# FRENCH BROAD RIVER
METROPOLITAN PLANNING ORGANIZATION

A PROGRAM OF LAND OF SKY REGIONAL COUNCIL


# Appendix F: Related Plans:

## Congestion Management Process

## I. Prelude

The Congestion Management Process (CMP) for the French Broad River MPO was completed in December of 2010. Since that time, no major projects were built in any of the identified congestion management hot spots. In addition, the Transportation Demand Management (TDM) program at the City of Asheville was cut during the economic slump in 2011-2012. Since economic conditions are just returning to their pre-recession levels, this program is still valid for the 5 year update, with the following note: the Land of Sky Regional Council and the French Broad River MPO have agreed to fund a part-time TDM Coordinator position, , with state funding serving as a . The remainder of this document is adopted from the 2010 Congestion Management Program.

## II. Executive Summary

The transportation system of Western North Carolina has historically been defined by the paths taken by the rivers and streams within the region. Even as modernization of technological approaches and construction techniques has occurred, the geographic constraints presented by the mountains and their valleys still represent major challenges to developing an efficient multi-modal transportation system. Over the past century the network of major transportation corridors has remained confined to a finite number of areas suitable for system development. These networks have primarily followed the course of the French Broad River, the Swannanoa River, Hominy Creek and the Pigeon River.

> ***"A river is not only a highway in itself, but frequently it also provides, like the ancient buffalo trails and Indian traces, the route of least resistance and marks the way for thoroughfares to follow."***
>
> **-Wilma Dykeman**

These constraints, combined with a lack of opportunities for a gridded street system or parallel routes, can lead to the creation of congestion that is disproportionate when compared to other regions in the United States with similar populations. These constraints, however, also offer unique opportunities to provide more effective, sustainable, and context-sensitive corridor strategies and alternative transportation systems to manage congestion and operate the system in a more efficient manner if appropriate policies are adopted and implemented by city and county governments and the North Carolina

Department of Transportation, with guidance and support from the French Broad River Metropolitan Planning Organization (FBRMPO).

These opportunities are identified, in part, through the development of the Federally-mandated Congestion Management Process (CMP) for the region, which is also included in summary as part of the 2035 Long-Range Transportation Plan. By incorporating methods for addressing congestion that transcend the historical reaction to add capacity to the system by providing more lane miles, a CMP for FBRMPO can address the unique features of the region while respecting the environment and improving quality of life for its inhabitants.

Corridors constructed in the first half of the 20th Century to connect major towns and communities within Western North Carolina resulted in their names reflecting their destination – Hendersonville Road, Asheville Highway, Haywood Road, Charlotte Highway, Brevard Road, Greenville Highway, Leicester Highway and Weaverville Highway. These early connectors formed the backbone of the primary transportation system and many were designated and continue to be part of the state and national highway system, which is reflected in their designation as North Carolina and United States highways.


***Corridors such as US 25 and US 25A follow the course of the French Broad River from Hendersonville to Asheville.***

These corridors were originally low volume two-lane roads, reflected in what remains of historical housing development patterns where prominent and affluent residents desired a location along one of these highways to showcase their wealth and standing in the community. As the communities connected by these corridors grew, along with manufacturing in the region, increased traffic congestion necessitated either a widening of the existing roads or construction of parallel routes. Federal government initiatives such as the Interstate Highway System and Appalachian Development Highway System also influenced construction of new or wider corridors.

The transportation system, which is one driver of regional growth

patterns, projects a radial pattern of land use along these river beds and historic corridors. The region, inclusive of urban areas in Buncombe, Henderson and Haywood County spreads out in a star-like pattern. From a congestion perspective, the geography of the region and resulting transportation network and high traffic areas reflect the nature of the rivers and tributaries. Congestion along these corridors occurs for the same reasons that lead to flooding within river basins – too much volume feeding a corridor with limited carrying capacity.

There are few opportunities for parallel or complementary arterial and collector systems, and steep slopes and ridgelines have prevented connectivity between major corridors except at high-capacity nodes (e.g. junctions of I-240, I-26 and I-40). An example of the travel demand for such major connectors is the commuting section of the Blue Ridge Parkway between US 70 – Tunnel Road and NC 191 – Brevard Road, which is the only roadway in the region that connects existing roadways outside of the existing radial corridor system but is not intended to serve such a function.

**Table 1: Typical Level-of-Service Descriptions**

| LOS | Description | Speed (mph) | Flow (veh./hour/lane) | Density (veh./mile) |
|---|---|---|---|---|
| A | Traffic flows at or above the posted speed limit and all motorists have complete mobility between lanes. | Over 60 | Under 700 | Under 12 |
| B | Slightly congested, with some impingement of maneuverability. Two motorists might be forced to drive side by side, limiting lane changes. | 57-60 | 700-1,100 | 12-20 |
| C | Ability to pass or change lanes is not assured. Most experienced drivers are comfortable, and posted speed is maintained, but roads are close to capacity. This is often the target LOS for urban highways. | 54-57 | 1,100-1,550 | 20-30 |
| D | Typical of an urban highway during commuting hours. Speeds are somewhat reduced, motorists are hemmed in by other cars and trucks. | 46-54 | 1,550-1,850 | 30-42 |
| **E** | **Flow becomes irregular and speed varies rapidly, but rarely reaches the posted limit. On highways this is consistent with a road over its designed capacity.** | **30-46** | **1,850-2,000** | **42-67** |

| | | | | |
|---|---|---|---|---|
| F | Flow is forced; every vehicle moves in lockstep with the vehicle in front of it, with frequent drops in speed to nearly zero mph. A road for which the travel time cannot be predicted. | Under 30 | Unstable | 67-Maximum |

The concentration of transportation demand within a limited number of corridors represents an opportunity for the region to address congestion through several different management alternatives, particularly at a time when resources are scarce, NCDOT has altered policies to improve roadways within the region only when their performance declines to a Level of Service of "E" (refer to Table 1), and construction technologies are still not able to overcome the area's geography.

The resulting concentration of land development along these major corridors and their "tributaries" offers an opportunity to address congestion through management and operations and build capacity through other means. It can promote greater public transportation usage (and connectivity to the transit system); more effective implementation of Intelligent Transportation Systems along non-Interstate highways; transportation demand management programs and incentives; and strategic improvements to operations at major intersections.

### *The Congestion Management Process in Metropolitan Transportation Planning*

In 2006, then Transportation Secretary Norman Mineta announced congestion as one of the largest threats to the U.S. economy and began focusing more resources and time on congestion relief efforts. Out of this grew the Urban Partnership Agreements in 2007, which gave five major cities the opportunity and funds to implement tolling, transit, telecommuting, or technology as a means to reduce congestion on heavily traveled corridors. Efforts like these have produced an array of tools in the Federal Highway Administration's (FHWA) congestion toolbox, including: improved service on existing roads; pricing; additional capacity; better work zones; travel options; and traveler information.


Figure 1. Eight-Step FHWA CMP Approach

Also in 2007, the most recent transportation bill, the Safe Accountable Flexible Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU), was reauthorized and made several changes to the planning requirements for metropolitan planning organizations (MPOs). Of those was the requirement for Transportation Management Areas (TMA) - MPOs over 200,000 in population - to have a Congestion Management Process (CMP) that followed an eight-step method for identifying the causes and locations of congestion at the regional level and then incorporating mitigation goals and strategies into their plans. To make this process meaningful, it helps to have collaboration and consistency among the various plans in a region, including local land use plans, transit plans, bicycle and pedestrian plans, downtown plans, and more. Figure 1 outlines the eight-step approach as defined by FHWA and notes the areas within the FBRMPO CMP that address each step.

In 2009, new direction by the Federal government resulted in the Interagency Partnership for Sustainable Communities between the United State Department of Housing and Urban Development (HUD), the U.S. Environmental Protection Agency (EPA) and U.S. Department of Transportation (DOT) where key principles include enhancing "the unique characteristics of all communities by investing in healthy, safe and walkable neighborhoods – rural, urban or suburban" and developing livability measures and tools. It is advisable for MPOs to follow the lead of the Interagency Partnership when developing performance measures and evaluating projects for inclusion in the LRTP and TIP.

Prior to the 2000 Census, the MPO for the Asheville metropolitan area consisted of Asheville, Buncombe County (urban portions), Biltmore Forest,

Black Mountain, Montreat, Weaverville, Woodfin, and the Town of Fletcher in Northern Henderson County. As a result of the Census, the MPO area picked up all of the jurisdictions in Haywood and Henderson Counties, bringing the population to 323,000, thus making it a TMA and becoming the French Broad MPO (FBRMPO), a name that better reflected the region. At the time of this designation, MPOs were operating under the planning requirements in the Transportation Equity Act for the 21st Century (TEA-21).
This transportation bill required TMA's to have a Congestion Management System (CMS) "that provides for effective management of new and existing transportation facilities eligible for funding." (*Title 23 – United States Code*). Under this requirement, the FBRMPO convened a CMS Work Group, made up of members from their Transportation Advisory Committee, Technical Coordinating Committee, and members of the community to craft and then eventually adopt (on February 19,2004), the *French Broad River MPO Congestion Management System Plan*.

The Plan laid the groundwork for identifying specific congestion points, air quality and quality of life considerations, particular strategies to mitigate the problems, and ways to measure their success. In particular, the CMS Work Group came up with six strategies to reduce local and commuter traffic including, the development of a transportation demand management (TDM) program, development of mitigation measures for congestion during the I-26 construction (10 year project), implementation of a city-wide signalization upgrade, development of local transportation plans, reflection of congestion projects in the short range planning document (TIP) and Priority Needs List, and development of a long range approach to managing congestion. Although, the TEA-21 federal language put the focus of CMS planning on physical capacity improvements, which is reflected somewhat in the listed TIP projects from the CMS (new and additional lanes projects), the FBRMPO did incorporate other types of strategies into their plan, which should make the transition to the CMP requirements in SAFETEA-LU easier.

As mentioned above, in 2007 SAFETEA-LU changed the requirements of the CMS, making it the CMP. The most notable differences are the emphasis on an objectives driven, multi-modal approach and the strong focus on management and operations as a means to manage and reduce congestion. The formal definition of the CMP, pulled from *An Interim Guidebook on the Congestion Management Process in Metropolitan Transportation Planning*, states it is "…a systematic approach, collaboratively developed and implemented throughout a

metropolitan region, that provides for the safe and effective management and operation of new and existing transportation facilities through the use of demand reduction and operational management strategies."

The essential elements of CMP include:

- Measuring multi-modal transportation system performance;
- Identifying the causes of congestion;
- Assessing alternative actions;
- Implementing cost-effective actions;
- Considering management and operations strategies; and
- Evaluating the effectiveness of implemented actions.

### *Planning History & Transportation Services Summary*

A review of documents adopted within the region and relevant to the Congestion Management Process were identified and reviewed for potential guidance of the final document and the LRTP. These documents were compiled from various municipal sources as well as FBRMPO. These documents are used to inform the process and document past planning decisions that may impact the menu of congestion management options for hot spots or corridors. Transportation service providers and the basic features of their services are also summarized for the CMP, including city and county transit services and private transportation providers.

Key documents reviewed for the CMP include:

- French Broad River MPO Congestion Management System Plan;
- City of Asheville – Final Transit Master Plan;
- Asheville Regional ITS Deployment Plan;
- Western Regional ITS Deployment Plan;
- French Broad River MPO – Transportation 2030 (LRTP);
- Asheville Downtown Master Plan;
- Coordinated Public Transportation & Human Services Transportation Plan; and
- French Broad River MPO Comprehensive Transportation Plan.

***Vision & Goals Established for the LRTP and CMP***

Using the vision established through *Transportation 2030: The Multi-Modal Long Range Plan for Buncombe, Haywood, and Henderson Counties* as a basis, FBRMPO established a refined set of goals and objectives to support this vision as part of the LRTP update and CMP development process.

Visioning is a technique whereby a community or region identifies and determines, in a broad context, what it wants to become. A shared community vision can provide clarity to a planning process, and having a vision generally makes it easier to implement action planning initiatives.

The vision developed for the 2040 plan is:

**"The FBRMPO will promote a safe and efficient transportation system that increases transportation options and enhances the environment and livability of the region through a well-integrated roadway, transit, rail, pedestrian, and bicycle network."**

To support this vision, the TCC and TAC identified the following goals for the region:

- *Goal #1: Prioritize the maintenance of existing facilities;*
- *Goal #2: Plan for and construct a regional public transportation system;*
- *Goal #3: Integrate quality of life into planning, project design & decision-making;*
- *Goal #4: Promote regional connectivity & character;*
- *Goal #5: Emphasize project delivery, project design & impact analysis;*
- *Goal #6: Consider and involve all users of the transportation system at a regional, municipal & neighborhood level; and*
- *Goal #7: Develop methods for managing congestion on existing corridors.*

Two additional goals were added by the TCC and TAC for purposes of conducting the Long Range Transportation Plan. They are:

- *Goal #8: Increase safety and security for all modes of transportation.*
- *Goal #9: Promote livable communities that feature access to affordable housing, more transportation options, and lower transportation costs while protecting the environment.*

It is anticipated that these goals and the specific objectives identified for each will form the basis of ongoing collaboration among FBRMPO, municipal and county governments, and NCDOT during future planning efforts and project development. The onset of performance measurement standards being established through federal transportation reauthorization will likely change the manner in which most MPOs conduct project selection through the development of the LRTP and TIP. The goals and objectives, which should be revisited during major updates of regional planning efforts, can guide FBRMPO in the establishment of these performance measures to help guide project prioritization and programming decisions, as well as recommend components of the annual UPWP outside of the elements required by law and NCDOT.

### *Congestion & Hot Spot Analysis*

The identification of congested hot spots within the French Broad River region is the principal feature of the Congestion Management Process and is intended to guide future decision-making, not only at the project level, but through the institution of planning decisions and municipal policies that address congestion management through the subdivision review and development process.

Through feedback from stakeholders through focus groups throughout the region, combined with technical analysis from transportation planners, the travel demand model and floating car studies, a list of congestion hot spots was identified for each of the counties within the current MPO boundaries.

Focus groups in Buncombe, Henderson, and Haywood Counties were organized to identify current and future congested corridors and potential solutions within the MPO boundaries, with participants consisting primarily of county and municipal planning and management staff as well as elected officials, NCDOT Division 13 and 14 representatives, business interests and citizens.

The input gathered during these focus group sessions, as well as through a preliminary analysis of the travel demand model and unique characteristics of various corridors throughout the region, have yielded a preliminary list of corridor typologies that will form the basis of the types of planning and policy, operational, and infrastructure improvements that can collectively form a congestion management strategy on a corridor-by-corridor basis.

Table 2 identifies corridor typologies based on land use and development features as well as transportation function. With guidance from the focus groups, who were asked to identify congested locations, prioritize them, and then identify up to three congestion management strategies for each, the following list has resulted.

### *The Drive to Get Better: Measuring Performance and Planning*

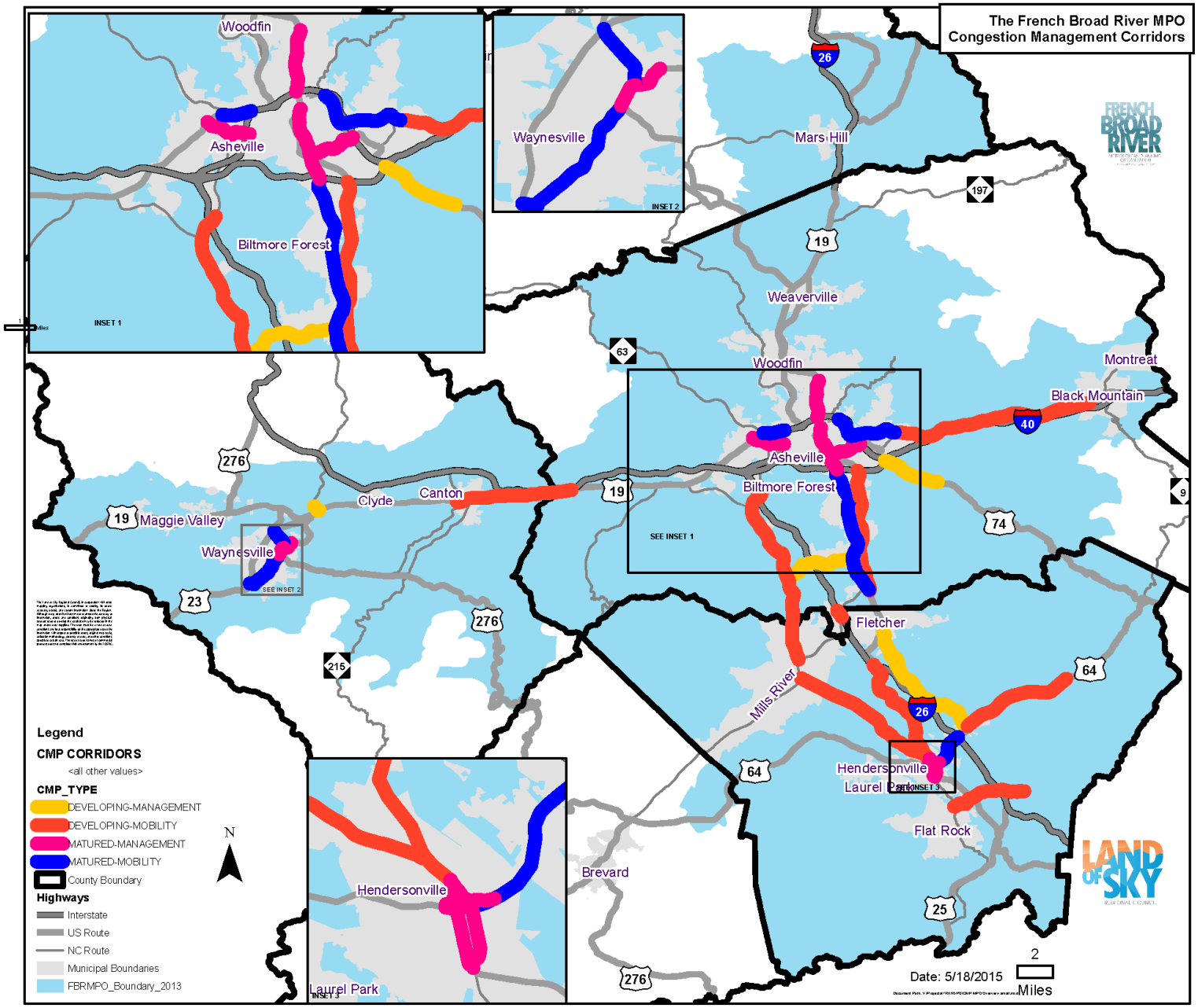
Metropolitan Planning Organizations and state departments of transportation have long had to measure their performance, typically against federal and state law. Additional project considerations are embedded in state policies and even in adopted policies of the MPO itself. Most MPOs have developed project priority systems and processes that measure the performance of individual projects in terms of meeting individual goals like safety, traffic flow, pedestrian or bicycle friendliness, or creating a higher mode share for public transportation.

However, prioritization is not performance. Performance must be measured as a *change over a period of time*; for MPOs, the periodicity of performance normally equates to the quadrennial update cycle of the metropolitan

transportation plan (MTP). Through the CMP, potential performance measures have been identified as the starting point for FBRMPO to consider incorporation of such metrics into future TIP and LRTP development. Suggest measures include:

- **Mobility:** Measured in percent increase in AADT and transit ridership.
- **Safety:** Measured as reduction in auto accident severity and reduction in accidents by mode of travel (ped/bike)
- **Community Cohesion / Connectivity:** Measured in average block length, travel time in minority/low income populations, to schools, employment centers and shopping centers.
- **MPO Effectiveness:** Measured in attendance at public meetings equal or greater than percentage population increase, as well as comments received and logged.

These values and criteria should be reviewed every two years at a minimum, not only to assess progress towards measuring the MPO's performance, but also to ensure that the criteria and targets remain valid. Many MPOs consider this review a type of "report card" that measures the progress of the MPO in a simple format.


The French Broad River MPO
Congestion Management Corridors
Woodfin
Asheville
Biltmore Forest
INSET 1
Waynesville
INSET 2
Mars Hill
Weaverville
Montreat
Black Mountain
Woodfin
Asheville
Biltmore Forest
SEE INSET 1
Clyde
Canton
Maggie Valley
Waynesville
SEE INSET 2
Fletcher
Mills River
Hendersonville
Laurel Park
INSET 3
Flat Rock
Brevard
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County Boundary
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Interstate
US Route
NC Route
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| Transportation Function | Land Use / Development: Matured | Land Use / Development: Developing |
|---|---|---|
| Mobility | *A matured, mobility corridor is one that has experienced near build-out conditions from a land use standpoint, but is still recognized as a critical need to move people through the region. Methods for addressing congestion can include: increased transit services; ITS; dedicated transit right-of-way; strategic intersection improvements; ped-bike improvements; incremental requirements of new or infill development; including TDM and connectivity.*<br><br>**Buncombe County**<br>US 19-23-Patton Av, I-240 to NC 63<br>US 25-Hendersonville Rd, I-40 to NC 280<br>US 70-Tunnel Rd, Tunnel to Riceville Rd<br><br>**Haywood County**<br>US 276-Russ Av, US23-74 to US 23 Business<br>US 23B-S. Main, US 276 to Hyatt Creek Rd<br><br>**Henderson County**<br>US 64-Four Seasons, I-26 to King St. | *A developing, mobility corridor is located in an area currently experiencing or expected to experience rapid growth and is a vital link in the mobility of the region's population. Methods for addressing congestion can include: capacity improvements along the corridor; access management / frontage roads; corridor preservation; increased or new transit services; ITS, intersection improvements; ped-bike facilities; TDM requirements on new development.*<br><br>**Buncombe County**<br>I-26 and NC 280 Interchange<br>NC 191 Brevard Rd, I-26 to NC 280<br>US 70, Riceville Rd to Black Mountain<br>US25A Sweeten Crk, I-240 to NC 280/US 25<br>**Haywood County**<br>US 19-23, NC 215 to Buncombe County<br>**Henderson County**<br>NC 191, NC 280 to Main St<br>Upward Rd, I-26 to NC 225<br>US 25 Business, I-26 to Main St<br>US 64, Mills Gap Rd to I-26 |
| Management | *A matured, management corridor is secondary for regional mobility and is built-out in terms of land development. Congestion may be acceptable along these corridors or at intersections to encourage walkability and livability and could include: relaxed LOS standards. Methods for addressing congestion include: increased transit services; ITS; ped-bike improvements; requirements of new or infill development, including TDM.*<br><br>**Buncombe County**<br>Biltmore Av., Downtown to I-40<br>Haywood Rd, Westwood Pl to US 19-23<br>Merrimon Av., Elkmont to I-240<br>NC 81 Swannanoa River Rd, US 25 to US 70<br><br>**Haywood County**<br>US 23B-S. Main, Walnut St to Pigeon St<br><br>**Henderson County**<br>Church/King/6th/7th, Downtown Hendersonville | *A developing, management corridor is secondary for regional mobility but has opportunities to improve congestion on the mainline or parallel corridors as the area develops. Development will occur but congestion may be acceptable during certain times of the day. Methods for addressing congestion include: strategic intersection improvements; access management; increased or new transit services; ped-bike facilities; ITS; TDM requirements on new development.*<br><br>**Buncombe County**<br>NC 146 Long Shoals Rd, US 25 to NC 191<br>US 74 Charlotte Hwy, I-240 to Cedar Mtn Rd<br><br>**Haywood County**<br>US 19-23-74 & NC 209 interchange<br><br>**Henderson County**<br>Howard Gap Rd, US 64 to US 25 |

### *Next Steps*

FBRMPO is tasked each year with meeting Federal requirements for TIP, CMP, UPWP and LRTP development as well as updates to reflect changes in project status, funding and priorities. Additional tasks are assigned to FBRMPO through NCDOT's role in MPO oversight across the state. The combined efforts of these requirements can present a strain on the abilities of MPO to address issues and needs not tied to these core functions. It is important, however, to begin work toward implementation of tasks identified in these efforts that can allow the MPO to respond more effectively to its member governments and meet the requirements established by the Federal government and NCDOT. The next steps outlined in the CMP are intended to be a short summary of actions that can be taken by FBRMPO over the next one to three years to incorporated the findings of the CMP in their planning efforts, project input to NCDOT, and assistance to local governments in establishing polices related to managing congestion and promoting regional stability. Details of these recommended next steps are included in the full report and include:

- Pursue MPO Policy Updates to Reflect CMP and LRTP Goals & Objectives;
- Refine List of Performance Measures for Implementation;
- Determine Level of Effort for Developments of Regional Significance;
- Develop an Activity-Based Travel Demand Model for Seasonal Variations;
- Evaluate all TIP Projects for CMP-related Components; and
- Regular Data Collection and Updates.

### *Data Collection*

The FBRMPO Congestion Management Process relies on data collected through in-the-field analyses aimed at identifying corridors and intersections within the region that are experiencing congestion during routine traffic conditions and areas that may be more conducive to promotion of alternative modes of transportation to help alleviate congestion. Other data efforts include analysis of the travel demand model and integration of pertinent alternative transportation counts.

The major data collection efforts include:

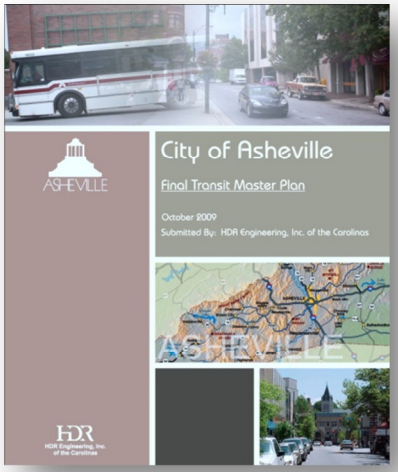
- **Vehicle Occupancy Counts,** consisting of occupancy rate tallies at major gateways to existing employment and activity centers throughout the region and collection of vehicle occupancy data during the AM or PM peak hour.
- **Pedestrian & Bicycle Counts,** as conducted through volunteers from the Asheville Pedestrian & Bicycle Task Force in September 2009 at more than 50 locations throughout Buncombe County. It is recommended that FBRMPO organize counts for other counties within the region during upcoming dates in September 2010.
- **Floating Car Studies,** whereby major corridors within the region are driven during free flow and peak hour conditions to calculate a comparative ratio of travel times during these periods. The hot spots identified through the focus groups will be of primary importance, although other corridors will also be tallied for continue tracking and maintenance of the CMP.

## III. Planning History & Transportation Services Summary

A review of documents adopted within the region and relevant to the Congestion Management Process were identified and reviewed for potential guidance of the final document and the LRTP. These documents were compiled from various municipal sources as well as FBRMPO.

**French Broad River MPO Congestion Management System Plan (2004).** The Congestion Management System Plan (CMS) was a federal requirement under the Transportation Equity Act for the 21st Century (TEA 21), but was updated under the last transportation bill (SAFETEA-LU) to reflect more of a systematic approach to congestion management. It is now called the Congestion Management Process (CMP) and has different requirements that the CMS. However, the CMS Plan for the French Broad River MPO includes several building blocks for their future CMP planning. The MPO instituted a CMS Work Group, made up of members from the Technical Advisory Committee (TAC), the Technical Coordinating Committee (TCC), and community members from the three county metropolitan region. This group was tasked with: working with the NC DOT division offices to identify the congested areas of concern in each county, collecting data to establish performance measures, evaluate and review the CMS progress, prepare an annual report, and guide CMS implementation. In the three-county region, priority areas were spelled out by project and particular attention was paid to a 10-year project on the popular I-26 corridor.

Four performance metrics were identified to measure congestion and establish system performance by location/mode, including volume to capacity ratio, accident rates, traffic counts and turning movements at critical intersections, and transit use. The MPO also laid out specific approaches for collecting data, strategizing on congestion relief efforts (including the potential implementation of a Transportation Demand Management (TDM) Program), monitoring progress, and setting a timeframe for next steps. The last paragraph of the CMS reads, "By January of 2005, the FBRMPO should have solidified its CMS as a continuing process…," which segues nicely into the development of the Congestion Management Process.




***The Asheville Transit Master Plan can help FBRMPO identify which corridors can be considered for increased service that address congestion and provide for the needs of dependent riders.***

**City of Asheville – Final Transit Master Plan (2009).** The French Broad River MPO (FBRMPO) Congestion Management System Plan (CMS) from 2004 identifies transit use as one of its performance metrics for measuring mobility. The Transit Master Plan examines the existing levels of bus service and lays the framework for the next 10 years of mobility for Buncombe County, one of the three counties that the FBRMPO serves. The overall goals of the Plan that could also ease traffic congestion include: more frequent service on the main travel corridors, marketing to choice riders, improving service for captive riders, and making transit part of the community lifestyle. The report goes into specifics about the existing services and concerns over these services, including on-time performance. Also included is a section on major requested changes – infrequent service was one of the biggest reasons for people not taking public transit.

This report consists of valuable data on population (growth and decline) in the various municipalities, demographic information, major employers, boarding and alighting counts, rider surveys, and ridership trends. The Plan also looks at transit propensity to see what segments of the County would be more or less inclined to take transit. The information, based on density and employment within different blocks of land will be updated in the 2010 Census and should be included in future project evaluation for FBRMPO. This information will be helpful for land use planning, since higher housing densities and employment clusters per acre increase the use of mobility options such as walking, bicycling, and transit ridership.

**Asheville Regional ITS Deployment Plan.** The purpose of this plan was to incorporate the regional ITS strategies from the Asheville region (defined as parts of Buncombe and Henderson Counties) into a statewide plan that addressed the immediate and long-term transportation needs of the state. This Plan went heavily through the background of ITS and ITS Architecture from the ISTEA and TEA-21 era – there was not any updated information from SAFETEA-LU. Based on a robust stakeholder involvement process to inform the regional ITS plans which fed directly into the statewide plan, there were 30 transportation needs identified, but traveler and tourist information, and weather and road conditions were considered the most urgent issues in Asheville. There is a relevant section

that summarizes the short and long term technology recommendations that support the deployment of ITS in the region. The short-term (2000 - 2006) technologies include: IMAP Management Plan, Highway Fog Warning System, Automatic Vehicle Location (AVL) for Transit, HAR, and Website. The long-term (2006 - 2011) technologies include: Transit System Expansion, DMS, and Kiosks. How each of these can be implemented in the region and the cost associated with each of them (most likely out-dated by now) is also spelled out in this section.

**Western Regional ITS Deployment Plan.** The purpose of this plan was to incorporate the regional ITS strategies from the Western Region (encompassing 27 rural counties) into a statewide plan that addressed the immediate and long-term transportation needs of the state. This Plan went heavily through the background of ITS and ITS Architecture from the ISTEA and TEA-21 era – there was not any updated information from SAFETEA-LU. Based on a robust stakeholder involvement process to inform the regional ITS plans, which fed directly into the statewide plan, there were 30 transportation needs identified, but safety improvements, congestion/mobility/traffic management, advanced traveler information, and provider Information were considered to be the key program areas for the Western Region. There is a relevant section that summarizes the short and long term technology recommendations that support the deployment of ITS in the region.

The short-term (2000 - 2006) technologies include: Traveler information kiosks (via partnerships with ISP/kiosk vendor), Truck safety on mountain grades, Web-based mapping and route identification, Broadcast video and data (via partnerships with local television and cable stations), Internet travel information system enhancements for region (NCSMARTLINK), Interim traveler information clearinghouse, Traffic Operations Center (TOC) and information clearinghouse (Phase I), Portable changeable message signs, Road weather information systems (RWIS), and Transit dispatching, demand forecasting, and automatic passenger counting. The long-term (2006 - 2011) technologies include: TOC and ATIS (Phase II), Smart Cards, Voice Remote Access System (VRAS), Internet travel information system enhancements (Phase II for Western Rural NCSMARTLINK), Regional archived data warehouse, and Regional system integration. How each of these can be implemented in the region and the cost associated with each of them (most likely out-dated by now) is also spelled out in this section.

**French Broad River MPO – Transportation 2030 (LRTP) (2005).** As a result of the 2000 Census, the former Asheville Area MPO expanded in size and complexity, growing from one to three counties, and changing its name to the French Broad River MPO. This plan was developed under TEA-21 requirements, not SAFTEA-LU. An interesting transportation dilemma lies within the topography of the area, which consists of river valleys and mountainous terrain. This makes road expansion to major corridors and the development of parallel routes, to ease congestion for automobiles, freight and public transportation, nearly impossible. The MPO is utilizing models and the 2000 Census data to maximize the use of current transportation assets and figure out where future development is optimal. The 12 areas that present the most concern for safety and congestion are mapped out for the MPO region. There are 10 primary policy objectives laid out and many of them relate to congestion strategies.

There is a strong desire to provide alternative mobility options such as increased transit (much of this information is utilized in the City of Asheville - Transit Master Final Plan), bicycling, and walking, enhance traffic flow on local roads through coordinated access points and turn lanes, improve automobile and freight movement on the interstates and expressways, utilize ITS strategies, identify transportation and land use opportunities for compact and mixed use development, and explore feasible TDM options such as carpool and vanpool. Based on the above objectives, the planning and institutional priorities that relate to congestion management include updating the Congestion Management System Report, continuing development of the travel demand model, and developing Comprehensive Transportation Plan (CTP) maps and GIS capabilities in order to depict a vision for all the various modes.

**Asheville Downtown Master Plan (2009).** The community vision, developed by various stakeholders within downtown Asheville, identifies numerous principles for making it a livable city. Principles such as: connectivity between downtown neighborhoods, clustering development of downtown employment centers, walkability, improved transit service, bike and pedestrian networks, and parking improvements can work individually or in unison to ease the amount of car traffic downtown as well as shape the linkage between land use (residential and commercial) and transportation options. In order to "Experience Downtown" it was identified that it is critical to have convenient choices for mobility to and from downtown as well as within it. Although the *City of Asheville – Final Transit Master Plan* was not incorporated into this plan (completed in October 2009), it does address

implementing the *2008 Comprehensive Bicycle Plan*, the *Asheville Pedestrian Thoroughfare Plan* and *Downtown Streetscape Plan*, and the *2008 Downtown Asheville Parking Study*.

**Coordinated Public Transportation and Human Services Transportation Plan (2008).** This plan is the result of three stakeholder meetings to identify the needs and the gaps in transportation services for people with disabilities, older adults, and people with low incomes. A complete inventory of transit assets and providers in the French Broad metropolitan area is listed. There is also detailed information on two funding programs and examples of how those funds can be spent – these include the Job Access and Reverse Commute (JARC) Program and the New Freedom Formula Grant Program. Some of the needs, gaps, and barriers identified in the stakeholder meetings that could hinder transit mobility and need to be addressed include: limited service hours, repairs around pathways to and from bus stops (including pedestrian street crossing facilities), lack of travel between counties, increased travel training and coordination, paratransit availability during all the times fixed route service is available, inability to afford fares, poor bus stop placement (including location of stops in relation to destinations), and expansion of allowed trips (beyond trips to medical offices, food stores, senior centers, etc) .

**French Broad River MPO Comprehensive Transportation Plan (2008).** This plan was developed for the metropolitan areas covered by the MPO and the rural areas of Buncombe and Haywood counties. Based on analysis from transportation models (including work done for *Transportation 2030*) and identified needs from planners and the public, three broad transportation recommendations were made in this plan, including, the Highway Map, Public Transportation and Rail Map, and the Bicycle Map. Maps in each of the three areas show the existing infrastructure, all of the areas that need improvement, and the highest priority areas for improvements in Buncombe, Haywood, and Henderson Counties. The goal of this plan is to coordinate all the existing and future transportation needs for the entire region.

### *EXISTING SERVICES and PROGRAMS*

- **Asheville Transit.** Managed by the City of Asheville through a third-party operator, Asheville Transit provides transportation within the City of Asheville and the surrounding area, including downtown, the hospitals, schools, malls, universities and residential areas. ATS currently operates 23 fixed routes six days a week including evening services. The system is currently configured as a hub-and-spoke system, with service on each route originating and terminating at the downtown transit center. ATS offers fixed-route service within a quarter mile of 90% of households in areas of higher density, and about 75% of all households in the city.

  According to the National Transit Database for 2008, Asheville ranks among the top transit services in terms of passenger miles and unlinked trips among cities with similar service area populations (2008 figures for select cities shown in Table 3). These figures indicate a high propensity for transit patronage among the population. The total passenger miles of 6.1 million represents an increase of 65% since 1998.

**Table 3: Ridership Data for Transit Systems in Urbanized Areas of Similar Size to Asheville**
*(source: 2008 National Transit Database)*

| City / Urbanized Area | Service Area Population | Passenger Miles | Unlinked Trips |
|---|---|---|---|
| Logan, UT | 80,000 | 6,800,000 | 1,900,000 |
| Bloomington, IN | 70,000 | 6,300,000 | 2,800,000 |
| Portland, ME | 80,000 | 6,200,000 | 1,500,000 |
| ***Asheville, NC*** | ***73,000*** | ***6,100,000*** | ***1,500,000*** |
| Muncie, IN | 68,000 | 6,000,000 | 2,000,000 |
| Charlottesville, VA | 76,000 | 3,900,000 | 1,700,000 |
| Iowa City, IA | 67,000 | 3,800,000 | 1,800,000 |
| Albany, GA | 79,000 | 3,700,000 | 770,000 |
| Decatur, IL | 86,000 | 3,600,000 | 1,200,000 |
| LaCrosse, WI | 78,000 | 3,500,000 | 1,200,000 |
| Huntington, WV | 86,000 | 3,100,000 | 790,000 |
| Beaumont, TX | 82,000 | 3,000,000 | 640,000 |
| Eau Claire, WI | 69,000 | 2,900,000 | 1,000,000 |
| Missoula, MT | 70,000 | 2,800,000 | 800,000 |
| Chico, CA | 87,000 | 2,700,000 | 830,000 |
| Santa Fe, NM | 76,000 | 2,300,000 | 680,000 |
| Panama City, FL | 85,000 | 2,000,000 | 420,000 |
| Battle Creek, MI | 83,000 | 1,800,000 | 480,000 |
| St. Joseph, MO | 74,000 | 1,700,000 | 360,000 |
| San Angelo, TX | 87,000 | 850,000 | 150,000 |
| Rapid City, SD | 66,000 | 890,000 | 240,000 |
| Springfield, OH | 74,000 | 750,000 | 450,000 |
| Spartanburg, SC | 70,000 | 250,000 | 530,000 |
| **Average** | **77,000** | **3,258,261** | **1,000,000** |

- **City of Asheville's Transportation Demand Management program.** Communities utilize transportation demand management (TDM) programs to encourage shared rides and other mobility alternatives to single occupancy vehicle commuting. The City of Asheville currently offers these strategies: The Passport Program, the Way to Go! Commuter Club, and the Emergency Ride Home program. Various TDM strategies (beyond the ones mentioned above) were identified in the *French Broad River MPO Congestion Management System Plan* and *Transportation 2030*.

- **Henderson County Apple Country Transit.** They provide subscription and dial-a-ride services, mainly for the transportation disadvantaged (elderly, disabled, young, etc.) in Henderson County. The service runs Monday through Friday from 6:45 am to 6:00 pm and offers individuals transport to place like the grocery store, counseling services, certain workplaces, the senior center, and medical appointments.

- **Buncombe County Mountain Mobility.** They provide demand-response service, subscription service, and deviated fixed-route service for the transportation disadvantaged (elderly, disabled, young, etc.) in Buncombe County. They also offer rides to medical appointments, nutrition sites, etc through their demand response and subscriptions services, but can provide deviated fixed-route service called, Trailblazer routes. These routes but can deviate off the fixed route by one-quarter mile to pick a passenger up from an address if the passenger is unable to get to the nearest street the bus runs on. In 2009, Mountain Mobility had 535 trips scheduled each day on average and a 93% on-time rate.

- **Transylvania County's TRANSPORT.** They provide an average of 152 trips a day in demand service primarily for the elderly, disabled, young, and Work First program individuals in Transylvania County. They run from 8:30 am to 5:00 pm, Monday through Friday and provide services to nutrition sites, schools, the grocery store, etc.

- **Madison County Transportation Authority.** They provide demand response service for all of the people in Madison County, coordinating through human service agencies and the general public. They are hoping to expand their services.

- **Haywood Public Transit.** They provide demand response service for individuals in Haywood County Monday through Friday from 6:00 am to 5:30 pm. Haywood Public transit is the result of several county agencies' consolidating their client transportation systems.

- **Carolina Vanpool, LLC.** This vanpool service is located in Alexander, NC and runs charter services, including point to point transportation service, school routes, group charters, contract services, and convention and airports 24 hours a day, seven days a week.

Additionally, the following companies provide private or human service transportation to citizens within the region:

| | | | |
|---|---|---|---|
| 360 Entertainment Transit, LLC | Diamond Executive Care Transportation Services | London Limo, Ltd. | Western Carolina Tours |
| A Touch of Class Limousine | Driving Miss Daisy Home | Marvels Upscale Transportation Service | The Wheelchair Taxi |
| Affordable Limos | Ecotrips | Medical Emergency Ambulance Transport | Young Transportation |
| Airport Ground Transportation | Elite Transportation Associates | Metro Cab | Your Cab II |
| Areawide Transportation & Taxi Inc. | Emma Bus Lines | Out "N" About | Your Transportation Service |
| Blue Ridge Limo | Euro Transport | Pegasus Transportation | |
| Candler Taxi | Flavjack Touring & Transport | Round-A-Bout Transportation Company | |
| Carolina Limousine & Transport | Green Transit | Runion Charters | |
| Checker Taxi Corporation | Greyhound Lines | Sky Shuttle Service | |
| Customer Inspired Services, LLC | J&J Cab Service | Special Occasions Limousine | |
| Cesar's Family Services | Jolly Taxi | Stacie's Personal Care Services | |
| Dee Williams & Co. | LaZoom Comedy Tours | Travel Professionals | |

## IV. Vision and Goals for the Congestion Management Process

As an integrated component of the Long Range Transportation Plan (LRTP), the Congestion Management Process utilized the existing vision established by the 2030 LRTP to jumpstart the identification of regional and corridor-specific goals and strategies. FBRMPO convened meetings of the agency's TCC and TAC in January 2010 for purposes of developing these goals and strategies and confirming the previously-established regional transportation vision.

Visioning is a technique whereby a community or region identifies and determines, in a broad context, what it wants to become. Creating a vision draws from where the region is now (*existing conditions*) and where it wants to go (*future directions*). A shared community vision can provide clarity to a planning process, and having a vision generally makes it easier to implement action planning initiatives. With the CMP intended to focus on more short-term management and operational strategies, the visions, goals and objectives established for the LRTP can be utilized to not only identify the type of major infrastructure changes within the context of the LRTP, but for interim and evolutionary approaches to identify solutions to congestion hot spots within the region.

The *Transportation 2030: The Multi-Modal Long Range Plan for Buncombe, Haywood, and Henderson Counties* included a visioning exercise with input from various stakeholders throughout the region. Both the TCC and TAC have determined that this vision should be maintained through the update of the LRTP and strengthened by development of new goals and objectives to fit this vision. The vision developed for the 2030 plan is:

> *The French Broad River Metropolitan Region will develop and maintain a safe and efficient system for the transportation of people and goods that is compatible with the unique social and environmental context of our western North Carolina counties and municipalities. The system will include a well-integrated and connected roadway, transit, rail, freight, pedestrian, and bicycle network and provide for the multiple use of rights-of-way. The system will also enhance the environment and livability of the area by providing an optimum level of service, choice, mobility, convenience and energy efficiency.*

The process to update the region's goals and objectives began with a context focus question based on the vision: "How should the region develop and maintain a safe and efficient transportation system that is compatible with the social and environmental context of western North Carolina?"

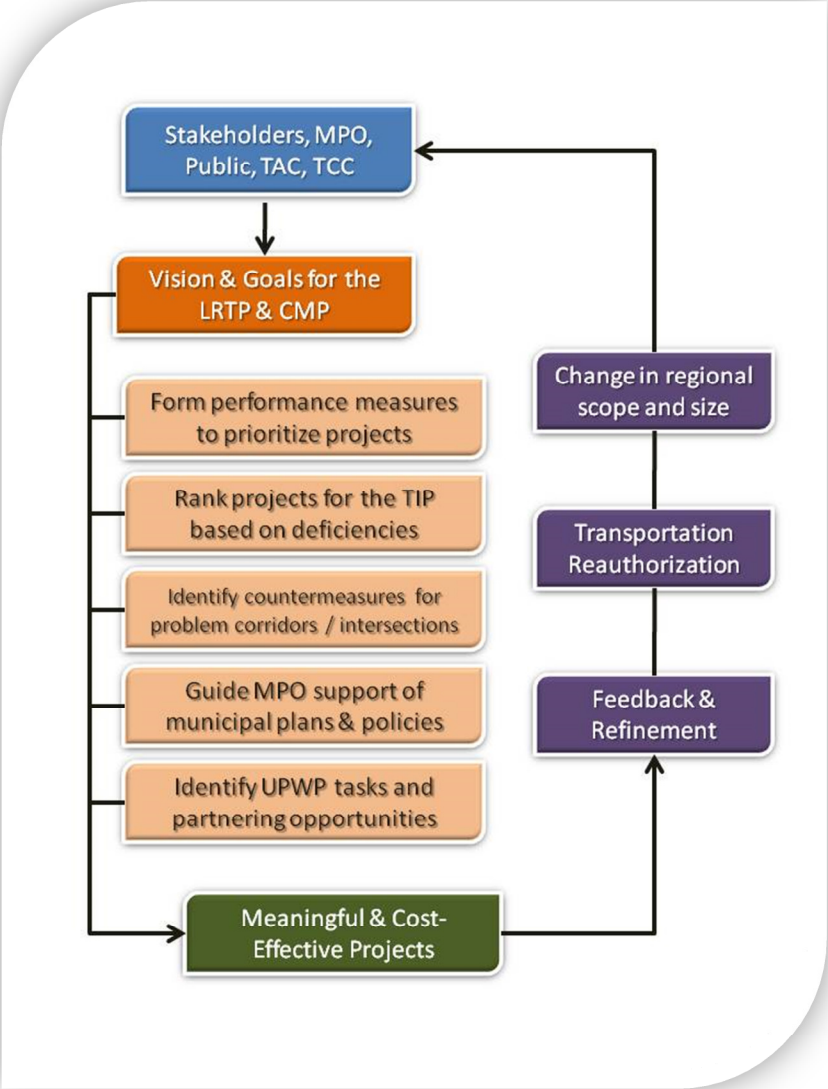



Figure 2: Incorporating Vision & Goals into Regional Transportation Planning

Following a visualization scenario relating to the focus question, participants in the TAC and TCC brainstormed goals-oriented components, organized these components by categorical relationships, named each categorical group, and lastly reflected about the results. The categories defined in the two separate committee settings had several common themes, as outlined below. Due to time constraints within the setting of the monthly TCC and TAC meetings, the results of the visioning exercise presented during the meetings have been expanded to include other goal- and objective-related ideas reflected in the individual responses of TCC and TAC members.

Continuing this process of involvement is critical, not just with MPO members, but with the interested public, planners, engineers, transit professionals, safety officials, and air quality experts. It is important to identify transportation projects and needs through the collection of data in areas such as: safety; travel reliability; accessibility; air quality; public transportation; road capacity; and environment. All of the above-mentioned stakeholders can contribute data as well as their local knowledge to help prioritize the most critical projects for inclusion in the TIP. Figure 2 shows one course that this continued involvement can continue to help influence transportation planning for the region.

By utilizing data as a means to rank projects, performance standards can be developed to demonstrate the benefits of each investment to the region. Potential projects that may need more data or research can be put into the UPWP and studies can be conducted

to determine the best ways to proceed. Through this inclusionary planning process by which projects are identified, developed, and prioritized, meaningful transportation work can proceed in the metropolitan area. Figure 1 outlines how the regional vision can also lend itself to other actions by the MPO within the context of its required duties stemming from Federal legislation as well as expectations from member agencies and the unique abilities that come with being a regional body.

**Major Themes**

To support the regional vision, FBRMPO has identified the following goals and objectives to achieve and address this vision.

| Goal #1 | Prioritize the maintenance of existing facilities. |
|---|---|
| Objectives | • Assure existing facilities are in a state of good repair before building new facilities;<br>• Identify creative methods for stormwater management and ditch maintenance;<br>• Conduct heavy maintenance on the region's critical infrastructure, such as its bridges, interstates, and overpasses;<br>• Upgrade maintenance programs for existing streets and sidewalks, particularly in residential areas;<br>• Research methods of rock fall containment to ensure regional and interstate mobility; and<br>• Allow for municipal agreements for maintenance of roadways in unincorporated areas along major NCDOT routes. |

| Goal #2 | Plan for and construct a regional public transportation system. |
|---|---|
| Objectives | • Improve the region's public transit system by connecting communities to key activity and employment centers;<br>• Plan for a system of multi-modal hubs throughout the region, including a system of park-and-ride lots;<br>• Design and construct a new central transit center to serve regional needs;<br>• Explore additional funding for public transportation;<br>• Integrate alternative fuel vehicles into transit fleets;<br>• Include bike lanes and greenways in the regional planning process;<br>• Improve pedestrian and bicycle safety around schools and other neighborhood centers;<br>• Encourage ridesharing activities such as carpool, vanpools, and HOV lanes; and<br>• Develop synergistic approaches tying public transportation to commercial and private capabilities. |

| Goal #3 | Integrate quality of life into planning, project design and decision-making. |
|---|---|
| Objectives | • Promote mixed-use and compact development patterns;<br>• Continually gather feedback from the public and other stakeholders for transportation improvements;<br>• Promote long-range planning at the local level;<br>• Plan for economic development;<br>• Make air quality a consideration in project design and planning;<br>• Identify how individual projects will promote livability;<br>• Research policies to promote billboard removal or down-sizing;<br>• Develop design alternatives to reflect downtown, urban, suburban and rural community needs and aesthetics; and<br>• Consider existing infrastructure needs when approving new housing developments. |

| Goal #4 | Promote regional connectivity and character. |
|---|---|
| Objectives | • Identify a strategic highway system for western North Carolina;<br>• Preserve existing rural and natural landscapes;<br>• Improve connectivity from outlying areas to central cities and regional activity centers;<br>• Work with state and Amtrak officials to encourage passenger rail connections to western North Carolina; and<br>• Evaluate projects from a regional perspective. |

| Goal #5 | Emphasize project delivery, project design and impact analysis. |
|---|---|
| Objectives | • View transportation improvements as a long-term financial investment;<br>• Projects should be designed and constructed in a timely manner;<br>• Consider the economic development and fiscal outcomes, both positive and negative, of projects;<br>• Streamline the project review process between the public, state agencies, municipalities and regulatory agencies;<br>• Design projects with appearance in mind;<br>• Construct water and sewer improvements concurrent with transportation projects;<br>• Work together to complete needed regional improvements; and<br>• Incorporate public art and other artistic elements into infrastructure design. |

| Goal #6 | Consider and involve all users of the transportation system at a regional, municipal and neighborhood level. |
|---|---|
| Objectives | • Promote citizen initiation of project ideas and concepts;<br>• Retrofit existing transportation facilities to include other modes;<br>• Include bike lanes and greenways in the regional planning process;<br>• Improve pedestrian and bicycle safety around schools and other neighborhood centers;<br>• Consider the needs of older citizens and those with special needs;<br>• Develop complete streets policies for municipalities, counties, the MPO & NCDOT;<br>• Work with NCDOT to identify additional funding for pedestrian & bicycle improvements;<br>• Enhance the regional trail system for pedestrian & bicycle connectivity between communities; and<br>• Ensure municipal policies and development standards require multi-modal improvements along transportation facilities. |

| Goal #7 | Develop methods for managing congestion on existing corridors. |
|---|---|
| Objectives | • Explore new materials and technologies for improving traffic flow;<br>• Understand that congestion is inevitable along some corridors and in some activity centers;<br>• Increase capacity on key growth corridors;<br>• Synchronize traffic signals on primary and secondary routes;<br>• Remove unwarranted traffic signals;<br>• Work with municipalities and NCDOT to develop access management policies on congested corridors;<br>• Consolidate driveways along commercial corridors through the development review and approval process and requirement of cross-access agreements;<br>• Construct medians as a method of managing access;<br>• Manage peak-hour traffic through promotion of alternative work hours, tele-work, and other methods;<br>• Strategically improve existing intersection by re-aligning crossing routes and eliminating offset intersections;<br>• Develop "no signal" solutions, such as connectivity and roundabouts, to reduce intersection delay; and<br>• Allow for construction along major corridor only during late night and off-peak hours. |

Additional goals added by TCC at March 18, 2010 Meeting

| | |
|---|---|
| Goal #8 | Increase safety and security for all modes of transportation. |

| | |
|---|---|
| Goal #9 | Promote livable communities that feature access to affordable housing, more transportation options, and lower transportation costs while protecting the environment. |

## V. Methods for Managing Congestion

One of the reasons many metropolitan areas of the United States are experiencing increased congestion is that design, policy and development approval decision-making favor only one method of addressing congestion: adding capacity to the system through the widening of corridors and intersections. In the French Broad River region, the ability to effectively address congestion through increased capacity is notably constrained by the natural environment. Because of this, it is important to implement policies and solutions that are tailored to the region's unique needs and circumstances. As noted previously, the terrain and environmental challenges of western North Carolina also provide an opportunity to address congestion through management and operations in a manner that may be more effective than in other cities with non-linear development patterns.

Through research and review of nationwide best practices and policies, the Federal Highway Administration (FHWA) acknowledged a deeper understanding of what impacts congestion and how it should be addressed when it published *An Interim Guidebook on the Congestion Management Process in Metropolitan Transportation Planning.* FHWA's goal in modifying its procedures for a CMP and publishing the guidebook were "to address congestion management through a process that provides for effective management and operations, an enhanced linkage to the planning process, and to the environmental review process, based on cooperatively developed travel demand reduction and operational management strategies as well as capacity increases."

Even after years of research in the development of technical procedures for assessing alternative congestion mitigation actions such as ITS, TDM, TSM and even basic traffic operational improvements, problems and difficulties still remain. To improve understanding of how actions affect congestion within the French Broad River region, specific strategies were developed for congestion hot spots identified through technical measures and the input and guidance from stakeholders within the region. The travel demand model will continue to be used by FBRMPO extensively in assessing the alternative congestion relief projects and will be a key component of the continued tracking of improvements as well as measures of effectiveness. However, the application of the model will require close coordination and planning for the development and running of the various congestion relief scenarios. Further, the model should be overused as a decision making tool as there are several inherent inaccuracies due to the nature of the model. It is only responsive to mainline corridor capacity improvements, which is only one of several methods identified in this section. The model should be used to inform decision

making as one of several criteria and project solutions aimed at identifying the most appropriate methods to manage congestion.

Within this section, methods for managing congestion are sorted into three categories, with specific strategies or practices outlined under each category.

### 1. *Planning & Policy Methods*

These methods reflect actions that should be taken by FBRMPO and its member agencies to help address congestion on a regionwide basis through the institution of policies and planning actions that are meant to guide decisions and practices that are related to congestion. These are not specific strategies assigned to a corridors, intersection or hot spots, rather they reflect a broader menu of options for municipalities and other regional stakeholders to undertake to help protect the existing investment in transportation infrastructure and identify potential problems before they arise and require more substantial – and costly – operational and infrastructure improvements.

**Multi-modal transportation system performance tools.** Historically, modeling-related performance measurements rely heavily on just three metrics: demand-capacity ratio, vehicle hours of delay, and person hours of delay. A host of performance measures should be considered and incorporated into future modeling practices by NCDOT and FBRMPO, including VMT, average travel speeds, lane-miles of congestion, development of localized volume/delay curves, and a travel time index (TTI, the ratio of peak period travel times compared to non-peak travel times).

The desire to include transit and bicycle/pedestrian performance measures should also be incorporated into the process as the traditional measures highlighted above do not take into consideration these system users. Measuring multi-modal transportation system performance has been a difficult task for many metropolitan areas due to diversity of the transportation system and lack of data. Through the use of existing data and development of the FBRMPO CMP, the first critical steps have been taken to incorporate this into the regionwide framework of transportation planning and decision-making. Further, incorporating pedestrian, bicycle and transit factors into the traditional four-step modeling process has proven to be ineffective in evaluating the true nature of these improvements. The model is based on capacity and the capacity of the system for pedestrian, bicycle and transit modes is rarely the true issue in small- and medium-sized urban environments. The institution of performance

metrics, particularly along the line of "Quality of Service" instead of "Level of Service" to move away from a capacity-based evaluation and toward metrics that identify user types, user needs and connectivity of the alternative transportation system.

Studies in the Puget Sound region by Lee and Moudon concluded with the identification of four land use and transportation factors associated with walking and reducing auto trips, measured as VMT per capita:

- *Density:* Residential units within 0.6 miles (1 km) of household;
- *Destinations:* Grocery stores, restaurant, retail, schools nearby;
- *Distance:* Length of travel route to key destinations; and
- *Route:* Smaller blocks, more prevalent sidewalks (measures may include % of 4-legged intersections and % sidewalk completion along streets).

The combination of these factors can have as much as 35% reduction in person miles traveled, the majority of which is undertaken by the predominant mode: auto (either as drive-alone or shared-ride).[1]

Most recently, the *Driving and the Built Environment* report summarizes evaluation of previous studies and conducts new sensitivity analysis of land use and transportation factors influencing VMT and energy use and $CO_2$ emissions. The report introduces a new term, the "five D's" which are meant to define land development patterns describing the built environment. The "five D's include:

- *Density:* Population and employment per geographic unit;
- *Diversity:* Mix of land uses and the degree to which they are balanced within an area;
- *Design:* Neighborhood layout and street characteristics, particularly connectivity (and other design features);
- *Destination accessibility:* Convenience of trip destinations from point of origin; and
- *Distance to transit:* Ease of access to transit from home or work.

The study summarizes past research relating VMT and the built environment which indicate widely varying results due to inconsistent measurements, scale and control on variables. New land use/transportation modeling is

[1] Lee C., and A. Moudon., The 3D's + R: Quantifying Land Use and Urban Form Correlates of Walking. *Transportation Research Part D* 11, 2006.

undertaken in the study and estimates of reduced VMT, energy use and $CO_2$ emissions from more compact, mixed-use development are detailed in 20- and 40-year forecasts. The study concludes that there is a modest decrease in VMT per capita by 2030 (-1.0 to -7.7%) and more significantly by 2050 (-1.3 to -11.0%) by assuming more compact, mixed-use development (compared to historic land development trends).[2]

Developing measures to adequately describe the efficiency and adequacy of roadways, transit systems, rail systems, freight operations and access, and pedestrian and bicycle facilities is an issue that should be prioritized by both FBRMPO and the cities and counties within the region who are approving new development that impacts all of these systems. Ideally, FBRMPO will be able to use to these tools to provide input to not only the transportation planning process, but the land use and comprehensive planning efforts undertaken by its member agencies. The Land Use or Comprehensive Planning process in North Carolina rarely includes a detailed analysis of land use options and their impacts on the transportation system at the local and regional level.

**Focused Access Management Policies.** The practice of managing access has oftentimes been met with skepticism from elected officials, developers and business owners. A misunderstanding of access management concepts and a lack of corridor planning to identify the most appropriate locations for such strategies is the key contributor to this skepticism once it is attempted along a specific corridor or at an intersection. As defined by FHWA, access management is the proactive management of vehicular access points to land parcels adjacent to all manner of roadways. Good access management promotes safe and efficient use of the transportation network.

There are several techniques that can be employed by state and local governments to control access to primary transportation corridors, including:

- **Access Spacing**: Increasing the distance between traffic signals improves the flow of traffic on major arterials, reduces congestion, and improves air quality for heavily traveled corridors.

[2] Driving and the Built Environment: The Effects of Compact Development on Motorized Travel, Energy Use, and CO2 Emissions. *Transportation Research Board – Special Report 298*. Transportation Research Board of the National Academies, Washington, DC 2009.

- **Driveway Spacing**: Fewer driveways spaced further apart allow for more orderly merging of traffic and presents fewer challenges to drivers.
- **Safe Turning Lanes**: Dedicated left- and right-turn, indirect left-turns and U-turns, and roundabouts keep through-traffic flowing. Roundabouts represent an opportunity to reduce an intersection with many conflict points or a severe crash history (T-bone crashes) to one that operates with fewer conflict points and less severe crashes (sideswipes) if they occur.
- **Median Treatments**: two-way left-turn lanes (TWLTL) and nontraversible and raised medians are examples of some of the most effective means to regulate access and reduce crashes.
- **Right-of-Way Management**: as it pertains to right-of-way reservation for future widening, good sight distance, access location, and other access-related issues.

Access Management provides an important means of maintaining mobility. It calls for effective ingress and egress to a facility, efficient spacing and design to preserve the functional integrity, and overall operational viability of street and road systems.

The majority of the corridors relied upon for mobility within a region have also developed in an auto-oriented manner in terms of land use. The resulting development patterns, as well as other market factors, lead to these corridors being lined with establishments that would be recognized by any American whether they are from North Carolina or North Dakota. The influx of chain and franchise stores along these corridors also reflects the ability of these businesses to adapt to almost any transportation situation. One only has to travel to corridors in nearby Atlanta, Charlotte or Chattanooga to see these familiar fast food chains and discount shopping stores operating along a corridor where access is only allowed at long intervals. However, when these same establishments are in front of a city council or county commission meeting their sponsors are adamant about economic survival requiring full and multiple access points.

It is this "fight or flight" plea from development interests that oftentimes leads to a compromise of access management policies by local officials. While each individual compromise typically does not pose a serious threat to long-term mobility (unless the site development is large, sight distance considerations compound the threat

imposed by the new conflict points, or the new driveways exacerbate opposing driveway exits), the cumulative impact from many such actions over a period of years results in a serious loss of roadway capacity due both to recurring and intermittent congestion (from accidents). This latter type of congestion is seldom considered in planning exercises, but is often the most important source of serious delays. The average person can plan for recurring congestion lasting five or ten minutes, but when exposed to occasional congestion that result in 30-minute or longer delays the level of perceived and real inconvenience is disproportionately greater. This aspect of intermittent congestion is felt most acutely by freight distributors and delivery services, since livelihoods and economic development hinges greatly on the ability of a roadway system to deliver just-in-time goods to manufacturing, retail, or distribution outlets.

Nationwide research has not borne out the conclusion of retailers that full access is a pre-requisite for a successful business. A study in Kansas revealed that 14 out of 15 businesses were still in operation after they had filed inverse condemnation suits against the DOT based on access controls being put into place.[3] Another study based in Texas looked at the impacts of left-turn restrictions on business operations. In all but a very few cases, typically auto repair and service industries, businesses of various types reported the same or increased levels of customers per day, with employment increasing in the corridors studied as did land values.[4] Similar results have been found in Iowa, Florida, and Minnesota studies as well.[5] Based on information from FHWA, these and other studies have consistently shown that implementing sound access management policies provides three major benefits to transportation systems without sacrificing economic viability of retail and other commercial activities: increased roadway capacity; reduced crashes; and shortened travel time for motorists. All of these benefits result from minimizing or managing the number of conflict points that exist along a corridor. These characteristics are factors that lead to corridors becoming a target of new development, as volumes and dependability are two key locational factors for businesses. Additionally, with the improved appearance and higher-quality of traffic management often carries over to higher-quality development types and designs.

[3] Rees, M., et al, "Police Power Regulation of Highway Access and Traffic Flow in the State of Kansas." Proceedings of the 4th National Conference on Access Management, Portland, Oregon. 2000.
[4] Eisele, W., and Frawley, W., "A Methodology for Determining Economic Impacts of Raised Medians: Data Analysis on Additional Case Studies. Research Report 3904-3, Texas Transportation Institute, College Station, October. 1999.
[5] Federal Highway Administration, "Safe Access is Good for Business," http://www.teachamerica.com/amv/ Primer%20for%20Print.pdf access on July 13, 2010.

**Prioritizing cost-effective actions.** It is important to not only link a CMP with longer term goals and forecasts but to also address small-scale congestion problems that affect the efficiency of the regional transportation network. FBRMPO can incorporate prioritization criteria to support small-scale projects and programs that are cost-effective actions, particularly within its STP-DA funding. These prioritization criteria should be directly linked to the performance measures developed by the MPO. Typical cost-effective actions would include strategies such as quick response blockage clearances, work zone management, and event coordination to reduce non-recurring delay. It is important that these short range actions and strategies to reduce non-recurring delay be incorporated into the CMP.

**Mixed-Use Development.** The approval of one new residential unit within an area leads to the addition of 10 vehicle trips per day to a roadway system. However, when these residential units are located in close proximity to other popular land use destinations such as grocery stores, drug stores, schools, post offices, restaurants and child care facilities, the average trips per day is shown to decrease up to 30-40%. Imagine being able to decrease traffic demand along a corridor or within a neighborhood by this amount through a change in land use requirements that does not require additional funding to be used along an existing corridor. It is possible through the long-term institution of mixed-use development policies that then lead to the capture of trips within a more confined area than would have been achieve through traditional development patterns.

There are several examples of existing development and associated policies by municipalities in the French Broad River region that can be used to inform other municipalities of the potential for land use to play a role in mitigating congestion. One only needs to go to the central business districts of communities large and small to see the ability of a mixture of land use to capture trips. Newly developed areas such as the Biltmore Park development adjacent to I-26 have the long-term potential to achieve trip capture rates that reduce the burden on the regional roadway system when compared to what would have occurred through conventional development.

**Alternative Transportation Incentive Programs.** An effective and low-cost option to encourage commuters to try alternative modes is the introduction of incentive programs provided by both public and private interests. With more and more discussion on sustainable business practices, companies are looking for ways to showcase how their policies and employee actions are leading to improvements in the environment. One option for these companies is a program that provides incentives to employees who carpool, vanpool, walk, ride a bike or take the bus to work. These incentives may range from full or partial payment of transit passes or fares by the employer, monthly issuance of gift certificates for modes that do not

involve a fare, or preferential treatment of employees using these modes through the designation of special parking spaces for carpoolers or vanpools, employee of the month promotions and annual prizes to frequent users.

The public realm also has a role to play in the development of alternative transportation incentives. The most notable program is one available to any employee of the Federal government. In April 2000, President Clinton signed Executive Order 13150, creating the *Mass Transportation and Vanpool Fringe Benefit Program,* which allows Federal agencies to provide transit or vanpool fares to employees and utilize other non-monetary incentives to encourage mass transportation and vanpool use. While this program has been implemented in some federal agencies, it is not universally promoted by all offices. The City of Asheville and UNC Asheville are two local entities that have developed similar programs for employees and students. National practices include other major employers and some state or local policies requiring TDM or Commuter Trip Reduction programs, with many involving service agreements with transit agencies or vanpool providers.

Another incentive program to encourage alternative transportation is a Guaranteed or Emergency Ride Home (G/ERH) program. The complexity of modern life has lead to the need for individuals to balance various interests related to transportation during the course of a work day. They fear that a situation such as a sick child, an unanticipated medical need, or other emergency could lead to them being stranded at work if they were to commute via a mode other than the single occupant automobile. By providing a regionwide G/ERH program, potentially through grant funding obtained by FBRMPO through JARC or other transit resources, regular users of transit systems and those using other modes can be made eligible to receive a free taxi ride home to address these unplanned situations. The primary fear in implementing such a system is the potential for abuse. These fears are often unfounded if a G/ERH program follows registration and verification procedures that require transit users, carpoolers, vanpoolers, bicyclists, or walkers to register with the program and submit a receipt from the taxi company for reimbursement after the trip has been taken. Regular subscribers to a bus or vanpool program who make transactions through the agency can be eligible for a free taxi ride without a request for reimbursement.

**Alternative work hours / Telecommuting.** The budget crises experienced by many government agencies led to many creative solutions, including the requirement for some employees to work four-day work weeks to reduce demand on electricity and other resources and curb budget demands. This also includes encouragement to work from home on one or more days per week. This practice also has the potential to reduce demand on roadways when work commute hours are shifted away from peak travel periods. There are several options for alternative work hours: 4 x 10 hour days; shifting start times to an hour earlier or later for some or all employees; and allowing for telecommuting.

### 2. *Operational Methods*

Operational methods of congestion management are aimed at improving the efficiency of existing transportation through the institution of various strategies related to both traffic flow and travel demand. Operational approaches, when combined with policy and planning approaches, have the collective ability to recognize noticeable changes in traffic characteristics, particularly when combined with a long-range vision for a corridor or regional sub-area.

**Intelligent Transportation Systems (ITS) and Signal Coordination.** There are many facets to ITS, but MPOs are employing the below techniques more regularly as a cost-effective way to manage congestion.

- Arterials: traffic signal control, surveillance, management & dynamic message signs;
- Crash prevention: advanced warning systems, rail crossings, & ped-bike detection;
- Electronic payment and pricing for toll facilities and transit services;
- Emergency services: management, hazmat detection, evacuation & signal pre-emption;
- Freeways: incident management, ramp metering, dynamic message signs & variable speed limit;
- Road weather & conditions management;
- Roadways operations & maintenance: work zone management, portable message signs;
- Smart vehicle technologies: collision avoidance, information systems.
- Transit: vehicle location, dispatch, management & information systems;
- Traffic incident: surveillance, detection/response, information, & clearance/recovery; and
- Traveler information.

**Quick Response Blockage Clearances.** When an accident occurs, the parties involved are generally unable to move their vehicles from the point of the accident to the side of the road, due to damage. Or in the case of a minor fender-bender, motorists sometimes simply forget to pull their cars to the side of the road because they are flustered. Either way, major or minor accidents can cause miles of delay behind them and even on the other side of a road from curious motorists slowing down to see what happened. Many states now have legislation, policies,

or at least memorandums of understanding (MOUs) in place to explicitly establish first responder roles at a scene, expedite crash investigations, and safely and efficiently move the debris from the road. The ultimate goals of quick response clearances are to increase the safety of incident responders by minimizing their exposure to adjacent passing traffic, reduce the probability of secondary incidents, and relieve overall congestion levels and delay.

**Work Zone & Construction Schedule Management.** When motorists see orange barrels and merge signs, road construction is generally happening ahead. With the temporary decrease in road capacity, congestion is inevitable. In the planning stages, MPOs can help identify route detours, inform the public of construction delays, or encourage people to take alternate modes of transportation. At the construction level, methods such as night-time work zones, total vs. partial shutdowns, incentives to finishing work early, or design/build projects are some of the ways to minimize delay.

**Coordination to Reduce Non-recurring Delay.** Car accidents, bad weather, major events (such as sports games or concerts), and work zones can all induce congestion on the roadways at unusual times. Coordination among first responders and transportation professionals is critical to keeping motorists safe and traffic flowing during major incidents, such as auto accidents or prolonged work zone activities. Utilizing warning signs as far in advance of the event as possible is effective at alerting motorists to seek alternate routes. If the event is sudden, like a car crash this may not be as effective as it would be prior to a planned event, such as a concert or an impending weather storm. Establishing park and rides for sporting, concert, or special events can take a large number of automobiles off the road, reducing congestion as well as accidents. Debrief sessions after special events are a cost effective way to coordinate with all parties involved to see what worked and what didn't, in preparation for the next incident.

**Regular Evaluation/Re-timing of Primary Corridor Signal Systems.** Due to residential or other types of growth, corridors will experience incremental increases in traffic suddenly or gradually over time. No matter how short or prolonged the change, signalized lights along corridors rarely get re-examined for better synchronization. However, the re-timing of lights has proven to be a low-cost way to enhance movement, reduce fuel consumption, and help air quality standards. Synching lights along major roadways also reduces the need for

motorists to utilize smaller, secondary roads as their primary routes, increasing safety and pavement conditions on them. Another option is to look at each intersection, making sure that the lights are adapting to shorter cue lines. For example, if the maximum time for a left-hand turn is 30 seconds, but only one car is waiting to make that turn, then the light should be able to adapt to this and cut the light short, so through traffic can resume quicker.

**Signal Priority/Pre-emption for Emergency & Transit Services.** When an accident happens, emergency responders need to get to and leave an accident scene quickly. Having a designated lane to bypass normal traffic or having the technology to give automatic green lights to emergency personnel would assist them in getting to and from places more efficiently and allow for accidents to be attended to and cleaned up quickly. Along a similar vein, having designated public transit lanes or allowing buses green signals longer at intersections would offer huge incentives for getting people out of their cars. It would essentially guarantee that they could get to work or other destinations quicker.

### *3. Capital Improvement Methods*

Capacity-related capital improvement methods should be the last resort for making congestion mitigation or management decisions once policy/planning and operational options have been exhausted or determined through analysis that such measures would not have the desired effect. Investments in capital improvements for alternative transportation solutions, such as pedestrian, bicycle and transit modes should also be determined in concert with other capital improvements or when the region has determined that such modes should be accommodated or mainline corridor capacity improvements are not reflective of regional land use, economic development tor livability priorities.

Capital methods are typically the most expensive and time consuming projects to implement, as environmental, design, project development, right-of-way acquisition and construction practices have become more complex and time consuming, particularly when projects utilize federal funding. Some agencies have found the cost of federal projects, due to these requirements can be 30% greater than the same project developed using local funds. In North Carolina, almost all major capital projects are funded through some type of Federal grant program administered by NCDOT. In conducting long-range planning it should be examined whether or not the capital

improvements and their projected timeline will also necessitate short-term operational improvements. Once capital investments have been made, the MPO, area municipalities and the DOT should have appropriate planning and policy frameworks in place to protect the long term function of the capital investment.

**Eliminating/Reconfiguring Offset Intersections.** Western North Carolina's transportation system has been influenced heavily by topography and roadway design decisions incorporated several decades ago. One defining characteristic of this combination of factors is the presence of offset intersections along several of the region's corridors. As development has occurred through the years—and traffic at some point in the past being of minimal consequence—the signalized intersections along mobility corridors have been built in a manner that causes skewed angles at connecting roads and commercial development driveways. This leads to the need to provide split phasing and other signal timing phases that reduce the throughput on the main corridor. Both NCDOT and the area's municipalities have the authority through their regulatory powers to require new development to properly align these intersections when they are re-zoned, redeveloped or reconfigured. These improvements should be identified on a corridor-by-corridor basis and prioritized in the event that funding partnerships may be necessary to accomplish such a project.

**Alternative/Parallel System Connectivity.** The topography of the region also has created challenges in realizing a system of parallel connectivity to major corridors, which has put increasing amounts of traffic burden on the highway system. This does not prohibit, however, the strategic identification of connectivity projects—either through new development, standalone project, or overall corridor capacity improvements—that provide for alternative routes. Such alternative routes can be realized for major sections of a corridor or smaller subareas where connecting commercial or residential properties can channelize vehicles to a common intersection. A recent example of this is the Russ Avenue (US 276) plan in Waynesville where one of the recommendations for capacity and function improvements from US 23-74 to downtown Waynesville is to add connections along a parallel road system that is currently discontinuous due to past commercial development that is now targeted for redevelopment which will include transportation connectivity improvements. It would be advisable for the MPO to consider a policy that any corridors being considered for mainline capacity improvement include an examination of potential parallel system connectivity that can either be achieved by the project itself or through short- and

long-range policies aimed at requiring such a system through development along the corridor. This is particularly true for developing corridors, such as US 25 south of Interstate 26 at Exit 44, where recent widening has prompted new commercial development without a system of planned parallel routes.

**Intersection Capacity Improvements.** Corridors that are constrained by development or other features along the mainline highway can be considered for strategic improvements at intersections. Corridors that were constructed without continuous two-way left turn lanes are oftentimes lacking left turn lanes at signalized intersections. As growth has occurred and signal warrants achieved along these corridor, signals have been installed without full improvements. Another outcome of the growth over the past 15 years has been lack of left turn capacity where these turning lanes exist at signalized intersection but demand is such at dual left-turn lanes are warranted. Given that intersection capacity is typically the driven factor of delay along a corridor, a program of intersection capacity improvements should be examined as a project alternative before a decision is made to invest in mainline corridor capacity improvements. These intersection capacity improvements can also be evaluated as a first phase of a long-term strategy for a corridor, whereby intersection capacity upgrades can be designed to fit within the future cross section of a mainline corridor improvement project which could come as a second phase in the future.

**Pedestrian, Bicycle & Greenway System Connectivity.** Creating parallel or connecting non-motorized transportation systems can be effective in reducing congestion on a subarea scale, particularly when travel along major corridors requires motorists, pedestrians and bicyclists to utilize signalized intersections when accessing destinations for short trips or traveling between stores or other generators such as parks or schools. Pedestrian, bicycle and greenway facilities should be thought of in a transportation context such as identifying different functional classifications for these facilities. As greenways evolve and connect over time they can become key transportation corridors in addition to recreational trails. It is important to identify these potential functions and think of a complete pedestrian and bicycle system as one that key greenways as well as bike lanes and sidewalks along or parallel to key corridors function as a type of arterial for non-motorized travelers.

The pedestrian and bicycle system is also overlooked in terms of its importance in linking travelers to the region's public transit systems. Commonly referred to as "first mile / last mile", it is recognized that every transit trip either begins or ends with the traveler accessing the bus by foot, by bike, or in the instance of park-and-ride lots, by car. These first mile / last mile connectors can have a major impact on generating and maintain transit riders, particularly those known as "choice" riders who have access to an automobile but choose to ride transit.

**Regional Transit Routes.** Transit systems in smaller urbanized areas struggle in striking a balance between the providing a vital social service to riders who have no other travel options and satisfying travel needs for commuters to increase ridership. The regions who have accomplished the most on both of these fronts are also the public transit systems that provide the highest measurable benefits in terms of reducing congestion through a bus system. Several of the factors involved in developing a balanced system were addressed in the recent Asheville Transit Master Plan and are also reflected in routes established in Henderson County to link to the Asheville system.

If it is determined that system of regional transit routes is in the interest of the region to provide alternative modes and a measurable reduction in traffic congestion, then the region should work toward prioritizing funding to develop regional commuter routes that complement the local services being provided by existing agencies. Further, the previously-identified strategies in this section can all work to make a regional transit system more efficiently and should be a consideration in the design and development of such plans, policies, operational and capital improvements.

**Regional Vanpool Programs.** Vanpool programs provide many small- and medium-sized urban areas with a type of evolutionary transit service to best reflect the smaller magnitude of transit generators. Smaller communities, scattered employment centers, and moderately-sized downtowns and office parks do not typically generate enough ridership to justify funding of bus services to these destinations. Therefore, the only option commuters are left with is to explore carpooling. A system of vanpool routes helps bridge the gap between carpooling and bus routes—and can return a higher farebox recovery ratio (up to 95%) than a bus system (typically around 15-20%).

Vanpools should be considered a component of a regional transit system to be effective, including consideration within regional funding priorities for transit. The regions that have been most successful in promoting vanpool programs find that their benefits in terms of mitigating congestion and air quality concerns can be more robust than those realized for local bus systems. Vanpools should be considered for longer commuter routes than can be provided by local bus services, typically beyond 10-15 miles one-way.

**Park-and-Ride Lots.** Several unnoticed opportunities exist in urban areas for implementation of a regional park-and-ride system to serve carpoolers, vanpoolers, bus routes and weekend travelers looking to consolidate trips for recreational or shopping purposes. The region has had some success in working with existing big box retailers to secure spots for park-and-ride users.

A strategy to develop a regional park-and-ride system should be a key component of any corridor planning effort, particularly for interstate widening, new interchanges, interchange reconfiguration and major non-interstate highway projects. DOT's typically make major investment in right-of-way purchases as part of these projects. This leads to several "remnant" parcels located adjacent to interstate highway, interchange and intersections that are ripe for development as a park-and-ride lot. The cost of constructing these corridors typically runs into the tens of millions of dollars while the cost of constructing a park-and-ride lot adjacent to them is typically $100,000 to $300,000, making incorporation of park-and-ride lots an easy addition to such corridor planning and design efforts.

Additionally, the region's municipalities could pursue park-and-ride requirements as part of the conditions of approval on big box and other developments that have large parking facilities, including office parks and churches. These may require some type of indemnification agreement or low-cost lease agreement to help assuage concerns by the developers regarding liability.

**Mainline Corridor Capacity Improvements.** The most expensive and time consuming capacity investment is in expansion of the full length of a major corridor, however this is oftentimes the default strategy for addressing congestion along a corridor. While it may be most appropriate on interstate highway facilities, this same approach

should be the last resort applied to other corridors, particularly in light of funding shortfalls for both capital improvements and maintenance within municipalities and the DOT.

Mainline corridor capacity projects involve the addition of through travel lanes along a corridor to add capacity through an entire subarea. Long-term traffic forecasts are used to help project the capacity needs of corridors with the number of lanes determined in large part by these forecasts. Navigating the project development process when utilizing federal funding can take up to 10 years to see a project through to construction. Corridor capacity improvements should not be conducted without an examination of the other types of improvements listed in this section and how they can either supplant or complement the proposed widening of a corridor. Such improvements should also be aligned with long-term strategies to preserve the functionality of these investments that cost tens of millions of dollars.

## VI. Congestion & Hot Spot Analysis

The identification of existing and future congested hot spots within the French Broad River region is one of the principal features of the Congestion Management Process and is intended to guide future decision-making, not only at the project level, but through the institution of planning decisions and municipal policies that address congestion management through the subdivision review and development process.

Through feedback from stakeholders through focus groups throughout the region, combined with technical analysis from transportation planners, the travel demand model and floating car studies, a list of congestion hot spots was identified for each of the counties within the current MPO boundaries.

Focus groups in Buncombe, Henderson, and Haywood Counties were organized to identify congested area and potential solutions within the MPO boundaries, with participants consisting primarily of county and municipal planning and management staff as well as elected officials, NCDOT Division 13 and 14 representatives, business interests and citizens.

The input gathered during these focus group sessions, as well as through a preliminary analysis of the travel demand model and unique characteristics of various corridors throughout the region, have yielded a preliminary list of corridor typologies that will form the basis of the types of planning and policy, operational, and infrastructure improvements that can collectively form a congestion management strategy on a corridor-by-corridor basis.

Table 4 on the following page identifies corridor typologies based on land use and development features as well as transportation function. With guidance from the focus groups, who were asked to identify congested locations, prioritize them, and then identify up to three congestion management strategies for each, the following list has resulted. Following Table 4 is a detailed breakdown of the congestion hot spot, their land use and transportation characteristics, and strategies identified through the CMP process to consider in developing new projects or evaluating existing project alternatives.

**Table 4: CMP Corridor Typologies & Congestion Hot Spots**

| *Transportation Function* | *Land Use / Development* | |
|---|---|---|
| | **Matured** | **Developing** |
| **Mobility** | *A matured, mobility corridor is one that has experienced near build-out conditions from a land use standpoint, but is still recognized as a critical need to move people through the region. Methods for addressing congestion can include: increased transit services; ITS; dedicated transit right-of-way; strategic intersection improvements; ped-bike improvements; incremental requirements of new or infill development; including TDM and connectivity.*<br><br>**Buncombe County**<br>US 19-23-Patton Av, I-240 to NC 63<br>US 25-Hendersonville Rd, I-40 to NC 280<br>US 70-Tunnel Rd, Tunnel to Riceville Rd<br><br>**Haywood County**<br>US 276-Russ Av, US23-74 to US 23 Business<br>US 23B-S. Main, US 276 to Hyatt Creek Rd<br><br>**Henderson County**<br>US 64-Four Seasons, I-26 to King St. | *A developing, mobility corridor is located in an area currently experiencing or expected to experience rapid growth and is a vital link in the mobility of the region's population. Methods for addressing congestion can include: capacity improvements along the corridor; access management / frontage roads; corridor preservation; increased or new transit services; ITS, intersection improvements; ped-bike facilities; TDM requirements on new development.*<br>**Buncombe County**<br>I-26 and NC 280 Interchange<br>NC 191 Brevard Rd, I-26 to NC 280<br>US 70, Riceville Rd to Black Mountain<br>US25A Sweeten Crk, I-240 to NC 280/US 25<br>**Haywood County**<br>US 19-23, NC 215 to Buncombe County<br>**Henderson County**<br>NC 191, NC 280 to Main St<br>Upward Rd, I-26 to NC 225<br>US 25 Business, I-26 to Main St<br>US 64, Mills Gap Rd to I-26 |
| **Management** | *A matured, management corridor is as secondary for regional mobility and is built-out in terms of land development. Congestion may be acceptable along these corridors or at intersections to encourage walkability and livability and could include relaxed LOS standards. Methods for addressing congestion include: increased transit services; ITS; ped-bike improvements; requirements of new or infill development, including TDM.*<br>**Buncombe County**<br>Biltmore Av., Downtown to I-40<br>Haywood Rd, Westwood Pl. to US 19-23<br>Merrimon Av., Elkmont to I-240<br>NC 81 Swannanoa River Rd, US 25 to US 70<br>**Haywood County**<br>US 23B-S. Main, Walnut St to Pigeon St<br>**Henderson County**<br>Church/King/6th/7th, Downtown Hendersonville | *A developing, management corridor is secondary for regional mobility but has opportunities to improve congestion on mainline or parallel corridors as the area develops. Development will occur but congestion may be acceptable during certain times of the day. Methods for addressing congestion include: strategic intersection improvements; access management; increased or new transit services; ped-bike facilities; ITS; TDM requirements on new development.*<br>**Buncombe County**<br>NC 146 Long Shoals Rd, US 25 to NC 191<br>US 74 Charlotte Hwy, I-240 to Cedar Mtn Rd<br>**Haywood County**<br>US 19-23-74 & NC 209 interchange<br>**Henderson County**<br>Howard Gap Rd, US 64 to US 25 |

## VII. Buncombe County Hot Spots

### US Highway 19-23 (Patton Avenue), I-240 to NC 63 (New Leicester Highway)

**Length:** 1.0 miles

**2008 ADT:**

**2035 ADT:**

**Land Use:**

- Matured mobility corridor is primarily big box and old strip commercial development with auto-dependent design.
- City of Asheville plans for redevelopment as urban villages at key intersections to take advantage of proximity to downtown Asheville.

**Transportation Characteristics:**

- Six lane principal thoroughfare includes medians for access control and at signalized intersection.
- Signalized intersections at Regent Park Boulveard, Florida Ave., Louisiana Ave. and NC 63.
- Congestion regularly occurs during peak and midday periods along this section of Patton Avenue.
- Corridor will likely be influenced by decision on alignment of I-240/I-26 interchange.
- No bicycle facilities and primitive pedestrian facilities.
- Asheville Transit Route #15, #16 and #46.

**Congestion Management Strategies:**

- Cross-access requirements for new or reconfigured development with consolidation of driveways
- Investment in ITS and signal control systems, including update of signal and controller hardware and software to maximize throughput
- Correction of offset intersections through redevelopment and potential adding of capacity at intersections.
- Investment in alternative transportation facilities and enactment of related policies.
- Pedestrian signals and crossings to accommodate pedestrian trips and transit riders.
- Park-and-ride lot at older large commercial developments or requirements on redevelopment to set aside spaces for carpooler and transit riders.

## US 25 (Hendersonville Road), I-40 to NC 280 (Airport Road)

**Length:** 7.0 miles **2008 ADT:**

**2035 ADT:**

**Land Use:**

- Matured mobility corridor traverses several land use typologies.
- North end of corridor includes Biltmore Village area and interchange land uses such as hotels, restaurants and convenience stores. .
- Corridor transitions to suburban auto-oriented land uses south of Biltmore Village to NC 280.
- Shiloh Neighborhood, Biltmore Forest and newer residential developments are buffered by commercial uses.
- Industrial uses near Long Shoals Road (NC 146).

**Transportation Characteristics:**

- Corridor is primarily a multi-lane facility constrained to four lanes north of and through Biltmore Village before transitioning to five lanes (including center turn lane) south to NC 280.
- Biltmore Estate east of the corridor and railroad tracks to the west of the corridor limit east-west connectivity, resulting in a funneling of traffic to the corridor.
- Few access management controls have been in place historically or required of new development.
- No bicycle facilities and few pedestrian facilities.
- Blue Ridge Park crosses US 25 north of Gerber Village.
- Asheville Transit Route #6 and #36 meeting the Apple Country Transit Blue Route at the Asheville Regional Airport.

**Congestion Management Strategies:**

- Access management via medians and cross-access requirements for new or reconfigured development.
- Investment in ITS and signal control systems.
- Correction of offset intersections through redevelopment and potential adding of capacity at intersections.
- Investment in alternative transportation facilities and enactment of related policies.
- Long-term connectivity project east and west of the corridor should be examined for feasibility in undeveloped areas.
- Designation as ITS detour during emergency situations on I-26.

## US 70 (Tunnel Road), Beaucatcher Tunnel to Riceville Road

**Length:** 3.4 miles

**2008 ADT:**

**2035 ADT:**

**Land Use:**

- Matured mobility corridor is primarily auto-oriented commercial from the tunnel to areas near the VA Hospital, with transition to residential areas near Haw Creek and continuation of commercial development to Riceville Road.
- VA Hospital, Asheville Mall, restaurants and hotels are primary traffic generators for the area.
- Areas east of I-240 have seem some redevelopment in recent years.

**Transportation features:**

- Four lanes from tunnel to Asheville Mall area with transition to five lanes to Riceville Road.
- Sidewalks along some commercial areas.
- Asheville Transit Routes #4, #13, #26, #28, #29, the highest ridership corridor in the system.
- Offset intersections east of I-240 at some locations.

**Congestion Management Strategies:**

- Signal coordination and modernization of signal system.
- Consider variable traffic signalization timing plans based on time of year, including summer, October and Christmas shopping season.
- Identify intersections conducive to queue jumping for transit routes
- Increase access management including driveway consolidation through redevelopment.
- Investment in alternative transportation strategies and facilities.
- Enhanced crossing treatments to accommodate pedestrians and transit riders.

## I-26 and NC 280 (Airport Road) Interchange

**Length: N/A**

**2008 ADT:**

**2035 ADT:**

**Land Use:**

- Developing mobility corridor near Asheville Regional Airport.
- WNC Agricultural Center.
- Auto- and airport-oriented commercial uses..
- Large shopping centers east of I-26.
- Large industrial complexes west of I-26

**Transportation features:**

- Five lane road with signals at major shopping center ingress/egress points, local streets and airport.
- Weaving and merging traffic from airport, land uses close to interchange on/off ramps.
- Asheville Transit Route #6 and Apple Country Transit's Blue Route service the Asheville Regional Airport.
- No pedestrian or bicycle facilities.

**Congestion Management Strategies:**

- Relegate airport-related land uses, including hotels, to areas east of interchange, where possible, to minimize the need for shuttles, taxi and vehicles to cross I-26 interchange area.
- Maximize signal coordination and upgrade equipment to allow for efficient operations in interchange area.
- Consider new interchange construction south of existing exit on existing NCDOT right-of-way, possibly through the long-term widening/improvements of I-26.
- Park-and-ride lot near interchange constructed through the I-26 widening, interchange reconfiguration or required as part of new commercial development in the area.

## NC 191 (Brevard Road), I-26 to NC 280 (Boylston Highway)

**Length:** 9.8 miles

**2008 ADT:**

**2035 ADT:**

**Land Use:**

- Developing mobility corridor.
- Suburban big box commercial, office parks and shopping mall near I-26, including hotels.
- South of Sardis Rd is in transition from rural residential to commercial.
- Suburban/rural residential and industrial uses have emerged near Long Shoals Road, south to NC 280, including some gated communities.
- Large industrial parcels near Long Shoals Road.

**Transportation features:**

- Four lane road on north end near between I-26 and Blue Ridge Parkway entrance.
- Median controls near Biltmore Square Mall and transition to five lane road to Parkway entrance.
- Two lane corridor south of Parkway to NC 280.
- Lack of turn pockets and acceleration/deceleration lanes within two-lane sections.
- No continuous sidewalks or alternative transportation facilities.
- Asheville Transit Route #9 services corridor, Biltmore Square Mall and office parks near mall.

**Congestion Management Strategies:**

- Long term widening of corridor.
- Consider interim intersection widening to conform to future road standards.
- Complete sidewalk system between Parkway and I-26.
- Mixed use development node at Long Shoals Road.
- Signals are close together and could be better synched:
    - Southwick and Glen Bridge
    - Long Shoals Road
    - Park South/Commerce (elementary school)
    - Borg Warner entrance
- Park-and-ride lot near I-26 at older large commercial developments or requirements on redevelopment to set aside spaces for carpooler and transit riders.

## US 70, Riceville Road to NC 9 in Black Mountain

**Length:** 10 miles **2008 ADT:**

**2035 ADT:**


**Land Use:**

- Developing mobility corridor.
- Emerging auto-oriented commercial uses in gaps between major access points to adjacent I-40 interchange.
- Commercial nodes near crossing roads providing access to I-40.
- Ingles Distribution Center.
- Redevelopment/re-use of older strip commercial developments near Black Mountain.
- Warren Wilson College and VA Hospital influence.
- Downtown Black Mountain.

**Transportation Characteristics**

- Five lane facility with little or no access control.
- Limited pedestrian facilities.
- Asheville Transit Routes #13, #28 and #29 to VA Hospital, WWC, Swannanoa and Black Mountain.
- Parallel railroad track between corridor and I-40 limits crossing opportunities.

**Congestion Management Strategies**

- Increase access management including medians and driveway consolidation through redevelopment.
- Signal coordination and modernization of signal system.
- Investment in alternative transportation strategies and facilities.
- Redevelopment of nodes for mixed uses.
- Enhanced crossing treatments to accommodate pedestrians and transit riders.
- Completion of parallel greenway system to link parks, major trip generators and recreational opportunities.
- Project to remove turn lane in some sections and construct parallel greenway in LRTP, Tier II.
- Park-and-ride lot near Black Mountain within older large commercial developments or requirements on redevelopment to set aside spaces for carpoolers and transit riders.

## US 25A (Sweeten Creek Road), I-40 to NC 280 (Airport Road) / US 25

**Length:** 6.7 miles

**2008 ADT:**

**2035 ADT:**

**Land Use:**

- Developing mobility corridor with suburban residential land uses south of I-40 to NC 280, with local market commercial uses interspersed.
- Interchange area at I-40 developed with hotel, Asheville Fun Depot and medical park.

**Transportation features:**

- Two lane corridor with scattered signalized intersections at major subdivision access points and cross streets.
- Parallel railroad tracks and topography limit parallel system connectivity and east-west connectivity.
- US 25E is parallel to US 25 – Hendersonville Road.
  Asheville Transit Route #8 & #36.
- Planning for widening in 2011-2015 in LRTP, U-2801a.

**Congestion Management Strategies:**

- Capacity improvements along corridor and at signalized intersections.
- Access control strategies in conjunction with corridor widening.
- Pedestrian and bicycle facilities to connect residential areas to local market commercial uses.
- Consider transit service increases as area continues to develop.
- Signal coordination and timing plans.
- Mixed use nodes offset from corridor to align with planned capacity increases.
- Designation as ITS Detour Route to US 25 – Hendersonville Road, including modification of signal timing/phases during emergencies on parallel route.

## Biltmore Avenue, Downtown Asheville to I-40

**Length:** 2.5 miles **2008 ADT:**

**2035 ADT:**


**Land Use:**

- Matured management corridor connects two key economic engines of the region – downtown Asheville and Biltmore Village/Biltmore Estate.
- Auto-oriented land uses between downtown and Biltmore Village are transitioning.
- Mission Hospital Campus
- Residential areas, including Kenilworth Neighborhood.
- McCormick Field.
- Biltmore Village Historic District.

**Transportation characteristics:**

- Constrained four-lane corridor.
- Substandard pedestrian facilities.
- No bicycle facilities.
- Asheville Transit Routes #4, #8, and #36.
- Railroad track crossing in Biltmore Village lacks pedestrian facilities and causes traffic delays.
- Mismatch of road design and Biltmore Village land uses, particularly on new Swannanoa River bridge.
- Parallel US 25 – McDowell Street corridor is underutilized.

**Congestion Management Strategies:**

- Traveler information systems to direct vehicles to US 25 – McDowell Street corridor, including consideration of variable message signs in downtown to alert to congestion conditions in Biltmore Village.
- Develop Biltmore Village-specific signal timing and ITS plan to maximize operations during peak periods.
- Complete and upgrade sidewalk system, include railroad track crossing.
- Continued mixed use redevelopment.
- Opticom system for emergency vehicle use along corridor to provide more efficient access to Mission Hospital Complex.
- Re-align Biltmore Estate intersection to maximize ingress/egress from the Estate.
- Increased alternative transportation and transit strategies and services.

## US 19 Business (Haywood Road), Westwood Place to US 19-23 (Patton Avenue)

**Length:** 1.6 miles

**2008 ADT:**

**2035 ADT:**

**Land Use:**

- Matured management corridor traverses "Main Street" are of West Asheville.
- Aging industrial parcels near I-240 are in transition.
- Neighborhood-scale commercial uses.
- Main Street area.
- Transition to more auto-oriented commercial uses near US 19-23 - Patton Avenue.

**Transportation characteristics:**

- Three lane corridor with limited access management due to driveways and old growth development.
- I-240 is a barrier for the corridor and adjacent neighborhoods.
- Heavy pedestrian and bicycle demand.
- Pedestrian facilities along both sides.
- No bicycle facilities.
- Asheville Transit Routes #1, #9 and #41.

**Congestion Management Strategies:**

- Upgrade pedestrian facilities – sidewalks through redevelopment, crosswalks and pedestrian signals at signalized intersections, some mid-block signals for pedestrian crossing.
- Continued mixed use redevelopment.
- Opticom system for emergency vehicle use along corridor to provide more efficient ingress/egress from West Asheville police and fire stations.
- Transit signal priority system.
- Implementation of bicycle-facility recommendations as contained in City's Bicycle Plan (shared lane markings).
- Increased alternative transportation and transit strategies and services.

## US 25 (Merrimon Avenue), Elkmont Road to I-240

**Length:** 3.5 miles **2008 ADT:**

**2035 ADT:**

**Land Use:**

- Matured management corridor serves UNC Asheville and nearby neighborhoods.
- Local access commercial uses.
- UNC Asheville.
- Grove Park Inn influence.
- Weaver Park.
- Claxton Elementary
- Beaver Lake

**Transportation characteristics:**

- Four lane corridor through old growth areas of North Asheville.
- Signalized intersection at major cross streets with limited exclusive turn lanes.
- Good east-west connectivity across the corridor and north-south parallel routes.
- Broken pedestrian system.
- No bicycle facilities.
- Greenway crossing at WT Weaver Boulevard.
- Asheville Transit Routes #2 and #52.

**Congestion Management Strategies:**

- Addition of left turn lanes at signalized intersection in LRTP (U-4013).
- Upgrade pedestrian facilities – sidewalks through redevelopment, crosswalks and pedestrian signals at signalized intersections, some mid-block signals for pedestrian crossing. Construct greenway-accommodating crossing at Weaver Blvd.
- Continued mixed use redevelopment.
- Opticom system for emergency vehicle use along corridor to provide more efficient movements.
- Transit signal priority system.
- Implementation of bicycle-facility recommendations as contained in City's Bicycle Plan (shared lane markings).
- Increased alternative transportation and transit strategies and services.
- Consider circulator transit service along Merrimon to Downtown Asheville to complement local routes.

## NC 81 (Swannanoa River Road), US 25 (McDowell Street) to US 70 (Tunnel Road)

**Length:** 4.0 miles **2008 ADT:**

**2035 ADT:**

**Land Use:**

- Matured mobility corridor that is constrained by Swannanoa River and slopes leading to Kenilworth neighborhood.
- Mostly industrial uses with some commercial uses.
- Major retail complexes near US 74 intersection (Asheville Mall Area).
- Biltmore Village area commercial land uses.
- Nearby Kenilworth neighborhood.
- Influence of Walmart complex east of I-240.
- River runs along length of road
- WNC Nature Center
- Asheville Municipal Golf Course

**Transportation characteristics:**

- Constrained two lane corridor following line of Swannanoa River.
- No pedestrian or bicycle facilities.
- Asheville Transit routes #12, #13, #29.

**Congestion Management Strategies:**

- Project considered in Wilma Dykeman Riverway Plan as couplet with Thompson on south side of river. Project would be difficult to implement without additional crossings of Swannanoa River to provide access. Project listed in Tier II LRTP list.
- Construction of pedestrian and bicycle system (possible sidepath or greenway on one side of roadway).
- Demand management strategies through programs to promote alternative uses, if available, or limitations on density and scale of development to reduce intensification of uses.

## NC 146 (Long Shoals Road), US 25 (Hendersonville Road) to NC 191 (Brevard Rd)

**Length:** 3.4 miles **2008 ADT:**

**2035 ADT:**

**Land Use:**

- Developing management corridor (east of I-26) and developing mobility corridor (west of I-26).
- Land uses east of I-26 are a mix of auto-oriented commercial and residential as well as the Lake Julian energy complex and park.
- West of I-26 includes rural residential development and industrial node at NC 191 (Brevard Road).
- TC Roberson High School influence.
- Biltmore Park is a mixed use development near I-26.
- Biltmore Baptist Church influence.

**Transportation characteristics:**

- Five lane corridor from I-26 to US 25 (Hendersonville Road).
- Newly constructed single point urban interchange (SPUI) at I-26, including widening to five lanes west of I-26 to Clayton Road.
- Two lane corridor from Clayton Road to NC 191 (Brevard Road).

**Congestion Management Strategies:**

- Access management along existing five lane sections to ensure future mobility through the corridor.
- Project for widening to NC 191 in LRTP, Tier II (R-2813a)
- Traffic signal system integration.
- ITS investments and designation as ITS Detour route (in combination with US 25) for emergency situations on I-26.
- Completion of sidewalk system and consideration of lane narrowing for bicycle lanes.
- Transportation Demand Management program requirements for new developments along corridor.
- Park-and-ride lot near I-26 through requirements on new development or us of surplus NCDOT property (if available) to set aside spaces for carpooler and transit riders.

## US 74A (Charlotte Highway), I-240 to Cedar Mountain Road

**Length:** 2.8 miles

**2008 ADT:**

**2035 ADT:**

**Land Use:**

- Developing management corridor transitions from suburban commercial uses near I-240 to rural residential and commercial uses to Cedar Mountain Road in the Fairview Community.
- AC Reynolds High School is west of the corridor on north end.
- Emergence of gated mountain communities in nearby hills.

**Transportation features:**

- Five lanes with lane width constraints near Blue Ridge Parkway and wider lanes through Cedar Mountain Road.
- Blue Ridge Parkway crossing approximately ½-mile south of I-240.
- Oak Hill Lane intersection includes school access and shopping center.
- Scenic Byway.

**Congestion Management Strategies:**

- Conduct corridor management and development plan to merge land use goals related to byway designation and preserve functionality of the corridor as the area grows.
- Install landscaped medians to provide access control and maintain scenic attributes for byway designation.
- Ensure traffic signal system integration or frontage roads (where possible) to preserve function.
- Transportation Demand Management requirements for new residential and commercial developments.
- Link major commercial nodes to residential areas with completion of pedestrian system (possible sidepath) along one side.
- Park-and-ride lot at older large commercial developments or requirements on redevelopment to set aside spaces for carpooler and transit riders.

## VIII. Haywood County Hot Spots

### US 276 (Russ Avenue), US 23-74 to US 23 Business (N. Main Street)

**Length:** 1.0 miles **2008 ADT:**

**2035 ADT:**

**Land Use:**

- Matured mobility corridor with a combination of auto-oriented commercial uses and old residential areas in transition closer to downtown Waynesville and US 23 Business (Main Street) intersection.
- Large shopping center with grocery and department store.
- Restaurants and banks.
- Local use commercial land uses near intersection with US 23 Business.

**Transportation features:**

- Five lane road with signalized intersections at major cross streets and shopping center entries.
- New sidewalks constructed in recent years with new development; discontinuous system.
- Limited access management.
- Russ Avenue Corridor Study adopted by Town of Waynesville in 2010 contains numerous congestion management strategies.

**Congestion Management Strategies:**

- Implement findings of corridor study, including:
  - Parallel system connectivity.
  - Cross access requirements.
  - Bicycle lanes.
  - Completion of pedestrian system.
  - Medians
- Corridor improvements in LRTP, Tier II.
- Improve signal system for better integration.
- Transportation Demand management for new developments.
- Park-and-ride lot near US 23/74 interchange within older large commercial developments or requirements on redevelopment to set aside spaces for carpoolers and transit riders.



## US 23 Business (S. Main St.), US 276 (Pigeon St.) to Hyatt Creek Rd.

**Length:** 2.2 miles

**2008 ADT:**

**2035 ADT:**

**Land Use:**

- Hyatt Creek to Ninevah: suburban/commercial, including Walmart/Best Buy complex.; high redevelopment potential
- Ninevah to Legion:, residential properties in wooded setting.
- Legion to US 276 (Pigeon Street): transition from residential to downtown commercial.
- Waynesville Inn influence.
- Downtown Waynesville influence.
- Connection to Hazelwood area.

**Transportation features:**

- Hyatt to Ninevah: Two lane road in constrained section with high potential for redevelopment; limited pedestrian access.
- Ninevah to Legion: Constrained two lane road with limited pedestrian system.
- Legion to US 276 (Pigeon St): Constrained two lane road with more complete pedestrian system along one side of road.
- No bicycle or fixed route transit services.

**Congestion Management Strategies:**

- Town of Waynesville to conduct corridor study to identify alternatives.
- Widening project in LRTP, Tier II.
- Hyatt to Ninevah has the potential for strategic widening to accommodate turn lanes and intersection improvements, possibly through redevelopment
- Ninevah to US 276 is constrained and has fewer options.
- Complete pedestrian system.
- Fixed route transit service from Walmart complex to downtown (and possible extension to US 276 (Russ Avenue) commercial avenue.
- Park-and-ride lot near US 23/74, Exit 100, at older large commercial developments or requirements on redevelopment to set aside spaces for carpoolers and transit riders.

## US 19-23 (Asheville Highway), NC 215 to Buncombe County Line

**Length:** 5.7 miles

**2008 ADT:**

**2035 ADT:**

**Land Use:**

- Developing mobility corridor connecting downtown Canton to Enka-Candler communities in western Buncombe County.
- Downtown Canton commercial district and Evergreen Paper plan.
- Rural residential and local use rural commercial uses east of Canton to Buncbombe County line.

**Transportation features:**

- Detour Route for I-40 during emergencies
- Five lane road from NC 215 to downtown Canton.
- Two lane urban couplet through downtown Canton
- Two/three-lane corridor east of Canton.
- Sidewalks both sides of street in downtown
- Parallel to railroad tracks and I-40.

**Congestion Management Strategies:**

- Coordinate signals from NC 215 through downtown Canton.
- Install variable message signs on US 23-74 between Waynesville and Clyde to alert motorists to situations on I-40 for earlier detour on US 19-23.
- Widening of corridor to four/five lanes from Canton to Enka-Candler area in LRTP (R-4406a).
- Long-term access management strategies.
- Park-and-ride lot near I-40 at Exit 37 using surplus NCDOT or other public agency property or requirements for developers in area to set aside spaces for carpoolers and transit riders.

## US 23 Business (S. Main Street), US 23 (Walnut Street) to US 276 (Pigeon Street)

**Length:** 0.5 miles

**2008 ADT:**

**2035 ADT:**

**Land Use:**

- Matured management corridor through downtown Waynesville.
- Commercial district throughout downtown Waynesville.
- Haywood County and Town government offices.
- Churches.

**Transportation features:**

- Two lanes with center turn lanes at signalized intersections.
- Context-sensitive corridor with low vehicle speeds.
- Crosswalks at intersections and at other high density locations.
- Free parking on either side of street.
- Wide sidewalks on both sides of road.
- Parallel local street connections provide low speed alternative routes.

**Congestion Management Strategies:**

- Pursue parking strategies on side streets to alleviate some demand on Main Street.
- Continue to prioritize pedestrian movement and improvements throughout the downtown area.
- Consider transportation demand management strategies for area employers.
- Long-term fixed route circulator or shuttle service, particularly for major downtown events/festival.
- Accept congestion as the downtown is a destination for the region.
- Park-and-ride lot at older large commercial developments or requirements on redevelopment to set aside spaces for carpoolers.

## US 19-23-74 & NC 209 Interchange (Crabtree Road / Asheville Road)

**Length:** N/A

**2008 ADT:**
**2035 ADT:**

**Land Use:**

- Developing management area with predominant commercial uses.
- New Haywood County government offices and DSS in old Walmart complex.
- Lowe's shopping center.
  Tuscola High School, Haywood Community College, Lake Junaluska and Haywood Regional Medical Center influence.

**Transportation features:**

- Interchange and connecting roads were not designed to accommodate the intensity of the existing land uses.
- Short merge distance from US 19 (from Maggie Valley) to US 23-74 to NC 209 interchange creating conflicts with through traffic.
- Steep grades in the area historically limited design options.

**Congestion Management Strategies:**

- Increase visibility of Jones Creek and other alternative options to college, medical and high school.
- Reconfigure interchange and section of US 19-23-74 with merging conflicts to include dedicated US 19 to NC 209 access, including construction of more conventional interchange (potential SPUI or tight diamond urban interchange).
- Promote transportation demand management programs for the major employment influences in the area.

## IX. Henderson County Hot Spots

### US 64 (Four Season Blvd), I-26 to King Street

**Length:** 2.3 miles

**2008 ADT:**
**2035 ADT:**

**Land Use:**

- Matured mobility corridor connecting I-26 to Downtown Hendersonville.
- Predominantly highway commercial uses including shopping centers and restaurants.
- Downtown commercial district between Grove Street and King Street.

**Transportation features:**

- Five lanes with full access control between Dana Road and Grove Street.
- Left turn lanes at signalized intersections.
- 7th Ave East is parallel corridor with pedestrian facilities.
- Transition to two-way couplet between Maple Street and King Street.
- Apple Country Transit White Route.

**Congestion Management Strategies:**

- Consolidate driveways through redevelopment between Dana Road and I-26.
- Updated to fully integrated signal system.
- Continued limited access policies between Dana Road and Grove Street.
- Balfour Parkway in LRTP for construction as alternate route north of downtown Hendersonville.
- Promote alternative transportation options within the corridor, including fixed route services.
- Park-and-ride lot near I-26 at large commercial developments or requirements on redevelopment to set aside spaces for carpoolers and transit riders.

## NC 191 (Haywood Road), NC 280 (Boylston Highway) to Main Street

**Length:** 7.0 miles

**2008 ADT:**

**2035 ADT:**


**Land Use:**

- Developing mobility corridor, with old highway commercial development near downtown Hendersonville.
- Corridor transitions to rural and suburban residential uses to the north of Hendersonville to Mills River.
- Suburban residential subdivisions near Mills River.
- Agricultural uses are located west of Rugby Road.
- Rugby Middle School.
- West Henderson High School.

**Transportation features:**

- Two-lane rural cross section along entire length.
- Due to rural setting, corridor has no pedestrian or bicycle facilities.
- Turn pockets have been constructed at primary subdivision entry points.

**Congestion Management Strategies:**

- LRTP Project R-2588a & R-2588b designate corridor for widening, intersection improvements and bicycle lanes.
- Requirement for turn pockets with approval of new development.
- Consider roundabouts at intersections meeting signal warrants.
- Long-term corridor capacity should be examined.

## Upward Road (SR 1722), I-26 to NC 225 (Greenville Highway)

**Length:** 2.3 miles

**2008 ADT:**
**2035 ADT:**

**Land Use:**

- Developing mobility corridor has commercial uses between I-26 interchange and US 176 intersection.
- Residential subdivisions are adjacent to corridor between I-26 and US 176.
- US 176 intersection is commercial node.
- Blue Ridge Community College influence.
- Golf course and residential development west of US 176 to NC 225 (Greenville Highway) intersection.

Transportation features:

- Widening is under construction for multi-lanes between I-26 and US 176 intersection (R-4430).
- Two-lane corridor between US 176 and NC 225 (Greenville Highway).
- Limited demand likely to occur for two-lane section.
- Apple Country Transit Red Route.

**Congestion Management Strategies:**

- Widening has already begun on section from I-26 to US 176.
- Adopt access management polices to preserve function of new four-lane section.
- Maintain connectivity between existing development and require connectivity between future development.
- Improve accessibility to pedestrian facilities.
- Transportation demand management policies for major developments along corridor.
- Park-and-ride lot near I-26 at surplus NCDOT or other public property, within older large commercial developments or requirements on redevelopment to set aside spaces for carpoolers and transit riders.

## US 25 Business (Asheville Highway), I-26 (Exit 44) to Main Street

**Length:** 6.5 miles

**2008 ADT:**

**2035 ADT:**

**Land Use:**

- Developing mobility corridor with recent improvements to multi-lane facility.
- Potential for increased commercial growth near I-26.
- Park Ridge Hospital influence.
- Commercial development and growth near I-26 interchange at exit 44.
- Transitions to rural residential and commercial
- Suburban residential densities through Mountain Home and Balfour communities as well as north side of Hendersonville.
- Industrial park influence in Mountain Home.

**Transportation features:**

- Five lane road along entire length with little congestion except during peak periods near interchange and in downtown Hendersonville.
- Apple Country Transit Blue Route.
- No signals at new development.
- Includes sidewalks along entire length.

**Congestion Management Strategies:**

- Consider alternative connectivity in conjunction with approval of new major commercial and residential development to concentrate traffic at existing intersections.
- Require cross access agreement between new commercial development.
- Long-term consideration of increased commuter transit service from Hendersonville.
- As corridor develops, implement Opticom system for signal preemption by emergency service vehicles accessing Park Ridge Hospital.
- Park-and-ride lot near I-26 at large commercial developments or requirements on redevelopment to set aside spaces for carpoolers and transit riders.

## US 64 (Chimney Rock Road), I-26 to Mills Gap Road (SR 1586)

**Length:** 6.0 miles

**2008 ADT:**

**2035 ADT:**

**Land Use:**

- Rural residential and agriculture uses predominate much of this developing mobility corridor.
- Commercial uses are concentrated between I-26 interchange and Howard Gap Road.
- North Henderson High School.
- Primary access road for apple orchards in Henderson County, including Fruitland and Edneyville.
- Corridor provides access to Chimney Rock and Lake Lure.

**Transportation features:**

- Four-lane corridor from Fruitland Road to I-26 with center turn lanes, which transitions to a couplet between Howard Gap Road and I-26.
- Two-lane corridor from Fruitland Road to Mills Gap Road.
- Apple Country Transit White Route and Green Route.

**Congestion Management Strategies:**

- Plan for capacity improvements east of Fruitland Road.
- Consider intersection capacity ahead of mainline corridor capacity.
- Require access management with approval of new development.
- Park-and-ride lot near I-26 at large commercial developments or requirements on redevelopment to set aside spaces for carpoolers and transit riders.

## Church Street / King Street / 6th Street / 7th Street, Downtown Hendersonville

**Length:** N/A

**2008 ADT:**

**2035 ADT:**

**Land Use:**

- Matured management corridor in the heart of Downtown Hendersonville.
- Commercial uses around four intersections.
- Pardee Memorial Hospital and Hendersonville High School influence.

**Transportation features:**

- Urban couplet in downtown Hendersonville buffering Main Street.
- All six intersections are signalized, including Main Street.
- Pedestrian facilities are present with connections to downtown Hendersonville.
- Apple Country Transit White, Blue and Red Routes.

**Congestion Management Strategies:**

- Regular evaluation of signal timing plan to ensure efficiency.
- Consider seasonal timing plans corresponding to summer and October peak seasons.
- Develop circulator/shuttle bus service for downtown Hendersonville during peak seasons.
- Consider traffic calming design standards once land uses in downtown Hendersonville begin to intensify around Church, King, 6th and 7th.

## Howard Gap Road (SR 1006), US 64 (Chimney Rock Road) to US 25

**Length:** 7.5 miles

**2008 ADT:**

**2035 ADT:**

**Land Use:**

- This developing management corridor traverses a rural setting east of I-26.
- Corridor has pockets of industrial, commercial and rural residential land uses.
- Park Ridge Hospital and Fletcher Academy near intersection with Naples Road.
- Fletcher Community Park.

**Transportation features:**

- Two-lane rural cross-section through entire length.
- Planned for widening in LRTP (R-5207).
- Stop control at major intersections.
- Terrain and sharp curves north of Naples Road.
- No pedestrian or bicycle facilities.

**Congestion Management Strategies:**

- Consider rural roundabouts at major intersections.
- Need for widening of corridor between Naples Road (Park Ridge Hospital) and US 25; constrained area with terrain and sharp curves as well as existing residential development.
- Connect pedestrian facilities between residential areas and activity generators on north end of corridor (one side of road).

## X. The Drive to Get Better: Measuring Performance and Planning

### *Measuring Performance in an Era of Fiscal Austerity*

Metropolitan Planning Organizations and state departments of transportation have long had to measure their performance, typically against federal and state law. MPOs are required to consider fiscal priorities, multimodal projects, projects of regional significance, projects that are certain elements of the National Highway System, corridor projects that facilitate the implementation of the North American Free Trade Agreement Implementation Act, and projects that support the Special Olympics and Paralympics in host cities.

> *"Measuring performance is a way to gauge the impacts of the decisionmaking process on the transportation system. Performance measures aim to answer questions about whether the performance of the transportation system (or economy, air quality, etc.) is getting better or worse over time; and whether transportation investments are correlated or linked to stated goals and outcomes."*
>
> -FHWA/FTA, *The Transportation Planning Process: Key Issues: A Briefing Book for Transportation Decisionmakers, Officials, and Staff*

Additional project considerations are embedded in state policies and even in adopted policies of the MPO itself. Most MPOs have developed project priority systems and processes that measure the performance of individual projects in terms of meeting individual goals like safety, traffic flow, pedestrian or bicycle friendliness, or creating a higher mode share for public transportation.

However, prioritization is not performance. Performance must be measured as a *change over a period of time*; for MPOs, the periodicity of performance normally equates to the quadrennial update cycle of the metropolitan transportation plan (MTP). The federal government has given considerable thought to the issue of performance-based planning. This is an area of practice that has particular meaning in a time when large capital funding isn't expected to be available anytime soon to create broad-brush, single-purpose capacity solutions.

Today more than ever transportation agencies and their constituencies are questioning the value of the products that they deliver to a critical public. Without major capacity or even capital-intensive non-capacity producing projects to fight for, the MPO will have to evolve into a more asset management-oriented planning provider, focusing on the relationship of many small projects to achieving community goals at a faster pace.

Performance for metropolitan transportation planning organizations can fall into many categories, each of which is in turn measured by some criterion. Table 5 depicts several performance areas and sample criteria developed during a recent (2009) Strategic Highway Research Program exercise; these are actual criteria selected out of 788 such criteria collected during the study program.

Table 5. Performance Measure Areas and Criteria (Sample)

| Performance Area | Sample Criteria |
|---|---|
| Economic | Number of accidents per ton-mile of freight traveled; Number and value of business loans in low income area |
| Natural Environment | Distance of habitat fragments from each other; Percent of materials used for project that are recycled |
| Public Health | Number of ozone action days; Change in percent of people feeling a lack of security from crime |
| Socio-Cultural | Unemployment rate by ethnicity; Change in sidewalk connectivity for disadvantaged populations compared to entire population |
| Land Use Considerations | Matrix  Measure of both color and reflectivity, with scores assigned from a matrix: Scores are based on compatibility with the natural landscape, with compatible colors and low reflectivity receiving the highest score |
| Mobility | Planning-Time Index:  95th percentile travel-time index divided by the free-flow travel-time index; Average duration of accidents |
| Financial Considerations | Ratio of private investment to public investment; Government subsidies as percent of gross income |
| Institutional (Political, Legal) | Set-back of buildings from curb; Activity-Promoting environment |

A major and recurring objection to the MPO's participation in performance-based planning is the unclear or weak relationship that many metropolitan planning organizations have with regard to actually implementing policy or infrastructure changes that can influence performance of transportation systems. State departments of transportation, municipal public works departments, transit authorities, and myriad private sector actors have more influence individually and collectively than a MPO, or at least that is the perception of the MPO. However, that assumption is questionable, since federal regulations clearly state that the MPO, especially the large (over 200,000 population) MPOs like FBRMPO, have authority over adopting the Metropolitan Transportation Improvement Program (MTIP) and creating and adopting the LRTP. North Carolina, operating as a Dillon's Rule state, imposes further restrictions on the ability of MPOs to make independent decisions, as does the propensity of MPOs in North Carolina to be hosted dependently on either a municipality or Council of Governments.

### *Implementation Considerations*

Clearly, there are both subtle and obvious differences between these criteria used to measure performance. Some are harder or easier to understand; difficult or easy to associate with their performance area; and some criteria are clearly cross-cutting among more than one performance area.

The following are therefore important considerations when implementing performance measures into long-range transportation plans and metropolitan planning functions.

1. **Intuitiveness and Clarity.** A good performance measure clearly relates its result to the performance area without a lot of interpretation or subjective interpretation.
2. **Relationship to a Goal.** A good performance measure aligns with one, and preferably only one, performance area.
3. **Availability.** The performance measure must itself be measurable, meaning that it depends on data that is readily available, over time, and in the right format and scale to be meaningful.
4. **Relationship to a Target.** In addition to the performance areas and measures (or criteria), each performance measure should be compared against past performance and a desired "target" value for the future.

Most importantly, performance-based planning requires commitment. The Town of Chapel Hill has issued a "transportation report card" since 2001 approximately every two years. The City of Raleigh has collected vehicle occupancy data at four points around the CBD annually since the 1970's. It is only through the regular application and study of performance at regular intervals that meaningful trends can be determined. With these determinations can come benefits in terms of resource allocations for future programming, more efficient operations, better alignment with community objectives, and a more credible planning process for the public and elected officials.

For these reasons, the outputs of performance measures should be made widely available and accessible in formats that allow many interpreters access to the information, not only to gain a broader perspective of the meaning of performance areas, but also to enrich other planning and design efforts. A reasonable performance-based planning paradigm for the French Broad MPO may be comprised of performance areas, measures and targets such as those expressed in Table 6.

These values and criteria should be reviewed every two years at a minimum, not only to assess progress towards measuring the MPO's performance, but also to ensure that the criteria and targets remain valid. Many MPOs consider this review a type of "report card" that measures the progress of the MPO in a simple format. In Table 6 note how there are only four performance areas, and that the measures are designed to be fairly straightforward to collect from existing data sources or easily created, on-line surveys. The most onerous measure to maintain is the accident severity index, which requires some knowledge of the TEEAS system or other access to the DMV or local accident records. More importantly, the severity index will require data on vehicle miles of travel (VMT) for roadway segments used to normalize the accident rate. The MPO effectiveness measure can be dramatically enhanced by asking people to complete postcards asking participants how convenient and effective they found the public participation exercise, location, and materials to be at every public meeting and outreach event.

Table 6. Potential Performance Measures for FBRMPO

| Performance Area | Performance Measure | Sample Target Value |
|---|---|---|
| Mobility | • Percentage Increase in AADT<br>• Percentage Increase in Transit Ridership<br>• Ratio of Sidewalks to Centerline Street Miles | • Equal to or Less than Percentage Population Increase<br>• Equal to or Greater than Percentage Population Increase<br>• 1:1 in Rural Areas; 1.4:1 in downtown or pedestrian activity centers |
| Safety | • Reduction in Accident Severity<br>• Reduction in Accidents, by Mode of Travel | • Reduction in Accident Severity Index<br>• Reduction in All Accident Types Involving Auto, Pedestrian and Bicycle Modes |
| Community Cohesion | • Block Length / Connectivity<br>• Travel Time of High Minority/Low Income Populations to Schools, Employment Centers, and Shopping Centers | • 500' in downtown and pedestrian activity centers; 800' elsewhere<br>• Reduction from Base Year to Forecasted Year in MTP |
| MPO Effectiveness | • Attendance at Public Meetings | • Equal to or Greater than Percentage Population Increase |

| | | |
|---|---|---|
| | • Comments Received and Logged | • Equal to or Greater than Percentage Population Increase |

***Additional Resources on Performance Measures***


1. Advancing Metropolitan Planning for Operations An Objectives-Driven, Performance-Based Approach, Federal Highway Administration: Washington, D.C., 2010 (www.ops.fhwa.dot.gov/publications/fhwahop10026/fhwa_hop_10_026.pdf)
2. SHRP 2 Capacity Performance Measures web resource (http://shrp2webtool.camsys.com/)
3. Performance Measurement Framework for Highway Capacity Decision Making, Strategic Highway Research Program 2: Washington, D.C., 2009 (http://onlinepubs.trb.org/onlinepubs/shrp2/shrp2_S2-C02-RR.pdf)
4. Measuring the Effectiveness of Community Impact Assessment: Recommended Core Measures, Beverly G. Ward: University of South Florida, 2005 (http://www.dot.state.fl.us/research-center/Completed_Proj/Summary_PTO/FDOT_BC353_28_rpt.pdf)
5. A Guidebook for Performance-Based Transportation Planning, NCHRP Report 446. Transportation Research Board: Washington, D.C., 2000 (www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=901)
6. Transportation Research Board's Conference Proceedings #36, Performance Measures to Improve Transportation Systems, 2004 (http://onlinepubs.trb.org/onlinepubs/conf/CP36.pdf)
7. Transportation Research Board's Transportation Research Circular E-C073 – Performance Measure to Improve Transportation Planning Practice, 2005 (http://onlinepubs.trb.org/onlinepubs/circulars/ec073.pdf)

## XI. Next Steps

FBRMPO is tasked each year with meeting Federal requirements for TIP, CMP, UPWP and LRTP development as well as updates to reflect changes in project status, funding and priorities. Additional tasks are assigned to FBRMPO through NCDOT's role in MPO oversight across the state. The combined efforts of these requirements can present a strain on the abilities of MPO to address issues and needs not tied to these core functions. It is important, however, to begin work toward implementation of tasks identified in these efforts that can allow the MPO to respond more effectively to its member governments and meet the requirements established by the Federal government and NCDOT. The next steps outlined in this section are intended to be a short summary of actions that can be taken by FBRMPO over the next one to three years to incorporated the findings of the CMP in their planning efforts, project input to NCDOT, and assistance to local governments in establishing polices related to managing congestion and promoting regional stability.

### Pursue MPO Policy Updates to Reflect CMP and LRTP Goals & Objectives

The Congestion Management Process and Long Range Transportation Plan have several goals, objectives and specific policy and project recommendations that are important for FBRMPO to pursue and promote efficient transportation throughout the region. To accomplish these tasks, FBRMPO will need to collaborate with local government agencies to align regional and local policies. The first step will be to have regular policy-specific discussions with member agencies through the TCC to identify policy gaps in zoning ordinance, subdivision ordinances and transportation policies. Perhaps a working group or subcommittee assigned to focus on these policies would provide time away from the month-to-month duties of the TCC.

*Complete Streets policies are most effective when street, land use and urban design standards all promote the safe and efficient movement of several modes of transportation.*

There has been discussion among TCC and TAC members regarding the adoption of a Complete Streets and county governments are just as instrumental in implementing complete streets as they have certain authorities through development regulation to guide land use development. Land use and its design is an overlooked component of most complete streets policies. It can be seen in several examples across the United States where beautiful boulevards with bicycle lanes

and wide sidewalks have been constructed by a city, county or DOT only to see a big box retail development surrounded by a sea of parking lots approved adjacent to the street.

**Refine List of Performance Measures for Implementation**

Several potential performance measures and related data have been included or referenced through the Congestion Management Process. Not all will be immediately accomplishable and some may not suit the short-term needs of the region. It is important, however, to begin identifying those metrics by which the transportation and land uses systems should be evaluated to allow the MPO to make better decisions and prepare for pending requirements for performance measurement through the upcoming transportation reauthorization.

Several MPOs across North Carolina and the United States are either actively involved in developing the preliminary metrics or already have them in place. The exchange of ideas and concepts will be important to FBRMPO to help develop institutional knowledge of these practices and the type of synergies and sensitivities being found in implementing these in other areas. It is advisable that the North Carolina Association of MPOs forms a work group to collaboratively research, design and implement these measures considering the limitations on resources and staff time.

While NCDOT has developed certain criteria for project evaluation through the recent SPOT process, these methods do not represent local needs and local concerns that can be gathered by the MPOs and RPOs. The goal of the performance measures developed by FBRMPO should be to align certain metrics to mirror NCDOT's criteria while also establishing metrics that reflect local context. This is particularly important given the character of the French Broad River region and the need in many cases to potentially advocate for deviation from standards statewide practices that do not always reflect the needs of transportation projects being considered in a constrained mountain environment.

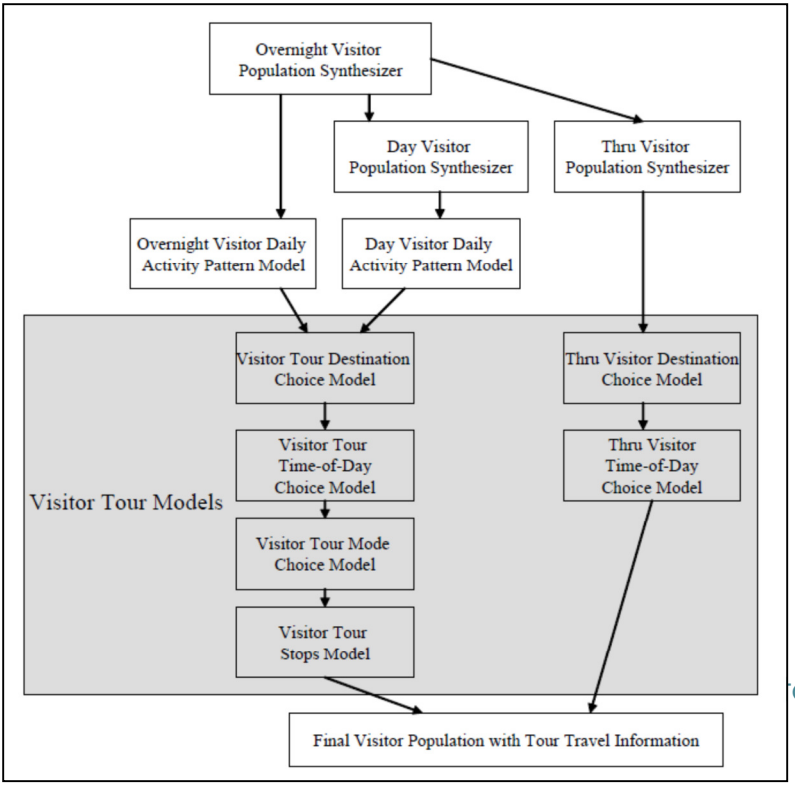
**Determine Level of Effort for Developments of Regional Significance**

While MPOs have no mandated authority over land use regulations, they do have data available and a perspective on regional transportation issues that are not typically accessible at local government agencies or

through state DOTs. It is advisable for FBRMPO to work with local agencies to define developments that are of such significance that they can have a major impact on regional transportation systems. This is particularly important given the limited role NCDOT plays in evaluation of such impacts outside of local access and minor analysis on local circulation issues. Cities are also less inclined to evaluate these impacts as they are also responding to localized issues and controversies that arise due to other factors.

North Carolina does not have growth management laws that require such analysis or concurrency as it relates to transportation, which presents an even greater challenge in assessing the performance of the regional transportation network.

FBRMPO should convene a local working group to identify how different land uses could impact the regional network and what level of magnitude would necessitate such regional impact analysis. For example, a residential subdivision containing 20 new lots is not likely to have a great impact on the transportation system beyond a ½-mile or 1-mile catchment area; neither is a new commercial development containing space for three or four stores, shops or offices. However, a residential development containing 500 apartments, 250 houses or a similar combination of condominiums or townhomes would likely have a much greater impact, as would a new manufacturing plant, big box retail development or business park. FBRMPO would be able to analyze these developments within performance measures developed for other planning efforts and perhaps through NCDOT perform a more detailed traffic impact analysis using the travel demand model as a starting point.




**Develop an Activity-Based Travel Demand Model for Seasonal Variations**

The uniqueness of the French Broad River region has made it a destination for visitors for almost two centuries. The influx of second home buyers and retirees over the past 30 years has created additional demand on the region's transportation system as well as impacts to non-peak or a changing of the

peak hour for transportation evaluation purposes. This combination of socioeconomic and demographic factors, combined with the seasonal tourist draws, indicates that travel patterns in the area may not conform to what is typically analyzed through a conventional travel demand model. Further, the degree to which this impacts the region's roadways is unknown through any type of empirical evaluation.

The Lake Tahoe region of California and Nevada has had a similar experience that led to the creation of an activity-based model for the region. It was determined that the tourist and transient population generated more than 30% of the daily vehicle miles traveled on non-peak travel days. Evaluated within the context of the regular travel demand model, Tahoe's approach included generation of characteristics unique to the seasonal population and modeled its travel behaviors. This was done through surveying of the seasonal population similar to what is done for a household travel survey.[6]

**Figure 3: Tahoe Visitor Model Flow Diagram**

As the French Broad River region continues to grow and attract visitors and seasonal populations, it is advisable that the FBRMPO, in coordination with NCDOT, explore the possibility of developing such a model for the region to help inform project planning, programming and design within the LRTP and TIP.

**Evaluate all TIP Projects for CMP-related Components**

Once the LRTP and CMP are adopted, FBRMPO should pursue measures to incorporate aspects of the hot spot evaluation into prioritization and funding decisions during development of the TIP. It is not likely that all congestion mitigation strategies will be realized due to time, fiscal and political constraints. However, this does not mean that the evaluation of the projects through an objective mechanism of project ranking should overlook the need to incorporate a variety of planning, operational and capital improvements to address congestion throughout the region and respond to the multi-modal transportation needs on the region's corridors.

The list of performance measures, in combination with the goals and objectives of the CMP/LRTP, should serve as a starting point to begin development of these prioritization procedures.

[6] Frazier, C, et al. The Tahoe Basin Region Visitor Model: An Activity-Based Approach. Proceedings of the Transportation Research Board Annual Meeting. Transportation Research Board of the National Academies. Washington, DC. 2008.

**Regular Data Collection and Updates**

The data collection efforts conducted as part of the CMP (and outlined in the following section) are the beginning of what should evolve into a regular practice by the MPO to update data on regional travel patterns and trends outside of information typically collected and analyzed as part of the travel demand model.

The floating car studies are intended to establish the baseline of how traffic flows in the region based on time delay instead of vehicular volume delay. By tracking the performance of corridors over time the MPO can establish a more robust set of trend data to supplement the traffic counts conducted annually by NCDOT and accident rates along hot spot corridors. Ideally, these would be updated every three to five years.

Further, the continued evaluation of vehicle occupancy and pedestrian/bicycle counts will establish similar trend lines and provide input to performance measures or prioritization criteria, whether it be for regional performance monitoring or specific project or corridor evaluation. The pedestrian and bicycle counts were generated through volunteers with the Asheville Bicycle and Pedestrian Task Force and the occupancy counts were conducted by students through a partnership with Western Carolina University. Utilization of these and other types of volunteer groups can help the MPO amass data for a relatively low cost. It is recommended that pedestrian/bicycle counts be updated every three years or after improvement to local non-motorized facilities. Occupancy counts should be updated every three to five years.

## XII. Data Collection

The FBRMPO Congestion Management Process relies on data collected through in-the-field analyses aimed at identifying corridors and intersections within the region that are experiencing congestion during routine traffic conditions and areas that may be more conducive to promotion of alternative modes of transportation to help alleviate congestion. Other data efforts include analysis of the travel demand model and integration of pertinent alternative transportation counts. The major data collection efforts are summarized below:

**Floating Car Studies.** The identification of hot spots within the framework of the focus groups will form the basis of collection of travel time data along these corridors within the region. The result is a comparison of free flow travel times to peak hour travel times (prioritized by direction based on the most heavily travelled section of the corridor, AM or PM).

Figure 4 represents the summary findings of the floating car studies. The color schemes on the map represent the average velocity of the vehicle traveling through individual segments (sometimes only a few hundred yards long) of a corridor. Green represents higher velocities (free flow travel) while red represents slower velocities (congested). These schemes represent the average of at least three runs along each corridor during peak periods, AM and PM. These are intended to serve as baseline data for the MPO moving forward. It is recommended that the MPO continuously measure travel times along key corridors in order to develop a larger sampling and identify changes over time.

**Vehicle Occupancy Counts.** The first data collection exercise involved the identification of major gateways to existing employment and activity centers throughout the region and collection of vehicle occupancy data during the AM or PM peak hour. The locations for these counts were identified to capture key traffic generators such as central business districts, major shopping centers, hospitals, mixed use developments and manufacturing/industrial parks. The average vehicle occupancy figures were tabulated for each location and account for more than 25,000 vehicles passing through these intersections and activity center gateways. This data will assist the MPO in measuring the effect of future transportation demand management efforts and identifying corridors to target for

TDM projects. The occupancy rates can be used as one performance measure to evaluate the type of planning, operation and capital improvements that could be implemented for congestion hot spots or other corridors and intersections where there is an interest in promoting TDM.

The average occupancy rates for the region can also be used, in addition to the new Census data, to help inform other planning-related efforts, including corridor studies, the travel demand model and land use planning.

Table 7 represents the counts and is ordered from highest to lowest average occupancy rate.

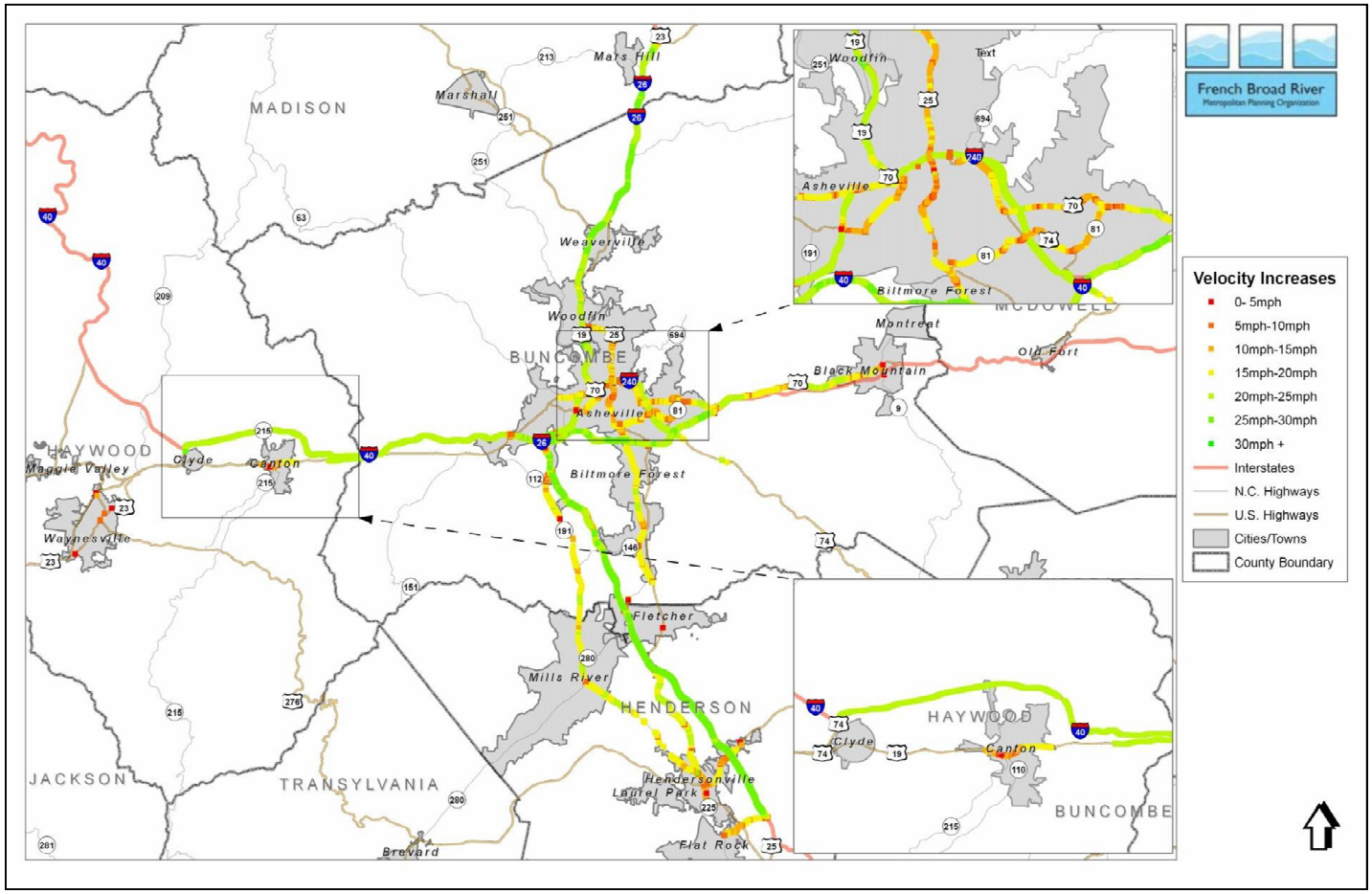





Figure 4. Floating Car Study Corridors

Table 7. Average Vehicle Occupancy Rates

| Location | Cross Street(s) | Avg/Car |
|---|---|---|
| Bleachery Blvd | Fairview Road | 1.59 |
| US 23 Business (S. Main) | Old Balsam Road | 1.44 |
| NC 9 | US 70 (Black Mountain) | 1.43 |
| Long Shoals Road | Biltmore Park Entrance | 1.38 |
| NC 213 - Mars Hill | west side of Exit 11 | 1.38 |
| Tunnel Road | Asheville Mall entrance | 1.37 |
| US 19-23 Smokey Park Ave | Exit 44, McDonald's | 1.37 |
| Hendersonville Rd (US 25) | Gerber Village | 1.36 |
| NC 251 (Riverside Dr) | Elk Mountain Road | 1.36 |
| Haywood Road | Brevard Rd | 1.36 |
| Merrimon/Broadway | North of I-240 Interchange | 1.35 |
| College St | Charlotte St | 1.34 |
| NC 280 (Airport Road-Boyleston Hwy) | Broadpointe Way | 1.34 |
| US 19-23 Smokey Park Hwy | Sand Hill Rd | 1.33 |
| Charlotte Street | Macon | 1.33 |
| Amboy Road | Riverside Drive | 1.32 |
| NC 191 (Brevard Road) | Ridgefield Blvd | 1.30 |
| US 70 - Weaverville | West side of exit 19 | 1.29 |
| Broadway | Division St | 1.29 |
| McDowell Street | Boston Way (Hardee's) | 1.29 |
| Blackwell Drive (NC215 in Canton) | Champion Drive | 1.27 |
| W.T. Weaver | University Heights | 1.25 |
| Upward Road (Hendersonville) | S. Allen Road | 1.25 |
| US 19-23-74 - Patton Ave | Louisiana Ave | 1.24 |
| Hospital Drive (Haywood) | Jones Cove Road | 1.23 |
| NC 63 - Leicester Highway | US 19-23-74 Smokey Park | 1.21 |
| US 276 – Russ Ave | US 23 Business | 1.21 |

| | | |
|---|---|---|
| **US 64 - 4 Seasons Blvd (Hendersonville)** | Thompson / Freeman Street | 1.21 |
| **US 70 - Tunnel Road** | Blue Ridge Parkway | 1.21 |
| **US 70** | Ingles Offices/Distribution Ctr | 1.20 |
| **Patton** | Clingman | 1.20 |
| **US 70** | Warren Wilson Rd | 1.18 |
| **McDowell Street** | Doctors Drive | 1.18 |
| **US 74 - Charlotte Highway** | Blue Ridge Parkway | 1.17 |
| **Montford** | I-240 Overpass | 1.16 |
| **US 25 - Asheville Highway** | Naples Road | 1.15 |
| **6th Avenue West (US 64)** | Buncombe Street | 1.11 |
| | **Average Occupancy** | **1.28** |

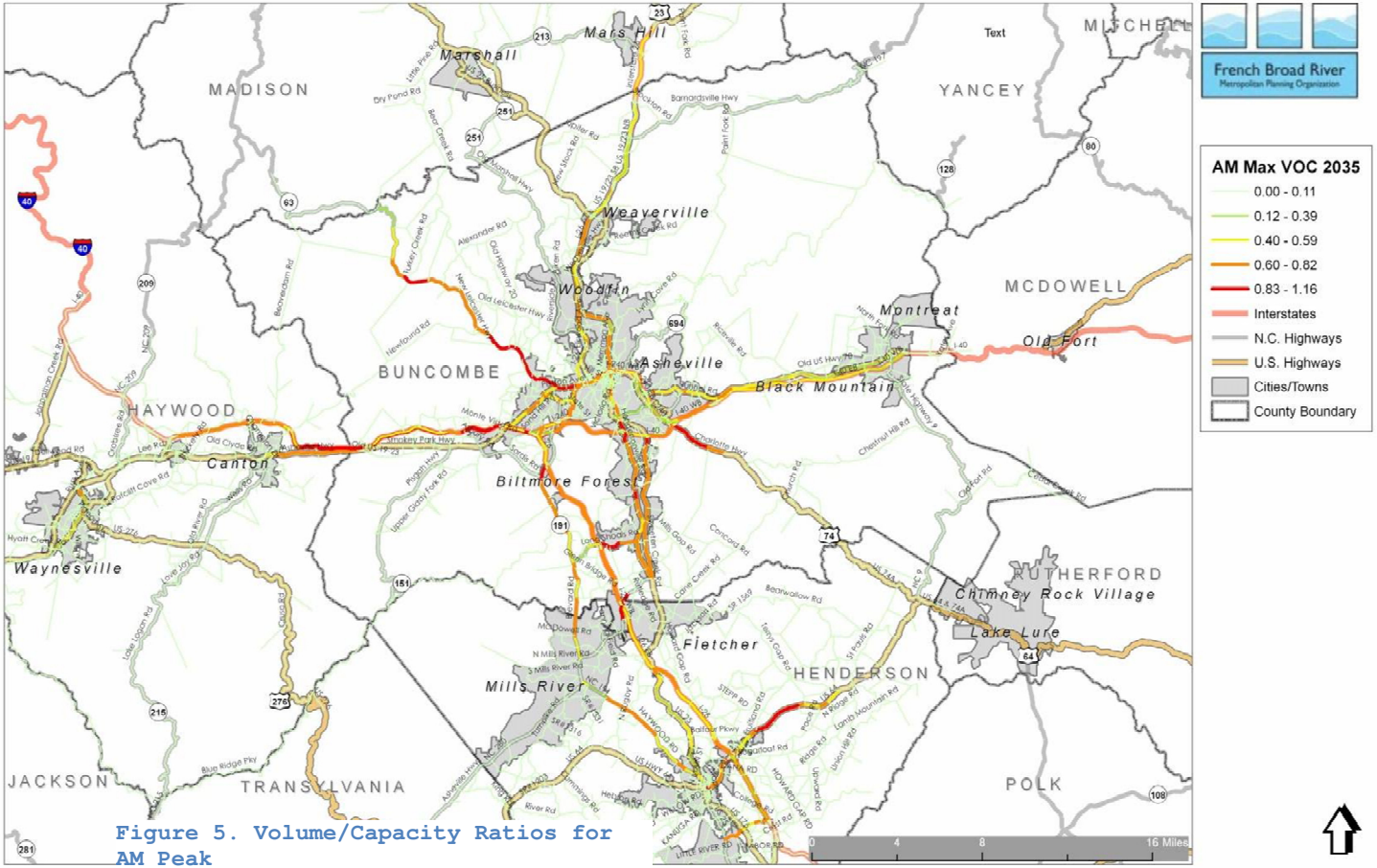



Figure 5. Volume/Capacity Ratios for AM Peak

**Travel Demand Model Outputs.** Figures 5 & 6 reflect volume-to-capacity (v/c) ratios for corridors identified through the hot spot analysis for the 2035 build scenario. These include both AM and PM analysis. Note that the NC 63 – Leicester Highway segments were added.

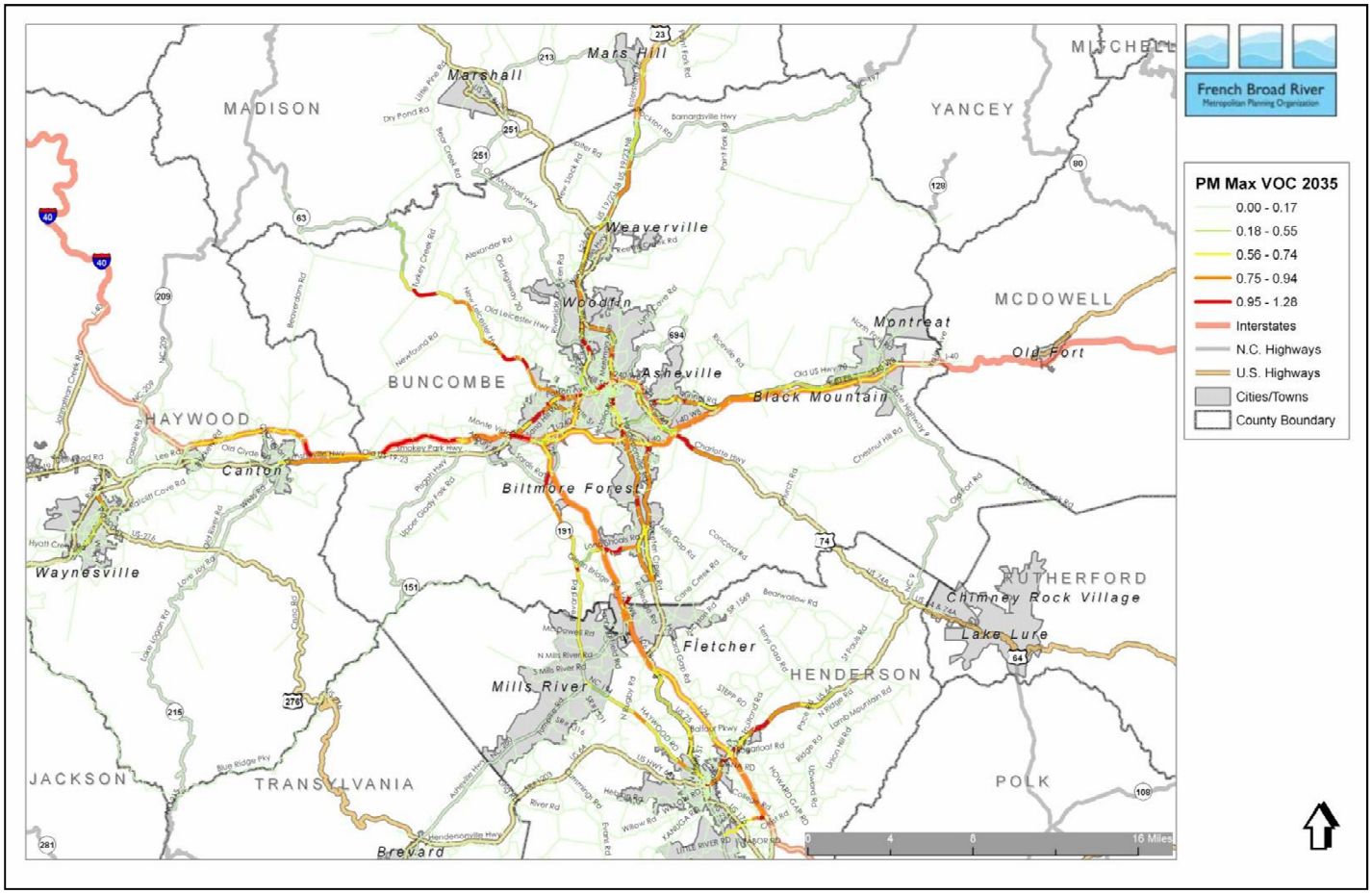





**Figure 6. Volume/Capacity Ratios for PM Peak**

**Pedestrian & Bicycle Counts.** Volunteers with the Asheville Bicycle and Pedestrian Task Force, along with other interested members of the community, conducted pedestrian and bicycle user counts at 51 intersections in Asheville and Buncombe County the week of September 7, 2009. The counts were coordinated as part of the National Bicycle and Pedestrian Documentation Project, which is collecting data from communities to generate demand models for various land uses, as well as urban, suburban and rural settings.

In all, there were more than 5,700 pedestrians tallied during the week of the counts along with more than 900 bicyclists. Each location consisted of counts conducted from 5 pm to 7 pm on one day that week, Tuesday through Thursday. Select locations also included a weekend count from 10 am to noon on Saturday. Locations near schools included a morning count (7 am to 9 am). Tables 8 and 9 contain the top 10 count locations for pedestrians and bicyclists.

Table 8. Top 10 locations for Pedestrian Counts[1]

| Street 1 | Street 2 | Total |
|---|---|---|
| Broadway | Walnut (Sat AM) | 684 |
| Lexington | Walnut | 557 |
| Broadway / Biltmore | Patton (Pack Square intersection) | 535 |
| Broadway | Walnut | 523 |
| Haywood | Battery Park | 512 |
| Patton | Coxe | 425 |
| Asheville Transit Center | Aston/Patton | 249 |
| Haywood | Vermont | 205 |
| Haywood | Vermont (Sat AM) | 194 |
| Patton | Coxe (Sat AM) | 178 |
| Asheville Transit Center | Aston/Coxe | 156 |
| Hilliard | Asheland | 152 |
| Amboy (Carrier Park) | Short Michigan | 85 |
| WT Weaver Blvd | Broadway | 84 |

[1] Locations with high Saturday AM counts are also included.

Table 9. Top 10 locations for Bicycle Counts[1]

| Street 1 | Street 2 | Total |
|---|---|---|
| Weaver | Broadway | 61 |
| Broadway | Walnut | 53 |
| Haywood | Vermont (Sat AM) | 47 |
| Amboy | Short Michigan (Greenway; Sat AM) | 41 |
| Patton | Coxe | 40 |
| Murdock | Coleman | 35 |
| Broadway / Biltmore | Patton (Pack Square intersection) | 34 |
| Lexington | Walnut | 32 |
| Haywood | Vermont | 32 |
| Chestnut/Broadway | Montclair | 32 |
| Hilliard | Asheland | 29 |
| Haywood | Battery Park | 28 |

[1] Locations with high Saturday AM counts are also included.

Table 10 on pages 67 and 68 is the full list of counts.

It was determined early in the CMP process that the season in which the majority of the planning efforts were being conducted are not conducive to collecting pedestrian and bicycle counts due to winter weather. The National Bicycle and Pedestrian Documentation project identifies preferred weeks to conduct counts during each season. The dates identified for 2010 are Tuesday, September 14 through Thursday, September 16; and Saturday, September 18 through Sunday, September 19.

The Optional Count Dates are as follows:

- Tuesday, May 11 through Thursday, May 13
- Tuesday, July 6 through Thursday, July 8

The following are potential locations for FBRMPO and Land-of-Sky RPO to identify volunteers conduct these counts in Haywood, Henderson, Transylvania and Madison Counties during the preferred dates in September. A more complete list should be obtained through discussions with the TCC and other pedestrian and bicycle groups.

**Haywood County**

- Bryson Street at Central Elementary School, Waynesville;
- North Main Street & East Street / Church Street, Waynesville;
- US 19-23 & Academy Street, Canton;
- US 19 & Rich Cove Road, Maggie Valley;

**Henderson County**

- Downtown Hendersonville, multiple locations;
- US 25 & Liberty Road / Cane Creek, Fletcher.

**Madison County**

- US 70-Main Street & Bridge Street, Marshall; and
- N. Main Street & College Street, Mars Hill.

**Transylvania County**

- US 64-Broad Street & US 276-East Main Street, Brevard.

Table 10. Complete Tally for All Locations of Pedestrian & Bicycle Counts

| Street 1 | Street 2 | Ped | Bike |
|---|---|---|---|
| **Amboy** | Short Michigan (Greenway; Sat AM) | 81 | 41 |
| **Amboy** | Short Michigan (Greenway) | 85 | 9 |
| **Asheville Transit Ctr** | Aston/Patton | 249 | 12 |
| **Asheville Transit Ctr** | Aston/Coxe | 156 | 11 |
| **Azalea** | Tunnel Road (US 70) | 13 | 6 |
| **Biltmore Avenue** | Bryson / Meadow | 15 | 14 |
| **Biltmore Avenue** | All Souls / Hendersonville Rd | 30 | 8 |
| **Biltmore Avenue** | All Souls / Hendersonville Rd (Sat AM) | 28 | 4 |
| **Blue Ridge Parkway** | Craven Gap (NC 694) | 41 | 15 |
| **Broadway** | Walnut | 523 | 53 |
| **Broadway** | Walnut (Sat AM) | 684 | 14 |
| **Broadway / Biltmore** | Patton (Pack Square intersection) | 535 | 34 |
| **Central** | Woodfin | 78 | 14 |
| **Charlotte** | Chestnut | 46 | 17 |
| **Chestnut/Broadway** | Montclair | 55 | 32 |
| **Clingman** | Patton | 35 | 18 |
| **Clingman** | Roberts | 20 | 10 |
| **College** | Oak | 51 | 12 |
| **Evelyn** | Edwin/Kimberly | 62 | 16 |
| **Fairview** | School Road | 29 | 1 |
| **Haywood** | Vermont (Sat AM) | 194 | 47 |
| **Haywood** | Vermont | 205 | 32 |
| **Haywood** | Battery Park | 512 | 28 |
| **Haywood** | Craven | 14 | 27 |
| **Haywood** | Patton / Smoky Park Hwy | 27 | 17 |
| **Haywood** | Vermont (Weekday AM) | 76 | 14 |

| Street 1 | Street 2 | Ped | Bike |
|---|---|---|---|
| **Hendersonville Road** | Rock Hill Road | 3 | 1 |
| **Hendersonville Road** | Busbee | 0 | 1 |
| **Hilliard** | Asheland | 152 | 29 |
| **Kimberly** | Beaverdam | 1 | 12 |
| **Lexington** | Walnut | 557 | 32 |
| **Lyman** | Amboy | 5 | 18 |
| **Merrimon** | W.T. Weaver (Sat AM) | 47 | 28 |
| **Merrimon** | W.T. Weaver | 82 | 21 |
| **Merrimon** | Beaverdam | 25 | 15 |
| **Merrimon** | Chestnut | 70 | 12 |
| **Montford** | Hill Street (Dickson Elem) | 42 | 14 |
| **Murdock** | Coleman | 65 | 35 |
| **Patton** | Coxe | 425 | 40 |
| **Patton** | Coxe (Sat AM) | 178 | 28 |
| **Patton** | Louisiana | 7 | 1 |
| **Riverside** | Lyman | 23 | 17 |
| **South French Broad** | Choctaw | 14 | 4 |
| **Swannanoa River Road** | South Tunnel Road | 5 | 11 |
| **Tunnel Road** | east of the tunnel (at Ingle's) | 30 | 6 |
| **Tunnel Road** | Riceville | 15 | 0 |
| **Victoria** | Mission Hospital entrance | 17 | 3 |
| **Weaver** | Broadway | 84 | 61 |
| **Weaver Blvd** | University Heights (Roundabout / Greenway) | 66 | 23 |
| **Weaverville Highway** | 39 South Main (Weaverville Primary) | 21 | 1 |
| **Weaverville Highway** | Old Marshall Highway | 0 | 1 |
| | **Total** | **5,778** | **920** |