



## 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



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

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.



**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

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—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.



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