Appendix C2: Transportation
Travel Demand Forecasting

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Acronyms

BRT ..... Bus Rapid Transit
CTPP ..... Census Transportation Planning Package
FTA ..... Federal Transit Administration
GBNRTC ..... Greater Buffalo-Niagara Regional Transportation Council
GTFS ..... General Transit Feed Specification
IPF ..... Iterative Proportional Fitting
LRT ..... Light-Rail Transit
NFTA ..... Niagara Frontier Transportation Authority
STOPS ..... Simplified Trips-on-Project Software
TAZ ..... Traffic Analysis Zone
UB ..... University at Buffalo

Appendix C Travel Demand Forecasting

This appendix supports Chapter 3, "Transportation", and provides additional detailed transportation information for the Buffalo-Amherst-Tonawanda Corridor Transit Expansion (Project). Specifically, this report describes the methodology developed for estimating potential ridership for the Project, key service characteristics, and resulting transit ridership forecasts. The forecasts generated for this report used the FTA Simplified-Trips-On-Project Software (STOPS) model. This model was calibrated using pre-pandemic data sources to represent 2018 demand patterns. Following recent FTA guidance, the calibrated model was updated with post-pandemic ridership counts, socio-economic projections, and zone-to-zone highway travel times to represent more recent transit demand patterns. The report details the model-building process in two steps. Section C.1 describes the pre-pandemic data and processing steps taken to generate a calibration year model portraying the key NFTA and Stampede transit markets from 2018.

Section C.2 describes the post-pandemic data sources used to update the model to generate 2023 and 2045 ridership forecasts. As described in Chapter 3, "Transportation," the evaluation of traffic conditions conservatively focuses on pre-pandemic conditions (years 2018 and 2040) whereas the conservative condition for transit ridership is post-pandemic (years 2023 and 2045).

The potential demand for the Project comprises two key markets:

- Commute, shopping, personal business and other travel currently served by Metro Bus and Metro Rail ("existing Metro markets").
- UB campus-to-campus and intra-UB North Campus circulation trips currently using the UB Stampede shuttle bus system ("UB Stampede market").

Forecasts were developed using Version 2.53 of the FTA STOPS model. For this Project, two different STOPS methods were employed:

- For the existing Metro markets, STOPS was applied in its synthetic mode. This STOPS approach synthesized total trip-making based on schedule data contained in Metro's general transit feed specification (GTFS) files and travel demand information obtained from the 2012 to 2016 Census Transportation Planning Package (CTPP). Initial estimates of ridership by route and stop location are compared to counts from 2017 to 2018 and the model is adjusted to match counts from that time period ridership patterns. Forecasts were prepared by:
  - Analyzing expected growth in population and employment projected by the Greater Buffalo-Niagara Regional Transportation Council (GBNRTC) for each Traffic Analysis Zone (TAZ) and estimating the impact of this growth on total (all mode) travel demand.
  - Evaluating changes to the transit network between existing, the No Build Alternative, and the two Build Alternatives and determining the impacts of these mobility changes on transit mode share.

- The UB Stampede market was estimated using the STOPS incremental method. This approach began with a transit trip table derived from user surveys conducted in 2014. STOPS then computed the change in demand that is anticipated to result from changes in population and employment projected by GBNRTC and from changes to the transit network between existing, No Build Alternatives, and the two Build Alternatives using procedures like those applied in the synthetic version of STOPS.

In most cases, the incremental form of STOPS is preferred by FTA for developing estimates of project-level ridership. Its use requires availability of a current survey that is carefully expanded to represent total transit trip-making and on the project serving a mature, already-developed transit market. These conditions are largely met with the UB Stampede service, hence the use of the incremental method for the UB Stampede market.

By contrast, the Metro market is not sufficiently mature and stable in parts of the Project corridor to support application of the incremental method. In particular:

- The Boulevard Mall, located near the intersection of Niagara Falls Boulevard and Maple Road, may be redeveloped into a new mixed-use area with considerably higher population and employment densities than are present today. The new area could be substantially different in character than what exists in the area at present.
- The area along Audubon Parkway currently has very little Metro service[1] and generates very few trips today. This could change with more direct and more frequent transit service to the area.

Both factors, together, mean that the incremental method was not suitable for either of the two proposed stations north of the UB North Campus or for the Boulevard Mall Station.

Because the requirements for using the incremental method were not present for the existing Metro market, these trips were forecast using the Synthetic Method.

The remainder of this document is organized as follows:

- Section C.1 presents the methodology used to develop the pre-pandemic calibrated model application.
- Section C.2 presents the post-pandemic data that has been applied to the calibrated model and used to generate 2023 and 2024 project forecasts
- Section C.3 presents key assumptions regarding the Project that are the basis of the ridership projections.
- Section C.4 presents the resulting forecasts of ridership for the Project.

[1] The service that does exist in the area operates on North Forest Road, a nearby local street.

C.1 METHODOLOGY

The process of generating future year projections of transit ridership for this project follows FTA's guidance on representing post-COVID ridership conditions using a model originally calibrated with pre-COVID data. This model is used to generate future year forecasts. The process used to develop and apply this model consists of three basic steps:

1. **Regional Data Processing and Model Assembly**: Regional data that characterizes the main elements of transit ridership within the project region were processed and assembled into a model. This includes data representing zone-to-zone transit demand in the form of the most recent CTPP commuter flows from 2012 and 2016. STOPS then applies a series of parameters to adjust how different transit paths are evaluated to find the best routes between origins and destinations and to estimate the number of travelers who will select each option. The process of refining the parameters to best represent local conditions is known as model calibration. In general, the calibrated model should reasonably simulate the then-current existing transit system and travel markets.

2. **Adjust Model to Represent Current Ridership (Post-COVID adjustment):** Updated counts, GTFS Schedules and socioeconomic forecasts for 2023 are used with the STOPS adjustment process to represent post-COVID ridership patterns. The resulting model generally estimates 2023 patterns reasonably well until such time as updated Census and transit survey data can be obtained to fully represent post-COVID demand.

3. **Forecast Preparation Using the Calibrated Model**: Using the post-COVID adjusted model, forecasts are prepared by updating information describing transit supply for the no-build and build alternatives.

This section documents the process described in Step 1 to generate a calibrated model. Section C.2 shows Steps 2 and 3 and how post-pandemic data elements have been incorporated into the calibrated model to prepare the forecasts.

C.1.1 Geographic Scope of the Analysis

The geographic scope of the analysis was based on the GBNRTC region and included all of Erie and Niagara Counties in New York.

Zones were based on the GBNRTC Traffic Analysis Zone (TAZ) system with state, county, and tract coding to describe the relationship between GBNRTC TAZs and the American Community Survey CTPP TAZs.

The zones representing the two main UB campuses were further subdivided to represent the catchment areas of the existing UB Stampede and University Shuttle services. These special zones (and their model names) were:

- UB South Campus
  - Area near Goodyear Residence Hall ($450gy[2])
  - Area near Main Circle ($450mn)
  - Remainder of the campus
- UB North Campus
  - Area near Flint Circle ($671fl)
  - Area near Lee Circle ($671le)
  - Area near Lockwood Library ($671li)
  - Area near Center for the Arts ($671ca)
  - Area near the Alumni Arena ($671ar)
  - Area Near Natural Sciences Complex ($671ns)
  - Area near Governor's Residence Halls ($671go)
  - Area near Center for Tomorrow ($671ce)
  - Area near Greiner Residence Hall ($673gr)
  - Area near the Ellicott Complex ($673el)
  - Remainder of the campus

One very large zone near the proposed Audubon Station was also split into three sections and walk links adjacent to this station and Boulevard Mall to account for internal circulation roads and driveways that can be used by the public to access the Project stations.

Figure C-1 presents an overview of the regional zone system and Figure C-2 shows a view of the zones in the Project corridor. Figure C-3 and Figure C-4 present the detailed zones in the vicinity of the UB South and UB North Campuses, respectively. Note that the special-market zones were configured to be a relatively small part of the overall zone area. This practice is recommended by FTA for special zones because it preserves the CTPP-based demand estimates in addition to the special-market elements of transit demand.

As part of the STOPS implementation, a detailed system of 97 districts were defined to provide a high degree of resolution for reporting on existing and future transit travel demand patterns. This district system is depicted in Figure C-5 for the existing Project corridor and Figure C-6 for the UB North Campus area. Separate districts were maintained for each special TAZ at the UB South and UB North Campuses.

[2] "$450gy" is the zone "name" used in STOPS data files and related mapping it is comprised of a dollar sign ("$") denoting a special zone, a 1 to 4 digit number indicating the GBNRTC zone number, and a 2-character abbreviation describing the location. Non-special zones are denoted with a "~" and the GBNRTC zone number. These zones represent multiple land uses and do not have a 2-character abbreviation.

Figure C-1. Overview of Regional Zone System

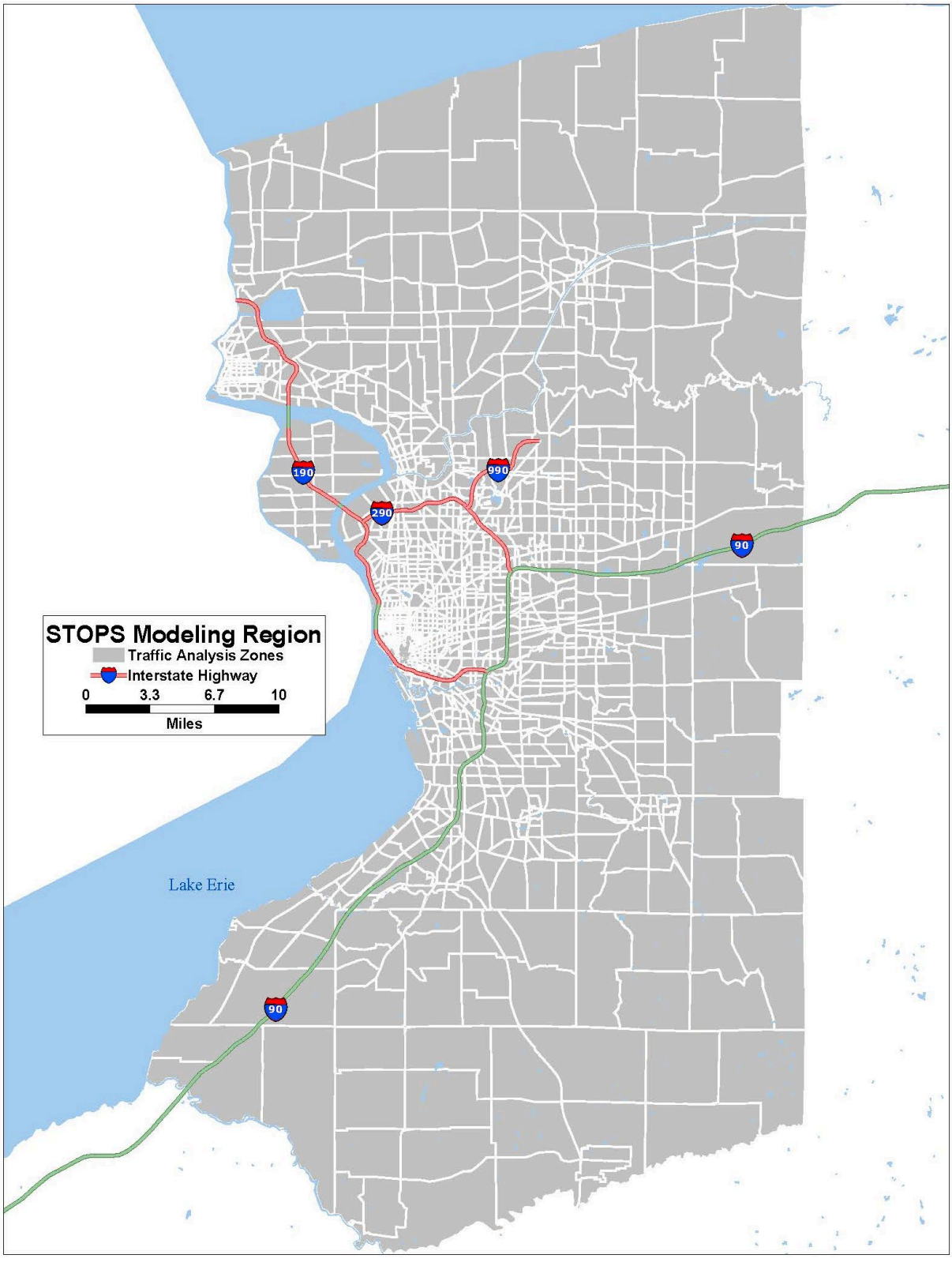


Figure C-2. Zone System in the Existing and Buffalo-Amherst-Tonawanda Metro Transit Expansion Corridor

Figure C-3. Zone System in University at Buffalo South Campus

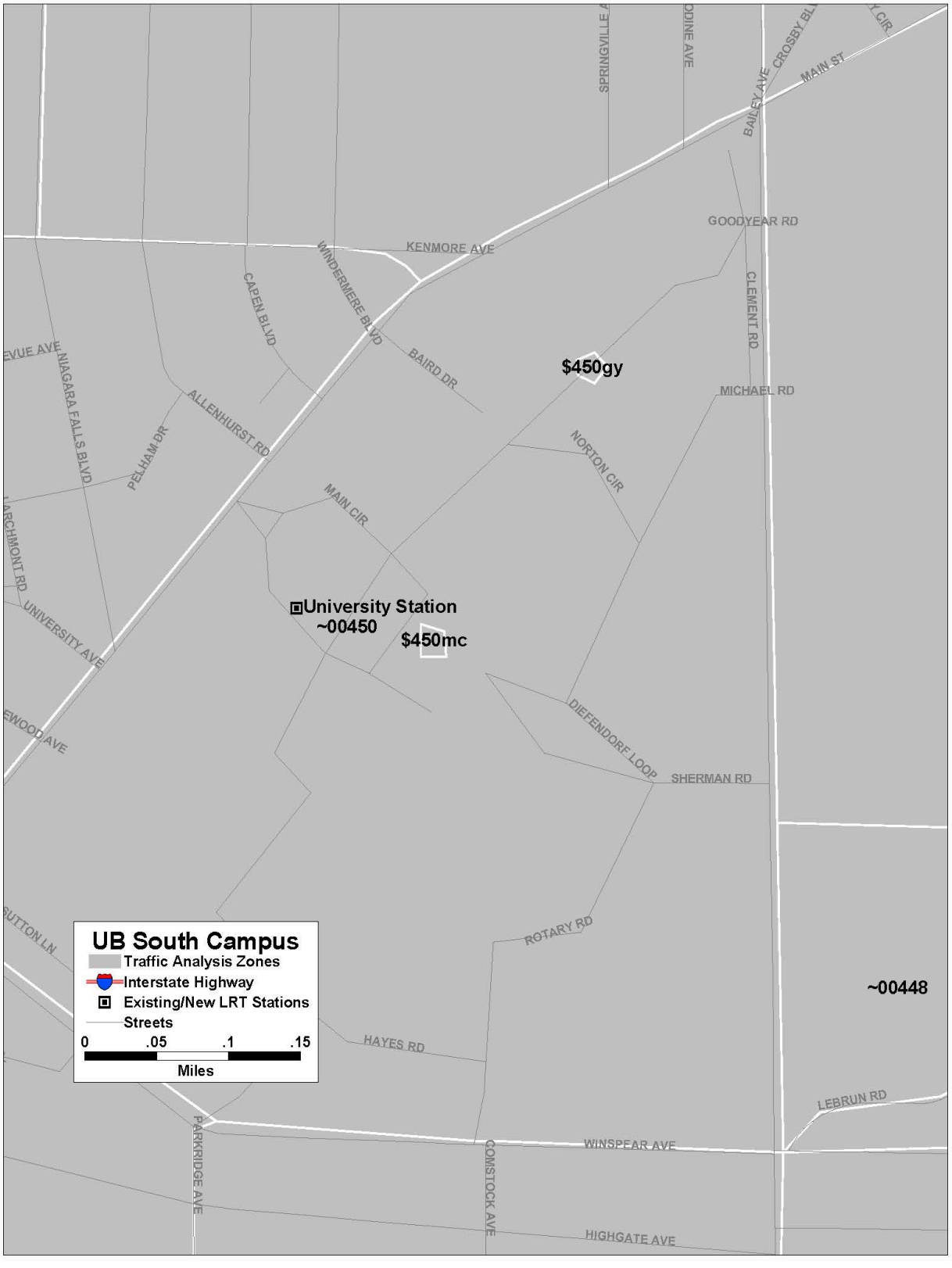


Figure C-4. Zone System in University at Buffalo North Campus

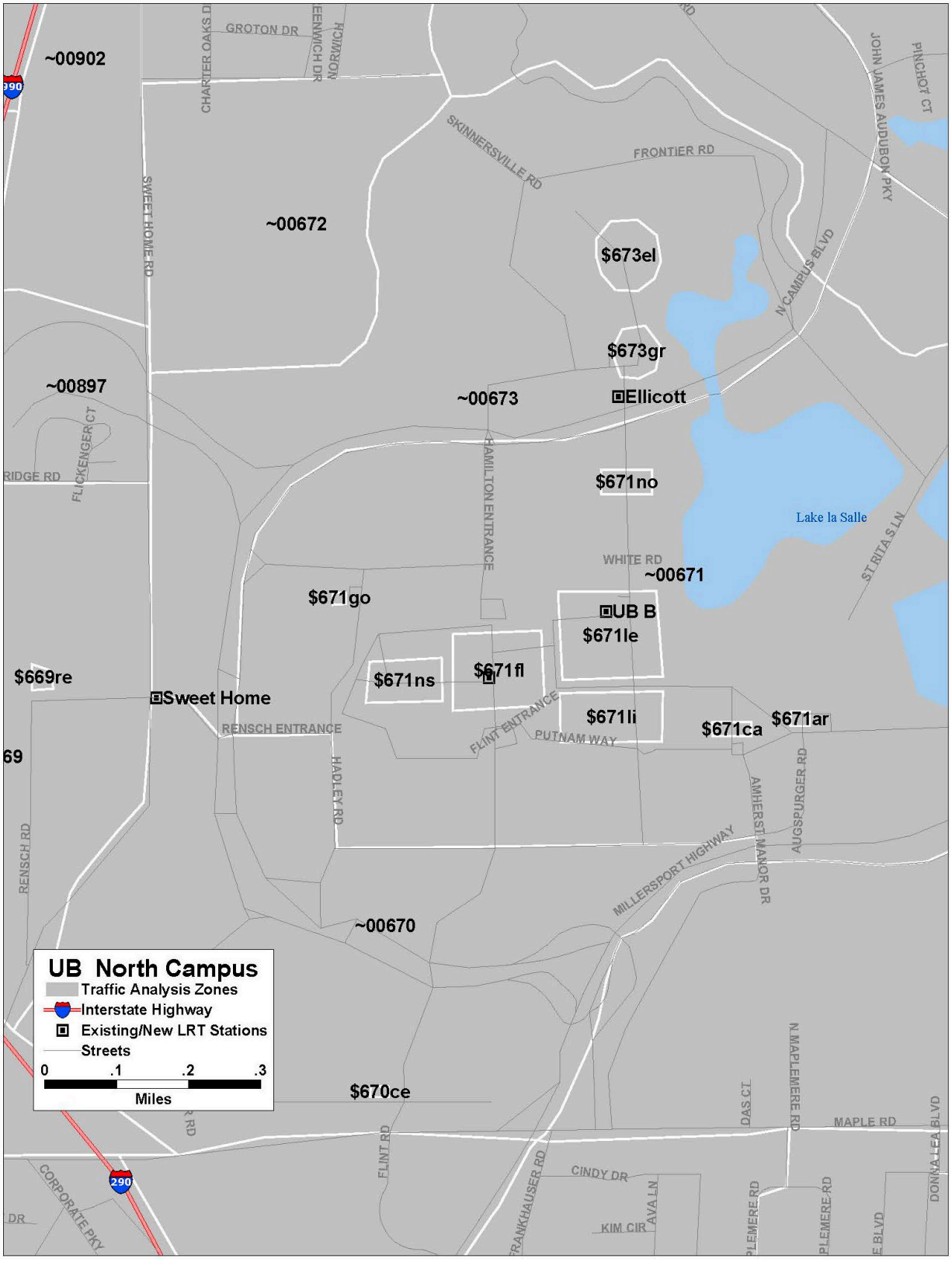


Figure C-5. District System in the Existing Buffalo-Amherst-Tonawanda Metro Transit Expansion Corridor

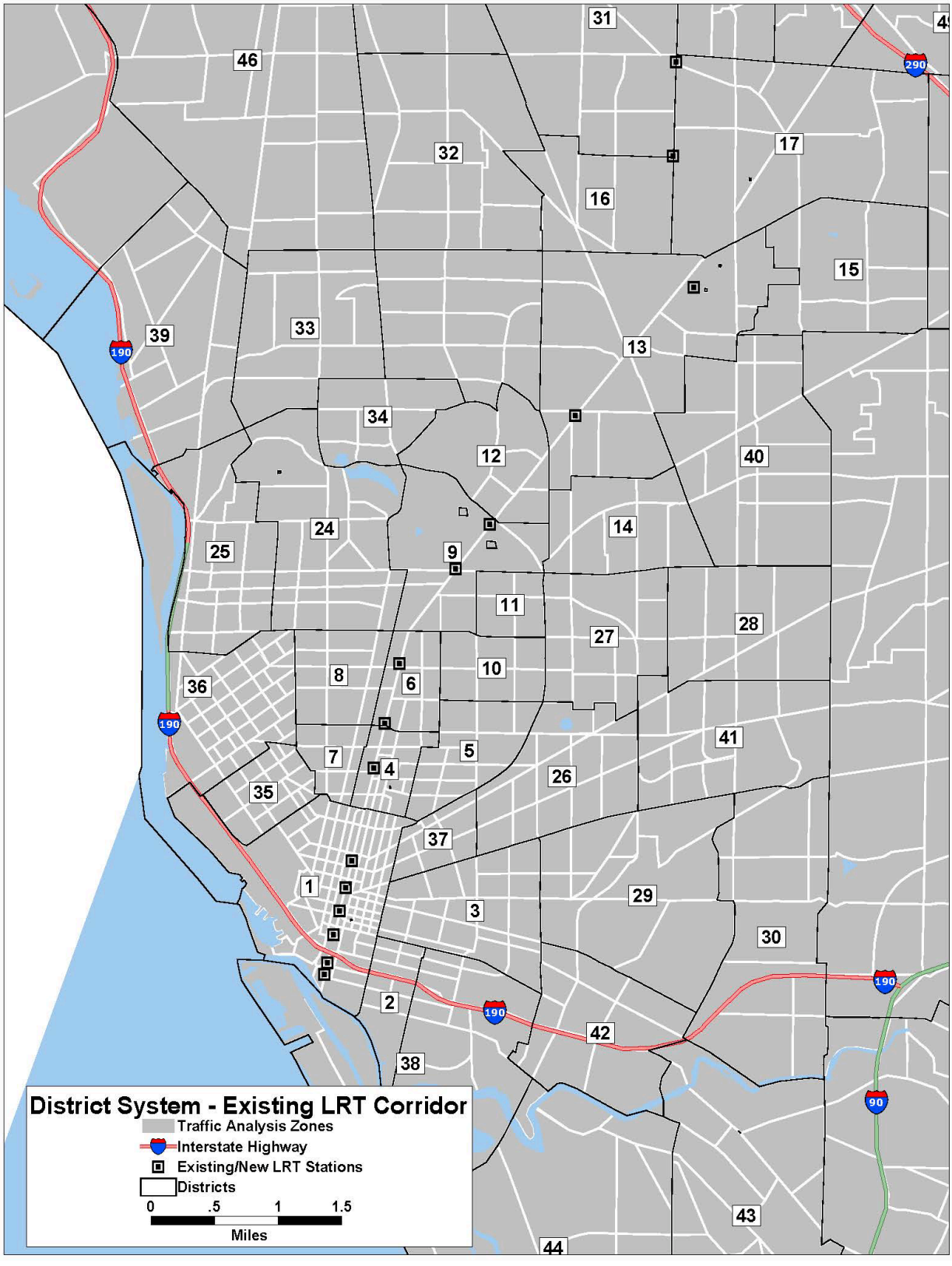
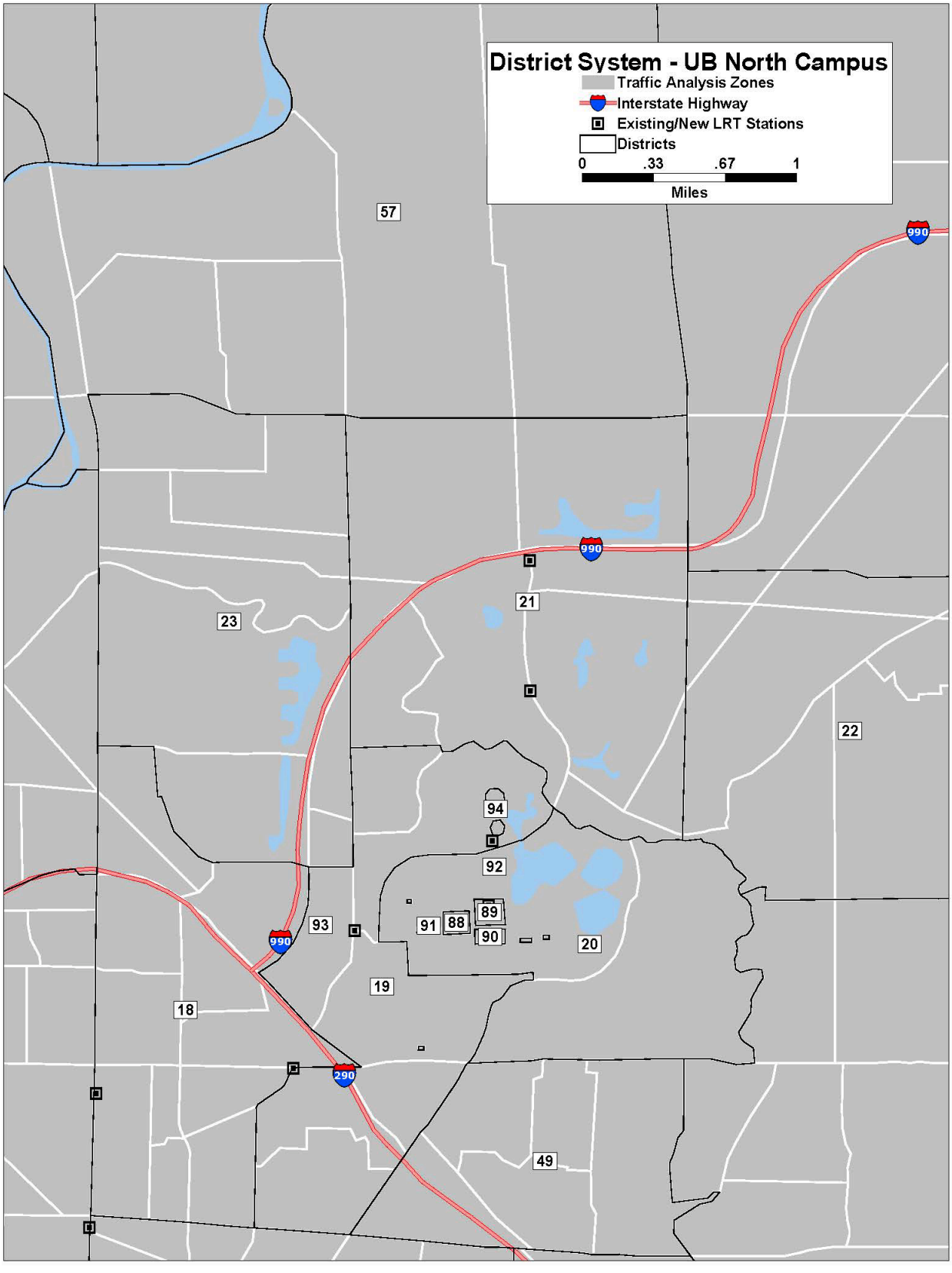


Figure C-6. District System in the University at Buffalo North Campus Area



C.1.2 Population and Employment Forecasts

Population and employment projections were provided by GBNRTC for 2015, 2030, and 2040. Intermediate years were interpolated. Table C-1 presents a summary of base year and forecast year population and employment by district and organized into four broad categories: the existing Metro Rail corridor, the Project corridor, other GBNRTC zones, and special-market zones. As this table shows, population in the existing Metro Rail corridor is projected to grow by 12 percent while employment is expected to grow by 31 percent between 2017 and 2040. The Project corridor is expected to grow at a more moderate rate—2 percent for population and 12 percent for employment between 2017 and 2040. Regional growth in population is expected to equal 2 percent for population and 15 percent for employment between 2017 and 2040.

Table C-1. Summary of Population and Employment by District

District	Population			Employment		
	2017	2040	Change	2017	2040	Change
1-CBD	6,940	8,901	28%	32,075	40,391	26%
4-LRT1	1,322	2,216	68%	10,822	19,453	80%
6-LRT2	2,795	3,236	16%	2,569	2,890	12%
7-wLR1	3,780	3,296	-13%	4,218	5,247	24%
8-wLR2	6,466	6,514	1%	5,175	5,558	7%
9-BFL20	5,349	5,982	12%	3,542	3,839	8%
12-BF20N	3,311	3,301	0%	3,818	3,822	0%
Subtotal, Existing Buffalo-Amherst-Tonawanda Metro Transit Corridor	**29,963**	**33,446**	**12%**	**62,219**	**81,200**	**31%**
13-LRT4	17,854	18,861	6%	11,613	12,854	11%
17-NofUB	13,740	13,533	-2%	7,036	8,378	19%
18-BlvdM	3,933	3,926	0%	11,192	12,525	12%
19-EofUB	6,751	7,265	8%	6,726	5,594	-17%
20-UBamh	536	534	0%	6,929	7,695	11%
21-AMH42	7,051	7,069	0%	8,988	11,321	26%
31-GrnAc	14,548	14,646	1%	5,401	6,216	15%
Subtotal, Proposed Buffalo-Amherst-Tonawanda Metro Transit Corridor	**64,413**	**65,834**	**2%**	**57,885**	**64,583**	**12%**
Subtotal, Other	**1,037,104**	**1,051,356**	**1%**	**536,898**	**611,024**	**14%**
Special Zones	**235**	**261**	**11%**	**646**	**706**	**9%**
TOTALS	**1,131,715**	**1,150,897**	**2%**	**657,648**	**757,513**	**15%**

Source: GBNRTC Population and Employment Projections Summarized to STOPS Districts

A key driver for future-year ridership for the Project would be future enrollment and employment at UB and the degree to which academic programs would be located so that they require more or less commuting by students and faculty between different campuses. During the data gathering phase, UB indicated that enrollment projections were not available for 20 years into the future. Instead, we have asserted a 10 percent growth factor to acknowledge modest growth potential at UB, which was an acceptable compromise to all parties.

C.1.3 Highway Characteristics

GBNRTC provided highway travel time skims for 2015 and 2040, which were checked against online mapping estimates. During this review, it was determined that a fixed addition of 3 minutes to all travel times would be useful for improving the estimate of highway impedances, particularly for shorter trips. This fixed quantity was added to the highway skims as the input data files were being prepared. The resulting times required an adjustment factor of 0.93 to match online times. This adjustment was accomplished using the STOPS auto-time adjustment parameter.

Table C-2 summarizes existing, online and adjusted highway times in minutes for a selection of TAZs. The column labeled "Original GBNRTC Skim" shows the modeled skim times before the adjustment, the 'Online Estimate' shows travel times calculated using an online driving direction algorithm, and the 'Adjusted Skim Value' column shows the updated skim times following the two-step adjustment.

Table C-2. Comparison of Modeled Highway Travel Times to Online Estimates of Highway Times to Central Business District

Origin TAZ	Nearby Intersection	Original GBNRTC Skim (min)	Online Estimate (min)	Adjusted Skim Value (min)
177	Porter Avenue/Plymouth Avenue	5.6	11.5	7.9
204	Jefferson Avenue/Northampton Street	5.8	8.8	8.1
511	Broadway/Herman Street	5.4	8.1	7.8
291	S Park Avenue/Louisiana Street	4.2	6.1	6.7
363	Amherst Street/SR 384	10.6	12.8	12.6
439	Kensington Avenue/Eggert Road	10.8	14.1	12.8
762	William Street/SR 240	11.5	15.5	13.4
561	S Park Avenue/US 62	9.6	14.8	11.7
667	***I 290/I990 (Near UB North Campus)***	**23.3**	***22.6***	***24.4***
1243	Clarence Center Road/SR 78	34.5	38.8	34.8
1454	William Street/Bowen Road	32.7	29.6	33.1
1040	US 20/SR 240	23.2	26.6	24.3
1371	Kinne Road/Waterman Road	48.7	42.0	48.0
1569	SR 5/Bamum Road	46.3	48.8	45.7
1595	Omphallus Road/SR 391	39.5	30.9	39.4

Source: GBNRTC and STOPS Adjustments

Highway skims contain one set of manual edits to represent detailed travel times between split zones on the UB North Campus. Distances were particularly important since they are used to represent the walk-all-the-way option. These distances were measured using online mapping programs to the centroid of each split zone.

C.1.4 Transit Supply

Transit supply is represented by the following elements:

- Metro Bus and Rail services as contained in the October 2017 Metro schedules in General Transit Feed Specification (GTFS) format for the base-year calibration and October 2018 Metro schedules for the No Build Alternative and as the beginning point for developing the Project.

- Fall 2018 UB Stampede, Red Line, Yellow Line and UB North Campus Shuttle as published on the UB web site and manually converted to GTFS format. Services coded in the GTFS files include the UB Stampede, North–South Express, Lee–Ellicott Express, and the UB North Campus Shuttle. Other services connect residential areas to the UB North Campus and neither the supply nor demand are represented inside STOPS. Metro and UB are coordinating and anticipate executing a Memorandum of Understand between the two parties as it relates to the Project. For the purposes of evaluating travel demand, it has been assumed that the UB Stampede and North–South Express routes would be eliminated for the Project, leaving only the Lee-Ellicott Express and UB North Campus Shuttle as UB shuttle services after the Project is implemented.

- A walk network based on a geographic database of individual streets in the modeling area with extra detail on the UB North Campus to represent internal walking opportunities.

- A station file with one station record for each bus or rail stop ID in the GTFS datasets. Key codes for each station included the following:

  – GTFS stop_id(s).

  – Year 2017-2018 average weekday boardings at the station/bus stop level

  – Station group definitions that correspond to the district for Metro bus stops. LRT stations and UB stops have individual station groups to facilitate reporting.

  – STOPS type set to the following:

    - Bus stops and surface LRT stations were coded as 1.
    - Underground LRT stations were coded as 3, 5, or 7, depending on their depth.
    - Station platforms less than 25 feet below the surface (no current stations) were treated as level "-1" and were assigned a type of 3.
    - Station platforms between 26 and 50 feet (LaSalle, Amherst, Utica, Summer-Best, and Allen/Medical Campus) were treated as level "-2" and were assigned a type of "5".
    - Stations deeper than 50 feet (University, Humboldt, and Delavan-Canisius) were treated as level "-3" and were assigned a type of "7".

  – Metro Rail services with route_type equal 1 were recoded so that Metro Rail services were always represented as full fixed guideway.

  - All park & ride lots in region were coded. However, the park & ride lot at University Station from the UB Stampede market run was excluded to prevent unlikely campus-to-campus trips parking at the University Station park & ride lot.

- The fare structure was coded as follows:
  - Metro services (except free services as described below) were coded as one-half of the day pass fare (i.e., $2.50) and any additional transfers are free. Although a one-trip ride costs just $2.00, this simpler structure was within $0.50 of the lowest fare available to the general public and avoided problems with over-estimating the cost of transfers under a variety of situations related to the specific pass types that are purchased.
  - UB Stampede services were assumed to be free to travelers within the UB North Campus and between the UB North and UB South Campuses.
  - Free LRT services (downtown Buffalo Fare-Free LRT zone and future LRT services that will replace the existing UB Stampede bus) were duplicated as separate LRT lines in a different GTFS file. These services were assigned with a suffix of "F" or "f" and were assumed in the fare structure file to be free.[3]
  - The value of time was assumed to be $9 per hour. This value was chosen to replicate the distribution of ridership between services that charge a fare and those that are free. This value is lower than the STOPS default of $12/hour but appears appropriate given the high proportion of transit-dependent riders.

C.1.5 Transit Demand

As noted above, the STOPS application was split into two elements:

- A synthetic STOPS application to represent general transit (i.e., Metro) ridership
- An incremental application to represent UB Stampede usage.

This approach was selected because the transit market in the Project corridor is not sufficiently robust in all locations to support the incremental method. In particular, the Boulevard Mall is slated for major redevelopment and project areas north of the UB North Campus have little or no transit service. By contrast, the UB market is robust and is a highly specialized market that is better represented using the incremental form of STOPS and an estimate of existing UB Stampede transit trips.

[3] UB Stampede Market forecasts assume that any LRT or BRT service replacing the current services will be free to students and employees who make trips within or between campuses. The separate forecasts developed for this market included GTFS file sets that coded this service as free. Riders of Metro rail service are assumed to pay regular fare.

Metro Market

The synthetic model uses estimates of travel demand from the CTPP and data on transit ridership in the form of route and bus stop/rail station counts. Optionally, it can also use estimates of linked transit trips by purpose and auto ownership to develop a better understanding of the reasons for making transit trips and the socioeconomic characteristics of transit riders.

For the Project, transit-linked trips by purpose and auto ownership were estimated from the 2013 NFTA onboard survey. Although a more recent survey was conducted, it was not weighted to represent total transit ridership. The older (2013) survey was weighted to represent 2013 and modest weighting adjustments could be used match 2017 ridership. Tables C-3 and C-4 present a route-level summary of the survey reweighting process.

Table C-5 presents a summary of the 2017 NFTA trip table developed from the 2013 survey.

Table C-3. Metro Weekday Route Ridership for 2013 and FY2018 and Adjustment to the Onboard Survey (Part 1 of 2)[4]

Route	Original 2013 Sum of Weights	2017-2018 Average Weekday Ridership	Adjustment to Survey to Represent 2018
1-William	1,642	1,466	0.89
2-Clinton	1,597	1,455	0.91
3-Grant	5,858	4,956	0.85
4-Broadway	2,818	2,564	0.91
5-Niagara/Kenmore	6,855	5,616	0.82
6-Sycamore	2,768	2,435	0.88
7-Baynes/Richmond	350	224	0.64
8-Main	1,318	1,442	1.09
11-Colvin	992	920	0.93
12-Utica	5,604	5,183	0.92
13-Kensington	3,396	2,828	0.83
14-Abbott	1,815	1,658	0.91
15-Seneca	2,090	2,170	1.04
16-South Park	1,954	1,853	0.95
18-Jefferson	758	514	0.68
19-Bailey	4,503	4,296	0.95
20-Elmwood	5,109	4,269	0.84
22-Porter/Best	1,171	1,321	1.13
23-Filmore/Hertel	4,915	4,579	0.93
24-Genesee	3,106	2,739	0.88
25—Delaware	3,177	2,680	0.84
26-Delevan	3,257	2,633	0.81
29-Wohlers	170	138	0.81
32-Amherst	3,170	2,915	0.92
34-Niagara Falls Blvd	1,647	1,159	0.70
35-Sheridan	774	597	0.77
36-Hamburg	736	633	0.86
40-Grand Island	1,271	1,332	1.05
42-Lackawamna	138	153	1.11
44-Lockport	747	633	0.85
45-Metro Rail	21,564	15,186	0.70
46-Lancaster	265	356	1.34
47-Youngs Road	512	375	0.73
48-Williamsville	940	822	0.87
49-Millard Suburban	154	227	1.47
50-Main/Niagara	495	494	1.00

Source: Analysis of 2013 Survey and NFTA

[4] Routes 27,57,201 and 211 were eliminated between 2013 and 2017 are not included in this table or adjusted to represent ridership in 2018.

Table C-4. Metro Weekday Route Ridership for 2013 and FY2018 and Adjustment to the Onboard Survey (Part 2 of 2)

Route	Original 2013 Sum of Weights	2017-2018 Average Weekday Ridership	Adjustment to Survey to Represent 2018
52-Hyde Park	306	274	0.90
54-Military	121	82	0.68
55-Pine Avenue	1,175	986	0.84
60-Niagara Falls Express	85	57	0.67
61-North Tonawanda Express	52	43	0.83
64-Lockport Express	67	39	0.58
66-Williamsville Express	97	75	0.77
67-Cleveland Hill Express	71	65	0.92
68-George Urban Express	26	21	0.81
69-Alden Express	63	48	0.76
70-East Aurora Express	62	38	0.61
72-Orchard Park Express	48	36	0.75
74-Hamburg Express	123	100	0.81
75-West Seneca Express	65	66	1.02
76-Lotus Bay Express	146	144	0.99
79-Tonawanda Express	28	30	1.07
81-Eastside Express	51	37	0.73
204-Airport/Downtown Express	130	117	0.90
206-Buffalo State Circulator	42	40	0.95
TOTALS	100,837	85,562	0.85

Source: Analysis of 2013 Survey and NFTA

Table C-5. Estimated Weekday Metro Linked Transit Trips by Purpose and Auto Ownership, FY 2018

Purpose	0-Car Households	1-Car Households	2+ -Car Households	Total
Home-Based Work	14,168	5,926	2,930	**23,024**
Home-Based Other	17,862	5,801	2,462	**26,125**
Non Home Based	8,186	2,564	1,574	**12,324**
TOTALS	**40,216**	**14,291**	**6,966**	**61,473**

Source: 2013 NFTA Survey and FY2018 Route-Level Counts

UB Stampede Market

UB Stampede ridership patterns were developed from a survey conducted in October 2014 and reweighted to match UB Stampede boarding and alighting counts from September to October 2018 and then further allocated to assign station-level trips to representative origin and destination zones within the UB North and South Campuses. The process was based on an iterative proportional fitting (IPF) technique and was done in stages to limit the incidence of very large adjustment factors that would distort the resulting trip table (shown in Table C-7).

Specific steps are as follows:

Convert the unweighted 2014 UB Stampede survey into a stop-to-stop trip table. This table has a total of 4,339 survey records suitable for use in developing trip tables (approximately one-third of all UB Stampede riders).

Estimate 2018 station-level boardings as equal to the counted boardings and alightings divided by two. Remove trips from the calibrated NFTA model that elect to use the UB Stampede shuttle bus. These are typically trips that access the South Campus by Metro transit services and then transfer to the UB Stampede. Stop count data and the resulting estimate of average September-October 2018 ridership is presented in Table C-6.

Merge the estimate of Ellicott and Greiner stations into a single number (the survey had no records boarding or alighting at Greiner). These stops are close to one another and serve similar markets. The Ellicott/Greiner split will be estimated from survey origins and destinations in a later step.

Use an IPF technique to adjust the survey trip table to match counts but limit the goal for growth to 2.03-the growth needed to match demand at Main Circle and Goodyear (the two South Campus Stations). This goal is enough to closely match all stations except Ellicott/Greiner and Flint/Lee Loop which require a much higher adjustment factor to match the survey to counts. This deficiency of surveyed Ellicott/Greiner-Lee/Flint Loop trips in the survey database is most likely a result of the very short trip times (6 minutes) which are frequently under-represented in transit surveys due to the lack of enough time to distribute, complete, and collect surveys. So that this under-sample did not distort the remaining trip table, factoring of these markets was limited to the adjustment applied on longer distance trips. Then Ellicott/Greiner-to-Lee/Flint trips were manually added back in the next step to match control totals.

Add trips to represent under-sampled journeys and match counted ridership

Ellicott-Lee Circle – 350 trips

Lee Circle-Ellicott – 200 trips

Flint (area) - Ellicott – 100 trips

Maynard-Flint Circle – 50 trips

Ellicott-Flint – 100 trips

Allocate services with limited UB North Campus station stops (i.e., those where the stop may not be indicative of the final destination) to origins and destinations according to distributions obtained from the survey:

Redistribute 5.1 percent of Ellicott trip-ends from Lee-Ellicott express to Greiner Hall

Redistribute 39.8 percent of Lee Circle trip-ends from Lee-Ellicott express to Flint Loop area (20.3%), Library (9.5%), Center for the Arts (1.3%), Arena (2.4%), and Natural Sciences Complex (6.3%)

Redistribute 21.5 percent of Flint Circle trips ends from UB Stampede service to Lee Loop area (8.9%), Library (5.7%), Arena (1.2%), Center for the Arts (0.3%) and the Natural Sciences Complex (5.3%)

The resulting table of 2018 station-to-station UB Stampede trips are shown in Table C-7.

UB Stampede trips are distributed to home-based other and non-home-based trip purposes and to auto ownership groups according to the university-related purposes found in the 2013 NFTA onboard survey. These percentages are as follows:

- Home-Based Other
  - 0-car households: 39 percent
  - 1-car households: 26 percent
  - 2+ car households: 14 percent
- Non-Home-Based
  - 0-car households: 11 percent
  - 1-car households: 5 percent
  - 2+ car households: 5 percent

Workers making trips to UB facilities will generally ride Metro transit services as part of their journey and these home-based work trips are captured in the NFTA onboard survey. Table C-6 summarizes the UB Stampede trips developed from the UB Stampede survey and ridership counts.

Table C-6. September to October UB 2018 Stampede Weekday Ridership (Unlinked Trips)

Station	Ons	Offs	Average Boardings (ons+offs)/2	Adjustment to avoid double-counting from NFTA Model	Final Estimated Boardings
Clement	22	83	53	—	53
Ellicott Tunnel	2,166	1,954	2,060	-4	2,056
Flint Loop	2,789	2,979	2,884	-99	2,785
Goodyear	1,333	1,189	1,261	-36	1,225
Governors	263	224	244	-43	201
Greiner Hall	43	335	189	—	189
Hadley Village	1	50	26	—	26
Lee Loop	2,341	1,840	2,091	—	2,091
Main Circle	1,772	1,736	1,754	-323	1,431
Maynard	184	29	107	-223	10*
Service Center Road.	241	68	155	-88	67
Tops International	1	—	1	—	1
Wegman S	54	87	71	—	71
TOTALS	**11,210**	**10,574**	**10,892**	**-816**	**10,203**

Source: UB Stampede Passenger Counts

* Full adjustment to account for trips in the NFTA portion of the model could not be applied because the trips to be removed exceeded the number of trips in the UB Stampede database. Ten trips were retained in the database so that factoring procedures would continue to work properly. This action resulted in the final database having approximately 130 more trips than originally intended. This variance is well within the precision of counted ridership estimates.

Table C-7. Estimated University at Buffalo Weekday Linked Origin-Destination Trips, 2018

Station	Ellicott Dorms	Greiner	Lee Loop	Gov Hall	Flint Loop	Ctr Tomw	Mayn Drive	Good year	Main Circ	Library	Arena	Ctr Arts	NSC	Total
Ellicott Dorms	—	—	848	35	789	3	1	123	175	267	66	34	183	**2,524**
Greiner	—	—	100	2	18	0	0	7	9	-	-	-	-	**137**
Lee Loop	459	45	19	48	44	12	2	215	250	10	2	1	9	**1,115**
Governors Hall	40	2	14	-	60	3	1	37	32	6	1	0	5	**200**
Flint Loop	1,024	55	30	48	87	32	5	643	725	13	3	2	10	**2,676**
Center for Tomorrow	7	0	5	3	39	-	-	2	3	3	1	0	3	**66**
Maynard Drive	0	0	1	0	8	0	-	0	-	1	0	0	1	**10**
Goodyear Hall	79	4	101	12	695	1	0	-	23	56	12	4	50	**1,036**
Main Circle/ Health Library	86	5	131	17	817	5	0	15	-	68	15	5	61	**1,224**
Library	171	-	7	14	20	4	1	81	93	—	—	—	—	**391**
Arena	41	-	2	3	5	1	0	19	22	—	—	—	—	**92**
CtrArts	18	-	1	2	3	0	0	8	9	—	—	—	—	**40**
NSC	130	-	6	10	14	3	1	65	74	—	—	—	—	**303**
TOTALS	**2,054**	**111**	**1,264**	**192**	**2,597**	**65**	**10**	**1,213**	**1,417**	**423**	**101**	**46**	**321**	**9,815**

Source: UB 2014 Stampede Survey Adjusted to Match 2018 Counts

Table C-8. Estimated Weekday UB Stampede Linked Transit Trips by Purpose and Auto Ownership, FY 2018

Purpose	0-Car Households	1-Car Households	2+ -Car Households	Total
Home-Based Work	—	—	—	—
Home-Based Other	3,856	2,525	1,350	**7,731**
Non Home Based	1,221	485	478	**2,184**
TOTALS	**5,077**	**3,010**	**1,828**	**9,915**

Source: 2014 UB Stampede Survey and 2018 Stop-Level Counts

C.1.6 STOPS Application

STOPS reads the transportation supply-and-demand information described above and automatically calibrates itself so that the base-year/existing simulation (i.e., current year estimate of transit ridership related to existing transit schedules) matches both linked and unlinked transit trip estimates developed from survey and count databases. Initial runs of the model were made without using the count-based adjustment procedures to confirm that the model had no major problems with the representation of transit service or ridership. Final runs were made using the count-based adjustment procedures and result in base-year STOPS ridership estimates that closely match counted ridership for groups of bus or rail stops and for individual routes.

C.1.7 Validation

The final base-year run was examined to confirm that the model has an appropriate grasp of the key markets that are the basis for the forecasts. Where available, model results with and without count-based adjustment were examined to confirm that the underlying model understands transit markets in the region and that the count-based adjustments serve as a minor tune-up rather than a broad (and possibly inaccurate) revision to the underlying travel data.

Validation results are presented in Table C-9. Key findings are as follows:

- The model properly represents the ratio of unlinked to linked Metro trips before and after the application of counts. This means that the willingness to transfer is appropriately represented and that count adjustments are not dramatically changing the nature of transit travel from that which is derived from the CTPP.
- The modeled UB Stampede ridership properly represents travel between the UB North and UB South Campuses, which comprise the largest single market for the Project. Nearly all of these riders are candidates for diversion to the extended Metro system. Travel within the UB North Campus is also appropriately represented and many of these riders may also be diverted to the Project.
- Existing LRT ridership is properly represented. The model closely matches ridership at the University Station, other stations in different segments of the line, within the fare-free zone downtown, and for park & ride access as compared to other access modes. For the most part, these markets are well represented before and after count-based adjustment. One exception is within-downtown trips before station adjustment. This is not unexpected since the CTPP Journey-to-Work tables don't include non-home-based circulation trips that are a sizable

proportion of these fare-free trips. The count-based adjustment largely corrects this shortcoming and the final estimate of intra-downtown trips more closely matches count data.

- STOPS generates a close match to observed bus trips on a route-by-route basis after count-based adjustment. The model overestimates these trips before the count adjustment suggesting that the model naturally overestimates transit ridership in the Project corridor. However, the count-based adjustment successfully calms this tendency before its use in forecasting ridership for the Project.
- STOPS closely replicates regional distributions of trips by purpose and auto ownership.

Table C-9. Validation Summary

Test (source of observed data and relevance)	Observed Value	Initial Model (Before Count Adjustment)	Final Model (After Count Adjustment)
Ratio of linked to unlinked Metro trips (2013 NFTA survey, demonstrates understanding of willingness to transfer)	1.39	1.36	1.33
North Campus-South Campus UB Stampede Ridership (**Sum** of Metro and UB Stampede Markets, based on September-October 2018 UB Stampede boardings+ alightings at Goodyear & Main Circle, largest potential market for the Proposed Project)	6,030		5,686
Other UB Stampede Ridership (September-October 2018 UB Stampede ridership, potential for some of these riders to shift to the Proposed Project)	4,862		5,538
LRT Boardings by line segment (FY 2018 NFTA counts, shows that STOPS reflects overall ridership and geographic distribution of trips)			
University Station	2,728	3,810	2,820
LaSalle-Amherst Stations	1,941	3,217	2,074
Humboldt-Allen-Medical Campus Stations	4,563	4,860	4,964
Fountain Plaza-Special Events Stations (CBD)	5,954	4,956	5,939
TOTAL LRT RIDERSHIP	**15,186**	**16,844**	**15,797**
LRT trips in downtown free-fare zone (FY2018 directional station boarding/alighting counts, reflects usage of LRT as circulator)	2,092	818	1,710
Park-and-Ride Linked Trips (2013 NFTA survey adjusted to FY2018 Counts, indicates strength of park & ride market)			
Trips Using LRT	1,364		1,350
Bus-Only Trips	461		435
ALL TRANSIT TRIPS	**1,825**		**1,785**
Corridor and non-corridor bus route ridership (FY2018 NFTA ridership counts, indicates market potential for transit in corridor)			
Route 34	1,159	1,873	1,155
Route 35	597	1,577	590
Route 44	633	1,722	630
Route 49	227	1,144	270
All Corridor Routes	2,616	6,316	2,644
Non-Corridor Routes	67,982	60,174	67,332
ALL BUS ROUTES	**73,214**	**72,806**	**72,620**
Metro linked transit trips by purpose (2013 NFTA survey adjusted to FY2018 Counts, indicates relative size purpose-specific markets)			
Home-Based Work	23,024		21,093
Home-Based Other	26,125		31,134
Non Home Based	12,324		14,421
TOTAL	**61,473**		**66,648**
Metro linked transit trips by autos owned (2013 NFTA survey adjusted to FY2018 Counts, indicates number of transit-dependent riders)			
0 car households	40,217		43,457
1 car households	14,291		16,072
2+ car households	6,966		7,120
TOTAL	**61,474**		**66,649**[5]

[5] Small differences (+/- One) in total unlinked ridership by purpose and unlinked ridership by auto ownership is the result of rounding.

C.2 CHANGES IN 2024

This section documents model elements that have been updated using more recent, post-pandemic data to implement forecasts that more closely reflect current transit market dynamics. With consideration to the special nature of the UB market, count data collected in October 2023[6] were used for the route and stop-level ridership.

Population and employment projections, provided by GBNRTC, were updated for the base year from 2017 to 2020 and for the forecast year from 2040 to 2045. Table C-10 summarizes the population and employment data for the base and forecast years by district, organized into four broad categories: the existing Metro Rail corridor, the Project corridor, other GBNRTC zones, and special-market zones.

As shown in the table, the population in the existing Metro Rail corridor is projected to grow by 10 percent while employment is expected to grow by 25 percent between 2020 and 2045. The Project corridor is expected to grow at a more moderate rate of 2 percent for population and 6 percent for employment between 2020 and 2045. Regional population is forecasted to grow by 2 percent, and employment is forecasted to grow by 15 percent between 2020 and 2045. These growth proportions are overall nearly identical to the forecasts used for the calibration process and shown in Table C-1; however, notable changes at the district level occur in some of the existing Metro Rail areas where both population and employment projections have modestly decreased. This pattern seems reasonable given that many central business districts throughout the country have shed jobs since the pandemic.

[6] Small zone structure representing the project (See Figure C-3 Figure C-4) updated ACS, and large ridership growth (Table C-14) generated anomalous results. Reverting to 2019 model specifications generated results that are more consistent with the observed growth patterns in the project area.

Table C-10. Summary of Population and Employment by District

District	Population			Employment		
	2020	2045	Change	2020	2045	Change
1-CBD	7,080	8,789	24%	34,470	41,874	21%
4-LRT1	1,321	2,082	58%	11,655	19,857	70%
6-LRT2	2,968	3,338	12%	2,740	2,937	7%
7-wLR1	4,055	3,591	-11%	4,464	5,434	22%
8-wLR2	6,618	6,700	1%	5,559	5,627	1%
9-BFL20	5,531	6,049	9%	3,864	3,909	1%
12-BF20N	3,256	3,301	1%	4,095	3,818	-7%
Subtotal, Existing Buffalo-Amherst-Tonawanda Metro Transit Corridor	**30,829**	**33,850**	**10%**	**66,847**	**83,456**	**25%**
13-LRT4	17,496	18,847	8%	12,455	13,042	5%
17-NofUB	13,417	13,547	1%	7,459	8,523	14%
18-BlvdM	4,061	4,108	1%	11,690	12,621	8%
19-EofUB	47	52	11%	799	312	-61%
20-UBamh	6068	5701	-6%	12,121	10,999	-9%
21-AMH42	6,934	7,067	2%	9,578	11,751	23%
31-GrnAc	14,362	14,344	0%	5,730	6,279	10%
Subtotal, Proposed Buffalo-Amherst-Tonawanda Metro Transit Corridor	**62,385**	**63,666**	**2%**	**59,832**	**63,527**	**6%**
Subtotal, Other	**1,043,773**	**1,054,253**	**1%**	**569,607**	**616,724**	**8%**
Special Zones	**2,000**	**2,000**	**0%**	**2,110**	**2,110**	**0%**
Totals	**1,138,987**	**1,153,769**	**1%**	**698,396**	**765,817**	**10%**

C.2.1 Transit Supply

Transit supply is represented by the following elements:

- Transit service coded in GTFS format:
  - NFTA: Initial tests were run using October 2023 schedules for the No Build Alternative, which produced unrealistic forecasts. This was attributed to major service reductions to NFTA routes introduced since 2018 (See Table C-12 and Table C-13). It was found that by layering new high-capacity transit within a model calibrated to pre-pandemic demand conditions, the resulting ridership forecasts were unreasonably inflated (did not consider post-pandemic conditions). Specifically, Metro has reduced transit service post pandemic, creating a condition of unmet transit demand. To circumvent this, it was decided to revert the existing, no-build, and build NFTA networks to 2018 NFTA schedules, which generated more realistic forecasts.

  - UB: The Stampede, Red Line, Yellow Line, and UB North Campus Shuttle schedules were taken from the UB website and manually converted to GTFS format. Although reasonable efforts were made to produce a GTFS file set that accurately portrayed fall 2023 service using online published schedules and driver-provided count data, reconciling these sources proved difficult. As a result, the forecasts used the 2018 GTFS dataset, which reasonably approximates current service. Services coded in the GTFS files include the UB Stampede, North–South Express, Lee–Ellicott Express, and the UB North Campus Shuttle. Other services connect residential areas to the UB North Campus and neither the supply nor demand are represented inside STOPS. The UB Stampede and North–South Express routes would be eliminated for the Project, leaving only the Lee-Ellicott Express and UB North Campus Shuttle as UB shuttle services after the Project is implemented.

- A walk network that matches the version used in calibration.
- A station file with one station record for each bus or rail stop ID in the GTFS datasets. Key codes for each station matched those used in the calibration steps and described in Section C.1.
- Metro Rail services with route_type equal to 1 were recoded so that Metro Rail services were always represented as full fixed guideway. The BRT was modelled as a partial fixed guideway equal to 20 percent of full fixed guideway effects.
- All park & ride lots in the region were coded and matched the files used in the calibration steps and is described in Section C.1.
- The fare structure matched the file used in the calibration steps and is described in Section C.1.

C.2.2 Transit Demand

Same as the 2018 model, the STOPS application was split into two elements:

- A synthetic STOPS application to represent general transit (i.e., Metro) ridership
- An incremental application to represent UB Stampede usage.

For both models, the stop and route level ridership counts have been updated to reflect Fall 2023 average weekday ridership.

Metro Market

Table C-11 presents a summary of the 2017-2018 NFTA and fall 2023 weekday average boardings. Compared to the 2017-2018 average weekday ridership, all routes experienced a decline in ridership in 2023, except for route 42-Lackawanna. Overall, there was a 34 percent decrease in ridership from 2017 to 2023. Although the drop in ridership is significant, it is generally consistent with many other US transit markets that have seen similar declines in weekday ridership following COVID.

Table C-11. Metro Average Weekday Route Ridership for 2017/2018 and 2023

Route	2017-2018 Average Weekday Ridership	Spring 2023 Average Weekday Ridership	Change
1-William	1,466	935	-36%
2-Clinton	1,455	1,144	-21%
3-Grant	4,956	2,790	-44%
4-Broadway	2,564	1,554	-39%
5-Niagara/Kenmore	5,616	3,400	-39%
6-Sycamore	2,435	1,431	-41%
7-Baynes/Richmond	224	---	---
8-Main	1,442	1,214	-16%
11-Colvin	920	698	-24%
12-Utica	5,183	3,160	-39%
13-Kensington	2,828	1,365	-52%
14-Abbott	1,658	1,087	-34%
15-Seneca	2,170	1,255	-42%
16-South Park	1,853	1,736	-6%
18-Jefferson	514	468	-9%
19-Bailey	4,296	2,852	-34%
20-Elmwood	4,269	2,435	-43%
22-Porter/Best	1,321	1,198	-9%
23-Filmore/Hertel	4,579	3,395	-26%
24-Genesee	2,739	1,729	-37%
25—Delaware	2,680	1,496	-44%
26-Delevan	2,633	1,681	-36%
29-Wohlers	138	---	---
32-Amherst	2,915	2,221	-24%
34-Niagara Falls Blvd	1,159	906	-22%
35-Sheridan	597	470	-21%
36-Hamburg	633	---	---
40-Grand Island	1,332	641	-52%
42-Lackawamna	153	431	182%
44-Lockport	633	432	-32%
45-Metro Rail	15,186	11,172	-26%
46-Lancaster	356	292	-18%
47-Youngs Road	375	199	-47%
48-Williamsville	822	475	-42%
49-Millard Suburban	227	156	-31%
50-Main/Niagara	494	429	-13%
52-Hyde Park	274	176	-36%
54-Military	82	---	---
55-Pine Avenue	986	499	-49%
59		82	---
60-Niagara Falls Express	57	29	-49%
61-North Tonawanda Express	43	13	-69%
64-Lockport Express	39	17	-56%
66-Williamsville Express	75	38	-49%

Route	2017-2018 Average Weekday Ridership	Spring 2023 Average Weekday Ridership	Change
67-Cleveland Hill Express	65	---	---
68-George Urban Express	21	---	---
69-Alden Express	48	20	-59%
70-East Aurora Express	38	13	-66%
72-Orchard Park Express	36	14	-61%
74-Hamburg Express	100	25	-75%
75-West Seneca Express	66	---	---
76-Lotus Bay Express	144	42	-71%
77	---	339	---
79-Tonawanda Express	30	---	---
81-Eastside Express	37	31	-16%
101-North-South	---	116	---
102-Bailey	---	17	---
103-East-Suburban	---	4	---
104-South-Central	---	42	---
106-South-Suburban	---	40	---
110-West-North	---	29	---
111-South Michigan	---	102	---
155	---	33	---
204-Airport/Downtown Express	117	---	---
206-Buffalo State Circulator	40	---	---
Totals	**85,119**	**56,567**	**-34%**

Source: NFTA

The depressed ridership shown in Table C-11 is at least partially attributable to reductions in service since 2018. Since 2018, Table C-12 shows that Metro service headways were reduced from 20 minutes to 10 minutes in the peak and to 20 minutes from 12 minutes in the off-peak. Table C-13 shows that overall service on the bus network has also been reduced. These statistics were calculated using the GTFS files describing NFTA service in 2018 and the fall of 2023. From 2018 to 2023, revenue hours decreased by 19 percent and revenue miles by 17 percent.

Table C-12. Metro Service Headways in 2018 and 2023 for Peak and Off-Peak Times

Metro (LRT) Service	Peak	Off-peak
2018 LRT Headways	10 min	12 min
2023 LRT Headways	20 min	20 min

Source: NFTA and WSP

Table C-13. NFTA Bus Network Revenue Hours and Revenue Miles in 2018 and 2023

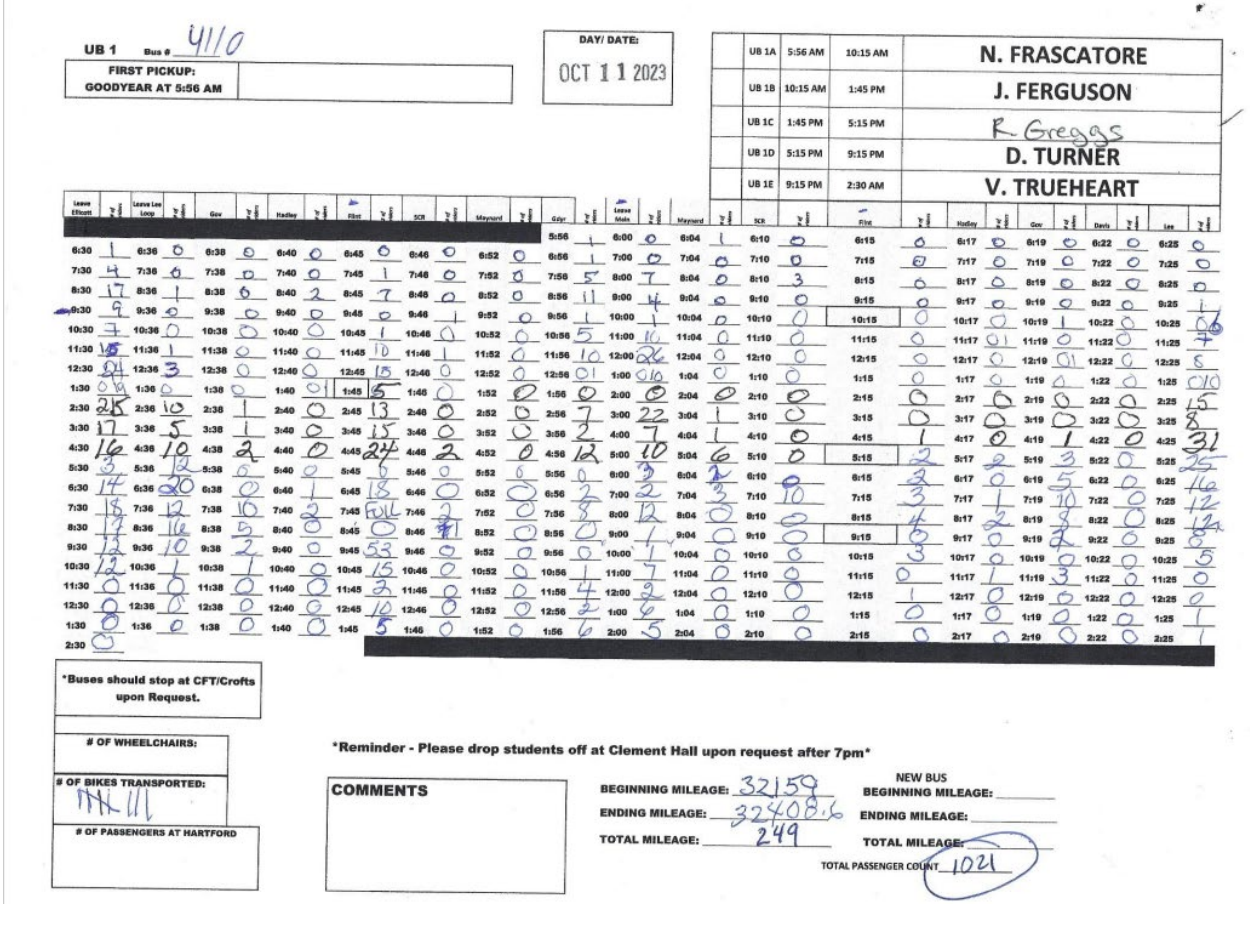
NFTA Bus Service	Revenue Hours	Revenue Miles
NFTA 2018 Bus Service	2,049	26,118
NFTA 2023 Bus Service	1,669	21,657
% Difference (2023/2018)	-19%	-17%

Source: NFTA and WSP

UB Stampede Market

Table C-14 presents the difference in UB Stampede market average weekday station ridership between 2018 and October 2023. The 2018 final estimated boardings for UB Stampede were developed from an onboard survey, with details described in Section C.1.5. The average weekday boardings for October 2023 were provided by the University at Buffalo, based on count sheets completed by bus drivers during their routes. Figure C-7 presents an example of one of these count sheets. The count sheets record the number of boardings at each station for each trip without including alignment information. RSG coordinated with WPS to manually enter these counts into spreadsheets, which were then used to summarize the average weekday boardings by stop for October 2023, as shown in Table C-14.

Figure C-7 UB Count Sheet Example



Source: University of Buffalo

As shown in Table C-14, four stations—Clement, Greiner Hall, Tops International, and Wegman S—do not have ridership data for 2023. The table shows there has been a significant increase in ridership at all stations from 2018 to 2023. Overall, total ridership increased by 53 percent from 2018 to 2023.

Table C-14. UB Stampede Average Weekday Ridership by Station for 2017/2018 and 2023

Station	2018 Final Estimated Boardings	2023 Oct Average Weekday Boardings	Change
Clement	53	--	--
Ellicott Tunnel	2,056	3,738	82%
Flint Loop	2,785	3,439	23%
Goodyear	1,225	1,415	16%
Governors	201	248	23%
Greiner Hall	189	--	--
Hadley Village	26	68	162%
Lee Loop	2,091	3,589	72%
Main Circle	1,431	2,402	68%
Maynard	10*	277	2670%
Service Center Road.	67	423	531%
Tops International	1	--	--
Wegman S	71	--	--
Davis Hall	---	3	--
TOTAL	**10,203**	**15,602**	**53%**

Source: University of Buffalo

C.3 THE PROJECT

The Project includes two Build Alternatives to extend high-quality transit from University Station northward along Kenmore Avenue, Niagara Falls Boulevard, Maple Road, Sweet Home Road, and through the UB North Campus to a new terminal station at Audubon Parkway and I-990/Dodge Road. Park & ride facilities are assumed to be constructed at Boulevard Mall and I-990/Dodge Road.

The Project assumes that most UB shuttle bus services would be eliminated, and users of these services would, for the most part, shift over to the new high-quality transit service. Eliminated services include:

- UB Stampede (Blue Line, Main Circle to/from Flint Circle and Ellicott)

- UB Stampede North-South Express (Yellow Line, Main Circle to/from Flint Circle with stops at Maynard, Service Center Road, and Goodyear Residence Hall[7])

Other UB shuttle services are assumed to remain in operation including the Lee-Ellicott Express (Red Line), and the UB North Campus shuttle.

Figure C-8 presents a map of the proposed LRT Build Alternative, while Figure C-9 presents a map of the proposed BRT Build Alternative. Table C-15 presents station-specific running times for the LRT Build Alternative and Table C-16 presents station-specific running times for the BRT Build Alternative. Table C-17 presents peak and off-peak frequencies for trips from University Station to local stops and to UB Flint Circle (which is served today by both UB Stampede Local and Express services). Both tables provide a comparison to the existing UB Stampede service, which is the principal transit service for this market at the present time. As these tables show, the LRT Build Alternative would be slightly faster than the UB Stampede between Main Circle and Flint Circle but would provide a substantial time advantage between Flint Circle and the Student Center due, in part, to its direct routing though the UB North Campus.

Existing bus services provide significantly more frequent services than the proposed high-quality transit service for trips between the UB North and South Campuses.

[7] Stop at Goodyear is made in the southbound direction only

Figure C-8. LRT Build Alternative

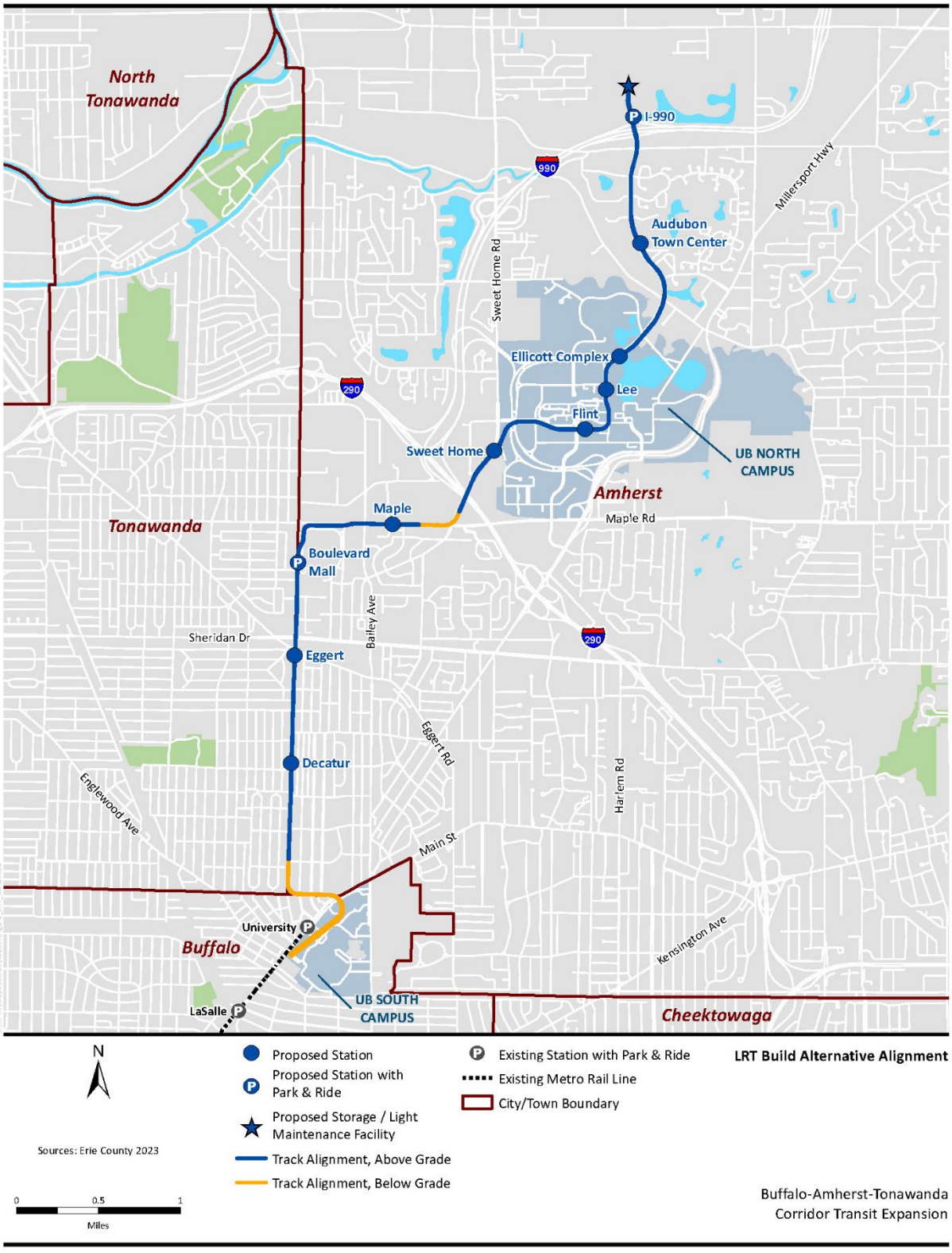


Figure C-9. BRT Build Alternative

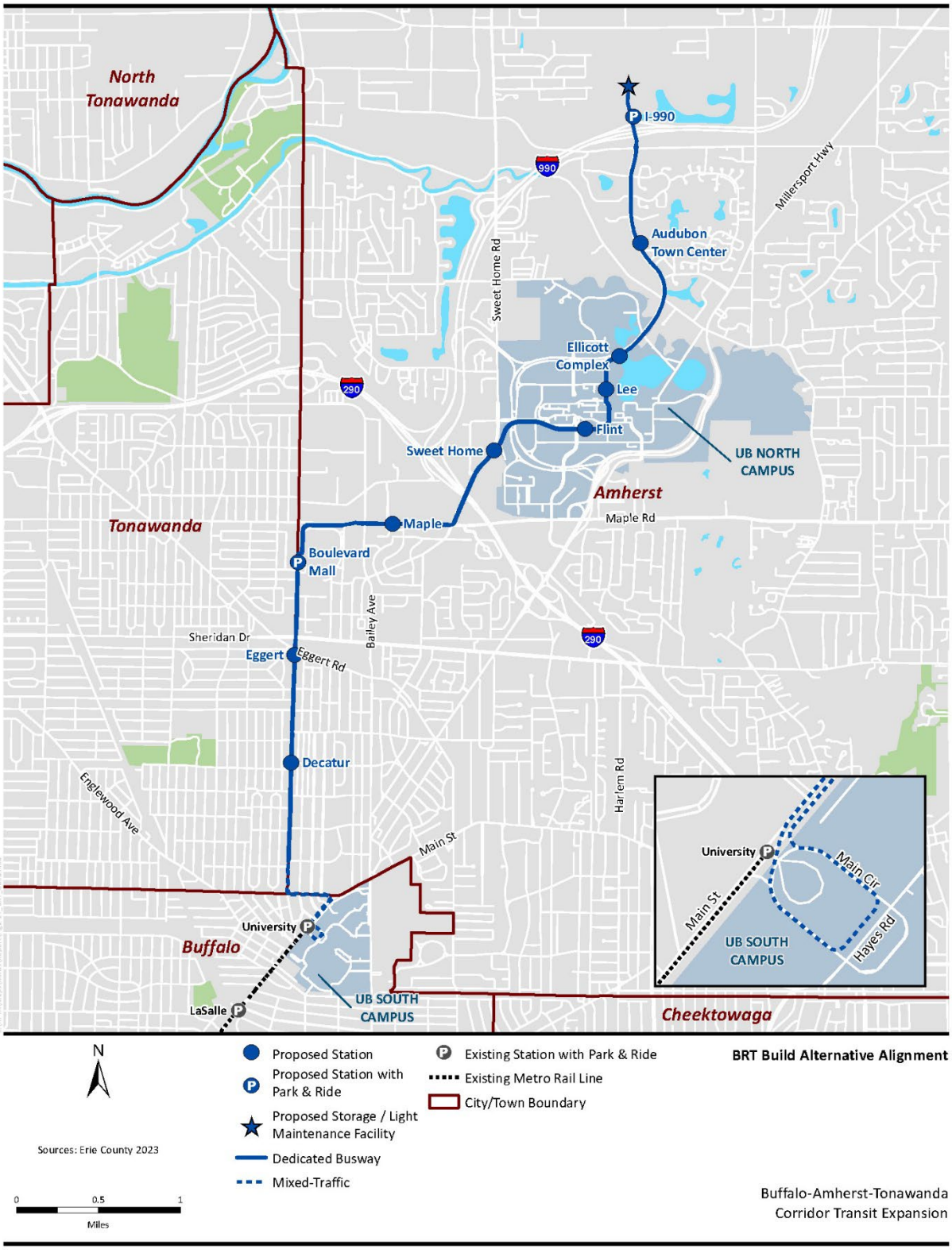


Table C-15. LRT Build Alternative Cumulative Times to New Stations from University Station (minutes) Compared to Existing UB Stampede Service

Station	UB Stampede*	LRT Build Alternative
University Station	0.00	0.00
Decatur		3.28
Eggert		5.47
Boulevard Mall		7.22
Maple Ridge		9.53
Sweet Home		11.61
University at Buffalo A (Flint Loop)	15.00**	14.07
University at Buffalo B (Student Center)	25.00	15.66
Ellicott Complex	33.00	17.03
Audubon		19.26
I-990/DODGE		20.70

Source: UB Stampede Fall 2018 Schedules and WSP
*Service provided by UB Stampede Blue Line service only unless otherwise noted
**Service provided by UB Stampede Blue and Yellow Lines.

Table C-16. BRT Build Alternative Cumulative Times to New Stations from University Station (minutes) Compared to Existing UB Stampede Service

Station	UB Stampede*	BRT Build Alternative
University Station	0.00	0.00
Decatur		4.47
Eggert		6.93
Boulevard Mall		9.62
Maple Ridge		13.19
Sweet Home		15.88
University at Buffalo A (Flint Loop)	15.00**	18.37
University at Buffalo B (Student Center)	25.00	19.92
Ellicott Complex	33.00	21.26
Audubon		24.11
I-990/DODGE		26.15

Source: UB Stampede Fall 2018 Schedules and WSP
*Service provided by UB Stampede Blue Line service only unless otherwise noted
**Service provided by UB Stampede Blue and Yellow Lines.

Table C-17. Service Frequencies (minutes) Compared to Existing UB Stampede Services

Period	UB Stampede	LRT and BRT Build Alternatives
To All Blue Line Stops		
AM Peak (8:00 a.m. to 9:00 a.m.)	6:00	10:00 (LRT), 5:00 (BRT)
Midday (1:00 p.m. to 2:00 p.m.)	6:00	12:00
Main Circle To Flint Circle (Local + Express, Combined Service)		
AM Peak (8:00 a.m. to 9:00 a.m.)	2.70	10:00 (LRT), 5:00 (BRT)
Midday (1:00 p.m. to 2:00 p.m.)	2.70	12:00

Source: Fall 2018 UB Stampede and NFTA Schedules

C.4 RIDERSHIP FORECASTS

When comparing Stampede ridership data collected in 2018 to 2023 data, as discussed previously, there has been a significant growth in Stampeded ridership. This increase in Stampede ridership has impacted Project ridership estimates, as riders using the Stampede service today are expected to be major contributors to the estimated Project ridership.

This section presents ridership forecasts for the Build Alternatives for two forecast years:

- A "current year" forecast that assumes the project had been constructed in 2023 and is used by the FTA to understand how the Project serves existing markets that are observable today.[8] FTA procedures weight current year forecasts more heavily than future-year forecasts since demographic growth assumptions add uncertainty to forecasts of project ridership.
- A "future year" forecast that assumes the Project would be operational in 2045. This is a forward-looking projection of ridership and includes the impact that future development will have on ridership.[9]

C.4.1 LRT Build Alternative Overview

Project forecasts begin with an assessment of the potential markets that would be served by the LRT Build Alternative. Figure C-10 shows the geographic areas represented by the different market areas discussed in this section. Table C-18 presents the results of this assessment of the ridership forecasts. The table also includes a comparison of the 2018 estimated market sizes to the 2023 estimates.

The largest market that would be served by the LRT Build Alternative is currently served by the UB Stampede bus service. As noted in Section C.2, the LRT Build Alternative service between the UB North and South Campuses would be slightly faster than the current UB Stampede bus service. However, the LRT Build Alternative would operate on 10-minute peak and 12-minute off-peak headways, which would be less frequent than the current bus service, which consists of two different routes operating on a combined 3-minute headway.

The current UB Stampede ridership for the UB North and South Campuses market is approximately 8,100 (excluding the demand that transfers from Metro Bus and LRT services).[10]

[8] As previously noted, the UB forecasts differed from the model calibrated in 2018 only with respect to ridership counts. Because UB does not have official projections of future enrollment, UB staff have indicated that the GBNRTC forecasts of approximately 10% employment growth between 2017 and 2040 for Districts 13 and 20 (UB South and UB North Campuses, respectively) are generally consistent with their expectation of modest growth over the next 20+ years. Since the UB application considers only the demand at a handful of UB districts, these imputed growth factors remain valid for this modeling exercise, making it unnecessary to update the socioeconomic forecasts to the 2020 and 2045 population/employment projections.

[9] It should be noted that since the initial sets of forecasts were submitted in 2020, projected overall ridership on the project in 2024 has modestly grown despite a decline in demand on NFTA routes since 2019. The growth in the 2024 forecasts is a function of the 50% increase in riders on UB shuttles, which is the project's primary market, and the model is responding to this observed change in demand. Correspondingly, the forecasts show a decline in NFTA ridership.

[10] The Stampede diversion market size estimates are based on origin/destination patterns from the 2014 onboard survey, which was re-weighted to match 2018 count data. The 2023 estimates were calculated by re-scaling the 2018 market by 53% to match the overall growth in UB shuttle ridership between 2018 and 2023. Note that existing submarket size estimates for 2023 are not included in Table C-18. While, in aggregate, the estimates reasonably approximate the existing markets, the lack of recently available data to characterize demand flows made estimates at smaller geographies less reliable and therefore they were removed from this analysis.

The vast majority of these riders would divert to the LRT Build Alternative when this service is implemented, and the north/south UB Stampede services would be eliminated. Enrollment at UB is assumed to be stable over time so this market is not expected to grow materially into the future. If UB restructures academic program locations or residence locations, this market could change in size and could grow smaller or larger depending on the nature of UB's future plans.

The next largest market is for circulation travel within the UB North Campus. Of the various sub-markets that are included, the LRT Build Alternative would offer a superior service for approximately 3,440 students who currently use the UB Stampede to travel from Ellicott to the Flint Circle and Natural Sciences Complex. With the LRT Build Alternative, this market is expected to grow to between 4,570 and 5,220 trips. The LRT Build Alternative would offer a much more direct trip than the UB Stampede bus, leading to the growth in transit demand.

For the Ellicott-to-Lee Circle market, the LRT Build Alternative would attract a smaller proportion of UB Stampede riders. Today, this service is offered by the Red Line, which is assumed to continue to operate even with the LRT Build Alternative. This line connects the Ellicott tunnel (a covered platform attached to the Ellicott Dorms) and provides direct, 6-minute frequency service to Lee Circle. The location of the Ellicott bus stop is much closer to student residential housing than the proposed Ellicott Complex station and service would be much more frequent, resulting in three quarters of all students choosing the UB Stampede bus over the LRT Build Alternative for this very short circulation trip.

The other UB North Campus circulation markets would not be served by the LRT Build Alternative and, consequently, would attract few of these riders.

The next largest market consists of walk-access transit trips that use Metro today to travel to, from, and within the Project corridor. Based on survey data and ridership counts, this market currently consists of approximately 5,230 transit trips. In the future, the LRT Build Alternative would attract 4,080 to 3,750 of these trips, with a modest decline in 2045. This market consists of trips with one or both trip-ends in the Project corridor. The other trip-ends are distributed broadly across the area, much like the survey market is today.

Finally, the LRT Build Alternative would attract 490 to 639 corridor park & rides. Of these, 212 to 270 cars would park at the proposed Boulevard Mall park & ride facility (420 to 540 trips) and about 50 to 60 cars would park at the proposed I-990 park & ride facility (100-120 trips). The model results show that a substantial portion of vehicles that park at University and Lasalle lots would move to Boulevard Mall in the build alternatives. A small number of park & ride trips would park at existing Metro Rail and Bus parking lots and travel outbound on the LRT Build Alternative and then transfer to a bus to the final destination accounting for the balance of LRT Build Alternative park & ride trips.

The LRT Build Alternative ridership forecast estimates a total of 19,300 to 20,060 weekday linked transit trips.

C.4.2 Detailed Forecast Statistics

This section presents detailed estimates of unlinked and linked ridership for each forecast year. These data are as follows:

- Table C-19 presents weekday[11] unlinked trips by LRT Build Alternative boarding station. This table includes all boardings, independent of access mode. A similar number of station exits would also occur at each station.
- Table C-20 presents weekday unlinked park & ride trips by boarding station. The number of parked vehicles is similar to this number but might be slightly less if the vehicle occupancy for park & ride trips is significantly greater than 1.0.
- Table C-21 presents weekday unlinked transfer trips by boarding station.
- Table C-22 presents weekday linked transit trips by trip purpose and auto-ownership. Table C-23 shows the incremental weekday linked transit trips as compared to the No Build Alternative. Incremental linked transit trips are also sometimes called "new" riders. Forecasting results show that the LRT Build Alternative would add about 3,400 new daily transit trips to the system each day.
- Table C-24 presents linked transit trips-on-project and is a key element of the FTA mobility measure. The LRT Build Alternative would attract 19,000 to 20,000 daily project trips. Of these, approximately half are made by residents of 0-car households. Trips by zero-car households are more heavily weighted by FTA in evaluating project mobility benefits.
- Table C-25 presents weekday automobile travel impacts. Both person-miles and vehicle-miles saved per day are reported.

[11] All weekday estimates of linked and unlinked trips represents a typical weekday when University at Buffalo is in session. Project ridership on weekdays when University at Buffalo is not in session would be lower by up to 12,000 to 13,000 passengers per day.

Figure C-10. LRT Build Alternative Market Areas

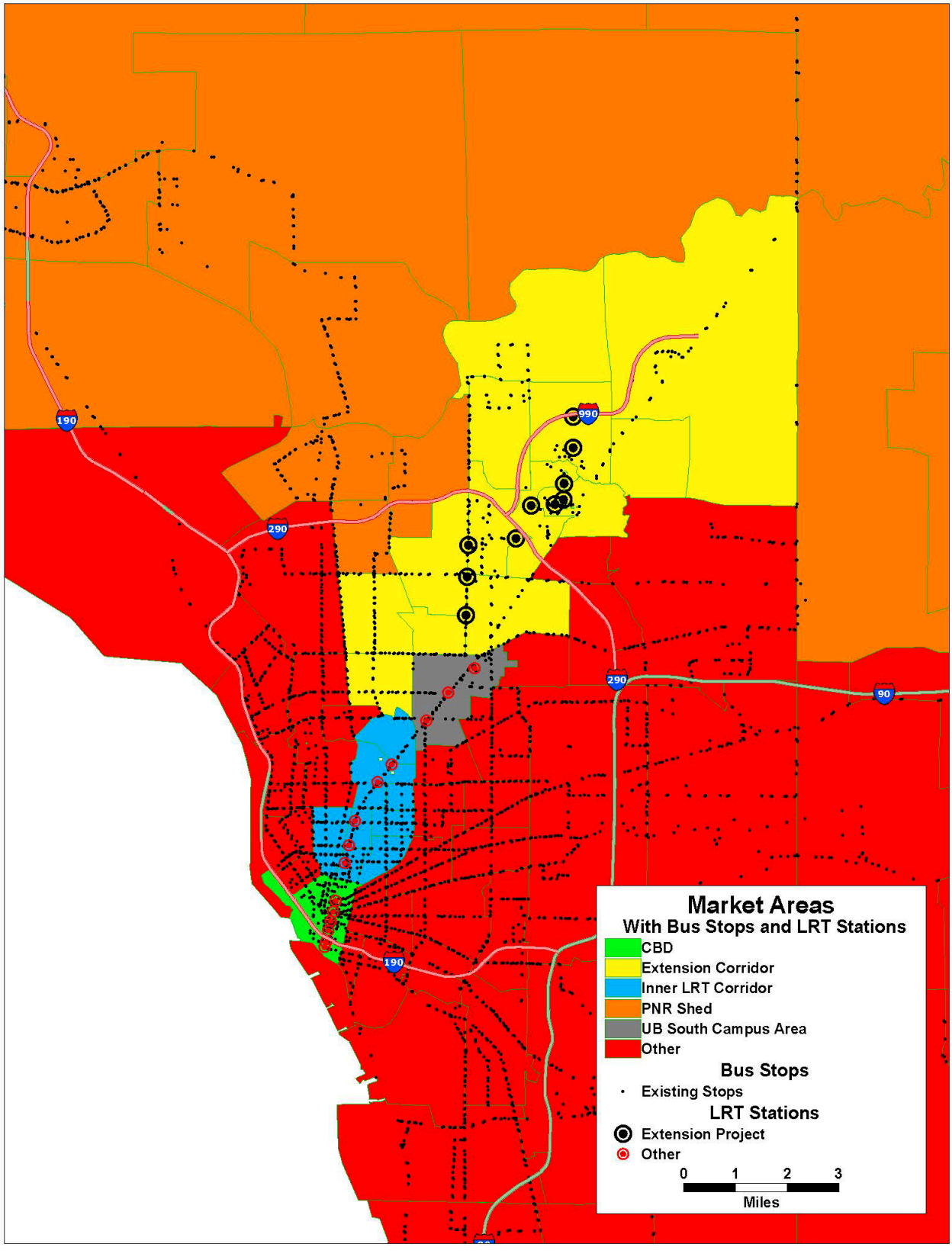


Table C-18. LRT Build Alternative Weekday Linked Trips-on-Project by Market Compared to Existing Transit Market Size

Market	2018 Estimated Market Size	2023 Estimated Market Size	2023 LRT Build Alternative	2045 LRT Build Alternative
Existing UB Stampede Ridership and Build Alternative ridership diversion (excludes transfers from Metro which is included in next section)				
North Campus to/from South Campus	5,291	8,095	7,154	7,182
Ellicott to/from Flint/Natural Sciences	2,251	3,444	4,572	5,222
Ellicott to/from Lee Circle	1,563	2,391	565	636
Other Intra-North Campus	1,314	2,010	51	57
Subtotal	**10,419**	**15,941**	**12,342**	**13,097**
Metro Walk-to-Transit Market				
Within Expansion Corridor	551	--	1,330	1,118
Expansion Corridor-CBD	491	--	488	575
Expansion Corridor-Inner LRT Corridor	374	--	86	131
Expansion Corridor-UB South Campus	489	--	83	93
Expansion Corridor to other parts of region	1,907	--	456	501
CBD- Expansion Corridor	15	--	3	3
Inner LRT Corridor-Expansion Corridor	150	--	215	174
UB South Campus-Expansion Corridor	209	--	235	164
Other Parts of Region-Expansion Corridor	1,076	--	1,187	990
Subtotal	**5,262**	**5,526**	**4,082**	**3,749**
Metro Park & Ride (PNR) Market				
Within Expansion Corridor	-	--	15	17
Project PNR Shed-Inner LRT Corridor	3	--	36	48
Expansion Corridor-CBD	382	--	157	190
Project PNR Shed-CBD	213	--	203	264
Expansion Corridor-Inner LRT Corridor	58	--	16	27
Project PNR Shed-Inner LRT Corridor	19	--	22	37
Expansion Corridor-UB South Campus	8	--	-	-
Project PNR Shed to UB South Campus	8	--	1	1
UB South Campus-Expansion Corridor	-	--	6	6
Other Parts of Region-Expansion Corridor	3	--	36	48
Subtotal	**694**	**613**	**492**	**639**
Metro Kiss & Ride (KNR) Market			**1,972**	**2,142**
Project Trips not to/from corridor				
Walk Access			259	283
PNR			169	147
TOTAL			**19,316**	**20,057**

Source: STOPS Model Runs

Table C-19. LRT Build Alternative Weekday Total (All Access Modes) Boardings by Metro Rail Station (2023 and 2045)

Station	Existing Condition (2023)	LRT Build Alternative (2023)	No Build Alternative (2045)	LRT Build Alternative (2045)
Special Events	84	85	99	101
Erie Canal Harbor	522	533	614	629
Seneca	431	455	451	478
Church Street	1,051	1,111	1,267	1,335
Lafayette	1,338	1,412	1,538	1,623
Fountain Plaza	1,754	1,812	2,042	2,107
Allen-Medical Campus	643	670	946	980
Summer-Best	528	552	753	780
Utica	987	1,043	1,107	1,155
Delavan-Canisius College	494	586	588	666
Humboldt	327	398	376	433
Amherst	785	1,031	911	1,103
LaSalle	648	677	755	771
University Station	1,585	5,091	1,923	5,217
Decatur	-	373	-	380
Eggert	-	544	-	559
Boulevard Mall	-	1,003	-	1,155
Maple Ridge	-	258	-	275
Sweet Home	-	492	-	258
University at Buffalo A (Flint Loop)	-	4,926	-	5,268
University at Buffalo B (Student Center)	-	1,724	-	1,768
Ellicott Complex	-	3,395	-	3,659
Audubon	-	239	-	265
I-990/Dodge	-	242	-	276
Subtotal Project Stations	**-**	**13,196**	**-**	**13,863**
TOTAL LRT AND PROJECT LRT STATIONS	**11,177**	**28,652**	**13,370**	**31,241**

Source: STOPS Model Runs

Table C-20. LRT Build Alternative Weekday Park-Ride Access Boardings by Metro Rail Station (2023 and 2045)

Station	Existing Condition (2023)	LRT Build Alternative (2023)	No Build Alternative (2045)	LRT Build Alternative (2045)
Special Events	-	-	-	-
Erie Canal Harbor	-	-	-	-
Seneca	-	-	-	-
Church Street	-	-	-	-
Lafayette	-	-	-	-
Fountain Plaza	-	-	-	-
Allen-Medical Campus	-	-	-	-
Summer-Best	-	-	-	-
Utica	-	-	-	-
Delavan-Canisius College	-	-	-	-
Humboldt	-	-	-	-
Amherst	-	-	-	-
LaSalle	51	52	61	61
University Station	299	164	386	186
Decatur	-	-	-	-
Eggert	-	-	-	-
Boulevard Mall	-	212	-	272
Maple Ridge	-	-	-	-
Sweet Home	-	-	-	-
University at Buffalo A (Flint Loop)	-	-	-	-
University at Buffalo B (Student Center).	-	-	-	-
Ellicott Complex	-	-	-	-
Audubon	-	-	-	-
I-990/Dodge	-	47	-	58
Subtotal Project Stations	**-**	**259**	**-**	**330**
TOTAL	**350**	**475**	**447**	**577**

Source: STOPS Model Runs

Table C-21: LRT Build Alternative Weekday Transfer Access Boardings by Metro Rail Station (2023 and 2045)

Station	Existing Condition (2023)	LRT Build Alternative (2023)	No Build Alternative (2045)	LRT Build Alternative (2045)
Special Events	1	1	2	2
Erie Canal Harbor	9	9	11	11
Seneca	43	58	75	89
Church Street	109	142	135	171
Lafayette	132	173	153	195
Fountain Plaza	56	64	59	68
Allen-Medical Campus	18	23	19	24
Summer-Best	19	29	20	29
Utica	258	291	270	298
Delavan-Canisius College	157	221	180	234
Humboldt	8	9	11	12
Amherst	367	498	435	556
LaSalle	31	53	33	53
University Station	698	725	792	774
Decatur	-	50	-	46
Eggert	-	110	-	116
Boulevard Mall	-	125	-	128
Maple Ridge	-	20	-	23
Sweet Home	-	-	-	-
University at Buffalo A (Flint Loop)	-	97	-	109
University at Buffalo B (Student Center).	-	16	-	17
Ellicott Complex	-	38	-	30
Audubon	-	8	-	5
I-990/Dodge	-	-	-	-
Subtotal Project Stations	**-**	**464**	**-**	**474**
TOTAL	**1,906**	**2,760**	**2,195**	**2,990**

Table C-22. LRT Build Alternative Weekday Linked Transit Trips (2023 and 2045)

Purpose/Auto Ownership	Existing Condition (2023)	LRT Build Alternative (2023)	No Build Alternative (2045)	LRT Build Alternative (2045)
Home-Based Work				
0 car	9,591	10,062	10,613	11,035
1 car	4,071	4,499	4,552	4,974
2+ cars	1,486	1,714	1,694	1,941
TOTAL	**15,148**	**16,275**	**16,859**	**17,950**
Home-Based Other				
0 car	14,089	14,724	15,327	15,861
1 car	4,363	4,824	4,910	5,357
2+ cars	1,756	1,998	1,936	2,192
TOTAL	**20,208**	**21,546**	**22,173**	**23,410**
Non Home Based				
0 car	6,565	6,872	7,135	7,395
1 car	1,939	2,153	2,165	2,369
2+ cars	1,016	1,164	1,126	1,284
TOTAL	**9,520**	**10,189**	**10,426**	**11,048**
UB Shuttle				
0 car	7,761	7,901	8,306	8,493
1 car	4,788	4,872	5,123	5,242
2+ cars	2,924	3,000	3,123	3,226
TOTAL	**15,473**	**15,773**	**16,552**	**16,961**
All Purposes				
0 car	38,006	39,559	41,381	42,784
1 car	15,161	16,348	16,750	17,942
2+ cars	7,182	7,876	7,879	8,643
TOTAL	**60,349**	**63,783**	**66,010**	**69,369**

Source: STOPS Model Runs Figure C-11. BRT Build Alternative Market Areas

Table C-23. LRT Build Alternative Weekday Incremental Linked Transit Trips (2023 and 2045)

Purpose/Auto Ownership	Existing Condition (2023)	LRT Build Alternative (2023)	No Build Alternative (2045)	LRT Build Alternative (2045)
Home-Based Work				
0 car	-	471	-	422
1 car	-	428	-	422
2+ cars	-	228	-	247
TOTAL	**-**	**1,127**	**-**	**1,091**
Home-Based Other				
0 car	-	635	-	534
1 car	-	461	-	447
2+ cars	-	242	-	256
TOTAL	**-**	**1,338**	**-**	**1,237**
Non Home Based				
0 car	-	307	-	260
1 car	-	214	-	204
2+ cars	-	148	-	158
TOTAL	**-**	**669**	**-**	**622**
UB Shuttle				
0 car	-	140	-	187
1 car	-	84	-	119
2+ cars	-	76	-	103
TOTAL	**-**	**300**	**-**	**409**
All Purposes				
0 car	-	1,553	-	1,403
1 car	-	1,187	-	1,192
2+ cars	-	694	-	764
TOTAL	**-**	**3,434**	**-**	**3,359**

Source: STOPS Model Runs

Table C-24. LRT Build Alternative Weekday Linked Project Transit Trips (2023 and 2045)

Purpose/Auto Ownership	Existing Condition (2023)	LRT Build Alternative (2023)	No Build Alternative (2045)	LRT Build Alternative (2045)
Home-Based Work				
0 car	-	1,273	-	1,258
1 car	-	1,087	-	1,110
2+ cars	-	550	-	636
TOTAL	**-**	**2,910**	**-**	**3,004**
Home-Based Other				
0 car	-	1,310	-	1,202
1 car	-	932	-	919
2+ cars	-	457	-	500
TOTAL	**-**	**2,699**	**-**	**2,621**
Non Home Based				
0 car	-	645	-	601
1 car	-	433	-	425
2+ cars	-	286	-	317
TOTAL	**-**	**1,364**	**-**	**1,343**
UB Shuttle				
0 car	-	6,161	-	6,529
1 car	-	3,816	-	4,051
2+ cars	-	2,371	-	2,521
TOTAL	**-**	**12,348**	**-**	**13,101**
All Purposes				
0 car	-	9,389	-	9,590
1 car	-	6,268	-	6,505
2+ cars	-	3,664	-	3,974
TOTAL	**-**	**19,321**	**-**	**20,069**

Source: STOPS Model Runs

Table C-25. LRT Build Alternative Weekday Automobile Travel Impacts (2023 and 2045)

Automobile Impact Statistic	Existing Condition (2023)	LRT Build Alternative (2023)	No Build Alternative (2045)	LRT Build Alternative (2045)
Change in Automobile Person-Miles (vs. No Build)	-	-49,588	-	-49,272
Change in Automobile Vehicle-Miles (vs. No Build)	-	-45,080	-	-44,792

Source: STOPS Model Runs

C.4.3 BRT Build Alternative Overview

Project forecasts begin with an assessment of the potential markets that would be served by the BRT Build Alternative. Figure C-11 shows the geographic areas represented by the different market areas discussed in this section. Table C-26 presents the results of this assessment of the ridership forecasts. The table also includes a comparison of the 2018 estimated market sizes to the 2023 estimates.

The largest market to be served by the BRT Build Alternative is currently served by the UB Stampede bus. As noted in Section C.2, the BRT Build Alternative service between the UB North and South Campuses would be slightly faster than the current bus. However, the BRT Build Alternative would operate on 5-minute peak, which would be less frequent than the current bus service that consists of two different routes operating on a combined 3-minute headway.

The current UB Stampede ridership for the UB North and South Campuses market is approximately 8,100 (excluding the demand that transfers from Metro Bus and BRT services)[12]. The majority of these riders would divert to the BRT Build Alternative when this service is implemented, and the north/south UB Stampede services would be eliminated. Enrollment at UB is assumed to be stable over time, so this market is not expected to grow materially into the future. If UB restructures academic program locations or residence locations, this market could change in size and could grow smaller or larger depending on the nature of UB's future plans.

The next largest market is for circulation travel within the UB North Campus. Of the various sub-markets that are included, the BRT Build Alternative would offer a superior service for over 3,440 students who currently use the UB Stampede to travel from Ellicott to the Flint Circle and Natural Sciences Complex. With the BRT Build Alternative, this market is expected to grow to between 4,550 and 5,200 trips. The BRT Build Alternative would offer a much more direct trip than the bus leading to the growth in transit demand.

For the Ellicott-to-Lee Circle market, the BRT Build Alternative attracts a smaller proportion of UB Stampede riders. Today, this service is offered by the Red Line, which is assumed to continue to operate even with the BRT Build Alternative. This line connects the Ellicott tunnel (a covered platform attached to the Ellicott Dorms) and provides direct, 6-minute frequency service to Lee Circle. The location of the Ellicott bus stop is much closer to student residential housing than the proposed Ellicott Complex station and service would be much more frequent, resulting in three quarters of all students choosing the Red Line over the BRT Build Alternative for this very short circulation trip.The other UB North Campus circulation markets would not be served by the BRT Build Alternative and, consequently, would attract few of these riders.

[12] The Stampede diversion market size estimates are based on origin/destination patterns from the 2014 onboard survey, which was re-weighted to match 2018 count data. The 2023 estimates were calculated by re-scaling the 2018 market by 53% to match the overall growth in UB shuttle ridership between 2018 and 2023. Note that existing submarket size estimates for 2023 are not included in Table C-18. While, in aggregate, the estimates reasonably approximate the existing markets, the lack of recently available data to characterize demand flows made estimates at smaller geographies less reliable and therefore they were removed from this analysis.

The next largest market consists of walk-access transit trips that use Metro services today to travel to, from, and within the Project corridor. Based on survey data and ridership counts, this market currently consists of approximately 5,560 transit trips. In the future, the BRT Alternative would attract approximately 2,000 to 1,750 of these trips through a combination of growing the transit market in this area and diverting existing bus trips to the BRT Build Alternative. This market consists of trips with one or both trip-ends in the Project corridor and is forecast to modestly shrink by 2045. The other trip-ends are distributed broadly across the area, much like the survey market is today.

Finally, the BRT Build Alternative would attract approximately 50 corridor park & ride trips. Of these, the majority would park at the proposed I-990 or the University Station (40 trips) and about 8 cars would park at the proposed Boulevard Mall lot (8 trips). The BRT Build Alternative forecast estimates ridership that ranges from 14,560 to 15,030 weekday linked transit trips.

C.4.4 Detailed Forecast Statistics

This section presents detailed estimates of unlinked and linked ridership for each forecast year. These data are as follows:

- Table C-27 presents weekday[13] unlinked trips by BRT Build Alternative boarding station. This table includes all boardings, independent of access mode. A similar number of station exits would also occur at each station.
- Table C-28 presents weekday unlinked park & ride trips by boarding station. The number of parked vehicles is similar to this number but might be slightly less if the vehicle occupancy for park & ride trips is significantly greater than 1.0.
- Table C-29 presents weekday unlinked transfer trips by boarding station.
- Table C-30 presents weekday linked transit trips by trip purpose and auto-ownership. Table C-31 shows the incremental weekday linked transit trips as compared to the Existing Conditions. Incremental linked transit trips are also sometimes called "new" riders. Forecasting results show that the project will add about 425-460 new daily transit trips to the system each day.
- Table C-32 presents linked transit trips-on-project and is a key element of the FTA mobility measure. The BRT Build Alternative would attract 14,560 to 15,025 daily project trips. Of these, approximately half are made by residents of 0-car households. Trips by zero-car households are more heavily weighted by FTA in evaluating project mobility benefits.
- Table C-33 presents weekday automobile travel impacts. Both person-miles and vehicle-miles saved per day are reported.

[13] All weekday estimates of linked and unlinked trips represents a typical weekday when UB is in session. Project ridership on weekdays when UB is not in session will be lower by up to 8,000 to 9,000 passengers per day.

Figure C-11. BRT Build Alternative Market Areas

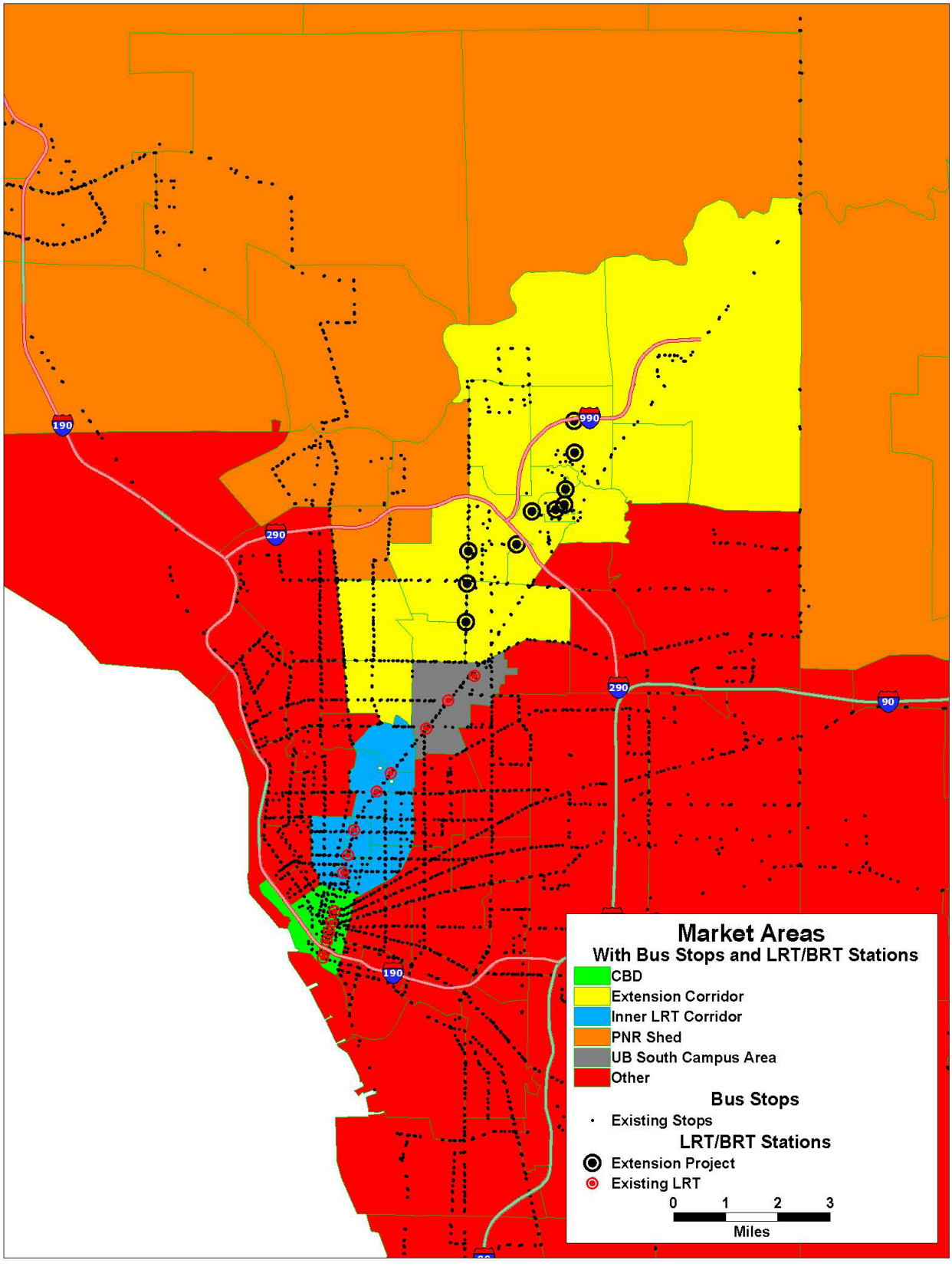


Table C-26. BRT Build Alternative Weekday Linked Trips-on-Project by Market Compared to Existing Transit Market Size

Market	2018 Estimated Market Size	2023 Estimated Market Size	2023 BRT Build Alternative with	2045 BRT Build Alternative with
Existing UB Stampede Ridership and Build Alternative ridership diversion (excludes transfers from Metro which is included in next section)				
North Campus to/from South Campus	5,291	8,095	6,896	6,918
Ellicott to/from Flint/Natural Sciences	2,251	3,444	4,549	5,195
Ellicott to/from Lee Circle	1,563	2,391	571	643
Other Intra-North Campus	1,314	2,010	51	60
Subtotal	10,419	15,941	12,067	12,816
Metro Walk-to-Transit Market				
Within Expansion Corridor	558	--	683	564
Expansion Corridor-CBD	471	--	108	126
Expansion Corridor-Inner LRT Corridor	302	--	10	15
Expansion Corridor-UB South Campus	373	--	86	103
Expansion Corridor to other parts of region	1,399	--	228	258
CBD-Expansion Corridor	24	--	2	1
Inner LRT Corridor-Expansion Corridor	280	--	91	77
UB South Campus-Expansion Corridor	302	--	173	117
Other Parts of Region-Expansion Corridor	1,363	--	620	488
Subtotal	5,072	5,569	2,001	1,750
Metro Park & Ride (PNR) Market				
Within Expansion Corridor	-		10	11
Project PNR Shed-Inner LRT Corridor	2	--	13	17
Expansion Corridor-CBD	417	--	-	-
Project PNR Shed-CBD	264	--	3	4
Expansion Corridor-Inner LRT Corridor	53	--	-	-
Project PNR Shed-Inner LRT Corridor	13	--	-	-
Expansion Corridor-UB South Campus	5	--	-	-
Project PNR Shed to UB South Campus	7	--	-	-
UB South Campus-Expansion Corridor	1	--	14	15
Other Parts of Region-Expansion Corridor	2	--	13	17
Subtotal		690	53	63
Metro KNR Market			246	231
Project Trips not to/from corridor				
Walk Access			56	48
PNR			137	120
TOTAL		**21,862**	**14,560**	**15,028**

Source: STOPS Model Runs

Table C-27. BRT Build Alternative Weekday Total (All Access Modes) Boardings by Metro Rail Stations and BRT Project Stations (2023 and 2045)

Station	Existing Condition (2023)	BRT Build Alternative (2023)	No Build Alternative (2045)	BRT Build Alternative (2045)
Special Events	84	80	99	90
Erie Canal Harbor	522	499	614	579
Seneca	431	390	451	428
Church Street	1,051	929	1,267	1,119
Lafayette	1,338	1,270	1,538	1,459
Fountain Plaza	1,754	1,581	2,042	1,835
Allen-Medical Campus	643	640	946	921
Summer-Best	528	519	753	746
Utica	987	970	1,107	1,062
Delavan-Canisius College	494	490	588	579
Humboldt	327	329	376	363
Amherst	785	806	911	922
LaSalle	648	623	755	735
University Station - LRT	1,585	1,984	1,923	2,212
Subtotal - LRT Stations	**11,177**	**11,110**	**13,370**	**13,050**
University Station - BRT		3,941		3,873
Decatur	-	82	-	70
Eggert	-	191	-	189
Boulevard Mall	-	134	-	134
Maple Ridge	-	127	-	139
Sweet Home	-	207	-	88
University at Buffalo A (Flint Loop)	-	4,665	-	5,006
University at Buffalo B (Student Center)	-	1,376	-	1,411
Ellicott Complex	-	3,350	-	3,633
Audubon	-	75	-	83
I-990/Dodge	-	62	-	70
Subtotal Project Stations	**-**	**14,210**	**-**	**14,696**
TOTAL LRT AND PROJECT BRT STATIONS	**11,177**	**25,320**	**13,370**	**27,746**

Source: STOPS Model Runs

Table C-28. BRT Build Alternative Weekday Park-Ride Access Boardings by Metro Rail Stations and BRT Project Stations (2023 and 2045)

Station	Existing Condition (2023)	BRT Build Alternative (2023)	No Build Alternative (2045)	BRT Build Alternative (2045)
Special Events	-	-	-	-
Erie Canal Harbor	-	-	-	-
Seneca	-	-	-	-
Church Street	-	-	-	-
Lafayette	-	-	-	-
Fountain Plaza	-	-	-	-
Allen-Medical Campus	-	-	-	-
Summer-Best	-	-	-	-
Utica	-	-	-	-
Delavan-Canisius College	-	-	-	-
Humboldt	-	-	-	-
Amherst	-	-	-	-
LaSalle	51	52	61	61
University Station - LRT	299	313	386	378
Subtotal - LRT Stations	**350**	**365**	**447**	**439**
University Station - BRT		19		19
Decatur	-	-	-	-
Eggert	-	-	-	-
Boulevard Mall	-	8	-	8
Maple Ridge	-	-	-	-
Sweet Home	-	-	-	-
University at Buffalo A (Flint Loop)	-	-	-	-
University at Buffalo B (Student Center).	-	-	-	-
Ellicott Complex	-	-	-	-
Audubon	-	-	-	-
I-990/Dodge	-	19	-	22
Subtotal Project Stations	**-**	**46**	**-**	**49**
TOTAL LRT & PROJECT STATIONS	**350**	**411**	**447**	**488**

Source: STOPS Model Runs

Table C-29: BRT Build Alternative Weekday Transfer Access Boardings by Metro Rail Stations and BRT Project Stations (2023 and 2045)

Station	Existing Condition (2023)	BRT Build Alternative (2023)	No Build Alternative (2045)	BRT Build Alternative (2045)
Special Events	1	-	2	1
Erie Canal Harbor	9	7	11	9
Seneca	43	45	75	70
Church Street	109	105	135	130
Lafayette	132	157	153	180
Fountain Plaza	56	51	59	55
Allen-Medical Campus	18	22	19	22
Summer-Best	19	24	20	24
Utica	258	266	270	272
Delavan-Canisius College	157	167	180	192
Humboldt	8	8	11	11
Amherst	367	369	435	449
LaSalle	31	36	33	37
University Station - LRT	698	1,008	792	1,049
Subtotal - LRT Stations	**1,906**	**2,265**	**2,195**	**2,501**
University Station - BRT		421		351
Decatur	-	30	-	24
Eggert	-	38	-	35
Boulevard Mall	-	10	-	10
Maple Ridge	-	2	-	3
Sweet Home	-	-	-	-
University at Buffalo A (Flint Loop)	-	24	-	28
University at Buffalo B (Student Center).	-	14	-	14
Ellicott Complex	-	17	-	16
Audubon	-	2	-	2
I-990/Dodge	-	-	-	-
Subtotal Project Stations	**-**	**558**	**-**	**483**
TOTAL LRT & PROJECT STATIONS	**1,906**	**2,823**	**2,195**	**2,984**

Source: STOPS Model Runs

Table C-30. BRT Build Alternative Weekday Linked Transit Trips (2023 and 2045)

Purpose/Auto Ownership	Existing Condition (2023)	BRT Build Alternative (2023)	No Build Alternative (2045)	BRT Build Alternative (2045)
Home-Based Work				
0 car	9,591	10,098	10,613	10,995
1 car	4,071	4,528	4,552	5,037
2+ car	1,486	1,854	1,694	2,105
TOTAL	**15,148**	**16,480**	**16,859**	**18,137**
Home-Based Other				
0 car	14,089	12,808	15,327	13,899
1 car	4,363	4,277	4,910	4,783
2+ car	1,756	1,858	1,936	2,043
TOTAL	**20,208**	**18,943**	**22,173**	**20,725**
Non Home Based				
0 car	6,565	5,854	7,135	6,357
1 car	1,939	1,872	2,165	2,084
2+ car	1,016	1,154	1,126	1,272
TOTAL	**9,520**	**8,880**	**10,426**	**9,713**
UB Shuttle				
0 car	7,761	7,833	8,306	8,422
1 car	4,788	4,753	5,123	5,119
2+ car	2,924	2,915	3,123	3,138
TOTAL	**15,473**	**15,501**	**16,552**	**16,679**
All Purposes				
0 car	38,006	36,593	41,381	39,673
1 car	15,161	15,430	16,750	17,023
2+ car	7,182	7,781	7,879	8,558
TOTAL	**60,349**	**59,804**	**66,010**	**65,254**

Source: STOPS Model Runs

Table C-31. BRT Build Alternative Weekday Incremental Linked Transit Trips (2023 and 2045)

Purpose/Auto Ownership	Existing Condition (2023)	BRT Build Alternative (2023)	No Build Alternative (2045)	BRT Build Alternative (2045)
Home-Based Work				
0 car	-	58	-	35
1 car	-	72	-	68
2+ car	-	23	-	21
TOTAL	**-**	**153**	**-**	**124**
Home-Based Other				
0 car	-	96	-	73
1 car	-	25	-	22
2+ car	-	36	-	38
TOTAL	**-**	**157**	**-**	**133**
Non Home Based				
0 car	-	44	-	33
1 car	-	16	-	14
2+ car	-	26	-	28
TOTAL	**-**	**86**	**-**	**75**
UB Shuttle				
0 car	-	73	-	117
1 car	-	(35)	-	(4)
2+ car	-	(9)	-	15
TOTAL	**-**	**29**	**-**	**128**
All Purposes				
0 car	-	271	-	258
1 car	-	78	-	100
2+ car	-	76	-	102
TOTAL	**-**	**425**	**-**	**460**

Source: STOPS Model Runs

Table C-32. BRT Build Alternative Weekday Linked Project Transit Trips (2023 and 2045)

Purpose/Auto Ownership	Existing Condition (2023)	BRT Build Alternative (2023)	No Build Alternative (2045)	BRT Build Alternative (2045)
Home-Based Work				
0 car	-	417	-	317
1 car	-	560	-	546
2+ car	-	114	-	116
TOTAL	**-**	**1,091**	**-**	**979**
Home-Based Other				
0 car	-	521	-	431
1 car	-	319	-	292
2+ car	-	105	-	109
TOTAL	**-**	**945**	**-**	**832**
Non Home Based				
0 car	-	240	-	199
1 car	-	139	-	124
2+ car	-	73	-	76
TOTAL	**-**	**452**	**-**	**399**
UB Shuttle				
0 car	-	6,090	-	6,456
1 car	-	3,695	-	3,926
2+ car	-	2,285	-	2,433
TOTAL	**-**	**12,070**	**-**	**12,815**
All Purposes				
0 car	-	7,268	-	7,403
1 car	-	4,713	-	4,888
2+ car	-	2,577	-	2,734
TOTAL	**-**	**14,558**	**-**	**15,025**

Source: STOPS Model Runs

Table C-33. BRT Build Alternative Weekday Automobile Travel Impacts (2023 and 2045)

Automobile Impact Statistic	BRT Build Alternative (2023)	BRT Build Alternative (2045)
Change in Automobile Person-Miles (vs. No Build)	-4,213	-3,232
Change in Automobile Vehicle-Miles (vs. No Build)	-3,830	-2,938

Source: STOPS Model Runs

C.4.5 LRT Build Alternative and BRT Build Alternative Comparison

Table C-34 shows a comparison of weekday boardings for both the LRT and BRT Build Alternatives for current and future year forecasts along with the No Build Alternative within the Metro Rail and the proposed Project corridors. The LRT Build Alternative generates about 28,650 to 30,100 daily unlinked trips, while the Metro Rail with the BRT Build Alternative generates 25,320 to 27,750 daily unlinked trips.

Table C-34. Weekday Boardings Comparisons for LRT Build Alternative and BRT Build Alternatives

Market	2023 No-Build	2023 LRT Alternative	2023 BRT Alternative	2045 No-Build	2045 LRT Alternative	2045 BRT Alternative
Metro Rail - Fare free areas	1,807	14,142	1,368	2,071	15,159	1,599
Metro Rail (full line)	9,369	13,230	9,392	11,301	14,937	11,122
Metro BRT - NFTA Market	-	-	1,542	-	-	1,369
Metro BRT - UB Market	-	-	12,071	-	-	12,815
Metro LRT/BRT - Free University Service	-	1,278	946	-	-	842
Total Ridership	**11,176**	**28,650**	**25,319**	**13,372**	**30,096**	**27,747**