

# STUDY TO ADD RAIL SERVICE AT CARMEL CHURCH, CAROLINE COUNTY, VIRGINIA

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Prepared for

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*Submitted by*



*In association with*



## I. EXECUTIVE SUMMARY

This Study seeks to address the most important issues related to the addition a new rail passenger station at Carmel Church in Caroline County, Virginia.

The tasks involved in the effort included:

- Research – identify comparable rail passenger studies.
- Interview key players; Amtrak, DRPT, VRE, FAMPO.
- Understand and analyze the Amtrak Travel Demand Model, including an estimate of monthly ridership
- Identify the steps required to “Quick Start” the process to have Amtrak add a new station at Carmel Church in response to development issues.

The study’s conclusion can be summarized as follows:

**If development occurs in the Carmel Church in a magnitude that will generate the travel demand that will justify a new passenger rail station and the necessary funding for the capital and operational costs can be identified and obtained, there is a clear path to establishing a new station that will be a linchpin to development on Caroline County.**

## II. APPROACH OVERVIEW

The purpose of this document is to, as part of an Alternatives Analysis, analyze and define the issues and circumstances surrounding the addition a new rail passenger station at Carmel Church in Caroline County, Virginia. The Team has conducted research, evaluated data and examined the process by which the station could be created. Also provided is a detailed explanation of the travel demand model used by Amtrak to determine revenues and ridership for a new rail passenger service on their system. Finally, we have provided a “Quick Start” roadmap for officials to consider if and when population growth, employment growth, and/or the relocation of a large employer, such as a federal agency, provides sufficient potential riders to justify a new station

## III. RESEARCH

### A. RAIL STUDIES

#### Summary

The Team set out to identify, collect, and review comparable revenue and ridership studies conducted for the addition of a service stop on an existing line in order to provide a framework for this study as well as relevant benchmarks for quantifiable data elements including capital and operating costs, revenues, and ridership. The Team was able to assemble a dozen revenue and ridership studies from across the US that included:

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|---|---|
| • Kansas City (MO)– Oklahoma City to Fort Worth | • Bossier City-Shreveport to Fort Worth |
|---|---|

<ul style="list-style-type: none"> <li>Chicago to Seattle (via Montana) – Hiawatha Route</li> </ul>	<ul style="list-style-type: none"> <li>Chicago to Seattle (via Utah) – Pioneer Route</li> </ul>
<ul style="list-style-type: none"> <li>Chicago-Rockford-Galena to Dubuque</li> </ul>	<ul style="list-style-type: none"> <li>Central New Jersey/Raritan Valley</li> </ul>
<ul style="list-style-type: none"> <li>Lansing to Detroit</li> </ul>	<ul style="list-style-type: none"> <li>Washington DC to Richmond</li> </ul>
<ul style="list-style-type: none"> <li>Michigan (Intrastate)</li> </ul>	<ul style="list-style-type: none"> <li>New York to Vermont</li> </ul>
<ul style="list-style-type: none"> <li>City of Fairfield (CA)</li> </ul>	<ul style="list-style-type: none"> <li>Southeastern North Carolina</li> </ul>

The Team reviewed each of these studies to develop an understanding of the approaches employed in assessing these expanded rail services and the underlying assumptions that informed their revenue and ridership estimates. The challenge for the analysis of adding a station at Carmel Church, however, is that these studies only contemplated new or the resumption of former service routes rather than the addition of a stop along an existing route. Moreover, these studies generally examined numerous alternative service options, including different routes and transportation modes. Therefore, for the purposes of this study, we focused more on the methodologies used in these analyses to assess the suitability and feasibility of the preferred alternative, which the Team could adopt or adapt here. The Team was then able to leverage these “best practices” for use in methodology laid forth in the remainder of this report for advancing the development of rail service at Carmel Church in as expeditious and cost-efficient manner as future circumstances warrant.

## B. INTERVIEWS

**Overview** In order to understand the history, issues and determining factors related to adding a new passenger rail station in Caroline County, VA, the team identified four key organizations essential to meet the requirements of this study:

**Amtrak** The **National Railroad Passenger Corporation**, doing business as Amtrak, provides intercity passenger train service in the United States. It has contractual relationships with several states, including the Commonwealth of Virginia, for financial and operational partnerships for trains operated in the states. In Virginia, this relationship includes several trains in the DC – Richmond corridor. Based on this relationship, Amtrak is responsible for determining the costs and benefits from changes to rail lines, such as adding a station in Carmel Church.

Our team had several conversations with Jay McArthur, principal officer in Amtrak’s Policy & Development Department which oversees Amtrak’s operations in Virginia. Key info:

Prior to the approval of new rail service, Amtrak requires a formal Revenue and Ridership (R&R) study by AECOM, as an Amtrak consultant, to determine the justifications for a new station at Carmel Church, the cost of which would range from \$25,000 to \$40,000.

### Key Findings:

- Amtrak has no funding for incremental costs associated with a new station. Funds from Virginia, local government or private sources will be required.
- Within operational parameters indicated by the R&R study, Amtrak will add the station at Carmel Church if the expenses associated with the stop are borne by other entities.

### DRPT

The Virginia Department of Rail and Public Transportation's (DRPT) mission is to improve the mobility of people and goods while expanding transportation choices in the Commonwealth. DRPT has three primary areas of activity — Rail, Public Transportation, and Commuter Services.

The Team initiated discussions and contacts with Emily Stock, DRPT Director of Rail Planning, advising her of the progress of the Alternatives Analysis and discussing in particular the study related to a new rail station at Carmel Church.

**Key Finding:** Commonwealth does not have a dedicated source of funding for rail projects like this. However, DRPT requested that they be kept apprised of developments.

### VRE

The Virginia Railway Express, (VRE) is a joint project of the Northern Virginia Transportation Commission and the Potomac Rappahannock Transportation Commission to provide commuter-oriented rail passenger service.

The Team spoke with Constance Hoeffner, Planning Manager at Virginia Railway Express.

**Key Finding:** VRE has no plans or interest at this time to extend further south than the Spotsylvania station.

### FAMPO

The Fredericksburg Area Metropolitan Planning Organization (FAMPO) was designated after the 1990 Census and has a planning area that includes the City of Fredericksburg, and the counties of Spotsylvania and Stafford. FAMPO serves as a regional partnership among the United States Department of Transportation, Virginia Department of Transportation, Virginia Department of Rail and Public Transportation, transit agencies, local elected leadership, local planning and public works directors, the business community, and citizens in the planning area.

The Team has had several contacts with Lloyd Robinson, FAMPO Administrator, advising of progress discussing issues.

**Key Finding:** While FAMPO has taken no position, it is likely that, if ridership and revenues can be demonstrated, then there should be little reason for FAMPO to oppose the project.

### IV. ANALYSIS OF AMTRAK REVENUE AND RIDERSHIP (R&R) MODEL

**Overview** Since there is currently insufficient ridership available at the Carmel Church site, requesting and funding a full R&R study from Amtrak would be premature. However, it is important to understand the inputs to and results from the Amtrak Travel Demand Model. The following section describes the methodology and operation of the model in detail. When there are existing or potential circumstances that appear to justify a passenger rail station at Carmel Church, this knowledge, understanding and documentation will allow Caroline County officials to undertake the necessary actions to achieve their goals regarding rail access to this area.

**Methodology** The ridership/revenue model is responsive to all of the following parameters:

- Station stop locations;
- Train travel times;
- Train departure/arrival times/time-of-day;
- Frequency (number of trains);
- Rail fares/yields;
- Competing auto travel time & cost;
- Competing bus travel time & cost; and
- Future growth rates.

**Study Area Defined** The model study area to analyze the ridership and revenue effects of adding a new rail station at Carmel Church:

- Corridor Definition
  - DC – Richmond: this corridor has been studied extensively for decades. The expansion of VRE south to Spotsylvania County is the latest recognition of increased rail passenger demand. Moreover, the additional trains from DC to Norfolk/Newport News are also recognition of this pattern. For the purposes of determining the justification of adding a new station at Carmel Church in Caroline County there should be sufficient data available to assess demand in this corridor.
  - Fredericksburg – Richmond: for the purposes of adding a new station at Carmel Church, it will be necessary to look at the “micro” aspect of the corridor, specifically the nature and decision making of potential rail passengers in the immediate geographic area. What will be important is whether they are “new” passengers or existing passengers.

**Data Sources**

- Existing Travel Market
  - The key model inputs are provided by Amtrak/DRPT train timetables and fares. As well, the statewide highway network for access to/from

stations and for competing auto travel plays a vital role.

- Variables in the travel market growth include population, income, and employment. Variables in the travel market share include travel time, line haul, access/egress, travel cost, and frequency (number of trains and departure/arrival times-of-day). The model also accounts for trip purpose market segments across commute, business, recreation and other categories. As a matter of practice, each origin-destination market is analyzed with a separate set of calculations by trip purpose.
- Highway traveler data can be obtained through both license plate surveys and rest area surveys. The license plate survey technique involves videotaping license plates, reducing that data and entering in observed plates, obtaining addresses from the Department of Motor Vehicles and mailing surveys. Completed surveys can be returned by mail and key-entered or, the respondent may have an option to complete survey by internet. The rest area survey technique involves direct interviews with travelers in a rest area.
- For train traveler surveys, self-administered survey forms will be distributed to passengers on-board Amtrak trains in the corridor. These will be collected and completed surveys were key-entered.

Survey content for both the highway and rail surveys consisted of the following categories of data:

- Origin & Destination
  - Location (5-digit zip code)
  - Type/trip purpose
  - Departure/arrival times
  - Group Size / Vehicle Occupancy
  - Trip Frequency
  - Traveler Characteristics
  - Age & gender
  - Household Characteristics
  - Size
  - Number of vehicles
  - Annual income
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- Travel service characteristics are the key independent variable in the model, including travel time, travel cost, frequency (for rail) and time of day. VDOT's geographic information system (GIS) based intercity highway network should provide the basis for highway travel times, distances and costs. The intercity rail travel characteristics are based on published timetables as well as ridership and revenue data provided by both DRPT and Amtrak. Highway and rail surveys provide the basis for quantifying the existing travel market.

<b>Travel Model</b>	<p>The model development steps will use input from conducted travel surveys, socio-economic data and survey data, and the development of service parameters/assumptions. From this information, the travel demand models will be run with key Inputs being rail service characteristics, train schedules, travel time, frequency (departure/arrival times-of-day), revenue yield/fares, station access (highway time and cost), competing auto and bus service characteristics, and socio-economic data and forecasts.</p> <p>The first stage of the model predicts total travel volumes for each origin/destination pair, including the proposed Carmel Church station. The second stage predicts the share of intercity travel that is expected to use each available modal alternative (automobile, rail) in the future. Both model stages are conditional on the characteristics of the modal services to be offered and the characteristics of the population. The model is consistently checked for accuracy through comparison of incremental ridership and revenue forecasts of near term service changes with the actual ridership and revenue increments resulting from the initiative.</p>
<b>Travel Demand Model Calibration and Validation</b>	<p>This model will be calibrated to match observed shares for selected city pairs and then the results will be validated to predict the results for the Carmel Church station.</p>
<b>Model Output Results</b>	<p>Once the model is calibrated, the model will be used to forecast revenue and ridership for the proposed Carmel Church rails station.</p>

### V. "QUICK START" RAIL SERVICE TO CARMEL CHURCH

<b>Overview</b>	<p>The area of Caroline County in the vicinity of Carmel Church has the potential to develop rapidly, given its location and attributes, as discussed elsewhere in this report. However, rail passenger access may be a key element of the justification for rapid development, especially a scenario in which a large federal agency or a large business unit wants to relocate to the Carmel Church location. Therefore, this section of the report provides a framework to understand the issues and actions required to expedite a new rail passenger station at Carmel Church.</p>
<b>1. Study and understand the issues, data and other issues involved</b>	<p>This part of the report includes a discussion of the circumstances related to the criteria that could justify Amtrak rail service to Caroline County via a passenger rail station at Carmel Church. Increased demand due to population and/or employment growth, along with other situations leading to increased ridership, costs and other relevant issues (e.g., the southern expansion of VRE) in the DC – Richmond corridor should be monitored. When overall growth or rapid development reaches a threshold that would likely justify a new train station, this sets out the steps for a "Quick Start" to achieve this goal.</p> <p>The following are the most important Issues that could establish conditions that would justify a new Amtrak station at Carmel Church:</p>

2. Monitor development / population growth

- **Future Increases in Population and Employment**

As discussed elsewhere in this Alternatives Analysis, the population base in the George Washington Region, including Caroline County, is anticipated to double over the next twenty-five years. Caroline County, while distant from two of the state's largest urban areas, Washington, D.C. metropolitan area and the greater Richmond region, is closely tied to these major employment centers by the many residents who travel along I-95 each day to work and access services in these areas. While employment forecasts for the George Washington Region indicate a significant increase in jobs by 2035, the rate of employment growth is projected to be less than the rate of population growth, indicating an increase in the existing trend of daily commuting out of the region. For this reason, residents will continue to travel outside of the county to the major employment centers of the Washington, D.C. metropolitan area and Richmond for work. According to the 2000 Census, nearly 60 percent of Caroline County residents travel over 30 minutes to work, with over 15 percent of residents traveling an hour or more. As the population of the George Washington Region and allure of jobs in the Washington, D.C. metropolitan area continues to grow, so does congestion on I-95, resulting in the continued increase in these already substantial commute times.

Currently, Caroline County lacks viable transit options for commuters traveling to employment concentrations outside of the county; thus, commuters are forced to rely on the roadway system, primarily I-95, to be the primary means of transportation to work. The proportion of work trips originating in Caroline County using transit or carpool is roughly 17 percent, compared to approximately 78 percent of work trips made by residents who drive alone.

While capacity improvements are planned along the I-95 corridor, the currently planned roadway and transit infrastructure will be inadequate to serve the needs of its users, both the residents of the George Washington Region and traffic travelling between Richmond and the Washington, D.C. metropolitan areas. With investment in multimodal transportation facilities and/or services, Caroline County could become better connected to the state and Eastern Seaboard, while reducing its reliance on I-95.

- **Rapid Economic Development (e.g., Agency relocation)**

This location is prime for a potential significant rapid development, such as the relocation of a major federal government agency or a significant commercial office operation since the majority of Caroline County is currently underdeveloped and used for agricultural purposes. The majority of the County is planned to remain rural in character, with preserved open space, working farm, or rural living uses. The County has focused planning efforts on specific growth areas, primarily along the I-95 corridor, such as Carmel Church. The primary growth area is planned for the most development and change from

existing conditions in the future, with higher density uses such as industrial, town center, and mixed-use neighborhoods. The Caroline County Comprehensive Plan 2030 identifies a strategy for transit-oriented development within the County. The plan proposes that high-quality transit service will be the catalyst for transit-oriented development and additional infrastructure investment in the County. The investment in transit-oriented centers would address the County's need for business investment, job creation and a higher quality of life for County residents without creating sprawl or dispersed population growth.

**3. When threshold(s) met - contact Amtrak – request a study using their Travel Demand Model**

- **Maintain oversight of the process, initiate study as necessary**

Caroline County, state and regional officials will monitor these situations as part of their overall responsibilities. When the “background” population and/or economic growth increases to levels that would potentially justify a passenger rail station at Carmel Church, FAMPO or Caroline County, working with DRPT should initiate a request to Amtrak to study the ridership, revenues and costs that will result from a new station. The exact level of development to trigger this request is not a bright line. However, the current total ridership at the Ashland station is approximately 1,800 – 2,000 per month, is an indicator when this threshold may be met.

The population density and economic development profiles of the areas surrounding the Ashland and Staples Mills stations will be documented so the Caroline County officials know when the threshold is close to being met so appropriate actions can be taken.

**4. Using the results of the Amtrak R&R study, take actions to initiate service at Carmel Church**

- **When justified, initiate rail service**

When the Amtrak model is run and the results are available, presuming the outcome justifies the station, state and local officials will have to take necessary actions to construct (or inspect and upgrade) the facilities existing at Carmel Church at that time (for example, there may be an existing bus bridge/park & ride facility).

One of the outputs from the model will be if and how much of a subsidy will be required to add the new station. Depending on the nature and magnitude of this requirement, a source of funding needs to be identified and secured.