. RBA has over 30 Miovision Scount video data collection units and is experienced in collecting traffic data for large project areas.

New England Traffic Solutions (NETS) rounds out the team and will perform the Timing Implementation and Fine Tuning tasks. NETS is intimately familiar with the City of Stamford's signal system including signal equipment, signal controllers, central software management systems, traffic management video display center, and the fiber/copper communications network. Urban has also included CT Counts, RHS Consulting Design, and Rodriguez Consulting to assist with the data collection task. These firms add to our past experience with Stamford and data collection and give our Team a depth of resources likely unmatched by other firms. Below is a brief summary of the key staff experience.

Scott Diehl, PE, PTOE, AICP

Proposed **Project Manager** Scott J. Diehl, PE, PTOE has over 20 years of traffic engineering experience, including working with the Town of Greenwich on retiming the congested section of Route 1 as well as on the Arch Street Corridor Adaptive Signal System Project. In the last two years, Mr. Diehl has worked to improve the operations of over 250 signals throughout the region and has trained agency staff, including NJDOT, on best practices to follow in their retiming efforts. In addition to his work in NJDOT, Mr. Diehl has worked on signal timing projects in a number of states with municipalities, MPOs, and DOTs. He is currently completing Congestion Mitigation and Air Quality Improvement (CMAQ) projects that included signal timing improvements on two corridors (40 intersections) in Southern New Jersey.

Relevant Project Experience:

- Route 45 – 19 Signals over 6.3 Miles
- Route 9 – 30 Signals along 11.2 Miles
- Route 72 – 14 Signals along 7.9 Miles
- Route 30 – 12 Signals along 4.4 Miles
- Route 47 - 20 Signals along 9.1 Miles
- Route 206 - 12 Signals along 4.4 Miles
- Route 70 - 25 Signals along 11.9 Miles
- Route 47&9 - 7 Signals along 2.1 Miles

Christopher Burke, PE, PTOE

Proposed Deputy Project Manager and System Modeling Task Leader Christopher Burke, PE, PTOE has over 9 years of traffic engineering experience, including working directly with NJDOT staff as Deputy Project Manager on the NJDOT Signal Optimization contract. Mr. Burke was directly responsible for the analysis and optimization of over 150 signals on nine New Jersey state corridors. Mr. Burke is well-versed in all programs required for this assignment and has participated in the development and proctoring of Beginner, Intermediate, and Advanced Synchro training courses at Rutgers University, NJDOT, and Ocean County Engineering Department.

Relevant Project Experience:
- NJDOT Signal Optimization – 9 Corridors and over 150 signals
- Route 1, Greenwich Connecticut Signal Optimization – 7 signals (41 signals total in Corridor Study)
- County Route 549/631 Signal Optimization, Ocean County – 39 signals
- SJTPO FY 2016 Local Safety & CMAQ Project Development, Atlantic & Cape May Counties – 40 signals

Orla H. Pease, PE, PTOE

Proposed System Modeling Team Leader Ms. Pease, PE, PTOE has an extensive background in traffic operations and final signal design. She was project manager for the City of Philadelphia's efforts to retime signals across the City. Ms. Pease has also provided Synchro and SimTraffic modeling software training for Rutgers University and was an officially licensed Trafficware trainer for Synchro Studio.

Relevant Project Experience:
- City of Philadelphia On-Call Signal Optimization – 150 signals
- Woodland Avenue Traffic Signal Final Design and Transit Signal Priority - 26 signals
- NJ Route 42 – 12 signals along 6 miles

Ryan Walsh, AICP, PP

Proposed Public Involvement & Participation Task Leader Mr. Walsh has over 10 years of experience as a planner and public involvement specialist, and he has worked on transportation planning and public involvement projects across the country. He has experience conducting research for transportation programs as well as interviews and surveys for community planning initiatives. Mr. Walsh is certified to conduct planning charrettes by the National Charrette Institute, and has great facility in the use of on-line social media as an innovative tool for public involvement programs.

Relevant Project Experience:
- City of Stamford Westside Transportation Study
- Connecticut Department of Transportation Statewide Busy Study
- Hudson County, Jersey City/Hoboken Subregional Transportation Study

Michael L. Morehouse, PE

Proposed **Public Involvement & Participation Support** team member Mr. Morehouse is a Senior Project Manager for FHI with 22 years of experience in multimodal transportation planning and engineering, with an emphasis on transportation master planning for towns and cities looking to achieve sustainable outcomes. Mr. Morehouse specializes in bringing diverse interest groups together to address issues in consensus building efforts. His work has included identifying stakeholders, orchestrating and moderating public or stakeholders' meetings, charrettes and public workshops, newsletters, leadership of stakeholder groups, and project websites, as well as a variety of other public outreach applications. Mike is also a sought-after speaker on the topic of Complete Streets.

Relevant Project Experience:
- Boston Post Road Corridor Plan, Southeast CT
- Town of Greenwich Safety Study, CT
- West Hartford Road Diet and Safety Study, CT
- New Milford Transportation Management Plan, CT

Gordon Meth, PE, PTOE

Proposed **Data Collection Task Leader** Mr. Meth, Director of Traffic Engineering for The RBA Group, has 25 years of experience in traffic engineering and project management. Mr. Meth has expertise in data collection, traffic and parking analysis, traffic and parking design, pedestrian and bicycle accommodation, and traffic safety. Mr. Meth has significant experience using the Miovision Scout video collection units for collecting turning movement counts, mid-block directional classification or automatic traffic recorder (ATR) counts, and travel time studies. He frequently provides presentations and training to both public and private sector individuals, and has been an adjunct professor for Rutgers University, where he taught Transportation Engineering to undergraduates.

Relevant Project Experience:
- Port Authority of NY and NJ Fall Data Collection Program – 2010, 2011, 2012, 2013 and 2016
- Norwalk, CT Town-wide Data Collection and Synchro Network Development – 70 signals
- Somerset County, NJ Data Collection and Traffic Signal Optimization – 140 signals
- NJDOT Region North Traffic Signal Optimization – 150 signals

Claudio Vecchiarino, IMSA II

Proposed **Timing Implementation and Fine Tuning Task Leader** Mr. Vecchiarino has been in the transportation industry for over 25 years. He began his career in 1989, installing traffic signals for various contractors in CT. In 2011, Mr. Vecchiarino became part owner of New England Traffic Solutions and is responsible for overseeing and providing technical support on all projects. With over two decades of industry experience installing, managing, and supporting traffic signal systems in Connecticut, Mr. Vecchiarino will prove to be an invaluable asset on this signal system timing implementation project.

Relevant Project Experience:
- City of Stamford, In-House Controller Upgrades
- City of Stamford, IT Network Communication and Video Display Center
- City of Hartford ATMS.now Central Software Management System Upgrade
- New Haven Advanced Traffic Management System – 300+ intersections

Kevin Cramer, IMSA II

Proposed **Timing Implementation and Fine Tuning Support** team member Mr. Cramer has over 13 years of experience in the signal equipment and timing implementation industry. Mr. Cramer is IMSA Level II certified and will be responsible for implementation and fine-tuning for all signals, including keypad and direct timing implementations at the controllers and timing uploads into the ATMS.now and STDWIN central software management systems. Mr. Cramer has built, programmed, modified, and turned on over 400 signals in his 13 years in the transportation industry.

Relevant Project Experience:

- City of Stamford, In-house Controller Upgrades
- City of Stamford, IT Network Communication and Video Display Center
- City of Norwalk Advanced Traffic Management System – 70 Intersections
  New Haven Intersection Upgrade Project – 102 intersections

ORGANIZATION CHART

ORGANIZATION CHART

City of Stamford – Engineering Bureau
Veera Karukonda

Principal-In-Charge
Mark A. Kinnee, PE

Quality Assurance/Quality Control
Robert Talbot, PE

Project Manager
Scott J. Diehl, PE, PTOE

Deputy Project Manager
Christopher A. Burke, PE, PTOE

Public Involvement & Participation

Task Leader
Ryan Walsh, AICP, PP (FHI)

Staff
Ryan Walsh, AICP, PP ▲ (FHI)
Michael L. Morehouse, PE ▲ (FHI)
Christopher Henry, AICP (FHI)
Leslie Black (FHI)

KEY TASKS
- Public involvement and outreach
- Public input meetings and facilitation
- Stakeholder and TAG meetings
- Website development and management
- Virtual workshops
- Mailing lists

Data Collection

Task Leader
Gordon Meth, PE, PTOE (RBA)

Staff
Team 1 – Gordon Meth, PE, PTOE ▲ (RBA)
Jamey Jahr (RBA)
Team 2 – Carlos Cabral (CT Counts)
Team 3 – Rifat Saleh, PE (RHS Consulting)

KEY TASKS
- Miovision turning movement counts
- Miovision midblock classification counts
- GPS-based travel time runs
- Bluetooth travel time data
- Data processing
- Field signal timings & additional field data
- Intersection inventory

System Modeling

Task Leader
Christopher A. Burke, PE, PTOE

Staff
Team 1 – Christopher A. Burke, PE, PTOE ▲
Rob Macioce, PE, PTOE
Team 2 – Orla Pease, PE, PTOE ▲
Peter O'Halloran, PE, PTOE

KEY TASKS
- Existing conditions system models
- Model calibration
- Clearance calculations
- Signal phasing review
- Identify zones & Time-of-Day schedule
- Signal timing optimization
- VISSIM simulation analysis including TSP

Timing Implementation & Fine Tuning

Task Leader
Claudio Vecchiarino, IMSA II (NETS)

Staff
Claudio Vecchiarino, IMSA II ▲ (NETS)
Kevin Cramer, IMSA II ▲ (NETS)
Damin Scott, IMSA III (NETS)
Scott J. Diehl, PE, PTOE ▲

KEY TASKS
- Implementation Plan
- Signal timing implementation
- STDWIN & ATMS.now System Integration
- Trafficware/Naztec & PEEK signal timing implementation
- IMSA Level II and III Field certified
- Fine tuning
- On-call personnel 24/7

LEGEND
FHI = Fitzgerald & Halliday
RBA = The RBA Group
NETS = New England Traffic Solutions
▲ = Resume Included

RESUMES

Scott J. Diehl, PE, PTOE

Project Manager

URBAN ENGINEERS
Formulating Excellence

WHY SELECTED

- **Over 20 years of professional experience**
- **Extensive signal optimization experience**
- **Experience on similar projects**

REGISTRATIONS/ MEMBERSHIPS

- Professional Engineer NJ, DE, MD, CT, PA
- Professional Traffic Operations Engineer
- Institute of Transportation Engineers (ITE)
- IMSA Level I

EDUCATION

MCE, 1993, University of Virginia, Civil Engineering

BCE, 1991, University of Delaware, Civil Engineering

2016, IMSA Traffic Signal Technician Level I

2014, Computerized Traffic Signal Systems Workshop, CTDOT

2013, Tru-Traffic Training, Cherry Hill, NJ

2010, Dale Carnegie, Dale Carnegie Training

2009, JAMAR, Traffic Data Collection Training

2008, FHWA, Value Engineering Training Workshop

2008. Urban Engineers, Inc., Project Management Training

2007, NE Roundabout Design Course

2007, Rutgers University, NJDOT Traffic Signal Design Course

2004, PTV, advanced VISSIM Training

2003, Traffic Control Coordinator, Course #314

2001, Trafficware, Advanced SYNCHRO and SimTraffic training

RECORD OF PROFESSIONAL EXPERIENCE

Mr. Diehl has an extensive background in both transportation engineering and transportation planning. As Department Manager, his primary responsibility includes developing and supervising traffic studies for various types of projects, as well as overall project responsibility. Projects typically range from small-scale traffic impact, intersection, and highway feasibility studies to detailed analysis and design of entire transportation systems with the integration of land use planning. He is proficient in the use of various traffic analysis and simulation software packages including HCS and Synchro/SimTraffic and his extensive simulation experience led to his involvement in the beta testing of various traffic analysis software products. Highlights of Mr. Diehl's relevant experience include:

Route 1 Signal Optimization, Town of Greenwich, CT – Project Manager responsible for developing and implementing signal timing improvements on sections of Route 1 in the Town of Greenwich, CT. Project included updating signal plans and developing signal timing plans for multiple time periods. Additionally, the project included conversion of pedestrian operation from exclusive to concurrent. Project include data collection, development of detailed calibrated Synchro/SimTraffic models for multiple peak hours, vehicular and pedestrian clearance intervals, development of optimized signal timing directives, revised signal plans, results summary, and submission to CTDOT. Post implementation analysis to be conducted will evaluate and fine tune the signal timings.

NJDOT Traffic Signal Optimization Contract, New Jersey Department of Transportation – Project Manager responsible for a series of corridor signal optimization projects as part of a New Jersey Department of Transportation open-end contract. Project includes comprehensive data collection coordination efforts, development of detailed calibrated Synchro/SimTraffic models for multiple peak hours, vehicular and pedestrian clearance intervals, development of optimized signal timing directives, review of implementation and adjustments if needed and final report preparation. Post implementation analysis was also conducted to evaluate and fine tune the signal timings. Corridors analyzed include:

- Route 42: Monroe & Washington Townships, 6 miles and 12 signals
- Route 45: Mantua and Deptford Townships, 7 miles and 19 signals
- Route 30: Galloway Township and Absecon City, 4.3 miles and 12 signals
- Route 72: Stafford Township and Ship Bottom, 8.5 miles and 14 signals
- Route 9: Atlantic County, 11 miles and 30 signals
- Route 47: Cumberland County, 9 miles and 20 signals
- Route 206: Somerset County, 5 miles and 12 signals
- Route 70: Camden and Burlington County, 12 miles and 30 signals
- Rt. 47 and Rt. 9: Cape May County, 2 crossing corridors, 2 miles, 7 signals

Of particular note is the Route 72 corridor, where travel times for this shore route where reduced from over 45 minutes to less than 16 minutes during the peak periods representing over a 65% reduction in travel times.

CR 549/CR 631 Traffic Signal Optimization Contract, Ocean County, NJ – Project Manager responsible for this recently completed signal optimization project (39 signals) along one of Ocean County's most congested corridors. The project included comprehensive data collection efforts, development of detailed calibrated Synchro/SimTraffic models for multiple peak hours, vehicular and pedestrian clearance intervals, development of optimized signal timing directives, review and fine tuning of timings during implementation and final report preparation. Post implementation analysis was conducted to evaluate the signal timing changes. Final Timing directives were approved April 2015 with implementation completed in early May.

FY 2016 Local Safety & CMAQ Project Development, Atlantic and Cape May Counties, NJ – Project Manager responsible for this recently completed project which includes signal optimization and intersection evaluation of 40 signals for two corridors in Atlantic and Cape May Counties. Tasks include the development of a detailed calibrated Synchro/SimTraffic model, vehicular and pedestrian clearance intervals, development of optimized timing directives, and field implementation including fine tuning as necessary. The project also includes the development of an intersection improvements report identifying potential benefits of changes at the intersections including (e.g., phasing, detection, etc.). A draft intersection improvement report and optimized simulation model was submitted in January 2016. The MPO, SJTPO, is currently utilizing the intersection improvement report and optimized model results to secure CMAQ funding for intersection improvements including curb ramps, pedestrian signal heads, and controller upgrades.

FY 2015 Local Safety & CMAQ Project Development, SJTPO, City of Vineland and Cumberland County, NJ – Task Manager responsible for the optimization of 39 signals for this on-going project in the City of Vineland and Cumberland County. Task includes development of a detailed calibrated Synchro/SimTraffic model, vehicular and pedestrian clearance intervals, and the development of optimized timing directives. The project also includes the development of an intersection improvements report identifying potential benefits of changes at the intersections including (e.g., phasing, detection, etc.). A draft intersection improvement report and optimized simulation model and timings were submitted in April 2015. The MPO, SJTPO, has submitted the intersection improvement report and is awaiting CMAQ funding award for new curb ramps, pedestrian and vehicular signal heads, and controller upgrades.

Arch Street Adaptive Signal Control Technology, Town of Greenwich, CT – Project Manager with the Town of Greenwich on developing a state-of-the-art adaptive signal control technology (ASCT) signal system to address the Town's most congested intersections. The project includes signal design at seven intersections in the Town of Greenwich in and around the interchange of I-95 and Arch Street, and signal system integration into a central traffic management software program operated from the Town's Traffic Operations Center (TOC). As part of the project, Systems Engineering documents following FHWA Model Systems Engineering Documents for Adaptive Signal Control Technology (ASCT) Systems were prepared and approved by FHWA and CTDOT. The documents included Concept of Operations, System Requirements, Verification Plan and Validation Plan. Additionally, responsible for preparing an RFP for the selection of the adaptive vendor. The RFP has been approved by FHWA and CTDOT and is to be issued shortly. The project is completing Preliminary Design with Semi-Final and Final Design anticipated to be completed by the end of 2016.

Synchro and Signal Optimization Training, New Jersey Department of Transportation – Assisted in development and presentation of an advanced level signal optimization training course provided to NJDOT staff at the Trenton, NJ headquarters, as requested by the NJDOT Bureau of Mobility and Systems Engineering division. The training including using multiple software tools, existing model calibration, problem solving and troubleshooting software tools, "homework" assignments, and producing a final product ready for field implementation. The training was spread out over several weeks to allow students to ask the instructors questions and work through pre-determined issues during the model calibration process, optimization, and final signal timing directive preparation.

The overall process includes setting up a Synchro model with accurate geometry, signal timings and traffic volumes, followed by SimTraffic calibration using field measured travel time and queuing data. Optimization methodology included clearance calculations, zone partitioning, time-of-day schedule preparation, cycles/splits/offsets optimization, Synchro/SimTraffic analysis, and NJDOT signal timing directive preparation. The Tru-Traffic program is utilized to help develop arterial offsets by using the programs user-friendly Time-Space and Platoon-Progression diagrams.

Synchro and SimTraffic Training, Rutgers University Center for Advanced Infrastructure and Transportation, New Brunswick, NJ – Assisted in the development and co-instructed Synchro and SimTraffic training course taught by Urban Engineers at Rutgers University in 2008 and 2009. Three different classes (beginner, intermediate and advanced) were prepared and presented over two-day period. The classes were taught on multiple occasions.

Citywide Retiming Initiative, City of Philadelphia Streets Department, Philadelphia, PA - Project includes signal retiming along 16 corridors across the city encompassing 261 signals over 37 miles of city roadways. The project was part of a citywide, ARLE and CMAQ-funded retiming initiative to improve corridor travel times and reduce congestion and delay. The project included manual turning movement counts, ATRs, collection of travel time data, existing conditions inventory, Synchro/SimTraffic modeling, preparation of work orders, and an after study to be included in a final report. Mr. Diehl's responsibilities included Qa/Qc all deliverables and final field implemented timings.

Christopher A. Burke, PE, PTOE

Deputy Project Manager | System Modeling Team Leader

URBAN ENGINEERS

WHY SELECTED

- **Extensive signal optimization experience**
- **Provided Synchro, SimTraffic, and Signal Optimization Training**
- **Field Implementation**

REGISTRATIONS/ MEMBERSHIPS

Professional Engineer, NJ

Professional Traffic Operations Engineer (PTOE)

Institute of Transportation Engineers, Mid-Atlantic Section

Intelligent Transportation Society of New Jersey (ITSNJ)

County and Municipal Traffic Engineers Association (CAMTEA)

IMSA Level I

EDUCATION/CONFERENCES

BS Civil Engineering, 2006, Rowan University, Glassboro, NJ

MS Civil Engineering, 2007, Rowan University, Glassboro, NJ

2016, IMSA Traffic Signal Level I Certification, Bordentown, NJ

2015, Project Management Training, Urban Engineers

2015, Highway Capacity Analysis (HCS) 2010 Training, McTrans, NJDOT, Ewing Twp, NJ

2014, Computerized Traffic Signal Systems Workshop, CTDOT

2014, Systems Engineering for Signal Systems Including Adaptive Control, Cherry Hill, NJ - NJDOT

2013, Tru-Traffic Training, Cherry Hill, NJ

2013, Adaptive Signal Control Technology Training, CTDOT

2013, PTV VISTRO Training, Newark, NJ

2011, Engineer Ethics: Professional Engineer's Challenge, Urban Engineers

2008, Synchro 7 Studio Training, Trafficware

RECORD OF PROFESSIONAL EXPERIENCE

Mr. Burke's experience includes nine years of traffic operations and various aspects of engineering design. His primary responsibilities and past experience include traffic operations studies including signal optimization, traffic impact studies, corridor studies, toll facility operations, transit operations and three-dimensional simulation videos illustrating traffic operations using VISSIM. He is proficient with computer software such as Synchro 8, SimTraffic 8, HCS+, Tru-Traffic, AutoCAD, Camtasia Studio, and Microsoft Office and has a working knowledge of MicroStation. Highlights of Mr. Burke's relevant experience include:

Route 1 Signal Optimization, Town of Greenwich, CT – Deputy Project Manager responsible for developing and implementing signal timing improvements on sections of Route 1 in the Town of Greenwich, CT. Project included updating signal plans and developing signal timing plans for multiple time periods. Additionally, the project included conversion of pedestrian operation from exclusive to concurrent. Project included data collection, development of calibrated Synchro/SimTraffic models for multiple peak hours, vehicular and pedestrian clearance intervals, optimized signal timing plans, revised signal plans, results summary, and submission to CTDOT.

NJDOT Traffic Signal Optimization Contract, New Jersey Department of Transportation – Deputy Project Manager assisting corridor signal optimization project as part of a New Jersey Department of Transportation open-end contract. Responsibilities include assisting in data collection coordination efforts, development of detailed calibrated Synchro/SimTraffic models for multiple peak hours, vehicular and pedestrian clearance intervals, development of optimized signal timing directives, and final report preparation. Post implementation analysis was also conducted to evaluate the signal timing changes and fine tune as necessary. Corridors analyzed include:

- Route 42: Monroe & Washington Townships, 6 miles and 12 signals
- Route 45: Mantua and Deptford Townships, 7 miles and 19 signals
- Route 30: Galloway Township and Absecon City, 4.3 miles and 12 signals
- Route 72: Stafford Township and Ship Bottom, 8.5 miles and 14 signals
- Route 9: Atlantic County, 11 miles and 30 signals
- Route 47: Cumberland County, 9 miles and 20 signals
- Route 206: Somerset County, 5 miles and 12 signals
- Route 70: Camden and Burlington County, 12 miles and 30 signals
- Route 47 & 9: Cape May County, 2 crossing corridors, 2 miles, 7 signals

CR 549/CR 631 Traffic Signal Optimization Contract, Ocean County, NJ – Deputy Project Manager for an on-going corridor signal optimization project (39 signals) along one of Ocean County's most congested corridors. Project includes comprehensive data collection efforts, development of detailed calibrated Synchro/SimTraffic models for multiple peak hours, vehicular and pedestrian clearance intervals, development of optimized signal timing directives, review of implementation, and fine tuning as needed. Final Timing directives were approved April 2015 with implementation was completed in May 2015.

Synchro and Signal Optimization Training, Ocean County Engineering Department, NJ – Mr. Burke was invited by Ocean County to developed and present a multi-day training course on Synchro, SimTraffic and traffic signal system optimization to Ocean County engineering staff. The training included introduction and intermediate courses on Synchro and SimTraffic, and completed with general guidance on signal optimization from data collection to field implementation and fine tuning of signal timings. A "homework" assignment was provided to the students to complete between the training sessions to allow them to work at their own pace and ask Mr. Burke any questions along the way.

SJTPO FY 2016 Local Safety & CMAQ Project Development, SJTPO, Atlantic and Cape May Counties, NJ – Deputy Project Manager for the inventory and optimization of 40 signals for this recently completed project in the Atlantic and Cape May Counties. Task includes development of a detailed calibrated Synchro/SimTraffic model, vehicular and pedestrian clearance intervals, development of optimized timing directives, and field implementation including fine tuning as necessary. The project also includes the development of an intersection improvements report identifying potential benefits of changes at the intersections including (e.g., phasing, detection, etc.). GPS-clocks were installed at many of the 40 intersections to maintain coordination between the signals. Implementation of the GPS-clocks and proposed signal timing directives occurred in May 2016. The MPO, SJTPO, is currently utilizing the intersection improvement report and optimized model results to secure CMAQ funding for intersection improvements including curb ramps, pedestrian signal heads, and controller upgrades.

FY 2015 Local Safety & CMAQ Project Development, SJTPO, City of Vineland and Cumberland County, NJ – Deputy Project Manager responsible for the optimization of 39 signals for this on-going project in the City of Vineland and Cumberland County. Task includes development of a detailed calibrated Synchro/SimTraffic model, vehicular and pedestrian clearance intervals, and the development of optimized timing directives. The project also includes the development of an intersection improvements report identifying potential benefits of changes at the intersections including (e.g., phasing, detection, etc.). A draft intersection improvement report and optimized simulation model and timings were submitted in April 2015. The MPO, SJTPO, has submitted the intersection improvement report and is awaiting CMAQ funding award for new curb ramps, pedestrian and vehicular signal heads, and controller upgrades.

Arch Street Adaptive Signal Control Technology, Town of Greenwich, CT – Transportation Engineer responsible for organizing data collection, crash data analysis, vehicle and pedestrian clearance intervals, FHWA Model Systems Engineering Documents for Adaptive Signal Control Technology (ASCT) Systems, and assisting in adaptive vendor RFI and RFP document development and final vendor selection. The extensive data collection effort included turning movement counts, travel time, queuing, and origin-destination data using Bluetooth readers. Systems Engineering documents followed the FHWA format including Concept of Operations, System Requirements, Verification Plan and Validation Plan. The Arch Street signal system will be integrated into a central traffic management software program operated from the Town's Traffic Operations Center (TOC). Traffic operations analysis was completed using Synchro 8 for Existing Conditions and for developing Optimized timing plans as backup if the adaptive system temporarily fails. Mr. Burke was also responsible for the Preliminary Engineering Report.

Synchro and Signal Optimization Training, New Jersey Department of Transportation – Assisted in development and presentation of an advanced level signal optimization training course provided to NJDOT staff at the Trenton, NJ headquarters, as requested by the NJDOT Bureau of Mobility and Systems Engineering division. The training including using multiple software tools, existing model calibration, problem solving and troubleshooting software tools, "homework" assignments, and producing a final product ready for field implementation. The training was spread out over several weeks to allow students to ask the instructors questions and work through pre-determined issues during the existing model calibration process, optimization, and final signal timing directive preparation.

The overall process includes setting up a Synchro model with accurate geometry, signal timings and traffic volumes, followed by SimTraffic calibration using field measured travel time and queuing data. Optimization methodology included clearance calculations, zone partitioning, time-of-day schedule preparation, cycles/splits/offsets optimization, Synchro/SimTraffic analysis, and NJDOT signal timing directive preparation. The Tru-Traffic program is utilized to help develop arterial offsets by using the programs user-friendly Time-Space and Platoon-Progression diagrams.

Synchro and SimTraffic Training, Rutgers University Center for Advanced Infrastructure and Transportation, New Brunswick, NJ – Assisted in the development of a two-day Synchro and SimTraffic training course taught by Urban Engineers at Rutgers University in November 2009. Responsible for developing class files for students including Synchro files, signal plans, timing directives, and turning movement counts for beginner, intermediate and advanced levels. Mr. Burke also participated as an instructor for the training.

Citywide Retiming Initiative, City of Philadelphia Streets Department, Philadelphia, PA - Project includes signal retiming along 16 corridors across the city encompassing 261 signals over 37 miles of city roadways. The project was part of a citywide, ARLE and CMAQ-funded retiming initiative to improve corridor travel times and reduce congestion and delay. The project included manual turning movement counts, ATRs, collection of travel time data, existing conditions inventory, Synchro/SimTraffic modeling, and an after study.

Orla H. Pease, PE, PTOE

System Modeling

URBAN ENGINEERS
Formulating Excellence

WHY SELECTED

- **14 years of professional experience**

REGISTRATIONS/ MEMBERSHIPS

- Professional Engineer CT, DE, MD, NJ, PA
- Professional Traffic Operations Engineer
- Institute of Transportation Engineers, Mid-Atlantic Section (MASITE)
- Traffic Engineering Council Executive Committee (ITE)

EDUCATION

ME, 1999, University College, Cork, Ireland, Engineering

BE, 1998, University College, Cork, Ireland, Civil & Environmental Engineering

2009, JAMAR Technologies, ATR, AVC, TMC Training

2009, ATSSA, New Jersey Certified Flagger

Certificate, 2008, Urban Engineers, Inc., Project Management Training

2007, Rutgers, NJ Traffic Signal Design Course

2006, Penn State, Traffic Engineering and Safety Conference

2005, Roundabout Design

2004, VISSIM Software Training

2002, VISSIM Software Training

2002, Georgia Tech, Traffic Signal Workshop: Signalized Intersections

2001, University of Maryland, Traffic Signal Timing

2001, FHWA, NEPA Project Development and Section 4(f)

2001, SYNCHRO/SIM TRAFFIC Software Training by Trafficwa

2001, ASHE Bicycle Analysis and Integration

2001, ASHE, Traffic Calming Guidelines

2000, Lehigh University, Highway Capacity Analysis

RECORD OF PROFESSIONAL EXPERIENCE

Ms. Pease has an extensive background in both traffic operations and final design studies. Her primary responsibilities and past experience include transportation planning and analysis; traffic impact and highway access studies; context-sensitive solutions; environmental document preparation; analysis of transportation systems; preliminary and final traffic signal design. Ms. Pease also has extensive experience in transportation planning and analysis using the simulation tool Synchro/SimTraffic and has provided traffic analysis training at local, state and national level. Ms. Pease's experience includes:

Citywide Retiming Initiative, City of Philadelphia Streets Department, Philadelphia, PA – Ms. Pease is the Project Manager for the project, whose responsibilities include overall project management, coordination with the City of Philadelphia, project scheduling, staff assignments, review and approval of Synchro, SimTraffic and clearance calculation deliverables, and development of optimized timing plans. The Project includes signal retiming along the following eight corridors across the City of Philadelphia:

- Frankford Avenue – 5.9 miles, 43 signals
- Bartram Avenue – 1.7 miles, 8 signals
- Hunting Park Avenue West – 1.9 miles, 15 signals
- Hunting Park Avenue East – 2.6 miles, 18 signals
- Lindbergh Boulevard – 2.4 miles, 14 signals
- 5th Street – 2.0 miles, 17 signals
- Spruce Street – 2.4 miles, 24 signals
- Grant Avenue/Welsh Street – 5.1 miles, 18 signals

The project was part of a citywide, ARLE and CMAQ-funded retiming initiative to improve corridor travel times and reduce congestion and delay. The project includes manual turning movement counts, ATRs, collection of travel time data, existing conditions inventory, Synchro/SimTraffic modeling, preparation of work orders, and an after study to be included in a final report.

Citywide Intersection Modifications, City of Philadelphia Streets Department, Philadelphia, PA – Project includes safety improvements at eight intersections across the City of Philadelphia. The safety improvements included bump-outs, signal enhancements and ADA improvements. This project received ARLE Grant funding. Package one, which included the first four intersections is anticipated to begin construction in the summer of 2014. Ms. Pease is the Project Manager on the project, whose responsibilities includes overall project management, coordination with the City of Philadelphia, project scheduling, staff assignments, plan review, signal design and signing and striping.

Traffic Signal Optimization Project, NJDOT, Statewide, NJ – Project includes signal retiming based on hourly, daily and seasonal variations along nine corridors across New Jersey including Rt 42, Monroe and Washington Townships, 6 miles, 12 signals. This project is a part of a NJDOT open-end contract includes manual turning movement counts, collection of travel time data, existing conditions inventory, Synchro/SimTraffic modeling, TruTraffic bandwidth analysis, and related documentation. Revised signal directives are prepared for multiple time frames for each corridor and after implementation an after study is performed. Ms. Pease was a Corridor Manager on the Route 42 project, whose responsibilities included: coordination of the data collection effort (Automatic traffic Recorders, turning movement counts and GPS-based travel time information), development of detailed calibrated SimTraffic models for multiple peak hours, and development and implementation of optimized signal timings. (2010-Current)

Atlantic Avenue and Pacific Avenue Traffic Signal Upgrades and One-Way Conversion Project, Atlantic City, NJ - Traffic Engineer for this fast-tracked large signal upgrade project in Atlantic City, NJ. This project will convert the two primary corridors through the city, from two-way to one-way operation; upgrade/replace signal equipment for 110 signalized intersections; provide new signal timing programs for six time periods; transit pre-emption; signal coordination; and interconnect to a new traffic operations center. Responsible for coordination of the large data collection effort, including intersection turning movement counts, travel time data, ATR data, and operational observations. Additionally responsible for the development of a calibrated Synchro/SimTraffic network for most of the city grid, including the primary approach highways. This network will be used to examine and report the benefits of the one-way operations using such "measures of effectiveness" including delay, level of service, travel times, average speeds, and vehicle emissions. The models will be used to develop the final timing programs which will be implemented following signal construction.

Traffic Sign System Upgrade Phase III, City of Norwalk, CT – Project manager responsible for providing services for the survey, engineering design, signal system timing updates, preparation of construction documents, and services during construction for Phase III of the Norwalk Traffic Signal System Upgrade. The proposed improvements include, traffic signal timing, installation of new and/or upgrade of existing traffic control signal equipment, fiber optic communications for signal interconnect, video detection, system integration, emergency pre-emption, and ADA compliant ramps.

Route 1 Greenwich-Stamford Operational Improvements Plan Project, CT- The purpose of this project is to develop a coordinated plan to improve traffic operations on Route 1; improve pedestrian safety; manage access; accommodate transit; and enhance the corridor's economic potential. As project Traffic Engineer, primary responsibilities include review of past studies; coordination of traffic data collection efforts; development and calibration of a corridor Synchro/SimTraffic model; analysis of existing conditions; identification of deficiencies; and evaluation of proposed alternatives.

Synchro and SimTraffic Software Training, Beginners, Intermediate and Advanced, Rutgers University, NJ - Invited instructor responsible for development of a one day Intermediate training classes in signal timing using Synchro/SimTraffic Traffic analysis software Version 8 for the NJDOT and New Jersey Institute of Technology, New Jersey.

Trafficware - Synchro and SimTraffic Software Trainer - Trafficware instructor responsible for providing three day Level I and Level II hands-on training classes on an as needed basis, in the use of Synchro and SimTraffic Traffic analysis software. As an instructor, she was solely responsible for delivering the training classes to groups of approximately 20 students, in multiple locations across the US.

Pennsylvania State University, Transportation Engineering Safety Conference, SimCap Workshop, – developed and presented four hour workshop with co-presenters on the methods and best practices for model calibration.

Pennsylvania Turnpike Northeast Extension (A31-38) Reconstruction, PA - The project includes preliminary design and future reconstruction and widening of the Northeastern Extension of the Pennsylvania Turnpike (I-476) north of the Lansdale Interchange to north of Clump Road between Milepost A31 and A38. The seven-mile project corridor traverses Lower Salford, Franconia, ans Salford Townships in Montgomery County. The project includes the replacement of 9 bridges and the development and evaluation of detour routes for four overhead bridge replacement projects. Ms Pease was the lead Traffic Engineer responsible for the development and evaluation of detour routes for four overhead bridge replacement projects. A detailed traffic analysis report was developed for each route to assess the potential impacts, and recommend appropriate mitigation. The project also includes development of traffic control plans for the staged construction of Harleysville Pike (PA 113) bridge replacement

RYAN WALSH, AICP, PP, LEED GA

PUBLIC INVOLVEMENT & PARTICIPATION TASK LEADER

OVERVIEW

As a planner and public involvement specialist, Ryan has worked on transportation planning and public involvement projects across the country. He has experience conducting research for transportation programs as well as interviews and surveys for community planning initiatives. Ryan is certified to conduct planning charrettes by the National Charrette Institute, and has great facility in the use of on-line social media as an innovative tool for public involvement programs.

EDUCATION

- University of Oregon, Bachelor of Science, Geology and Environmental Studies, 2001
- Columbia University Graduate School of Architecture, Planning, and Preservation, Master of Science, Urban Planning, 2007

PROFESSIONAL AFFILIATES

- LEED Green Associate, 2013
- New Jersey Professional Planner (PP), 2012
- American Institute of Certified Planners (AICP), 2009
- Member, American Planning Association, 2005-ongoing

YEARS EXPERIENCE

- 2.5 Year with firm
- 10 Years in industry

PROJECT EXPERIENCE

NASSAU COUNTY BALDWIN DOWNTOWN COMMERCIAL CORRIDOR STUDY | 2016 - ONGOING

Ryan is serving as FHI's Project Manager for a downtown corridor study in the Hamlet of Baldwin, in Nassau County, Long Island. The study, a recommendation of a preceding NY Rising post-Hurricane Sandy effort, seeks to improve economic development opportunities and make improvements to the local transportation network via complete streets improvements on the Hamlet's central commercial corridor. Ryan is overseeing public involvement for the study and assisting with the development and review of complete streets concepts for the corridor.

CONNECTICUT DEPARTMENT OF TRANSPORTATION STATEWIDE BUS STUDY | 2016 - ONGOING

Ryan is leading the public and stakeholder involvement for a statewide study that will provide an understanding of the current and future direct, fixed route transit travel needs of the state's residents and employees, and provide recommendations to better align the existing bus system to meet these needs while providing the planning framework for a more interconnected and user-friendly multi-modal transit network that supports economic growth and environmental goals. To that end, Ryan is planning and facilitating a series of online virtual workshops that will allow bus riders from around the state to participate in interactive exercises and provide input on Connecticut's bus system.

CITY OF STAMFORD WESTSIDE TRANSPORTATION STUDY | 2014 - 2015

For the City of Stamford, Ryan assisted on a study to develop policies and recommendations that will improve multi-modal mobility within the West Side neighborhood of Stamford as well as connectivity to the Stamford Intermodal Center and the Downtown. In support of this effort, Ryan conducted data collection, land use and bicycle and pedestrian network analysis, and development of transportation investment scenarios. Ryan also coordinated and facilitated stakeholder outreach for this project.

MORRIS COUNTY CIRCULATION ELEMENT | MORRIS COUNTY, NJ | 2014-ONGOING

Morris County has embarked on an update of the Circulation Element of its Master Plan. As part of this effort, Ryan served as Task Leader for the analysis of Bicycle and Pedestrian conditions within the county. In this capacity, Ryan has reviewed relevant bicycle and pedestrian plans at the municipal, county and state level; cataloged existing conditions including current bicycle usage in the county using Strava user data; and reported on the policies and best practices that will benefit or otherwise impact Morris County's bicycle and pedestrian planning efforts going forward. Ultimately Ryan will make recommendations regarding investment in bicycle infrastructure in the County. Ryan also assisted with public and municipal outreach for the project.

PRIOR TO JOINING FHI

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP) LOCAL POLICIES AND PRACTICES THAT SUPPORT SAFE PEDESTRIAN ENVIRONMENTS | 2010-2012

For the NCHRP study, Local Policies and Practices that Support Safe Pedestrian Environments, Ryan researched the regulatory, financial, and administrative tools used by communities to provide safe, pedestrian friendly environments. Ryan performed a literature review of existing ordinances, policies, and guidelines from across the United States; interviewed professionals engaged in these practices; and prepared case studies that reflect best practices across a range of contexts and development conditions, and involve a variety of tools including engineering and design guidelines, land development regulations, operations, maintenance, and enforcement tools. The report was published in August 2012.

HUDSON COUNTY JERSEY CITY/HOBOKEN SUBREGIONAL TRANSPORTATION STUDY | 2010-2011

Ryan led the public outreach on a multi-jurisdictional transportation study for Hudson County, New Jersey. The study resulted in recommendations for increasing safety for pedestrians, bicyclists, drivers, transit users, and improving connections in a developing area between the cities of Jersey City and Hoboken. Ryan planned a series of large public meetings to engage stakeholders and involve the public in all stages of the study's development, from visioning to final recommendations. Ryan facilitated small group, subject-focused discussions on transit, bicycle and pedestrian issues, and auto traffic.

BARTLETT PLACE, PROJECT IMPACT REPORT, BOSTON, MA | 2012

Ryan assisted in accurately modeling the existing network of roadways and intersections, analyzed and identified congestion issues within the study area of a large mixed-use development project with over 300 residential units, 27,000 square feet of commercial office space and 27,000 square feet of ground floor retail space. Ryan modeled the build and no build conditions of the study area, and evaluated how various roadway improvements could mitigate the traffic impacts or the residential, commercial and office mixed use development in the Roxbury neighborhood of Boston. The Project Impact Report was approved and the development is currently under construction.

75 BRAINERD STREET, PROJECT IMPACT REPORT, BOSTON, MA | 2012

Ryan assisted on a traffic impact report for proposed residences in the Allston neighborhood of Boston. Ryan accurately modeled the existing network of roadways and intersections. Ryan also modeled the build and no build conditions of the study area, and recommended mitigation to the study area intersections. The Project Impact Report was approved and the development has been constructed.

PUBLICATIONS AND PRESENTATIONS

- Presenter, "Airports, Noise, and Local Communities," 2016 APA Annual Meeting, Phoenix, AZ, American Planning Association, 04/03/16.
- Presenter and Moderator, "Green Infrastructure and Resiliency," 2015 APA Annual Meeting, Seattle, WA, American Planning Association, 4/19/15.
- Presenter, "Online Outreach Tools for Public Engagement," Transportation Research Board Annual Meeting, Washington, D.C., 01/12/15
- Presenter, "Library Partnerships for Public Involvement," Poster Session, APA Annual Meeting. Atlanta, Georgia, American Planning Association, 04/28/2014.

MICHAEL MOREHOUSE, PE

PUBLIC INVOLVEMENT AND PARTICIPATION

OVERVIEW

Mr. Morehouse is a Senior Project Manager with 22 years of experience in multimodal transportation planning and engineering, with an emphasis on transportation master planning for towns and cities looking to achieve sustainable outcomes.

TRANSPORTATION PLANNING AND ENGINEERING
Mr. Morehouse has managed multi-modal and multi-disciplinary transportation planning studies of all types and sizes. Mike has extensive experience dealing with complex technical issues while developing visionary and consensus-based solutions to each project. He has a thorough understanding of the relationships between land use and transportation, and is an advocate for sustainable transportation systems. Mike has both technical proficiency and broad-based planning and decision-making skills to support the development of reasonable and implementable solutions to transportation and community design projects.

CONECPTUAL DESIGN AND VISUALIZATION
Mr. Morehouse has an extensive background in traffic engineering analysis and concept design. Mike offers a comprehensive perspective of traffic engineering as it relates to livable communities and human safety. This perspective values the relationship between mobility and place making. Using Sketchup and other illustration tools, Mike is able to help communities visualize transportation improvements and their relationship to the built and natural environment. Mike also uses 3D traffic microsimulation modeling to show how people and vehicles respond to changes in transportation systems.

PUBLIC INVOLVEMENT
Mr. Morehouse specializes in bringing diverse interest groups together to address issues in consensus building efforts. His work has included identifying stakeholders, orchestrating and moderating public or stakeholders' meetings, charrettes and public workshops, newsletters, leadership of stakeholder groups, and project websites, as well as a variety of other public outreach applications. Mike is also a sought-after speaker on the topic of Complete Streets.

EDUCATION
- B.S. Civil Engineering, University of Connecticut, 1993

PROFESSIONAL REGISTRATIONS
- Registered Professional Engineer – Connecticut 1999

PROFESSIONAL AFFILIATIONS
- National Complete Streets Coalition Speakers' Bureau
- Institute of Transportation Engineers (ITE) – CT Chapter Past President
- University of Connecticut Civil Engineering Advisory Board
- ACEC Government Affairs Committee
- Association of Pedestrian and Bicycle Professionals

YEARS EXPERIENCE
- 8 Years with firm
- 22 Years in Industry

RECENT PROJECT EXPERIENCE

I-84 VIADUCT PROGRAM MANAGEMENT | CT | 2012-ONGOING
FHI is a member of the Program Management Team selected to advance the planning, design and construction of a replacement alternative for the aging I-84 Viaduct in Hartford, CT. This will be a project spanning the course of several years and will involve intensive engineering evaluation, environmental review, public outreach, and design and construction coordination. Mr. Morehouse is the Project Manager for FHI and part of the project management team working with CTDOT. Mike is responsible for leading the project's outreach efforts, and is lead

facilitator for the project's Advisor Committee. Other activities that Mike is managing include environmental planning, traffic and transportation analysis, and Complete Streets integration into the Alternatives Analysis.

BOSTON POST ROAD CORRIDOR PLAN | SOUTHEAST CT | 2013-2015

Fitzgerald and Halliday, Inc. (FHI) lead a transportation and land use corridor study for the 12-mile Route 1 Corridor along the three towns of Clinton, Westbrook, and Old Saybrook, Connecticut. Working for the Lower Connecticut River Valley Council of Governments (RiverCOG), FHI developed a comprehensive plan to address current and long-range intermodal travel and community quality of life issues along this unique coastal route. Mr. Morehouse was responsible for leading the development of mobility infrastructure recommendations for the corridor. Recommendations were guided by Complete Streets principles.

WEST HARTFORD ROAD DIET AND SAFETY STUDY | CT | 2015-2016

FHI led a study to assess the safety of North Main Street from West Hartford Center to Bishop's Corner. This 1.8-mile road consists of four 10-foot travel lanes in a mostly residential context. The road has frequent accidents and is characterized by high speeds and cut-through traffic. One of the desired outcomes is a road diet and inclusion of bicycle infrastructure. FHI conducted a 3-day charrette to hear from the community about how North Main Street should be redesigned.

NJTPA PUBLIC OUTREACH FOR REGIONAL TRANSPORTATION PLANNING | NORTHERN NJ | 2012-2015

FHI worked with the North Jersey Transportation Planning Authority (NJTPA), in collaboration with Together North Jersey, the Rutgers University led planning consortium of county and local governments, public agencies, nonprofit organizations and others, to develop a coordinated, creative, and innovative approach for public outreach to support the development of both a Regional Plan for Sustainable Development (RPSD) as well as NJTPA's Regional Transportation Plan (RTP) update. Together, these two plans will guide future planning activities in the NJTPA region for land use, transportation, economic, and environmental / conservation initiatives. Mr. Morehouse led the development and maintenance of the Mindmixer online application for public engagement as well as other outreach tools employed to inform the public about the initiative and ways to provide input. Mr. Morehouse also served as a senior facilitator for up to 18 regional public workshops, including those in Essex County.

NEW MILFORD TRANSPORTATION MANAGEMENT PLAN, CT | 2012-2013

FHI developed a detailed assessment of traffic flow and safety for New Milford's downtown. Mr. Morehouse managed the project which was primarily concerned with the safe and efficient movement of traffic, pedestrians, and bicycles, while preserving the strong historic identity of the town. Working closely with state officials, town staff, and local stakeholders, Mike developed a series of implementable solutions to problems largely created by the three regional arterials that bound the downtown area.

TOWN OF BROOKFIELD VILLAGE DISTRICT PLAN, CT | 2011-2012

FHI developed and transportation and land use plan for the 4-Corners area located within the town's village center district. The plan was built on public engagement and feedback resulting from a 4-day charrette in the community. Transportation recommendations included measures to improve pedestrian and bicyclist safety around the 4-Corner's intersection, reduce vehicular conflicts through access management, and calm traffic while preserving mobility. The plan has been adopted by the town and is receiving funding for implementation.

TOWN OF GREENWICH SAFETY STUDY, CT | 2010

FHI performed a town-wide assessment of critical safety locations and prioritized a list for inclusion in the town's transportation improvement program. The analysis established performance criteria so that a numerical ranking could be established to rank a finite list of locations. The top ten locations were further analyzed, and conceptual designs of the traffic safety counter measures were developed.

GORDON E. METH, P.E., PTOE
Data Collection Task Leader

Education	B.S., Civil Engineering, 1991, University of Waterloo M.S., Civil Engineering (Transportation Planning), 1992, University of Waterloo MBA, 2004, Montclair State University
Registrations	Professional Engineer, NJ, 2000 (#42257); NY, 2001 (#78739); MD, 2009 (#36428); DE, 2009 (#16283); CT, 2010 (#27629); DC, 2010 (#905666); FL, 2015 (#80216); Ontario, 1993 (#90377946) Professional Planner, NJ, 2008 (# 6017) Professional Traffic Operations Engineer, 2000, Certification (#478) Professional Transportation Planner, 2007, Certification (#34)
Memberships	Institute of Transportation Engineers (Past President of Metropolitan NY/NJ Section, Immediate Past Chair of Northeastern District, member of executive board for Traffic Engineering National Council, member of Sustainability Standing Committee, member, Complete Streets Council) New Jersey Planning Officials Transportation Professional Certification Board TransAction Committee

Mr. Meth has 25 years of experience in traffic engineering and project management. He manages a wide range of projects, with total revenue of approximately $2,000,000 per year. Mr. Meth has an expertise in traffic and parking analysis, traffic and parking design, pedestrian and bicycle accommodation and traffic safety. Mr. Meth has provided expert testimony in over 60 municipalities within 14 counties of New Jersey. He has served as expert for one or more cases for nearly 20 municipalities over thė past 15 years. He frequently provides presentations and training to both public and private sector individuals, and has been an adjunct professor for Rutgers University, where he taught Transportation Engineering to undergraduates.

Port Authority of NY and NJ (Tunnels, Bridges and Terminals Department) Fall Data Collection Program and 2013 Port Authority Bus Terminal Passenger Queuing Study – Project manager for the 2010, 2011, 2012, 2013, and 2016 Data Collection programs for the Port Authority of NY and NJ Tunnels Bridges & Terminals, which included counts of Hudson River crossings, a bus study at the Lincoln Tunnel, and an HOV study at the Lincoln Tunnel, Holland Tunnel, and George Washington Bridge, a manual count of the Goethals Bridge toll plazas, counts of the Lincoln Tunnel approaches on the NJ side, and a weaving count of the Outerbridge Crossing eastbound approach. Work efforts included up to 67 Automatic Traffic Recorder (ATR) counts and 23 MioVision video imaging volume and classification counts over an 11 day period. MioVision was used for the Holland Tunnel instead of ATRs due to being non-invasive, and its ability to count at slow speeds with frequent merges. MioVision was also used for additional locations in 2012 and 2013 for the same reason, and for the entire count in 2016. Work efforts also included a separate effort to collect passenger queuing and bus departure information for the Port Authority Bus Terminal.

Norwalk, CT Town-wide Synchro Network Development – Developed a Town-wide Synchro network that included over 70 signalized intersections for Norwalk, CT.

Somerset County Traffic Signal Optimization – Project Manager for the optimization/coordination of 140 traffic signals in Somerset County in 2010 and 2011. Work efforts included traffic data collection, intersection inventory, travel time runs, Synchro analysis, preparing and installing timing directives, and developing conceptual improvement plans for intersections that were failing after signal optimization. The optimization resulted in peak hour delay reductions of 21-24%.

New Jersey Department of Transportation Region North Traffic Signal Optimization – Managed the optimization of over 150 signalized intersections on 7 corridors. Work efforts included conducting Manual Turning Movement and Automatic Traffic Recorder counts, travel time runs, and aerial photographs, preparing as built traffic signal plans, updating traffic signal timing plans based on existing traffic conditions using SYNCHRO and SimTraffic traffic simulation, developing traffic signal coordination plans, and preparing signal timing directives.

Essex County On Call Traffic Engineering Services - Services involved conducting traffic data collection, a number of traffic safety reviews and mitigation strategies, performing traffic analysis, preparing traffic signal warrant and other traffic studies, and designing traffic signal modifications and other traffic improvements. Work efforts included preparing/adjusting traffic signal coordination plans along Bloomfield Avenue, Central Avenue, Springfield Avenue, Lyons Avenue, Chancellor Avenue, and Park Avenue, and in downtown Millburn in Essex County (100 intersections total).

Hunterdon County Transportation Master Plan Traffic Safety Component – Conducted a comprehensive review of crashes on Hunterdon County Roadways, and identified 20 priority intersections and 25 priority road segments for improvements. Work efforts included developing improvement recommendations for these locations, as well as developing a matrix of improvement needs. Synchro was used for traffic analysis.

Ocean County On Call Traffic Consultant - Prepared traffic signal and electrical plans and curb profiles for 10 signalized intersections in Ocean County, and prepared several traffic investigations and training.

Port Authority of NY and NJ Traffic Engineering On-Call Contract - Project Manager for an on call traffic engineering contract with the Port Authority of NY and NJ Traffic Engineering department. Specific examples include the following:

- Roadway safety audit of 138 traffic signals at JF Kennedy Airport, LaGuardia Airport, Newark Airport, Port Newark-Elizabeth, and the Holland Tunnel
- Signal optimization of all 33 non-Central Terminal Areas at JF Kennedy Airport
- Roadway realignment and signal design for Redneck Avenue at Teterboro Airport
- Construction of a new ramp from the Lower Level of the George Washington Bridge to the Palisades Interstate Parkway
- The design of changes to the signalization and detours around the Holland Tunnel in support of the reconstruction of Route 139
- Maritime Industrial District/Peninsula at Bayonne Harbor 2008 Traffic Counts
- The design of several traffic signals and coordination plans at Port Newark-Elizabeth
- The design of several traffic signals and roadway improvements at JF Kennedy Airport

Township of Parsippany-Troy Hills On Call Traffic Engineering Services – As part of services for this project, prepared traffic signal timing optimizations and coordination for 24 intersections, including 9 on Route 46.

Borough of Florham Park On Call Traffic Engineering Services – As part of services for this project, prepared traffic signal timing optimization/coordination for 12 intersections, including 9 on Columbia Turnpike.

Various Traffic Signal Design Projects - Managed the design of over 200 state, local and county signalized intersections located in Essex County (102), Morris County (24), Union County (19), Ocean County (33), Atlantic County (4), Monmouth County (7), Hudson County (11), Middlesex County (3), Passaic County (3), Sussex County (3), Somerset County (2), Warren County (2), and Bergen County (1). This included overseeing construction inspection in many cases.

New England
Traffic Solutions

Claudio Vecchiarino

Timing Implementation & Fine Tuning Task Leader

Education

Associate Degree Electronic Engineering
Associate Degree Electrical
Associate Degree Business

Certification

E1 License Unlimited Electrical Contractor
IMSA Certified Level II

Mr. Vecchiarino will serve as the Timing Implementation and Fine-Tuning Task Leader for this project. Mr. Vecchiarino has been in the transportation industry for over 25 years, began his career in the transportation industry in 1989, installing traffic signals for various contractors in CT. Duties included installing, wiring and programming various manufactures cabinets, controllers and peripheral equipment. In 2000 Claudio went to work for a Supplier / Integrator in CT as a Technical Engineer, responsibilities included building cabinets, programming controllers and turning on intersections. In 2011 Mr. Vecchiarino became part owner of New England Traffic Solutions and is responsible overseeing and providing technical support on all projects. With over two decades of industry experience installing, managing and supporting traffic signal systems in Connecticut, Mr. Vecchiarino will prove to be an invaluable asset on this signal system timing implementation project.

Training

Trafficware	Traffic Control Devices
Actelis Networks	Ethernet over Copper Communications
Traficon	Video Detection and Data Collections
GridSmart	Video Detection and Data Collections
MsSedco Detectors	Microwave Detection
Wavetronix	Radar Detection and Data Collection
Campbell Company	Accessible Pedestrian Systems
Etherwan	Fiber Optics Communications
Ruggedcom	Fiber Optics Communications
Milestone VMS	Video Management System

Related Experience

City of Hartford ATMS upgrade
Upgrade the city of Hartford's central system, converting existing intersection data base into the new ATMS.now system.

New Haven, CT - Advanced Traffic Management System
300+ intersections integrated into ATMS through via 6 CT DOT/City of New Haven Traffic Intersection improvements Project – Projects: 92-629, 92-531, 92-564, 92-659, 92-488, and 92-522. These projects required extensive knowledge of the cities fiber infrastructure, traffic control hardware, vehicle detection technologies and emergency preemption.

Glastonbury, CT –Advanced Traffic Management System
Training and on-going support were critical pieces for the Main Street Improvement Project, as the technologies in both the ATMS system and the traffic control cabinets were new for the town. Since the initial project, additional intersections have been added into the ATMS system.

Stamford, CT In House Controller upgrade
Working hand in Hand with the city of Stamford's maintenance division to replace controllers

Stamford, CT – IT Network Communication
Support and installation of the city's traffic management video display center integrating live traffic data from controller cabinets, vehicle detection and emergency preemption to the city's engineering department. Extensive knowledge of the cities fiber and copper network along with the internal office server network was required for successful implementation of this project.

Norwalk, CT – Advanced Traffic Management System
70+ intersections integrated into ATMS as part of city wide improvements and safe routes to school projects. Using the ATMS System, a real-time traffic application for the public was implemented.

New Haven, CT Intersection Upgrade Project
102 aged traffic cabinets were upgraded by installing new controllers and an Ethernet over copper communication network to enable these cabinets to be integrated into the cities ATMS system.

New Haven, CT – Field Network Communication
Established network communication between 300+ citywide intersections and the City Engineering hub location for numerous CT DOT/City of New Haven Traffic Intersection projects; Extensive knowledge with Ethernet switch programming and fiber layout were critical to the success of these projects.

CT Department of Transportation – Wireless POD Installations
Using Trafficware's latest wireless technology, installed wireless vehicle detection in Middletown, CT, New Haven, CT and New Britain, CT.

New England Traffic Solutions

160 Oak St. Unit 410 Glastonbury, CT. 06033
860-633-1768; 860-633-1796 fax

Kevin Cramer
Timing Implementation & Fine Tuning

On this project Mr. Cramer will be responsible for implementation and fine-tuning for all signals including keypad and direct timing implementations at the controllers and timing uploads into the ATMS.now and STDWIN central software management systems. Mr. Cramer has built, programmed, modified and turned on over 400 signals in his 13 years in the transportation industry. Mr. Cramer is IMSA Level II certified and highlights of his Connecticut experience include:

Stamford, CT In House Controller upgrade
Working hand in Hand with the city of Stamford's maintenance division to replace controllers.

Stamford, CT – IT Network Communication
Support and installation of the city's traffic management video display center integrating live traffic data from controller cabinets, vehicle detection and emergency preemption to the city's engineering department. Extensive knowledge of the cities fiber and copper network along with the internal office server network was required for successful implementation of this project.

New Haven, CT - Advanced Traffic Management System
300+ intersections integrated into ATMS through via 6 CT DOT/City of New Haven Traffic Intersection improvements Project – Projects: 92-629, 92-531, 92-564, 92-659, 92-488, and 92-522. These projects required extensive knowledge of the cities fiber infrastructure, traffic control hardware, vehicle detection technologies and emergency preemption.

Norwalk, CT – Advanced Traffic Management System
70+ intersections integrated into ATMS as part of city wide improvements and safe routes to school projects. Using the ATMS System, a real-time traffic application for the public was implemented.

Glastonbury, CT –Advanced Traffic Management System
Training and on-going support were critical pieces for the Main Street Improvement Project, as the technologies in both the ATMS system and the traffic control cabinets were new for the town. Since the initial project, additional intersections have been added into the ATMS system.

New Haven, CT Intersection Upgrade Project
102 aged traffic cabinets were upgraded by installing new controllers and an Ethernet over copper communication network to enable these cabinets to be integrated into the cities ATMS system.

New Haven, CT – Field Network Communication
Established network communication between 300+ citywide intersections and the City Engineering hub location for numerous CT DOT/City of New Haven Traffic Intersection projects; Extensive knowledge with Ethernet switch programming and fiber layout were critical to the success of these projects.

CT Department of Transportation – Wireless POD Installations
Using Trafficware's latest wireless technology, installed wireless vehicle detection in Middletown, CT, New Haven, CT and New Britain, CT.

LICENSES

STATE OF CONNECTICUT ✦ DEPARTMENT OF CONSUMER PROTECTION

Be it known that

SCOTT J DIEHL
9 STEVENS DR
DELRAN, NJ 08075-1728

has been certified by the Department of Consumer Protection as a licensed

PROFESSIONAL ENGINEER

License # PEN.0028631

Effective: 02/01/2016
Expiration: 01/31/2017

Jonathan A. Harris, Commissioner

STATE OF CONNECTICUT ✦ DEPARTMENT OF CONSUMER PROTECTION

Be it known that

ORLA H PEASE
2104 MAGNOLIA CT
CINNAMINSON, NJ 08077-3461

has been certified by the Department of Consumer Protection as a licensed

PROFESSIONAL ENGINEER

License # PEN.0029471

Effective: 02/01/2016
Expiration: 01/31/2017

Jonathan A. Harris, Commissioner

STATE OF CONNECTICUT ✦ DEPARTMENT OF CONSUMER PROTECTION

Be it known that

GORDON E METH
51 CALUMET AVE
LAKE HIAWATHA, NJ 07034-2731

has been certified by the Department of Consumer Protection as a licensed

PROFESSIONAL ENGINEER

License #PEN.0027629

Effective: 02/01/2016
Expiration: 01/31/2017

Jonathan A. Harris, Commissioner

MANAGEMENT PLAN

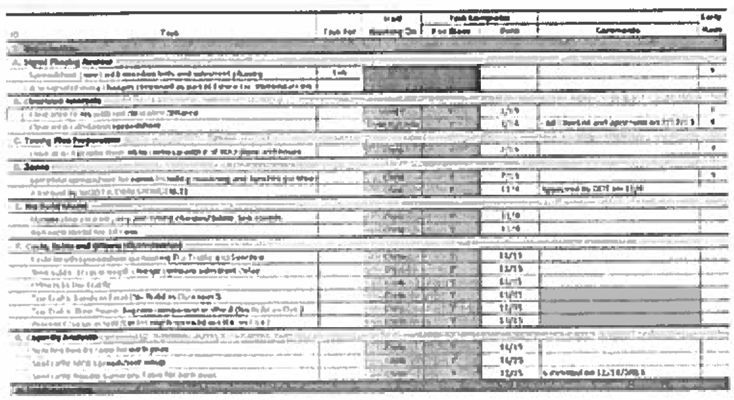
MANAGEMENT PLAN

Urban Engineers is committed to the City of Stamford and signal system optimization projects. Mr. Diehl is responsible for managing all signal optimization projects companywide for Urban and will provide key staff from Urban Engineers that will be dedicated to this project. Our teaming partners, who have worked with Urban on past projects, include FHI for public involvement; RBA, CT Counts, and RHS Consulting Design for data collection; and New England Traffic Solutions for implementation and fine tuning.

As shown on the organization chart, Mr. Diehl and Mr. Burke will serve as the Project Manager and Deputy Project Manager, respectively, for the project. Mr. Diehl will serve as the primary point of contact for the City. Mr. Diehl and Mr. Burke will manage the work for each of the task areas. Each Primary Task Leader has a number of support staff, identified in the organizational chart, who are committed to working on the project.

Each firm has additional staff that can be made available if needed to expedite a particular task or the project as a whole. As the prime, Urban is ultimately responsible for the work completed and submitted to the City. We understand the importance of that responsibility and have developed numerous QA/QC procedures as to provide the highest quality product for our clients. In fact, our QA/QC process is integral to the entire signal optimization project, it begins prior to data collection and continues through implementation. From a QA/QC perspective, signal optimization is divided into the following stages:

1) Data collection
2) Data compilation/evaluation
3) Base model development
4) Calibrated existing conditions model
5) Optimization preparation
6) Optimized timings model
7) Timing directive preparation
8) Implementation/fine tuning



Signal Optimization Project Task Checklist

For each one of these stages, Urban has developed a checklist that documents the steps or subtasks that need to be completed (See checklist on right). The checklist records who performed the work, who checked the work, and a section for comments to maintain coordination between Urban staff on all tasks. Urban maintains detailed QA/QC procedures for each of signal optimization stages.

Past Performance on Projects

Below is a list of similar projects that met schedule and budget. A detailed description and references for these projects is included in Section 3 under Prior Similar Project Experience. Please also feel free to contact any reference listed in that section with regards to Urban's ability to maintain schedule and budget, and our quality of performance on signal optimization projects.

- **Route 1 Signal Optimization, Town of Greenwich, CT**
- **NJDOT Traffic Signal Optimization**
- **Ocean County Hooper Ave. (CR 549/631) Signal Optimization, Ocean County, NJ**
- **SJTPO FY 2016 Local Safety & CMAQ Project Development, SJTPO, Atlantic and Cape May Counties**
- **SJTPO FY 2015 Local Safety & CMAQ Project Development, SJTPO, City of Vineland and Cumberland County, NJ**

FINANCIAL CAPABILITIES

FINANCIAL CAPABILITIES

Urban has a long history of working with the City of Stamford. We have an active on-call agreement with Stamford's Traffic Engineering Bureau and have received assignments in the past three years. Per the RFQ, since Urban has worked on City of Stamford projects in the past three years, we are not including information on our financial capabilities.