

UC Davis

Research Reports

Title

"I See Myself in that Career": Exploring Methods to Attract the Next Generation Transportation Workforce

Permalink

<https://escholarship.org/uc/item/82r0k1ch>

Authors

McFadden, Marissa
Ullman, Hannah
McRae, Glenn

Publication Date

2019-12-01

Data Availability

The data associated with this publication are within the manuscript.

“I See Myself in that Career”: Exploring Methods to Attract the Next Generation Transportation Workforce

December
2019

A Research Report from the National Center
for Sustainable Transportation

Marissa McFadden, University of Vermont

Hannah Ullman, University of Vermont

Glenn McRae, University of Vermont



National Center
for Sustainable
Transportation



THE UNIVERSITY OF VERMONT
TRANSPORTATION
RESEARCH CENTER

About the National Center for Sustainable Transportation

The National Center for Sustainable Transportation is a consortium of leading universities committed to advancing an environmentally sustainable transportation system through cutting-edge research, direct policy engagement, and education of our future leaders. Consortium members include: University of California, Davis; University of California, Riverside; University of Southern California; California State University, Long Beach; Georgia Institute of Technology; and University of Vermont. More information can be found at: ncst.ucdavis.edu.

Disclaimer

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the information presented herein. This document is disseminated in the interest of information exchange. The report is funded, partially or entirely, by a grant from the U.S. Department of Transportation's University Transportation Centers Program. However, the U.S. Government assumes no liability for the contents or use thereof.

Acknowledgments

This study was funded, partially or entirely, by a grant from the National Center for Sustainable Transportation (NCST), supported by USDOT through the University Transportation Centers program. The authors would like to thank the NCST and USDOT for their support of university-based research in transportation, and especially for the funding provided in support of this project. Much appreciation is also due the fourteen transportation environmental professionals who shared their career path and professional history with the authors.



“I See Myself in that Career”: Exploring Methods to Attract the Next Generation Transportation Workforce

A National Center for Sustainable Transportation Research Report

December 2019

Marissa McFadden, Transportation Research Center, University of Vermont

Hannah Ullman, MS, Transportation Research Center, University of Vermont

Glenn McRae, PhD, Transportation Research Center, University of Vermont



[page intentionally left blank]

TABLE OF CONTENTS

EXECUTIVE SUMMARY	ii
Introduction	1
Building on Foundational Transportation Career Development Initiatives	2
Personal Career Profiles as a Key Workforce Development Tool.....	6
Developing the Model	7
The Utility of Career Story Profiling: A Value Proposition for Profiles as a Career “attractant” and Guide for High School and College Students	7
The Tool.....	8
Discussion.....	12
Conclusion.....	13
References	14
Data Management	17
Appendix A: Career Profiles.....	18

“I See Myself in that Career”: Exploring Methods to Attract the Next Generation Transportation Workforce

EXECUTIVE SUMMARY

Predicting a workforce crisis for the past twenty years, the transportation field has launched a wide variety of initiatives to increase the future talent pipeline that would choose transportation as a field of choice for study and future careers. This project follows on the premise that increasing awareness of career opportunities is essential to attracting new entrants at an early age, and that awareness building should be dynamic. This includes providing views of who works in the transportation field, what their experiences are, and what they value about their work. This paper hypothesizes that first-person glimpses into transportation careers are just as essential for job seekers as knowing job specs, qualifications, pay scales and opportunities for advancement. In-depth career profiles of workers were developed and showcase individuals, from diverse backgrounds and interests, engaged in work critical to the future of our transportation systems and infrastructure as an inducement to consider future education and training work needed to enter such a field. A number of other initiatives have created occupation and career profiles in public and private agencies. As with other awareness building and talent pipeline development initiatives such efforts need to be made accessible to a wider more diverse audience and metrics for tracking their effectiveness should be developed and implemented. Coordinating and testing these efforts are part of a future stage of program.

Introduction

Critical Issues in Transportation 2019 highlights that “given the growing, shifting, and increasingly diverse population of the United States, the perspectives of a variety of racial and ethnic communities are needed to inform transportation planning and decision making at all levels,” and presents the challenge of “how can we best attract more students and professionals from underrepresented racial and ethnic groups to transportation?” (NASEM, 2018).

In expanding on the methods that transportation employers and policy makers have been developing over the past two decades to promote and improve the attractiveness and awareness of careers in transportation fields, the Northeast Transportation Workforce Center (NETWC) undertook a project to highlight career profiles of a diverse group of professionals in environmental transportation fields. This effort expanded on research for the National Transportation Career Pathways Initiative (NTCPI). Increasingly, employers have begun to use video and text profiles on their employment websites to provide greater connectedness to job seekers. Letting workers in the field speak as directly as possible to the next generation of workers has been increasingly promoted, putting new tools directly into the hands of future students and job seekers, as well as those who are critical in future career choices (e.g. parents, guidance and career counselors, educators). ITE is just one of the professional organizations creating content that allows a career seeker to hear directly from people they might identify with who are doing work that might inspire them (see ITE’s career promotional video www.youtube.com/watch?v=bVVp0t1hfQI, published June 10, 2011).

This project follows on the long-standing premise behind FHWA and other program investments that increasing awareness of career opportunities is essential to attracting new entrants at an early age, and that awareness building needs to be dynamic. This includes providing views of who works in the transportation field, what their experiences are, and what they value about their work. This paper hypothesizes that first-person glimpses into transportation careers are just as essential for job seekers as knowing job specs, qualifications, pay scales and opportunities for advancement. In-depth career profiles of workers were developed and showcase individuals, from diverse backgrounds and interests, engaged in work critical to the future of transportation systems and infrastructure as an inducement to consider future education and training needed to enter such a field. (See the Environmental Career Path Profiles page, www.netwc.net/ecpp/, at the NETWC site). This was a pilot effort to establish a basic pool of profiles that can be marketed to target audiences to determine whether this method achieves the goal of attracting new entrants to the field.

Career story profiles can serve to build relationships between people who are serving in professional roles and who are excited by their work and contributions, and new recruits, from younger, more diverse populations because they can physically see and read about professionals who are similar to them (Judge & Bretz, 1992; Mayfield & Keating, 2003). This concept is formally understood as the ‘similar to me’ effect, wherein applicants evaluate a job opportunity based on whether they perceive that they share a similar background, likes, and

dislikes with prospective coworkers (Heckert et al., 2002). Considering jobs in which an applicant can clearly see a fit between their values and those of the organization is a strong attractant (Judge & Bretz, 1992). Additionally, career story profiles help prospective future careerists to understand what they are likely to face in the field—and then to make the decision to work in a field, a particular organization within the field, or to not work in the field at all (Tang, Pan & Newmeyer, 2008). Career story profiles can provide a network of decision-making tools to:

1. Create awareness of a particular career within the field of transportation,
2. Spark a relational interest via the ‘similar to me’ effect, and
3. Help an individual to understand and become aware of which careers within the transportation field might best contribute to the growth of an individual’s knowledge, skills, and abilities in the workforce.

Seeing someone “similar to me” as a student can help them direct their career and educational path to that field, help with college persistence (Dennehy & Dasgupta, 2017), and may increase retention in the field. One company built a new career app (www.RePicture.com) to promote careers in the engineering field and extend outreach to underrepresented populations. The researchers have drawn on Expectancy-Value Theory to posit that stories of successful engineers, especially those that “look like” the students have a positive impact on attraction and retention in engineering studies (Mayo & Voter, 2019), a theory that the app adheres to.

Building on Foundational Transportation Career Development Initiatives

For more than two decades the transportation sector has been documenting and seeking to address an impending and now very real workforce shortage in people and skills (Martin, 2001; Warne 2003; Spy Pond Partners et. al., 2009; Cronin et. al., 2011; Cronin et. al. 2012; Cronin et. al. 2016). As early as 1997, studies began to anticipate the need for new recruitment and retention approaches due to significant demographic changes anticipated, both in the large number of current workers approaching retirement and the increasing diversity of the future workforce population. In his 1997 address, then Secretary of Transportation Rodney Slater announced a new initiative, the Garrett A. Morgan Technology and Transportation Futures Program (GAMTTEP). He stated that, “We are at a crossroads in the transportation field, with much of the seasoned workforce retiring and the demand for traditional and new skills expanding.” (TRB, 1998) The impending retirement of a significant portion of incumbent transportation workers (largely a male, white population) was identified, and while its actualization may have been a slower process, perhaps due to the 2008 financial crisis, the erosion of the workforce, and loss of experience and knowledge base, as well as numbers across all fields (e.g. construction, operations, planning) and modes was repeatedly documented in the subsequent decade and a half leading to a national strategy session (Martin, 2001; Martin & Glenn, 2002; TRB, 2003; Glenn, 2006; Spy Pond Partners et al., 2009; Cronin et al., 2011). This session was convened in 2012 by the USDOT in partnership with the Council of

University Transportation Centers (CUTC), and the Departments of Education and Labor. The broad industry challenge was framed in the Summit Summary report as the following:

Our nation's transportation system depends on a skilled and qualified workforce, yet the transportation industry is experiencing a growing number of challenges related to workforce recruitment, training, and retention. The transportation workforce requires a broader range of skills than in the past, as agency missions are changing and expanding and as new technologies continue to emerge. "Baby Boomer" retirements are a major challenge facing transportation systems, as 50 percent of the transportation workforce will be eligible to retire in the next ten years. Often, long-time employees are the only ones who possess the specialized knowledge and historical perspective critical to the efficient operation of transportation organizations. The loss of these highly skilled personnel is likely to result in skill gaps needed to perform mission critical tasks (CUTC, 2013).

With an acknowledgement that the future workforce will not look like the current one, summit participants agreed that there is a lack of awareness and effective branding that serves as an ongoing barrier to recruiting a young and diverse transportation workforce, with specific issues needing to be addressed to specifically attract a range of under-represented populations to the field, minorities and women, who represent the largest pools of untapped workers for the transportation field (CUTC, 2013).

Table 1. 2012 Transportation Workforce Summit Summary – adapted from final report (CUTC, 2013)

Challenge	Strategy	Action Item
<ul style="list-style-type: none"> • Lack of awareness of transportation career opportunities • Difficulty in integrating transportation content into existing school curricula and programs • Inconsistent efforts nationwide to increase awareness • Lack of a connection between educators and industry 	<ul style="list-style-type: none"> • Coordinate efforts at the state or regional level • Identify and work with champions within schools to introduce programs • Build a centralized clearing- house of K-12 transportation awareness and education efforts • Standardize the career path- way, beginning with elementary school students • Focus transportation curriculum on local industries and opportunities • Raise awareness beyond the classroom 	<ul style="list-style-type: none"> • Build on existing outreach programs, activities and publications • Develop tools to educate parents, teachers and school counselors about the industry • Create a web portal identifying educational opportunities, curricular and extracurricular transportation activities, industry internships, and career profiles • Address transportation opportunities in STEM courses beginning in elementary school • Work with parents, politicians and neighborhoods to reinforce the importance and relevance of transportation to youth

Published the same year, the NCHRP Report 693, focusing on attracting staff to Transportation Systems Operations and Management careers, surfaced parallel concerns and problems, and identified similar strategies (Cronin, et.al. 2012):

1. Implement annual or semi-annual Systems Operation & Maintenance (SOM) career days
2. Develop SOM curriculum content for related higher education courses and training programs
3. Implement student-worker internship programs with a job rotational component
4. Implement virtual pre-employment realistic job previews
5. Institute a mentoring program
6. Develop employees and maintain employee career pathways

7. Implement SOM succession plans
8. Recruit from non-traditional sources

Following the 2012 national summit (CUTC, 2013), investments and work focused on tools and collaborations to address the challenges that had been identified. In many cases the themes of investing in attracting new workers to the field through deepening familiarity of transportation careers and work in K-12 curriculum and informal education, as well as in early post-secondary education opportunities and programs was advanced. While USDOT's flagship program, GAMTTEP was not funded after 2011, and funding for the Transportation Education Development Pilot Program (TEDPP) ended in 2012, the outcomes of these programs informed the next investments and national effort pursued by FHWA: the funding of five Regional Surface Transportation Workforce Centers, the creation of the online magazine, Fast Forward, the National Transportation Career Pathway Initiative, and the Highway Construction Workforce Pilot program with AASHTO, American Road & Transportation Builders Association (ARTBA), and Associated General Contractors (AGC). At FHWA, a reorganization in 2016 created a focused Center for Transportation Workforce Development (www.fhwa.dot.gov/innovativeprograms/centers/workforce_dev/) under the Office of Innovative Program Delivery to oversee and advance these new, more substantial initiatives.

The regional centers took on a joint focus (see www.nntw.org) to identify barriers and advance collaborative initiatives to address more diversity in the workforce, working to build a new conduit for transportation workers across disciplines and regions of the country. This is perhaps best summarized in the forthcoming volume of *Empowering the New Mobility Workforce* (Reeb, 2019), featuring work by several of the centers (Ivey, 2019).

Parallel efforts, working more broadly in the engineering disciplines, and science, technology, engineering, and mathematics (STEM) more generally, have strengthened as well in the last five years and are having an impact on growing the diversity of the field, though as each organization points out there is significant work yet to be done:

- The growth of *WTS, Advancing Women in Transportation* (WTS, 2019), with more than 6,500 members worldwide, and the *Transportation You* mentoring programs and camps;
- The rapid expansion of the National Society of Black Engineers (NSBE, 2019), approaching 20,000 members, seeing a 10% growth from 2017-2018, with 33% of members now women, and the initiation of the NSBE Jr. pre-collegiate programs to expose students in grades 3–12 to high-quality STEM learning experiences;
- The convening of the 50K Coalition (50K Coalition, 2019) in 2016, a unique collaborative of 60 organizations with a national goal to produce 50,000 diverse engineering graduates annually by 2025;
- National Action Council for Minorities in Engineering (NACME, 2019), seeks to increase the representation of blacks, Latinos and native Americans in engineering in the U.S. It does so by providing scholarships and professional support for under-represented

minorities pursuing engineering degrees, looking to build an engineering workforce “that looks like America,” hosting “Engineered Stories for You,” and profiling multiple minority men and women prominent in different fields of engineering;

- Noting that Hispanics represent the fastest growing demographic in the U.S., The Society of Hispanic Professional Engineers (SHPE, 2019) is advancing strategies to bring more Hispanics into STEM careers where they are significantly under-represented;
- With more than 35,000 members, the Society of Women Engineers (SWE, 2019) provides training and development, networking, scholarships, and outreach and advocacy activities to support women entering and staying in the engineering disciplines. It hosts SWENext for student ages 13-18, providing mentoring and career development support, and has conducted or sponsored a number of recent studies to address gender disparities in engineering fields and barriers or deterrents to active consideration of such careers by young women (SWE-Research, 2019).
- The American Indian Science and Engineering Society (AISES, 2019) sustains 189 chartered college and university chapters, and 158 affiliated K-12 schools supporting American Indian students in the critically needed disciplines of Science, Technology, Engineering and Math (STEM), it has awarded more than \$11 million in academic scholarships to American Indian STEM students.

This work provides a hopeful foundation for diversifying the entrants to the disciplines needed in the current and future transportation workforce. It further emphasizes the need to more fully represent a range of career profiles and work that speaks to an increasingly diverse talent pipeline that will be the source of the next generation of transportation workers.

Personal Career Profiles as a Key Workforce Development Tool

Generating a pilot set of career profiles of individuals in the transportation workforce in environmental disciplines has utility to advance, on a pilot basis, what is an effective career profile, to launch a limited study of how it is received by key audiences, and create a template for adding future profiles and building out a broader tool set across multiple disciplines. A future initiative will be needed to make these available to career centers and environmental programs at community colleges, universities, and high schools in a focused effort to gather feedback on what is most effective in creating an attraction environment. Similar initiatives have been undertaken by the Southeast Transportation Workforce Center (see: www.memphis.edu/setwc/) with profiles in operation careers, and the West Region Transportation Workforce Center (see: wrtwc.org/center-initiatives/safety-career-pathways-spotlight/) with profiles in the safety discipline. The National Network for the Transportation Workforce (NNTW) is examining models to provide a more cohesive and common approach across disciplines in the future.

Developing the Model

The creation of profiles within the disciplines related to environmental practice in the transportation field was engendered by research on behalf of FHWA's National Transportation Career Pathway Initiative and the work on high priority occupations in the environmental disciplines undertaken by the NETWC (see netwc.net/ecpi/). FHWA's Environment Section identifies 18 fields in this very interdisciplinary discipline that are essential to success in the transportation field (see www.fhwa.dot.gov/resources/topics/environment.cfm). The project sought to identify individuals willing to tell their career story and have it shared, covering as many fields as possible. Given the limitations of time and access to research assistance, a targeted outreach effort included the University of Vermont Transportation Research Center's Advisory Group (See: www.uvm.edu/cems/trc/external-advisors) including public and private employers, Young Professionals in Transportation (YPT), and TRB Standing Committees on Resource Conservation and Recovery and Transportation and Land Development.

More than twenty individuals volunteered to participate and fourteen of them completed profiles (eight women and six men) through the process that included an interview with the field researcher, submission of supporting materials and photos, and review and editing of their profile. Eleven fields were covered in the profiles (sometimes more than one in an individual profile). Each of the individuals were between eight to fifteen years into their careers, and were able to speak to their work, the challenges and excitements, along with the paths that have simultaneously led them to, and prepared them to be, successful in their respective field. A set of leading interview questions were prepared to guide the discussions and ensure that all topics were covered, but in most cases, little guidance, other than "tell your story" was necessary.

The Utility of Career Story Profiling: A Value Proposition for Profiles as a Career "attractant" and Guide for High School and College Students

Ultimately, providing the story of individuals in the environmental transportation workforce, or any other subsector, seeks to humanize the jobs through introducing actual people working in this field. While the protocol used by the University of Vermont Transportation Research Center was perhaps more extensive, resulting in more comprehensive profiles, the idea of creating profiles in the field is well-established and gaining popularity. In addition to the career profile spotlights created by other workforce centers noted above, private employers are increasingly providing more information on staff throughout the organization, their background, specific projects they are working on, and interests (See for example the staff directory for Nelson Nygaard, nelsonnygaard.com/staff-directory/), video and other resources showcasing the work and applications that staff are involved in (See for example the job recruitment web page at Nelson Nygaard, nelsonnygaard.com/why-work-with-us/ and/or at VHB, vimeo.com/160639024). Public employers are similarly creating profiles and features in video and print that have workers explain what they do and why it is important, creating a virtual direct connection (See for example the Vermont State government recruitment page, careers.vermont.gov/content/Hear-our-Stories/?locale=en_US). National career resource centers have increasingly integrated video and print story profiles of workers along with job

specifications, credentials needed, and employment links (See for example US Department of Labor’s CareerOneStop resource page, www.careeronestop.org/toolkit/careers/occupations/Occupation-profile.aspx; or the national New Zealand government careers page, www.careers.govt.nz/jobs-database/animal-care-and-conservation/conservation/environmental-scientist/).

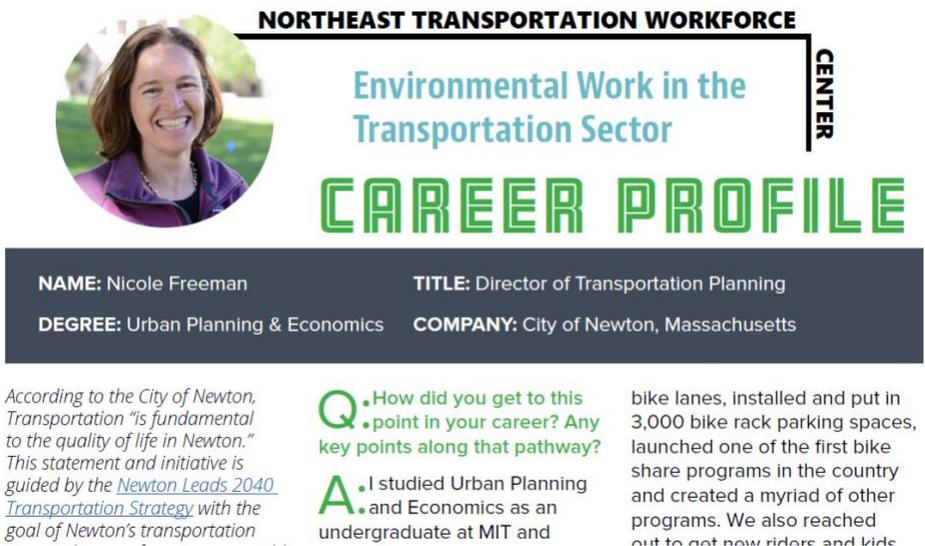
The Tool

Based on review of other profiles and tools, the decision was made to create a longer narrative covering the job and the pathways the individual took to get to that job, and retain as much of the first-person information as possible in the final product. Each profile was designed to have seven sections:

1. Individual profile, and interview
2. Overview of their organization
3. Job description
4. Overview of the “field”
5. Examples of projects
6. Links to national organizations or resource groups
7. Skills and requirements necessary to fulfill the job

Originally the profiles were designed to be a uniform 4 pages, but as the stories and materials were collected a number of the profiles were going to be longer given the deeper description provided by the participants. It was decided that the richness of the description length, in the spirit of maintaining the voice of the participant, would not be artificially curtailed, especially as these were being designed for web display, not print.

The intent of the design was to highlight the person as much as the job (See Figure 1). While an index of the profiles provides direct connection to occupations and fields, the profile itself displays the individual as the feature and seeks to connect people to people, first leading into a story that will be the basis for the reader to decide if there is a broader career connection.



NORTHEAST TRANSPORTATION WORKFORCE CENTER

Environmental Work in the Transportation Sector

CAREER PROFILE

NAME: Nicole Freeman **TITLE:** Director of Transportation Planning

DEGREE: Urban Planning & Economics **COMPANY:** City of Newton, Massachusetts

According to the City of Newton, Transportation "is fundamental to the quality of life in Newton." This statement and initiative is guided by the [Newton Leads 2040 Transportation Strategy](#) with the goal of Newton's transportation

Q. How did you get to this point in your career? Any key points along that pathway?

A. I studied Urban Planning and Economics as an undergraduate at MIT and

bike lanes, installed and put in 3,000 bike rack parking spaces, launched one of the first bike share programs in the country and created a myriad of other programs. We also reached out to get new riders and kids

Figure 1. Environmental Career Profile Header

Building the profile was an iterative process with the field researcher engaging the professional with questions and encouraging the building of a story that would be unique to the individual, but fit in a common format that would be recognizable across all profiles with the expectation that career exploration would take readers across multiple profiles.

The discussion questions were used in the profiles to create an outline and to allow the reader to scan and focus in on aspects of the story that most resonated with them, allowing for a coherent full reading of the profile, but also to accommodate the scanning and quick access of profiles that are expected to increase in number in the future.

Q. How did you get to this point in your career? Any key points along that pathway?

A. I studied Urban Planning and Economics as an undergraduate at MIT and Stanford (transferred), after which I worked part time as a bike planner at Stanford University while I pursued my first career as a professional

Q. What are some of your own personal characteristics and values that make you a good fit for this type of work?

A. I thrive in a dynamic fast-paced environment that requires a lot of multitasking with analytic projects. I thrive with highly complex, innovative,

Q. What does a day in the life of your position look like?

A. Yesterday was fairly typical. I had ten emails that required some thought and time. Usually there are questions from the mayor. Today's included whether to take a position on a specific transit project. I responded about

Q. Were there any experiences that helped to best prepare you for the work that you do?

A. Boston was just an amazing opportunity. Reporting to the mayor allowed us to get things done. It was a new and very progressive initiative and the mayor's

Q. What do you enjoy most about your job?

A. I enjoy some of the more complex projects where we are trying to bring in a new innovation. Transportation has flipped on its head in the last 10 years regarding the way transportation has changed. We are working to bring an electric vehicle car share to Newton. We

Q. What are some of your own personal characteristics and values that make you a good fit for this type of work?

A. I thrive in a dynamic fast-paced environment that requires a lot of multitasking with analytic projects. I thrive with highly complex, innovative,

Figure 2. Question & Answer in Environmental Career Profiles sample format

The profiles are intended to also provide clear occupational and career pathway information and guidance, so in addition to the story, they provide sections on the key occupation being highlighted, how it sits within the organization the professional works for, specific work that is conducted, how the discipline directly relates to working within transportation systems, and a broad review of abilities needed to be successful in the field.

Type of Projects Carried Out by the City of Newton, Massachusetts

DEDHAM-NAHANTON STREETS

Traffic Signalization project to upgrade traffic signal equipment, improve intersection alignment geometry, improve multimodal safety and operations and implement signal coordination.

WASHINGTON STREET CORNER

Conceptual design to improve safety and pedestrian accommodations, improve traffic flow, and ADA compliance.

NEEDHAM STREET

MassDOT led and funded project to pave and improve Needham Street. Project upgrades to traffic signal equipment, improves roadway alignment geometry, improves multimodal safety with projected bike lanes and crossings, and implements signal coordination.

About the City of Newton, Massachusetts

Environmental sustainability is one of Newton's main initiatives. This initiative is being achieved through the utilization of the City's designation as a "Green Community", implementation of energy initiatives, promotion of energy conservation efforts, and reduction of energy consumption throughout the City by 20% by the year 2020.

Since 2010, the City of Newton has set out to become a leader in environmental sustainability. Previous efforts toward this goal have been the adoption of the "Stretch Code" which requires higher energy efficiency levels in new construction and additions, and achieving "Green Community" status from the state.

Source: www.newtonma.gov/gov/executive/metrics/environmental_sustainability.asp

Figure 3. Example of Key information in Environmental Career Profiles

It was debated as to whether to specify a listing of knowledge, skills and credentials related to each position, but given the breadth of types of jobs and the rapidly changing nature of many of the fields the decision was made to simply provide a common guide to key skills and abilities that was generated in the National Transportation Career Pathways Initiative, as foundational areas that would be applicable across a number of types of jobs and career paths.

Key Skills

- ▶ **Reading Comprehension** – Reading work-related information.
- ▶ **Complex Problem Solving** – Noticing a problem and figuring out the best way to solve it.
- ▶ **Critical Thinking** – Thinking about the pros and cons of different ways to solve a problem.
- ▶ **Active Listening** – Listening to others, not interrupting, and asking good questions.
- ▶ **Judgment and Decision Making** – Thinking about the pros and cons of different options and picking the best one.
- ▶ **Coordination** – Changing what is done based on other people's actions.
- ▶ **Active Learning** – Figuring out how to use new ideas or things.
- ▶ **Systems Evaluation** – Measuring how well a system is working and how to improve it.
- ▶ **Systems Analysis** – Figuring out how a system should work and how changes in the future will affect it.
- ▶ **Time Management** – Managing your time and the time of other people.
- ▶ **Monitoring** – Keeping track of how well people and/or groups are doing in order to make improvements.

Abilities Needed for Success

- ▶ **Written Comprehension** – Reading and understanding what is written.
- ▶ **Oral Expression** – Effective spoken communication.
- ▶ **Written Expression** – Effective communication in written form.
- ▶ **Deductive Reasoning** – Using rules to solve problems.
- ▶ **Inductive Reasoning** – Making general rules or coming up with answers from lots of detailed information.
- ▶ **Oral Comprehension** – Listening and understanding what people say.
- ▶ **Problem Sensitivity** – Noticing when problems happen.
- ▶ **Fluency of Ideas** – Coming up with lots of ideas.
- ▶ **Near Vision** – Seeing details up close.
- ▶ **Originality** – Creating new and original ideas.
- ▶ **Information Ordering** – Ordering or arranging things.
- ▶ **Visualization** – Imagining how something will look after it is moved around or changed.

Figure 4. Key Skills and Abilities related to Environmental Career Profiles

Discussion

A number of implementation and evaluation questions emerged from this effort, including:

- How to put the profiles in front of different user audiences in a manner that will stimulate use and be controllable so that impacts can be measured;
- How to develop meaningful metrics that can demonstrate the extent to which student engagement with profiles can stimulate thinking about career opportunities and direction in any particular field;
- Whether text/photo profiles are effective or is there evidence that multi-media approaches (e.g. embedding video discussions with the professional, field videos showing the work and its impact, discussions with students who have chosen the track in a particular field) are more effective and whether they can be cost-effectively produced;
- And, should there be a concerted effort to identify a common format/template and branding initiative so that the transportation community is represented as an integrated discipline for future career seekers?

Transportation workforce development initiatives are spread across hundreds of programs at the local, state, and federal levels, in universities and community colleges, as well as public agencies and private companies. While FHWA brought together some programs under the Center for Transportation Workforce Development, that has not resulted in more program coordination, and specific federal programs still exist in FTA and USDOT's University Transportation Research Center program that have workforce development built in as an output for Center research agendas. The National Highway Institute, the National Transit Institute, and the Intelligent Transportation Systems Professional Capacity Building Program (ITS PCB) are all federal initiatives, along with multiple Centers of Excellence. AASHTO, the National Transportation Training Directors (NTTD), and the National Local Technical Assistance Program Association (NLTAPA) design and conduct training for hundreds of thousands of public transportation employees, and in some cases support outreach to local schools. On the private front, ASCE and ITE have extensive education and workforce outreach programs in addition to the many other associations noted above. While the 2012 National Transportation Workforce Development Summit brought together representatives from all of these fields and more to knit together a national strategy statement, most program initiatives still operate independently and little formal coordination has advanced. The crisis of a workforce shortage has been echoed continuously since the 1997 address by Secretary Slater. A common goal is to increase the proportion of the next generation of workers who understand the opportunities and value of transportation sector careers, however, little headway has been made to brand transportation as a field of choice for the future.

Conclusion

Producing in-depth profiles and stories about people working in the transportation disciplines is growing as a tactic. As with other awareness building and talent pipeline development initiatives, such efforts need to be made accessible to a wider more diverse audience and metrics for tracking their effectiveness need to be developed and implemented. Stories can imbue a field of work with understandable value to the community and to the professionals conducting the work. Methods for telling those stories need to be developed and tested. Coordinating and testing these efforts needs to be part of a future stage of program development. The stories themselves need to be reflective of not just people who are in the workforce now, but for the message that "I can see myself in that career" to resonate, the stories will need to showcase people who look like the next generation of workers and can speak directly to the values and interests of those who will be making those choices.

References

1. AISES, American Indian Science and Engineering Society, <https://www.aises.org/about>, (accessed 05312019).
2. Cronin B., Alexander A., Majumdar E. Executive Summary & National Overview: U.S. Transportation Job Needs and Priorities. Summary of five regional Job Needs and Priority Reports produced by the FHWA sponsored Regional Surface Transportation Centers. FHWA, Washington, D.C. 2016. http://netwc.net/wp-content/uploads/2018/02/FHWA-JNPR-National-Overview_2-4-16.pdf (accessed 07312019).
3. Cronin B., Anderson L., Heinen B., Cronin C.B., Fien-Helfman D., Venner M. (2011). Strategies to Attract and Retain a Capable Transportation Workforce. TRB's National Cooperative Highway Research Program (NCHRP) Report 685. The National Academies Press, Washington D.C., 2011. <http://www.trb.org/Publications/Blurbs/164747.aspx>.
4. Cronin B., Anderson L., Fien-Helfman D., Cronin C., Cook, A, Lodato, M., Venner M. Attracting, Recruiting, and Retaining Skilled Staff for Transportation System Management. TRB's National Cooperative Highway Research Program (NCHRP) Report 693. The National Academies Press, Washington D.C. 2012. <http://www.trb.org/Publications/Blurbs/166342.aspx>
5. CUTC (Council of University Transportation Centers), National Transportation Workforce Development Summit Report (2013) http://netwc.net/wp-content/uploads/2018/02/NTWS_Summary_of_Results1.pdf (accessed 07312019).
6. Dennehy T.C., Dasgupta, N. Female peer mentors early in college increase women's positive academic experiences and retention in engineering. Proceedings of the National Academy of Sciences, Washington DC, PNAS June 6, 2017, 114 (23) 5964-5969; first published May 22, 2017 <https://doi.org/10.1073/pnas.1613117114>
7. 50k Coalition, <https://50kcoalition.org/> (accessed 5312019).
8. Glenn, Vicki. Acting Now, Building for the Future. Public Roads. U.S. Department of Transportation, FHWA-HRT-06-004, Vol. 69, No. 6, May/June 2006. <https://www.fhwa.dot.gov/publications/publicroads/06may/04.cfm>
9. Heckert, T., Droste, H., Farmer, G., Adams, P., Bradley, J., & Bonness, B. Effect of gender and work experience on importance of job characteristics when considering job offers. *College Student Journal*, 2002. 36: 344–356.
10. Ivey, S. S. (2019). *Inspiring the Next Generation Mobility Workforce through Innovative Industry-Academia Partnerships*. In Empowering the New Mobility Workforce (T. Reeb, ed.). Elsevier Press, Amsterdam, The Netherland., 2019.
11. Judge, T. A., & Bretz, R. D. (1992). Effects of work values on job choice decisions. *Journal of Applied Psychology*, 1992. 77(3): 261-271.
12. Martin, C. (2001) Help Wanted – Meeting the Need for Tomorrow's Transportation Workforce. *Public Roads*. U.S. Department of Transportation, FHWA, Vol. 65, No.1,

July/August 2001.

<https://www.fhwa.dot.gov/publications/publicroads/01julaug/helpwanted.cfm>

13. Martin, C., and Glenn, V. (2002). Filling the pipeline. *Public Roads*. U.S. Department of Transportation, FHWA, Vol. 66, No. 3, November/December 2002.
<https://www.fhwa.dot.gov/publications/publicroads/02nov/02.cfm>
14. Mayfield, R.W. & Keating, C.B. Major Factors That Influence Employment Decisions of Generation X Consulting Engineers, *Engineering Management Journal*, 2003. 15: 2, 35-43.
15. Mayo, L., & Voter, C. B. *Board 15: Introducing Students to Engineering by Helping Them RePicture Their World*. Paper presented at 2019 ASEE Annual Conference & Exposition, Tampa, Florida, June 2019. <https://peer.asee.org/32265>
16. National Academies of Sciences, Engineering, and Medicine (NASEM). *Critical Issues in Transportation 2019*. Washington, DC, 2018. <https://doi.org/10.17226/25314>.
17. NACME, National Action Council for Minorities in Engineering, <http://www.nacme.org/about-us> (accessed 05312019).
18. NSBE, National Society of Black Engineers, http://www.nsbe.org/About-Us.aspx#.XUG_zuhKjSE (accessed 05312019).
19. Reeb, Tyler, ed. *Empowering the New Mobility Workforce: Educating, Training, and Inspiring Future Transportation Professionals*. Elsevier, Amsterdam, The Netherland, 2019.
20. SHPE, Hispanic Professional Engineers, <https://shpe.org/about/> (accessed 05312019).
21. SWE, Society of Women Engineers, <https://swe.org/> (accessed 05312019).
22. SWE-Research, Society of Women Engineers Research, <https://research.swe.org/> (accessed 05312019).
23. Spy Pond Partners, Martin B, ERS Associates, Randolph Morgan Consulting. NCHRP Report 636: Tools to Aid State DOTs in Responding to Workforce Challenges. Transportation Research Board, Washington D.C., 2009.
<http://www.trb.org/Publications/Blurbs/161795.aspx>
24. Tang, M., Pan, W., & Newmeyer, M. D. (2008). Factors Influencing High School Students' Career Aspirations. *Professional School Counseling*, 2008. 11: 285-295.
25. TRB-Transportation Research Board. Proceedings of the Intermodal Transportation Education and Training Conference. Washington D.C., 1998.
<https://trid.trb.org/View/488063>.
26. TRB-Transportation Research Board. TRB Special Report 275: The Transportation Workforce Challenge: Recruiting, Training, and Retaining Qualified Workers for Transportation and Transit Agencies. Committee on Future Transportation Agency Human Resource Needs. The National Academies Press, Washington, D.C. 2003.
<http://www.trb.org/Publications/Blurbs/152777.aspx>

27. Warne, T.R. NCHRP Synthesis 323: Recruiting and Retaining Individuals in State Transportation Agencies: A Synthesis of Highway Practices. Transportation Research Board, Washington D.C., 2003.
28. WTS, Advancing Women in Transportation, www.wtsinternational.org/ (accessed 05312019)

Data Management

Products of Research

Career path profiles of fourteen transportation professionals working in different environmental disciplines.

Data Format and Content

Career path narratives.

Data Access and Sharing

The profiles are accessible on the website of the Northeast Transportation Workforce Center at <http://netwc.net/ecpp/>.

Reuse and Redistribution

Other organizations and researchers are welcome to use the profiles in their research, education, or career development programs, link directly to the site from their websites, and reference them in works related to the subject.



Environmental Work in the Transportation Sector

CAREER PROFILE

NAME: James Brady

TITLE: Senior Environmental Biologist

DEGREE: Ecology

COMPANY: Vermont Agency of Transportation (VTrans)

Vermont has an extensive multimodal transportation system. With oversight from the Vermont Legislature, the Vermont Agency of Transportation (VTrans) is responsible for planning, development, implementation, and maintenance of a variety of transportation infrastructure including, but not limited to, roads, bridges, state-owned railroads, airports, park and ride facilities, bicycle facilities, pedestrian paths, public transportation facilities and services, and Department of Motor Vehicles operations and motor carrier enforcement. VTrans serves the entire population of the State of Vermont.

Source: vtrans.vermont.gov/about

Q. What is your current role at the organization?

A. I am at the Vermont Agency of Transportation and I am a Senior Environmental Biologist-- there are two of us that cover all of Vermont. I cover the southern half of the state. We review basically every single transportation project for natural resources-related concerns. And that can range from doing

resource identification during the scoping process all the way through environmental permitting with the Army Corps of Engineers, the VT Wetlands Office, VT Fish and Wildlife. We've been recently starting to get plugged into corridor planning—which means that we are getting looped in early into more long-term processes.

When we are thinking about issues like wildlife connectivity on a regional scale, it requires a lot of information gathering and a lot of evidence showing that a project might be eligible for upgrading, due to wildlife concern not just transportation concerns. So I've been here about eight years and in that time frame, we've been really integrated into the entire life of a project, which is pretty neat. There are very few positions within this agency where somebody might be involved from scoping all the way to post-construction, so it's kind of a unique part of my job, which I really enjoy. NEPA (National Environmental Policy Act) review

and environmental permitting are the bread and butter, that's why the job exists.

And then, beyond that, I am involved heavily with wildlife connectivity issues related to the transportation network and research-related work. We have several on-going wildlife-related studies specific to the Vermont transportation network. We are using that information to integrate into our design reviews. Going above and beyond what most states do—it's becoming the norm to think about wildlife in the transportation network, but it's still not everywhere yet. It's definitely still an emerging science even though it has a lot of public support, at least in the Northeast.

Q. How did you get to this point in your career? Any key points along that pathway?

A. So, starting back in my undergrad at UVM (The University of Vermont), I had a unique transition that fits well into my current role. I

actually started out studying civil engineering. Half way through I just realized that it wasn't for me. I switched into the Rubenstein School and I graduated with a degree in ecology. So after graduating, I landed an internship with the U.S. Fish and Wildlife Service in New Jersey. I did that to kind of spring board into additional seasonal jobs which took me up to the north shore of Massachusetts, in Ipswich, working for a land trust (The Trustees of Reservations) doing similar but new and additional work related to coastal birds and their nesting—and protecting their habitats. It was a lot of fun—basically hiking the beach and inventorying bird colonies and doing nest counts, counting chicks and keeping an eye on them. These were all threatened and endangered species so they had reporting requirements for properties that had endangered birds on them. I did that for three field seasons. Basically, for four years after college, I was bouncing around from seasonal position to seasonal position. And these were pretty low-paying jobs. They often would provide housing, which made them viable positions. The field of natural resources historically, doesn't pay a ton. And you're basically competing with people who are willing to do the work for free as a volunteer. So, you find yourself wanting to start a career path but there is so much interest from folks all over, they can

almost justify having these low paying jobs to get the people they need. So, you're basically getting the experience and then you are able to use that experience to finally get a job—like I did—at a place like VTrans. I got a job here at VTrans as an environmental specialist. Which is more general, but definitely related to the natural resources background that I had. But it also kind of got me into the world of cultural resources, which I did not really have any experience in. I thought that this was very interesting and something that people don't often think about.

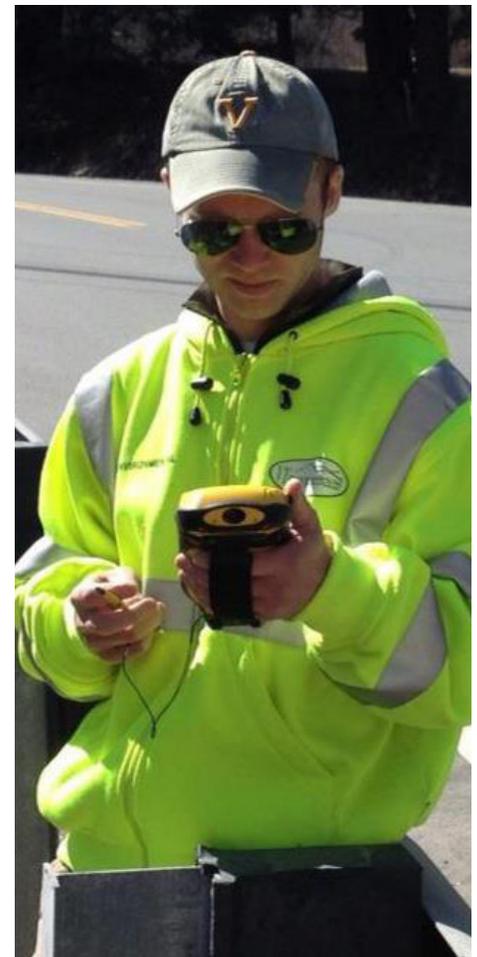
Luckily, I got that job. That was in 2011 and then my day-to-day was doing NEPA review and making sure permitting was checked off for each of the places it needed to be. There were a lot of administrative tasks involved with that but also a lot of ability to dig deeper into the environmental world related to transportation. I was able to start my career path in wildlife connectivity, at that point, as a focus. That job let you have a focus as a specialty and I kind of used my wildlife background to do a lot more research into wildlife connectivity and transportation.

Using my wildlife background over the years, I was able to leverage that and continue an education in wetlands and GIS to get the biologist position when that opened up about three years ago. It was just a

lot of patient waiting and taking opportunities as they came up that got me to where I am now. Three years into the biologist position and there is a great deal that I can do internally for that—but I've been in the position long enough where I feel comfortable.

Q. Were there any experiences that helped to best prepare you for the work that you do?

A. During my job at the Trustees of Reservations in Massachusetts, I was able to run a field crew that included folks from college-graduates down to high school students. I



feel like the level of experience and level of commitment from those staff members varied quite a bit and it kind of started the beginning of my experience with dealing with different personalities, different work ethics, and different work methods that I think is transferable forever—in and out of the professional career. When you are dealing with so many different types of personalities, it is critical to figure out how best to work with each person. There's only so much you can do to get somebody to follow a prescription for a job, or a method. But, you need to allow them to be themselves too. So that experience really early on helped me in my career. During that same job, I was kind of starting public speaking—in the environmental specialist job there was an opportunity to speak at a conference or an engagement or anywhere really.

I tried to take each one as they came along. Now, I have a lot of confidence going into meetings or conferences where I am invited to speak. Not only is it a skill, but it gets your name out there in a way that you couldn't do without putting yourself out there in that public eye. So that's the huge one, for me. Those opportunities and the skill sets that I gained from them have really broadened my horizons. It's been tremendous fun—though at first, terrifying.

Q. What does a day in the life of your position look like?

A. In winter, I wouldn't want somebody shadowing me. We are still in the thick of winter and there is snow everywhere. There's not much to do in the field. It's pretty boring. It's a lot of big-picture thinking—kind of like prepping for the field season. But throughout the year,

it varies.

But a typical day would kind of be going to our database of projects that come through and sorting by due date to see what reviews or permits are required—and setting up the next couple of weeks or months in terms of scheduling site visits as needed and coordinating with regulators and then hopefully, on a good day, we are out in the field delineating a wetland or walking up and down a stream. During the summer, we are driving around a lot—which is great because we are living in Vermont. I don't know if this would necessarily be as great if we lived somewhere else. We are pretty lucky to be where we are. But then, we have to take that data that we collect in the field and produce results. That is the desk part of the job. Depending on the season, it can be pretty varied. There can be weeks where we are in the field almost every day. And this time of year, we are stuck behind a computer pretty exclusively. There is no normal day but I think that they variety helps because it keeps things interesting and fresh.

Q. What skills have you gained in the work? Are these unique or transferable to other disciplines?

A. This position has allowed me to coordinate, on a professional level, almost every type of job that I can think of related to the transportation



industry and natural resources field; and they all speak different languages. So being able to interpret a transportation project from an engineer and provide that information to coordinate with regulators in the natural resources world is a skill-set that I've developed over this job. It's unique experience because there are not a lot of people in that role that have to funnel natural resources-related information to all kinds of different agencies. This also falls the other way in terms of understanding wildlife terms and relaying impacts to transportation agencies to mitigate impacts to natural resources. Being able to do this is a clear skill-set needed to be successful in this job.

Q. What do you enjoy most about your job?

A. There are a lot of great things. Obviously, going out in the field is wonderful. I get to see all parts of Vermont that you don't really get to. It forces us to get all over the state. A lot of this wildlife work gets us interacting with professionals from all over North America, and even other parts of the world, to do this research related to transportation and wildlife connectivity. It's been really exciting because there are so many incredible people that I have been able to interact with and collaborate with. This is one of the things that goes above and beyond our typical day-to-day tasks.

Q. What are some of the challenges you have faced in the work? How did you overcome them?

A. One of the challenging parts of this job is that we operate under a project schedule that is set up years in advance. It is our agency's goal to meet that schedule by delivering a project in a set period of time. We are under constraints that way and we often have variables in our review, like permitting, that can be pretty time consuming and take up to six months to get. But not every project needs that and so we have to figure this out in order to keep projects on track. This can be a tricky needle to thread without jeopardizing a resource or requiring changes at the end. It's pretty difficult and at times, it can be really stressful trying to get our piece of the puzzle to fit. And then of course, it is a transportation and engineering-heavy agency. So, natural resources are considered and included in design but making the most with the state's limited budget in terms of repairing and maintaining our transportation network is hard to do. And then, if there are issues related to natural resources, it can often times increase the cost of a project. So its challenging to figure out when this needs to be integrated and it can be kind of stressful because we need to make sure that we are really confident that a project might

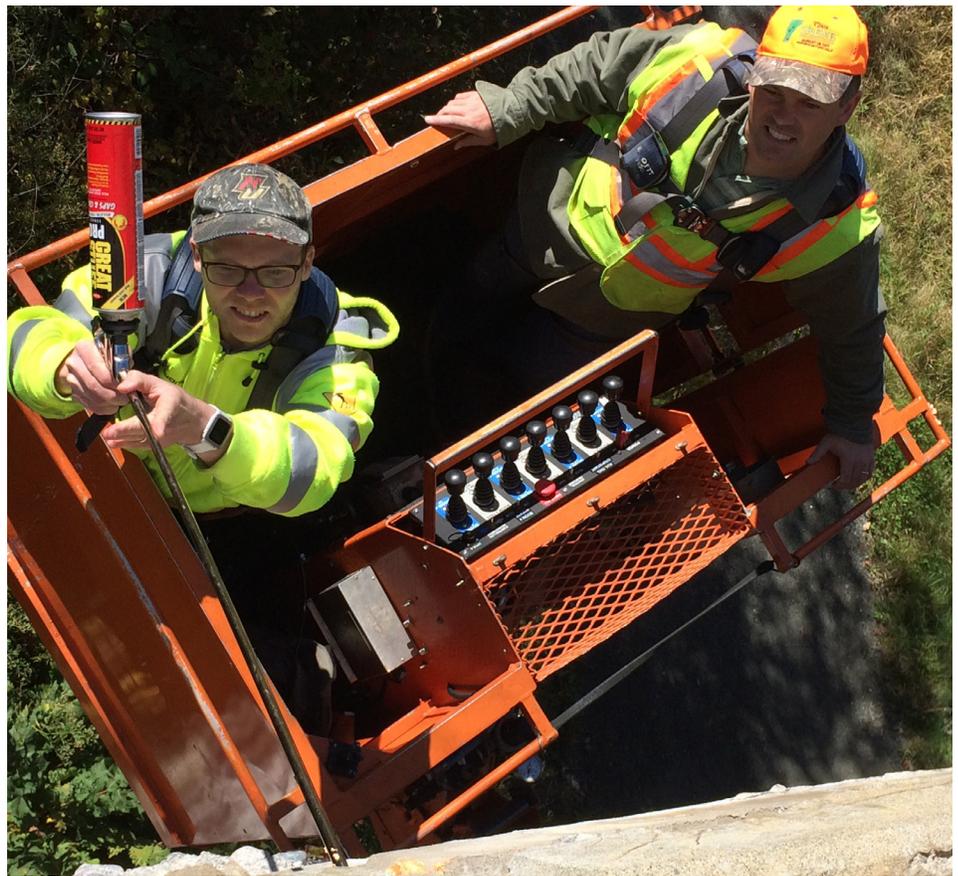
be worth an extra investment, in terms of natural resources, when the budget is so limited. But this can also be really rewarding. Once we have that trust from the designers and project managers, it feels really good.

Q. What are some of your own personal characteristics and values that make you a good fit for this type of work?

A. I come from a natural resources degree in ecology, this is a passion of mine. But, I have a strong and very legitimate interest in the transportation world. I've always been interested in it. I love driving around, and this is the background that initially got me into civil engineering. I totally understand the value in the work that is being done that is directly related to transportation and how important a role that plays into our economy and a Vermonter's day-to-day life where you basically have to drive in a rural state. It's pretty much the reality as public transportation is really difficult in a rural setting. So, totally understanding the need and the value and also the constraints of having a small population to support with tax money and the large amount of infrastructure that we have; and understanding how difficult it is to maintain that infrastructure with the small amount of financial resources and tax payers that we have (relative to other states) in particular.

But then also, understanding that as climate change continues to march seemingly out of control right now—there is more of a need than ever to provide a permeable transportation network for terrestrial wildlife in particular. So, allowing our wildlife to move into different parts of our region without getting blocked by the interstate or state roads is critical for the genetic exchange and long-term survival of a lot of species that cannot adapt as easily to the changing environment. Being able to understand the constraints of the transportation network and the costs, but also understanding that there is critical value in a lot of these natural resource concerns that people understand and buy into, and commit to while understanding that our roads could actually be in better shape. It's a hard needle to thread and I try my hardest to do that and be successful in lobbying for those resources to our engineers and our natural resources communities wherever it makes the most sense to place our interests and money. Being able to not just think project-by-project, but being able to think regionally. I think that this is a skill set that has allowed me to be successful in these contexts that not everybody would be completely comfortable with, especially with our financial constraint.

Q. What is something that you want people to know



about the work that you do?

A. I would say be willing to travel for work and be very open to the type of work. If you have some interest in the work, consider it. So for me, I lived in New Jersey and then I moved to the north shore of Massachusetts. I took a job before I even visited the site—I knew it was a good job, so I took a leap of faith and it worked out pretty tremendously. I use the experiences that I gained there, to this day. I think, if you can make it work, seasonal positions are an excellent way to build experience much faster than potentially an entry-level job at a bigger firm or agency.

Obviously, there are a lot of constraints with paying

for college loans and health insurance, but if you can make it work, it's definitely worth it. It gets incredibly frustrating to essentially be laid off every season; and then every season, was like having to find a whole new job. It was extremely stressful, but it was temporary and it was really important to think of it as temporary. It was worth it in the long run. It's stressful, it's frustrating, but also, those jobs can be a lot of fun. You're in the field a lot, doing the hands on work, getting dirty, riding around in ATVs, and all that cool stuff. It was huge to power through those trying times when you weren't sure where your next job would come from. It was tough, but worth it.

↪

Overview of Position as it Relates to Transportation

Transportation-related impacts to wildlife, plants, and endangered species typically may occur because of road construction, tree clearing, wetland impacts, or other impacts to plant and animal habitat.

Impacts to fish, wildlife, plants, and rare species are regulated at the state level through the Vermont Fish and Wildlife Department, and at the federal level through the US Fish and Wildlife Service and other federal agencies. Laws and regulatory programs pertaining to fish, wildlife and plants are created in partnership with transportation agencies. Some examples of these laws and regulations are: impacts to state-listed rare species, impacts to federally listed rare species, impacts to wildlife from federally funded projects, and impacts to migratory birds.

Source: vtrans.vermont.gov/environmental-manual/permitting/fish-and-wildlife

Environmental Biologists

Biologists with a specialty in transportation are typically responsible for coordination with the state transportation department on transportation-related projects and programs: 1) help complete DOT environmental assessment and permits 2) Development of evidence-based information, strategies, management practices, communication and coordination addressing collisions and wildlife crossings. They also provide technical and site-specific consultation

and training to staff and contractors to develop and implement connectivity priorities, mitigation, and improvement projects on state highways. Additionally, they assist in the design of road projects to restore and improve wildlife while determining the impacts of roads and highways while creating criteria for wildlife crossing design.

James is responsible for natural resource review and clearances on all transportation projects in Southern Vermont; and the agency lead on wildlife and transportation connectivity initiatives. Additionally, James is the primary contact for all ecology related resources associated with the VT transportation network; serves on development

and implementation teams for three major photo monitoring studies for wildlife throughout Vermont; serves as agency representative; and is the in-house GIS specialist for the agency's Environmental Section.

About the Vermont Agency of Transportation

VTrans works to provide safe and efficient movement of people and goods with the vision of

a safe, reliable, and multimodal transportation system that promotes Vermont's quality of life and economic well-being. This includes providing a safe and resilient transportation system that supports the Vermont economy to preserve, maintain, and operate the transportation system in a cost effective and environmentally responsible manner; and to provide Vermonters with efficient travel options.

Source: vtrans.vermont.gov/about/mission-and-vision

Fish, Wildlife & Rare Species

"As climate change continues to march seemingly out of control right now—there is more of a need than ever to provide a permeable transportation network for terrestrial wildlife in particular. So, allowing our wildlife to move into different parts of our region without getting blocked by the interstate or state roads is critical for the genetic exchange and long-term survival of a lot of species that cannot adapt as easily to the changing environment."

—James Brady

Overview of General Skills and Requirements for an Environmental Biologist

Environmental biologists are required to have skills regarding communication, critical-thinking, emotional stamina and stability, interpersonal skills, observation skills, outdoor skills, and problem-solving skills. These skills are important for disseminating knowledge to the public, academics, and policymakers. Biologists also need reasoning and judgment to draw conclusions from their own experimental results and observations. It is also important for biologists to have the ability to work, problem-solve and communicate on teams that often operate in the outdoors.

Biologists require certain credentials. For the field of wildlife conservation/environmental biology, an entry-level position requires a bachelor's degree. For higher-level investigative or scientific work, a master's degree is needed. Additionally, to lead independent research or to occupy a university research position, a Ph.D. is necessary.

Looking to the future, employment of biologists is expected to grow 8 percent from 2016 to 2026—

this is average for the majority of occupations. Biologists will be needed to study human wildlife interactions as the human population continues to grow. Human development and growth will impact wildlife and their natural habitats. It is predicted that because most funding for this work comes from government agencies, demand for biologists will be limited by budget, although this is the expectation for most occupations funded by the government.

Source: Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, Zoologists and Wildlife Biologists, www.bls.gov/ooh/life-physical-and-social-science/zoologists-and-wildlife-biologists.htm

Type of Projects Carried Out at the Vermont Agency of Transportation

ROAD ECOLOGY & CLIMATE CHANGE ADAPTATION

Two presentations were made at the 2017 Conference on Road Ecology & Climate Change Adaptation: "Successes in Road Ecology: Partnerships and Training in Vermont" and "Lessons Learned in Vermont Following Tropical Storm Irene."

ECO-LOGICAL

VTrans contributed to a Federal Highway Administration 2015 Eco-Logical Webinar Series with the presentation, "Vermont's Staying Connected Initiative: A Partnership to Advance Landscape-Scale Conservation."

ANIMAL CROSSINGS

James was interviewed in 2015 by journalist Jane Lindholm on Vermont Public Radio's Vermont Edition which was titled, "Animal Crossings: Sharing Roads with Vermont Wildlife."

WILDLIFE MOBILITY

James was interviewed in 2013 by journalist Joel Banner Baird with the Burlington Free Press for an article titled, "A study shoots for improved wildlife mobility across our roads."

GLOSSARY

- ▶ **Wildlife Corridor** – an area of habitat connecting wildlife populations separated by human activities or structures.
- ▶ **Resilient Transportation System** – the ability of a transportation system to move people around in the face of one or more major obstacles to normal function (e.g. natural disaster or crash).
- ▶ **NEPA** – National Environmental Policy Act, environmental law that promotes the enhancement of the environment and established the President's Council on Environmental Quality (CEQ).

Key Skills

- ▶ **Reading Comprehension** – Reading work-related information.
- ▶ **Complex Problem Solving** – Noticing a problem and figuring out the best way to solve it.
- ▶ **Critical Thinking** – Thinking about the pros and cons of different ways to solve a problem.
- ▶ **Active Listening** – Listening to others, not interrupting, and asking good questions.
- ▶ **Judgment and Decision Making** – Thinking about the pros and cons of different options and picking the best one.
- ▶ **Coordination** – Changing what is done based on other people’s actions.
- ▶ **Active Learning** – Figuring out how to use new ideas or things.
- ▶ **Systems Evaluation** – Measuring how well a system is working and how to improve it.
- ▶ **Systems Analysis** – Figuring out how a system should work and how changes in the future will affect it.
- ▶ **Time Management** – Managing your time and the time of other people.
- ▶ **Monitoring** – Keeping track of how well people and/or groups are doing in order to make improvements.

Abilities Needed for Success

- ▶ **Written Comprehension** – Reading and understanding what is written.
- ▶ **Oral Expression** – Effective spoken communication.
- ▶ **Written Expression** – Effective communication in written form.
- ▶ **Deductive Reasoning** – Using rules to solve problems.
- ▶ **Inductive Reasoning** – Making general rules or coming up with answers from lots of detailed information.
- ▶ **Oral Comprehension** – Listening and understanding what people say.
- ▶ **Problem Sensitivity** – Noticing when problems happen.
- ▶ **Fluency of Ideas** – Coming up with lots of ideas.
- ▶ **Near Vision** – Seeing details up close.
- ▶ **Originality** – Creating new and original ideas.
- ▶ **Information Ordering** – Ordering or arranging things.
- ▶ **Visualization** – Imagining how something will look after it is moved around or changed.



This material is based upon work supported by the Federal Highway Administration under Agreement No. DTFH6114H00025 & DTFH6116H00030. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the Federal Highway Administration.



Environmental Work in the Transportation Sector

CAREER PROFILE

NAME: Emma Chapman

TITLE: Bike Train Operator

DEGREE: History of Art and Political Science, Architectural History & Urban Studies

COMPANY: Divvy Bicycle Share, Motivate International, Inc.

“Divvy is Chicagoland’s bike share system, with 6,000 bikes available at 570+ stations across Chicago and Evanston. Divvy provides residents and visitors with a convenient, fun and affordable transportation option for getting around and exploring Chicago.

Divvy, like other bike share systems, consists of a fleet of specially designed, sturdy and durable bikes that are locked into a network of docking stations throughout the region. The bikes can be unlocked from one station and returned to any other station in the system. People use bike share to explore Chicago, commute to work or school, run errands, get to appointments or social engagements, and more.

Divvy is available for use 24 hours/day, 7 days/week, 365 days/year, and riders have access to all bikes and stations across the system.”

Source: www.divvybikes.com/about

Q. What is your current role at the organization?

A. I work for Chicago’s public bike share system, Divvy, which is actually the “newest” advancement in

public transportation—a mature established industry. Bike share actually showed up in the 1960s but didn’t take off; operational and management challenges prevented success, but in the last five years has made a comeback in many cities following urban trends with better management, maintenance, systems, equipment, and operations.

Divvy started in 2013, and I started working there in June 2018 as a “rebalancer”. I actually moved to Chicago the week before Divvy started, so I witnessed Divvy’s roll-out and have seen Divvy grow. Divvy, and bike share in general, personifies sustainability, getting people out of cars and giving them some exercise, all while getting where they need to go.

Divvy is run by Motivate, a private operator that operates other bike share companies, but Divvy is owned by the City of Chicago’s Department of Transportation (CDOT). Lyft bought Motivate a couple of

months ago, and CDOT has retained their ownership rights.

Bike share rebalancing is a big part of operating a bike share system and usually occupies over half of an operating budget. Rebalancing is needed particularly during weekday rush hours, taking bikes from full stations and bringing them to empty stations. Nearly all bike share systems use vans to “rebalance” bikes, but I use a “Bike Train,” operating a large tricycle that has a couple of trailers and load bikes on the back of trailers to haul. The tricycle is “pedal assist” with a motor and a small battery. The program started when I joined, and I am the first person in Chicago to do this. We’re definitely figuring it out as we go, but as a start up, we have a lot of flexibility.

Q. How did you get to this point in your career? Any key points along that pathway?

A. From the beginning, I’ve been interested in learning how things work,

building, and putting things together, “Playing” with Lego’s led to working for a couple of architects throughout high school and college, where I also learned drafting skills and how to work with clients.

I liked the industry but wasn’t sure I wanted to “be” an architect because I was much more interested in larger systems, the bigger picture, and the overall context. I knew Yale had a good architecture program which I took some advantage of, but I ended up taking more classes in history of cities, civilizations, policy, politics, and urban politics and became fascinated with New Haven, the oldest planned city in North America. However, what really struck me was how the City’s train station was so far away from downtown as cities had developed through railroads.

Knowing I was intrigued by rail, history, and cities, I worked for Parsons Brinckerhoff’s management consulting division, PB Consult, the summer before my senior year which introduced me to transit and transportation as an industry and a business I could work in. Parsons Brinckerhoff is a big civil engineering giant now owned by WSP and originally founded by the creator of New York City’s Subway, William Barclay Parsons. PB/WSP does transportation work all over the world, and my client that summer was the

Washington Metropolitan Area Transit Authority (WMATA). I was tasked with delivering an Asset Management Plan for the Authority. I inventoried their entire system: quantities and types of rail cars, signals, switches, tracks, stations, and buses etc.; what needed to be fixed and when, etc., which actually made me want to work for them inside their agency to learn more.

Returning to Yale for my senior year and still perplexed by the city’s train station, I strove to uncover why in my senior thesis, which ended up connecting transportation, transit, urban history, architecture, preservation all under one roof and further clarified my passion and desire to get inside the industry, starting with WMATA.

Being offered a graduate research fellowship for the Eno Center for Transportation landed me in DC, sleeping on a couch after graduating, and I

witnessed WMATA have their largest accident in history: two trains collided because of failed signals, and I was on the train behind the one that crashed—nine or ten people died. It was a matter of making one train and not the other, so clearly it was a really big deal, especially because I had worked on that report and realize how moving around, transportation, is inherently dangerous; infrastructure must be maintained.

WMATA offered me a job about five months later in their division of Long Range Planning, but the only way they could bring me on was for a one-year position. Having witnessed what happens when neglecting good asset management, I took the gamble because I really wanted to help WMATA bounce back and serve their region.

WMATA was under enormous budget pressure and was unable to extend the position





into a second year, but Parsons Brinckerhoff's Planning Department in New York was looking for Junior Planners, and I also wanted to work on more than just transit, so I moved to New York to work on all sorts of projects, including transit. I worked in their New York Office for three and a half years, doing everything from subway extensions, commuter rail tunnels, bus rapid transit studies, public housing inspections, traffic analysis, and air traffic studies. It was fantastic. I was learning this stuff at twenty-two years old, and I didn't really know what was going on, but I did know that if I worked hard and focused, I would help our clients succeed. PB was passionate about developing young talent (I was actually featured in their company video which streamed in the lobby), and they strongly supported Young Professionals in Transportation (YPT), helping the organization take off.

Throughout the planning work, I became curious in how these initiatives could be paid for and started asking questions about transportation finance, but didn't get any clear answers. Furthermore, I was growing a bit tired of the east coast, and after visiting a friend in Chicago, I decided a few years later that I wanted to move here and transferred from the New York office to their Chicago office to work on the Tier II FEIS for the Illiana Greenfield Toll Road.

I continued trying to figure out how public infrastructure is paid for and out of the blue, applied to a job at Fitch Ratings to issue ratings for transportation bonds despite lacking finance experience. Fitch hired me because of my planning and engineering transportation work, and I joined their Global Infrastructure Group (GIG), where I stayed for about two and half years and rated over 300 revenue-backed

transportation bonds.

Working with so many municipal transportation issuers running airports, toll roads, and transit systems intrigued me to join the Chicago Transit Authority (CTA) to manage the entirety of their debt, about \$10 billion, which no one had done before. I was a "one-person department" which CTA is full of, and everyone works so hard. I loved the challenge and am proud of the work, but I was definitely in over my head and needed help through the non-stop chaos. However, once I got my head around all of CTA's obligations and set up a debt management system, it actually clarified that I needed to learn more about finance before I could move more things forward.

I started looking into MBA programs because they would teach me what I hadn't learned as well as help me make more sense of what I have already been exposed to. As I was applying to MBA programs, I also got word that Divvy was hiring bike train operators. I thought that this would be great because I love riding my bike and love transportation but had never worked in operations. I wanted to try driving a bus or a train at WMATA, so I thought that this would be a total change yet exactly what I was missing because I had yet to actually work in operations. Working for Divvy has been a good balance between being able to still help others and work in

transportation while being back in school.

Q. Were there any experiences that helped to best prepare you for the work that you do?

A. My dad has always been my champion throughout my career. He is my best professional advisor and continually offers guidance, helping me throughout each stage sticking to simple principles: “understand before being understood; ask, don’t tell; work together, asking how you can help, instead of shooting out commands.”

In the context of where I am now, I actually had to convince Divvy to hire me. They believed that I was both over and under qualified for the job, but I said “give me a shot.” I convinced them I’d be able to do the work because I know I can do anything I put my mind to. I also explained I wanted to be in the field, not stuck in an office. Out in the field, I am interfacing and interacting with mechanics and people I had never been around at CTA because I was in finance, and it was expected I’d only do finance even though I still wanted to learn as much about the entire agency as possible.

Soft skills are important and require patience to obtain. Working for Divvy has helped me practice every day interacting with so many different people, ensuring to respect everyone and make

each person feel important, valued, and appreciated which is vital to succeed in any field.

Q. What does a day in the life of your position look like?

A. I go to the warehouse and set up all of the equipment that I need to go out into the field. I perform safety checks, fixing things that needs to be fixed, and make sure everything is safe. I set up all of the lights and batteries, check tire pressure (there are 11 wheels!), assemble the rig and take it out. I go to a few stations to pick up bikes and drop them off where they are needed. That’s the work.

Q. What skills have you gained in the work? Are these unique or transferable to other disciplines?

A. My dad has a workshop which I “played” around in growing up, so I am comfortable using tools and getting dirty, but now I know how to re-wire electric and fix a flat tire in under ten minutes! While being interviewed, I explained my background and relative physical strengths as well as weaknesses, convincing them I could learn any new skills required. I also told them I’m pretty tough, even though I may not “look it” because I swam competitively for twenty years—and swimming is an insane sport where you have to go back and forth for hours. I know what pain feels like. I also know that the

body heals and that you can build strength up. Looking at me on paper, I’m this accomplished over achieving ivy league kid but I really care about making a difference and directly helping others.

Q. What do you enjoy most about your job?

A. I absolutely love constantly moving around, being outside, and interacting with as well as helping anyone I can (staff, the public, and other riders). I also love how each day is completely different; I never know what to expect upon arriving at the warehouse. Part of working for a “startup” is that things are constantly changing, from operations to admin.

Throughout my career, I’ve never accepted “no;” many have told me “no,” but I don’t take it. Saying yes is about making others feel valued in their work. The best part of everything that I’ve gotten to do is actually see my “sweat equity” help others. I’m also proud of myself, knowing I had enough confidence in myself to do this, actually move these 50 pound bikes, and show everyone else that I could do it. No one had done this before, and so I learned how to do it without a lot of help, especially once out in the field alone.

Q. What are some of the challenges you have faced in the work? How did you overcome them?

A. I say, “Let me try. If it doesn’t work, I’ll try a different way.” For example, when I was loading and unloading these bikes for the first time (six bikes go on a trailer and there are two trailers), it took me thirty minutes to load one trailer, which is insanely poor, slow, and inefficient. Not a good idea for any business. But, I’ve gotten it down to roughly six minutes per trailer because I figured out how to load more efficiently based on my own size and physical abilities. Receiving feedback needing to speed up, I used the chance to improve instead of getting discouraged.

Q. What are some of your own personal characteristics and values that make you a good fit for this type of work?

A. I have a lot of energy. I love moving around, being outside, and staying active. I also love biking, and getting people on bikes makes me happy because it makes them happy. There’s just something about riding a bike that makes a person happy, and helping

people to do that, for work, working for Divvy, is a huge reward.

I’ve been really fortunate to have had so many opportunities already, but hands down, I am most proud of the work that I do for Divvy because I left an “office” to do “manual labor,” (“womannual labor” actually) which has raised a lot of eyebrows. Combine that with getting an MBA, I’m definitely an outlier. For me, it’s not about how big the paycheck is. I want my work to help others. Money buys food and pays rent which matters, so if you’re not making as much, then don’t spend a lot. It’s not complicated.

Additionally, I’ve gotten used to being one of few women or the only woman around by now, whether it’s in a conference room or in a warehouse; I’m not scared of hard work and getting dirty to get the job done. I’ve earned respect because of my behavior and have demonstrated that I am no different; we are all individuals who deserve to be treated equally.

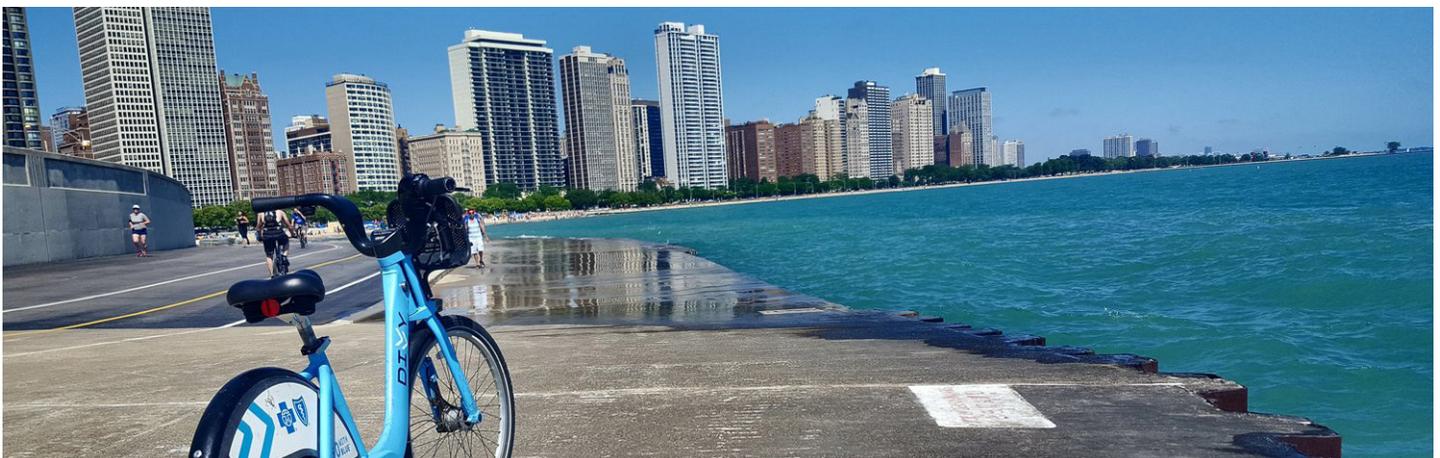
Q. What is something that you want people to know about the work that you do?

A. Number one, to all the women: learn how to be comfortable being the only one; just accept it and get used to it. Don’t ask nor tolerate being treated differently than anyone else. DO the work and deliver the job.

Number two: don’t stop asking yourself what you want to learn; figure out how to understand whatever it is you want to know, and don’t stop asking questions.

Number three: figure out what you don’t want first because that tells you what you do want—even when you don’t know what that is yet.

Number four: go out of your way and spend your own time to understand how something works; it makes the “job” you’ve been hired to do a whole lot “easier” because without an understanding of how something works, forget being able to fund let alone operate or improve it. You’ve got to understand how it works. ⇨



Overview of Position as it Relates to Transportation

Rebalancers are an essential personnel within the bike share industry. They are required to follow safe work practices and help to create a safe working environment as much of this work occurs on public streets and roads, often in cities. Additionally, they assist drivers with safe vehicle operation and maintenance; address and report bike status, system events and rebalancing data as instructed. This all must happen to ensure that users can access bikes where and when they must. Rebalancers are also responsible for troubleshooting; assisting with bike and bike station deactivation and reactivation; communicating with dispatch and other duties as assigned.

Transportation Program Manager

Rebalancers are responsible for relocating bikes throughout the system. Rebalancers load and unload the vehicle with bikes as well as dock/undock bikes at every station stop. Rebalancers typically work under the guidance and supervision of a Management team focused in delivering services to clients.

Emma is the Inaugural operator of the Divvy Bike Train to supplement system-wide bicycle rebalancing; assists in other operations and administrative functions as needed.

Overview of General Skills and Requirements

The general skills and requirements of a bike train operator/rebalance are (1) a high school diploma, equivalent, or exceeding (2) a valid driver's license or ability to operate a bike trailer (3) flexibility in

schedule and (4) dependability. Additional skills include that one is able to be a team player, follow instructions, and solicit feedback to improve performance. One should have a drive to learn about bikes so that they can effectively troubleshoot problems with bikes, be able to lift large amounts of weight, be active, have a good sense of judgment, and open to trying new ideas.

About Divvy Bicycle Share

Divvy is a program of the Chicago Department of Transportation (CDOT), which owns the city's bikes, stations and vehicles. Initial funding for the program came from federal grants for projects that promote economic recovery, reduce traffic congestion and improve air quality, as well as additional funds from the City's Tax Increment Financing program. In 2016, Divvy expanded to the neighboring suburb of Evanston with a grant from the State of Illinois.

Additionally, Divvy is operated by Motivate, a global leader in bike share. A full-service bike share

operator and technology innovator, Motivate works to re-envision how people experience and move around cities.

Source: www.divvybikes.com/about

Type of Planning Projects Carried Out at Divvy Bicycle Share

Bringing Divvy to Chicago

During this project Divvy established 580 bikeshare stations with 5,800 bikes across Chicagoland. Riders can buy a pass from a Divvy station kiosk or mobile app, or become an annual member.

Bicycle & Pedestrian Initiatives

"I'm thankful to be outside constantly moving, interacting with and helping the public, preserving the environment, as well as promoting Divvy and cycling in general. Within Divvy, I like sharing experiences from the field, addressing and making repairs, as well as interacting with and learning from each arm of Divvy's operations."

— Emma Chapman, Women of Divvy

Key Skills

- ▶ **Reading Comprehension** – Reading work-related information.
- ▶ **Complex Problem Solving** – Noticing a problem and figuring out the best way to solve it.
- ▶ **Critical Thinking** – Thinking about the pros and cons of different ways to solve a problem.
- ▶ **Active Listening** – Listening to others, not interrupting, and asking good questions.
- ▶ **Judgment and Decision Making** – Thinking about the pros and cons of different options and picking the best one.
- ▶ **Coordination** – Changing what is done based on other people’s actions.
- ▶ **Active Learning** – Figuring out how to use new ideas or things.
- ▶ **Systems Evaluation** – Measuring how well a system is working and how to improve it.
- ▶ **Systems Analysis** – Figuring out how a system should work and how changes in the future will affect it.
- ▶ **Time Management** – Managing your time and the time of other people.
- ▶ **Monitoring** – Keeping track of how well people and/or groups are doing in order to make improvements.

Abilities Needed for Success

- ▶ **Written Comprehension** – Reading and understanding what is written.
- ▶ **Oral Expression** – Effective spoken communication.
- ▶ **Written Expression** – Effective communication in written form.
- ▶ **Deductive Reasoning** – Using rules to solve problems.
- ▶ **Inductive Reasoning**– Making general rules or coming up with answers from lots of detailed information.
- ▶ **Oral Comprehension** – Listening and understanding what people say.
- ▶ **Problem Sensitivity** – Noticing when problems happen.
- ▶ **Fluency of Ideas** – Coming up with lots of ideas.
- ▶ **Near Vision** – Seeing details up close.
- ▶ **Originality** – Creating new and original ideas.
- ▶ **Information Ordering** – Ordering or arranging things.
- ▶ **Visualization** – Imagining how something will look after it is moved around or changed.



This material is based upon work supported by the Federal Highway Administration under Agreement No. DTFH6114H00025 & DTFH6116H00030. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the Federal Highway Administration.



Environmental Work in the Transportation Sector

CAREER PROFILE

NAME: Eleni Churchill

TITLE: Transportation Program Manager

DEGREE: Civil Engineering

COMPANY: Chittenden County Regional Planning Commission

The Chittenden County Regional Planning Commission assists local communities in planning and project design for critical transportation systems and infrastructure. Transportation plays a critical role in shaping an area's economic and community health and quality of life. Transportation Planning is a comprehensive and collaborative process that develops multimodal transportation solutions to address present and future transportation and land use needs. It promotes safety; supports local and regional economic development goals; respects the natural and built environment; improves social equity; and promotes a balanced, multimodal transportation system. It is a collaborative process that encourages participation of all relevant stakeholders including local governments, state and federal agencies, multi-jurisdictional partners, and the public at-large.

transportation planning projects and initiatives in Chittenden County that are funded through the CCRPC as well as supervising transportation planners and engineers in the organization. My educational background is in engineering with a Bachelor's and Master's degree in Civil Engineering. I moved to Vermont in the mid-1990s to begin my first job at the Vermont Agency of Transportation (VTrans) as a traffic engineer. I worked for VTrans for about twelve years and while there I moved from the Engineering/Technical

Services to the Planning and Policy Division within the agency. While at Policy and Planning I managed numerous statewide modal and policy plans (Highways, Public Transit, Freight, Corridor Management, and others). In 2007 I got a job as a Senior Transportation Planner & Engineer with the Chittenden County Metropolitan Planning Organization (CCMPO) to manage regional transportation corridor studies and local scoping studies among other projects. The CCMPO merged with the CCRPC in 2011. In 2015, the CCRPC created two

Q. What is your current role and how did you get to this point in your career?

A. I am currently serving as the Transportation Program Manager at the CCRPC. This work involves managing



new manager positions, one in transportation (managing the MPO program) and the other in planning (land use, energy, etc.). I applied and was hired as the CCRPC Transportation Manager in the spring of 2015.

Q. What do you enjoy the most about your job?

A. This is a fulfilling and interesting job. I like helping communities in Chittenden County address transportation issues and plan for the future to achieve their goals and realize their vision. This job requires collaboration with diverse groups and partners and I really enjoy working with them to address issues, develop solutions and plan for the future of our county. There is also a big variety in the projects we do and initiatives we are engaged in as every community is unique with very diverse transportation needs. I work and interact with different people across diverse fields such as professional planners and engineers at cities and

towns in the county; volunteer committee and Board members at the CCRPC as well as at various municipal commissions/committees; local and state elected officials; and staff from state and federal agencies such as VTrans and the Federal Highway Administration (FHWA).

Q. What are some of the challenges that you have faced in this work and how did you overcome them?

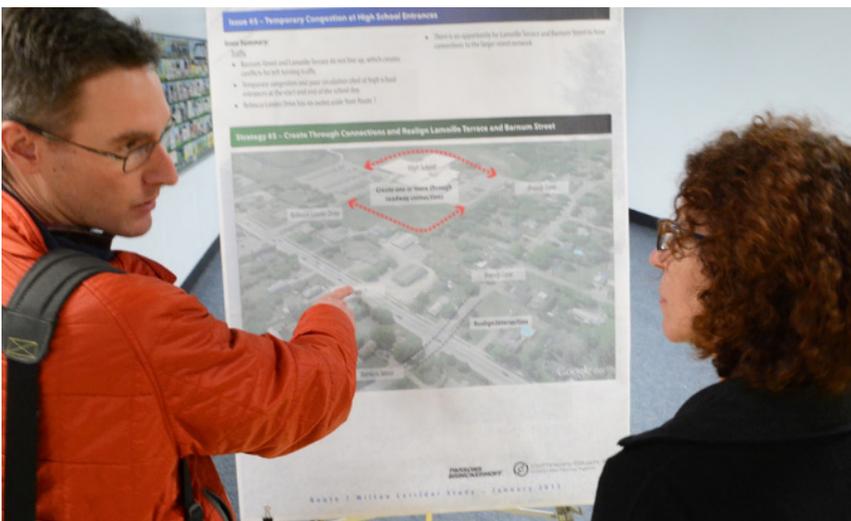
A. When I was first hired as a traffic engineer at VTrans, I knew very little about the field as traffic engineering was not the focus of my education. I needed to get up to speed fast so I could perform my duties that included supervising a number of technicians that gathered and analyzed a variety of traffic data and also conducted traffic studies in support of VTrans projects. As a supervisor, I needed to learn fast so that I could provide guidance and gain the trust of my staff. I spent a fair amount of time studying at home after work and pursuing

various trainings, which was time consuming and challenging but absolutely essential.

Some of the toughest challenges that I face at the CCRPC are meetings where stakeholders and/or members of the public who are upset or outright hostile for various reasons. These could include objections to a specific transportation facility planned in their community, usually close to their homes and businesses, or objecting to the overall community transportation vision. In my experience, the only way to overcome this specific challenge is to be prepared, know your subject well, listen respectfully to all comments, try not to judge, and base your answers on objective information and data to the degree possible.

Q. What are some of your own personal characteristics and values that make you a good fit for this type of work?

A. Work ethic; ability to collaborate with colleagues and interested parties as well as communicate with the general public; attention to detail; and capacity to embrace new challenges and opportunities along the way. I am in the public sector because I want to help my communities and my current job provides me the opportunity to work with partners to effect positive change in terms of livability and quality of life for residents and visitors in our county ↪



Overview of Position as it Relates to Transportation

Urban and regional planners develop land use plans and programs in order to create communities, accommodate population growth, and to revitalize existing structures (ie: facilities in towns, cities, counties, and metropolitan areas). Additionally, urban and regional planners own analytical, communicative, decision-making, and leadership skills that are vital to carrying out development work in communities. When Urban and regional planners choose to specialize in transportation, their role often becomes embedded in transportation planning.

The role of a transportation planner is best described as “the planner of the transportation system of tomorrow.” This requires work in the public and private sectors and/or engaging with government policy and the final details before the beginning of building work. This includes designing research methods and survey techniques for proposed transportation projects; assessing the impact of recent building developments on transportation systems; modeling traffic flows; recommending improvements for transportation systems; collaborate with engineers; and analyze information related to transportation such as policy, impact reports, or long-term planning needs.

In the public sector, transportation planners typically provide services for government bodies and contractors, examining current traffic and population trends and determining the effectiveness of proposed and constructed roads. Transportation planners also plan new roads based on future predicted populations. Alongside transport engineers, developers, and environmental planners, transportation planners

work to ensure that estates, commercial, and industrial zones have the correct transport infrastructure and also that they adhere to environmental legislation.

In the private sector, transportation planners work for public transport companies typically examining effectiveness of timings and schedules, as well as volume of transport services to ensure that these systems are working optimally. Transportation planners will also work to and be involved in the decision-making process to compose new routes when transportation service providers are not functioning optimally.

Source: www.environmentalscience.org/career/transportation-planner

Urban and Regional Planning

“It’s a hot day, and you wish your town would hurry up and build that pool everyone keeps talking about. But where should it be built? What land is available? How will people get there? How would building it affect the local wildlife? What do you say to neighbors who worry about noise and traffic? As an urban or regional planner, it would be your job to help the town answer all of these questions—and many more.”

—College Board

Transportation Program Manager

Transportation Program Management is a position within the broader field of Urban and Regional Planning. This job includes duties such as: assisting executive director in managing and implementing the commission’s transportation program and congruent activities. This also includes serving as a program leader and supervising other transportation team members.

Managers work with municipalities, state and federal agencies, and other organizations to address local & regional transportation.

About Chittenden County Regional Planning Commission

The CCRPC is one of eleven commissions serving municipalities in the state of Vermont. The CCRPC operates under the Vermont Municipal and Regional Planning Development Act and guided by Commissioners appointed by local City Councils, Village Trustees and boards of the municipalities under the designated Chittenden County region.

Overview of General Skills and Requirements

Urban and regional planners are required to have the skills to analyze information and data regarding market research, censuses, and environmental impact studies. This is necessary for the purposes of decision-making around planning options and choosing an appropriate action plans regarding community development projects. Urban and regional planners must also have clear and effective communication skills as they interact with colleagues, stakeholders, and investors, as well as prepare and present reports to a wide variety of audiences. Finally, planners must be able to manage projects, oversee tasks, and plan assignments for themselves and others.

Urban or regional planners require certain credentials. Most require a Master's degree from an accredited urban or regional planning program. People who hold a Bachelor's degree in Urban and Regional Planning can qualify for a small number of jobs as assistants or junior planners. Additionally, some entry-level positions require 1 to 2 years of work experience in a related field (i.e., architecture, public policy, or economic development). Acceptable experience can also be attained through internships related to Urban and Regional Planning either while enrolled in school or post-graduation

GLOSSARY

- ▶ **Corridor** – a linear area that is defined by one or more modes of transportation like highways, railroads, or public transit which share a common course.
- ▶ **MPO** – metropolitan planning organization.
- ▶ **Multimodal** – utilizing two or more modes of movement of goods or people (e.g. vehicle, rail, bicycle).
- ▶ **TDM** – transportation demand management.

Looking into the future, urban planners will be needed to develop revitalization projects and address issues regarding population growth, environmental degradation, movement, and resource scarcity. Common challenges are predicted to be: population change, affordable housing needs and transportation systems; all of which can address high- and low-density populations. As communities emerge and grow they will require development and improved infrastructure regarding housing, roads, sewer systems, parks and schools. As a result, the employment of urban and regional planners is projected to grow 13 percent from 2016-2026. This employment growth is driven by demographic, transportation, and environmental changes.

Sources: Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, Urban and Regional Planners. U.S. Department of Labor CareerOneStop: Transportation Planners Occupation Profile

Type of Planning Projects Carried Out at the CCRPC

CORRIDORS & CIRCULATION

Corridor & Circulation Studies review and analyze current and future corridor conditions. The CCRPC conducts Circulation Studies which address critical congestion and safety needs for all modes along a segment of a regional corridor. Visit the Corridor & Circulation Studies page for examples of projects and more information.

ITS

Intelligent Transportation Systems (ITS) is the application of technology to improve the operations of our transportation system. Visit the ITS page for more information.

SCOPING & PROJECT DEVELOPMENT

Project "Scoping" is the phase in the Project Development process that moves a recognized problem from an idea through the development of alternatives and environmental screening. Visit the Scoping & Project Development page for examples of projects and studies.

Key Skills

- ▶ **Reading Comprehension** – Reading work-related information.
- ▶ **Complex Problem Solving** – Noticing a problem and figuring out the best way to solve it.
- ▶ **Critical Thinking** – Thinking about the pros and cons of different ways to solve a problem.
- ▶ **Active Listening** – Listening to others, not interrupting, and asking good questions.
- ▶ **Judgment and Decision Making** – Thinking about the pros and cons of different options and picking the best one.
- ▶ **Coordination** – Changing what is done based on other people’s actions.
- ▶ **Active Learning** – Figuring out how to use new ideas or things.
- ▶ **Systems Evaluation** – Measuring how well a system is working and how to improve it.
- ▶ **Systems Analysis** – Figuring out how a system should work and how changes in the future will affect it.
- ▶ **Time Management** – Managing your time and the time of other people.
- ▶ **Monitoring** – Keeping track of how well people and/or groups are doing in order to make improvements.

Abilities Needed for Success

- ▶ **Written Comprehension** – Reading and understanding what is written.
- ▶ **Oral Expression** – Effective spoken communication.
- ▶ **Written Expression** – Effective communication in written form.
- ▶ **Deductive Reasoning** – Using rules to solve problems.
- ▶ **Inductive Reasoning**– Making general rules or coming up with answers from lots of detailed information.
- ▶ **Oral Comprehension** – Listening and understanding what people say.
- ▶ **Problem Sensitivity** – Noticing when problems happen.
- ▶ **Fluency of Ideas** – Coming up with lots of ideas.
- ▶ **Near Vision** – Seeing details up close.
- ▶ **Originality** – Creating new and original ideas.
- ▶ **Information Ordering** – Ordering or arranging things.
- ▶ **Visualization** – Imagining how something will look after it is moved around or changed.



This material is based upon work supported by the Federal Highway Administration under Agreement No. DTFH6114H00025 & DTFH6116H00030. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the Federal Highway Administration.



Environmental Work in the Transportation Sector

CAREER PROFILE

NAME: Paige Cornell
DEGREE: Environmental Science, Geology & Geospatial Technologies

TITLE: Environmental Scientist, Waste Assessment, Management, & Remediation

COMPANY: Vanasse Hangen Brustlin, Inc. (VHB)

VHB is known as an American civil engineering consulting and design firm with offices throughout the country. Founded in 1978, the company primarily focuses on transportation and land development, working on a variety of transportation civil engineering projects in the Northeast and along the East Coast of the United States.

VHB “aspires for a sustainable world in all that (they) do. It is inherent to who (they are) and (their) generational company philosophy—founded on stewardship. “VHB helps their clients take action to improve health and well being, contribute to economic vitality, and promote environmental stewardship.

Source: www.vhb.com/Pages/home.aspx

Q.What is your current role at the organization?

A.I am currently an environmental scientist in our remediation and assessment division. We do the assessment of properties to determine if there are any impacts from oil and/or hazardous materials (OHM). For transportation-specific work,

our team would assess for the potential to encounter OHM during construction phases of the project and facilitate the proper handling, regulatory documentation, and health and safety plans required. This is also important when soil disposal is required as there is often a cost contingency associated with contaminated soils.

Q.How did you get to this point in your career? Any key points along that pathway?

A.I went to the University of Vermont and majored in environmental science with a concentration in geology and a minor in geospatial technologies. After I graduated, I went to work at an environmental consulting agency where I focused more on doing emergency response which involved the response to small-scale oil spills and doing property assessments, similar to my current position.



Q. Were there any experiences that helped to best prepare you for the work that you do?

A. During my time at UVM I had a lot of internship experience. My first job out of college doing more of the emergency response work gave me a lot of experience working in a field environment and assessing soils lithologic characteristics.

I had one internship at the New York State Department of Environmental Conservation. I spent two summers there. I worked in pesticide applications, and remediation assessment—the latter of which is what I am doing now. I also worked in two different graduate departments during my time as an undergrad at UVM. One internship was for the Plant and Soil Science department where I evaluated invasive earthworms throughout Vermont, and the other was working in the Geospatial Laboratory where I processed large scale imagery.

Q. What does a day in the life of your position look like?

A. The great part about my position is that not every day looks the same. Some days, you can be out on a drill rig collecting samples, groundwater sampling, or construction oversight at a remediation site. Another day, you could be in the office processing data and writing it up into a technical

report to give to a client.

Q. What skills have you gained in the work? Are these unique or transferable to other disciplines?

A. I would say that what is unique to this work is probably being able to balance working at different locations: field work versus office work, and being able to manage your time between both. I'd say that this is a good skill that not a lot of other jobs have.

Q. What do you enjoy most about your job?

A. Probably the variability in work and that not every day is the same. I enjoy that I am not at my desk every day. I also enjoy the problem solving that is involved with our line of work, as there are a lot of ways to approach a situation. I also really enjoy the historical research component of our work, as we often have to dive into old records and resources to uncover a potential source of contamination.

Q. What are some of the challenges you have faced in the work? How did you overcome them?

A. Due to the large variety of our work, there can be a lot of obstacles—whether it is an angry contractor, difficult client, or complicated data. It's really about learning how to be patient and working with your team to determine the best way to solve a challenge.

Q. What are some of your own personal characteristics and values that make you a good fit for this type of work?

A. I would say patience and flexibility are some characteristics that make me a good fit for this type of work.

Q. What is something that you want people to know about the work that you do?

A. I would say that my work is extremely interesting but also very rewarding. At the end of the day you could be the one who's identified contamination that was not previously identified and assist in remediating the contamination while protecting workers who would have potentially come in contact with the material. ↪



Overview of Position as it Relates to Transportation

The regulations regarding remediation wastes are essential to ensure that facilities properly clean up contaminated areas. To provide regulatory flexibility while protecting human health and the environment, Environmental Protection Agency (EPA) updated the Requirements for Management of Hazardous Contaminated Media Rule and issued Amendments to the original Corrective Action Management Units Rule. In addition, the EPA issued a series of regulations and policies to address these issues. The EPA is working to provide greater flexibility for non-media remediation wastes (such as remedial sludge), address certain statutory permitting provisions, and provide more appropriate treatment requirements for remediation wastes.

The Resource Conservation and Recovery Act (RCRA) Regulations are primarily focused on prevention rather than response or cleanup of wastes already released. However, the waste generated from the cleanup of environmental contamination, known as remediation waste, is an important part of the RCRA hazardous waste program, because environmental media contaminated by the release of a hazardous waste often retains the classification of hazardous waste. As opposed to on-going waste management, remediation activities often involve less concentrated wastes, one-time activities, and shorter-term activities. EPA or an authorized state oversees remediation activities.

Source: www.epa.gov/hw/guidance-remediation-waste-management-resource-conservation-and-recovery-act-rcra-corrective

Field Scientists

Field scientists in waste management and remediation perform internal environmental assessments of assigned facilities and perform site assistance visits to ensure implementation/efficacy. Field scientists might also work on developing rules and regulations. They can also provide general environmental support activities to clients and serve as a point of contact for environmental agencies, organizations, contractors and other agents. Field scientists might also provide all technical assistance necessary to fully programs and associated projects, including research, analysis, development, coordination, and management.

Paige is an experienced Environmental Scientist in VHB's Remediation and Assessment Group. She works on both public and private projects performing all phases of environmental assessment and mitigation planning and oversight ranging from Phase I Site Assessments to data collection and analysis. Paige is adept at developing and implementing soil mitigation strategies which often includes working with the Massachusetts Contingency Plan (MCP) and has authored

numerous complex regulatory submittals. Paige's diverse skill set allows her to develop comprehensive sampling and mitigation plans and coordinate with contractors to implement them.

Hazardous Material

"I enjoy that I am not at my desk every day. I also enjoy the problem solving that is involved with our line of work, as there are a lot of ways to approach a situation. I also really enjoy the historical research component of our work, as we often have to dive into old records and resources to uncover a potential source of contamination."

—Paige Cornell



Overview of General Skills and Requirements

Field scientists such as Paige require certain educational credentials such as: as B.S. in Environmental Science, Engineering or a related degree. At a certain level a Masters of Science is preferred by employers.

Other qualifications include: Strong written and verbal communication skills and the ability to interface and effectively communicate with individuals from all levels of the organization; Confidence, willingness, and ability to conduct presentations and provide training sessions to small and large groups of people.

Types of Projects Carried Out by VHB, Inc.

SOUTH COAST RAIL PROJECT

This project is currently the largest in the state of Massachusetts, and one of the more complex undertakings of the Massachusetts Bay Transportation Authority (MBTA). For this project VHB is acting as a project manager and is assessing environmental conditions for property acquisitions, sampling soil within the rail corridor for disposal, and more, in order to [restore commuter rail service](#) between Boston and southern Massachusetts.

GLOSSARY

- ▶ **Remediation Assessment** – the assessment and management of environmental conditions associated with building materials, indoor air quality, soil, and groundwater, and their potential effects on human health and the environment.
- ▶ **Mitigation Plan** – the process of developing options and actions to enhance opportunities and reduce threats to project objectives.

About VHB, Inc.

VHB is an environmental consulting firm focused on making a positive impact on its surrounding communities, making the most out of opportunities to grow personally and professionally, while build a network of lifelong colleagues. VHB is known for collaborating across disciplines to develop and implement effective strategies, problem-solving techniques and solutions through, “a combination of technical and personal skills to help build a successful consulting team.”

Source: www.vhb.com/Pages/Trends/Students-and-New-College-Grads.aspx



Key Skills

- ▶ **Reading Comprehension** – Reading work-related information.
- ▶ **Complex Problem Solving** – Noticing a problem and figuring out the best way to solve it.
- ▶ **Critical Thinking** – Thinking about the pros and cons of different ways to solve a problem.
- ▶ **Active Listening** – Listening to others, not interrupting, and asking good questions.
- ▶ **Judgment and Decision Making** – Thinking about the pros and cons of different options and picking the best one.
- ▶ **Coordination** – Changing what is done based on other people's actions.
- ▶ **Active Learning** – Figuring out how to use new ideas or things.
- ▶ **Systems Evaluation** – Measuring how well a system is working and how to improve it.
- ▶ **Systems Analysis** – Figuring out how a system should work and how changes in the future will affect it.
- ▶ **Time Management** – Managing your time and the time of other people.
- ▶ **Monitoring** – Keeping track of how well people and/or groups are doing in order to make improvements.

Abilities Needed for Success

- ▶ **Written Comprehension** – Reading and understanding what is written.
- ▶ **Oral Expression** – Effective spoken communication.
- ▶ **Written Expression** – Effective communication in written form.
- ▶ **Deductive Reasoning** – Using rules to solve problems.
- ▶ **Inductive Reasoning** – Making general rules or coming up with answers from lots of detailed information.
- ▶ **Oral Comprehension** – Listening and understanding what people say.
- ▶ **Problem Sensitivity** – Noticing when problems happen.
- ▶ **Fluency of Ideas** – Coming up with lots of ideas.
- ▶ **Near Vision** – Seeing details up close.
- ▶ **Originality** – Creating new and original ideas.
- ▶ **Information Ordering** – Ordering or arranging things.
- ▶ **Visualization** – Imagining how something will look after it is moved around or changed.



This material is based upon work supported by the Federal Highway Administration under Agreement No. DTFH6114H00025 & DTFH6116H00030. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the Federal Highway Administration.



Environmental Work in the Transportation Sector

CAREER PROFILE

NAME: Scott Edwards

TITLE: Consultant, Senior Associate

DEGREE: Acoustical Engineering & Music

COMPANY: Cross-Spectrum Acoustics

Cross-Spectrum Acoustics Inc. (CSA) is a full-service noise and vibration consulting firm. Their consultants have over 160 years of combined experience in the noise and vibration field, with specialties in: transit, freight, and high-speed rail; traffic and highway noise studies; construction noise and vibration; community, industrial, and energy noise; architectural acoustics; and noise and vibration measurement systems.

Q. What is your current role at the organization?

A. My official title is senior associate at Cross Spectrum Acoustics. We are a full-service noise and vibration consulting firm. We'll develop acoustic solutions for anything ranging from residential complaints about the neighbors' footsteps in the condo above to mechanical systems such as HVAC noise issues, elevator shaft noise, or noise and vibration coming from cross-fit gyms/fitness centers. However, our specialty and most of our work is in the transportation world. Whenever there is a

large-scale transportation project—whether it be through the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA)—if it is receiving federal funding, then it requires an environmental impact statement which includes a noise and vibration impact analysis. We are experts in doing that. As an organization we have recently authored the newest revision of the FTA transit noise and vibration impact assessment guidance manual. It is federal guidance that is referenced worldwide as a model for how to conduct a noise and vibration impact assessment for transit projects. Personally, I interact with clients and make noise and vibration measurements; which we use to establish the existing conditions and then we build computer models to predict future noise and vibration levels after the completion of a given project. Afterwards, we will write up a report identifying potential impacts based on the data analysis and modeling,

and then we will recommend design solutions to mitigate any impacts.

Q. How did you get to this point in your career? Any key points along that pathway?

A. In high school, I was mainly interested in music. I played saxophone and made the all-state band. I wanted to stick with music, but I was also very strong in math and science. My dad was an engineer, and I thought that it would be a better idea to go into a career in engineering rather than music. I had a class that I took in high school called “music for music majors.” It was a class to prepare high school students who wanted to be music majors for college. We had a project to research colleges where we might want to apply for music school. I was doing some research and I came across a program at the University of Hartford and the Hartt School of Music called Acoustical Engineering and Music. So, it was one major, but it was an



acoustical engineering degree—which is mostly mechanical engineering with a focus on vibrations—while also getting what was essentially a free education at the Hartt School in music performance. That was a very attractive program and seemed perfect for me. I applied through their early application process and got accepted. That was the only school I applied to and I went for it. I am really glad that I did.

I graduated in 2010 and I wanted an engineering job. There were few jobs available in acoustics at the time and most were government department of defense contract work in the Southern Connecticut area. I didn't like the idea of going into that line of work. I couldn't find any other jobs at the time, so I auditioned and got a full scholarship to go to graduate school at The Boston Conservatory

for music performance. After one semester at The Boston Conservatory, my acoustics advisor from the University of Hartford gave me a call to let me know that there was an open position at an environmental noise and vibration consulting firm in the Boston area. I interviewed and was offered the job. I left music school and began my career in acoustics. That was about nine years ago. I was at that firm for four years, and now I have been at Cross-Spectrum Acoustics for about five years.

Q. Were there any experiences that helped to best prepare you for the work that you do?

A. College didn't totally prepare me to be a consultant. Engineering school provided me with book-smarts, but not people-smarts. In my experience, college was a lot of math, science, physics,

countless hours studying textbooks, and taking tests. That was mostly it. I would say, in general, that engineers tend to be awkward to talk to in social settings. I always had basic social skills, but I think that what prepared me to be a consultant was a summer job that I had during high school and college at a beach on Cape Cod, where I grew up. I worked at the front gate where people had to pay to park at the beach. I interacted with thousands of people every day and I developed a skill to quickly identify and solve a person's issue—needing directions, restaurant recommendations, complaining, etc.—just having a five-second conversation, figuring out their issue, solving it and moving onto the next person, all while being friendly and welcoming—I think that this is what prepared me best for consulting.

In consulting, it is so much more about having strong client relationships than it is about being technically the best in every engineering facet. I think music performance prepared me for this as well because there is a lot of performing on stage and public speaking. We know that public speaking is a thing that gives many people anxiety. I dealt with "stage fright" all the time through middle school, high school, college and grad school. On stage, I was always being put in extremely high-pressure situations in college and grad school: all

eyes on me, and I only get one chance. That prepared me to be a consultant because I often speak at public meetings to help the public understand why we are proposing noise barriers or noise and vibration abatement for one neighborhood but not another. I also give lectures at conferences, networking events, and professional society meetings. My engineering school background provided me with the knowledge skill set that is required to be an engineer. But the rest came through unexpected experiences.

Q. What does a day in the life of your position look like?

A. It is constantly changing, which is nice. I don't like the idea of working on the same project for years and years. On average, I'd guess that I travel 30% of the time for measurement trips. We arrange for noise measurements in locations that will give a representative sample of the noise exposure to a given neighborhood. We need to do this for each unique noise environment along a proposed transit corridor, so, depending on the length of the transit corridor, it can take weeks to collect all the noise data that we need to establish the existing conditions. Sometimes we are required to knock on people's doors to see if we can leave noise monitors in their yards. It's a lot of interacting with the public. Vibration measurements



are more like traditional engineering work – we get greasy! We disassemble our equipment for shipping and then rebuild it once it arrives. Ground vibration measurements involve creating a large force on the surface (or sometimes below the surface) of the ground and measuring the way that waves propagate through the soil at all frequencies to an array of accelerometers. It's fun and challenging—when things break, we must fix them.

I'd say another 50% of my time is analyzing data and reporting results. This involves building a lot of computer models and conducting QA/QC on our work to make sure that our models are valid and make sense. I use geographic information

systems (GIS) most frequently, but other modeling programs that I use are SoundPLAN for outdoor noise propagation, TNM for traffic noise projects, EASE for architectural acoustics projects, and LISA for finite element analysis of tricky vibration scenarios. The reporting requires us to take a lot of complicated analysis and put it into a nice, concise report that can be understood by the general public. Many times, our reports will be incorporated into an environmental impact statement. These are reviewed by the public, local transit agencies, and the FTA or FHWA. Then, we go to public meetings and explain our findings and recommendations to the public.

The remaining 20% of my time



clients correctly so that you can manage cash flow.

Q. What do you enjoy most about your job?

A. The variety of work is what is great about this job. I don't do well with doing the same thing day-in and day-out. It would be so hard for me to show up to the same cubicle every day to perform the same task with no end in sight. I really enjoy going to different cities for work. One of the really cool things about working on environmental impact statements for transportation projects is that, for the most part, they are granting federal money to build transportation projects in cities that are booming. Planned transit is almost always in a very vibrant neighborhood that is growing rapidly—there's art, there's business, there's a happening urban scene of shops and restaurants—and they just need a way to connect all of these things with transportation. Traveling to these places is always very fun. I have been to places like Houston, Dallas, Minneapolis, Los Angeles, San Francisco, Austin—and we have work coming up in Seattle, D.C., Miami, Fort Lauderdale, and Chicago. I feel like I've gotten to see a lot of the country and meet and interact with so many different people through the transportation industry. Traveling really breaks up the work so that work doesn't feel monotonous.

is spent working on proposals, professional development, networking and marketing. I'm the president of the Greater Boston Chapter of the Acoustical Society of America (ASA). I'm also actively involved with Young Professionals in Transportation (YPT), and the Institute of Noise Control Engineers (INCE). I go to conferences several times per year and write technical papers as well.

Q. What skills have you gained in the work? Are these unique or transferable to other disciplines?

A. There are a lot of business activities that I do that I wouldn't have expected in engineering school: helping with invoices, proposals, reviewing contracts, and having to deal with insurance and financial documents. I think that this is a function of working at a very small company where, originally, we didn't have an accounting department or human resources department. In the private sector, business is all about making sure that you have contracts, a backlog of future work, and making sure that you are invoicing your

Q. What are some of the challenges you have faced in the work? How did you overcome them?

A. I never really enjoyed writing in school. In fact, I went into engineering to get away from English class! But a big part of this job is writing a report so that a client can understand what we did and what solutions we are recommending. Technical writing can be very dry. But I've gotten much better with this over time, and now I feel like I have a professional template to work with. I have learned so much about writing from my colleagues at Cross-Spectrum Acoustics.

Q. What are some of your own personal characteristics and values that make you a good fit for this type of work?

A. I do think that social skills have really helped me. In my short career, I have realized that technical expertise is not always enough. Some consultants will not excel because of their lack of social skills. You need to be able to interact with clients and the community in order to get the work done. Having strong technical writing and communication skills are also very important. In general, business comes down to completing work on time and on budget, but being a consultant requires you to do it in a

positive way so that clients will want to work with you again or recommend you to a colleague.

Q. What is something that you want people to know about the work that you do?

A. First and foremost, I want people to know about it! Noise and vibration control is a niche of engineering that people don't think about until it is a problem. Most people like music, so they understand sounds and how to listen critically. "Sound" is good—it's music, it's talking. "Noise" is annoying and unwanted. If we don't do anything about noise, our cities are going to continue to get louder and louder until there are real health effects (that

people are already studying). No one likes to be woken up in the middle of the night due to a loud noise. Repeated, significant noise and vibration exposure can contribute to health concerns such as hearing loss, increased stress, high blood pressure and other health issues—many of which are linked to sleep deprivation. I like to think that I am helping the community by solving their annoying noise issues. Working in the environmental science world is fulfilling. I just want people to know about noise control. I think that this is a very cool type of engineering that has attracted many musicians like myself. ↪



Overview of Position as it Relates to Transportation

As an organization, Cross-Spectrum Acoustics (CSA) has experience on projects ranging from preliminary assessments to environmental impact statements to final design of systems. CSA staff, like acoustical engineers provide noise and vibration consulting on transit projects at locations throughout the United States (CSA, inc.). CSA as an organization, and acoustical engineering as a position, play a vital role in ensuring that transportation/transit systems do not negatively impact human quality of life.

Acoustical Engineers

Consultants can be authors of the FTA's noise and vibration guidance manual. Consultants might also have experiences in teaching the NTI/FTI transit noise and vibration assessment courses throughout the country. Clients of consultants might include state and federal agencies, consumer companies, universities, law enforcement, other engineers, developers and consultants. Consultants often author technical papers and participate as active members of professional companies.

Scott has over six years of experience in environmental noise and vibration, focusing primarily on transit, highway and sound insulation projects. He has a Bachelor of Science Engineering (B.S.E.) in Acoustical Engineering and Music from the University of Hartford, and has completed Master's degree level coursework

in saxophone performance at The Boston Conservatory. Additionally, Scott is a member of both the Institute of Noise Control Engineering and the Acoustical Society of America. He has worked on a number of transit projects, ranging from environmental impact assessment studies to final design of noise and vibration mitigation. Scott has worked on noise barrier designs for both transit and highway applications, is a highly experienced FHWA Traffic Noise Model (TNM) user, has extensive noise and vibration field measurement experience, and is an expert in the application of GIS to noise and vibration studies (CSA, Inc.).

Community Impact Assessment

"I really enjoy going to different cities for work. One of the really cool things about working on environmental impact statements for transportation projects is that, for the most part, they are granting federal money to build transportation projects in cities that are booming. Planned transit is almost always in a very vibrant neighborhood that has money and is growing rapidly—there's art, there's business, there's a happening urban scene of shops and restaurants—and they just need a way to connect all of these things with transportation."

—Scott Edwards

About Cross-Spectrum Acoustics

CSA helps the public understand complex issues related to noise in a simple and straightforward manner. CSA staff have represented municipal, state and Federal clients in public meetings for projects across the country. CSA has also provided litigation support and expert witness testimony on behalf of our clients (CSA Inc.).



Overview of General Skills and Requirements

Acoustical engineering consultants work in challenging and variable environments. This requires that a consultant is detail-oriented, independent, and able to engage in work-client interactions. General skills might include: capturing and analyzing noise measurement data; travel; estimating sound levels of various sources, conducting modeling analyses; quantifying the effectiveness of noise mitigation; critical reviewing and interpreting of local, state, provincial, and federal environmental regulations; preparing and disseminating reports/impact assessments; and managing projects and client relationships.

General skills and requirements include a B.S. or M.S. in an engineering, science, or mathematics related major; strong spreadsheet, noise modeling, and software tool skills; capabilities in understanding and applying environmental regulations to real-world situations; and ability to work well independently and on a team.

Type of Projects Carried out at Cross-Spectrum Acoustics

CALIFORNIA HIGH-SPEED RAIL PROJECT, MERCED FRESNO, CA

This project consists of a [65-mile section](#) that will help provide new economic opportunities to the downtown areas of Fresno and Merced. Cross-Spectrum Acoustics worked on the noise and vibration portion of the Merced-Fresno segment.

NORTHAMPTON LUMBERYARD VIBRATION ASSESSMENTS, MA

This project consists of a variety of noise and vibration measurement and analysis tasks including studying the effect of train noise and vibration on the proposed lumberyard affordable housing project in Northampton. Long-term measurements were used to characterize the existing noise and vibration environment, which helped provide architectural recommendations to ensure interior noise and vibration levels would be acceptable to occupants.



GLOSSARY

- ▶ **GIS** – geographic information system, software designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data.
- ▶ **Transit System** – a system of large-scale public transportation in a given metropolitan area, typically comprised of buses, subways, and elevated trains.
- ▶ **Environmental Impact Assessment** – the assessment of the environmental consequences of a plan, policy, program, or actual projects prior to the decision to move forward with the proposed action.

Key Skills

- ▶ **Reading Comprehension** – Reading work-related information.
- ▶ **Complex Problem Solving** – Noticing a problem and figuring out the best way to solve it.
- ▶ **Critical Thinking** – Thinking about the pros and cons of different ways to solve a problem.
- ▶ **Active Listening** – Listening to others, not interrupting, and asking good questions.
- ▶ **Judgment and Decision Making** – Thinking about the pros and cons of different options and picking the best one.
- ▶ **Coordination** – Changing what is done based on other people’s actions.
- ▶ **Active Learning** – Figuring out how to use new ideas or things.
- ▶ **Systems Evaluation** – Measuring how well a system is working and how to improve it.
- ▶ **Systems Analysis** – Figuring out how a system should work and how changes in the future will affect it.
- ▶ **Time Management** – Managing your time and the time of other people.
- ▶ **Monitoring** – Keeping track of how well people and/or groups are doing in order to make improvements.

Abilities Needed for Success

- ▶ **Written Comprehension** – Reading and understanding what is written.
- ▶ **Oral Expression** – Effective spoken communication.
- ▶ **Written Expression** – Effective communication in written form.
- ▶ **Deductive Reasoning** – Using rules to solve problems.
- ▶ **Inductive Reasoning**– Making general rules or coming up with answers from lots of detailed information.
- ▶ **Oral Comprehension** – Listening and understanding what people say.
- ▶ **Problem Sensitivity** – Noticing when problems happen.
- ▶ **Fluency of Ideas** – Coming up with lots of ideas.
- ▶ **Near Vision** – Seeing details up close.
- ▶ **Originality** – Creating new and original ideas.
- ▶ **Information Ordering** – Ordering or arranging things.
- ▶ **Visualization** – Imagining how something will look after it is moved around or changed.



This material is based upon work supported by the Federal Highway Administration under Agreement No. DTFH6114H00025 & DTFH6116H00030. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the Federal Highway Administration.



Environmental Work in the Transportation Sector

CAREER PROFILE

NAME: Charlie Farmer

DEGREE: Environmental Science & Environmental Engineering

TITLE: Senior Environmental Engineer

COMPANY: Vanasse Hangen Brustlin, Inc. (VHB)

VHB is known as an American civil engineering consulting and design firm with offices throughout the country. Founded in 1978, the company primarily focuses on transportation and land development, working on a variety of transportation civil engineering projects in the Northeast and along the East Coast of the United States.

VHB “aspires for a sustainable world in all that (they) do. It is inherent to who (they are) and (their) generational company philosophy—founded on stewardship. “VHB helps their clients take action to improve health and well being, contribute to economic vitality, and promote environmental stewardship.

Source: www.vhb.com/Pages/home.aspx

Q.What is your current role at the organization?

A.I am a Senior Environmental Engineer and work in the Contaminated Site Assessment and Remediation group at VHB. Prior to coming to VHB in 2018, my practice primarily supported national private industrial clients and federal clients with

contaminated site investigation and remediation. Since coming to VHB, I have supported a number of different large transportation infrastructure projects where-in contaminated soil and groundwater needed to be managed.

One example would be the Middlebury Bridge and Rail Project. Two bridges are being replaced with a concrete box tunnel in downtown Middlebury. The project intersects a known hazardous site that resulted from a gasoline release from a train derailment. The hazardous site listing as well as potential releases of hazardous materials from historical railroad activities prompted the need for characterization of soil and groundwater that would need to be managed as part of construction activities. VHB completed a Phase I Environmental Site Assessment (ESA) to evaluate potential impacts to the project from historical releases of oil and hazardous materials (“OHM”), a Phase II ESA to collect samples

to determine the degree and extent of contamination, secured a National Pollutant Discharge Elimination System permit for the treatment and discharge of contaminated groundwater required for construction, and completed a Corrective Action Plan that was reviewed and approved by the Vermont Department of Environmental Conservation. The Corrective Action Plan provided specific guidance for the management of contaminated materials during construction, including reuse of contaminated soil on-site under engineered soil barriers to reduce soil disposal costs.

Q.How did you get to this point in your career? Any key points along that pathway?

A.I received an Environmental Science degree at the University of Denver and initially had the plan to work for a few years as a consultant before going back to law school. After working in water quality for a year I fell in love with designing solutions

to problems and cleaning up sites. So, rather than going to law school, I went back to school for a second degree in Environmental Engineering. I graduated from the University of Vermont and went to work for an environmental consulting firm called The Johnson Company located in Montpelier, VT. I worked on projects for the Corps of Engineers, National Park Service, and numerous private and industrial clients, as well as a little bit of work in Vermont. After nearly a decade at the Johnson Company, I joined VHB for opportunities to work on more local projects with many being transportation and infrastructure related.

Q. Were there any experiences that helped to best prepare you for the work that you do?

A. After receiving my environmental science degree, I initially focused on water resources and contaminated sediment work. It was then that I had my first experiences identifying contaminated sites. I was in Tennessee at the time working on Urban Creeks and the Tennessee River. Through sediment, soil, and surface water sampling I was able to identify some new contaminated sites by finding some contamination and “swimming upstream”. In one case, I “swam” all the way up the sewer pipe into an industrial facility and was able to help with some pre-treatment system

work to bring a large industrial operation into compliance with their permits. I was hooked. I realized that if I was going to be actively involved in cleaning up these sites it would be helpful to get the added skills and professional licensure available through receiving an engineering degree. The added degree in Engineering vastly increased my skill set to address these problems while my Environmental Science degree provided invaluable perspective that has aided in working collaboratively with interdisciplinary teams and state and federal regulators. So, I guess if there is one way to sum up my personal and professional experience that helped me become the professional I am it is to keep swimming up stream!

Q. What does a day in the life of your position look like?

A. Oh, days can be quite variable for an environmental worker in general, but definitely for a contaminated site worker. Days can range from contaminated site investigation fieldwork in Yosemite (amazing) to writing reports and proposals sitting at my desk for a week or two (can also be surprisingly fun). Somebody coming in fresh to the industry can probably expect that half of their time is outside in the field, doing sampling and various other things. As your career progresses, you can choose to take a track

that keeps you in the field more or you can take a track that takes you more towards project management, report writing, data analysis, technical modeling, and remedial design. As a consultant, writing proposals, interacting with clients, client meetings, and stakeholder meetings are also part of the work. People go into an environmental career often because they want to spend time outside and that is certainly possible. That said, you don’t get to pick the place and you rarely get to call off the work due to weather!

Q. What skills have you gained in the work? Are these unique or transferable to other disciplines?

A. Collaborating with an interdisciplinary group of engineers is key for any transportation-related engineering work. It’s ineffective to work in a silo and only focus on your part of these very large, complex projects. The Environmental Engineers need to be working closely with the Civil, Structural, and Transportation Engineers as well as the Planners and Landscape Architects. Each aspect of the project must dovetail perfectly to achieve project goals, so you really need to be able to speak all of the different languages for all of the different disciplines and understand the key concerns. It’s not just your piece of the puzzle, but the whole puzzle that you have to learn to



work on, and to work on with others.

In my 16 years as an environmental professional, I've also learned that environmental concerns can be very divisive amongst stakeholders. Some stakeholders understand

the potential impacts to the environment and why they should be addressed, but others just see the environmental side of the project as a boondoggle. I've found that human health and economics are things that people in general can understand and agree on. Even though my work will add additional cost to a project, stakeholders can rest assured that construction workers and the general public will not be exposed to dangerous chemicals as part of the project and property values will be increased by receiving a clean bill of health after remediation.

Q. What do you enjoy most about your job?

A. Cleaning up sites is definitely why I'm in this business. I want to look back on my career and see a ton of clean sites.

Q. What are some of the challenges you have faced in the work? How did you overcome them?

A. Probably what I alluded to earlier dealing with contaminated sites. Environmental Assessments and Remediation can be a real cost driver and I think that it is challenging to have to break the news. You never want to see a great public infrastructure or development project die because we found something. But, it can happen.

Q. What are some of your own personal characteristics and values that make you a good fit for this type of work?

A. I'm a pro-business and pro-responsible-development kind of guy because I think it is good for the state economy and good for the country. That said, I moved to Vermont because of our pristine environment and I believe there is no better, healthier place to raise my family and to live. I feel like I strike a good balance between doing the work responsibly while still trying to not inhibit a project from being constructed. The unique position of my work is that the data (degree and extent of contamination) usually drives the work. Our job centers around being able to communicate with clients and regulators, to think critically and efficiently collect and analyze data, and to develop a remedial design that efficiently protects human health in the environment in a cost effective manner.

Q. What is something that you want people to know about the work that you do?

A. It is very challenging but it is very rewarding. It is difficult to appease all of the stakeholders, but it's incredibly satisfying to get to the point of consensus where you are moving forward with a successful plan. ⇐

Overview of Position as it Relates to Transportation

In regards to transportation, environmental engineering skills often translate into tasks such as: preparing, reviewing and updating environmental investigation reports; designing projects focused on environmental protection; obtaining, updating, and maintaining plans, permits, and standard operating procedures. Engineers are also required to provide technical support, analyze scientific data regarding quality-control checks, and monitoring the progress of environmental improvement programs. Further, environmental engineers are responsible for inspecting industrial and municipal facilities to ensure compliance with environmental regulations and to advise corporations and government agencies about environmental procedures.

Environmental Engineer

Environmental engineers use the principles of engineering, soil science, biology and chemistry in order to develop solutions to environmental problems. Typically within the work, environmental engineers conduct hazardous waste-management studies in which they evaluate the significance of a hazard as well as advise on treating and containing the hazard. Environmental engineers also design systems for municipal and industrial water supplies and industrial wastewater treatment.

Additionally, environmental engineers may study ways to minimize the effects of acid rain, climate change, automobile emissions, and depletion of the ozone layer. As a result, environmental engineers often collaborate with environmental scientists, urban and regional planners, hazardous-waste technicians, and other

engineers to address environmental problems and environmental sustainability.

Charlie joined VHB one year ago, which represented his initial foray into supporting transportation projects. Charlie has over 16 years of environmental science and engineering experience with specific expertise in: site investigations, corrective action/remediation, NPDES permit compliance, water/wastewater systems, and NPDES permit compliance. After receiving his Environmental Science degree, Charlie worked on Industrial discharge monitoring, surface water, and sediment investigations in Tennessee. He found a passion for designing practical solutions to real problems and pursued

an additional degree in Environmental Engineering. He initially focused on water and wastewater engineering, NPDES permit compliance, and Site remediation from the initial investigations through remedial design. Charlie joined the VHB Remediation, Assessment, and Compliance team in 2018.

Source: www.bls.gov/ooh/architecture-and-engineering/environmental-engineers.htm#tab-1

Water Resources Engineer

"I'm a pro-business and pro-responsible-development kind of guy because I think it is good for the state economy and good for the country. I feel like I strike a good balance between doing the work responsibly while still trying to no inhibit a project from being constructed. The unique position of my work is that the data (degree and extent of contamination) usually drives the work."

— Charlie Farmer

About VHB, Inc.

VHB is an environmental consulting firm focused on making a positive impact on its surrounding communities, making the most out of opportunities to grow personally and professionally, while build a network of lifelong colleagues. VHB is known for collaborating across disciplines to develop and implement effective strategies, problem-solving techniques and solutions through, "a combination of technical and personal skills to help build a successful consulting team."

Source: www.vhb.com/Pages/Trends/Students-and-New-College-Grads.aspx

Overview of General Skills and Requirements

Environmental engineers are required to have certain credentials—the most basic of these is a bachelor’s degree in environmental engineering or a related field. Additionally, a degree from a program accredited by the ABET (Accreditation Board for Engineering and Technology) is needed to earn the professional engineer license.

After a bachelor’s degree it is helpful to continue course work in math, statistics, engineering, physics, and technology. This is so that one can stay caught up with new and emerging technology. Prior to entering college, high school students with an interest in environmental engineering should take high school courses in chemistry, biology, physics, and advanced math.

Looking to the future, the employment of environmental engineers is expected to grow 8% between 2016 and 2026. The demand for environmental engineers is expected to be sustained by the government’s requirements to clean up contaminated sites. They will also be needed for managing waste water treatment as well as to increase the efficiency of the ways that water is used for transportation or otherwise.

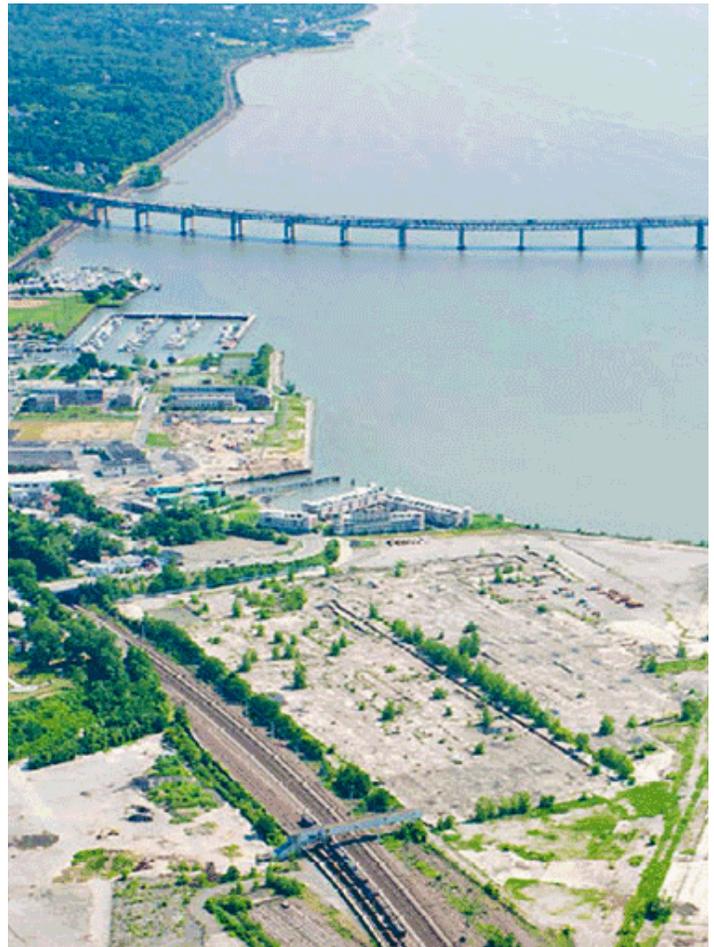
Type of Projects Carried out at VHB

MIDDLEBURY BRIDGE & RAIL PROJECT

This involved creating a Corrective Action Plan to manage contaminated soil and groundwater. A NPDES Permit for discharges of contaminated groundwater from construction dewatering activities was needed.

WINOOSKI MAIN STREET

This project began with investigation of PCB contaminated soil and groundwater. A Corrective Action Plan to manage contaminated soil and groundwater during construction was created. A NPDES Permit for discharges of contaminated groundwater from construction dewatering was requested.



GLOSSARY

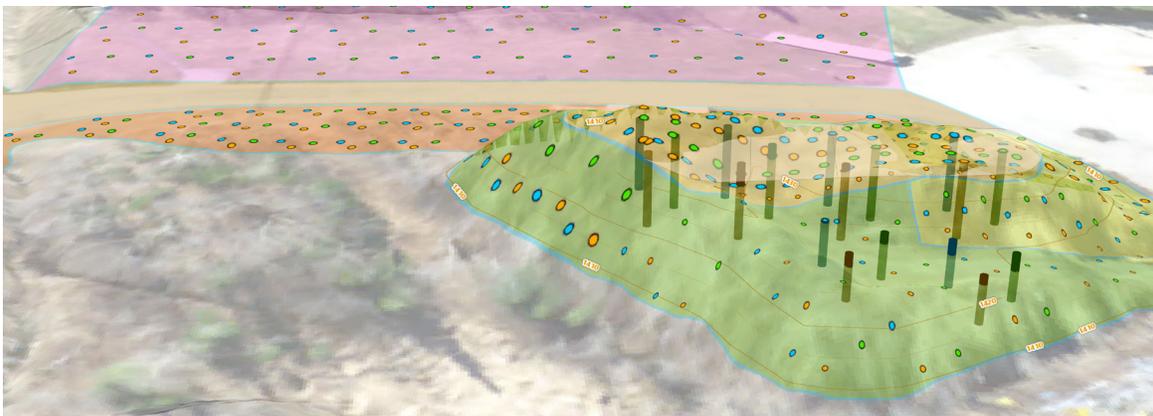
- ▶ **Remediation** – the removal of pollution or contaminants from environmental media such as soil, groundwater, sediment, or surface water.
- ▶ **NPDES** – National Pollutant Discharge Elimination System, addresses water pollution by regulating point sources that discharge pollutants to waters of the U.S.
- ▶ **ESA** – environmental site assessment, identifies potential or existing environmental contamination liabilities.
- ▶ **PCB** – polychlorinated biphenyls, or industrial products or chemicals, that were banned in 1979 in the United States.

Key Skills

- ▶ **Reading Comprehension** – Reading work-related information.
- ▶ **Complex Problem Solving** – Noticing a problem and figuring out the best way to solve it.
- ▶ **Critical Thinking** – Thinking about the pros and cons of different ways to solve a problem.
- ▶ **Active Listening** – Listening to others, not interrupting, and asking good questions.
- ▶ **Judgment and Decision Making** – Thinking about the pros and cons of different options and picking the best one.
- ▶ **Coordination** – Changing what is done based on other people’s actions.
- ▶ **Active Learning** – Figuring out how to use new ideas or things.
- ▶ **Systems Evaluation** – Measuring how well a system is working and how to improve it.
- ▶ **Systems Analysis** – Figuring out how a system should work and how changes in the future will affect it.
- ▶ **Time Management** – Managing your time and the time of other people.
- ▶ **Monitoring** – Keeping track of how well people and/or groups are doing in order to make improvements.

Abilities Needed for Success

- ▶ **Written Comprehension** – Reading and understanding what is written.
- ▶ **Oral Expression** – Effective spoken communication.
- ▶ **Written Expression** – Effective communication in written form.
- ▶ **Deductive Reasoning** – Using rules to solve problems.
- ▶ **Inductive Reasoning** – Making general rules or coming up with answers from lots of detailed information.
- ▶ **Oral Comprehension** – Listening and understanding what people say.
- ▶ **Problem Sensitivity** – Noticing when problems happen.
- ▶ **Fluency of Ideas** – Coming up with lots of ideas.
- ▶ **Near Vision** – Seeing details up close.
- ▶ **Originality** – Creating new and original ideas.
- ▶ **Information Ordering** – Ordering or arranging things.
- ▶ **Visualization** – Imagining how something will look after it is moved around or changed.



This material is based upon work supported by the Federal Highway Administration under Agreement No. DTFH6114H00025 & DTFH6116H00030. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the Federal Highway Administration.



Environmental Work in the Transportation Sector

CAREER PROFILE

NAME: Nicole Freeman

TITLE: Director of Transportation Planning

DEGREE: Urban Planning & Economics

COMPANY: City of Newton, Massachusetts

According to the City of Newton, Transportation “is fundamental to the quality of life in Newton.” This statement and initiative is guided by the [Newton Leads 2040 Transportation Strategy](#) with the goal of Newton’s transportation systems being safe, smart, accessible, livable and sustainable by 2040. The current [Mayor of Newton, Mayor Fuller](#) has stated, “I want to see our villages linked by a transportation system convenient and safe for drivers, bicyclists and pedestrians, and where wonderful open spaces and a greener, more sustainable environment thrives. I will continue to be a strong and tireless advocate for all the city’s residents, and I care deeply about making sure Newton is a city where we respect people with different opinions and where we stay true to being a city that is welcoming, inclusive, and diverse.” This statement drives the 2040 initiative for the City of Newton.

Q.What is your current role at the organization?

A.I am the director of transportation planning at the city of newton.

Q.How did you get to this point in your career? Any key points along that pathway?

A.I studied Urban Planning and Economics as an undergraduate at MIT and Stanford (transferred), after which I worked part time as a bike planner at Stanford University while I pursued my first career as a professional bike racer.

More recently, I worked from 2007-2015 as the Director of Bike Programs for the City of Boston, 2015-2016 in Seattle as Chief of Active Transportation and currently work as Director of Transportation Planning in Newton, MA.

I spent time in Boston and one year in Seattle before I came to Newton. My job in Boston was the my most important, impactful job I have ever held to date. I worked for the Mayor Menino, to start up his bike initiative, Boston Bikes. I built the Boston Bike Share Program from the ground up. We went from 0 and added almost 100 miles of

bike lanes, installed and put in 3,000 bike rack parking spaces, launched one of the first bike share programs in the country and created a myriad of other programs. We also reached out to get new riders and kids families to get kids and parents biking. Boston went from the worst cycling city in the U.S. to a recognized leader. I ended up moving on to Seattle because this position reported directly to the Mayor. I chose Seattle because the Boston job was directly linked to Mayor Menino. When Menino left, I think the new Mayor wanted to carve a



new space for himself. The Bike Share initiative was very much Mayor Menino’s legacy and the new Mayor needed something else.

Then I moved onto Seattle to work as Chief of Active Transportation for the City of Seattle. Doing this, I got to oversee the expansion of bike share, worked on their New Mobility Playbook and helped with the creation of the Summer Parkways program. I was there for one year and then I came back to Massachusetts where I was hired as Director of Transportation for the City of Newton. Shortly thereafter, the job was split into operations and planning. So, I am the Director of Transportation Planning for the city of Newton.

Q. Were there any experiences that helped to best prepare you for the work that you do?

A. Boston was just an amazing opportunity. Reporting to the mayor allowed us to get things done. It was a new and very progressive initiative and the mayor's strong support helped push the program through and circumvented the bureaucracy of transportation to get it done. It meant a lot of staff that might have otherwise caused friction for progress, were supportive, albeit sometimes reluctantly. We were very dependent on the Boston Transportation Department (BTD) and the Department of Public Works (DPW) because they were reviewing the plans and working to move it forward. It was just such a brilliant structure for driving change and one of the

best experiences of my career.

Q. What does a day in the life of your position look like?

A. Yesterday was fairly typical. I had ten emails that required some thought and time. Usually there are questions from the mayor. Today's included whether to take a position on a specific transit project. I responded about positions that we should take on transportation projects. This usually involves researching on the project and then making a proposal of recommendation position to the mayor. Another task was we were trying to put in planning locations for a few bus shelters. We had to reach out to the Massachusetts Bay Transportation Authority (MBTA) to see if we want to proceed with this or not. We are also working on getting the electrical vehicle car share company to operate in Newton—which entailed today working so working with lawyers and the company to develop a contract was another part of my day discuss contract issues. Another part of this day was a development project that would propose some bike pedestrian trails that would connect to the 'T' and to parks, and working with preservation people to decide on options for routes. We are also wrapping up a project regarding a bike path in West Newton that is about to go out to bid—so a lot of this work now is around resolving emerging

issues and solutions. Often times there will be a couple of meetings and there might be one project to work on for a few hours: whether designing bike lanes, and writing memos, or preparing presentations. Remember, this was just one day of a five day work week.

Q. What skills have you gained in the work? Are these unique or transferable to other disciplines?

A. I've learned that planning is much more process oriented—which is about working hand in hand with constituents. It's quite a different skill set than what I did for Boston which was focused on deliverables.

Q. What do you enjoy most about your job?

A. I enjoy some of the more complex projects where we are trying to bring in a new innovation. Transportation has flipped on its head in the last 10 years regarding the way transportation has changed. We are working to bring an electric vehicle car share to Newton. We are also working on a \$300,000 contract to use taxis for and to replace taxis with an on-demand shared mobility company that will provide transportation services for seniors. Another part of my work is wondering if cities of our density can support a privately funded bike share system—because when the population is lower and cannot support the bike share system,



it will often break down. So, new mobility is hard sometimes because there's not much you can do with it in a small city like Newton. I think that it is so much more interesting on a city/regional level. When it comes to the work of planners, there is the sort of traditional work—the city is going to re-construct and re-design a roadway and you're responsible for carrying the project from conception through concept, design and implementation. This is not really my strength. I much prefer the new mobility and operations work. But, the whole other side of transportation, like operations work, that is more analytical, dynamic, innovative, and transformative, I enjoy.

Q. What are some of the challenges you have faced in the work? How did you overcome them?

A. In Boston, being a young female, educated and trying to create change, it was a tough place. But I was so committed to what we were doing. Our group that worked together was incredibly passionate and just loved the work and it was so rewarding. We had each other and that compensated. Now it's sort of different. The bike world is a little more of a sub-culture and an image so there was a lot more camaraderie. In Newton, everyone is lovely and it is an easier place to work.

Q. What are some of your own personal characteristics and values that make you a good fit for this type of work?

A. I thrive in a dynamic fast-paced environment that requires a lot of multitasking with analytic projects. I thrive with highly complex, innovative,

and new projects that are sort of entrepreneurial on the edge of public/private sector—the projects that require a business mind. As I said, these are not really the core skill sets required to be a planner. Planners typically need to excel in process, communications, patience and tend to have a better design sense than I do. That is not so much of this world—most of it is about the planning and the planning process.

Q. What is something that you want people to know about the work that you do?

A. For people that love transportation planning, the nice thing about the suburbs is that people tend to be nice, it is less cut throat, it is a manageable pace, it is less formal a hierarchical and you have more interactions with the mayor and department heads. It is a slower pace and I think some people might like to be able to dive deep on certain items that they might not get to otherwise. On the other hand, bigger cities are much more dynamic, large scale, there is more “professional suffering” and a harder environment to survive on a personal level. But there are cool and incredible opportunities and projects, and much more connection to other professionals to build networks.

Overview of Position as it Relates to Transportation

The role of a transportation planner is best described as “the planner of the transportation system of tomorrow.” This requires work in the public and private sectors and/or engaging with government policy and the final details before the beginning of building work. This includes designing research methods and survey techniques for proposed transportation projects; assessing the impact of recent building developments on transportation systems; modeling traffic flows; recommending improvements for transportation systems; collaborating with engineers; and analyzing information related to transportation such as policy, impact reports, or long-term planning needs.

In the public sector, transportation planners typically provide services for government bodies and contractors, examining current traffic and population trends and determining the effectiveness of proposed and constructed roads. Transportation planners also plan new roads based on future predicted populations. Alongside transport engineers, developers, and environmental planners, transportation planners work to ensure that estates, commercial, and industrial zones have the correct transport infrastructure and also that they adhere to environmental legislation.

In the private sector, transportation planners work for public transport companies typically examining effectiveness of timings and schedules, as well as volume of transport services to ensure that these systems are working optimally. Transportation planners will also work to and be involved in the

decision making process to compose new routes when transportation service providers are not functioning optimally.

Source: www.environmentalscience.org/career/transportation-planner

Transportation Planning Directors

The main role of Directors is logistics and planning regarding transportation, as well as the management of other transportation managers on the team. In the public sector, directors may work for government bodies or contractors: examining trends, determining effectiveness of proposed structures, and bidding on projects.

Nicole is the Director of Transportation at the City of Newton Public Works Department. The Departmental Division serves under Mayor Setti. D. Warren. This position requires that Nicole direct and manage all aspects of Transportation Division including capital projects, operations, traffic design, active transportation, parking and asset management.

This includes: Designing, planing and executing multiple major capital projects on-time and on-budget; Overhauling parking programs with implementation of state-of-the-ark kiosk technology, new standard operating procedures for parking appeals, shared parking program (in progress), and on-street charging (in progress); Partnering with Planning Department to design City’s first modern Complete Streets projects: \$4M reconstruction of West Newton and \$3M reconstruction of Newtonville; and spearheading the first large-scale regional suburban bike share system, launching in 2018.

Source: www.environmentalscience.org/career/transportation-planner

Transportation Planning

“In this field of study, you’ll learn how to use math and science to design, develop, and improve transportation systems. You’ll explore ways to keep traffic moving as well as ways to encourage the use of subways, buses, and bikes. And you’ll study other forms of transportation, including trains, planes, and ships.”

—College Board

Overview of General Skills and Requirements

Transportation planning directors are required to have the skills to analyze information and data regarding market research, censuses, and environmental impact studies. This is necessary for the purposes of decision-making around planning options and choosing appropriate action plans regarding community development projects. Transportation planners must also have clear and effective communication skills as they interact with colleagues, stakeholders, and investors, as well as prepare and present reports to a wide variety of audiences. Finally, planners must be able to manage projects, oversee tasks, and plan assignments for themselves and others.

Transportation planners require certain credentials. Most require a Master's degree from an accredited planning program. People who hold a Bachelor's degree in Urban and Regional Planning can qualify for a small number of jobs as assistants or junior planners. Additionally, some entry-level positions require 1 to 2 years of work experience in a related field (i.e., architecture, public policy, or economic development). Acceptable experience can also be attained through internships related to Urban and Regional Planning either while enrolled in school or post-graduation.

Looking into the future, transportation planners will be needed to develop revitalization projects and address issues regarding population growth, environmental degradation, movement, and resource scarcity. Common challenges are predicted to be: population change, affordable housing needs and transportation systems; all of which can address high- and low-density populations. As communities emerge and grow they will require development and improved infrastructure regarding housing, roads, sewer systems, parks and schools. As a result, the employment of urban and regional planners is projected to grow 13 percent from 2016-2026. This employment growth is driven by

demographic, transportation, and environmental changes.

Sources: Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, Urban and Regional Planners. U.S. Department of Labor CareerOneStop: Transportation Planners Occupation Profile.



GLOSSARY

- ▶ **Carshare** – a model of car rental where members can rent cars for short periods of time, often by the hour. The model is often promoted as an alternative to car ownership.
- ▶ **On-Demand Transit** – any fixed route system of transporting individuals that requires advanced scheduling by the customer, including services provided by public entities, nonprofits, and private providers; often used in rural areas.
- ▶ **New Mobility** – emphasizes use of on-demand transit, shared mobility, and technology use such as fully or partially self-driving cars, electric vehicles, and vehicles with some combination of those elements.
- ▶ **Community Development** – a process where community members come together to take collective action and generate solutions to common problems.

Type of Projects Carried Out by the City of Newton, Massachusetts

DEDHAM-NAHANTON STREETS

Traffic Signalization project to upgrade traffic signal equipment, improve intersection alignment geometry, improve multimodal safety and operations and implement signal coordination.

WASHINGTON STREET CORNER

Conceptual design to improve safety and pedestrian accommodations, improve traffic flow, and ADA compliance.

NEEDHAM STREET

MassDOT led and funded project to pave and improve Needham Street. Project upgrades to traffic signal equipment, improves roadway alignment geometry, improves multimodal safety with projected bike lanes and crossings, and implements signal coordination.

About the City of Newton, Massachusetts

Environmental sustainability is one of Newton's main initiatives. This initiative is being achieved through the utilization of the City's designation as a "Green Community", implementation of energy initiatives, promotion of energy conservation efforts, and reduction of energy consumption throughout the City by 20% by the year 2020.

Since 2010, the City of Newton has set out to become a leader in environmental sustainability. Previous efforts toward this goal have been the adoption of the "Stretch Code" which requires higher energy efficiency levels in new construction and additions, and achieving "Green Community" status from the state.

Source: www.newtonma.gov/gov/executive/metrics/environmental_sustainability.asp



Key Skills

- ▶ **Reading Comprehension** – Reading work-related information.
- ▶ **Complex Problem Solving** – Noticing a problem and figuring out the best way to solve it.
- ▶ **Critical Thinking** – Thinking about the pros and cons of different ways to solve a problem.
- ▶ **Active Listening** – Listening to others, not interrupting, and asking good questions.
- ▶ **Judgment and Decision Making** – Thinking about the pros and cons of different options and picking the best one.
- ▶ **Coordination** – Changing what is done based on other people’s actions.
- ▶ **Active Learning** – Figuring out how to use new ideas or things.
- ▶ **Systems Evaluation** – Measuring how well a system is working and how to improve it.
- ▶ **Systems Analysis** – Figuring out how a system should work and how changes in the future will affect it.
- ▶ **Time Management** – Managing your time and the time of other people.
- ▶ **Monitoring** – Keeping track of how well people and/or groups are doing in order to make improvements.

Abilities Needed for Success

- ▶ **Written Comprehension** – Reading and understanding what is written.
- ▶ **Oral Expression** – Effective spoken communication.
- ▶ **Written Expression** – Effective communication in written form.
- ▶ **Deductive Reasoning** – Using rules to solve problems.
- ▶ **Inductive Reasoning** – Making general rules or coming up with answers from lots of detailed information.
- ▶ **Oral Comprehension** – Listening and understanding what people say.
- ▶ **Problem Sensitivity** – Noticing when problems happen.
- ▶ **Fluency of Ideas** – Coming up with lots of ideas.
- ▶ **Near Vision** – Seeing details up close.
- ▶ **Originality** – Creating new and original ideas.
- ▶ **Information Ordering** – Ordering or arranging things.
- ▶ **Visualization** – Imagining how something will look after it is moved around or changed.



This material is based upon work supported by the Federal Highway Administration under Agreement No. DTFH6114H00025 & DTFH6116H00030. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the Federal Highway Administration.



Environmental Work in the Transportation Sector

CAREER PROFILE

NAME: Pattie Kallfelz-Wertz **TITLE:** Field Scientist
DEGREE: Ecology **COMPANY:** Vanasse Hangen Brustlin, Inc. (VHB)

VHB is known as an American civil engineering consulting and design firm with offices throughout the country. Founded in 1978, the company primarily focuses on transportation and land development, working on a variety of transportation civil engineering projects in the Northeast and along the East Coast of the United States.

VHB “aspires for a sustainable world in all that (they) do. It is inherent to who (they are) and (their) generational company philosophy—founded on stewardship. “VHB helps their clients take action to improve health and well being, contribute to economic vitality, and promote environmental stewardship.

Source: www.vhb.com/Pages/home.aspx

Q.What is your current role at the organization?

A.I work in the natural sciences group. In Vermont we are very lucky to have a really big environmental group—it is really robust. My particular role is in the ecology group. So, we do wetlands, waters, animals, and plants (invasive, native, or rare

species). As an environmental scientist—I’m more of a supervisor, coach, trainer and mentor—at this point in my career. We have a lot of younger staff that are doing the hoofing around out in the field (data collection). I will review their work, get them trained up, and just sort of guide them through process. So, I am less of a swamp rat (an old nickname for ourselves) at this point. Now my current role is teaching others how to do it rather than being a do-er.

Q.How did you get to this point in your career? Any key points along that pathway?

A.I went to Unity College—my degree was in ecology. After I graduated, I moved back home and took a break for about 6 months before I went to work for a small firm in central New York for about five and a half years. That was my first job and I was the swamp rat: I did a LOT of the fieldwork, data entry and recording. Then in 2006 my husband and I moved to

Vermont. I took a year off just to get my head on straight. I took some time to organize myself and then started at VHB (then known as Pioneer Environmental Associates, the merger was made public the day I started), which at the time was a very small firm started by one of our current directors. That was in 2007, and I have been here ever since. Pioneer became the environmental side of this office. So when I got hired, I was as a junior staff scientist, and after some staff changes and shuffling, I ended up in the Wetlands department. And I’ve just been working there since.

The better that you get at certain things, you are sort of offered other opportunities. So you get good and you work your way up and into the office. I started in wetlands and then moved up into invasive species, monitoring and control. Then getting a little more experience I got into rare species surveys and management plans. You just keep growing: and then you are doing more reporting and

coordination, and planning. And as you are moving up and newer people are coming in, you start mentoring and teaching.

My career path was more organic and based on whatever opportunity came up. I never had a very clear set plan. I have been very lucky to be able to move from opportunity to opportunity. It has been nice for me to be able to naturally grow my career in a way that works for me. My career has been a boat in a stream—my career didn't happen to me, sometimes you have to do stuff you don't love but overall I have been able to try new things as they come along and learn from them every step of the way and appreciate those opportunities.

Q. Were there any experiences that helped to best prepare you for the work that you do?

A. I was always an outdoor kid. Growing up in the woods, playing in the mud, and coming of age in the '80s and '90s. This work always felt like what I should do. There was a certain time when I was growing up that people started talking about (what was then called) global warming—plastic and pollutions became really mainstream. That national conversation really affected me and I wanted to be a part of that (a part of making it better). I really liked science and I really thought, “this works for me!” Going into middle and high



school I started pursuing more actively and deliberately the sciences, math, and even social studies to a certain extent. Just being hyper-aware of doom and gloom conversation and narrative that we were hearing regarding the health of the planet was a huge motivator. It was a relatively new conversation to the majority of people, and was very important for the first time.

I had really great science teachers in high school. I wasn't discouraged from doing math and science as was the case for

many girls at that time. It was a really good mix and never discouraged as, “it's a boy thing, don't do that.” And even then in the '90s that was weird. I just happened to be in a little bubble where I was living. Being in that environment where my career plan was encouraged—and understanding how rare this was twenty years ago still boggles my mind. So that was also something that helped me to foster my intent to start and stay on that path. Overall, where I was it was very supportive and in that sense, even now, I am very lucky.



Q. What does a day in the life of your position look like?

A. At this point, most days I check e-mails, check voicemails, making sure nothing is on fire. I check in with the people that I work with—either supervising or mentoring – and make sure that there is nothing they need. I check my work list. I live by post-it notes, outlook invitations, and reminders. I do our written projects and review those. I read other peoples’ stuff. It is just a lot of internal coordinating. I go to last second meetings. I answer questions. Also walking people through processes, pulling strings and running around.

Q. What skills have you gained in the work? Are

these unique or transferable to other disciplines?

A. I am a lot better of a writer than I used to be. Coordination and outreach is something that I have really grown in because I am naturally very introverted and I had to. If I can’t communicate in a way that is meaningful to everyone at the table, then what’s the point? Even if you’re just e-mailing you’ve got to know who is going to see it and how they will interpret what you’re communicating. It takes a lot of understanding of your work and how other people will perceive it.

Q. What do you enjoy most about your job?

A. I work with a really good group of people and with low turnover rate. It is so great to see people learn and come up, and do really well—that is what I find really rewarding. I still enjoy the field work, and I’ve been lucky to see some amazingly beautiful, unique places all over the northeast. Seeing something you’ve worked on for so long, from “soup to nuts” get finished (constructed) is also rewarding. You may not love every part of every project you work on, however, you love or at least appreciate the big result at the end in this kind of work. Even when it was not the most exciting project, you get to see how that project made something better or safer, or was constructed in a way that

protects natural resources in addition to meeting a project objective. Also, when I do get to go out in the field, I see some amazing things. I have thousands of photos of beautiful places, of plants, of wildlife—just being able to get paid to go out and see these places is pretty amazing.

Q. What are some of the challenges you have faced in the work? How did you overcome them?

A. Everything is a challenge: time, set deadlines, working with different people who have varying degrees of interpersonal skills. People are always the challenge. Also, working in every kind of weather and during every month of the year. I've been out when it is 100 degrees and I have been out when it is below 0 degrees. It is physically challenging when you do field work.

I have a job because the person who hired me needs me to talk with the agency that is regulating their project. Being the intermediary and working to build and maintain relationships between the parties that I am working with—threading that needle can be challenging. I've said that people are not my thing, and being in a very contentious meeting with a client and a regulator, it's my role to keep calm and make sure that it is a productive meeting. Being able to do that regularly with different groups always

at the table is challenging—especially when who is at the table is always changing. Kind of dealing with the things that I don't have control over and working hard to make sure that every encounter works to get the job done.

Q. What are some of your own personal characteristics and values that make you a good fit for this type of work?

A. One of the characteristics that has helped me progress in this field is a strong work ethic—not doing the bare minimum just to get it done. It's got to be done right—and knowing what you need to do and having the intellectual curiosity to hunt down and find those answers—whatever and wherever they may be. Just having that characteristic has helped me. It doesn't have to be innate but more like knowing that attention to detail is so key and realizing that and being willing to learn how to work on that skill, that more than anything is a challenging aspect of training people.

Being observant—I'm a field scientist. Just general curiosity and caring about the work that you're doing is key. If you don't care, then you are may struggle to succeed in this work. Wanting to do the best job in general, and knowing what it takes can be learned. But wanting to look or knowing how to look is key—understanding attention to

detail and caring a little bit about the planet. If you only care to impress a teacher/ supervisor, and not about what you working to protect, then you may be in the wrong field; you're probably not looking at the biggest picture. Even if you don't enjoy a class, task, or person you have to work with, you have to be willing to do the best job and do what it takes to get a job done correctly. You have to do your due diligence and the right job, and be willing to care to do your best job. The more you know, the better you can do your job.

Q. What is something that you want people to know about the work that you do?

A. Keep an open mind. You can't always find a job that meets your passion and interest right away. It is a lot of legwork. You may be surprised at what you find in terms of the ability to do what you really want to do. Be your own best advocate, do your research, talk yourself up (promote yourself), apply for the jobs that you do not think that you are qualified for yet—you may be surprised at what you are capable of, and that's how you grow. For example, who would think that a transportation firm has such a robust environmental practice? But I still get to do all of this cool stuff, work with awesome people, and get paid too. Shake it up, keep an open mind, and do some research so that you know what is out there for you. ⇨

Overview of Position as it Relates to Transportation

Impacts to fish, wildlife, plants, and rare species are regulated at the state level through the state's Fish and Wildlife Department. This also occurs at the federal level through the United States Fish and Wildlife Service and other federal agencies. These regulations in particular apply to the public and private transportation sectors due to the effects and impacts that transportation-related activities have on fish, wildlife and plant species. A few examples of activities that cause impact are road construction, tree clearing, and other impacts to wetlands, plant and animal habits.

State policies promote the accommodation of wildlife and aquatic organisms along transportation systems and minimize wildlife vehicle collisions. At the state and federal levels, policies work to help implement measures to minimize impacts to fish and wildlife such as: facilitating wildlife movement across highways, GIS modeling to protect wildlife movement, and improved planning and coordination.

Source: vtrans.vermont.gov/environmental-manual/permitting/fish-and-wildlife

Field Scientists

Field scientists observe and collect data and information on subject (fish, wildlife, plants, invasive and rare species) in their natural environment. The information gained through this process is applied with applications regarding: wildlife conservation, farming, and/or medicine.

Field scientists must travel to various locations to take proper samples and record data—which will later be cataloged and analyzed.

Patti is a Staff Scientist in VHB's South Burlington, Vermont, office. She performs wetland/ waters delineations, impact assessments, wetland permit applications (Federal and State), wetland mitigation planning and design, data analysis, mapping, and reporting; permit compliance monitoring (during construction and post-construction); non-native and invasive species monitoring and management planning; as well as rare botanical species, habitat, and natural community surveys. Patti works on a wide variety of project types for both the public and private sectors, for a variety of markets including transportation, energy, commercial, and residential. Additionally, she trains, supervises/

mentors, and conducts technical reviews of various work products of VHB's technical staff in all aspects of the ecology/natural science group's work, both field work (e.g., wetland/ waters delineations, rare plant surveys, non-native and invasive species plant surveys) and office-centered work (e.g., data entry, mapping, memos, reports, permit applications, etc.).

Fish, Wildlife, & Rare Species

"Keep an open mind. You can't always find a job that meets your passion and interest right away. It is a lot of legwork. You may be surprised at what you find in terms of the ability to do what you really want to do. Be your own best advocate, do your research, talk yourself up, apply for the jobs that you do not think that you are yet qualified for—you may be surprised at what you are capable of, and that's how you grow."

—Patti Kallfelz-Wertz

About VHB, Inc.

VHB is an environmental consulting firm focused on making a positive impact on its surrounding communities, making the most out of opportunities to grow personally and professionally, while building a network of lifelong colleagues. VHB is known for collaborating across disciplines to develop and implement effective strategies, problem-solving techniques and solutions through, "a combination of technical and personal skills to help build a successful consulting team."

Source: www.vhb.com/Pages/Trends/Students-and-New-College-Grads.aspx

Overview of General Skills and Requirements

Field scientists are required to have skills regarding communication, critical-thinking, emotional stamina and stability, interpersonal skills, observation skills, outdoor skills, and problem-solving skills. These skills are important for many reasons. The first would be for disseminating knowledge to the public, academics, and policymakers. Scientists also need reasoning and judgment to draw conclusions from their own experimental results and observations. It is also important for biologists to have the ability to work, problem-solve and communicate on teams that often operate in the outdoors.

Field Scientists require certain credentials. For the field, an entry-level position requires a bachelor's degree. For higher-level investigative or scientific work, a Master's degree is needed. Additionally, to lead independent research or to occupy a university research position, a Ph.D. is necessary.

Looking to the future, employment of field scientists is expected to grow 8 percent from 2016 to 2026—this is average for the majority

of occupations. Scientists will be needed to study human wildlife interactions as the human population continues to grow. Human development and growth will impact wildlife and their natural habitats. It is predicted that because most funding for this work comes from government agencies, demand for biologists will be limited by budget—although this is the expectation for most occupations funded by the government.

Source: Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, Zoologists and Wildlife Biologists, and Field Scientists,

www.bls.gov/ooh/life-physical-and-social-science/zoologists-and-wildlife-biologists.htm

Type of Projects Carried out by VHB

LAMOILLE VALLEY RAIL TRAIL

For this [project](#) VHB is completing natural resources assessments, regulatory agency coordination, and permitting. The trail will contribute to the region's growing recreational economy.

I-89 EXIT 16

This project involves natural resources assessments, reporting, permitting and permitting assistance. The project will rebuild exit 16 of Interstate 89 so it uses a [diverging diamond design](#).

BURLINGTON GREENWAY/BIKE PATH

This project involves natural resources assessments, regulatory agency coordination, and permitting. The [project](#) consists of renovations to more than eight miles of bike path in Burlington, which rerouted the bike path at the Lake Champlain waterfront and added fitness stations along the path.

SOUTH BURLINGTON CITY CENTER

During this project VHB assisted with the state and federal environmental permitting process. The \$21.8 million [City Center project](#) will include a new library, senior and recreation center, and city hall.

GLOSSARY

- ▶ **GIS** – geographic information system, software designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data.
- ▶ **Impact Assessment** – formal, evidence-based procedures that assess the economic, social, and environmental effects of a project or public policy.
- ▶ **Invasive Species** – a species that is not native to a specific location, and that has a tendency to spread to a degree that may cause damage to the environment, the human economy, or human health.

Key Skills

- ▶ **Reading Comprehension** – Reading work-related information.
- ▶ **Complex Problem Solving** – Noticing a problem and figuring out the best way to solve it.
- ▶ **Critical Thinking** – Thinking about the pros and cons of different ways to solve a problem.
- ▶ **Active Listening** – Listening to others, not interrupting, and asking good questions.
- ▶ **Judgment and Decision Making** – Thinking about the pros and cons of different options and picking the best one.
- ▶ **Coordination** – Changing what is done based on other people’s actions.
- ▶ **Active Learning** – Figuring out how to use new ideas or things.
- ▶ **Systems Evaluation** – Measuring how well a system is working and how to improve it.
- ▶ **Systems Analysis** – Figuring out how a system should work and how changes in the future will affect it.
- ▶ **Time Management** – Managing your time and the time of other people.
- ▶ **Monitoring** – Keeping track of how well people and/or groups are doing in order to make improvements.

Abilities Needed for Success

- ▶ **Written Comprehension** – Reading and understanding what is written.
- ▶ **Oral Expression** – Effective spoken communication.
- ▶ **Written Expression** – Effective communication in written form.
- ▶ **Deductive Reasoning** – Using rules to solve problems.
- ▶ **Inductive Reasoning**– Making general rules or coming up with answers from lots of detailed information.
- ▶ **Oral Comprehension** – Listening and understanding what people say.
- ▶ **Problem Sensitivity** – Noticing when problems happen.
- ▶ **Fluency of Ideas** – Coming up with lots of ideas.
- ▶ **Near Vision** – Seeing details up close.
- ▶ **Originality** – Creating new and original ideas.
- ▶ **Information Ordering** – Ordering or arranging things.
- ▶ **Visualization** – Imagining how something will look after it is moved around or changed.



This material is based upon work supported by the Federal Highway Administration under Agreement No. DTFH6114H00025 & DTFH6116H00030. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the Federal Highway Administration.



Environmental Work in the Transportation Sector

CAREER PROFILE

NAME: Emily Nosse-Leirer

TITLE: Senior Planner, Land Use

DEGREE: Urban Geography

COMPANY: Chittenden County Regional Planning Commission

The Chittenden County Regional Planning Commission assists local communities in planning and project design for critical transportation systems and infrastructure. Transportation plays a critical role in shaping an area's economic and community health and quality of life. Transportation Planning is a comprehensive and collaborative process that develops multimodal transportation solutions to address present and future transportation and land use needs. It promotes safety; supports local and regional economic development goals; respects the natural and built environment; improves social equity; and promotes a balanced, multimodal transportation system. It is a collaborative process that encourages participation of all relevant stakeholders including local governments, state and federal agencies, multi-jurisdictional partners, and the public at-large.

Q. What is your current role at the organization?

A. I am a senior planner. Our work at CCRPC has a pretty clear split between transportation and non-transportation. I am not on the

transportation side of things, but the work that I do with land use is broad ranging. I work on things from municipal and town planning, energy planning and working to meet Vermont's energy goals, brownfields and economic development, and permit review. So, a lot of different things.

Q. How did you get to this point in your career?

A. I received my undergraduate and graduate degrees in Urban Geography from Ohio State University through a combined BA/MA program. At the time, I thought that I was going to be an academic. But during graduate school, I realized that this was just not what I wanted to do. So, I took a few city planning classes, got some internships and worked in an AmeriCorps position with the Central Vermont Regional Planning Commission. I was there for about one year when I applied for the position at the CCRPC. I had worked there for

about three years before I was promoted to senior planner—and that is where I am now. It was definitely a fast-track experience once I made the decision to do this kind of work.

Q. What does a day in the life of your position look like?

A. It really depends. I work with a lot of volunteer committees, like planning commissions or select boards. Some days are spent preparing for and attending meetings, which might be about a plan I am helping them write or a new state policy they want explained. Other days I am in the office all day to do research or prepare documents for others to review. I'm never "in the field" the way some of our transportation or water quality folks are.

Q. What do you enjoy most about your job?

A. I went to graduate school because I really love to read and write and talk about things with interesting people,

and it is so nice that this is a big component of the work that I do. As weird as it sounds, I actually like weeding through dense documents to find out exactly what they are saying—it's like a puzzle to find the most important pieces of information for a particular person, community, or situation. I also really like working with community groups. It is more fulfilling. It is also really nice to have a supportive office environment at the CCRPC.

Q. What is something that you want people to know about the work you do?

A. I want the general public to see us as a resource and a group that serves people in the community. I wish more people would reach out to us when they have questions because we have a lot of staff people who are experts on various issues and can usually answer their questions easily.

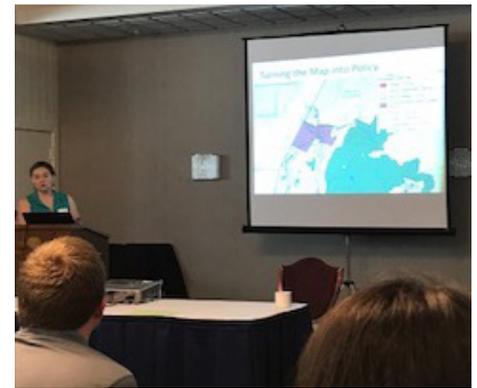
Q. What are some of the challenges that you have faced in the work and how did you overcome them?

A. Planning is all about making decisions on what's important for a

community and what's not, so we'll sometimes do a ton of research and writing on something explaining a potential policy and then the community might decide to move in a different direction. I try to remember that to make an informed decision, you have to have both sides of the story, so our work is useful even if it's the option the community doesn't move towards. But of course, it can be disappointing to see work not going forward. I really appreciate it when people tell us that we've been useful to their process. So, it's validating to know when this work does help people, and that helps get me through those challenging moments.

Q. What are some of the things that you don't love about the work that you do?

A. Working at the regional level instead of for a single community helps us to be an objective voice without personal politics interfering, but on the other hand, it can lead to a sense of removal from the communities that we help. We often don't get to stay involved for the end of a project when it



really starts to impact people.

Q. What are some of your own personal characteristics and values that have made you a good fit for this type of work?

A. From a personality standpoint, I love meeting new people, debating ideas and presenting on things, so planning is can be a great fit for all of that! I've also always been drawn to community building work. I do a fair amount of volunteering outside of work—I am the executive chair of the United Way of Northwest Vermont's Emerging Leaders United and I also volunteer with a Girl Scout troop in Winooski and with political campaigns. I like that my work at CCRPC advances many of the same goals as my volunteer opportunities. ↪



About Chittenden County Regional Planning Commission

The CCRPC is one of eleven commissions serving municipalities in the state of Vermont. The CCRPC operates under the Vermont Municipal and Regional Planning Development Act and guided by Commissioners appointed by local City Councils, Village Trustees and boards of the municipalities under the designated Chittenden County region.

Overview of Position as it Relates to Transportation

Urban and regional planners develop land use plans and programs in order to create communities, accommodate population growth, and to revitalize existing structures (i.e. facilities in towns, cities, counties, and metropolitan areas). Additionally, urban and regional planners own analytical, communicative, decision making, and leadership skills that are vital to carrying out development work in communities. When Urban and regional planners choose to specialize in transportation, their role often becomes embedded in transportation planning.

The role of a transportation planner is best described as “the planner of the transportation system of tomorrow.” This requires work in the public and private sectors and/or engaging with government policy and the final details before the beginning of building work. This includes designing research methods and survey techniques for proposed transportation projects; assessing the impact of recent building developments on transportation systems; modeling traffic flows; recommending improvements for transportation systems; collaborate with engineers; and analyze information related to transportation such as policy, impact reports, or long-term planning needs.

In the public sector, transportation planners typically provide services for government bodies and contractors, examining current traffic and population trends and determining

the effectiveness of proposed and constructed roads. Transportation planners also plan new roads based on future predicted populations. Alongside transport engineers, developers, and environmental planners, transportation planners work to ensure that estates, commercial, and industrial zones have the correct transport infrastructure and also that they adhere to environmental legislation.

In the private sector, transportation planners work for public transport companies typically examining effectiveness of timings and schedules, as well as volume of transport services to ensure that these systems are working optimally. Transportation

planners will also work to and be involved in the decision making process to compose new routes when transportation service providers are not functioning optimally.

Source: www.environmentalscience.org/career/transportation-planner

Urban and Regional Planning

“It’s a hot day, and you wish your town would hurry up and build that pool everyone keeps talking about. But where should it be built? What land is available? How will people get there? How would building it affect the local wildlife? What do you say to neighbors who worry about noise and traffic? As an urban or regional planner, it would be your job to help the town answer all of these questions -- and many more. As the nation’s population grows, so do our cities and suburbs. Planners play a key role in managing that growth. They help keep communities safe, livable places and work to improve them.”

—College Board

Planners

Land Use Planning is a career in the broader field of Urban and Regional Planning. Planners do work such as: managing assistance project, working extensively on

community engagement, outreach, and education and providing development review assistance. Planners might also write comprehensive strategies and coordinate for the commission.

As a senior planner at CCRPC, Emily has co-authored CCRPC’s energy plan and author of four local energy plans, completed in response to Vermont’s Act 174; Presented on and developed testimony/legislative committee comments regarding complex regulatory systems and processes, such as energy data modeling and

the Vermont NetMetering Rules, to legislators, community legislative bodies, volunteers, peers and members of the press; and managed energy permit review (Section 248) by developing review standards, submitting testimony to Vermont Public Utility Commission and participating in process-review.

Overview of General Skills and Requirements

Urban and regional planners are required to have the skills to analyze information and data regarding market research, censuses, and environmental impact studies. They must also be able to determine the significance of the data that is analyzed. This is necessary for the purposes of decision-making around planning options and choosing an appropriate action plans regarding community development projects. In addition to analytical skills, urban and regional planners must also have clear and effective communication skills as they interact with colleagues, stakeholders, and investors, as well as prepare and present reports to a wide variety of audiences. Finally, planners must be able to manage projects, oversee tasks, and plan assignments for themselves and others.

Urban or regional planners require certain credentials. Most require a Master's degree from an accredited urban or regional planning program. People who hold a Bachelor's degree in Urban and Regional Planning can qualify for a small number of jobs as assistants or junior planners. Additionally some entry-level positions require 1 to 2 years of work experience in a related field (i.e. architecture, public policy, or economic development). Acceptable experience can also be attained through internships related to Urban and Regional Planning either while enrolled in school or post-graduation. It is not uncommon for people to seek internships post-graduation to gain experience in the field of urban and regional planning before being hired full time.

Looking into the future, urban planners will be needed to develop revitalization projects and addressed issues regarding population growth,

environmental degradation, movement, and resource scarcity. Common challenges are predicted to be: population change, affordable housing needs and transportation systems; all of which can address high and low density populations. As communities emerge and grow they will require development and improved infrastructure regarding housing, roads, sewer systems, parks and schools. As a result, the employment of urban and regional planners is projected to grow 13 percent from 2016-2026. This employment growth is driven by demographic, transportation, and environmental changes.

Source: Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, Urban and Regional Planners, at www.bls.gov/ooh/life-physical-and-social-science/urban-and-regional-planners.htm

Types of Projects Carried Out at CCRPC

Brownfield Assessment

Projects through CCRPC's environmental protection agency Targeted Brownfields Assessment Grant

Long Range Policy

Author and researcher of complex, long range policy documents, including the Chittenden County Comprehensive Economic Development Strategy and the 2017 Bolton Town Plan

GLOSSARY

- ▶ **Brownfield** – a former industrial or commercial site where future use is affected by real or perceived environmental contamination.
- ▶ **Transportation Planning** – the process of defining future policies, investments, designs, and goals to prepare for future needs to move people and goods to destinations.
- ▶ **RPC** – regional planning commission.

Key Skills

- ▶ **Reading Comprehension** – Reading work-related information.
- ▶ **Complex Problem Solving** – Noticing a problem and figuring out the best way to solve it.
- ▶ **Critical Thinking** – Thinking about the pros and cons of different ways to solve a problem.
- ▶ **Active Listening** – Listening to others, not interrupting, and asking good questions.
- ▶ **Judgment and Decision Making** – Thinking about the pros and cons of different options and picking the best one.
- ▶ **Coordination** – Changing what is done based on other people’s actions.
- ▶ **Active Learning** – Figuring out how to use new ideas or things.
- ▶ **Systems Evaluation** – Measuring how well a system is working and how to improve it.
- ▶ **Systems Analysis** – Figuring out how a system should work and how changes in the future will affect it.
- ▶ **Time Management** – Managing your time and the time of other people.
- ▶ **Monitoring** – Keeping track of how well people and/or groups are doing in order to make improvements.

Abilities Needed for Success

- ▶ **Written Comprehension** – Reading and understanding what is written.
- ▶ **Oral Expression** – Effective spoken communication.
- ▶ **Written Expression** – Effective communication in written form.
- ▶ **Deductive Reasoning** – Using rules to solve problems.
- ▶ **Inductive Reasoning** – Making general rules or coming up with answers from lots of detailed information.
- ▶ **Oral Comprehension** – Listening and understanding what people say.
- ▶ **Problem Sensitivity** – Noticing when problems happen.
- ▶ **Fluency of Ideas** – Coming up with lots of ideas.
- ▶ **Near Vision** – Seeing details up close.
- ▶ **Originality** – Creating new and original ideas.
- ▶ **Information Ordering** – Ordering or arranging things.
- ▶ **Visualization** – Imagining how something will look after it is moved around or changed.



CHITTENDEN COUNTY RPC
Communities Planning Together

This material is based upon work supported by the Federal Highway Administration under Agreement No. DTFH6114H00025 & DTFH6116H00030. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the Federal Highway Administration.



Environmental Work in the Transportation Sector

CAREER PROFILE

NAME: Kaitlin O'Shea	TITLE: Preservation Planner
DEGREE: Historic Preservation	COMPANY: Vanasse Hangen Brustlin, Inc. (VHB)

VHB is an American civil engineering consulting and design firm with offices throughout the country. Founded in 1978, the company primarily focuses on transportation and land development, working on a variety of transportation civil engineering projects in the Northeast and along the East Coast of the United States.

VHB “aspires for a sustainable world in all that (they) do. It is inherent to who (they are) and (their) generational company philosophy—founded on stewardship.” VHB helps their clients take action to improve health and well being, contribute to economic vitality, and promote environmental stewardship.

Source: www.vhb.com/Pages/home.aspx

Q. What is your current role at the organization?

A. I am a preservation planner. I help our projects comply with regulations. So, in the preservation field, it is my job to review projects and to determine if there are historic resources in the project and whether or not those resources will be adversely affected

by the project’s proposed scope of work. And if the resources are affected, can we avoid adversely affecting the resources? And if not, can we mitigate the adverse affect? To determine that, I work with our project managers, engineers, and clients to make sure that the projects aren’t negatively affecting historic resources—it could be to bridges, to streetscapes, to landscapes, to individual buildings, to parks, to cemeteries. It is hard to have a project in Vermont that does involve historic resources.

Q. How did you get to this point in your career? Any key points along that pathway?

A. My undergraduate and graduate degrees are in historic preservation. I went to the University of Vermont (UVM) for graduate school and the University of Mary Washington for undergraduate. But I had never heard of the term ‘historic preservation’ until I was looking at colleges. Because I like history, I like writing, it just

clicked. So I started researching which colleges had historic preservation, and only about seven had undergrad programs, so I found out more about it and just loved it.

As to what I do now (project review or regulatory review), I did not anticipate ever doing that because I used to think that Section 106 regulations, and laws were so boring. But here I am now, doing that work, and I really love it. I got here because I went to graduate school at UVM. During that time, I got an internship with VTTrans doing regulatory review and I loved it. I was there for five years. Then I transitioned into the private sector. It was unanticipated, but it turned out to be great.

Q. Were there any experiences that helped to best prepare you for the work that you do?

A. My job before coming to UVM was in oral history. I worked for the Cultural Resources Management Program of the U.S. Army



It touched everybody. No matter what you do, you can't get away from a transportation project because you drive, you walk, you travel downtown.

Q. What does a day in the life of your position look like?

A. Sometimes, I'm in the office all day writing review letters. But before you get to that point, you often have to be on site and review the project, meet with the client and understand what is going on, and take photographs. I could be writing a Section 106 memo or I could be doing something more like photo documentation. I could be attending client meetings or an internal meeting. Because of the regulations we follow, it is a process. That way, everyone follows the rules, is held accountable, and knows what is expected of them.

Q. What skills have you gained in the work? Are these unique or transferable to other disciplines?

A. Well, thinking of oral history—that was a lot of talking to people, listening to people, following through on a conversation, making phone calls. I am an excellent typist because I transcribed hundreds of hours of interview time. But in transportation, just learning how to look at plans, read them, understand them, and translate them to people who might be looking at them, are all important. I learned to

on Fort Bragg as a civilian contractor. My job was a three-year project documenting a former Rockefeller estate that the army had purchased. Because it was historically significant and federal dollars were used to acquire the property, it had to be documented. It was just an amazing experience and an entirely different branch of historic preservation than where I am now.

As for UVM, the program is three semesters. It's not all that long but enough to get to know Vermont a little bit and understand what your options are.

At VTrans, I started as a preservation monitor for the Lake Champlain Bridge Project, which is the bridge between

Addison and Crown Point. It was demolished (blown up) in 2009. I was working to help construct a new bridge on the Vermont side. I essentially had to keep the contractors in line and make sure that they were following the Programmatic Agreement between the Vermont Agency of Transportation, the Vermont Division for Historic Preservation, the Federal Highway Administration, and the Advisory Council on Historic Preservation. After, I stayed on as an intern at VTrans and then became the historic preservation specialist there.

I love transportation because you can see it happen. You know that resources are being protected and that the work you did mattered --and it was gratifying to see over the years the projects that we developed.

be comfortable going into a meeting where you might be the only female and getting used to that. I really learned how to walk into a room and be as comfortable as you can be, depending on your experience. And then, there's writing proposals and documents, that's another skill set.

Q. What do you enjoy most about your job?

A. I really enjoy being in the field because I like to see what is going on in Vermont and exploring the state. I love getting to travel to a site and photo-document the resource, or look at plans or look at the site. It is really hard to review a project without seeing it. Somebody else could take photos for me, but I am not really going to understand it unless I go there.

Q. What are some of the challenges you have faced in the work? How did you overcome them?

A. Because of project budget, I don't always get to go to a site, so I don't like that part. I think the challenging part of being a consultant is the fact of billable hours and estimating how long you think it is going to take you. Sometimes you are told to cut down a budget, which means cutting down your hours even though you know that it is going to take longer. What I do requires thought and time to process the effects of something, or the historic significance, and you can't really



charge a line item for 'thinking.'

Another hard part is clients who would rather ask for forgiveness than follow the rules the first time. And then I have to explain to the Division for Historic Preservation what happened or help a client justify what they did even when you might not have agreed with what they have done. I am here to help clients navigate and learn the historic preservation review process.

Q. What are some of your own personal characteristics and values that make you a good fit for this type of work?

A: I understand that people want to get a project done. Over the years I have learned that they don't necessarily want to follow the rules because it can be a long process, not because they don't care about the resources. But if you take your process back to the regulations, and take an analytical approach, you can

show the client what they have to do.

Q. What is something that you want people to know about the work that you do?

A. I guess to know that it matters is really important. Any of the work that we do touches everyone even though they might not see it. In a place like Vermont, we like to keep Vermont looking like Vermont. You might think that adding more trees in a village landscape on a transportation project seems excessive or ridiculous, but if you compare before and after of projects it is the things that you won't notice until you look for it. The work that we do helps people really enjoy their surroundings. Sometimes it's the things like, you wouldn't know we were there reviewing a project, until we weren't. You don't know what you have until it's gone. So we try to help you miss the fact that we were there essentially. It is fun and its important work. ↪

Overview of Position as it Relates to Transportation

“Go to the heart of any thriving community and you will discover the special place reserved there for historic resources and for the public transportation that enhances access to them. During the past two decades, Americans have rediscovered and embraced the historic elements of their cities and neighborhoods, and in recent years have shifted the focus of conservation efforts from individually important buildings and districts to the traditional forms, transportation choices, and street designs that make city centers and residential areas walkable and workable for businesses and residents. Cities and towns that have replenished and revitalized critical public transportation links in their downtowns and nearby neighborhoods are also extending their efforts to work with regional agencies and adjacent communities to capture the benefits of public transportation and preserve historic urban designs throughout metropolitan areas.”

Source: www.planning.dot.gov/documents/casestudy/cities/returning_city.htm

Preservation Planners

Historic preservation has been a federal concern since 1906 when the Antiquities Act provided for the protection of historic and prehistoric remains and monuments on federal lands. Since that time, Congress has made historic preservation a responsibility of every federal agency, enacting multiple laws that extend the consideration of our nation’s historic and archaeological resources to properties beyond federal lands and reflect the importance the American people attach to safeguarding and maintaining the places that embody our nation’s rich heritage.



As a Preservation Planner at VHB, Kaitlin assists clients in historic resource assessments and compliance with the regulatory processes for Section 106 of the National Historic Preservation Act, Section 4(f) of the Department of Transportation Act, and Vermont’s Section 248, Act 250, and 22 VSA 14. Kaitlin specializes in regulatory review for transportation, hydropower, solar, and land development projects. In addition, her work includes National Register nominations, photo-documentation, historic surveys, historical research, historic properties management plans, and historic site assessments.

Source: www.environment.fhwa.dot.gov/env_topics/historic_preservation.aspx

Cultural Resources

“Today, the work of thousands of preservationists, both professionals and volunteers, is guided by the vision of the future in which communities make historic places a vital part of daily life. In the course of doing so, they have made preservation one of the most effective tools for revitalizing communities of all kinds and sizes.”

— Holt, 1997

About VHB

VHB is an environmental consulting firm focused on making a positive impact on its surrounding communities, making the most out of opportunities to grow personally and professionally, while build a network of lifelong colleagues. VHB is known for collaborating across disciplines to develop and implement effective strategies, problem-solving techniques and solutions through, “a combination of technical and personal skills to help build a successful consulting team.”

Source: www.vhb.com/Pages/Trends/Students-and-New-College-Grads.aspx

Overview of General Skills and Requirements

Preservation is a growing area and has been for the last few decades as environmental sciences and activism develops. Becoming a preservation planner requires a bachelor's or master's degree in historic preservation, cultural preservation, archaeology or a related field. One of the main causes for which environmental professionals and activists fight, is preservation of existing landscapes. Historic preservationists have the skills to do this work professionally, with contractors and companies as their clients, so that historically significant and influential architecture and landscapes are impacted as little as possible. In general, historical preservationists are working with landscapes that may have environmental significance for the local ecology or for the wider environmental biology. However, they may have cultural significance, such as modern importance to local communities, or archaeological significance in its wider context. These types of landscape tend to be allocated as State Parks or National Parks but not in all cases. It is the job of the Preservation Planner to preserve and

enhance landscapes as they are by ensuring that clients are following federal rules and regulations to impose the least amount of impact on a historically significant landscape or architecture.

No landscape is pristine or complete wilderness and any geography is the result of thousands of years of both natural and human influence. These influencing factors often create unique landscapes that are worthy of preservation, even if they are not deemed important enough for legislative protection. Preservation Planners plan and implement elements that impact the least change on a landscape - either for cultural value or for something less quantifiable such as aesthetics.

Source: www.environmentalscience.org/career/preservation-planner

Type of Planning Projects Carried Out at VHB

MIDDLEBURY RAIL AND BRIDGE PROJECT

During this project VTrans is working with the Town of Middlebury to replace [two nearly 100 year old bridges](#) in the center of Middlebury with a tunnel. The two bridges are about 300 feet apart. Analysis was done to see if rehabilitating all or part of the bridges was possible, but this option was not deemed viable. The new structure will provide new green space and connect two existing parks. It will also allow for modernization of the rail line for freight and the eventual addition of passenger rail service.

PRESERVATION PLANNING

In her preservation planning position at VHB, Kaitlin works with government agencies, municipalities, private developers, architects, energy companies, institutions, individuals, and non-profit organizations to provide a wide range of [historic preservation services](#). These include historic resource surveys and documentation reports, regulatory review and compliance, preservation planning and incentives, and public education and outreach.

GLOSSARY

- ▶ **Section 106 Regulations** – of the National Historic Preservation Act (NHPA) of 1966, requires each federal agency to identify and assess the effects their actions will have on historic resources.
- ▶ **Historic Preservation** – endeavoring to preserve, conserve, and protect buildings, objects, landscapes, or other artifacts of historical significance.
- ▶ **Antiquities Act** – passed in 1906, this law gives the President of the United States the authority to create national monuments from federal lands to protect significant natural, cultural, or scientific features.

Key Skills

- ▶ **Reading Comprehension** – Reading work-related information.
- ▶ **Complex Problem Solving** – Noticing a problem and figuring out the best way to solve it.
- ▶ **Critical Thinking** – Thinking about the pros and cons of different ways to solve a problem.
- ▶ **Active Listening** – Listening to others, not interrupting, and asking good questions.
- ▶ **Judgment and Decision Making** – Thinking about the pros and cons of different options and picking the best one.
- ▶ **Coordination** – Changing what is done based on other people's actions.
- ▶ **Active Learning** – Figuring out how to use new ideas or things.
- ▶ **Systems Evaluation** – Measuring how well a system is working and how to improve it.
- ▶ **Systems Analysis** – Figuring out how a system should work and how changes in the future will affect it.
- ▶ **Time Management** – Managing your time and the time of other people.
- ▶ **Monitoring** – Keeping track of how well people and/or groups are doing in order to make improvements.

Abilities Needed for Success

- ▶ **Written Comprehension** – Reading and understanding what is written.
- ▶ **Oral Expression** – Effective spoken communication.
- ▶ **Written Expression** – Effective communication in written form.
- ▶ **Deductive Reasoning** – Using rules to solve problems.
- ▶ **Inductive Reasoning** – Making general rules or coming up with answers from lots of detailed information.
- ▶ **Oral Comprehension** – Listening and understanding what people say.
- ▶ **Problem Sensitivity** – Noticing when problems happen.
- ▶ **Fluency of Ideas** – Coming up with lots of ideas.
- ▶ **Near Vision** – Seeing details up close.
- ▶ **Originality** – Creating new and original ideas.
- ▶ **Information Ordering** – Ordering or arranging things.
- ▶ **Visualization** – Imagining how something will look after it is moved around or changed.



This material is based upon work supported by the Federal Highway Administration under Agreement No. DTFH6114H00025 & DTFH6116H00030. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the Federal Highway Administration.



Environmental Work in the Transportation Sector

CAREER PROFILE

NAME: Jeff Owen

TITLE: Strategic Planning Coordinator

DEGREE: Landscape Architecture, City & Regional Planning

COMPANY: TriMet

TriMet provides bus, light rail and commuter rail service in Portland, Oregon and the surrounding region. The transportation options connect people with their community, ease traffic congestion, and reduce air pollution, “making our region a better place to live.”—TriMet.

Q. What is your current role at the organization?

A. Currently, my role is the strategic planning coordinator. I first joined TriMet in 2012 as a transportation planner focused on active transportation connections to transit, which includes getting people biking and walking to our transit system. Last year, I transitioned to this role that is strategic planning coordinator, focusing on longer term strategies, and how we are working towards our larger mobility goals in the future. This role includes advocating that our agency utilize national best practices, monitoring performance related outcomes, and creative ways to get where we are going.

It is a blend of being close enough to the service that we deliver for our customers on the street, alongside stepping back to a larger scale to make recommendations for policies or practices that we should consider pushing forward for the agency to deliver improvements for our customers.

Q. How did you get to this point in your career? Any key points along that pathway?

A. I began with an undergraduate degree in landscape architecture, which focused on the space between buildings and how the built environment works. Next in graduate school I chose a Master’s in city and regional planning program, with a focus around urban design and transportation. This larger planning lens includes a much more complex perspective, from design to economy to housing, and the way our cities and communities interact with each other and grow over time. During both undergraduate and

graduate school, I benefited from combining classroom learning with internships and work-study programs—both in the public sector at a town government, and in the private sector at land use and transportation planning firms. After grad school, my main role at a private firm focused on the Atlanta Beltline—a large and dynamic public project involving planning for trails, park spaces, and future transit service encircling downtown Atlanta. While I loved the role, I decided to move across the country in 2008 and landed in Portland, Oregon. After some part-time work getting my bearings, I began working at a small transit agency south of Portland on the southern edge of our metro region where I focused on active transportation. After a few years, I switched over to working at TriMet, our regional transit agency, keeping my focus on active transportation, but increasing the size and scale of my focus around our entire region.

Q. Were there any experiences that helped to best prepare you for the work that you do?

A. Because my experience includes both the education piece plus real-world work experience, I feel that was a great way for me to prepare in my career. I've really enjoyed having a good grasp of the design side of the physical world that I got from landscape architecture, including an understanding of dimensions and parameters that designers use to prepare for construction projects in the built environment. For me, that design side is complemented by and expanded with more policy and planning work. I think the combination of education with work internships really prepared me to contribute in the work world right away. As my role includes policy development and regional coordination with our many jurisdictional partners, I am thankful to have both education and work experience. One crucial piece of advice that I took to heart was to gain an understanding of both the public and private sides of the planning and design fields. This combination of how both sides fit together proves very helpful working in the public sector, managing private sector consultants, to produce outcomes on the ground for people moving around our communities.

Q. What does a day in the life of your position look like?

A. A typical day for me includes many internal and external meetings, but also protecting some time that I need to push forward on my own priorities. My work requires a lot of coordination with jurisdictional partners all around our region and at the state level. I try to plan out my time carefully, but also have to remain flexible for unexpected items that come up and need to be dealt with. I support and advise our executive team, general manager and board members in responding to a range of policy, planning, or political requests. So, I suppose it is a blend of the known and the unknown. It requires me to manage my time the best I can, but also be available and flexible

to help out other people in my agency, or external partners who need support.

Q. What skills have you gained in the work? Are these unique or transferable to other disciplines?

A. I think time management is really important for the work that I do, and trying to think about when to focus on which efforts to be most effective. It's not a solo effort for me, as much of my work revolves around utilizing and depending on others within my own agency, and outside of it. I try to ask for other peoples' time and expertise carefully and effectively to provide insight into my work. My work depends on frequent and effective collaboration, which is highly transferable to many other lines of work and disciplines.



In addition, my role often involves critical thinking, framing policy options and trade-offs, making recommendations to our leadership team, and finding consensus among many partners in moving towards good outcomes for transit, mobility, and the growth of our region.

Q. What do you enjoy most about your job?

A. I enjoy the blend of delivering on the ground, tangible results for people to benefit from, plus thinking through policy and planning issues that are more long term, nuanced, or nebulous. We provide mobility service for people to get to their jobs, to school, to shop, to see family or friends, and move around their communities. So, there is a lot of direct tangible results from the work that we do. But I also enjoy the policy work that is more vague or more long-term or abstract. If I only worked to deliver physical projects, that would not be fulfilling to me. Or, if I worked 100% on policy that was long-term, and it was harder to see results on the ground soon enough, that would also be frustrating for me. So, I enjoy the mix of both of those things.

Q. What are some of the challenges you have faced in the work? How did you overcome them?

A. I deal with bureaucracy, both directly at my agency, and in working with

partners. We are a big agency and we work with other governmental agencies. There are a lot of processes that are necessary and good for making sure that we are spending public money the best way that we can, and that we are responsible to tax payers. But, it's also a challenge because it can be frustrating to be slowed down on an innovative idea, maybe related to an emerging technology, which does not mesh well with a larger, slower, more thorough process that is already in place or adopted. So that can be frustrating if you are trying to move quickly, but still respect processes that are in place.

Q. What are some of your own personal characteristics and values that make you a good fit for this type of work?

A. I am able to find peace in knowing that my role is essentially advocacy within bureaucracy. I am asked to push for what is best, and that might be slightly outside of the realm of what most people think is easily achievable, but balancing that push with knowing that there are a lot of on-the-ground realities that often resist change. You have to be really hopeful and proactive and aggressive in chasing after a bigger vision, but then you also have to be ready to come back down to earth and negotiate with everyone else who might want something different than you. If

someone in this position were totally advocacy-minded, they would likely be very frustrated. But, if someone in this position was only concerned about protecting the bureaucracy and immediate implications of new ideas, they would likely not be effective in working towards the larger vision of where we should be heading. So, I think that it is a blend of knowing when to push for something bigger, and knowing when to focus on what we can accomplish in a shorter period of time, that can still drive us towards that larger vision.

Q. What is something that you want people to know about the work that you do?

A. I would encourage someone to really follow their passion, but also be ready to temper those hopes and dreams with what they can accomplish within a given amount of time. I just think that blend is really important to someone's happiness in their career trajectory. I am trying to help make the world a better place by working to provide improved mobility solutions that people want and need, but the work is tough. New challenges and opportunities will continue to emerge into the future, and we should be ready to evaluate the options carefully, in order to invest in the best ones to carry us into the future.↔

Overview of Position as it Relates to Transportation

In the field of TDM, a strategic planning coordinator conducts an array of essential functions related to transportation. Strategic planning coordinators: track and analyze federal, state and local legislation policy related to transportation; prepare and present company policies to the public; respond to requests for information related to policies and performance; provide data analysis for projects; participate in the development and implementation of a visionary mobility program, among other duties.

Strategic Planning Coordinator

Communicate and work to implement those goals and policies through federal, state, and regional partnerships and coordination. Coordinate with the Directors of Service Delivery, Operating Projects, and Marketing/ Communications to develop annual plans and strategies. Represent the organizational interests with state, regional, and local government policy staff. Represent the organization at meetings with Metro, various jurisdictions, agencies and the public in matters related to policies, environmental plans and efforts. Strategic Planning Coordinators also ensure a commitment to safety through consistent and professional behaviors in performance of job requirements that demonstrate safety is a fundamental value that guides all aspects of our work.

As a strategic planning coordinator, Jeff: supports general managers, board members, and the executive team on a range of strategic issues; represents TriMet locally, regionally, at the state

level, and at national events and conferences; coordinates the internal TriMet New Mobility Work Group across all divisions and departments; leads planning coordination efforts with regional partners and elected leaders, jurisdiction staff; tracks and analyzes federal, state, and local legislation and policy related to transportation, land use, sustainability, livability, and funding and forecasting outlook for transit opportunities; develops policy recommendations for internal agency practices and partner jurisdictions; and presents policy, plans, and projects to regional elected leaders and TriMet Board of Directors.

Automated & Connected Systems

"I am trying to help make the world a better place by working to provide improved mobility solutions that people want and need, but the work is tough. New challenges and opportunities will continue to emerge into the future, and we should be ready to evaluate the options carefully, in order to invest in the best ones to carry us into the future."

— Jeff Owen

Overview of General Skills and Requirements

A Master's Degree in Public Administration, Planning, Communication or another related field is required to become a Strategic Planning Coordinator. Additionally, most companies look for a minimum of six years of credited experience with increasingly responsible professional experiences in municipal administrations. Companies also desire someone who has worked

in the development of public policy, who has a working knowledge of transit and experience working at a transit agency.





About TriMet

TriMet, more formally known as the Tri-County Metropolitan Transportation District of Oregon, is a public agency that operates mass transit in a region that spans most of the Portland metropolitan area in the U.S. state of Oregon. TriMet started operating a light rail system named MAX in 1986, as well as a commuter rail line in 2009. It also provides the operators and maintenance personnel for the City of Portland-owned Portland Streetcar system.

Source: trimet.org

GLOSSARY

- ▶ **Active Transportation** – a form of transportation of people and sometimes goods, that only uses the physical activity of the human for being the locomotion.
- ▶ **Mobility as a Service** – the shift away from personally-owned modes of transportation and towards mobility solutions that are consumed as a service.

Type of Planning Projects Carried Out at TriMet

WORKING WITH PORT OF PORTLAND

Jeff is on the 30-member [committee](#) which is working to create a long-range development plan for Portland International Airport over three years.

TRIMET BIKE PLAN

This project resulted in the [TriMet Bike Plan](#) — a roadmap that will help guide future investments in biking infrastructure and amenities, including access to transit stops, expanding parking options, and accommodating bikes onboard buses and trains. The goal of the plan is to make bike+transit trips easier, safer, and more convenient for people.

OREGON AUTONOMOUS VEHICLE TASK FORCE

Jeff serves on the [task force](#) for autonomous vehicles (AVs) which looks into how AVs intersect with issues including licensing and registration, insurance and liability, law enforcement and accident reporting, and cybersecurity.

Key Skills

- ▶ **Reading Comprehension** – Reading work-related information.
- ▶ **Complex Problem Solving** – Noticing a problem and figuring out the best way to solve it.
- ▶ **Critical Thinking** – Thinking about the pros and cons of different ways to solve a problem.
- ▶ **Active Listening** – Listening to others, not interrupting, and asking good questions.
- ▶ **Judgment and Decision Making** – Thinking about the pros and cons of different options and picking the best one.
- ▶ **Coordination** – Changing what is done based on other people’s actions.
- ▶ **Active Learning** – Figuring out how to use new ideas or things.
- ▶ **Systems Evaluation** – Measuring how well a system is working and how to improve it.
- ▶ **Systems Analysis** – Figuring out how a system should work and how changes in the future will affect it.
- ▶ **Time Management** – Managing your time and the time of other people.
- ▶ **Monitoring** – Keeping track of how well people and/or groups are doing in order to make improvements.

Abilities Needed for Success

- ▶ **Written Comprehension** – Reading and understanding what is written.
- ▶ **Oral Expression** – Effective spoken communication.
- ▶ **Written Expression** – Effective communication in written form.
- ▶ **Deductive Reasoning** – Using rules to solve problems.
- ▶ **Inductive Reasoning** – Making general rules or coming up with answers from lots of detailed information.
- ▶ **Oral Comprehension** – Listening and understanding what people say.
- ▶ **Problem Sensitivity** – Noticing when problems happen.
- ▶ **Fluency of Ideas** – Coming up with lots of ideas.
- ▶ **Near Vision** – Seeing details up close.
- ▶ **Originality** – Creating new and original ideas.
- ▶ **Information Ordering** – Ordering or arranging things.
- ▶ **Visualization** – Imagining how something will look after it is moved around or changed.



This material is based upon work supported by the Federal Highway Administration under Agreement No. DTFH6114H00025 & DTFH6116H00030. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the Federal Highway Administration.



Environmental Work in the Transportation Sector

CAREER PROFILE

NAME: David Sorrell

TITLE: Manager, Mobility Solutions Programs & Transportation Demand Admin.

DEGREE: Public Administration

COMPANY: University of CA at Berkeley Parking & Transportation Department

The UC Berkeley Parking and Transportation Department provides a full range of parking and transportation services, serving a diverse community of more than 35,000 students and 15,000 faculty and staff seven-days per week. The Department strives to improve the quality of life for the UC Berkeley community by providing safe, convenient and well maintained parking and transportation options, while promoting and facilitating alternative modes of transportation. Parking and Transportation is dedicated to delivering transportation systems that complement long-term growth and development, and enhance and protect the physical attributes of the campus and surrounding areas. We are committed to provide professional and highly responsive customer service.

Q.What is your current role at the organization?

A.I am the manager of UC Berkeley’s Transportation Demand Management Program. I have been here for about two years now and I oversee all of the partnerships, the programs, the communicating and marketing regarding

transportation for the entire campus. Our campus has about 40,000 students—so at any given time, I am overseeing a program for roughly 60,000 people. We have about 5,400 parking spaces currently, but in the Fall, we are going to lose about 500 of those spaces—so with a rapidly decreasing parking inventory, I have to get out the word about service changes and alternative programs, and overall, make commuting to campus a little easier.

Q.How did you get to this point in your career?

A.I have been in transit and transit demand management for ten years. I have had an interest in transit since I was a child. My parents exposed me to public transit as a kid, mainly because we didn’t have a car. It just allowed me to learn how to read a map early and come up with directions on how to get from one place to another. I also developed a skill to learn public transit in Chicago. I learned not only the



CTA (Chicago Transit Authority) system quickly, but figured out the Pace Bus Suburban system, quickly and at a relatively young age. That love of transit at a young age pretty much set me up for the path that I took to get to where I am today.

I learned about cities and I learned about construction, architecture, and buildings during my childhood because it was what I was interested in. When I was in high school they didn't offer anything along the lines of transit or geography, or anything that really pertained to urban planning or urban studies. My first job was actually constructing playgrounds as an engineering intern. While doing that, I took classes in history and government, learning about the background of Chicago politics (including the "Machine"), Federal Government and politics, and getting that knowledge base—this gave me

some background about how cities operate.

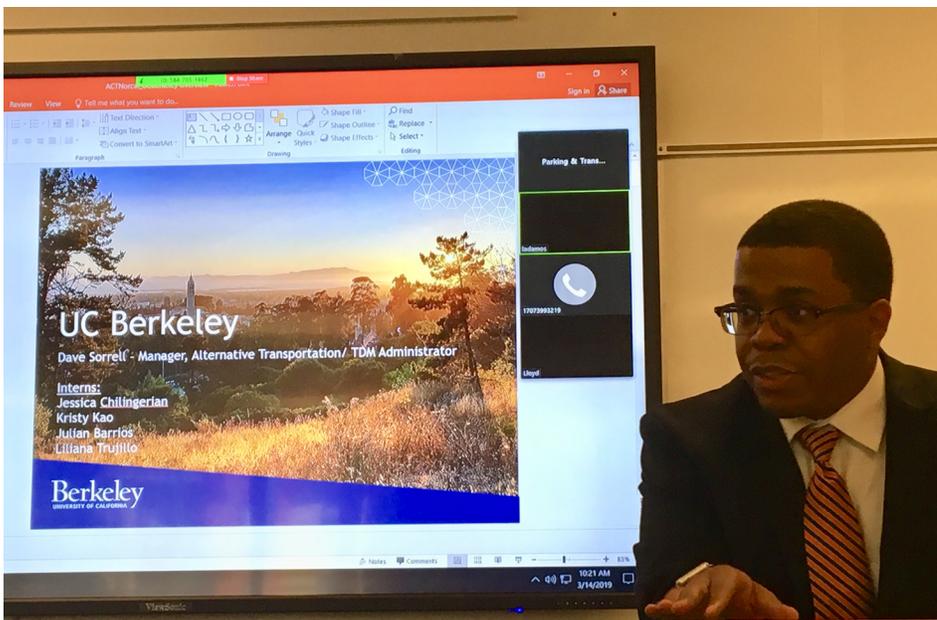
I got my undergraduate degree from Northern Illinois University in 2008. My area of study was in public administration—local government—I wanted to be a city manager. I kind of put transit off to the side because my school did not offer a planning program. But during this time, I took classes in GIS, local government, policy, and family psychology. I took geography courses related to the local sector but also had the background in local government—and I worked internships in city government. This gave me the information I needed to know.

I started out in grad school. My first go-around was in local government and public administration and it did not work out. I ended up transferring to a new grad program in organizational development and

leadership at Olivet Nazarene University (outside of Chicago). When I started this program, I also started working in transit. In 2009, I worked as a rideshare coordinator for Pace Suburban Bus, in which I oversaw the social media marketing arm as well as some of the operational day-to-day stuff. I built out the social media program in conjunction with their primary page, and oversaw a regional employer grant. I was the ride share coordinator there for about four years. I did a lot with carpooling, van pooling, and learned a lot more about TDM and ride sharing. I also participated with the Association for Commuter Transportation—which I am still a part of today. At the time, I did not fully know what TDM was until I did a leadership academy program in 2013.

After four and a half years of doing TDM, our department had a reorganization. I was taken off of the rideshare program. But, I remained on board as the Service Analyst with Multimodal and TDM programs under the research and development for three years before I left for the Bay Area. When I was in my new role, I still did a lot of outreach with the marketing department, became an app tester for Ventracard and provided a footprint by helping rewrite Pace's Title VI program as well as their service standards analysis.

I took a job with the San Mateo county transit district



in late 2015. I was only there for seven months because they were going through a reorganization. While I didn't get the mentoring and necessary training that I needed from my bosses, in seven months I was able to lay the groundwork for improving standards and metrics for grant-funded shuttle services, community programs, and worked with schools in San Mateo to improve transit service—all while applying the same knowledge, approach and skills that I had learned from Pace.

After, I worked for a company in San Jose called Altrans—which focuses on TDM consultation and shuttle programs (among others) in the Bay Area. I was brought on as one of their TDM program managers for a hospital in Oakland. That was fun because I had never built a program from scratch before. I did this for about a year, and then a colleague told me about an opening at UC Berkeley. I decided to just put my resume in because I had known about UC Berkeley's TDM program for many years. I started in April 2017.

Q. Were there any experiences that helped to best prepare you for the work that you do?

A. Taking transit while young helped me understand the communities I served. One cannot be an effective planner or TDM Manager without

experiencing the process that your colleagues, employees, or clients go through. Whether or not your commute is done by car, bus, train, bike, or even ferry, it helps gather empathy for the people you're directly impacting.

It also helps that, in my first job in high school as an engineering intern and in later internships, I learned to listen actively. Communicating with your clients, employees, even your direct reports, helps you identify blind spots, get a perspective of their successes or failures, and helps me better understand the world around me.

When it comes to managing, having great leaders as your bosses helps you prepare. In the years I was at Pace, ALTRANS, and at UC Berkeley, I had great bosses who have helped me become my better self – they challenged me to think critically, take in new concepts that I wasn't familiar with, and to trust that I can do the job effectively and guide me if I have questions.

These same skills I've applied to my own employees, because I could trust that they can make magic, and I am proud of the skills they've brought to their respective jobs.

Q. What skills have you gained in the work?

A. Definitely working partnerships. My director has helped me get a better handle on how to do programs

on a small and large scale, and to be strategic regarding the right things to say and the right things to do. Collaborating with him has been incredibly helpful regarding building my strategic plan and collaborating with campus and community organizations and partners to create programs that work for the campus and the UC Parking & Transportation department.

I have also gained leadership skills, people skills, and technical skills. All are being developed as we speak, day by day. I would also say that part of this is being relatable to students and meeting them where they are at. It is being flexible and being able to realize that the times and methods have changed for communication. It's about learning these changes and using what I have learned to make sure that I can reach out to the students. Also, being patient with contractors, colleagues, and even my students.

Q. What do you enjoy most about your job?

A. I have learned from every job that I have ever taken—and I like to pay this forward. I want to spread as much knowledge about TDM as possible and to "Make transit awesome". I really enjoy being able to train future geeks like myself and my interns gain a lot of experience by working in my office.

I love that we were able to be the first university in the

state, if not the nation, to be able to provide a subsidized year-long bike share program for students who are first generation Pell grant kids, also DREAM recipients. This not only is of great benefit to a student who could really benefit from a bikeshare program, but it also gets the entire student body on board with the bikeshare program—by getting students to sign up for bike share and make this program work, they can spread the word and ditch their car (or an Uber for that matter).

Q. What are some of your own personal characteristics and values that make you a good fit for this type of work?

A. Leading with a passion and making wise, ethical choices is necessary for all types of public service positions; however, a passion for transit, public service, an ability to objectively problem solve, and being a good communicator helps me tackle the problems that we face. Being a transit planner in a non-traditional transit setting I can still see my role in the whole mobility spectrum, knowing I'm doing a part to help curb climate change, increase programs to underserved communities, and improve the quality of life (at least to my students).

Being introverted and having to come out of my shell is a challenge that I face often; and having the confidence to say the

right words can be tough, but manageable.

Q. What is something that you want people to know about the work that you do?

A. Every day, I ensure that I make transit awesome for everyone and provide the resources to make transit accessible and affordable for everyone.

You don't necessarily have to get a degree in planning to

be in TDM or a transit planner. Some experience in working with the public is needed, a little understanding in government, marketing, and data is helpful too.

The key about working in TDM is knowing that the mobility spectrum is large and that the efforts in bringing technology, policy, and political will can help us get out of our cars and “go further, faster.” ⇨



Overview of Position as it Relates to Transportation

The Berkeley campus continues to have excess demand for parking on campus. The Transportation Demand Manager (TDM) is responsible for creating, marketing, and managing alternative transportation programs to try and get faculty, staff, and students out of their cars yet still able to easily get to and travel around campus. This position is a key position for the success of the Department of Parking & Transportation (UC Berkeley Parking and Transportation).

Transportation Demand Managers

TDM managers have an array of responsibilities including but not limited to: the development and distribution of TDM marketing materials, conducting commute-related outreach at orientations and other events where transportation and parking might be limited by location, assisting with community outreach, and developing and promoting community transportation initiatives. In terms of program administration,

TDM managers are responsible for creating and monitoring the progress of program goals, responding to internal and external TDM information requests, participating in committees and task forces, along with developing and maintaining partnerships, assisting in TDM research, data collection/ analysis and developing initiatives and best practices.

The Transportation Demand Manager is responsible for creating, marketing, and managing alternative transportation programs with the goal

of people to easily access and travel around the UC Berkeley campus without cars. In his work, David: creates, markets and promotes the campus TDM program, is responsible for program administration, as well is in charge of data collection and analysis on the UC Berkeley campus.

About University of California at Berkeley Parking and Transportation

“The UC Berkeley Parking and Transportation Department provides a full range of parking and transportation services [to] more than 35,000 students and 15,000 faculty and staff in the City of Berkeley. It is the mission of the department to improve the quality of life for the UC Berkeley

community by providing safe, convenient, and well maintained parking and transportation options, while promoting and facilitating alternative modes of transportation.”

Source: pt.berkeley.edu/node/77

Transportation Demand Management

“Every day, I ensure that I make transit awesome for everyone and provide the resources to make transit accessible and affordable for everyone. You don't necessarily have to get a degree in planning to be in TDM or a transit planner. Some experience in working with the public is needed, a little understanding in government, marketing, and data is helpful too.”

—David Sorrell

Overview of General Skills and Requirements

Most people who work as a TDM have a Master's degree in Transportation Planning or a related

discipline. It is required that a person who is a TDM has: demonstrable experience in managing teams; experience of successfully delivering technically challenging transportation planning projects; knowledge and experience in transport modeling; strong technical and report writing skills; and an analytical mind and background. Additionally, some companies require other qualifications such as professional accreditation related to the field of TDM.

Types of Projects Carried Out at UC Berkeley Parking & Transportation Department

Gold Status for Bike Friendly University

This project took the school from [silver to gold status](#) under the Bicycle Friendly America program.

Next Steps for Mobility at California

This project looked at how to allow [electric scooter share companies](#) to operate on campus and throughout the city.

Key Skills

- ▶ **Reading Comprehension** – Reading work-related information.
- ▶ **Complex Problem Solving** – Noticing a problem and figuring out the best way to solve it.
- ▶ **Critical Thinking** – Thinking about the pros and cons of different ways to solve a problem.
- ▶ **Active Listening** – Listening to others, not interrupting, and asking good questions.
- ▶ **Judgment and Decision Making** – Thinking about the pros and cons of different options and picking the best one.
- ▶ **Coordination** – Changing what is done based on other people's actions.
- ▶ **Active Learning** – Figuring out how to use new ideas or things.
- ▶ **Systems Evaluation** – Measuring how well a system is working and how to improve it.
- ▶ **Systems Analysis** – Figuring out how a system should work and how changes in the future will affect it.
- ▶ **Time Management** – Managing your time and the time of other people.
- ▶ **Monitoring** – Keeping track of how well people and/or groups are doing in order to make improvements.



Abilities Needed for Success

- ▶ **Written Comprehension** – Reading and understanding what is written.
- ▶ **Oral Expression** – Effective spoken communication.
- ▶ **Written Expression** – Effective communication in written form.
- ▶ **Deductive Reasoning** – Using rules to solve problems.
- ▶ **Inductive Reasoning** – Making general rules or coming up with answers from lots of detailed information.
- ▶ **Oral Comprehension** – Listening and understanding what people say.
- ▶ **Problem Sensitivity** – Noticing when problems happen.
- ▶ **Fluency of Ideas** – Coming up with lots of ideas.
- ▶ **Near Vision** – Seeing details up close.
- ▶ **Originality** – Creating new and original ideas.
- ▶ **Information Ordering** – Ordering or arranging things.
- ▶ **Visualization** – Imagining how something will look after it is moved around or changed.

This material is based upon work supported by the Federal Highway Administration under Agreement No. DTFH6114H00025 & DTFH6116H00030. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the Federal Highway Administration.



Environmental Work in the Transportation Sector

CAREER PROFILE

NAME: Robert Wildey

DEGREE: Environmental Studies, Water Resources Engineering

TITLE: Water Resources Engineer

COMPANY: Vanasse Hangen Brustlin, Inc. (VHB)

VHB is known as an American civil engineering consulting and design firm with offices throughout the country. Founded in 1978, the company primarily focuses on transportation and land development, working on a variety of transportation civil engineering projects in the Northeast and along the East Coast of the United States.

VHB “aspires for a sustainable world in all that (they) do. It is inherent to who (they are) and (their) generational company philosophy—founded on stewardship.” VHB helps their clients take action to improve health and well being, contribute to economic vitality, and promote environmental stewardship.

Source: www.vhb.com/Pages/home.aspx

Q. What is your current role at the organization?

A. My job title is Water Resources Engineer. I am a Project Manager and supervise two other staff engineers. The three of us sit on the Environmental Services side of the office, which largely reflects how I came into this work and what the needs of the

organization were when I was hired. Overall, the time I spend working on water resources is divided into a few categories, which includes work on land development and transportation projects but also working on more “pure environmental” type projects related to water resources.

The best part of my work is that I get to touch a wide range of projects. So, for the transportation practice—typically work on bridges and culverts that are being replaced—I analyze the hydraulics and hydrology for those structures to make sure they are sized correctly and have enough scour protection. I also work with our land development practice, so for example, the work might be for a ski resort that has a reservoir that they use for snow making and they need to be able to fill it from a water intake that will withdraw water from a nearby river and pump it up to the reservoir.

Sometimes my work involves

sites where there are previous impacts to rivers or streams that need to be remediated, which usually happens in conjunction with another project that can provide the funding source. For example, this might involve a dam removal or bank stabilization work that is associated with a utility line project.

Another aspect of my work involves construction inspections for erosion and sediment control. This ties into my own history and interest, particularly in terms of seeing where water resources are being impacted, which is often due to sediment discharges. One of the key places and times that we can prevent excess sediment from getting into a water body is during construction projects, which is why there are state and federal permits that specifically address construction storm water controls.

Q. How did you get to this point in your career? Any



key points along that pathway?

A. I grew up in Florida, obviously a very wet place, so there was always a lot of water to be around. For my undergraduate, I ended up going to a small liberal arts college that did not have engineering but did have a strong science curriculum and a strong environmental studies program. I did not come around to the engineering profession until a bit later in life. As an undergraduate, I pursued an environmental studies degree,

which was mostly focused on ecology and biology, but I also had an interest in economics and learning how society allocates resources for the things that it values. However, once I graduated, I ended up taking a few years where I wasn't working in the environmental field at all.

Eventually, I made my way back to an environmental field and landed an entry-level position with a company in Massachusetts that works in the environmental engineering

field, specifically focused on bioengineering for stream bank stabilization, wetlands restoration, and the so on. Their target was federal contracts with the US Army Corps of Engineers. That work exposed me to this whole other side of the environmental profession that I had never really seen or even understood, based on my undergraduate experience. Everything I did there led me to understand that I loved working and playing in the swamp and wanted to be a "water rat," but at the same time it wasn't really

clear how to make a career out of that with the tools I had picked up as an undergrad.

After a few years there, my supervisor gave me some career advice and basically told me that, “If you are going to really make something of this field, what you need to do is go back to school and get an advanced degree, and it seems like what you really want to do is engineering because it brings together both the environmental side but also gives you a way to be at the table and have meaningful input in the projects.”

And I saw the truth in that, because over the three years that I was with the firm, it was clear that most of the decisions for a project were driven by the engineering needs or by the desire of the project proponent to build something. The environmental components were often relegated to second-tier status and were advanced only as far as they needed to meet permit requirements. It was rare that the environmental components were the driver for the project or that they were really baked into the project design from the start.

I ended up leaving that job to go to graduate school and went to the University of New Hampshire (UNH) to pursue a Master’s degree in Water Resources engineering. My focus at UNH was storm water. UNH has a storm water research

center and I was one of the first graduate students to do that research pertaining to how we should go about treating storm water.

When I graduated I took a job with VHB in Massachusetts but it turned out not to be in line with what I wanted to be doing. I spent a few years there, kind of hitting my head against the wall, because I felt like I was losing touch with what I was interested in with the work. I ended up finding another job within VHB that allowed me to move to Vermont. This was more in the mode of stream and river work, while still having the storm water component, but a broader set of projects and just a better niche for what my interests are and how I work with people.

I’ve been in Vermont for six years now. I never in a million years thought that I would be interested in transportation engineering, never could have seen that linkage as an undergrad, and yet you come to Vermont and thanks to Tropical Storm Irene and how the DOT has taken a very active role in managing rivers and human infrastructure interface, we touch it just about every single day.

Q. Were there any experiences that helped to best prepare you for the work that you do?

A. Perhaps one of the most instructional things for me was coming up here (Vermont)

in the aftermath of Irene and seeing the number of projects that we have done subsequent to that, as well as, how it has driven the regulation so that you have permits and know what they are controlling. And, people are engaged and interested in that because it’s still relatively fresh in their mind that if they don’t do it right, it blows up and people lose their houses and the roads are gone.

Q. What does a day in the life of your position look like?

A. The job does vary seasonally, maybe not as much as I initially thought that it would. But it is true that the work on a typical day will vary depending on the season. Ideally, I would like to spend 50 to 75% of my time in the office and 25 to 50% of my time being out in the field—actually taking stream measurements, collecting water samples, meeting with contractors—but that percentage varies across the seasons and depending on what is projects are happening. I think one of the interesting problems of the career is that as you get farther into it, you are supposed to be spending less time in the field and more time managing other people and letting them do the fun field work. So that’s one tricky piece that I haven’t mastered yet. But at the same time, you get to the point where you’ve done what you set out to do and it’s time to help train other people.



Otherwise, lots of emails. I think one of things that has been really helpful to me is the importance of communication—being able to write a coherent paragraph to explain things and to be able to transmit information to others. There are always calculations using Excel

or other software packages—and, even if I'm not performing the calculations myself, I'm at least checking another person's work as a measure of quality control. I also review plans that will be going out the door and add comments or markups on them—so if you see something

that is missing the point of the project or is going to cause an environmental problem, or if you got a piece of information from the client, then another way to transmit that information to others is to do a markup on a set of plans.

There are also a fair number of meetings—face-to-face communication is a great way to move a project forward and keep the team working together to meet the project goals, all while understanding what we need to do the work. There is also time spent budgeting and writing contracts so that we can keep getting paid. The interesting thing about consulting is that you don't just show up and get paid; not only do you have to do the work but then you have to justify the work to the client so that they will pay you for it. That role and responsibility changes as you develop in your career.

Q. What skills have you gained in the work? Are these unique or transferable to other disciplines?

A. I'd say some of them are unique—you know, calculating runoff from a development site, sizing a storm water basin, developing an erosion sediment control plan. These are very focused skills that don't necessarily transfer. But another set of skills would be, being able to communicate and being able to analyze a problem and try to lead your

way to the solution. The process is an important part of that. So, being able to lay out a logical process, come to a conclusion, and then be able to backup your conclusion with some set of calculations that others can review, I think all of that is transferable to some other fields and other endeavors.

One other thing is, that learning something in school, being able to turn in an assignment and get a grade is a world apart from getting a blank slate and being told 'here is this thing that I need to accomplish, you need to take me there' and having to come up with the series of steps to get to that end result. There is a leap forward from a school assignment to the real world. Additionally, your skills with that school assignment is not the same as doing it for real one time. You have to understand the steps and do it correctly to get to the answer, and then you have to be satisfied that it is the correct answer.

Q. What do you enjoy most about your job?

A. I think in this job my favorite thing is the diversity. We have a really good group of folks here and we work on a ton of different kinds of projects. There are certainly common threads that run through, but the science is always changing, the regulations are always changing—it is nice to have a job that is the same but changes.

Q. What are some of the challenges you have faced in the work? How did you overcome them?

A. It is a double-edged sword between always having to be on your tip-top to understand new changes. But with the fast-paced work, it means that there is always a deadline crunch. The ideal situation is that you are just a little busier than you'd like to be. You don't want to be bored or looking for work, but there are also periods with simultaneous deadlines that it gets to be like exam week all over again. And so those are the weeks that I don't like but I think that's my biggest drawback.

Q. What are some of your own personal characteristics and values that make you a good fit for this type of work?

A. There is a fair amount of individual drive that is needed, you are not going to advance very well if you are waiting for the next assignment to fall into your lap—so, the personal initiative and willingness to take on some challenges. You are only advancing your career if you are learning something new which means stretching yourself in the work that you are doing. So, if you are looking for a vanilla job, this might not be the right career.

There is a good degree of people skills that are necessary: being able to relate to people

and work with them even if they are different. The engineering field is a horribly un-diverse place across all schemes and it's an area where we are actively seeking to improve upon that. But if they are not working here, they are working on the other side of the table—in the public sector, in the private sector—and you need to be able to work through that without being biased about different people, different backgrounds, and/or different expectations in order to get the job done.

Q. What is something that you want people to know about the work that you do?

A. The first thing that comes to mind is that infrastructure matters. We tend to take it for granted, our roads and bridges and clean water and systems that work. All of that is a luxury that we experience in this country because of the amazing work that was done in the last century, century and a half. We have forgotten about this in a lot of ways. It really is time for us to refocus on that both for the economic and health benefits that it provides, but also because of the environmental benefits that it provides. We've all heard the slogan about think globally, act locally? This is really where the rubber meets the road and it really is the chance to act-locally; all of the pieces that we work on have meaningful impacts to the environment. ⇨

Overview of Position as it Relates to Transportation

In the field of hydrological studies, water resources engineers study how water moves across and through the earth's crust. Because of this, engineers are equipped to solve problems in the areas of water quality and availability. Much of the work requires analyzing how water influences the surrounding environment and how changes to the environment influence the water source. Work in hydrology requires the measurement of bodies of water, collecting and testing water and soil samples, analyzing data on the environmental impacts of pollution, erosion, drought, and other problems that come to impact the environment.

Water resource engineers use computer models to predict water supplies, to map the spread of pollution, and to track floods and other weather events that can impact water sources. They work closely with engineers, scientists, and public officials to study the water supply as well as to evaluate water-related building projects (ie: hydroelectric power plants, irrigation systems, and wastewater treatment facilities).

Water Resource Engineer

“Water resource engineers develop new equipment and systems for water resource management facilities across the United States. The systems that water resource engineers create ensure that citizens are provided with a continuous supply of clean, uncontaminated water for drinking, living, and recreational purposes. Water resource engineers not only design these

water management systems, but often oversee the construction and maintenance of these systems as well. An increasing population and continuous need for more water stimulates this fast-growing industry. A Bachelor's degree and official certification are required to pursue this career, though many water resource engineers also go on to pursue their Master's Degrees.”

In addition to being a subset in the field of hydrology and hydraulics, water resources engineering is also a specific type of civil engineering. Engineers in this specific field are tasked with creating new equipment and systems “to increase the effectiveness and efficiency

of water treatment and aquatic resource management.”

Robert is a water resources engineer with VHB's Environmental Services Group where he has worked on a variety of water and storm-water-related projects for both public and private-sector clients. His key focus is the interface between natural streams and the built environment, from bridges and culverts that carry transportation infrastructure to storm water treatment practices

that manage runoff from impervious areas and convey flows to surface waters. Robert is also experienced with environmental permitting related to wetlands and other water resources at the local, state, and federal levels on projects as diverse as residential developments, retail shopping centers, renewable energy facilities, highway and rail projects, and utility corridors.

Source: www.environmentalscience.org/career/water-resource-engineer

Hydrological Studies

“The field is equipped to solve problems in the areas of water quality and availability. Much of the work requires analyzing how water influences the surrounding environment and how changes to the environment influence the water source. Work in hydrology requires the measurement of bodies of water, collecting and testing water and soil samples, analyzing data on the environmental impacts of pollution, erosion, drought, and other problems that come to impact the environment.”

—Collegegrad.com

Overview of General Skills and Requirements

Hydrologists are required to have certain skills. These include skills in analysis and critical thinking. These skills are important because hydrologists need to analyze the data that is collected in the field and to examine results of the field that might have undergone laboratory testing. In conducting analysis, hydrologists develop and use models to assess risks to water supply. This concludes with the development of a water management plan, which functions to mitigate threat to water sources. Hydrologists are also required to have physical stamina, interpersonal skills and communications skills—not only do hydrologists work in remote locations of varying terrain, but they must be able to report in detail—to government officials and the general public on their research, methods, and findings.

Hydrologists require certain credentials. Most begin careers in hydrology with a Master's degree as very few universities offer undergraduate degrees in hydrology. Students interested in hydrology should attend universities that offer degrees and concentrations in geosciences,

engineering, or earth science. Prior to entering college, if there is an interest in studying hydrology, students should have a strong background in math, statistics, and be well rounded in the sciences. Additionally, hydrologists might also find use of a background in economics, environmental law, and other policy-related topics. This is because it is important to understand the goals and implications of policy makers and other government workers and how that relates to the environment.

Source: www.bls.gov/ooh/life-physical-and-social-science/hydrologists.htm#tab-2

About VHB, Inc.

VHB is an environmental consulting firm focused on making a positive impact on its surrounding communities, making the most out of opportunities to grow personally and professionally, while building a network of lifelong colleagues. VHB is known for collaborating across disciplines to develop and implement effective strategies, problem-solving techniques and solutions through, “a combination of technical and personal skills to help build a successful consulting team.”

Source: www.vhb.com/Pages/Trends/Students-and-New-College-Grads.aspx

Type of Projects Carried Out at VHB

FLOOD RESILIENCY

Meeting the requirements for floodplain and river corridor protection are a big part of what Robert Wildey works on to help [preserve roads](#).

CULVERTS

The Jenny Coolidge Brook and Bingo Brook [culverts](#) were designed by VHB.

STORMWATER

Managing [stormwater](#) is one big component that drives many of VHB's projects.

GLOSSARY

- ▶ **Scour** – the removal of sediment such as sand and gravel from around bridge abutments or piers. Scour is caused by swiftly moving water, and can scoop out scour holes, compromising the integrity of the structure.
- ▶ **Hydrology** – the branch of science concerned with the movement of water in relation to land.
- ▶ **Built Environment** – man-made structures, features, and facilities collectively viewed as the environment in which people live and work.

Key Skills

- ▶ **Reading Comprehension** – Reading work-related information.
- ▶ **Complex Problem Solving** – Noticing a problem and figuring out the best way to solve it.
- ▶ **Critical Thinking** – Thinking about the pros and cons of different ways to solve a problem.
- ▶ **Active Listening** – Listening to others, not interrupting, and asking good questions.
- ▶ **Judgment and Decision Making** – Thinking about the pros and cons of different options and picking the best one.
- ▶ **Coordination** – Changing what is done based on other people’s actions.
- ▶ **Active Learning** – Figuring out how to use new ideas or things.
- ▶ **Systems Evaluation** – Measuring how well a system is working and how to improve it.
- ▶ **Systems Analysis** – Figuring out how a system should work and how changes in the future will affect it.
- ▶ **Time Management** – Managing your time and the time of other people.
- ▶ **Monitoring** – Keeping track of how well people and/or groups are doing in order to make improvements.

Abilities Needed for Success

- ▶ **Written Comprehension** – Reading and understanding what is written.
- ▶ **Oral Expression** – Effective spoken communication.
- ▶ **Written Expression** – Effective communication in written form.
- ▶ **Deductive Reasoning** – Using rules to solve problems.
- ▶ **Inductive Reasoning**– Making general rules or coming up with answers from lots of detailed information.
- ▶ **Oral Comprehension** – Listening and understanding what people say.
- ▶ **Problem Sensitivity** – Noticing when problems happen.
- ▶ **Fluency of Ideas** – Coming up with lots of ideas.
- ▶ **Near Vision** – Seeing details up close.
- ▶ **Originality** – Creating new and original ideas.
- ▶ **Information Ordering** – Ordering or arranging things.
- ▶ **Visualization** – Imagining how something will look after it is moved around or changed.



This material is based upon work supported by the Federal Highway Administration under Agreement No. DTFH6114H00025 & DTFH6116H00030. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the Federal Highway Administration.



Environmental Work in the Transportation Sector

CAREER PROFILE

NAME: Lori Zeller

TITLE: Transportation Planner

DEGREE: City and Regional Planning, Transportation

COMPANY: Foursquare (ITP)

Foursquare Integrated Transportation Planning is, "data-driven and informed by meaningful public and stakeholder engagement. (Foursquare ITP has) a team of over 40 transit and transportation planners, GIS and data analysts, and urban designers, with nationally renowned expertise in areas such as transit service planning, transit operations, regional planning, corridor planning, transportation demand management, and bike share. Foursquare ITP views transportation as a tool to create better communities, and pride ourselves in seeing our plans become a reality."

Source: www.foursquareitp.com

Q. What is your current role in the organization?

A. I've been with Foursquare Integrated Transportation Planning for about six months now. I am a transportation planner. Foursquare ITP is a private consulting firm that works on wide-ranging transportation planning projects. We work in the D.C. area but also across the whole country.

The projects that I have been working on in my role so far have been a mix of analysis and outreach. Right now we are working on a few projects to help transit agencies re-think their bus systems. This type of work involves working with communities to help them determine how bus service could better serve the people living in the regions or cities with which we work. We have various kinds of analyses that we look at to see how well current bus service serves the community. I've been a part of running scenario analysis where we look at theoretical examples of re-structuring the bus network in different ways -- how would those theoretical changes impact ridership, how would that impact where bus service is available and to whom?

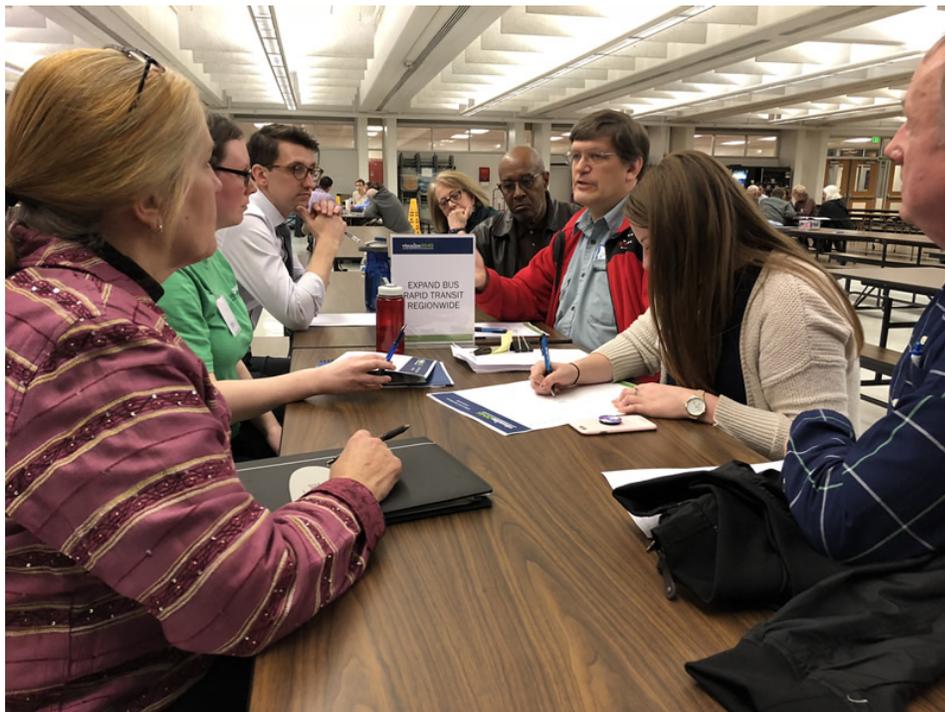
As a part of those same projects, in addition to working on analysis I have also done outreach. I really enjoy doing both because, depending on the project, it can be hard to do one

without the other. It's helpful for the analyst to get to know the stakeholders and what's important to them and what they care about. On the flip side it can be hard to communicate with stakeholders and the public if you don't know what is going on with the technical side of things. I enjoy working on both aspects. Stakeholder outreach involves working with staff members of various agencies, jurisdictions, elected officials—reaching out to them, sharing project information and getting their input about where they would like to see the project go. I've been involved with different types of public outreach, which has included public meetings, surveys, focus groups, and other means to get public input—I've done a lot of writing for synthesizing the findings from these activities.

Q. How did you get to this point in your career? Any key points along that pathway?

A. I think that my interest in transportation really

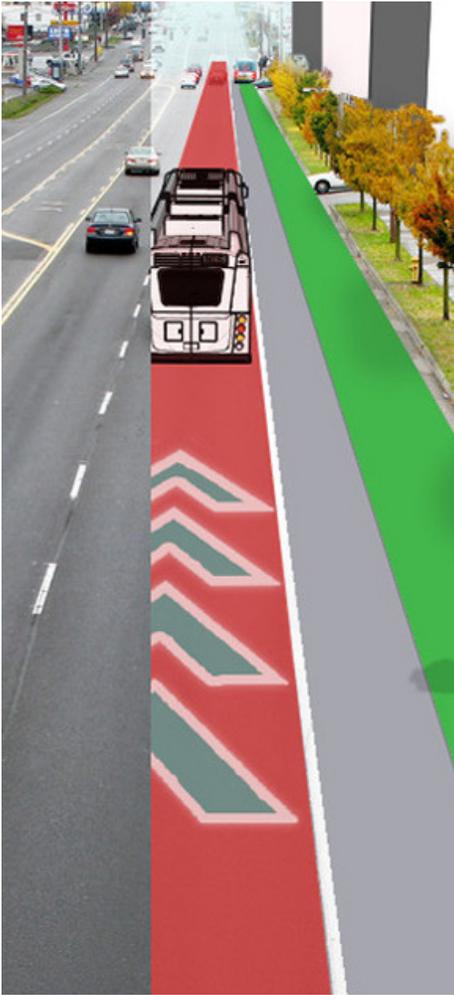
started in college but didn't really start to form into a career path until I was getting ready to go to grad school-- I chose a grad school where I could study transportation. I went to Rutgers University and I just was always interested in transportation and the inter-play between transportation, land-use and the built environment--and I wanted to be able to work in jobs that gave me the opportunity to do work in transportation because I found it to be really interesting work. I wanted the impact of my work to benefit communities in terms of people being able to have a higher quality of life and improving environmental health. After grad school, I worked as a research fellow at the U.S. Environmental Protection Agency's Office of Sustainable Communities. This office is where transportation, land-use and the environment came together in that agency. That was really meaningful work to me because a lot of the projects that office worked on were technical assistance programs which involved going into communities and helping local planners and elected officials direct their policies and programs to be more smart growth oriented. At EPA I was also able to work on creating some interesting datasets. I really liked the work there. I left that position ultimately because it wasn't a full-time employment position, it was a fellowship--so I knew that I wanted to move on. From



there I went to the Metropolitan Washington Council of Governments (COG), where I was a transportation planner for the DC area's metropolitan planning organization (MPO), called the National Capital Region Transportation Planning Board. In that position I was more directly involved with transportation, working on regional transportation planning, whereas at the EPA it was more of a multidisciplinary planning position. Working at COG, I learned a lot about the transportation planning process and I learned very useful skills for working with elected officials and other stakeholders, and I also learned a whole lot more about the region. I was there for about two years before I left for the job that I have now.

The thought process that I went through in moving on from COG

was that I wanted to be doing something that was going to allow me to learn new things and grow my analytical skills. I had never worked in the private sector before my current job. When I was considering looking for another job, I learned that the private sector provides opportunities to work on projects in different regions, and with different people, which was appealing to me. I was also drawn to my current position because I was really excited to work more specifically in public transit, which is something that Foursquare ITP specializes in. I felt that Foursquare ITP would provide me the opportunity to learn more, be challenged, and continue to grow. So, that was a lot of what motivated me to find a new position and I definitely found that at this firm.



Q. Were there any experiences that helped to best prepare you for the work that you do?

A. I think one of the most important things for a successful planner in general and maybe the private sector, is being able to think about things from multiple perspectives, to see multiple perspectives, and to listen to people for what they are saying, understand underneath what they are saying, and maybe understand what they are not saying—and what this all means. These are skills that can be in any profession, but

when you are working to fulfill a project need—especially with a client—you need to be able to understand what they want (whether they are saying it or not) and make that happen. It requires perceptions and good communication skills, creative thinking and problem-solving skills, and I think I've built that skill-set over time. Especially working with elected officials—a lot of the time they are not experts in the fields that we are working in, not experts in transportation and the environment. They are local politicians and they need to be responsive to their constituents and they need to know a little about a lot of things. And, being able to work with them was just a formative thing for me—being able to communicate well with people.

Q. What does a day in the life of your position look like?

A. Every week, depending on individual project schedules, I know which projects I will be needed on and what work is expected of me. One type of work I might do is to prepare for a presentation for a client to get their input on if we are going in the right direction or not. Or, I might be doing analysis to prepare for a presentation. I might be doing GIS or Excel analysis to look at some kind of data need that we are working on. I might be analyzing survey results or preparing a new survey. Or, I might be planning

out a calendar of when we are going to do all of the public outreach for the next three months. Sometimes there is travel, and, sometimes we will be staffing events to get public input. There's definitely a mix of solo work and collaborative work and I really think that it depends on the day. In the private sector—at least for my firm—for each project we work with a different mix of people in the company.

Q. What skills have you gained in the work? Are these unique or transferable to other disciplines?

A. I think definitely, communication and being able to understand people and get them what they need. That's probably transferable to all kinds of consulting and many other kinds of work. I think that another aspect of that is being able to take technical information that we are working with and making it understandable to various different audiences. You need to know your audience and communicate on the most appropriate level so that they can interact, give feedback, and ask questions. I think that's transferable to other fields and is a role that I played in my past role and that I play in my current role: someone who can straddle the technical and outreach side of things. I think that not everyone needs to do that, but it is a skill that I've developed. On the more technical side, for

transportation planners, being familiar with GIS and Excel are very useful skills. I'm not an expert on either, but I know the ins and out really well. Writing is another—definitely writing technically, as much as possible, and for the public, and for officials—writing for different audiences. I think also time management and being able to know what you can do within a certain amount of time. It is important to be honest with yourself and honest with others. Being an assertive communicator is also important.

Q. What do you enjoy most about your job?

A. I think that what I enjoy most is when we have a technical need or question and I am provided an opportunity to figure out the methodology for how we are going to address it. I think that's a really fun and challenging way to think and stretch your brain.

Q. What are some of the challenges you have faced in the work? How did you overcome them?

A. Sometimes in the planning field it can feel like some things you work on may sit on a shelf and not be implemented. I have experienced this feeling and it has been a challenge in the sense that it impacted my motivation. As I've gained more experience, I've gained more perspective on this, and find myself feeling better on this subject. I have learned

more about the transportation planning process and its many aspects, which range from regulatory requirements to grassroots community advocacy, each playing their own role. I have learned to use all of my work experiences as learning opportunities – even if I am not sure what will come out of a certain project or task, I appreciate the learning and growth that I have experienced.

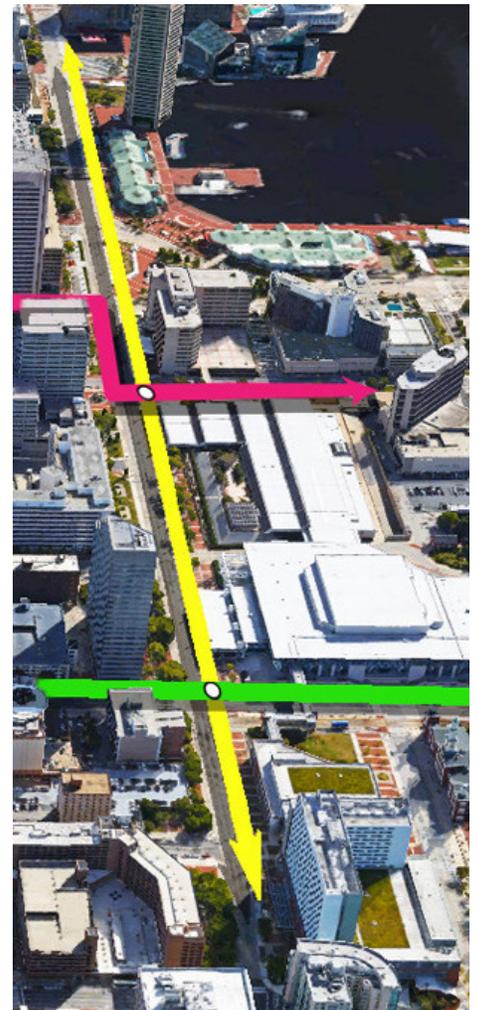
Q. What are some of your own personal characteristics and values that make you a good fit for this type of work?

A. I genuinely care about the work that I am doing and I am in this work because I care about making people's lives better and about making a more sustainable future for our environment. With that, I am motivated even if I am having a tough day and something is not going well work-wise—I know that I am working towards something that will make a difference as well as, something that I really deeply care about. In this job, that's been really true because we are working directly with communities. It's direct and I really like that. I think I am generally an empathetic person and I care about listening to someone and trying to understand what they are saying about project needs. I am a good listener and I will be able to hear what someone wants—even though I do have strong opinions and strong

convictions—it is a balance of having opinions and being a good listener. With those two combined I am able to address problems head on to come up with the best solutions.

Q. What is something that you want people to know about the work that you do?

A. I'd say, that as a transportation planner in a small firm you really get to grow and do new things on a regular basis. If variety interests someone, and always learning something new, and getting new and different exposure interests you, then this is for you. ↪



Overview of Position as it Relates to Transportation

The role of a transportation planner is best described as “the planner of the transportation system of tomorrow.” This requires work in the public and private sectors and/or engaging with government policy and the final details before the beginning of the building phase. This includes designing research methods and survey techniques for proposed transportation projects; assessing the impact of recent building developments on transportation systems; modeling traffic flows; recommending improvements for transportation systems; collaborating with engineers; and analyzing information related to transportation such as policy, impact reports, or long-term planning needs.

Source: www.environmentalscience.org/career/transportation-planner

Transportation Planner

In the public sector, transportation planners typically provide services for government bodies and contractors, examining current traffic and population trends and determining the effectiveness of proposed and constructed roads. Transportation planners also plan new roads based on future predicted population growth.

Alongside transport engineers, developers, and environmental planners, transportation planners work to ensure that estates, commercial, and industrial zones have the correct transport infrastructure and that they adhere to environmental legislation.

In the private sector, transportation planners work

for public transport companies typically examining effectiveness of timings and schedules, as well as volume of transport services to ensure that these systems are working optimally. Transportation planners will also be involved in the decision-making process to compose new routes when transportation service providers are not functioning optimally.

Lori Zeller, AICP is a transportation planner with experience in regional transportation planning and active transportation data and tool development. Prior to joining Foursquare ITP, Lori managed a long-range metropolitan transportation plan update and organized regional policy formation efforts. She has also researched, developed datasets and tools, and crafted policy recommendations regarding: community walkability, improving pedestrian access to public transit, and siting workplaces in transportation-efficient locations. Lori has also developed and analyzed high-volume public transportation-focused surveys. Currently, Lori’s duties include data analysis and public outreach.

Source: www.environmentalscience.org/career/transportation-planner

Transportation Planning

“I genuinely care about the work that I am doing and I am in this work because I care about making people’s lives better and about making a more sustainable future for our environment. With that, I am motivated even if I am having a tough day and something is not going well work-wise—I know that I am working towards something that will make a difference as well as, something that I really deeply care about.”

—Lori Zeller

About Foursquare ITP

Foursquare ITP is a multi-modal transportation planning firm focused on providing innovative transportation solutions that are practical, focused, and implementable. Core values guide the organization’s pursuits in sustainable and equitable transportation project work, as well as their commitment to advancing the field of transportation planning through leadership, volunteerism, research, and education.

Source: www.foursquareitp.com/about/

Overview of General Skills and Requirements

Urban and regional planners are required to have the skills to analyze information and data regarding market research, censuses, and environmental impact studies. This is necessary for the purposes of decision-making around planning options and choosing an appropriate action plans regarding community development projects. Urban and regional planners must also have clear and effective communication skills as they interact with colleagues, stakeholders, and investors, as well as prepare and present reports to a wide variety of audiences. Finally, planners must be able to manage projects, oversee tasks, and plan assignments for themselves and others.

Urban or regional planners require certain credentials. Most require a Master's degree from an accredited urban or regional planning program. People who hold a Bachelor's degree in Urban and Regional Planning can qualify for a small number of jobs as assistants or junior planners. Additionally, some entry-level positions require 1 to 2 years of work experience in a related field (i.e., architecture, public policy, or economic development). Acceptable experience can also be attained through internships related to urban and regional planning either while enrolled in school or post-graduation

Looking into the future, urban planners will be needed to develop revitalization projects and

Type of Planning Projects Carried Out at Foursquare ITP

VISUALIZE 2045

This project produced a [long-range transportation plan](#). The plan includes details on freight planning, airport systems planning, intercity buses, travel and tourism, emergency preparedness, evolving technology, land-use coordination, equity emphasis, bike and pedestrian planning, resiliency and reliability, coordinated human service transportation plan, and more.

addressed issues regarding population growth, environmental degradation, movement, and resource scarcity. Common challenges are predicted to be: population change, affordable housing needs, and transportation systems; all of which can address high- and low-density populations. As communities emerge and grow they will require development and improved infrastructure regarding housing, roads, sewer systems, parks and schools. As a result, the employment of urban and regional planners is projected to grow 13 percent from 2016-2026. This employment growth is driven by demographic, transportation, and environmental changes.

Sources: Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, Urban and Regional Planners. U.S. Department of Labor CareerOneStop: Transportation Planners Occupation Profile.

GLOSSARY

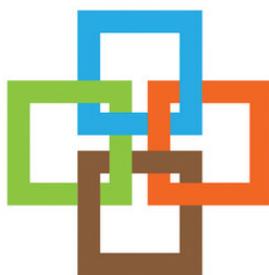
- ▶ **Smart Growth** – an urban planning and transportation theory that concentrates growth and development in compact, walkable urban centers to avoid sprawl.
- ▶ **GIS** – geographic information system, software designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data.
- ▶ **Multimodal** – utilizing two or more modes of movement of goods or people (e.g. vehicle, rail, bicycle).
- ▶ **Grassroots** – advocacy approach for something that starts at the ground level where ordinary people or the community are regarded as the main body of an organization's membership.
- ▶ **AICP** – American Institute of Certified Planners. Certification requires a combination of relevant education and professional experience.

Key Skills

- ▶ **Reading Comprehension** – Reading work-related information.
- ▶ **Complex Problem Solving** – Noticing a problem and figuring out the best way to solve it.
- ▶ **Critical Thinking** – Thinking about the pros and cons of different ways to solve a problem.
- ▶ **Active Listening** – Listening to others, not interrupting, and asking good questions.
- ▶ **Judgment and Decision Making** – Thinking about the pros and cons of different options and picking the best one.
- ▶ **Coordination** – Changing what is done based on other people’s actions.
- ▶ **Active Learning** – Figuring out how to use new ideas or things.
- ▶ **Systems Evaluation** – Measuring how well a system is working and how to improve it.
- ▶ **Systems Analysis** – Figuring out how a system should work and how changes in the future will affect it.
- ▶ **Time Management** – Managing your time and the time of other people.
- ▶ **Monitoring** – Keeping track of how well people and/or groups are doing in order to make improvements.

Abilities Needed for Success

- ▶ **Written Comprehension** – Reading and understanding what is written.
- ▶ **Oral Expression** – Effective spoken communication.
- ▶ **Written Expression** – Effective communication in written form.
- ▶ **Deductive Reasoning** – Using rules to solve problems.
- ▶ **Inductive Reasoning** – Making general rules or coming up with answers from lots of detailed information.
- ▶ **Oral Comprehension** – Listening and understanding what people say.
- ▶ **Problem Sensitivity** – Noticing when problems happen.
- ▶ **Fluency of Ideas** – Coming up with lots of ideas.
- ▶ **Near Vision** – Seeing details up close.
- ▶ **Originality** – Creating new and original ideas.
- ▶ **Information Ordering** – Ordering or arranging things.
- ▶ **Visualization** – Imagining how something will look after it is moved around or changed.



FOURSQUARE INTEGRATED TRANSPORTATION PLANNING

This material is based upon work supported by the Federal Highway Administration under Agreement No. DTFH6114H00025 & DTFH6116H00030. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the Author(s) and do not necessarily reflect the view of the Federal Highway Administration.