CENTRAL VIRGINIA LONG-RANGE TRANSPORTATION PLAN – YEAR 2035





D. MODELING METHODOLOGY


APPENDIX

OCTOBER 2010

CVLRTP 2035 UPDATE
PROJECT MEMORANDUM

MODELING METHODOLOGY
Renaissance utilized VDOTs year 2035 model to examine the future year conditions to identify deficiencies for the trend condition and scenarios.

MODEL VALIDATION
As part of the modeling exercise, Renaissance ran a base year (2007) analysis to validate the model against existing traffic counts, made minor adjustments in the Greenview Drive area, and then ran the model for the future year 2035 scenarios. The minor adjustment for the Greenview Drive area was necessary due to the observed differences between the model volumes and the actual field volumes, which are significantly higher than the model volumes. In an effort to correlate the volumes, the numbers of houses and jobs in the nearby TAZs were increased such that the modeled conditions would better represent the field conditions. For the future year volumes, the model output was compared to the Greenview Drive preliminary engineering traffic study in an effort to validate the output.

Aside from the Greenview Drive area, the model was found to be performing well and was considered to be a valid demand model.

DEFICIENCY ANALYSIS
Volume over Capacity (v/c) Analysis
An analysis of volume-to-capacity (v/c) describes the quality of traffic service for a particular highway facility, which can then be mapped using Geographic Information System (GIS) software to identify patterns of deficiencies across the region.

The Central Virginia Metropolitan Planning Organization (MPO) utilizes a TRANPLAN highway network model, originally derived from Virginia Department of Transportation (VDOT) resources. The future year (2035) trend scenario network model was used as the basis for identifying deficiencies, in conjunction with the 2030 Central Virginia Long Range Transportation Plan (LRTP) list of highway projects. Model attributes for traffic volume and highway capacity were compared and categorized into one of three groups:

- ***Approaching capacity*** (volume/capacity is less than 0.9) –Volumes along these network links are not within 10% of the maximum hourly capacity for the facility. There may be infrequent traffic congestion during am or pm peak hours, typically related to a vehicle collision.

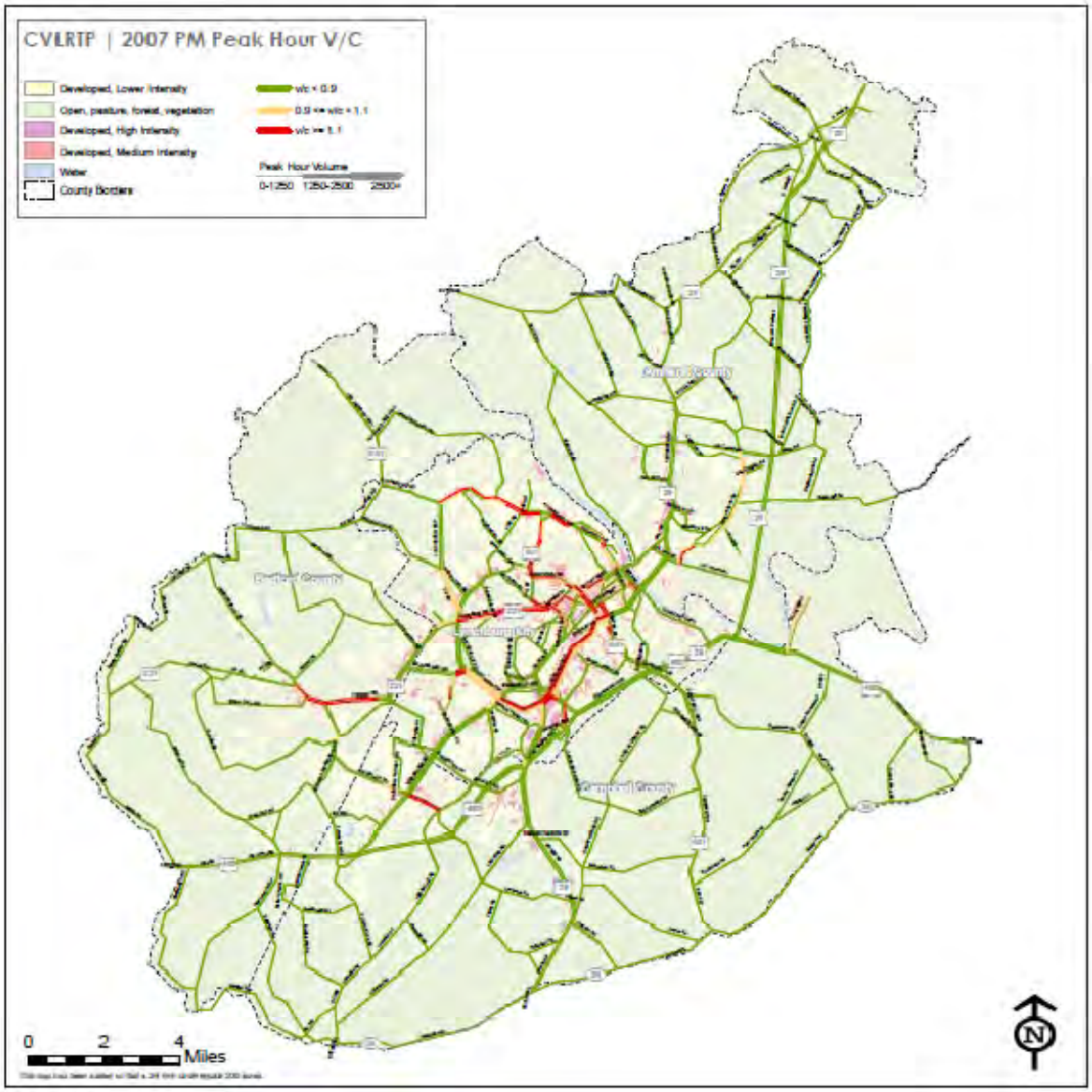
- ***At capacity*** (volume/capacity is between 0.9 and 1.1) – Volumes along these network links are within 10% of the maximum hourly capacity for the facility. There may be intermittent traffic congestion during am or pm peak hours.

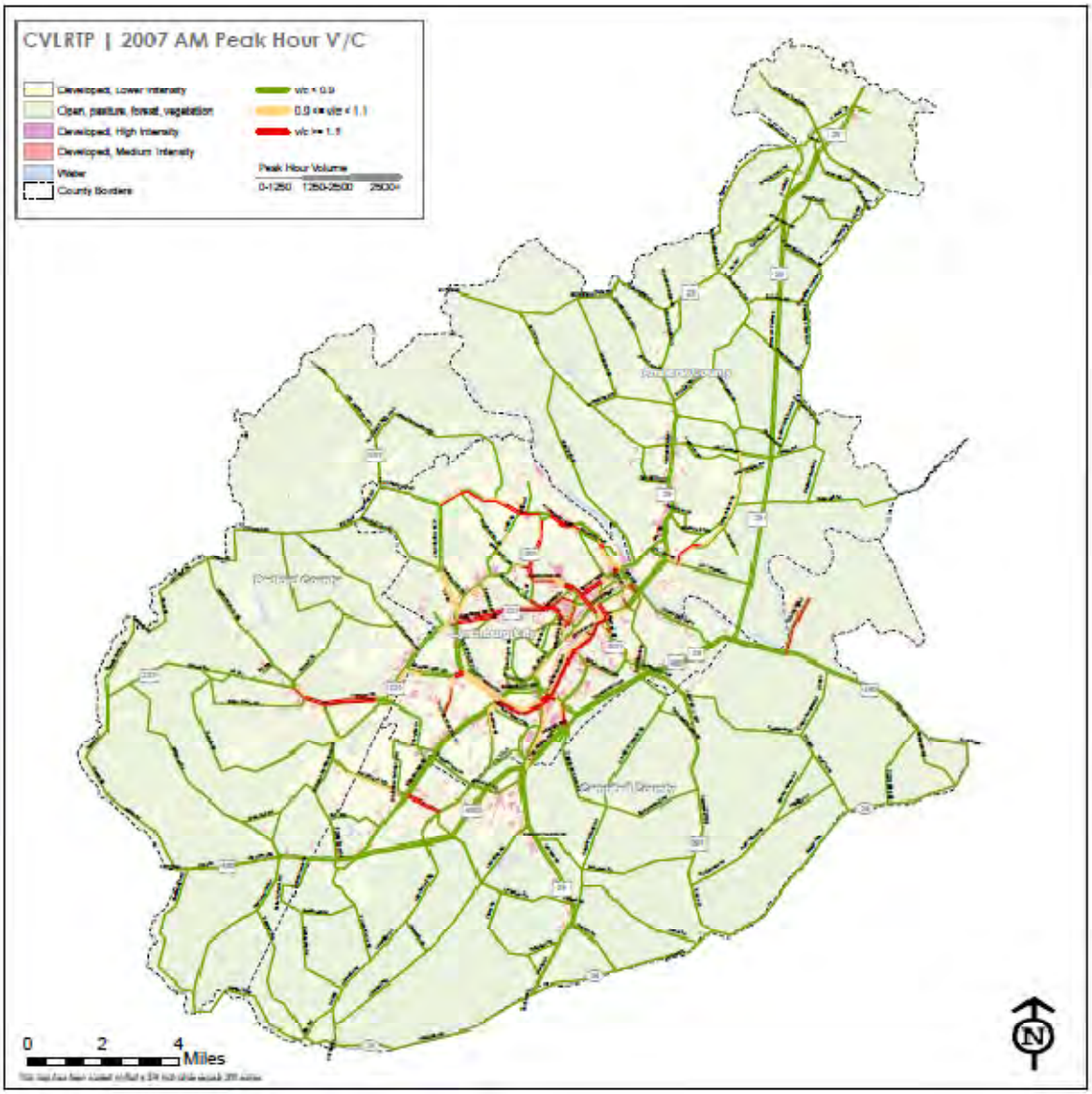
- ***Over capacity*** (volume/capacity is greater than 1.1) – Volumes along these network links exceed the maximum hourly capacity for the facility. There is routine traffic congestion during the am or pm peak hours.

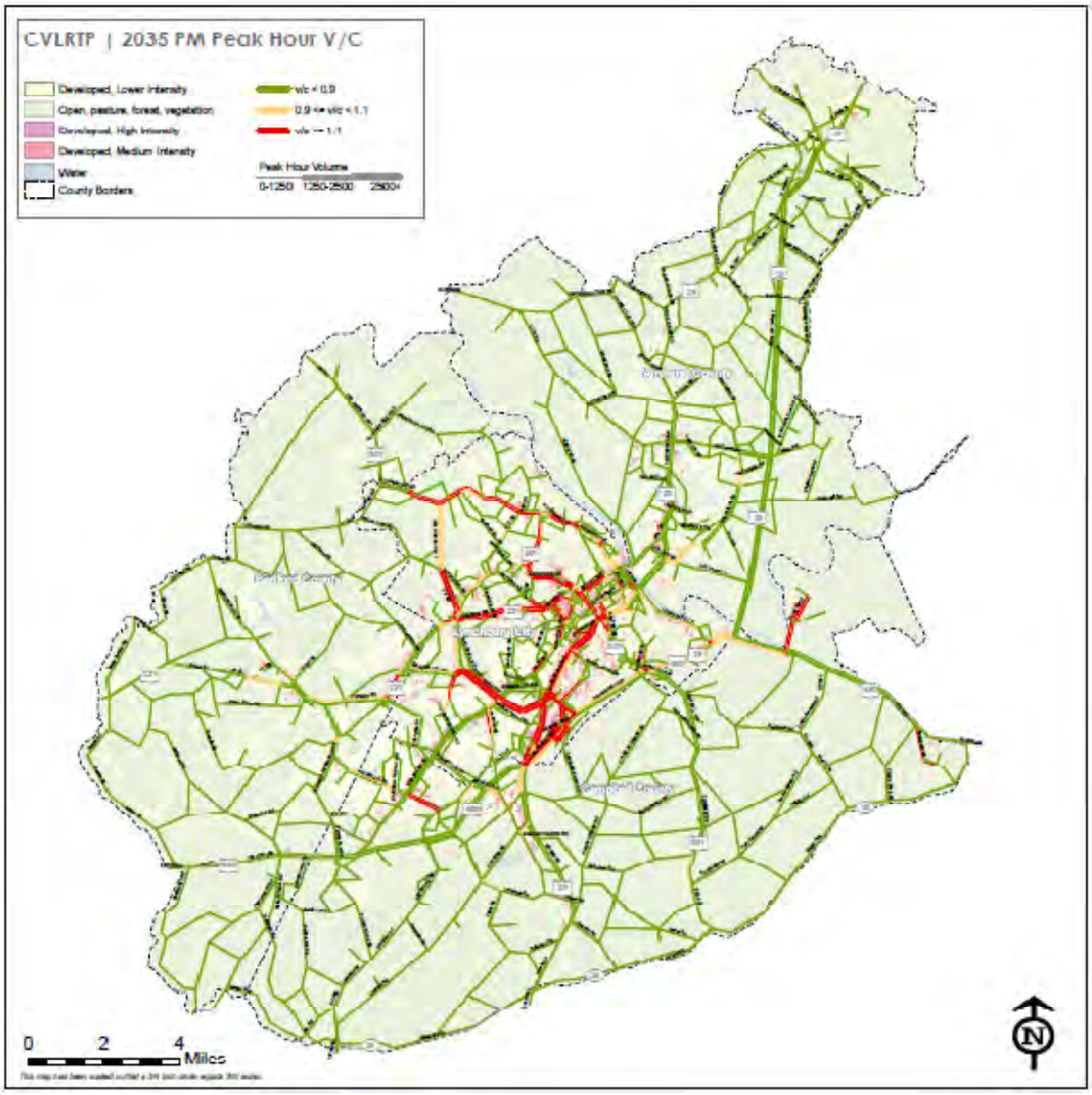
The first step in this analysis was to standardize the network model attributes to a one-hour measurement of traffic volume and capacity. The original network model calculates am and pm peak

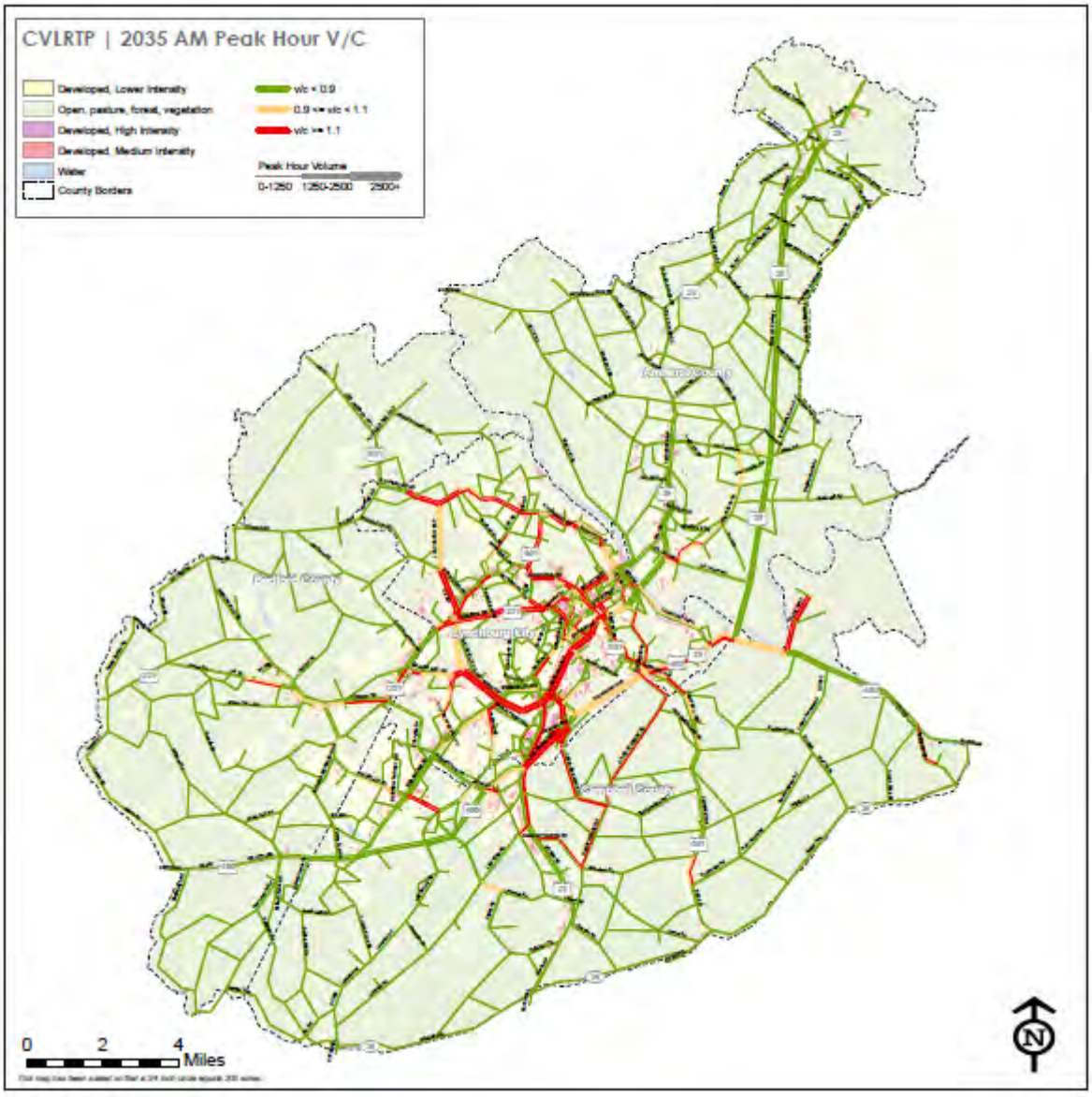
traffic volumes using a two-hour period. These values were converted to a one-hour period by using 60% of the value for the am peak, and 55% of the value for the pm peak, as established by best engineering practices. The original network model calculates roadway capacity according to the number of passenger cars, per hour, per lane, and reports a 24-hour ('daily') capacity. These values were converted to a one-hour period by using 10% of the value for daily capacity, as established by best engineering practices.

Volume-to-capacity ratios for individual roadways throughout the study area were analyzed to identify projected deficiencies in the future year (2035). Roadways that were projected to be over capacity in 2035 were recommended for inclusion on the list of LRTP improvement projects. See the following exhibits for the graphical representation of existing vs trend congested links. These identified deficiencies were compared to the previously identified deficiencies in the 2030 LRTP and were vetted with local stakeholders and VDOT.




CVLRTP | 2007 AM Peak Hour V/C
Developed, Lower Intensity
Open, pasture, forest, vegetation
Developed, High Intensity
Developed, Medium Intensity
Water
County Borders
v/c < 0.9
0.9 <= v/c < 1.1
v/c >= 1.1
Peak Hour Volume
0-1250
1250-2500
2500+
0
2
4
Miles
N


CVLRTP | 2035 PM Peak Hour V/C
Developed, Lower Intensity
Open, pasture, forest, vegetation
Developed, Medium Intensity
Water
County Borders
v/c < 0.9
0.9 <= v/c < 1.1
Peak Hour Volume
0-1250
1250-2500
2500+
0
2
4
Miles



SCENARIO MODELING

As part of the LRTP update, the trend scenario was modeled as described in the previous sections of this summary. The trend scenario is the basis for identification of the LRTP projects. However, in an effort to compare alternative future development scenarios, the CORPLAN GIS tool, as developed by Renaissance Planning Group under an FHWA grant in the early '90s, was utilized to develop productions and attractions for the redistributed jobs and households data. The CORPLAN model tool considers the type of development, density, design, and diversity of uses to skim off walk and bicycle trips to better replicate trip making characteristics found in compact mixed use development. The productions and attractions were then imported into the demand model and the model was re-run to examine certain performance measures for the region, including VMT, average trip length, and congested links, among others.

END OF MEMORANDUM

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