

# CHAPTER 4 – COMPREHENSIVE TRANSPORTATION SCREENING

## 4.1 Introduction

This chapter of the report describes the methodology and results of the comprehensive transportation screening of the conceptual alternatives that were developed through the initial transportation screening process described in Chapter 3. The purpose of the comprehensive transportation screening effort is to further “test” in detail how each of the alternatives addresses the three categories established in the project’s Purpose and Need: 1) relieve congestion on VT 2A and at Five Corners; 2) address mobility needs between Williston and Essex; and 3) improve safety along VT 2A and at Five Corners. The comprehensive transportation screening seeks to answer the question: how and to what extent does each alternative change travel patterns and/or transportation system capacity such that the Purpose and Need of the project might be accomplished?

The comprehensive transportation screening consists of the following basic steps, each of which is described in this chapter:

- Conceptually develop the 23 alternatives, i.e., define physical/operational improvements assumed for each alternative, including longitudinal alignment, number of lanes (i.e., width), treatment of intersections, etc. (Section 4.2)
- Describe the No Build Alternative (as this is the baseline against which the 23 alternatives are compared). (Section 4.3)
- Determine the existing traffic conditions. (Section 4.4)
- Identify appropriate analysis methods and performance measures. (Section 4.5)
- Conduct analysis and present results. (Sections 4.6 and 4.7)

## 4.2 Description of the 23 Conceptual Alternatives

This section describes the 23 conceptual alternatives identified through the initial transportation screening in greater detail. Alternative 1 is a combined TDM and public transportation alternative that does not include any improvements to existing roadways or construction of new roadways. Alternatives 2 through 8 are “Improve Existing Roadways” alternatives. Alternatives 9 through 15 are “Construct New Roadways” alternatives. Alternatives 16 through 23 are considered “Combination/Other Alternatives.” Alternatives 22 and 23 are concepts proposed by the Vermont Smart Growth Collaborative (VSGC). For all but Alternative 1, specific intersection, cross-section, and overall roadway improvements are described. The No Build Alternative is described in Section 4.3.

With regard to the conceptual development of the alternatives, there are many physical elements that must be specified to define any roadway alternative. Key elements are the number of travel lanes, provisions for each traffic move at intersections, separation of the travel directions (divided or undivided), control of access (limited access with interchanges, at-grade intersections, driveway access), and provision for pedestrians and bicycles. Some of these elements are the basis of defining alternatives (e.g., Circ limited access highway vs. boulevard), but all must be specified in order to make the transportation and environmental assessments.

For all roadway alternatives, the number of travel lanes was based on expected traffic volumes, which were determined with the Chittenden County Metropolitan Planning Organization (CCMPO) regional travel demand model. Based on projected traffic volumes, it was determined

that four travel lanes would be required in most alternatives in order to have a reasonable chance of meeting the Purpose and Need; the exceptions are Alternative 15 (Mountain View Road Connector), where traffic volumes would be low enough to be carried by two lanes, and Alternatives 22 and 23, which were defined by the VSGC with two- and three-lane segments. For all situations except the limited access highways, four-foot shoulders and a seven-foot planted strip with sidewalks were included on both sides of the roadway. For roundabouts, a uniform 180-foot diameter was used for screening purposes for those alternatives involving roundabouts. This diameter size is the high end of the FHWA-recommended range of sizes for urban roundabouts and the low end for rural roundabouts.

In summary, alternatives were defined to have a reasonable chance to satisfy Purpose and Need, but cross-sections were made no wider than necessary in the interest of limiting environmental impacts. It is recognized that some cross-sections could lead to environmental, historic, or property impacts (as discussed in Chapter 5), but for the purposes of screening, the first question to be answered is whether an alternative has the potential to meet the Purpose and Need. The alternatives that will be advanced to the short list for detailed analysis in the Draft EIS will be refined to reduce environmental impacts to the extent possible consistent with meeting the Purpose and Need.

#### **4.2.1 Alternative 1 – Combined TDM and Public Transportation Concepts**

This alternative includes both the TDM and public transportation concepts that were recommended to be advanced in the initial transportation screening and is shown conceptually in Figure 2. The purpose of this alternative is to determine if a stand-alone “package” of TDM and public transportation concepts, without any improvements to existing roadways or new roadways, achieves the three categories of the Purpose and Need. This alternative was developed in consultation with the Chittenden County Transit Authority (CCTA).

Alternative 1 differs from the other alternatives in that it includes improvements outside the project area. For public transportation to be effective, improvements must capture trips at their origin, and many of the vehicle trips in the project area originate elsewhere in Chittenden County and adjacent counties. Thus, Alternative 1 includes service elements that serve public transportation catchment areas at points of origin outside the project area to reduce traffic volumes on VT 2A rather than accommodating trips when they enter the project area, as roadway improvements and new roadway alternatives do.

The following sections describe the individual components of this alternative.

##### **Transportation Demand Management (TDM)**

The TDM concepts that were incorporated into this alternative from the initial screening (see Chapter 3) include:

- TMA development for VT 2A businesses
- Ridesharing
- Flexible work schedule
- Park-and-ride lots

A region-wide TDM program is already assumed for the project area as part of the Chittenden County Metropolitan Transportation Plan (MTP) and these assumptions are included in the future No Build condition (described later in this chapter). The MTP assumes that a regional TDM program is successful at reducing home to/from work single occupant vehicle (SOV) trips by 10% to major employment centers. According to the MTP, the 10% reduction is assumed only for home to/from trips associated with the target TDM areas. The result is an approximate reduction of 1.5% in county-wide vehicle trips. This methodology does not explicitly measure specific TDM strategies such as flex-time, rideshare programs, preferential parking for car-pools, parking space cash-out, etc. Rather, the 10% reduction of home to/from work SOV trips is a reasonable goal based on the local experience of the Campus Area Transportation Management Association (CATMA). This mode share is directly attributable to CATMA programs such as subsidizing transit passes, incentives for walking and biking, and rideshare programs. Based upon this, a county-wide reduction of 10% was applied in the analysis for this alternative for work auto trips to account for the implementation of TDM strategies.

TDM items not carried forward include HOV lanes and congestion pricing. HOV lanes in the traditional sense were not carried through this alternative for two reasons. First, instead of creating dedicated HOV lanes for the relatively short distance on VT 2A to be used by high occupancy autos, the additional northbound and southbound lanes would be created as dedicated bus lane(s) to maximize the efficiency and ridership for the transit portion of this alternative (see public transportation section below). Second, regional HOV lanes on I-89 were not contemplated because this would require the widening of the highway from two lanes in the peak direction to three lanes.

Congestion pricing was also not carried through this alternative, for the following reasons. Congestion pricing is a transportation mitigation measure largely implemented on high traffic volume highways in the major urban centers in the United States, such as San Diego, the San Francisco Bay Area, Los Angeles and New York to reduce traffic congestion during peak travel periods. This approach applies a higher fee to roadways at peak hours and is mainly implemented on existing toll roads. Studies have shown that congestion pricing is most beneficial in downtown central business districts where commuters have many transportation options. By implementing congesting pricing on a roadway in the Circ-Williston project area, existing employers, retail centers and residents would be at an economic disadvantage to other areas where similar tolling or congestion pricing are not in place. It would be more difficult and expensive to make basic deliveries, to provide services and to attract new business. Commuters, shoppers and other motorists would likely avoid the toll, thus hurting existing and future development. This policy may help reduce traffic volumes in the project area but would likely push the congestion to other parts of the region.

### **Public Transportation**

This component of Alternative 1 was developed using combinations of the transit services presented in Chapter 3. These services would be designed to serve major work trip travel flows to, from, and within the project area, and would consist of a mix of four different types of transit services:

- Traditional bus service
- Flexible bus service
- Bus rapid transit (BRT)
- Rail

As described below, the combination of these services could greatly expand public transportation options within the project area, and to and from surrounding areas. These services could provide high quality regional services that could be competitive with travel by

private vehicle, and flexible services that could provide door-to-door service for many trips. The process of identifying specific public transportation improvements began first with an inventory of existing services and then a demographic analysis to appropriately scale and locate proposed improvements.

### Existing Bus and Rail Services

The Chittenden County Transit Authority (CCTA) operates three bus routes within the project area, and one bus route that operates as an express service through the project area without making any stops (Figure 3). The four routes that currently travel in the project area are:

- Route 2 – Essex Junction, local route that operates between Burlington and Essex Junction via Winooski.
- Route 4 – Essex Center, local route that operates in a loop entirely within Essex.
- Route 23 – Williston, local route that operates between the University Mall in South Burlington and Essex Junction via Williston.
- Route 86 – Montpelier LINK Express, express route that operates between Montpelier and Burlington via I-89 with no stops in the project area. There is a stop, however, just beyond the southeast boundary of the project area (I-89 exit).

Rail service in the project area is provided by Amtrak. Amtrak's Vermonter operates between St. Albans and Washington, D.C., and stops at Essex Junction. There is one round trip per day, which departs southbound daily in the morning and arrives northbound on weekdays and weekends in the evening. CCTA Routes 2, 4, and 23 all provide connections to and from the morning train. Route 2 meets the evening Amtrak arrival, providing a connection to Burlington.

### New Service Development

Essex Junction and Williston are the second and third largest trip attractors in Chittenden County, behind only Burlington. Excluding trips within the same town, Burlington attracts 29,110 work trips per day, Essex Junction attracts 12,117 work trips per day, Williston attracts 11,067 per day, and South Burlington attracts 9,736 work trips per day. The largest numbers of work trips to the project area are from these Burlington area communities, plus St. Albans. As shown in Figure 4, which displays work trip volumes between communities with 1,000 or more daily trips (in terms of one-way trips in both direction), the largest volumes of work trips are between the project area and Burlington, South Burlington, and Colchester. As would be expected, travel volumes to and from less-densely populated communities to the east are substantially lower.

The implications of these travel flows for the design of transit services are that:

- Services that operate to and from the project area via Burlington could also serve multiple markets, i.e., to and from Burlington as well as to and from the project area. The combination of markets in this manner could support more frequent service, which would be more convenient and more attractive.
- Services that operate to and from Burlington through the project area (for example, St. Albans – Essex – Burlington rail) could also serve multiple markets, which would also improve service viability.

### Proposed New Public Transportation Services

The proposed transit services associated with Alternative 1 would provide a mix of routes designed to provide attractive transit service to, from, and within the project area. New commuter rail service from St. Albans to Burlington via Essex Junction, and new BRT services from Burlington and Charlotte to Essex Junction via Williston would provide fast regional connections. New and expanded traditional fixed-route and new flex-route services would provide connections to and from the rail lines, between local routes, and within the project area.

Trips to most important activity centers could be made directly or via one transfer, with curb-to-curb service provided in many cases.

New transit centers would also be developed at Essex Junction Station and at Maple Tree Place in Williston. These transit stations would act as the focal points for local services, and provide connections between the rail lines and local fixed-route and flex-route services, and between the local services. Detailed descriptions of these services are provided in the following sections.

- **St. Albans - Burlington Rail Service**

New commuter rail service would be implemented between St. Albans and Burlington via Georgia, Milton, Colchester, Essex Junction, and Winooski. This service would provide connections to and from the project area from all of these communities, and also provide commuter service to and from Burlington. This service would operate along the New England Central Railroad (NECR) Main Line between St. Albans and Essex Junction, and the NECR Burlington – Essex Line between Essex Junction and Burlington.

- **Regional Bus Rapid Transit Service**

Using combinations of rail right-of-ways, limited access highways, and dedicated bus lanes on VT 2A, two BRT services would be developed that could provide travel times competitive with private vehicles:

- BRT1 Burlington – Essex Junction/IBM via Williston
- BRT2 Charlotte – Essex Junction/IBM via Williston

Each of the proposed BRT lines would initially operate in the Vermont Railways corridor to and west of US 7. One route would operate from downtown Burlington to I-189 (BRT 1) in an exclusive busway adjacent to the railroad tracks. Typically railroad corridors are approximately 65 feet wide, which provides sufficient width for busways and a rail line, but it has not yet been confirmed that sufficient width exists in these corridors. The other route (BRT 2) would operate from Charlotte to I-189 in an exclusive busway adjacent to the railroad tracks. As these routes meet along the Vermont Railways corridor just to the west of the US 7 and I-189 interchange, both BRT services would be connected to I-189. From this point on, each route would operate along the same alignment. Each service would travel in the general stream of traffic on I-189 to I-89 and exit at VT 2A (Exit 12) in Williston.

On VT 2A, the BRT services would operate in dedicated bus lanes along each side of the road between I-89 and Five Corners. The bus lanes would be 16 feet wide (12-foot travel lane with four feet of separation from VT 2A) with two-foot wide shoulders on each side of VT 2A. These lanes would be limited to buses except at intersections where they would be used by right turning vehicles. The BRT services would also operate in exclusive busways in the NECR right-of-way to a terminal station at IBM. BRT services would have limited stops, which would be at stations with similar facilities as rail stations. Transit signal priority would also be provided at signalized intersections along VT 2A. To complete the transit service, vehicles operating on BRT 1 and BRT 2 would travel along their respective routes in the opposite direction to Burlington and Charlotte, respectively.

- **Local Bus Services**

To provide connections with the rail and BRT lines and with local services, and to improve service in areas that would not be served by the rail lines, changes would be made to existing services. New services would also be developed. As described below, many of the local routes would operate along all or part of VT 2A between I-89 and Essex Junction. All local bus services in this corridor would use the dedicated bus lanes and would stop at the BRT stations.

**Fixed-Route Services.**

Changes to existing services would include:

- CCTA Route 23 would be straightened to operate more directly between the University Mall and Essex Junction, and to serve Burlington International Airport. The revised route would bypass the Taft Corners area, which would instead be served by a new F1 Taft Corners - Essex Junction Flex-Route (see next section).
- CCTA Route 4 would be eliminated and replaced by new F2 Essex Flex-Route service (see next section).

New fixed-route services would include:

- Route 24 Fairgrounds, which would operate between Susie Wilson and Kellogg Roads and Fairgrounds Station. This route would serve employment centers along Route 15 between Fairgrounds Station and residential areas along Susie Wilson and Kellogg Roads.
- Route 87 Montpelier– Essex Junction/IBM, which would operate via Williston, would be a commuter route that would operate in a similar manner as the existing CCTA Route 86 Montpelier – Burlington commuter route. It would operate along I-89 and VT 2A, and would use the dedicated bus lanes on VT 2A.

**Flex-Route Services.**

Seven new Flex-Route services would be developed to serve lower density areas and to provide curbside service to locations that are difficult to serve with fixed-route service. These would include:

- Route F1 Taft Corners – Essex Junction Flex Area. This route would operate as regularly scheduled fixed-route service between retail areas near Taft Corners and Essex Junction and then provide Flex-Route service in the Essex Junction Flex Area. Timed transfers would be provided with other services at Essex Junction Station.
- Route F2 Essex Flex Area–Essex Junction. This route would provide connections between the Essex Flex Area and Essex Junction Station. Flex service would be provided within the Essex Flex Area, with scheduled connections to and from Essex Junction Station (that would be coordinated with rail and BRT services). Connections could be made at Essex Junction Station to rail service, BRT service, and other local services (including Route F1 flex-service to Essex Junction locations).
- Route F3 Jericho/Underhill Flex Area–Essex Junction Station. This route would operate in the same manner as Route F2, but would operate between the Jericho/Underhill Flex Area and Essex Junction. This route would be designed to provide connections between Jericho and Underhill and job sites in Essex Junction.
- Route F4 Kimball Avenue Flex Area–Essex Junction. This route would operate in the same manner as Routes F2 and F3, but between a flex area along Kimball Avenue in Williston and Essex Junction.
- Route F5 Williston Flex Area–Essex Junction. This route would provide flex-service between Williston residential areas, Taft Corners, and Essex Junction and IBM.
- Route F7 Waterbury Flex Area–Essex Junction, which would operate from a Waterbury flex area to Williston, Essex Junction, and IBM via I-89, and VT 2A.
- Route F7 Richmond Flex Area–Essex Junction/IBM, which would operate from a Richmond flex-area, and then to Williston, Essex Junction, and IBM via I-89 and VT 2A.