

# Union Township Board of Education

## Bus Routing Optimization



December 18, 2024

Presentation for: Union Township Board of Education



## Meet the Team



**Grant Ervin**  
Director of Applied  
Technology



**Kris Krzyston**  
Regional Market Leader



# About T&M

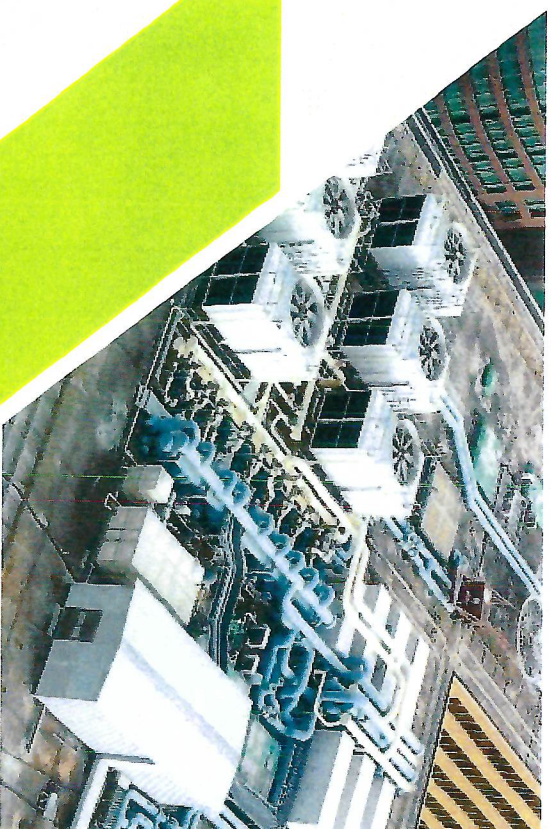
- Founded in 1966
- 17 Offices in 8 States (4 in NJ)
- Headquartered in Middletown, NJ
- More than 400 employees holding over 250 professional licenses
- Multi-disciplined consultants, engineers, technologists, construction managers and environmental specialists serving public and private clients throughout the United States

## OUR MISSION

*Improving neighborhoods, infrastructure and environments one project at a time.*

## OUR VISION

*Committed to enhancing the quality of life for employees, clients and communities.*



## **Bus Routing Optimization**

- Restructuring to a K to 6 configuration:
  - Removal of a centralized 5<sup>th</sup> grade Jefferson Elementary, moving to K to 6
  - Kawameeh Middle School moving to K to 6
  - Burnet Middle School – 7<sup>th</sup> & 8<sup>th</sup> grades
- Optimize Bus Routing across the district for all school levels
- School Catchment Area Updates
- Minimize or Eliminate Private Transportation Contractors and number of routes
- Increase safety for bus riders and walkers



# **Bus Routing Optimization**

## **Project Tasks:**

1. Project Kick-Off Meeting
2. School Catchment Area Updates/Creation
3. Initial Bus Route Creation and Analysis
4. Bus Routing Optimization
5. Bus Route Optimization Analysis Report
6. Data Delivery, Documentation and ArcGIS Online
7. Project Management

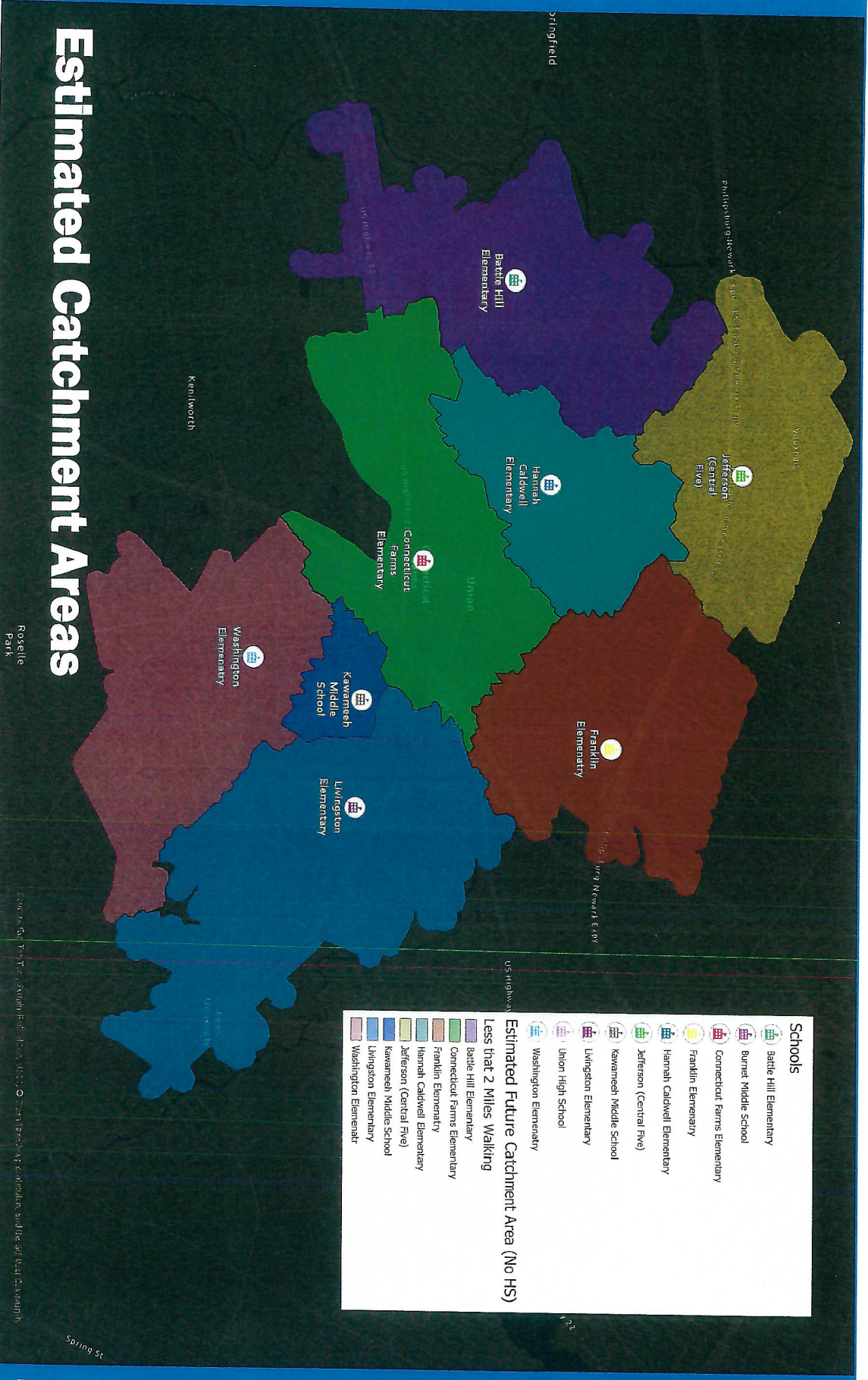


## **Task 2 School Catchment Area Updates/Creation**

- Update and create school catchment areas using existing street list
- Create new map layer of catchment areas using GIS software
- Web-based map viewer to review, mark up and make comments
- Catchment area adjustments
- Catchment area analysis, additional adjustments performed
- Final catchment areas created for each school



# Estimated Catchment Areas



**Schools**

- Battle Hill Elementary
- Burnet Middle School
- Connecticut Farms Elementary
- Franklin Elementary
- Hannah Caldwell Elementary
- Jefferson (Central Five)
- Kawameesh Middle School
- Livingston Elementary
- Union High School
- Washington Elementary

**Estimated Future Catchment Area (No HS)**

Less than 2 Miles Walking

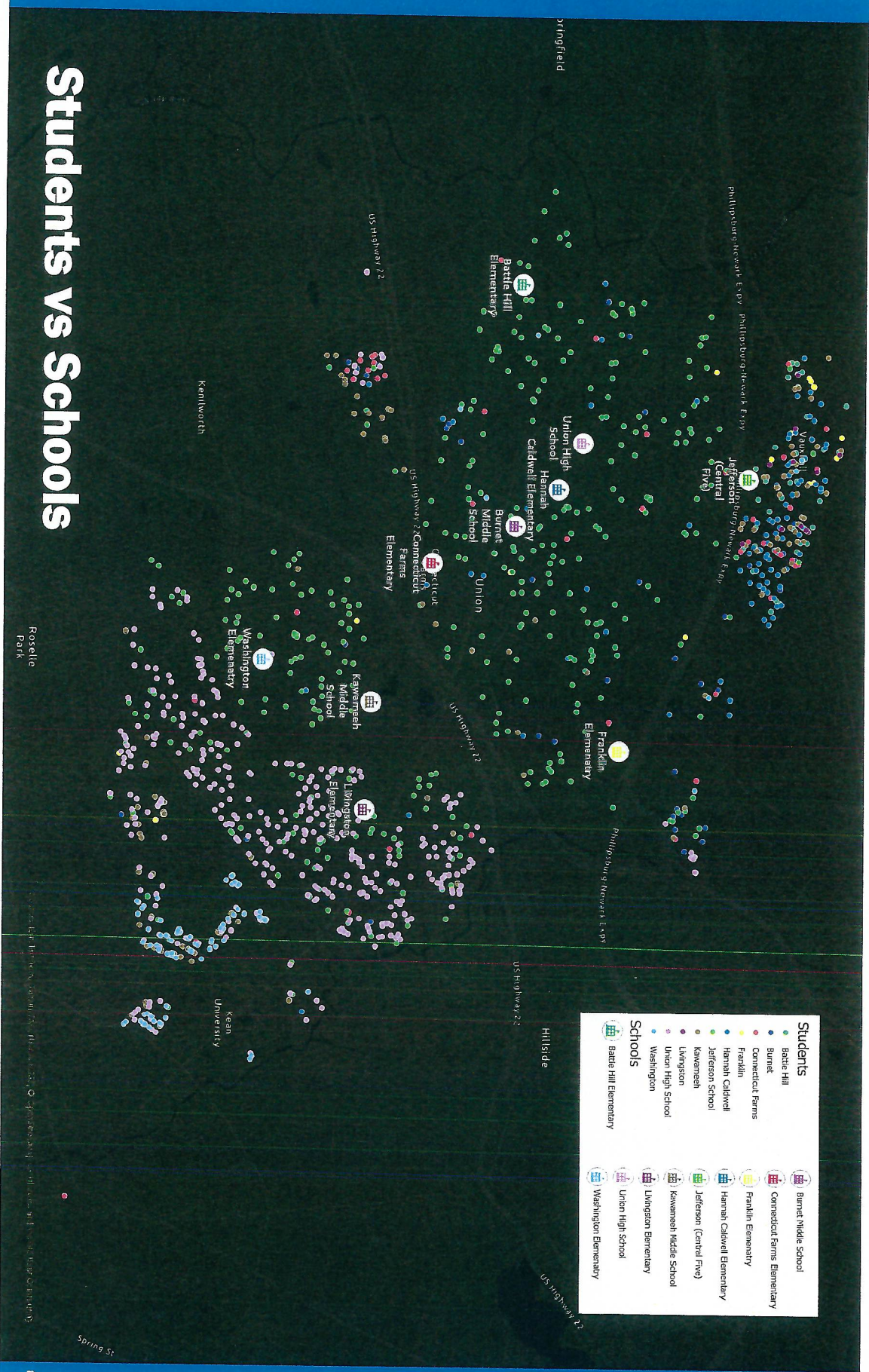
- Battle Hill Elementary
- Connecticut Farms Elementary
- Franklin Elementary
- Hannah Caldwell Elementary
- Jefferson (Central Five)
- Kawameesh Middle School
- Livingston Elementary
- Washington Elementary

Map by GIS Technology Services, Inc. © 2011. All rights reserved. No warranty is made for use of this map.



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# Students vs Schools



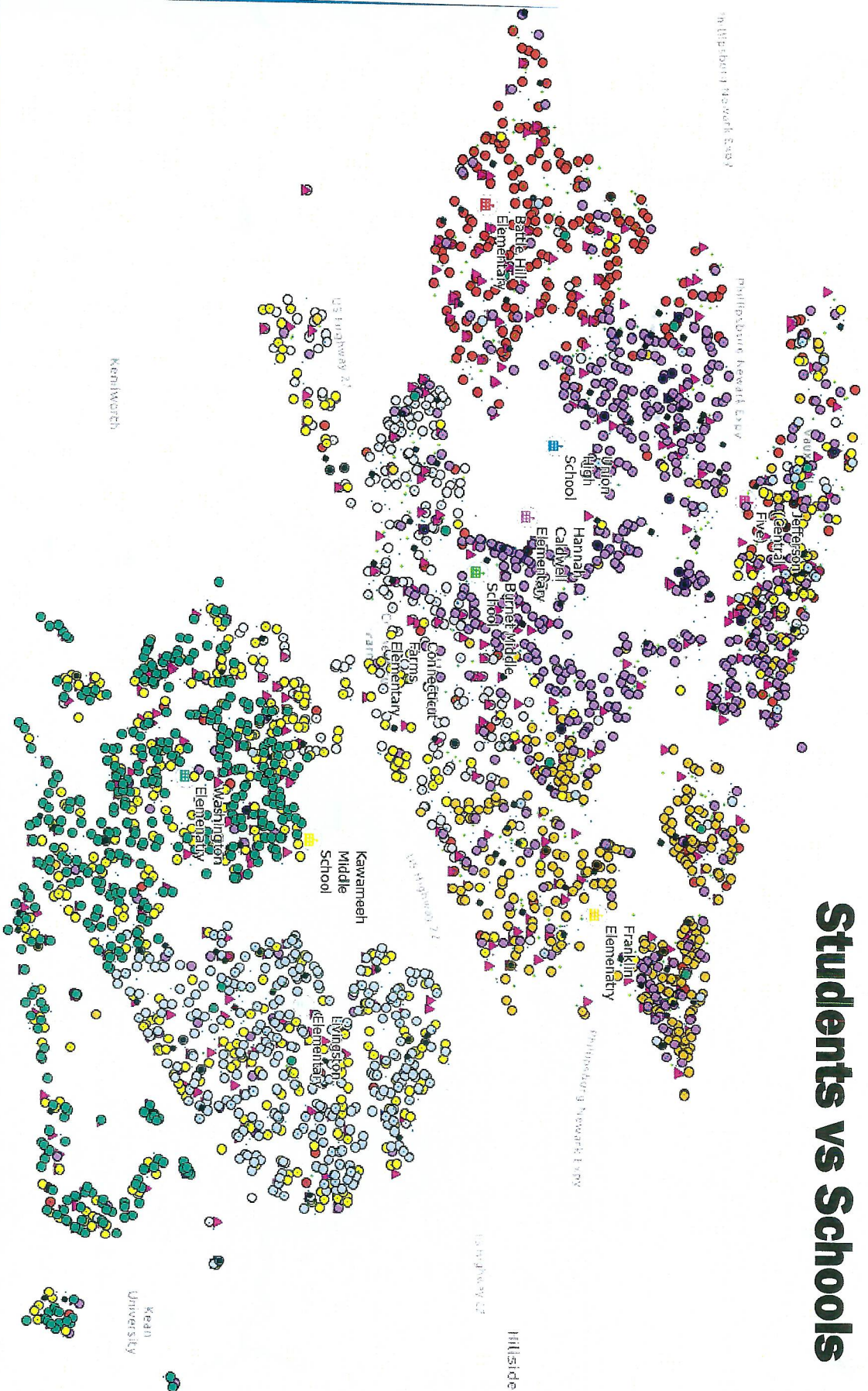
Source: Education Commission of the States, 2011. Data collected by the author using GIS software and census data.



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# Students vs Schools



## **Task 3 Initial Bus Route Creation and Analysis**

- Assemble existing information:
  - School info, vehicle information, student info, bus stops, new catchment areas, travel restrictions, sidewalks/crosswalks, known issues/problem areas, etc...
- Removal of walking students (2.0 miles K to 8, 2.5 miles for High School)
- Run routing solution for buses, iterative and very collaborative process
- Web-based map viewer for review and comments
- Analysis and routing solution performed until desired outcomes are met



## **Task 4 Bus Routing Optimization**

- Deeper dive to increase routing efficiency using Task 3 output as baseline
- Each route is individually reviewed with staff
- Adjustments and re-running of routing solution
- Finalization and acceptance of bus routes



## **Task 5 Bus Route Optimization Analysis Report**

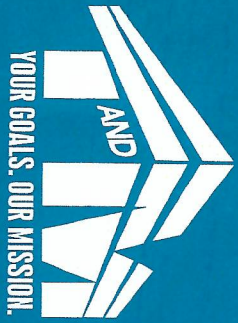
- Evaluation and comparison of old vs new routes
- Characteristic information about new routes and catchments
- Efficiencies and ROI gained from process
- Maps of catchment areas and new routes
- Report Delivered as a Word Document
- T&M will provide support analysis for Leadership as needed



## **Task 6 Data Delivery, Documentation and ArcGIS Online**

- Documentation for the project and each task
- Setup and configuration of ArcGIS Online
  - Online platform for hosting and sharing data and information, building web and mobile applications, dashboards and additional functionality
  - 2 applications to be configured using project data/information
- Delivery of project data in GIS format to be stored in ArcGIS Online
- Board of Education owns the platform





# Thank you. Questions?

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