

# Developing a Subsurface Map Interactive Atlas for the Regional Municipality of York

GIS Collaborative Project | June 2020

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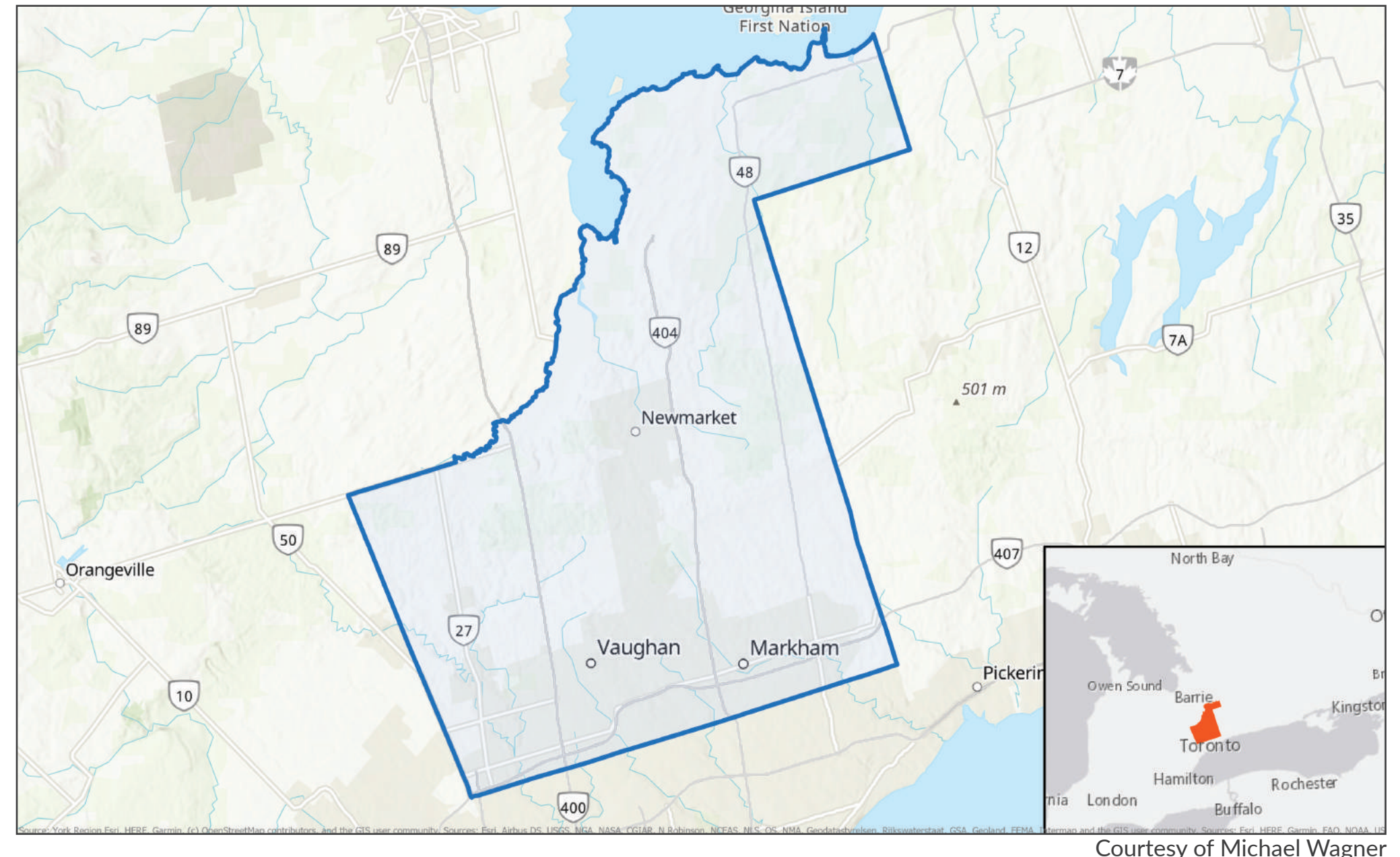
School of Environmental & Natural Resource Sciences  
Frost Campus | Fleming College

## Team Members: Abhinay Arora and Michael Wagner

## Project Background

Currently, all subsurface reports related to York Region projects are stored inefficiently. The existing file management system does not have a map interface to allow users to view the data or rapidly retrieve reports according to areas of interest. As a result, hydrogeological and geotechnical information housed in the reports are inaccessible, adding to the challenge for Source Water Protection (SWP) managers to coordinate endeavours related to development and subsurface management. Furthermore, valuable information from previous projects are not effectively used or incorporated into future decision making.

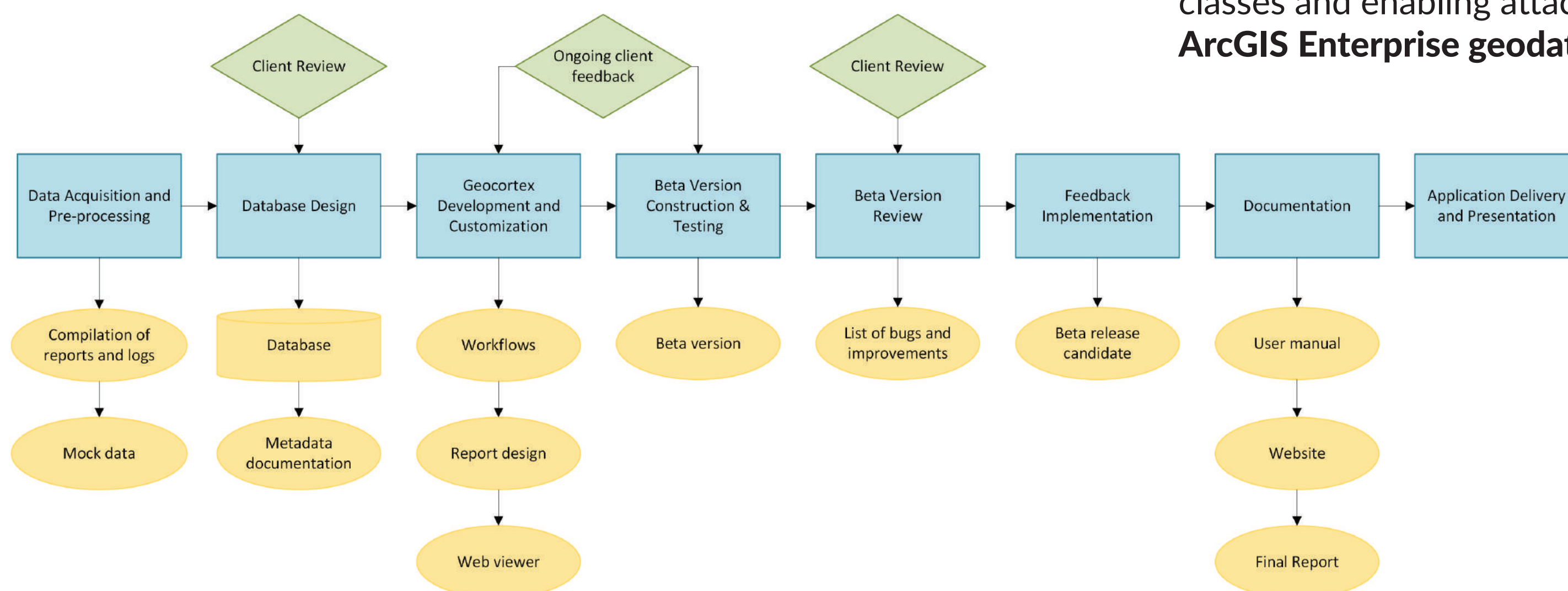
To solve this issue, our team has developed an interactive web application that can input, store, retrieve, and map subsurface reports and also query against various vulnerable subsurface areas. The web application was developed using the latest Geocortex 5-Series products (Geocortex Web, Geocortex Workflow, and Geocortex Reporting) that leverage the ArcGIS web platform. By increasing accessibility to these reports, this application will play an important role in building knowledge on York Region's local systems to address groundwater and development concerns. Furthermore, the application will assure consistency between future environmental investigations and enhance communication between project managers.



Courtesy of Michael Wagner

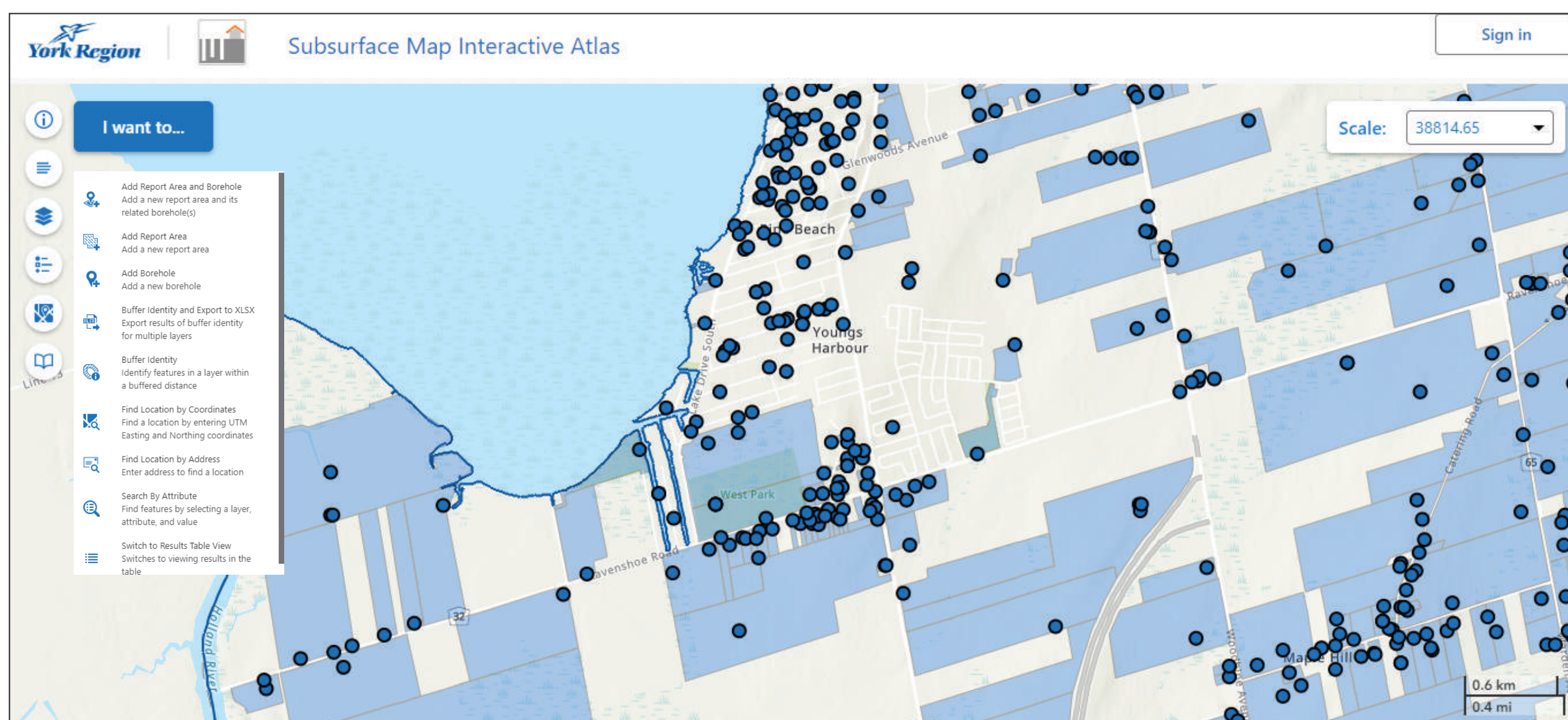
## Methodology

- 1 Data Acquisition and Pre-processing**  
ArcGIS Pro was used to create and pre-process mock data of report areas and boreholes based on the York Region parcel data and Ontario Water Well Information System data respectively. All SWP layers were provided by our client from York Region.
- 2 Database Design and Processing**  
We designed our database in ArcGIS Pro and populated the attribute tables of our feature classes with mock attributes using Python. After setting domains, performing a spatial join, creating relationship classes and enabling attachments, we stored all the data in an ArcGIS Enterprise geodatabase in SQL Server.
- 3 Web Technology**  
All data layers were published as feature and map services to ArcGIS Server, and were added to an ArcGIS Online web map where we configured settings and symbology. The web map was brought into the Geocortex Web application.
- 4 Programming and Customization**  
We created 16 workflows in Geocortex Workflow, each representing a custom functionality (e.g. logging new report areas/boreholes, querying attributes of SWP layers intersecting a borehole or report area on demand).
- 5 Cartographic Presentation & Visualization**  
We created report templates for several of our workflows using Geocortex Reporting. All workflows were then added to the Geocortex Web application and we designed the layout according to the design of existing York maps and also added a custom icon to represent our application. A user guide was also created.



## Results

The final web application (link to application) was accompanied by a comprehensive user manual (link to manual) and a deployment/maintenance guide. Visit the final report and StoryMap for more details.



## Acknowledgements

We would like to thank Shawn Morgan, our advisor, for sharing his expertise with us and for all his support. Many thanks to Alexandra Crasnic, our client, for her continuous guidance and feedback, and the Source Water Protection team at York Region for entrusting us with this project.

When the application was complete, we delivered it to our client to be deployed.