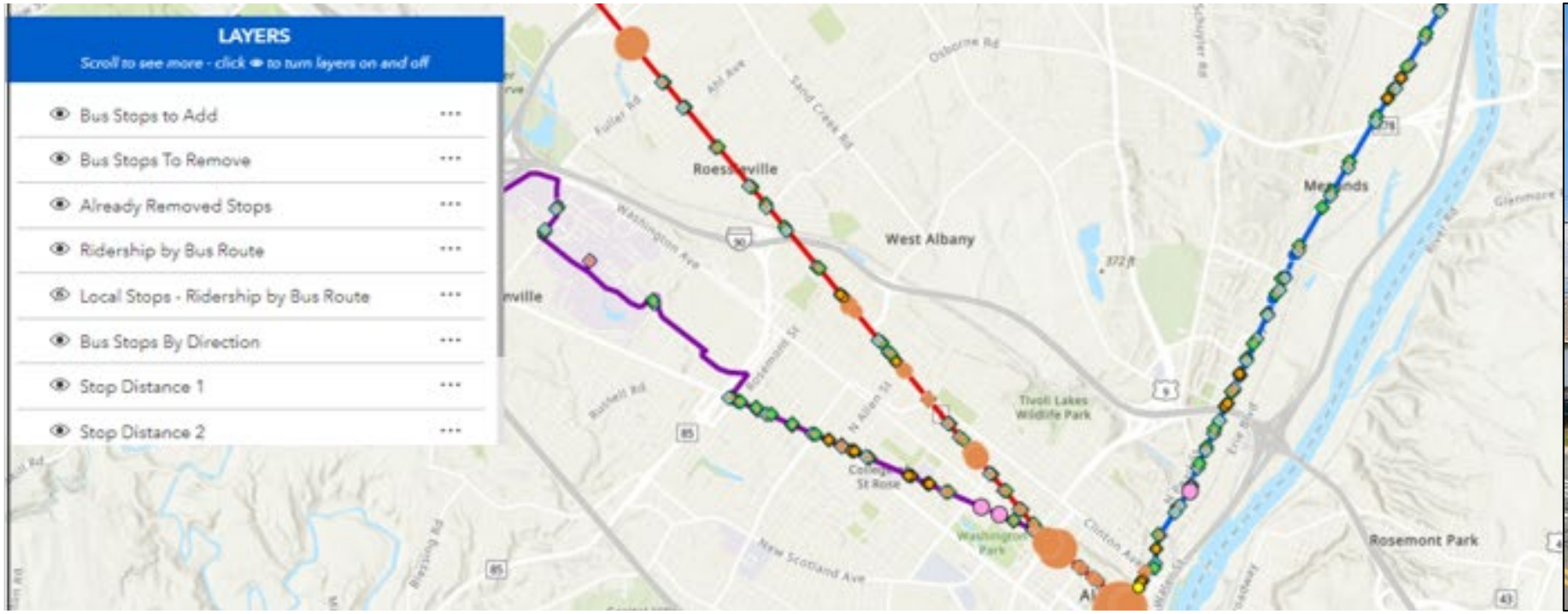
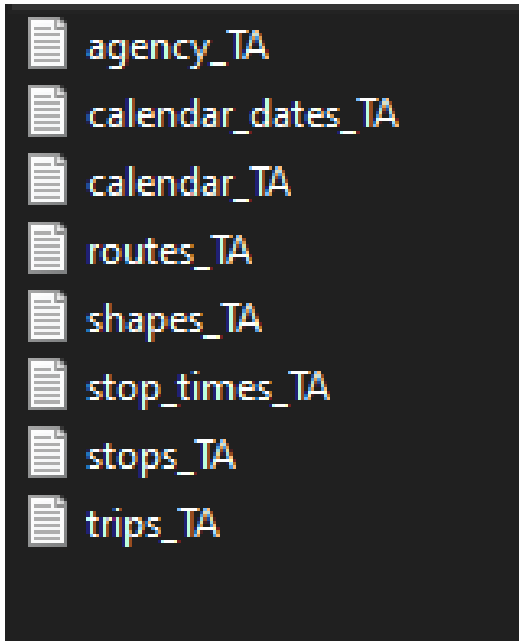


GTFS for Transit Planning

What is GTFS?

- Transit agencies can be producers of “Big Data”
- General Transit Feed Specification (GTFS)
- Universal language for documenting transit data
- Set of text files with specified sets of attributes



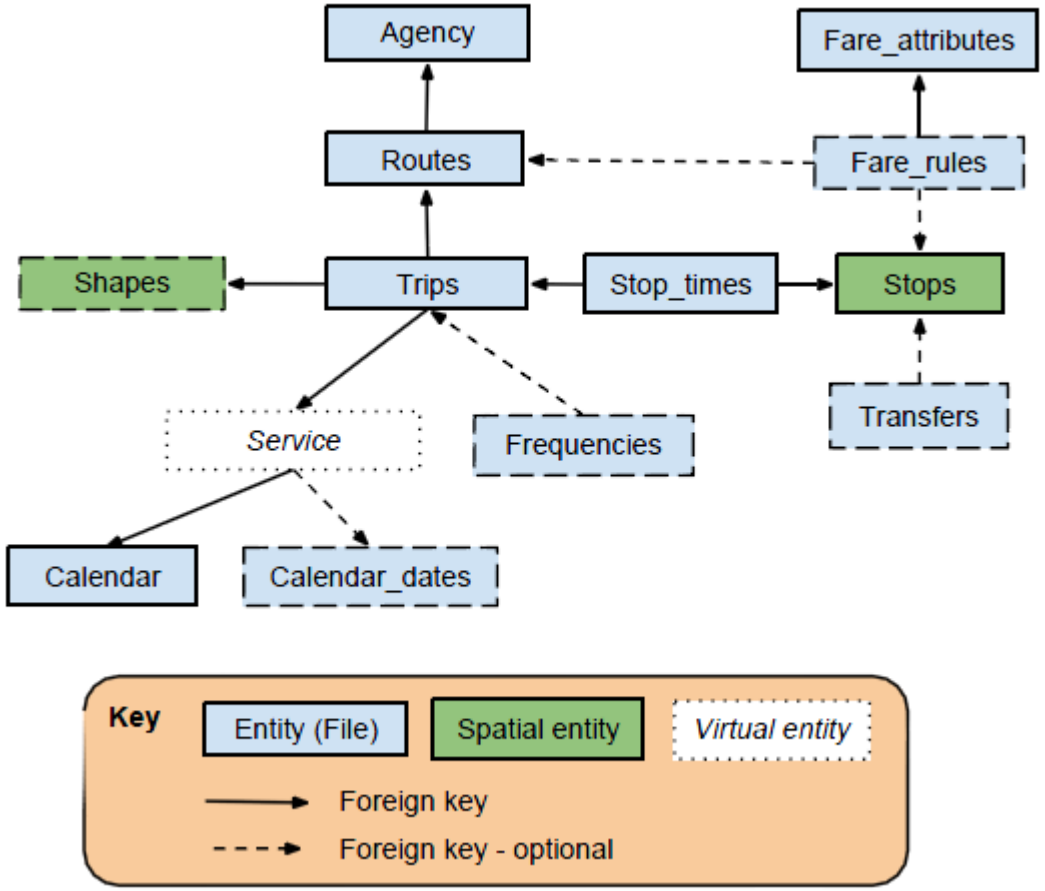
routes - Notepad

File Edit Format View Help

```
route_id,agency_id,route_short_name,route_long_name,route_desc,route_type,route_url,route_color,route_te
4069,72,KPL-NB,KPL: Poughkeepsie - Kingston ,,3,https://r.peaktransit.com/res/72/2021_Aug_KPL_P-K.png,80
3851,72,UPL-EB,UPL: New Paltz - Train Station - Grand Central,Ulster-Poughkeepsie Link,3,https://r.peakt
4066,72,KS-SB,KS: Saugerties - Mall - Kingston,,3,https://r.peaktransit.com/res/72/2021_Aug_KS_S-K.png,4
3845,72,EU-SB,EU: Kingston - SUNY Ulster - Ellenville,,3,https://r.peaktransit.com/res/72/2021_Aug_EU_K-
11937,72,Yellow,Yellow: DSS to Port Ewen,DSS to Port Ewen,3,https://r.peaktransit.com/res/72/2021_Aug_Ye
4070,72,R-NB,R: New Paltz - Kingston,,3,https://r.peaktransit.com/res/72/2021_Aug_R_N-K.png,7f7f7f,FFFFF
3847,72,KS-NB,KS: Kingston - Mall - Saugerties,,3,https://r.peaktransit.com/res/72/2021_Aug_KS_K-S.png,4
3854,72,Z-WB,Z: Kingston - Woodstock - Pine Hill,,3,https://r.peaktransit.com/res/72/2021_Aug_Z_K-P.png,
4073,72,Z-NB,Z: Pine Hill - Woodstock - Kingston ,,3,https://r.peaktransit.com/res/72/2021_Aug_Z_P-K.png
3849,72,NPL,New Paltz Loop,,3,https://r.peaktransit.com/res/72/2021_Aug_NPL.png,9bbb59,FFFFFF,6
4071,72,W-NB,W: Plattekill - Wallkill - New Paltz,,3,https://r.peaktransit.com/res/72/2021_Aug_W_W-N.png
3850,72,R-SB,R: Kingston - New Paltz,,3,https://r.peaktransit.com/res/72/2021_Aug_R_K-P.png,7f7f7f,FFFFF
```

What is in a GTFS Data Set?

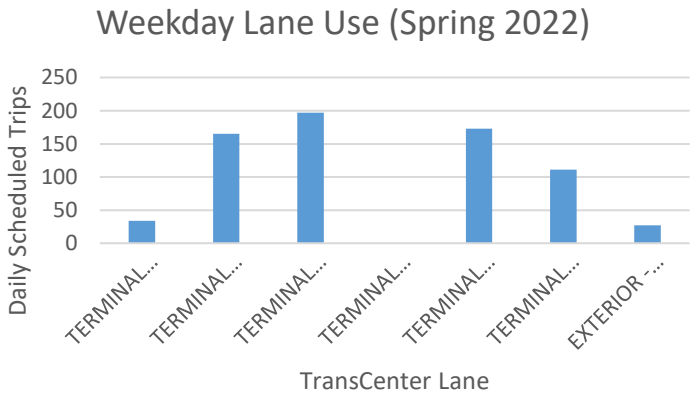
- Required
  - Agency/Feed Info
  - Stops/Stop Times
  - Routes
  - Trips
  - Calendar/Dates
- Optional
  - Fare Attributes/Rules
  - Shapes
  - Frequencies
  - Transfers
  - Others…

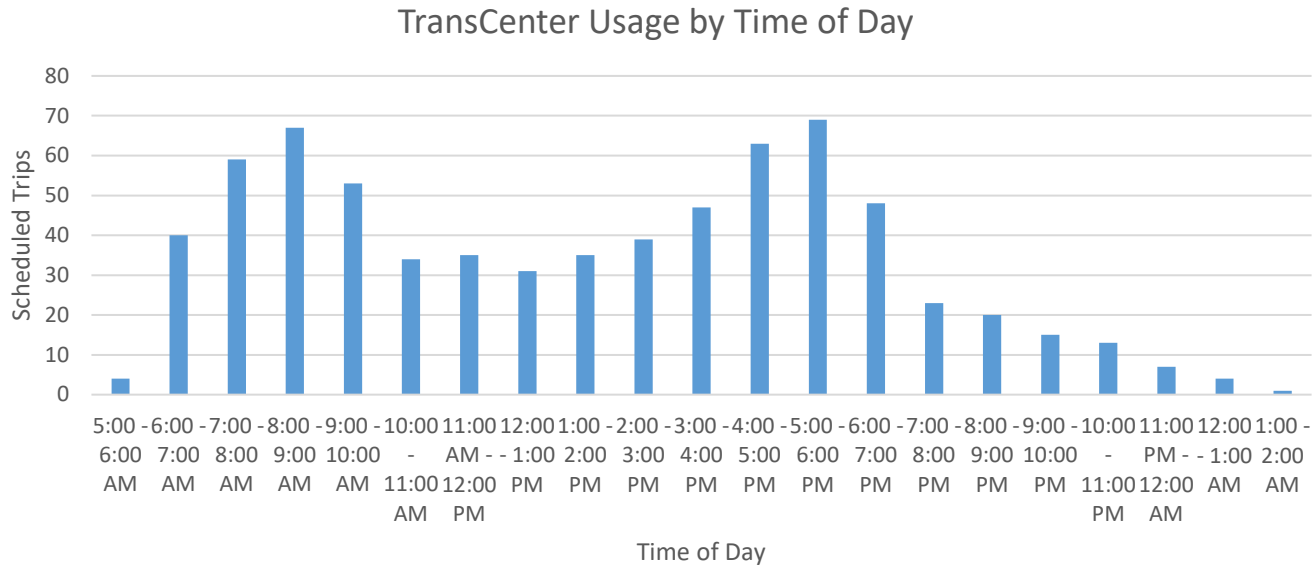


Working with GTFS Data

- Sources of GTFS data:
  - https://511ny.org/developers/resources
  - Agency generated
- Bring .txt file into Spreadsheet or GIS
- Join additional data sets
  - Ridership
  - Travel times
  - Land use
- Map/Analyze

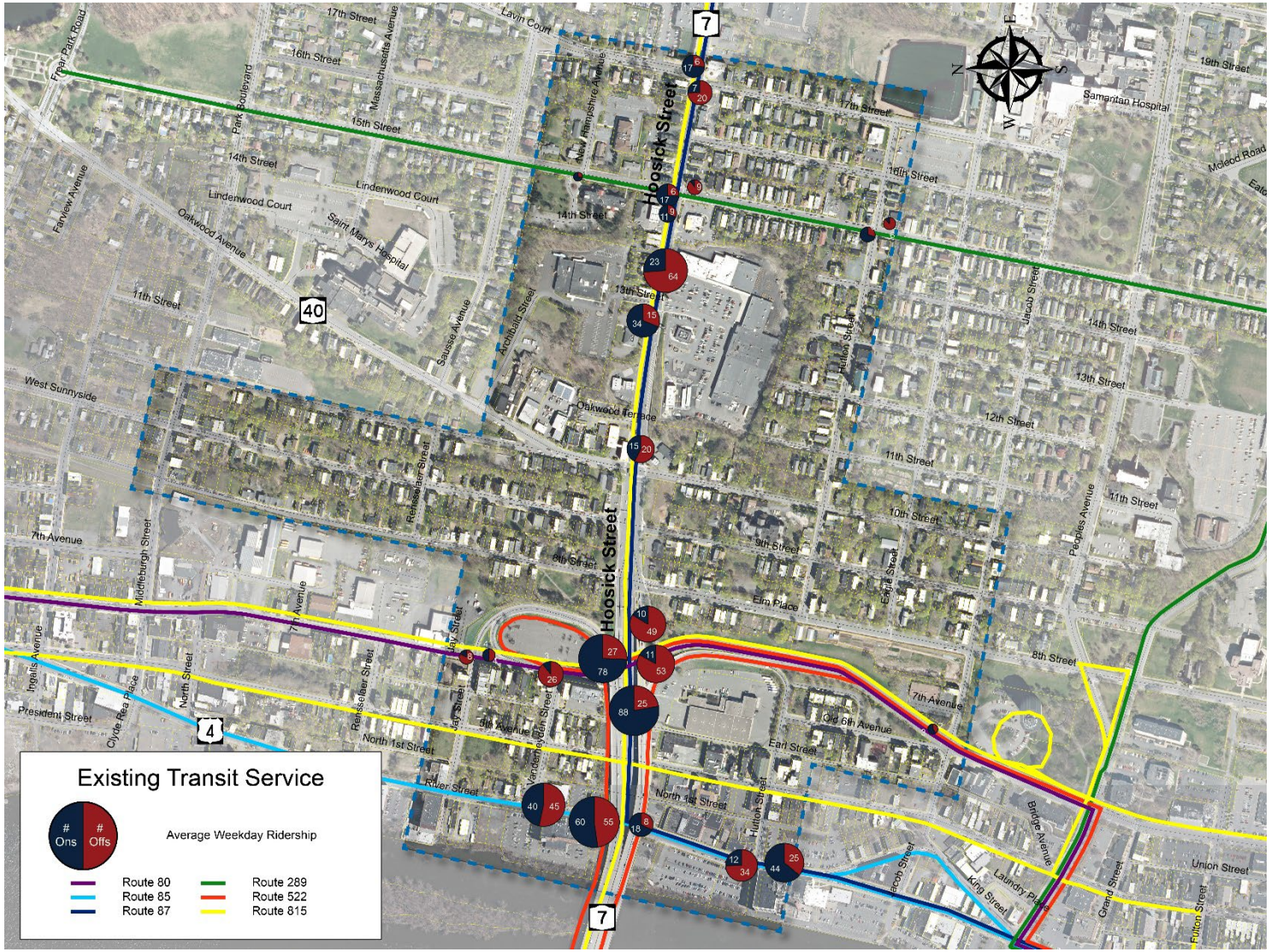
	A	B	C	D	E	F
1	trip_id	arrival_time	departure_ti	stop_id	stop name	stop_sequ
2	1081052	8:35:00 AM	8:35:00 AM	4995	WHITE PLA	26
3	1081053	9:35:00 AM	9:35:00 AM	4995	WHITE PLA	26
4	1081050	4:00:00 PM	4:00:00 PM	4995	WHITE PLA	26
5	1081051	12:40:00 PM	12:40:00 PM	4995	WHITE PLA	26
6	1081056	10:35:00 AM	10:35:00 AM	4995	WHITE PLA	26
7	1081054	4:55:00 PM	4:55:00 PM	4995	WHITE PLA	26
8	1081055	2:00:00 PM	2:00:00 PM	4995	WHITE PLA	26
9	1083109	8:30:00 AM	8:30:00 AM	4991	WHITE PLA	1
10	1083106	9:25:00 AM	9:25:00 AM	4991	WHITE PLA	1
11	1083107	10:25:00 AM	10:25:00 AM	4991	WHITE PLA	1
12	1083104	3:10:00 PM	3:10:00 PM	4991	WHITE PLA	1
13	1083105	11:00:00 AM	11:00:00 AM	4991	WHITE PLA	1





GTFS Applications

- Integration with developer API
  - Trip planners
- Integration with GIS
  - Route Alignments
  - Stop Locations
  - Ridership by Stop/Route
  - Segment Run Times
  - Frequent Service Corridors



Use of GTFS for Transit Reliability

Minutes Matter: A Bus Transit Service Reliability Guidebook

To view the report, visit:

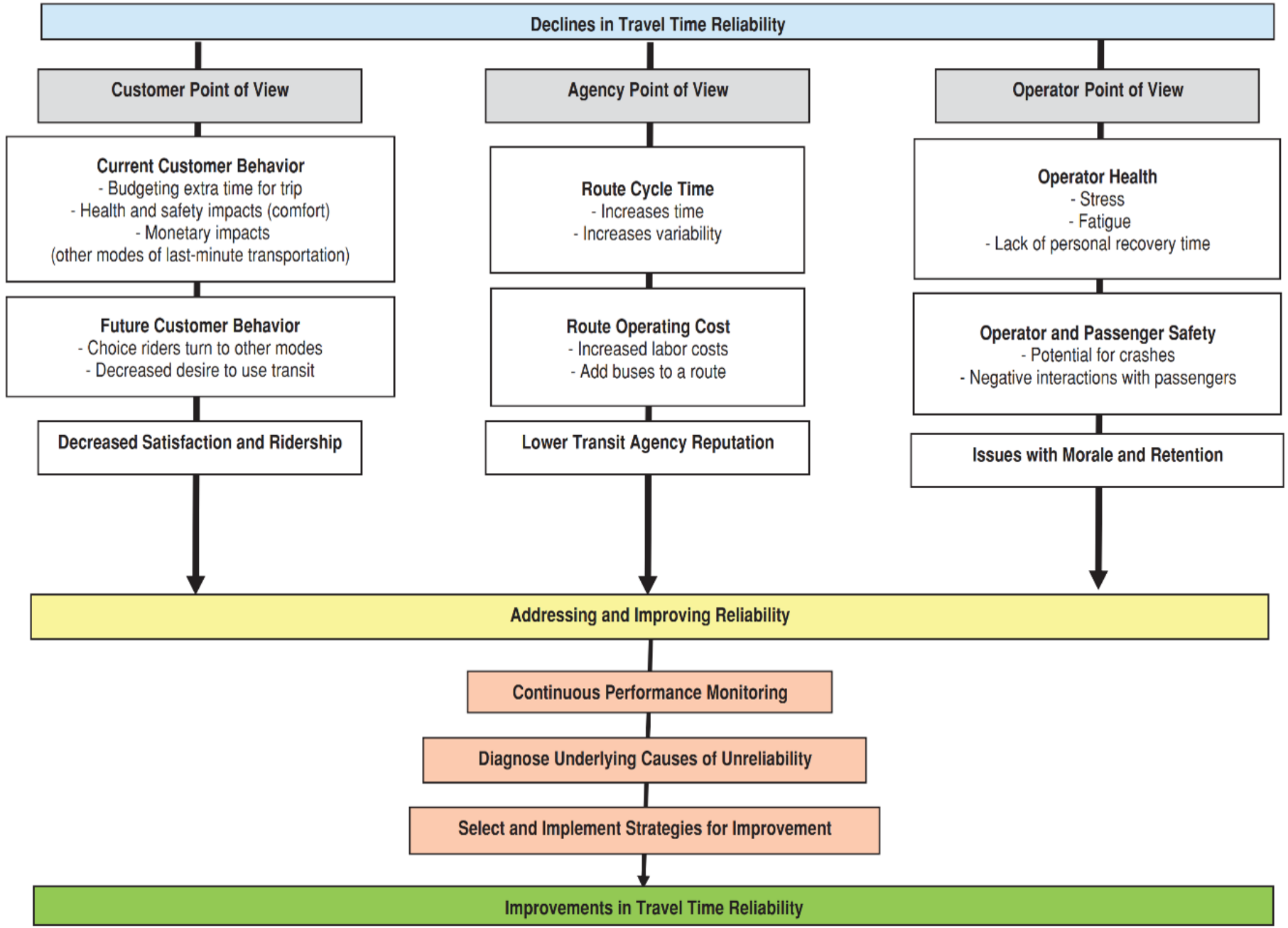
https://www.nap.edu/read/25727/chapter/1

To download, visit:

http://www.nap.edu/download/25727

Why is Reliability Important: Travel Time Budget

- If a trip normally takes 20 minutes, but takes 30 minutes once a week — a very typical situation for bus riders — then the customer must budget 30 minutes
- By reducing trip length variability, an agency can save customers time, without speeding up buses!


Declines in Travel Time Reliability
Customer Point of View
Agency Point of View
Operator Point of View
Current Customer Behavior
- Budgeting extra time for trip
- Health and safety impacts (comfort)
- Monetary impacts
(other modes of last-minute transportation)
Route Cycle Time
- Increases time
- Increases variability
Operator Health
- Stress
- Fatigue
- Lack of personal recovery time
Future Customer Behavior
- Choice riders turn to other modes
- Decreased desire to use transit
Route Operating Cost
- Increased labor costs
- Add buses to a route
Operator and Passenger Safety
- Potential for crashes
- Negative interactions with passengers
Decreased Satisfaction and Ridership
Lower Transit Agency Reputation
Issues with Morale and Retention
Addressing and Improving Reliability
Continuous Performance Monitoring
Diagnose Underlying Causes of Unreliability
Select and Implement Strategies for Improvement
Improvements in Travel Time Reliability

Guidebook: Selecting Measurements, Standards, and Monitoring Data

- Comprehensive list of measures
- The metrics selected must inform standards or targets to measure goals being accomplished

Aspect of Reliability	Data Needed	Reliability Measure
Punctuality	Arrival and departure times	On-time performance/schedule adherence
Variability	Trip start and end times	Running time
	Dwell time at stops	Dwell time
	Customer travel times	Travel time
		Buffer time indices
	Time between buses	Headways
	Customer wait times	Wait times
Non-operation	Records of missed service	Pullouts missed
		Missed hours of service
		Scheduled trips cancelled
	Counts of service disruptions	Number of crashes
		Mean distance between failures
Multiple	Customer surveys	Passenger ratings of reliability

Guidebook: Reliability Treatment Menus
Physical

- Encourage roadway agencies to incorporate bus-supportive features
- Far-side stop placement
- Dedicated transitways
- Queue jump lanes
- Level boarding and low-floor buses
- Right-sized terminals and layovers
- Curb extensions at bus stops
- Articulated buses

BRT Stop Consolidation Case Study

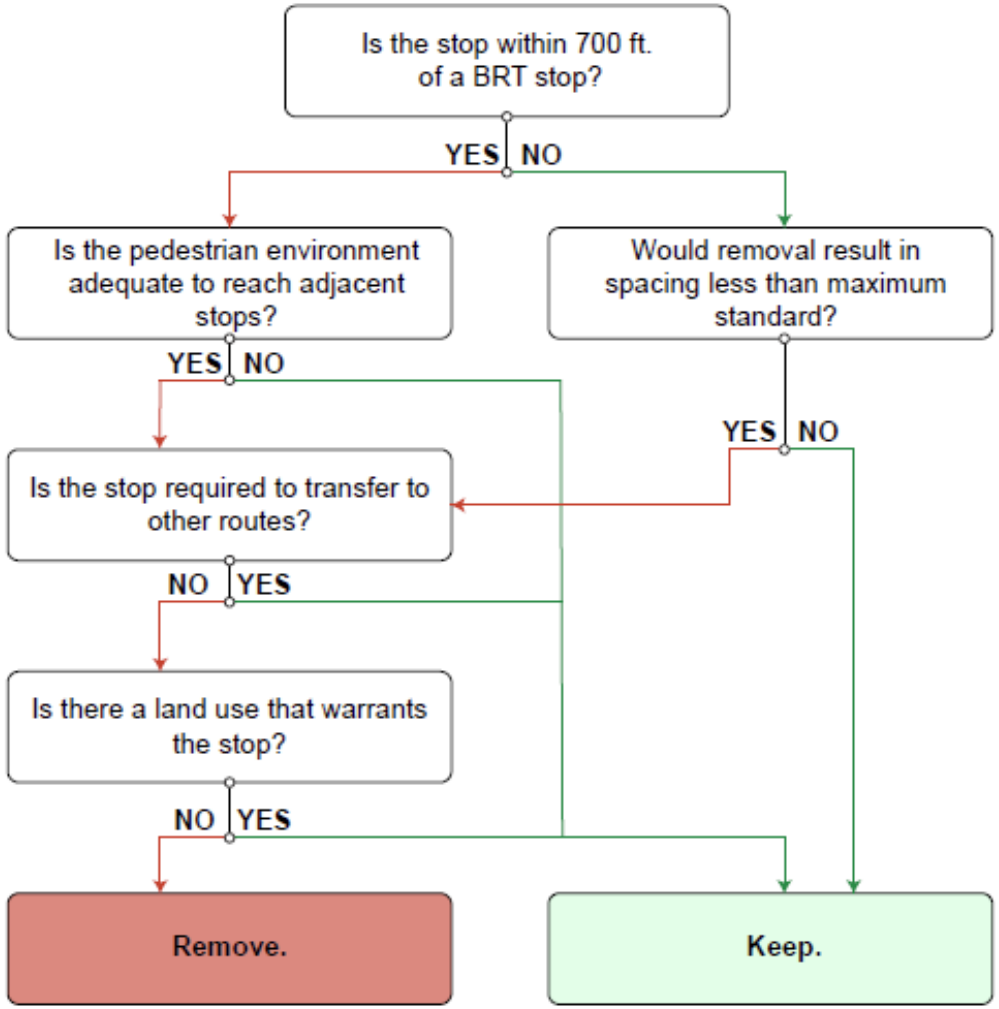
Study Goals:

- Identify factors that suppress BRT ridership
- Assess stop locations in BRT corridors
- Improve efficiency in BRT corridors
- Encourage use of new BRT service

Bus Stop Spacing Standards

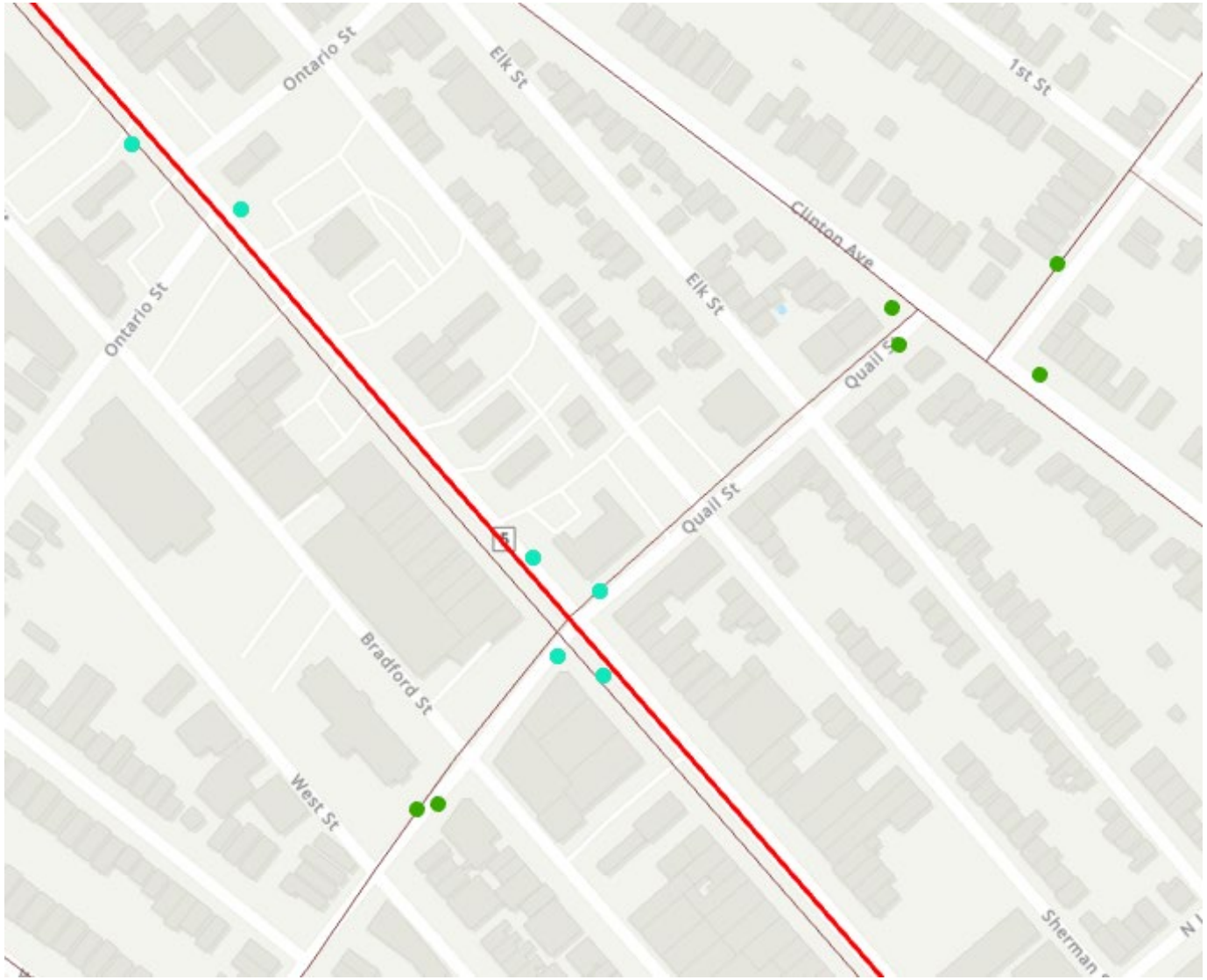
Stop removal standards based on:

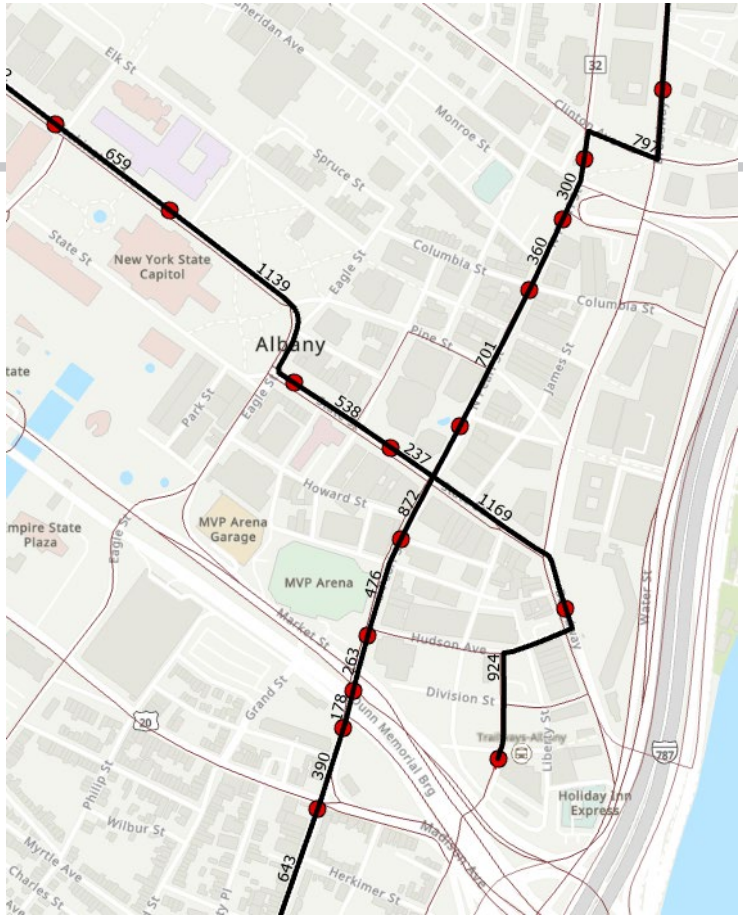
- Transit development plan/existing stop spacing standards
- Sidewalk network/ability to walk to/from nearest stop
- Transit network/ability to transfer
- Transit dependent land uses
- Ridership?

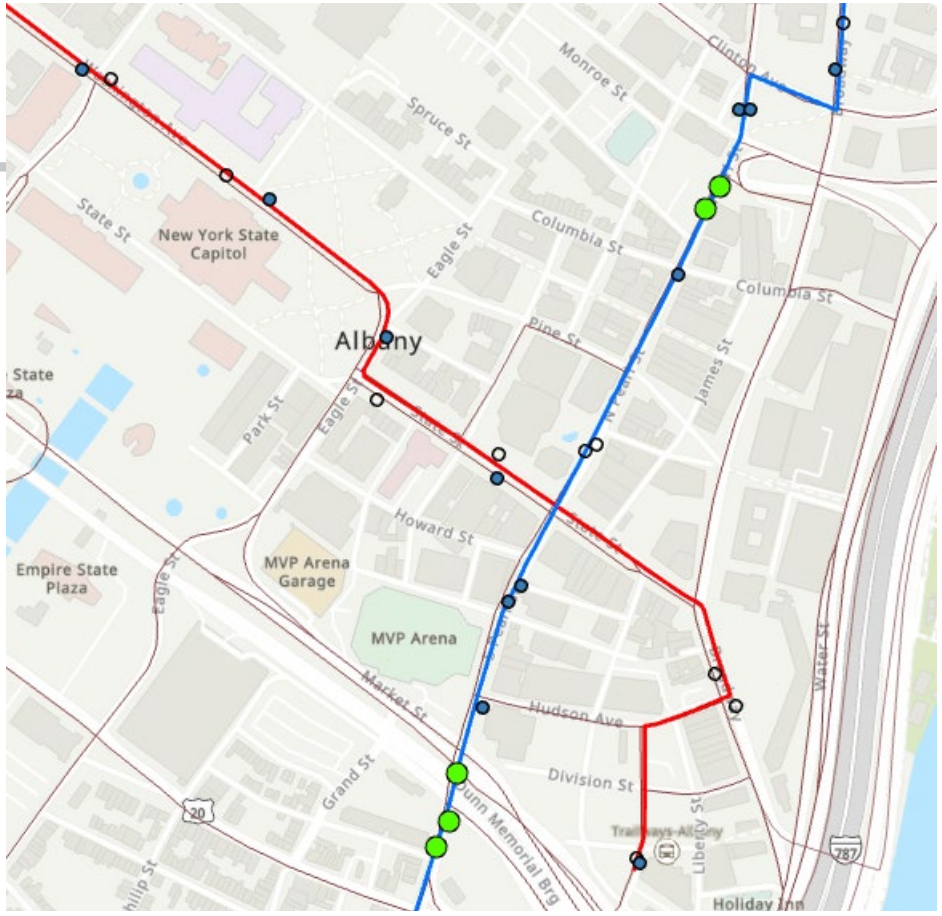


Existing Conditions – Desktop Evaluation

- GTFS data for all stops
- Filter to stops along BRT corridors
  - By Route? – Join Route Data
  - By Location?
- Identify travel direction
  - GTFS Data?
  - Ridership Data?
- Calculate distance
  - Move stops to line first!







Identify Route Direction

Calculate Stop Spacing

Identify Stops Below Standards

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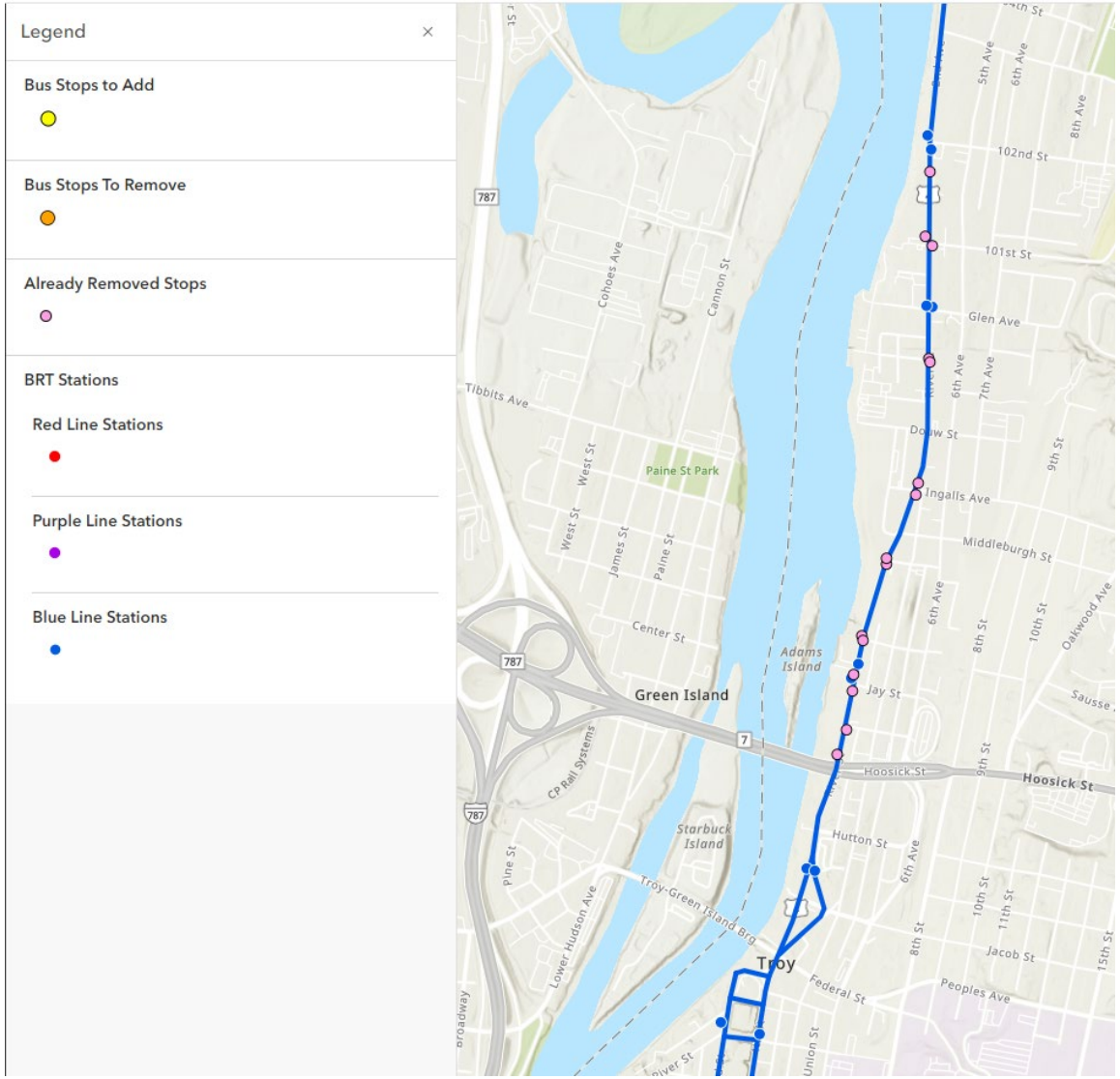
Existing Conditions - Field Visit

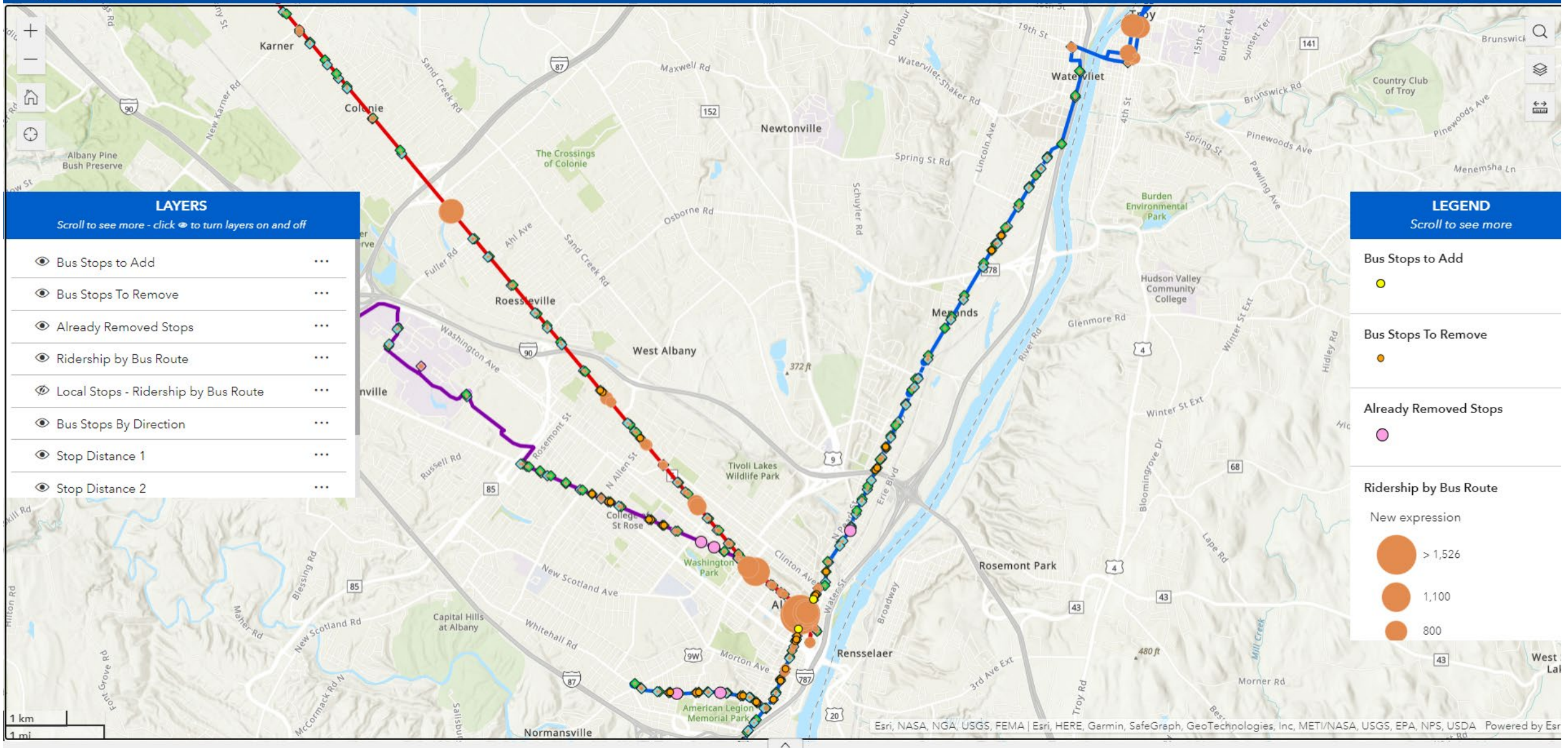
- Confirm stop locations and route info
- Assess pedestrian network
- Identify transit dependent land uses

Findings

- 355 Stops located along BRT corridors
- 60 Stops recommended for removal
  - Some were already inactive due to local service restructure
- Two new stops proposed in Downtown Albany



Bus Stop Consolidation Data Viewer



Thank You

Contact Info

Creighton Manning Engineering, LLP

Presenter: Jesse Vogl, AICP

jvogl@cmellp.com

www.cmellp.com

Tel. 518.689.1867