Pettengill Road/Airport Access Road
Transportation/Land Use Plan
REPORT

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A. Executive Summary

The purpose of this document is to report on the methodology and findings of the Pettengill Road/Airport Access Road Transportation/Land Use Plan, developed for the New Hampshire Department of Transportation (NHDOT), the City of Manchester and the towns of Bedford, Litchfield, Londonderry and Merrimack. The Plan was designed to 1) identify the transportation and land-use related impacts of increased access to a study area in the vicinity of the Bedford-Manchester-Londonderry Airport Access Road (MAAR) and 2) determine if additional planned/proposed development resulting from the improvements will generate levels of traffic in excess of the anticipated capacity of selected principal elements of the study area roadway network. The Plan has been designed to identify the impacts of Pettengill Road on selected roadway corridors in the five study area communities. The study also quantifies the impacts of Pettengill Road on the traffic operations of selected intersection and arterial segment locations on these corridors. The Pettengill Road/Airport Access Road Transportation/Land Use Plan has been completed through the efforts of the Southern New Hampshire Planning Commission (SNHPC), the Nashua Regional Planning Commission (NRPC) and a Study Advisory Committee formed to guide the progress of the study.

The impacts of Pettengill Road on the study area corridors were generally quantified based on a comparison of operating characteristics for Build (assuming Pettengill Road is constructed) and No-Build (assuming Pettengill Road is not constructed) scenarios. Build traffic projections were based on trip generation/distribution information from the 2004 Pettengill Road Traffic Study completed for the Town of Londonderry and from NHDOT information used in the design of the MAAR. Data from these sources was used to distribute the trips generated by Pettengill Road and surrounding lands onto the study area roadway network and study area corridors. Utilizing this methodology, 2025 Weekday PM peak hour Build turning movements and two-way volumes were projected for study area intersections and arterial segments. To address potential impacts in Merrimack and Litchfield, NRPC used the region-wide version of its Travel Demand Forecasting Model. The model was used to generate base and 2025 conditions without the Pettengill Road project. Forecasted peak hour turning movements at each study area intersection from the 2004 Pettengill Road Traffic Study were then added. Of the four intersections originally determined to be studied for possible impact in that report, only the NH3A/Corning Road intersection in Litchfield was included. As a result, other methods were used to estimate future conditions for the remaining three locations chosen for study in the Pettengill Road/Airport Access Road Transportation/Land Use Plan.

The following specific observations/conclusions regarding the study area corridors can be made from the results of the Pettengill Road/Airport Access Road Transportation/Land Use Plan:

i) Portions of the existing South River Road (US 3) study area corridor in Bedford (not including the South River Road intersections with the MAAR and the South River Road/Hawthrone Drive North intersection) will experience unacceptable (LOS E – F) operations in the future both with and without the trips generated by Pettengill Road. The trips generated by Pettengill Road do not appear to have a significant impact on the capacity of the arterial segments evaluated in the study.
ii) Portions of the Brown Avenue corridor in Manchester will experience unacceptable traffic operations in the future both with and without the trips generated by Pettengill Road. Based on the evaluation completed for the corridor, the trips generated by Pettengill Road do not appear to have a significant impact on the capacity of the arterial segments evaluated in the study.

iii) Assuming the planned improvements included in the Supplemental Traffic Study for Pettengill Road completed for the Town of Londonderry in 2010, selected intersection locations on the Londonderry study area corridor will experience unacceptable traffic operations in the future. The arterial analysis completed for the study area corridor indicates that the segment of Pettengill Road west of Harvey Road will be approaching capacity during the 2025 Weekday PM peak hour.

iv) Trips generated by Pettengill Road do not appear to have a significant impact on operations at the study area intersections in Litchfield.

v) Assuming that it operates as unsignalized, the Bedford Road/F.E. Everett Turnpike Exit 12 On/Off Ramps intersection in Merrimack will operate at LOS F during the 2025 No-Build and Build scenarios.

vi) Based on the results of prior work completed for this location, LOS F conditions are projected for the Daniel Webster Highway (US 3)/Bedford Road intersection in Merrimack during the 2025 No-Build scenario.

vii) Principals of access management should be incorporated into the design of roadway improvements resulting from the observations and conclusions of this study.

viii) New facilities resulting from the development of land adjacent to the Pettengill Road project should be designed so as to pursue opportunities for transit-oriented development and other practices to encourage transit use.
B. Introduction

The purpose of this document is to report on the methodology and findings of the Pettengill Road/Airport Access Road Transportation/Land Use Plan. The Plan was developed for the New Hampshire Department of Transportation (NHDOT), the City of Manchester and the towns of Bedford, Litchfield, Londonderry and Merrimack. The Plan was funded through the Community Technical Assistance Program (CTAP), a NHDOT five-year initiative to assist twenty-six communities that will be affected by the reconstruction of Interstate 93. The purpose of CTAP is to promote beneficial growth patterns and development practices to minimize the negative effects of growth on community services, remaining open space, schools, existing traffic patterns, quality of the environment, and existing residential and commercial development. Specifically, this project was funded through a Local CTAP Collaborative Grant, which is a Phase Two CTAP Program. The Local CTAP Collaborative Grant program is intended to help two or more local governments undertake a cooperative project that addresses an immediate concern to their communities and helps to achieve the broad goals of CTAP. The Pettengill Road/Airport Access Road Transportation/Land Use Plan was designed to 1) identify the transportation and land-use related impacts of increased access to a study area in the vicinity of the Bedford-Manchester-Londonderry Airport Access Road (MAAR) and 2) determine if additional planned/proposed development resulting from the improvements will generate levels of traffic in excess of the anticipated capacity of selected principal elements of the study area roadway network.

Pettengill Road is a Class VI four-lane roadway proposed by Londonderry for the northwestern portion of the Town immediately south of Manchester-Boston Regional Airport (MBRA). As proposed, Pettengill Road would provide a direct connection between the planned MAAR to the west and the existing Londonderry arterial roadway system via Industrial Drive and Harvey Road to the east. The concept for the proposed roadway was originally developed by the Town’s Planning and Economic Development Department during a design charrette held in May 2003. The purpose of the design charrette was to address the transportation and land-use planning and context-related issues and concerns associated with the roadway and surrounding lands. Pettengill Road has also been incorporated into the Londonderry Northwest Small Area Plan completed by the Planning and Economic Development Department in September 2009.

The Pettengill Road/Airport Access Road Transportation/Land Use Plan has been completed through the efforts of the Southern New Hampshire Planning Commission (SNHPC), the Nashua Regional Planning Commission (NRPC) and a Study Advisory Committee formed to guide the progress of the study. The technical portions of the project have been completed by the Planning Commission on behalf of the five study area communities included in the SNHPC (Bedford, Londonderry and Manchester) and NRPC (Litchfield and Merrimack) regions. The next section of this report provides a detailed description of the methodology and findings of the Pettengill Road/Airport Access Road Transportation/Land Use Plan. The study area for the Pettengill Road/Airport Access Road Transportation/Land Use Plan is shown in Figure 1.
STUDY AREA
Pettengill Road/ Airport Access Road Transportation- Land Use Study

Figure 1

Manchester - Boston Regional Airport
Study Area Corridors
C. Methodology/Findings

C. i) General

It is anticipated that the construction of Pettengill Road in the northwestern portion of Londonderry will have a significant impact on traffic conditions for existing and planned portions of the roadway network in this area. The direct connection between the planned MAAR and the existing arterial system via Pettengill Road will result in the roadway being utilized for both regional and local traffic. Many of the issues related to these improvements have already been evaluated largely through the efforts of the Town of Londonderry and NHDOT. The original “Pettengill Road Traffic Study”, which evaluated existing and proposed traffic conditions to provide justification for the concept of a direct connection between MAAR and the existing local roadway system, was completed by the Town in 2004. A “Supplemental Traffic Study for Pettengill Road”, completed by the Town in 2010, was designed to 1) expand the geographic limits of the original study including additional analysis locations; 2) propose future required improvements and 3) incorporate updated information related to variables such as the timing for the completion of the MAAR and study area land use. Data from these studies, as well as additional information supplied by the study area communities and NHDOT have been incorporated into the methodology for this Pettengill Road/Airport Access Road Transportation/Land Use Plan.

The anticipated impacts of Pettengill Road will also include those created by trips generated from approximately 1,000 acres of presently open land adjacent to the planned roadway. This study, as well as the original 2004 Pettengill Road Traffic Study and the 2010 Supplemental Traffic Study for Pettengill Road, all assume that much of this land will be developed as a direct result of the construction of Pettengill Road. Table 1 is a summary of the estimated non-residential trips generated by the development of this land based on information contained in the Pettengill Road Traffic Study. Table 1 estimates that the land, which for the purposes of the Pettengill Road Traffic Study, was separated into Western, Eastern and Central Sectors, will generate approximately 53,500 trips during a 24-hour period, including approximately 6,000 and 5,800 trips during the Weekday AM and PM peak hours, respectively. It should be noted that not all of these trips would travel through the study area intersections and arterial segments included in the Pettengill Road/Airport Access Road Transportation/Land Use Plan.
Table 1 Pettengill Road Trip Generation *

<table>
<thead>
<tr>
<th>Sector</th>
<th>Daily Trips</th>
<th>AM Trips</th>
<th>PM Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Western</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross Total</td>
<td>40,470</td>
<td>3,184</td>
<td>4,005</td>
</tr>
<tr>
<td>Internal Total</td>
<td>10,416</td>
<td>22</td>
<td>668</td>
</tr>
<tr>
<td>Net Total</td>
<td>30,054</td>
<td>3,162</td>
<td>3,337</td>
</tr>
<tr>
<td><strong>Eastern</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross Total</td>
<td>23,102</td>
<td>2,684</td>
<td>2,368</td>
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<tr>
<td>Internal Total</td>
<td>907</td>
<td>2</td>
<td>64</td>
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<tr>
<td>Net Total</td>
<td>22,195</td>
<td>2,682</td>
<td>2,304</td>
</tr>
<tr>
<td><strong>Central</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross Total</td>
<td>1,270</td>
<td>159</td>
<td>135</td>
</tr>
<tr>
<td>Internal Total</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Net Total</td>
<td>1,270</td>
<td>159</td>
<td>135</td>
</tr>
<tr>
<td><strong>Grand Totals</strong></td>
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</tr>
<tr>
<td>Gross Total</td>
<td>64,842</td>
<td>6,027</td>
<td>6,508</td>
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<tr>
<td>Internal Total</td>
<td>11,323</td>
<td>24</td>
<td>732</td>
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<tr>
<td>Net Total</td>
<td>53,519</td>
<td>6,003</td>
<td>5,776</td>
</tr>
</tbody>
</table>

Western Sector- approximately 700 acres including hotel/convention center, educational, retail, office and light industrial developments
Eastern Sector- including educational, office, and mixed-use developments
Central Sector- light industrial development
*From Pettengill Road Traffic Study

C. ii) Study Area

The Pettengill Road/Airport Access Road Transportation/Land Use Plan has been designed to identify the impacts of Pettengill Road (including impacts of trips generated by lands developed as a result of the new roadway) on selected roadway corridors located in the five study area communities. Additionally, the study methodology will quantify the impacts of Pettengill Road on the traffic operations of selected intersection and arterial segment locations on these corridors. The following study area corridors were selected based on consultation with the study area communities:

1. Bedford – South River Road (US 3) between the F.E. Everett Turnpike bridge and the Merrimack Town Line
2. Litchfield – Charles Bancroft Highway (NH 3A) between the Manchester City Line and Albuquerque Avenue
3. Londonderry – Pettengill Road/Harvey Road/Page Road between MAAR and NH 28
4. Manchester – Brown Avenue (NH 3A) between I-293 and MBRA
5. Merrimack – Daniel Webster Highway (US 3) between the Bedford Town Line and Bedford Road

The study area corridors were discussed and confirmed with the members of the Study Advisory Committee during a meeting held on July 9, 2009. Study area intersections and arterial segments located on the study area corridors were then chosen for detailed analysis. These locations were finalized based on feedback received during a Study Advisory Committee meeting held on January 27, 2010. The following analysis locations, illustrated in Figure 2, were included in the study:
Manchester:

**Intersections** – 1) Brown Avenue at Winston Street (unsignalized) 2) Brown Avenue at Raymond Street 3) Brown Avenue at Goffs Falls Road 4) Brown Avenue at Perimeter Road

**Arterial Segments** – 1) Brown Avenue north of Winston Street 2) Brown Avenue north of Raymond Street 3) Brown Avenue north of Goffs Falls Road 4) Brown Avenue north of Perimeter Road

Bedford:

**Intersections** – 1) South River Road at Hawthorne Drive North 2) South River Road at Hawthorne Drive South 3) South River Road/Commerce Drive/Technology Drive 4) South River Road/Technology Drive/Autumn Lane 4) South River Road at MAAR WB Ramps 5) South River Road at MAAR EB Ramps

**Arterial Segments** – 1) South River Road south of Hawthorne Drive North 2) South River Road south of Technology Drive North 3) South River Road south of Technology Drive South 4) South River Road south of MAAR WB Ramps

Londonderry:

**Intersections** – 1) MAAR at Pettengill Road 2) Pettengill Road at South Loop Road (unsignalized) 3) Pettengill Road at Industrial Drive 4) Pettengill Road at Harvey Road 5) MAAR at South Perimeter Road 6) Grenier Field Road at Webster Road 7) Rockingham Road (NH 28) at Page Road

**Arterial Segments** – 1) Pettengill Road West of Industrial Drive 2) Pettengill Road West of Harvey Road 3) Page Road West of Rockingham Road

Merrimack:

**Intersections** – 1) Daniel Webster Highway (US 3) at Bedford Road 2) Bedford Road at F.E. Everett Turnpike Exit 12 On/Off Ramps (Proposed)

Litchfield:

**Intersections** – 1) Charles Bancroft Highway (NH 3A) at Corning Road 2) Charles Bancroft Highway at Albuquerquee Avenue

The study area analysis locations are shown in Figure 2. Much of the geometric and traffic signal data for the analysis locations included in the study was gathered in the field by SNHPC staff. Many of the geometric characteristics of the study area intersection and arterial locations used in the study analyses were taken from design work already completed by others. The design for the South River Road intersections with the MAAR and the South River Road/Hawthorne Drive North intersections in Bedford were previously completed by NHDOT. NHDOT’s designs for the MAAR/Pettengill Road and MAAR/South Perimeter Road intersections were also incorporated into the study. The design for
Pettengill Road including the Pettengill Road intersections with the South Loop Road, Industrial Drive and Harvey Road in Londonderry were taken from the 2010 Supplemental Traffic Study for Pettengill Road completed by the Town. Work recently completed in the vicinity of the Rockingham Road at Page Road intersection in Londonderry has also been incorporated into the study.

C. iii) Traffic Projections

The impacts of Pettengill Road on the study area corridors were generally quantified based on a comparison of operating characteristics for Build (assuming Pettengill Road is constructed) and No-Build (assuming Pettengill Road is not constructed) scenarios. The Build traffic projections were based on trip generation/distribution information from the 2004 Pettengill Road Traffic Study and from information from NHDOT used in the design of the MAAR. Data from these sources was used to distribute the trips generated by Pettengill Road and surrounding lands onto the regional roadway network and study area corridors. Utilizing this methodology, 2025 Weekday PM peak hour turning movements and two-way volumes for the No-Build and Build scenarios were projected for the study area intersections and arterial segments. The next section of this report provides additional details on the methodology used to develop traffic projections for each of the study area corridors. Additional information related to community-wide Build-Out scenarios has been completed as separate projects for the CTAP communities.

C. iii) a) Bedford

Traffic projections for the South River Road corridor in Bedford were based on information received from the Town that included data from the US 3 Corridor Access Management Plan and traffic impact studies completed for proposed developments on the corridor. Information developed by NHDOT to design the MAAR interchange with South River Road was also used to develop projections for the Bedford corridor. Turning movements to/from the intersections on the northern portion of the South River Road corridor were adjusted to account for changes in travel patterns resulting from the construction of the MAAR interchange with South River Road. The 2025 Weekday PM peak hour traffic projections for the No-Build and Build scenarios for the Bedford corridor are shown in Figures 3 and 4. Additional information related to the development of all 2025 No-Build and Build Weekday PM peak hour study area traffic projections can be found in the Appendix that accompanies this report.

C. iii) b) Manchester

Projections for the Brown Avenue corridor in Manchester were based on information received from the City and from traffic impact studies completed for proposed developments in the area. Projections from the SNHPC regional travel demand model were also considered in the development of these volumes. The intersection turning movements and two-way arterial volumes included adjustments to account for changes in traffic patterns resulting from the completion of the MAAR. The 2025 Weekday PM peak hour traffic projections for the No-Build and Build scenarios for the Manchester corridor are shown in Figures 5 and 6.
Figure 3

2025 NO-BUILD TRAFFIC PROJECTIONS
Pettengill Road/ Airport Access Road Transportation- Land Use Study