

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: Context Sensitive Solutions (CSS)	NUMBER: IIM-LD-235.5
SPECIFIC SUBJECT: Performance Based Practical Design (PBPD) and Context Sensitive Solutions to Transportation Challenges	DATE: September 29, 2023
	SUPERSEDES: IIM-LD-235.4
APPROVED:	Emmett Heltzel, P.E. State Location and Design Engineer Approved September 29, 2023

Changes are shaded.

CURRENT REVISION

- Revised Common Sense Engineering to Performance Based Practical Design (PBPD) to be aligned with IIM-LD-255.
- Updated web links throughout document; removed link to CEDAR
- Revised AASHTO “Geometric Design of Very Low-Volume Local Roads (ADT < 400)” to “Guidelines for Geometric Design of Low-Volume Roads”

EFFECTIVE DATE

- This memorandum is effective upon receipt. Please include this memorandum with other policy memorandums from Location and Design, Structure and Bridge, Environmental, Maintenance, Transportation and Mobility Planning, Right of Way, and Local Assistance Divisions. The instructions herein have been discussed with the noted Divisions and are to be considered as their instructional memorandum.

PURPOSE

- The policies and procedures addressed in this memorandum are intended to clarify, and emphasize, VDOT's commitment to project and program development processes that provide flexibility, innovative design, and Context Sensitive Solutions (CSS) to transportation challenges. These processes have been structured and orientated to include stakeholders and citizens in the design of transportation systems that improve public mobility, while reflecting the community's values, preserve the scenic, aesthetic, historic and environmental resources, without compromising safety.
- This policy is intended to be a guide to reinforce and extend existing Departmental processes to produce quality transportation projects and systems that serve well-defined purposes and needs, fit physically and visually within the natural, social and cultural environment and meet the needs of users, neighboring communities, and the environment. Departmental staff is reminded to consider that motorists, pedestrians, cyclists, and public transit vehicles jointly use transportation systems for commuting, distribution of goods, providing essential services, and for recreational purposes. The CSS approach seeks a realistic and practical balance between more traditional transportation objectives, such as mobility and safety, and preservation of scenic, aesthetic, historic, and environmental resources, and other community values and needs.
- Project development is to follow PBPD applications outlined in the VDOT Project Management Manual on the Preliminary Engineering Project Development Process. See "Project Scope" at:
http://www.virginiadot.org/business/resources/LocDes/Project_Scope_PMO.pdf
CSS is to be initiated no later than the Project Scoping stage.

POLICY

- CSS is a project development approach that promotes the involvement of all relevant stakeholders in the development of a transportation facility that fits its physical setting and reflects concerns for scenic, aesthetic, historic, and environmental resources while providing for transportation safety and mobility. Key characteristics in the application of the principles of CSS include:
 - open, honest, early, and continuous communication with all stakeholders
 - a multidisciplinary project development team including the public stakeholders
 - a consensus on clearly defined project purpose, need and scope before proceeding to detailed development
 - a project development process tailored to meet project specific circumstances
 - a commitment to process from top agency officials and local leaders

- a public involvement process tailored to project specifics
 - an understanding of geography, community, and valued resources before planning and engineering design is started
 - a full range of communication tools used to clearly visualize the project.
 - a commitment to fully examine all modes of travel and intermodal solutions.
 - a balance of safety, mobility, community, and environmental goals.
- This policy emphasizes the importance of recognizing VDOT's commitment to PBPD and the flexibility within established standards, especially AASHTO's Policy on Geometric Design of Highways and Streets (Green Book), discussed in more detail on page 9 of this memorandum. While practicable and innovative approaches to using the flexibility inherent in existing standards is encouraged by this policy, individual project development decisions on specific applications of flexibility ultimately rest with the professional engineer in responsible charge, working with the project manager and the project team.

These decisions are made after carefully processing input from all project stakeholders as well as the project team and evaluating this input with respect to project goals as well as safety and mobility concerns.

VDOT'S ONGOING COMMITMENT TO CSS

- Specialized training on context sensitive issues and solutions is an ongoing practice for VDOT's technical staff, including FHWA sponsored CSS training. As specific needs are identified, additional training will be programmed.
- VDOT is committed to encouraging interactive public involvement early in the project development process, beginning in the Project Scoping stage. Some examples of VDOT's commitment to public involvement and CSS are as follows:

- **PUBLIC INVOLVEMENT**

Public Participation in Virginia's Transportation Planning and Programming Process

This guide provides direction on the numerous opportunities for public stakeholders to offer input and participation in the planning and programming processes prior to the beginning of roadway design (i.e., Small Urban Area Transportation Studies, Corridor/Feasibility Studies, Metropolitan Planning Organization Plans, Statewide Transportation Improvement Program, Transportation Improvement Program, County Secondary Roads Six-Year Plans, Transportation Enhancement Program). This guide is available Under the "Public participation process" link at:

<https://www.virginiadot.org/programs/default.asp>

Policy Manual for Public Participation in Transportation Projects

This manual provides guidance on methods of soliciting citizen participation in locating and designing transportation improvements prior to design approval through community-based planning sessions, transportation program meetings, establishment of project priorities, citizen information meetings, public hearings, etc. This manual is available at:

http://www.vdot.virginia.gov/business/resources/LocDes/Public_Involvement_Manual.pdf

- **PLANNING**

Virginia's Statewide Transportation Plan

Virginia's Statewide Transportation Plan represents Virginia's commitment to uniting all modes of transportation (highways, bike and pedestrian facilities, rail and public transportation, ports, and aviation) into a coordinated planning effort spearheaded by Virginia's Secretary of Transportation. Updated every five years, VTRANS sets forth transportation policies, strategies, and programs to guide the future of Virginia's transportation agencies (VDOT, Department of Rail and Public Transportation, Virginia Department of Aviation and Virginia Port Authority). This is a mandated initiative with opportunities for local participation.

The VTRANS public involvement process includes stakeholder and citizen meetings, special interest group meetings, surveys, etc. All future transportation improvements involve stakeholders in the development of the Statewide Transportation Plan, the State Highway Plan, corridor, and feasibility studies. VTRANS examines ways to decrease transportation demands and/or divert the demand for highway transportation to other modes. VTRANS is available at: <https://www.vtrans.org/>

Policy for Integrating Bicycle and Pedestrian Accommodations

This policy provides the framework for accommodating bicyclists and pedestrians in the planning, funding, design, construction, operation and maintenance of Virginia's multimodal transportation system. This information is available at:

<https://www.virginiadot.org/programs/bikeped/default.asp>

- **ENVIRONMENTAL PROGRAMS**

Environmental Review Process (ERP)

This process is a proactive initiative involving 13 state agencies who "pre-screen" project corridors for potential environmental impacts, before detailed preliminary engineering efforts are made.

Virginia's Environmental Review Process (ERP) partners with federal agencies to provide early development strategies for environmentally sensitive projects. This initiative involves VDOT, FHWA, Corps of Engineers, U.S. Fish and Wildlife Services, and the Environmental Protection Agency.

The Comprehensive Environmental Data and Reporting System (CEDAR) tracks and documents environmental tasks and commitments, including environmental compliance reporting. Contact the VDOT Project Manager for more information.

- **PBPD PROJECT DESIGN AND DEVELOPMENT**

Project Development Process

VDOT's Project Development Process includes involvement of a multidisciplinary team that may include representatives from local government and citizen groups.

This process begins early in the development of the project and continues throughout, allowing PBPD flexibility in tailoring objectives and activities to the needs of the project. Project Scoping encourages meaningful ways for establishing public involvement prior to public hearing milestones. Project Development Guidelines include tools for the project manager to use that identify project team members, meeting activities, responsibilities, and deliverables for the five major project milestones:

- (1) Project Scoping
- (2) Preliminary Field Inspection
- (3) Public Hearing
- (4) Field Inspection
- (5) Pre-Advertisement Conference

This process is available at: <http://www.virginiadot.org/projects/concureng-default.asp>.

Stakeholder Project Policy Steering Teams

Stakeholder Project Policy Steering Teams (including technical representatives) may be established to develop details of project development on high-profile, complex, and potentially controversial projects where extensive public involvement is essential. Requests to establish these teams, as well as the details of their composition, responsibilities, assignment durations, and reporting requirements, will be made by the District Engineers/Administrators to the Chief Engineer. The Chief Engineer will approve these requests at his discretion. He may also direct District Engineers/Administrators to establish such teams without District requests, or recommendations to do so, if in his judgment the project would benefit from such additional involvement.

Project Management Program

The Virginia Department of Transportation has defined and developed its project management methodology for developing and delivering transportation projects. This methodology includes a policy document and applicable procedures that outline the guidelines for project managers to follow in development and delivery of transportation projects https://www.virginiadot.org/business/locdes/project_management_office.asp

Pave-in-Place Legislation

In effect since July 1, 1997, this legislation (Va. Code 33.2-332) allows non-hard surface roads with 50 to 750 vehicles per day, upon request by resolution from the local Board of Supervisors under certain conditions, to be paved within existing right of way. VDOT's RRR Guidelines or AASHTO's "Guidelines for Geometric Design of Low-Volume Roads" are the most applicable design guidelines for Pave-in-Place projects. The VDOT Commissioner grants or denies requests for Pave-in-Place projects based on:

- (1) safety
- (2) views of residents and property owners
- (3) views of governing body
- (4) historic and aesthetic significance
- (5) availability of right of way
- (6) environmental considerations

Rural Rustic Roads Program

An expansion of the Pave-in-Place Legislation (Va. Code 33.2-332), this legislation permits governing bodies, in consultation with the Department, to designate a road as a Rural Rustic Road when (1) located in low-density development area with an ADT no more than 1,500 vehicles per day and (2) the posted speed limit shall not exceed 35 mph. The Legislation also indicates that the Rural Rustic Road concept should be considered as the priority for eligible facilities. Improvements on Rural Rustic Roads include paved surface width based on reduced and flexible standards that leave trees, vegetation, side slopes and open drainage abutting the roadway undisturbed to the maximum extent possible without compromising safety. Engineering designs, prepared by a professional engineer in a position of responsible charge, are based on AASHTO "Guidelines for Geometric Design of Low-Volume Roads," This program is available at:

[http://www.virginiadot.org/business/local-assistance-programs.asp#Rural Rustic](http://www.virginiadot.org/business/local-assistance-programs.asp#Rural%20Rustic).

Scenic Byways Program

Roadways that have been designated as a "Virginia Byway" (Va. Code 33.2-405) should be designed in accordance with the recommendations published in the Virginia Research Council's publication "Developing Design Elements for Scenic Byways in Virginia." Virginia's scenic byways typically bypass major roads, or provide opportunity to leave high-speed routes, for variety and leisure in motoring. Scenic

Byways link, or provides access to, significant scenic, scientific, historic or recreational points. These roads are typically low-speed, low-volume and on alternative routes between or to points of interest. VDOT's RRR Standards or AASHTO's "Guidelines for Geometric Design of Low-Volume Roads," are the most applicable design guidelines to consider for Scenic Byways. However, other design guidelines may need to be considered based on traffic conditions to facilitate the movement of traffic and the safety of the traveling public. This program is available at:

<http://www.virginiadot.org/business/local-assistance-programs.asp#Scenic>.

Transportation Alternatives Program (TAP)

The Transportation Alternatives Program is the first Federal initiative to focus on enhancing the travel experience and fostering the quality of life in American communities. This program fosters more choices for travel by providing funding for sidewalks, bike lanes, and the conversion of abandoned railroad corridors into trails. Communities may also use the program to revitalize local and regional economies by restoring eligible historic buildings, renovating streetscapes, or providing transportation museums and visitor centers. Many communities also use the program to acquire, restore and preserve scenic or historic sites. This program is available at:

<http://www.virginiadot.org/business/prehancegrants.asp> .

- **MAINTENANCE**

VDOT's Roadside Management Program (Maintenance Division) has the objective of preserving, or enhancing, the compatibility of Virginia's highway system with the environment. Initiatives include Outdoor Advertising, Historical Markers, Junkyards, Adopt-a-Highway Program, Arboriculture, Landscaping, Wildflowers, and Turf Management. Maintenance Best Practices programs and initiatives are accessible:

https://www.virginiadot.org/business/maintenance_division.asp

VDOT PLANNING AND DESIGN CRITERIA

- VDOT's PBPD engineering process recognizes the importance of flexibility within established standards. The goal of PBPD is to produce effective projects that optimize system wide transportation improvements using appropriate design flexibility that provides for essential improvements. PBPD requires the use of sound engineering judgment to assess all possible solutions while evaluating design tradeoffs, and mitigating risks to the extent practical, to achieve the most return for the least cost. The ultimate decision on the application of flexibility rests with the professional engineer in responsible charge, after processing input from all the project's stakeholders and the project team. The CSS approach can be considered for use with any of the following VDOT design criteria:

Geometric Design Standards

Application of the criteria in VDOT's Geometric Design Standards should be in conjunction with sound engineering judgment and cross-referenced to applicable

AASHTO's publications, including A Policy on Geometric Design of Highways and Streets and the Roadside Design Guide.

RRR Guidelines

Resurfacing, Restoration and Rehabilitation (RRR) Guidelines, provide for the extension of the service life of an existing highway by using minimal cost effective improvements. Non-freeway RRR projects include providing additional pavement strength, restoring, or improving the existing geometric cross section, decreasing noise characteristics, improving the rideability of the roadway, improving bridges, and enhancing safety. These guidelines are published in Appendix A4 of VDOT's Road Design Manual, available at:

<http://www.virginiadot.org/business/locdes/rdmanual-index.asp>.

Subdivision Streets

The Geometric Design Guidelines for Subdivision Streets are used for streets that are classified as local. These Guidelines are a composite of the Rural Local Road System and the Urban Local Street System. Compliance with these Standards qualifies subdivision streets for submittal to VDOT for consideration for acceptance as a part of Virginia's Secondary Roads System.

The Subdivision Streets Design Guide is available in Appendix B(1) of VDOT's Road Design Manual, available at: <http://www.virginiadot.org/business/locdes/rdmanual-index.asp>.

Traffic Calming

There are various design features that can be used to slow traffic on existing low-speed/low-volume residential streets that provide direct access to residential homes. Examples of some of these techniques include speed humps, chokers, roundabouts (traffic circles), raised crosswalks, raised median islands and crosswalk refuges or chicanes. Some of these features introduce challenges with drainage, noise, emergency vehicles and maintenance costs that must be considered during design. Information on this and other Neighborhood Traffic Programs can be found at:

<https://www.virginiadot.org/programs/is-VDOTCommunityPrograms.asp>

APPLICATION OF VDOT's PBPD DESIGN STANDARDS

- PBPD does not dismiss engineering policies and/or standards. Rather, it aims to increase flexibility to produce efficient and effective designs that include essential improvements while meeting the project purpose, need/scope and budget. VDOT must ensure that every engineering decision and every dollar spent is focused on improving VDOT's overall transportation system.

- The Virginia Department of Transportation maintains its Geometric Design Standards in Appendix A of the Road Design Manual, located on the VDOT web site at: <http://www.virginiadot.org/business/locdes/rdmanual-index.asp>.
- VDOT's Geometric Design Standards were developed using the latest AASHTO publications:
 - A Policy on Geometric Design of Highways and Streets (Green Book),
 - Geometric Design of Very Low-Volume Local Roads (ADT <400),
 - A Policy on Design Standards Interstate System and
 - Roadside Design Guide.
- VDOT's Geometric Design Standards are categorized by roadway Functional Classification Systems that parallel AASHTO and include:
 - Rural Principal Arterial - for main traffic movements
 - Urban Principal Arterial - for main traffic movements
 - Rural Minor Arterial - distributor
 - Urban Minor Arterial Street- distributor
 - Rural Collector - intra-county
 - Urban Collector Street - circulation within residential, commercial and industrial areas
 - Rural Local Road - all rural roads not classified as principal arterial, minor arterial or collector roads
 - Urban Local Street - all urban streets not classified as principal arterial, minor arterial or collector streets
- AASHTO's A Policy on Geometric Design of Highways and Streets (Green Book), although often viewed as dictating a set of national standards, is a series of basic geometric design guidelines that establish the physical features of a roadway.

The Green Book offers a range of values for various criteria that allow sufficient flexibility for designs to be tailored to particular situations. Designers must consider many factors including economic, social, environmental and safety when developing a transportation or highway facility. Designers should always attempt to provide for the highest degree of safety and the best level of service that is economically feasible. Lesser values of design criteria may be used when social, economic, or environmental considerations are present. The use of less than minimal values for design criteria shall be examined and disposed through the design exception process. Design exceptions and design waivers must be fully documented in the project files.

- For more information and instructions on the Design Exception/Design Waiver Process, see VDOT's Location and Design Division Instructional and Informational Memorandum, IIM-LD-227, available at: https://www.virginiadot.org/business/locdes/iim_table_of_contents.asp

CSS PERFORMANCE MEASUREMENT

- Application of CSS principles, individual project performance measurement and CSS related project commitments are tracked and documented by the Project Manager at each project milestone through meeting minutes, official project correspondence, project development review reports, “Project Performance Reports” and through “Lessons Learned” (Quality Assurance) resource materials.
- VDOT’s Project Management Website, one mechanism for monitoring project performance, is only accessible to those within VDOT at: http://isyp/development/dev_search.asp , and VDOTs Project dashboard is available to the public at: <https://www.virginia-dot.org/dashboard/projects.asp>

ADDITIONAL RESOURCES

- The Center for Environmental Excellence by AASHTO (including CSS) is accessible at: <http://environment.transportation.org>
- AASHTO
 - A Guide for Achieving Flexibility in Highway Design, 2004 is accessible at: <https://store.transportation.org/Item/PublicationDetail?ID=103>
- FHWA
 - Flexibility in Highway Design is accessible at: <http://www.fhwa.dot.gov/environment/publications/flexibility/>
 - Context Sensitive Solutions is accessible at: <https://www.fhwa.dot.gov/planning/css/>