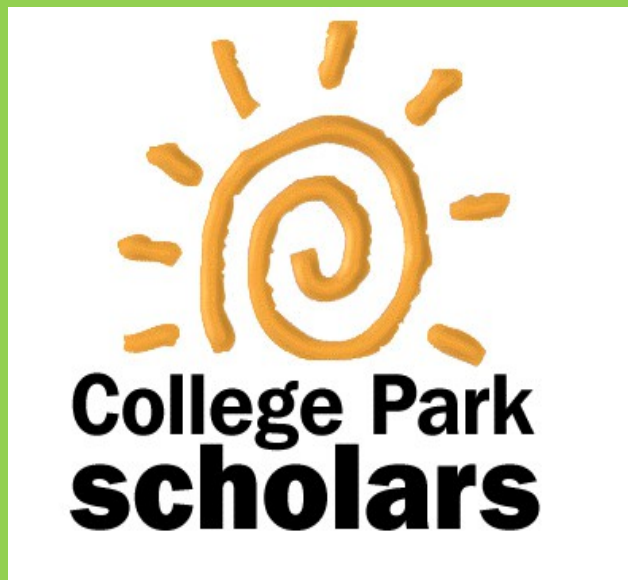




Bio Retention Designs for Greener Infrastructure



Kevin Bian

College Park Scholars – Science & Global Change Program

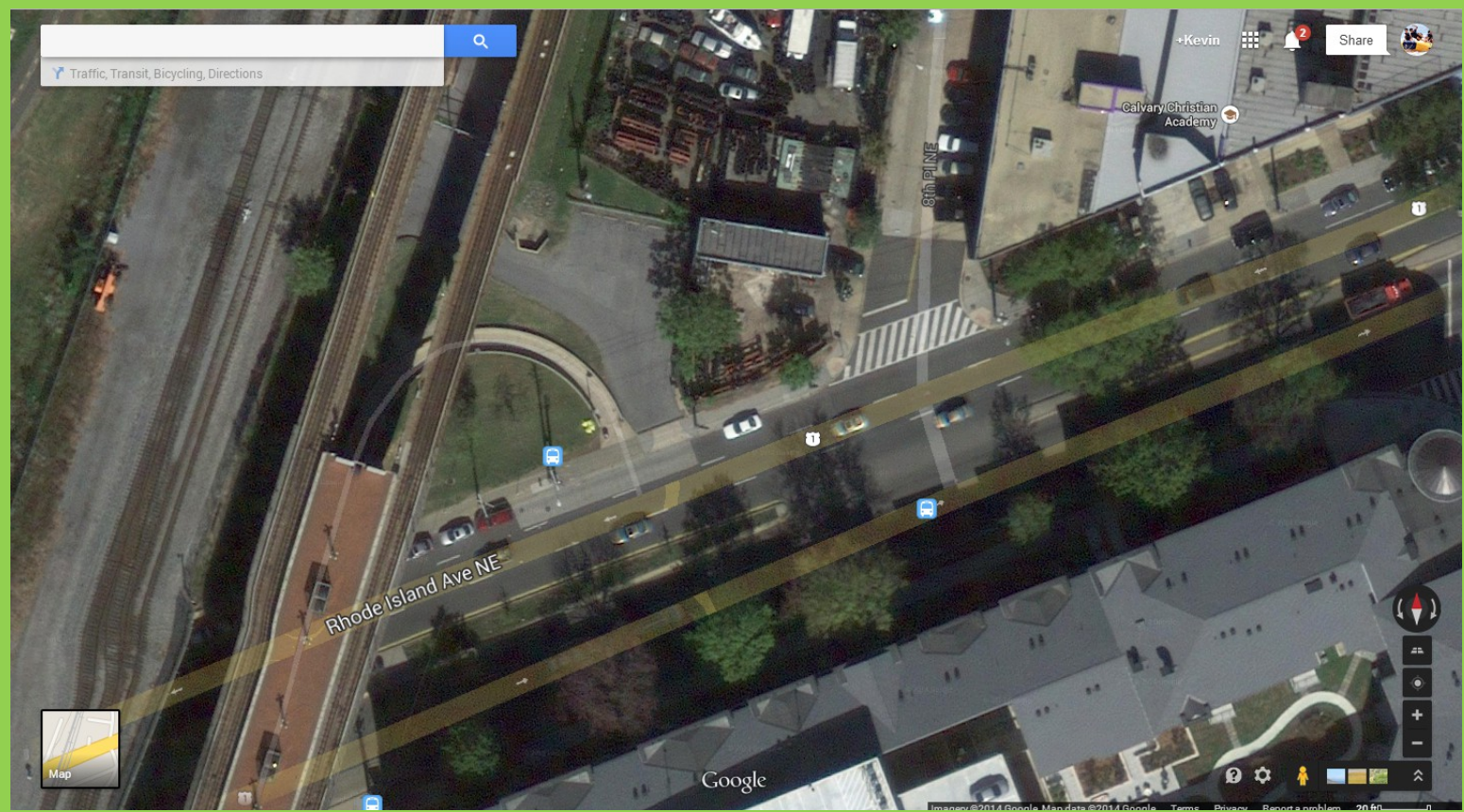
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College Park Scholars Academic Showcase, May 8, 2015

Introduction

For my practicum project, I was fortunate to work at DC Water, the largest advanced wastewater treatment plant in the world. During my time there I worked alongside civil and environmental engineers in the Department of Clean Rivers. The field of sustainable and environmentally friendly engineering has always intrigued me, ever since growing up on National Geographic and Natural Science magazines. Being able to work alongside talented and experienced engineers and scientists gave me a chance to see exactly what happens behind the scenes in a professional environmental setting.



Aerial View of Rhode Island Avenue Site

Site Information:

Internship Site: DC Water’s Blue Plains Advanced Wastewater Treatment Plant.

Address: 5000 Overlook Ave SW
Washington, DC

Supervisor: Moussa Wone, Carlton Ray

Site mission: To protect the public from possible harmful substances in our wastewater and to also cleaning up our waterways, by reducing the pollutants that enter our rivers and can be harmful to our wildlife.

Issues Confronting Site:

Rhode Island Avenue is a diagonal avenue in the Northwest/Northeast quadrant of DC. The sewer drainage system near 790 R.I.A. is lacking and combined with a low elevation profile, tends to flood during moderate to heavy rainfalls. This is problematic not on for this specific site, but for many sites surrounding DC, and the burden on the sewer system often leads to discharge of raw sewage to the Anacostia River during periods of heavy rain when the current sewer system cannot handle the combined flow of rainwater/sewage.

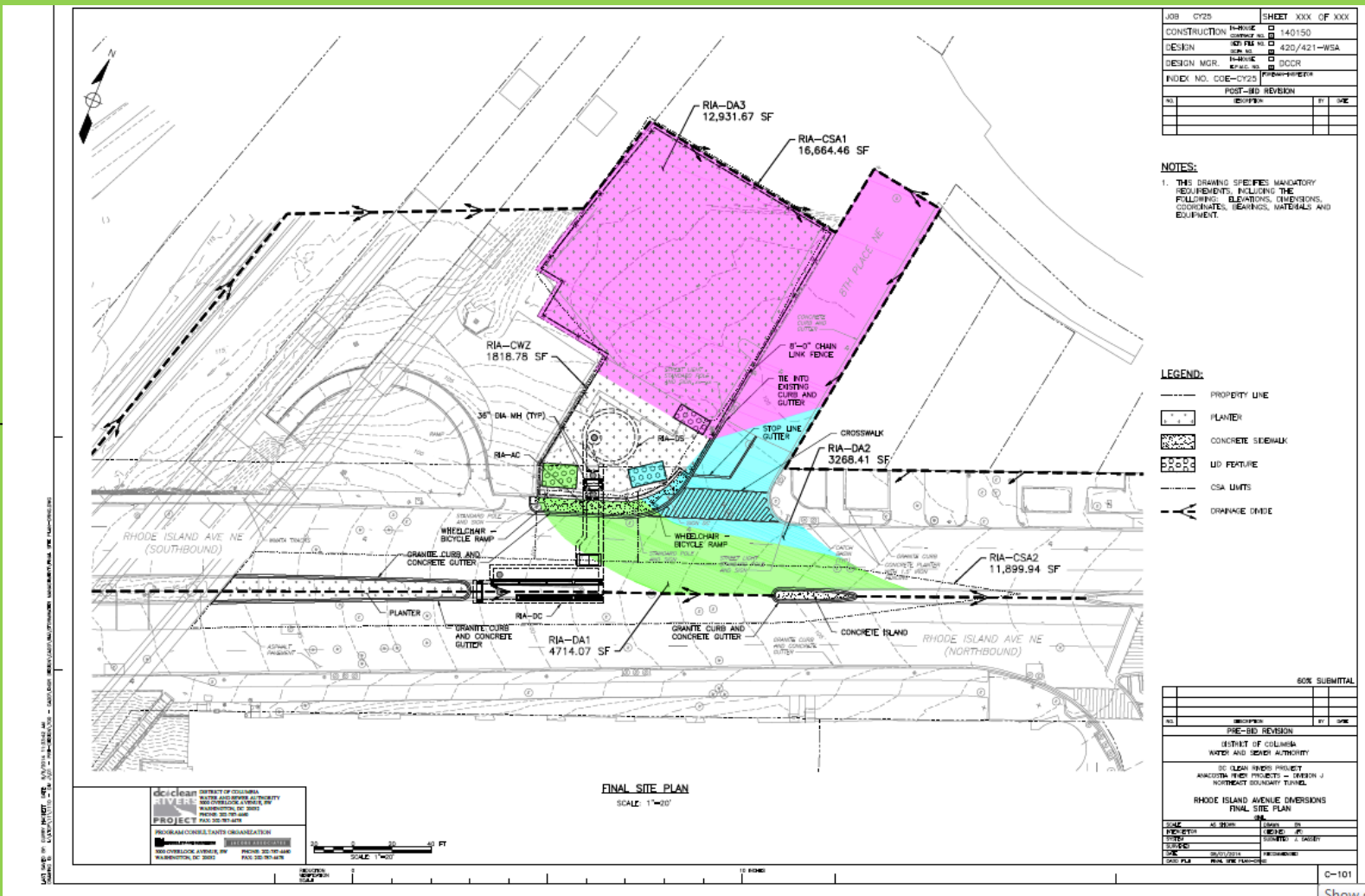
Tasks done:

During my time working at DC Water, I alternated my time between shadowing meetings, going out into the field, and collaborating with senior engineers on ongoing projects.

Meetings were often held between senior engineers from a variety of departments and contractors. I was tasked to take minutes, or notes, of the meetings – who said what, what’s the issue, what actions are planned, etc. This allowed me insight into the daily on goings of an engineering firm such as DC Water, and to see the challenges that arise daily.

I went out into the field around twice a week, usually to a variety of different of sites ranging from public opening ceremonies, project sites undergoing construction, and completed sites done in the past. During these trips I was able to talk with my mentors about the experiences of working in the field and lessons not taught in the classroom.

Likewise, I worked with senior engineers on an ongoing project over the summer – Rhode Island Avenue located in the heart of DC. During periods of heavy rainfall there is insufficient drainage, leading to flooding of roads and nearby businesses. I got the opportunity to calculate and design a Bioretention site to fix the issue of the constant flooding there.



Final Site Plan

Impact: During my time interning at DC Water I believe I have made a large impact on the environmental and living conditions inside DC. Through utilizing spreadsheets to help calculate retention and detention volumes needed for Green Infrastructure requirements and utilizing elevation cross-sections to determine drainage areas, my final results resulted in the designing of three Bio-retention gardens within the construction site area. These gardens will be able to hold a storm water retention value (SWRv) of 831.88 cubic feet during periods of rain, lessening the burden on the existing sewer and water systems.

Discussion:

Before getting the chance to intern at DC Water, I did not have any clue what went on inside an engineering firm, especially not one as large as DC Water. I can say that I learned a lot through my daily interactions during my short time there.

I was impressed at the efficiency at which meetings and design meetings were held. There was a sense of cooperation, as if everyone was part of a big family. This was helped in part by a very generous GM and plentiful employee activities, from massages, volleyball games, and picnics to other breaks from the heat and work.

Likewise, the usage of electronic cloud computing systems to store data and files archived years ago helped transition what would’ve been tedious digging into painless searches for spreadsheets, pictures, and information.

I feel blessed to be a part of this large family during my time there. I am especially proud that I managed to make an impact on this company that will last for years to come as the permits go through and construction begins at the site, construction which stems my efforts in designing my own sites using my own calculations. This sense of teamwork working with senior engineers and managers is one that is tough, trying, but oh so emotionally satisfying once the final touches are put onto it. I walked away from this internship with a stronger desire to pursue a career as a civil engineer and to work there again.

In fact, I have applied for an internship at DC Water again and hope to get the chance to work with the people there again over the summer. Here’s to hoping for the best!

Acknowledgments:

I would like to thank the following people for all their assistance with my practicum:

•Moussa Wone and Bethany Bezak, my internship supervisors, for being there for me when I needed help.

•My coworkers Curry Hackitt, Steven Bealby, Nicholas Bonacquisti, Gayle Moomaw, and Justin Carl, for always being there to take me to sites, answer my questions, and enlighten me on your daily tasks.

•Dr. Holtz and Dr. Merck, for their awesome dedication to the Science and Global Change program and to the scholars program as well, allowing me to enjoy this wonderful experience

