Service Equity Analysis Ridership vs. Population Data

Rev. 11/07/12

Overview

- Describe FTA's role in reviewing the methodology
- Data used and why
- Step-by-step illustrations on a service equity analysis.
- Examples are for ILLUSTRATIVE PURPOSES ONLY
- Examples will use population data or ridership data

Analysis Submission & Assistance

- Service Equity analyses are part of your Title VI program if you are a transit provider with 50 or more fixed route vehicles in peak service located in a UZA of 200,000 + pop.

- FTA regions can provide technical assistance on the methodology prior to Board Action

- After Board Approval, FTA will not provide technical assistance

- FTA can provide technical assistance on the methodology to examine whether the analysis is <u>properly documented</u>

What Should be Included in Service Equity Analysis

Requirements and Guidelines

Chapter IV Requirements for Fixed Route Providers

- "Major Service Change" policy defined
- Describe how the proposed service change meets your definition of a major service change as defined in your Title VI Program.
- Analysis Framework:
  - Data Set(s) Described
  - Comparison analysis
    - Comparison of impacts using population data around impacted routes to population of service area; **or**
    - Comparison of impacts using ridership data of impacted routes to ridership of service area

Chapter IV Requirements for Fixed Route Providers Cont.

- Analysis should include:
  - Step-by step analytical methodology
  - Overlay Maps if using population data
  - Accompanied by the tables describing impacts
  - Narrative of method of analysis
  - Applies "adverse effects" definition consistently

Chapter IV Requirements for Fixed Route Providers Cont.

- Analysis should include:
  - Applies "disparate impact/disproportionate burden policy" consistently
  - Provides a conclusion (e.g., whether there is disparate impact or not)
  - If there is a disparate impact, **the legal test must be properly documented**
  - If there is a disproportionate burden, **take steps to avoid, minimize or mitigate impacts where practicable**

Data

Requirements and Guidelines

Pre-Analysis Considerations

- What datasets will you use?

  - Population or

  - Ridership

- **Population** compares the population in Census blocks or block groups served by the affected route(s) with the population of the service area

- **Ridership** compares the ridership of the affected route(s) with the ridership of the system

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Clear Analytical Approach

- Dataset(s) in the analysis must be clear **(using either population <u>or</u> ridership data),** and include reasons for the dataset(s) chosen, and techniques for collecting the data

- If agency uses <u>population data</u>, it must describe the geographic level used to measure minority and low-income concentrations (Census tract, block, or TAZ to compare with population of service area)

- If agency uses <u>ridership data</u>, it must describe the routes impacted and the minority and low-income concentrations (to compare to system-wide ridership)

A Traffic Analysis Zone (TA Z) is a special area delineated by state and/or local officials for tabulating traffic-related data

Pre-Analysis Considerations (Cont.)

- If using population data, at which geographic level will you measure minority and low-income concentrations?
  - Census block
  - Census block group or tract
  - Traffic analysis zone

- Describe techniques/technologies to collect data

Determining Data for GIS Analysis

- Obtain Block, Census tract, or Traffic Analysis Zone-level Household data
  - Race and ethnicity
  - Income
  - National origin

Assemble Information Needed for Analysis

- Demographic Data
  - U.S. Census
  - Local Data

- GIS Layers
  - Census Block
 - Census Tract
  - Traffic Analysis Zone (TAZ)
  - Route maps

A TAZ is a special area delineated by state and/or local officials for tabulating traffic-related data

- Ridership Data
  - Transit Rider Origin and Destination Surveys

Ridership Data for Rider Analysis

- Identify transit riders using affected routes
    - Route change
    - Headway change
    - Span of service change
    - Route elimination
- Identify minority and low-income riders

Illustrative Purposes ONLY

Examples are to assist you in understanding the concepts
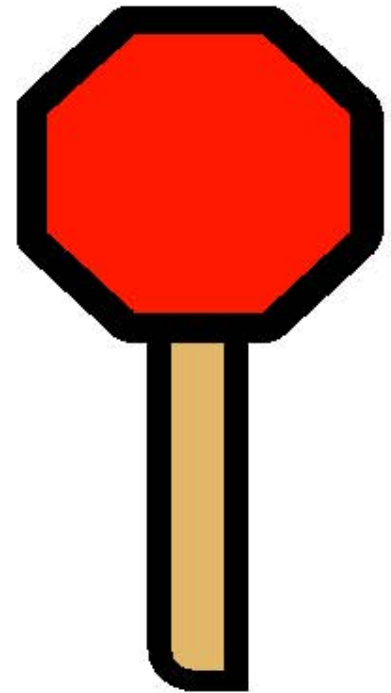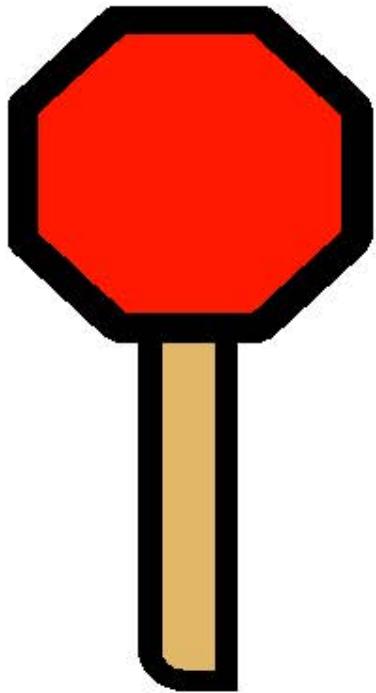
Assessing Service with Population Data

Scenario A

Major Service Change Policy

- Our Sample Major Service Change definition:

    - The establishment of new bus or rail routes
    - A reduction of service on a given route of more than 20% of its route miles on any bus or rail route
    - The elimination of any bus or rail service
    - A major modification that results in a 25% or greater reduction in the number of daily service hours provided

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Adverse Effects: Impacts in relation to "Major Service Change"

- Consider the degree of adverse effects/impacts, and analyze those impacts when planning changes.
- Analysis between existing and proposed service changes:
  - Service changes that reduce service (eliminate route, removing trips on a route, changing span of service)
  - Service changes that change the frequency of service (headway changes)
  - Disparate impact analysis should consider the degree of adverse affects

If there is a potential disparate impact

If a disparate impact is found, the transit provider may implement the service change only if:

*"the recipient (1) has a substantial legitimate justification for the proposed service change; **and** (2) the transit provider can show that there are no alternatives that would have a less disparate impact on minority riders but would still accomplish the transit provider's legitimate program goals."*

Disparate Impact Definition and Disparate Impact Policy

Requirements and Guidelines

Disparate Impact Definition

- Facially neutral policy or practice that disproportionately affects members of a protected class identified by race, color, or national origin;
- The Recipient's policy or practice lacks a substantial legitimate justification; **and**
- where there exists one or more alternatives that would serve the same legitimate objectives, but with less disproportionate effect on the basis of race, color, or national origin

Consistent Disparate Impact Policy

- Policy is clearly stated
- Consistent with the policy in your approved Title VI program
- Application is mathematically consistent throughout the analysis
- **Disparate impact policy defines a material difference**
  - May be presented as a statistical percentage of impacts borne by minority populations
  - Has to pass the "so what" test

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Disparate Impact Policy

- Disparate Impact Policy is a policy where the change is deemed materially different:

  – Our Sample agency has defined its disparate impact policy to be +/-2% statistical difference between the effects on minorities compared to the impacts borne by non-minority passengers:

    - Material differences like this must be applied to system-wide demographics to a) individual routes and b) routes cumulatively

Disproportionate Burden Policy

- Disproportionate Burden Policy is a policy where the change is deemed materially different on low-income populations

  Our Sample agency has defined its disproportionate burden policy as +/-2% statistical difference between the effects on low-income populations compared to the impacts borne by non-low-income passengers:

  - Material difference will apply system-wide demographics to a) individual routes and b) routes cumulatively

Assessing Impacts

- Assess impacts on minority and low-income populations at GIS level:
  - MAPS of proposed changes and demographic data will assist in this analysis

- Tables showing impacts of each type of route or service change (routing frequency, span of service, addition or elimination of routes).
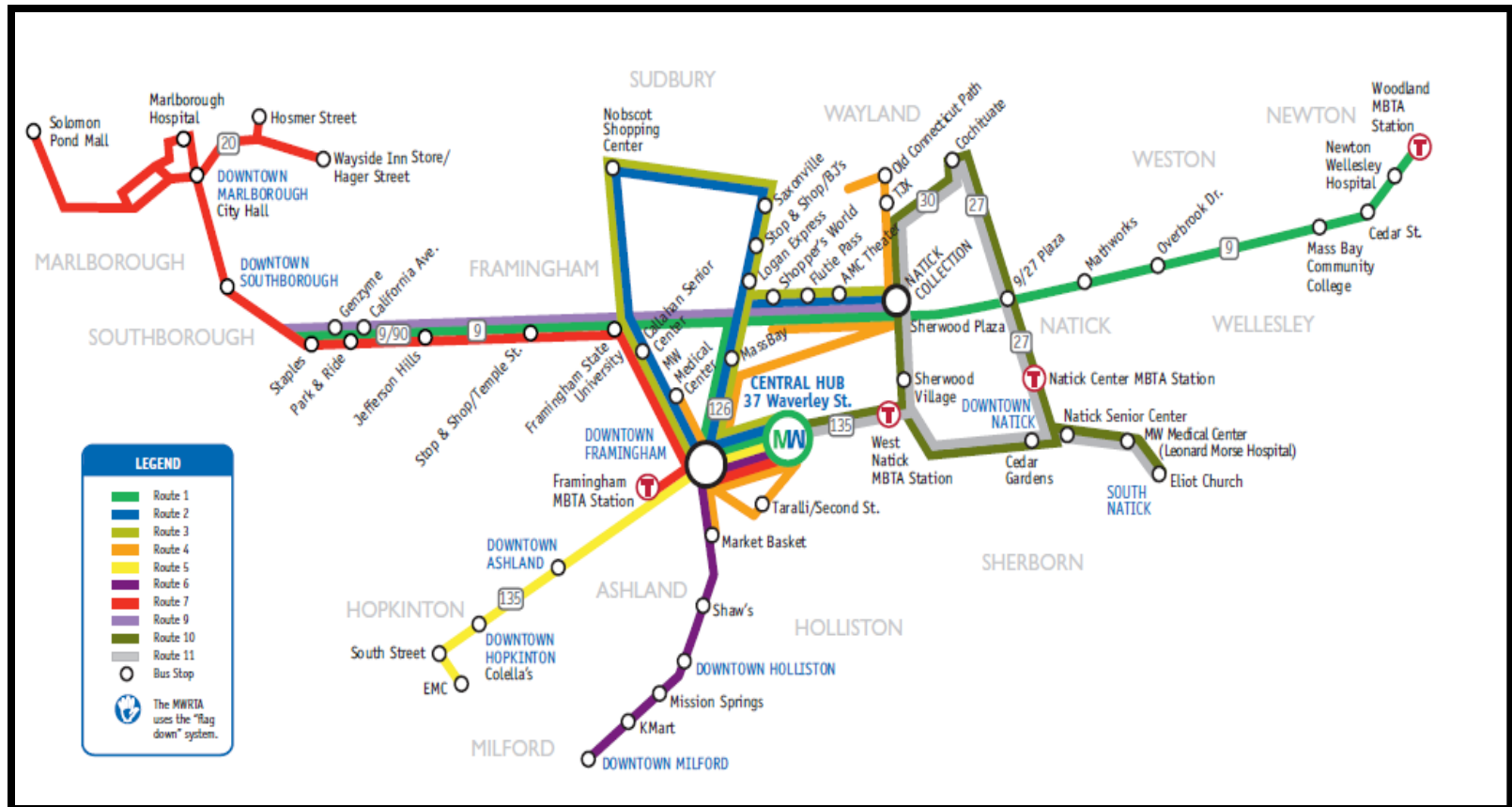
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Example 1: GIS Analysis MWRTA, MA – Area Map
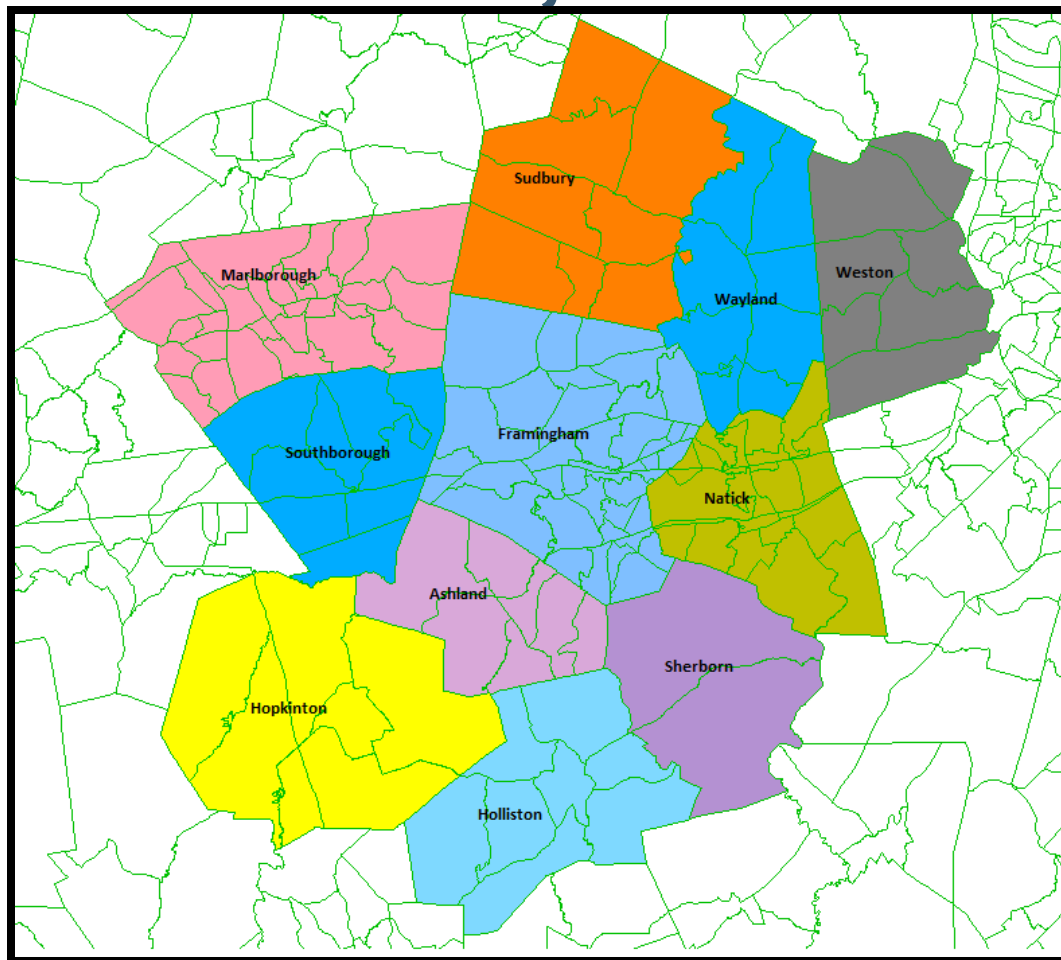
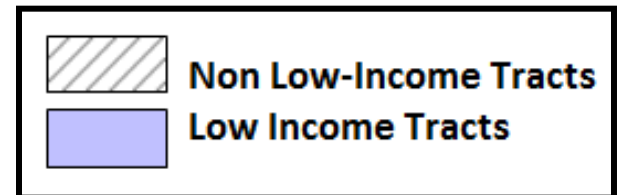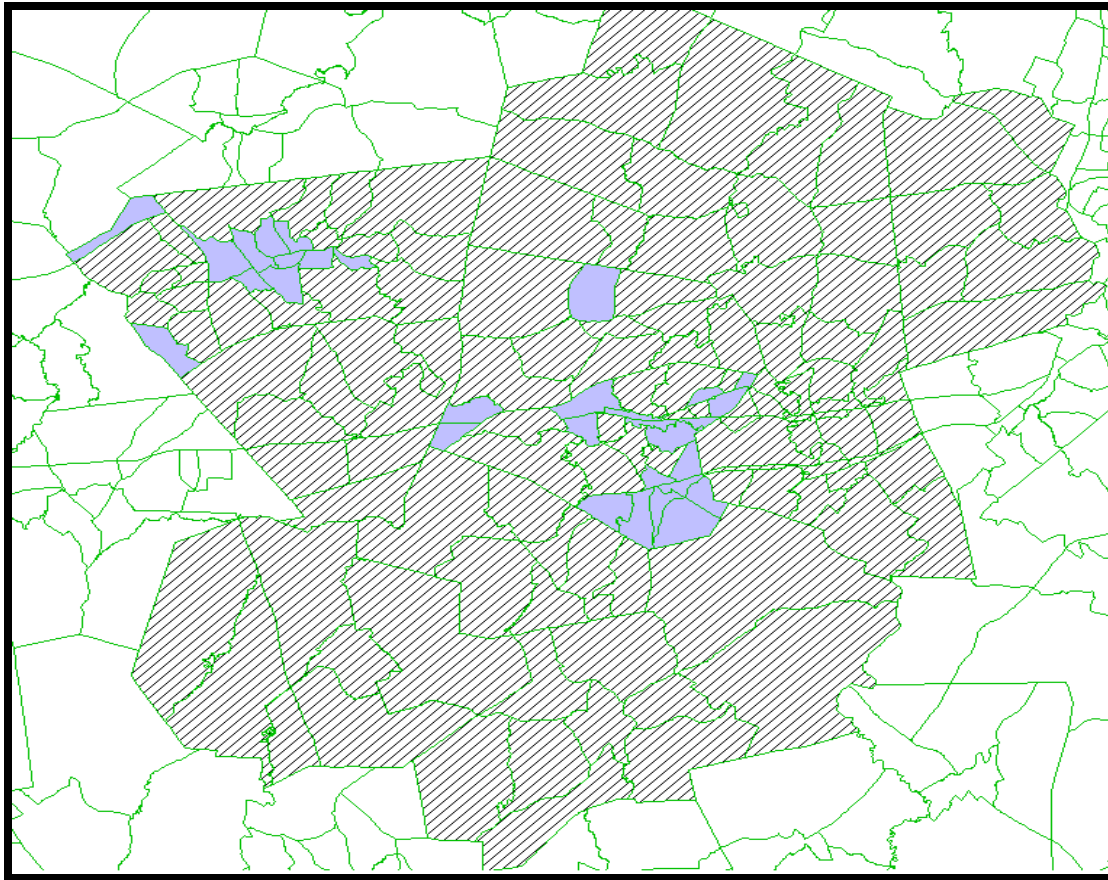| Metro West Regional Transit Authority (MWRTA) Data	
Total Pop =	242,916
Total HH =	97,524
Minority Pop =	50,829
Percent minority =	21%
Median HH Income =	$93,000
60% of median HH Income =	$57,000
Percent Low-Income Pop =	18%

MWRTA Transit System Map
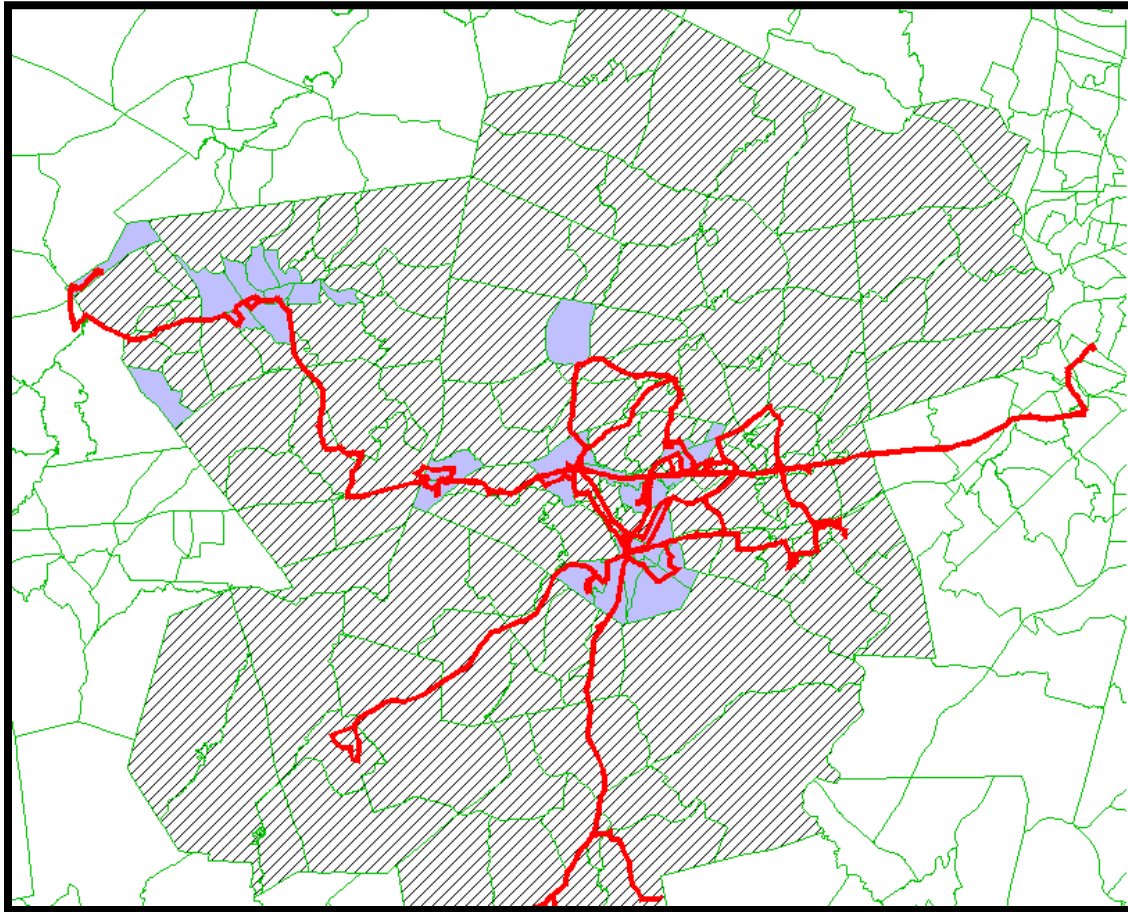
GIS Analysis – Map Existing Transit Routes on TAZ Layer
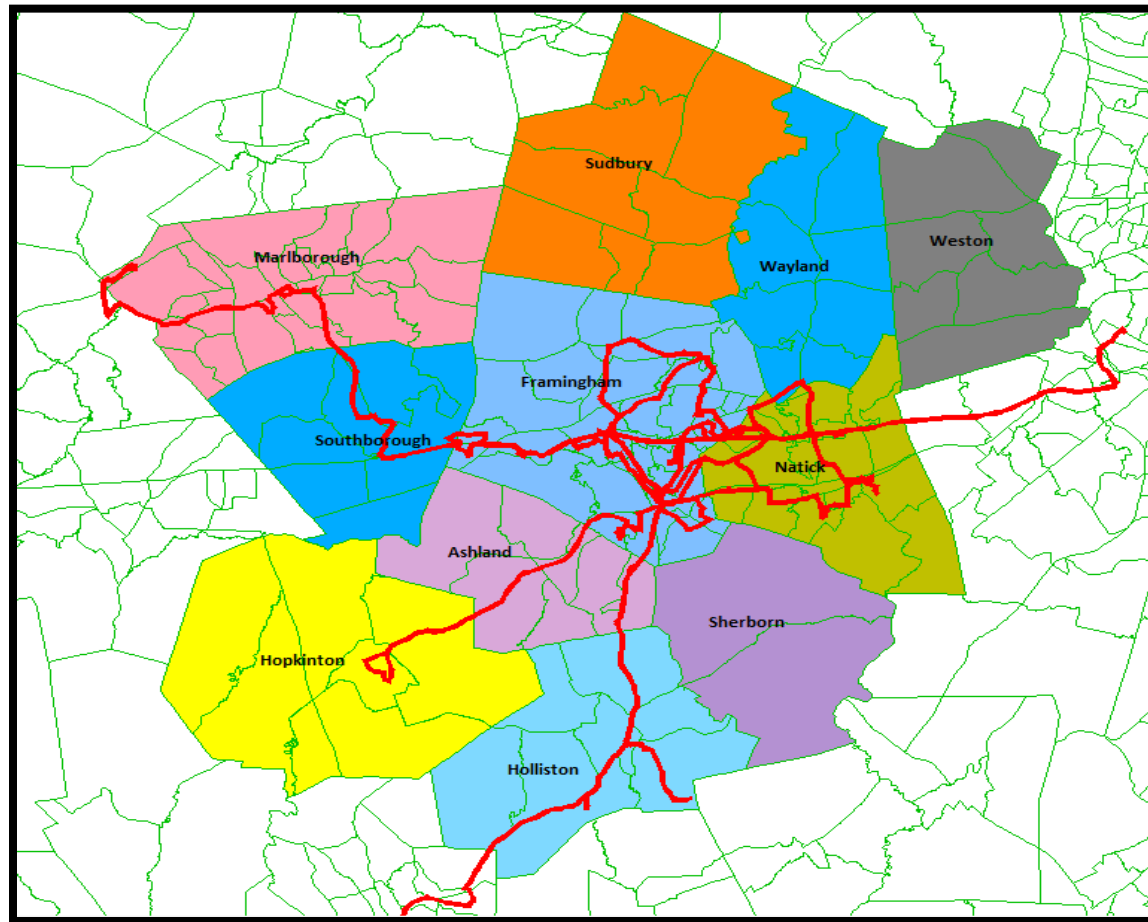
GIS Analysis – Map of Low-Income Areas

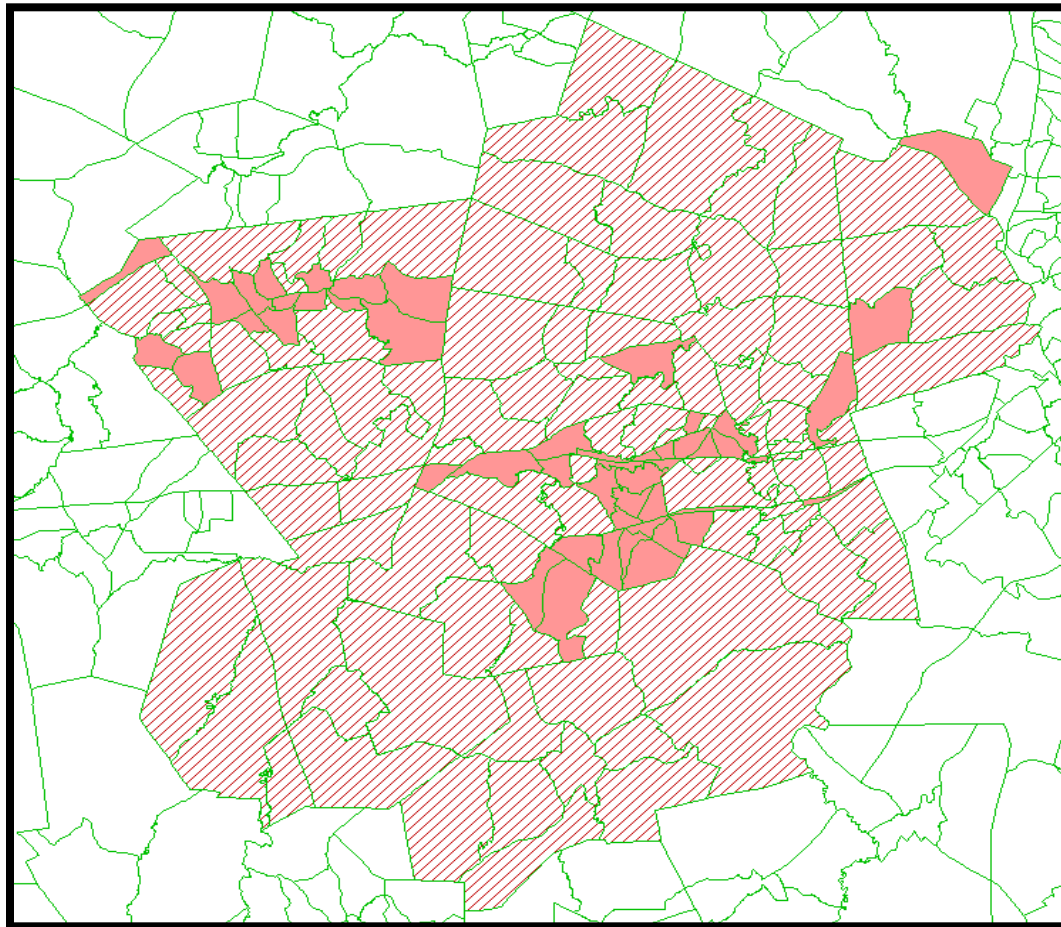
Legend:
- Non Low-Income Tracts
- Low Income Tracts

Low-income threshold is 18% of regional population

GIS Analysis – Transit Routes on Low-Income Areas
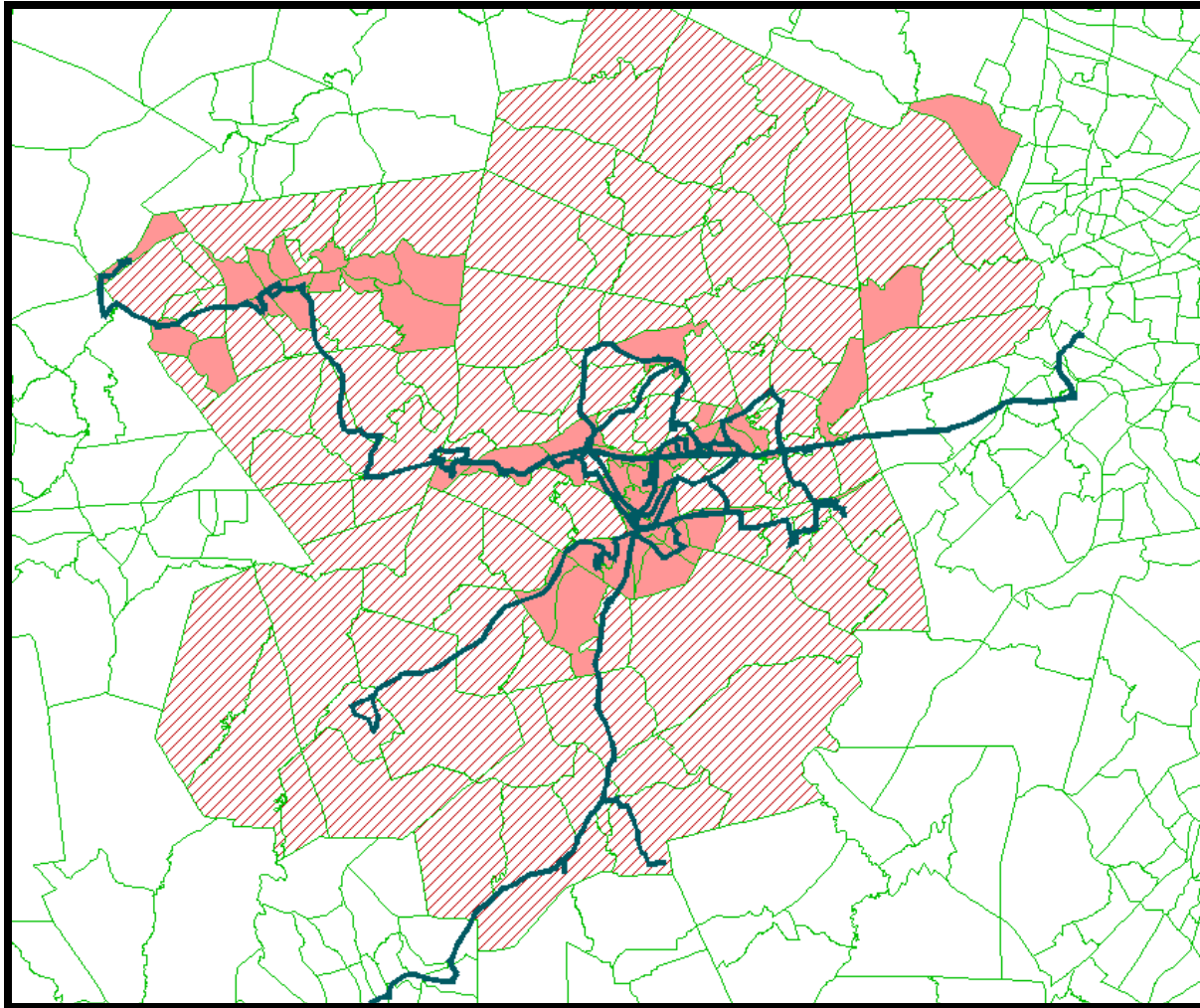
GIS Analysis – Map of Minority Areas

Non Minority Tracts
Minority Tracts

Minority threshold of 21% determined by total service area population

GIS Analysis – Transit Routes on Minority Areas
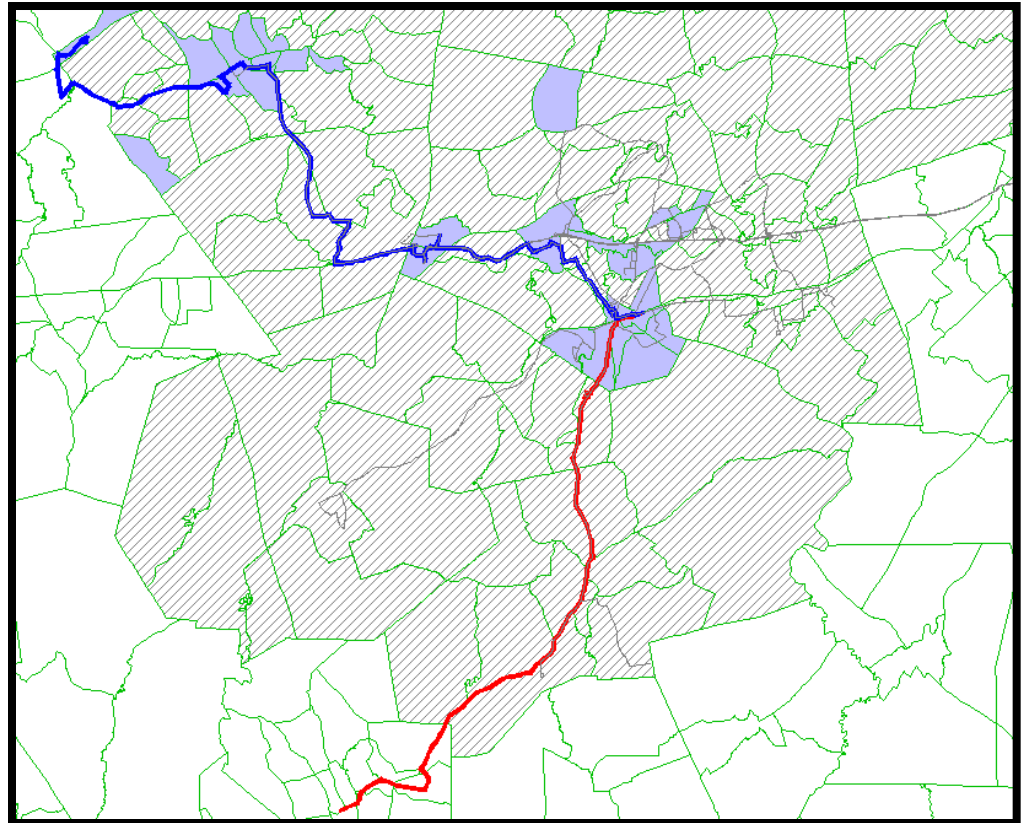
Sample A: Service Change

Analysis must identify impacts of service change to:

1. Low-income and minority populations

2. Population around Impacted transit routes as compared to population of service area

GIS Analysis – Overlay Affected Routes to Identify Low-Income TAZs
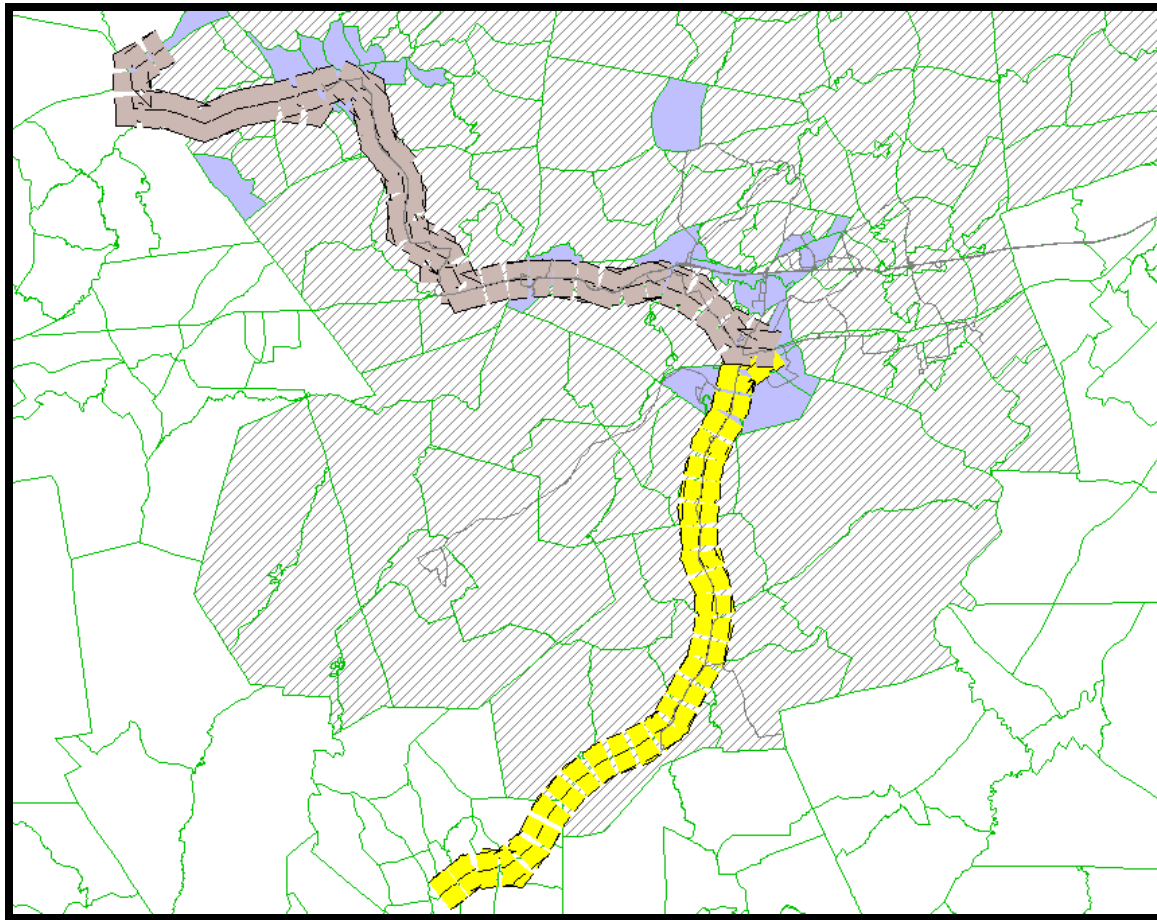
¼ mile buffer is used to identify the affected population

GIS Analysis - Eliminated Routes on Minority TAZs

GIS Analysis – Overlay Affected Route to Determine Minority TAZs

¼ mile buffer is used to identify the affected population

Calculate Effects of Service Change Using Population

MWRTA - Regional Population & Household Data
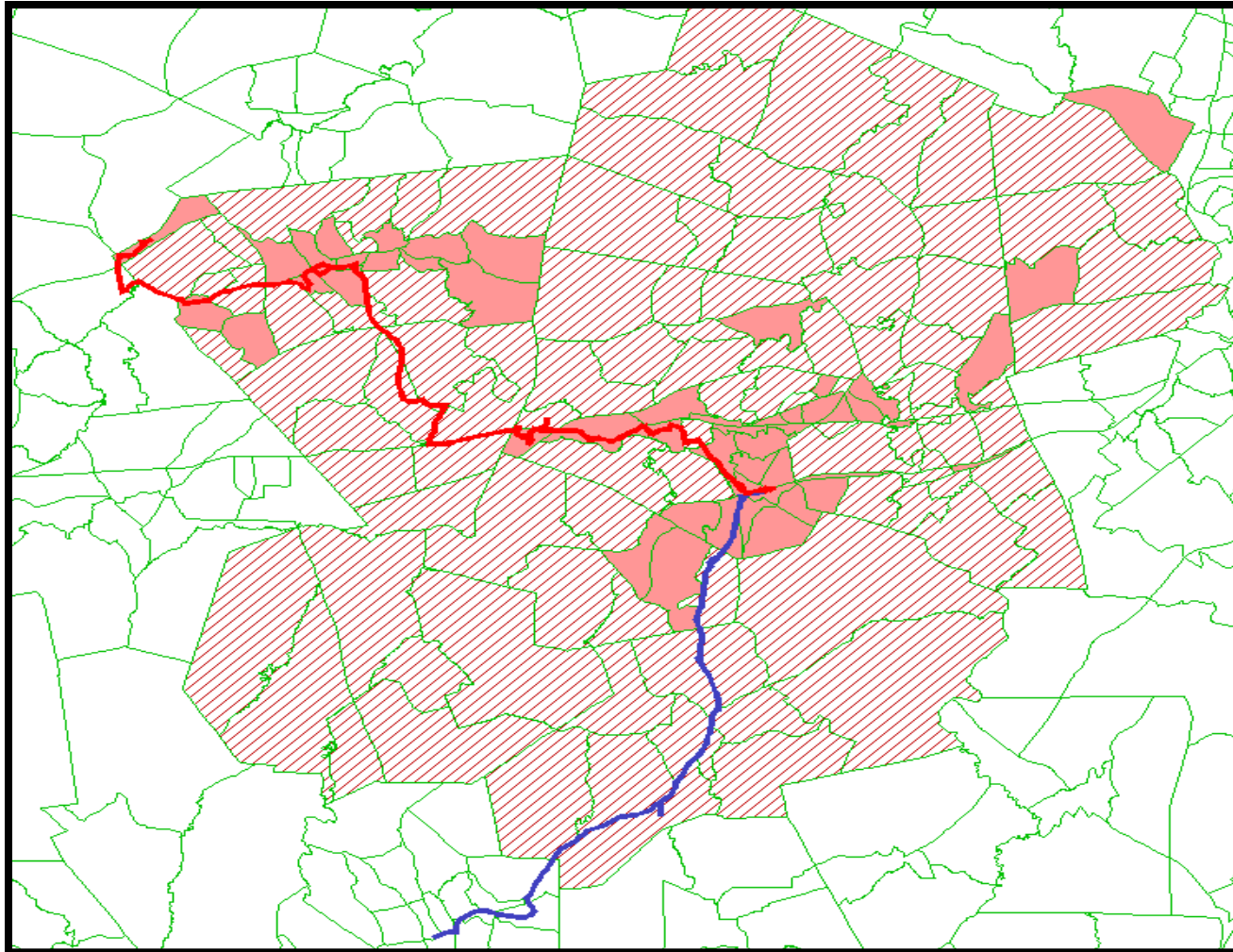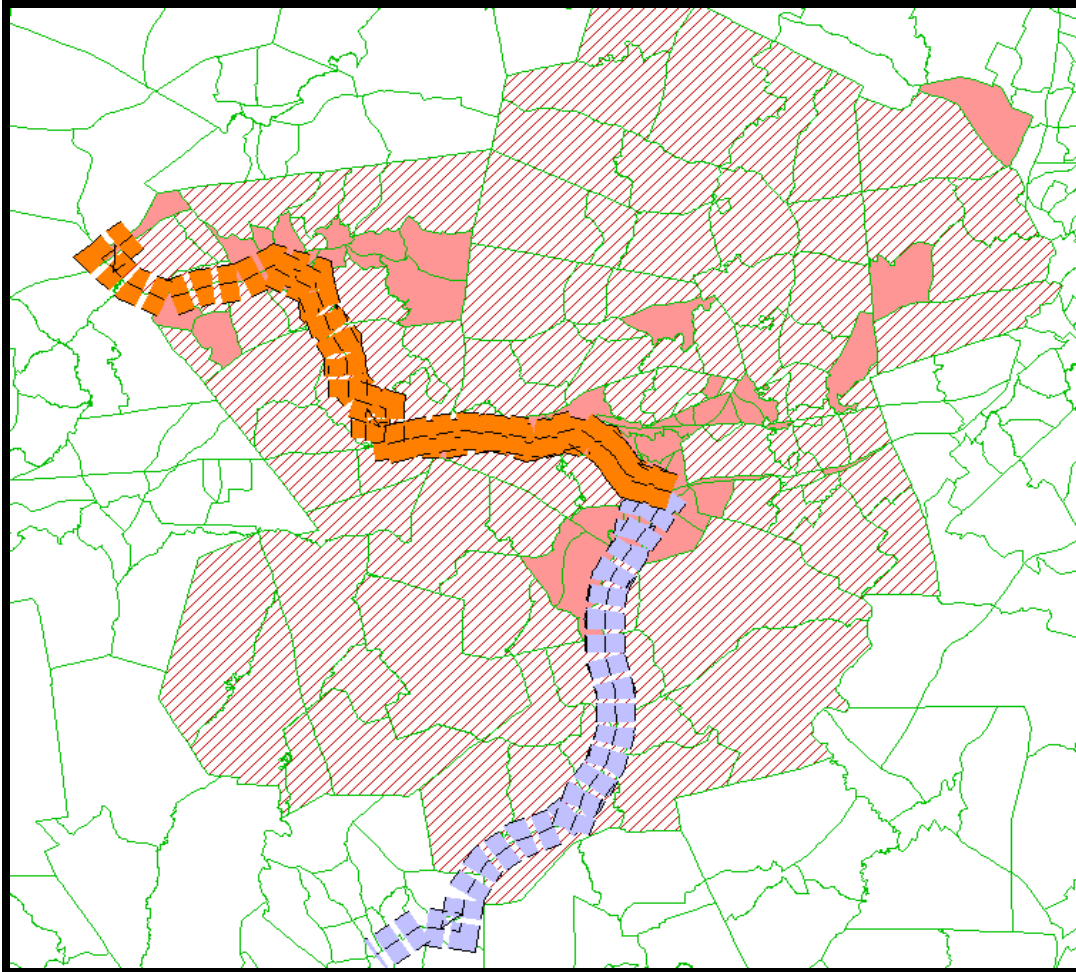
Total Population	Minority Population	Percent Minority	Low-income Population	Percent Low-income
242,916	50,829	21%	43,000	18%

Set threshold with demographic data

MWRTA - Affected TAZ Area Population Data

Route #	Change type	Total Population in the	Minority Population	Percent Minority	Low-income Population	Percent Low-income
Route 6	Discontinued	5,870	800	14%	250	4%
Route 7	Discontinued	9,500	2,500	26%	2,100	22%
Total		15,370	3,300	21%	2,350	15%

Analysis with demographic data

Disparate Impact Policy +/-2%.
Regional Population DATA of 21% compared to 21% of total routes adversely effected; compare the 21% to Route 7 which is 26%

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Calculate Effects of Service Change

Statistical Significance
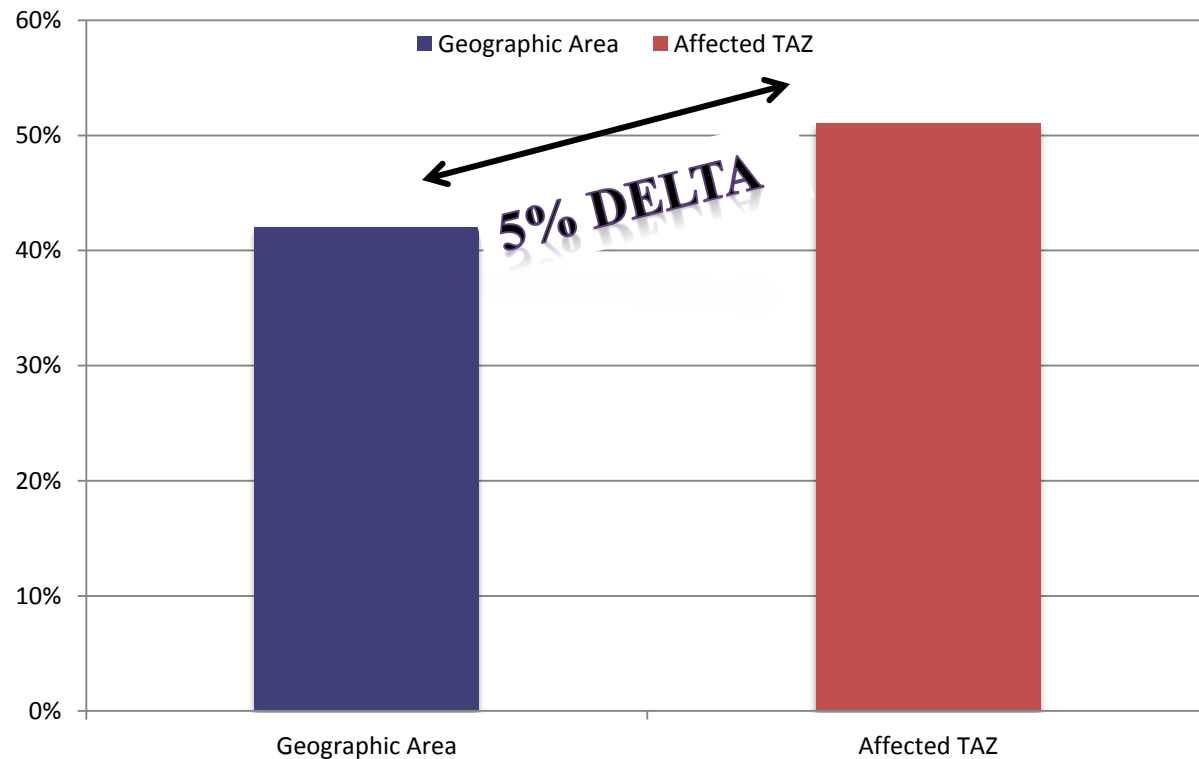
What Does This Mean?

- Grantee needs to conclude disparate impact or not based on their own analysis.
- The narrative, along with the tables should be able to draw a conclusion.
- Again, grantees can carry out actions that may result in disparate impact as long as they have properly documented that they have met the legal test.

Example 2: GIS Analysis – Map Existing Transit Routes
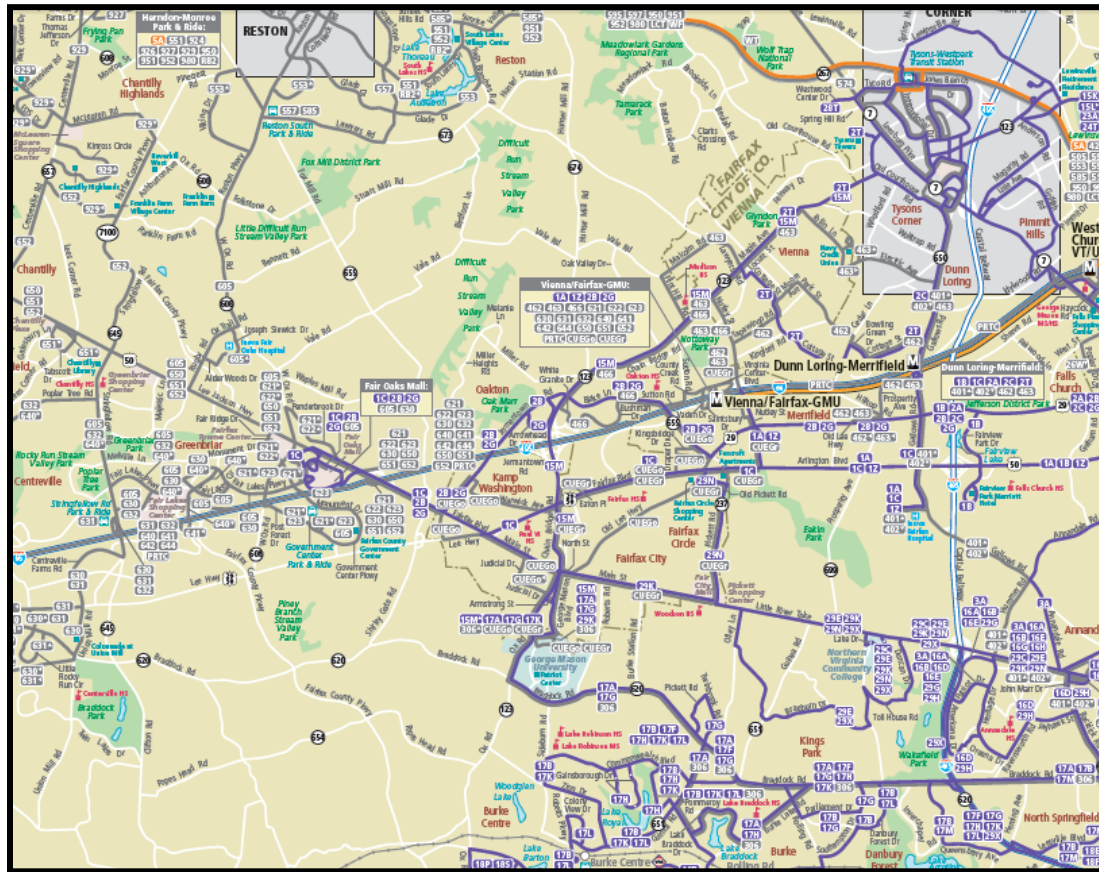
GIS Analysis – Map Predominantly Minority Areas

Non Minority Tracts

Minority Tracts
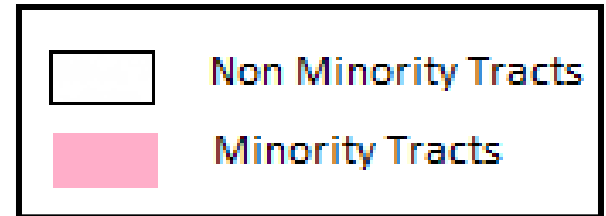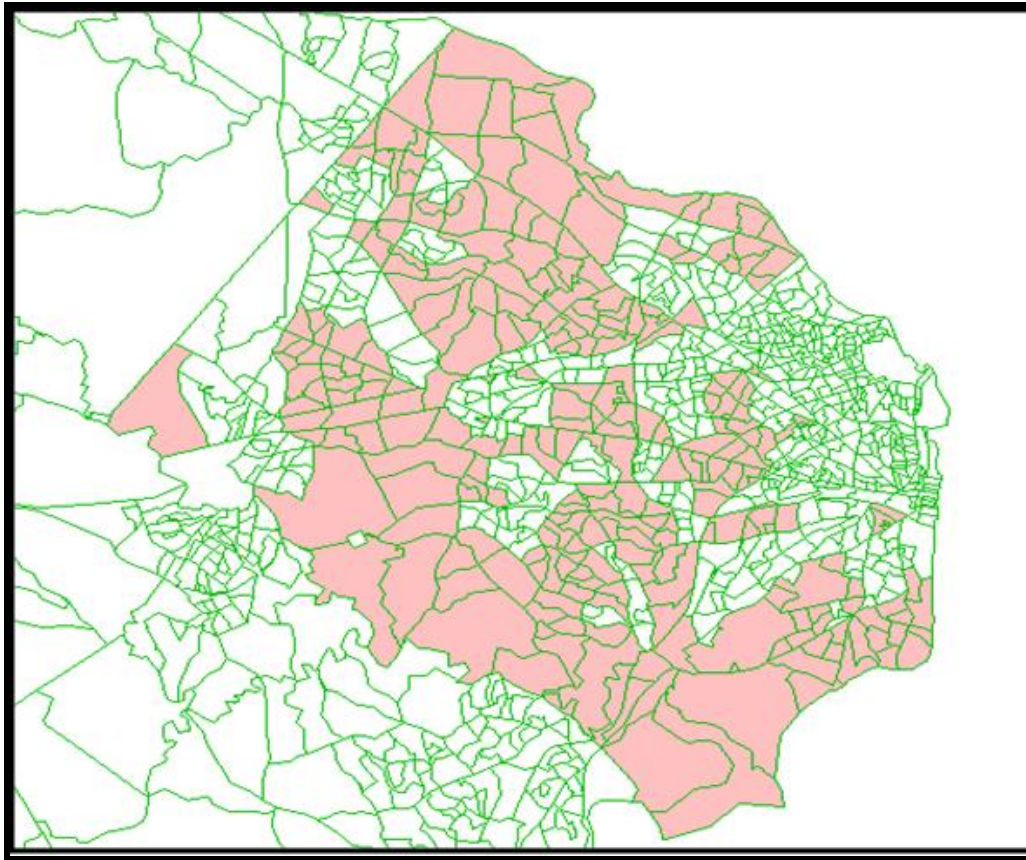
Minority threshold of 37% determined by total service area population

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GIS Analysis – Map Predominantly Low-Income Areas

☐	Non Low-Income Tracts
▨	Low-Income Tracts
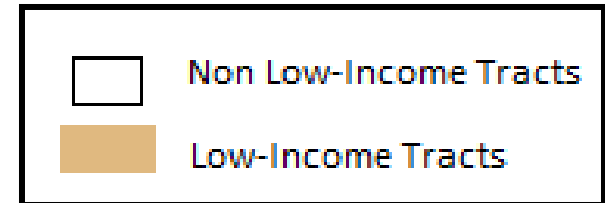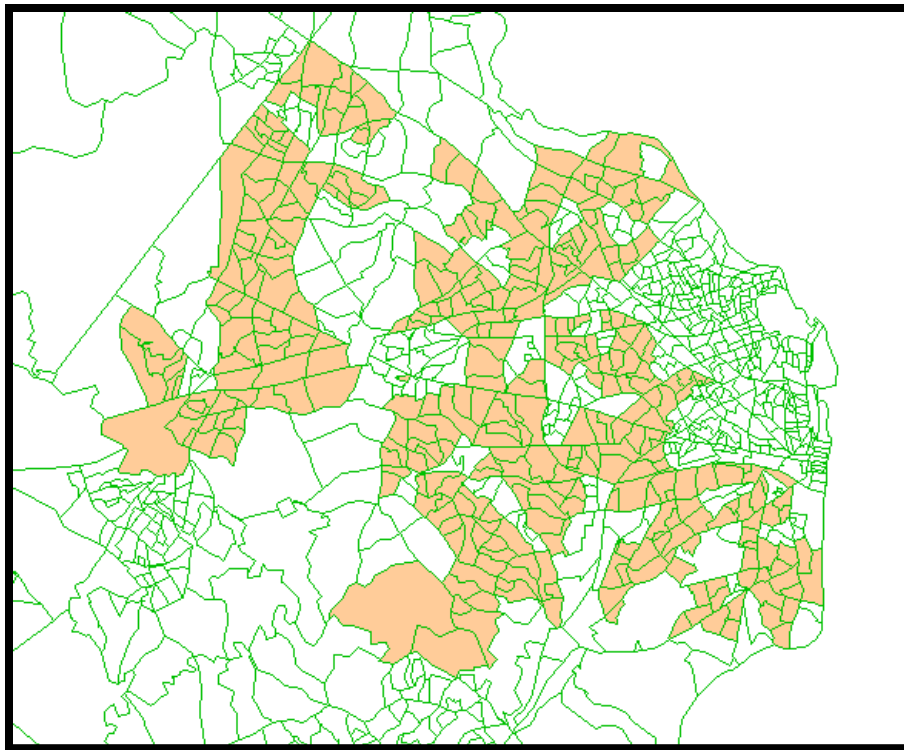
Low-income threshold of 35% determined by total regional population

For __this analysis__, low-income means a person whose household income is at or below the U.S. Department of Health and Human Services poverty guidelines.

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Example 2: Service Change

Analysis must identify impacts of service change to:

1. Low-income and minority populations

2. Population of Impacted transit routes as compared to population of service area
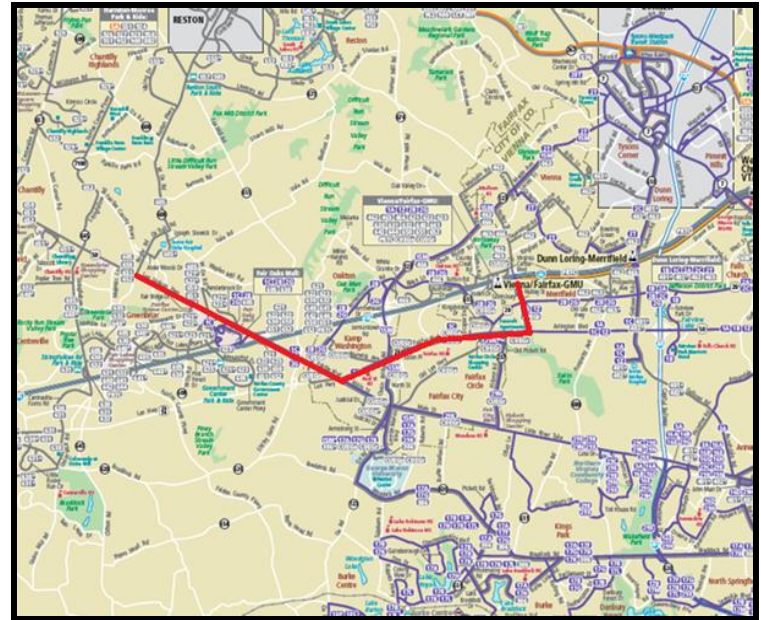
Affected Route

GIS Analysis – Overlay Affected Route to Determine Minority TAZs

¼ mile buffer is used to identify the affected population

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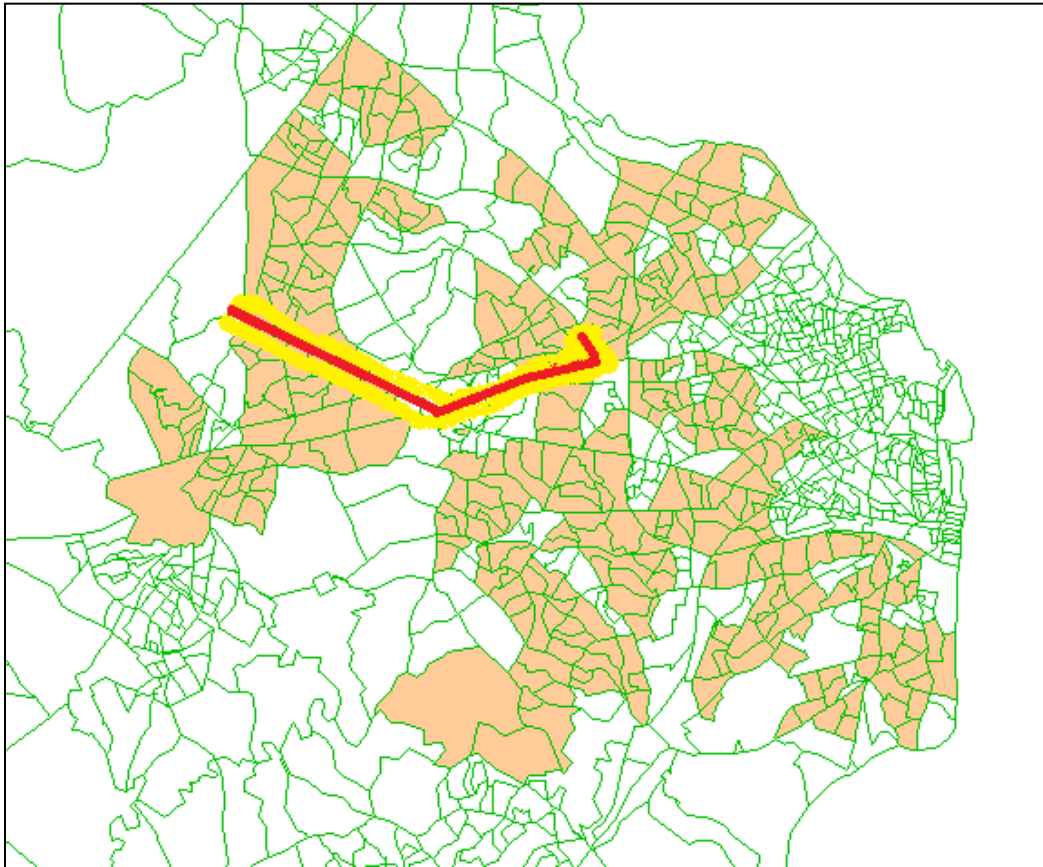
Calculate Effects of Service Change Using Population

Regional Population Data				
Total Population	Minority Population	Percent Minorit	Low-Income	Percent Low-
1,081,726	403,736	37%	378,604	35%

Set threshold with demographic data

Affected TAZ area Population Data

Route #	Change type	Day	Population in the Corridor	Minority Population	Percent Minorit	Minority Threshold	Low-income Population	Percent Low-Income	Low-Income Threshold
22	Segments discontinued	Weekday	5,250	2,783	53%	37%	714	14%	35%
22	Segments discontinued	Saturday	5,250	2,783	53%	37%	714	14%	35%
22	Segments discontinued	Sunday	5,250	2,783	53%	37%	714	14%	35%

Analysis with demographic data/GIS

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Assessing Service Impacts Using Ridership Data

Scenario A

Ridership

- GIS maps can be helpful but are not required

- Ridership data must be by route in order to compare the minority and low-income populations riding the impacted routes with the minority and low-income populations of the system

- Document surveys taken, sample sizes, etc. to show adequate ridership data for the service equity analysis

Calculate Effects of Service Change Using Ridership

Table 3 - MWRTA - Regional Ridership Data				
Total Systemwide Riders	Minority Riders	Percent Minority	Low-Income Riders	Percent Low-Income
Weekday 2,542	1,057	42%	950	37%

Set threshold with ridership data

| Table 4 - MWRTA - Affected Route Ridership Data						
Route No & Day		Discontinued Segment - Ridership	Minority Riders	% Minority Riders	Low-Income Riders	% Low-Income Riders
Route No.	Day					
Route 6	Weekday	184	55	30%	37	20%
Route 7	Weekday	672	380	57%	400	60%
Total	Weekday	856	435	51%	437	51%

Analysis with ridership data

Disparate Impact Policy +/-2%:
Regional Ridership of 42% compared to 51% of total adverse effected

Calculate Effects of Service Change

Statistical Significance
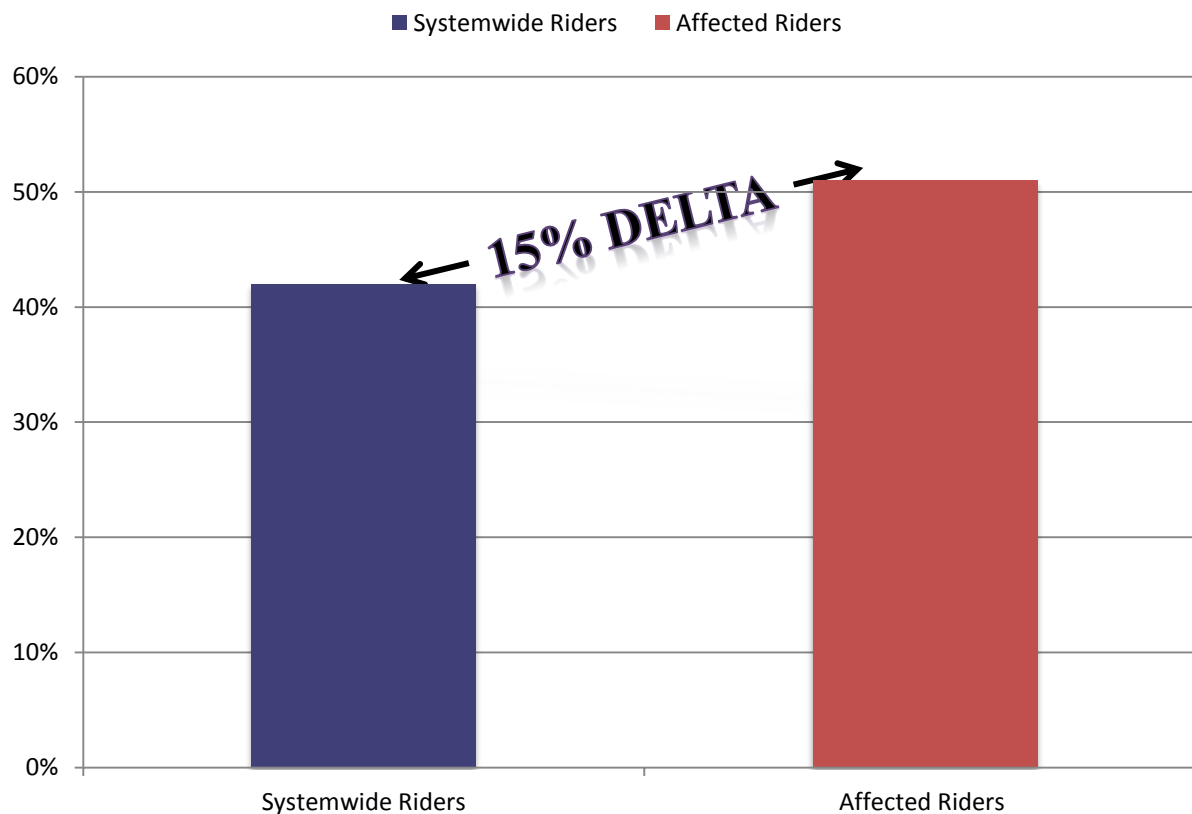
Impact of Potential Service Adjustments on Minority and Low Income Passengers

Weekly Numbers

Bus Lines	Wkly Ons	Under20k	Minority	%<20k	% Min	Impacted	Under20k	Minority
6	50,340	25,081	21,602	50%	43%	1,453	724	624
14	56,929	20,727	10,639	36%	19%	4,623	1,683	864
15	39,479	15,902	7,414	40%	19%	2,396	965	450
19	18,396	7,309	4,509	40%	25%	688	273	169
20	52,845	21,450	13,172	41%	25%	1,572	638	392
23	952	446	248	47%	26%	237	111	62
47	4,562	679	2,012	15%	44%	659	98	291
59	1,781	455	414	26%	23%	280	71	65
62	13,596	4,177	4,093	31%	30%	1,161	357	349
67	6,294	3,264	3,079	52%	49%	0	0	0
70	19,346	7,186	4,965	37%	26%	1,014	377	260
75	65,337	33,005	22,653	51%	35%	998	402	187
115	19,406	7,565	3,864	39%	20%	378	150	93
119	21,728	7,379	4,359	34%	20%	931	378	232
Ridership Adjusted Lines	370,990	154,623	103,022	42%	28%	16,390	6,228	4,037
Total Percent Impacted							38%	25%
Ridership All Bus Lines	1,266,568	527,728	381,169	42%	30%			

5% DELTA

"Impacted Ons" calculated by taking the number of trips eliminated in a given hour times the number of passengers per trip during that hour and adding up the number of passengers impacted in a week.
Disparate Impact Policy +/-5%

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If There is a Potential Disparate Impact

If a disparate impact is found, the transit provider may implement the service change only if:

*"the recipient (1) has a substantial legitimate justification for the proposed service change; **and** (2) the transit provider can show that there are no alternatives that would have a less disparate impact on minority riders but would still accomplish the transit provider's legitimate program goals."*

Steps Taken if _Disparate Impact_ Found

Flowchart:

- **Disparate Impact?**
  - **Yes** → **Take Actions to Avoid, Minimize, Mitigate (Revise Changes)** → **Reanalyze Changes for Disparate Impact**
  - **No** → **Analysis Complete**

- **Reanalyze Changes for Disparate Impact**
  - **Yes** → **Legal Test Met**
    - **Yes** → **Analysis Complete**
    - **No** → **Possible Title VI Violation**
  - **No** → **Analysis Complete**

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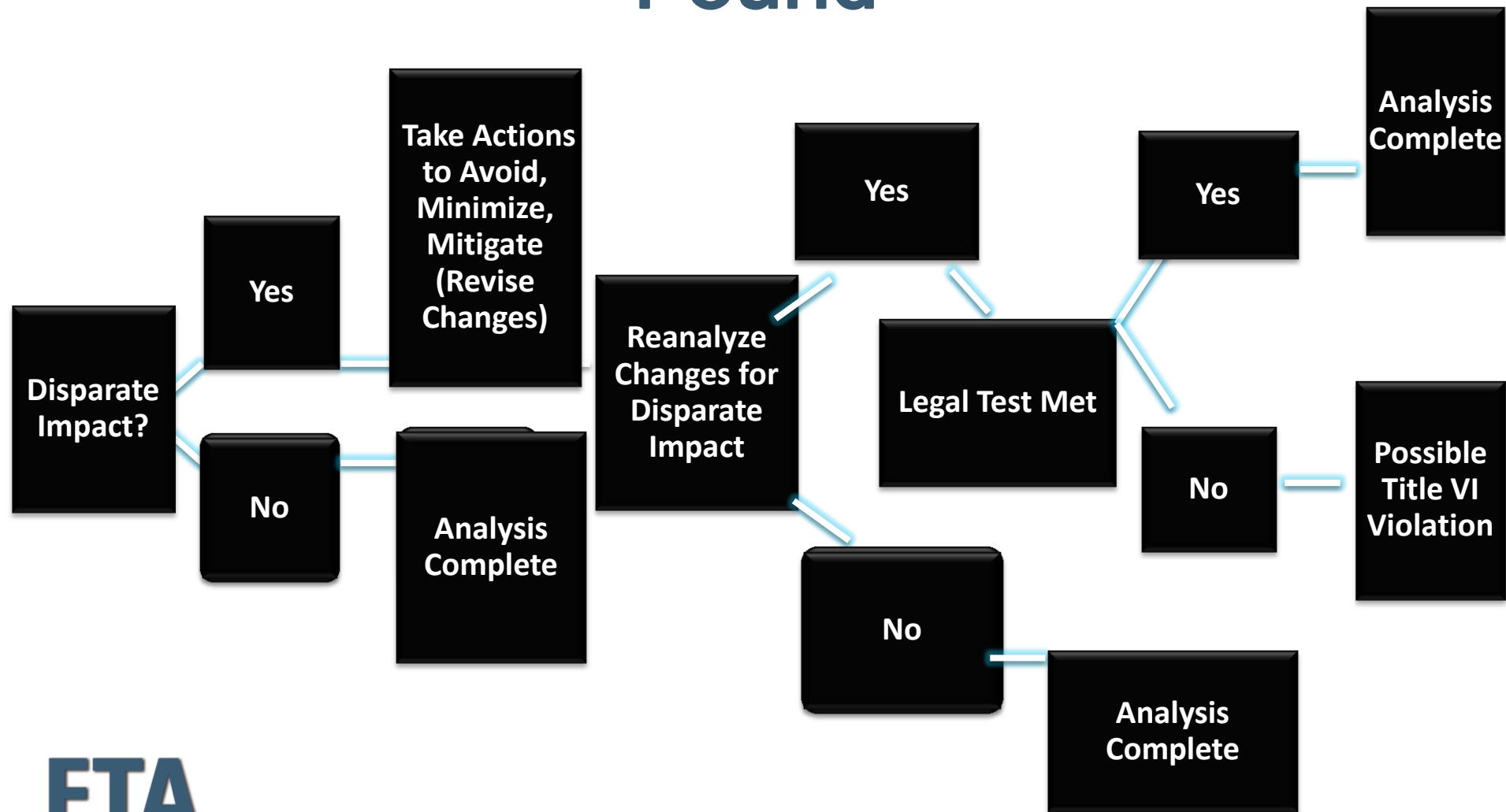
Alternative Services Available

- What alternative services are available for people impacted by the service change?

- How would the use of alternatives affect riders' travel times and costs?

  – Example: Other lines or services, potentially involving transfers and/or other modes, that connect affected riders with destinations they typically access

  – Can test alternatives using a trip planner

Determine Mitigation

Avoid

- The service change that results in WORST IMPACTS

- Revise service change, requiring reanalysis

Minimize

- Alignment changes located to nearby lines with same origin and trip destinations
- Cost containment strategies to limit impacts to riders.
- Market mitigation strategies that may help offset impacts

Mitigate

- Expand demand-response service in impact area
- Guaranteed ride home program

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Recap

- Major Service Change defined
- Describe how the service change exceeded major service change
- ✓ Analysis Framework Clearly Described
  - Data Set(s) Described
  - Comparison analysis
    - Comparison of impacts using population data to population of service area; or
    - Comparison of impacts using ridership data to ridership of service area

Recap

- Analysis should include
  - Step-by step analytical methodology
  - Overlay Maps
  - Accompanied by the tables describing impacts
  - Narrative of method of analysis
  - "Adverse effects" definition applied consistently
  - "Disparate impact policy" applied consistently
  - Provide a conclusion (whether there is a disparate impact or not)
  - Determine whether there is a disproportionate burden or not
  - Legal test properly documented
  - Explore avoidance, minimizing impacts, mitigation

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Questions?

Contact(s): <u>Contact</u>(s): FTAtitleVItraining@dot.gov