



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

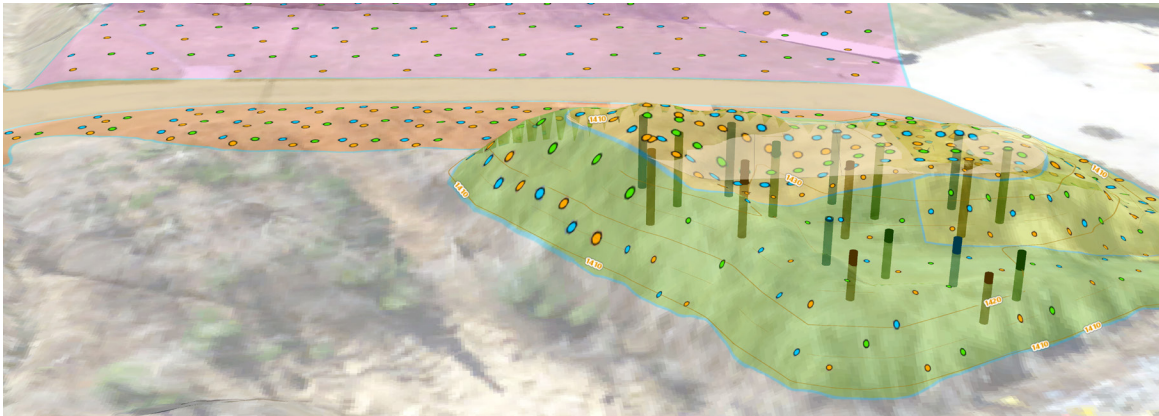
- ▶ **Remediation** – the removal of pollution or contaminants from environmental media such as soil, groundwater, sediment, or surface water.
- ▶ **NPDES** – National Pollutant Discharge Elimination System, addresses water pollution by regulating point sources that discharge pollutants to waters of 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.