Long Range Transportation Plan
Project Prioritization Methodology

Fredericksburg Area Metropolitan Planning Organization

Approved by the FAMPO Policy Committee May 20, 2021

Mission Statement

The MPO's mission is to provide a cooperative, continuous and comprehensive ("3C") transportation planning process to build regional agreement on transportation investments, that balance roadway, public transit, bicycle, pedestrian, and other transportation needs and support regional land use, economic, and environmental goals for the safe and efficient movement of people and goods. Special emphasis is placed on providing equal access to a variety of transportation choices and effective public involvement in the transportation planning process.

GWRC/FAMPO Title VI Nondiscrimination Statement

"The George Washington Regional Commission and the Fredericksburg Area Metropolitan Planning Organization fully comply with Title VI of the Civil Rights Act of 1964 and its related statutes and regulations in all programs and activities. For more information or to obtain a Discrimination Complaint Form, please visit www.gwregion.org or www.fampo.gwregion.org or call (540) 373-2890. Para información en español, llame al (540)-373-2890."

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1.0 Introduction

To understand the long-term transportation needs of a region, carefully prepared and executed planning processes are undertaken. These processes compile existing and future transportation system and usage information, as well as other non-technical considerations and elements to identify the comprehensive set of transportation infrastructure, policy, and service modifications that are necessary to accommodate existing and future travel demand by all modes of transportation. In any planning area, differing projects have differing costs and benefits (relative and absolute). In addition, for plans encompassing multiple jurisdictions, regional priorities may differ widely from local priorities.

Understanding that there are practical limitations to the implementation of transportation improvement projects, a regimented system for determining the relative value of all projects when compared to one another generally (all modes and project types together), and when compared to one another within specific groupings, is needed. FAMPO has developed an updated Project Prioritization Methodology ("Methodology") to assist in developing the regional Long-Range Transportation Plan (LRTP) as required in 23 CFR § 450.324.

2.0 Background

FAMPO identified the need to update its 2008 Highway Project Prioritization Methodology (see Appendix A) in its FY21 Unified Planning Work Program (UPWP). In early 2021, staff proposed to not only update the highway project methodology, but create a clear, objective, and standardized scoring and evaluation process for transit and transportation demand management (TDM) projects as well as active transportation projects. These three broad mode categories reflect FAMPO's LRTP project list structure.

In developing the evaluation criteria and prioritization process for this document, a focus was placed on better alignment with the Commonwealth of Virginia's SMART SCALE program, federal planning factors from the Fixing America's Surface Transportation (FAST) Act, and FAMPO's regional performance measures. These guiding criteria served as a framework for establishing evaluation measures across all three modes and are briefly described below.

2.1 SMART SCALE Evaluation Measures

SMART SCALE serves as one of the primary transportation funding mechanisms in Virginia. Operating on a two-year cycle, eligible applicants submit project applications which are first screened in and then evaluated across six factors: congestion mitigation, economic development, accessibility, safety,

environmental quality, and land use coordination. Jurisdictions are categorized into one of four typologies – A, B, C, or D - depending on their size and characteristics which determines the weights applied to each of the six evaluation measures. The FAMPO planning area (City of Fredericksburg, Spotsylvania County, and Stafford County) falls into category B. Figure 1 illustrates the weights used for SMART SCALE scoring purposes.

Factor	Congestion Mitigation	Economic Development	Accessibility	Safety	Environmental Quality	Land Use
Category A	45%[b]	5%	15%	5%	10%	20%[a]
Category B	15%	20%	25%	20%	10%	10%[a]
Category C	15%	25%	25%	25%	10%	
Category D	10%	35%	15%	30%	10%	

Figure 1. Factor Weights by Category. Source: SMART SCALE Technical Guidance, February 2021

Please refer to Appendix B for the full SMART SCALE Technical Guidance as of February 2021.

2.2 Federal Planning Factors

The primary federal law governing metropolitan transportation planning is the Fixing America's Surface Transportation (FAST) Act, enacted in 2015. The FAST Act built upon the Moving Ahead for Progress in the 21st Century Act (MAP-21). Under the FAST Act, MPOs must establish a transportation planning process that provides for consideration and implementation of projects, strategies, and services that will address the following 10 planning factors:

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
2. Increase the safety of the transportation system for motorized and non-motorized users;
3. Increase the security of the transportation system for motorized and non -motorized users;
4. Increase accessibility and mobility of people and freight;
5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
7. Promote efficient system management and operation;

8. Emphasize the preservation of the existing transportation system;
9. Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation; and
10. Enhance travel and tourism.

These factors are addressed via SMART SCALE and reflected in the evaluation measures developed by FAMPO in this Methodology.

2.3 Performance Measures in the FAMPO Area

The Federal Highway Administration (FHWA), states, and MPOs are required to undertake a performance-based approach to planning and programming under 23 USC 150 and 23 CFR 490. Federal rulemaking covers issues such as highway safety, pavement and bridge condition, and system performance and within these categories, there are sets of performance measures (number and rate of fatalities, percentage of pavement in good condition, percent of person-miles traveled on the interstate, truck travel time reliability index, etc.) that are meant to guide investment decisions that impact the transportation system.

FAMPO is required to utilize these requirements to carry out planning and project selection processes in addition to continual monitoring and reporting in coordination with the Virginia Department of Transportation (VDOT) and the Office of Intermodal Planning and Investment (OIPI). As such, these performance measures and regulations are built into the evaluation measures detailed in Section 5.

3.0 Methodology

This prioritization methodology uses readily accessible data and information in evaluating projects based on the following major factors (defined in Section 5) and project classifications:

- SMART SCALE Evaluation Measures (60%)
    - Safety (12%)
    - Congestion Mitigation (9%)
    - Accessibility (15%)
    - Environmental Quality (6%)
    - Economic Development (12%)
    - Land Use Coordination (6%)
- Statewide Coordination (10%)
- Project Benefit (30%)

Percentages for the six SMART SCALE measures are proportional with the Category B weighting that is utilized for the FAMPO region. The Active Transportation evaluation measures, however, use a slightly modified breakdown to better suit the size and scope of bicycle and pedestrian improvement. For instance, greater weight is given to safety and accessibility (see Section 5.3 for full details).

These factors are consistent with FAMPO's mission, are consistent with SMART SCALE but appropriately modified to fit the unique needs of the FAMPO region, address each of the ten federal planning factors, and help achieve performance-based planning requirements.

Scored projects are classified by the following:

- Roadway
    - Interstate Projects
    - Other Principal Arterial Projects
    - Minor Arterial Projects
    - Collector Projects
    - Local Roads Projects
- Transit/TDM
    - Transit Projects
    - TDM Projects
- Active Transportation
    - Bicycle and Pedestrian Projects

By evaluating projects based on factors within these major categories, projects are scored on a 10-point scale. Projects with the highest score are technically identified as higher priorities than those earning lower scores.

4.0 Project Ranking Process

1. Score projects by mode according to the evaluation measures

    a. Staff will collect candidate projects via a call for projects. After the close of the project submission deadline, staff will score each candidate project and produce a numerical score according to the measures and scoring details in Section 5.

    b. The output from this step will be three lists of scored projects which staff will make available to all FAMPO committees for review and feedback.

2. Assess cost effectiveness for each candidate project to identify potential exceptions

    a. To build in flexibility to the process of ranking projects, staff worked with the FAMPO Technical Advisory Committee (TAC) to develop a measure for factoring in cost or cost effectiveness. While project cost is not used an evaluation measure in scoring, cost effectiveness will be assessed in order to identify projects with low costs and high impacts. For example, staff may use metrics such as project cost divided by annual average daily traffic (AADT) to determine cost effectiveness for roadway projects.

    b. The output from this step will be a listing of highly cost-effective projects by mode.

3. Prioritize projects and develop initial project list

    a. Once all projects have been scored and their cost effectiveness assessed, staff will develop an initial ranked project list by mode. These will be presented to FAMPO committees for consideration, review, and feedback*.

4. Apply projected revenue figures to determine cutoff line for fiscally constrained project lists

    a. MPOs are required to demonstrate fiscal constraint for their Long-Range Transportation Plans. In simple terms, this means that the total sum of project costs based on year-of-expenditure dollars must fit within total projected revenues. While this is a planning-level exercise and no funding allocations are made, FHWA/Federal Transit Administration (FTA) rules require MPOs to develop a project list based on reasonably expected revenues.

    b. Regarding fiscal constraint determination as required in 23 CFR 450.324, Development and content of the metropolitan transportation plan, staff will work cooperatively with VDOT and the TAC to identify appropriate aggregate cost ranges/bands and assignment of projects into such bands. This information will inform the calculation of year-of-expenditure dollars for project estimates in determining overall fiscal constraint.

    c. For the purposes of the FAMPO LRTP, three fiscally constrained project lists will be developed in keeping with FAMPO's historical approach: roadway and active transportation, transit/TDM, and preliminary engineering (PE)/studies.

        i. The project list containing planning studies, PE work, and the like will be developed based on the current FAMPO Transportation Improvement Program

(TIP), VDOT Six-Year Improvement Program (SYIP), and other needs identified by staff, the TAC, and VDOT.

5. Review by staff and the TAC to identify additional possible exceptions
6. Staff recommended project lists presented to FAMPO Policy Committee for approval

*Note: For the 2050 LRTP update scheduled for completion in early 2022, staff has worked with the TAC and the Policy Committee to keep all projects on the 2045 LRTP project lists for the 2050 update assuming projected revenues meet or exceed projected expenditures. The intention is that for this document's first use, it will be utilized to score only new projects for consideration in the 2050 LRTP. The FAMPO 2045 LRTP was amended in July 2020 and is scheduled for a second amendment in summer 2021 as a result of SMART SCALE Round 4. With this in mind, the universe of projects will be largely up to date when the prioritization process takes place for the 2050 LRTP. Projects scheduled for financial closure prior to the adoption of the 2050 LRTP can be removed from the fiscally constrained lists.

5.0 Scoring Categories, Point Values, and Descriptive Guidance

The following sections are to guide the scoring of projects and provide detailed descriptions of each factor in the major categories and the measures for assigning point values to projects.

5.1 Roadway Projects

Evaluation Measure (Overall Weight)	Measure ID	Measure Name	Measure Description	Measure Objective	Measure Weight	Overall Weight	Scoring Criteria
Safety (12%)	S1	Potential Safety Improvement (PSI) Locations	Number of PSI segments/nodes on project segment	Determine the number of PSI locations within a distance from the project	30%	3.6%	Total (PSI Locations) 0 = 0/10 1 = 2/10 2 = 4/10 3 = 6/10 4 = 8/10 >5 = 10/10
	S2	Potential Safety Improvement (PSI) Locations	Ranking of PSI segments/nodes on project segment	Determine the ranking level of PSI locations within a distance from the project	30%	3.6%	Project area includes: 0 = 0 /10 >51 = 5/10 41-50 = 6/10 31-40 = 7/10 21-30 = 8/10 11-20 = 9/10 < 10 = 10/10
	S3	Equivalent Property Damage Only (EPDO) Weighted Crashes	Number of PDO crashes (nodes) within .25 mi	Determine the number of crashes within project segment	40%	4.8%	Total EPDO Weighted Crashes (i.e. fatal crash = 567, Injury = 33, PDO = 1) <250 = 2/10 250-500 = 4/10 500-1,000 = 6/10 1,001-2,000 = 8/10 >2,001 = 10/10

Evaluation Measure (Overall Weight)	Measure ID	Measure Name	Measure Description	Measure Objective	Measure Weight	Overall Weight	Scoring Criteria
Congestion Mitigation (9%)	C1	Current volume to capacity (V/C) ratio	Current V/C ratio	Determine the current V/C ratio for the project segment	50%	4.5%	Average V/C Ratio < 0.50 = 2/10 0.51 – 0.75 = 4/10 0.76 – 0.85 = 6/10 0.86 – 1.00 = 8/10 > 1.01 =10/10
	C2	Future volume to capacity (V/C) ratio	Future V/C ratio	Determine the future V/C ratio for the project segment	50%	4.5%	Average V/C Ratio < 0.50 = 2/10 0.51 – 1.00 = 4/10 1.01 – 1.50 = 6/10 1.51 – 2.00 = 8/10 > 2.01 =10/10
Accessibility (15%)	A1	Multimodal component	Project improvement includes more than one mode	Determine if the proposed project has a scope that includes more than one mode and, if so, which modes	40%	6.0%	Roadway project only = 0/10 Roadway project with bike/ped accommodations = 5/10 Roadway project with transit improvement/accommodations = 8/10 Roadway project with bike/ped and transit improvements = 10/10
	A2	Multimodal choices	Connections to other modes within 1 mile (bus, train, trail, P&R, sidewalk)	Determine the number of other mode types (bus stops, train stations, sidewalks, trail, park & ride lots) that are within 1 mile of the project	30%	4.5%	Total possible points - 10 Train station or P&R lot: 6 Bus stop: 3 Trail or sidewalk: 1

Evaluation Measure (Overall Weight)	Measure ID	Measure Name	Measure Description	Measure Objective	Measure Weight	Overall Weight	Scoring Criteria
	A3	Disadvantaged populations	Project provides benefit in location within or adjacent to Census block group that is identified as an Environmental Justice (EJ) area	Determine if project provides benefit or harm to location within or adjacent to EJ Census block group	30%	4.5%	Out of 10; staff to provide composite numerical score and written justification factoring positive and negative externalities
Environmental Quality (6%)	EQ1	Impact to natural/cultural resources	Project is not within or adjacent to protected area (Y/N)	Determine if the project is within or adjacent to a protected area in order to determine if it is related to environmental quality.	50%	3.0%	Yes (10/10) No (0/10)
	EQ2	Impact to natural/cultural resources	SqMi of protected area within .5 mi of improvement	Determine the total square milage of protected area within 0.5 miles of the project	50%	3.0%	0 SqMi = 10/10 0-0.5 SqMi = 5/10 >0.5 SqMi = 0/10
Economic Development (12%)	ED1	Virginia Economic Development Partnership (VEDP) sites	Number of sites within 1 mile of improvement	Determine the number of available VEDP sites near the location of the proposed project which can promote ED	40%	4.8%	10+ sites 10/10 7-9 sites 8/10 4-6 sites 6/10 1-3 sites 4/10 No sites 0/10
	ED2	Local land use	SqMi of commercial/industrial zoning within .5 mi of improvement	Determine the total square milage of commercial and industrial zoning within 0.5 miles of a project	40%	4.8%	2.01+ SqMi 10/10 1.6 - 2.0 SqMi 8/10 1.1 - 1.5 SqMi 6/10 0.6 - 1.0 SqMi 4/10 0.01 - 0.5 SqMi 2/10 No Commercial or Industrial SqMi 0/10

Evaluation Measure (Overall Weight)	Measure ID	Measure Name	Measure Description	Measure Objective	Measure Weight	Overall Weight	Scoring Criteria
	ED3	Freight	On freight network (P4P data set) or within .5 mi	Determine if the project is on the Freight network or the number of Freight Network Features (airports, ports, etc) within 0.50 miles of project	20%	2.4%	On Freight Network 10/10 Near 2+ Freight Network Features 7/10 Less than 2 Freight Network Features 3/10 No Freight Network Features 0/10
Land Use Coordination (6%)	LU1	Current jobs	Number of 2017 jobs within 1 mile of improvement	To measure how many jobs are available in the immediate region surrounding the project	20%	1.2%	Jobs in 1 mile <500 = 2/10 501-1,000 = 4/10 1,001-2,500 = 6/10 2,501-5,000 = 8/10 >5,000 = 10/10
	LU2	Current population	Number of 2017 population within 1 mile of improvement	To measure how many people are in the immediate region surrounding the project	20%	1.2%	Pop in 1 mile <1,000 = 2/10 1,001 – 2,500 = 4/10 2,501 – 5,000 = 6/10 5,001 – 7,500 = 8/10 >7,501 = 10/10
	LU3	Future jobs	Number of 2050 jobs within 1 mile of improvement	To measure how many jobs may be available in the immediate region surrounding the project in the future	30%	1.8%	2050 Jobs in 1 mile <1,000 = 2/10 1,001 – 2,500 = 4/10 2,501 – 5,000 = 6/10 5,001 – 7,500 = 8/10 >7,501 = 10/10
	LU4	Future population	Number of 2050 population within 1 mile of improvement	To measure how many people may be in the immediate region surrounding the project in the future	30%	1.8%	2050 Pop in 1 mile <2,500 = 2/10 2,501 – 5,000 = 4/10 5,001 – 7,500 = 6/10 7,501 – 10,000 = 8/10 >10,000 = 10/10

Evaluation Measure (Overall Weight)	Measure ID	Measure Name	Measure Description	Measure Objective	Measure Weight	Overall Weight	Scoring Criteria
Statewide Coordination (10%)	SC1	VTrans needs	Does the project meet a VTrans need?	Determine if proposed project is consistent with a determined VTrans Need Point or Segment	50%	5.0%	Yes (10/10) No (0/10)
	SC2	VTrans needs	Tier of District VTrans need	Determine the priority of VTrans segment or point that overlaps with the proposed project	25%	2.5%	Priority 1 (10/10) Priority 2 (6/10) Priority 3 (3/10) Priority 4 (1/10)
	SC3	VTrans needs	Tier of State VTrans need	Determine the priority of VTrans segment or point that overlaps with the proposed project	25%	2.5%	Priority 1 (10/10) Priority 2 (6/10) Priority 3 (3/10) Priority 4 (1/10)
Project Benefit (30%)	PB1	Recommended in study	Project was recommended in a formal planning/engineering study	Degree to which project aligns with study recommendation	30%	9.0%	Out of 10; staff to provide numerical score and written justification
	PB2	Improvement impact	Staff judgement on extent to which project will achieve its intended outcome, factoring in study data and analysis (if applicable) and other readily available project information	Staff to qualitatively determine project's overall benefit based on what the project is trying to achieve	15%	4.5%	Out of 10; staff to provide numerical score and written justification

Evaluation Measure (Overall Weight)	Measure ID	Measure Name	Measure Description	Measure Objective	Measure Weight	Overall Weight	Scoring Criteria
	PB3	Regional benefit	Provides a regional benefit by meeting one or more of the following criteria: 1. Does the project contribute to intraregional mobility? 2. Does the project significantly contribute to east-west mobility? 3. Does the project connect directly to any transit route or regional bike route? 4. Does the project connect to or directly improve major north-south corridors?	Determine whether the project provides a regional benefit	30%	9.0%	Out of 10; staff to provide numerical score and written justification
	PB4	Meets strategic goals	Project directly advances FAMPO LRTP goals and objectives	Determine whether the project aligns with goals and objectives	25%	7.5%	Out of 10; staff to provide numerical score and written justification

5.2 Transit/TDM Projects

Evaluation Measure (Overall Weight)	Measure ID	Measure Name	Measure Description	Measure Objective	Measure Weight	Overall Weight	Scoring Criteria
Safety (12%)	S1	Regional Safety	How much safer will individuals be with the project	Determine if the proposed project will increase the safety of individuals	100%	12.0%	Park and Ride lots = 6/10 Transit services (Bus/Rail) and Transit facilities (Bus/Rail) = 10/10
Congestion Mitigation (9%)	C1	Capacity Increase	Additional people expected to be transported via the project	Determine the additional amount of people who are expected to be transported via the project and not take their own car	50%	4.5%	Out of 10; specific metrics to be set on a project-by-project basis
	C2	Traffic Congestion	Does the project operate in a congested area?	Determine if the proposed project operates in an area with significant traffic congestion in forecast year 0 (2017)	25%	2.3%	A = 0/10 B = 2/10 C = 4/10 D = 6/10 E = 8/10 F = 10/10
	C3	Traffic Congestion	Does the project operate in a congested area?	Determine if the proposed project operates in an area with significant traffic congestion in horizon year 2045	25%	2.3%	A = 0/10 B = 2/10 C = 4/10 D = 6/10 E = 8/10 F = 10/10
Accessibility (15%)	A1	Multimodal component	Project improvement includes more than one mode	Determine if the proposed project has a scope that includes more than one mode and, if so, which modes	15%	2.3%	Transit/TDM project with bike/ped accommodations = 5/10 Transit/TDM project with multiple transit improvement/accommodations = 8/10 Transit/TDM project with bike/ped and multiple transit improvements 10/10

Evaluation Measure (Overall Weight)	Measure ID	Measure Name	Measure Description	Measure Objective	Measure Weight	Overall Weight	Scoring Criteria
	A2	Multimodal choices	Connections to other modes within 0.25 mile (bus, train, trail, P&R, sidewalk)	Determine the number of other mode types (bus stops, train stations, sidewalks, trail, park & ride lots) that are within 0.25 mile of the project	20%	3.0%	Total possible points - 10 Train station or P&R lot: 6 Transit service: 3 Trail or sidewalk: 1
	A3	Disadvantaged populations	Project provides benefit in location within or adjacent to Census block group that is identified as an Environmental Justice (EJ) area	Determine if project provides benefit or harm to location within or adjacent to EJ Census block group	15%	2.3%	Out of 10; staff to provide composite numerical score and written justification factoring positive and negative externalities
	A4	Transit Oriented Populations	Transit Oriented Populations in Transportation Analysis Zones (TAZ)	Determine if the project is within a transit-oriented population (TOP) TAZ according to the 2019 Lafayette Blvd Multimodal Study TAZs	50%	7.5%	TOP Score <10 = 2/10 10.01-20 = 4/10 20.01-33 = 6/10 33.01-66 = 8/10 > 66.01 = 10/10
Environmental Quality (6%)	EQ1	Impact to natural/cultural resources	SqMi of protected area within .25 mi of improvement	Determine the total square milage of protected area within 0.25 miles of the project	30%	1.8%	0 SqMi = 10/10 0-0.5 SqMi = 5/10 >0.5 SqMi = 2/10

Evaluation Measure (Overall Weight)	Measure ID	Measure Name	Measure Description	Measure Objective	Measure Weight	Overall Weight	Scoring Criteria
	EQ2	Non-single occupancy vehicle (SOV) Impacts	Project includes benefits for non-SOV	Determine the benefits the project provides to non-single occupancy vehicles (SOV)	70%	4.2%	Includes Rail facilities = 2 Includes Bicycle and/or Pedestrian facilities = 2 Improves existing or proposed PNR Lot = 2 Bus facility/transit route improvements = 2 Includes energy efficient infrastructure (electric or hybrid buses) = 2
Economic Development (12%)	ED1	Virginia Economic Development Partnership (VEDP) sites	Number of sites within 0.5 mile of improvement	Determine the number of available VEDP sites near the location of the proposed project which can promote ED	40%	4.8%	10+ sites 10/10 7-9 sites 8/10 4-6 sites 6/10 1-3 sites 4/10 No sites 0/10
	ED2	Local land use	SqMi of commercial/industrial zoning within .5 mi of improvement	Determine the total square milage of commercial and industrial zoning within 0.5 miles of a project	60%	7.2%	2.01+ SqMi 10/10 1.6 - 2.0 SqMi 8/10 1.1 - 1.5 SqMi 6/10 0.6 - 1.0 SqMi 4/10 0.01 - 0.5 SqMi 2/10 No Commercial or Industrial SqMi 0/10
Land Use Coordination (6%)	LU1	Current jobs	Number of 2017 jobs within 0.5 mile of improvement	To measure how many jobs are available in the immediate region surrounding the project	20%	1.2%	Jobs in 1 mile <500 = 2/10 501-1,000 = 4/10 1,001-2,500 = 6/10 2,501-5,000 = 8/10 >5,000 = 10/10
	LU2	Current population	Number of 2017 pop within 0.5 mile of improvement	To measure how many people are in the immediate region surrounding the project	20%	1.2%	Pop in 1 mile <1,000 = 2/10 1,001 – 2,500 = 4/10 2,501 – 5,000 = 6/10 5,001 – 7,500 = 8/10 >7,501 = 10/10

Evaluation Measure (Overall Weight)	Measure ID	Measure Name	Measure Description	Measure Objective	Measure Weight	Overall Weight	Scoring Criteria
	LU3	Future jobs	Number of 2050 jobs within 0.5 mile of improvement	To measure how many jobs may be available in the immediate region surrounding the project in the future	30%	1.8%	2050 Jobs in 1 mile <1,000 = 2/10 1,001 – 2,500 = 4/10 2,501 – 5,000 = 6/10 5,001 – 7,500 = 8/10 >7,501 = 10/10
	LU4	Future population	Number of 2050 pop within 0.5 mile of improvement	To measure how many people may be in the immediate region surrounding the project in the future	30%	1.8%	2050 Pop in 1 mile <2,500 = 2/10 2,501 – 5,000 = 4/10 5,001 – 7,500 = 6/10 7,501 – 10,000 = 8/10 >10,000 = 10/10
Statewide Coordination (10%)	SC1	VTrans needs	Does it meet need? Y/N	Determine if proposed project is consistent with a determined VTrans Need Point or Segment	50%	5.0%	Yes (10/10) No (0/10)
	SC2	VTrans needs	District - Tier of prioritized need Transit access to activity centers OR Transportation Demand Management	Determine the priority of VTrans segment or point that overlaps with the proposed project	25%	2.5%	Priority 1 (Very High) (10/10) Priority 2 (High) (6/10) Priority 3 (Medium) (3/10) Priority 4 (Low) (1/10)
	SC3	VTrans needs	District - Tier of prioritized need Transit access to equity emphasis areas	Determine the priority of VTrans segment or point that overlaps with the proposed project	25%	2.5%	Priority 1 (Very High) (10/10) Priority 2 (High) (6/10) Priority 3 (Medium) (3/10) Priority 4 (Low) (1/10)
Project Benefit (30%)	PB1	Recommended in study	Project was recommended in a formal planning/engineering study	Degree to which project aligns with study recommendation	30%	9.0%	Out of 10; staff to provide numerical score and written justification

Evaluation Measure (Overall Weight)	Measure ID	Measure Name	Measure Description	Measure Objective	Measure Weight	Overall Weight	Scoring Criteria
	PB2	Improvement impact	Staff judgement on extent to which project will achieve its intended outcome, factoring in study data and analysis (if applicable) and other readily available project information	Staff to qualitatively determine project's overall benefit based on what the project is trying to achieve	15%	4.5%	Out of 10; staff to provide numerical score and written justification
	PB3	Regional benefit	Provides a regional benefit by meeting one or more of the following criteria: 1. Does the project contribute to intraregional mobility? 2. Does the project significantly contribute to east-west mobility? 3. Does the project connect directly to any other transit route (rail, bus or vanpool) or regional bike route? 4. Does the project connect to or directly improve major north-south corridors?	Determine whether the project provides a regional benefit	30%	9.0%	Out of 10; staff to provide numerical score and written justification
	PB4	Meets strategic goals	Project directly advances FAMPO LRTP goals and objectives	Determine whether the project aligns with goals and objectives	25%	7.5%	Out of 10; staff to provide numerical score and written justification

5.3 Active Transportation Projects

Evaluation Measure (Overall Weight)	ID	Measure Name	Measure Description	Measure Objective	Measure Weight	Overall Weight	Scoring Criteria
Safety (25%)	S1	Separation	Degree to which the proposed project is separated from traffic and roadways	Degree to which project is separated from traffic via paint, separate material, bollards, physical barriers, or distance-such as shared-use path	35%	8.8%	Complete separation = 10/10 Physical barrier = 7/10 Visual barrier with space = 3/10 No or Inadequate barrier for application as determined by VDOT, AASHTO, NACTO guidelines and staff = 0/10
	S2	Crashes	Presence and number of bike or pedestrian crashes at project location from 2013-2020	Determine presence and number of crashes at or adjacent to project location	15%	3.8%	Crash history in project location: 0 = 0 /10, 1 = 5/10, 2 = 6/10, 3 = 7/10, 4 = 8/10, 5 = 9/10, >5 = 10/10
	S3	Barriers and connections	Project safely crosses a barrier/ gap in the existing network	Project connects two existing pieces of bike/ped infrastructure and/or provides safe crossing of a barrier to cyclists and pedestrians	15%	3.8%	Provides connection = 10/10, Crosses barrier only with no connecting infrastructure= 5/10, Does neither (disconnected from network) = 0/10
	S4	Pedestrian Safety Action Plan (PSAP) Corridor	Is project located on a PSAP priority corridor or will it benefit a PSAP corridor?	Determine whether project location is on, adjacent to, or intersects PSAP corridors	35%	8.8%	Project is on or intersects PSAP corridor = 10/10, Project is immediately adjacent to PSAP corridor = 5/10 Project is not on or adjacent to PSAP corridor = 0/10

Evaluation Measure (Overall Weight)	ID	Measure Name	Measure Description	Measure Objective	Measure Weight	Overall Weight	Scoring Criteria
Congestion Mitigation (5%)	C1	Non SOV Trips	Does project increase biking/ walking as transportation rather than just as recreation?	Determine if project will potentially increase bike/walk trips for daily activities	100%	5.0%	Out of 10; staff to provide composite numerical score and written justification, factoring in proximity to activity centers, connection to transit
Accessibility (15%)	A1	Activity Centers	Project provides access to or within community activity centers	Determine how many community activity centers (park, school, government building, community center) can be accessed via the project	30%	4.5%	0-10 points depending on number of activity centers
	A2	Multimodal choices	Connections to other modes within 1 mile (bus, train, trail, P&R, sidewalk)	Determine the number of other mode types (bus stops, train stations, sidewalks, trail, park & ride lots) that are within 1 mile of the project	35%	5.3%	Total possible points = 10 Train station or P&R lot= 6 Bus stop= 3 Trail or sidewalk= 1
	A3	Disadvantaged populations	Project provides benefit in location within or adjacent to Census block group that is identified as EJ	Determine if project provides benefit or harm to location within or adjacent to EJ Census block group	35%	5.3%	Out of 10; staff to provide composite numerical score and written justification factoring positive and negative externalities
Environmental Quality (5%)	EQ1	Impact to natural/cultural resources	Will project adversely impact a protected natural area?	Determine of the project will adversely impact a protected natural area	100%	5.0%	10/10- project will not impact protected area, 0/10 project will impact protected area
Economic Development (5%)	ED1	Virginia Economic Development Partnership (VEDP) sites	Number of sites within 1 mile of improvement	Determine the number of available VEDP sites near the location of the proposed project which can promote ED	75%	3.8%	10+ sites=10/10 7-9 sites= 8/10 4-6 sites=6/10 1-3 sites= 4/10 No sites= 0/10

Evaluation Measure (Overall Weight)	ID	Measure Name	Measure Description	Measure Objective	Measure Weight	Overall Weight	Scoring Criteria
	ED2	Local land use	SqMi of commercial/industrial zoning within .5 mi of improvement	Determine the total square mileage of commercial and industrial zoning within 0.5 miles of a project	25%	1.3%	2.01+ SqMi = 10/10 1.6 - 2.0 SqMi = 8/10 1.1 - 1.5 SqMi = 6/10 0.6 - 1.0 SqMi = 4/10 0.01 - 0.5 SqMi = 2/10 No Commercial or Industrial SqMi = 0/10
Land Use Coordination (5%)	LU1	Current jobs	Number of 2017 jobs within 0.5 mile of improvement?	To measure how many jobs are available in the immediate region surrounding the project	20%	1.0%	Jobs in 0.5 mile <500 = 2/10 501-1,000 = 4/10 1,001-2,500 = 6/10 2,501-5,000 = 8/10 >5,000 = 10/10
	LU2	Current population	Number of 2017 population within 0.5 mile of improvement	To measure how many people are in the immediate region surrounding the project	20%	1.0%	Pop in 0.5 mile <1,000 = 2/10 1,001 – 2,500 = 4/10 2,501 – 5,000 = 6/10 5,001 – 7,500 = 8/10 >7,501 = 10/10
	LU3	Future jobs	Number of 2050 jobs within 0.5 mile of improvement	To measure how many jobs may be available in the immediate region surrounding the project in the future	30%	1.5%	2050 Jobs in 0.5 mile <1,000 = 2/10 1,001 – 2,500 = 4/10 2,501 – 5,000 = 6/10 5,001 – 7,500 = 8/10 >7,501 = 10/10
	LU4	Future population	Number of 2050 population within 0.5 mile of improvement	To measure how many people may be in the immediate region surrounding the project in the future	30%	1.5%	2050 Pop in 0.5 mile <2,500 = 2/10 2,501 – 5,000 = 4/10 5,001 – 7,500 = 6/10 7,501 – 10,000 = 8/10 >10,000 = 10/10

Evaluation Measure (Overall Weight)	ID	Measure Name	Measure Description	Measure Objective	Measure Weight	Overall Weight	Scoring Criteria
Statewide Coordination (10%)	SC1	VTrans needs	Does it meet need? Y/N	Determine if proposed project is consistent with a determined VTrans Need Point or Segment	50%	5.0%	Yes = 10/10 No = 0/10
	SC2	VTrans needs	Tier of prioritized need	Determine the priority of VTrans segment or point that overlaps with or intersects the proposed project = (1, 2, 3, 4)	50%	5.0%	Priority 1 = 10/10 Priority 2 = 6/10 Priority 3 = 3/10 Priority 4 = 1/10
Project Benefit (30%)	PB1	Recommended in study	Project was recommended in a study	Degree to which project aligns with study recommendation	30%	9.0%	Out of 10; staff to provide numerical score and written justification
	PB2	Improvement impact	Staff judgement on extent to which project will achieve its intended outcome, factoring in study data and analysis (if applicable) and other readily available project information	Staff to qualitatively determine project's overall benefit based on what the project is trying to achieve, inclusion of special project features (bike lockup facilities, lighting, bike share, etc.)	15%	4.5%	Out of 10; staff to provide numerical score and written justification

Evaluation Measure (Overall Weight)	ID	Measure Name	Measure Description	Measure Objective	Measure Weight	Overall Weight	Scoring Criteria
	PB3	Regional benefit	Provides a regional benefit by meeting one or more of the following criteria: 1. Does the project contribute to non-SOV intraregional mobility? 2. Does the project connect directly to any transit route or existing bike/ped route such as the VCR Trail, Rappahannock River Heritage Trail, East Coast Greenway, or other major trailway?	Determine whether the project provides a regional benefit	30%	9.0%	Out of 10; staff to provide numerical score and written justification
	PB4	Meets strategic goals	Project directly advances FAMPO LRTP goals and objectives	Determine whether the project aligns with goals and objectives	25%	7.5%	Out of 10; staff to provide numerical score and written justification

6.0 Appendices

Appendix A – 2008 FAMPO Highway Project Prioritization Methodology

Please see the next page.

Highway Project Prioritization Methodology

Adopted July 21, 2008

FAMPO

Highway Project Prioritization Methodology

Adopted July 21, 2008

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Prioritization Approach

Introduction

To understand the long-term transportation needs of a region, carefully prepared and executed planning processes are undertaken. These processes compile existing and future transportation system and usage information, as well as other non-technical considerations and elements to identify the comprehensive set of transportation infrastructure, policy, and service modifications that are necessary to accommodate existing and future travel demand by all modes of transportation. In any plan area, differing projects have differing costs and benefits (relative and absolute). In addition, for plans encompassing multiple jurisdictions, regional priorities may differ widely from local priorities.

Understanding that there are practical limitations to the implementation of transportation improvement projects, a regimented system for determining the relative value of all projects when compared to one another generally (all modes and project types together), and when compared to one another within specific groupings, is needed. The Fredericksburg Area Metropolitan Planning Organization has developed a Highway Project Prioritization Methodology to assist in the setting of priorities for projects identified as a part of the Regional Long-Range Transportation Plan.

Background

The FAMPO Highway Project Prioritization Methodology is based on the collective experience of other Metropolitan Planning Organizations and localities, the eight SAFETEA-LU Federal Planning Factors, and the FAMPO Mission Statement. The following is a brief summary of factors evaluated for use, the eight Federal Planning Factors, and the FAMPO Mission Statement.

Summary of Factors Considered

- Congestion
- Economic Opportunities
- Safety
- Security
- Public Support
- Environmental Impacts
- Funding, Local Matches, and Prior Funding Commitments
- Cost
- Regional Connectivity
- Gap Closure
- Deliverability/Readiness
- Freight Mobility
- Emergency Evacuation
- Improve Mobility for Disadvantaged
- Sustainability
- Local Priority
- Benefit/Cost Ratio
- Remaining Life Cycle and Existing Conditions

SAFETEA-LU: Federal Planning Factors

1. Support the economic vitality of the United States, the States, metropolitan areas, and non-metropolitan areas, especially by enabling global competitiveness, productivity, and efficiency;
2. Increase the safety of the transportation system for motorized and non-motorized users;
3. Increase the security of the transportation system for motorized and non-motorized users;
4. Increase accessibility and mobility of people and freight;
5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
6. Enhance the integration and connectivity of the transportation system, across and between modes and throughout the State, for people and freight;
7. Promote efficient system management and operation; and
8. Emphasize the preservation of the existing transportation system

FAMPO Mission Statement

The Fredericksburg Metropolitan Area Planning Organization's (FAMPO) mission is to provide a cooperative, continuous and comprehensive ("3C") transportation planning process to build regional agreement on transportation investments that balance roadway, public transit, bicycle, pedestrian, and other transportation needs and support regional land use, economic, and environmental goals for the safe and efficient movement of people and goods. Special emphasis is placed on providing equal access to a variety of transportation choices and effective public involvement in the transportation planning process.

Methodology

This methodology uses readily accessible information in evaluating projects based on the following major factors and project classifications:

- **Congestion relief:** 30 points
- **Safety and security:** 30 points
- **Environmental impacts:** 16 points
- **Public and community support:** 8 points
- **Funding and implementation considerations:** 8 points
- **Smart growth/mobility:** 8 points

These factors are consistent with FAMPO's mission, build on the relevant factors used in other areas for project prioritization, and fulfill each of the eight Federal Planning Factors, as summarized in **Table 1.0**. The recommended project classifications are the following:

Level I

- **Urban:** includes projects in designated urban areas
- **Rural:** includes projects in designated rural areas

Level II

- **Interstate:** includes interstate mainline projects, projects for new and improved interchanges, and interstate ramp projects (does not include surface street crossings of the interstate not having ramps to the interstate)
- **Arterial:** includes facilities (non-interstate) within the arterial functional classification
- **Collector:** includes facilities within the collector functional classification
- **Local:** includes facilities within the local functional classification
- **Bridge:** includes bridge projects divided into the following two groups:
    - Replacement
    - Rehabilitation and maintenance

Table 1.0: Summary of Federal Planning Factors and Prioritization Criteria

	FAMPO Prioritization Factor					
Federal Planning Factor	1. Congestion Relief	2. Safety and Security	3. Environmental Impacts	4. Public/ Community Support	5. Funding/ Implementation Considerations	6. Smart Growth/Mobility
1. Economic Vitality						X
2. Safety		X				
3. Security		X				
4. Accessibility	X					X
5. Environment			X	X		
6. Integration and Connectivity	X					
7. Efficiency	X	X			X	X
8. Existing Network Preservation	X	X				

By evaluating projects based on factors within these major categories, projects are scored on a 100 point scale. Projects with the highest score are technically identified as higher priorities than those earning lower scores.

Application of Factors: Project Ranking Process

1. **Apply prioritization factors**
   - Quantitative factors
   - Qualitative factors

2. **Add totals within individual categories**

3. **Add totals of categories**

4. **Prioritize (rank) projects**
   - Step 1—Organize projects into Urban and Rural
   - Step 2—Organize projects into the following categories: Interstate, Arterial, Collector, Local, and Bridges *[divided into A) Replacement and B) Rehabilitation/Maintenance]*
   - Step 3—Rank categorized projects from highest to lowest scores
   - Step 4 (optional)—Separate projects for individual jurisdictions (within categories)

5. **Review information**

6. **Projects with highest score (nearest 100) are highest priority based on factors**

7. ***Review by Staff, TAC, and Board to identify acceptable exceptions***

Scoring Categories, Point Values, and Descriptive Guidance

The following sections are to guide the scoring of projects and provide detailed descriptions of each factor in the major categories and the measures for assigning point values to projects.

1. Congestion Relief (30 points)

Congestion (14 points): Level of current and future congestion

Existing level of congestion = existing volume/existing capacity

7 points: V/C>1.5
5 points: V/C≥1.0 and V/C<1.5
2 points: V/C≥0.9 and V/C<1.0
0 points: V/C<0.9

Future level of congestion = future volume/existing capacity

7 points: V/C>2.0
5 points: V/C≥1.5 and V/C<2.0
2 points: V/C≥1.0 and V/C<1.5
0 points: V/C≤1.0

*For projects on existing location, the higher the existing and future congestion, the more points are awarded. For new location projects, if the project were not implemented, the higher the level of congestion in parallel corridors and future congestion in parallel corridors, the more points are awarded.

Continuity and Connectivity (7 points): Improvement to route continuity and the connectivity of the overall transportation network

7 points: Project has regional significance and provides considerable benefit to the regional transportation system –OR- completes a logical element of the transportation system (i.e. fills in the gaps)
4 points: Project has multijurisdictional significance and provides benefit to a multijurisdictional area
1 points: Project has local significance (only) and provides benefit only to a localized area

*This criterion awards more points to projects that promote overall system continuity and efficiency. More points are awarded for projects that increase the efficiency of the entire system, whereas fewer points are awarded for projects that benefit an isolated area alone.

Major Users (4 points): Service to major activity centers

4 points: Project provides improvements in access to an existing regional major activity center –OR- project reduces single-occupant vehicle travel to, between, and within activity centers

2 points: Project provides improvements in access to an existing local major activity center or a future regional major activity center –OR- project reduces single-occupant vehicle travel to and within activity centers

1 point: Project provides improvements in access to a future local major activity center –OR- project reduces single-occupant vehicle within activity centers

0 points: Project does not benefit activity centers

*Multimodal projects that benefit activity centers are awarded the highest number of points whereas projects not benefiting activity centers are awarded the lowest number of points.

Freight Use (5 points): Substantial service to freight movement or facility servicing substantial freight movements

5 points: Project enhances the ability for a National Highway System Route, Interstate Route, or other major state or local route to efficiently move freight

3 points: Project maintains the ability for a National Highway System Route, Interstate Route, or other major state or local route to efficiently move freight

0 points: Project impairs the ability for a National Highway System Route, Interstate Route, or other major state or local route to efficiently move freight

*Projects that increase capacity, improve roadway geometry, increase average travel speed, improve access, and/or improve mobility are awarded a higher point value. Projects that make the movement of trucks more difficult and less efficient are awarded a lower point value.

2. Safety and Security (30 points)

Geometric Impact on Existing Roadways (18 points): Improvement to geometric deficiencies such as horizontal and vertical alignment, lane width, or shoulder conditions

18 points: Project corrects all existing geometric roadway deficiencies
15 points: Project corrects 80% of existing geometric roadway deficiencies
12 points: Project corrects 65% of existing geometric roadway deficiencies
9 points: Project corrects 50% of existing geometric roadway deficiencies
6 points: Project corrects 35% of existing roadway geometric deficiencies
3 points: Project corrects 20% of existing geometric roadway deficiencies
0 points: Project does not correct any existing roadway geometric deficiencies

*Projects that mitigate inadequate width roadways (not number of lanes, width of travelway), inadequate width/condition shoulders, and sharp curves or steep hills/deep valleys are awarded the highest point values. New location roadways are awarded points only if they replace or supplement a deficient facility that is not being improved.

Vehicle Crash Reduction (6 points): Potential to reduce crash history

6 points: Project with highest crash rate (segment rate)
3 points: Project with a mid-range crash rate (segment rate)
0 points: Project with the lowest crash rate (segment rate)

*Projects are ranked from highest to lowest and awarded a graduated point value based on ranking

Bike/Pedestrian Safety (4 points): Contributor to improved safety for pedestrians and bicyclists

4 points: Project provides positive benefit to pedestrian and bicycle safety (i.e. provides new sidewalks, bikeways, multiuse paths, trails, improved crossings, and similar)
1 point: Project will not change conditions for pedestrians or bicyclists
0 points: Project will negatively impact bicycle or pedestrian facilities and accommodation

* Projects that include improvements to the pedestrian and bicycle system that enhance safety and accommodation above existing conditions, are awarded more points. Projects that maintain the status quo or have negative impacts are awarded fewer points.

Homeland Security (2 points): Strategic project that improves Homeland Security

2 points: Project supports evacuation or incident management purposes
0 points: Project does not support evacuation or incident management purposes

*Projects that enhance the efficiency of key travel routes and/or services during major incidents or during evacuations would be awarded the highest point values. Projects on other routes or that do not enhance travel efficiency and system use during evacuations and/or incidents would not be awarded points.

3. Environmental Impacts (16 points)

Natural Environment (8 points): Impact on wetlands, watersheds, ecosystems, air, and water quality

8 points: Project has significant and measurable net positive impact on wetlands, watersheds, ecosystems, air, and water quality

4 points: Project is neutral in its environmental impact, neither providing significant benefit or detriment to the environment

0 points: Project has significant and net negative impact on wetlands, watersheds, ecosystems, air, and water quality

*Projects that contribute to improvements in water and air quality, restore or increase (appropriately) wetlands, and protect ecosystems are awarded higher point values. Projects that involve significant mitigation and remediation of wetlands and impact sensitive ecosystems are awarded lower point values.

Neighborhood (8 points): Impact on neighborhoods, communities, and historic and archaeological sites

8 points: Project has a net positive impact on neighborhood, community, historic, or archaeological elements in the community. The project is sensitive to the area context. Project has limited or no impact to significant community elements (schools, churches, archaeological sites, homes, cultural amenities, etc.) and provides measurable benefit in terms of aesthetics, safety, and accommodation of all modes of transportation.

4 points: Project is neutral in its impact on neighborhood, community, historic, or archaeological elements in the community. The project is somewhat context sensitive; however, it has some measurable and real impact to community elements (schools, churches, archaeological sites, homes, cultural amenities, etc.).

0 points: Project has a net negative impact on neighborhood, communities, and historic and archaeological sites. Project encourages unsustainable growth.

*Streetscape, bikeway, trail, sidewalk, transit, context-sensitive roadway modification, and similar projects are awarded higher point values. Significant road widening and projects that require significant "takings" and that have substantial community impacts are awarded lower point values.

4. Public/Community Support (8 points)

Existing Plans (4 points): Adherence to existing street and highway, master, regional, and local modal plans

4 points: Project is a part of two of the following: statewide, regional, and locally adopted plans
3 points: Project is a part of a statewide, regionally or locally adopted plan
2 points: Project is not a part of any of the aforementioned plans, but is regionally and locally supported
1 point: Project is not a part of any of the aforementioned plans, but is locally supported

*Projects programmed in local capital improvement programs, regional programs, and statewide programs and that are a part of adopted plans are awarded the highest number of points. Projects that are not programmed or a part of adopted plans are awarded the fewest number of points.

Community Support (4 points): Strong governmental or community support or continuity with local goals and initiatives and consistency of request by local jurisdictions

4 points: Project has strong and consistent local support (project has been identified as a high local priority on a consistent basis). Project has received funding towards design and ROW.
2 points: Project has strong, but not always consistent local support or it is a new project within the last year. Project has some funding, but is not enough to begin design work.
1 point: Project has strong local support from the jurisdiction, but is highly controversial or has not received any funding**.**

*Projects that have been a consistent priority for local jurisdictions and those that the public and public officials widely support are awarded the highest number of points. Projects that are controversial (making them hard to implement), but are supported by the local jurisdiction would be awarded fewer points.

5. Funding/Implementation Considerations (8 points)

Feasibility (3 points): Reasonable cost, efficient, resourceful, having positive long-term economic impacts

3 points: Project has demonstrated feasibility either through a concept plan or completed feasibility study, project has begun design work
2 points: Project has undergone some level of concept planning or demonstrates the ability to be implemented
1 point: Project is undefined, except by long range or comprehensive plan

*Projects that have demonstrated feasibility for implementation are awarded the highest number of points. These projects will often have had a supporting feasibility study, concept design, and engineering completed. Projects that are less well-defined are awarded fewer points.

Project Ready (4 points): Project ready to go, except for funding

4 points: Project ready to go (designed and mostly funded)
3 points: Project is well-defined (designed and partially funded)
2 points: Project is well-defined (has feasibility study), but has no funding identified
1 point: Project has funding identified, but is an expansion of an existing road
0 point: Project has no funding and is an new road

*Projects that are ready and have some or all the funding needed would be awarded higher point values. Projects that are less well-defined and do not have funding would receive fewer points.

Interagency Cooperation (1 point): Importance to other agencies or jurisdictions or related to joint initiatives involving multiple jurisdictions or agencies

1 point: Project has state or regional, as well as local support
0 points: Project has only single-agency support

*Projects of regional significance, supported by a larger contingent of jurisdictions are awarded more points and projects with less interagency support and cooperation are awarded fewer points.

6. Smart Growth/Mobility (8 points)

Growth Areas (4 points): Promotion of sensible, sustainable growth

4 points: Project promotes, encourages, and supports sustainable patterns of growth
1 point: Project neither promotes nor discourages sustainable patterns of growth
0 points: Project encourages unsustainable patterns of growth

*Projects that support and enhance existing stable communities and/or planned nodes of responsible growth are awarded more points. Projects that promote or extend unsustainable patterns of development are awarded fewer points.

Intermodal (4 points): Enhancement of intermodal access

4 points: Project is on a transit route (or provides access to regional transit), designated bike route, supports TDM, and in an area with pedestrian activity
3 points: Project is on two of: transit route, supports TDM, bike route, and in a pedestrian activity area
1 point: Project is on a bike route, transit route, supports TDM or in a pedestrian activity area
0 points: Project is not on a bike route, transit route, does not support TDM or in a pedestrian activity area

Appendix B – SMART SCALE Technical Guidance, February 2021

Please see the next page.

SMART SCALE

Funding the Right Transportation Projects in Virginia

SMART SCALE Technical Guide

prepared for

Commonwealth Transportation Board

date

REVISED February, 2021

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1.0 Introduction

Transportation needs will almost always be greater than the funds available to address them. The signing of House Bill 2313 in 2013 created a more sustainable revenue source supporting transportation funding. While passage of this bill enabled the Commonwealth Transportation Board (CTB) to add significant revenues to Virginia's transportation program, there are still many transportation needs that cannot be addressed with available revenues. To find a way to better balance transportation needs and prioritize investments for both urban and rural communities throughout the Commonwealth, new legislation – House Bill 2 – was signed into law in 2014. In 2016, the process was renamed "SMART SCALE, Funding the Right Transportation Projects in Virginia." SMART SCALE stands for System Management and Allocation of Resources for Transportation: Safety, Congestion, Accessibility, Land Use, Economic Development and Environment.

The purpose of SMART SCALE is to fund the right transportation projects through a prioritization process that evaluates each project's merits using key factors, including: improvements to safety, congestion reduction, accessibility, land use, economic development and the environment. The evaluation focuses on the degree to which a project addresses a problem or need relative to the requested funding for the project.

Prior to the implementation of SMART SCALE, the Commonwealth utilized a politically driven and opaque transportation funding process that included uncertainty for local communities and businesses. SMART SCALE requires the CTB to develop and implement a quantifiable and transparent prioritization process for making funding decisions for capacity enhancing projects within the Six-Year Improvement Program (SYIP).

The ultimate goal in the implementation of SMART SCALE is investing limited tax dollars in the right projects that meet the most critical transportation needs in Virginia. Transparency and accountability are crucial aspects of delivering a process that project sponsors will support. SMART SCALE projects will be evaluated based on a uniform set of measures that are applicable statewide, while recognizing that factors should be valued differently based on regional priorities.

Beginning in 2017, the SMART SCALE process transitioned to a biennial schedule with applications accepted in March of even numbered years and final project selections made in June of the following odd numbered year. The SMART SCALE process does not cover all types of projects within the SYIP. There are other sources of funding including the State of Good Repair program, the Highway Safety Improvement Program, the Revenue Sharing Program, the Congestion Mitigation Air Quality Program, the Transportation Alternatives Set-Aside Program, and Regional Surface Transportation Program funds. These are detailed later in this guidance document.

Three rounds of SMART SCALE prioritization have been successfully completed. Since implementing the SMART SCALE process in 2015, information has been collected on lessons learned in order to identify potential improvements to the application in-take, screening, validation, evaluation process, documentation and training. This updated Technical Guide reflects these recent improvements.

This Technical Guide document provides detailed information on the CTB's SMART SCALE policy including information on process, roles and responsibilities, project eligibility, project readiness requirements, the project application process, evaluation measure definitions, project cost and scoring, and prioritization programming considerations and rules.

1.1 SMART SCALE LEGISLATION REQUIREMENTS

Virginia House Bill 2, signed by Governor Terry McAuliffe on April 6, 2014 and effective as of July 1, 2014, (as defined in § 33.2-214.1) required the development of a prioritization process that the CTB was to use for project selection by July 2016. The prioritization process evaluates projects using following factor areas: congestion mitigation, economic development, accessibility, safety, environmental quality and land use coordination (in areas with over 200,000 population). Factor areas are weighted differently across the commonwealth based on certain characteristics and may be weighted differently within each district. Candidate projects are screened to determine if they meet an identified need in VTrans, the Commonwealth's mid- and long range transportation plan, and to determine if they meet eligibility requirements.

Projects are scored based on an objective and fair analysis applied statewide. SMART SCALE also requires that project benefits be analyzed relative to project cost. CTB policy requires the project benefits be analyzed relative to the amount of SMART SCALE funds requested, so the final SMART SCALE score is based on the project cost to the state.

In 2017, the General Assembly adopted HB2241/SB1331 (as defined in § 33.2-214.2) updating several items related to SMART SCALE. These bills provide the responsibility for the implementation of the SMART SCALE process to the Office of Intermodal Planning and Investment (OIPI), which reports to the Secretary of Transportation in their role as the Chairman of the CTB. It also requires that the scores be released at least 150 days prior to the CTB action to include SMART SCALE projects in the SYIP, or January of odd-numbered years. This will ensure there is always 5 months for public discussion of the results of the project evaluations.

Funding Programs

In February 2015, the General Assembly adopted HB1887, which established a new transportation funding formula with funding, after specialized programs, distributed as follows: 45% for the State of Good Repair Program (SGR); 27.5% for

the District Grant Program (DGP); and 27.5% for the High-Priority Projects Program (HPPP). Both the HPPP and the DGP are subject to SMART SCALE (see Table 1.1).

The DGP (as defined in § 33.2-371) refers to projects and strategies solicited from local governments that address a need for a corridor of statewide significance, regional network, improvements to promote urban development areas, or safety improvements identified in VTrans, Virginia's Transportation Plan. In this program, candidate projects and strategies from localities within a highway construction district compete for funding against projects and strategies within the same construction district.

The HPPP (as defined in § 33.2-370) refers to projects of regional or statewide significance that address a transportation need identified for a corridor of statewide significance or a regional network in VTrans, Virginia's Transportation Plan. In this program, projects and strategies compete for funding against projects and strategies submitted statewide.

For both programs, projects and strategies are to be screened, evaluated, and selected according to the process established pursuant to SMART SCALE.

Table 1.1 Funding Program Eligibility

Project Type	High Priority Projects Program	District Grant Program*
Addresses Need on Corridor(s) of Statewide Significance	Yes	Yes
Addresses Need on Regional Network(s)	Yes	Yes
Improvement to Support Urban Development Area(s)	No	Yes
Addresses Identified Safety Need	No	Yes

* Only projects submitted by localities are eligible.

1.2 ROLES AND RESPONSIBILITIES

Commonwealth Transportation Board

The CTB establishes the policy and oversees the SMART SCALE project evaluation process. The CTB reviews the scored project list once the evaluation has been released, and uses the scoring, along with other information submitted to the CTB about each project to inform their funding decisions regarding the allocation of funds for the HPPP and the DGP in the SYIP. The CTB is not required to fund the highest-scoring projects and may use other considerations, in addition to the SMART SCALE process, to make final funding decisions. However, if the CTB makes modifications to the staff recommended funding scenario, then the member seeking such change must provide a rationale for such modification and seek approval, by majority vote, of the Board.

Office of the Secretary of Transportation

Under the Secretary of Transportation's Office, OIPI manages the implementation of the SMART SCALE process. Both VDOT and DRPT assist the office in the screening and evaluation of applications under the guidance of the Office. The Office provides the final evaluation to the CTB, makes the final evaluation public, and develops the staff-recommended funding scenario for the Board's consideration.

Technical Evaluation Team

A technical evaluation team is responsible for conducting the measure calculations and making qualitative rating assessments for each factor area, for each of the submitted, screened projects in the SMART SCALE process. This evaluation team is comprised of technical staff from OIPI, DRPT, and VDOT. The staff appointed to the technical evaluation team includes subject matter experts from both the District and Central Office that are experienced with the data, analytical tools, and qualitative content reported for each measure. Duties of the internal technical evaluation team include:

- Validating project information;
- Evaluating project preparation; and
- Calculating evaluation measures and scores for submitted projects according to the methodologies set out in Appendices A-F.

To ensure consistency and quality control ten percent of projects are selected at random for a second evaluation. A member of the technical evaluation team not involved in the initial analysis conducts the blind independent evaluation to ensure consistency in the development of assumptions and application of analytical methods.

Applicant Responsibilities

Applicants are responsible for ensuring that all SMART SCALE application requirements are understood. Projects submitted for SMART SCALE funding will be held to a basic standard of development to guarantee they can be evaluated reliably throughout the application process. Beginning in 2018, the SMART SCALE application process is comprised of two parts: (1) A pre-application containing sufficient information for project screening and eligibility review; and (2) the remaining sections needed to complete the validation and evaluation steps. More information on the schedule for application intake can be found in Section 1.4.

To ensure the submittal of complete applications, it is strongly recommended that applicants complete the following tasks:

- Reach out to VDOT, DRPT and OIPI staff early in the process

- Complete a Pre-Application in March (no new applications may be created after April 1)
- Ensure project meets a VTrans Mid-term (0-10 years) Need
- Ensure project and applicant eligibility requirements have been met
- Ensure project readiness requirements have been met
- Ensure project is properly defined in terms of scope, schedule, and cost estimate
- Submit a completed application by August 1, preferably earlier

Applicants are expected to prioritize the applications they submit. Beginning in 2020, there will be a limit on the number of pre-applications and applications allowed per applicant, based on population thresholds as shown in the table below:

- Localities with a population *below* 200,000, and MPOs/PDCs/Transit agencies that serve a population *below* 500,000, may submit a maximum of four applications and five pre-applications;
- Localities with a population *above* 200,000, and MPOs/PDCs/Transit agencies that serve a population *above* 500,000, may submit a maximum of ten applications and twelve pre-applications; or
- A Board member may allow one additional application from a county within their district if (1) the project is located within a town that is ineligible to submit projects and (2) the county in which the town is located will submit the maximum number of applications allowed. Only one such additional application is allowed per district.

Table 1.2 Application Cap Limits by Population

Localities	MPOs/PDCs/Transit Agencies	Pre-Application Cap	Full Application Cap
Less than 200,000	Less than 500,000	5	4
Greater than or equal to 200,000	Greater than or equal to 500,000	12	10

The source of population data for localities, MPOs and PDCs is the last preceding United States Census (2010). Application limits for transit agencies were determined based on service area population in the 2010 National Transit Database (NTD). If service area population was not available in NTD, Census 2010 population was used to determine population in jurisdictions served by transit agency.

The listing of eligible entities, population data and tier/maximum number of applications is available in a spreadsheet that can be downloaded in the Resources section of the webpage at http://smartscale.org/resources/.

For information on the required inputs to the SMART SCALE application, please refer to the SMART SCALE Application Guide (also available at http://smartscale.org/resources/).

1.3 STAKEHOLDER INPUT

To develop a fair and informed SMART SCALE project prioritization process that would work across all modes and throughout the Commonwealth, extensive stakeholder input was considered in its initial development. Numerous meetings were held to obtain the input of jurisdictions, agency stakeholders and the public body across the Commonwealth.

Stakeholder engagement continues to be essential for each biennial implementation of the SMART SCALE submission process and evaluation. Collaboration and involvement continues throughout the entire process. At a minimum, the opportunities for stakeholder input include the following:

- Pre-Application and Application phase: Stakeholders have the opportunity to provide input as to what projects the jurisdictions/MPOs/PDCs/transit agencies should consider moving forward in the process through the development of an application for SMART SCALE funds as well as by providing feedback to the CTB during the annual Fall Transportation Meetings. Stakeholders may work with the state to ensure that projects are defined in sufficient detail for SMART SCALE evaluation. All of the applications and supporting analysis will be posted on the SMART SCALE web site (smartscale.org) and made available for public review prior to scoring.
- Analysis and Scoring phase: By January of each SMART SCALE cycle, the evaluation of projects selected for SMART SCALE prioritization evaluation will be complete, and results will be made public. Stakeholders have the opportunity to review assumptions and calculations and see each project's score.
- Results and Programming phase: Every year, during the development of the SYIP, stakeholder input is received during public meetings held following the release of the draft SYIP in April. Stakeholders have the opportunity to provide input upon the projects that were selected for funding for both grant programs.
- Lessons Learned and Process Improvement Evaluation: Each cycle, applicants are invited to provide feedback on opportunities for improvement to the process. Additionally, as enhancements are considered for process improvements, stakeholder input is requested prior to adoption by the CTB.

1.4 BIENNIAL SMART SCALE CYCLE

Each year that funding is available, SMART SCALE is planned to operate according to the biennial cycle illustrated in Figure 1.1. Applicants now have more than five months to complete their SMART SCALE applications, a significant

increase from two months available in previous rounds. Eligible entities can begin creating candidate project applications starting March 1st in even numbered years from eligible entities, with complete project applications due August 1st of the same year.

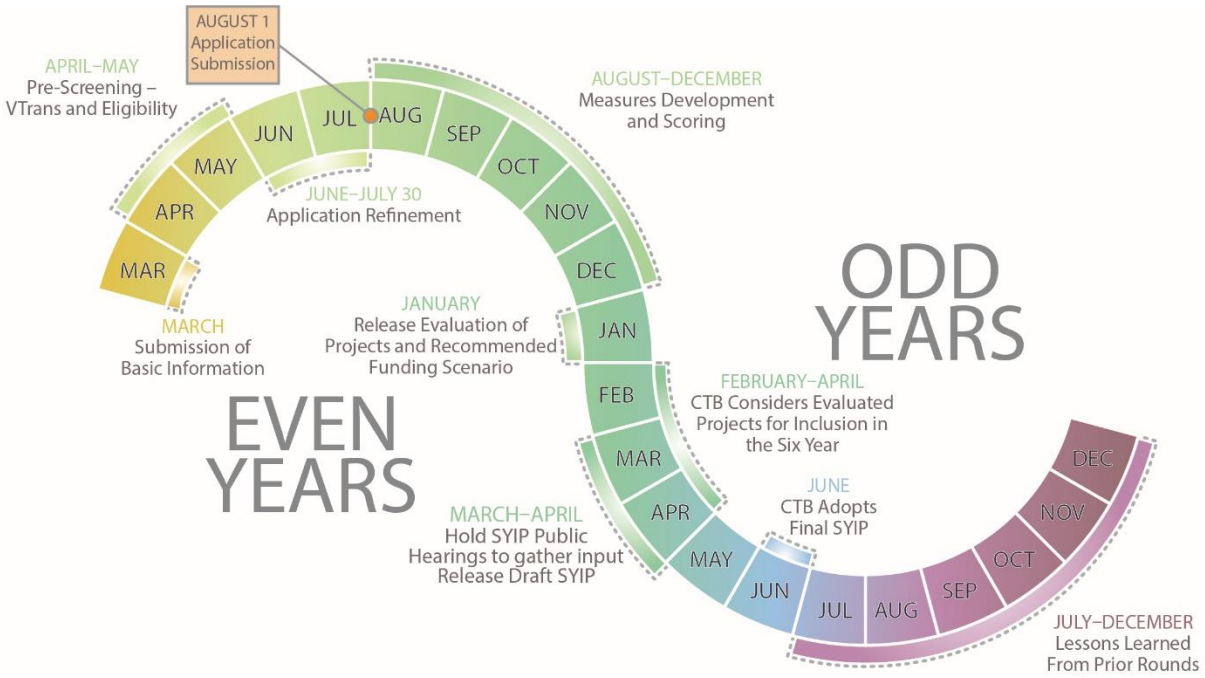
All candidate project applications must be created by June 1st with a required minimum level of information to be provided by that date (the pre-application). No new applications will be created after June 1st. However, once applications are created, applicants will be able to continue editing applications in the system until the August 1, 2018 submission deadline. Applicants have no limit to the number of applications that can be created in the portal; but applicants are limited on the number that can be submitted by August 1st, based on the adopted application limits.

Project sponsors are encouraged to coordinate well before August working with VDOT and DRPT staff. From there, OIPI, VDOT and DRPT screen, review/validate, and evaluate the projects per the SMART SCALE process over a five month period from August through December.

At the January CTB meeting the results of the evaluation are released along with the staff-recommended funding scenario. In the spring, the draft SYIP is released by the CTB, followed by public hearings to gather input. In June, the revised final SYIP is released and considered for adoption by the CTB.

Any changes to the staff recommended scenario require affirmative action by the CTB prior to the June meeting.

Figure 1.1 Anticipated SMART SCALE Biennial Cycle



As currently identified, the application and evaluation process timeline will generally proceed as follows (if day does not fall on business day, the first business day after will be used):

- **Winter/Spring: –** Early coordination with DRPT and VDOT prior to application submissions.
- **March 1st** - Call for applications and notification of estimated amount of funding available.
- **March 1st through March 31st -** Applicants create pre-application containing sufficient basic project information for project screening and eligibility review.
- **April 1st –** Deadline to complete pre-application. No new applications will be allowed after April 1st.
- **April 1st through May 31st -** Pre-screening to see if project meet VTrans Mid-term Need and are eligible for SMART SCALE funding.
- **June 1 through July 30th** - Application refinement.
- **August 1st –** Final applications due. All applications will be made public after the deadline to submit has passed.
- **August through December –** Submitted projects are screened, evaluated and scored.
- **January CTB Meeting –** Results of SMART SCALE screening and evaluations are made public along with the staff recommended funding scenario.

- **January through June –** SMART SCALE-funded projects will follow existing public comment period and SYIP approval process. The CTB may modify the staff recommended funding scenario through formal action.

2.0 Project Eligibility and Application Process

This section summarizes project eligibility, readiness, needs screening, and application process considerations for SMART SCALE implementation. Prospective projects must meet or exceed certain qualifications to be considered for evaluation in the SMART SCALE process, and sponsors must provide specific information for eligible projects. Figure 2.1 illustrates the overall screening process for determining whether a project has been developed enough to assess its benefits according to the SMART SCALE evaluation and scoring process.

2.1 ELIGIBILITY REQUIREMENTS

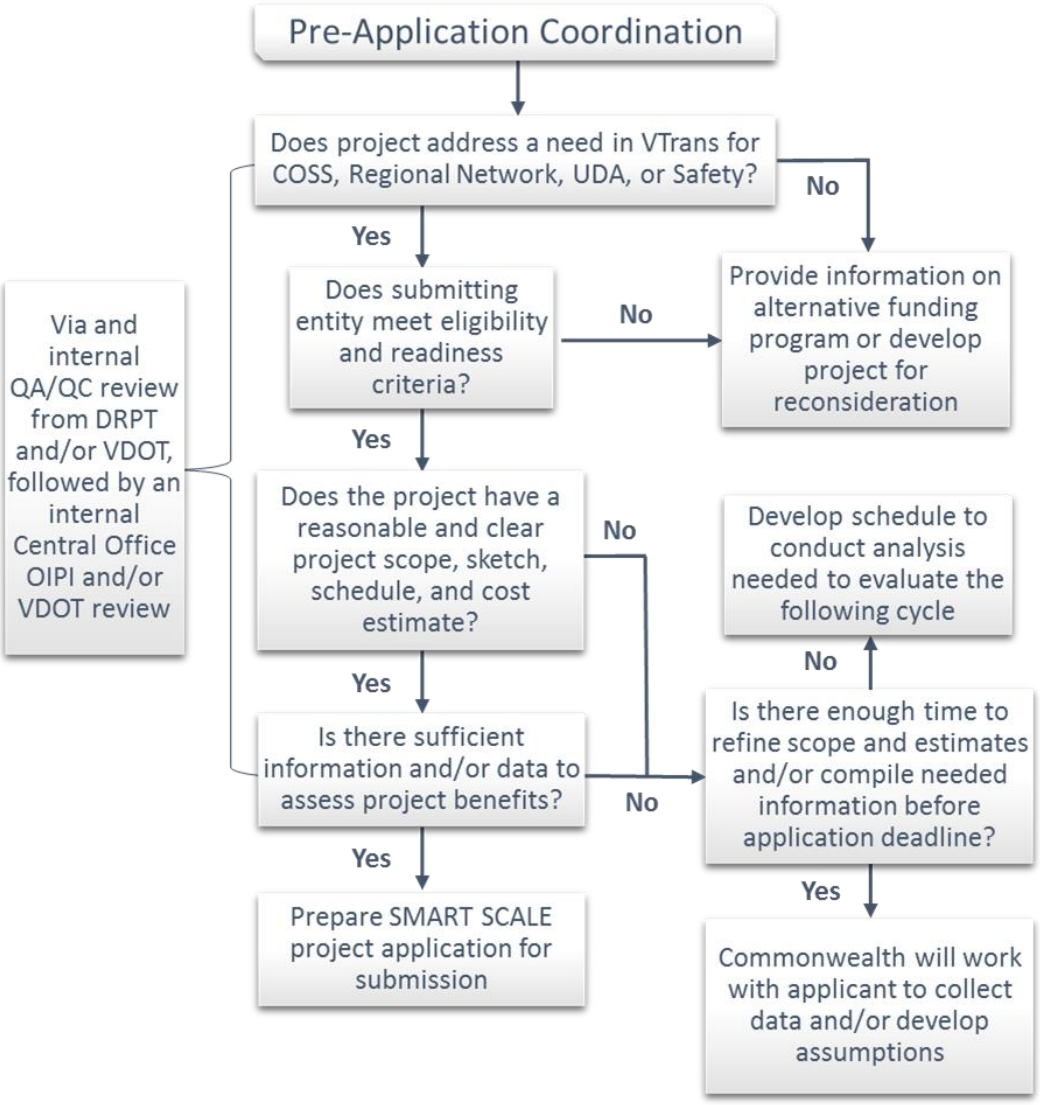
The types of projects and entities eligible for consideration are described in this section, along with a listing of funding sources not affected by SMART SCALE, and characterizations of entities eligible to submit projects. SMART SCALE projects may be submitted by a range of entities including:

- Metropolitan Planning Organizations (MPOs) and Planning District Commissions (PDCs);
- Counties;
- Cities;
- Towns that maintain their own infrastructure and qualify to receive payments pursuant to §33.2-319; and
- Transit agencies that receive state operating assistance from the Mass Transit Trust Fund, as established in § 58.1-638(A)(4)(b)(2) of the Code of Virginia, are also eligible to submit projects.

The responsibility for transportation in those towns that do not receive maintenance payments is with the County. Counties are encouraged to coordinate with towns and prioritize candidate projects for submission similar to the Secondary Six-Year Plan process. Counties, cities, and towns that maintain their own infrastructure are eligible to submit applications regardless of the roadway system. Maintenance of the specific roadway system is not a requirement of eligibility.

An eligible entity can submit an application as long as a portion of the project is located within the boundary of the qualifying entity. An applicant cannot submit an application for a project entirely outside of the boundary of their jurisdictional authority. For an application submitted by one jurisdiction that crosses into one or more other jurisdictions, a resolution of support is needed from the other affected jurisdiction(s)..

Figure 2.1 Eligibility, Readiness, and Needs Screening Process



Eligible Types of Projects

There are several types of projects that are considered for SMART SCALE funding. Highway, transit, rail, road, operational improvements and transportation demand management projects and strategies will be considered. The following project types are (1) not eligible or (2) will not be considered eligible to be evaluated and rated for SMART SCALE:

- Stand-alone studies;
- Projects where a majority of the SMART SCALE funding request is related to "in-kind" repair or replacement of existing traffic control devices, asset management (bridge rehabilitation, "bridge-only" bridge replacement projects, pavement repair/replacement, guardrail repair/replacement) or other activities eligible for State of Good Repair funding;
- Projects that are fully funded through other committed funding sources such as local funding or proffers. In general projects that are fully funded in a capital improvement program, a metropolitan planning organization's transportation improvement program, VDOT/DRPT or NVTA SYIP, or committed by a developer through local zoning approval process will be excluded from consideration in evaluating and rating for SMART SCALE. However, the Board recognizes that there are unique circumstances for large projects that require flexibility. Accordingly, a fully funded project may be considered under SMART SCALE if the total project cost is reasonably expected to exceed $1 billion and will start procurement prior to the award of the next round of SMART SCALE but was ineligible for the most recent previous round of SMART SCALE due to project readiness; and
- Projects where a project components or feature is not contiguous or proximate, or of the same improvement type (e.g., signal improvements, transit stations, etc.). For the purposes of this policy, contiguous means adjacent or together in a sequence. Transit stops or stations along a transit route or intersections or spot improvements along a corridor meet the definition of contiguous for the purposes of the project eligibility policy.

Transit and Rail Project Eligibility

Eligible SMART SCALE transit and rail projects are capital projects that demonstrate expanded capacity and increase ridership. State of Good Repair (SGR) projects, such as asset rehab or replacement, are not eligible under this program.

Applicants should be aware that SMART SCALE project funding is generally programmed in the out years of the subsequent SYIP. For example, if an applicant was awarded SMART SCALE project funds in FY20, funding may not become available until FY26.

Eligible transit projects under SMART SCALE include, but are not limited to, the following:

- Rolling stock and necessary infrastructure for new or expanded transit or intercity passenger rail service.
- Transit stations, intercity passenger rail stations, transfer facilities, and other passenger facilities that increase ridership or system capacity.
- New or expanded platforms, platform access, and circulation infrastructure at rail stations to accommodate longer trains or increased train service.
- Multimodal facilities, such as those that accommodate some combination of services (i.e. intercity bus and Amtrak).
- Park and ride facilities with transit service.
- Technology improvements that provide enhanced transit services in high-priority corridors, such as ITS and signal prioritization.
- Enhanced modal connections, such as trails, sidewalks and bike lanes leading to major transit stations, provided they have a transit connection and enhance transit ridership.

Maintenance and administrative facilities that are part of a larger service expansion project are also eligible. Agencies that utilize this provision must clearly describe the new transit or rail service that the facility will support.
The following projects do not provide expanded capacity or increase ridership and therefore are ineligible under this program:

- Maintenance equipment and supplies
- Support vehicles
- Administrative technologies

Applicants are encouraged to reach out to DRPT staff if they have questions about transit or rail project eligibility.

Other Considerations

- If an applicant submits an existing fully funded or committed project with independent utility for SMART SCALE funding with intention of requesting additional funds to add additional project component such as landscaping, streetscaping, and/or bicycle and pedestrian infrastructure, then the benefits associated with the fully funded or committed project element(s) will be excluded from consideration in evaluating and rating the project for SMART SCALE.
- For a project phase or element with independent utility that is expected to be funded or accomplished through proffers, the costs and benefits associated with that project element will be excluded from consideration in evaluating and rating the project for SMART SCALE. Non-project specific cash proffers are not subject to this policy and may be used as other committed funding in the SMART SCALE project application. If the applicant desires to submit a

project with proffered conditions and seeks to obtain SMART SCALE funding for, or in lieu of the proffer, the proffer must have been legally rescinded or terminated before the applicant may submit an application for the project.

- If an applicant leverages the same funding on more than one request for funding (SMART SCALE, Revenue Sharing, TAP, etc.) and more than one project is selected for funding, then the applicant is responsible for covering the difference. A letter of commitment to fund the leveraged amount is required for each project.
- All projects submitted for funding must be developed in accordance with all applicable policies and procedures (CTB, VDOT, DRPT, FHWA, FTA). For example, the CTB's policy regarding bicycle and pedestrian accommodations applies to all candidate projects.
- Signal controller/software upgrades should be considered eligible for SMART SCALE funds if they meet the following standards:
    - Proposed project is not an "in-kind" repair or replacement of existing traffic control devices, with the exception of implementing adaptive signal control.
    - Systemwide upgrades will not be considered for SMART SCALE scoring.
    - To justify the project, documentation shall be provided that includes analysis with supporting models and/or simulation outputs from a VDOT accepted software (HCS, Synchro, VISSIM, etc.). The documentation should also demonstrate operational or safety benefits from the proposed improvements.
    - All request for new traffic signals or upgrades to an existing traffic signal system shall conform to the latest VDOT Standards and Specifications (VDOT approved controller, cabinet, communication system and detection system).
    - D4 software shall be used with VDOT approved controllers where the signal is maintained by VDOT. (Per TED policy).

Table 2.1 shows the general project types that are eligible to receive SMART SCALE funds.

Table 2.1 Project Types Eligible for SMART SCALE Funding

Project Types Included within SMART SCALE (Capacity and Operational Improvements only)	Project Types Excluded from SMART SCALE
• Highway Improvements (Widening, Operational Improvements, Access Management, Intelligent Transportation Systems, Technology Operational Improvements)	• Studies, Asset Management (bridge rehabilitation, "bridge-only" bridge replacement projects, pavement repair/replacement, guardrail repair/replacement)*
• Transit and Rail Capacity Expansion	• Planning studies
• Bicycle and Pedestrian Improvements	• Systemwide improvements
• Transportation Demand Management (Vanpool, carpool, trip reduction programs, and park & rides - including new, expanded, or designated spaces on publicly-owned property).	• Transit maintenance facilities without capacity expansion

* Asset Management projects excluded from SMART SCALE may be eligible for funding under the State of Good Repair program as pursuant to 33.2-369 of the Code of Virginia.

In addition, projects must meet a need identified in VTrans as defined in SMART SCALE legislation;

> *"Candidate projects and strategies shall be screened by the Commonwealth Transportation Board to determine whether they are consistent with the assessment of capacity needs for all corridors of statewide significance, regional networks, and improvements to promote urban development areas established pursuant to § 15.2-2223.1, undertaken in the Statewide Transportation Plan in accordance with § 33.2-353."*

The process for screening projects based on VTrans needs is described in more detail in Section 2.2.

Funding Programs

A variety of funding sources are subject to allocation according to the SMART SCALE process. Projects seeking funding from most state and Federal discretionary fund categories are required to go through the SMART SCALE process. However, the following funding categories are exempt from the SMART SCALE process: Congestion Mitigation and Air Quality Improvement (CMAQ) Program funds, Highway Safety Improvement Program (HSIP), Regional Surface Transportation Block Grant Program (STBG), Transportation Alternatives (TA) Set-Aside funds (previously known as Transportation Alternatives Program (TAP) under MAP-21), and the Revenue Sharing program. Regional funds for Northern Virginia and Hampton Roads are also exempt from the SMART SCALE process. Funds not subject to SMART SCALE may be allocated to projects and used to leverage/reduce the SMART SCALE fund request.

As described in Section 1, HB1887 established two new funding programs; the HPPP and the DGP. These programs, and the State of Good Repair Program also established by HB1887, replace the previous 40-30-30 system formula and the CTB alternate formula.

The HPPP addresses projects of regional or statewide significance and projects will compete statewide for funding. The HPPP (as defined in § 33.2-370) can fund projects that address a transportation need identified for a CoSS) or a Regional Network in VTrans. The DGP can fund projects that address CoSS and RN needs, as well as needs identified for UDAs and safety issues.

The DGP sets aside funds for each district and projects will compete for funding only with projects submitted by other localities within the same district.

Although both state and Federal funds are expected to be available through the SMART SCALE process, all projects selected for funding that can qualify for Federal funds shall be developed as federally eligible projects.

Entities Eligible to Submit Projects

While many stakeholders across the Commonwealth have an interest in projects that are considered for funding, only a select group of entities are eligible to submit projects for consideration. Public transit agencies, and regional entities, including Metropolitan Planning Organizations (MPO), the Northern Virginia Transportation Authority, and Planning District Commissions (PDCs) are eligible to submit projects, along with counties, cities, and those towns that maintain their own infrastructure. To support local and regional planning efforts and consistency with the Constrained Long Range Plans (CLRP), a resolution of support from the MPO is needed for all projects within the MPO study area that are not included in or consistent with the adopted CLRP. If project is included in or consistent with the CLRP, then a resolution is not required. A summary of the entities eligible to submit projects for SMART SCALE is presented below in Table 2.2.

Table 2.2 Eligibility to Submit Projects

Project Type	Regional Entity (MPOs, PDCs)	Locality (Counties, Cities, and Towns)	Public Transit Agencies
Corridor of Statewide Significance	Yes	Yes, with a resolution of support from relevant regional entity	Yes, with resolution of support from relevant regional entity*
Regional Network	Yes	Yes, with a resolution of support from relevant MPO*	Yes, with resolution of support from relevant regional entity*
Urban Development Area	No	Yes, with a resolution of support from relevant MPO*	No
Safety	No	Yes, with a resolution of support from relevant MPO*	No

* Projects within established MPO study areas that are not identified in or consistent with the regionally adopted Constrained Long Range Plan (CLRP) must include a resolution of support from the respective MPO Policy Board.

Applications for funding through either the HPPP or the DGP must relate to projects located within the boundary of the qualifying entity. Localities and regional planning bodies may submit joint applications for projects that cross boundaries.

By majority vote, the CTB may choose to submit up to two projects for evaluation each application cycle.

2.2 PROJECT READINESS – PLANNING REQUIREMENTS

In order to reduce risk to changes in project scope or budget and to ensure that a project can advance to construction, projects must demonstrate a certain level of readiness. This section provides guidance on the required level of planning and supporting documentation needed for projects to be considered and evaluated for SMART SCALE funding. All projects must include a detailed description for each project feature that focuses on the scope of the project and not the benefits of the project.

The following guidelines will be used to assist the applicant in providing a complete and accurate application regarding specific project types. Applicants are encouraged to coordinate with VDOT and DRPT staff for assistance in determining and/or supporting development of project readiness analysis and documentation. If the required level of planning and supporting documentation has not been completed, then the project application will be excluded from consideration in the evaluating and rating of SMART SCALE. Supporting documentation will be required for application submission. If such documentation is required to be updated this would be considered an eligible project expense and should be included in the cost estimate.

Minimum Planning Requirements

Detailed Project Description Requirements

The project description must reflect all project features associated with a project. The description should focus on the scope of the project and not why the project is being pursued or the benefits of the project.

Any elements not clearly defined will not be considered for scoring and the addition of such features could be considered as a scope addition if the project is selected for funding.

Sketch Requirements

All projects are required to have a conceptual sketch that displays and locates the project elements described in the detailed project description. The sketch should show a plan view of the project in its completed form but clearly articulate any new features that are proposed. Detailed design plans (construction documents) prepared with land survey are not required; however, the sketch should be drawn to-scale and over the latest available aerial imagery. Bicycle and pedestrian elements, including crosswalks, must be shown in the sketch to receive scores in those categories.

Detailed construction plans that have previously prepared can be used for the project sketch; however, the construction plans must reflect the project that is described in the detailed project description. Any changes to the design project from the design plans should be reflected in a sketch.

Planning Study Requirements

At a minimum, a planning assessment/study, operational analysis, and/or safety assessment should be prepared prior to applying for SMART SCALE funds. The provided assessment/analysis should reflect the candidate project.

Projects that are proposed to address an operational issue should have an assessment/study that includes a purpose and need statement, recent count data (within the last 10 years), operational analysis, alternatives considered, preferred alternatives, expected benefits and a brief summary of conclusions.

Projects that are proposed to address a safety issue not identified as a VTrans safety need shall include a safety analysis/study that includes a purpose and need statement, AADT traffic data, field review observations, geometric design review, alternatives considered, preferred alternative, expected benefits and a brief summary of conclusions.

The size of the analysis/study will vary based on the complexity of the project; however, project types with greater requirements are detailed later in this section.

Cost Estimates

Project cost estimates will be developed per cost estimating guidance and requirements and reflect all items in the detailed project description and project sketch.

Grade Separation Projects

Grade Separation on Limited Access Facilities

Proposed new grade separated interchanges on existing limited access facilities **require** a draft or final Interchange Justification Request (IJR) study or interchange feasibility study with a warranted and feasible preferred alternative identified that is consistent with the scope described in the application. An Interchange Justification Report is only required for new access points on limited access facilities. Modifications to existing access points do not require a formal IJR or Interchange Modification Report (IMR) – a planning study is sufficient. For all interchange projects, new or modifications to existing, VDOT needs to understand the specific interchange configuration or modifications proposed for funding in order to calculate the benefits.

Grade Separation of at-grade Intersection

Proposed grade separations of existing at-grade intersections **requires** a planning level study or analysis that includes the evaluation of at-grade alternatives and identifies a warranted and feasible preferred alternative that is consistent with the scope described in the application.

New Traffic Signals

Proposed new traffic signals must meet VDOT spacing standards and **require** an approved traffic signal justification report to justify their use as the appropriate traffic control method at the proposed location and the applicant must provide evidence that innovative intersection improvements have been considered and evaluated. The signal justification (including warrants analysis and evaluation of alternatives to signalization) must be uploaded to the SMART Portal as part of the project documentation. If a justification report has not been conducted to show that a signal is the appropriate traffic control method, then the project will be excluded from consideration in scoring and rating for SMART SCALE.

Adaptive Signal Controllers

Proposed installation of adaptive signal controllers must include a corridor study or operational analysis to meet readiness requirements. The planning study or operational analysis must be uploaded to the SMART Portal as supporting documentation. If a planning study or operational analysis has not been conducted then the project will be screened out for readiness and will be excluded from consideration in scoring and rating for SMART SCALE.

New Location Facilities

An applicant that proposes construction of a new roadway must demonstrate that alternatives to improve the existing transportation network have been evaluated as part of the planning process, and that the alternatives analysis results were used in making the decision on the preferred alternative. The preferred alternative must be consistent with the scope described in the application. In addition to completion of alternatives analysis, the applicant must provide information on NEPA approval status (see section below on NEPA).

New Access Point(s) Adjacent to an Interchange

Minimum spacing standards for a commercial entrances and intersections on crossroads near an interchange are defined in Appendix F of the VDOT Road Design Manual. The minimum distance required is 750 feet to the first crossroad entrance on the right from the end of the off ramp. Additionally, 750 feet is required from the last crossroad entrance on the right to start of an on-ramp terminal. The minimum distance for a four-legged intersection is 1320 feet from the end of the ramp terminal on the crossroad. There are additional standards for offset entrances and crossovers on the crossroad, and can be obtained in Appendix F. If access management standards are not met, an operational assessment following VDOT's Traffic Operations and Safety Analysis Manual is required to demonstrate that interchange operations and safety are not impaired by the proposed improvement.

Major Widening Projects

In general, a major widening is defined as the addition of two or more general purpose through lanes. An applicant that proposes a major widening of an existing roadway must demonstrate that alternatives to optimize the existing capacity have been evaluated as part of the planning process, and that the alternatives analysis results were used in making the decision on the preferred alternative. The preferred alternative must be consistent with the scope described in the application. The intention of this proposed requirement is not to force applicants to spend extensive time and resources conducting detailed studies. Instead it is meant to require applicants to show that they have considered options to maximize the performance and operation of existing capacity.

Park & Ride Project Readiness

Projects that include park & ride lot(s) should include a project sketch that clearly depicts the lot location, lot boundaries, entry and exit points, parking space layout, transit circulation, and amenities where applicable.

Transit Project Readiness

Major Capital Projects (+$2M)

Proposed transit projects that request $2 million or more in SMART SCALE funding must demonstrate readiness by providing a copy of any completed corridor plan, site plan, Transit Development Plan (TDP), comprehensive plan, long-range transportation plan, detailed cost estimate, or federally required planning documents such as NEPA and Section 106. A locally preferred alternative (LPA) must be identified for all fixed guideway service projects prior to application submission. A feasibility or site selection study must be provided for any passenger facility projects that seek funding for land purchases. A feasibility study must be provided for any proposed new transit service.

FTA CIG (new starts, small starts, core capacity) program funding will be considered as part of the project funding package if the following conditions have been met: FTA has approved the project to enter the formal project development process, or if the applicant can demonstrate that they are in the process with FTA to enter project development. Such documentation should demonstrate that FTA is fully engaged with the applicant on the project in anticipation of the project formally entering the project development process. No SMART SCALE funding should be released (by agreement) for any project activities until FTA participation is formally secured by FTA approval of the project to enter the CIG pipeline.

Minor Capital Projects (<$2M)

Proposed transit projects that request less than $2 million in SMART SCALE funding must demonstrate readiness by referencing the project and providing a copy of the agency's Transit Development Plan (TDP). A feasibility study, which examines ridership potential and identifies optimal routing, stops, and timetables, must be provided for any proposed new transit service. Proposed new transit service projects must also provide documentation confirming availability of operating funds.

NEPA and Alternatives Analysis

Applicants should provide documentation that the appropriate level of planning, including alternatives analysis, and environmental review (NEPA) have been or are being conducted:

- If NEPA is complete, the FHWA approval letter (CE, FONSI, ROD), and (if available) a link to the document on-line, shall be uploaded in the SMART Portal as part of the project documentation;
- If NEPA is not complete then VDOT/DRPT will assess the anticipated level of NEPA document required and the current status;
- In the situation where it is determined that the project requires analysis of alternatives then there must be an identified locally preferred alternative.

The applicant must provide the draft NEPA document, if available, along with the anticipated level of NEPA class of action required. The NEPA Concurrence form approval by FHWA must be uploaded to the SMART SCALE Portal.

- The preferred alternative must be identified in the application. If more than one alternative is listed, then the State will request the applicant to modify the application to identify the preferred alternative. If the applicant is unable to identify preferred alternative, then the State will deem project not ready and will screen project out from consideration.
- In the situation where it is determined that an alternatives analysis is not required, VDOT/DRPT will provide the applicant with documentation of such determination prior to application submission.

Public Support

Applicants must demonstrate that a project has the support of key stakeholders that the public has been afforded the opportunity to provide comments and input at the time of application submittal to SMART SCALE. A resolution of support from the relevant governing body or policy board, approved in a public forum with adequate public notice, is required at the time of application. The resolution of support must be uploaded in the SMART Portal as part of the project documentation. There are two elements of public support eligibility:

- Public Support: Every application must have a resolution of support from its governing body; In the case of an application that traverses the submitting entity's boundaries, the submitting entity must provide resolution(s) of support from the affected jurisdiction(s) or regional planning organization(s); and
- Eligibility to Submit Applications/Regional Support: For locality and transit-submitted project applications located within an MPO area, the project must have a resolution for support from the MPO. Projects within established MPO study areas that are identified in or consistent with the regionally adopted Constrained Long Range Plan (CLRP) do not require a resolution of support from the respective MPO Policy Board.

2.3 SCREENING PROCESS

VTrans Needs Screening

Screening for VTrans Needs is a critical component of SMART SCALE as it links the planning process to the programming process to ensure that the overarching transportation goals of the Board are advanced. All project funding applications submitted for the SMART SCALE process must be consistent with one or more Mid-term Needs identified in VTrans, Virginia's Transportation Plan (§ 33.2-353)

which identifies critical safety and capacity related needs for the following four travel markets:

- **Corridor of Statewide Significance (CoSS**) – 12 corridors that include highways, railroads, and seaport and airport facilities that move people and goods within and through Virginia, serving primarily interregional and long-distance travel;

- **Regional Networks (RN)** – multimodal infrastructure within 15 Regional Network that are based on designated Metropolitan Planning Organizations (MPO) within the Commonwealth, serving primarily intraregional travel;

- **Urban Development Areas (UDA)** – this travel market includes: (1) multimodal infrastructure within over 200 designated growth areas based on local initiatives pursuant to § 15.2-2223.1; and (2) locally-identified Industrial and Economic Development Areas (IEDA) included in Virginia Economic Development Partnership's (VEDP) Virginia Business Ready Sites Program (VBRSP) (§ 2.2- 2238 C); and,

- **Statewide Safety** – entire roadway network in the Commonwealth.

The 2019 Update of VTrans Mid-term Needs were adopted by the CTB in January 2020. The VTrans website (http://www.vtrans.org/mid-term-planning/mid-term-needs) provides the three methods to access the Needs:

- Option 1: Print-ready documents compiled by VDOT Construction Districts, includes maps depicting the Mid-term Needs;
- Option 2: ArcGIS Map Package, which includes a description of the Needs data; and,
- Option 3: InteractVTrans, an interactive mapping application developed for viewing, downloading, and querying VTrans Mid-term Needs as well as other relevant datasets.

Per Commonwealth Transportation Board (CTB) policy, for the purposes of screening for SMART SCALE, identified UDA Needs within the following Regional Networks with all also be considered Regional Network (RN) Needs: (1) Bristol; (2) Charlottesville; (3) Danville; (4) Harrisonburg; (5) Kingsport; (6) New River Valley; (7) Staunton-Augusta-Waynesboro; and, (8) Winchester.

The same CTB policy also directs that, for the purposes of screening for SMART SCALE, identified Safety Needs on CoSS roadways will also be considered CoSS Needs.

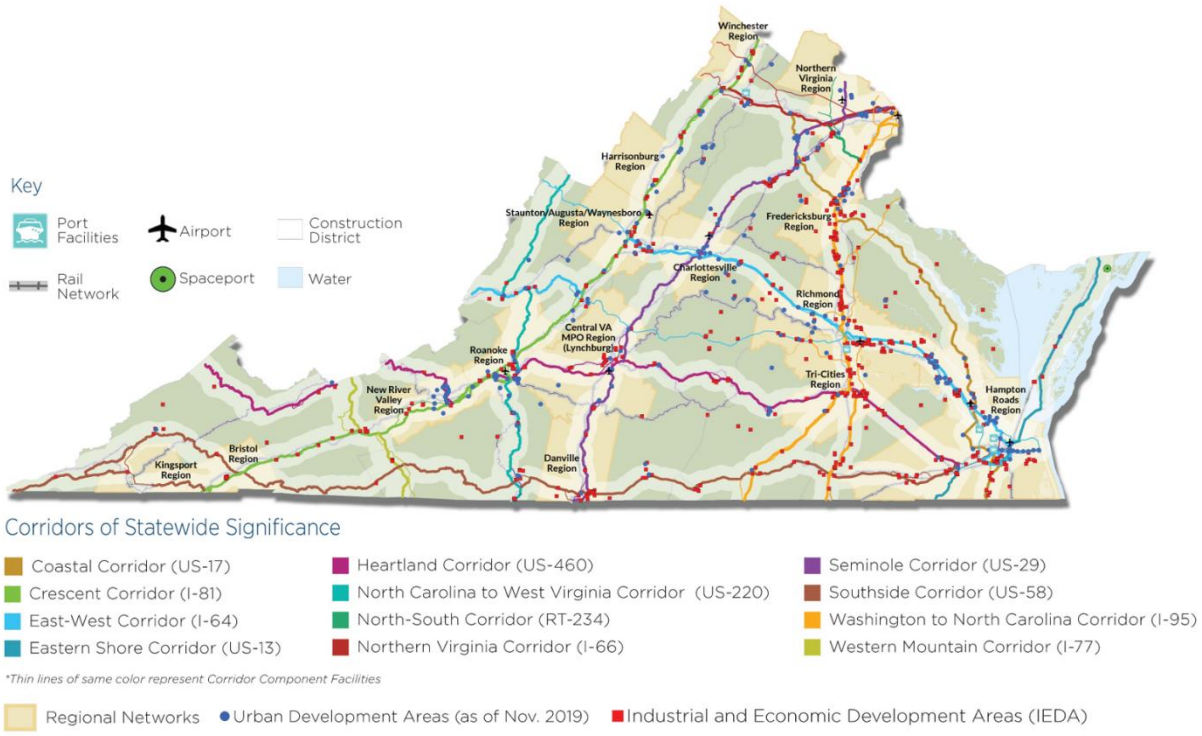
Project applicants are required to include the following components in their application and demonstrate how their proposed project meets one or more VTrans Mid-term Needs:

1. Identify one of the four relevant travel markets;
2. Identify one or more VTrans Mid-term Needs associated with one or more nodes or segments; and,

3. Describe how the project purpose meets one or more identified VTrans Mid-term Needs.

Each project funding application is reviewed by sets of reviewers: (1) VDOT District or DRPT staff; and, (2) OIPI VTrans Team to ensure that the proposed improvement(s) meet one or more relevant VTrans Mid-term Needs. If a project does not address an identified need in VTrans, it is screened out and not considered for validation or scoring.

Figure 2.2 VTrans Travel Markets (CoSS, RN, and UDA)



Source: The 2019 Update of VTrans Mid-term Needs

Note: Regional Networks are focused on the MPO areas plus the full county boundaries surrounding them. In some cases needs were identified beyond the county boundaries, in order to reflect needs addressing the connection between exurban and rural areas into the Regional Network. Those needs will also be considered in the screening process.

2.4 APPLICATION AND VALIDATION PROCESS

To support the success of the evaluation process, project sponsors are encouraged to coordinate with VDOT and DRPT early in the process to share information on prospective applications. This coordination phase will allow project descriptions

and scopes of work, cost estimates, and potential benefits to be developed and refined and will facilitate the application and evaluation process.

Applicants are required to create a pre-application within the on-line application tool by April 1. Project applications created by April 1 will be reviewed for eligibility, project readiness and screened to determine if the project meets a VTrans Mid-term Need adopted by the CTB. This will provide the project sponsor with screening and eligibility determination. No new applications may be created after April 1. VDOT and DRPT will be available to assist in application preparation.

Project Preparation

Projects submitted as candidates for SMART SCALE funding will be held to a basic standard of development to assure that meet basic readiness criteria and have sufficient detail to be evaluated and scored. Additionally, all project submissions must comply with relevant federal, state and CTB policies. VDOT and DRPT intend to provide support to project sponsors prior to application submission to help project sponsors understand and meet expectations. Project sponsors are encouraged to initiate coordination with VDOT and DRPT staff prior to the application period to ensure that candidate projects are adequately developed.

SMART SCALE project applications must include the following information:

- **Scope –** At a minimum, the scope should define the limits of the project, its physical and operational characteristics, and physical and/or operational footprint.
- **Schedule –** At a minimum, the schedule should clearly define the expected process for further project development including key milestones, work activities, related activities, and approvals/approval timelines. The schedule should be realistic and reflect the complexity of the project. For any future planned phase start date for which funding is requested, the applicant should assume a start date of no earlier than August 1st of the first available fiscal year of funding - this is typically the second to last fiscal year of the subsequent Six-Year Improvement Program (SYIP) following application intake. This information will be used in validating project costs and schedules. Actual dates may be earlier or later depending on several project specific factors such as federal and/or state phase authorization requirements (ex. required TIP/STIP actions, project administration agreements) and the availability of funding by fiscal year
- **Cost –** At a minimum, the cost estimate should be as realistic as possible and should account for applicable risk and contingencies based on the size and complexity of the project. Projects should not be divided/segmented to the extent that they no longer have logical termini or independent utility. Cost estimates provided in the base year specified in the SMART Portal. The applicant also enters contingency assumptions.

If federally eligible and where applicable, projects must meet the relevant federal requirements for consistency with adopted Constrained Long Range Plan (CLRP) in order to make use of funding received through SMART SCALE and to advance in project development.

Projects with an estimated total cost greater than $100 million are required by both state and federal code to have a financial plan. If selected for funding, the initial project financial plan will be required prior to federal authorization of construction phase funding. The financial plan document provides reasonable assurance that there will be sufficient funding available to implement and complete the entire project as planned. Additional information on financial plan requirements can be found at http://www.virginiadot.org/projects/financial_plans.asp.

The estimated cost of the project is a critical input used to determine each project's SMART SCALE score and ranking. Prior to submitting project applications, applicants should work in conjunction with VDOT and DRPT staff to develop reliable cost estimates as part of the application process. Increases in project cost and SMART SCALE funding requests, could result in reevaluation of the project and potentially a loss of funding as described in Section 5.2.

Phase estimates should account for the total cost of the phase to include costs of any previous work or accomplishments to date on existing phases. To the extent possible, right of way phase costs should attempt to exclude the value of donated land or easements or other right of way phase related in-kind contributions. If such aspects are included as a part of the phase's cost estimate, the applicant should denote that the value of such items are reflected as "Local Funds" in the Project Funding Sources described below. The base cost estimate will be escalated pursuant to the scheduled phase start date included in the application.

For projects in which the applicant requests VDOT/DRPT to administer the project, VDOT will be responsible for providing the applicant with a cost estimate for each project application. If the applicant has provided an estimate, VDOT/DRPT will be required to validate the estimate for use on each project application.

For projects in which the applicant requests to locally administer the project (and for all DRPT oversight projects), the applicant must provide a cost estimate for each project application, however VDOT and/or DRPT staff will validate the estimate for use on each project application

Pre-Application Coordination and Submission

VDOT and DRPT strongly encourage early coordination with VDOT and DRPT as they consider projects for application submission. The on-line application tool (SMART Portal) will open on March 1, allowing project sponsors to begin application development. All candidate project applications must be created by April 1st and no new applications will be allowed after April 1st. There is a cap on the number of candidate project applications that can be submitted, and are defined in Table 1.2. To further facilitate VDOT and DRPT assistance in

developing project applications, an applicant must submit basic information by April 1st to guarantee technical assistance from the two agencies. The pre-application will identify if projects meet a VTrans Mid-term need, are eligible and ready before submission and provide advance knowledge of the number and type of applications. Project Sponsors will be notified prior to submission if their application meets a VTrans Mid-term Need and is eligible. VDOT and DRPT will strive to complete VTrans screening and eligibility determinations early depending on when information is provided in the SMART Portal. Refer to Table 1.2 for pre-application and full application cap limits.

The pre-application requires minimum inputs be provided by the applicant to include the following:

- General Project Information
    - POC Name
    - POC Phone Number
    - POC Email
    - Project Title
    - Principal Improvement
    - Project Description - Short Description (describing the project details, not the project history or objectives)
- Project Eligibility
    - Project Type and other basic project features needed to understand the general project scope
    - Verify not a standalone study
    - Verify contiguous improvement
    - Verify project is not fully funded
    - If in a MPO study area, ensure project is in CLRP
- Project Readiness
    - If project feature is a Bus Transit, Rail Transit, Passenger Rail, or Freight Rail project cost over $2 million, provide details of corridor plan, site plan, Transit Development Plan (TDP), comprehensive plan, long-range transportation plan, detailed cost estimate, or federally required planning documents such as NEPA and Section 106
    - If project feature is a new grade-separated interchange on an existing limited access facility, provide details relating to required Interchange Justification Report (IJR)
    - If project feature is a new grade separation of at-grade intersection on a non-limited access roadway, provide details relating to planning

level study or analysis that includes the evaluation of at-grade alternatives and identifies grade separation as the preferred alternative

- If project feature is a modification(s) to an existing grade-separated interchange, provide details relating to required Interchange Modification Report (IMR)
- If project feature is a new traffic signal, provide details relating to VDOT spacing standards, required signal warrant analysis and signal justification report, and assessment of unsignalized or innovative intersection alternatives
- If project feature is a roadway on new alignment, provide details of assessment that includes alternatives to improve the existing transportation network
- If project feature is adding two or more general purpose through lane(s), provide details of planning assessment that includes evaluation of alternatives to optimize the existing capacity
- NEPA Status

- Delivery and Funding
  - Identify all prior work completed for the project including
    - Constrained Long Range Plan (MPO)
    - Preferred Alternative (NEPA or Planning Level)
    - Vision Long Range Plan (MPO)
    - Rural Long Range Plans
    - Other Regional Plan
    - Transportation Element of Local Comprehensive Plan
    - Planning/Safety Study
    - State Transportation Plan
    - Transit Development Plan (TDP)
    - NEPA Study
  - Provide cost estimate information for
    - PE (Survey, Environmental, Design)
    - RW (Right of Way and Easement Acquisition, Utility Relocation)
    - CN (Construction, Oversight, Contingencies)
- VTrans Need Selection and Location Mapping

- Supporting Documents based on features checked, but at a minimum including project sketch

Screening and Validation (Pre- and Post-Application Submittal)

Due to the implementation of pre-application cap limits in 2020, all submitted pre-applications will be screened based on the following three items: 1) project eligibility, 2) project readiness and 3) project meeting a VTrans Mid-term Need adopted by the CTB. Depending on the completeness of available data, the VDOT and DRPT staff may request additional information or identify issues that need to be resolved. Final submitted applications are reviewed by internal technical staff and must be fully validated to move forward into the evaluation and evaluating process. Validation helps to ensure information in the application is accurate, reasonable and consistent with CTB policies.

If there is disagreement concerning the cost estimate or other application data that impacts the evaluation that cannot be resolved between the applicant and VDOT/DRPT SMART SCALE Point of Contact (POC), the applicant may request resolution from the VDOT District Engineer/Administrator or the DRPT Director.

Based on the review and validation by internal technical staff, a project application may be recommended to not advance to evaluation since the project type of applicant is not eligible for SMART SCALE or the project has been determined to not meet project readiness requirements or lacks sufficient detail to calculate project benefits.

Certain projects that are based on conceptual planning-level recommendations and have not been formally scoped or defined may require additional planning/pre-scoping level work before their benefits can be adequately assessed according to the SMART SCALE factors and measures. Planning and pre-scoping resources exist within VDOT, DRPT, localities, regional planning bodies, and some other entities (e.g., SPR, PL, Pre-scoping, FTA 5303, FTA 5304, etc.). However, resources are unlikely to be sufficient to fund every potential request for assistance for project development related to the SMART SCALE process. Additional information on project eligibility and project readiness are included in Section 2.2.

Application Submittal

The CTB's goal is to maintain an application process that remains simple and straightforward for applicants but also provides enough information to estimate project benefits and minimize project development risks. Once the applicant is ready, the online application can be completed and submitted through the SMART Portal link at: https://smartportal.virginiahb2.org/. Additionally, staff from VDOT and DRPT are available for support throughout the process. It is important for applicants to reach a consensus with VDOT and DRPT staff on the scope, schedule and estimate for project submissions. A key guiding principal was to develop a process that does not require applicants to invest significant time and resources for submission of project information, or require the use of consultants

to develop an eligible application. Early application coordination and submission is encouraged to mitigate discrepancies throughout the process.

The SMART Portal allows applicants to submit applications for other VDOT programs to include Revenue Sharing, Transportation Alternatives (TA) Set-Aside funds (previously known as Transportation Alternatives Program (TAP) under MAP-21), and Highway Safety Improvement Program (HSIP) funds. State of Good Repair forms for bridges and paving are also available through the on-line application tool (pending). The ability to apply for additional programs may be added in the future. Applications submitted through other applications programs or from a prior round may be cloned for use in SMART SCALE.

The SMART Portal is continually enhanced based on feedback and lessons learned. VDOT and DRPT staff provide regular training and are available to provide support and tools for applicants in compiling data and information needed for application development.

Table 2.3 lists the types of information needed to calculate the prioritization measures and highlights which items are calculated based on information provided by the applicant and which items are compiled or calculated by the Commonwealth. The on-line application tool is electronic and map-based to facilitate automated population of key data elements. This has the potential to reduce the likelihood of data entry errors and improve consistency with VDOT's current scoping form.

Note that if an applicant submits more than one project for consideration, as part of the application process, applicants may be asked to rank order their submitted projects based on priority. Applicants are encouraged to focus on their highest priority needs as each applicant is limited in the number of applications it can submit.

Table 2.3 SMART SCALE Measure Data Responsibility

	Responsibility	
	State	**Applicant**
All Measures		
Detailed description of improvement		X
Project location		X
Safety		
S.1 - Reduction in number of Fatal and Injury crashes	X	
S.2 - Reduction in Fatal and Injury crash Rate	X	*
Congestion Mitigation		
C.1 - Increase in Person Throughput	X	*
C.2 - Decrease in Person Hours Delay	X	*
Accessibility		
A.1 - Increase Access to Jobs	X	
A.2 - Access to jobs for disadvantaged population	X	
A.3 - Checklist of multimodal elements included in the project (transit, bike/ped, park&ride, etc.)		X
A.3 - Number of non-SOV users	X	*
Environment		
E.1 - Checklist of project elements that contribute to reduced pollutant emissions and/or energy use (transit, bike/ped, park&ride, energy-efficient facilities, etc.)		X
E.1 - Location of improvement on roadways with truck use > 8%	X	
E.1 - Improvements that benefit freight rail or intermodal facilities		X
E.2 - Acres of natural and cultural resources potentially impacted	X	
Economic Development		
ED.1 - Transportation project consistency with Local Comprehensive Plan or Local Economic Development Strategy		X
ED.1 - Transportation project consistency with Regional Economic Development Strategy		X
ED.1 - List of Development projects supported by the transportation improvement (up to 3 miles away depending on project type) including description, square footage, distance from the transportation project, and directness of access that the transportation improvement provides		X
ED.1 - Development project consistency with locality Comprehensive Plan/Zoning		X
ED.1 - Development project site plan status		X
ED.2 - Improves access to distribution, intermodal and manufacturing facilities	X	
ED.2 - Improves STAA truck route	X	
ED.2 - Enhances access or reduces congestion at ports/airports	X	
ED.2 - Tonnage (1000s) per day	X	
ED.3 - Travel time reliability	X	
Land Use and Transportation Coordination		
L.1 - Transportation efficient land use	X	
L.2 – Increase in transportation efficient land use	X	

* On non-VDOT roadway facilities, the applicant will need to provide study traffic data (existing turning movement counts). For non-roadway (transit, park&ride, bike/ped) projects, applicant will need to provide existing year peak period usage. For roadway improvements on segments with significant transit use, bus ridership counts should also be provided.

* Applicants are encouraged to provide supplemental data and analysis, but will not be required.

3.0 Evaluation Measures

This section summarizes the evaluation measures used in the SMART SCALE evaluation process, and the methods by which those evaluation measures are calculated. SMART SCALE legislation requires that the measures be quantifiable and objective, that the analysis of a project's benefits is relative to its cost and that the CTB consider all modes of transportation. The law requires that the measures fall into six factor areas, listed below:

- Safety;
- Congestion Mitigation;
- Accessibility;
- Environmental Quality;
- Economic Development; and
- Land Use Coordination (for areas over 200,000 populations).

Using the framework of the six factor areas, VDOT and DRPT used an extensive process to develop the measures for SMART SCALE. The team researched best practices from other state DOTs and MPOs, established a work group focused on measures, held a peer exchange workshop, and conducted lessons learned tasks from the initial rounds of SMART SCALE. From these working groups and activities, the team gained a key understanding of some guiding principles that should be included in SMART SCALE, formalized into six guiding principles:

- Analyze what matters to people and has a meaningful impact;
- Ensure fair and accurate benefit-cost analysis;
- Be both transparent and understandable;
- Work for both urban and rural areas;
- Work for all modes of transportation; and
- Minimize overlap between measures.

3.1 SAFETY MEASURES

The SMART SCALE safety measures evaluate how each project addresses multimodal transportation safety concerns through implementation of best practice crash reduction strategies. Listed below in Table 3.1 are brief summaries of the two measures. Additional information about the measures, methodologies, and other details are available in Appendix A.

Table 3.1 Safety Measures

ID	Measure Name	Measure Description	Measure Objective	Measure Weight
S.1	EPDO of Fatal and Injury crashes	Equivalent property damage only (EPDO) of fatal and injury crashes expected to be avoided due to project implementation	Estimate number of fatalities and injury crashes (weighted by EPDO) at the project location and the expected effectiveness of project specific counter-measures in reducing crash occurrence	70%*
S.2	EPDO Rate of Fatal and Injury crashes	EPDO of fatal and injury crashes per 100 million vehicle miles traveled (VMT) expected to be avoided due to project implementation	Similar to S.1, but by focusing on the change in fatality and injury crashes (weighted by "EPDO" per VMT. The measure considers projects that address areas with a high rate of crashes that may be outside of high-volume roadways	30%

* Weighted at 100% for Transit and Transportation Demand Management projects.

3.2 CONGESTION MITIGATION MEASURES

The SMART SCALE congestion mitigation measures evaluate how each project addresses the ability of the transportation system to move people and reduce travel delay across the State. Listed below in Table 3.2 are brief summaries of the measures. Additional information about the measures, methodologies, and other details are available in Appendix B.

Table 3.2 Congestion Mitigation Measures

ID	Measure Name	Measure Description	Measure Objective	Measure Weight
C.1	Person Throughput	Increase in corridor total (multimodal) person throughput attributed to the project	Assess the potential benefit of the project in increasing the number of users served within the peak-period.	50%
C.2	Person Hours of Delay	Decrease in the number of person hours of delay in the corridor	Assess the potential benefit of the project in reducing peak-period person hours of delay.	50%

3.3 ACCESSIBILITY MEASURES

The SMART SCALE accessibility measures evaluate how each project addresses worker and overall household access to jobs and other opportunities, as well as multiple and connected modal choices. Listed below in Table 3.3 are brief summaries of the measures, and additional information is available in Appendix C.

Table 3.3 Accessibility Measures

ID	Measure Name	Measure Description	Measure Objective	Measure Weight
A.1	Access to Jobs (Total Population)	Change in average jobs accessibility within 45 minutes (within 60 minutes for transit projects)	Measure assesses the average change in access to employment opportunities as a result of project implementation based on the GIS accessibility tool.	60%
A.2	Access to Jobs (Disadvantaged Populations)	Change in average jobs accessibility for disadvantaged populations within 45 minutes (within 60 minutes for transit projects)	Measure assesses the average change in access to employment opportunities as a result of project implementation based on the GIS accessibility tool.	20%
A.3	Access to Multimodal Choices	Assessment of the project support for connections between modes, and promotion of multiple transportation choices	Measure assigns more points for projects that enhance interconnections among modes, provide accessible and reliable transportation for all users, encourage travel demand management, and potential to support emergency mobility.	20%

3.4 ENVIRONMENTAL QUALITY MEASURES

The two SMART SCALE environmental quality measures evaluate how projects address the reduction of pollutant emissions and energy consumption, and minimize the impact on natural and cultural resources. Listed below in Table 3.4 are brief summaries of the measures, and additional information is available in Appendix D.

Table 3.4 Environmental Quality Measures

ID	Measure Name	Measure Description	Measure Objective	Measure Weight
E.1	Air Quality and Energy Environmental Effect	Potential of project to improve air quality and reduce greenhouse gas emissions	Measure rates a project's potential benefit to air quality and ability to increase energy efficiency or alternative energy use weighted by the total number of users served.	100%
E.2	Impact to Natural and Cultural Resources	Potential of project to minimize impact on natural and cultural resources located within project buffer	Measure evaluates how much sensitive land would be affected within project buffer around the project. Points are subtracted from final score based on total potential sensitive acreage impacted.	(*)

* Up to 5 points subtracted from final score based on the total potential sensitive acreage impacted

3.5 ECONOMIC DEVELOPMENT MEASURES

The SMART SCALE economic development measures evaluate how each project addresses regional and local economic development plans and new development

activity, as well as improvements to intermodal freight movement access and efficiency, and travel time reliability to support the movement of goods and people. Listed below in Table 3.5 are brief summaries of the measures. Additional information about the measures, methodologies, and other details are available in Appendix E.

Table 3.5 Economic Development Measures

ID	Measure Name	Measure Description	Measure Objective	Measure Weight
ED.1	Project Support for Economic Development	Project consistency with regional and local economic development plans and policies and support for local development activity	This measure assesses whether the project is supporting new economic development and the progress made toward development in the project corridor at the local level. The scoring value is scaled by square footage of sites being developed in the area of influence of the project (up to a maximum of 10 million square feet of development).	60%
ED.2	Intermodal Access and Efficiency	Rate projects based on the extent to which the project is deemed to enhance access to critical intermodal locations, interregional freight movement, and/or freight intensive industries	This measure assesses the: • Level to which the project enhances access to distribution centers, intermodal facilities, manufacturing industries or other freight intensive industries; • Level to which the project supports enhanced efficiency on a primary truck freight route (or high volume/ high value truck or rail freight corridor); • Level to which the project enhances access or reduces congestion at or adjacent to VA ports/ airports The scoring value is scaled by the length of the project.	20%
ED.3	Travel Time Reliability	Improvement in travel time reliability attributed to the project	This measure determines the project's expected impact on improving reliability which supports efforts to retain businesses and increase economic activity.	20%

3.6 LAND USE COORDINATION MEASURES

The coordination between transportation and land use is an important issue within jurisdictions throughout Virginia. SMART SCALE legislation mandates the use of this factor area for metropolitan areas in the Commonwealth with a total population of 200,000 or more. Localities with a population beneath that threshold were given the opportunity to voluntarily choose to use this factor area as well. The goals of the SMART SCALE land use coordination measures are to improve the consistency of the connection between local comprehensive plan goals for transportation-efficient land use and transportation infrastructure design, multimodal accommodation, and system operations. Listed in Table 3.6 is a brief

summary of the land use measures, and additional information is available in Appendix F.

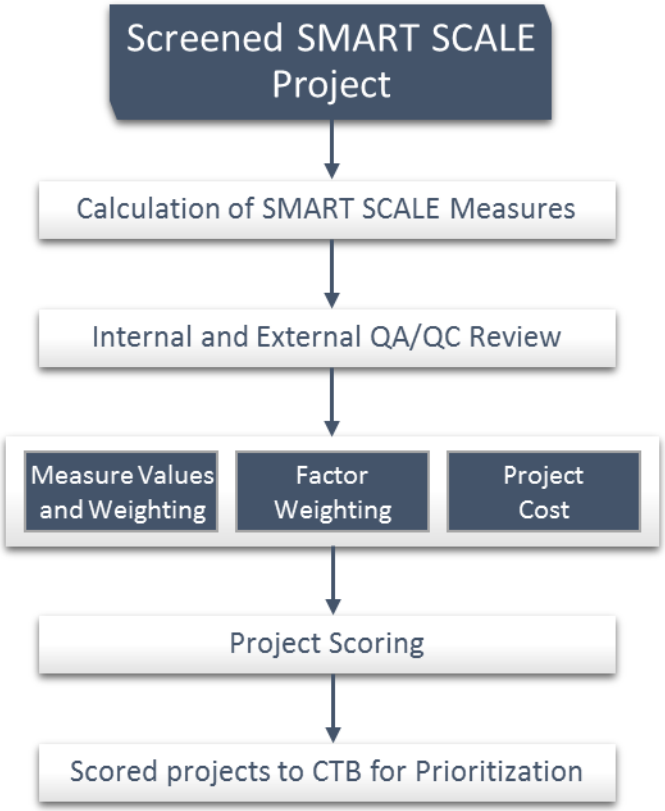
Table 3.6 Transportation Efficient Land Use Measure

ID	Measure Name	Measure Description	Measure Objective	Measure Weight
L.1	Transportation Efficient Land Use	Amount of population and employment located in areas with high non-work accessibility	This measure determines the degree to which the project supports population and employment that on averages has a reduced impact on the transportation network	50%
L2	Increase in Transportation Efficient Land Use	Increase in amount of population and employment located in areas with high non-work accessibility between present day and the horizon year of 2030	This measure determines the degree to which the project supports population and employment that on averages has a reduced impact on the transportation network	50%

4.0 Project Evaluation and Rating

This section summarizes how projects are evaluated once submitted and screened in for consideration in the SMART SCALE process. The CTB's goal is to ensure a transparent process that allows the public and stakeholders to understand how the project benefit for each project is determined and hold decision makers accountable. The flowchart in Figure 4.1 below illustrates the general process of SMART SCALE project evaluation and rating, and will be explored in more detail within this section.

Figure 4.1 SMART SCALE Project Evaluation Process



4.1 Calculation of SMART SCALE Measures

The technical evaluation team collects and calculates measures listed in Section 3, spanning the six factor areas. This is an open process that involves state agency collaboration and review from an external team of stakeholders to ensure transparency and improve consistency. Methodologies and specific evaluating methods are listed in Appendix A-F for each of the factor areas.

4.2 INTERNAL/EXTERNAL REVIEW

A key step in the rating process is to perform quality assurance / quality control (QA/QC) review of the calculated measures for each project. This review will be conducted by internal and external technical groups. Measures generated through a GIS-based analysis (i.e., environmental factor) or based on responses from the applicant are not subject to the QA/QC review.

The internal technical evaluation team led by OIPI in cooperation and coordination with VDOT and DRPT staff, is responsible for calculating and evaluating submitted projects in the SMART SCALE process. Duties of this group include:

- Validating and screening projects;
- Calculating measure values for submitted projects according to the methodologies set out in the Appendices; and
- Identifying any inconsistencies.

Once initial analysis is done a blind secondary analysis is performed on a minimum of 10 percent of the applications. Projects are randomly chosen for a blind secondary evaluation. A member of the technical evaluation team not involved in the initial analysis conducts the blind independent evaluation to ensure consistency in the development of assumptions and application of analytical methods and to identify process improvements.

4.3 FACTOR WEIGHTING

The SMART SCALE legislation recognized the diversity of transportation needs in different areas of the Commonwealth. It states:

"The Commonwealth Transportation Board shall weight the factors used in subdivision 1 for each of the state's highway construction districts (9). The Commonwealth Transportation Board may assign different weights to the factors, within each highway construction district, based on the unique needs and qualities of each highway construction district"

"The Commonwealth Transportation Board shall solicit input from localities, metropolitan planning organizations, transit authorities, transportation authorities, and other stakeholders in its development of the prioritization process pursuant to this section. Further, the Board shall explicitly consider input provided by an applicable metropolitan planning organization or the Northern Virginia Transportation Authority when developing the weighting of factors pursuant to subdivision 3 for a metropolitan planning area with a population over 200,000 individuals."

"The Commonwealth Transportation Board, pursuant to subdivision B.3 of § 33.2-214.1 as created by this act, shall ensure that congestion mitigation, consistent with § 33.2-257 of the Code of Virginia, is weighted highest among the factors in the prioritization process."

Based on a robust public involvement process, it was determined that needs within each construction district are often diverse as well. The CTB decided to create four weighting frameworks and assign frameworks by planning district commission (PDC) and metropolitan planning organization (MPO) boundaries. Table 4.1 and Figure 4.2 present the final factor weighting categories assigned to each MPO and PDC area.

Figure 4.2 PDC and MPO Factor Weighting Typology Map

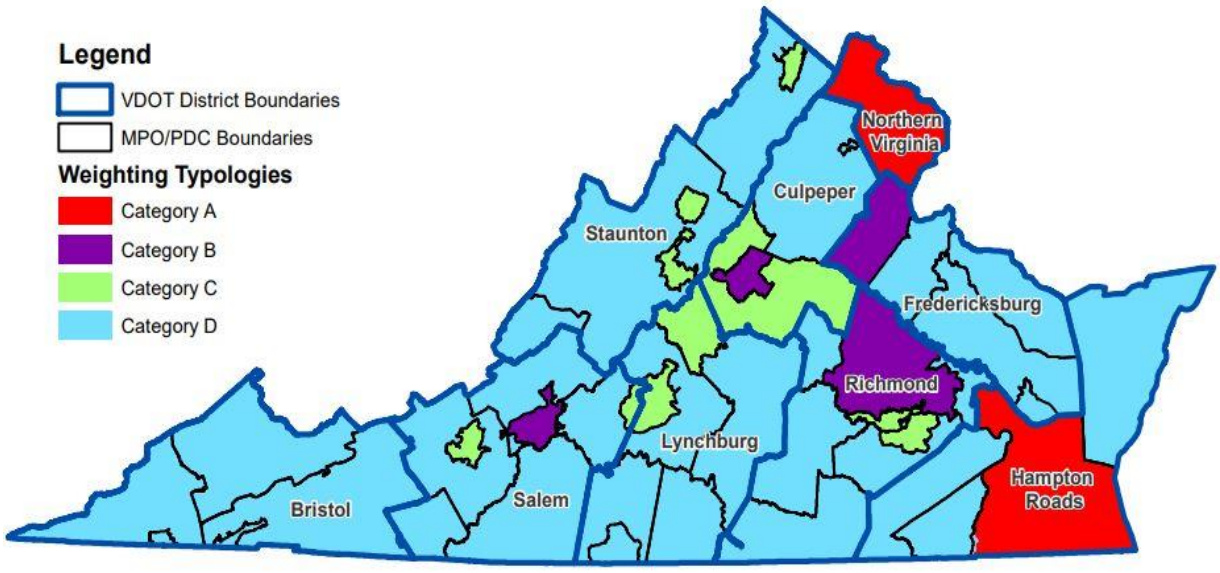


Table 4.1 PDC-MPO Factor Weighting Typology

Name	Typology
Accomack-Northampton PDC	Category D
Bristol MPO	Category D
Central Shenandoah PDC*	Category D
Central Virginia MPO	Category C
Charlottesville-Albemarle MPO	Category B
Commonwealth RC	Category D
Crater PDC*	Category D
Cumberland Plateau PDC	Category D
Danville MPO	Category D
Fredericksburg Area MPO (FAMPO)	Category B
George Washington RC*	Category D
Hampton Roads PDC[i]	Category D
Hampton Roads TPO (HRTPO)[i,ii]	Category A
Harrisonburg-Rockingham MPO	Category C
Kingsport MPO	Category D
Lenowisco PDC	Category D
Middle Peninsula PDC[ii]	Category D
Mount Rogers PDC*	Category D
New River Valley MPO	Category C
New River Valley PDC*	Category D
Northern Neck PDC	Category D
Northern Shenandoah Valley RC*	Category D
Northern Virginia RC (NVRC)	Category A
Northern Virginia Transportation Authority (NVTA)/ Transportation Planning Board (TPB)[iii]	Category A
Rappahannock-Rapidan RC[iii]	Category D
Region 2000 LGC*	Category D
Richmond Regional PDC*	Category D
Richmond Regional TPO (RRTPO)	Category B
Roanoke Valley TPO (RVTPO)	Category B
Roanoke Valley-Alleghany PDC*	Category D
Southside PDC	Category D
Staunton-Augusta-Waynesboro MPO	Category C
Thomas Jefferson PDC*	Category C
Tri-Cities MPO	Category C
West Piedmont PDC*	Category D
WinFred MPO	Category C

*Note: PDC defined as the remainder of the region outside the MPO boundary. In many cases, these regions include partial counties (e.g., Goochland County is partially within RRTPO and the Richmond Regional PDC). If a project is within the MPO boundary in a partial county, the project shall use the weighting associated with the MPO with the following exceptions:

i. The portion of Southampton County and the City of Franklin within the Hampton Roads TPO boundary shall use the weighting associated with the Hampton Roads PDC.

ii. Gloucester County portion of HRTPO included within Middle Peninsula PDC typology.

iii. Fauquier County portion of TPB included within Rappahannock-Rapidan RC typology.

For projects that cross multiple typology boundaries, the project shall use the weighting associated with the typology for which the majority of the project is located.

The final weighting scheme by category is presented in Table 4.2. Where MPO boundaries cover a partial county, the assumption is that any project partially or wholly within the MPO boundary will use the assigned MPO weighting approach unless noted otherwise in Table 4.1. For projects that cross multiple typologies, the weighting framework from the typology for which the majority of the footprint of the project is located will be utilized.

Table 4.2 Factor Weights by Category

Factor	Congestion Mitigation	Economic Development	Accessibility	Safety	Environmental Quality	Land Use
Category A	45%[b]	5%	15%	5%	10%	20%[a]
Category B	15%	20%	25%	20%	10%	10%[a]
Category C	15%	25%	25%	25%	10%	
Category D	10%	35%	15%	30%	10%	

[a] For metropolitan planning areas with a population over 200,000, the prioritization process shall also include a factor based on the quantifiable and achievable goals in VTrans. TPB, HRTPO, RRTPO, FAMPO and RVTPO all meet this definition.

[b] For Northern Virginia and Hampton Roads construction districts, congestion mitigation is weighted highest among the factors in the prioritization process.

4.4 PROJECT COST

SMART SCALE (§ 33.2-214.1) mandates that the prioritization process be based on benefit of a project relative to the cost of the project. In accordance with the CTB policy, the SMART SCALE score is based on the benefit of the project relative with the requested SMART SCALE funds.

For purposes of determining the SMART SCALE score, only the funds requested from SMART SCALE programs – the High Priority Projects Program and the District Grant Program – are considered. Information on a project's benefits relative to total cost will be provided to the CTB for comparison purposes.

Using only the funds requested from SMART SCALE programs directly accounts for the benefit of private, local, or other leveraged funding, and helps augment limited state and federal funding sources.

This policy encourages applicants to bring resources to the table.

4.5 PROJECT SCORING

SMART SCALE requires an analysis of the project benefits, considering each applicable factor, relative to the cost of the project. Each project's benefit is

determined by calculating values for each of the evaluation measures, converting those values into a normalized value for each factor (0 to 100 scale), and then by weighting the factor values according to one of several potential weighting frameworks approved by the CTB. Ultimately, a Project Benefit is divided by the amount of funds requested from the SMART SCALE programs to obtain the final SMART SCALE score used to rank projects and develop the staff-recommended funding scenario. In addition, the Project Benefit is divided by the total cost of the project and this figure is provided to the CTB for information purposes.

Key Terms

Measure Value – Data calculated for the project that describes the characteristics of the project. Wherever possible, the SMART SCALE measure values should be calculated so they are proportional to the size or impact of the project, even for qualitative measures.

Normalized Measure Value – Numerical value given to each measure based on the Measure Value as a percentage of the maximum or best Measure Value in the state (in other words, scoring based on proportion of the highest Measure Value).

Weighted Normalized Measure Value – Normalized Measure Values within a factor area multiplied by their measure weights.

Factor Value – Sum of the Weighted Relative Measure Values within a factor area.

Weighted Factor Value – Factor Value multiplied by the factor weight of the appropriate weighting framework based on the project location.

Project Benefit – Sum of the Weighted Factor Values for each factor area. This represents the total benefits of the project relative to other project's benefits.

SMART SCALE Score (Project Benefit / SMART SCALE Cost) – Project Benefit divided by the SMART SCALE-funded cost of the project. This index allows projects to be compared to each other in terms of their benefit per SMART SCALE dollar invested. Project costs are applied in units of tens of millions of dollars ($10 million).

Methodology

Step 1 – Within each factor, for each measure, the highest Measure Value is determined after calculating the measures for each project. The highest Measure Value is given a value of 100. Other Measure Values are compared to the highest Measure Value, and the Normalized Measure Value is then established by taking the project Measure Value as a percentage of the highest value. An example of normalization is shown in Table 4.3 below.

Table 4.3 Normalization of Measure Weights

	Project 1	Project 2	Project 3	Project 4
Measure Value	11.62 hours	166.45 hours	1332.85 hours	21131.65 hours
Measure Value	0.05	0.79	6.31	100.00

Step 2 - Once each Normalized Measure Value has been assigned for a factor, the measure weighting is applied. Each measure within the five or six factors has a measure weight which determines the proportion of the Factor Value carried by each measure. Once the measure weighting has been applied, the sum of the Weighted Normalized Measure Values produces the Factor Value. Table 4.4 presents an example for the Congestion Mitigation factor area.

Table 4.4 Applying Measure Weights

	C.1: Person Throughput		C.2: Reduction in Person Hours of Delay		Raw Factor Value: Congestion
Measure Weight	50%		50%		
	Value	Value	Value	Value	
Project 1	5	0.01	11	0.05	(50% * .01) + (50% * .05) = .03
Project 2	747	1.40	166	0.80	(50% * 1.4) + (50% * .80) = 1.1
Project 3	182	0.34	1,332	6.30	(50% * .34) + (50% * 6.31) = 3.32
Project 4	53,200	100.00	21,131	100	(50% * 100) + (50%*1000)= 100

Step 3 - The Factor Value is then multiplied by the weighting percentage assigned to that factor by the predetermined weighting typology. Table 4.5 demonstrates this factor weighting using example project 2 and the Category A weights. This process is repeated for all applicable factors – their sum producing the Project Benefit.

Table 4.5 Applying Factor Weights

Project 2 (Category A Weights)	Congestion Mitigation	Economic Development	Accessibility	Safety	Environmental Quality	Land Use	Final Project Benefit
Weight	45%	5%	15%	5%	10%	20%	
Factor Value	1.1	2.6	0.2	4.1	0.3	4.5	
Weighted Value	0.50	0.13	0.03	0.2	0.03	0.89	1.78

Step 4 - The Project Benefit is then divided by the SMART SCALE-funded cost of the project (in $10 millions) to determine the value of benefit for every dollar invested. For example, assume that Project 2 is requesting $12.4 million in SMART SCALE funds out of a total cost of $20 million. The Project Benefit is 1.78, the SMART SCALE Score would be 1.43 (i.e. 1.78/1.24 = 1.43).

The Project Benefit is also divided by the total project cost to provide supplemental information on the cost-effectiveness of each project. If the total project costs were used, instead of SMART SCALE funds only, the cost-effectiveness of Project 2 would be 0.89 (i.e. 1.78/2 = 0.89).

Everything is Relative

Under this process, the maximum measure values may change on a year-to-year basis depending on the characteristics of the projects that are submitted. The aim of this method is to score each project on a scale proportional to its benefits and relative to its cohort of projects rather than an arbitrary scale that defines whether a project does well or not.

In the first round of SMART SCALE, the Transform66: Outside the Beltway project received the highest measure value in the congestion factor with a 100. In that same round the I-64 High Rise Bridge and Widening project received a 24.3. In the second round of SMART SCALE without the Transform66: Outside the Beltway project, the I-64 High Rise Bridge and Widening project received a 94.5 measure value for the congestion factor – the highest value. The benefits of the I-64 High Rise Bridge and Widening project did not quadruple, rather as the evaluation is done on a relative basis the benefit increased because it did the most to reduce congestion of the projects submitted in the second round of SMART SCALE.

Table 4.6 summarizes the calculation of the SMART SCALE Score for the Project 2 example described above. This shows how the measure values and weights, combined with the factor weights, can be used to calculate the Project Benefit. The SMART SCALE Score is the Project Benefit divided by the SMART SCALE cost. Once all projects have been evaluated, they are sorted (ranked) based on the highest scored to lowest scored projects.

Project Segmentation – Fixed Guideway Projects (Transit and Rail Only)

Some projects are submitted for SMART SCALE that are a segment of a larger project plan. The individual project may not deliver certain benefits but the larger project will have significant benefits if each of the individual components are built. For example, if a project is submitted to extend a platform at a rail station to allow longer trains to be utilized, the benefits for just the extended platform will be very limited. To account for future benefits of projects that are segmented, a percentage of the benefits derived from all segments of a larger plan will be used in the evaluating of a specific segment. In our example, assuming the rail platform cost $10 million, and the future purchase of railcars cost $90 million for a total cost of $100 million, benefits would be measured for the total project and the segmented component would receive a pro-rata percentage of the benefits relative to the component's cost to the total project's cost. In this instance, 10% ($10 million/$100

million) of the benefits would be used for evaluating the platform project as this component represents 10% of the overall cost of the total project.[1]

Table 4.6 Calculate SMART SCALE Score

SMART SCALE Area Type A														
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	Potential Sensitive Acreage Impacted	Support of Transportation-Efficient Land Use	Increase Transportation- Efficient Land Use
Measure Value	2,928.0 persons	643.9 person hrs.	33.5 EPDO	86.8 EPDO / 100M VMT	1,653.7 jobs per resident	2,552.3 jobs per resident	14,165.9 adjusted users	7,414,543.8 thousand adj sq. ft.	79,931.5 thousand adj daily tons	141,935,293.9 adj. buffer time index	14,165.9 adjusted points	20.2 scaled points	651,654.1 access * pop/emp density.h	149,664.9 access * pop/emp density change.
Normalized Measure Value (0-100)	10.4	10.0	9.6	0.2	29.1	44.1	50.6	37.7	1.7	3.3	100.0	61.1	49.2	42.4
Measure Weight (% of Factor)	0.5	0.5	0.7	0.3	0.6	0.2	0.2	0.6	0.2	0.2	1	Up to -5 points*	0.5	0.5
Factor Value	10.2		6.78		36.4			23.6			100		45.8	
Factor Weight (% of Project Score)	45%		5%		15%			5%			10%		20%	
Weighted Factor Value	4.6		0.3		5.5			1.2			8.1		9.2	
Project Benefit	**27.6** *[30.7 – 3.1(E.2*)]*													
SMART SCALE Cost	$57,200,000													
SMART SCALE Score (Project Benefit per $10M SMART SCALE Cost)	**4.8**													

[1] This has very limited applicability and does not apply to roadway widenings

5.0 CTB Prioritization and Programming

This final section summarizes CTB prioritization and programming methods that are used in the SMART SCALE process, specifically how SMART SCALE scored projects are reviewed, and ultimately, incorporated into the SYIP. The flowchart in Figure 5.1 below illustrates the basic process of the final stages of the SMART SCALE Biennial Process, in which the CTB begins with the results from the SMART SCALE evaluation and rating process, and the staff recommended funding scenario, to inform funding decisions for the draft SYIP.

Figure 5.1 Prioritization and Programming Process (Odd Years)

First, the SMART SCALE technical review team presents the screening and scoring results to both the CTB and the public. Pursuant to Section 33.2-214.2 of the Code of Virginia, project values will be made publicly available no later than 150 days prior to the CTB's vote to adopt the Six-Year Improvement Plan. Under current

practices this requires that the results be released at the January CTB meeting. The CTB gives guidance on program development, and begins to narrow down their funding decisions for projects that will be funded in the draft SYIP. Their decisions are represented in the draft SYIP. After the draft SYIP is presented, the CTB holds a public comment period that allows eligible entities to comment on the process, on screening decisions, and on the evaluating of individual projects. The CTB takes into account public comments based on the draft SYIP, ultimately approving the final SYIP in June.

Funding Decisions for Draft SYIP

Pursuant to Section 33.2-214 of the Code of Virginia, each year the CTB must approve a capital improvement program that outlines planned spending for transportation projects for proposed construction development or study for the next six years. The SYIP covers all surface transportation projects, including highway, transit, rail, roadway, technology operational improvements and transportation demand management strategies. Project funding is programmed in accordance with project schedules and cash flow requirements. The CTB updates the SYIP each year as revenue estimates are updated, priorities are revised, project schedules and costs change, and study results are known.

Information from the fall transportation meetings and results of the evaluation process are utilized by the CTB to direct the development of a draft SYIP. The draft SYIP is presented to the CTB each spring. At that time the draft SYIP is made available for public comment. A final SYIP is presented to the CTB in June each year for approval. To meet its statutory obligation, the CTB will adopt a SYIP in June of each year effective July 1st, though SMART SCALE will only happen every other year (see Section 1.4, Biennial SMART SCALE Cycle).

Once the scoring is complete, OIPI develops a staff-recommended funding scenario based on guidance from the CTB.

The CTB may modify the staff-recommended funding scenario. Additional considerations that may be used by the CTB include:

- Public feedback from Fall Transportation Meetings and Spring public meetings;
- SMART SCALE scores;
- Project segmentation – starting the next phase of a multi-segment roadway improvement, e.g., to complete a major multi-segment project; and
- Other information on project status.

The prioritization process does not require that the CTB fund projects in order of their scores. Further, the CTB is not required to select the highest scoring project. The process is a means to assist the CTB in evaluating and comparing proposed improvements. The CTB continues to retain final decision-making authority on improvements to be included in the SYIP.

5.1 PUBLIC COMMENT PERIOD

The CTB provides numerous opportunities for the public to provide input on transportation projects and priorities as part of the continuing transportation planning process. The CTB holds annual Fall Transportation Meetings in the construction districts, providing public and elected officials with an opportunity to identify transportation priorities and to review and comment on the current SYIP. VDOT and DRPT also hold an annual planning and programming meeting inviting representatives from all MPOs and PDCs to attend and provide their transportation priorities prior to the annual development of the SYIP.

Stakeholders have the opportunity to provide input as to what projects the jurisdictions/MPOs/PDCs/transit agencies should consider moving forward in the process through the development of an application for SMART SCALE funds as well as by providing feedback to the CTB during the annual Fall Transportation Meetings. Stakeholders may work with the state to ensure that projects are defined in sufficient detail for SMART SCALE evaluation. All of the applications and supporting analysis will be posted on the SMART SCALE web site (www.smartscale.org) and made available for public review prior to scoring. Public input at this stage is critical to ensuring that no pertinent issues or options are overlooked in the development of a project application. By January of each SMART SCALE cycle, the evaluation of projects selected for SMART SCALE prioritization evaluation will be complete, and results will be made public. Stakeholders have the opportunity to review assumptions and calculations and see each project's score.

Each spring, the draft SYIP is made available for public comment and CTB hosts a public hearing in each construction district. Attendance at the Fall Transportation Meetings and spring public meetings generally includes elected state officials, city and town officials, members of County Boards of Supervisors, representatives of advocacy groups, representatives from MPOs and PDCs, and the general public. Comments are accepted both verbally and in writing at the meeting or via regular mail or email after the meeting.

5.2 PROCESS ISSUES

The CTB adopted an updated SYIP policy on December 7, 2016 with changes to the programming process intended to: 1. improve transparency in the programming process, 2. increase certainty for local project sponsors, citizens and businesses, and 3. accelerate delivery of selected projects. This policy document outlines key provisions in the following areas:

- Frequency of updates to the SYIP and to HPPP and DGP;
- Changes relating to modification of the amounts of funds previously committed and programmed to projects under certain programs;

- All SMART SCALE projects selected for funding under the HPPP and the DGP must be fully funded and demonstrate the Board's commitment to advance the project through construction;
- The Board will select a preferred prioritization scenario to guide allocation of funds and consider modifications to the preferred prioritization scenario;

Some of the specific process issues pertaining to SMART SCALE are outlined below.

Changes in Project Scope/Schedule/Cost

In general, once a project has been screened, evaluated, and selected for funding, it will remain in the SYIP as a funding priority. However, certain circumstances may warrant review of the project's SMART SCALE score or funding decision. More specifically, any changes to a project's scope or budget may require engagement in the SMART SCALE project change process.

The project change process was developed to ensure the integrity of the SMART SCALE scoring process, the original intent/benefits of evaluated projects, and the CTB's allocation decisions. Changes to basic project elements, such as scope or cost could result in funding projects that are not as cost effective as others.

The project change process was designed to be flexible, allowing for most project modifications to be addressed through business rules without requiring CTB action, thereby avoiding potential project delays. More information about SMART SCALE project changes can be found in the SMART SCALE Project Change Guide.

A project that has been selected for funding must be reviewed through the project change process if there are significant changes to either the scope or cost of the project:

1. If proposed project scope changes will change the nature of the project as presented in the project's SMART SCALE application, then a preliminary review of the proposed changes will be conducted to determine if there is an impact to project benefits. If the project benefits may be impacted, then a quantitative assessment will be conducted to determine the level of impact. If warranted the project will be re-scored utilizing the same methodology and maximum measure values for the round of SMART SCALE in which the project was selected for funding. In this case, if the revised score is less than the lowest ranked funded project in the district for that round of SMART SCALE, CTB action is required to approve the change in scope.

   In the event the CTB does not approve such changes, they may choose to cancel the project. In such cases, the remaining SMART SCALE funds will be reserved to address budget adjustments on existing SMART SCALE projects or reserved for allocation in the next solicitation cycle for SMART SCALE. The CTB may also choose to advance the original scope of the

project. Results of SMART SCALE project scope changes reviewed by the CTB will be made publicly available.

If the proposed scope change is an increase in scope, then the applicant is responsible for the additional cost attributable to the increase in scope regardless of budget impact.

2. If an estimate increases prior to project advertisement or contract award that exceeds the following thresholds shown in Table 5.1, and the applicant is not funding the increased cost with other funds, CTB action is required to approve the budget increase:

Table 5.1 Project Budget Change Thresholds for CTB Action

Total Project Budget	Change from original SMART SCALE requested amount
Less than $5,000,000	20% or greater increase in funding requested
From $5,000,000 to $10,000,000	$1,000,000 or greater increase in funding requested
Greater than $10,000,000	10% or greater increase in funding requested; $5,000,000 maximum increase in funding

3. If there is a significant reduction in the locally/regionally leveraged funds available for the project, in cases where a project has been selected for funding which identified other sources of funding, the qualifying entity is committed to pay the difference if other sources of funding are not provided. An applicant may only identify State of Good Repair, Transportation Alternatives Set-Aside, Highway Safety Improvement Program and Revenue Sharing funds as committed funds, if the funding has already been approved by the CTB. Applicants must have an approved or pending application for other sources of committed funds, such as local/regional or other federal funds, at the time of the SMART SCALE application submission.

Funding Sources

Other sources of funding may include previous applications for VDOT or DRPT funding programs (State of Good Repair, Revenue Sharing, Transportation Alternatives (TA) Set-Aside funds, FTA Programs, MERIT), regional funding (CMAQ/RSTP), or local funds requested from the BOS or City/Town Council. An explanation of the source of the requested funding must be provided. The applicant must provide documentation of other requested funds; such as resolutions of support, letter, applications, etc. In the cases where a project has been selected for funding which identified other sources of funding, the applicant is committed to pay the difference if other sources of funding are not provided.

A project that has been selected for funding must be initiated and at least a portion of the programmed funds expended within one year of the budgeted year of allocation or funding may be subject to reprogramming to other projects selected through the prioritization process. In the event the Project is not advanced to the

next phase of construction when requested by the CTB, the locality or metropolitan planning organization may be required, pursuant to § 33.2-214 of the Code of Virginia, to reimburse the Department for all state and federal funds expended on the project.

Fully Funded Project Applications

Committed funds are funds committed to cover the difference in total project cost and SMART SCALE request so that the project is fully funded through construction. Applicants are encouraged to identify other sources of funding (local, regional, proffers, other stated/federal funds) to reduce the amount of SMART SCALE funding. However, since committed funds are used to leverage and reduce the SMART SCALE requested amount forming the basis of SMART SCALE Score, applicants must submit a letter of commitment that they are responsible for such committed funds even if the original source of the funds is no longer available.

SMART SCALE funding is not intended to replace other committed funding sources such as local/regional funding, proffers, and/or other committed state or federal funding sources. In general, projects that are fully funded in a capital improvement program, a metropolitan planning organization's transportation improvement program, VDOT/DRPT or NVTA SYIP, or required to be paid by a developer as a result of a local zoning process will be excluded from consideration in evaluating and rating for SMART SCALE. To ensure that a proffer is accepted as other committed funds, it needs to be void of language that references a specific project (or project element with independent utility) and instead should only apply to a general area or corridor.

1. The CTB may waive this requirement for projects that:
   a. have an anticipated total cost in excess of $1 billion; and
   b. were not eligible for submission in the previous round of SMART SCALE due to readiness considerations, but initiated procurement prior to award of the current round of SMART SCALE.
2. If a fully funded project is submitted with additional features that are not yet funded, the benefits associated with the fully funded or committed project element(s) will be excluded from consideration in evaluating and rating the project benefits for SMART SCALE.
3. Other committed funds must have at least been applied for at the time of the SMART SCALE application submission.
   a. Future applications for State of Good Repair, Transportation Alternatives, Safety, Revenue Sharing, CMAQ, RSTP, NVTC, HRTAC, FTA New Starts, etc. cannot be considered other committed funds.

Re-Submittal of Projects

If a submitted project is not selected for funding during a cycle, the CTB will allow eligible entities to re-submit the project the next cycle.

Other considerations regarding resubmittal of projects include the following:

- A project that has been selected for funding cannot be resubmitted to address cost increases or loss of other sources of funding.
- Once a project is selected for funding, an entity must wait for two rounds of SMART SCALE following the end date of construction before submitting a new project application for the same location that meets the same need as the project that was selected for funding.
- Once a project is selected for funding, an entity may not resubmit the project with a revised scope in a subsequent round unless the previously selected project has been cancelled.

Program Funding Changes

In order to cover estimate increases, funds will be reprogrammed from projects with surplus allocations due to estimate decreases, contract award savings, schedule changes, etc. or from future SMART SCALE funds from the applicable grant program (DGP or HPPP). Regular reviews will be conducted to ensure that the scope and benefit of selected projects has not changed significantly. Project estimates will also be monitored to determine if the thresholds need to be adjusted.

The Board may adjust the timing of funds programmed to projects selected in previous SMART SCALE cycles to meet the cash flow needs of the individual projects, but will not (1) reduce the total amount of state and federal funding committed to an individual project unless it is no longer needed for the delivery of the project or the project sponsor is unable to secure permits and environmental clearances for the project or (2) increase the total amount of state and federal funding committed to an individual project beyond the thresholds requiring CTB action identified in the SMART SCALE policy.

In cases where programmed funds are no longer needed for delivery of a project due to estimate decreases, contract award savings, schedule changes, etc., the unexpended surplus funds are reallocated within the SMART SCALE program, unless superseded by the terms of a signed project agreement, as follows:

- Surplus DGP funds no longer needed for delivery of a project will remain with the district and may not be used in other districts;
- Surplus HPPP funds will be transferred to a statewide balance entry account and may be used on a statewide basis on other High Priority projects; or
- Such funds will be reserved to address budget adjustments on existing SMART SCALE projects or reserved for allocation in the next solicitation cycle for SMART SCALE.

In the event that revenue reductions decrease the amount of actual funding available for a particular SMART SCALE cohort, two approaches are envisioned:

- Delaying timing of projects to out years where future funding may be available; or
- Utilizing SMART SCALE funds from future years to fund the project.

5.3 IMPROVEMENTS TO PROCESS AND MEASURES

SMART SCALE represented a new step forward for the Commonwealth of Virginia, and the CTB broke new ground in moving towards a prioritized transportation funding structure. As the process moves into future cycles, SMART SCALE will continue to evolve and improve. Advances in technology, data collection, and reporting tools will upgrade and modernize SMART SCALE for a growing Virginia, and the CTB looks forward to using these tools to provide a more balanced and equitable distribution of the Commonwealth's transportation funds.

6.0 Appendix A: Safety Measures

Table 6.1 Safety Factor – Measures Summary

ID	Measure Name	Weight	Measure Description	Measure Objective
S.1	EPDO of Fatal and Injury crashes	70%[a]	Equivalent property damage only (EPDO) of fatal and injury crashes expected to be avoided due to project implementation	Estimate number of fatalities and injury crashes (weighted by "equivalent property damage only" crash value reported by FHWA) at the project location and the expected effectiveness of project specific counter-measures in reducing crash occurrence
S.2	EPDO Rate of Fatal and Injury crashes	30%	Equivalent property damage only (EPDO) of fatal and injury crashes per 100 million vehicle miles traveled (VMT) expected to be avoided due to project implementation	Similar to S.1, but by focusing on the change in fatality and injury crashes (weighted by "equivalent property damage only" crash value reported by FHWA) per 100 million vehicle miles traveled (VMT), the measure considers projects that address areas with a high rate of crashes that may be outside of high-volume roadways

[a] 100% for Transit and Transportation Demand Management projects

Measures Approach

S.1 Equivalent property damage only (EPDO) of Fatal and Injury crashes

Definition: EPDO-weighted fatal and injury crashes expected to be reduced due to project implementation.

Data Source(s)

- Most recent five years of crashes from VDOT Roadway Network System (RNS) geospatial (GIS) data prepared by Traffic Engineering Division.
- FHWA report on crash cost estimates by severity of the injuries sustained adjusted to the mid-year of the analysis period as modified by VDOT[2].
- SYIP to determine if and when improvements have been implemented in proximity to the project in the last five years.

[2] Council, F., Zaloshnja, E., Miller, T., and Persaud, B., Crash Cost Estimates by Maximum Police-Reported Injury within Selected Crash Geometries, U.S. Department of Transportation, Federal Highway Administration (FHWA), October 2005, Washington, DC.

- SMART SCALE project expected crash reduction percentage developed using FHWA's Crash Modification Factors (CMF) Clearinghouse website and Virginia crash summaries and models published in the Resource page.[3]
- For park and ride projects, data from the U.S. Census Bureau's OnTheMap tool will be used to indicate the most common primary direction(s) and average distances of commute(s) for those living within the catchment area of the proposed improvement. Additionally, when available, lot user surveys or other applicable information (conducted within the past five years) of existing park and rides within reasonable proximity of the proposed improvement can supplement OnTheMap data. Common directions of travel and average distances from OnTheMap, as well as any available origin-destination information from lot users surveys, are used to apply logical routing. The number of new park & ride users is determined using existing park & ride utilization in the area and/or projected demand based upon established methodology that factors in demographic data and travel patterns.[4]

Methodology

The methodology varies by project type, as described below.

Roadway

Step 1: VDOT will compile the latest 5 years of fatal (F) and injury (I by severity) crashes for the roadway segments within the project limits. The project limits are defined by the begin and end milepost for roadway, pedestrian, bicycle, in-roadway transit service (e.g., bus rapid transit), in-roadway freight service corridor improvements; the ends of the turn bays on all approaches for intersection improvements; the nearest intersection(s) on the cross street for a new interchange as well as adjacent ramps on the freeway within 1,600 feet of any proposed interchange ramp; and the begin and end milepost on key parallel roadway(s) (facilities where vehicles may shift from) for transit and freight improvement projects. The SYIP will be reviewed and local VDOT staff will determine if and when improvements have been implemented within the project limits during the 5 year analysis period. When identified the analysis period will be shortened to the post improvement years as necessary.

Step 2: Weight the number of crashes by severity using the "equivalent property damage only" (EPDO) crash value scale reported by FHWA and adjusted to the mid-year of the analysis period. Research has shown that many factors unrelated to the design or condition of a roadway play a role in whether a crash results in fatality or severe injury, such as age of the individual and age of the vehicle, VDOT has developed an average weighted EPDO value for crashes that involve either a fatality or a severe injury. The EPDO values used in the SMART SCALE process are shown in Table 6.2 below.

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[3] *http://www.cmfclearinghouse.org/ and http://smartscale.org/resources/*

[4] *http:onthemap.ces.census.gov/*

Table 6.2 EPDO Crash Value Conversion

Accident Type	Rounded Value	Weight
Fatal + Severe Injury	$850,000	85
Moderate Injury	$100,000	10
Minor Injury	$50,000	5

Step 3: Select the most appropriate expected crash reduction (PECR) percentage (PECR=1-CMF) for each of the project segments based on targeted (crash specific) or all crash CMFs applicable to SMART SCALE project types.

Step 4: Multiply the average annual EPDO weighted fatal and injury crash frequency by the PECR to estimate the number of EPDO crashes expected to be reduced.

- For roadway widening (capacity) projects, the previously described steps are applied using crashes on the highway segment from the beginning and end mile points of the project plus influence areas of intersections at the terminals.
- For intersection related improvement projects, crashes in the influence area of the minor roadway approaches to the major roadway, which is defined as the highest volume facility, will be included for those minor roadways recorded in VDOT's RNS roadway inventory. The minor roadway approach improvement influence area is considered to be 250 feet or the length of existing turn lanes, whichever is greater.
- For projects on roadways on new location, crashes on the most reasonable alternative route(s) would be compiled. The statewide 5-year average fatal and injury crash rate for the new roadway, using the facility type and number of lanes of the new roadway, would represent the build condition. Based on travel demand model estimates of VMT for the build versus no-build scenarios, percent changes in VMT on each alternate route segment equates to the CMF applied. The net total of the expected EPDO crashes on the alternative route(s) and the expected EPDO crashes on the build corridor equals the overall project crash reduction. The alternate routes with expected changes in traffic volumes may be identified by the applicant.
- New interchanges and interchange ramp modifications on the freeway will consider freeway and crossing route crashes depending on the specific ramp improvements in proposed projects.

Transit/Freight Rail/TDM

The methodology described for roadway projects is not used for transit infrastructure projects. Rather the safety benefits for transit projects will be estimated based on reduced vehicle miles traveled from expected shift from auto to transit with the assumption that dedicated transit vehicles have minimal crash frequencies. The same approach as described for transit projects would be applied to freight rail projects, except the focus will be on the 5-year average of truck-

related fatal and injury crashes in the parallel corridor. For TDM projects like park and ride lots, the same approach as described for transit projects would be applied taking into account the traffic reductions on adjacent highways.

Transit/Freight Rail/TDM service safety analysis includes the following steps:

Step 1: Highway segments predicted to experience primary travel shifts by the proposed improvement(s) will be provided by the transit project applicant (transit) or determined with U.S. Census data to determine the most common directions of travel and average distance traveled in each direction. Park and ride lot user origin-destination surveys may be provided by the applicant when available. In addition, for each highway and fixed-guideway transit segment with new service, the applicant sponsor shall provide the daily and hourly ridership, and/or the increase in parking spaces for projects increasing park and ride capacity. The highway segments impacted by a mode shift will be assessed to determine the percent VMT change on the network; that is, the expected percent modal shift from highway (VMT) to transit/ride-sharing due to the project. The after project VMT will be one minus the percent model shift (VMT After = 1 – %VMT Reduced).

Step 2: Compile all fatal and injury crashes by severity from segments of highway predicted to experience primary travel shifts.

Step 3: Weight the number of crashes by severity using the "equivalent property damage only" (EPDO) crash value scale reported by FHWA and adjusted to the mid-year of the analysis period.

Step 4: Compute the 5-year annual average F+Injury EPDO crash frequencies for the on-road segments and impacted parallel roadways.

Step 5: Calculate the expected reduction of annual F+Injury EPDO crash frequencies for segments of highway predicted to experience primary travel shifts by multiplying the existing crash frequency by the after-project percent VMT reduction.

Bicycle/Pedestrian

The methodology described for roadway projects will be used for bicycle and/or pedestrian projects based on the proposed segment and/or intersection improvement CMFs. CMFs from FHWA and other sources were developed based on the associated roadway element improvement CMF targeting bicycle and pedestrian crashes. Other alternative sources of information may be developed to assess the safety benefit of these project types based on bicycle facility classification or facility separation from travel lanes.

Scoring Value

Total change in EPDO of fatal and injury (F+I) crash frequency.

S.2 Equivalent property damage only (EPDO) Rate of Fatal and Injury crashes reduced

Definition: Number of Equivalent Property Damage Only (EPDO) weighted fatal and injury crashes per 100 million vehicle miles traveled (VMT) expected to be reduced due to project.

Data Source(s)

- Most recent five years of crashes from VDOT RNS geospatial GIS data maintained by Traffic Engineering Division. Driving while under the influence of alcohol crashes will be removed from the data set used for safety scoring.
- FHWA report on crash cost estimates by severity of the injuries sustained adjusted to the mid-year of the analysis period[5].
- SYIP to determine if and when improvements have been implemented in the last five years.
- Existing AADT by roadway segment from VDOT RNS, available studies, Congestion Measure analysis or the applicant/jurisdiction, and segment(s) length to calculate annual VMT.
- SMART SCALE project expected crash reduction percentage developed using FHWA's CMF Clearinghouse website and Virginia crash summaries and models published in the Resource page.[6]

Methodology

The methodology varies by project type, as described below.

Roadway and Bicycle/Pedestrian

Step 1: Collect and use the most recent years AADT to calculate the annual VMT for the same segment(s) used for crash data collection for the S.1 measure.

Step 2: Match the project location segment VMT with the expected F+I EPDO of F+I crashes reduced by the project from the S.1 measure.

Step 3: Compute the existing F+I EPDO crash rate based on EPDO per 100 million VMT.

Step 4: Compute the expected F+I EPDO crash rate reduction as a result of the project improvements - the S.1 reduced annual average F+I EPDO crashes divided by the segment 100 million VMT. For longer projects covering several segments

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[5] Council, F., Zaloshnja, E., Miller, T., and Persaud, B., Crash Cost Estimates by Maximum Police-Reported Injury within Selected Crash Geometries, U.S. Department of Transportation, Federal Highway Administration (FHWA), October 2005, Washington, DC.

[6] http://www.cmfclearinghouse.org/ and http://smartscale.org/resources

with different AADT values, the average annual crash rate reduction is the sum of the segment reduced crashes over the sum of the segment VMTs.

The methodology varies by project type, as described above for S.1 crash frequency reduction assessments.

Transit/Freight Rail/TDM

The methodology described for roadway projects cannot be used for transit projects. For on-road and off-road (dedicated guideway) transit projects, only the S.1 measure of the total F+I EPDO crash frequency reduction will be used so the transit safety score will be based on the S.1 result. The same approach as described for transit would be applied for Freight Rail types of project except the focus will be on the 5-year average of truck-related fatal and injury crashes in the parallel corridor.

Scoring Value

Expected reduction in fatal and injury (F+I) EPDO crash rate.

7.0 Appendix B: Congestion Mitigation Measures

Table 7.1 Congestion Mitigation Factor – Measures Summary

ID	Measure Name	Weight	Measure Description	Measure Objective
C.1	Person Throughput	50%	Increase in corridor total (multimodal) person throughput attributed to the project	Assess the potential benefit of the project in increasing the number of users served within the peak period.
C.2	Person Hours of Delay	50%	Decrease in the number of person hours of delay in the corridor	Assess the potential benefit of the project in reducing peak period person hours of delay.

Measures Approach

C.1 Person Throughput

Definition: Change in corridor total (multimodal) person throughput attributed to the project.

Data Source(s)/Analytical Tools

- Latest available 24-hour traffic count data summarized by hour, direction, and roadway segment, including vehicle classification, where applicable, from VDOT TMS, or jurisdiction.
- Latest available regional travel demand model encompassing the influence area only for projects consisting of new transportation facilities. The project is tested with the regional travel demand model using the SYIP highway network.
- Existing AADT by roadway segment from VDOT TMS or jurisdiction.
- Lane capacity is set by the current functional classification of the roadway. In the case of a new location roadway, the planned functional classification is used. Lane capacities were established based on an average of the capacities outlined in the *ENTRADA User's Guide*, February 2014 and the *Virginia Travel Demand Modeling Policies and Procedures Manual Version 2.0.*
- Obtain lane capacities for different facility types (i.e., freeway, collector, etc.) and area types from the *ENTRADA User's Guide*, February 2014. The urban threshold for capacity will be used statewide and is generally based on LOS D/E.
- For park and ride projects, data from the U.S. Census Bureau's OnTheMap tool will be used to indicate the most common primary direction(s) and average distances of commute(s) for those living within the catchment area of the

proposed improvement. Additionally, when available, lot user surveys or other applicable information (conducted within the past five years) of existing park and rides within reasonable proximity of the proposed improvement can supplement OnTheMap data. Common directions of travel and average distances from OnTheMap, as well as any available origin-destination information from lot users surveys, are used to apply logical routing. The number of new park & ride users is determined using existing park & ride utilization in the area and/or projected demand based upon established methodology that factors in demographic data and travel patterns.

- For transit projects, Department of Rail and Public Transportation (DRPT) will provide estimated daily ridership and hourly ridership for the proposed service.
- For new managed lane projects, assumed occupancy rates will be provided by VDOT.
- For roadway projects, SPS will be used to determine number of lanes, lane widths, speed limit, terrain (e.g., level, rolling, mountainous), lateral clearance, number of driveways on arterials, interchange density on freeways, and median type on arterials.
- Latest available aerial imagery used to determine merge, diverge, and weaving lengths on freeways and verify other data from SPS.
- FHWA Cap-X: evaluation tool that uses critical lane volumes (CLV) to evaluate the efficiency of intersections and interchanges.
- Potential traffic growth rate sources include VTrans, SPS, and travel demand model.
- Highway Capacity Software (HCS) 2010 – Freeway Facilities Module.
- Modified Bureau of Public Roads (BPR) spreadsheet.

Methodology

The methodology is a quantitative, corridor-based analysis that requires an estimate of future no-build (without the project) and build (with the project) person throughput. It is anticipated that project corridor will consist of an intersection or segment within the corridor depending on the project type. The segment within the corridor with calculated person throughput increase above zero is used for analysis purposes.

The methodologies to determine person throughput for roadway, bicycle/pedestrian, transit, TDM (including park and ride lots), and freight projects are described below, starting with roadway projects.

For all project types described in this section, person throughput is only credited/ scored if the facility is over capacity in the no-build project condition (has a volume to capacity ratio greater than 1.0)

Roadway: There are four types of analyses used to quantify the change in person throughput as a result of a proposed roadway project:

- Basic roadway segment (freeway, rural multilane, rural two-lane), urban arterial (segments between signals are combined with delay calculations from Cap-X to establish no-build versus build average travel speeds)
- Freeway facility (diverge, merge, weave)
- Intersection or interchange, and
- New/Complex facilities - Limited-access roadway capacity expansion projects greater than 2 miles in length are defined as complex.

The methodology to compute the change in person throughput will be described for each of the four facility types listed above. The methodology for the analysis of first two facility types is the same.

Basic Roadway Segment / Freeway Facility

Basic segments represent uninterrupted-flow conditions and have no fixed causes of delay or interruption external to the traffic stream. This category includes two-lane highways, multilane highways, and basic freeway segments as defined in the *2010 Highway Capacity Manual*. Freeway facilities also represent uninterrupted-flow facilities consisting of continuously connected segments that include: basic freeway, weaving, merge, and diverge segments. In order to calculate average travel speeds along signalized arterial routes, basic roadway segment sheets are coded along the project length and are combined with the Cap-X analysis to compute the no-build and build average travel speeds.

A modified BPR equation is used for the analysis of these types of facilities. Nationally, the BPR equation is the mostly widely used volume-delay function for road segments. The equation addresses the relationship between volume and capacity on the segment, with the result being the delay associated with traffic volumes. Capacity in the BPR equation is based on the area type and facility type.

Step 1: Compile existing peak period traffic volumes within the project corridor using some of the aforementioned data sources, including existing peak period traffic count data from VDOT TMS.

Step 2: Determine the peak period flow rate on the roadway segment without the project and with the project. Using the capacity values by functional classification, compute the vehicle throughput without the project and with the project.

Step 3: Compute the change in peak period vehicle throughput by subtracting the no-build vehicle throughput from the build vehicle throughput.

Step 4: Compute the peak period person throughput for no-build and build conditions by multiplying an average vehicle occupancy rate by the vehicle throughput.

Intersection / Interchange

Intersections and interchanges represent interrupted flow conditions with features that create delay such as traffic signals.

Step 1: Compile existing peak period traffic volumes within the project corridor using the aforementioned data sources, including existing peak period traffic count data from VDOT TMS.

Step 2: Use FHWA CAP-X analysis tool to determine the intersection / interchange critical lane volumes and to estimate the vehicle throughput for the no-build and build conditions.

Step 3: Compute the change in peak period vehicle throughput by subtracting the no-build vehicle throughput from the build project vehicle throughput.

Step 4: Compute the peak period person throughput for without and with conditions by multiplying an average vehicle occupancy rate by the vehicle throughput.

New/Complex Roadway Facilities

Estimating vehicle throughput for new roadway facilities requires the use of a regional travel demand model. The project is added to the regional travel demand model, using the SYIP highway network, and model outputs are then used to summarize with project vehicle throughput.

Step 1: Code the new facility into the regional travel demand model with assumed posted speed limit, facility type, and number of lanes.

Step 2: Identify links in the regional network operating below the speed limit in future no-build scenario with greater than 10% reduction of traffic for the different alternative improvements compared to the no build scenario. Calculate total difference in VHT for these links between the no-build model and the build model.

Step 3: Multiplying the difference between the no-build VHT from the build VHT by 30% to convert to peak period delay reduction (expressed in vehicle hours).

Step 4: Compute the average system project throughput by multiplying the difference between the no-build VHT from the build VHT by 60 to convert to vehicles minutes traveled, and dividing this difference by the average trip length (expressed in minutes).

Transit / Bicycle/Pedestrian / Freight Rail / TDM

New service for alternative modes supports change in throughput both on the other mode and on highway network. For trips on other modes, estimate total person throughput for existing and new users in the peak period. The person throughput reduction for new users is associated with any throughput savings associated with a shift from auto to the other mode. For the highway network, total demand is reduced, which may lead to a reduction in vehicle demand on parallel facilities. For transit projects, compute the number of equivalent vehicles on roadway(s) within the impacted area using a forecasted ridership per hour and an assumed transit occupancy. Once the number of vehicles on impacted roadway(s) is computed, determine the peak period person throughput for no-build and build conditions by multiplying an average vehicle occupancy rate by the vehicle throughput.

Scoring Value

Total change in person throughput due to the project.

C.2 Person Hours of Delay

Definition: Decrease in the number of peak period person hours of delay in the project corridor.

Data Sources/Analytical Tools

- Latest available 24-hour traffic count data summarized by hour, direction, and roadway segment, including vehicle classification, where applicable, from VDOT TMS, or jurisdiction.
- Latest available regional travel demand model encompassing the influence area only for projects consisting of new location transportation facilities.
- Existing AADT by roadway segment from VDOT TMS or jurisdiction.
- Lane capacity is set by the current functional classification of the roadway. In the case of a new location roadway, the planned functional classification is used. Lane capacities were established based on an average of the capacities outlined in the *ENTRADA User's Guide*, February 2014 and the Virginia Travel Demand Modeling Policies and Procedures Manual Version 2.0.
- For park and ride projects, data from the U.S. Census Bureau's OnTheMap tool will be used to indicate the most common primary direction(s) and average distances of commute(s) for those living within the catchment area of the proposed improvement. Additionally, when available, lot user surveys or other applicable information (conducted within the past five years) of existing park and rides within reasonable proximity of the proposed improvement can supplement OnTheMap data. Common directions of travel and average distances from OnTheMap, as well as any available origin-destination information from lot user's surveys, are used to apply logical routing. The number of new park & ride users is determined using existing park & ride

utilization in the area and/or projected demand based upon established methodology that factors in demographic data and travel patterns.

- For transit projects, Department of Rail and Public Transportation (DRPT) will provide estimated daily ridership and hourly ridership for the proposed service.
- For new managed lane projects, assumed occupancy rates will be provided by VDOT.
- For roadway projects, SPS will be used to determine number of lanes, lane widths, speed limit, terrain (e.g., level, rolling, mountainous), lateral clearance, number of driveways on arterials, interchange density on freeways, and median type on arterials.
- Latest available aerial imagery used to determine merge, diverge, and weaving lengths on freeways and verify other data from SPS.
- FHWA Cap-X: evaluation tool that uses critical lane volumes (CLV) to evaluate the efficiency of intersections and interchanges.
- Potential traffic growth rate sources include VTrans, SPS, and travel demand model.
- Highway Capacity Software (HCS) 2010 – Freeway Facilities Module.
- Modified BPR spreadsheet.

Methodology

The methodology is a quantitative, corridor-based analysis that requires an estimate of future no-build (without project) and build (with project) person throughput and congested travel speeds.

The methodologies to determine person hours of delay for roadway, bicycle/pedestrian, transit, and freight projects are described below, starting with roadway projects. It is anticipated that project corridor length definition will vary by mode and project type. For example, the project length for a park and ride lot project is equal to the average commuting distance determined from the census data website identified in the data sources. On the other hand, the project length for a roadway corridor improvement project is established by extending the corridor to the next adjacent signalized intersection or interchange on both ends of the corridor. If there are no adjacent signalized intersections or interchanges within one mile of either end of the corridor, then one mile is added to both ends of the corridor.

Roadway: There are four types of analyses used to quantify the change in person hours of delay as a result of a proposed roadway project:

- Basic roadway segment (freeway, rural multilane, rural two-lane, urban arterial)
- Freeway facility (diverge, merge, weave),

- Intersection or interchange, and
- New facility.

Basic Roadway Segment

Basic segments represent uninterrupted-flow conditions and have no fixed causes of delay or interruption external to the traffic stream. This category includes two-lane highways, multilane highways, and basic freeway segments as defined in the *2010 Highway Capacity Manual*. In order to calculate average travel speeds along signalized arterial routes, basic roadway segment sheets are coded along the project length and are combined with the Cap-X analysis to compute the no-build and build average travel speeds.

A modified BPR equation is used for the analysis of these types of facilities. Nationally, the BPR equation is the mostly widely used volume-delay function for road segments. The equation addresses the relationship between volume and capacity on the segment, with the result being the delay associated with traffic volumes. Capacity in the BPR equation is based on functional classification.

Step 1: Compile existing peak period traffic volumes within the project corridor using some of the aforementioned data sources, including existing peak period traffic count data from VDOT TMS.

Step 2: Collect and document all roadway geometric features using data from SPS and supplemented by field visits and/or aerial imagery.

Step 3: Convert the peak period traffic volumes to flow rates using methods from the *2010 Highway Capacity Manual*.

Step 4: Compute no-build and build travel speeds and delays using a modified BPR equation. Delay is calculated by calculating the difference between the predicted travel speed and the posted speed limit.

Step 5: Compute the change in vehicle hours of delay by subtracting the build (with project) delay from the non-build (without project) delay.

Step 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.

Step 7: Compute the change in person hours of delay by subtracting the build (with project) delay from the non-build (without project) delay.

Freeway Facility

Freeway facilities also represent uninterrupted-flow facilities consisting of continuously connected segments that include: basic freeway, weaving, merge, and diverge segments. The HCS Freeway Facility module is based on *2010 Highway Capacity Manual* procedures.

Step 1: Compute existing peak period no-build and build traffic volumes within the project corridor using the aforementioned data sources, including existing peak period traffic count data from VDOT TMS.

Step 2: Compute volume-to-capacity ratio and travel speed using HCS methodologies for no-build and build conditions.

Step 3: Compute no-build and build delay using the travel speed and segment length.

Step 4: Compute the peak period person delay for no-build and build conditions by multiplying the average vehicle delay by an average vehicle occupancy rate by the vehicle delay.

Step 5: Compute the change in person hours of delay by subtracting the build (with project) delay from the non-build (without project) delay.

Intersection / Interchange

Intersections and interchanges represent interrupted flow conditions with features that create delay such as traffic signals. Corridor travel speed and delay will be calculated based on intersection/interchange delay and segment speed and delay. Apply a capacity check for intersection/interchange and roadway segment. Use the least improved bottleneck to calculate throughput change between the no-build (without project) and the build (with project) conditions.

Step 1: Compute existing peak period traffic volumes within the project corridor using the aforementioned data sources, including existing peak period traffic count data from VDOT TMS.

Step 2: Determine the critical lane volume for each approach to the intersection, which is defined as the movements with the maximum traffic volume per lane.

Step 3: Use FHWA CAP-X analysis tool to estimate the vehicle delay for the no-build and build conditions.

Step 4: Compute the peak period person delay for no-build and build conditions by multiplying the average vehicle delay by an average vehicle occupancy rate by the vehicle delay.

Step 5: Compute the change in peak period delay by subtracting the build (with project) delay from the non-build (without project) delay.

New Roadway Facilities

Estimating vehicle delay for new facilities requires the use of a regional travel demand model. The project is added to the regional travel demand model and model outputs are then used to summarize project build vehicle delay. The total vehicle delay reduction is the cumulative effect at a system level (total trips).

Step 1: Code the new facility into the regional travel demand model with assumed posted speed limit, facility type, and number of lanes.

Step 2: Identify links in the regional network operating below the speed limit in future no-build scenario with greater than 10% reduction of traffic for the different alternative improvements compared to the no build scenario. Calculate total difference in VHT for these links between the no-build model and the build model.

Step 3: Multiplying the difference between the no-build VHT from the build VHT by 30% to convert to peak period delay reduction (expressed in vehicle hours)

Step 4: Compute the person peak period delay by multiplying the average vehicle delay by an average vehicle occupancy rate.

Transit / Freight Rail / TDM

New service from alternative modes supports change in delay both on the other mode and on the highway network. For trips from other modes, estimate total person travel time savings for existing and new users in the peak hour. The person travel time savings for existing users is associated with any improvement in frequency or travel time associated with the project. The person travel time savings for new users is associated with any travel time savings associated with a shift from auto to the other mode. For the highway network, total demand is reduced, which may lead to a reduction in delay on parallel facilities.

Bicycle/Pedestrian

No reduction in person hours of delay is assumed for a stand-alone bicycle and/or pedestrian project.

Scoring Value

Total peak-period person delay reduction.

8.0 Appendix C: Accessibility Measures

Table 8.1 Accessibility Factor – Measures Summary

ID	Measure Name	Weight	Measure Description	Measure Objective
A.1	Access to Jobs	60%	Change in average job accessibility per person within 45 minutes (within 60 minutes for transit projects)	Measure assesses the average change in access to employment opportunities in the region as a result of project implementation based on the GIS accessibility tool.
A.2	Access to Jobs for Disadvantaged Populations	20%	Change in average jobs accessibility per person for disadvantaged populations within 45 minutes (within 60 minutes for transit projects)	Measure assesses the average change in access to employment opportunities in the region as a result of project implementation based on the GIS accessibility tool.
A.3	Access to Multimodal Choices	20%	Assessment of the project support for connections between modes, and promotion of multiple transportation choices	Measure assigns more points for projects that enhance interconnections among modes, provide accessible and reliable transportation for all users, encourage travel demand management, and potential to support incident management.

Measures Approach

A.1 Access to Jobs

Definition: The GIS accessibility tool analyzes the existing average accessibility to jobs within 45 minutes per person at the individual U.S. Census block group level statewide. For transit projects, accessibility will be calculated to jobs within 60 minutes. The tool calculates the average accessibility to jobs by mode (auto and transit). The jobs are weighted based on a travel time decay function, where jobs within a shorter travel time are weighted more than jobs farther away. The decay function was developed based on travel survey data. The average accessibility represents the total number of jobs reachable in a 45 minute travel time from each block group to every other block group.

The tool calculates the improvement in number of jobs reachable within that travel shed resulting from a proposed transportation improvement. Therefore, the average number of jobs reachable represents the total jobs accessible from each block group to every other block group, weighted by the population in each block group. The actual metric relevant for SMART SCALE prioritization purposes is the increase in average job accessibility resulting from a proposed project. Travel

times are based on congested roadway travel times, real transit operating schedules, and an assessment of pedestrian network connectivity.

As part of the estimation of change in project corridor person hours of delay (Measure C.2), an estimate of the project build congested speed is developed. The project build congested speed is entered into the underlying congested network within the accessibility tool, and the difference between the build and no build congested speeds is used to calculate the change in cumulative accessibility by block group for auto.

Data Source(s)

- Accessibility tool.
- Change in project corridor congested speed, transit operations, and pedestrian system connectivity (as it relates to last mile connections to transit service).

Methodology

The accessibility tool reports an average accessibility to jobs by mode for each Census block group (for auto, or Census block for transit) in region. The analysis of project benefits considers how an improvement in travel time expands accessibility to jobs at the block group or block level (without consideration of regional or State boundaries). By default, 2030 land use forecasts will be used. Applicants may also provide modified land use density assumptions from a locally or regionally approved market study to be used for Build versus No-Build analysis.

Step 1: Update congested roadway speeds, transit network, or pedestrian system connectivity. Based on analysis conducted in the congestion factor for measure C.2, post-project implementation congested speeds are generated and applied to the roadway network underlying the accessibility tool. For transit projects, the project corridor and basic operational information (peak period frequency and travel times) are coded into the transit network (based on General Transit Feed Specification (GTFS) data, which is a common format for public transportation schedules and associated geographic information) underlying the accessibility tool. For the non-motorized mode, the tool reflects improvements in connectivity provided by new sidewalk or path connections or meaningful pedestrian elements that substantially improve quality of service on routes providing access to transit service.

Step 2: Use the accessibility tool to calculate the current (no build) accessibility by mode for a project. The accessibility is the average access to jobs from each block group to every other block group within the project's area of influence.

Step 3: Use the accessibility tool to calculate the build accessibility (using post-project implementation congested speeds and/or changes in transit operations) by mode for a project.

Step 4: Calculate the change in accessibility scores between the build and no build conditions. For each project, an average accessibility improvement is reported

(depending on mode, e.g., for roadway projects the auto mode improvement is reported, for transit projects the transit mode improvement is reported).

Scoring Value

Total change in average jobs accessibility.

A.2 Access to Jobs for Disadvantaged Populations

Definition: The accessibility tool analyzes the existing average accessibility to jobs within 45 minutes at the individual U.S. Census block group level statewide. For transit projects, accessibility will be calculated to jobs within 60 minutes. The tool calculates the average accessibility to jobs by mode (auto and transit). The jobs are weighted based on a travel time decay function, where jobs within a shorter travel time are weighted more than jobs farther away. The decay function was developed based on travel survey data. The average accessibility represents the total number of jobs reachable in a 45 minute travel time from each block group to every other block group[7]. For this measure, the change in average job accessibility is calculated and averaged based on the disadvantaged population in each Census block or block group.

Data Source(s)

- Accessibility tool.
- 2014 U.S. Census American Community Survey 5-year estimates.

Methodology

For the purposes of this analysis, "disadvantaged population" is calculated as low-income, minority, or limited-English proficiency (LEP) population.

All Census blocks and block groups in Virginia were analyzed to determine the populations of low-income minority, or limited English speaking persons (LEP)in each.

The accessibility tool calculates job accessibility averaged by population in each Census block or block group. The calculation of accessibility for disadvantaged population was calculated in exactly the same way as described in A.1 above for general accessibility, except that instead of averaging for population as a whole, the accessibility was averaged for the disadvantaged population in each Census block or block group.

Scoring Value

Total change in average jobs accessibility for disadvantaged populations.

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[7] The area of influence of a project is defined as a 45 mile radius circle around the project (reflecting 45 minutes of travel at 60 miles per hour). Beyond this area of influence, the tool does not calculate job accessibility as it is a distance that is not relevant to the vast majority of trips.

A.3 Access to Multimodal Choices

Definition: This measure considers the degree to which the project can increase access to non-single occupant vehicle travel options. The objective is to recognize projects that enhance connections between modes or create new connections.

Data Source(s)

- GIS data of transit routes or transit service areas, all rail transit stations (from GTFS data as described for accessibility tool).
- DRPT/VDOT GIS data of park-and-ride lots.
- VDOT GIS data of on and off-road bicycle facilities (incomplete dataset at this time).
- Anticipated peak period non-SOV users of travel options with increased access or service.

Methodology

Step 1: The project sponsor provides project level detail on the extent of connections and accommodation of multiple modes as part of the project definition and self-assign points consistent with descriptions in Table 8.2.

Step 2: The project corridor is entered into a GIS database and overlaid with a layer including all multimodal transportation options. The GIS analysis is recommended to inform the validation of sponsor scoring in Table 8.2.

For roadway or multimodal projects this includes: type of bicycle facility, type of pedestrian facilities, connection to park-and-ride locations or inclusion of managed lanes, inclusion of technology supporting traveler information, or wayfinding signage to other modes, and accommodation of on-road transit vehicles.

For transit projects, depending on transit mode, this includes: associated bike and pedestrian facilities, bicycle parking, accommodation of bike on transit vehicles, park-and-ride facilities, traveler information, affiliation or presence of local TDM programs, and transfers with other transit modes.

For bike and pedestrian projects, this includes: class of bicycle facility, type of pedestrian improvements, connections to other on- or off-road bicycle facilities, connections to transit facilities, and affiliation or presence of local TDM programs. A bicycle facility project can include elements in one or more of the following categories:

- On-Street Facilities: Shared use paths, separated bicycle lanes (cycle tracks), buffered bicycle lanes, conventional bicycle lanes, bicycle boulevards (signed routes) and shared roadways.
- Off-Street Facilities: Off-street bicycle facilities are separate from motor-vehicle roadways and include shared use paths or trails. Trails may be adjacent to the roadway or located on an abandoned railroad right of way.

- Equipment: Bicycle facility equipment includes signs, traffic signals, barriers, and bicycle parking. Note: standalone equipment improvements, including bicycle racks as part of an application are not eligible as a bicycle facility.

Freight related accessibility is considered in the economic development factor.

Step 3: SMART SCALE review staff evaluate project scoring and work with project sponsor to adjust scoring as necessary.

Step 4: Total project points are then multiplied (scaled) by the number of peak period non-SOV users.

Scoring Value

Total points reflecting multimodal choices scaled by the number of peak period non-SOV users of the project.

Table 8.2 Access to Multimodal Choices – Scoring Approach

Project Type (Mode) and Characteristics	Points (If Yes)
Project includes transit system improvements or reduces delay on a roadway with scheduled peak service of 1 transit vehicle per hour.	5
Project includes improvements to an existing or proposed park-and-ride lot. Ex. New lot, more spaces, entrance/exit, technology (payment, traveler information).	4
Project includes improvements to existing or new HOV/HOT lanes or ramps to HOV/HOT	2
Project includes construction, enhancement, or replacement of bike facilities. For bicycle projects, off-road or on-road buffered or clearly delineated facilities are required.	1.5
Project includes construction, enhancement, or replacement of pedestrian facilities. For pedestrian projects, sidewalks, pedestrian signals, marked crosswalks, refuge islands, and other treatments are required (as appropriate).	1.5
Project provides real-time traveler information or wayfinding specifically for intermodal connections (access to transit station or park&ride lot).	1
Provides traveler information or is directly linked to an existing TMC network/ITS architecture.	1
Total Points Possible	**5 points maximum**
Measure Scaling: Points are multiplied by the number of new peak period non-SOV users	

9.0 Appendix D: Environmental Quality Measures

Table 9.1 Environmental Quality Factor – Measures Summary

ID	Measure Name	Weight	Measure Description	Measure Objective
E.1	Air Quality and Energy Environmental Effect	100%	Potential of project to improve air quality and reduce greenhouse gas emissions	Measure rates a project's potential benefit to air quality and ability to increase energy efficiency or alternative energy use weighted by the total number of users served.
E.2	Impact to Natural and Cultural Resources	(*)	Potential of project to minimize impact on natural and cultural resources located within project buffer	Measure evaluates how much sensitive land would be affected within project buffer around the project. Points are subtracted from final score based on total potential sensitive acreage impacted.

* Up to 5 points subtracted from final score based on the total potential sensitive acreage impacted

Measures Approach

E.1 Air Quality and Energy Environmental Effect

Definition

The Air Quality and Energy Environmental Effect measure describes the level of benefit that a project is projected to have on air quality and greenhouse gas emissions (or alternative energy use). The objective of this measure is to recognize projects that are expected to contribute to improvements in air quality and reductions in greenhouse gas emissions.

Data Source(s)

- Project sponsor answers defined qualifiers as described below based on project definition.
- Total project corridor passenger throughput (as determined in the congestion factor).

Methodology

Air quality and energy effect is determined by reviewing a project sponsor responses (collected through the project nomination) to the qualifications identified in Table 9.2. The methodology applies to all project types.

Step 1: The project sponsor self-assesses the project based on Table 9.2 (10 point potential maximum). The nomination form includes space for the sponsor to provide clarifications/justifications for the points awarded.

Step 2: SMART SCALE review staff receive each project nomination and reviews the information provided. As appropriate, staff contact project sponsors to address any questions or unexplained scoring.

Table 9.2 Air Quality and Energy Environmental Effect – Scoring Approach

Project Type (Mode) and Characteristics	Points (If Yes)
Non-SOV Project Characteristics	
Project includes improvements to rail transit or passenger rail facilities.*	3
Project includes construction or replacement of bike facilities. For bicycle projects, off-road or on-road buffered or clearly delineated facilities are required.*	2
Project includes construction or replacement of pedestrian facilities. For pedestrian projects, sidewalks, pedestrian signals, marked crosswalks, refuge islands, and other treatments are required (as appropriate).*	2
Project includes improvements to an existing or proposed park-and-ride lot. Ex. New lot, more spaces, entrance/exit, technology (payment, traveler information).*	2
Project includes bus facility improvements or reduces delay on a roadway with scheduled peak service of 1 transit vehicle per hour.*	1
Project include special accommodations for hybrid or electric vehicles, or space or infrastructure for electric vehicle parking/charging).*	0.5
Project includes energy efficient infrastructure or fleets, including: hybrid or electric buses, electronic/open road tolling, alternative energy infrastructure (e.g., roadside solar panels).*	0.5
Total Points Possible	**8.5 points maximum***
Measure Scaling: *Points are multiplied by the number of peak period non-SOV users.	
Freight Transportation Project Characteristics	**Points (If Yes)**
Project reduces traffic delay at a congested intersection, interchange, or other bottleneck with a high percentage of truck traffic (greater than 8 percent of AADT). ***	1
Project includes improvements to freight rail network or intermodal (truck to rail) facilities/ports/terminals.**	0.5
Total Points Possible	**1.5 points maximum****
Measure Scaling: **Points are multiplied by daily truck volumes ** Points awarded for projects with a decrease in person hour delay greater than zero and with truck traffic greater than 8% AADT	

Scoring Value

After SMART SCALE staff review and confirm points assigned in Table 9.2, the maximum total points for each category (non-SOV and trucks) are multiplied by the respective scaling value (non-SOV users and peak period truck volume).

E.2 Impact to Natural and Cultural Resources

Definition: This measure considers the potential of a project to minimize the impact on natural and cultural resources located within the project buffer.

Data Source(s)

GIS layers for each of four categories. For cultural resources, associated non-spatial data ("Property Evaluation Status" or "Site Evaluation Status") will be used to determine eligibility for listing in the National Register of Historic Places. For threatened and endangered species, species status will be referenced to appropriately filter the spatial data and is limited to state endangered, state threatened, federal endangered, federal threatened.

Methodology

The potential of the project to minimize impact on natural and cultural resources is conducted by considering the existing acres of sensitive areas and resources located within a ¼ mile buffer around the project, as well as the type of environmental document (EIS, EA, CE) expected to be required for the project. The final E.2 (Natural and Cultural Resource Impact) score for the project will be based on the total acres affected within the project buffer (initial score) and the weighted points derived from other factor areas. The resulting value is then renormalized to calculate the final score and weighting is applied. Measure E.2 is unique among evaluation measures because the score is subtractive.

Step 1: Using a ¼ mile buffer around each project, total the acreage of land in four categories – 1) Conservation Land, 2) Species/Habitat, 3) Cultural Resources, and 4) Wetlands. The specific GIS layers used in each category are as follows:

Conservation Lands

- Virginia Outdoor Foundation Protected Easements
- Virginia Department of Conservation and Recreation 6F properties
- Virginia Department of Conservation and Recreation Conservation Lands
- Virginia Department of Forestry Agricultural/Forest Districts
- Virginia Department of Historic Resources Protected Easements

Species/Habitat

- Virginia Department of Game and Inland Fisheries Threatened and Endangered Species
- Virginia Center for Conservation Biology (Eagles)

Cultural Resources

- National Park Service, American Battlefield Protection Program Potential

National Register (POTNR) Areas

- Virginia Department of Historic Resources Architecture layer: properties listed in, or determined eligible for listing in the National Register of Historic Places ("Evaluation Status")
- Virginia Department of Historic Resources Archeology layer: sites listed in, or determined eligible for listing in the National Register of Historic Places

Cultural Resources

- U.S. Fish and Wildlife Service National Wetlands Inventory

Step 2: Determine the level of environmental documentation required for the federal action. This information will be used to assess and scale the potential natural resource impacts. If not already determined by the appropriate federal agency with the action, VDOT/DRPT environmental staff will determine the anticipated level of environmental documentation required for the project using the best available information. Concurrence by the federal agency is required prior to initiation of environmental documentation. The amount of potentially impacted acreage that will be counted towards the score is different based on the type of environmental document required:

- *Environmental Impact Statement (EIS)* – 50% of acreage used for scoring
- *Environmental Assessment (EA)* –30% of acreage used for scoring
- *Categorical Exclusion (CE)* – 10% of acreage used for scoring
- *Programmatic Categorical Exclusion (PCE)* – 0% of acreage used for scoring

This process of scaling acres based on the type of environmental document is illustrated in Table 9.3 below.

If the sum of potentially impacted acres across all categories exceeds the total number of impact buffer acres (i.e. there are areas with multiple overlapping categories), the final measure is capped at the total size of the impact buffer in acres.

Table 9.3 Example of Potentially Impacted Acres by Type of Environmental Document

Project	Conservation	Species/ Habitat	Cultural Resources	Wetlands	Total Acres	Environmental Document Scale	Total Acres Scaled by Environmental Document	Impact Buffer Acres	Final Total Acres
A	100	25	25	150	300	EA (30%)	90	500	90
B	100	25	25	150	300	EIS (50%)	150	500	150
C	20	0	0	5	25	CE (10%)	2.5	500	2.5
D	200	400	200	400	1200	EIS (50%)	600	500	500

Scoring Value

Whereas all the other measures are added together based upon typology weighting, the E.2 measure is applied to that sum as a subtractive measure.

Across typologies, all factor weights sum to 100% for a theoretical maximum benefit score of 100. For a project with no impacts to natural and cultural resources, zero points are subtracted; thus a theoretical maximum score of 100 is maintained. Non-zero E.2 measures are normalized by dividing by the highest E.2 measure (ie. the greatest impact to natural and cultural resources) then scaled by 5 points. These derived points, ranging from 0 to 5, are then subtracted from the sum of all other measures' weighted scores. This measure can cause a project with a non-zero score to earn a total adjusted score of zero. No project will receive a negative total benefit score.

Table 9.4 Example of Potentially Impacted Acres by Impact to Natural and Cultural Resources

Sum of All Other Weighted Measures	Impact to Natural and Cultural Resources	Normalized E.2 Measure	E.2 Points (Subtractive)	Total Benefit Score
60	Highest	100	-5.0	55.0
25	Moderate	40	-2.0	23.0
4	High	70	-3.5	0.5
3	Low	10	-0.5	2.5

10.0 Appendix E: Economic Development Measures

Table 10.1 Economic Development Factor – Measures Summary

ID	Measure Name	Weight	Measure Description	Measure Objective
ED.1	Project Support for Economic Development	60%	Project consistency with regional and local economic development plans and policies and support for local development activity	The intent of this measure is to assess if the project is supporting future economic development and the progress made toward development in the project corridor at the local level. Progress will be assessed through use of a checklist of desired actions.
ED.2	Intermodal Access and Efficiency	20%	Rate projects based on the extent to which the project is deemed to enhance access to critical intermodal locations, interregional freight movement, and/or freight intensive industries.	The intent of this measure is to assess the: Level to which the project enhances access to distribution centers, intermodal facilities, manufacturing industries or other freight intensive industries; Level to which the project supports enhanced efficiency on a primary truck freight route (or high volume/ high value truck or rail freight corridor); Level to which the project enhances access or reduces congestion at or adjacent to VA ports/ airports.
ED.3	Travel Time Reliability	20%	Improvement in travel time reliability attributed to the project	The intent of this measure is to determine the project's expected impact on improving reliability which supports efforts to retain businesses and increase economic activity.

Measures Approach

ED.1 Project Support for Economic Development

Definition: Assessment of project based on input provided by the applicant regarding the project's potential to directly support economic development and the readiness of the economic development sites affected. Progress will be assessed through use of a checklist of desired actions that examine the impact of the project on economic development sites and the progress that has been made to advance the economic development sites.

Data Sources: Economic Development site description and supporting information provided by the project sponsor.

Methodology: The focus of this measure is on support of real, planned non-residential development/redevelopment (residential-only developments are not eligible) within the project corridor (what is included in the project corridor is clarified in steps below). Residential development as part of a mixed-use development that includes a non-residential component is eligible. To qualify as mixed-use development, a site or parcel must be designated in the locality's current zoning map or future land use map as mixed-use zoning or future land use, which allows for a range of land uses (residential, commercial, cultural, institutional, and/or industrial) in a single development project. To qualify as redevelopment, a site or parcel must be in a measurable state of decline, disinvestment, abandonment, or a site cleared of the previous building(s). Redevelopment sites must rebuild or restore to non-residential or mixed-use and must include either a conceptual site plan, detailed site plan, or a building permit.

Project assessment is based on points received based on characteristics of both the transportation project and development sites located within a project buffer, as shown in Table 10.2 below. Validation (based on documents provided by applicant) of the existence of the project and site status in the checklist is included as part of the project nomination. The transportation project is awarded scaling points for each development site within a project buffer. The total scaling points are multiplied by the proposed or projected square footage of each development site to reflect the magnitude of the development supported by the transportation project. The maximum amount of development that can be considered for the purpose of scaling the ED.1 measure is set at 10 million square feet. An applicant may submit additional sites (square footage) above this cap; however, additional documentation consisting of tenant agreements, major economic development announcements from the state (Governor or Economic Development Partnership), and/or mega-site certification by a third party will be required for all sites that are zoned only or have conceptual site plans related to the project.

Figure 10.1 below illustrates the overall process to calculate ED.1 measure value.

Figure 10.1 Flow Chart for Project Support for Economic Development Measure Value

Step 1: Determine ED Site Eligibility - Distance from Transportation Project (Refer to Table 10.2)

- Tier 1 Transportation Project Type: 0.5-mile buffer
- Tier 2 Transportation Project Type: 1-mile buffer
- Tier 3 Transportation Project Type: 3-mile buffer

Step 2: Calculate Site Scaling Points (Refer to Table 10.3)

Select one – Site Plan Type (maximum of 3 scaling points):

- Detailed Site Plan Approved: 3 points
- Detailed Site Plan Submitted: 1 point
- Conceptual Site Plan Approved: 0.5 points
- Conceptual Site Plan Submitted: 0.25 points
- Zoned Only: 0 points

Select one – Site Characteristics (maximum of 1 scaling point)

- Redevelopment of existing site: 1 point
- VEDP Tier 5 Site: 1 point
- VEDP Tier 4 Site: 0.5 points
- VEDP Tier 3 Site: 0.25 points

(Maximum 4 total scaling points can be applied in Step 2)

Step 3: Calculate Transportation Project Scaling Points (Refer to Table 10.4)

- Proposed Transportation Project Included in Local Plans: 0.5 point
- Degree of economic distress: up to 0.5 point

(Maximum 1 scaling point can be applied in Step 3)

Step 4: Calculate Total Site Scaling Points

- Add ED Site Points (Step 2) and Transportation Project Points (Step 3)
  (Total Maximum of 5 scaling points per ED site)

Step 5: Calculate Site Adjusted Building Square Footage (Refer to Table 10.5)

- Identify ED Site Building Square Footage (up to a maximum of 10 million square feet)
- Adjust for Access Provision: 100%(multiply by 1) or 50% (multiply by 0.5)
- Adjust for Distance: Divide by distance to transportation project if greater than 1 mile

Step 6: Calculate Adjusted Site Score and Final Measure Value

- ED Site Scaling Points X Adjusted Square Footage = Adjusted Site Value
- Sum of each Adjusted Site Square Footage = ED.1 Measure Value

Site Eligibility by Transportation Project Type

To determine if a site is eligible for consideration in the ED.1 measure value, the proposed or potential development has to be within a buffer distance from the transportation project. The project type has an assigned a tier value, which defines the buffer area for eligibility. The site eligibility determination is defined in Table 10.2.

Table 10.2 Site Eligibility by Transportation Project Tier

Transportation Project Tier by Feature Type Selected	Distance from Transportation Project to be an Eligible ED Site
Tier 1 Add/Construct Bike Lane, Bike/Pedestrian Other, Construct or Convert Existing General Purpose or Parking Lane to Bus-only Lane, Construct or Improve Bus Stop / Shelter, Construct Shared-Use Path, Construct Sidewalk, Highway Other, Improve Bike/Pedestrian Crossing (At Grade), Improve Bike/Pedestrian Crossing (Grade Separated), Improve Park and Ride Lot, Improve Rail Crossing, Improve/replace existing bridge(s), Increase Existing Route Service – Additional Vehicles or Increased Frequency, ITS Improvement(s) / Adaptive Signal Control, New Intersection, New Park and Ride Lot, New Route/Service, New Traffic Signal, New/Expanded Vanpool or On-Demand Transit Service, Other Transit Technology Improvements, Rail Transit Other, Ramp Improvement(s), Right-of-Way/Easements acquisition required, Road Diet, Roadway Reconstruction/Realignment, Shoulder Improvement(s), TDM Other, Traffic Signal Modification, Turn Lane Improvement(s), Widen Existing Lane(s) (No New Lanes)	Up to 0.5 mile buffer
Tier 2 Access Management, Constuct/Expand Bus Facility, Innovative Intersection(s) / Roundabout(s), Intercity Passenger Rail Service Improvements, Intersection Improvement(s), Managed Lane(s) (HOV/HOT/Shoulder), New Interchange-Non-Limited Access Facility, Rail Service Improvements	Up to 1.0 mile buffer
Tier 3 Add New Through Lanes(s), Freight Rail improvements, Improve Grade-Separated Interchange, New Bridge, New Interchange-Limited Access Facility, New Intercity Passenger Rail Station or Station Improvements, New Station or Station Improvements, Roadway on New Alignment	Up to 3.0 mile buffer

Economic Development Site Scaling Points Criteria

Development site plan status scaling points are assigned in **Table 10.3**. Use the definitions below to determine the type and status of the site plan.

- Detailed Site Plan: Construction documents, engineering/architectural drawings and specifications that includes construction requirements for a site. These plans are detailed enough for construction and include details regarding building pad locations, grading, drainage, utilities, parking and entrances. Note that an applicant can only take credit for a site as long as the Certificate of Occupancy has not been issued prior to the final Smart Scale submission deadline.
- Conceptual Site Plan: A conceptual sketch, or preliminary plan, as part of a rezoning application that must include the following details: (1) The

location, area and density or floor area ratio (FAR) of each type of proposed land use within the development. (2) A delineation of developable land to exclude wetlands and terrain that will not be developed. (3) The location of any proposed roadway facility on site within the development's boundaries and the connectivity of the network addition as proposed. (4) The location of stub outs on adjoining property and the existing land use of such adjacent property, if applicable, and the location of any proposed stub outs within the network addition, if applicable.

- Approved: Site plans that have been reviewed and given documentation of support from a local jurisdiction and/or VDOT, if applicable. Official approval documentation from the approving authority must be uploaded with the application.
- Submitted: Site plans that are currently under review by a locality and/or VDOT, if applicable, for construction, rezoning or special use permits. Documentation of submitted site plans to the approving authority must be uploaded with the application.
- Zoned Only: Development project lacks an approved or submitted conceptual or detailed site plan but is consistent with local comprehensive plan's future land use or zoning map, and/or zoning code/ordinance. Zoned only sites must have primary access to the project or be directly adjacent to the proposed transportation project in order to be eligible. For the purposes of SMART SCALE, zoned only sites will be capped at an assumed Floor Area Ratio (FAR) of 0.3 unless the applicant can provide documentation as part of the project application that the average FAR for sites around the proposed project exceeds 0.3 or that local ordinances or zoning has established a minimum FAR greater than 0.3.

Site characteristic scaling points are defined below in Table 10.3. Use the definitions below to determine the type and status of the site plan.

- Redevelopment of Existing Site: Existing buildings on the site with a total building footprint of at least 10% of the site area that will be demolished or rehabilitated for non-residential or mixed-use development. Note that to gain points for redevelopment status a site must have Conceptual or Detailed site plan approved.
- VEDP Location: The site is listed by the Virginia Economic Development Partnership's (VEDP) Business Ready Sites Program (VBRSP) as a Tier 5 "shovel ready", Tier 4 "infrastructure ready" site, or Tier 3 "Zoned industrial/commercial, due diligence complete". Note that VEDP site location is independent of plan approvals, so VEDP site location status is allocated points in addition to the level of plan approvals.

Table 10.3 Site Scaling Points

Scaling Point Description	Points Value
Development Site Plan Status (Max of 3 scaling points)	Detailed site plan approved: 3
	Detailed site plan submitted: 1
	Conceptual site plan approved: 0.5
	Conceptual site plan submitted: 0.25
	Zoned Only: 0
Site Characteristics (Max of 1 scaling point)	Redevelopment of existing site: 1
	VEDP Tier 5 Site: 1
	VEDP Tier 4 Site: 0.5
	VEDP Tier 3 Site: 0.25
	Subtotal of Economic Development Site Scaling Points (max 4 points that can be applied)
Development building square footage up to a maximum of 10 million square feet (does not include residential-only property) within a specified buffer distance from the project and adjusted by factors will be multiplied by the above points to calculate the final project measure value. Zoned only sites must have primary access to the project or be directly adjacent to the proposed transportation project in order to be eligible.	

Transportation Project Scaling Points Criteria

Transportation project scaling points are applied based on the proposed transportation project, and then points are distributed to each eligible economic development site in the application.

Referenced in Local Plans: To determine whether a project is consistent with local plans, first identify the local Comprehensive Plan, local Economic Development Strategy or Regional Economic Development Strategy for the geographic area in which the transportation project is proposed. Second, review the goals, objectives and strategies noted in the document(s) to determine if the proposed transportation project is specifically cited in the document(s) as a key project desired to support local/regional economic development. If the proposed transportation project is specifically mentioned as a key project in at least one of the local Comprehensive Plan, local Economic Development Strategy or Regional Economic Development Strategy documents, the project is considered "referenced in," and is awarded 0.5 points.

Economic Distress: To determine the relative economic distress of a project location, consult the Economic Innovation Group's latest Distressed Communities Index by ZIP Code (ZIP Codes refer to US Census Bureau ZIP Code Tabulation Areas). Find the ZIP Code or Codes in which the transportation project is located. Use the highest distress score (maximum value of 100) and divide by 200. If the transportation project is located in a ZIP Code that does not have a distress score (Zip Codes with populations under 500 do not have a value calculated), then use the highest value adjacent ZIP Code and divide by 200.

Table 10.4 Transportation Project Scaling Points

Scaling Point Description	Points Value
Transportation project referenced in local Comprehensive Plan, local Economic Development Strategy or Regional Economic Development Strategy	Referenced in: 0.5 points
Transportation project area economic distress score	Up to: 0.5 points
Subtotal of Transportation Project Points (max 1 point that can be applied – these points are applied to each eligible economic development site included in the project application)	
NOTE: Zoned only sites must have primary access to the project or be directly adjacent to the proposed transportation project in order to be eligible.	

Scaling points are multiplied by the proposed or potential development building square footage (does not include residential-only property) near the project, based on the project buffer and access/distance adjustments, which are defined below in Table 10.5.

Table 10.5 Adjustments for Access and Distance

Access Provision Adjustment	
Transportation Project provides new direct access to the site or improves existing access to the site (site must be physically adjacent to the project). In case of capacity enhancement to limited access facility, new or improved interchange, transit rail capacity improvement, or new transit rail station, zoned properties* within 0.5 miles of the adjacent interchange(s) or rail station(s) qualify as receiving improved direct access.	100% of building sq. footage
Transportation Project enhances economic development by improving congestion, mobility, access, or operations in the vicinity of the site, but the site is not physically adjacent to the project	50% of building sq. footage
Distance Adjustment**	
Economic development site is within 1 mile of the proposed transportation project.	100% of building sq. footage
Economic development site is greater than 1 mile from proposed transportation project.	Divide building sq. footage by distance in miles

* Zoned only sites must have primary access to the project or be directly adjacent to the proposed transportation project in order to be eligible.

** distance is measured via the travel distance on the transportation network

The following hypothetical case study for a proposed interchange improvement project shows the sequence for scoring a transportation project's ED.1 measure value.

Step 1: Determine Site Eligibility by Transportation Project Type - Interchanges are classified as Tier 3 Projects, allowing economic development sites within 3 miles of the project to be considered for scoring.

Step 2: Calculate Site Scaling Points - There are three economic development sites within the 3-mile buffer of the proposed interchange Site A, Site B, and Site C.

- Site A has a detailed site plan approved (+3 points), is a VEDP Tier 4 site (+0.5 points) *Site A receives 3.5 total Economic Development Site scaling Points.*
- Site B has a conceptual site plan approved (+0.5 points), and has qualifying redevelopment (+1 points). *Site B receives 1.5 total Economic Development Site Scaling Points.*
- Site C is a zoned only site (+0 points), and is a VEDP Tier 3 Site (+0.25 points). *Site C receives 0.25 total Economic Development Site Scaling Points.*

Step 3: Calculate Transportation Project Scaling Points - A proposed interchange project is referenced as a key economic development project in the local Comprehensive Plan (+0.5 point). The ZIP code containing the proposed

interchange project has an identified Economic Distress Score of 50 (+0.25 points). *Total Transportation Project Scaling Points are 0.75. – there are 3 ED sites, therefore 0.75 scaling points will be applied individually to Site A, Site B, and Site C.*

Step 4: Calculate Total Site Scaling Points

- Site A total scaling points = 3.5 (economic development site scaling points) +0.75 (transportation project scaling points) = 4.25
- Site B total scaling points = 1.5 (economic development site scaling points) + 0.75 (transportation project scaling points) = 2.25
- Site C total scaling points = 0.25 (economic development site scaling points) + 0.75 (transportation project scaling points) = 1.0

Step 5: Apply Adjustments for Access and Distance - Adjust the building square footage for each site multiplying by 1 if directly accessed by the proposed transportation project or by 0.5 if indirectly accessed.

Then, adjust again by dividing by the distance in miles between the transportation project and development site for any distance greater than one mile. Example shown below in Table 10.6.

Table 10.6 Example Calculating Building Square Footage

Site	Building Sq. Ft.	Project provides direct access (Yes = 1, No = 0.5)	Adjusted Sq. Ft.	Distance to transportation project (divide by miles if greater than 1 mile)	Final Adjusted Sq. Ft.
A	250,000	1	250,000	0.2 miles	250,000
B	250,000	0.5	125,000	2.5 miles	50,000
C	150,000	1	150,000	1.5 miles	100,000

Step 6: Multiply the final adjusted square footage for each site by the Total Project Site Scaling Points. Total the scores for each site to determine the final ED.1 measure value. Example shown below in Table 10.7

Table 10.7 Support for Economic Development Final Measure Value

Site	Final Adjusted Square Footage	Total Site Scaling Points	Adjusted Site Value
A	250,000	4.25	1,062,500
B	50,000	2.25	112,500
C	100,000	1.0	100,000
			1,275,000

The proposed example project has an ED.1 measure value of 1,275,000.

ED.2 Intermodal Access and Efficiency

Definition: Measure rates each project based on the extent to which the project is deemed to enhance access to critical intermodal locations and/or freight intensive industries and supports increased efficiency for freight movement in congested corridors.

Data Sources:

- Project description and supporting information provided by project sponsor
- Project description, if applicable, in the Virginia Multimodal Freight Study (2014)
- STAA Truck Routes and Restrictions[8]
- SMART SCALE Congestion Scoring outputs

Methodology

Project descriptions will be reviewed and assessed based on the extent to which the project is deemed to enhance access to critical intermodal locations and/or freight intensive industries and supports increased efficiency for freight movement in congested corridors.

Points are assigned through a qualitative assessment of the project description and supplementary information submitted by the project sponsor. Flexibility is provided in the project nomination for sponsors to describe the manner in which the project is expected to enhance access to critical intermodal locations, interregional freight movement, and/or freight intensive industries and supports increased efficiency for freight movement in congested corridors. The project rating is based on the extent to which the project is deemed to enhance access to critical intermodal locations, freight networks, and/or freight intensive industries and supports increased efficiency for freight movement in congested corridors. The Congestion Scoring process will identify roadway improvements that are likely to provide an operational benefit to freight movement.

[8] http://gis.vdot.virginia.gov/vatruckweb/VaTruckRestrictions.aspx

This comparison supports a determination of the level of economic enhancement on a 0 to 6 scale as summarized in Table 10.8.

Table 10.8 Intermodal Access and Efficiency – Scoring Approach

Rating Description	Value
1. Level to which the project enhances access to existing or planned distribution centers, intermodal transfer facilities (excluding ports and airports), manufacturing industries or other freight intensive industries	
Project provides direct access (within 1 mile) to existing or planned locations	2
Project provides indirect access (greater than 1 mile, less than 3 miles) to existing or planned locations	1
No direct or indirect access	0
2. Level which the project supports enhanced efficiency on a primary truck freight route	
Project is on the designated STAA National and Virginia Network or a STAA Virginia Access Route[9]	2
Project directly connects to designated STAA National and Virginia Network or a STAA Virginia Access Routes	1
Project is not on and does not connect to the designated STAA National and Virginia Network	0
3. Level to which the project enhances access or reduces congestion at or adjacent to Virginia ports or airports	
Project provides direct access to (within 1 mile) existing or planned ports or airports (measured from designated entry gates to port or air cargo facilities)	2
Project provides indirect access to (greater than 1 mile, less than 3 miles) existing or planned ports or airports (measured from designated entry gates to port or air cargo facilities)	1
No direct or indirect access	0
Total (sum of score)	**0 – 6**

Scoring Value

Total points received based on the assessment in Table 10.8 are multiplied (scaled) by total freight tonnage within the project corridor and by the total length of the proposed roadway project contributing to the operational benefit to freight movement. Depending on the project type, the definition of total freight tonnage within the project corridor will vary. For example, for an interchange project or extension of acceleration/deceleration lanes at an interchange, estimates of freight tonnage on the ramps (instead of the mainline) will be used to scale the points received as described in Table 10.8.

[9] http://gis.vdot.virginia.gov/vatruckweb/VaTruckRestrictions.aspx.

ED.3 Travel Time Reliability

Definition: Change in travel time reliability attributed to the project.

Data Source(s)

- Latest five complete years of crashes from VDOT Roadway Network System (RNS) GIS data maintained by Traffic Engineering Division.
- Buffer index (BI) from University of Maryland Regional Integrated Transportation Information System (RITIS).
- Weather information from VDOT VA Traffic database.
- AASHTO *Highway Safety Manual* (HSM), 2010.

Methodology

The methodology to compute travel time reliability for a project is a quantitative, corridor-based analysis with two components: impact and frequency. Impact is defined as the ability of a project to reduce the impact of the four contributors for unreliable travel time:

- Highway incidents
- Weather events
- Work zones
- Capacity bottlenecks

Since other SMART SCALE measures account for the impacts of work zones and capacity bottlenecks, only the impacts of highway incidents and weather events will be accounted for in the computation of travel time reliability.

Frequency is defined as the likelihood of unanticipated delays due to highway incidents and weather events. Estimates of frequency are based on segment data for incidents and weather.

For each project, VDOT will compile information to compute five factors to be used in evaluating the reliability of the proposed project:

- BI
- Incident impact
- Incident frequency
- Weather impact
- Weather frequency

The BI is defined as the extra time travelers should add to average travel times to ensure on-time arrival. This index is expressed as a percentage of the average time. A BI of 0.20 means that a travelers needs to increase their time cushion by an extra 20% from the average travel time. This index value is computed by dividing the difference between the 95th percentile travel time and mean travel time by the

mean travel time for a segment. For long corridors, the index is averaged using a weighted factor based on VMT.

The BI which comes from the RITIS data does not provide statewide coverage. In the first round of SMART SCALE scoring, in cases where data does not exist, the method utilized buffer indices from other nearby facilities. This approach leads to questionable results on low volume roadways. Moving forward, if BI data does not exist within the project corridor, the approach is to assume there is no reliability issue and BI = 0 - therefore the score will be 0.

The methodology to compute travel time reliability for roadway projects is defined in the following steps:

Step 1: Determine the impact of incidents on the network. The effectiveness of the project to reduce the impact of incidents within the project study area will be based on the type of project. Table 10.9 present the impact values of both roadway and transit projects. Project types that are most effective at reducing the impacts of incidents will receive the highest scores as identified in the following scoring criteria:

2: Projects directly improving incident frequency and duration (e.g., interchange improvements, truck run-away ramps, queue warning)

1: Projects improving incident management response (e.g., traveler information systems, location signs, reversible lanes)

0: No impact

While most projects provide one benefit in incident reduction per the project type listed in Table 10.9, there are complex projects that provide more than one benefit. For those projects, the total score of the impact of incidents is found by adding the maximum value of one benefit (i.e., 1 or 2) to 10% of the value of the remaining benefits. For example, if a project adds a travel lane and a truck runaway ramp, its score is 2 (travel lane) + 10%x 2 (truck runaway ramp) = 2.2

Step 2: Determine the frequency of crashes using historical crash data. VDOT will compile the latest 5 years of crashes within the project limits. An annual average Equivalent Property Damage Only (EPDO) value is obtained through data from the VDOT Roadway Network System and the ratio of cost for crashes by severity published by FHWA and AASHTO since the EPDO value is used as a measure to quantify the incident duration and the impact to travel time reliability, the weight for Fatal crashes is adjusted from 540 to 120 to better reflect the incident duration as opposed to the societal cost as applied in the EPDO calculation for the safety measures. EPDO will be used as a surrogate measure to determine the frequency and duration of incidents, since more severe crashes will typically cause a longer traffic disruption. The EPDO equates injury and fatal crashes to property damage only crashes, thus reflecting the severity. Project types that are most effective at reducing the frequency and severity of incidents will receive the highest scores as identified in the following scoring criteria:

5: EPDO greater than 300

4: EPDO between 200 and 300

3: EPDO between 125 and 200

2: EPDO between 75 and 125

1: EPDO between 25 and 75

0: EPDO less than 25

Step 3: Determine the impact of weather events. The effectiveness of the project to reduce the impact of weather within the project study area will be based on the type of project. Project types that are most effective at reducing the impacts of weather will receive the highest scores as identified in the following scoring criteria:

2: Projects directly mitigate weather impacts by geometric improvements or end-to-end detection or warning systems

1: Projects that contain a component of an end-to-end detection or warning system or mitigate the event (e.g., improved detour routes, expanded transit operations)

0: No impact

While most projects provide one benefit in mitigating weather events per the project type listed in Table 10.9, there are complex projects that provide more than one benefit. For those projects, the total score of the impact of weather events is found by adding the maximum value of one benefit (i.e., 1 or 2) to 10% of the value of the remaining benefits. For example, if a project adds a bridge heating system and a reversible lane, its score is 2 (bridge heating system) + 10%x 1 (reversible lane) = 2.1

Step 4: Determine the frequency of weather events using historical weather data. VDOT will compile 3 years historical weather data within the project limits. The magnitude of weather events will be determined from historical data and scores will be assigned according to the following criteria:

2: More than 40 hours of combined moderate/severe snow events and flood events per year

1: Between 20 and 40 hours of combined moderate/severe snow events and flood events per year

0: Less than 20 hours of combined moderate/severe snow events and flood events per year

Step 5: Compute the BI of the roadway. The Regional Integrated Travel Information System (RITIS), offered through VDOT's participation with the I-95 Corridor Coalition provides a tool to calculate the BI. The RITIS system can provide the BI for all interstates and most primary routes. Where BI data is not available it can be assumed that the BI is zero if no congestion or reliability issues are observed.

Step 6: Compute the travel time reliability measure. To compute travel time reliability, add the product of the incident impact (from Step 1) and the incident frequency (from Step 2) to the product of the weather impact (from Step 3) and the weather frequency (from Step 4), then multiply this result by the BI (from Step 5).

The methodology to determine travel time reliability for transit and TDM (including park and ride lots) projects uses this defined process as they are included as project impacts in Table 10.9. Bicycle/pedestrian projects are not applicable.

Scoring Value

The travel time reliability measure estimated in Step 6 above is multiplied by corridor VMT to scale the scoring results.

Table 10.9 Incident, Weather and Work Zone Impact Scoring

Major Project Type	Sub Project Type	Incidents Impact	Weather Impact
Median Design	Emergency crossovers, Controlled/Gated turnaround	2	1
	Moveable traffic barriers	0	1
	Movable cable median barrier	1	1
	High median barriers	1	0
	Traversable medians	1	0
	Accessible/widen shoulder to 10 feet	2	1
Shoulder Design	Drivable shoulder to 11-12 feet	2	1
	Hard shoulder running/Dynamic shoulders	2	1
	Emergency pull-offs/Turnouts, Crash investigation sites	2	0
	Bus turnouts	0	0
Ramps Design and Use	Ramp widening (All lanes)	2	1
	Ramp closure (time of day)	1	1
	Off-ramp terminal traffic control	2	0
	Ramp turn restrictions (time of day)	0	0
Truck Incident Design	Runaway truck ramps	2	0
Travel Lanes Design	Add travel lanes	2	1
	Interchange modifications – ramps	2	1
	Intersection modifications – turning lanes	2	1
Animal-Vehicle Collision	Wildlife fencing over/underpass	1	0
Lane Types and Use	Contra-flow lanes – (no-notice evacuation will be scored w/ weather)	0	2
	Adding HOV lanes / HOT lanes	2	1
	Dual facilities (bypass lanes)	2	1
	Reversible lanes	1	1

Major Project Type	Sub Project Type	Incidents Impact	Weather Impact
	Lane reconfigurations to improve capacity or improve safety (static change, i.e., lane stripes)	1	0
Traffic Signals	Emergency vehicle traffic signal improvements	2	0
	Signal timing systems	1	0
Active Traffic Mgmt	Dynamic ramp metering / flow signals	1	1
	Variable speed limit / reduction	2	2
	Connected Vehicle System integration	2	2
	Over-height vehicle detection system	2	0
	Truck roll over warning	2	0
	Queue warning	2	0
	Integrated Corridor Management (alt routes/modes)	1	1
	Dynamic lane merging	1	0
Tolling	Converting to all electronic tolling	1	0
Weather	Fog detection warning system	0	2
	RWIS	0	2
	Flood warning systems / Wind warning systems	0	2
	Bridge heating systems / Anti-icing	0	2
	Drainage improvements	0	2
Incident Management	Incident clearance – pre staged incident response, incentive based towing, emergency relocation programs	2	0
	Safety Service Patrol	2	1
	Improvements to detour routes	2	1
	Reference location signs	1	0
	Incident detection / CAD integration	2	0
Transportation Demand Management	Park and Ride Lots	0	0
	Traveler Information/ Travel Time Information: DDMS	1	1
Transit	Additional trains on existing rail lines	0	1
	New rail lines	0	1
	New rail station / intermodal connection	0	1
	Transit AVL – Traveler Information	0	0
	Shorter headway	0	0
	New bus route	0	1
	Larger bus capacity	0	0
	Additional bus stops	0	0

11.0 Appendix F: Land Use Coordination Measure

Table 11.1 Land Use Factor – Measure Summary

ID	Measure Name	Weight	Measure Description	Measure Objective
L.1	Future transportation efficient land use	50%	Evaluates the amount of population and employment located in areas with high non-work accessibility	To determine the degree to which the project supports population and employment that on averages has a reduced impact on the transportation network
L.2	Increase in Transportation Efficient Land Use	50%	Evaluates the increase in amount of population and employment located in areas with high non-work accessibility between present day and the horizon year of 2030	To determine the degree to which the project supports population and employment that on averages has a reduced impact on the transportation network

Measures Approach

L.1 Future Transportation Efficient Land Use

Definition: The measure reports a project's support for transportation efficiency based on the amount and pattern of future development. The measure is based on (1) the amount of population and employment in 2030 and (2) the non-work accessibility, or the number of key non-work destinations that are accessible within a reasonable walking distance. Research and analysis has demonstrated that areas with a high level of non-work accessibility result in less vehicle miles traveled per household than in areas with less non-work accessibility with reductions of as much as 66% per household.

Data Sources

- Accessibility tool
- Change in local pedestrian network and network conditions
- Horizon year, 2030, population and employment

Methodology

The accessibility tool reports access to non-work destinations by walking as a composite value at the individual U.S. Census block level. The analysis considers how well local land uses around the project support access to a variety of destinations within a reasonable walking distance. Current non-work destinations considering the impact of the project will be used. Proposed changes to transportation networks are included in the analysis; those that improve walking access to destinations will improve scores while any that impede walking access will reduce scores.

A composite value of local access to non-work destinations was established by analyzing existing patterns throughout Virginia. This value, described in Table 11.2, assigns points for different types of non-work destinations accessible by walking, based on the maximum expected number of occurrences for each destination type statewide. Similar to the access to jobs analysis, destinations are evaluated using a decay curve where destinations within a shorter travel time are weighted more than destinations farther away. The decay function was developed based on travel survey data. Every location in Virginia earns a value between 0 and 100.

Table 11.2 Local Non-Work Access Value

Destination Type	Definition (specific destinations included)	Points per destination
Bank	Bank, ATM	0.74 (up to 15 occurrences)
Education	School	5.6 (up to 2 occurrences)
Entertainment	Cinema, Performing Arts, Museum, Nightlife, Sports Complex, Convention/Exhibition Center, Sports Center, Animal Park	5.6 (up to 2 occurrences)
Food & Drink	Restaurants, Coffee Shop, Winery, Bar or Pub	0.25 (up to 45 occurrences)
Grocery	Grocery	3.7 (up to 3 occurrences)
Healthcare	Hospital, Medical Service, Pharmacy	3.7 (up to 3 occurrences)
Public Services	Library, Post Office, Community Center, City Hall, Court House, Police Station	3.7 (up to 3 occurrences)
Recreation	Golf Course, Ice Skating Rink, Campground, Park/Recreation Area	3.7 (up to 3 occurrences)
Shopping	Shopping, Convenience Store, Clothing Store, Department Store, Specialty Store, Home Improvement & Hardware Store, Office Supply & Service Store, Bookstore, Home Specialty Store, Sporting Goods Store, Consumer Electronic Store	0.34 (up to 33 occurrences)
Total points		**100**

Step 1: Update transportation networks in the accessibility tool to reflect new or changed links that the proposed project will provide. The tool imposes impedances on certain walking conditions automatically. Measure development involves scanning the project area carefully using aerial imagery for links that are legally walkable but that average people would avoid, such as crossings of unsignalized freeway ramps, or narrow bridges with narrow shoulders and no

pedestrian accommodations; any of these links within a 1-mile buffer of the project are removed.

Step 2: Use the accessibility tool, with a destination-decay rate for walking mode, to calculate post-project non-work accessibility to the weighted destinations in Table 11.2 for each Census block in a 3-mile buffer of the project.

Step 3: Obtain horizon-year population and employment for all Census blocks in the 3-mile study area. For each block, calculate the sum to obtain the future job-population.

Scoring Value

L.1 – Non-Work Accessibility x Future Density

The post-project non-work accessibility value for each block is multiplied by the future job-population density of each block, and these values are averaged

L.1 Measure = Average for all blocks of [Future Job-Population Density x Post-Project Non-Work Accessibility Value]

L.2 Increase in Transportation Efficient Land Use

Definition: This measure uses the same inputs as the L.1 measure but it evaluates the increase in the amount of population and employment located in areas with high non-work accessibility. The measure is based on (1) the change in the amount of population and employment between today and the horizon year of 2030 and (2) the non-work accessibility, or the number of key non-work destinations that are accessible within a reasonable walking distance.

Data Sources

- Accessibility tool
- Change in local pedestrian network and network conditions
- Current year and horizon year, 2030, population and employment

Methodology

The accessibility tool reports access to non-work destinations by walking as a composite value at the individual U.S. Census block level. The analysis considers how well local land uses around the project support access to a variety of destinations within a reasonable walking distance. Current non-work destinations considering the impact of the project will be used. Proposed changes to transportation networks are included in the analysis; those that improve walking access to destinations will improve scores while any that impede walking access will reduce scores.

A composite value of local access to non-work destinations was established by analyzing existing patterns throughout Virginia. This value, described in the previous section in Table 11.2, assigns points for different types of non-work

destinations accessible by walking, based on the maximum expected number of occurrences for each destination type statewide.

Step 1: Update transportation networks in the accessibility tool to reflect new or changed links that the proposed project will provide. The tool imposes impedances on certain walking conditions automatically. Measure development involves scanning the project area carefully using aerial imagery for links that are legally walkable but that average people would avoid, such as crossings of unsignalized freeway ramps, or narrow bridges with narrow shoulders and no pedestrian accommodations; any of these links within a 1-mile buffer of the project are removed.

Step 2: Use the accessibility tool, with a destination-decay rate for walking mode, to calculate post-project non-work accessibility to the weighted destinations in Table 11.2 for each Census block in a 3-mile buffer of the project.

Step 3: Calculate the difference between the existing and horizon-year job-population (the sum of population and employment for all Census blocks in the 3-mile study area. For each block, calculate the sum to obtain the future job-population.

Scoring Value

L.2 - Non-Work Accessibility – Change in Density

The post-project non-work accessibility value is multiplied by the expected change in job-population density of each block, and these values are averaged

L.2 Measure = Average of all blocks of [(Future Job-Population Density – Existing Job-Population Density) x Post-Project Accessibility Value]

12.0 Appendix G: List of Acronyms

AADT	Annual average daily traffic
BOS	Board of Supervisors
BI	Buffer Index used in calculation of reliability measure
BPR	Bureau of Public Roads
CAP-X	FHWA Capacity Analysis for Planning of Junctions analysis tool
CE	Categorical Exclusion (NEPA)
CN	Construction phase for schedule and cost estimates
CMAQ	Congestion Mitigation and Air Quality Improvement Program
CoSS	Corridors of Statewide Significance
CTB	Commonwealth Transportation Board
DRPT	Virginia Department of Rail and Public Transportation
DGP	District Grant Program
EPDO	Equivalent Property Damage Only, crash value defined by FHWA
FAMPO	Fredericksburg Area MPO
FAST	Fixing America's Surface Transportation Act, federal transportation bill
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact (NEPA)
FTA	Federal Transit Administration
GIS	Geographic Information Systems
HCS	Highway Capacity Software
HPPP	High-Priority Projects Program
HRTPO	Hampton Roads TPO
HSIP	Highway Safety Improvement Program
HSM	AASHTO Highway Safety Manual
IJR	Interchange Justification Request
IMR	Interchange Modification Report

MAP-21	"Moving Ahead for Progress in the 21st Century" Act, federal transportation bill
MPO	Metropolitan Planning Organization
NEPA	National Environmental Policy Act process
NTD	National Transit Database
NVTA	Northern Virginia Transportation Authority
OIPI	Office of Intermodal Planning and Investment
PDC	Planning District Commission
PE	Preliminary Engineering phase for schedule and cost estimates
QA/QC	Quality Assurance/Quality Control
RITIS	University of Maryland Regional Integrated Transportation Information System
RN	Regional Networks
RNS	VDOT Roadway Network System
ROD	Record of Decision (NEPA)
RRTPO	Richmond Regional TPO
RVTPO	Roanoke Valley TPO
RW	Right-of-Way phase for schedule and cost estimates
SGR	State of Good Repair Program
SPR	State Planning and Research funding
STBG	Surface Transportation Block Grant Program
STIP	State Transportation Improvement Program
SYIP	Six-Year Improvement Program
TA	Transportation Alternatives Set-Aside funds
TIP	Transportation Improvement Program
TMS	VDOT Traffic Monitoring System
TPB	National Capital Region Transportation Planning Board
UDA	Urban Development Areas
VACO	Virginia Association of Counties
VDOT	Virginia Department of Transportation
VHT	Vehicle Hours of Travel
VML	Virginia Municipal League

VMTP	Virginia Multimodal Transportation Plan
VTA	Virginia Transit Association