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Walk to School Route Planner for Miami Dade County, Florida

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Safe Routes to Schools

Walk to School Route Planner for Miami Dade County, Florida

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Safe Routes to Schools

Outline

- Project Background
  - Stakeholders and Partners
  - Purpose
- Demo
- Methodology
  - Data Preparation
  - Routing Criteria and algorithm
  - Web solutions (Google Maps API and ArcGIS Server Mesh-up)
- Future work -- validation of safe routes
  - Go Mobile
  - Validation of the network – User feedback
  - Expansion

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Safe Routes to Schools

Project Background

- SRTS is a new federal reimbursement program with the following goals:
  - encourage children in grades K-8, including those with disabilities, to walk and cycle to school;
  - make walking and cycling to school safer and more appealing;
  - facilitate projects that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools.
- Find more information at www.srtsfl.org

Project Background – Stakeholders and Partners

Advisory members

Funding agency

Project team

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Project Background -- Objectives

- An Interactive web application
- Students and parents can enter the location of origin
- Default destination is the designated school within the school boundary of the chosen location
- Dynamically generates the safest route

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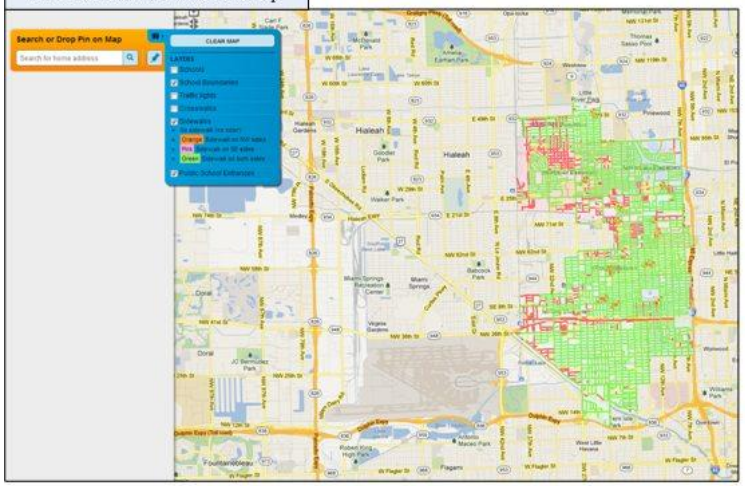
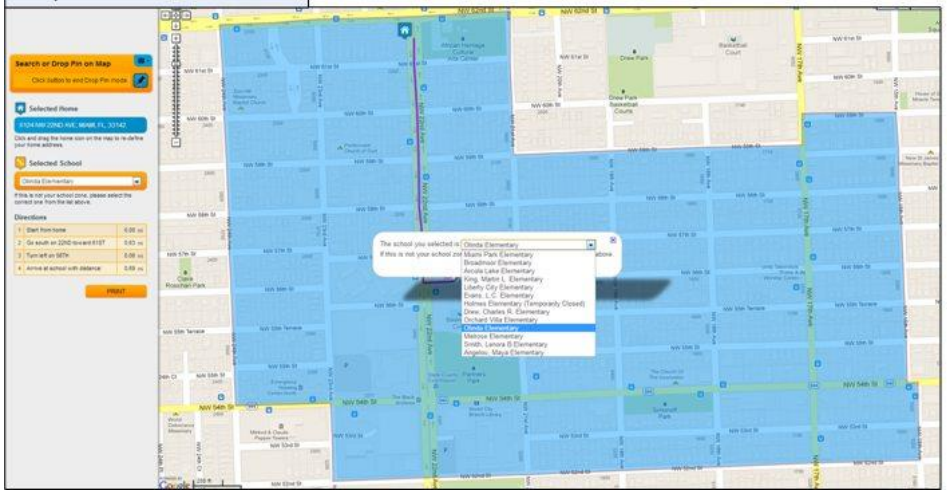
Live site: http://maps.fiu.edu/srts/

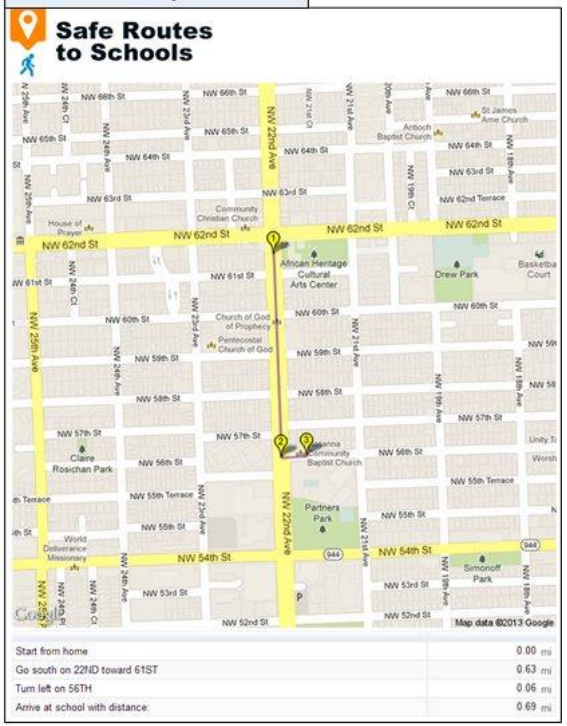
ArcGIS Server Data mash up



Dynamic Route Generation



Print Layout



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Methodology – Data Preparation

Data	Source
Street network data	NAVTEQ NAVSTREETS
School locations	Miami Dade School Board
School Boundaries	Miami Dade School Board
Speed Limit	Miami Dade County GIS
Side Walk	Digitized by FIU GIS Lab
Cross Walk	Digitized by FIU GIS Lab
Traffic Lights	Miami Dade County GIS

Methodology – Data Preparation and Processing

- Sidewalks, Crosswalks – Digitize the sidewalks and crosswalks based on Google Maps and Google Street View.
- School Entries – Digitize the school entries based on Google Street View.

Methodology – Data Preparation and Processing

- Remove freeway segments from network layer
- Generate “Cross Point”
- Convert sidewalks information into an attribute
- Extract school zone flashing signal
- Manually adjust the location
- Remove “fake” junctions
- School Entries – Digitize the school entries

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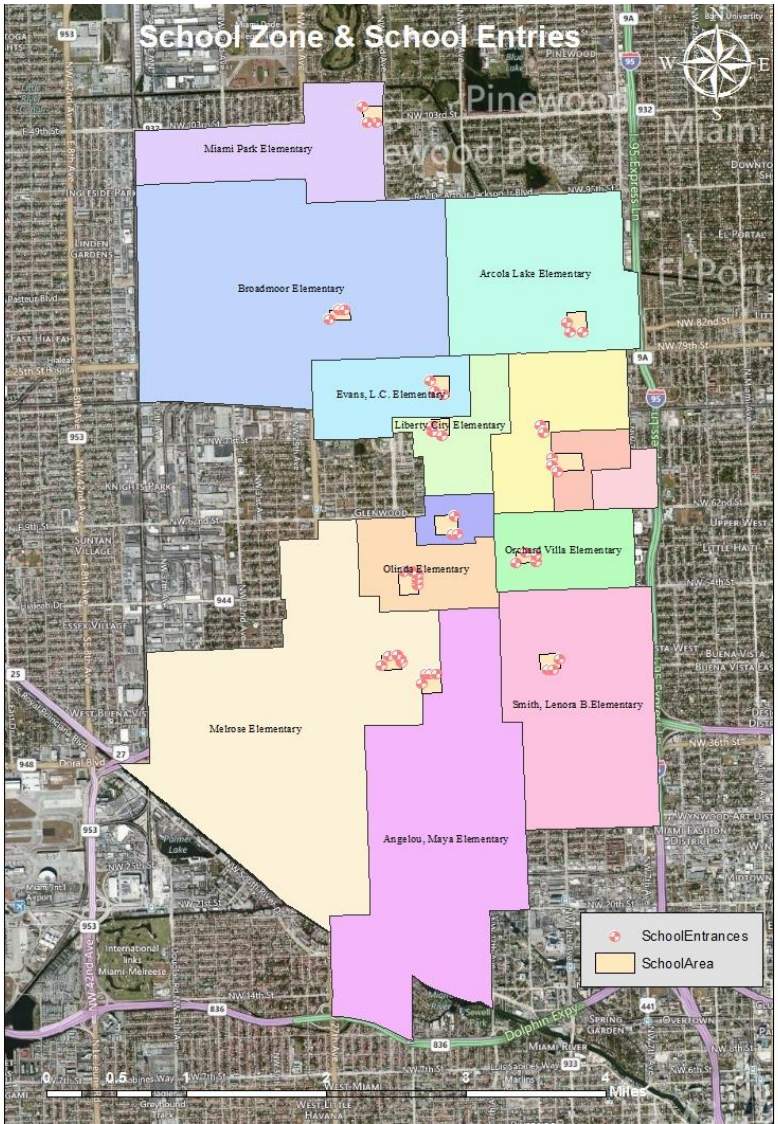
Methodology – Data Preparation and Processing



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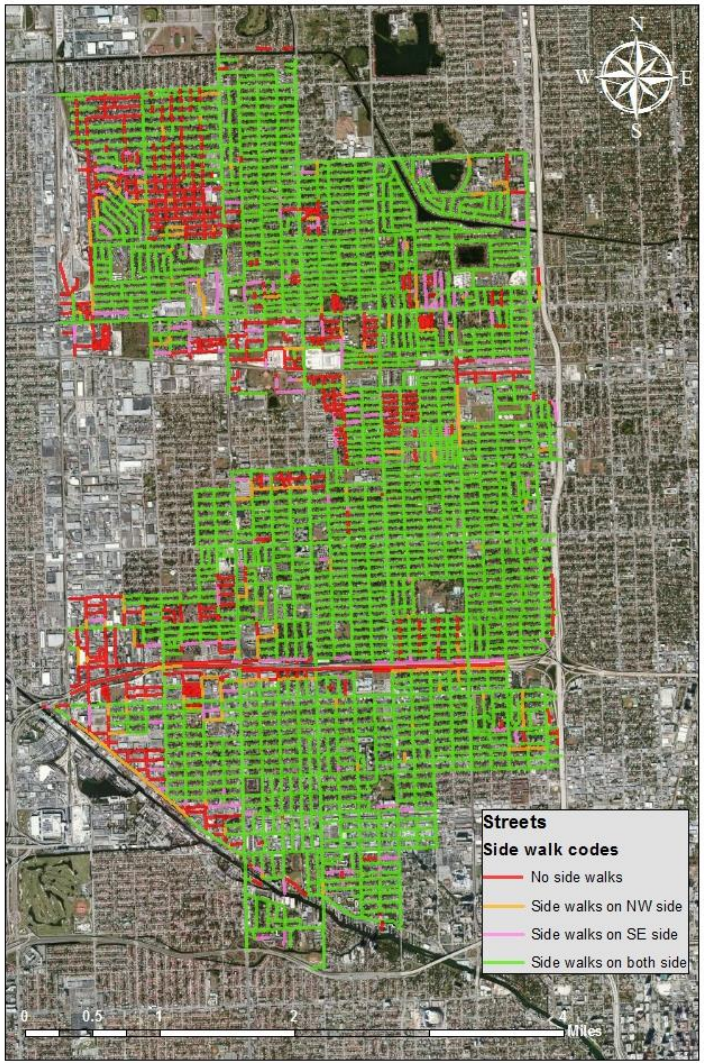
Methodology – Data Preparation and Processing

Side walks for the subject 13 school zones



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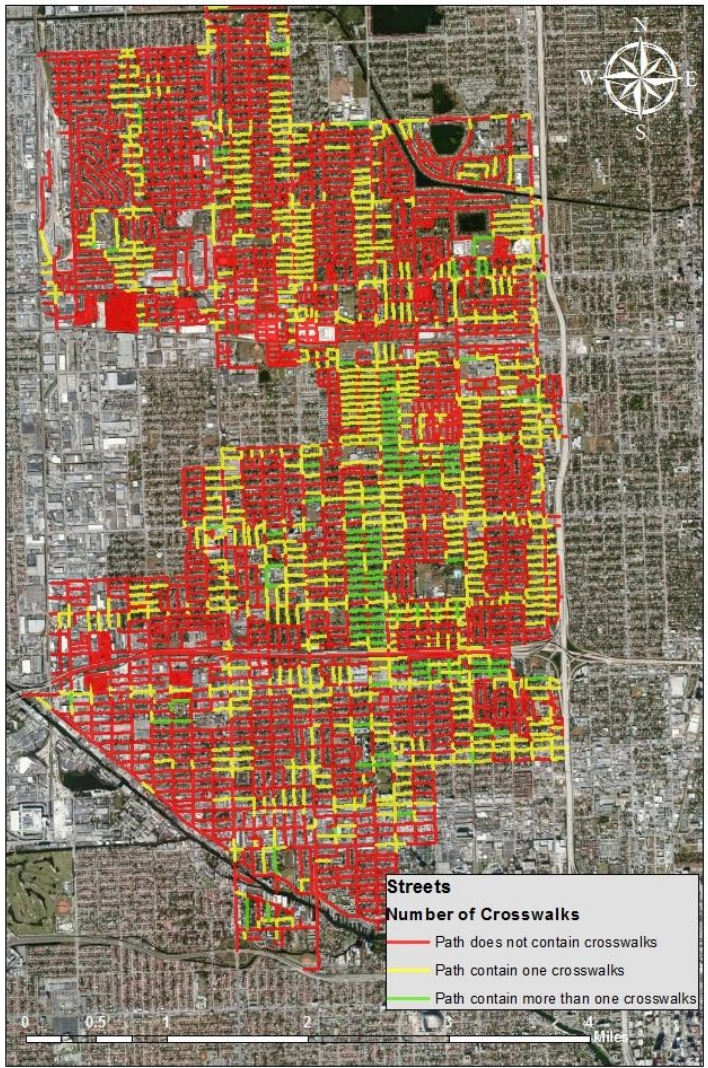
Methodology – Data Preparation and Processing

Crosswalks for the subject 13 school zones



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Methodology – Criteria and algorithm

Network contributors – Two ways to assign the impedance to a route network: Links and junctions

- **Impedance to the links** - Sidewalk, crosswalk, major street, inside the flashing school zone – the network will computed as cost distance in feet as follows (Pedestrian travel speed is estimated as 4ft/s as suggested by the Highway Capacity Manual)

$$\textit{Cost distance} = \frac{[\boldsymbol{Segment\ Length}]}{1600} * 5280 * 1.3^{2-[\boldsymbol{Sidewalks}]} * 1.5^{1-[\boldsymbol{OnMajor}]} * 1.4^{[\boldsymbol{MaxCross}]-[\boldsymbol{NumCross}]} * 1.6^{1-[\boldsymbol{InSchool}]}$$

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Methodology – Criteria and algorithm

Network contributors – Two ways to assign the impedance to a route network: Links and junctions

- **Junction without traffic signal**- each junction will add one minute as cost time
- **Junction with traffic signal** – each traffic signal point adds 0.5 minutes as cost time

Cost distance = cost time * 4 ft/s

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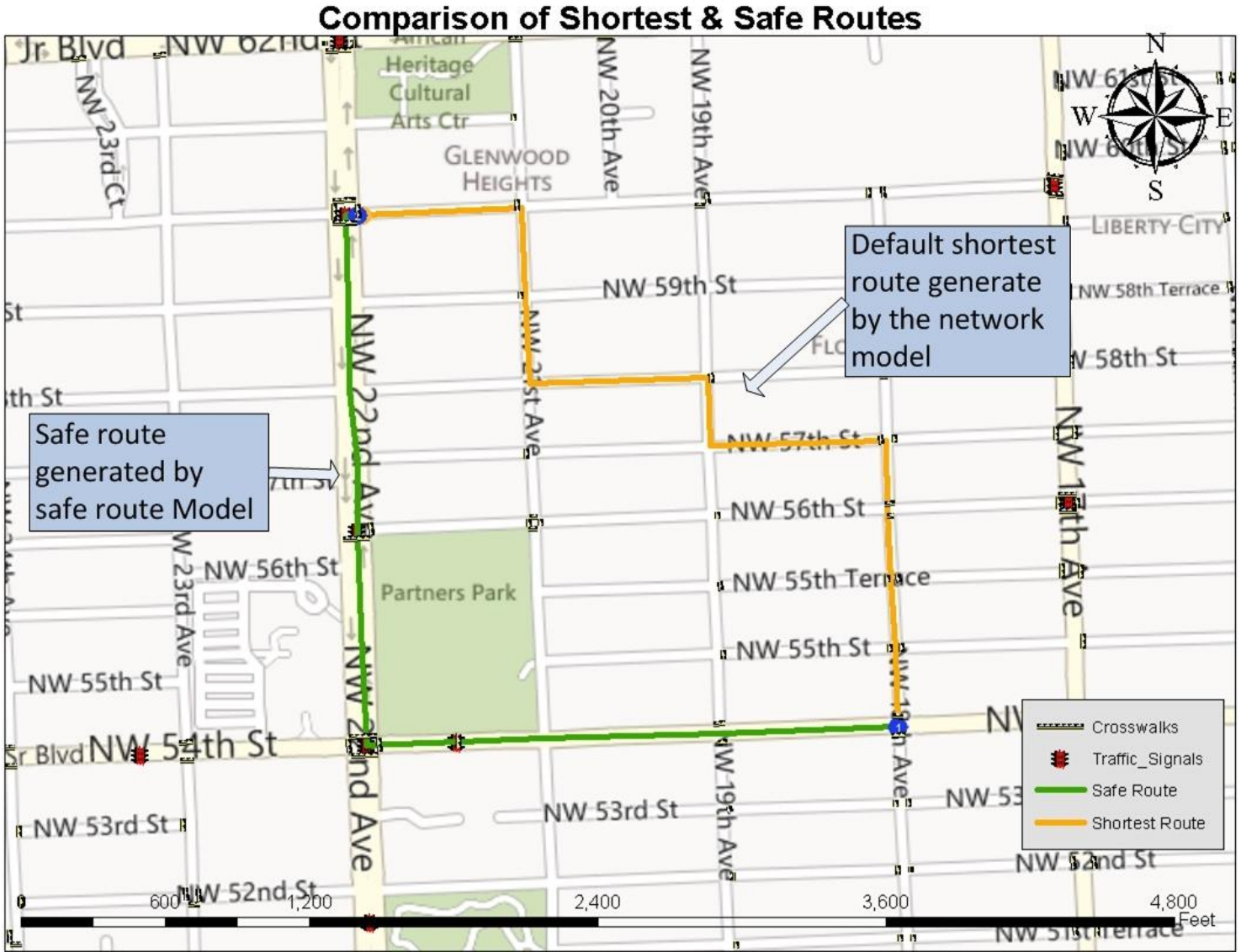
Methodology – Criteria and algorithm



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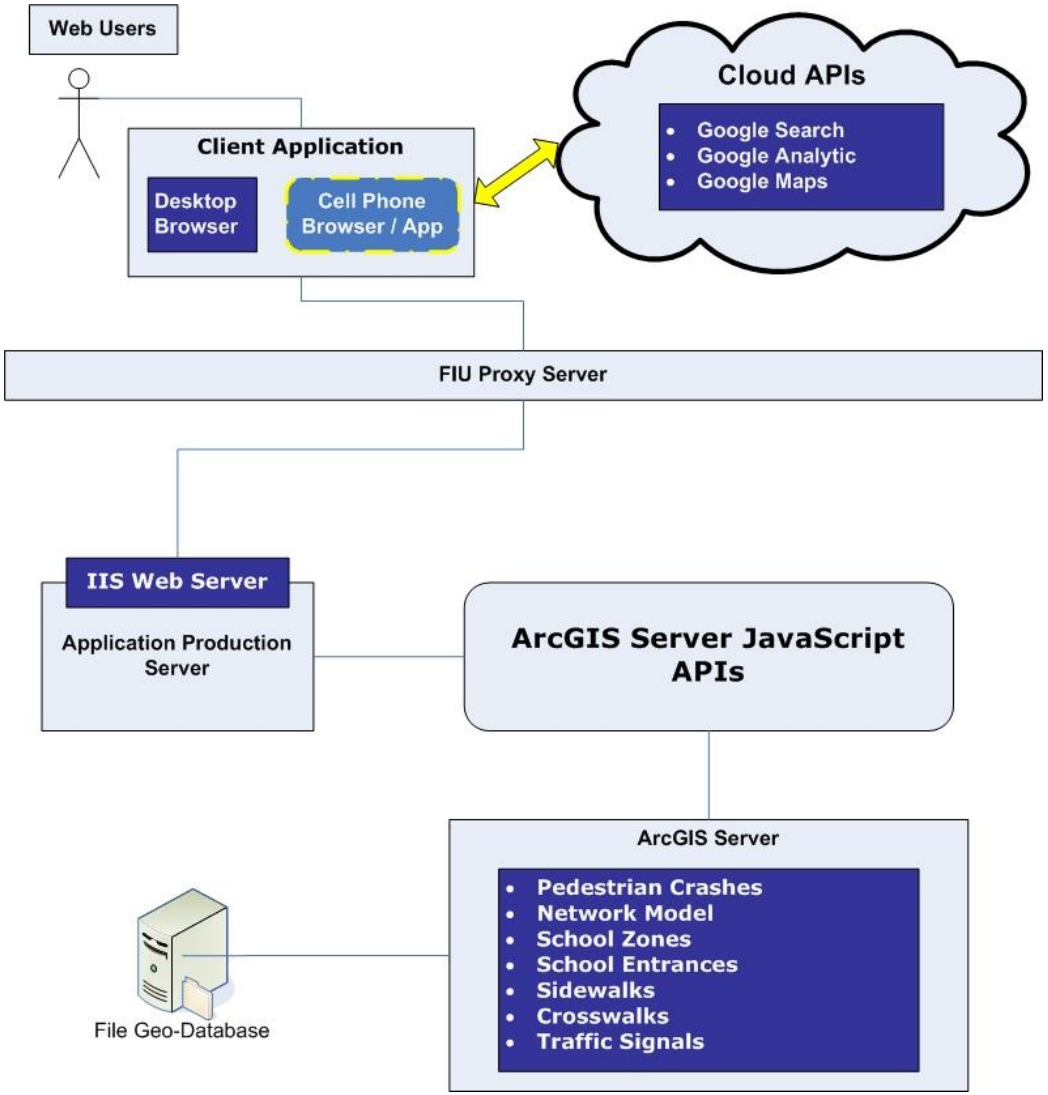
Methodology – Web Solution



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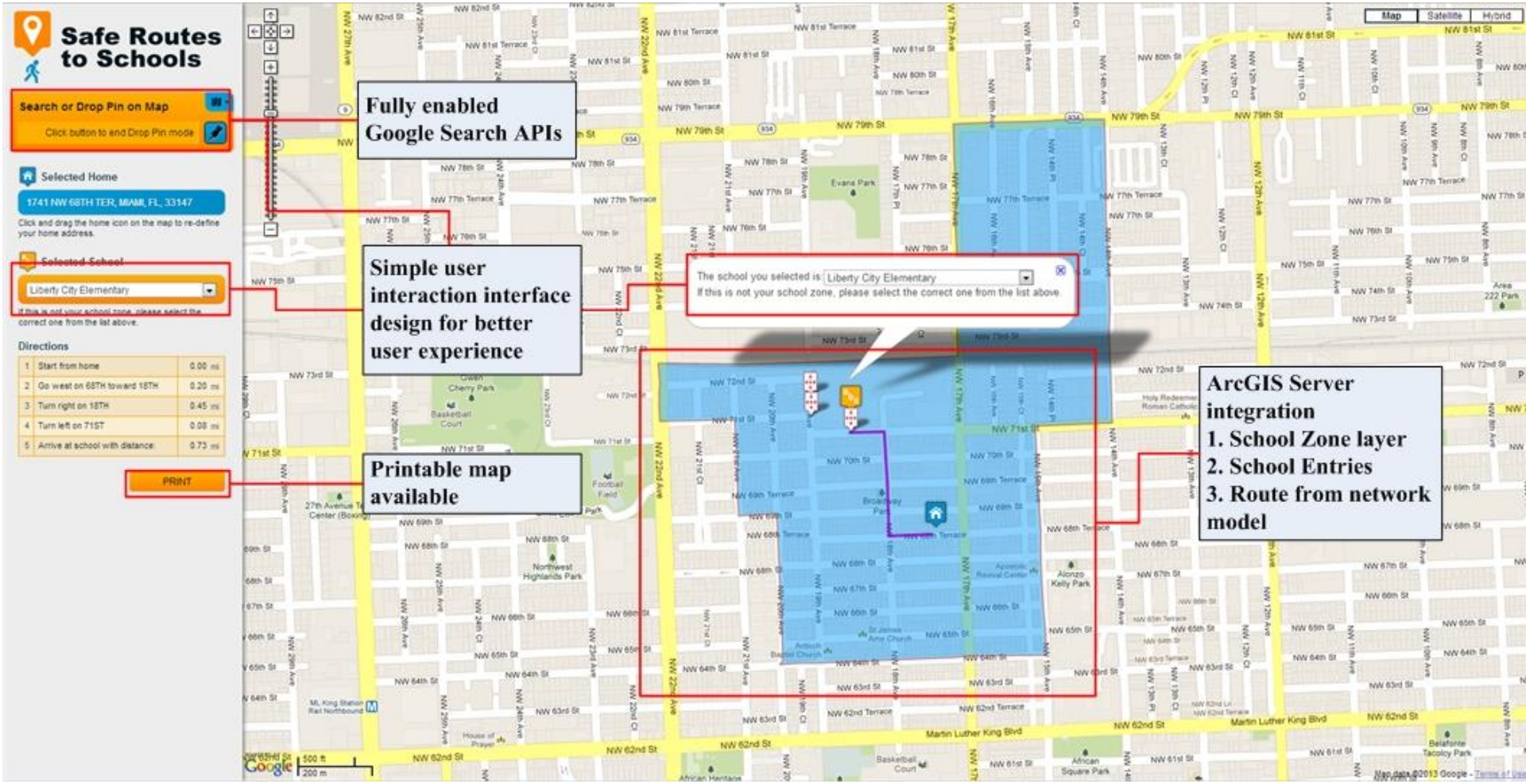
Methodology – Web Solution



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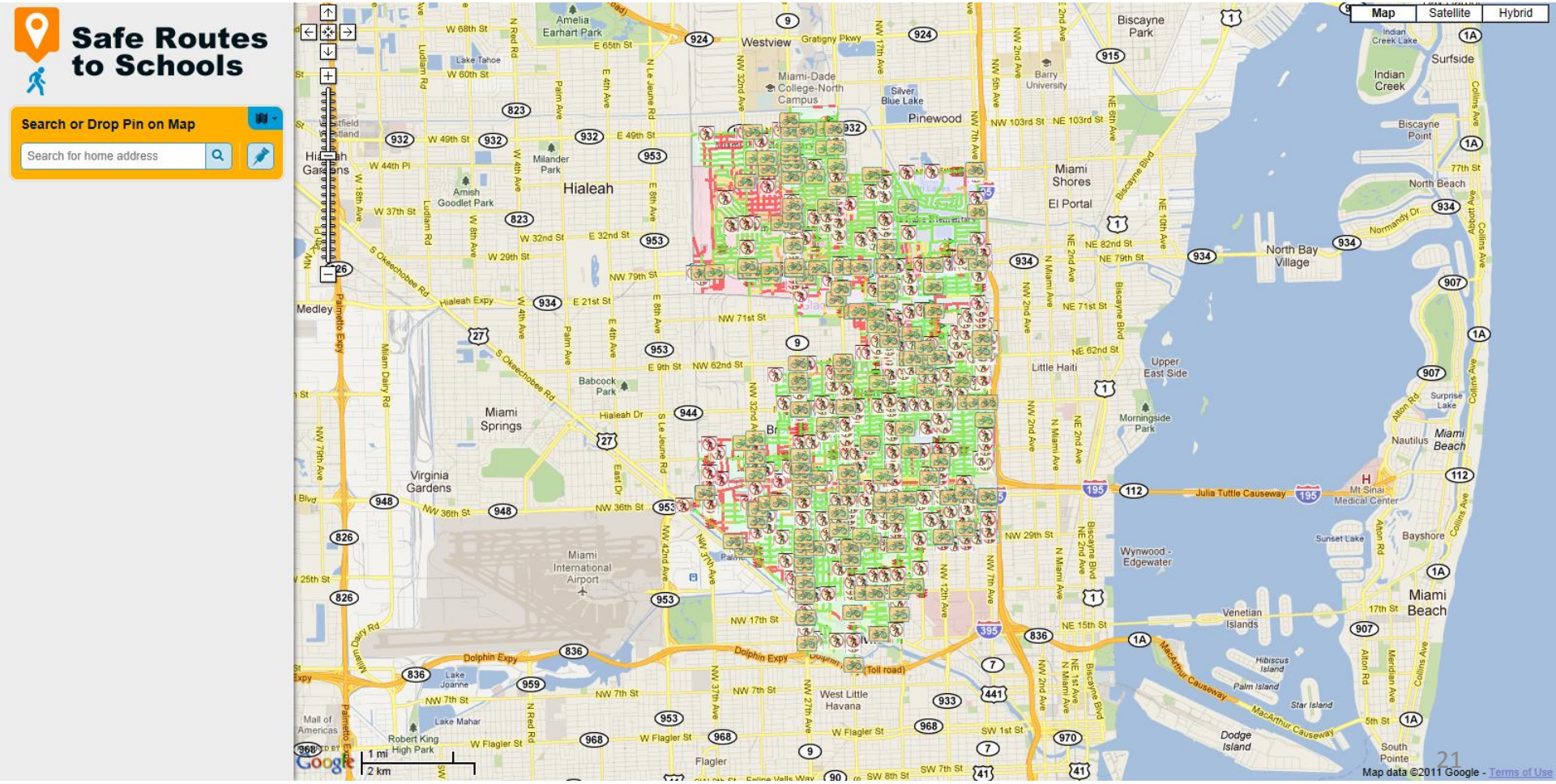
Methodology – ArcGIS Server Integration



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Future Work -- Go Mobile

- Adapt the user interface of route planner for Web browsers on mobile devices, including side panels, school selection menu, location search box, map window, and routing directions;
- Convert location selection through mouse-clicks to selection drop pins for the tactile user interface.
- Pinpoint the user's current location in the map window using the integrated positioning capabilities of the mobile device, such as GPS or WiFI;
- Provides step-by-step turn instructions along the route in real-time using the user's current location in the network.

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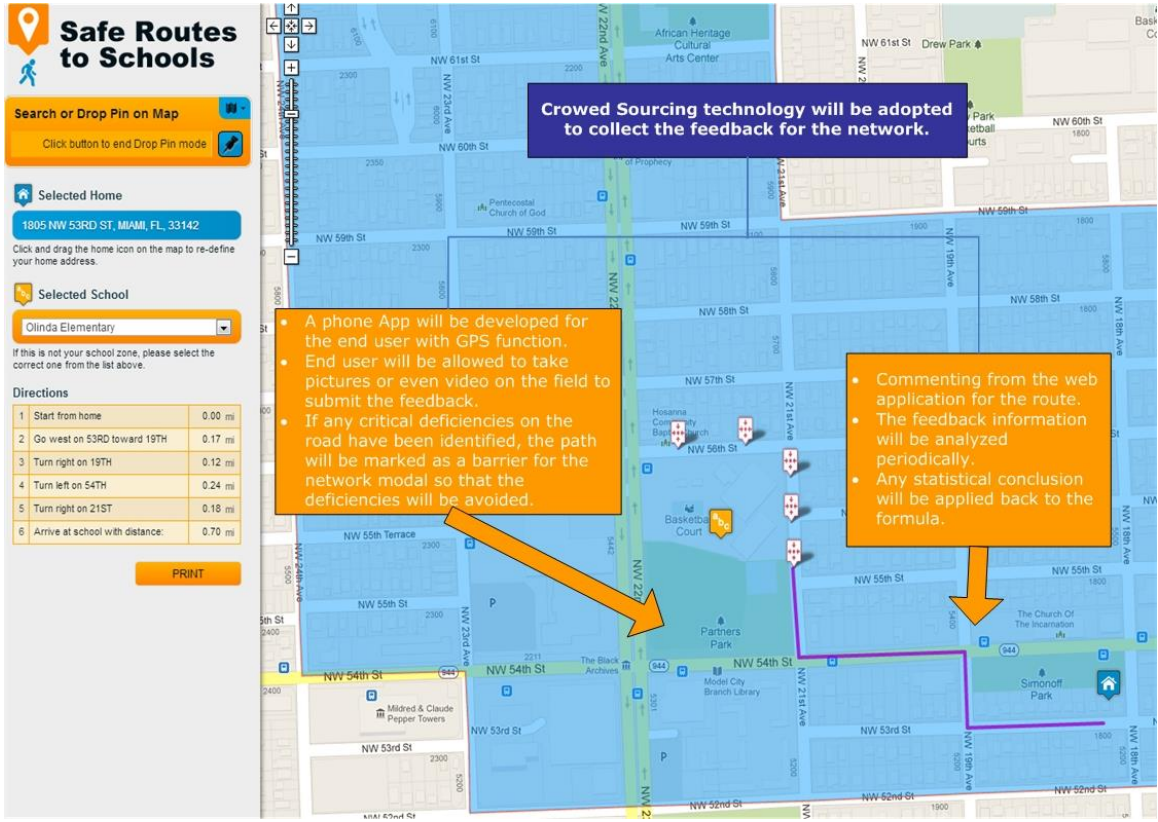
Future work -- User-feedback

- Leverage on the current parent and teacher network and outreach/education platform
- Conduct usability studies of the current Web based Walk to School Route Planner.
- Customized feedback functions for user interface and computed routes.
- Feedback function to report on observed conditions in the network, e.g. poor sidewalk condition



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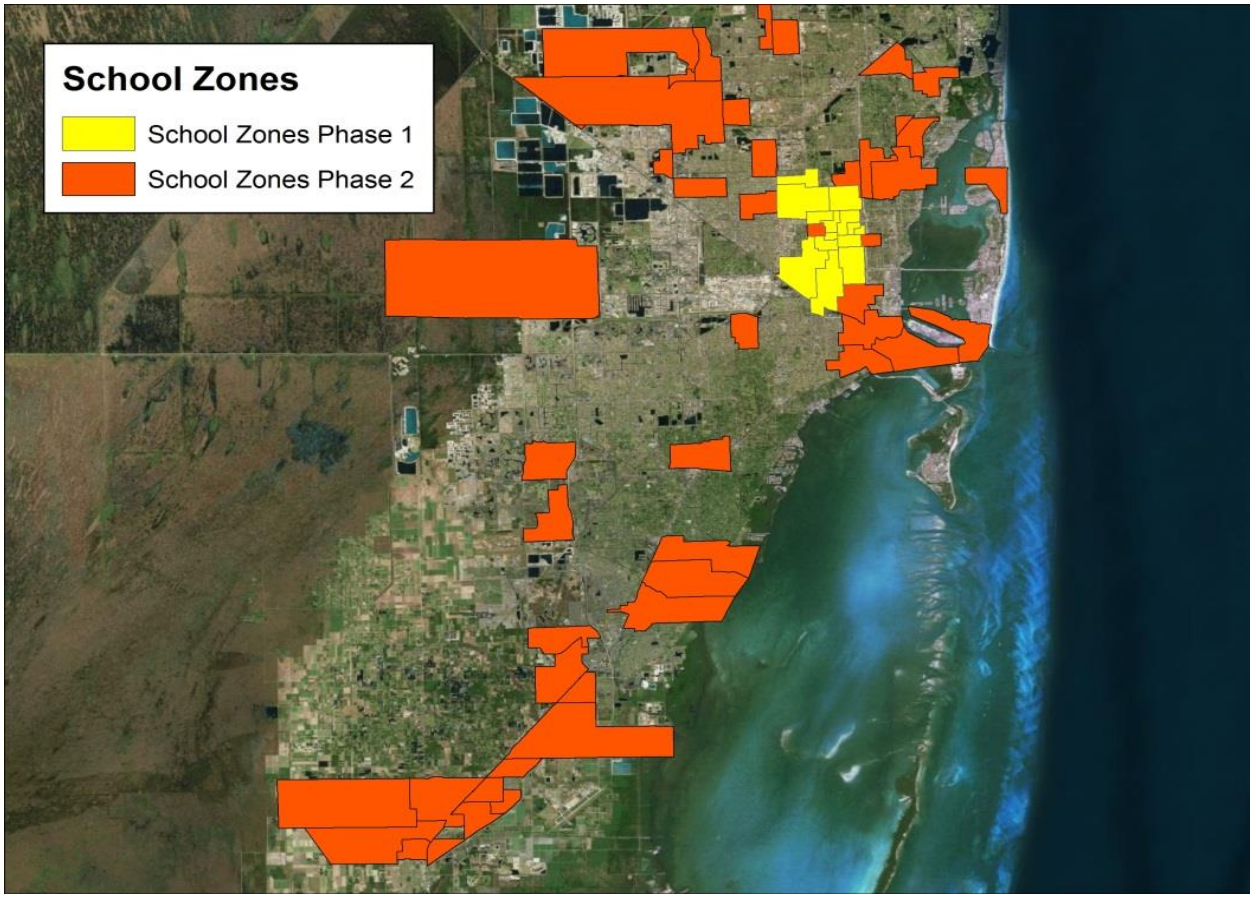
Future work -- Expansion

Expansion from 13 to 63 school zones



Thank you!
Any questions?