THE LONG AND WINDING ROAD FOR AUTONOMOUS VEHICLES

Submitted by: Jeffrey R. Parenti, PE, PTOE

Also in This Issue:
  ITE Trip Generation Manual - Understanding Its Limitations
Dear NEITE Members:

This has been a very busy year so far. NEITE is already putting out our second Chronicle of the year, and is about to hold our third NEITE Executive Board Meeting of the year. Maybe the extra work in the spring will allow everyone to have a longer summer break.

Our second New England Section Board Meeting was held on April 6 at the Manchester Country Club in Manchester, CT in conjunction with the Connecticut Chapter’s Annual Meeting. During the dinner presentation, we heard Tom Maziarz from the Bureau of Policy and Planning discuss CTDOT’s Complete Streets Policy. I would like to thank the Connecticut Chapter for doing a great job organizing this meeting.

I am looking forward to the District 1 Annual Meeting in Portsmouth, New Hampshire on May 11-13. Our local arrangement committee members have been working hard to create an excellent meeting. It is sure to provide great networking opportunities, plenty of professional development as well as some good times. I hope to see you there.

Because of the District 1 Annual Meeting occurring in Portsmouth, the traditional June New Hampshire/Maine meeting will be held later in the year. The NEITE Executive Board Meeting that usually coincides with the June meeting will instead be held at the Portsmouth Sheraton immediately following the District meeting on May 13th at 1:00 PM. Any member is welcome to come to the meeting to listen or offer input.

In addition to the meetings in Vermont this January and Connecticut in April, NEITE has been busy partnering and supporting other meetings and organizations. NEITE has been a sponsor and had board members attend UMass Tech Day in Amherst MA, the Student Symposium held at Northeastern University, Transportation Camp at MIT, Women in Transportation Leadership Panel Discussion at the Volpe Center in Cambridge and the National Society of Black Engineers Annual Meeting in Boston. Strategic Partnering expands the visibility of our organization while supporting worthwhile events.

I look forward to seeing you all at the upcoming meetings. If you have any question or suggestions, please contact me at alan.cloutier@stantec.com or 781-221-1245.

Sincerely,
Alan T. Cloutier, PE, PTOE
New England Section President

NEITE’s mission is to serve its members, the transportation profession, and the public by facilitating professional development and education, promoting the exchange of ideas, and enhancing the professional practice to provide safe efficient cost-effective and sustainable transportation solutions.
New England Section Directory

Executive Board:

President – Alan T. Cloutier, PE, PTOE
Stantec
5 Burlington Woods Drive, Suite 210 | Burlington, MA 01803
P: (781) 221.1000 | Alan.Cloutier@stantec.com

Vice-President – Rebecca L. Brown, PE, PTOE
Greenman-Pedersen, Inc.
181 Ballardvale Street, Suite 202 | Wilmington, MA 01887
P: (978) 570.2946 | rebecca.brown@gpinet.com

Secretary – Samuel W. Gregorio, PE, PTOE
TEC, Inc.
65 Glenn Street | Lawrence, MA 01843
P: (978) 794.1792 | SGregorio@theengineeringcorp.com

Treasurer – Jason M. DeGray, PE, PTOE
Toole Design Group
33 Broad Street, Suite 405 | Boston, MA 02109
P: (617) 619.9910 | jdegray@tooledesign.com

Senior Director – John Q. Adams, PE, PTOE
Milone & MacBroom, Inc.
121 Middle Street, Suite 201 | Portland, ME 04101
P: (207) 541.9544 | john@miloneandmacbroom.com

Senior Director – David J. DeBaie, PE, PTOE
Stantec Consulting Services, Inc.
5 Dartmouth Drive, Suite 101 | Auburn, NH 03032
P: (603) 669.8672 | dave.debaie@stantec.com

Junior Director – Matthew J. Kealey, PE, PTOE
VHB
101 Walnut Street | Watertown, MA 02472
P: (617) 924.1770 | mkealey@vhb.com

Junior Director – Ian A. McKinnon, E.I.T.
Tetra Tech, Inc.
100 Nickerson Road | Marlborough, MA 01752
P: (508) 786.2252 | Ian.McKinnon@tetratech.com

Immediate Past President – Joseph A. Hallisey, PE, PTOE
WSP | Parsons Brinckerhoff
500 Winding Brook Drive | Glastonbury, CT 06033
P: (860) 815.0269 | Hallisey@pbworld.com

Standing Committee Chairs:

Awards – Kim E. Hazarvartian, Ph.D., PE, PTOE
P: (603) 226.4013 | keh@teppllc.com

Charter/Bylaws – Kim E. Hazarvartian, Ph.D., PE, PTOE
P: (603) 226.4013 | keh@teppllc.com

Chronicle Action – Samuel W. Gregorio, PE, PTOE
P: (978) 794.1792 | sggregorio@theengineeringcorp.com

Chronicle Editor – Rachel A. Dooley, PE
P: (401) 457.2035 | rdooley@vhb.com

Continuing Education – Douglas S. Halpert, E.I.T.
P: (781) 794.1792 | dhalpert@theengineeringcorp.com

Desjardins Scholarship – Faysal J. Hussein, PE, PTOE
P: (857) 206.8756 | fhussein@Nitscheng.com

Emerging Professionals – Christina Dube, E.I.T.
P: (781) 641.8332 | cdube@vhb.com

Goals/Objectives – Michelle Langone Danila, PE, PTOE
P: (617) 619.9910 | mdanila@tooledesign.com

Historian – John P. Thompson, PE
P: (203) 294.2035 | jthompson@vhb.com

Industrial Support – William P. McNamara
P: (401) 231.6780 | billm@oceanstatesignal.com

Legislative Liaison – Kien Y. Ho, PE, PTOE
P: (781) 255.1982 | kho@BETA-inc.com

Membership – Justin M. Curewitz, E.I.T.
P: (781) 255.1982 | JCurewitz@BETA-inc.com

Nominating – Kenneth J. Petraglia, PE, PTOE
P: (781) 255.1982 | kp@BETA-inc.com

Past Presidents Council – William F. Lyons, PE, PTOE
P: (617) 305.4163 | w Lyons@fhilinc.com

Program – Keith E. Wenners, E.I.T.
P: (857) 206.8756 | kwenners@vhb.com

Public Relations – Jeffrey Gomes, MCPPO
P: (508) 823.2245 | billmc@oceanstatesignal.com

Strategic Plan – Joseph C. Balskus, PE, PTOE
P: (860) 808.2299 | balskusj@cdmsmith.com

Student Chapter Liaison – Steven M. Tupper, E.I.T.
P: (508) 362.3828 | stupper@capedcomission.org

Technical – Thomas A. Errico, PE
P: (207) 347.4354 | thomas.errico@tylin.com

Technical – Steven C. Findlen
P: (508) 823.2245 | sf@findlen@mcmahonassociates.com

Website – Colin T. White, PE
P: (978) 570.2979 | cwhite@gpinet.com

State Chapter Presidents:

Connecticut – Kwesi Brown, PE, PTOE
P: (203) 271.1773 | kwesi@miloneandmacbroom.com

Maine – Jennifer Williams, PE
P: (207) 783.9186 | williams@avicog.org

Massachusetts – Kenneth J. Cram, PE, PTOE
P: (781) 932.3201 | kcram@baysideengineering.com

New Hampshire – Jeffrey W. Santacruze, PE
P: (603) 225.2978 | jsantacruze@mijninc.com

Rhode Island – Derek L. Hug, PE, PTOE
P: (401) 861.3070 | dhu@fando.com

Vermont – Jennifer Conley, PE, PTOE
P: (802) 345.2321 | jconley@conleyassociates.com

Useful Links:

Institute of Transportation Engineers: http://www.ite.org

ITE Northeastern District: http://www.northeasternite.org

ITE New England Section: http://www.neite.org

ITE Upstate New York Section: http://www.itenyupstate.org

ITE New York Metro Section: http://ite-metsection.org

Young Professionals in Transportation - Boston Chapter
http://www.yptboston.org/

Boston Society of Civil Engineers: http://www.bsoces.org

American Society of Civil Engineers: http://www.asce.org

ASCE New Hampshire Chapter: http://www.ascenh.org

ASCE Vermont Chapter: http://sections.asce.org/vermont

ASCE Maine Chapter: http://www.maineasce.org/maine

ASCE Connecticut Chapter: http://www.csce.org

ASCE Rhode Island Chapter: http://riasce.org

Urban Land Institute: http://www.uli.org

MA Association of Consultant Planners: http://www.macponline.org


APA Massachusetts Chapter: http://www.massapa.org

APA Connecticut Chapter: http://www.capco.org

APA Rhode Island Chapter: http://www.rhodeislandapa.org

On the Cover: A bicyclist takes advantage of a warm spring morning over the Washington Pedestrian Bridge, Providence, Rhode Island. Photo Source: Bill DeSantis, PE LCI CSI

On the Back Cover: Flowers in bloom along America’s Cup Avenue, Newport, Rhode Island. Photo Source: Rachel Dooley, PE
Hello New England Section!

Well the warm weather is slowly starting to arrive and the New England ITE section has been very busy. I cannot believe we are already releasing the second issue of the New England Chronicle for the year. I’d like to take a moment to welcome all of the new members of the New England section. As you can see on page 14, there is a long list of new members to join in only the last few months.

Articles
The feature article in this issue discusses numerous aspects of autonomous vehicles, a technology that could soon impact many of our careers. I personally cannot wait for the day that I can kick back and relax while my car effortlessly drives me to my destination. While we may not be there yet, there are many companies who are striving for that goal. This article poses many questions that we as transportation professionals should be considering.

This issue also features an article discussing the limitations of the Trip Generation Manual, a document published by ITE that many of us utilize. The Trip Generation Manual is an extremely helpful tool but this article helps one recognize what factors should be considered as it is applied to our projects.

Looking Ahead
There are several great events planned in the coming months including chapter meetings, roundtable discussions, and the Thomas E. Desjardins Memorial Golf Tournament. Most notably though is the Northeastern District Annual Meeting in Portsmouth, New Hampshire this week. While I cannot personally attend, many of you are in for a great week filled with workshops, tours, and networking opportunities. I hope many of you take the opportunity to attend the NEITE Executive Board Meeting to hear the latest about the section.

Also, the ITE 2016 Annual Meeting and Exhibit in Anaheim, California is only a few short months away. Be sure to register and book your hotel room now. Please see the Section Calendar for all upcoming events.

Final Thank You
I would like to thank all of our sponsors that continue to renew their sponsorship. If you haven’t renewed yet, it can be done at any point through the year. Please contact Claire Choquette of Ocean State Signal (cchoquette@oceanstatesignal.com) or myself if you are interested in becoming a sponsor of the award-winning New England Chronicle. I would also like to thank all of the contributors to this issue. I hope you enjoy the Spring Issue!

Rachel A. Dooley, PE
Chronicle Editor
rdooley@vhb.com

Please remember to visit the New England Section website at http://www.neite.org and our updated Section Directory for information on the New England Section.
According to the National League of Cities, only 6% of the 68 long-range transportation plans they surveyed are considering the effect of cars that drive themselves. This may be cause for concern considering how fast Autonomous Vehicles will be coming to the market and amount of investment that will be required to prepare for them.

What should NEITE members be doing? And what are we getting ready for, exactly? In this article I will pose a series of questions the transportation engineering and planning community should be asking now and present some possible outcomes of the AV movement.

The popular press and bloggers alike have fallen madly in love with AVs. News items and opinion pieces are overwhelmingly positive and optimistic about the promise of self-driving cars, and for good reason. The tech industry, led by Google along with automobile manufacturers in several countries, are pouring copious amounts of money into developing AV technology.

Even the government is getting in on it: in January President Obama announced he was putting $3.9 billion in his budget proposal that will be dedicated to the AV concept. “Automated vehicles open up opportunities for saving time, saving lives, and saving fuel,” said Transportation Secretary Anthony Foxx.

“We are bullish on automated vehicles.”

But are we? Do those of us who are responsible for designing, building, and maintaining the infrastructure that will be used by AVs share the same enthusiasm? What should we be advising our clients and constituents? In a conversation that is being dominated by the tech industry and auto manufacturers, should we take a more active role in the public realm?

In this space we will take our foot off the gas a little and consider the hurdles that AVs will face before they can deliver the zero crash, delay-free motoring Nirvana that they promise.

Note: for the sake of this discussion we will assume that the technology argument is moot. In other words, we accept that the professionals developing the technology will, within our lifetimes, conquer all of the challenges they face: the vehicle’s fleet of sensors will operate without flaw in all possible weather conditions; computing and software will exceed the capability of a human brain; and that the above combined will navigate, without hesitation, the most heinous roadway conditions, including, but certainly not limited to, work zones with several sets of still visible double yellow lines, mangled regulatory signs, and pavement markings missing completely on pavement besieged by frost heaves. Armed with strong funding sources and motivated by market competition, the tech industry would say that they are this close to solving all of the above, and it is fruitless for us to argue the point.

So we move on. Here are some other important items for us all to consider.

Delivering on the Promise of Safety and a Free-Flowing Commute

Can the Automated Vehicle give us what we have wanted since horse and buggies clogged our 19th century city streets: No crashes and zero congestion? Maybe not.

The bar is already set very high. The public will expect AVs to perform, if not perfectly, at a very high standard with regard to safe driving. But they will be involved in crashes even if their algorithms make perfect decisions if only because human-piloted cars will collide with them. And as it is when two humans are driving cars that crash into each other, there will be disagreement about who (or what) is at fault. As a result, fair or unfair, the public will perceive that AVs crash into things.

We assume that AVs will be safe enough to let them share the roads with humans, but we will only know for certain by testing them on real roads. Google’s cars have already amassed 1.3 million miles driven with only 1 crash attributed to robot error. That sounds pretty good, but consider a recent RAND study that noted that the US fatality rate for human drivers is about 1 for every 100 million miles travelled. This means that we need to test AVs for several more years without a fatal incident before we can be fully confident that they really are safer drivers than humans.

What about the anti-congestion claim? Letting your car drive you to work at free flow speeds on I-93 while you snooze in the former driver’s position sounds great. But will this be the real AV experience? Not while...
humans are driving most of the other cars on the road. In the first few years at least, your AV will be tailgating a human-driven vehicle that keeps three seconds behind the vehicle in front of it. This means of course that freeway density will still be limited and therefore congestion will continue to be a part of commuting.

Privacy

In all the excitement about AVs, privacy has not garnered very much attention. We know that Americans are very protective of their privacy and have gone to great lengths to protect it. In the most recent national story, Apple Computer refused to unlock an iPhone that was part of an investigation in the California mass shootings. Thousands protested, siding with Apple.

Closer to home, the Commonwealth of Massachusetts still does not allow photo enforcement, which several studies have shown reduce red light running and speeding. Even the City of Cambridge, Massachusetts, which has worked very hard to protect pedestrians and bicyclists, eschewed photo enforcement. Over 15 years ago Cambridge City Council voted not to support a move toward photo enforcement, citing privacy concerns, and it has not considered the question since.

But perhaps the best window into the privacy worries of the traveling public in New England is EZPass usage. In November 2015 MassDOT announced, as part of its all-electronic tolling (AET) roll-out that as many as 1 in 4 toll both transactions were made without an EZPass. Drivers are making this choice despite the delay savings of gliding through the booths at 15 MPH versus waiting in line to conduct a cash transaction. There is a cost incentive, too – on the Tobin Bridge just north of downtown Boston, there is a 50 cent surcharge for a non-EZPass (“Pay by Plate”) transaction though its AET gantry.

MassDOT knows when and where EZPass users drive through a toll booth or gantry. Transaction records have been used as evidence in court cases, including civil actions such as divorces.

If up to a quarter of Massachusetts residents don’t want a state transportation agency to know when they pass a toll gantry a few hundred times a year, how will they react to an autonomous vehicle, whose X and Y coordinate will be sampled and stored in a database several times a second? If drivers are willing to pay money and spend some of their commute time to protect their privacy, will they surrender all of their “positional privacy” for an AV? How will the be public be part of the discussion regarding what data the AV will broadcast, where it will be stored, who owns the information, and who has legal access to it? When an AV owner is accused of some wrongdoing, either civil or criminal, will the vehicle be a witness of sorts?

The Law

Speaking of the law, there has been much more written and discussed about the how fast (or how slowly) rules are changing to allow use of AVs on public streets. A few states have already rushed to allow testing.

The National Highway Traffic Safety Administration considers the Google driverless car software the equivalent of a human driver, and sent a letter to the tech giant explaining that earlier this year.

Despite the utopian safety ideal of the robot car, AVs will not be perfect. Someday, sooner or later, an AV will be involved in a crash causing a death or debilitating injury. The attorneys representing the human being will name all the deep pockets in the lawsuit as defendants – Google, the automaker, individuals involved in the development of the car’s hardware, software, and sensors, and others. It will be a test case that may, depending on the outcome, spark massive recalls of every AV already on the road.

Can the AV movement sustain the lawsuits that will emerge as the vehicles make their first critical errors? Will AVs survive the national exposure that these cases will surely receive? Will AV developers learn from the mistakes of Volkswagen, whose software cheated customers out of promised fuel economy last year? Are tech companies willing to take on the legal responsibilities of thousands of their car’s occupants, and the millions of people they share the public roads with? Are the states willing to change their rules so that the software does not have the same responsibility as a human driver?

Ethics

It is every driver’s worst nightmare – a child darts out from behind a parked car and there is not enough time to stop.

ITE members know that stopping sight distance has two components – perception–reaction (P–R) time and braking distance. Autonomous Vehicles can cut the P–R time to nearly zero with constant and perfect attention, near instantaneous computing, and no physical right leg that has to move from the accelerator to the brake pedal.

But the braking distance remains. No matter how good the AV’s sensors are, they won’t be able to see through walls and probably not through other solid or mostly opaque objects such as parked cars or vegetation. In the scenario above, if adequate braking distance is not available, the AV’s software will have to make a decision – either strike the child or spare the child and swerve, possibly into a solid object. Put another way, the car will have to decide whether to place harm on someone outside or inside the vehicle.

Who will decide? A programmer deep inside a Google office building? Will the AV’s human owner be able to change settings of the car’s “ethics module?” If so, how far can he or she tilt the setting to favor his or her own occupants? Will animal rights activists lobby developers to set the “I brake for...” settings to include geese, ducks, squirrels, chipmunks, or field mice? Or will the user have access to these settings? Will the “ethics module” behave differently depending on location, such as school zones?

Infrastructure Investment

There are two major pieces to the success of AV technology: V2V, or vehicle to vehicle; and V2I, or vehicle to infrastructure.

V2V covers communications among vehicles. At the risk of oversimplifying, these transmissions tell other AVs where they each are and where they are going so they don’t crash into each other. AV developers, thank’s to a mountain of investment, are very busy working on V2V.

The V2I part is aimed squarely at us ITE members, many of whom are responsible for operating and maintaining critical “I” components such as traffic signal equipment. Nobody is quite sure what infrastructure we need to satisfy AVs. Visions vary. Some think it will work similar to Transit Signal Priority or emergency vehicle pre-emption on top of existing stop-and-go signals. Others, including the MIT Sensible Cities Lab, think that traffic signals will go away entirely.
Section Calendar

May 2016
Northeastern District Annual Meeting
May 11th - 13th, 2016
Sheraton Portsmouth Harborside
Portsmouth, New Hampshire

RI Chapter Complete Streets Roundtable Discussion
May 31st, 2016
Chelo's
Warwick, Rhode Island

June 2016
MA Chapter Bicycle Infrastructure Tour
June 16th, 2016
More information to follow

Thomas E. Desjardins Memorial Golf Tournament
June 22nd, 2016
Sandy Burr Country Club
Wayland, Massachusetts

August 2016
ITE 2016 Annual Meeting and Exhibit
August 14th - 17th, 2016
Anaheim Marriott
Anaheim, California

Please send all calendar announcements, including the name of event, the contact person, event location, and date to New England Section webmaster Colin T. White, PE and Chronicle Editor Rachel A. Dooley, PE at cwhite@gpinet.com and rdooley@vhb.com.

Would You Like to Contribute to the New England Chronicle?

Would you like to contribute to an award winning New England Chronicle newsletter? The New England Chronicle’s Action Committee is seeking members (both professionals and students) who are interested to write both short and feature articles for publication in the upcoming New England Chronicle issues. Both short and feature articles should be about technical topics, professional matters, innovative projects, and cutting-edge solutions that affect transportation engineering and planning.

Typically short article would consist of 1,000 to 2,500 words and feature articles would consist of 2,000 to 4,000 words. Each article should include a head shot and bio of all participating authors. Further details for each article submission can be given upon request.

For more information on how you can become a New England Chronicle contributor contact the New England Chronicle Editor, Rachel A. Dooley, PE at rdooley@vhb.com.
If AVs truly are around the corner, what infrastructure should we be integrating into our public ways? Is the industry developing components for traffic signals? How are they being tested and how soon will they be on the market? Will they work with existing controllers, cabinets, and/or backpanels? Once installed, will municipalities need to give up some or all control of their locations to approaching AVs? How much will these components cost, and how much is the public willing to pay for upgrades? Will AVs need other roadside sensors to operate properly?

What about lower-tech assets, such as pavement markings and signs, which AV sensors rely heavily on? Will markings have to be fully replaced on a repaved road surface before it can reopen? Do markings on routine utility cuts have to be replaced in kind immediately? What are the consequences for AVs if markings cannot be immaculately maintained? When STOP signs and other regulatory signs are damaged or missing, will the AVs still know what to do, and if they do not, will the municipality be responsible for an injury that results from the crash?

“The car industry has been working tirelessly for decades to convince us that the automobile is a part of us…”

Marketing

“Being in the Driver’s Seat is Important,” informs the brochure I received in the mail from Mazda, whose slogan is “Driving Matters.” BMW has been the Ultimate Driving Machine since 1975.

The car industry has been working tirelessly for decades to convince us that the automobile – and the 300 horsepower V8 motor under its hood – is a part of us and that we have a deeply personal connection to it.

This visceral connection is only partly between our body and leather seat under us. Largely this interaction is through our hands and feet. We grip the steering wheel, stomp the clutch, jerk the shifter, floor the gas pedal, and away we go. Watch just about any car commercial for a performance or luxury vehicle and you are nearly guaranteed a shot of a smirking driver very satisfied by any or all of the above.

Absent the exhilaration of piloting your sport-tuned suspension around the tight curves of a country road, what will it be like to ride in an AV, aside from the ability to tweet at will and take the occasional nap? Maybe not so good. An enterprising University of Michigan Transportation Research Institute study has already revealed that a ride in an AV will make about a third of all people seasick. That doesn’t bode well for the all-important test drive.

Consider the last revolution in vehicle technology, the hybrid electric vehicle, which was introduced to the US by the Toyota Prius in 2000. Sixteen years later hybrids are a proven technology offered by several carmakers. Its superior fuel economy should be a no-brainer for budget-conscious Americans. Yet hybrid electric market share was only about 3% of all vehicles sold in 2013 and has dropped since then.

A hybrid electric power plant costs extra, and so will AV technology. Will Americans be willing to pay for it? In another University of Michigan study, more than half of respondents had a generally positive opinion of self-driving cars, but their enthusiasm halted there. Study authors then asked how much respondents would be willing to pay for the technology, and 57 percent answered $0. Another 25 percent thought they might be willing to pay $2,000, which is far less than what the upcharge is likely to be.

It will be one of the most fascinating components of the AV movement – how will manufacturers convince us to buy them? How will the carmakers pivot, virtually overnight, from telling us that we must drive their latest creation to just riding idly in one? What will happen to the emotional connection that once compelled some of us to spend a years’ salary on a personal transportation device? Will the luxury and exotic brands (Mercedes-Benz, Porsche, Maserati, Jaguar, Bentley) even offer AVs, and will they scrap their old slogans for something like, “the Ultimate Riding-in, Self-Driving Machine”? Will AVs share a showroom with conventional vehicles, and how will dealers handle the rather awkward juxtaposition?

The Urban Fabric

Autonomous Vehicles may very well flourish in the suburbs, and they can easily succeed in the homogenous interstate environment. But the robot car’s Achilles’ Heel is the dense urban core, where it will be all but helpless for one simple and natural reason: pedestrians.

Picture Atlantic Avenue in downtown Boston during the peak hour. Thousands of people are rushing to catch their train at South Station. Today, these people wait nervously for the exclusive ped phase, hoping it will come in time for them to catch the 5:20. When the WALK finally lights, commuters flood the intersection.

Fast forward to 2030. Your Google car leads a line of AVs approaching the Summer Street intersection and the light is green (thanks to V2I technology) but the intersection is full of
Can AVs share the road harmoniously with humans either inside conventional vehicles or outside on foot and two wheels and still move about freely? Will they be good for cities, which urban and transportation planners are diligently trying to make more livable as people increasingly choose to live there? Or will they push people to move back to the sprawling suburbs, as cheap land and highway expansion did in the 1950s and ’60s? What effect will they have on active transportation and public transit? Will VMT climb to new heights, and what does that mean for energy consumption and global climate change?

Conclusions

Drivers worldwide continue to hear the amazing benefits of the future of cars that drive themselves: no delay, no crashes, and full internet connectivity. Market researchers have used rosy customer survey results to project that the AV industry will be worth as much as $87 billion by 2030.

But when all vehicles are fully automated, pedestrians have nothing to worry about. AVs will all operate at appropriate city speeds, and their flawless programming will stop for any errant walker, anywhere, at anytime. Bicyclists will also reap the benefits. No more “sharing the road” – bikes will own the road and AVs will have to follow behind them at a safe distance.

Imagine, every street in the city a shared street. And there won’t be anything the AV occupants can do about it. After all, a vehicle that needs no steering wheel also has no horn to honk.

Unless AV developers integrate V2ped and V2bike into their technology, non-auto modes will be excluded from efficiency algorithms. Put another way, they will share the same roads, but they will not play by the same rules. The ironic result will be that the vast investments in autonomous vehicles to improve upon the human operator inside the car will be thwarted by humans outside.

Some of the questions we have asked here may seem trivial or even silly. But all of them will be asked at some point along the AV story arc. When and how they are answered will determine the ultimate success or failure of the autonomous vehicle movement. ITE members should be asking many of them, and our industry should take more interest. To date AV development has been a technology story. It is also an earth-shaking transportation story. Autonomous vehicles need us too.

Jeffrey R. Parenti, PE, PTOE is a Project Manager for Nitsch Engineering. He also served the City of Cambridge as Principal Traffic Engineer and Engineering Manager of its Traffic, Parking, and Transportation Department and the Town of Brookline DPW as its Transportation Engineer. Reach him at jparenti@nitscheng.com

Photo Source: U.S. DOT
The Trip Generation Manual is one of the primary resources of the Institution of Transportation Engineers (ITE), and arguably what ITE is best known for outside of the Transportation Engineering community. As a living evolving document, it is a masterpiece – The 9th Edition of the Trip Generation Manual includes 26,621 trip generation samples covering 173 land uses and 358 variables. This information was gathered by volunteers and compiled and reviewed by a combination of volunteers and staff, all for the betterment of our industry and the public.

Yet for as great a tool the Trip Generation Manual is, it has its limitations, which every practitioner should recognize and address during their work efforts. There has been a tendency, particularly for retail land uses, to add new categories based on very limited data. Table 1 contains a summary of the number of samples for each land use-variable combination, by time period. As shown, about 20% of all land use-variable combinations have only 1 sample. A sample size of 20 is considered a good sample in ITE guidance documents. Approximately 20% of weekday peak hour and less than 10% of Saturday peak hour land use-variable combinations have 20 or more samples. Only 3% of weekday peak hour land use-variable combinations have 100 or more samples.

Statistical validity of the data in the ITE Trip Generation Manual is a whole separate issue. The correlation coefficient (R^2) is a measure of the statistical fit of data to a mathematical model. The guidance provided in the ITE Trip Generation Handbook is that mathematical models, which are either linear or logarithmic, should be used when the number of samples exceeds 20 and R^2 exceeds 0.75 (which roughly means that 75% of the variation of the data can be explained by the variable used). The guidance goes on to state that an average rate should be used otherwise. One interesting question to ask is that if a good statistical fit isn’t found for the combination of the data and variable, should the data be used in the first place.

It is noteworthy that even an average rate per variable is simply a mathematical model with a linear form and a 0 intercept. Therefore, why is it OK to use an average rate when the data doesn’t seem to fit the variable? Table 2 summarizes the correlation coefficients of land use-variable combinations with 20 or more samples. As shown, only 30-40% of samples meet the statistical fit recommended by ITE. That means that less than 10% of total land use-variable combinations satisfy the guidance within ITE to be suitably statistically robust.

One variable that has a particularly poor statistical fit is acreage. Over 20% of land uses in the ITE Trip Generation Manual have the variable acreage, and acres comprise over 10% of the 358 land use-variable combinations within said manual. While having the variable acreage may be useful for order of magnitude trip generation estimates from areas with potential growth, its predictive

Table 1—Land Use-Variable Combination Sample Sizes by Time Period

<table>
<thead>
<tr>
<th>Sample Size</th>
<th>Weekday Adjacent Street (7-9) AM Peak</th>
<th>Weekday Adjacent Street (4-6) PM Peak</th>
<th>Saturday Peak Hour Generator</th>
<th>Weekday (24 hour)</th>
<th>Saturday (24 hour)</th>
<th>Sunday (24 hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>62</td>
<td>66</td>
<td>42</td>
<td>52</td>
<td>43</td>
<td>38</td>
</tr>
<tr>
<td>2-4</td>
<td>59</td>
<td>77</td>
<td>81</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>5-9</td>
<td>49</td>
<td>55</td>
<td>48</td>
<td>42</td>
<td>39</td>
<td>34</td>
</tr>
<tr>
<td>10-19</td>
<td>48</td>
<td>53</td>
<td>36</td>
<td>59</td>
<td>38</td>
<td>40</td>
</tr>
<tr>
<td>20-49</td>
<td>43</td>
<td>45</td>
<td>14</td>
<td>25</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>50-99</td>
<td>12</td>
<td>15</td>
<td>2</td>
<td>12</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>100+</td>
<td>7</td>
<td>9</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>280</td>
<td>320</td>
<td>224</td>
<td>265</td>
<td>208</td>
<td>196</td>
</tr>
</tbody>
</table>

Table 2—Statistical Fits for Land Use-Variable Combinations with 20 or More Samples

<table>
<thead>
<tr>
<th>R^2</th>
<th>Weekday Adjacent Street (7-9) AM Peak</th>
<th>Weekday Adjacent Street (4-6) PM Peak</th>
<th>Saturday Peak Hour Generator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>0.85</strong></td>
<td>14</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>0.75-0.84</td>
<td>10</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>0.55-0.74</td>
<td>11</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>&lt;0.55</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td><strong>0.85</strong></td>
<td>14</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>69</td>
<td>17</td>
</tr>
</tbody>
</table>

Continued on Page 11
abilities on specific trip generation are questionable.

To its credit, the ITE Trip Generation Manual does not purport to be anything other than an accumulation of data samples and equations. The ITE Trip Generation Handbook further warns practitioners of the importance of understanding where data is limited, and of the need to collect local data to supplement data in the manual.

Knowing this, it is incumbent on practitioners to thoroughly review and understand the data adequacy and fit for trip generation before using it for studies. It is necessary to review trip generation from every angle, and make the best judgement, given all the facts. Where equations are used, there are ranges where the results become unrealistic for extremely small or extremely large sites. In these instances, the practitioner may need to not use the equation. Where trip generation can be calculated a number of ways, the practitioner should look at the full range of results and make an appropriately conservative determination of which to use. One should always compare the size of what they are looking at versus the data from the ITE Trip Generation Manual.

Where statistical fits of data are not appropriate, it is possible to look to a subset of data based on size of site, region, or age of data in order to determine if an improved predictive ability is possible. The web-based program OTISS (www.otisstraffic.com) provides the ability to filter the ITE dataset and produce equations based on a portion of the data.

There are many means of gathering more information than is contained within the ITE Trip Generation Manual. Seeking additional articles by practitioners can be helpful, especially if data in the ITE Trip Generation Manual is limited. The ITE digital library affords the opportunity to review articles regarding a specific land use quite well. Customer counts or transaction histories from similar stores are sometimes readily available from applicants as well, and this can often provide information for more than just one day. Where possible, actual trip generation rates of similar sites should be considered. By leveraging video technology, the cost of collecting data can be dramatically reduced. For instance, we recently collected traffic counts at 3 Dunkin Donut stores with two driveways each from 7-9 am and 4-6 pm using video technology set for Automatic Traffic Recorder counting, which could be reported minute by minute after the fact. With one visit to the sites during each peak, we were able to determine parking occupancy for the entire peak, as well as trip generation, all for a data collection cost of less than $700. Adding this step to traffic impact studies when trip generation data is questionable would only marginally increase costs.

By means of example of the need to review all possible options available, consider the case of land use that is being constructed throughout the region, the Super Convenience Market/Gas Station. These stores tend to be between 5,000 - 6,000 square feet, and have 12-20 fueling positions. An article by Jina Mahmoudi regarding this land use was in the ITE Journal in June, 2012. Table 3 above contains a summary of trip generation for various Convenience Mart alternatives. As shown, the most likely ITE land use produces less traffic in the morning than a stand-alone convenience store without gas. This makes no intuitive sense whatsoever. In the case of a Super Convenience Mart/Gas Station, both uses can be described as primary. Consequently, a reasonable estimate of trip generation (which is similar to observed trip generation) can be obtained by determining trip generation for a 24 hour convenience store and 16 fueling position gas station separately, and assuming an internal capture of about 15% between the two uses (which was found in a recent traffic study at one site). The land use

<table>
<thead>
<tr>
<th>Land Use Category</th>
<th>Convenience Store Size</th>
<th>Morning Peak Hour</th>
<th>Evening Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>LU 853 - Convenience Mart with Gas</td>
<td>5,500 sf</td>
<td>225</td>
<td>280</td>
</tr>
<tr>
<td>LU 851 - Convenience Mart (Open 24 Hours), no Gas</td>
<td>5,500 sf</td>
<td>369</td>
<td>288</td>
</tr>
<tr>
<td>LU 945 - Gasoline/Service Station with Convenience Mart</td>
<td>5,500 sf</td>
<td>452</td>
<td>536</td>
</tr>
<tr>
<td>New Jersey sites from June, 2012 Article</td>
<td>4,980 sf</td>
<td>634</td>
<td>538</td>
</tr>
<tr>
<td>9 Recent Samples in New Jersey</td>
<td>5,506 sf</td>
<td>567</td>
<td>425</td>
</tr>
<tr>
<td>Convenience Mart (Open 24 Hours) + 16 fueling position Gas Station, 15% internal capture</td>
<td>5,500 sf</td>
<td>479</td>
<td>434</td>
</tr>
</tbody>
</table>
It is noteworthy that the article concluded that store size provided among the lowest statistical fit of all potential variables. Therefore, it may be more useful to look at raw trip generation regardless of size of facility. The relevant numbers are shown in Table 5. It is also necessary to recognize the wide range of data in the samples. Using the data below, one could conclude that adding a drive-through window would add 30-41 trips per hour during the morning peak hour. However, it would also be useful to measure some New Jersey samples, so that it can be compared to the 4 samples shown from said state.

One way that practitioners can help make the ITE Trip Generation Manual better would be to submit data to ITE. OTISS allows one to submit trip generation samples to ITE within about 10-15 minutes, even if one is not a paid subscriber. In researching for this article, I personally submitted 169 data points from 28 sites on land uses that included convenience markets with gasoline, day care centers, ice skating rinks, cemeteries, car washes, private schools, and coffee shops. Some of these land uses only had 1-2 data points for peak hours, meaning that these submissions have the potential to substantially improve how robust future ITE Trip Generation Manuals will be. If only 150 additional practitioners (remember that there are about 700 members in the Met-Section and about 15,000 ITE members worldwide) could provide a similar amount of data, the data samples used in the ITE Trip Generation Manual, which took over 40 years to compile, would be doubled!

Gordon Meth, PE, PP, PTOE, PTP is the Immediate Past Chair of the Northeast District of ITE. He is currently the Director of Traffic Engineering at NV5 and Governor of the New Jersey District of Kiwanis.

<table>
<thead>
<tr>
<th>Land Use Category</th>
<th>Trip Rate Basis</th>
<th>Morning Peak Hour</th>
<th>Evening Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>LU 936 - Coffee/Donut Shop without Drive-Through Window</td>
<td>per 1,000 ft</td>
<td>108.38</td>
<td>40.75</td>
</tr>
<tr>
<td>LU 937 - Coffee/Donut Shop with Drive-Through Window</td>
<td>per 1,000 ft</td>
<td>100.58</td>
<td>42.80</td>
</tr>
<tr>
<td>LU 938 - Coffee/Donut Shop with Drive-Through Window and No Indoor Seating</td>
<td>per 1,000 ft</td>
<td>303.33</td>
<td>75.00</td>
</tr>
<tr>
<td>4 samples from New Jersey Sites - no drive-thru</td>
<td>per 1,000 ft</td>
<td>99.53</td>
<td>32.54</td>
</tr>
<tr>
<td>1 sample from Rochester Area - no drive-thru (from June, 2011 ITE Article)</td>
<td>per 1,000 ft</td>
<td>38.76</td>
<td>not avail</td>
</tr>
<tr>
<td>12 samples from Rochester Area - with drive-thru (from June, 2011 ITE Article)</td>
<td>per 1,000 ft</td>
<td>49.04</td>
<td>not avail</td>
</tr>
</tbody>
</table>

Table 5—Trip Generation Totals for Coffee/Donut Shops

The ITE Trip Generation Handbook further warns practitioners of the importance of understanding where data is limited, and of the need to collect local data to supplement data in the manual.

It is noteworthy that the article concluded that store size provided among the lowest statistical fit of all potential variables. Therefore, it may be more useful to look at raw trip generation regardless of size of facility. The relevant numbers are shown in Table 5. It is also necessary to recognize the wide range of data in the samples. Using the data below, one could conclude that adding a drive-through window would add 30-41 trips per hour during the morning peak hour. However, it would also be useful to measure some New Jersey samples, so that it can be compared to the 4 samples shown from said state.

Continued from Page 11

category of Gasoline Station with Convenience Mart also seems to reasonably match the data. However, said land use usually has a convenience store component of only 400-2,800 square feet, and is consequently easily dismissed as not being relevant.

For a second example, consider the case of someone proposing to add a drive-through window to an existing Dunkin Donuts store. Table 4 contains a summary of trip generation rates for various land use categories involving Coffee/Donut Stores and Drive-Through Windows, as well as some actual data samples from New Jersey and an article from the ITE Journal in June, 2011. For the morning peak hour, it would appear that adding a Drive-Through Window to an existing store would drop the number of trips slightly – a conclusion that makes no intuitive sense. However, of indoor seating is removed as well as adding a drive-through window would nearly triple trips. This also makes little intuitive sense. The real samples show that samples in New Jersey align closely with the average rate from ITE, but that rates in the Rochester area are far lower.

Table 4—Trip Generation Rates for Coffee/Donut Shops

<table>
<thead>
<tr>
<th>Land Use Category</th>
<th>Store Size</th>
<th>Morning Peak Hour</th>
<th>Evening Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>LU 936 - Coffee/Donut Shop without Drive-Through Window</td>
<td>2,000 sf</td>
<td>217</td>
<td>81</td>
</tr>
<tr>
<td>LU 937 - Coffee/Donut Shop with Drive-Through Window</td>
<td>2,000 sf</td>
<td>201</td>
<td>86</td>
</tr>
<tr>
<td>LU 938 - Coffee/Donut Shop with Drive-Through Window and No Indoor Seating</td>
<td>100 sf</td>
<td>30</td>
<td>8</td>
</tr>
<tr>
<td>4 samples from New Jersey Sites - no drive-thru</td>
<td>2,140 sf</td>
<td>213</td>
<td>68</td>
</tr>
<tr>
<td>1 sample from Rochester Area - no drive-thru (from June, 2011 ITE Article)</td>
<td>2,090 sf</td>
<td>81</td>
<td>not avail</td>
</tr>
<tr>
<td>12 samples from Rochester Area - with drive-thru (from June, 2011 ITE Article)</td>
<td>2,488 sf</td>
<td>122</td>
<td>not avail</td>
</tr>
</tbody>
</table>
SAVE THE DATE!

Join RIITE for a roundtable discussion about Complete Streets!

GUEST SPEAKERS:
DOUG HAUSLADEN
Director of Transportation, Traffic, & Parking, City of New Haven, CT

ALEX KROGH-GRABBE
Executive Director, Rhode Island Bicycle Coalition

DONNA PERSONEUS
Executive Director, Thayer Street District Management Authority

STEVEN PARE
Commissioner, Providence Department of Public Safety

ROBERT ROCCHIO, P.E.
Managing Engineer for Traffic Design, Rhode Island Department of Transportation

TUESDAY
MAY 31, 2016
COMPLETE STREETS ROUNDTABLE

Presented by
Rhode Island Chapter of the Institute of Transportation Engineers

MAY 31, 2016
11:30AM – 1:30PM
CHELO’S
2225 POST ROAD
WARWICK, RI
Quarterly Photos

Photos from the Connecticut ITE Spring Meeting held at the Manchester Country Club in Manchester, Connecticut on April 6th.

Kwesi Brown presents Jay Koolis with the President’s Award.

Keynote speaker Tom Maziarz discussed CTDOT’s Complete Streets Policy.

2016 Officers Kevin Burnham, Joe Rimiller, Craig Yannes, and Kwesi Brown.

Congratulations to our Immediate Past President Joe Hallisey for completing the 120th Annual Boston Marathon in 3:17! This is his 3rd Boston Marathon in a row and his time qualified him to run again next year. Great job Joe!

Continuing Education Opportunities

As always, the Continuing Education Committee needs your feedback and fresh ideas for technical sessions and training opportunities that are innovative and that would draw significant interest to the Section membership. Most importantly, training opportunities that would serve you, the New England Section membership in the upcoming meetings and gatherings. If you have ideas for training sessions that would benefit the membership the most and have a high interest level, whether a half-day or full-day or training, please contact:

Douglas S. Halpert, EIT
dhalpert@theengineeringcorp.com

Welcome to the Newest ITE New England Section Members (as of April 28, 2016)

Heather Ann Georgallas, EIT (Greenman-Pedersen, Inc.)
Thomas Loughlin (BSC Group)
John J. Mastera, PE (Massachusetts Highway Department)
Douglas R. Small, EIT (Massachusetts Highway Department)
Yousef Alsharif (Northeastern)
Colin T. White, PE (Greenman-Pedersen, Inc.)
Stephen B. Haas, PE (Hoyle, Tanner & Associates)
Christine Carrigan, PE, Ph.D. (RoadSafe LLC)
Dana Benjamin, EIT (City of Cambridge, MA)
Brooke McKenna (City of Cambridge, MA)
Anna Stokes (Milone & MacBroom, Inc.)
Philip A. Corbett (CMA Engineers, Inc.)
Benjamin W. Wargo (Fitzgerald & Halliday, Inc.)
Jianhong Wang, PE (Milone & MacBroom, Inc.)
Tyler Grzegorczyk (CDM Smith)
Sarah Ebaugh (Northeastern University)
Andrew Fabiszewski (Northeastern University)
Steven Hock (Northeastern University)
Annabelle Dally (Conley Associates)
Tyler Kenji Wong (Northeastern University)
Mark Gravallese (Howard Stein Hudson)
Carl P. Duesler (University of Connecticut)
Alyssa M. Ryan (University of Massachusetts)
Eric Ryan Paquette (TEC, Inc.)
Kevin F. McCarthy (AECOM)
Christopher G. Clow, PE (Vermont Agency of Transportation)
Todd C. Law, PE (Vermont Agency of Transportation)
Nicholas Meltzer, PE (Vermont Agency of Transportation)
Briana Weisgerber (Stantec)

Total NEITE Membership: 562 persons
Come prepared to expand your horizons with four days of transportation know-how! The future of transportation is here. The ITE 2016 Annual Meeting & Exhibit is about embracing the rapid change occurring in our profession, meeting the challenges of new models and technologies, and being ready to take advantage of the immense opportunity offered by this new era.

http://www.ite.org/

ITE 2016 Annual Meeting and Exhibit
August, 14-17 | Anaheim, CA

Applications for the future October 1st - 31st, 2016 computer-based exams of Professional Traffic Operations Engineer (PTOE) and Professional Transportation Planner (PTP) are due August 4th, 2016.

Please note that applications received after the deadline will require an additional $75 late fee to process the application in addition to the application and examination fee that must accompany the application. TPCB will try to accommodate late applications but there is no guarantee they will be able to do so.

For a list of available exam cities, please visit:

Candidate for 2017 International Vice-President

Michael Sanderson, P.E., PTOE, LEED AP, FITE
President/CEO, Sanderson Stewart, Billings, MT USA
msanderson@sandersonstewart.com / @mpsanderson1 / Facebook / LinkedIn

The world of transportation is transforming before our eyes. Big advances in technology, generational demographic shifts, and globalization are among the many forces that will transform our profession. This type of change can either be a threat, or it can present great opportunities. To seize the opportunities, ITE must take a leadership role to ensure that our members have the right information, the right connections, and the right opportunities to succeed.

- Develop a strong ITE brand. ITE needs to clearly define its space among transportation organizations and then provide decisive leadership where it can be most effective.
- Leverage technology and social media. ITE must modernize its approach to service delivery and communication by better utilizing technology, fully embracing online and cloud-based platforms, social media, and mobile technology.
- Embrace & encourage diversity. In our changing profession, ITE must position itself as the organization of choice for professionals of all diverse origins and backgrounds.
- Define ITE’s global role. A global economy more strongly dominated by Asia and other emerging economies is impacting the transportation industry, even for those that never work outside North America. ITE needs to identify how it can best engage and support transportation professionals globally.
- Leadership. In our own organizations, in our profession, and in society, ITE members need to be the technical experts and the advocates leading the conversations and delivering the solutions to the transportation challenges of the 21st century.

ITE is the organization that I have devoted my career to serving for the last 20 years. I have served ITE as an elected leader at the chapter, section, district, and international levels, and I have served on many committees, task forces, and technical councils. I love ITE for what it has done for me professionally and for the many personal relationships I value so much. ITE is at a crossroads and change is needed for ITE to be successful into the future. With your help and collaboration, I look forward to applying my knowledge of ITE, along with my education and experience as a business leader, to effectively lead our Institute through this transformative time.
Chapter President: Francis Tainter

The UMass ITE Student Chapter hosted its 17th Annual Technical Day March on 24th-25th. The event was well attended by students and professionals from around the country, as we celebrated John Collura’s contributions to the field of transportation. In addition, this year’s event was held in conjunction with the Northeastern District Student Chapter Traffic Bowl Competition.

The two day event was filled numerous technical sessions, the student traffic bowl competition, an afternoon plenary session on the future of high speed rail in the U.S. by Dr. Joseph M. Sussman, and a keynote presentation by Dr. John Collura. Dr. Collura discussed his career in academia along with many interesting stories that were accrued along the way. The student traffic bowl competition involved two teams, UMass Amherst and Northeastern University. In the end, UMass Amherst prevailed and took home win, earning a spot in the Grand Championship in Anaheim, CA later this summer.

Looking forward, the chapter is hoping to send many of our students to the Northeastern District Annual Meeting in Portsmouth, NH. Further, the chapter is excited to send its traffic bowl team to the 2016 Collegiate Traffic Bowl Grand Championship to be held in conjunction with the ITE Annual Meeting in Anaheim, CA in August. Finally, the chapter is looking forward to continued success as well as improving its membership and activity in the upcoming year.
For Detailed Employment Opportunity Information, please visit: http://neite.org/job-opportunities/

VHB

At VHB, we’re invested in what we do, compelled by intellectual curiosity, and driven to work collectively to best serve our clients and help shape the future of our communities in a meaningful way. We’re proud, yet humbled, to have been doing this for 36 years. We are dedicated to making a positive impact, and providing opportunities to grow personally and professionally.

Senior Project Manager
South Burlington, Vermont

VHB has an immediate need for an experienced Transportation Engineering Project Manager to join our South Burlington, VT office, helping to manage complex and exiting transportation engineering projects across Vermont. The successful candidate must have broad knowledge in the delivery of transportation engineering assignments for State DOT’s, municipalities, and private sector clients. The person selected for this position will have a proven ability to manage complex projects, mentor staff, and develop new business.

Responsibilities include: lead, manage and develop a dynamic team of industry professionals; oversee relationships with key clients and manage important project assignments; serve as Engineer-of-Record, providing guidance to the team on select transportation projects; make key personnel decisions; and manage external visibility efforts.

Skills and abilities of successful candidate include: lead, manage and develop a dynamic team of industry professionals; be knowledgeable in a broad range of transportation engineering topics including design and construction of highways, urban streets, and intersections; excellent teamwork and collaboration skills, including ability to mentor staff while successfully managing complex, multi-disciplinary projects; demonstrate superior ability in collaborative problem solving with stakeholders, clients, and teammates; be a highly motivated self-starter; excellent verbal, written and interpersonal communication skills; strong presentation skills; and experience working with the Vermont Agency of Transportation is highly desirable.

Successful candidate will have 12+ years of relevant experience in transportation engineering, registration as a professional civil engineer in the State of Vermont (or the ability to obtain registration within six months) is required, and demonstrated experience managing other staff members.

Traffic/Transportation Engineer
South Burlington, Vermont

VHB’s South Burlington, VT office has an immediate opening for an enthusiastic, highly organized, detail-oriented Traffic / Transportation Engineer to join our experienced team of transportation engineers. The ideal candidate should possess a “can-do” attitude, excellent verbal and written communication skills, and an ability to work independently as well as with a team in a dynamic, fast paced, and innovative consulting firm. The position includes opportunities for personal and professional development and growth in joining VHB’s fastest growing office on the east coast.

The successful candidate should be familiar with all facets of transportation planning and traffic engineering including: transportation planning and corridor studies, highway and intersection scoping and design, traffic engineering, traffic signal timing, and signal system design.

Responsibilities include: develop mobility solutions which consider all users, including motorists, bicyclists, public transit users and pedestrians of all ages and abilities; prepare traffic impact studies, corridor studies, and intersection improvement studies; complete traffic safety and operational improvement studies for localized intersections and corridors; address community transportation engineering issues; perform traffic operational capacity analyses for isolated intersections, corridors and networks; conduct crash evaluations and develop crash diagrams; design of traffic control devices and construction-phase traffic management plans; and manage projects involving simulation and signal optimization plans using Synchro/SimTraffic, Vissim, or TransModeler.

Skills and abilities of successful candidate include: excellent communication (written and oral) and interpersonal skills; the ability to manage multiple assignments and work independently under minimal supervision; a strong work ethic with the desire to learn and achieve; the ability to train, mentor, and motivate staff; thorough knowledge and understanding of the Highway Capacity Manual, the AASHTO Green Book, and the Manual on Uniform Traffic Control Devices; and experience with MicroStation, InRoads, and/or AutoCAD Civil 3D is desirable.

Successful candidate will have 5+ years of increasingly responsible professional transportation engineering experience, bachelor’s degree in Civil Engineering, registration as a professional civil engineer in the State of Vermont (or the ability to obtain registration within six months), familiarity with engineering guidelines and standards, strong oral presentation, communication, and teamwork skills are essential, and experience working with both public and private sector clients is a plus.
Employment Opportunities

McMahon Associates, Inc.

McMahon Associates specializes exclusively in transportation planning, traffic engineering and design with 13 offices located along the East Coast (two in Massachusetts and one in Rhode Island) and a staff of 160 employees. Our local New England offices have immediate openings for a Project Manager, a Senior Project Engineer, and Staff Engineers.

The ideal candidate for the Project Manager position would have a Bachelor’s Degree from an accredited engineering program, 8+ years of experience in transportation engineering, and be a registered PE. The Project Manager’s responsibilities would include management of multiple projects, provision of technical quality control, preparation of plans, proposals, reports, specifications, schedules, invoices, and traffic analysis for various roadway improvement projects, participate in business development, and direct, supervise, and train staff.

The ideal candidate for the senior project engineer position would have a Bachelor’s Degree from an accredited engineering program, 5+ years of experience in transportation engineering and be a registered PE (or have the ability to obtain within 18 months). The responsibilities of the senior project engineer position would include preparation of plan sets, cost estimates and specifications for various roadway improvement projects, assist project managers with client contact, delegate work and mentor younger staff members.

The ideal candidate for staff engineer position would have an interest in traffic and road design and have a Bachelor’s Degree from an accredited engineering program, 0-5 years of experience and Engineer-In-Training preferred. The responsibilities of the staff engineer would include engineering analysis and designs, preparation of reports, specifications and plans, and coordination with technical staff.

For more information on these job opportunities, please contact Maureen Chlebek at mchlebek@mcmahonassociates.com.

Nitsch Engineering

Nitsch Engineering is looking for a dynamic Transportation Engineer with 4-8 years of hands on practical transportation engineering experience to join our team in the Worcester Office. With a 26-year history, we are an established mid-sized engineering firm that provides survey, civil/site, transportation, structural, GIS, and planning services to a wide variety of clients including developers, architects, universities, and state and municipal government agencies. As we continue to grow our market share, we strive to position ourselves and build on our successful model of client delivery by expanding our transportation engineering capabilities. To achieve this goal, we are expanding our geographic presence and we need talented and motivated individuals like you on our team.

If you have the required ambition and if you are ready for your next career adventure where you can make a difference, come and talk to us — the next step is up to you.

A bachelor’s degree in Civil Engineering and an EIT are required. A master’s degree in transportation engineering, and certification in LEED and/or ENV SP will be considered a plus. The candidate must have a PE in Massachusetts or the ability of obtain one within one year from the date of hire.

McMahon Associates, Inc.

Providing Quality Engineering Services to New England for Over 38 Years

- Bridge & Highway Design
- Traffic/Transportation
- Site Development
- Survey
- Civil & Structural Design
- Site Development
- Inspection/Review
- Water/Wastewater
- Construction Management
- Value Engineering

Maine
New Hampshire
Vermont
207-363-6669
603-658-4233
802-690-8370
www.cldeengineers.com

McMahon Associates specializes exclusively in transportation planning, traffic engineering and design with 13 offices located along the East Coast (two in Massachusetts and one in Rhode Island) and a staff of 160 employees. Our local New England offices have immediate openings for a Project Manager, a Senior Project Engineer, and Staff Engineers.

The ideal candidate for the Project Manager position would have a Bachelor’s Degree from an accredited engineering program, 8+ years of experience in transportation engineering, and be a registered PE. The Project Manager’s responsibilities would include management of multiple projects, provision of technical quality control, preparation of plans, proposals, reports, specifications, schedules, invoices, and traffic analysis for various roadway improvement projects, participate in business development, and direct, supervise, and train staff.

The ideal candidate for the senior project engineer position would have a Bachelor’s Degree from an accredited engineering program, 5+ years of experience in transportation engineering and be a registered PE (or have the ability to obtain within 18 months). The responsibilities of the senior project engineer position would include preparation of plan sets, cost estimates and specifications for various roadway improvement projects, assist project managers with client contact, delegate work and mentor younger staff members.

The ideal candidate for staff engineer position would have an interest in traffic and road design and have a Bachelor’s Degree from an accredited engineering program, 0-5 years of experience and Engineer-In-Training preferred. The responsibilities of the staff engineer would include engineering analysis and designs, preparation of reports, specifications and plans, and coordination with technical staff.

For more information on these job opportunities, please contact Maureen Chlebek at mchlebek@mcmahonassociates.com.

Nitsch Engineering

Nitsch Engineering is looking for a dynamic Transportation Engineer with 4-8 years of hands on practical transportation engineering experience to join our team in the Worcester Office. With a 26-year history, we are an established mid-sized engineering firm that provides survey, civil/site, transportation, structural, GIS, and planning services to a wide variety of clients including developers, architects, universities, and state and municipal government agencies. As we continue to grow our market share, we strive to position ourselves and build on our successful model of client delivery by expanding our transportation engineering capabilities. To achieve this goal, we are expanding our geographic presence and we need talented and motivated individuals like you on our team.

If you have the required ambition and if you are ready for your next career adventure where you can make a difference, come and talk to us — the next step is up to you.

A bachelor’s degree in Civil Engineering and an EIT are required. A master’s degree in transportation engineering, and certification in LEED and/or ENV SP will be considered a plus. The candidate must have a PE in Massachusetts or the ability of obtain one within one year from the date of hire.
WE ARE HIRING! Are you ready to step up and meet a new challenge and be a part of our extraordinary growth? Green International Affiliates, Inc. (Green), a multi-disciplined civil engineering firm providing transportation planning and engineering services, has several exciting opportunities for both Senior Transportation Engineers/Planners and Midlevel Transportation Engineers. Projects include evaluating Complete Streets, conducting Road Safety Audits, and developing Maintenance of Traffic plans for construction projects. Located conveniently off I-495 in Westford, MA, the firm currently serves the six New England states with a wide range of projects for both public and private clients. Marquis projects are now beginning for the region’s State Transportation Departments – you can be a part of them.

The successful candidates should have the following experience.

**Sr. Transportation Engineer/Planner**
Westford, Massachusetts

We are looking for a Senior Engineer/Planner with 5 to 10 years experience and who is looking to advance to a team leader position. The successful candidate should have experience in performing transportation planning studies, traffic impact studies for land development projects, evaluating Complete Streets, developing travel forecasts, completed traffic operational analyses using SYNCHRO, SimTraffic, HCS, SIDRA, etc.. The Candidate should also be experienced in conducting/overseeing safety audit studies, traffic signal operations and design, using AutoCAD and be very familiar with the MUTCD. Experience with State agencies is beneficial. Excellent writing and speaking skills are essential as the selected candidate will be responsible for preparing study and design reports for clients, interacting with internal project teams, state agencies, municipal review boards and clients as well as assisting the firm in the preparation of proposals.

**Transportation Engineer/Planner**
Westford, Massachusetts

The successful candidates should have experience in performing traffic operational analyses using SYNCHRO, SimTraffic, HCS, SIDRA, etc.. The Candidate should also be experienced in conducting safety studies, traffic signal operations and design, using AutoCAD (and/or Microstation) and be familiar with the MUTCD. Excellent writing and speaking skills are essential as the selected candidate will be responsible for preparing study and design reports for clients and interacting with internal project teams.

For Detailed Employment Opportunity information, please visit: [http://neite.org/job-opportunities/](http://neite.org/job-opportunities/)

Would You Like to Advertise in the New England Chronicle?

To become an official sponsor, please contact:
Rachel A. Dooley, PE
Chronicle Editor
rdooley@vhb.com

[http://neite.org/](http://neite.org/)
The New England Chronicle is interested in short articles on innovative projects and cutting-edge solutions.

Please send articles, listings (ITE and other relevant), graphics and photographs to the Editor: Rachel A. Dooley, PE at rdooley@vhb.com

The New England Section Chronicle staff thanks you and we hope you enjoy the issue.

REMINDERS

Those members of the New England Section that have not updated your personal and/or business contact information recently should visit the ITE website and do so. An updated contact directory allows the Section to properly send information emails, election information, and other details such as the NEITE calendar.

http://www.ite.org

For those members of the New England Section that would like to be included on the Section email list for Google Groups, please contact Samuel W. Gregorio, PE, PTOE at TEC, Inc.

sgregorio@theengineeringcorp.com