

This memo describes the steps taken to integrate the updates to the constrained project list into Connect Central Virginia 2045. The methodologies used to update the constrained list were detailed in previous memos, “SubTask 2b_Budget Methodology Memo” and “Task 4_Draft Constrained List Memo”, both of which are included as attachments to this memo. The changes detailed below conclude the effort to update the constrained projects list of connect Central Virginia 2045.

The main changes with this amendment can be summarized as following:

- The Constrained List is now comprised of four subsections, as described in “Task 4_Draft Constrained List Memo”
- Many projects that were in the Vision List when the plan was adopted in 2020 are now in the Constrained List
- The projects that were moved from the Vision List to the Constrained List (using the priority rankings adopted in the 2020 plan) now have project profiles, to facilitate with funding and grant applications

No projects were added to or removed the from the lists in the plan as adopted in September 2020. Rather, this amendment reflects a budgeting exercise to determine the likely amounts of federal and state funds that the Central Virginia Transportation Planning Organization (CVTPO) can expect to receive from 2021 to 2045. The project lists in Connect Central Virginia 2045 were then reorganized according to the expected funding, and more project profiles were created to assist TPO staff with grant and funding applications. Review the memos in Attachments A & B for more information on the funding estimates and the constrained list. The specific changes to Connect Central Virginia 2045 with this amendment are described in the table below.

Updates to Connect Central Virginia 2045

Chapter	Page Number	Section	Changes
Cover Page	-	-	Added Amendment Date
Executive Summary	9	2045 LRTP PROJECT LIST	Updated description of project lists.
	10-22	Tables	Updated constrained list tables
	23	Map	Updated map of constrained list project
Chapter 8	115	2045 CVTPO VISION LIST OF PROJECTS	Updated description of vision project list.
	116-120	Tables	Updated vision list tables
	121	Map	Updated map of vision list project
	126-127	2045 CONSTRAINED LONG RANGE PLAN	Added content describing the updated constrained list.

Chapter	Page Number	Section	Changes
	128-140	Tables	Updated constrained list tables
	141	Map	Updated map of constrained list project
Appendix B	164-195	-	Added profile sheets for the projects in the Constrained List New Additions list
Appendix L	493-499	-	Added memo on the constrained budget methodology

Attachment 1

SubTask 2b_Budget Methodology Memo

This memo lays out the methodology for developing the constrained budget for the Connect Central Virginia 2045 Long Range Transportation plan (LRTP). The constrained budget methodology is part of Task 2: Constrained Budget, of the Scope of Work for this effort. This memo constitutes the deliverable for Sub-Task 2b: Budget Methodology.

The steps detailed below propose a process for determining anticipated federal and state funds for new construction projects and transit projects within the TPO area. The proposed methodology includes revenue estimates for bike and pedestrian projects as a subset of the highway project funding, allowing the TPO to prioritize specific bike and pedestrian based on reasonably expected funding. Additionally, Attachment A compares the preliminary budget estimate for Highway Projects (created using the methodology detailed below) to the comparable estimates in the most recent LRTPs of ten MPOs across the Commonwealth.

Time Horizons

The budget will consist of a near-term horizon of 2021-2024 and a long-term horizon of 2025-2045. Research conducted during Task 2a showed most MPOs in the Commonwealth divided revenue forecasts into two or three time horizons. Using fiscal years 2021-2024 for the near-term aligns the LRTP with the TPO's Transportation Improvement Program (TIP). The remaining 26 years constitute the Long-Term horizon of 2025-2045.

Data Sources

The methodology relies on the CVTPO's previous four TIPs (2012-2015, 2015-2018, 2018-2021, and 2021-2024) and VDOT's FY 2022 Six-Year Improvement Program (SYIP). The TIPs informed the highway projects and transit project budgets, while the SYIP provided a basis for estimating revenues for bike and pedestrian projects.

Methodology

The steps for determining the three budgets are detailed below. All three estimates use a 3% yearly inflation rate for revenues beyond 2021. While the Bike and Pedestrian budget is listed separately, it is a subset of the Highway projects funding. Both the Highway and Bike and Pedestrian budgets are revenues for new construction projects and do not include funding revenues from maintenance programs.

Highway Projects Budget

1. Review the non-maintenance funding estimates in the previous four TIPs.
2. Sum the federal and state revenue estimates for the first three Federal Fiscal Years (FFY) of each TIP (the fourth years were excluded because they overlap, so they are less accurate estimates than each TIP's first year).
3. Average the sum for each FFY to get a baseline yearly revenue estimate.

4. For the Near-Term (2021-2024), the FFY estimates for the four years in the 2021-2024 TIP are the estimated budget.
5. For the Long-Term (2025-2045), a 3% inflation rate is applied to the baseline estimate from Step 3.
6. Sum the total costs for all highway projects and project groupings in the 2021-2024 TIP and subtract from the revenue estimates in the TIP Financial Plan to calculate the outstanding balances in the TIP.
7. Subtract the balance from Step 6 from the Long-Term revenue total calculated in Step 5 to arrive at the available budget for the Long-Term time horizon.
8. Subtract the values for the Bike and Pedestrian Budget, outlined below.

Bike and Pedestrian Projects Budget

1. Review bike and pedestrian projects within the TPO in the FY 2022 SYIP.
2. Average the yearly funding revenues to get a baseline yearly revenue estimate.
3. Apply a 3% inflation rate to the baseline estimate for each year beyond 2021.

Transit Projects Budget

1. Review the transit projects included in the 2021-2024 TIP.
2. Sum the yearly Federal revenues for the 5307 and 5339 programs to get a baseline yearly funding estimate.
3. For the Near-Term (2021-2024), the FFY estimates for the four years in the 2021-2024 TIP are the estimated budget.
4. For the Long-Term (2025-2045), a 3% inflation rate is applied to the baseline estimate from Step 3.

Attachment A – MPO Budget Estimate Comparison

Using the methodology outlined above, the Central Virginia TPO can expect roughly \$409,498,542 in state and federal funds for non-maintenance highway projects from 2020 to 2045. To validate this estimate, we compared it to the estimates for non-maintenance highway projects provided in the most recent Long Range Transportation Plans (LRTPs) of ten Metropolitan Planning Organizations (MPOs) in Virginia. The MPOs selected for comparison are listed below:

- Bristol MPO
- Charlottesville-Albemarle MPO
- Fredericksburg Area MPO
- Staunton-Augusta-Waynesboro MPO
- Harrisonburg-Rockingham MPO
- Hampton Roads TPO
- New River Valley MPO
- Richmond Regional TPO
- Roanoke Valley TPO
- Winchester-Frederick MPO

The Danville MPO was not selected because its constrained list is the set of projects in its Transportation Improvement Program (TIP), so it is not comparable to the estimate created in this undertaking. The Metropolitan Washington Council of Governments was not selected because it is too different from the CVTPO region in size, with roughly 5.6 million people. The Tri-Cities Area MPO's most recent LRTP was not available on the organization's website at the time of this effort.

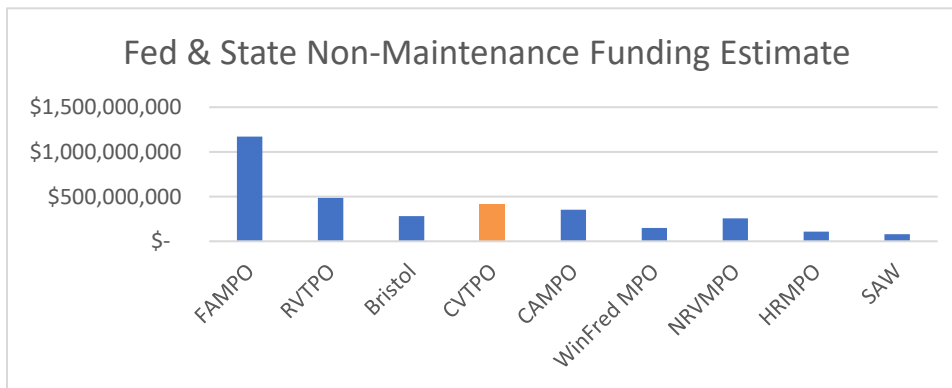
It should be noted that there are differences in how the LRTPs breakdown, categorize, and/or describe their funding estimates, so it is possible that relevant numbers could have been omitted or incorrectly considered due to inconsistencies in how the LRTPs express the funding estimates. We are confident in their validity as benchmarks, but these figures should be considered in the context of this memo, and not as the authoritative estimate for federal and state non-maintenance highway funding for these MPOs over their respective planning horizons.

To validate our estimate, we used three benchmark statistics. All three benchmarks suggest that the estimate for the Central Virginia region is valid. Each measure is described below, followed by a table and charts that visualize trends among them. **Table 1** shows the MPO funding characteristics. **Figure 1** charts the funding estimates for the MPOs, excluding the two outliers, HRTPO and RRTPO.

Table 1. MPO Funding comparison

MPO Name	Horizon Year	Base Year Population	Fed & State Non-Maintenance Funding Estimate	Funding Est. Per Capita	Ratio of CVTPO Population	Ratio of CVTPO Funding Estimate	Notes
HRTPO	2045	1,725,777	\$ 10,993,000,000	\$ 6,370	10.6	26.8	Includes CMAQ funding estimates
RRTPO	2045	1,091,680	\$ 14,462,700,000	\$ 13,248	6.7	35.3	Includes CMAQ funding estimates
FAMPO	2045	350,916	\$ 1,171,200,000	\$ 3,338	2.2	2.9	
RVTPO	2040	230,457	\$ 485,474,656	\$ 2,107	1.4	1.2	
Bristol	2040	229,534	\$ 282,293,972	\$ 1,230	1.4	0.7	Includes Tennessee population
CVTPO	2045	162,816	\$ 409,498,542	\$ 2,515	1.0	1.0	
CAMPO	2045	127,659	\$ 354,000,000	\$ 2,773	0.8	0.9	
WinFred MPO	2040	107,115	\$ 148,397,475	\$ 1,385	0.7	0.4	
NRVMPO	2045	92,757	\$ 527,270,609	\$ 5,684	0.6	1.3	Includes \$271mil allocation for the I-81 Improvement Program
HRMPO	2040	81,409	\$ 108,367,420	\$ 1,331	0.5	0.3	
SAW	2045	78,794	\$ 358,874,549	\$ 4,555	0.5	0.9	Includes \$271mil allocation for the I-81 Improvement Program

Figure 1. Funding estimates

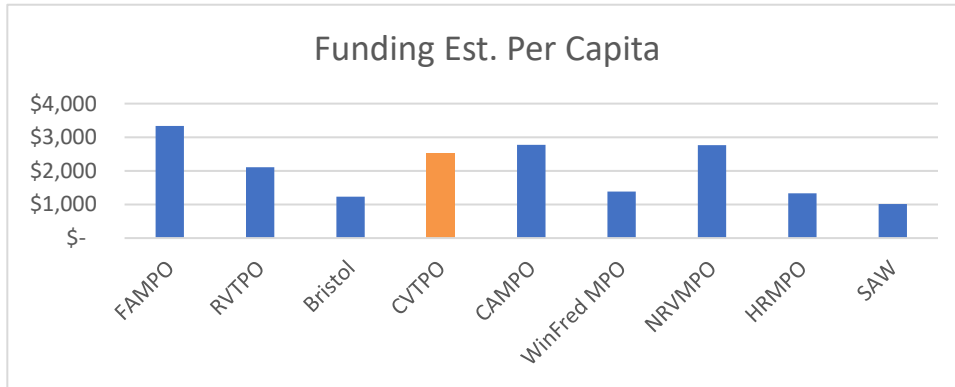


Funding Per Capita

We calculated each MPO’s funding estimate as a per capita amount by dividing the funding estimate by the MPOs’ base year population. The CVTPO funding per capita of \$2,515 is similar to most other MPO per capita rates. Two exceptions are HRTPO and RRTPO. Both MPOs have large enough population sizes to qualify for CMAQ funding, a funding source for air pollution mitigation that the CVTPO does not qualify for. The average of the estimates excluding HRTPO, RRTPO, and CVTPO is \$2,800. This suggests that the CVTPO estimate is a plausible amount.

Figure 2 shows that funding per capita, excluding the two outliers, HRTPO and RRTPO.

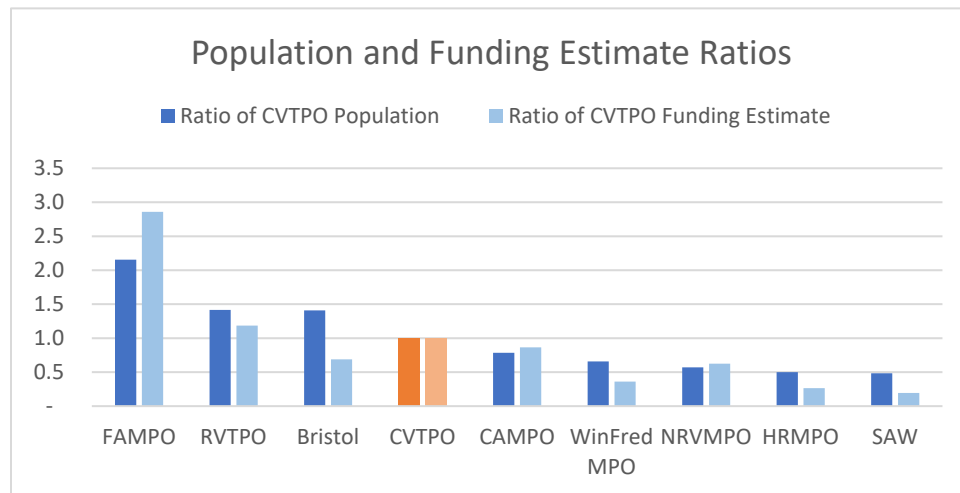
Figure 2. Funding estimates as a per capita rate



Population and Funding Estimate Ratios

The two ratio statistics complement each other. The first is the ratio of each MPO’s base year population to the CVTPO’s base year population. The second is the ratio of each MPO’s funding estimate to the CVTPO’s funding estimate. Together, the two ratios show the plausible trend that larger MPOs generally forecasted higher amounts of funding. This trend suggests that the CVTPO estimate fits the overall pattern. **Figure 3** shows the two ratios side by side for each MPO, excluding HRTPO and RRTPO.

Figure 3. MPO populations and funding estimates as ratios of the CVTPO population and estimate



Three outliers are Bristol, NRVMPPO and SAW. The Bristol MPO is partly in Virginia and partly in Tennessee. The Bristol 2040 LRTP split out the Tennessee funding estimates from the Virginia estimates, and the Tennessee estimates were generally lower than the Virginia estimates. Therefore, the lower than expected funding percentage ratio could be explained by the difference in either the allocation of federal funds to the two states or from the two state

Department of Transportations to the Bristol MPO. U.S. Interstate 81 traverse both NRVMP0 and SAW, and consequently they both are slated to receive large apportionments from the I-81 Improvement Program. Removing the I-81 allocations gives NRVMP0 a funding percentage ratio of 0.6 and SAW a ratio of 0.2, as would be expected if they, like CVTPO, did not forecast interstate improvement funds.

Attachment 2

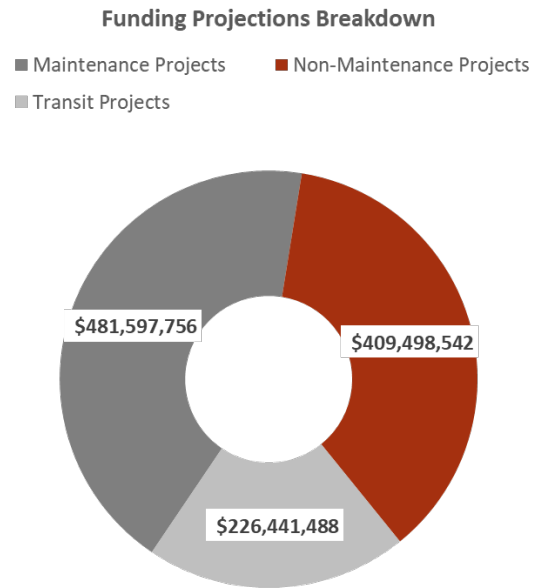
Task 4_Draft Constrained List Memo

This memo presents a draft constrained projects list for the Connect Central Virginia 2045 Long Range Transportation plan (LRTP). The memo includes the results of the funding projection methodology described in a prior memo, followed by a description of the constrained list sections, and a discussion fiscal constraint.

Funding Estimates

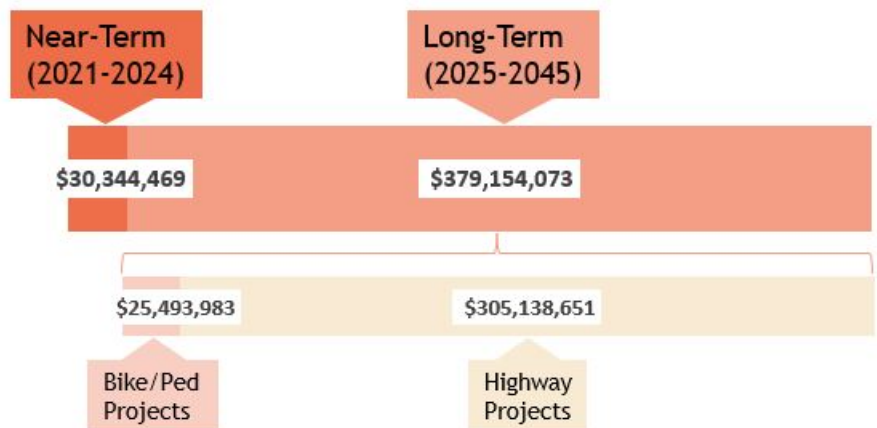
The funding estimates for the 2021-2045 planning horizon are shown in **Figure 1**. The methodology for creating the estimates is detailed in the previous memo, "SubTask 2b_Budget Methodology Memo_211201", which is included here as Appendix A. One deviation from the previous memo is the inclusion of a funding projection for maintenance projects. The maintenance estimate was created with the same steps detailed in the Highway Project Budget section of the memo, except that the estimates in the Maintenance section of the previous Transportation Improvement Programs (TIPs) was used.

Figure 1. Total funding estimates.



The Non-Maintenance Projects funding projection was then split into the two time horizons, Near-Term (2021-2024) and Long-Term (2025-2045). The Long-Term amount was then split into a portion that can be expected for Highway Projects and a portion that can be expected for Bike and Pedestrian Projects, as shown in **Figure 2**.

Figure 2. Time horizons and modal allocations



Constrain List Sections

The constrained list is comprised of four sections:

1. Near-Term Committed Projects
2. Long-Term Committed Projects
3. Long-term New Additions Projects
4. Bike & Pedestrian Projects

The Near-Term Committed Projects list was derived from the projects listed individually in the 2021-2024 TIP. The projects in the Project Groupings in the 2021-2024 TIP comprise the Long-Term Committed Projects list. The Long-Term New Additions Projects section consists of projects that were prioritized during the Connect Central Virginia 2045 planning process. Projects were added to the New Additions section of the constrained list using their priority ranking, which is described in Chapter VI: Goals and Performance Measures. The Long-Term Bike and Pedestrian Projects list is the final section of the constrained list. All four parts of the list are included here as Appendix B.

Fiscal Constraint

As seen in **Figure 3**, the total cost of the projects in the list exceeds the total expected funding amount by roughly \$4,000,000. The discrepancy is due to the Bike and Pedestrian Projects section. The listed bike/ped projects total to roughly \$29,000,000, but the anticipated funding for such projects over the planning horizon is just over \$25,000,000.

Figure 3. Comparison of anticipated funding and project costs

