

Summer 2026 Internship Reflection Paper

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Ph.D. Program in Civil and Environmental Engineering

City of Norfolk | City Planning GIS Team

Executive Intern, Municipal Intern II

Internship Period: May 18-July 24, 2026

August 20, 2026

1. Introduction

I am a Ph.D. student in Civil and Environmental Engineering at Old Dominion University, with a professional and research focus in water resources, hydraulic systems, and quantitative engineering analysis. Much of my academic work requires me to interpret data, build models, evaluate physical systems, and communicate technical findings clearly. Before this internship, I had only limited practical experience with geographic information systems. The Summer 2026 internship with the City of Norfolk therefore gave me an opportunity to add a new technical dimension to my engineering background while learning how data and spatial analysis are used in a municipal setting.

Through the Norfolk Emerging Leaders program, I served as an Executive Intern, Municipal Intern II, and worked with the City Planning GIS Team from May 18 through July 24, 2026. My immediate supervisor was Matthew Straley, Principal Planner in City Planning. The experience exposed me to city operations, public planning work, GIS production, programming, workflow improvement, and communication with staff who depend on accurate spatial information for everyday decisions.

2. Professional Goals

After completing my doctoral degree, I plan to continue working at the intersection of civil and environmental engineering, water resources, geospatial analysis, automation, and data-driven decision support. My primary interest remains water resources and hydraulic engineering, but this internship broadened my view of the tools that can support that work. GIS is useful for understanding where engineering problems occur, how infrastructure and environmental conditions vary across space, and how technical results can be organized for people who must make decisions.

I am particularly interested in combining engineering models with GIS, Python-based automation, and well-structured data workflows. In future research or professional practice, I would like to use these tools in areas such as watershed and flood analysis, infrastructure planning, water-quality assessment, municipal asset management, and environmental decision support. The internship strengthened my interest in work that connects technical analysis to practical public needs.

3. Learning Objectives

Because this internship was completed under Curricular Practical Training (CPT), three learning objectives were established at the beginning of the experience. They guided both the assigned work and the way I evaluated my own progress.

Objective 1: Apply data analysis to real-life problems and understand operational impact.

I wanted to move beyond classroom examples and work with information that had a direct use in an organization. During the internship, I worked with parcel data, approved site-plan records, ownership information, spatial buffers, and mailing-list outputs. I learned that the quality of the

analysis is important, but so is the way the result fits into the larger work process. A technically correct result is most useful when another employee can review it, reproduce it, and act on it.

Objective 2: Improve modeling and GIS skills. My second objective was to become more capable with ArcGIS Pro and related analytical tools. I practiced researching and digitizing approved site plans, creating polygons, populating attributes, working with spatial selections, and developing online mapping data. I also learned ArcPy and used Python to automate a municipal GIS workflow. In addition, I completed Esri training in deep learning, spatial cluster analysis, time-series clustering, and animation in ArcGIS Pro.

Objective 3: Improve communication through consultation with stakeholders. The third objective was to improve my ability to communicate with people who use technical information for different purposes. I worked under my supervisor and alongside City Planning GIS staff, attended planning-related meetings, asked questions about assignments, and learned to think about the needs of the end user. This became especially important in the mailing-list automation project, where the output had to be useful to staff outside the coding process, not merely correct within ArcGIS Pro.

4. Internship Overview

4.1. Internship Site and Role

The City of Norfolk is a municipal government organization, and my placement was with the City Planning GIS Team. The team uses geographic information and mapped records to support planning operations and other city functions. My formal role was Executive Intern, Municipal Intern II. The internship was designed to provide practical experience related to my field of study while also giving me exposure to local government operations, public policy, and professional collaboration.

Item	Details
Internship organization	City of Norfolk
Primary work unit	City Planning GIS Team
Role	Executive Intern, Municipal Intern II
Supervisor	Matthew Straley, Principal Planner, City Planning
Dates	May 18-July 24, 2026
Schedule	Up to 40 hours per week

4.2. Assigned Responsibilities

My assigned responsibilities centered on expanding a GIS layer for approved site plans. I researched approved plans, digitized their boundaries, created polygons representing approved site-plan areas, and populated required attributes. The work also supported the creation of an online mapping layer through which the data could be displayed. Although the task could be repetitive, it taught me the importance of careful data entry, consistent spatial representation, and accurate

records. By the end of the internship, I had contributed multiple years of information to the growing Site Plan database.

4.3. Project Contribution: ArcPy Mailing-List Automation

A major project grew from observing an existing process for preparing property-owner mailing lists. The workflow was needed for property notices and civic-league requests, but it involved repeated manual selections in ArcGIS Pro, table joins and relates, and repeated formatting of labels. I saw an opportunity to make the process more consistent and efficient, and I developed a parameter-driven ArcPy tool that converted request information into mailing-ready outputs.

The tool accepts case information such as GPINs, buffer distances, civic-league rules, and city exemptions through a request file. ArcPy then performs the source lookup, creates the required buffers, selects parcels, matches ownership information from the Proval data, removes duplicate recipient records, and exports the results. The output package includes clean Excel records and Avery 5160 PDF mailing labels. The script was designed to handle multiple target properties, flexible buffer configurations, optional civic-league filters, removal of City of Norfolk ownership records, and duplicate control based on owner and street information.

The project also required attention to reliability. I separated the target-search layer from the parcel-selection layer to prevent selection carryover from one case to another. I added duplicate handling so that the same owner at the same street address would not receive repeated mailings. I also handled long owner names so that mailing labels would wrap properly instead of overflowing. To improve performance, the workflow could use a local geodatabase cache and indexed parcel identifiers rather than making repeated calls to the enterprise database. These details changed the project from a one-time script into a repeatable operational workflow.

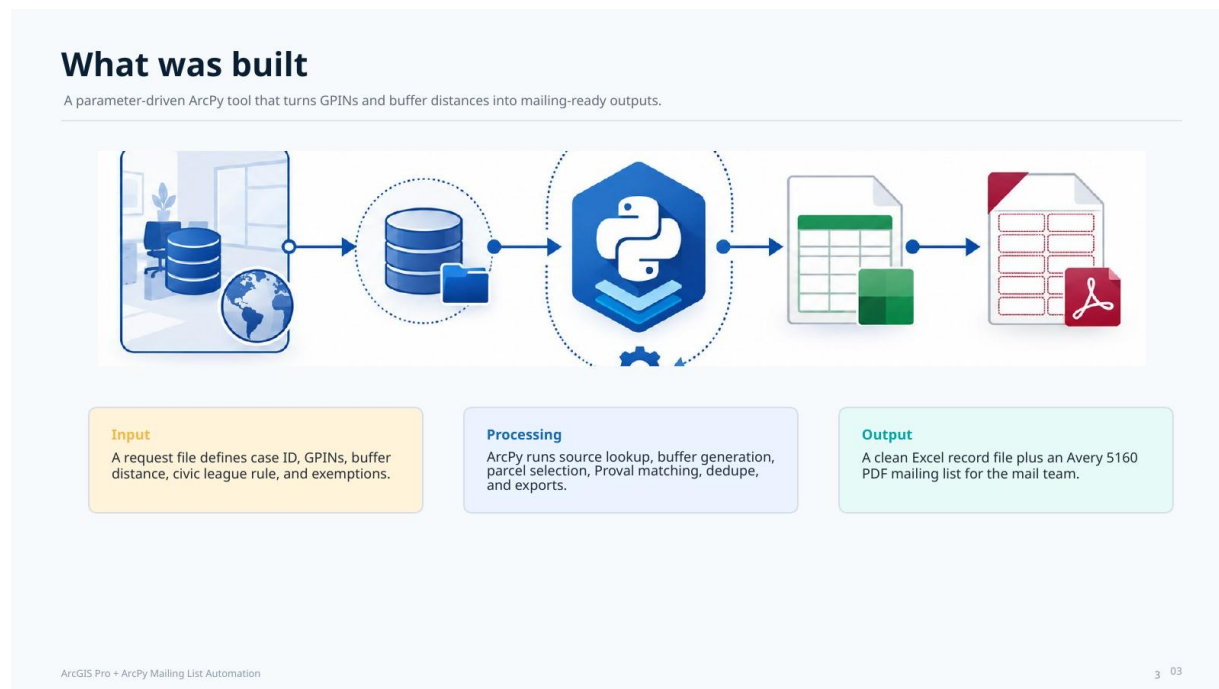


Figure 1. ArcPy mailing-list automation workflow developed during the internship.

4.4. Collaboration and Professional Development

I collaborated primarily with Matthew Straley and the City Planning GIS staff. I also attended planning-related meetings that helped me understand how GIS fits within a larger municipal organization. These interactions were useful because they connected the technical work to the people and decisions that depend on it. My professional development also included several Esri courses that expanded my knowledge beyond the immediate assignments.

Esri Course	Duration	Completed
Creating and Sharing Animation in ArcGIS Pro	1 hour 45 minutes	July 8, 2026
Deep Learning Using ArcGIS Pro	2 hours 15 minutes	July 8, 2026
Mapping Clusters: Optimized Hot Spot and Optimized Outlier Analysis	2 hours	July 10, 2026
Space-Time Analysis: Time-Series Clustering	1 hour	July 10, 2026

5. Reflection

5.1. How the Learning Objectives Were Met

The internship met the three CPT objectives in a practical way. First, I applied data analysis to real municipal problems rather than working only with academic examples. The site-plan database and mailing-list workflow both required accuracy because the information was intended for actual planning and notification activities. Second, my GIS skills improved substantially. I entered the internship with limited GIS experience, but I became more comfortable with ArcGIS Pro, spatial selections, feature creation, attribute management, geodatabases, and ArcPy automation. Third, I improved my professional communication by asking questions, participating in meetings, explaining the behavior of the automation, and thinking about how the output would be used by staff.

5.2. Key Learning and Challenging Moments

The most important learning experience was discovering that a useful technical solution must be both correct and dependable. My early focus was on making the script produce the right answer. As the project developed, I learned to think about what happens when the next case uses different inputs, when selections remain active, when the same owner appears more than once, when an owner name is too long for a label, or when repeated database calls make the process slow. Those details forced me to think beyond a single successful run.

Another challenge was the learning curve. I did not begin the internship as an experienced GIS user. The combination of assigned production work, independent practice, formal Esri training, and direct feedback from my supervisor helped me build confidence quickly. The repetitive parts of the site-plan database work also taught me patience and attention to detail. In municipal records, a small inconsistency can affect later searches, maps, and decisions, so careful work matters even when the task itself seems routine.

5.3. Skills Practiced

The internship allowed me to practice technical and professional skills together. Technically, I worked with ArcGIS Pro, ArcPy, Python logic, spatial buffers, parcel selection, attribute tables, geodatabases, data matching, duplicate control, Excel outputs, and PDF label generation. I also strengthened my understanding of spatial statistics, time-series clustering, deep learning concepts, and animation through the Esri courses. Professionally, I practiced problem solving, self-direction, documentation, communication, teamwork, and translating a technical process into an output that non-programming staff could use.

5.4. What I Would Do Differently

If I were beginning the internship again, I would spend more time at the start documenting the full workflow before writing the automation. I would identify the expected inputs, edge cases, output requirements, and measures of performance earlier. I would also record baseline information such as the approximate time required for the manual process so that the improvement from automation could be measured more precisely. Finally, I would build user documentation alongside the code instead of treating documentation as a final step. These changes would make testing, handoff, and future maintenance easier.

5.5. Advice for Future Students

My advice to future interns is to be willing to start with tasks that feel unfamiliar and to ask thoughtful questions early. It is also useful to look beyond the assigned task and understand why the organization performs it. That broader view can reveal opportunities for improvement. At the same time, an intern should not assume that a faster technical solution is automatically better. The solution must fit the existing work environment, be understandable to the people who use it, and produce results that can be checked. Taking advantage of training opportunities and attending meetings outside the immediate assignment can also make the internship much more valuable.

5.6. Connection to My Major and Future Goals

This experience connects directly to my Civil and Environmental Engineering studies because many engineering problems are spatial. Water resources, drainage, flooding, water quality, infrastructure condition, and environmental risk all have geographic dimensions. The internship showed me how GIS can serve as the bridge between engineering analysis and the physical locations where decisions are made. It also showed me how Python automation can reduce repetitive work and make analytical procedures more consistent. I plan to continue developing at

the intersection of civil engineering, water resources, GIS, automation, and data-driven municipal decision support.

5.7. Would I Recommend This Internship?

Yes. I would recommend the City of Norfolk internship to students who want practical exposure to public service and are willing to learn. The experience gave me meaningful work, access to a supervisor and staff who were willing to answer questions, exposure to city planning operations, and room to develop an improvement beyond my original assignment. I finished the internship with stronger GIS skills, a working automation project, a better understanding of municipal decision processes, and a clearer sense of how geospatial tools can complement my engineering career.

5.8. Conclusion

The internship changed the way I think about GIS. I now see it as more than a tool for producing maps. It can organize records, connect different data sources, support repeatable decisions, and help technical work move from analysis to action. The site-plan database work taught me discipline and accuracy, while the ArcPy mailing-list project taught me how to turn an observed problem into a practical workflow. Most importantly, the experience gave me a foundation that I can continue to apply in engineering research and professional practice.

Appendix A. Supporting Materials

The following materials support the internship activities described in this report and is included with the Canvas submission.

1. Certificate of Internship.
2. Four Esri Course Completion Certificates.
3. The ArcPy mailing list automation project presentation.
4. Intern Presentation
5. Resume.