NYMTC Best Practices Model (BPM) Base Year Update and Validation - 2010

TECHNICAL MEMORANDUM

Tasks 5, 10, 11, and 12: Transit Network Update

Prepared for the
New York Metropolitan Transportation Council

By
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1 OBJECTIVES AND OVERVIEW

This Technical Memorandum describes the data and methods used to update the transit network related components of the BPM 2010 Update model, documenting the work done and products developed in:

- Task 5: Transit Counts Update
- Task 10: Rail Service Update
- Task 11: Bus Service Update
- Task 12: Transit Fares

It also includes reporting of the BPM 2010 transit network refinement and calibration done in the prior TH-TDFM 2010 for the PANYNJ (Stage 1), and a parallel and supporting Task Order J (Stage 2) for NYMTC. As a sub-consultant to Parsons Brinckerhoff, AECOM provided major technical support in the transit model improvement work done in these efforts.

The structure and contents of this report is organized by the BPM 2010 Update task structure as follows:

- Transit Service Updates to 2010 - Rail, Bus and other transit modes
- Transit Fare updates to 2010, including a newly developed tool for future year fare coding
- Transit counts updated to 2010, including correspondence files linking the BPM transit network to NYCT subway counts
- Transit network validation and calibration, OD survey based assignment testing
- Transit network and data deliverables – including the complete updated BPM 2010 transit network database [Version 140618]

2 TRANSIT SERVICE UPDATES

2.1 Overview and Summary:

Both "Task 10: Update Rail Service to Current" and "Task 11: Update Bus Network and Service to Current" of the NYBPM 2010 Update project involved updating all transit service representation in the BPM transit network and route database to reflect 2010 conditions. These updates were accomplished in conjunction with transit network calibration (performed with the assistance of AECOM) and with the highway network update (performed under Tasks 6 & 7). Edits to the rail and bus service attributes were made by AECOM as well as by the Port Authority of New York and New Jersey, as a part of the TH-TDFM 2010 Update. All of these revisions and updates have been incorporated into the BPM 2010 transit network. Bus pre-loads for highway network assignment have been updated with the correspondence between the updated all links layer of the transit network and the updated and conflated highway network highway network (see Task 6 & 7 Technical Memorandum).

2.2 Updating Base Year and Future Year Scenarios Transit Network Elements in the NYBPM 2010 Update

The update of the transit element of the NYBPM 2010 Update model has been done within the transit modeling system implemented in TransCAD 6.0-based BPM-2G, developed since the prior BPM 2005 Update. All base and future year scenario transit system components are stored in a specific location within the model. The Transit Master folder is used as an internal transit repository and is stored at the following location:

"<NYBPM-MODEL>\2_Alts\Master\0_Input\2_TNet\"

This folder contains all transit system components required by the model: Transit Routes, Route Stops, Stations, Park-N-Ride facilities and the Underlying Link Layer that can be thought of as a Street Layer with walk access/egress links, transfer links, and specialized Transit facilities, such as railroad or subway paths, etc. Each transit component in this repository is assigned a scenario year(s) in which it operates. Thus, the NYBPM transit repository has the following scenario years available in the model: 2005, 2010, 2011, 2012, 2014, 2020, 2030, 2035, and 2040. It also has data sets of transit fares by mode and by fare zone where applicable for each of the scenario years available in the model and listed above.

To build a new scenario, the user selects a scenario year and a fare year, and the model automatically builds the scenario year transit system based on the data from the transit repository (Transit Master). Thus, in the new scenario folder, the model creates the scenario-specific transit system, which is referred to in all model runs of the given scenario.

2.3 Transit Network Components in NYBPM 2010 Update

Transit service is described by the collective attributes of all available transit components. Two major attributes of the transit system at-large are presented below: available Transit Network Modes and offered Transit Routes[1].

Transit Network Modes:

Transit modes in the NYBPM are defined as:

1) Local Bus,
2) Limited Bus,
3) Express Bus,
4) Commuter Rail,
5) Subway,
6) RIT (Roosevelt Island Tram), and
7) Ferry and Ferry Bus.

In the NYBPM, these seven groups are broken down into more specific sub-categories that define each mode in greater detail. These sub-categories may reflect sub-modes or services where different transit fares are applied, or a distinction by geographic areas served. For example, "Subway" includes NYC Subway lines, PATH, SI Railway, Airtrain JFK, Airtrain EWR, Hudson Bergen LRT, and others. All detailed definitions can be found in the NYBPM 2G transit documentation. Importantly, the detailed sub-modes each have a specific transit fare, which is used in the NYBPM transit system.

Transit Route System

The coding of transit level of service attributes and fares are coded and updated in the transit routes system in the 2010 NYBPM. Transit routes have multiple definitions and groupings. Similar to the definitions of transit modes, the transit route definitions reflect the numerous variations of transit services offered in the NYBPM region. For example, if on a transit route some trains skip certain stops, such a route is presented in the model by two or more "Routes" that have the same route layout and length, but their respective lists of stops are different to reflect that one "Route" makes some stops that the other "Route" skips. In addition, if there are trains on the same route operating only during specific day period(s), these trains may be recorded on separate routes, with headways and capacities defined for only those day periods in which they operate. A route is often represented by two different records (Route IDs), with one record defining the route from the first stop to the last stop and one from the last stop back to the first stop. These can be different route records (different "Routes" in the model) with the same name, but one is, for example, north-bound (_NB), and the other one south-bound (_SB). Thus, a route in the model may have more detailed specifications than one might expect based on only the route timetable schedule and its first and last stops.

"Route Family" in the NYBPM aggregates several "model Routes" into groups based on their general

[1] Note that the core mode choice model of the BPM generates four distinct trip table modes: Commuter Rail – Walk Access, Commuter Rail – Drive Access, Other Transit – Walk Access, and Other Transit – Drive Access. The seven transit sub-modes are determined by the path-building and loading of these tables in the transit network as part of the assignment process.

layout and other common features. For example, the Route Family called "NYC Subway 1" incorporates eight (8) routes. Six of them include three north-bound and three south-bound routes between "South Ferry" and "Van Cortlandt Park-242 St" stations. Within this group, the south-bound routes have shorter headways during AM period, which reflects higher demand in the CBD-bound direction. Two additional Routes in this Route Family operate only during the PM Day period in the south-bound direction and have slight differences in their stops.

The number of route families and routes contained in the NYBPM 2010 Update are summarized by county for each mode in **Table 1Error! Reference source not found.** and **Table 2Error! Reference source not found.,** respectively.

A complete listing of all base year and current available future year NYBPM 2010 transit routes, with their descriptors and coded service attributes is also being transmitted as a Task 10 & 11 deliverable. This listing has been exported from its native TransCAD format and broken down by mode in an easily readable Excel format [BPM 2010_Transit Network_140618_ Routes Database - Descriptors and Attributes.xlsx]. In this document, each mode is described in two worksheets, one with route descriptors and one with coded service attributes. These worksheets and their corresponding fields are described in **Table 3**. For illustration, the first page of records for the Limited Bus, Express Bus, Subway, and Commuter Rail modes' descriptors and attributes tables are shown in **Table 4**, **Table 5**, **Table 6**, **Table 7**, **Table 8**, **Table 9**, **Table 10**, and **Table 11**, respectively.

Table 1: Route Families by Mode by County

Color coding:		NYC
		NJ
		CT

Route Families by Mode by County

	MODE	1 Local Bus	2 Limited Bus	3 Express Bus	4 Commuter Rail	5 Subway	6 + 7 RIT + Ferry + Ferry Bus	All Modes*
1	MANHATTAN	83	7	166	34	25	21	336
2	QUEENS	98	13	19	20	15		165
3	BRONX	54	5	15	6	7		87
4	KINGS	57	6	7	14	17		101
5	RICHMOND	19	10	12		1	1	43
6	NASSAU	62	2	1	20			85
7	SUFFOLK	58			8		1	67
8	WESTCHESTER	69		10	6		1	86
9	ROCKLAND	22		11	4		1	38
10	PUTNAM	8		1	4			13
11	ORANGE	17		10	2			29
12	DUTCHESS	35		4	4			43
13	FAIRFIELD	65			2		1	68
14	BERGEN	46		52	4		1	103
15	PASSAIC	23		23	4			50
16	HUDSON	52		66	12	11	15	156
17	ESSEX	50		21	10	3		84
18	UNION	20		8	8			36
19	MORRIS	11		7	4			22
20	SOMERSET	7		4	4			15
21	MIDDLESEX	32		17	6			55
22	MONMOUTH	17		18	2		2	39
23	OCEAN	14		10	2			26
24	HUNTERDON			3	2			5
25	WARREN	2		2	4			8
26	SUSSEX			2				2
27	NEW HAVEN	62			2			64
28	MERCER	18		2	2			22
	TOTAL	**1001**	**43**	**491**	**190**	**79**	**44**	**1848**

* - the numbers of Route Families may be not exact because of varying route coding

Table 2: Routes by Mode by County

Color coding:		NYC
		NJ
		CT

Routes by Mode by County

MODE		1 Local Bus	2 Limited Bus	3 Express Bus	4 Commuter Rail	5 Subway	6 + 7 RIT + Ferry + Ferry Bus	All Modes
1	MANHATTAN	277	27	648	627	179	71	1829
2	QUEENS	377	32	77	277	91		854
3	BRONX	175	20	62	62	80		399
4	KINGS	225	19	47	57	137		485
5	RICHMOND	86	14	60		20	2	182
6	NASSAU	116	4	6	288			414
7	SUFFOLK	128			183		2	313
8	WESTCHESTER	124		16	187		2	329
9	ROCKLAND	49		25	46		2	122
10	PUTNAM	14		2	49			65
11	ORANGE	19		19	17			55
12	DUTCHESS	36		5	30			71
13	FAIRFIELD	70			121		2	193
14	BERGEN	139		161	57		2	359
15	PASSAIC	88		84	54			226
16	HUDSON	164		198	233	16	36	647
17	ESSEX	268		76	253	6		603
18	UNION	90		27	155			272
19	MORRIS	36		27	85			148
20	SOMERSET	20		12	39			71
21	MIDDLESEX	105		55	109			269
22	MONMOUTH	46		54	44		18	162
23	OCEAN	34		26	24			84
24	HUNTERDON			9	8			17
25	WARREN	6		4	11			21
26	SUSSEX			5				5
27	NEW HAVEN	64			61			125
28	MERCER	61		3	41			105
	TOTAL	**2817**	**116**	**1708**	**3118**	**529**	**137**	**8425**

Table 3: Transit Routes Data Deliverable: Worksheets and Attributes Included

Worksheets Included:

… Descriptors	Provide general identifying information for each route, including the - route identifier and name, - route family, - mode number and name, - operating company, - length, and - first and last stops.
… Attributes	Provide detailed service attributes, including the - headway by TOD period, - capacity by TOD period, - fare by scenario, and - scenario inclusion flag.

Attribute Definitions:

ROUTE ID	Internal unique number assigned to each route
	* = Route ID, stops, headways, and capacity may vary across scenarios
ROUTE NAME	Unique route name
MODE	Mode code used for categorizing transit sub-modes
MODE NAME	Definition of MODE: 1 = Local Bus (all operators, excluding ferry shuttles) 2 = Limited Bus (NYCT bus) 3 = Express Bus (all operators) 4 = Commuter Rail (LIRR, MNR, NJT) 5 = Subway (NYC Subway, PATH, Newark City Subway) 6 = Roosevelt Island Tram (RIT) 7 = Ferry/Ferry Shuttlebus
COMPANY	Operating company
ROUTE FAMILY	Route family, as described in accompanying Technical Memorandum, Section 2
NJBUSFLAG	Flag indicating whether the route is operated by a NJ-based operator
ROUTE LENGTH	Length of the route (in miles)
DIR	TransCAD topological direction code (not maintained or used for modeling)
TRANS-HUD	Flag indicating whether the route crosses the Hudson River
KEY TERMINAL	Main terminal station on the route
STOP First	First stop on the route
COUNTY First	County in which the route starts
STOP Last	Last stop on the route
COUNTY Last	County in which the route terminates
HEADWAY	Headways, by TOD period, in minutes [999 = Not in service for given time period]
CAP	Vehicle passenger capacity, by TOD period
FARE	One-way full fare for routes with a fixed fare
SCENARIO INCLUSION FLAG	Flag indicating whether the route is included in each scenario

Table 4: Local Bus Descriptors

Local Bus Descriptors

ROUTE ID		ROUTE NAME	MODE	MODE NAME	COMPANY	ROUTE FAMILY	NJBUSFLAG	ROUTE LENGTH	DIR	TRANS-HUD	KEY TERMINAL	STOP First	COUNTY First	STOP Last
7917		B1_EM	1	Local Bus	NYCTA	B1	0	5.8	0	0	0	86 St & 13 Av	0	Oriental Bl & Mackenzie St
4980	*	B1_MS	1	Local Bus	NYCTA	B1	0	9.0	0	0	0	Oriental Bl & Mackenzie St	0	Mackay Pl & Shore Rd
7919		B1_OM	1	Local Bus	NYCTA	B1	0	1.5	0	0	0	Brighton Beach Av & Br 1 Pl	0	Oriental Bl & Mackenzie St
7918		B1_RM	1	Local Bus	NYCTA	B1	0	3.9	0	0	0	Stillwell Av & 86 St	0	Oriental Bl & Mackenzie St
4981	*	B1_SM	1	Local Bus	NYCTA	B1	0	8.9	0	0	0	Mackay Pl & Shore Rd	0	Oriental Bl & Mackenzie St
3961		B2_UQ	1	Local Bus	NYCTA	B2	0	2.6	0	0	0	Av U & Flatbush Av	0	Quentin Rd & E 16 St
7920		B2_RQ	1	Local Bus	NYCTA	B2	0	2.2	0	0	0	Flatbush Av & Utica Av	0	Quentin Rd & E 16 St
3960		B2_QU	1	Local Bus	NYCTA	B2	0	2.8	0	0	0	Quentin Rd & E 16 St	0	Av U & Flatbush Av
8393	*	B3_YT	1	Local Bus	NYCTA	B3	0	6.0	0	0	0	Av X & E 74 St	0	Harway Av & 25 Av
7923	*	B3_YD	1	Local Bus	NYCTA	B3	0	3.7	0	0	0	Av X & E 74 St	0	E 15 St & Av U
8394		B3_UT	1	Local Bus	NYCTA	B3	0	5.4	0	0	0	Av U & E 71 St	0	Harway Av & 25 Av
8395	*	B3_TY	1	Local Bus	NYCTA	B3	0	6.1	0	0	0	Harway Av & 25 Av	0	Av X & E 74 St
8396		B3_TU	1	Local Bus	NYCTA	B3	0	5.4	0	0	0	Harway Av & 25 Av	0	Av U & Veterans Av
6022	*	B4_VN	1	Local Bus	NYCTA	B4	0	9.1	0	0	0	Knapp St & Harkness Av	0	Narrows Av & 77 St
6021	*	B4_NV	1	Local Bus	NYCTA	B4	0	9.5	0	0	0	Narrows Av & 77 St	0	Knapp St & Harkness Av
8406		B6O_SL	1	Local Bus	NYCTA	B6O	0	10.1	0	0	0	Harway Av & Bay 37 St	0	Ashford St & New Lots Av
8408		B6O_SB	1	Local Bus	NYCTA	B6O	0	8.0	0	0	0	Harway Av & Bay 37 St	0	Rockaway Pky Sta Loop
8409		B6O_LE	1	Local Bus	NYCTA	B6O	0	11.4	0	0	0	Ashford St & New Lots Av	0	Harway Av & Bay 37 St
7926		B6O_KJ	1	Local Bus	NYCTA	B6O	0	4.9	0	0	0	Rockaway Pky Sta Loop	0	Av J & Coney Island Av
7927		B6O_HN	1	Local Bus	NYCTA	B6O	0	3.3	0	0	0	Rockaway Pky Sta Loop	0	Nostrand Av & Glenwood Rd
7928		B6O_FN	1	Local Bus	NYCTA	B6O	0	1.7	0	0	0	Glenwood Rd & Ralph Av	0	Nostrand Av & Glenwood Rd
8411		B6O_BE	1	Local Bus	NYCTA	B6O	0	8.6	0	0	0	Rockaway Pky Sta Loop	0	Harway Av & Bay 37 St
3919		B7O_SH	1	Local Bus	NYCTA	B7O	0	7.0	0	0	0	Quentin Rd & Coney Island Av	0	Halsey St & Saratoga Av
6180		B7O_KH	1	Local Bus	NYCTA	B7O	0	5.2	0	0	0	Kings Hy & Ryder St	0	Halsey St & Saratoga Av
3918		B7O_HS	1	Local Bus	NYCTA	B7O	0	6.7	0	0	0	Halsey St & Saratoga Av	0	Quentin Rd & Coney Island Av
8415	*	B8_YH	1	Local Bus	NYCTA	B8	0	10.2	0	0	0	4 Av & 5 Av	0	Rockaway Av & Hegeman Av
8416		B8_SH	1	Local Bus	NYCTA	B8	0	8.9	0	0	0	V A Hospital Rd	0	Rockaway Av & Hegeman Av
8417	*	B8_HY	1	Local Bus	NYCTA	B8	0	10.0	0	0	0	Rockaway Av & Hegeman Av	0	4 Av & 5 Av
8418		B8_HS	1	Local Bus	NYCTA	B8	0	8.8	0	0	0	Rockaway Av & Hegeman Av	0	V A Hospital Rd & Cropsey Av
7931		B8_HN	1	Local Bus	NYCTA	B8	0	3.2	0	0	0	Rockaway Av & Hegeman Av	0	Nostrand Av & Newkirk Av
8398		B82_UA	1	Local Bus	NYCTA	B82	0	9.2	0	0	0	Cropsey Av & Bay 38 St	0	Seaview Av
8400		B82_SC	1	Local Bus	NYCTA	B82	0	10.9	0	0	0	Seaview Av	0	Stillwell Av & Surf Av
8401		B82_SB	1	Local Bus	NYCTA	B82	0	9.6	0	0	0	Seaview Av	0	Bay 38 St & Cropsey Av
8397		B82_CS	1	Local Bus	NYCTA	B82	0	10.8	0	0	0	Stillwell Av & Surf Av	0	Seaview Av
3943		B83_VS	1	Local Bus	NYCTA	B83	0	3.7	0	0	0	Van Sinderen Av & Fulton St	0	Seaview Av
3940		B83_SV	1	Local Bus	NYCTA	B83	0	3.7	0	0	0	Seaview Av	0	Van Sinderen Av & Fulton St
8403		B9O_SE	1	Local Bus	NYCTA	B9O	0	8.2	0	0	0	Shore Rd & 71 St	0	Flatbush Av & Av V
8405		B9O_LS	1	Local Bus	NYCTA	B9O	0	6.8	0	0	0	Flatbush Av & Overbaugh Pl	0	Shore Rd & 71 St
8404		B9O_ES	1	Local Bus	NYCTA	B9O	0	8.2	0	0	0	Flatbush Av & Av V	0	Shore Rd & 71 St
8412		B11_WE	1	Local Bus	NYCTA	B11	0	5.8	0	0	0	58 St & 1 Av	0	Nostrand Av & Flatbush Av
8413		B11_FE	1	Local Bus	NYCTA	B11	0	4.8	0	0	0	5 Av & 50 St	0	Nostrand Av & Flatbush Av
8414		B11_EW	1	Local Bus	NYCTA	B11	0	6.0	0	0	0	Flatbush Av & E 31 St	0	58 St & 1 Av
4099	*	B12_SO	1	Local Bus	NYCTA	B12	0	6.3	0	0	0	Sheridan Av & Liberty Av	0	Parkside Av
4098	*	B12_OS	1	Local Bus	NYCTA	B12	0	6.2	0	0	0	Parkside Av	Kings	Sheridan Av & Liberty Av
7934		B12_OE	1	Local Bus	NYCTA	B12	0	4.1	0	0	0	Parkside Av	Kings	Jamaica Av & Fulton St
7935		B12_EO	1	Local Bus	NYCTA	B12	0	4.2	0	0	0	Jamaica Av	0	Parkside Av
7937		B13_WS	1	Local Bus	NYCTA	B13	0	8.0	0	0	0	Palmetto St & St Nicholas Av	0	Seaview Av-
6216	*	B13_SG	1	Local Bus	NYCTA	B13	0	10.6	0	0	0	Erskine St & Seaview Av	0	Ainslie St & Graham Av

Table 5: Local Bus Attributes

Local Bus Attributes

ROUTE ID		ROUTE NAME	MODE	MODE NAME	COMPANY	NJBUSFLAG	HEADWAY					CAP					FARE									SCENARIO INCLUSION FLAG									
							AM	MID	PM	EVE	NT	AM	MID	PM	EVE	NT	2005B	2010N	2011B	2012B	2014B	2020B	2030B	2035B	2040B	F2005B	F2010NB	F2011B	F2012B	F2014B	F2020B	F2030B	F2035B	F2040B	DIR
7917		B1_EM	1	Local Bus	NYCTA	0	5	10	10	15	50	720	360	360	240	72	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
4980	*	B1_MS	1	Local Bus	NYCTA	0	10	10	10	15	50	360	360	360	240	72	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	0	0	0	0	0	0	0	0	0
7919		B1_OM	1	Local Bus	NYCTA	0	11	10	10	15	50	342	360	360	240	72	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
7918		B1_RM	1	Local Bus	NYCTA	0	15	10	10	15	50	248	360	360	240	72	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
4981	*	B1_SM	1	Local Bus	NYCTA	0	11	10	10	15	50	342	360	360	240	72	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	0	0	0	0	0	0	0	0	0
3961		B2_UQ	1	Local Bus	NYCTA	0	13	20	10	15	999	276	180	360	240	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
7920		B2_RQ	1	Local Bus	NYCTA	0	16	20	10	15	999	232	180	360	240	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
3960		B2_QU	1	Local Bus	NYCTA	0	14	20	10	15	999	255	180	360	240	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
8393	*	B3_YT	1	Local Bus	NYCTA	0	7	9	6	10	60	553	400	600	360	60	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	0	0	0	0	0	0	0	0	0
7923	*	B3_YD	1	Local Bus	NYCTA	0	13	18	6	10	60	276	200	600	360	60	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	0	0	0	0	0	0	0	0	0
8394		B3_UT	1	Local Bus	NYCTA	0	12	18	6	10	60	313	200	600	360	60	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
8395	*	B3_TY	1	Local Bus	NYCTA	0	11	18	6	10	60	342	200	600	360	60	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	0	0	0	0	0	0	0	0	0
8396		B3_TU	1	Local Bus	NYCTA	0	18	9	6	10	60	205	400	600	360	60	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
6022	*	B4_VN	1	Local Bus	NYCTA	0	16	30	15	30	999	225	120	240	120	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	0	0	0	0	0	0	0	0	0
6021	*	B4_NV	1	Local Bus	NYCTA	0	17	30	15	30	999	218	120	240	120	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	0	0	0	0	0	0	0	0	0
8406		B6O_SL	1	Local Bus	NYCTA	0	999	10	10	15	60	0	360	360	240	60	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
8408		B6O_SB	1	Local Bus	NYCTA	0	8	10	10	15	60	480	360	360	240	60	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
8409		B6O_LE	1	Local Bus	NYCTA	0	11	12	10	15	60	342	300	360	240	60	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
7926		B6O_KJ	1	Local Bus	NYCTA	0	14	12	10	15	60	257	300	360	240	60	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
7927		B6O_HN	1	Local Bus	NYCTA	0	13	12	10	15	60	288	300	360	240	60	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
7928		B6O_FN	1	Local Bus	NYCTA	0	8	10	10	15	60	480	360	360	240	60	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
8411		B6O_BE	1	Local Bus	NYCTA	0	9	10	10	15	60	423	360	360	240	60	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
3919		B7O_SH	1	Local Bus	NYCTA	0	11	30	20	30	999	342	120	180	120	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
6180		B7O_KH	1	Local Bus	NYCTA	0	999	30	20	30	999	0	120	180	120	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
3918		B7O_HS	1	Local Bus	NYCTA	0	12	30	20	30	999	313	120	180	120	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
8415	*	B8_YH	1	Local Bus	NYCTA	0	19	22	17	15	999	194	163	211	240	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	0	0	0	0	0	0	0	0	0
8416		B8_SH	1	Local Bus	NYCTA	0	15	12	17	15	999	240	300	211	240	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
8417	*	B8_HY	1	Local Bus	NYCTA	0	14	20	17	15	999	266	180	211	240	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	0	0	0	0	0	0	0	0	0
8418		B8_HS	1	Local Bus	NYCTA	0	13	12	17	15	999	276	300	211	240	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
7931		B8_HN	1	Local Bus	NYCTA	0	6	12	17	15	999	654	300	211	240	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
8398		B82_UA	1	Local Bus	NYCTA	0	9	10	5	10	60	400	360	720	360	60	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
8400		B82_SC	1	Local Bus	NYCTA	0	10	20	5	10	60	378	180	720	360	60	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
8401		B82_SB	1	Local Bus	NYCTA	0	10	10	5	10	60	378	360	720	360	60	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
8397		B82_CS	1	Local Bus	NYCTA	0	10	10	5	10	60	360	360	720	360	60	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
3943		B83_VS	1	Local Bus	NYCTA	0	11	12	6	9	999	327	300	600	400	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
3940		B83_SV	1	Local Bus	NYCTA	0	7	12	6	9	999	553	300	600	400	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
8403		B9O_SE	1	Local Bus	NYCTA	0	7	9	9	30	999	553	400	400	120	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
8405		B9O_LS	1	Local Bus	NYCTA	0	10	10	9	30	999	360	360	400	120	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
8404		B9O_ES	1	Local Bus	NYCTA	0	6	9	9	30	999	600	400	400	120	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
8412		B11_WE	1	Local Bus	NYCTA	0	10	10	10	15	999	360	360	360	240	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
8413		B11_FE	1	Local Bus	NYCTA	0	15	10	10	15	999	248	360	360	240	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
8414		B11_EW	1	Local Bus	NYCTA	0	9	10	10	15	999	423	360	360	240	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0
4099	*	B12_SO	1	Local Bus	NYCTA	0	9	12	9	13	40	423	300	400	276	90	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	0	0	0	0	0	0	0	0	0
4098	*	B12_OS	1	Local Bus	NYCTA	0	8	13	9	13	40	450	276	400	276	90	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	0	0	0	0	0	0	0	0	0
7934		B12_OE	1	Local Bus	NYCTA	0	8	7	9	13	40	480	514	400	276	90	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	0

Table 6: Express Bus Descriptors

Express Bus Descriptors

ROUTE ID		ROUTE_NAME	MODE	MODE NAME	COMPANY	ROUTE FAMILY	NJBUSFLAG	ROUTE LENGTH	DIR	TRANS_HUD	KEY TERMINAL	STOP First	COUNTY First	STOP Last	COUNTY Last
8450		BM1_BC	3	Express Bus	NYCTA	BM1	0	20.4	0	0	0	Strickland Av & 56 Dr	0	E 57 St & 1 Av	0
7986		BM1_BD	3	Express Bus	NYCTA	BM1	0	13.8	0	0	0	Strickland Av & 56 Dr	0	Thomas St & Church St	0
8446		BM1_BM	3	Express Bus	NYCTA	BM1	0	20.0	0	0	0	Strickland Av & 56 Dr	0	E 57 St & 1 Av	0
8451		BM1_CB	3	Express Bus	NYCTA	BM1	0	20.6	0	0	0	E 57 St & 2 Av	0	Mill Av & National Dr	0
8422		BM1_DB	3	Express Bus	NYCTA	BM1	0	15.1	0	0	0	Park Pl	Kings	Mill Av & National Dr	0
8423		BM1_MB	3	Express Bus	NYCTA	BM1	0	20.6	0	0	0	E 57 St & 2 Av	0	Mill Av & National Dr	0
8452		BM2_BC	3	Express Bus	NYCTA	BM2	0	20.2	0	0	0	E 94 St & Flatlands Av	0	E 57 St & 1 Av	0
7989		BM2_BD	3	Express Bus	NYCTA	BM2	0	13.6	0	0	0	E 94 St & Flatlands Av	0	Thomas St & Church St	0
8449		BM2_BM	3	Express Bus	NYCTA	BM2	0	19.8	0	0	0	E 94 St & Flatlands Av	0	E 57 St & 1 Av	0
8456		BM2_CB	3	Express Bus	NYCTA	BM2	0	20.5	0	0	0	E 57 St & 2 Av	0	E 94 St & Flatlands Av	0
8454		BM2_DB	3	Express Bus	NYCTA	BM2	0	15.0	0	0	0	Park Pl	Kings	E 94 St & Flatlands Av	0
8455		BM2_MB	3	Express Bus	NYCTA	BM2	0	20.4	0	0	0	E 57 St & 2 Av	0	E 94 St & Flatlands Av	0
8453		BM2_SC	3	Express Bus	NYCTA	BM2	0	21.1	0	0	0	Seaview Av	0	E 57 St & 1 Av	0
7990		BM2_SD	3	Express Bus	NYCTA	BM2	0	14.5	0	0	0	Seaview Av	0	Thomas St & Church St	0
8461		BM3_BC	3	Express Bus	NYCTA	BM3	0	21.2	0	0	0	Emmons Av & E 15 St	0	E 57 St & 1 Av	0
8459		BM3_BD	3	Express Bus	NYCTA	BM3	0	14.7	0	0	0	Emmons Av & E 15 St	0	Thomas St & Church St	0
8460		BM3_BM	3	Express Bus	NYCTA	BM3	0	20.9	0	0	0	Emmons Av & E 15 St	0	E 57 St & 1 Av	0
8462		BM3_CB	3	Express Bus	NYCTA	BM3	0	21.2	0	0	0	E 57 St & 2 Av	0	Emmons Av & Shore Bl	0
8457		BM3_DB	3	Express Bus	NYCTA	BM3	0	15.7	0	0	0	Park Pl	Kings	Emmons Av & Shore Bl	0
8458		BM3_MB	3	Express Bus	NYCTA	BM3	0	21.1	0	0	0	E 57 St & 2 Av	0	Emmons Av & Shore Bl	0
8465		BM4_BC	3	Express Bus	NYCTA	BM4	0	19.1	0	0	0	Gerritsen Av & Lois Av	0	E 57 St & 1 Av	0
8463		BM4_BD	3	Express Bus	NYCTA	BM4	0	12.5	0	0	0	Gerritsen Av & Lois Av	0	Thomas St & Church St	0
8464		BM4_BM	3	Express Bus	NYCTA	BM4	0	18.7	0	0	0	Gerritsen Av & Lois Av	0	E 57 St & 1 Av	0
8466		BM4_CB	3	Express Bus	NYCTA	BM4	0	18.9	0	0	0	E 57 St & 2 Av	0	Gerritsen Av & Lois Av	0
6903		BM4_DB	3	Express Bus	NYCTA	BM4	0	13.4	0	0	0	Park Pl	Kings	Gerritsen Av & Lois Av	0
7171		BM4_MB	3	Express Bus	NYCTA	BM4	0	18.8	0	0	0	E 57 St & 2 Av	0	Gerritsen Av & Lois Av	0
8444		BQM1_CM	3	Express Bus	NYCTA	BQM1	0	20.5	0	0	0	E 82 St & Av M	0	E 57 St & 1 Av	0
7048		BQM1_MC	3	Express Bus	NYCTA	BQM1	0	20.0	0	0	0	E 57 St & 2 Av	0	Av M & E 80 St	0
7047		BQM1_MS	3	Express Bus	NYCTA	BQM1	0	16.8	0	0	0	E 57 St & 2 Av	0	Seaview Av	0
8445		BQM1_SM	3	Express Bus	NYCTA	BQM1	0	17.4	0	0	0	Seaview Av	0	E 57 St & 1 Av	0
8584		BXM1_HM	3	Express Bus	NYCTA	BXM1	0	13.0	0	0	0	Henry Hudson Py W & W 236 St	0	Lexington Av & E 34 St	0
8579		BXM1_IB	3	Express Bus	NYCTA	BXM1	0	13.0	0	0	0	Independence Av & W 239 St	0	Lexington Av & E 34 St	0
8583		BXM1_ID	3	Express Bus	NYCTA	BXM1	0	13.0	0	0	0	Independence Av & W 239 St	0	Lexington Av & E 34 St	0
8580		BXM1_IM	3	Express Bus	NYCTA	BXM1	0	13.3	0	0	0	Independence Av & W 239 St	0	Lexington Av & E 34 St	0
7425		BXM1_MB	3	Express Bus	NYCTA	BXM1	0	14.1	0	0	0	E 33 St & 3 Av	0	Riverdale Av	0
7426		BXM1_MD	3	Express Bus	NYCTA	BXM1	0	14.1	0	0	0	E 33 St & 3 Av	0	Riverdale Av	0
7424		BXM1_MR	3	Express Bus	NYCTA	BXM1	0	14.5	0	0	0	E 33 St & 3 Av	0	Riverdale Av	0
8576		BXM1_RA	3	Express Bus	NYCTA	BXM1	0	14.0	0	0	0	Riverdale Av & W 261 St	0	Lexington Av & E 34 St	0
8610		BXM1_RB	3	Express Bus	NYCTA	BXM1	0	14.6	0	0	0	Riverdale Av & W 261 St	0	Lexington Av & E 34 St	0
8577		BXM1_RC	3	Express Bus	NYCTA	BXM1	0	13.6	0	0	0	Riverdale Av & W 261 St	0	Lexington Av & E 34 St	0
8582		BXM1_RE	3	Express Bus	NYCTA	BXM1	0	13.6	0	0	0	Riverdale Av & W 261 St	0	Lexington Av & E 34 St	0
8578		BXM1_RM	3	Express Bus	NYCTA	BXM1	0	14.9	0	0	0	Riverdale Av & W 261 St	0	Lexington Av & E 34 St	0
8589		BXM2_HM	3	Express Bus	NYCTA	BXM2	0	13.7	0	0	0	Henry Hudson Py W & W 236 St	0	7 Av & W 34 St	New York
8588		BXM2_IM	3	Express Bus	NYCTA	BXM2	0	14.0	0	0	0	Independence Av & W 239 St	0	7 Av & W 34 St	New York
8585		BXM2_MR	3	Express Bus	NYCTA	BXM2	0	14.9	0	0	0	Av of The Americas & W 35 St	0	Riverdale Av	0
8586		BXM2_RA	3	Express Bus	NYCTA	BXM2	0	14.7	0	0	0	Riverdale Av & W 261 St	0	7 Av & W 34 St	New York
8587		BXM2_RM	3	Express Bus	NYCTA	BXM2	0	15.6	0	0	0	Riverdale Av & W 261 St	0	7 Av & W 34 St	New York
8596		BXM3_BM	3	Express Bus	NYCTA	BXM3	0	12.1	0	0	0	Van Cortlandt Pk S-Major Deegan En Nb	0	E 26 St & 5 Av	0

Table 7: Express Bus Attributes

Express Bus Atttributes

ROUTE ID		ROUTE NAME	MODE	MODE NAME	COMPANY	NJBUSFLAG	HEADWAY					CAP					FARE									SCENARIO INCLUSION FLAG									DIRECTION
							AM	MID	PM	EVE	NT	AM	MID	PM	EVE	NT	2005B	2010N	2011B	2012B	2014B	2020B	2030B	2035B	2040B	F2005B	F2010NB	F2011B	F2012B	F2014B	F2020B	F2030B	F2035B	F2040B	
8450		BM1_BC	3	Express Bus	NYCTA	0	45	60	60	999	999	80	60	60	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
7986		BM1_BD	3	Express Bus	NYCTA	0	14	60	60	999	999	266	60	60	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8446		BM1_BM	3	Express Bus	NYCTA	0	9	60	60	999	999	400	60	60	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8451		BM1_CB	3	Express Bus	NYCTA	0	999	60	60	999	999	0	60	60	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8422		BM1_DB	3	Express Bus	NYCTA	0	999	60	60	999	999	0	60	60	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8423		BM1_MB	3	Express Bus	NYCTA	0	999	60	60	999	999	0	60	60	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8452		BM2_BC	3	Express Bus	NYCTA	0	40	60	999	999	999	90	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
7989		BM2_BD	3	Express Bus	NYCTA	0	26	60	999	999	999	138	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8449		BM2_BM	3	Express Bus	NYCTA	0	10	60	999	999	999	378	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8456		BM2_CB	3	Express Bus	NYCTA	0	999	999	999	999	999	0	0	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8454		BM2_DB	3	Express Bus	NYCTA	0	999	999	999	999	999	0	0	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8455		BM2_MB	3	Express Bus	NYCTA	0	999	999	999	999	999	0	0	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8453		BM2_SC	3	Express Bus	NYCTA	0	999	999	999	999	999	0	0	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
7990		BM2_SD	3	Express Bus	NYCTA	0	28	999	999	999	999	130	0	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8461		BM3_BC	3	Express Bus	NYCTA	0	38	60	999	999	999	96	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8459		BM3_BD	3	Express Bus	NYCTA	0	16	60	999	999	999	225	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8460		BM3_BM	3	Express Bus	NYCTA	0	13	60	999	999	999	288	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8462		BM3_CB	3	Express Bus	NYCTA	0	999	60	999	999	999	0	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8457		BM3_DB	3	Express Bus	NYCTA	0	999	60	999	999	999	0	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8458		BM3_MB	3	Express Bus	NYCTA	0	999	60	999	999	999	0	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8465		BM4_BC	3	Express Bus	NYCTA	0	36	60	999	999	999	101	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8463		BM4_BD	3	Express Bus	NYCTA	0	12	60	999	999	999	313	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8464		BM4_BM	3	Express Bus	NYCTA	0	13	60	999	999	999	276	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8466		BM4_CB	3	Express Bus	NYCTA	0	999	60	999	999	999	0	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
6903		BM4_DB	3	Express Bus	NYCTA	0	999	60	999	999	999	0	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
7171		BM4_MB	3	Express Bus	NYCTA	0	999	60	999	999	999	0	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8444		BQM1_CM	3	Express Bus	NYCTA	0	15	60	999	999	999	240	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
7048		BQM1_MC	3	Express Bus	NYCTA	0	999	60	999	999	999	0	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
7047		BQM1_MS	3	Express Bus	NYCTA	0	999	60	999	999	999	0	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8445		BQM1_SM	3	Express Bus	NYCTA	0	37	60	999	999	999	98	60	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8584		BXM1_HM	3	Express Bus	NYCTA	0	35	30	999	999	999	102	120	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8579		BXM1_IB	3	Express Bus	NYCTA	0	15	30	999	999	999	240	120	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8583		BXM1_ID	3	Express Bus	NYCTA	0	999	30	999	999	999	0	120	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8580		BXM1_IM	3	Express Bus	NYCTA	0	18	30	999	999	999	205	120	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
7425		BXM1_MB	3	Express Bus	NYCTA	0	45	30	18	999	999	80	120	200	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
7426		BXM1_MD	3	Express Bus	NYCTA	0	999	30	30	999	999	0	120	120	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
7424		BXM1_MR	3	Express Bus	NYCTA	0	35	30	13	999	999	102	120	276	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8576		BXM1_RA	3	Express Bus	NYCTA	0	15	30	999	999	999	240	120	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8610		BXM1_RB	3	Express Bus	NYCTA	0	999	30	999	999	999	0	120	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8577		BXM1_RC	3	Express Bus	NYCTA	0	26	30	999	999	999	141	120	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8582		BXM1_RE	3	Express Bus	NYCTA	0	20	30	999	999	999	180	120	0	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8578		BXM1_RM	3	Express Bus	NYCTA	0	34	30	35	999	999	105	120	102	0	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8589		BXM2_HM	3	Express Bus	NYCTA	0	999	30	10	30	999	0	120	360	120	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8588		BXM2_IM	3	Express Bus	NYCTA	0	20	30	10	30	999	180	120	360	120	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0
8585		BXM2_MR	3	Express Bus	NYCTA	0	30	30	9	30	999	120	120	400	120	0	4.98	5.00	5.00	5.00	5.51	5.51	5.51	5.51	5.51	1	1	1	1	1	1	1	1	1	0

Table 8: Subway Descriptors

SUBWAY Descriptors

ROUTE ID		ROUTE_NAME	MODE	MODE NAME	COMPANY	ROUTE FAMILY	NJ BUS FLAG	ROUTE LENGTH	DIR	TRANS_HUD	KEY TERMINAL	STOP First	COUNTY First	STOP Last	COUNTY Last
3185	*	1..N51R	5	Subway	NYCTA	NYC Subway 1	0	14.9	NB	0	0	South Ferry	New York	Van Cortlandt Park-242 St	Bronx
2202	*	1..N59R	5	Subway	NYCTA	NYC Subway 1	0	14.7	NB	0	0	South Ferry	New York	Van Cortlandt Park-242 St	Bronx
2080	*	1..N60R	5	Subway	NYCTA	NYC Subway 1	0	14.7	NB	0	0	South Ferry	New York	Van Cortlandt Park-242 St	Bronx
3184	*	1..S51R	5	Subway	NYCTA	NYC Subway 1	0	14.7	SB	0	0	Van Cortlandt Park-242 St	Bronx	South Ferry	New York
3186	*	1..S55R	5	Subway	NYCTA	NYC Subway 1	0	14.4	SB	0	0	231 St	Bronx	South Ferry	New York
2203	*	1..S59R	5	Subway	NYCTA	NYC Subway 1	0	14.7	SB	0	0	Van Cortlandt Park-242 St	Bronx	South Ferry	New York
2081	*	1..S60R	5	Subway	NYCTA	NYC Subway 1	0	14.7	SB	0	0	Van Cortlandt Park-242 St	Bronx	South Ferry	New York
3187	*	1..S61R	5	Subway	NYCTA	NYC Subway 1	0	14.7	SB	0	0	238 St	Bronx	South Ferry	New York
5031		2..N01R	5	Subway	NYCTA	NYC Subway 2	0	25.4	NB	0	0	Brooklyn College-Flatbush Av	Kings	Wakefield-241 St	Bronx
5036		2..N02R	5	Subway	NYCTA	NYC Subway 2	0	25.0	NB	0	0	Brooklyn College-Flatbush Av	Kings	Nereid Av	Bronx
5035		2..N03R	5	Subway	NYCTA	NYC Subway 2	0	26.6	NB	0	0	New Lots Av	Kings	Wakefield-241 St	Bronx
5034		2..N04R	5	Subway	NYCTA	NYC Subway 2	0	26.3	NB	0	0	New Lots Av	Kings	Nereid Av	Bronx
5033		2..N08R	5	Subway	NYCTA	NYC Subway 2	0	25.4	NB	0	0	Brooklyn College-Flatbush Av	Kings	Wakefield-241 St	Bronx
5037		2..S01R	5	Subway	NYCTA	NYC Subway 2	0	25.4	SB	0	0	Wakefield-241 St	Bronx	Brooklyn College-Flatbush Av	Kings
5040		2..S02R	5	Subway	NYCTA	NYC Subway 2	0	25.0	SB	0	0	Nereid Av	Bronx	Brooklyn College-Flatbush Av	Kings
5041		2..S03R	5	Subway	NYCTA	NYC Subway 2	0	26.6	SB	0	0	Wakefield-241 St	Bronx	New Lots Av	Kings
5039		2..S08R	5	Subway	NYCTA	NYC Subway 2	0	25.4	SB	0	0	Wakefield-241 St	Bronx	Brooklyn College-Flatbush Av	Kings
5032		3..N01R	5	Subway	NYCTA	NYC Subway 3	0	18.2	NB	0	0	New Lots Av	Kings	Harlem-148 St	New York
3198		3..N02R	5	Subway	NYCTA	NYC Subway 3	0	0.8	NB	0	0	135 St	New York	Harlem-148 St	New York
3196		3..N04R	5	Subway	NYCTA	NYC Subway 3	0	15.2	NB	0	0	New Lots Av	Kings	96 St	New York
5038		3..S01R	5	Subway	NYCTA	NYC Subway 3	0	18.2	SB	0	0	Harlem-148 St	New York	New Lots Av	Kings
3197		3..S02R	5	Subway	NYCTA	NYC Subway 3	0	0.8	SB	0	0	Harlem-148 St	New York	135 St	New York
5042		3..S03R	5	Subway	NYCTA	NYC Subway 3	0	18.2	SB	0	0	145 St	New York	New Lots Av	Kings
3202		4..N01R	5	Subway	NYCTA	NYC Subway 4	0	22.9	NB	0	0	New Lots Av	Kings	Woodlawn	Bronx
3203		4..N02R	5	Subway	NYCTA	NYC Subway 4	0	22.9	NB	0	0	New Lots Av	Kings	Woodlawn	Bronx
3204		4..N03R	5	Subway	NYCTA	NYC Subway 4	0	22.9	NB	0	0	New Lots Av	Kings	Woodlawn	Bronx
2086		4..N06R	5	Subway	NYCTA	NYC Subway 4	0	20.0	NB	0	0	Crown Hts-Utica Av	Kings	Woodlawn	Bronx
3200		4..N13R	5	Subway	NYCTA	NYC Subway 4	0	22.9	NB	0	0	New Lots Av	Kings	Woodlawn	Bronx
3207		4..N14R	5	Subway	NYCTA	NYC Subway 4	0	14.6	NB	0	0	Bowling Green	New York	Woodlawn	Bronx
3210		4..N34R	5	Subway	NYCTA	NYC Subway 4	0	20.0	NB	0	0	Crown Hts-Utica Av	Kings	Woodlawn	Bronx
3199		4..S01R	5	Subway	NYCTA	NYC Subway 4	0	22.9	SB	0	0	Woodlawn	Bronx	New Lots Av	Kings
3212		4..S02R	5	Subway	NYCTA	NYC Subway 4	0	22.9	SB	0	0	Woodlawn	Bronx	New Lots Av	Kings
3211		4..S03R	5	Subway	NYCTA	NYC Subway 4	0	22.9	SB	0	0	Woodlawn	Bronx	New Lots Av	Kings
3205		4..S05R	5	Subway	NYCTA	NYC Subway 4	0	20.0	SB	0	0	Woodlawn	Bronx	Crown Hts-Utica Av	Kings
3206		4..S06R	5	Subway	NYCTA	NYC Subway 4	0	20.0	SB	0	0	Woodlawn	Bronx	Crown Hts-Utica Av	Kings
3208		4..S09R	5	Subway	NYCTA	NYC Subway 4	0	15.3	SB	0	0	149 St-Grand Concourse	Bronx	Crown Hts-Utica Av	Kings
3201		4..S13R	5	Subway	NYCTA	NYC Subway 4	0	22.9	SB	0	0	Woodlawn	Bronx	New Lots Av	Kings
2087		4..S34R	5	Subway	NYCTA	NYC Subway 4	0	20.0	SB	0	0	Woodlawn	Bronx	Crown Hts-Utica Av	Kings
3209		4..S35R	5	Subway	NYCTA	NYC Subway 4	0	14.6	SB	0	0	Woodlawn	Bronx	Bowling Green	New York
3213		4..S41R	5	Subway	NYCTA	NYC Subway 4	0	20.0	SB	0	0	Woodlawn	Bronx	Crown Hts-Utica Av	Kings
2103		GS.N01R	5	Subway	NYCTA	NYC Subway 42 Shuttle	0	0.4	WB	0	0	Grand Central-42 St	New York	Times Sq-42 St	New York
2104		GS.S01R	5	Subway	NYCTA	NYC Subway 42 Shuttle	0	0.4	EB	0	0	Times Sq-42 St	New York	Grand Central-42 St	New York
3216		5..N01R	5	Subway	NYCTA	NYC Subway 5	0	3.9	NB	0	0	E 180 St	Bronx	Eastchester-Dyre Av	Bronx
3237		5..N02R	5	Subway	NYCTA	NYC Subway 5	0	24.3	NB	0	0	Brooklyn College-Flatbush Av	Kings	Nereid Av	Bronx
2214		5..N03R	5	Subway	NYCTA	NYC Subway 5	0	24.1	NB	0	0	Brooklyn College-Flatbush Av	Kings	Eastchester-Dyre Av	Bronx
3233		5..N04R	5	Subway	NYCTA	NYC Subway 5	0	24.1	NB	0	0	Brooklyn College-Flatbush Av	Kings	Eastchester-Dyre Av	Bronx

Table 9: Subway Attributes

SUBWAY Attributes

ROUTE ID		ROUTE NAME	MODE	MODE NAME	COMPANY	NJ BUS FLAG	HEADWAY					CAP					FARE									SCENARIO INCLUSION FLAG								DIRECTION
							AM	MID	PM	EVE	NT	AM	MID	PM	EVE	NT	2005B	2010N	2011B	2012B	2014B	2020B	2030B	2035B	2040B	F2005B	F2010NB	F2011B	F2012B	F2014B	F2020B	F2030B	F2035B	F2040B	
3185	*	1..N51R	5	Subway	NYCTA	0	999	999	8	999	999	0	12320	9000	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	0	0	0	0	NB
2202	*	1..N59R	5	Subway	NYCTA	0	8	10	8	999	999	7700	14080	9000	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	0	0	0	0	NB
2080	*	1..N60R	5	Subway	NYCTA	0	8	10	8	999	999	7700	12320	9000	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	0	0	0	0	NB
3184	*	1..S51R	5	Subway	NYCTA	0	999	5	8	999	999	0	12540	9000	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	0	0	0	0	SB
3186	*	1..S55R	5	Subway	NYCTA	0	999	999	8	999	999	0	12540	9000	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	0	0	0	0	SB
2203	*	1..S59R	5	Subway	NYCTA	0	7	10	8	999	999	9900	15400	9000	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	0	0	0	0	SB
2081	*	1..S60R	5	Subway	NYCTA	0	7	10	8	999	999	9900	13860	9000	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	0	0	0	0	SB
3187	*	1..S61R	5	Subway	NYCTA	0	999	999	8	999	999	0	12540	9000	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	0	0	0	0	SB
5031		2..N01R	5	Subway	NYCTA	0	6	10	8	12	20	11000	7200	9600	6000	3600	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB
5036		2..N02R	5	Subway	NYCTA	0	999	999	8	12	20	0	7200	9600	6000	3600	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB
5035		2..N03R	5	Subway	NYCTA	0	999	999	8	12	20	0	7200	9600	6000	3600	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB
5034		2..N04R	5	Subway	NYCTA	0	999	999	8	12	20	0	7200	9600	6000	3600	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB
5033		2..N08R	5	Subway	NYCTA	0	999	999	8	12	20	0	7200	9600	6000	3600	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB
5037		2..S01R	5	Subway	NYCTA	0	5	10	8	12	20	13200	7200	9600	6000	3600	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	SB
5040		2..S02R	5	Subway	NYCTA	0	999	999	8	12	20	0	7200	9600	6000	3600	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	SB
5041		2..S03R	5	Subway	NYCTA	0	999	999	8	12	20	0	7200	9600	6000	3600	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	SB
5039		2..S08R	5	Subway	NYCTA	0	999	999	8	12	20	0	7200	9600	6000	3600	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	SB
5032		3..N01R	5	Subway	NYCTA	0	7	10	8	12	999	9900	7200	9600	6000	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB
3198		3..N02R	5	Subway	NYCTA	0	999	999	8	12	999	0	7200	9600	6000	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB
3196		3..N04R	5	Subway	NYCTA	0	999	999	8	12	999	0	7200	9600	6000	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB
5038		3..S01R	5	Subway	NYCTA	0	6	10	8	12	999	12100	7200	9600	6000	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	SB
3197		3..S02R	5	Subway	NYCTA	0	999	999	8	12	999	0	7200	9600	6000	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	SB
5042		3..S03R	5	Subway	NYCTA	0	999	999	8	12	999	0	7200	9600	6000	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	SB
3202		4..N01R	5	Subway	NYCTA	0	999	999	999	10	999	0	12000	0	7200	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB
3203		4..N02R	5	Subway	NYCTA	0	999	999	999	10	999	0	12000	0	7200	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB
3204		4..N03R	5	Subway	NYCTA	0	999	999	999	10	999	0	12000	0	7200	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB
2086		4..N06R	5	Subway	NYCTA	0	4	6	999	10	999	16500	12000	0	7200	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB
3200		4..N13R	5	Subway	NYCTA	0	999	999	999	10	999	0	12000	0	7200	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB
3207		4..N14R	5	Subway	NYCTA	0	999	999	999	10	999	0	12000	0	7200	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB
3210		4..N34R	5	Subway	NYCTA	0	999	999	999	10	999	0	12000	0	7200	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB
3199		4..S01R	5	Subway	NYCTA	0	999	999	999	999	999	0	7700	0	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	SB
3212		4..S02R	5	Subway	NYCTA	0	999	999	999	999	999	0	7700	0	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	SB
3211		4..S03R	5	Subway	NYCTA	0	999	999	999	999	999	0	7700	0	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	SB
3205		4..S05R	5	Subway	NYCTA	0	999	999	999	999	999	0	7700	0	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	SB
3206		4..S06R	5	Subway	NYCTA	0	999	999	999	999	999	0	7700	0	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	SB
3208		4..S09R	5	Subway	NYCTA	0	999	999	999	999	999	0	7700	0	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	SB
3201		4..S13R	5	Subway	NYCTA	0	999	999	999	999	999	0	7700	0	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	SB
2087		4..S34R	5	Subway	NYCTA	0	4	6	999	999	999	16500	7700	0	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	SB
3209		4..S35R	5	Subway	NYCTA	0	999	999	999	999	999	0	7700	0	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	SB
3213		4..S41R	5	Subway	NYCTA	0	999	999	999	999	999	0	7700	0	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	SB
2103		GS.N01R	5	Subway	NYCTA	0	2	5	3	999	999	42000	16848	33696	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	WB
2104		GS.S01R	5	Subway	NYCTA	0	2	5	3	999	999	42000	16848	33696	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	EB
3216		5..N01R	5	Subway	NYCTA	0	999	999	999	999	999	0	9075	0	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB
3237		5..N02R	5	Subway	NYCTA	0	999	999	999	999	999	0	9075	0	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB
2214		5..N03R	5	Subway	NYCTA	0	5	999	999	999	999	14348	8250	0	0	0	2.00	2.25	2.25	2.25	2.29	2.29	2.29	2.29	2.29	1	1	1	1	1	1	1	1	1	NB

Table 10: Commuter Rail Descriptors

Commuter Rail Descriptors

ROUTE ID	ROUTE_NAME	MODE	MODE NAME	COMPANY	ROUTE FAMILY	NJBUSFLAG	ROUTE LENGTH	DIR	TRANS_HUD	KEY TERMINAL	STOP First	COUNTY First	STOP Last	COUNTY Last
11148	Babylon East(1)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11149	Babylon East(2)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11150	Babylon East(3)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11151	Babylon East(4)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11152	Babylon East(5)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11153	Babylon East(6)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11154	Babylon East(7)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11155	Babylon East(8)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11156	Babylon East(9)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11157	Babylon East(10)	4	Commuter Rail	LIRR	Babylon East	0	24.9	OB	0	NY Penn Station	New York-Penn Station	New York	Freeport	Nassau
11158	Babylon East(11)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11159	Babylon East(12)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11160	Babylon East(13)	4	Commuter Rail	LIRR	Babylon East	0	28.9	OB	0	NY Penn Station	New York-Penn Station	New York	Wantagh	Nassau
11161	Babylon East(14)	4	Commuter Rail	LIRR	Babylon East	0	28.9	OB	0	NY Penn Station	New York-Penn Station	New York	Wantagh	Nassau
11162	Babylon East(15)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11163	Babylon East(16)	4	Commuter Rail	LIRR	Babylon East	0	31.7	OB	0	NY Penn Station	New York-Penn Station	New York	Massapequa Park	Nassau
11164	Babylon East(17)	4	Commuter Rail	LIRR	Babylon East	0	36.8	OB	0	Flatbush Ave	Flatbush Ave	Kings	Babylon	Suffolk
11165	Babylon East(18)	4	Commuter Rail	LIRR	Babylon East	0	24.9	OB	0	NY Penn Station	New York-Penn Station	New York	Freeport	Nassau
11166	Babylon East(19)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11167	Babylon East(20)	4	Commuter Rail	LIRR	Babylon East	0	28.9	OB	0	NY Penn Station	New York-Penn Station	New York	Wantagh	Nassau
11168	Babylon East(21)	4	Commuter Rail	LIRR	Babylon East	0	36.8	OB	0	Flatbush Ave	Flatbush Ave	Kings	Babylon	Suffolk
11169	Babylon East(22)	4	Commuter Rail	LIRR	Babylon East	0	36.8	OB	0	Flatbush Ave	Flatbush Ave	Kings	Babylon	Suffolk
11170	Babylon East(23)	4	Commuter Rail	LIRR	Babylon East	0	28.9	OB	0	NY Penn Station	New York-Penn Station	New York	Wantagh	Nassau
11171	Babylon East(24)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11172	Babylon East(25)	4	Commuter Rail	LIRR	Babylon East	0	24.9	OB	0	NY Penn Station	New York-Penn Station	New York	Freeport	Nassau
11173	Babylon East(26)	4	Commuter Rail	LIRR	Babylon East	0	36.8	OB	0	Flatbush Ave	Flatbush Ave	Kings	Babylon	Suffolk
11174	Babylon East(27)	4	Commuter Rail	LIRR	Babylon East	0	24.9	OB	0	NY Penn Station	New York-Penn Station	New York	Freeport	Nassau
11175	Babylon East(28)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11176	Babylon East(29)	4	Commuter Rail	LIRR	Babylon East	0	30.1	OB	0	NY Penn Station	New York-Penn Station	New York	Seaford	Nassau
11177	Babylon East(30)	4	Commuter Rail	LIRR	Babylon East	0	36.8	OB	0	Flatbush Ave	Flatbush Ave	Kings	Babylon	Suffolk
11178	Babylon East(31)	4	Commuter Rail	LIRR	Babylon East	0	36.8	OB	0	Flatbush Ave	Flatbush Ave	Kings	Babylon	Suffolk
11179	Babylon East(32)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11180	Babylon East(33)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11181	Babylon East(34)	4	Commuter Rail	LIRR	Babylon East	0	28.9	OB	0	NY Penn Station	New York-Penn Station	New York	Wantagh	Nassau
11182	Babylon East(35)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11183	Babylon East(36)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11184	Babylon East(37)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11185	Babylon East(38)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
11186	Babylon East(39)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
12001	Babylon East_1(1)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
12002	Babylon East_1(2)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
12003	Babylon East_1(3)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
12004	Babylon East_1(4)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
12005	Babylon East_1(5)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
12006	Babylon East_1(6)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk
12007	Babylon East_1(7)	4	Commuter Rail	LIRR	Babylon East	0	38.9	OB	0	NY Penn Station	New York-Penn Station	New York	Babylon	Suffolk

Table 11: Commuter Rail Attributes

Commuter Rail Attributes

ROUTE ID	ROUTE NAME	MODE	MODE NAME	COMPANY	NJBUSFLAG	HEADWAY					CAP					FARE									SCENARIO INCLUSION FLAG									DIRECTION
						AM	MID	PM	EVE	NT	AM	MID	PM	EVE	NT	2005B	2010N	2011B	2012B	2014B	2020B	2030B	2035B	2040B	F2005B	F2010NB	F2011B	F2012B	F2014B	F2020B	F2030B	F2035B	F2040B	
11148	Babylon East(1)	4	Commuter Rail	LIRR	0	999	360	999	60	999	0	240	0	1440	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11149	Babylon East(2)	4	Commuter Rail	LIRR	0	999	999	999	150	999	0	0	0	576	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11150	Babylon East(3)	4	Commuter Rail	LIRR	0	240	360	240	999	150	360	240	360	0	576	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11151	Babylon East(4)	4	Commuter Rail	LIRR	0	240	999	999	999	999	360	0	0	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11152	Babylon East(5)	4	Commuter Rail	LIRR	0	120	90	999	999	999	720	960	0	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11153	Babylon East(6)	4	Commuter Rail	LIRR	0	240	999	999	999	999	360	0	0	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11154	Babylon East(7)	4	Commuter Rail	LIRR	0	240	999	999	999	999	360	0	0	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11155	Babylon East(8)	4	Commuter Rail	LIRR	0	120	999	999	300	999	720	0	0	288	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11156	Babylon East(9)	4	Commuter Rail	LIRR	0	999	999	240	999	300	0	0	360	0	288	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11157	Babylon East(10)	4	Commuter Rail	LIRR	0	999	999	999	999	999	0	0	0	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11158	Babylon East(11)	4	Commuter Rail	LIRR	0	999	999	999	999	999	0	0	0	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11159	Babylon East(12)	4	Commuter Rail	LIRR	0	999	360	999	999	999	0	240	0	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11160	Babylon East(13)	4	Commuter Rail	LIRR	0	999	360	999	999	999	0	240	0	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11161	Babylon East(14)	4	Commuter Rail	LIRR	0	999	360	999	999	999	0	240	0	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11162	Babylon East(15)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11163	Babylon East(16)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11164	Babylon East(17)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11165	Babylon East(18)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11166	Babylon East(19)	4	Commuter Rail	LIRR	0	999	999	80	999	999	0	0	1080	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11167	Babylon East(20)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11168	Babylon East(21)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11169	Babylon East(22)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11170	Babylon East(23)	4	Commuter Rail	LIRR	0	999	999	80	999	999	0	0	1080	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11171	Babylon East(24)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11172	Babylon East(25)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11173	Babylon East(26)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11174	Babylon East(27)	4	Commuter Rail	LIRR	0	999	999	80	999	999	0	0	1080	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11175	Babylon East(28)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11176	Babylon East(29)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11177	Babylon East(30)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11178	Babylon East(31)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11179	Babylon East(32)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11180	Babylon East(33)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11181	Babylon East(34)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11182	Babylon East(35)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11183	Babylon East(36)	4	Commuter Rail	LIRR	0	999	999	240	999	999	0	0	360	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11184	Babylon East(37)	4	Commuter Rail	LIRR	0	999	999	999	150	999	0	0	0	576	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11185	Babylon East(38)	4	Commuter Rail	LIRR	0	240	120	999	150	999	360	720	0	576	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
11186	Babylon East(39)	4	Commuter Rail	LIRR	0	999	72	999	999	999	0	1200	0	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1	0	0	0	0	0	0	0	0	OB
12001	Babylon East_1(1)	4	Commuter Rail	LIRR	0	999	999	999	60	999	0	0	0	1440	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	0	1	1	1	1	0	0	0	0	OB
12002	Babylon East_1(2)	4	Commuter Rail	LIRR	0	999	999	999	150	999	0	0	0	576	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	0	1	1	1	1	0	0	0	0	OB
12003	Babylon East_1(3)	4	Commuter Rail	LIRR	0	240	999	240	999	150	360	0	360	0	576	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	0	1	1	1	1	0	0	0	0	OB
12004	Babylon East_1(4)	4	Commuter Rail	LIRR	0	240	999	999	999	999	360	0	0	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	0	1	1	1	1	0	0	0	0	OB
12005	Babylon East_1(5)	4	Commuter Rail	LIRR	0	120	72	999	999	999	720	1200	0	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	0	1	1	1	1	0	0	0	0	OB
12006	Babylon East_1(6)	4	Commuter Rail	LIRR	0	240	999	999	999	999	360	0	0	0	0	1.50	1.50	1.50	1.50	1.38	1.38	1.38	1.38	1.38	0	1	1	1	1	0	0	0	0	OB

3 TRANSIT FARE UPDATES

In NYBPM modeling, the up-to-date transit fares play an important role not only in transit procedures but also in the determination of travel mode choice and journey destination choice (e.g., zonal accessibilities). As a part of the NYBPM 2010 update, other travel costs (e.g., highway tolls, parking costs, fuel prices, etc.) have been updated to represent current and up-to-date transportation pricing policy and market-based fuel costs. Updating the transit fare to reflect the 2010 Base Year, under Task 12, constitutes the final step in updating travel costs in order to obtain an unbiased travel cost basis for all travel modes in the NYBPM.

The existing NYBPM 2G transit fares are coded in Year 2005 dollars, corresponding to the former base year of the NYBPM (and model estimation). For forecast year fares, the identical fares are applied – meaning that the existing process assumes fares will rise with inflation. Since 2005, the MTA and other regional transit agencies have passed along additional fare increases to their users. The increasing adoption of electronic toll/fare systems (e.g., NYCT MetroCard, EZ-pass, etc.) by various transportation agencies, in conjunction with the ever increasingly scarce financial resources available for these agencies, may result in travel cost increases that are inconsistent, but could exceed the rate of core inflation. As such, the fares have been updated to ensure that the 2010 fare policy is properly represented in the NYBPM, with consistency between year dollars and the estimated mode choice model parameters. Additionally, a tool has been developed and incorporated into the NYBPM GUI to update future year fares in the event that fare increases deviate from the rate of inflation, or to test such scenarios.

3.1 Travel Cost Update and Indexing Method

As indicated above, it is worthwhile to reflect "real-life" travel costs, including transit fares, accurately and explicitly rather than to treat them implicitly (and not accurately) as a part of an expected rate of future inflation.

For the purposes of adjusting all of the transit fare costs, a comprehensive update of costs for the main modes in the BPM was performed. These include:

- Zone-based commuter rail fares (LIRR, MNR and NJT)
- Zone-based ferry fares
- NYCT subway and local bus fare
- NYCT express bus
- PATH

For non-NYCT buses, a fairly simple update was performed by inflating the coded 2005 fares to represent 2010 fares. A comprehensive update to the regional bus fares is not feasible given the thousands of routes and numerous operators. A simple update was performed, where the growth in the CPI between 2005 and 2010 was used to scale up the regional bus fares (i.e. the assumption being that fares on these services rose with inflation).

This update was undertaken with a three-step approach:

1. Transit fares were coded as they existed in the Fall of 2010 for the base year 2010 network.
2. Current (Spring 2014) fares were identified for the services listed above, which were then applied, deflating back to 2010 dollars.
3. Those 2014 derived fares were then carried through (held constant) to all of the future year scenarios. This essentially embeds an assumption that future year fares will rise with inflation between 2014 and each forecast year.

These adjustments were performed to the transit fares, using the same CPI factors and coding methods used for the highway toll and other cost updates done in Task 9 for the BPM 2010 Update. The relevant CPI factors used are:

2005 = 195.3 2010 = 218.056 2014 = 237.616

3.2 Fare Updating and Coding Method Implemented

A new procedure incorporated into NYBPM 2010 Update allows the user to input both flat fares and zonal fares in nominal dollar terms (i.e., current fares) for current and future years, which will then be scaled back to 2010 (the "model estimation year") fares to provide a fair comparison of travel costs across various travel modes. The new transit modeling features of the NYBPM TransCAD 6.0 GUI model will enable a more flexible (e.g., bus flat fares for individual express bus routes), explicit (e.g., consideration of transit fares and PNR fees in Multi Class User Equilibrium Pathfinder procedure), and transparent incorporation of these regular updates to the transit fares.

In order to facilitate the data entry, an accompanying spreadsheet (as described in *Section 6: Transit Network and Data Transmittal*) contains all of the updated fares for 2010 and 2014. The fields "CPI_FARE_???" (where ??? refers to a scenario name) in sheet "Flat_Fares" is used in the transit assignment and will be copied to the "NYMTC Merged.RTS" file once saved as a file named "FARE_UPDATE.CSV" by using the "Update Transit Fares" utility (accessible through the BPM GUI as show in **Figure 1**), and selecting the "Flat Fares" option. By default, the field "FARE" corresponds to 2010, already in the model, and thus the fares do not need to be adjusted to run a base scenario. If creating a future year scenario, the nominal fare (in that year's dollars) is saved under the "FARE_2014B" field, or "FARE_2020B" field (or whatever the given scenario may be called). An intermediate field "CPI_FARE_???" is thus needed to convert the nominal fare to 2010 dollars. The script will copy this field to the field "FARE???" in the "NYMTC Merged.RTS" model file, by specifying the desired future year scenario and again saving the worksheet as "FARE_UPDATE.CSV". The fares in the delivered spreadsheet for the year 2020 are a simple copy of 2014, and as has been done previously, the latest known and discounted fare (in this case 2014, using column "CPI_FARE_2014B") should be used for all subsequent future scenarios. As reference, the CPI index used for all future years is the 2013 value with an annual 2% growth rate, and is referenced in the TOC worksheet, the table of contents of the spreadsheet, which is presented in **Figure 2**.

The other fares used in transit modeling are zonal fares for Ferry, Long Island Rail Road (LIRR), Metro North Rail (MNR) and New Jersey Transit (NJT). Tabs in yellow are identified for each entity, where a zone to zone fare matrix may be updated if necessary. Again, the column FARE is for 2010, while the same field names are used for nominal (FARE_2014B, FARE_2020B) and discounted (CPI_FARE2014B, CPI_FARE2020B) rates, in grey and green respectively. The Prime Transit Zone

(PTZ) reference for each Fare zone (FZ_O for origin and FZ_D for destination) is located in a worksheet immediately after the Fare matrix sheet, as reference if zonal rates need to be updated. Once the update is done, and after having saved the spreadsheet, the fare matrix tab (i.e. "MNR_FMatrix" if Metro North fares were updated for 2014) would need to be saved as "MNR_FMatrix2014.CSV" and the "Update Transit Fares" utility (with the "Zonal Fares" option selected) would then generate the corresponding "MNRFARE_2014.MTX".

After either the flat fares or zonal fares are updated in the transit master through the "Update Transit Fares" utility, the scenario transit network must be (re)built in order for the new fares to take effect.

It is important to save the master "BPM 2010 Transit_Fares Application_140618.xlsx" file before exporting any worksheet in CSV format, possibly changing the date in the name every time an update is made, which allows to the different versions to be tracked. A "LOG" tab at the end also allows the user to comment on the changes that were made in previous versions.

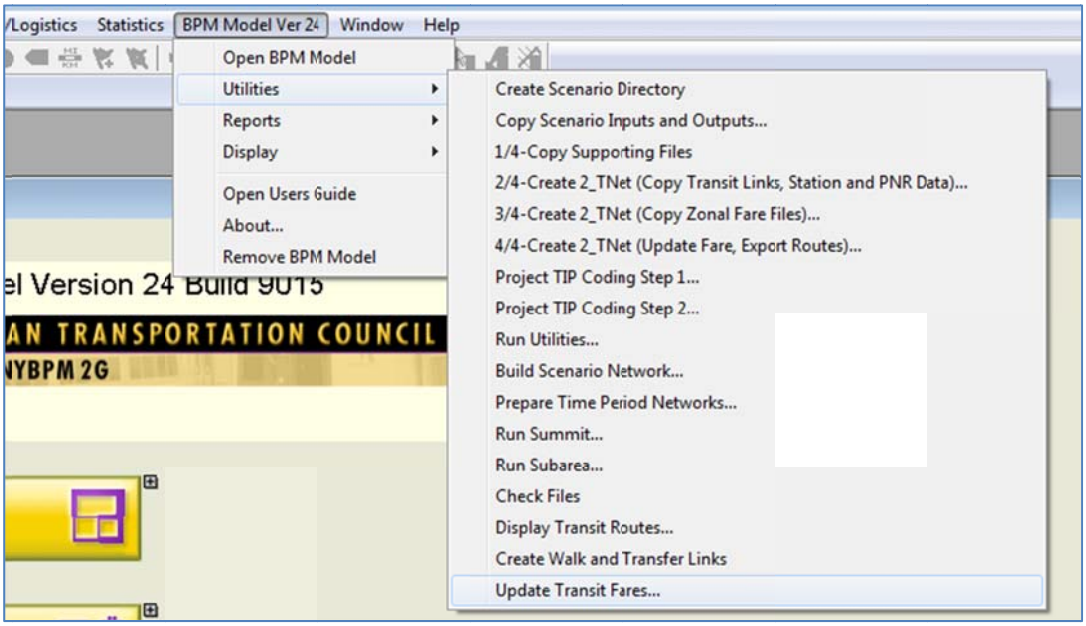

Figure 1: Screenshot of the Update Transit Fares Utility in the BPM GUI

Table of contents to BPM Transit Fare

Flat_Fares	All Transit Flat Fares by Route
FERRY_FMatrix	Ferry Fare Matrix
EQUV_FERFARE	Ferry Fare Zone Index by PTZ
LIRR_FMatrix	LIRR Fare Matrix
EQUV_LIRFARE	LIRR Fare Zone Index by PTZ
MNR_FMatrix	MNR Fare Matrix
EQUV_MNRFARE	MNR Fare Zone Index by PTZ
NJT_FMatrix	NJ Transit Fare Matrix
EQUV_NJTFARE	NJ Transit Fare Zone Index by PTZ
LOG	List of changes

Figure 2: Transit Fare Spreadsheet Table of Contents

4 TRANSIT COUNTS UPDATED

For use in validating and calibrating the NYBPM 2010 Update model, transit counts were collected and updated in Task 5. Summaries of the updated transit counts are provided in this section of the Technical Memorandum, while the actual count databases described here are transmitted as noted in *Section 6: Transit Network and Data Transmittal.*

The counts for the year 2010 assembled and processed as part of the NYBPM 2010 Update project include:

- Hub-bound CBD cordon counts by general transit mode – Typical Weekday and AM Peak period
- AM Peak Period Ridership By Station/Cordon Location: Summary Level - Commuter Rail, Ferries, and Trans-Hudson Bus
- Average Annual Weekday Ridership – Hourly – Bus Boardings (NYC Transit)
- Average Annual Weekday Ridership – Hourly – Subway Entries (NYC Transit)
- October Weekday 2010 Subway Station to Station Flows – Hourly

4.1 Hub-bound CBD Cordon Transit Counts

These typical weekday and 6-10 AM Peak period transit counts were taken from the Hub-Bound Travel 2010 Report, made available by NYTMC. Specifically, the total number of persons entering the Manhattan Central Business District (CBD), on a typical Fall weekday, were obtained from that report's "Table 14: Where, When and How People Entered the Hub on a Fall Day in 2010."

The 2010 estimates, along with the 2005 estimates used in the previous BPM validation, are shown in **Table 12,** by the three sectors: 60th Street (from the North), East River Sector (from the East), and New Jersey Sector (from the West). The table shows about a 6 percent increase in weekday travel to the CBD from the prior 2005 Base Year update of the BPM, with substantial growth in Trans-Hudson continuing from New Jersey (14%), and also across the Brooklyn cordon (11%).

Table 13 extracts the estimated inbound transit flows to the CBD during the morning peak period. Transit ridership entering the CBD during the 6-10 AM hours accounts for about 49% of total weekday ridership, and varies by sector from a high for the NJ cordon (55%) to a low for the 60th Street cordon (41%). While the BPM models OD demand for four time periods over the 24 hour weekday (AM, Midday, PM, and Night/Other), it is the AM Peak Period for which BPM transit assignments are made and can be directly compared to transit counts.

Table 12: Hub-bound CBD Cordon Counts by General Transit Mode – Typical Weekday - Total

PART A: TOTAL WEEKDAY - 2010 - INBOUND

	60TH ST SECTOR	BROOKLYN SECTOR	QUEENS SECTOR	STATEN ISLAND SECTOR	COMBINED: EAST RIVER	N. J. SECTOR	ALL SECTORS
Bus	38,282	24,851	11,762		36,613	193,768	268,663
Rapid Rail	769,426	727,547	452,804		1,180,351	115,934	2,065,711
Subway and Bus	**807,708**	**752,398**	**464,566**		**1,216,964**	**309,702**	**2,334,374**
Ferry & Tram		155	35	36,251	36,441	18,954	55,395
Subway+Bus+Ferry	**807,708**	**752,553**	**464,601**	**36,251**	**1,253,405**	**328,656**	**2,389,769**
Commuter Rail	**102,710**		**114,566**		**114,566**	**82,890**	**300,166**
Total Transit	**910,418**	**752,553**	**579,167**	**36,251**	**1,367,971**	**411,546**	**2,689,935**

PART B: TOTAL WEEKDAY - 2005 - INBOUND

	60TH ST SECTOR	BROOKLYN SECTOR	QUEENS SECTOR	STATEN ISLAND SECTOR	COMBINED: EAST RIVER	N. J. SECTOR	ALL SECTORS
Bus	52,014	30,668	16,101		46,769	181,272	280,055
Rapid Rail	752,625	645,045	438,585		1,083,630	89,336	1,925,591
Subway and Bus	**804,639**	**675,713**	**454,686**		**1,130,399**	**270,608**	**2,205,646**
Ferry & Tram		171	2,206	32,697	35,074	19,319	54,393
Subway+Bus+Ferry	**804,639**	**675,884**	**456,892**	**32,697**	**1,165,473**	**289,927**	**2,260,039**
Commuter Rail	**97,562**		**114,229**		**114,229**	**72,364**	**284,155**
Total Transit	**902,201**	**675,884**	**571,121**	**32,697**	**1,279,702**	**362,291**	**2,544,194**

PART C: TOTAL WEEKDAY - Growth in Transit Trips

	60TH ST SECTOR	BROOKLYN SECTOR	QUEENS SECTOR	STATEN ISLAND SECTOR	COMBINED: EAST RIVER	N. J. SECTOR	ALL SECTORS
Bus	(13,732)	(5,817)	(4,339)		(10,156)	12,496	(11,392)
Rapid Rail	16,801	82,502	14,219		96,721	26,598	140,120
Subway and Bus	**3,069**	**76,685**	**9,880**		**86,565**	**39,094**	**128,728**
Ferry & Tram		-16	(2,171)	3,554	1,367	(365)	1,002
Subway+Bus+Ferry	**3,069**	**76,669**	**7,709**	**3,554**	**87,932**	**38,729**	**129,730**
Commuter Rail	**5,148**	**-**	**337**		**337**	**10,526**	**16,011**
Total Transit	**8,217**	**76,669**	**8,046**	**3,554**	**88,269**	**49,255**	**145,741**

PART D: TOTAL WEEKDAY - Percent Growth in Transit

	60TH ST SECTOR	BROOKLYN SECTOR	QUEENS SECTOR	STATEN ISLAND SECTOR	COMBINED: EAST RIVER	N. J. SECTOR	ALL SECTORS
Bus	-26.4%	-19.0%	-26.9%		-21.7%	6.9%	-4.1%
Rapid Rail	2.2%	12.8%	3.2%		8.9%	29.8%	7.3%
Subway and Bus	**0.4%**	**11.3%**	**2.2%**		**7.7%**	**14.4%**	**5.8%**
Ferry & Tram		-9.4%	-98.4%	10.9%	3.9%	-1.9%	1.8%
Subway+Bus+Ferry	**0.4%**	**11.3%**	**1.7%**	**10.9%**	**7.5%**	**13.4%**	**5.7%**
Commuter Rail	**5.3%**		**0.3%**		**0.3%**	**14.5%**	**5.6%**
Total Transit	**0.9%**	**11.3%**	**1.4%**	**10.9%**	**6.9%**	**13.6%**	**5.7%**

Table 13: Hub-bound CBD Cordon Counts by General Transit Mode – Typical Weekday – 6-10 AM Peak Period

PART A: 2010 - INBOUND - 6-10 AM Peak Period

	60TH ST SECTOR	BROOKLYN SECTOR	QUEENS SECTOR	STATEN ISLAND SECTOR	**COMBINED: EAST RIVER**	**N. J. SECTOR**	**ALL SECTORS**
Bus	14,957	20,004	9,909		29,913	105,410	150,280
Rapid Rail	288,680	362,577	223,969		586,546	62,113	937,339
Subway and Bus	**303,637**	**382,581**	**233,878**		**616,459**	**167,523**	**1,087,619**
Ferry & Tram		28	23	16,738	16,789	12,739	29,528
Subway+Bus+Ferry	**303,637**	**382,609**	**233,901**	**16,738**	**633,248**	**180,262**	**1,117,147**
Commuter Rail	**70,172**		**81,872**		**81,872**	**47,513**	**199,557**
Total Transit	**373,809**	**382,609**	**315,773**	**16,738**	**715,120**	**227,775**	**1,316,704**

PART B: TOTAL WEEKDAY - 2010 - INBOUND

	60TH ST SECTOR	BROOKLYN SECTOR	QUEENS SECTOR	STATEN ISLAND SECTOR	**COMBINED: EAST RIVER**	**N. J. SECTOR**	**ALL SECTORS**
Bus	38,282	24,851	11,762		36,613	193,768	268,663
Rapid Rail	769,426	727,547	452,804		1,180,351	115,934	2,065,711
Subway and Bus	**807,708**	**752,398**	**464,566**		**1,216,964**	**309,702**	**2,334,374**
Ferry & Tram		155	35	36,251	36,441	18,954	55,395
Subway+Bus+Ferry	**807,708**	**752,553**	**464,601**	**36,251**	**1,253,405**	**328,656**	**2,389,769**
Commuter Rail	**102,710**		**114,566**		**114,566**	**82,890**	**300,166**
Total Transit	**910,418**	**752,553**	**579,167**	**36,251**	**1,367,971**	**411,546**	**2,689,935**

PART C: TOTAL WEEKDAY - A Peak Share of Total Weekday

	60TH ST SECTOR	BROOKLYN SECTOR	QUEENS SECTOR	STATEN ISLAND SECTOR	**COMBINED: EAST RIVER**	**N. J. SECTOR**	**ALL SECTORS**
Bus	39%	80%	84%		82%	54%	56%
Rapid Rail	38%	50%	49%		50%	54%	45%
Subway and Bus	**38%**	**51%**	**50%**		**51%**	**54%**	**47%**
Ferry & Tram		18%	66%	46%	46%	67%	53%
Subway+Bus+Ferry	**38%**	**51%**	**50%**	**46%**	**51%**	**55%**	**47%**
Commuter Rail	**68%**		**71%**		**71%**	**57%**	**66%**
Total Transit	**41%**	**51%**	**55%**	**46%**	**52%**	**55%**	**49%**

4.2 Commuter Rail, Ferries, and Trans-Hudson Bus Counts

Table 14 summarizes the transit counts available for comparing Commuter Rail, Ferries, and Trans-Hudson Bus ridership with the model assigned transit volumes of the BPM 2010 Update. Detailed version of these counts, at the station level, are included in the Task 5 database transmittal.

Two separate sets of counts are shown here, and both have been used in the development of the BPM 2010 Update.

A. Survey Related Counts: These include counts collected from 2005-2008, and are the basis of the Transit OD survey expansion used to validate the networks as described in Section 5: Transit Network Validation and Calibration. These are the most relevant for the transit network assignments testing done in that work, where the network and assignment procedures should mimic the survey based counts (survey trips in and boarding/alighting outs from the transit assignment). See *Section 5.2* for further explanation of the transit OD survey based trip tables.

B: Best Available 2010 Counts: These include more recent count updates where available, including most Trans-Hudson transit services. Thus, for comparison of the transit volumes from the application of the full BPM model when done in Task 15, these are the set of transit observed volumes that will be used for model validation. Where updates are not available and the 2005-08 counts are the best available, these are shown *in italics* in **Table 14**.

Table 14: AM Peak Period Ridership By Station/Cordon Location: Summary Level - Commuter Rail, Ferries, and Trans-Hudson Bus

		A. Survey Related Counts			B. Best Available 2010 Counts		
Node	**Station**	**Year 2005-08 Counts**			**Year 2010 Counts**		
		Ons	**Offs**	**Ons+Offs**	**Ons**	**Offs**	**Ons+Offs**
LIRR							
CITY TERMINAL ZONE							
3000	New York-Penn Station	5,965	85,526	91,491	4,370	81,330	85,700
3807	New York-GCT	0					
3002	Hunterspoint Ave	0	3,409	3,409	0	2,790	2,790
3001	Long Island City	0	79	79			
3091	Flatbush Ave	4,143	10,593	14,736	1,780	9,090	10,870
	Atlantic Ave - New Service						
	Lower Manhattan						
	Subtotal	10,108	99,607	109,715	6,150	93,210	99,360
3806	Jamaica - LIRR Station	1,388	3,415	4,803	*1,388*	*3,415*	*4,803*
	Jamaica - LM Station						
3003	Woodside	1,170	1,257	2,427	*1,170*	*1,257*	*2,427*
3808	Sunnyside						

		A. Survey Related Counts			B. Best Available 2010 Counts		
Node	**Station**	**Year 2005-08 Counts**			**Year 2010 Counts**		
		Ons	**Offs**	**Ons+Offs**	**Ons**	**Offs**	**Ons+Offs**
3004	Forest Hills	637	81	718	*637*	*81*	*718*
3005	Kew Gardens	712	37	749	*712*	*37*	*749*
3092	Nostrand Ave	101	61	162	*101*	*61*	*162*
3093	East New York	311	179	490	*311*	*179*	*490*
	Subtotal	4,319	5,030	9,349	*4,319*	*5,030*	*9,349*
	Total	14,427	104,637	119,064	*14,427*	*104,637*	*119,064*
BABYLON BRANCH							
	Total	27,406	4,664	32,070	*27,406*	*4,664*	*32,070*
FAR ROCKAWAY BRANCH							
	Total	7,499	880	8,379	*7,499*	*880*	*8,379*
HEMPSTEAD BRANCH							
	Total	5,973	1,642	7,615	*5,973*	*1,642*	*7,615*
LONG BEACH BRANCH							
	Total	7,033	1,163	8,196	*7,033*	*1,163*	*8,196*
MONTAUK BRANCH							
	Total	2,529	486	3,015	*2,529*	*486*	*3,015*
OYSTER BAY							
	Total	2,066	237	2,303	*2,066*	*237*	*2,303*
PORT JEFFERSON							
	Total	25,988	5,024	31,012	*25,988*	*5,024*	*31,012*
PORT WASHINGTON							
	Total	15,904	2,689	18,593	*15,904*	*2,689*	*18,593*
RONKONKOMA							
	Total	16,355	2,449	18,804	*16,355*	*2,449*	*18,804*
WEST HEMPSTEAD							
	Total	1,226	28	1,254	*1,226*	*28*	*1,254*
LIRR TOTALS							
LIRR Total W/O Terminal Zone		111,979	19,262	131,241	*111,979*	*19,262*	*131,241*
LIRR Total With Terminal Zone		126,406	123,899	250,305	*126,406*	*123,899*	*250,305*
METRO NORTH				2007 Counts			
HUDSON LINE							
	Total	17,827	985	18,812	17,338	*985*	*18,812*
HARLEM LINE							
	Total	27,089	2,032	29,121	26,288	*2,032*	*29,121*
NEW HAVEN LINE							

		A. Survey Related Counts			B. Best Available 2010 Counts		
Node	**Station**	**Year 2005-08 Counts**			**Year 2010 Counts**		
		Ons	**Offs**	**Ons+Offs**	**Ons**	**Offs**	**Ons+Offs**
	Total	36,191	5,243	41,434	36,445	*5,243*	*41,434*
MANHATTAN							
3500	125th St	142	2,514	2,656		*2,514*	*2,656*
3201	125th St						
3200	NYC-Grand Central	0	70,632	70,632		*70,632*	*70,632*
	Total	142	73,146	73,288		*73,146*	*73,288*
Total MNCRR W/O Manhattan		81,251	8,268	89,519		*8,268*	*89,519*
Total MNCRR With Manhattan		81,393	81,414	162,807		*81,414*	*162,807*
FERRY				97 Hubbnd			*97 Hubbnd*
	Staten Island	19,249	1,404	20,653	19,249	*1,404*	*20,653*
	Brooklyn	21	0	21	21	*0*	*21*
	Total NJ	9,824	849	10,673	9,824	*849*	*10,673*
Total Ferry		29,293	2,258	31,347	29,293	*2,258*	*31,347*
NJT Commuter Rail				2005 Counts			
Main/Bergen/Port Jervis							
	Port Jervis Subtotal	1,962	44	2,006	1,880	6	1,886
	Suffern Subtotal	4,202	49	4,251	3,603	120	3,305
Main Line							
	Main Line Subtotal	1,761	130	1,891	2,207	61	2,268
Bergen County Line							
	Subtotal	1,845	56	1,901	2,024	35	2,059
	TOTAL Port Jervis/ Main/Bergen County	9,770	279	10,049	9,714	222	9,518
Pascack Valley Line							
	Outer Pascack						
	Outer Pascack Subtotal	2,045	10	2,055	2,199	30	2,229
	Inner Pascack						
	TOTAL Pascack	3,018	85	3,103	2,998	115	3,113
Boonton Line							
	Outer Boonton Subtotal	1,545	50	1,595	975	101	1,076
	Middle Boonton Subtotal	391	13	404	273	25	298
	Inner Boonton						
	Inner Boonton Subtotal	1,576	37	1,613	1,437	67	1,504
	TOTAL Boonton Line	3,512	100	3,612	2,685	193	2,878
Morris/Essex							
	Outer M&E						

Node	Station	A. Survey Related Counts			B. Best Available 2010 Counts		
		Year 2005-08 Counts			Year 2010 Counts		
		Ons	Offs	Ons+Offs	Ons	Offs	Ons+Offs
	Outer M&E Subtotal	4,401	271	4,672	2,738	124	2,862
	Gladstone Br.						
	Gladstone Br. Subtotal	2,484	41	2,525	2,217	25	2,242
	Inner M&E						
	Inner M&E Subtotal	9,197	635	9,832	9,181	412	9,593
	Montclair Branch Subtotal	1,990	10	2,000	1,990	10	2,000
	NEWARK BROAD ST	402	796	1,198	935	1,069	2,004
	TOTAL Morris & Essex	18,474	1,753	20,227	17,061	1,640	18,701
Raritan Valley Line							
	Outer Raritan						
	Outer Raritan Subtotal	1,260	20	1,280	924	14	938
	Inner Raritan						
	Inner Raritan Subtotal	5,685	143	5,828	4,352	134	4,486
	TOTAL	6,945	163	7,108	5,276	148	5,424
NEC/NJC							
	Outer NJC						
	Outer NJC Subtotal	1,517	93	1,610	825	41	866
	Central NJC						
	Central NJC Subtotal	9,898	360	10,258	7,995	538	8,533
	Outer NEC						
	Outer NEC Subtotal	26,685	1,674	28,359	22,350	464	22,814
	Inner NEC/NJC						
	Inner NEC/NJC Subtotal	4,342	1,124	5,466	1,329	264	1,593
	TOTAL NJC/NEC	42,442	3,251	45,693	32,499	1,307	33,806
NJT Terminal Stations							
	Secaucus (MAIN)	396	2,490	2,886	65	1,187	1,252
	Secaucus (NEC/NJC/M&E)	3,207	396	3,603	3,996	256	4,252
	Secaucus (BRG/PAS)		629	629	131	3,262	3,393
	Secaucus Subtotal	3,603	3,515	7,118	4,192	4,705	8,897
	Newark Penn Station (NJT)	4,199	15,322	19,521	3,928	15,574	19,502
	Hoboken (NJT)		16,579	16,579		14,001	14,001
	New York Penn Station (NJT)		50,966	50,966		44,092	44,092
	Total Terminal Stations	7,802	86,382	94,184	8,120	78,372	86,492
NJT Rail without Terminal Stations		84,161	5,631	89,792	70,233	3,625	73,440
NJT Rail with Terminal Stations		91,963	92,013	183,976	78,353	81,997	159,932
PATH							

		A. Survey Related Counts			B. Best Available 2010 Counts		
Node	**Station**	**Year 2005-08 Counts**			**Year 2010 Counts**		
		Ons	**Offs**	**Ons+Offs**	**Ons**	**Offs**	**Ons+Offs**
	33rd St Line						
	33rd St	2,534	10,746	13,280	4,979	19,789	24,768
	23rd St	297	3,547	3,844	641	3,798	4,439
	14th St	446	3,071	3,517	1,270	3,870	5,140
	9th St	246	1,498	1,744	505	1,596	2,100
	Christopher St	309	1,374	1,683	359	2,046	2,404
	33rd St Line Subtotal	3,832	20,236	24,068	7,752	31,098	38,850
	WTC	7,726	41,404	49,130	7,371	31,935	39,306
	New Jersey						
	Hoboken	23,434	1,035	24,469	17,819	1,971	19,790
	Pavonia/Newport	3,391	2,061	5,452	6,717	4,827	11,544
	Exchange Place	1,863	6,462	8,325	4,611	10,614	15,225
	Grove St	6,036	1,448	7,484	8,439	1,634	10,073
	Journal Square	12,648	2,446	15,094	12,911	2,723	15,634
	Harrison	3,895	496	4,391	4,597	407	5,003
	NEWARK PENN STATION	18,785	3,194	21,979	17,941	4,266	22,207
	Subtotal	70,052	17,142	87,194	73,034	26,441	99,475
	TOTAL PATH	81,610	78,782	160,392	88,157	89,474	177,631
Bus							
	PABT Regional Commuter	6,550	62,470	69,020	6,550	62,470	69,020
	Trans-Hudson Jitney				1,668	4,236	5,904
	Midtown Curbside				0	6,365	6,365
	Downtown Curbside				0	4,565	4,565
	GWBBS				1,165	1,590	2,755
	TOTAL Trans-Hudson Bus				9,383	79,226	88,609
Ferry	Midtown				0	4,025	4,025
	Downtown				0	7,305	7,305
	Total TH Ferry				0	11,330	11,330
	Trans-Hudson Transit Total				24,506	197,681	222,187

4.3 New York City Transit – Bus and Subway Counts – Hourly Weekday Ridership

Average weekday bus boardings by route for NYC Transit buses, and by station entry for Subway trips, both hourly for the full 24 hour day, have been provided to NYMTC by NYC Transit. These detailed databases are separately transmitted, but summarized by Boro and time of day period in **Table 15** and Error! Reference source not found. below. These data are developed from MetroCard turnstile transactions.

Total average weekday NYCT bus ridership in 2010 was 2.2 million, while weekday subway ridership was 5.2 million.

Table 15: 2010 Transit Counts by Boro and Time Period – NYCT Bus Boardings
(MetroCard Swipes)

Borough	AM	MD	PM	NT	TOTAL
Manhattan	127,103	185,568	148,872	53,245	**514,788**
Queens	106,586	116,203	99,062	48,368	**370,218**
Bronx	149,341	190,803	137,940	59,789	**537,874**
Brooklyn	180,052	228,729	181,103	78,722	**668,605**
Staten Island	26,902	30,648	24,456	11,690	**93,696**
Express Buses	18,314	4,712	14,857	4,375	**42,259**
	608,299	**756,663**	**606,290**	**256,188**	**2,227,440**

Table 16: 2010 Transit Counts by Boro and Time Period – NYCT Subway Station Entries
(MetroCard Swipes)

Borough	AM	MD	PM	NT	TOTAL
Manhattan	532,173	795,554	1,092,196	436,324	**2,856,247**
Queens	304,989	212,331	150,507	87,666	**755,493**
Bronx	171,869	137,801	88,181	58,374	**456,225**
Brooklyn	420,795	322,059	230,356	120,828	**1,094,038**
	1,429,825	**1,467,744**	**1,561,240**	**703,193**	**5,162,002**

4.4 October Weekday 2010 Subway Station to Station Flows – Hourly

NYC Transit also provided NYMTC, for use in the BPM 2010 Update, estimated station-to-station subway flow (trip table) data derived from 2012 MetroCard station entry data, and with established methods and algorithms, imputed station exits. Using station-level factors comparing 2012 and 2010

station entries, it is possible to develop a 2010 station-to-station subway flow (trip table). This also provides the basis for the estimation of hourly subway station exits. **Table 17** below summarizes these by Boro for the 6-10 AM Peak Period for which the BPM assigns transit trips.

Table 17: 2010 Transit Counts by Boro and Time Period – NYCT Subway Station Exits

Borough	AM
Manhattan	1,137,072
Queens	134,366
Bronx	90,596
Brooklyn	236,903
	1,598,937

4.5 Correspondence Files – BPM 2010 Transit-to-NYCT Count Data

An important product of the work done in Task 5 is the development of a current set of correspondence files relating NYCT subway stations, represented as "PTZs" in the BPM transit network, to NYCT count and MetroCard databases. These are included in the task deliverables, as described in *Section 6: Transit Network and Data Transmittal*.

5 TRANSIT NETWORK VALIDATION AND CALIBRATION

Validation and calibration of the transit network for the BPM 2010 Update has been carried out in two phases. Stage 1, performed as the West of Hudson River (WOH) calibration, was completed in the TH-TDFM 2010 Update project for the PANYNJ, and its results were carried over as the starting point for the transit network and calibration in the NYBPM 2010. For this project, Stage 2 focused on the East of Hudson (EOH) calibration, performed as a part of Task Order J, in order to complete a similar level of transit network validation and calibration for the NYBPM 2010. This used the same process, featuring a transit OD survey-based assignment calibration methodology, as described in the following sections, while also allowing for the migration to the new and expanded Tier 1.2 TAZ system used in the NYBPM 2010 Update model.

It is important to note that the transit calibration, done in this task of the BPM 2010 Update and described in this Technical Memorandum, is a first phase effort, that focuses on the transit network and the path-building elements of the transit assignment step of the model, using the best available survey and other data-derived transit demand matrices In Task 15, further transit validation and calibration, in conjunction with core model and highway assignment calibration, will be done using the trip tables that are generated by the full application of the NYBPM 2010.

5.1 Survey-Based Assignment Calibration Method

For both the Stage 1 TH-TDFM 2010 and the Stage 2 NYBPM 2010 Update, survey-based assignment testing was used to calibrate the transit network and assignment system. For Stage 2, the first step in this process involved migrating the transit system and survey data into the new Tier 1.2 TAZ system introduced in NYBPM 2010.

Migrating Regional Transit Survey Database to the BPM 2010 Update TAZ System

As with the regional transit networks, AECOM started with the current best available regional transit survey database that was used to validate the transit networks used in the TH-TDFM. Equivalencies were then developed between the TH-TDFM zone system (3824 zones—Tier 1.1) and the NYBPM 2010 Update TAZ Tier 1.2 system (4629 zones). AECOM then developed a routine to disaggregate the survey-based transit trip tables to the expanded and more detailed TAZ system. This resulting set of transit trip tables was then used to iteratively perform survey-based trip table assignments and network calibration adjustments.

Survey and Other Data Sources for Synthetic Transit Trip Tables

The regional transit survey database consists of the following elements:

- 2002 PANYNJ Interstate Bus Survey
- 2005 NJT On-Board Rail Survey
- 2007 PATH On-Board Rail Survey
- 2007 NJ Hudson-Bergen LRT Survey
- 1998 PANYNJ Ferry Survey (scaled to 2005)
- Late 1990's NJT Local Bus Surveys (scaled to 2005)

- 2007 Metro-North On-Board OD Survey
- 2006 LIRR On-Board OD Survey
- 2008 MTA RTFM Estimates of East of Hudson Subway/Bus Trips

It should be noted that there are several new regional transit surveys, not available for this task, that will start becoming available soon and that should be utilized to inform future BPM transit validation. These include:

- 2013-2015 NJ Transit Rail Surveys (lines are being surveyed on a rolling basis)
- 2012-2013 PANYNJ/NJ TRANSIT Trans-Hudson Bus Survey (data is becoming available)
- On-Going PATH Survey Efforts
- 2013-2014 LIRR OD Survey (data should be available in the Fall of 2014)
- 2014-2015 Metro-North OD Survey
- 2015 NJ Transit Local Bus Survey

Table 18 shows to what extent the estimated transit flow constructed form the above sources agrees with the 2010 Hub-Bound transit flows. While generally fairly close, due to inevitable inconsistencies among the different data sources, it can be seen that there is not perfect agreement, and calibration of the transit flows in the next stage of the BPM 2010 Update will need to account for such issues.

Table 18: Comparison of Transit OD Survey-based Tables with 2010 Hub-Bound Transit Flows

Scenario:	**Transit Survey-Based Trip Tables (T-17)**
Hub-Bound 2010	**6-10 AM Peak Period**

Total - All Transit

Sector		BPM Trips	Counts	# Diff	% Diff
60th St.	1	409,274	373,809	35,465	9%
East River	2	779,944	715,120	64,824	9%
New Jersey	3	170,467	227,775	-57,308	-25%
		1,359,685	**1,316,704**	**42,981**	**3%**

Commuter Rail (only)

Sector		BPM Trips	Counts	# Diff	% Diff
60th St.	1	73,744	70,172	3,572	5%
East River	2	95,747	81,872	13,875	17%
New Jersey	3	62,564	47,513	15,051	32%
		232,055	**199,557**	**32,498**	**16%**

Other Transit

Sector		BPM Trips	Counts	# Diff	% Diff
60th St.	1	335,530	303,637	31,893	11%
East River	2	684,197	633,248	50,949	8%
New Jersey	3	107,903	180,262	-72,359	-40%
		1,127,630	**1,117,147**	**10,483**	**1%**

Survey-Based Assignment and Calibration Process

Through this exercise, AECOM evaluated the transit network performance in replicating observed transit counts, by feeding the transit assignment the best-available database of on-board surveys described above. Approximately 30 iterations of these assignment tests were run and a number of transit procedure and network improvements were identified and implemented to enhance the performance of the transit networks. These include:

- *Expanding the available network of walk links* – This was identified by cross tabulating the number of transit trips by class (walk-commuter rail, drive-commuter rail, walk-transit and drive-transit) where the surveys showed trips, but the path-builder did not construct a path. Through this approach, instances were found where the new TAZ system connected centroids to links that prohibited walking. Our review showed that many of these non-activated walk access links were in fact arterials (with sidewalks). Because of this finding, AECOM expanded the number of links available for walking East of the Hudson River, which significantly enhanced the performance of the path-builder in identifying walk-access transit paths. For these newly identified walk links, the walking speed was coded as 3.5 mph (consistent with the methodology for the regional walk links).
- *Adjusting the PNR settings* – PNR settings were adjusted to better mimic commuter rail PNR choices at individual stations using on-board surveys to adjust parameters.
- *Shadow pricing* – For two non-terminal commuter rail stations (i.e. Metro-North 125th Street and Jamaica), shadow pricing was added to transfer links between commuter rail and the subway at both terminals. From a time and cost perspective, it would be advantageous for a significant number of customers to transfer at both of these stations. However, both the MNR and LIRR on-board surveys show that very few customers actually make both transfers. As such, additional time penalties were added to the commuter rail and subway transfers, to mimic the observed amount of commuter rail to subway transfers at both locations.

5.2 Stage 1: West of Hudson River (WOH / TH-TDFM) Transit Network Calibration

The West of Hudson River (WOH) transit calibration was undertaken as a part of the Trans-Hudson Travel Demand Forecasting Model (TH-TDFM) 2010 Update, and its final products have been incorporated into the NYBPM 2010. This section of the technical memorandum documents key items developed by AECOM in this process. Three of the larger development items performed on the Trans-Hudson networks are described in this section. These include:

- Development of improved bus travel time estimates for West of Hudson bus services
- Calibration adjustments made to Trans-Hudson bus link travel times to calibrate the "other-transit" trips from the West of Hudson market to Manhattan
- Development of improved procedures to represent drive-access to transit in the TH-TDFM

Development of Improved Bus Travel Time Estimates

Bus travel time procedures were modified from the then-current version of the NYBPM for use in the TH-TDFM. With the NYBPM emphasis being largely focused on the East of Hudson region, the model had employed somewhat crude functions to estimate West of Hudson bus travel times. AECOM

took a regional look at bus travel times, with an emphasis on routes operating with service to Manhattan, to calibrate improved bus travel time relationships for the TH-TDFM. The process relies on using equations of motion (with acceleration & deceleration rates, maximum operating speeds and stop spacing) to estimate stop-to-stop travel times.

The resulting parameters for these bus functions are summarized in **Table 19Error! Reference source not found.**.

Table 19: Parameters for Improved Bus Travel Time Estimates

Stop Tier Location	Top Local Bus Speed (mph) Stops < 0.3 miles	Top Local Bus Speed (mph) Stops > 0.3 miles	Top Bus Speed if Next Stop is Manhattan	Acceleration Rates* (mi per second squared)	Deceleration Rates* (mi per second squared)
Tier 1	12	25	25	1.6	1.6
Tier 2	12	35	55	1.6	1.6
Tier 3	12	50	55	1.6	1.6
* Acceleration/Deceleration inclusive of dwell times					
Tier 1 = Essex, Hudson, Union					
Tier 2 = Bergen, Middlesex, Morris, Passaic, Summerset					
Tier 3 = Hunterdon, Mercer, Monmouth, Ocean and Sussex					

These parameters can be found in lines 123 through 126 of the GISDK script file c:\0_BPM1\11_Code\flow_transit_times.rsc. The statement is shown below:

```
//topspeed, acc, dec, dwelltime, higher speed for longer stops**********
    nj_specs1={12,1.6,1.6,0,25}
    nj_specs2={12,1.6,1.6,0,50}
    nj_specs3={12,1.6,1.6,0,35}
```

In addition, the top bus speed if the next stop is Manhattan is coded as an "override" in the GISDK code. The rationale is that a suburban North Jersey bus is likely to get onto a limited access facility in order to travel to Manhattan. This adjustment can be found on line 355 of the GISDK script c:\0_BPM1\11_code\flow_transit_times.rsc. The statement is shown below:

```
//increased speeds if 1st stop in nj_arr2/nj_arr3 next stop in Manhattan
    if (distance>=BREAKPOINT & (start=5|start=6) & fin=1)  then do
        MAXSPEED=55
    end
```

The speed functions documented in **Table 19Error! Reference source not found.** resulted in the following comparisons of modeled (original and improved – dubbed "Iteration 7") versus observed bus travel times from selected locations in Northern New Jersey. **Table 20Error! Reference source not found.** summarizes these comparisons, and shows that the adjustments made were able to tune the bus speed relationships to better replicate observed travel times.

Table 20: Modeled versus Scheduled Bus Travel Times

	Schedule		Model		Original	Iter 7
	Route	IVTT (min)			IVTT (min)	Runtime
			Route	Starting Node	LinDelay=5 All NJ=50	Speed 55 for NJ-NY stop del=15
Tenafly	Rockland20	40	166A1	2721	26	37
	NJ166	40, 60 (Exp)				
Ridgewood	NJ163	62	163E1	2711	33	65
Clifton	NJ191	28	191A1	3732	23	42
Wayne	NJ197	53	197B1	301526	32	62
Dover	LK46	90	LK46A1	3152	46	87
Exit 8A	Exit 8A	60	SUX8AA1	300549	50	65
		From 8A PNR			From 8A PNR	
Old Bridge	NJ139	62	139G1	3218	60	75
Somerville NJ	NJ114	106	114A1	3200	58	132
Princeton NJ	Subarbabn Rt	95	SUPTD1	3580	69	92
	Coach USA					
Lakewood	NJ139	106	139A1	301430	92	130
Oradell		45	165D1	2704	29	45
Vince Lombardi		25	321A1	2709		26

Calibration of Trans-Hudson Delays

The previous section discusses the procedures to develop bus travel time relationships that approximate the bus schedules. One of the challenges of the TH-TDFM calibration is the fact that the mode choice model uses two modal choices for Trans-Hudson travel (commuter rail and other transit). As such the other-transit path-builder has the weighty task of replicating observed modal shares between PATH, bus, and ferry. These modes are particularly competitive with one-another from the urban portions of Northern NJ.

During calibration, the Trans-Hudson delay parameter was used to replicate observed transit sub-mode volumes for the "other-transit" category of trips. The Trans-Hudson bus delays were adjusted in the following fashion (see line 134 in the flow transit_times.rsc GISDK file).

```
// Holland Tunnel override
    hol_man_dly=20.
// Lincoln Tunnerl override
    lin_man_dly=25.          //AECOM changed, Original=5
```

Enhancements to West of Hudson Drive Access to Transit

The original NYBPM used a two-part strategy to represent Drive-Access trips. For areas East of the Hudson, FORTRAN routines were calibrated that developed centroid-to-station connection links to provide accessibility to fixed guideway transit. For the West of Hudson networks, the original NYBPM directly used drive-access links from the NJ Transit North Jersey Transit Demand Forecasting Model (NJTDFM). When the FORTRAN processes were converted to native TransCAD procedures, they were applied to the entire modeled region (both East and West of the Hudson River). The West of the Hudson region has a very different propensity for drive-access from the East of the Hudson region. As such, the adjusted GISDK routines were fine-tuned in the following fashion:

1. The restriction that required the production end TAZ to be the same as the PNR lot was eliminated. This restriction unduly constrained commuters to using lots in their home county.
2. The maximum drive access time parameter in the path-builder was expanded from 30 minutes to 180 minutes. At 30 minutes, the parameter was set so that several long-drives to transit (in the on-board surveys) were not allowed to occur. In order to prevent building a "cliff" in the path-builder, the 180 minutes was set to consider virtually all possible drive access opportunities. Sub-optimum opportunities would be culled using the path-weight on drive access time.
3. Additional discipline in the park-and-ride logic was implemented, to force commuter rail paths to drive to commuter rail stations and other-transit paths to drive to non-commuter rail stations. This prevented the path-builder from allowing drive access to the "other" transit mode (commuter rail riders parking at PATH stations and vice versa).

Highway Assignment of Drive Access / Egress Trips to Selected PNR Facilities

Park-and-Ride processing was revised and upgraded for the TH-TDFM 2010 Model Update. Highway trips necessary for providing "Drive to Transit" and "Drive to Commuter Rail" transit travel had not previously been addressed and were not specifically processed in previous versions of the model. Thus, a "drive" component of transit travel in the model was missing, and these highway trips were not included in the highway assignment task. The TH-TDFM 2010 was upgraded to have these trips embedded in the modeling process, as a task automatically performed in the end of the model's Pre-Assignment Procedure (PAP). As a result, "Drive to Transit" and "Drive to Commuter Rail" origin-destination trips are added into the highway trip tables before running the "Highway Assignment" task.

Three major issues had to be resolved in order to develop and implement this upgrade:

- Flows between TAZ trip ends and transit parking Facility: Extract transit "Drive" trips to parking facilities and derive Origin-Destination (OD) demand based on the TAZ system;
- Time Of Day (Transit TOD ⇔ Highway TOD): Transform AM and MD transit demand into four-day-period highway demand;
- Mode Split: The transit demand has only one "Drive" mode to either Transit or Rail, while highway modes include "SOV" and "HOV" options.

Drive Access Trip Extraction: The implemented revisions to the Park-and-Ride procedure in the TH-TDFM 2010 Update follow the steps below:

- Transit "Drive" trips are extracted by parking facility separately for AM and MD day period. Origin-Centroid-to-Parking demand tables are created in this step for AM and MD

day period;

- Each Parking Facility is associated with the nearest Centroid. Associated "parking" centroids are used in place of Parking Facilities in the demand table derived in the first step. This way, Origin-to-Destination transit "Drive" demand matrices based on network centroids are constructed for AM and MD periods.

Time of Day (TOD) Allocation: This issue was resolved with the following two assumptions:

- PM matrix is estimated as a transposed AM matrix;
- NT matrix is estimated as a transposed MD matrix;

Modal Split – SOV and HOV

In reality, the transit "Drive" mode consists of "Park-and-Ride" (PNR) and "Kiss-and-Ride" (KNR) alternatives, which correspond to highway "SOV" and "HOV" modes. In terms of vehicle trips, "SOV" trips have to be one-way trips from the origin (home) to the destination (parking), while "HOV" (KNR) trips assume a vehicle trip back from parking to home. The following two assumptions are made in the TH-TDFM "Park and Ride" procedure:

- SOV (PNR) mode trips were estimated as 80% of all trips and
- HOV (KNR) mode trips were estimated as 20% of all transit "Drive" trips.
- According to this assumption, three additional final processing operations were applied to each TOD transit "Drive" demand matrix:
    - 20% of all trips in transit "Drive" demand in each TOD period were separated from total amount into initial HOV trips. The remaining portion of the demand comprised SOV mode trips;
    - The initial HOV portion of the demand was duplicated;
    - The duplicated portion was transposed and added to the initial HOV demand, thus ensuring that both the trip to drop off a passenger and the return trip home for the driver are both included in the final HOV demand used in the highway assignment.

Selection of PNR for Highway Assignment

The upgrade of "Park and Ride" procedure is performed automatically during the PAP model task as an addition to the main GISDK script. The procedure includes a filter that allows the user to limit the number of considered parking facilities. This may be a convenient control if a parking facility creates unreasonable traffic flows around its associated centroid. The filter is based on a parking facility capacity. Currently the filter is set to allow processing of parking facilities with a capacity of 500 or greater. If the user changes the filter value, the GISDK script has to be recompiled for the change to take effect.

5.3 Stage 2: East of Hudson River (EOH) Transit Network Calibration

This section documents the improvements and enhancements that were made to the NYBPM transit networks to support the 2010 BPM Update in the calibration of the transit network for the East of Hudson (EOH) region. The work performed for this Task Order[1] represents an extension of the West of Hudson transit network validation work that the PANYNJ performed in their development of the TH-TDFM. The work focused on several areas, including:

- Correcting coding mistakes identified through the QA/QC process, identified by stakeholders.
- Updating all of the costs in the BPM transit networks to 2010 dollars (refer to section 3.1).
- Migration of the regional transit survey database from TH-TDFM Tier 1.1 TAZ system (3824 TAZs) to the expanded BPM 2010 Update Tier 1.2 TAZ system (4629 TAZ's).
- A series of iterative assignment tests of the regional transit survey database to the 2010 base year networks. Through this exercise, the transit network performance was evaluated in replicating observed transit counts, when the transit assignment is fed a best-available database of on-board surveys.

This section documents in detail the changes that were made to the BPM transit networks and procedures in each of these dimensions.

Correcting Coding Mistakes Identified Through the QA/QC Process

For the purpose of developing the East of Hudson transit validation work to support the NYBPM 2010 Update implementation and calibration, AECOM started this work using the finalized TH-TDFM transit networks that were completed in November 2013. PANYNJ staff performed several enhancements to the BPM transit networks during the Summer and Fall of 2013. As they transmitted these transit networks to the Parsons Brinckerhoff Team, they identified several clean-ups to the underlying transit networks. AECOM performed the following edits:

- Extended the N train to Stillwell-Coney Island
- Removed V/M service to 2nd Av, updating the G train with service to Church Av
- Updated travel times, headways, and capacities for the northbound G
- Recoded the headways for the G train as 6.5 minutes in the peak-period, 10 minutes during midday
- Made minor changes to travel times.

Bus service changes to the network included the following:

- M60 Local was updated to reflect anticipated capacity changes due to the use of articulated buses on the route; more specifically, vehicle capacity on the M60 Local was increased to 85 persons per vehicle and headways changed from every eight minutes to every ten minutes, during the AM peak.

[1] This work was done as Task Order J: BPM 2010 Transit Network Validation - East of Hudson River, NYBPM Technical Support – Contract C000758.

- The headway was changed for only one direction (LaGuardia to Broadway)
- The capacity was updated to reflect the use of articulated buses.

Following the completion of the edits identified by PANYNJ, AECOM performed a complete inspection of the coded NYCT subway routes with data from the MTA Regional Transit Forecasting Model (MTA Headquarters current forecasting model, or MTA RTFM). AECOM tied all of the service plans back to the MTA RTFM. While this review did not identify any major issues, it did result in mostly minor modifications to:

- Headways by route (generally the BPM was very good with only a few routes with 1-2 trains per hour variances)
- Stop-to-Stop travel times: This represents the bulk of the changes. There were several very minor adjustments (on the order of 0.5 minutes) that were made.
- Capacities: Review and adjustment of NJ Commuter Rail capacities

Suggested Future Improvements

While good incremental progress has been made in this task with respect to the 2010 BPM transit networks, there are recommended next steps for future development and improvement of the BPM transit procedures beyond the scope of the current work. These include:

- Updating the transit survey database with the most current survey data as new datasets continue to roll in between the start of 2014 and the beginning of 2015.
- A major effort to review details of the NYCT bus networks. As AECOM has identified previously, the NYCT transit networks come from the NYCT transit assignment MetroCard model. That model uses Stochastic User Equilibrium assignment method, which does not combine headways. As a result, NYCT uses an approach where coded headways do not represent actual service frequency, but are pre-calculated to post a proper combined waiting time. The pathfinder algorithm used in BPM, however, does combine headways. As a result, the wait times on the bus system are likely generally too low in the BPM.
- Known issues have been resolved with respect to the NYCT subway services (hundreds of individual routes), but not the bus system (because it involves several hundred routes, with extensive individual route variation). This exercise will require significant resources to resolve, but it is one where the investment is probably worthwhile if the current set of TransCAD procedures will continue to be used for at least the next 5 years.

Transit Network Assignment Calibration Results

The OD survey-based transit assignment results from the work described here are shown in **Error! Reference source not found.**, **Table 22**, and

Table 23, comparing these assignment 6-10 AM assignment volumes with the both the 2005-2008 survey- based assignment described in Section 5.1.

Table 21: Survey-Based Network Calibration – Stage 2 Results – Commuter Rail, Ferries and Trans-Hudson Bus

Model Run: **T17_[140527] _Cong**

AM Peak Period Ridership By Station/Cordon Location

compared to: **Survey Based Counts ***

	Counts		Model		# Difference (Model - Counts)		% Difference (Diff / Counts)	
Node Station	Survey Based Counts *		OD Survey TASN (only) T17_[140527] _Cong					
	Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs
NJT Commuter Rail								
TOTAL Port Jervis/Main/Bergen County	9,770	279	6,993	1,084	(2,777)	805	-28%	288%
TOTAL Pascack	3,018	85	2,354	562	(664)	477	-22%	561%
NEWARK BROAD ST	402	796	1,516	4,741	1,114	3,945	277%	496%
TOTAL Morris & Essex	18,474	1,753	16,122	6,135	(2,352)	4,382	-13%	250%
TOTAL Raritan	6,945	163	6,316	513	(629)	350	-9%	214%
TOTAL NJC/NEC	42,442	3,251	31,394	5,884	(11,048)	2,633	-26%	81%
NJT Terminal Stations								
Secaucus (MAIN)	396	2,490	88	1,744	(308)	(746)	-78%	-30%
Secaucus (NEC/NJC/M&E)	3,207	396	3,850	245	643	(151)	20%	-38%
Secaucus (BRG/PAS)	0	629	139	2,120	139	1,491		237%
Secaucus Subtotal	3,603	3,515	4,077	4,109	474	594	13%	17%
Newark Penn Station (NJT)	4,199	15,322	8,624	16,439	4,425	1,117	105%	7%
Hoboken (NJT)	0	16,579	288	7,546	288	(9,033)		-54%
New York Penn Station (NJT)	**0**	**50,966**	**2,764**	**39,971**	**2,764**	**(10,995)**		**-22%**
Total Terminal Stations	7,802	**86,382**	15,753	**68,065**	7,951	**(18,317)**	102%	**-21%**
NJT Rail without Terminal Stations	**84,161**	**5,631**	**65,889**	**14,613**	**(18,272)**	**8,982**	**-22%**	**160%**
NJT Rail with Terminal Stations	**91,963**	**92,013**	**81,642**	**82,677**	**(10,321)**	**(9,336)**	**-11%**	**-10%**
PATH								
33rd St Line								
33rd St	2,534	10,746	2,570	7,400	36	(3,346)	1%	-31%
23rd St	297	3,547	1,126	4,056	829	509	279%	14%
14th St	446	3,071	300	2,459	(146)	(612)	-33%	-20%
9th St	246	1,498	750	2,481	504	983	205%	66%
Christopher St	309	1,374	863	3,302	554	1,928	179%	140%
33rd St Line Subtotal	**3,832**	**20,236**	**5,610**	**19,698**	**1,778**	**(538)**	**46%**	**-3%**
WTC	**7,726**	**41,404**	**7,056**	**38,122**	**(670)**	**(3,282)**	**-9%**	**-8%**
New Jersey								
Hoboken	23,434	1,035	15,018	792	(8,416)	(243)	-36%	-23%
Pavonia/Newport	3,391	2,061	9,063	3,390	5,672	1,329	167%	64%
Exchange Place	1,863	6,462	2,140	2,691	277	(3,771)	15%	-58%
Grove St	6,036	1,448	7,918	4,118	1,882	2,670	31%	184%
Journal Square	12,648	2,446	10,110	4,871	(2,538)	2,425	-20%	99%
Harrison	3,895	496	2,946	631	(949)	135	-24%	27%

Model Run: **T17_[140527] _Cong**

AM Peak Period Ridership By Station/Cordon Location

compared to: **Survey Based Counts ***

		Counts		Model		# Difference (Model - Counts)		% Difference (Diff / Counts)	
Node	Station	Survey Based Counts *		OD Survey TASN (only) T17_[140527] _Cong					
		Ons	Offs	Ons	Offs	Ons	Offs	Ons	Offs
	NEWARK PENN STATION	18,785	3,194	17,984	3,531	(801)	337	-4%	11%
	Subtotal	**70,052**	**17,142**	**65,179**	**20,025**	**(4,873)**	**2,883**	**-7%**	**17%**
	TOTAL PATH	**81,610**	**78,782**	**77,845**	**77,845**	**(3,765)**	**(937)**	**-5%**	**-1%**
Bus	**PABT Regional Commuter**	**6,550**	**62,470**	**8,093**	**66,233**	**1,543**	**3,763**	**24%**	**6%**
	PABT Jitney	1,668	4,236	NA	NA				
	Midtown Curbside	0	6,365	0	5,603	0	-762		**-12%**
	Downtown Curbside	0	4,565	0	6,615	0	2,050		**45%**
	GWBBS	1,165	1,590	1,001	639	-164	-951	**-14%**	**-60%**
	TOTAL Trans-Hudson Bus	**9,383**	**79,226**	**9,094**	**79,090**	**-289**	**-136**	**-3%**	**0%**
Ferry	Midtown	0	4,025	221	1,908	221	-2,117		**-53%**
	Downtown	0	7,305	326	611	326	-6,694		**-92%**
	Total TH Ferry	**0**	**11,330**	**547**	**2,519**	**547**	**-8,811**		**-78%**
	Trans-Hudson Transit Total	**20,941**	**203,162**	**25,071**	**179,400**	**4,130**	**(23,762)**	**20%**	**-12%**
LIRR									
CITY TERMINAL ZONE									
3000	New York-Penn Station	5,965	**85,526**	**3,292**	**72,646**	**(2,673)**	**(12,880)**	**-45%**	**-15%**
3807	New York-GCT	0	0	0	0	0	0		
3002	Hunterspoint Ave	0	3,409	0	4,119	0	710		21%
3001	Long Island City	0	79	0	0	0	(79)		-100%
3091	Flatbush Ave	4,143	10,593	2,441	9,461	(1,702)	(1,132)	-41%	-11%
	Atlantic Ave - New Service	0	0	0	0	0	0		
	Lower Manhattan	0	0	0	0	0	0		
	Subtotal	10,108	99,607	5,733	86,226	(4,375)	(13,381)	-43%	-13%
LIRR Total W/O Terminal Zone		**111,979**	**19,262**	**105,808**	**16,901**	**(6,171)**	**(2,361)**	**-6%**	**-12%**
LIRR Total With Terminal Zone		**126,406**	**123,899**	**118,392**	**118,392**	**(8,014)**	**(5,507)**	**-6%**	**-4%**
MNCR									
MANHATTAN									
3500	125th St	142	2,514	184	1,275	42	(1,239)	30%	-49%
3201	125th St	0	0	0	0				
3200	NYC-Grand Central	**0**	**70,632**	**4,460**	**66,810**	**4,460**	**(3,822)**		**-5%**
	Total	142	73,146	4,644	68,086	4,502	(5,060)	3171%	-7%
Total MNCRR W/O Manhattan		**81,251**	**8,268**	**84,635**	**21,112**	**3,384**	**12,844**	**4%**	**155%**
Total MNCRR With Manhattan		**81,393**	**81,414**	**89,279**	**89,198**	**7,886**	**7,784**	**10%**	**10%**

* Best 2010 Counts where Survey-based Counts are not available.

Table 22: Survey-Based Network Calibration – Stage 2 Results – Subway Stations: Ins and Outs by Boro

OD SURVEY-BASED Transit Assignment (TASN) versus MetroCard by BOROUGH

		IN		OUT	
#	BOROUGH	Observed	Survey-based TASN	Observed	Survey-based TASN
1	Manhattan	532,173	927,349	1,137,072	1,424,086
2	Queens	304,989	499,610	134,366	262,604
3	Bronx	169,155	267,692	90,596	127,702
4	Brooklyn	423,509	745,266	236,903	474,659
Total		**1,429,825**	**2,439,917**	**1,598,937**	**2,289,051**

Table 23: Survey-Based Network Calibration – Stage 2 Results – Subway Stations: Ins and Outs by Branch

OD SURVEY-BASED Transit Assignment (TASN) versus MetroCard by BRANCH

		IN		OUT	
#	Branch_ID	Observed	Survey-based TASN	Observed	Survey-based TASN
1	Broadway/7 Av (CBD)	49,132	50,529	88,158	103,389
2	Broadway/7 Av (Non-CBD)	34,483	35,809	51,871	46,757
3	Upper Broadway	42,984	62,233	30,159	22,058
4	Lenox Av	15,922	10,574	12,722	8,067
5	Lexington Av (CBD)	25,137	11,337	75,830	62,728
6	Lexington Av (Non-CBD)	59,333	92,706	78,238	89,626
7	Jerome Av	32,579	27,496	19,833	13,089
8	White Plains Rd	44,963	83,722	25,243	49,364
9	Dyre Av	8,974	10,790	3,618	4,174
10	Pelham	39,200	60,003	17,270	27,100
11	Broadway-60 St	10,252	6,073	54,481	40,343
12	Nassau St	585	129	5,024	9,513
13	14 St	5,003	5,069	8,822	10,186
14	6 Av	11,795	22,273	59,728	67,238
15	8 Av	34,911	26,816	55,416	59,164
16	53 St	1,617	33,158	24,488	50,290
17	63 St	5,912	4,580	16,546	28,563
18	8 Av/Central Pk W	30,872	68,882	29,704	49,964
19	Washington Heights	20,493	17,136	5,766	5,016
20	Concourse	27,834	49,164	10,486	9,873
21	Manhattan CBD Transfer	172,392	470,050	510,046	747,980

OD SURVEY-BASED Transit Assignment (TASN) versus MetroCard by BRANCH

		IN		OUT	
#	Branch_ID	Observed	Survey-based TASN	Observed	Survey-based TASN
22	Upper Manhattan/Bronx Transfer	14,759	40,139	20,021	40,478
23	New Lots	32,338	49,588	9,349	21,852
24	Nostrand Av	16,508	18,689	5,665	2,474
25	Eastern Pkwy	11,861	21,268	11,673	19,215
26	4 Av	35,090	72,083	16,313	53,737
27	Sea Beach	19,645	18,814	6,982	5,894
28	West End	24,098	25,669	7,647	7,834
29	Brighton	52,133	79,112	21,293	26,483
30	Franklin Av	923	92	366	312
31	Culver	37,839	67,077	19,889	44,817
32	Rockaway	7,402	21,279	2,993	10,725
33	Lefferts Blvd	6,545	5,981	1,045	823
34	Fulton St	41,157	58,279	16,776	21,463
35	Crosstown	16,704	32,936	10,551	16,133
36	Queens Blvd	101,042	184,789	41,334	101,328
37	Jamaica	34,113	36,713	15,398	18,188
38	Myrtle Av	9,869	0	1,949	0
39	Canarsie	37,602	40,867	17,505	16,208
40	Flushing (Queens)	92,025	118,118	42,282	53,022
41	Astoria	27,701	28,487	7,716	6,387
42	Downtown Brooklyn Transfer	26,924	131,256	61,049	149,419
43	Other Brooklyn Transfer	36,154	112,002	16,372	77,946
44	Queens Transfer	28,842	121,777	26,376	83,002
45	No Corresponding PTZ	44,181	6,373	34,944	6,830
Total		**1,429,825**	**2,439,917**	**1,598,937**	**2,289,051**

6 TRANSIT NETWORK AND DATA TRANSMITTAL

With this memorandum, the complete BPM 2010 Update transit network database [Version 140618], along with a set of BPM 2010 supporting data deliverables are being transmitted to complete Tasks 5, 10, 11, and 12. **Table 24** describes the files transmitted for each Task.

Table 24: Deliverables Transmitted

Task / Task Order	Deliverable File Name	Deliverable Description
Task 5: Update Transit Counts	1_Hub_Valid_2010_Summary_V2 2_CR-Ferry-TH EBus Counts_BPM 2010 Update_V2 3_NYCT-2010 Sub and Bus by Hour_140611_PB 4_Oct 2012 Avg Hourly Trips_Station to Station_MetroCard 5_AM 2012 PLP tables (for BPM) 1_Subway PTZ to NYC_ID Correspondence 2_MetrCard_STA_ID to NYCT_ID Correspondence	▪ 2010 Hub-Bound Transit Counts ▪ 2010 Database of Updated "Best Set" of Transit Counts – Commuter Rail, Ferry and TH Bus ▪ Additional Transit Count Database Collected from NYC Transit: 2010 Bus and Subway ▪ BPM PTS Correspondence to Counts
Task 10: Update Rail Service **Task 11: Update Bus Service and Network**	BPM 2010_Transit Network_140618: ▪ 2_TNET transit database ▪ Routes Database - Descriptors and Attributes	▪ Full contents of updated BPM 2010 Transit network ▪ Complete listing of transit routes and attributes by detailed mode
Task 12: Update Transit Fares	▪ 2_TNET transit database ▪ Routes Database - Descriptors and Attributes ▪ BPM 2010 Transit_Fares Application_140618.xlsx	▪ (as above) ▪ (as above) ▪ Tool to calculate future year fares in 2010 dollars