Final Project Report

GROUP NO. : 5
GROUP MEMBERS :
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INTRODUCTION :

Vehicle pollution is the introduction of harmful material into the environment by motor vehicles. These materials, known as pollutants, have several bad effects on human health and the ecosystem. Examples of such pollutants include Carbon monoxide, Hydrogen, Nitrogen Oxide, particulate matter, Ammonia and Sulphur Dioxide. Transportation is a major source of air pollution in many countries around the world due to the high number of vehicles that are available on the roads today.

As a result, People are shifting towards safe and greener transportation methods. These include community travels, bikes and pedestrians. However, it is important to have greener roadways to allow such transportation to blossom. As a result of this shift, the concept of **Greenways** came.

Greenways are defined as a strip of undeveloped land near an urban area, set aside for recreational use or environmental protection. They are scenic pathways through a city that accommodate pedestrians and bikes, and connects different urban locations to one another. They are ideal for a stroll, spending leisure walks and are quintessential for connectivity as well.

One of potential early adapters of Greenways could be Toronto, Canada.

OBJECTIVE :

Universities and colleges are located all over the city of Toronto with the highest concentration downtown. By connecting the universities and colleges that are located more peripherally to the ones in the downtown core, we aim to provide a network of greenways catered towards students.

We have laid stress on following information :

1. The greenways must be close to residential areas which by default means they are farther from industrial areas.
2. The greenways must connect schools and colleges. The underlying presumption is that school and college students would prefer to commute along greenways more often than business oriented people.
3. The greenways must connect the public libraries. The underlying presumption is the same as above.

DATA SET :

The following datasets are used in this project which are downloaded from city of Toronto website which have this data available open source :

City Wards – This vector layer will be used as a base map for Toronto city limits.

- Format: ESRI shapefile, WGS84 projection

Bikeways - This vector layer will be used to identify key biking areas in the city and assign appropriate weights for the creation of a cost surface

- Format: ESRI shapefile, WGS84 projection

School Locations - All Types – This vector layer was used in the creation of a new layer of universities and colleges so they could be buffered to locate nearby roads for use in a weighted analysis. Key schools were later extracted for the purposes of creating least-cost pathways between them (proposed greenways).

Toronto Centreline (TCL) – This vector layer was used to extract relevant linear features for our weighted analysis including specific types of roads, rivers and walkways

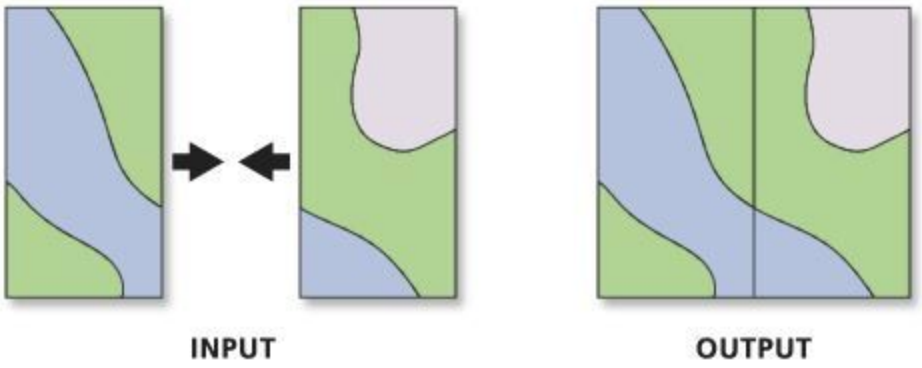
- Format: ESRI Shapefile, WGS84 projection

Address Points (Municipal)- This vector layer was used to extract library points so that we could identify significant roads around these library points

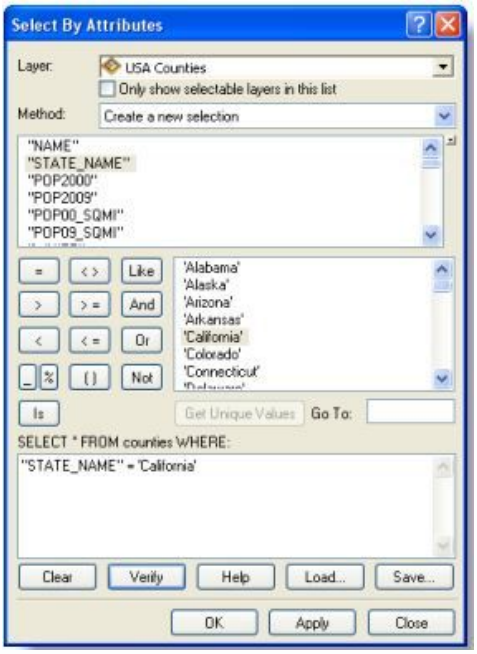
- Format: ESRI shapefile, WGS84 projection

TOOLS USED :

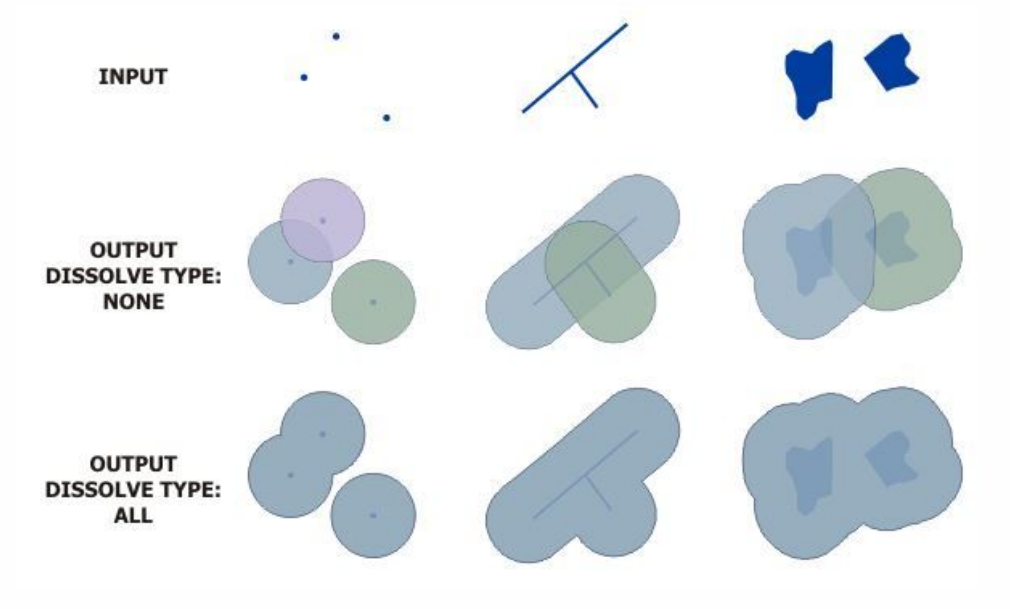
- Merge Tool : Combines multiple input datasets into a single, new output dataset. This tool can combine point, line, or polygon feature classes or tables.



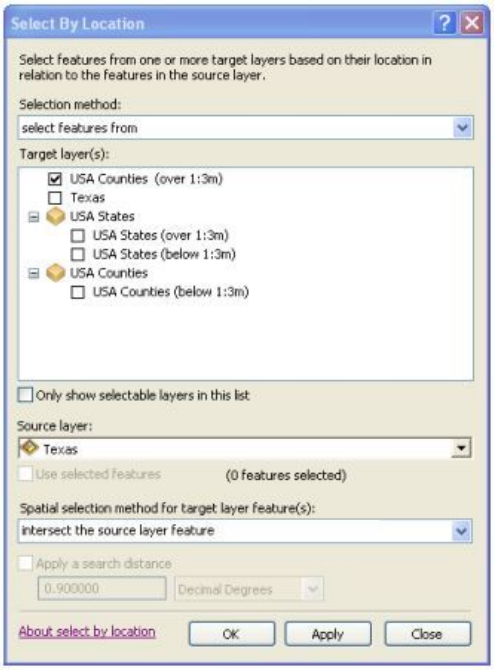
- Select By Attribute Tool : **Select By Attributes** allows you to provide a SQL query expression that is used to select features that match the selection criteria.



- Buffer Tool : Creates buffer polygons around input features to a specified distance.

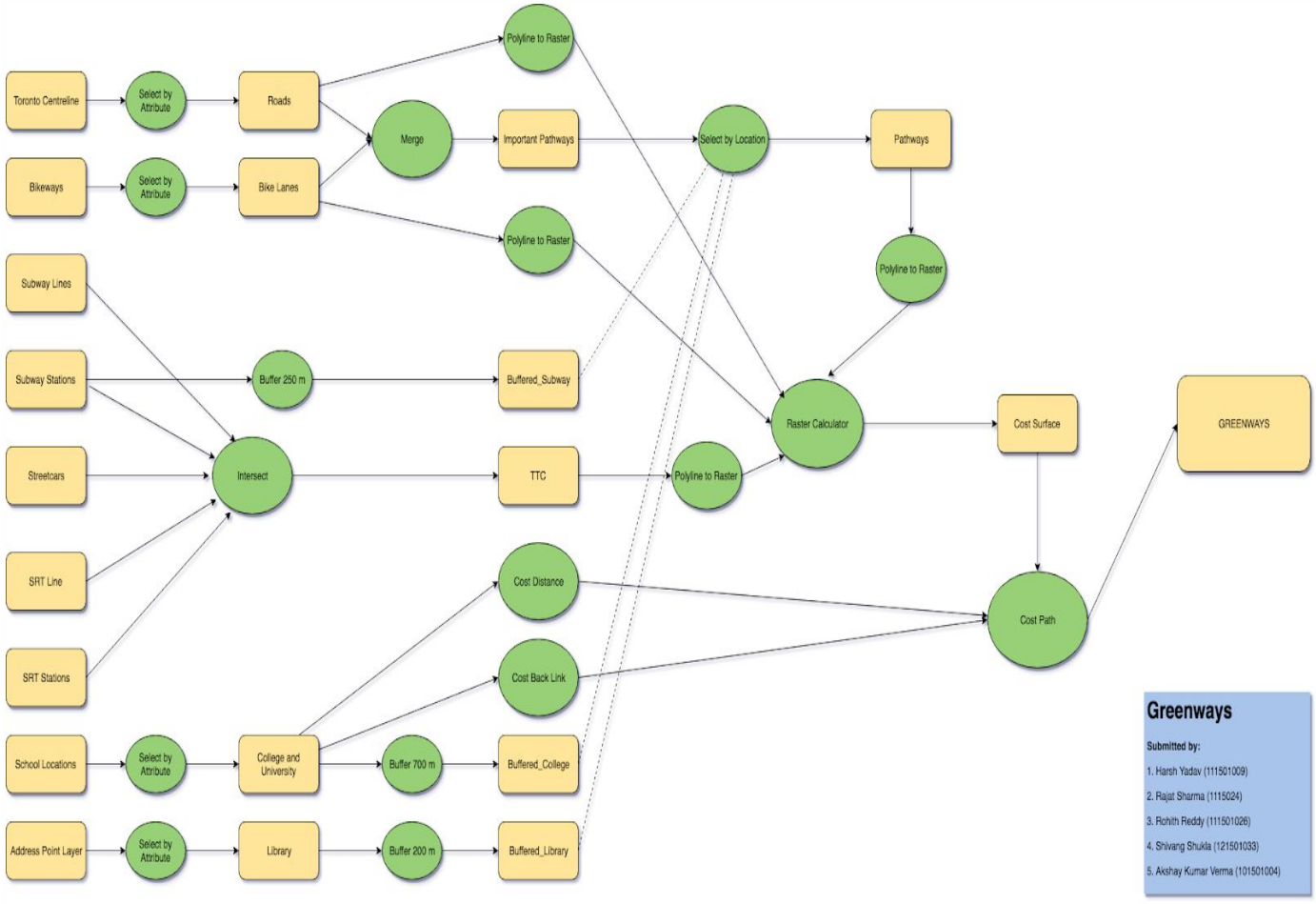


- Select By Location : The **Select By Location** tool lets you select features based on their location relative to features in another layer. For instance, if you want to know how many homes were affected by a recent flood, you could select all the homes that fall within the flood boundary.



- Raster Conversion Tool : The vector layers of interest were converted into raster layers.
- Reclassify Tool : Reclassifies (or changes) the values in a raster.
- Overlay Tool : The Overlay toolset contains tools to overlay multiple feature classes to combine, erase, modify, or update spatial features, resulting in a new feature class.
- Cost Distance Tool: Calculates the least accumulative cost distance for each cell to the nearest source over a cost surface.
- Cost Back Link Tool : Defines the neighbor that is the next cell on the least accumulative cost path to the nearest source.
- Cost Path Tool : Calculates the least-cost path from a source to a destination.
- Raster Calculator : Builds and executes a single Map Algebra expression using Python syntax in a calculator-like interface.

PROCEDURE :


Toronto Centreline
Select by Attribute
Roads
Polyline to Raster
Merge
Important Pathways
Select by Location
Pathways
Bikeways
Select by Attribute
Bike Lanes
Polyline to Raster
Polyline to Raster
Subway Lines
Subway Stations
Buffer 250 m
Buffered_Subway
Raster Calculator
Cost Surface
GREENWAYS
Streetcars
Intersect
TTC
Polyline to Raster
SRT Line
Cost Distance
Cost Path
SRT Stations
Cost Back Link
School Locations
Select by Attribute
College and University
Buffer 700 m
Buffered_College
Address Point Layer
Select by Attribute
Library
Buffer 200 m
Buffered_Library
Greenways
Submitted by:
1. Harsh Yadav (111501009)
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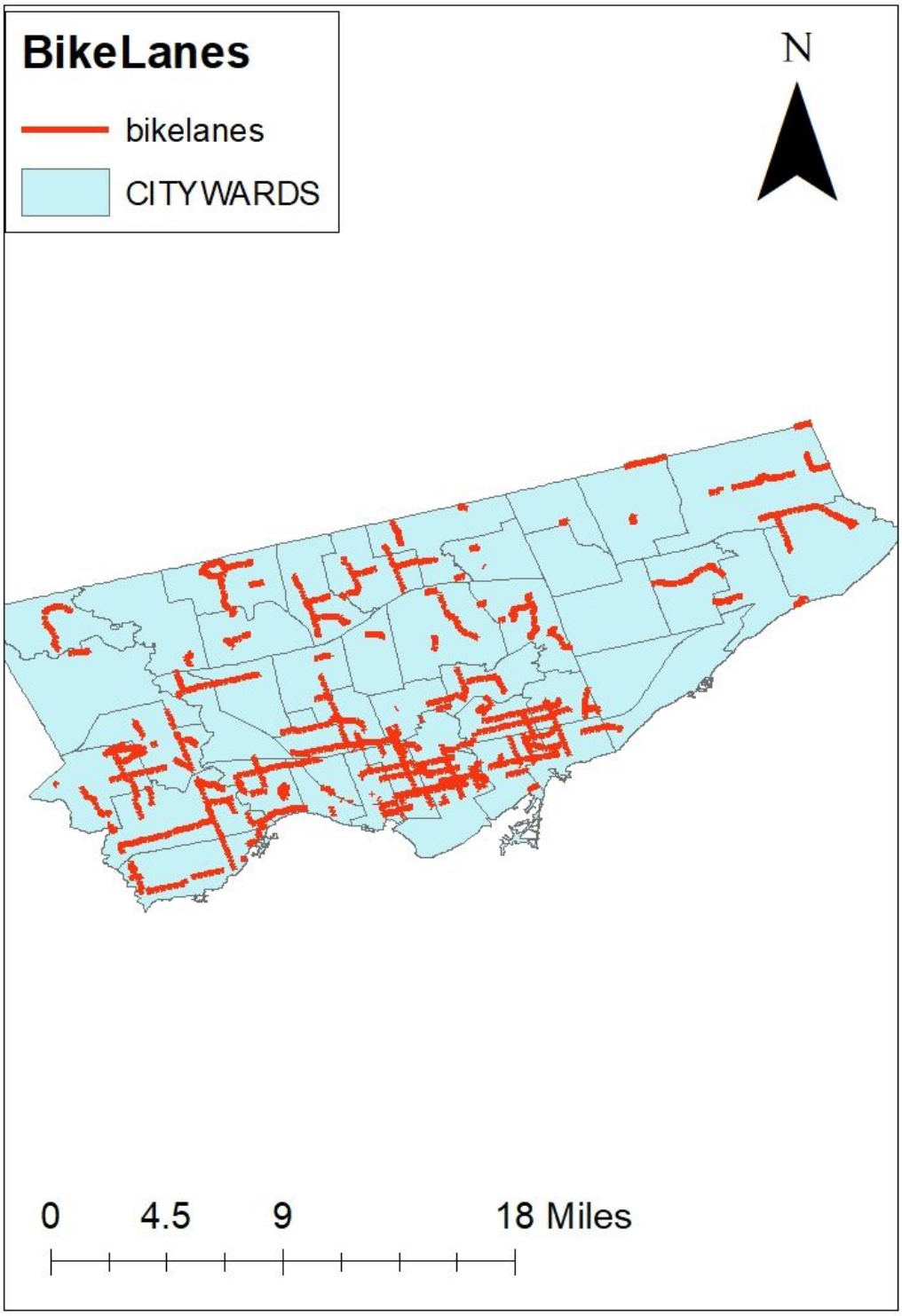
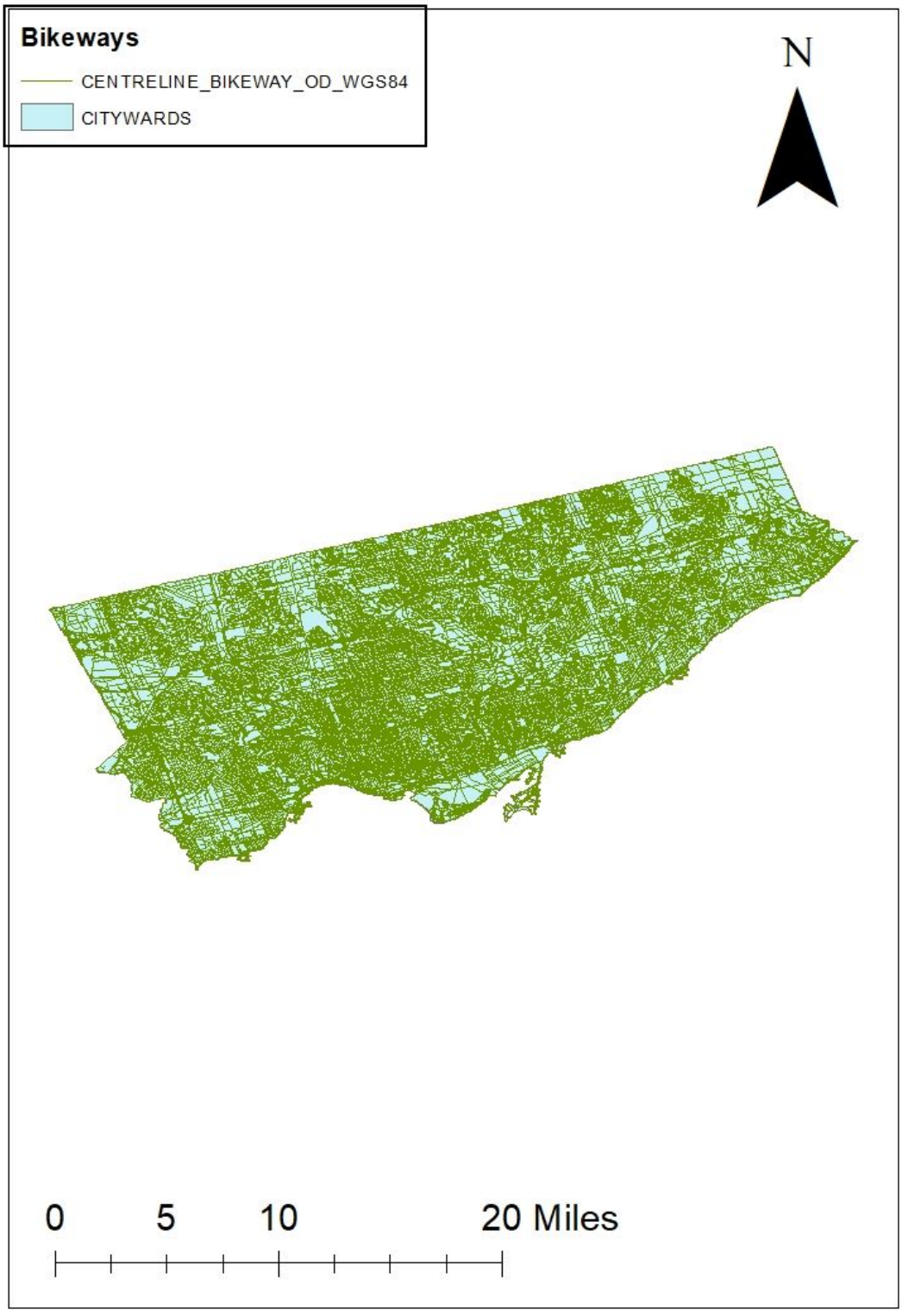
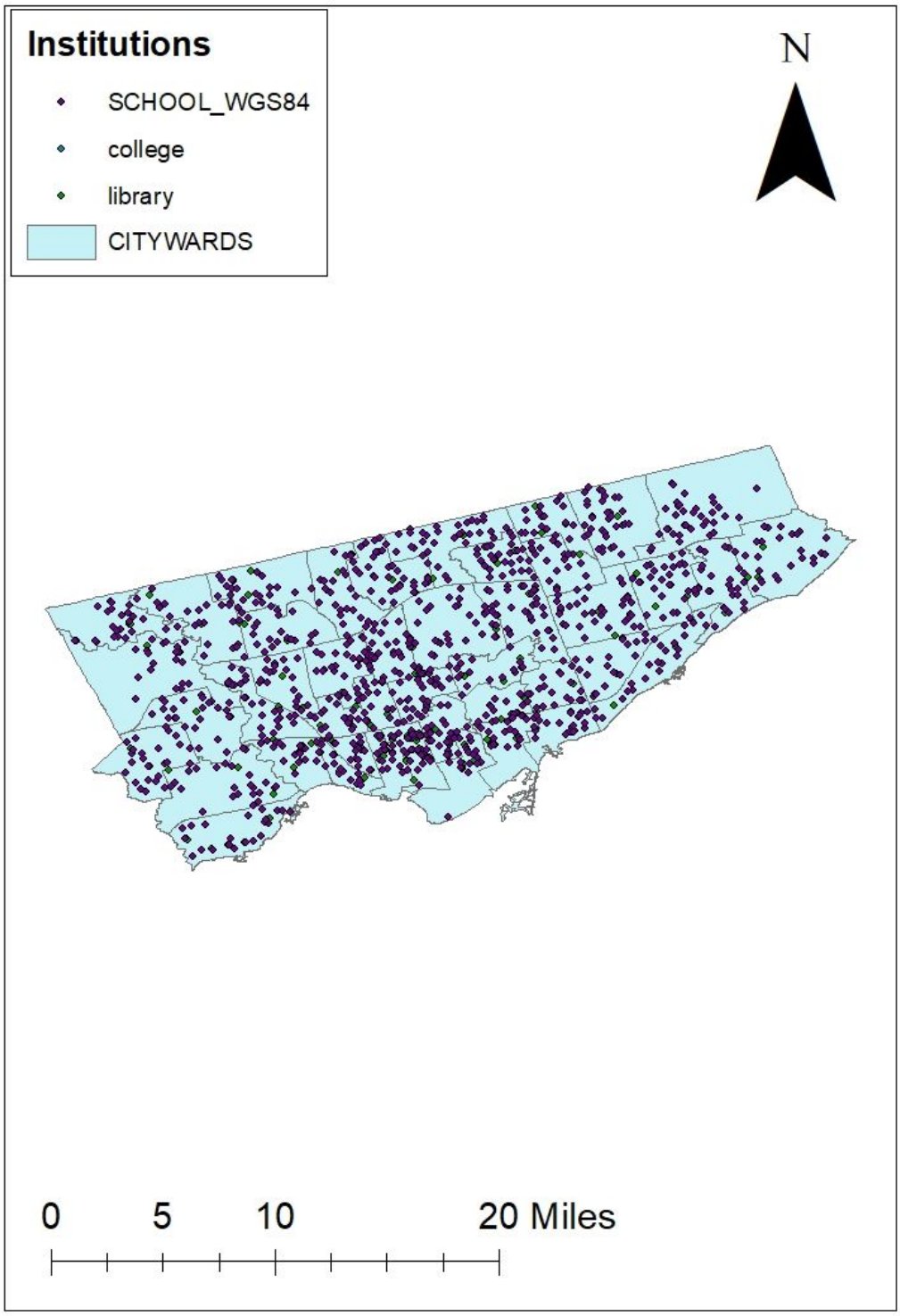
3. Rohith Reddy (111501026)
4. Shivang Shukla (121501033)
5. Akshay Kumar Verma (101501004)

RESULT :

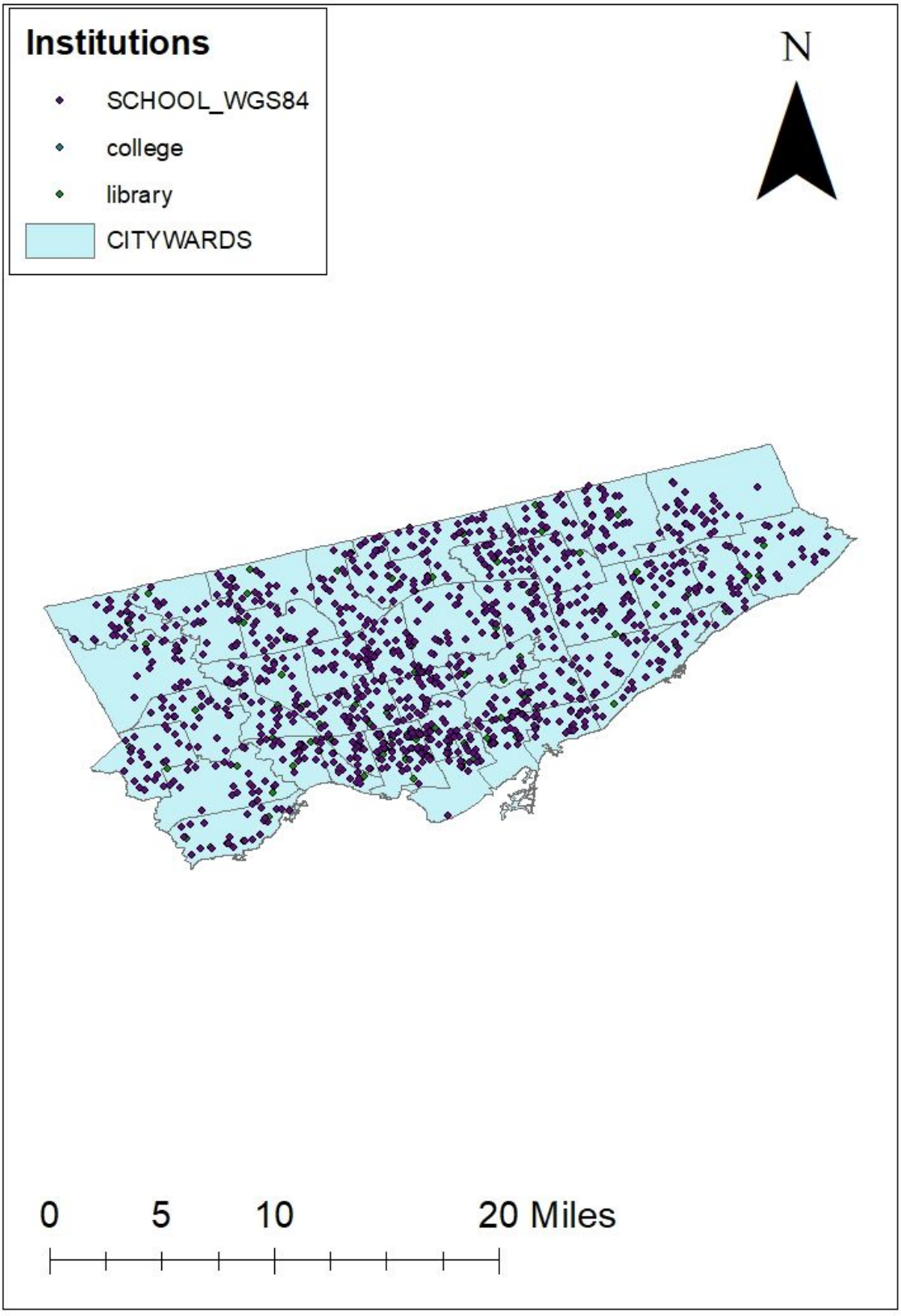


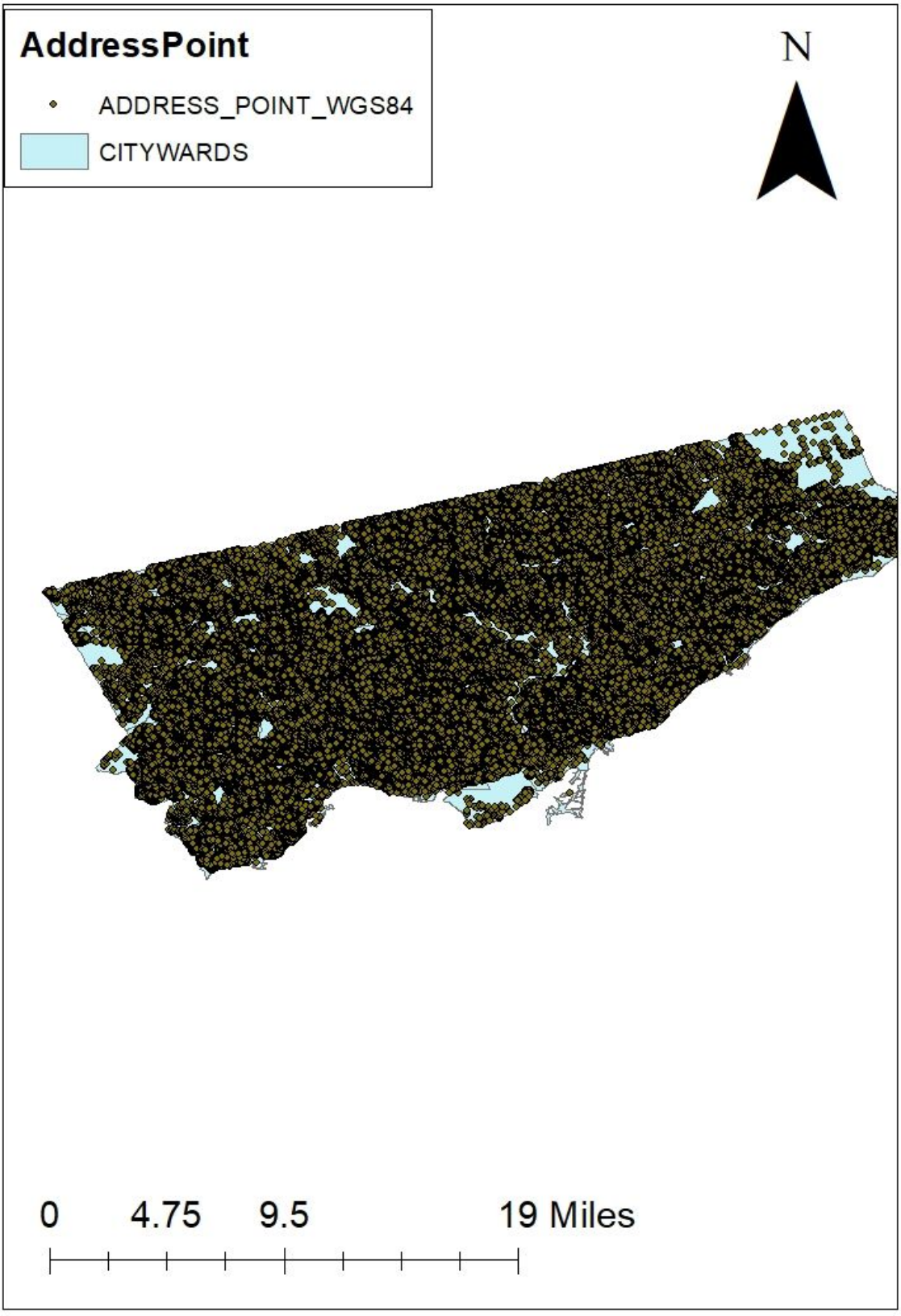

Bikeways
CENTRELINE_BIKEWAY_OD_WGS84
CITYWARDS
N
0
5
10
20 Miles

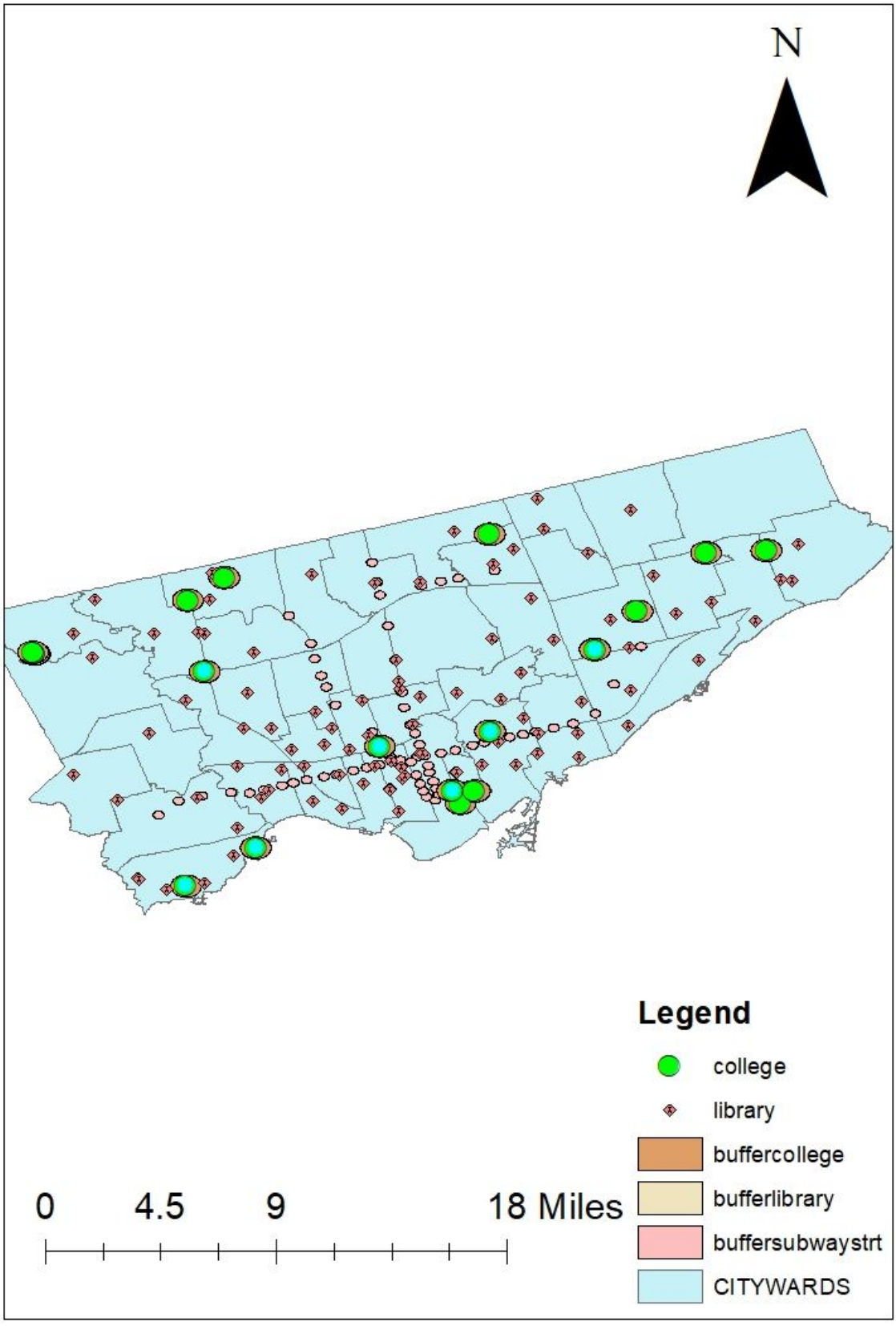

Institutions
SCHOOL_WGS84
college
library
CITYWARDS
N
0
5
10
20 Miles

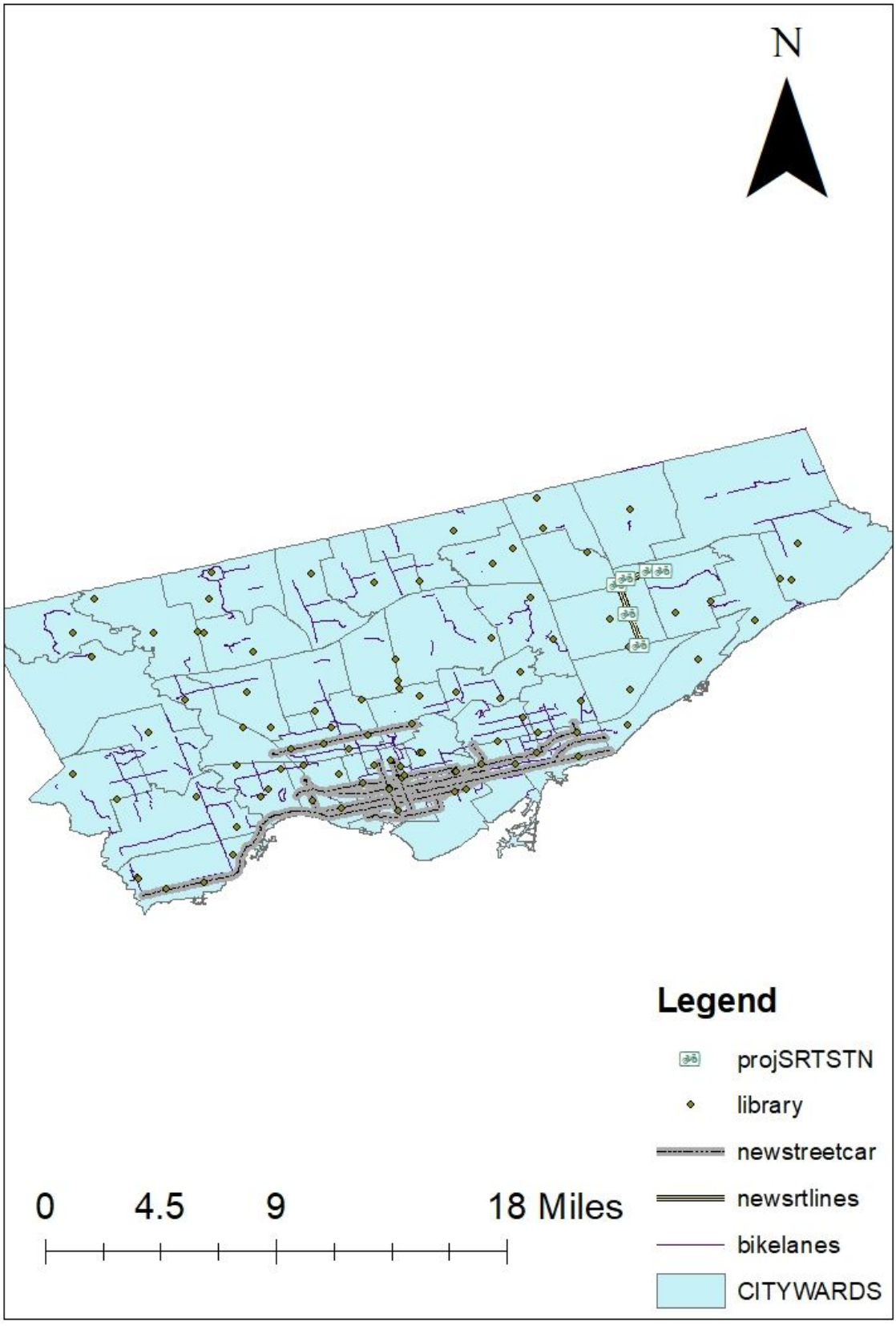

Roads and Paths
important_CENTRELINE
CITYWARDS
N
0
4.75
9.5
19 Miles

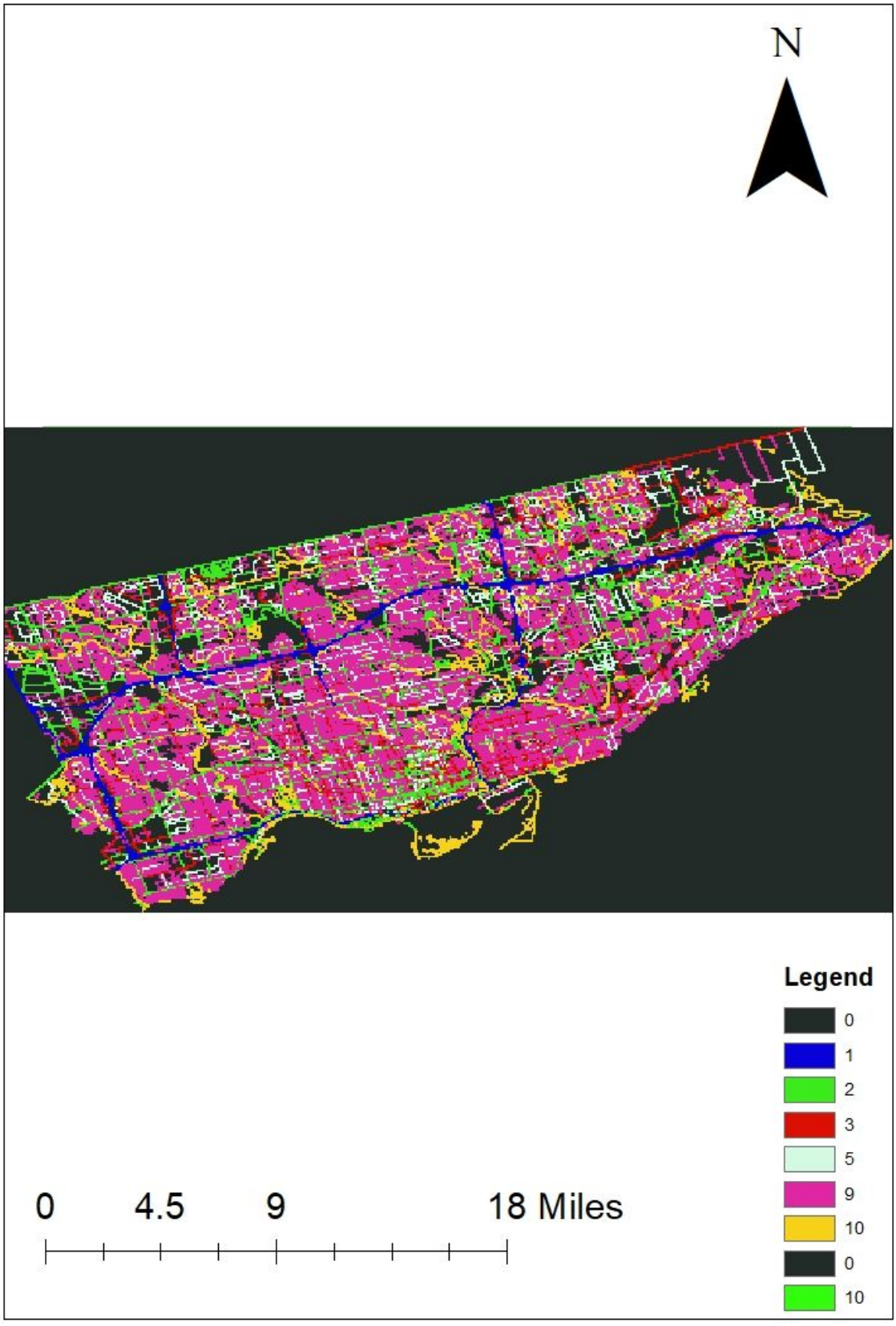

Toronto Centreline
CENTRELINE_WGS84
CITYWARDS
N
0
5
10
20 Miles

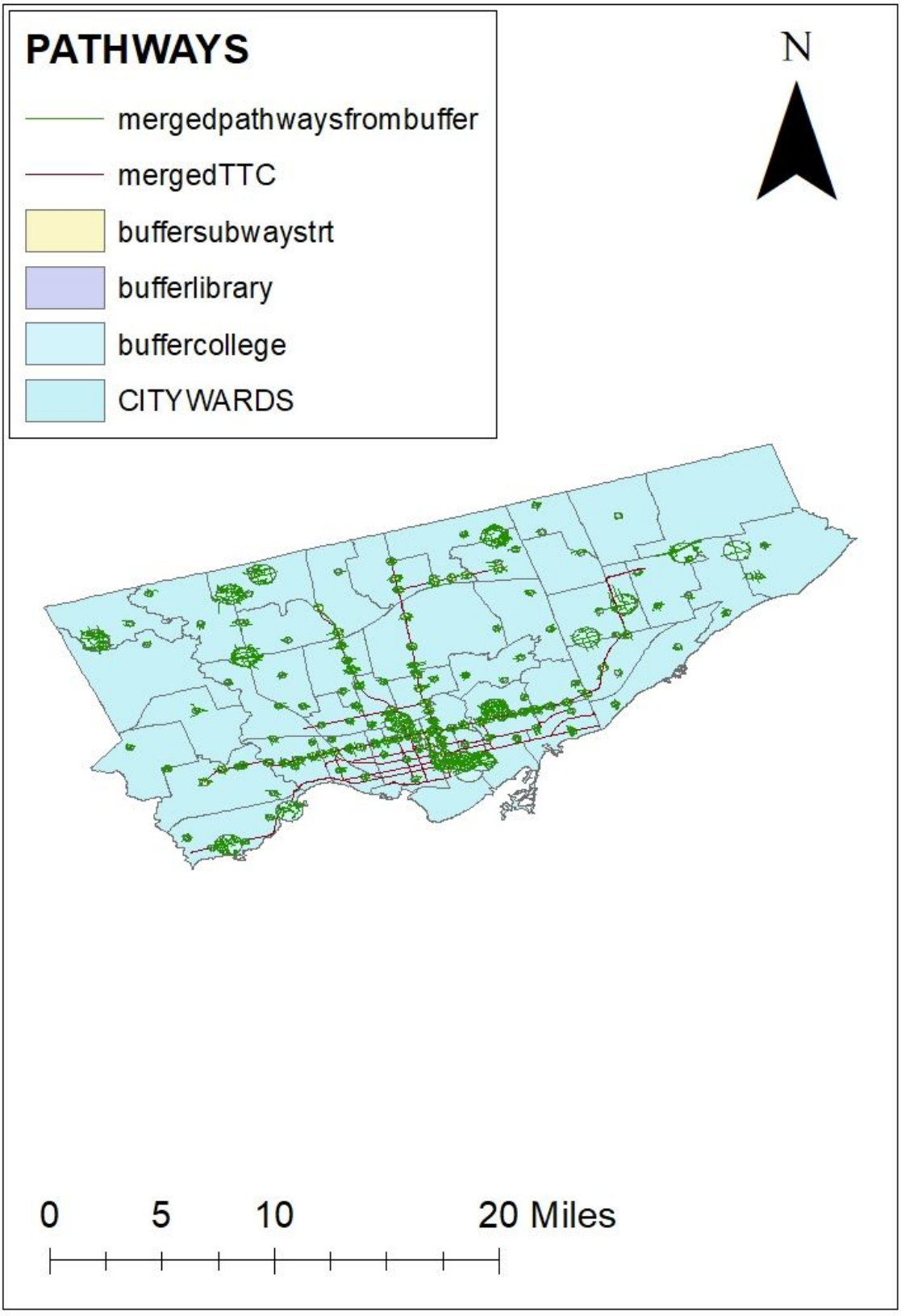

Institutions
SCHOOL_WGS84
college
library
CITYWARDS
N
0
5
10
20 Miles

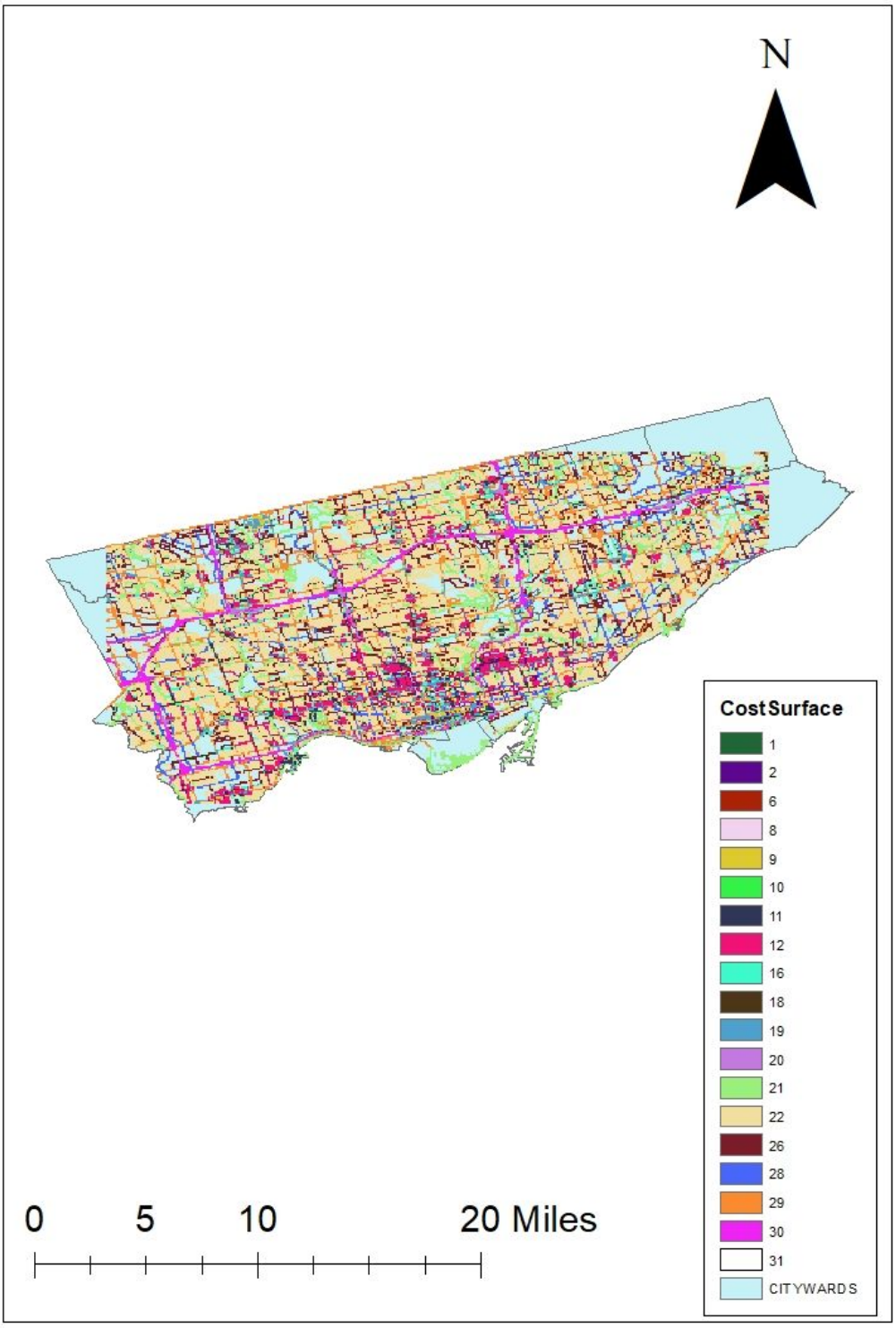

AddressPoint
ADDRESS_POINT_WGS84
CITYWARDS
N
0
4.75
9.5
19 Miles


N
Legend
college
library
buffercollege
bufferlibrary
buffersubwaystrt
CITYWARDS
0
4.5
9
18 Miles

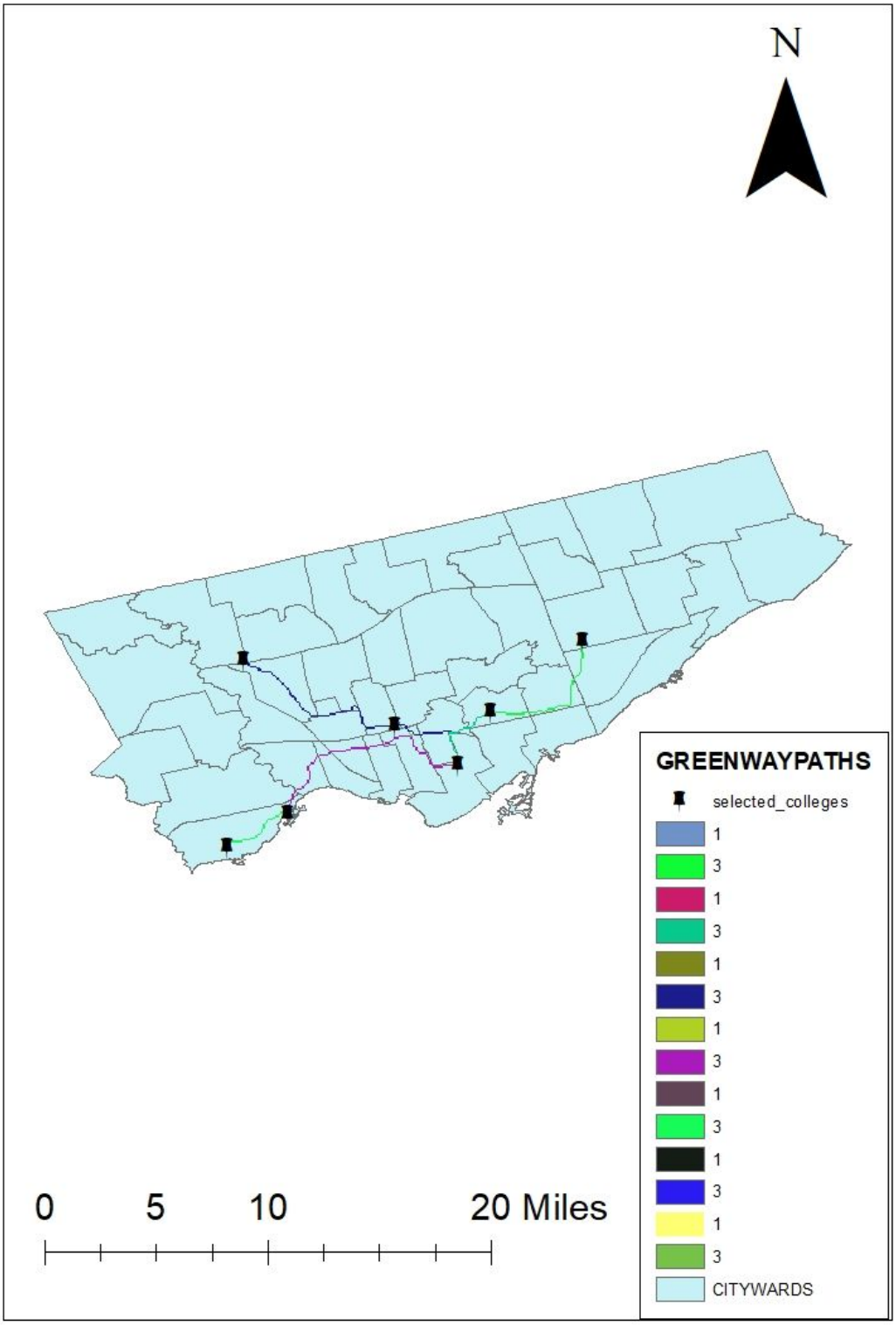

N
Legend
projSRTSTN
library
newstreetcar
newsrtlines
bikelanes
CITYWARDS
0
4.5
9
18 Miles


N
0
4.5
9
18 Miles
Legend
0
1
2
3
5
9
10
0
10


PATHWAYS
mergedpathwaysfrombuffer
mergedTTC
buffersubwaystrt
bufferlibrary
buffercollege
CITYWARDS
N
0
5
10
20 Miles



Cost Surface



Final GreenWays

CONCLUSION :

1. We found the suitable Greenways in Toronto City which satisfies out assumptions (Shown in Fig: Final Greenways).
2. This project has enabled us to get more familiar with ArcGis Software. We got the chance to practically implement many tools which we learnt during GIS Lab.
3. We got the chance to learn new tools like Cost Distance, Cost Back Link & Cost Path Tool which were not covered in the Lab sessions.

REFERENCES :

https://www.toronto.ca/city-government/data-research-maps/open-data/open-data-catalogue/

http://desktop.arcgis.com/en/arcmap/10.3/main/get-started/arcgis-tutorials.htm