MEMORANDUM

DATE: September 9, 2009

TO: Mohammed Khan, Administrator, MART

FROM: McMahon Associates

SUBJECT: Wachusett Station Ridership Forecast

Overview

This memorandum outlines the methodology for the estimation of ridership at the proposed Wachusett Station. This ridership memorandum was created in support of the application for TIGER funding to be submitted September 15, 2009. In summary, the ridership projections include 400 new inbound riders in 2012, with 630 expected in 2032. Reverse commute opportunities could generate an additional 10 riders in 2012 and 30 riders by 2032.

Ridership to Adjacent Highway Ratio

Ridership information from 2009 for the terminus stations of the other four north side commuter rail lines – Lowell, Haverhill, Newburyport, and Rockport – was examined to form the basis of the ridership projections. Aside from Lowell Station, a major population area, these terminus stations typically see around 500 trips per day.

Therefore, in order to estimate ridership at the proposed Wachusett Station, the 2009 ridership information for each terminus station was compared with average daily traffic volumes on the closest highway segment to each station (as available through MassHighway). Due to the fact that the ridership at Lowell was more than twice that of any other terminus station, it was not included in the analysis. The nearest highway to Rockport is Route 128; however, no traffic data was available through MassHighway or through the Boston MPO. Route I-495 S, north of the Route 125 Connector, was used for Haverhill Station, and Route I-95 S at the Amesbury town line was used for Newburyport.

Comparing the ridership numbers at each station to the adjacent highway volume yielded a ratio which was then used to calculate the expected ridership at Wachusett Station in 2009. Therefore, the ratio used to calculate the expected 2009 Wachusett Station ridership was 0.0070 commuter rail passengers for every daily automobile trip on Route 2, east of Oak Hill Road.

Table 1, below, outlines the calculation process used to determine the ridership ratio. Applying the 0.0070 ratio to the 48,300 vehicles currently on Route 2 in the vicinity of the proposed station yielded a projected 2009 ridership of 340, as seen in Table 2 on the following page.

Table 1: Calculation of Ridership Ratio

Terminus	2009 Ridership	Closest Highway Segment		Daily Volume on Highway	ADT Year		Ratio
Haverhill	536	I-495 S	Exit 49 MA-110/MA-113	104,400	2004	N. of Rte 125 Conn	0.0051
Newburyport	568	I-95 S	Exit 32B - 32A Rte 3	64,300	2,005	at Amesbury TL	0.0088
Wachusett	n/a	Rte 2 E	Exit 28 - Rte 31	48,300	2,005	East of Oak Hill Rd	**0.0070**

Elasticity

Due to the decreased travel time as a result of this project and the ongoing improvements to the Fitchburg Commuter Rail Line, riders departing from the proposed Wachusett Station will see an overall travel time to Boston that is several minutes faster than what riders from Fitchburg experience today. Using an elasticity of -0.6[1], as advised by the FTA in an April 2006 teleconference, it is expected that the reduced travel time will result in approximately an additional 40 inbound passengers (or about 80 additional round-trip riders).

Estimated 2012 Ridership

Growth rates for ADT for Route 2 were used to approximate ridership for the opening year 2012. Based on the information at the MHD Continuous Count Station #44 (Athol) and #3008 (Westminster), Route 2 experienced an annual growth rate between 2% and 3% for the past 8-9 years. To be conservative for the proposed Wachusett station, the lower growth rate was used. This 2% rate was applied to the 2009 ridership estimate of 375 passengers to achieve a projected value for the 2012 opening-year ridership of 400 passengers.

Table 2: Ridership Projection

Route 2 Roadway Volume by Exit 28	**48,300**
Wachusett Estimate for 2009 (based on 0.0070 ratio)	340
Riders from Travel Time Elasticity	40
Total Estimated Riders 2009	**375**
2012 estimate	**400**
(at 2.0% growth rate for 3 years)	

[1] This number was derived from a Dallas case study, which was performed as a part of the Small Starts application process. The FTA advised the project team that this value is appropriate for use in estimating ridership attraction due to travel time savings on the Fitchburg Commuter Rail Line.

Opening Year Parking Requirements

Many stations along the Fitchburg Line have a significant portion of drop-off, bicycle, and walk-up passengers. Using these ratios to tabulate the breakdown of arrival modes for the projected 400 riders in the opening year 2012, it was determined that 240 riders, or 60%, are anticipated to arrive and park at the facility before boarding the train. Table 3 outlines these calculations.

Table 3: Trip Generation, by Mode[2]

Arrival Mode	Percent	Riders	Daily Trips/Rider	Daily Trips
Park and Ride	60%	240	1	240
Kiss and Ride	30%	120	2	240
Bicycle	4%	15	0	0
Shuttle/Bus	4%	15	0.2	3
Pedestrian	2%	5	0	0
Total Daily	**100%**	**400**	**1.2**	**483**
			Total Round-Trip	**966**

Due to the high proportion of riders expected to arrive by alternate means (based on the experiences of other MBTA commuter rail stations on the line), the parking needs for the proposed Wachusett Station in the opening year are not expected to be as high as they would be if all passengers accessed the station via park and ride. Examining the ratio of passengers to the number of parked cars at each station west of West Concord, it was determined that Wachusett Station could expect about 1.4 riders per automobile parked at the station (see Table 4).

Table 4: Boardings[3] per Parking Space Used

Station	Total Boardings	Spaces Used	Boardings/ Space Used
Fitchburg	169	138	1.2
N. Leominster	204	126	1.6
Shirley	116	105	1.1
Ayer	185	132	1.4
Littleton/495	156	120	1.3
S. Acton	579	417	1.4
Total	**1,400**	**1,000**	**1.4**

For the opening year of 2012, this would come to approximately 280 spaces.

[2] Arrival mode distribution is an average of Fitchburg Commuter Rail Line stations west of South Acton Station.
[3] Utilization data based on observations from 2006 and 2007.

Future Growth

Using the growth factors derived from Route 2 (between 2% and 3% annually), twenty-year inbound ridership for the year 2032 is expected to be somewhere between 630 and 780 riders. For the purpose of further estimates, the lower number of 630, will be used, to be conservative.

Reverse Commute

The ridership estimate for the reverse commute was calculated based on commercial/industrial parcels within a half-mile walking distance of the proposed Wachusett Station.

As current employment data was not available for this area, each property within this area was examined, using information provided by the Montachusett Regional Planning Coalition (MRPC) and the Fitchburg Assessors website. The total square footage for buildings in this industrial and light industrial area came to 557,000 s.f. With a factor of about 700 square feet per employee, it is estimated there are currently about 800 people employed in the immediate station area.

The land area available for further development, for each property, was estimated using information from MRPC and the City Assessor website, GIS data on wetlands and topography, and regulations in the Fitchburg zoning ordinance. Within the twenty-six properties in the station area, about 690,000 s.f. (about 16 acres) were available for further development. Dedicating 2/3 of the space to parking needs and the rest to additional or new structures (as high as three stories), a total of 230,000 s.f. of new industrial facilities could be constructed. Using the factor of 700 s.f. per manufacturing job, it is possible that up to 330 jobs could be added to the area in the future

In addition, the proposed Westminster Business Park, a relatively undeveloped area near the proposed layover facility has a great deal of development potential. Promotional material for the Westminster Business Park indicates up to 350,000 s.f. are "ready to build," with up to 1.6 million square feet possible in the long-term. This translates to 500 jobs in the short-term, and as many as 2,250 for the long-term, assuming 700 s.f. per employee.

If we accept 1% of employment as the basis for determining "reverse commuters," we can expect 10-15 reverse commute riders in the opening year and up to 30 reverse commute travelers at build out in approximately 2032.

Other Ridership Growth

Additionally, due to the scheduling improvements and creation of express trips, riders boarding at other stops along the corridor will see reduced travel times. These travel time savings have not been accounted for in the increased ridership forecasting based on travel time elasticities, but it is likely there will be an added passenger benefit to existing stations along the line.