SMART SCALE ANALYSIS AND OBSERVATIONS

Historical Analysis of SMART SCALE in the RVTPO Region

Roanoke Valley Transportation PLANNING ORGANIZATION
Staffed by the REGIONAL commission

SMART SCALE PRE-APPLICATION COORDINATION FORM

This form was developed to provide preliminary guidance to assist SMART SCALE applicants w
projects to be considered through the SMART SCALE process. This form is not the official appl
applications through the SMART Portal. When navigating between fields in this form, only u
data entry fields, refer to either the Status Bar on the bottom left of the window or the asse
Information. Fields with additional help information are denoted with numbers.

GENERAL

Applicant Information *(Select one of the following)*

☐ MPO   ☐ PDC   ☐ NVTA   ☐ Public Transit Agency

Applicant Name:

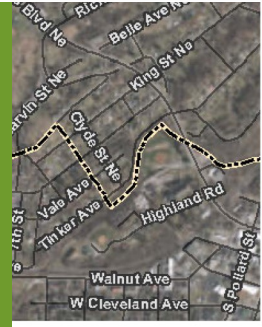**Project Point of Contact Information** The primary person that the State can con

Point of Contact Name:

Point of Contact Phone Number:

$72,635,000
$77,195,000
.8
0.6

	Land Use	
Other Factor Values Scaled by Potential Acreage Impacted	Support of Transportation-Efficient Land Use	Increase Transportation-Efficient Land Use
3.9	87,418.0	11,488.1
scaled points	access * pop/emp density.h	access * pop/emp density change.

Normalized Measure Value (0-100)	0.5	0.7	14.2	0.6	0.8	0.8	0.8	12.6	3.3	2.6	2.1	11.8	6.6	3.3
Measure Weight (% of Factor)	0.5	0.5	0.5	0.5	0.6	0.2	0.2	0.6	0.2	0.2	0.5	0.5	0.7	0.3
Factor Value	0.6		7.4		0.8			8.8			6.9		5.6	
Factor W (% of Proje								20%			10%		10%	
Weighted								1.8			0.7		0.6	

Project B		
SMART SCALE Cost	$72,635,000	
SMART SCALE Score (Project Benefit per $10M SMART SCALE Cost)	**0.7**	

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SMART SCALE Analysis and Observations FY 2020 – Round 3

Introduction

Following the January 2019 RVTPO Policy Board meeting, a request was made of staff to perform an in-depth analysis of the SMART SCALE program and its impacts on transportation in the region. Staff has developed this analysis with the intent of:

Addressing

- The overall performance of RVTPO region;
- The reasons for successes and disappointments; and

Answering

- What are the impacts of leveraging funds;
- How the Congestion Mitigation factor is calculated; and

Exploring

- Differing processes in project selection;
- External forces statewide contributing to success and loss in the region; and

Reflecting

- On the first three rounds of SMART SCALE and developing strategies for continued success.

The analysis looks at not only the most current FY 2020 round of applications, but the previous two in FY 2017 and FY 2018.

1.   SMART SCALE Report Card for the RVTPO Region

Over the cumulative three-round SMART SCALE period, the region and individual localities/agencies collectively have fared rather well. Table 1 measures the success rate of each locality and agency over the course of the three SMART SCALE rounds.

Table 1: Overall SMART SCALE Performance of RVTPO and Member Organizations

Organization	Total Projects Submitted	Total Projects Funded	Total Percent of Projects Funded	Total Funding Allocated
Bedford County*	5	$35,096,016	3	$22,883,773
Botetourt County	8	$88,387,591	1	$4,251,000
Montgomery County*	6	$23,799,017	0	$0
Roanoke City	13	$268,145,648	4	$21,367,196
Roanoke County	13	$71,639,278	8	$24,833,556
RVTPO	14	$370,672,400	4	$66,963,432
Salem	6	$25,913,823	4	$10,038,044
Valley Metro	5	$6,150,371	4	$4,272,811
Vinton	2	$9,641,828	0	$0
TOTAL	**61**	**$840,550,939**	**21**	**$131,726,039**

Although Bedford and Montgomery Counties are served by the RVTPO, these projects are outside the service area.

Tables 2, 3, and 4 show how each locality and agency fared in the respective SMART SCALE round. The Request to Allocation Ratio shows the proportion funded based on the amount requested. This statistic revealed that, overall, localities and agencies submitting fewer projects per round (1-2) are more likely to be funded than those submitting three or more.

Table 2: Performance of RVTPO and Member Organizations in SMART SCALE Round 1 – FY 2017

Organization	Projects Submitted	Funding Requests	Projects Funded	Total Funding Allocated	Request to Allocation Ratio
Bedford County*	1	$18,829,369	1 (100%)	$18,829,369	1.00
Botetourt County	1	$35,151,285	0 (0%)	$0	0.00
Montgomery County	0	--	--	--	--
Roanoke City	5	$160,265,213	2 (40%)	$14,996,245	0.09
Roanoke County	4	$21,026,380	3 (75%)	$8,079,834	0.38
RVTPO	5	$155,532,553	3 (60%)	$34,795,321	0.22
Salem	2	$3,797,865	2 (100%)	$3,797,865	1.00
Valley Metro	1	$350,811	1 (100%)	$350,811	1.00
Vinton	0	--	--	--	--
Grand Total	**19**	**$340,972,822**	**12 (63.2%)**	**$62,020,076 (18.2%)**	**0.22**

Although Bedford County is served by the RVTPO, this project is outside the service area.

Table 3: Performance of RVTPO and Member Organizations in SMART SCALE Round 2 – FY 2018

Organization	Projects Submitted	Funding Requests	Projects Funded	Total Funding Allocated	Request to Allocation Ratio
Bedford County*	2	$3,833,647	1 (50%)	$321,404	0.08
Botetourt County	3	$21,172,902	0 (0%)	$0	0.00
Montgomery County*	3	$9,020,469	0 (0%)	$0	0.00
Roanoke City	4	$88,239,948	1 (25%)	$3,552,247	0.04
Roanoke County	5	$19,636,678	3 (60%)	$3,318,369	0.17
RVTPO	5	$86,506,847	1 (20%)	$32,168,111	0.37
Salem	3	$17,749,958	2 (66%)	$6,240,179	0.35
Valley Metro	4	$5,799,560	3 (75%)	$3,922,000	0.68
Vinton	1	$2,796,828	0 (0%)	$0	0.00
Grand Total	**30**	**$254,756,837**	**11 (36.6%)**	**$49,522,310 (19.4%)**	**0.19**

Although Bedford and Montgomery Counties are served by the RVTPO, these projects are outside the service area.

Table 4: Performance of RVTPO and Member Organizations in SMART SCALE Round 3 - FY 2020

Organization	Projects Submitted	Funding Requests	Projects Funded**	Total Funding Allocated	Request to Allocation Ratio
Bedford County*	2	$12,433,000	1 (50%)	$3,733,000	0.30
Botetourt County	4	$32,063,404	1 (25%)	$4,251,000	0.13
Montgomery County*	3	$14,778,548	0 (0%)	$0	0.00
Roanoke City	4	$19,640,487	1 (25%)	$2,818,704	0.14
Roanoke County	4	$30,976,220	2 (50%)	$13,435,353	0.43
RVTPO	4	$128,633,000	0 (0%)	$0	0.00
Salem	1	$4,366,000	0 (0%)	$0	0.00
Valley Metro	0	--	--	--	--
Vinton	1	$6,845,000	0 (0%)	$0	0.00
Grand Total	**23**	**$249,735,659**	**4**	**$24,238,057 (9.7%)**	**0.09**

Although Bedford and Montgomery Counties are served by the RVTPO, these projects are outside the service area.
**As of the publication of this analysis, the Round 3 (FY 20) recommendations for funding have not been approved by the Commonwealth Transportation Board.*

Tables 5, 6, and 7 show how the RVTPO service area compared statewide, to the Salem District, and the other eight VDOT Construction Districts. In Round 1 the RVTPO service area's percentage of funded projects from those submitted outperformed projects statewide and in the Salem District, 61% to 57% to 54% respectively. Due to three large multi-hundred-million-dollar projects funded in Round 1 along with 31 projects (22% overall) with SMART SCALE costs exceeding $10 million, the statewide Percent Amount Allotted (last column in each table) exceeded the RVTPO and Salem District.

In Round 2, the RVTPO service area's percentage of funded projects from those submitted, was slightly higher at 40% compared to those statewide and the Salem District, which were both at 36%. There was only one hundred-million-dollar project funded in Round 2 along with 23 projects (16% overall) with SMART SCALE costs exceeding $10 million.

Based on the scores and preliminary scenario released for the current FY 20 SMART SCALE cycle, there is a 28% reduction in the number of applications submitted from the RVTPO service area from Round 2 (Tables 6 and 7). This varies directly when comparing the number and percentage of projects funded in Round 2 with Round 3 (10 or 40% and 5 or 28% respectively).

Table 5: Performance of RVTPO and Member Organizations in Round 1 - FY 2017

		Projects Submitted	Projects Funded	Percent of Projects Funded	Total SMART SCALE Cost of All Projects Submitted	SMART SCALE Cost of Projects Funded	Percent Amount Allotted
	RVTPO Area	**18**	**11**	**61.1%**	**$ 376,124,107**	**$ 62,020,076**	**16.5%**
	Statewide	**287**	**163**	**56.8%**	**$7,385,409,505**	**$1,416,232,205**	**19.2%**
VDOT Districts	**Salem**	**37**	**20**	**54.1%**	**$709,225,480**	**$113,441,188**	**16.0%**
	Bristol	22	10	45.5%	$214,816,429	$71,164,603	33.1%
	Culpeper	17	11	64.7%	$353,476,755	$80,432,133	22.8%
	Fredericksburg	22	19	86.4%	$371,789,273	$204,620,173	55.0%
	Hampton Roads	40	21	52.5%	$2,006,965,689	$332,417,789	16.6%
	Lynchburg	36	23	63.9%	$188,331,256	$85,765,598	45.5%
	NOVA	45	18	40.0%	$2,527,650,042	$222,854,393	8.8%
	Richmond	39	22	56.4%	$605,706,175	$199,763,473	33.0%
	Staunton	29	18	62.1%	$407,448,406	$105,772,855	26.0%

Table 6: Performance of RVTPO and Member Organizations in Round 2 - FY 2018

		Projects Submitted	Projects Funded	Percent of Projects Funded	Total SMART SCALE Cost of All Projects Submitted	SMART SCALE Cost of Projects Funded	Percent Amount Allotted
	RVTPO Area	**25**	**10**	**40.0%**	**$ 241,902,721**	**$ 49,200,906**	**20.3%**
	Statewide	**404**	**147**	**36.4%**	**$8,566,240,501**	**$1,026,812,430**	**12.0%**
VDOT Districts	**Salem**	**50**	**18**	**36.0%**	**$714,423,044**	**$70,972,299**	**9.9%**
	Bristol	42	9	21.4%	$1,030,904,768	$24,028,700	2.3%
	Culpeper	35	11	31.4%	$318,707,245	$56,132,245	17.6%
	Fredericksburg	25	9	36.0%	$494,895,227	$47,864,525	9.7%
	Hampton Roads	52	25	48.1%	$1,542,645,106	$230,515,811	14.9%
	Lynchburg	28	10	35.7%	$217,999,726	$37,184,410	17.1%
	NOVA	58	21	36.2%	$2,612,407,487	$367,292,726	14.1%
	Richmond	72	25	34.7%	$1,141,901,542	$152,117,094	13.3%
	Staunton	42	19	45.2%	$562,376,356	$40,704,620	7.2%

Table 7: Performance of RVTPO and Member Organizations in Round 3 - FY 2020

		Projects Submitted	Projects Funded	Percent of Projects Funded*	Total SMART SCALE Cost of All Projects Submitted	SMART SCALE Cost of Projects Funded	Percent Amount Allotted
	RVTPO Area	**18**	**5**	**27.8%**	**$ 222,524,111**	**$ 20,505,057**	**9.21%**
	Statewide	**433**	**140**	**32.3%**	**$7,355,892,214**	**$859,437,159**	**11.68%**
VDOT Districts	**Salem**	**45**	**10**	**22.2%**	**$548,939,659**	**$51,000,057**	**9.29%**
	Bristol	44	10	22.7%	$787,928,936	$34,979,057	4.4%
	Culpeper	42	6	14.3%	$715,427,347	$31,582,299	4.4%
	Fredericksburg	32	15	48.9%	$397,476,026	$53,525,348	13.5%
	Hampton Roads	54	32	59.3%	$821,030,650	$312,011,511	38.0%
	Lynchburg	28	8	28.6%	$239,704,066	$35,260,316	14.7%
	Northern Virginia	39	13	33.3%	$2,046,026,993	$205,164,371	10.0%
	Richmond	79	19	24.1%	$1,313,895,674	$92,219,080	7.0%
	Staunton	70	20	28.6%	$485,462,863	$43,695,120	9.0%

2.   Success is Only as Good as the Last Funded Application

The region's success in the SMART SCALE program has been attributed to various elements which have been not only strategic, but timely. Particularly these elements, and examples of projects which succeeded as a result, are:

- Previously-performed VDOT studies on I-81 suggesting specific improvements (Exit 141-143 NB and SB auxiliary lane projects);
- Identification of crucial Corridor of Statewide Significance, Regional Network, Urban Development Areas, and Safety needs which were captured in VTrans2040 (all funded projects);
- Previously-committed Six-Year Improvement Program, STBG, or TA funds which served as leverage on lower cost projects (U.S. 220 at International Pkwy. Intersection Improvements, Williamson Rd. Sidewalk Improvements);
- Significant points gained in more than one SMART SCALE factor, leading to a high/competitive cost benefit score (many of the funded projects); and
- Relatively inexpensive locality projects seeking District Grant Program funding only (Lila Dr./Rte. 115 Intersection Safety Improvements, Rte. 311/419 Intersection Safety & Congestion Improvements).

An old familiar phrase teaches us that, "You can't win them all." However true that is, lessons can be learned. Post-funding analysis yields these reasons for project funding being denied (not only FY 20, but all rounds):

- Low cost benefit in proportion to its size and scope;
- Low scores in the Accessibility and Economic Development factors which each have the highest factor weighting of 20%;
- No previously-committed or leveraged funding to projects which had scores nearing the cutoff line for funding; and
- No significant change in scope to several projects reapplying for SMART SCALE whose score was very low when first applied.

During each SMART SCALE round, staff and VDOT has briefed the Policy Board on the Salem District's funding allocation for the District Grant Program and the statewide allocation to the High Priority Projects Program. To summarize, in 2015, the General Assembly adopted legislation, enacted as Code of Virginia § 33.2-370 and 33.2-371, which funds the High-Priority Projects Program (HPPP) and highway construction District Grant Programs (DGP). Until July 1, 2020, all state transportation funds not allocated to other highway purposes will be designated for the HPPP and DGP equally at 50%. After July 1, 2020, those remaining funds will be apportioned as follows:

- State of Good Repair (deficient pavement conditions and structurally deficient bridges) – 45%
- High-Priority Projects Program – 27.5%
- Highway Construction District Grant Program – 27.5%

Because the SMART SCALE program does not include State of Good Repair projects, the overall state funding of the HPPP and DGP changes before and after 7/1/2020 will not affect the 50/50 distribution.

High Priority Projects (HPP) refer to those of regional and statewide significance identified by the Commonwealth Transportation Board (CTB) which seek to, "…reduce congestion, increase safety, create jobs, or increase economic development." For this region, that refers to the following Corridors of Statewide Significance: Interstate 81, Interstate 581, U.S. 11, U.S. 11 Alternate, U.S. 220, U.S. 220 Alternate, and U.S. 460.

Candidate projects in the HPP compete with all others in the Commonwealth for funding.

District Grant Program funding is accessible to local governments in each VDOT Construction District that apply, are successfully screened and scored, and selected by the CTB. Localities within a construction district compete for DGP funding.

The Code of Virginia (§ 33.2-371) outlines the criteria for allocating DGP funds among VDOT Construction Districts. Table 8 shows each criterion used to determine the district allocation.

Table 8: Criteria for Determining District Grant Program Funding

Criteria	Percentage of Overall Determination
Ratio of population of cities and towns eligible to receive maintenance payments by District divided by all eligible cities and towns in the Commonwealth	30%
Ratio of vehicle miles traveled (VMT) on primary highways within the District divided by VMT on all primary highways in the Commonwealth.	28%
Ratio of the population of counties in a Construction District divided by the total population of all counties in the Commonwealth.	24%
Ratio of the number of primary lane-miles in the District divided by the total of primary lane-miles in the Commonwealth.	10%
Ratio of the land area of counties in the District divided by the total land area of all counties in the Commonwealth.	6%
A primary need factor which addresses the largest under-allocation to Construction Districts relative to primary needs.	2%

Based on the first and third criteria, 54% of the funding determination is based on population.

Here are the 2017 population estimates from the Weldon Cooper Center for Public Service, which is what is used in determining funding (Table 9):

Table 9: 2017 VDOT Construction District Populations

VDOT District	Population
Bristol	348,862
Lynchburg	399,270
Culpeper	412,685
Fredericksburg	501,541
Staunton	555,049
Salem	694,336
Richmond	1,300,765
Hampton Roads	1,766,213
Northern Virginia	2,491,299

Source: Weldon Cooper Center for Public Service 2010-2017 Intercensal Population Estimates

Based on the above population estimates alone, there is a difference in the placement of the Bristol, Culpeper, Fredericksburg, Lynchburg, and Staunton Districts. When all criteria are used, the order is as follows in Table 10A-10C (from least to most funding):

Table 10A-10C: Statewide Distribution of District Grant Program Funding

VDOT District	FY 2017 DGP Funding	Percentage
Culpeper	$54,872,548	6.2%
Fredericksburg	$60,504,406	6.9%
Bristol	$62,239,019	7.0%
Lynchburg	$63,096,890	7.1%
Staunton	$68,917,727	7.8%
Salem	$84,868,412	9.6%
Richmond	$127,411,522	14.4%
Hampton Roads	$178,033,507	20.2%
Northern Virginia	$183,055,970	20.7%
TOTAL	**$883,000,000**	**100.0%**

VDOT District	FY 2018 DGP Funding	Percentage
Culpeper	$19,910,405	5.2%
Bristol	$21,210,894	5.6%
Staunton	$24,270,367	6.4%
Lynchburg	$25,297,175	6.6%
Fredericksburg	$26,409,641	6.9%
Salem	$32,633,500	8.5%
Richmond	$56,176,746	14.7%
Hampton Roads	$86,791,093	22.7%
Northern Virginia	$89,403,058	23.4%
TOTAL	**$382,102,879**	**100.0%**

VDOT District	FY 2020 DGP Funding	Percentage
Culpeper	$24,574,905	5.8%
Bristol	$25,199,298	5.9%
Lynchburg	$27,083,771	6.4%
Staunton	$29,688,863	7.0%
Fredericksburg	$32,074,604	7.6%
Salem	$37,877,254	8.9%
Richmond	$67,368,537	15.9%
Hampton Roads	$82,342,045	19.4%
Northern Virginia	$98,064,652	23.1%
TOTAL	**$424,273,929**	**100.0 %**

Although population is a significant determinant of DGP funding, others such as vehicle miles traveled, and lanes of primary highways can be influential. The Northern Virginia, Hampton Roads, Richmond, and Staunton Districts, each of which contains a TMA MPO, has not changed position in terms of DGP funding,

Regarding the allocation of state HPP funds, there has been an equal 50/50 distribution with DGP funding. For the second round (FY18), however, there was an additional $300 million in federal HPP funds to supplement the $358 million in statewide DGP funding. Tables 11A-11C show the distribution of HPP funds from all three rounds. The Salem District received 4% or $80,034,379 of the total $1,927,166,109 in HPP funds allocated thus far.

Table 11A-11C: Statewide Distribution of High Priority Program Funding

VDOT District	FY 2017 HPP Funding	Percentage
Bristol	$8,925,584	1.1%
Lynchburg	$22,668,708	2.7%
Culpeper	$25,559,585	3.1%
Salem	$28,572,777	3.4%
Staunton	$36,855,128	4.4%
Richmond	$72,351,951	8.7%
Fredericksburg	$144,115,767	17.3%
Hampton Roads	$154,384,282	18.5%
Northern Virginia	$339,798,423	40.8%
TOTAL	**$833,232,205**	**100.0%**

VDOT District	FY 2018 HPP Funding	Percentage
Bristol	$2,817,806	0.4%
Lynchburg	$12,630,159	1.9%
Staunton	$16,434,253	2.5%
Fredericksburg	$23,528,870	3.6%
Culpeper	$36,670,555	5.6%
Salem	$38,338,799	5.8%
Richmond	$90,390,348	13.7%
Hampton Roads	$150,334,113	22.8%
Northern Virginia	$287,625,771	43.7%
TOTAL	**$658,770,674**	**100.0%**

VDOT District	FY 2020 HPP Funding	Percentage
Culpeper	$7,007,394	1.6%
Lynchburg	$8,176,545	1.9%
Bristol	$9,779,759	2.2%
Salem	$13,122,803	3.0%
Staunton	$14,006,257	3.2%
Fredericksburg	$21,450,744	4.9%
Richmond	$24,850,543	5.7%
Northern Virginia	$107,099,719	24.6%
Hampton Roads	$229,669,466	52.8%
TOTAL	**$435,163,230**	**100.0%**

Table 12 shows the eligible applicants for HPP funding, which serves Corridors of Statewide Significance:

Table 12: Eligibility to Submit High Priority Program Projects on Corridors of Statewide Significance

Project Type	MPOs and PDCs	Localities	Public Transit Agencies
Corridor of Statewide Significance	Yes	Yes, with a resolution of support from relevant MPO or PDC	Yes, with resolution of support from relevant MPO or PDC

Table 13 shows the overall statistics from each round, which includes number of applications submitted versus funded, total and SMART SCALE cost of all applications, and total and SMART SCALE cost of all funded applications.

Table 13: Statewide SMART SCALE Performance

Round	All Applications			Funded Applications		
	Applications Scored	Total Cost	SMART SCALE Cost	Applications Funded	Total Cost	SMART SCALE Cost
FY 17 (Round 1)	287	$13.4 billion	$7.4 billion	163	$3.2 billion	$1.7 billion
FY 18 (Round 2)	404	$10.9 billion	$8.6 billion	147	$2.3 billion	$970.6 million
FY 20 (Round 3)	433	$12.3 billion	$7.4 billion	134	$5.1 billion	$869.1 million

Throughout the three rounds, note these observations regarding performance:
- Number of funded applications have decreased by nearly 20%;
- Total Cost of funded applications increased by 59%; and
- Difference between Total Cost and SMART SCALE Cost, as a result of leveraging funds, has increased dramatically from 47% to 58% to 83% respectively.

3. What Will it Take?

So, a project isn't funded in SMART SCALE, it is often thought that if there were enough leveraged funds available that a project could have been funded. This is true to a fault, because at some point, it becomes illogical to think that a project worth funding is seeking leverage for over 75% of the project cost. Right? Yes, this is done in Northern Virginia and Hampton Roads Districts where large-scale, high cost benefit projects use leveraged funding as the primary source and SMART SCALE funding to complete the *last mile*, but this is because they can. In the RVTPO region, the strategy should be the same only modified: seek high cost benefit projects which may or may not be expensive (relatively speaking), and secure leverage amounts which are realistic enough to actually "move the needle" when placed in competition with others.

Table 14 shows the hypothetical leverage needed for all the projects in Round 3 which are currently not recommended for funding. Of these 15 projects, two need leverage of $88,000 and $1.6 million (3% and 9% respectively). Due to their low cost, additional reasonable leverage would have made them successful. Two other projects would need leverage of $2.5 million and $1.1 million (39% and 45% respectively). Of these four projects listed, there is only one project with a "good" project benefit score (when compared to the other three). This is the Diverging Diamond Interchange at Route 419 and U.S. 220. The 11 remaining projects would require leverage exceeding 50%, with two which would require over 90%.

Table 14: FY 2020 SMART SCALE Project Leverage Calculations

Applicant	Project Title	Project Benefit Score	Total Cost	SMART SCALE Request	Original Leverage	Percent Leverage	SMART SCALE Score	Additional Leverage	Additional Percent Leverage	Maximum SMART SCALE Request Necessary for Funding	Total Leverage Amount Required for SMART SCALE Funding	Total Percent Leverage
								Hypothetical Analysis				
Botetourt County	Route 220 Superstreet Improvement	1.48	$6,361,000	$6,361,000	-		2.33	$2,494,558	39%	$3,866,442	$2,494,558	39%
Botetourt County	Glebe Road Alignment and Bike/Pedestrian Improvements	0.28	$2,823,000	$2,060,404	$762,596	27%	1.34	$1,337,779	47%	$722,625	$2,100,375	74%
Botetourt County	Route 220 Superstreet and Route 640 Improvement	1.54	$19,391,000	$19,391,000	-		0.79	$15,376,767	79%	$4,014,233	$15,376,767	79%
Roanoke City	Valley View Blvd / Aviation Drive Pedestrian Improvements	1.12	$3,022,859	$3,022,859	-		3.72	$87,913	3%	$2,934,946	$87,913	3%
Roanoke City	13th Street Southeast Improvements	1.01	$7,302,000	$7,102,000	$200,000	3%	1.43	$4,458,491	61%	$2,643,509	$4,658,491	64%
Roanoke City	Main Street (Rte. 221) Corridor Improvements	1.12	$30,696,924	$6,696,924	$24,000,000	78%	1.67	$3,781,323	12%	$2,915,601	$27,781,323	91%
Roanoke County	Old Cave Spring Road Improvements	0.54	$2,561,000	$2,561,000	-		2.11	$1,153,715	45%	$1,407,285	$1,153,715	45%
Roanoke County	McVitty Road Improvements	0.70	$9,998,000	$9,998,000	-		0.70	$8,178,924	82%	$1,819,076	$8,178,924	82%
RVTPO	I-81 Northbound Improvements between Exit 140 and 141	1.95	$14,446,000	$14,446,000	-		1.35	$9,356,516	65%	$5,089,484	$9,356,516	65%
RVTPO	I-81 Southbound Improvements between Exit 141 and 140	2.27	$23,515,000	$17,515,000	$6,000,000	26%	1.30	$11,588,927	49%	$5,926,073	$17,588,927	75%
RVTPO	Orange Avenue Improvements	4.77	$77,195,000	$72,635,000	$4,560,000	6%	0.66	$60,177,893	78%	$12,457,107	$64,737,893	78%
RVTPO	I-81 Southbound Improvements from Exit 150 to Weigh Station	0.46	$24,037,000	$24,037,000	-		0.19	$22,831,854	95%	$1,205,146	$22,831,854	95%
Salem	Downtown Salem - College Avenue Improvements	0.77	$4,366,000	$4,366,000	-		1.75	$2,367,749	54%	$1,998,251	$2,367,749	54%
Vinton	Walnut Avenue Corridor Improvements Phase 2 Project	0.75	$6,845,000	$6,845,000	-		1.10	$4,883,891	71%	$1,961,109	$4,883,891	71%

4.   Congestion…See a Doctor?

The Congestion Mitigation factor considers two measures: Person Throughput and Person Hours of Delay. For this example, the Orange Avenue Improvements (11th St. to Gus Nicks) is being used.

Person Throughput is defined as the number of distinct vehicles able to enter or exit the highway system during an analysis period. In order to calculate Person Throughput for an urban arterial such as Orange Avenue, the following steps must be followed, and data collected:

1. Peak period traffic count volumes for the project area;
2. Peak period flow rate (number of vehicles passing a reference point per unit of time, vehicles per hour) on the segment with and without the project. Determine the capacity based on functional classification to compute the vehicle throughput with and without the project.
3. Calculate the change in peak period vehicle throughput by subtracting no-build throughput from the build value.
4. Multiply the average vehicle occupancy rate by the vehicle throughput to obtain the peak person throughput for build and no-build conditions.

Person Hours of Delay is defined as the number of peak period person hours of delay in the project area. In order to calculate Person Hours of Delay for an urban arterial such as Orange Avenue, the following steps must be following, and data collected:

1. Peak period traffic count volumes for the project area.
2. Roadway geometric features using existing data sources and supplemented by field visits and/or aerial imagery.
3. Convert the peak period traffic volumes to flow rates using methods from the 2010 Highway Capacity Manual.
4. Compute no-build and build travel speeds and delays. Delay is calculated by calculating the difference between the predicted travel speed and the posted speed limit.
5. Compute the change in vehicle hours of delay by subtracting the build (with project) delay from the non-build (without project) delay.
6. Compute the peak period person hours of delay for no-build and build conditions by multiplying an average vehicle occupancy rate by the vehicle delay.
7. Compute the change in person hours of delay by subtracting the build (with project) delay from the non-build (without project) delay.

Once a value for each measure is calculated, a weighting of 50% each is applied, summed, and then multiplied by the factor weight of 15%.

Using the Orange Avenue Improvements Project as an example, there is clear congestion, but the way in which the VTrans2040 Needs Assessment currently treats the corridor, it is downplayed compared to the needs of other Corridors of Statewide Significance, as is evidenced directly in the document:

Passenger traffic along this segment experiences the most congestion of all Corridor E segments except Segment E5. The highest congestion levels occur in Blacksburg, Salem, and Roanoke. Passenger delays in the most congested sections can reach 500 person-hours per mile traveled. Overall passenger delays per mile along Segment E2 are in the top 35th percentile among corridor Segments of Statewide Significance. Peak-period passenger delays account for only one-fourth of daily congestion, considerably lower than average for the peak-period share of congestion along corridor Segments of Statewide Significance.

To the right is a map from the VTrans2040 Needs Assessment for U.S. 460 showing person hours of delay per mile along the corridor. The Orange Avenue project area is located within the highest delay in the segment. Although it may not yield a significant change, due to the diversity in working hours and shifts of businesses along the Orange Avenue corridor (especially at the Roanoke Centre for Industry and Technology), there is notable recurring congestion at times other than the A.M. and P.M. peak periods.

Person Hours of Delay per Mile

—	< 100	—	501 - 1,000
—	101 - 200	—	> 1,000
—	201 - 500		
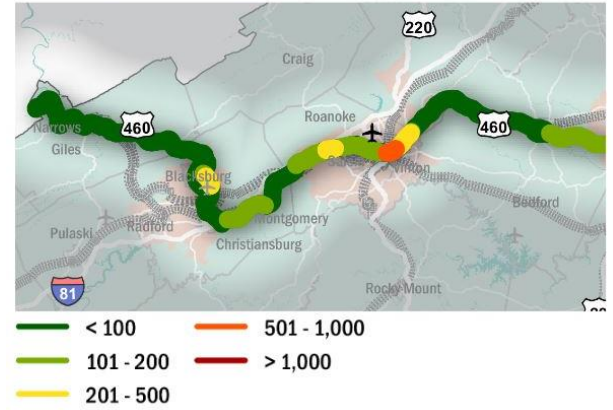
5.   Change is Good?

This section will explore the:
- Historical SMART SCALE project scoring methodology steps and changes made since Round 1;
- Historical data regarding the number of applications submitted from localities, MPOs, PDCs, and transit agencies, and the effect application limits have on success rates in Round 3;
- SMART SCALE scoring process; and
- Per capita VDOT District cost benefit per round based on the various scoring steps.

Round 1 Scoring Methodology

In the first Round of SMART SCALE, there was a four-step scoring methodology. In each Round, statewide District Grant funds and statewide High Priority funds are each allocated 50% of the total SMART SCALE allocation.

Table 15A-15D SMART SCALE Round 1 Scoring Methodology Steps

Step 1: Fund top scoring projects with each district eligible for DGP funds using DGP funds until remaining funds are insufficient to fund the next highest scoring project, excluding any project originally included solely because it does not have an environmental impact

District	# Projects	DGP Available	DGP Allocated	DGP Remaining
Bristol	9	$62,239,019	$49,964,603	$12,274,416
Culpeper	10	$54,872,548	$54,432,133	$440,415
Fredericksburg	13	$60,504,406	$50,371,617	$10,132,789
Hampton Roads	17	$178,033,507	$161,131,186	$16,902,321
Lynchburg	19	$63,096,890	$61,457,336	$1,639,554
Northern Virginia	17	$183,055,970	$180,524,715	$2,531,255
Richmond	16	$127,411,522	$121,266,122	$6,145,400
Salem	14	$84,868,412	$68,032,666	$16,835,746
Staunton	13	$68,917,727	$63,318,226	$5,599,501
TOTAL	**128**	**$883,000,000**	**$810,498,604**	**$72,501,396**

Step 2: Fund top scoring projects using HPP funds within each district that would have otherwise been funded with DGP funds but were not because they are only eligible for HPP (if their SMART SCALE cost is less than the total DGP funds available).

District	# Projects	HPP Available	HPP Allocated	HPP Remaining
Bristol	-	-	$0	-
Culpeper	-	-	$0	-
Fredericksburg	4	-	$27,243,596	-
Hampton Roads	2	-	$6,358,850	-
Lynchburg	3	-	$7,106,097	-
Northern Virginia	-	-	$0	-
Richmond	5	-	$18,586,963	-
Salem	5	-	$15,577,806	-
Staunton	4	-	$13,319,751	-
TOTAL	**23**	**$833,000,000**	**$88,193,063**	**$744,806,937**

Step 3: In any district where unallocated DGP funds are available, co-mingle remaining DGP funds with HPP funds to fund the next highest scoring project eligible for both programs.

District	# Projects	HPP Available	HPP Allocated	HPP Remaining
Bristol	1	-	$8,925,584	-
Culpeper	1	-	$25,559,585	-
Fredericksburg	1	-	$1,372,171	-
Hampton Roads	1	-	$3,097,679	-
Lynchburg	1	-	$15,562,611	-
Northern Virginia	1	-	$39,798,423	-
Richmond	1	-	$53,764,988	-
Salem	1	-	$12,994,970	-
Staunton	1	-	$23,535,377	-
TOTAL	**9**	**$833,000,000**	**$184,611,389**	**$560,195,548**

Step 4: Fund projects with a SMART SCALE score over 1.0 based on the highest project benefit until funds are insufficient to fund the unfunded project with the highest project benefit.

District	# Projects	HPP Available	HPP Allocated	HPP Remaining
Bristol	-	-	-	-
Culpeper	-	-	-	-
Fredericksburg	1	-	$115,500,000	-
Hampton Roads	1	-	$144,927,753	-
Lynchburg	-	-	-	-
Northern Virginia	-	-	-	-
Richmond	-	-	-	-
Salem	-	-	-	-
Staunton	-	-	-	-
TOTAL	**3**	**$833,000,000**	**$260,427,753**	**($232,205)**

Table 16: Round 1 Statewide Totals

District	# Projects	DGP Allocated	HPP Allocated	Total Funding
Bristol	10	$62,239,019	$8,925,584	$71,164,603
Culpeper	11	$54,872,548	$25,559,585	$80,432,133
Fredericksburg	19	$60,504,406	$144,115,767	$204,620,173
Hampton Roads	21	$178,033,507	$154,384,282	$332,417,789
Lynchburg	23	$63,096,890	$22,668,708	$85,765,598
Northern Virginia	18	$183,055,970	$39,798,423	$222,854,393
Richmond	22	$127,411,522	$72,351,951	$199,763,473
Salem	20	$84,868,412	$28,572,777	$113,441,188
Staunton	18	$68,917,727	$36,855,128	$105,772,855
TOTAL	**163**	**$883,000,000**	**$533,232,205**	**$1,416,232,205**

Rounds 2 and 3 Scoring Methodology

Unlike Round 1, Rounds 2 and 3 had only a three-step scoring methodology. The only difference is that Step 3 from Round 1, which co-mingled DGP and HPP funds, was removed.

Round 2 Methodology

Step 1: Fund top scoring projects within each district eligible for DGP funds using DGP funds until remaining funds are insufficient to fund the next highest scoring project.

Table 17A-17C: SMART SCALE Round 2 Scoring Methodology Steps

District	# Projects	DGP Available	DGP Allocated	DGP Remaining
Bristol	9	$21,210,894	$21,210,894	-
Culpeper	5	$19,910,405	$19,461,690	$448,715
Fredericksburg	7	$26,409,641	$24,335,655	$2,073,986
Hampton Roads	22	$86,791,093	$80,181,698	$6,609,395
Lynchburg	8	$25,297,175	$24,554,251	$742,924
Northern Virginia	12	$89,403,058	$79,666,955	$9,736,103
Richmond	19	$56,176,746	$61,726,746	-$5,550,000
Salem	14	$32,633,500	$32,633,500	-
Staunton	14	$24,270,367	$24,270,367	-
TOTAL	**110**	**$382,102,879**	**$368,041,756**	**$14,061,123**

Step 2: Fund top scoring projects within each district that would have otherwise been funded with available DGP funds but were not because they are only eligible for HPP funds, using HPP funds, as long as their SMART SCALE cost does not exceed the total amount of DGP funds available to be programmed based on their rank.

District	# Projects	HPP Available	HPP Allocated	HPP Remaining
Bristol	0	-	-	$2,817,806
Culpeper	0	-	-	$36,670,555
Fredericksburg	1	-	$1,481,550	$22,047,320
Hampton Roads	1	-	$334,058	$150,000,055
Lynchburg	1	-	$1,083,903	$11,546,256
Northern Virginia	0	-	-	$287,625,771
Richmond	1	-	$7,199,224	$83,191,124
Salem	2	-	$2,318,000	$36,020,799
Staunton	4	-	$7,275,298	$9,158,955
TOTAL	**10**	**$658,770,774**	**$19,692,033**	**$639,078,641**

Step 3: Fund projects with a benefit relative to SMART SCALE score greater than an established threshold based on the highest project benefit using HPP funds until funds are insufficient to fund the next unfunded project with the highest project benefit.

District	# Projects	HPP Available	HPP Allocated	HPP Remaining
Bristol	1	-	$2,817,806	-
Culpeper	6	-	$36,670,555	-
Fredericksburg	1	-	$22,047,320	-
Hampton Roads	2	-	$150,000,055	-
Lynchburg	1	-	$11,546,256	-
Northern Virginia	9	-	$287,625,771	-
Richmond	6	-	$83,191,124	-
Salem	3	-	$36,020,799	-
Staunton	2	-	$9,158,955	-
TOTAL	**31**	**$658,770,774**	**$639,078,641**	**$0**

Table 18: SMART SCALE Round 2 Statewide Totals

District	# Projects	DGP Allocated	HPP Allocated	Total Funding
Bristol	10	$21,210,894	$2,817,806	$24,028,700
Culpeper	11	$19,461,690	$36,670,555	$56,132,245
Fredericksburg	9	$24,335,655	$23,528,870	$47,864,525
Hampton Roads	25	$80,181,698	$150,334,113	$230,515,811
Lynchburg	10	$24,554,251	$12,630,159	$37,184,410
Northern Virginia	21	$79,666,955	$287,625,771	$367,292,726
Richmond	26	$61,726,746	$90,390,348	$152,117,094
Salem	19	$32,633,500	$38,338,799	$70,972,299
Staunton	20	$24,270,367	$16,434,253	$40,704,620
TOTAL	**151**	**$368,041,756**	**$658,770,674**	**$1,026,812,430**

**Overprogrammed DGP funds in Richmond are offset by funds released from Round 1 from UPC 109308 in Petersburg.

Round 3 Methodology

Table 19A-19C: SMART SCALE Round 3 Scoring Methodology Steps

Step 1: Fund top scoring projects within each district eligible for DGP funds using DGP funds until remaining funds are insufficient to fund the next highest scoring project.

District	# Projects	DGP Available	DGP Allocated	DGP Remaining
Bristol	2		$16,454,000	
Culpeper	3		$13,709,265	
Fredericksburg	7		$24,552,436	
Hampton Roads	22		$63,857,537	
Lynchburg	6		$15,104,905	
Northern Virginia	7		$86,214,652	
Richmond	12		$60,407,418	
Salem	6		$31,376,924	
Staunton	17		$29,688,863	
TOTAL			**$341,366,000**	

Step 2: Fund top scoring projects within each district that would have otherwise been funded with available DGP funds but were not because they are only eligible for HPP funds, using HPP funds, if their SMART SCALE cost does not exceed the total amount of DGP funds available to be programmed based on their rank.

District	# Projects	HPP Available	HPP Allocated	HPP Remaining
Bristol	0		$0	
Culpeper	0		$0	
Fredericksburg	3		$11,647,639	
Hampton Roads	2		$1,455,000	
Lynchburg	0		$0	
Northern Virginia	2		$27,110,000	
Richmond	2		$3,669,000	
Salem	0		$0	
Staunton	1		$3,209,056	
TOTAL			**$47,090,695**	

Step 3: Fund projects with a benefit relative to SMART SCALE score greater than an established threshold based on the highest project benefit using HPP funds until funds are insufficient to fund the next unfunded project with the highest project benefit.

District	# Projects	Amount HPP
Bristol	0	$0
Culpeper	0	$0
Fredericksburg	0	$0
Hampton Roads	1	$200,000,000
Lynchburg	0	$0
Northern Virginia	1	$50,000,000
Richmond	0	$0
Salem	0	$0
Staunton	0	$0
TOTAL		**$250,000,000**

Step 4

District	# Projects	Amount DGP	Amount HPP
Bristol	8	$8,745,298	$9,779,759
Culpeper	3	$10,865,640	$7,007,394
Fredericksburg	8	$7,522,168	$9,803,105
Hampton Roads	9	$18,484,508	$28,214,466
Lynchburg	2	$11,978,866	$8,176,545
Northern Virginia	4	$11,850,000	$29,989,719
Richmond	5	$6,961,119	$21,181,543
Salem	4	$6,500,330	$13,122,803
Staunton	3	$0	$10,797,201
TOTAL		**$82,907,929**	**$138,072,535**

Table 20: SMART SCALE Round 3 Statewide Totals

District	# Projects	DGP Allocated	HPP Allocated	Total Funding
Bristol	10	$25,199,298	$9,779,759	$34,979,057
Culpeper	6	$24,574,905	$7,007,394	$31,582,299
Fredericksburg	18	$32,074,604	$21,450,744	$53,525,348
Hampton Roads	34	$82,342,045	$229,669,466	$312,011,511
Lynchburg	8	$27,083,771	$8,176,545	$35,260,316
Northern Virginia	14	$98,064,652	$107,099,719	$205,164,371
Richmond	19	$67,368,537	$24,850,543	$92,219,080
Salem	10	$37,877,254	$13,122,803	$51,000,057
Staunton	21	$29,688,863	$14,006,257	$43,695,120
TOTAL		**$424,273,929**	**$435,163,230**	**$859,437,159**

Round 3 Application Limits

Following the FY 18 round of applications, the SMART SCALE Technical Guide was revised create a limit on the number of applications allowed per applicant. This is a two-tiered system based on population thresholds (Table 21).

Table 21: New SMART SCALE Application Limits

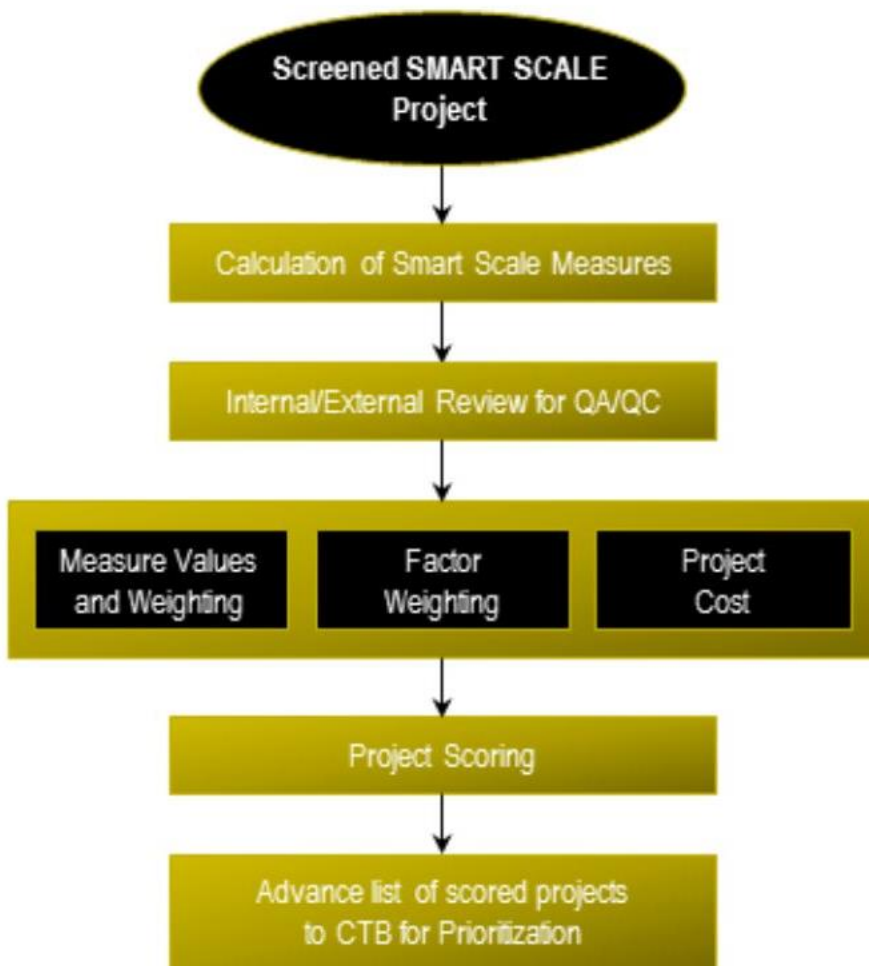| Tier	Localities	MPOs/PDCs/Transit Agencies	Maximum Number of Applications
1	Population less than 200,000	Population less than 500,000	4
2	Population greater than 200,000	Population greater than 500,000	10

Notes: 1) Population determined by 2010 Census, and 2) Population used for a PDC is reduced by the MPO population within the PDC boundary.

Based on the new application limits, all localities and agencies in the RVTPO service area, beginning in Round 3, were limited to submitting no more than four (4) applications. There were minimal changes statewide regarding how many projects were applied for by individual locality or agency. Some of the same localities such as Chesterfield County, who applied for 31 projects in Round 2, used their new maximum limit of 10 in Round 3. It was observed that some rural localities applied for their complement of four projects, where they had not made any previous applications.

SMART SCALE Scoring Process

Obviously over time, improvements are necessary to refine or streamline an existing program or process—SMART SCALE is no exception. Regarding the scoring calculations, this has remained constant throughout three rounds of the process. As a refresher for many, and an introduction to new Policy Board members, a tutorial of how the final SMART SCALE score is calculated follows.

The diagram below shows the SMART SCALE process for project evaluation and scoring.

```
        ┌─────────────────────────┐
        │   Screened SMART SCALE  │
        │         Project         │
        └─────────────────────────┘
                     │
                     ▼
        ┌─────────────────────────────────┐
        │ Calculation of Smart Scale      │
        │ Measures                        │
        └─────────────────────────────────┘
                     │
                     ▼
        ┌─────────────────────────────────┐
        │ Internal/External Review        │
        │ for QA/QC                       │
        └─────────────────────────────────┘
                     │
                     ▼
┌──────────────┬──────────────┬──────────────┐
│ Measure      │   Factor     │  Project     │
│ Values and   │  Weighting   │   Cost       │
│ Weighting    │              │              │
└──────────────┴──────────────┴──────────────┘
                     │
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        ┌─────────────────────────────────┐
        │       Project Scoring           │
        └─────────────────────────────────┘
                     │
                     ▼
        ┌─────────────────────────────────┐
        │ Advance list of scored projects │
        │ to CTB for Prioritization       │
        └─────────────────────────────────┘
```

A project is successfully screened in if it has needs identified in at least one or more of the VTrans2040 Needs Assessment categories for:

- Corridors of Statewide Significance
- Regional Networks
- Urban Development Areas
- Safety

All projects are evaluated on the Safety, Congestion Mitigation, Accessibility, Economic Development, and Environmental Quality factors. For Metropolitan Planning Organizations (MPO) with populations over 200,000, a sixth factor of Land Use Coordination is required. This Land Use factor affects the following MPOs

- Fredericksburg Area MPO
- Hampton Roads TPO
- Richmond Regional TPO
- Roanoke Valley TPO
- Transportation Planning Board (Northern Virginia)

When scoring the projects, each MPO and Planning District Commission has a set of factor weights. This is due mainly as a result of the varying transportation needs, not only within each VDOT District, but from region to region. Prior to funding projects in Round 1, a statewide PDC-MPO Factor Weighting Typology Map was developed which shows the four distinct weighting typologies. The RVTPO has a weighting typology of Category B. Table 22 gives the weightings for each typology.
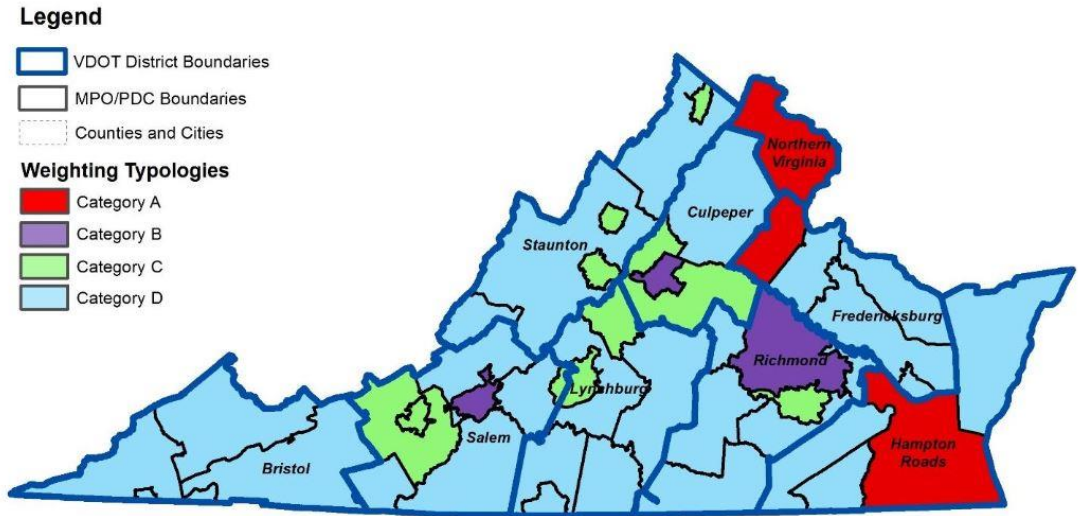
Table 22: SMART SCALE Factor Weights by Typology

Typology	Congestion Mitigation	Economic Development	Accessibility	Safety	Environmental Quality	Land Use
Category A	45%	5%	15%	5%	10%	20%
Category B	15%	20%	25%	20%	10%	10%
Category C	15%	25%	25%	25%	10%	-
Category D	10%	35%	15%	30%	10%	-

Within each of the six factors are measures, which have individual weights. Once the highest score in each of the measures is determined, a value of 100 is assigned and the normalized weighting of measures for all other projects is a percentage of that project to the highest. Once the normalized measure values are determined, they are multiplied by their weighting and added to all other measures to yield a factor value. The factor value is then multiplied by the factor value, based on the project's typology weighting. The sum of all the weighted factors yields a Project Benefit Score.

Once the Project Benefit Score is determined, it is then divided by the SMART SCALE project cost in $10 millions. This yields a value of benefit for every dollar invested. As an example, the Orange Avenue Improvements project has a Project Benefit Score of 4.8 and requested $72,635,000 of a total cost of $77,195,000. The SMART SCALE score is 0.7 (4.8/7.26 = 0.7).

PROJECT SCORECARD
For more information on how to read a scorecard, click here.

Orange Avenue Improvements Project Id: 3479

Widen Orange Avenue from two lanes in each direction to three lanes in each direction from and including the 11th Street, N.E intersection to approx. 1230 feet east of Gus Nicks Boulevard.

Submitting Entity:	Roanoke Valley Transportation Planning Organization
Preliminary Engineering:	Not Started
Right of Way:	Not Started
Construction:	Not Started
Eligible Fund Program:	Statewide High Priority
VTRANS Need:	CoSS

(click here for details)

0.7 SMART SCALE SCORE

#341 OF 433 STATEWIDE
#37 OF 45 DISTRICTWIDE

SMART SCALE Requested Funds	$72,635,000
Total Project Cost	$77,195,000
Project Benefit	4.8
Project Benefit / Total Cost	0.6

SMART SCALE Area Type B

Factor	Congestion Mitigation		Safety		Accessibility			Economic Development			Environment		Land Use	
Measure	Increase in Peak Period Person Throughput	Reduction in Peak Period Delay	Reduction in Fatal and Injury Crashes	Reduction in Fatal and Injury Crash Rate	Increase in Access to Jobs	Increase in Access to Jobs for Disadvantaged Populations	Increase in Access to Multimodal Travel Choices	Square Feet of Commercial/Industrial Development Supported	Tons of Goods Impacted	Improvement to Travel Time Reliability	Potential to Improve Air Quality	Other Factor Values Scaled by Potential Acreage Impacted	Support of Transportation-Efficient Land Use	Increase Transportation-Efficient Land Use
Measure Value	134.2 persons	44.8 person hrs.	49.7 LPDO	273.4 LPDO / 100M VMT	45.2 jobs per resident	45.6 jobs per resident	222.6 adjusted users	2,478,191.2 thousand adj sq. ft.	157,657.6 thousand adj daily tons	114,477,461.1 adj. buffer time index	296.8 adjusted points	3.9 scaled points	87,418.0 access * pop/emp density.h	11,488.1 access * pop/emp density change.
Normalized Measure Value (0-100)	0.5	0.7	14.2	0.6	0.8	0.8	0.8	12.6	3.3	2.6	2.1	11.8	6.6	3.3
Measure Weight (% of Factor)	0.5	0.5	0.5	0.5	0.6	0.2	0.2	0.6	0.2	0.2	0.5	0.5	0.7	0.3
Factor Value	0.6		7.4		0.8			8.8			6.9		5.6	
Factor Weight (% of Project Score)	15%		20%		25%			20%			10%		10%	
Weighted Factor Value	0.1		1.5		0.2			1.8			0.7		0.6	
Project Benefit	4.8													
SMART SCALE Cost	$72,635,000													
SMART SCALE Score (Project Benefit per $10M SMART SCALE Cost)	0.7													

Per Capita VDOT District Cost Benefit

Tables 23, 24, and 25, which follow, illustrate the effects that each step employed to fund projects in each round has, relative to overall per capita cost benefit per VDOT District.

Table 23: Effects of Step 4 in the Scoring Methodology on Per Capita Benefit in FY 2017

VDOT District	SMART SCALE District Funding Step 1	Step 1 District Per Capita Funding	SMART SCALE District Funding Step 2	Step 2 District Per Capita Funding	SMART SCALE District Funding Step 3	Step 3 District Per Capita Funding	SMART SCALE District Funding Step 4	Step 4 District Per Capita Funding	District Population	Total Per Capita Funding
Bristol	$49,964,603	$140	-	-	$8,925,584	$25	-	-	356,897	$199
Culpeper	$54,432,133	$134	-	-	$25,559,585	$63	-	-	404,735	$199
Fredericksburg	**$50,371,617**	**$102**	**$27,243,596**	**$55**	**$1,372,171**	**$3**	**$115,500,000**	**$235**	**492,144**	**$416**
Hampton Roads	$161,131,186	$91	$6,358,850	$4	$3,097,679	$2	$144,927,753	$82	1,764,170	$188
Lynchburg	**$61,457,336**	**$153**	**$7,106,097**	**$18**	**$15,562,611**	**$39**	**-**	**-**	**401,945**	**$210**
NOVA	**$180,524,715**	**$74**	**-**	**-**	**$39,798,423**	**$16**	-	-	**2,436,146**	**$90**
Richmond	$121,266,122	$95	$18,586,963	$14	$53,764,988	$42	-	-	1,282,919	$156
Salem	**$68,032,666**	**$98**	**$15,577,806**	**$22**	**$12,994,970**	**$19**	**-**	**-**	**695,583**	**$163**
Staunton	$63,318,226	$115	$13,319,751	$24	$23,535,377	$43	-	-	548,454	$193

Table 24: Effects of Step 3 in the Scoring Methodology on Per Capita Benefit in FY 2018

VDOT District	SMART SCALE District Funding Step 1	Step 1 District Per Capita Funding	SMART SCALE District Funding Step 2	Step 2 District Per Capita Funding	SMART SCALE District Funding Step 3	Step 3 District Per Capita Funding	District Population	Total Per Capita Funding
Bristol	$21,210,894	$60	-	-	$2,817,806	$8	352,369	$68
Culpeper	**$19,461,690**	**$48**	**-**	**-**	**$36,670,555**	**$90**	**406,760**	**$138**
Fredericksburg	$24,335,655	$49	$1,481,550	$3	$22,047,320	$45	494,045	$97
Hampton Roads	**$80,181,698**	**$45**	**$334,058**	**$0.19**	**$150,000,055**	**$85**	**1,765,205**	**$130**
Lynchburg	$24,554,251	$61	$1,083,903	$3	$11,546,256	$29	400,300	$93
Northern Virginia	**$79,666,955**	**$32**	**-**	**-**	**$287,625,771**	**$117**	**2,461,620**	**$149**
Richmond	$61,726,746	$48	$7,199,224	$6	$83,191,124	$65	1,287,852	$119
Salem	**$32,633,500**	**$47**	**$2,318,000**	**$3**	**$36,020,799**	**$52**	**693,603**	**$102**
Staunton	$24,270,367	$44	$7,275,298	$13	$9,158,955	$17	550,054	$74

Table 25: Effects of Step 3 in the Scoring Methodology on Per Capita Benefit in FY 2020

VDOT District	SMART SCALE District Funding Step 1	Step 1 District Per Capita Funding	SMART SCALE District Funding Step 2	Step 2 District Per Capita Funding	SMART SCALE District Funding Step 3	Step 3 District Per Capita Funding	SMART SCALE District Funding Step 4 (DGP+HPP)	Step 4 District Per Capita Funding	District Population	Total Per Capita Funding
Bristol	$16,454,000	$47	$0	$0	$0	$0	$18,525,057	$53	348,862	$100
Culpeper	$13,709,265	$33	$0	$0	$0	$0	$17,873,034	$43	412,685	$77
Fredericksburg	$24,552,436	$49	$11,647,639	$23	$0	$0	$17,325,273	$35	501,541	$107
Hampton Roads	**$63,857,537**	**$36**	**$1,455,000**	**$1**	**$200,000,000**	**$113**	**$46,698,974**	**$26**	**1,766,213**	**$177**
Lynchburg	$15,104,905	$38	$0	$0	$0	$0	$20,155,411	$50	399,270	$88
Northern Virginia	$86,214,652	$35	$27,110,000	$11	$50,000,000	$20	$41,839,719	$17	2,491,299	$82
Richmond	$60,407,418	$46	$3,669,000	$3	$0	$0	$28,142,662	$22	1,300,765	$71
Salem	**$31,376,924**	**$45**	**$0**	**$0**	**$0**	**$0**	**$19,623,133**	**$28**	**694,336**	**$73**
Staunton	$29,688,863	$53	$3,209,056	$6	$0	$0	$10,797,201	$19	555,049	$79

As a result of the Hampton Roads Bridge Tunnel and the Southern Virginia Mega Site at Berry Hill Connector Road (Pittsylvania Co – Lynchburg District), the total funding dollars per capita for the Hampton Road and Lynchburg Districts were significantly skewed upward. In contrast, without those projects, the total per capita for funding for Hampton Roads and Lynchburg would be $49 and $54 respectively.

Most of the significant increases to per capita funding in the districts occur in Step 4 of Round 1 and Step 3 of Rounds 2 and 3, where the highest scoring Cost Benefit Scores are funded with the remaining HPP funds. Looking at the Salem District in FY 17, 60% of the per capita benefit came from DGP funds in Step 1. In FY 18, 46% of the benefit came from DGP funds and 51% from Step 3, the highest cost benefit score of HPP projects with funding available. In FY 20, all the per capita cost benefit came from Step 1 with DGP funds.

6. That's Perfectly Normal…ized

Since Round 1, staff has observed a variety of contributing factors to the approval and denial of some SMART SCALE applications in the RVTPO service area:

Reasons for Approval
- In some rounds, the highest normalized score is not as strong compared to others—this is an inconsistency seen in each round, but can be an advantage for projects which may score on the borderline;
- Smaller cost projects with high cost benefit;
- Substantial future development and development potential of property surrounding the proposed project area, which results in the capitalization of points from the Economic Development factor, whose measures are weighted at 20% of the total score;
- Projects that successfully provide access to more jobs in a 45-minute (highway) and 60-minute (transit) travel time from each block group to every other block group, more jobs in a 45 and 60-minute travel time for disadvantaged populations, and increased access to multimodal choices score well on the Accessibility factor whose measures are weighted at 25% of the total score;
- Although not as great as the largest metropolitan regions in the Commonwealth, those projects in the region which have successfully leveraged funds have an advantage over more rural localities in the Salem District which may have little to no ability to leverage;
- Projects featuring VDOT-promoted Innovative Intersections, such as the U.S. 220 at International Parkway Intersection Improvements which feature a Restricted Crossing U-Turn (RCUT) because they tend to have high cost benefit; and
- Leveraging of significant funding on projects with the realized potential for a high cost benefit.

Reasons for Denial
- When HPP "congestion" projects are competing against those in Northern Virginia, Hampton Roads, or the Fredericksburg Area MPO where the congestion factor carries a weighting of 45% (most weighting given to any single factor in any category statewide) so their projects will always typically be the highest scoring (one that's normalized to all others) in each round;
- Projects that lack in the provision of access to: more jobs in a 45-minute (highway) and 60-minute (transit) travel time between block groups, and more jobs in a 45 and 60-minute travel time for disadvantaged populations;
- Large, high-cost projects with low cost-benefit scores
- No leveraged funding to increase the project score;
- Disproportionately leveraged funding, which is either due to low cost benefit potential, or limitations on the amount of leverage available to allocate to a project; and
- Expensive applications competing for HPP funding against localities in Northern Virginia and Hampton Roads face enormous fund-leveraging ability and larger populations which yield the potential for higher project cost benefits for those reasons.

There has been much discussion regarding the 45 percent weighting that the Congestion factor receives on all projects in the Northern Virginia, Hampton Roads Districts and the Fredericksburg Area MPO. It is true that when *congestion* projects are scored, projects from those districts are typically found to be the highest in the category. What should be considered is that this high weighting can be a blessing and a curse. In Round 3, Hampton Roads has 26 projects which are recommended for funding—the most statewide. Twenty-three of those projects have a SMART SCALE cost of less than $10 million (Table 26).

Table 26: Round 3 Congestion Factor Values of Hampton Roads District Projects Recommended for Funding

Project Title	Congestion Factor Value	Project Benefit Score	Total Project Cost	SMART SCALE Cost	Leverage (%)	SMART SCALE Score
Hampton Roads Bridge-Tunnel Widening/I-64 Expansion	100	74.16	$3,662,372,004	$200,000,000	95	3.71
Battlefield Blvd/Volvo Pkwy Intersection Improvements	5.4	9.09	$1,475,129	$1,447,129	2	62.83
Jefferson Ave & Oyster Point Rd Intersection Improvements	4.8	7.25	$10,856,521	$10,856,521	0	6.68
Ballentine Blvd Lane Improvements	0	5.52	$1,067,388	$1,067,388	0	51.75
Virginia Beach Blvd Widening – George St to Newtown Rd	0	3.71	$15,701,021	$15,701,021	0	2.37
Terminal Blvd/Diven St Intersection Improvements	0	3.32	$1,732,600	$1,732,600	0	19.19
Shoulder Widening Rte. 13	0	3.04	$2,923,357	$2,923,357	0	10.41
Portsmouth Railroad Crossing Message Signs	0	2.72	$753,699	$570,000	24	47.68
N Armistead Ave Reconstruction, Ped, & Drainage Impr.	0	1.85	$5,298,528	$4,818,528	9	3.83
Route 31 Bicycle Accommodations	0	1.72	$9,600,000	$9,600,000	0	1.79
Warwick Blvd & Oyster Point Rd Intersection Improvements	0.2	1.64	$5,445,737	$5,445,737	0	3.01
Hampton Roads Center Pkwy Bike & Pedestrian Access	0	1.39	$2,163,325	$2,158,325	0	6.42
J. Clyde Morris Blvd Intersection Improvements	0.1	1.34	$1,768,528	$1,768,528	0	7.58
Monticello Ave-Richmond Rd-Lafayette St Roundabout	0	1.20	$6,381,090	$6,381,090	0	1.88
Richmond Rd. Signal Coordination & Pedestrian Impr.	0	1.17	$203,500	$203,500	0	57.28
Lafayette Street Widening	0	0.84	$5,870,000	$4,329,000	26	1.94
Longhill Road Shared Use Path	0	0.81	$4,400,000	$4,400,000	0	1.83
General Booth Blvd/Oceana Blvd Intersection Improvements	0	0.80	$4,100,277	$3,600,000	12	2.21
Rte. 171 capacity enhancements between Rtes. 134 & 1740	0	0.73	$3,630,000	$2,420,000	33	3.03
Wakefield 460 Eastbound Turn Lane	0	0.61	$994,846	$981,290	1	6.21
Lafayette Street Signal & Pedestrian Improvements	0	0.60	$91,000	$91,000	0	65.74
Bicycle Lane on US Business 13	0	0.56	$2,360,061	$2,360,061	0	2.37
HWY 301S Sidewalk Greensville Project	0	0.55	$576,903	$576,903	0	9.54
Carrollton Boulevard (Route 17) Crosswalks	0	0.08	$212,000	$212,000	0	3.82
WATA Bus Stop Pull-Offs	0.2	0.60	$255,000	$255,000	0	22.20
Newport News Shipyard - Gloucester MAX Service	0.1	0.90	$1,200,000	$1,200,000	0	7.50

When reviewing these projects, it becomes apparent that the 45% Congestion Mitigation factor weighting is only beneficial for funding it: 1) it is a congestion project where points are scored in that factor, and 2) if the project scores relatively well in several of the other factors. Nine of the projects highlighted above feature widening and intersection improvements and received 0 points for congestion. Not all projects are congestion projects, therefore the 45% weighting cannot be relied upon to score well, rather it must do so in the other five factor categories.

Because Hampton Roads' factor weightings are different and oftentimes less than those in the Salem District, the same struggle exists there to score well. An example of this is the Economic Development and Safety factors. The Hampton Roads District only has a category weighting of 5% for each of these categories, unlike the RVTPO service area which has weightings of 20% for the same. Therefore, it is prudent to have a project score well in many, if not all six factors. Having a high factor weighting with little to no points scored in it is not helpful in any District.

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7. What do We Get from All of This?

As discussed previously, Innovative Intersections have the potential to be a smaller, and better cost-benefit solution to traditional interchanges and signalized and unsignalized intersections. Although Innovative Intersections are being used as alternatives to traditional highway improvements, it is important to note that proper analysis should be performed by the applicant, in conjunction with VDOT, to determine the feasibility and appropriateness of applying for a project that features an Innovative Intersection. If an alternative is determined to provide a solid cost benefit and lower cost than the traditional solution, such would be preferable.

Tables 27 and 28 show that both the average total project cost for all highway applications and the average total cost for all funded highway applications has decreased sharply since 2017 (52% and 53% respectively). In Round 3, there were 51 Innovative Intersection project applications statewide. Due to an average cost range of $15-$20 million specifically covering the Innovative Intersection improvement, this aids in lowering the average highway application cost of funded and unfunded projects.

Table 27: Average of Total Project Cost Statewide for Highway Improvement Projects (outliers removed)

Round	Average of Total Project Cost (Applied Highway Projects)	Average of Total Project Cost (Funded Highway Projects)
FY 2017	$45,094,641	$11,144,390
FY 2018	$27,083,081	$9,645,688
FY 2020		

As one might imagine, there have been several large-scale projects funded in each round which skew the average cost of statewide highway projects. Tables 27 and 28 show these averages with and without the outlier projects.

Round 1 Outliers
Fredericksburg District
- UPC 101595 - Rappahannock River Crossing (Southbound) - $125,000,000

Hampton Roads District
- I-64 Peninsula Widening - $647,448,358

Northern Virginia District
- Route 7 Widening (Phase II) - $118,000,000
- Route 7 Widening (Phase I) - $135,872,000
- Transform66 Outside the Beltway - $600,000,000

Round 2 Outliers
Hampton Roads District
- I-64/I-264 Interchange Improvements - $350,091,800
- I-64 Southside Widening and High-Rise Bridge - Phase 1 - $600,000,000

Round 3 Outliers
Hampton Roads District
- Hampton Roads Bridge Tunnel Widening/I-64 Expansion - $3,662,372,004

Table 28: Average of Total Project Cost Statewide for Highway Improvement Projects (All projects)

Round	Average of Total Project Cost (Applied Highway Projects)	Average of Total Project Cost (Funded Highway Projects)
FY 2017	$50,720,534	$22,953,401
FY 2018	$29,749,527	$18,344,758
FY 2020		

In conclusion, the following takeaways should lead to more thoughtful and meritorious projects:

- Design more innovative intersection projects, which are proven to have higher cost benefit and lower cost.
- Design and develop projects which will score well in several factor categories—the *putting your eggs in one basket* approach isn't extremely effective.
- As has been seen by the disparities in per capita cost-benefit, be mindful of the amount of business and people that will benefit from a project. If that is out of balance, consider other locations, or improvements, and certainly other funding sources.
- Leveraging funds and its relationship to project benefit: the better the project, the more that proportional leveraging will affect the score. Having said that, there is an amount of guesswork involved in determining a *proper* amount of leverage. If your leverage *guess* is wrong…
- If a project is resubmitted one round to the next and the scope doesn't change, and leveraging funds has had no real effect, scope changes are necessary and looking at alternatives such as innovative intersections are warranted.