MONTGOMERY COUNTY PLANNING DEPARTMENT THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

> MCPB Item No. 2 Date: 01/23/2020

Vision Zero Update and Work Program Discussion

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SUMMARY

Receive briefing and add the Predictive Safety Analysis project to the department's work program for the current fiscal year (FY20).

DESCRIPTION

The purpose of this discussion is to:

- 1) Provide an update on the Planning Department's Vision Zero work plan.
- 2) Provide an overview of the Department's Vision Zero accomplishments in 2019.
- Request approval from the Planning Board to add a Predictive Safety Analysis project to the department's work program for the <u>current</u> fiscal year.

BACKGROUND

Vision Zero is a proven approach to preventing roadway-related deaths and severe injuries. It represents a fundamental change in how we plan and design our roads, shifting from a focus on maximizing motor vehicle efficiency to ensuring that our roads are safe regardless of whether travel is by car, bus, bicycle or foot. Vision Zero recognizes that people will sometimes make mistakes and that our roads should be designed to ensure those inevitable mistakes do not result in severe injuries or fatalities.

Through its 2016 County Council resolution, Montgomery County committed to eliminating traffic fatalities and severe injuries. In 2017, the County Executive released an initial two-year action plan of activities to advance the County toward Vision Zero and substantial progress has been made toward most of these items (see Attachment A). The two items that are in the Planning Department's work program – ENG-2 (Road Design Standards, aka the Complete Streets Design Guide / Roadway Classification Study) and LPA-6 (Pedestrian Master Plan) – are both well underway. A One-Year 2020 Action Plan will be released by the County imminently to bridge activities between the current Two-Year Action Plan and the Ten-Year Action Plan. The County will be developing a Ten-Year Action Plan over the next year.

PLANNING DEPARTMENT'S VISION ZERO WORK PLAN

Vision Zero is a multidisciplinary effort that requires the support of all County agencies to be successful. The Montgomery County Planning Department has an important role to play in Vision Zero and can support Montgomery County's program with community engagement, data analysis, master planning, development review and capital project review, among other things. The Planning Department has prepared a Vision Zero Work Plan describing the tasks that the department can undertake to support the County's Vision Zero program. This work plan includes a description of each task, the justification for the task, the required resources and the anticipated timeline to completion.

Staff will brief the Planning Board on the Planning Department's Vision Zero Work Plan on January 16. A copy of the work plan is included as Attachment B.

RECAP OF THE PLANNING DEPARTMENT'S VISION ZERO ACCOMPLISHMENTS IN 2019

The Planning Department had several Vision Zero accomplishments in 2019. These include hiring the department's first Vision Zero Coordinator, completing the Veirs Mill Corridor Master Plan, MARC Rail Communities Master Plan and Aspen Hill Vision Zero Study, co-leading the development of the Complete Street Design Guide / Roadway Functional Classification Project and the Fire Department Access Performance-Based Design Guide with the Department of Transportation and the Department of Permitting Services, initiating the Pedestrian Master Plan, preparing a Pedestrian Level of Comfort Map and reviewing a number of important regulatory projects.

A summary of the Planning Department's Vision Zero accomplishments in 2019 is included as Attachment C.

PREDICTIVE SAFETY ANALYSIS

One of the changes that many Vision Zero communities undertake is to transition from a safety approach that focuses on locations where high rates of severe injuries or fatalities have already occurred to one that also proactively identifies and treats locations with similar risk characteristics. This approach – what we are calling a Predictive Safety Analysis – seeks to prevent serious injury or fatal crashes from happening throughout the roadway network, including at locations without a recent history of crashes, but where a high risk of future crashes may be suspected based on the roadway characteristics and surrounding context.

Planning Department staff requests approval from the Planning Board to add a Predictive Safety Analysis project to the Department's work program for the current fiscal year (FY20). It is anticipated that this project will take 12 months.

The Planning Department is well-positioned to complete this effort as we have the necessary staffing to manage the project and we have extensive data management and analysis expertise. Staff believes this project is necessary to initiate this fiscal year, as the analysis it provides is critical to guiding the projects and policy changes that will be identified in the County's ten-year action plan, which the County intends to complete by the end of calendar year 2020. The project, which is described in greater detail in Attachment D, will be completed in partnership with the Montgomery County Department of Transportation (MCDOT) and CountyStat, with their staff participating heavily in the development of the project. The Planning Department has recently hired Jesse Cohn as its first Vision Zero Coordinator and one of her primary tasks would be to manage this project. Staff estimates the cost of this project to be approximately \$250,000, based on similar work that was completed by the City of Seattle, Washington.

Staff recommends that we use a combination of existing funds to complete this project.

The Functional Planning and Policy Division has identified \$75,000 in its current FY20 operating budget that can be used toward this project, including 1) \$25,000 for Transportation Modeling for the Pedestrian Master Plan and 2) \$50,000 for Data for Vision Zero.

An additional \$125,000 has been identified through early estimates of FY20 personnel savings, which the Planning Department is requesting to reallocate for the Predictive Safety Analysis project.

The Department believes that the remaining \$50,000 can be identified in additional personnel savings or other budget savings over the remaining six months in FY20.

Another option to fund this project would be to seek a supplemental appropriation for any remaining funding shortfall from the County Council.

Staff has considered asking MCDOT to contribute funding to this project. However, when we have tried this option in the past, we have found the process to be complicated and very time-consuming to transfer funding between departments, relative to the timeline for this project. MCDOT already has committed to be a critical partner in the Predictive Safety Analysis, and that department's capital budget will be a key source of funding to implement recommendations from the study.

MCDOT has provided a letter supporting the addition of the project to the Planning Department's work program, which is included as Attachment E.

SUMMARY OF STAFF RECOMMENDATIONS

Staff recommends:

- Adding the Predictive Safety Analysis to the Planning Department's current work program, with a completion date of January 2021.
- Funding the Predictive Safety Analysis in part by transferring \$125,000 to the project from personnel savings in the Planning Department's FY20 operating budget.

ATTACHMENTS

- Attachment A Progress in Implementing the Vision Zero Two-Year Action Plan
- Attachment B Planning Department Vision Zero Work Plan
- Attachment C Overview of Planning Department's Vision Zero Accomplishments in 2019
- Attachment D Predictive Safety Analysis Work Plan
- Attachment E Letter from the Montgomery County Department of Transportation



Status of Vision Zero action items as of 11/12/2019

Action Item	Due Date	Status	Notes
ENG-1 Identify HINs for Modification	Identify priority HIN projects by 1/31/2018	Complete	Identified High Injury Network. Identified initial list of potential engineering options. Performed 2nd round of reviews of County- maintained portion of the HIN. Have already started some projects such as restriping on Crabbs Branch Way and implementing Pedestrian Road Safety Audit recommendations on Middlebrook Rd and Bel Pre Rd. Met with SHA 7.10.19 to review SHA HIN projects. Some SHA HINs have already received updates, others are in design.
ENG-2 Road Design Standards	Publish revised road designs by 11/1/2019	On Schedule	MCDOT and M-NCPPC are advancing on this action item together under joint funding. MCDOT is also updating its existing lighting, signing, marking, and signals standards. Public feedback has started with one session in spring 2019 and another planned for this winter.
ENG-3 Road Safety Audits	Implement new process by 11/1/2018	Complete	MCDOT added a preconstruction RSA activity to its design process.
ENG-4 Review Transit Stops	Develop program review requirements by 5/1/2018	Complete	MCDOT identified 265 bus stops to be reviewed and potentially modified. MCDOT completed Middlebrook & MD 355 bus stop audits. MCDOT performed two additional bus stop audits in November 2018 for Wheaton CBD and Randolph Road with final recommendations nearly complete.
ENG-5 Trail Crossings	Develop list of priority trail crossings and intersections for modification by 11/1/2018	Complete	Parks is improving 18 mid-block crossings. MCDOT is coordinating with M-NCPPC on crossings for Rock Creek Trail, Diabase Trail, Hoyles Mill Trail, Muddy Branch Greenway Trail, Northwest Branch Trail, Upper Rock Creek Trail, Cabin John Trail, and more. MCDOT has conducted and reviewed speed studies and crossing plans. Parks and MCDOT met in May 2019 to review second round of trail crossing upgrades.



Action Item	Due Date	Status	Notes
ENG-6 Collaboration w State	Identify potential project areas by 1/1/18	Complete	SHA and MCDOT are prioritizing work on MD-97 (Georgia Ave) and MD-586 (Veirs Mill Rd) to develop short- and long-term solutions for pedestrian safety. SHA and MCDOT are jointly investigating and implementing safety improvements along a MD 97 corridor with SHA including curb markings, sidewalk stamps, speed limit reduction, non-traversable median, lighting improvements, signal installations, HAWK signal, RRFB signal, and lane narrowing. SHA Administrator Greg Slater has promised increased focus on pedestrian safety by his agency to include lowering speed limits to 30 MPH or lower in all central business districts and improving pedestrian crossings. Changes by SHA to MD-97 detailed at https://www.roads.maryland.gov/pages/release.aspx?newsld=3350
ENG-7 Ped Signals	All pedestrian signals retimed to 3.5 feet/second by November 2019	Complete	MCDOT reset the crossing time at each of the County's pedestrian signals to a 3.5 ft/sec standard. MCDOT is also installing new pedestrian signals throughout the County, including 6 pedestrian actuated beacons at Muddy Branch Rd & Harmony Hall Rd (complete), Forest Glen Rd & Sligo Creek Pkwy, Aspen Hill Rd & Northgate Shopping Center (complete), Democracy Blvd & Walter Johnson HS, Willard Ave & The Hills Plaza, and Tuckerman Ln at Bethesda Trolley Trail. An additional pedestrian signal at Randolph Road and Livingston Street was turned into a full signal.
ENG-8 Accelerate Sidewalk Building	Publish list of high priority areas lacking sidewalks by 4/1/18	On-going	MCDOT's consultant has begun a sidewalk evaluation throughout the entire County, not just the HIN. All of the top 20 HIN locations have been evaluated. In addition to the gap analysis required in the Two-Year Plan, the study will evaluate ADA ramp provision and other impediments to sidewalk travel. A priority project has been identified and is being designed for construction fall of 2019.



Action Item	Due Date	Status	Notes
ENG-9 Bicycle Network	On-going effort	On-going	Significant additions coming to Silver Spring and Bethesda BiPPAs for separated bicycle facilities. Construction of Second/Wayne Ave Cycletrack was completed in early Oct. County Council approved the updated Bicycle Master Plan on 11/27/18. MCDOT has developed a website, video, and brochure about how to use these new facilities at montgomerycountymd.gov/lookout
ENF-1 Fatal Crash Review Team	Establish team and hold first meeting by 12/15/17	Behind Schedule, In Progress	County staff participated on MHSO's pedestrian fatal crash review team with the Montgomery County meetings on March 28 and May 31. The MHSO reviewed all fatal pedestrian crashes during 2016. For the County team, MCPD and CountyStat have developed meeting framework, team roster, and team goals. Once non- disclosure agreement is finalized by the County Attorney's Office, first session can be held.
ENF-2 Enforcement Activity	On-going effort	On-going	MCPD will be conducting the following fall and winter enforcement campaigns: Street Smart - pedestrian safety (Nov), Seatbelts (Thanksgiving week). Late November through December is the Holiday Task Force against impaired driving.
ENF-3 Automated Enforcement	On-going effort	On-going	Request for Proposals have been sent out for new automated (red- light and speed) enforcement contract. The RFP sets up for the expansion of the program. RFP available at <u>https://www.montgomerycountymd.gov/PRO/Resources/Files/Solic</u> <u>itations/1081683.pdf</u>
ENF-4 Unmarked Cars	Purchase and use more unmarked cars by 12/1/18	Behind Schedule, Not Started	Issuance of unmarked vehicles is a subject of bargaining and must be negotiated with Union prior to implementation.
ENF-5 Collaboration w/ Courts	Complete initial outreach by 5/1/18	On-Going	A public-private education campaign called "Noah on Patrol" was released on May 23, 2018. As part of "Noah on Patrol," a court watch program will monitor impaired driving cases in the county.



Action Item	Due Date	Status	Notes
			The State's Attorney Office will push for ignition interlocks in
			impairment cases.
EDU-1	Publish Strategy by		The Public Information Office completed the 2019 strategy and the
Comprehensive	5/1/18	Complete	Steering Committee has committed resources to the plan. The plan
Strategy			was finalized on October 24, 2018.
EDU-2	Expand SRTS by start of		Walk to School Day events were held on Wednesday, Oct 2.
Expand SRTS	2019-2020 school		http://www.walkbiketoschool.org/
	year		The Safe Routes to School coordinator position was filled in early
		On	Sept 2019.
		Cabadula	The Vision Zero Youth Ambassador Summit was October 21 at
		Schedule	Glenmont Local Park.
			MCDOT tasked two different consultants with additional Safe
			Routes to School Walk Audits in fall 2018. MCDOT and MCPS are
			coordinating together on Safe Routes to School programs.
EDU-3	Agreement with MCPS		MCPS, MC Rec Dept, and MCDOT are coordinating together on
On-bike Education	by 19-20 school year		this action item. A pilot program kicked off in April 2019 at Oak
		On-	View ES in Silver Spring.
		schedule	MCDOT did not win grant funding for a permanent Safety Garden
			to be installed in the County, but will research other funding
			options.
EDU-4	Solicit proposals by	No	Due to budget constraints, the FY20 approved budget does not
Grant Program	6/1/2018	Resources	fund this item.
EDU-5	Complete first round of		Currently developing targeted material for key departments and
County Employee	awareness trainings by	Robind	divisions. Held a focus group of County employees from 9 different
Safety Campaigns	11/1/2018	Schodulo	departments to assess new distracted driving campaign on 4/24
		In Progress	and pop-up events in Wheaton on 5/4 and 7/27 in Rockville.
		in Plogress	Contractor is using feedback to develop next drafts due in
			December.

Action Item	Due Date	Status	Notes
EDU-6 Team Building	Hold at least two collaboration events by 11/1/2018	Behind Schedule, In Progress	MCDOT, MCFRS, MCPD, MCPS, PIO, and CEX staff have partnered in the fall "Be Safe, Be Seen" pedestrian safety outreach campaign. Developing a job shadowing opportunity for police and DOT employees this fall. MCPD will also have officers trained on roadway engineering practices from UMD.
EDU-7 Sleep & Safety	Complete first round of awareness trainings by 11/1/2018	Complete	Drowsy driving messages have been sent to shift work employees as part of their safety meetings.
EDU-8 Future Tech	1st Report by 12/31/2018	Behind Schedule, Not Started	This item will be reevaluated for the 2020 Action Plan. MCDOT and other experts presented to the County Council on September 26, 2017 about the future of autonomous vehicles in Montgomery County. Video of session is at: <u>http://montgomerycountymd.granicus.com/MediaPlayer.php?view</u> <u>id=169&clip_id=13823&meta_id=143448</u>
EDU-9 Community Partners	12/1/2018	On-going	Currently developing targeted material for key departments and divisions. Held a focus group of County employees from 9 different departments to assess new distracted driving campaign on 4/24 and pop-up events in Wheaton on 5/4 and 7/27 in Rockville. Contractor is using feedback to develop next drafts due in December. Currently using materials developed by Public Information Office, MHSO, and NHTSA.
TIM-1 Emergency Services	On-going effort	On-going	FRS has sent a proposed measurement to CountyStat for review and approval.
TIM-2 TIM Plan	Create plan by 11/1/2018	Behind Schedule, In Progress	Contractors working with MCFRS and MCPD to review current practice and compare to national standards have completed their draft and sent to departments for review and comments.
TIM-3 Police Driver Training	Improve driver training by 11/1/2019	On-going	Improving driver training is a strategy for MCPD's Turn the Curve Plan for reducing the number of at-fault vehicle crashes.



Action Item	Due Date	Status	Notes
TIM-4 Temporary Traffic Control Devices	Procure traffic control devices for a pilot program by 11/1/2018	No Resources	Due to budget constraints, the FY20 approved budget does not fund this item.
LPA-1 Law & Policy Change	Identify changes needed by 12/1/2017	Complete	County elected officials, MCDOT, and MCPD have testified in Annapolis to support bills enhancing pedestrian safety, reducing impaired driving, and bringing Vision Zero to the State. Full list available at <u>https://www.montgomerycountymd.gov/OIR/Resources/Files/2019</u> <u>/Accomplishments_2019.pdf</u>
LPA-2 Equity Task Force	Establish task force by 12/31/17	Complete	Five meetings of the task force were held where the task force reviewed the County's engineering, education, and enforcement efforts. Final comments from the task force on the report have been processed with a final version to be release in December. All meeting materials can be found at <u>https://www.montgomerycountymd.gov/visionzero/equity.html</u>
LPA-3 VZ Manager	Appoint interim manager 11/17 with full-time coordinator by 1/31/18	Behind Schedule, In Progress	CountyStat currently provides interim support for Vision Zero coordination. The Request for Proposal (RFP) for a Vision Zero coordinator was released by Procurement on May 16 with a deadline for responses of June 14. Bids received did not score high enough to move forward with a contract. County Executive has approved moving forward with a full-time, merit position for the coordinator. The position description to create the position has been approved by Human Resources and now drafting a job advertisement with a target of having the position filled in February.
LPA-4 VZ Website	Have full page build- out by 11/30/17	Complete	PIO led a revamp of the Vision Zero homepage to provide links to events and partner websites. New homepage was launched on 6/30.
LPA-5 VZ Feedback Map	Publish map by 11/30/17	Complete	App was launched with redesigned website in late September 2018 on the Vision Zero website.



Action Item	Due Date	Status	Notes
LPA-6	Complete master plan		The scope of work for the Pedestrian Master Plan was approved by
Ped Master Plan	by 11/1/2019		the Planning Board in September 2019 with the plan due to be
			completed and approved in summer 2021. Public meetings
		On-Going	sponsored by the Planning Department to kick-off the plan will be
			held in September and October. More at
			https://montgomeryplanning.org/planning/transportation/pedestri
			an-planning/pedestrian-master-plan/
LPA-7	Publish by 11/1/17	Consulato	All 3 tables are published and updating weekly. MCPD added new
Public Crash Data		Complete	fields to existing tables in May 2019 to provide more location data.
LPA-8	Start outreach by		Currently MCPD has implemented training to address proper
Improve Crash Data	11/30/17		report writing within the academy classes as well as to audit
Collection		On-Going	reports for data entry errors. MSP has made some fields within the
			ACRS reports mandatory and some fields mandatory on
			dependencies to help in capturing all the relevant data per event.
LPA-9	Start outreach by	Complete	Montgomery County is a member of the Road to Zero coalition,
Peer Collaboration	12/1/17	and On-	works with the State as participants in Zero Deaths MD
		Going	workgroups, and working with regional vision zero cohort.
LPA-10	Release results by		Reviewed safety programs in conjunction with Equity Task Force
Review Safety	11/1/2018	Complete	work. Task force recommended changes in practice and project
Programs			prioritization that could lead to better resource allocation.
LPA-11	Complete initial		The County is working with Rockville and Takoma Park to discuss
Municipalities	outreach by 1/1/18	Complete	how the County can help build their Vision Zero plans. Continued
			outreach efforts will be conducted by the Vision Zero Coordinator
LPA-12	Reach out to potential		The County does not have funds to pay for research, but is open to
Research Partners	research partners by	On-Going	participating or being a living laboratory for researchers. The
	1/1/18		County will reach out to local partners to gauge interest.
LPA-13	Finalize policy by	Behind	This action item has been moved to 2020. Discussions with PRO
Vehicle Procurement	11/1/2018	Schedule,	and DGS-Fleet Management will start once the Vision Zero
		Not Started	Coordinator position is filled.



Action Item	Due Date	Status	Notes
LPA-14 10-Year Plan	Start feedback sessions in January 2019 , complete by November 2019	Behind Schedule, Not Started	A one-year 2020 Action Plan will be released in December 2019 to bridge activities between the current Two-Year Plan and the Ten- Year Plan. Public outreach for building the long-term plan will start in March 2020.

MONTGOMERY PLANNING VISIONZERO

WORK PLAN

VISION ZERO BACKGROUND

Montgomery County is one of the first counties and suburban communities to commit to Vision Zero. The County's neighborhoods and subdivision patterns are largely auto-centric, characterized by long blocks, wide travel lanes and low-densities. Coupled with a transportation system built to prioritize motor vehicle travel, these land use patterns encourage motorists to drive at high speeds and create a highly disconnected walking and bicycling network.

These suburban features present greater challenges to achieving the objectives of Vision Zero than the grid of walkable streets that define the development pattern of many North American cities that have adopted Vision Zero. Montgomery County's land use patterns and the design of its transportation network were intentional and represent the fulfillment of a vision to segregate land uses and connect distant activity centers by high-speed automobile travel. Achieving Vision Zero will require re-envisioning its existing development patterns and transportation network.

Vision Zero is a multidisciplinary effort that requires the support of all County agencies to be successful. The Montgomery County Planning Department has an important role to play in Vision Zero and can support Montgomery County's program with community engagement, data analysis, master-planning, development review and capital project review, among other things.

WORK PLAN OVERVIEW

To support the successful implementation of Montgomery County's Vision Zero policy, the Montgomery County Planning Department should focus on the following elements:

- Educate residents, community organizations and elected officials.
- Develop collaborative partnerships with local, regional and state agencies, as well as the community, to advance Vision Zero.
- Base recommendations for the Planning Department's work products on robust data analysis that informs changes to County policies and priorities.
- Utilize the master plan process to re-envision our communities, especially our suburban transit corridors and commercial areas, as multimodal complete streets with appropriate land use densities.
- Review and approve regulatory projects with a Vision Zero focus.
- Review capital projects and identify budget priorities that best support Vision Zero.

This work plan includes a list of actions the Planning Department can initiate to support Montgomery County's Vision Zero program, identifies the resources that are needed to complete these tasks and assigns a timeline to each task. The work plan is divided into four sections:

- Building Knowledge and Collaborative Partnerships
- Problem Verification
- Develop Solutions
- Incorporate Solutions into Work Program

BUILDING KNOWLEDGE AND COLLABORATIVE PARTNERSHIPS

The Planning Department engages with the community, appointed and elected officials, and governmental agencies through master plans, regulatory applications, review of capital projects and review of budget priorities. This comprehensive participation provides an opportunity for the Planning Department to educate stakeholders and develop collaborative partnerships to advance Vision Zero. The following list of actions identifies strategies to educate participants, establish a shared understanding of Vision Zero and provide opportunities for collaboration amongst individuals and groups to advance Vision Zero in their communities and throughout Montgomery County.

Develop a Vision Zero Toolkit for Community Organizations

Lead: Vision Zero Coordinator	Support : Communications Team, Transportation Planners

Action: Collaborate with Montgomery County to develop a toolkit for community organizations and community members to build a systematic understanding of Vision Zero and provide resources for advocating on behalf of Vision Zero through participation in master plan development, regulatory review and capital project review / budgeting. Toolkit can be translated into multiple languages and may include:

- Educational letters and flyers.
- Presentation talking points.
- Video that explains Vision Zero in an approachable way.
- Yard signs to build awareness of Vision Zero (with messaging such as "20 is Plenty").
- Residential testimonials.
- Walk audit checklists.

Justification: To ensure that community leaders have the resources they need to develop a Vision Zero constituency and to educate other community members about Vision Zero.

Resources: Communications support

Timeline: Short Term

Engaging Hard-to-Reach Communities				
Lead: Vision Zero Coordinator Support: Communications Team				
Action: Collaborate with Montgomery County to convene hard-to-reach groups to advance understanding of Vision Zero in their communities.				
 Identify opportunities to reach community members in the County's Equity Emphasis Areas and vulnerable populations, such as students. Identify and engage leaders in traditionally bard-to-reach communities 				
Justification : To ensure that all communities are aware of and have the opportunity to participate in Vision Zero.				
Resources: Communications support				
Timeline: Ongoing				

Educate Community Members, Agency Staff and Appointed/Elected Officials		
Lead: Vision Zero Coordinator	Support: Communications Team, Transportation Planners	
Action: Collaborate with Montgomery County to e	ducate community organizations, community	
members, county agencies and appointed and elec	ted officials about Vision Zero and opportunities	
for engagement.		
 Organize and implement a Vision Zero sum interest in Vision Zero. Organize and implement a Citizen's Acader members with a working knowledge of the a central resource for community member Organize demonstration projects, through solutions, improvements or strategies cons Educate county and state employees indire and regulatory review. Educate appointed and elected officials the project review and regulatory approvals. Develop partnerships with other stakehold Share data and analysis developed through as well as the best practices identified in the efforts. Request Civic Associations and Homeowne 	amit for established organizations with a stated my, or program designed to provide community e roles of governmental agencies in Vision Zero and s. placemaking events or tactical urbanism, to exhibit sistent with Vision Zero. ectly through master plans, capital project review rough briefings, master plan development, capital lers, such as the public health community. In the Problem Verification section of this work plan he Develop Solutions section to inform educational ers Associations to designate a Vision Zero liaison.	
Justification: Build a better understanding of Vision Zero.		
Resources: Communications support		
Timeline: Ongoing		

Vision Zero Electronic Newsletter

Support: Communications Team

Action: Develop and maintain a Vision Zero electronic newsletter to:

- Share information related to new and ongoing plans and projects with a Vision Zero focus.
- Provide updates on transportation and planning projects that improve roadway safety.
- Share opportunities for interaction and participation to advance Vision Zero strategies.
- Offer resources for community members to learn about available or newly developed resources to advance Vision Zero.

Justification: To inform community organizations and community members of progress toward Vision Zero in Montgomery County and opportunities for involvement.

Resources: Communications support

Timeline: Ongoing

PROBLEM VERIFICATION

A critical first step to successfully implement Vision Zero is to verify the causes of severe injuries and fatalities on the County's transportation network. The Planning Department maintains extensive datasets and is capable of complex data analysis. These resources can be used to systematically identify roadway characteristics that create safety challenges. Data analysis will help Montgomery Planning to prioritize master plan and regulatory recommendations and to provide comments on the capital budget and capital projects and will help community members in advocating for safer streets.

A preliminary analysis of crashes in Montgomery County indicates that roadway safety is a reflection of land use and the County's high-speed, high-volume roads, which often lack safe facilities for pedestrians, bicyclists and transit users. Countywide, between 2015 and 2019 about 30 percent of severe injury crashes and 50 percent of fatalities involve pedestrians and bicyclists. In rural areas motor vehicle occupants represent over 95 percent of these crashes. In the county's major employment and activity centers (Silver Spring, Bethesda, White Flint, Wheaton, Rockville Town Center and Friendship Heights) pedestrians and bicyclists represent approximately 65 percent of these crashes. Proven strategies in cities that have adopted Vision Zero may be appropriate in our major employment and activity centers, but alternative and innovative approaches are needed in the County's rural and suburban areas.

Develop a Severe and Fatal Crash Dataset

rt: Functional Planning & Policy Division
r

Action: Create and maintain a dataset to conduct crash analysis based on land use and street characteristics.

- Develop systematic procedures for cleaning CountyStat crash data.
- Add variables to enrich analysis, including land use context, roadway functional classification, number of travel lanes (total and through), roadway vehicle volumes, posted speed limit and distance between safe crossings.
- Incorporate racial, income and health data into the database.
- Work with Montgomery County Police Department to clean crash data.
- Identify when and where infrastructure conditions have changed during the period of crash data collection.

Justification: This dataset will enable staff to conduct <u>reactive</u> safety analyses to identify the types of land use and street characteristics that contribute to severe and fatal crashes. It will serve as a building block for a <u>predictive</u> safety analysis.

Resources: CountyStat crash data and existing GIS resources.

Timeline: Ongoing

Develop a Multimodal Volumes Data Collection Plan	
Lead: Vision Zero Coordinator	Support: Functional Planning & Policy Division
Action: Develop a data collection plan to identify locations where pedestrian, bicycle and motor vehicle volume data is needed to develop a model that estimates volumes where they do not currently exist.	
Justification : A data collection plan is needed to identify locations where pedestrian, bicycle and motor vehicle volume data is underrepresented in the department's intersection database.	
Resources: Consultant support, existing pedestrian, bicycle and motor vehicle volume data	
Timeline: Short Term	

Collect Multimodal Counts and Traffic Speed Data		
Lead: Vision Zero Coordinator	Support: Functional Planning & Policy Division	
Action: Collect auto, bicycle and pedestrian volume data at locations identified in the Multimodal Volumes Data Collection Plan.		
Justification : This data will be used to develop a model to estimate pedestrian, bicycle and motor vehicle volumes on every road segment in the County.		
Resources: New pedestrian, bicycle and motor vehicle volume data.		
Timeline: Short Term		

Estimate Pedestrian, Bicycle and Motor Vehicles Volumes Countywide

Lead: Vision Zero Coordinator	Support: Functional Planning & Policy Division
Action : Develop a model to estimate pedestrian, bicycle and motor vehicle volumes where they do not currently exist and to convert these volumes into annual volumes.	
Justification : Measures of exposure such as pedestrian, bicycle and motor vehicle volumes are normalization factors (i.e., the denominator) that equalize for differences in the quantity of potential crash events in different road environments and therefore help to quantify risk.	

Resources: Consultant support, existing pedestrian, bicycle and motor vehicle volume data.

Timeline: Short Term

Create a Database to Store Multimodal Counts and Traffic Speed Data		
Lead: Functional Planning and Policy Division	Support: Information Technology & Innovation	
Action: Modify the existing intersection count application (mcatlas.org/intersections) to include counts at unsignalized and mid-block locations and to include speed data.		
Justification: Successful Vision Zero programs make safety-related data available to the public.		
Resources: Existing GIS resources.		
Timeline: Medium Term		

GIS Layers of Variables that are Hypothesized to be Correlated with Severe and Fatal Crashes

Lead: Vision Zero Coordinator	Support: Functional Planning and Policy Division
Action : Using the Severe and Fatal Crash Dataset, create street segment and crossing GIS layer that identifies variables that are locally hypothesized to be correlated with severe and fatal crashes.	
Justification: This dataset will allow the County to identify variables that are correlated with severe	
and fatal crashes in Montgomery County.	
Resources: Severe and Fatal Crash Dataset	

Timeline: Short Term

Develop Safety Performance Factors	
Lead: Vision Zero Coordinator	Support: Functional Planning and Policy Division
Action : Develop Safety Performance Factors (SPF) for common crash types involving severe and fatal injuries. SPFs are equations used to predict the average number of crashes per year at a location as a function of exposure and roadway characteristics.	
Justification: Data analysis will help Montgomery Planning prioritize master plan and regulatory recommendations and to provide comments on the capital budget and capital projects.	
Volumes Countywide and the GIS Layers of Variables Hypothesized to be Correlated with Severe and Fatal Crashes.	
Timeline: Short Term	

Create a Pedestrian Level of Comfort Map	
Lead: Functional Planning and Policy Division	Support: N/A
Action: Develop a pedestrian level of comfort methodology and code the pedestrian network countywide.	
Justification : Similar to the Bicycle Level of Stress map, this effort will enable sophisticated analysis of connectivity within geographic areas and to public facilities that will support master plan recommendations and help to prioritize pedestrian improvements.	
Resources: University of Maryland Center for Smart Growth Contract	
Timeline: Short Term	

Develop Procedures for Data Collection and Analysis		
Lead: Vision Zero Coordinator	Support: Transportation Planners	
Action: Develop procedures for Vision Zero data collection and analysis for master plans and regulatory review, including:		
Data Collection		
 Data conection Location and time periods of motor vehicle, pedestrian and bicycle counts, including signalized and unsignalized locations and high-volume mid-block crossing locations. Location and time periods of speed studies. Develop a Vision Zero-standard approach to data analysis Crash analysis Conflict analysis Connectivity analyses 		
 Justification: Effective data collection and analysis is needed to understand where safety problems are most severe and to help prioritize Vision Zero recommendations. Through Vision Zero, safety can be achieved by reducing travel speeds and conflicts. Resources: Consultant Support 		
Timeline: Short Term		

DEVELOP SOLUTIONS

Once the safety challenges have been systematically identified through data collection and analysis, staff will identify engineering solutions and policy changes that address the challenges present in Montgomery County's diverse land uses – challenges resulting from the segregation of land uses and prioritization of high-speed vehicular travel over several decades. These solutions will be used to incorporate Vision Zero into the department's work program, including master plan recommendations, regulatory approvals/changes and review of capital projects.

Load: Vision Zoro Coordinator	Support: Transportation Planners, Community
	Planners and Urban Designers

Action: This investigation will look at best practices in suburban counties that have adopted Vision Zero (Macon, Georgia; Alameda, California; and Contra Costa, California) and cities that have suburban areas (New York; Alexandria, Virginia) and will include:

- Best practices to manage suburban arterial speeds.
- Best practices to reduce suburban arterial conflicts.
- Identify context-sensitive design characteristics to reduce vehicular speeds.

Justification: To understand how other jurisdictions approach transportation safety on suburban roads.

Resources: Consultant Support

Timeline: Medium Term

Develop Policies for Street Types and Land Use Context	
Lead: Vision Zero Coordinator	Support: Transportation Planners

Action: Develop policies for different combinations of street typologies and land use context to address the safety challenges identified in the Problem Verification section. Policies will include these areas:

- Access management
- Frequency of safe crossings in urban areas, transit corridors, suburban areas and rural areas
- Locations where unsignalized trails crossings are acceptable

Justification: Bring Montgomery County's policies in line with strategies to reduce severe and fatal crashes.

Resources: Consultant Support

Timeline: Medium Term

Develop Complete Streets Design Guide / Roadway Functional Classification Study			
Lead: M-NCPPC and MCDOT Support: DPS			
Action: This project has two main elements:			
 A Complete Streets Design Guide to design and operate roads to provide safe, accessible and healthy streets for all users of our roadway system in support of the County's Vision Zero policy, and A replacement for Montgomery County's roadway functional classification system that organizes categorizes streets based on how they are used by people and their land use context, rather than the current approach that largely organizes street based on how vehicles use them. 			
Justification: Montgomery County's road design standards are out of date.			
Resources: Consultant Support			
Timeline: Ongoing			

INCORPORATE SOLUTIONS INTO WORK PROGRAM

Using the results of the Develop Solutions section of this work plan, staff will work to incorporate solutions to the identified safety challenges into the Planning Department's work program through master plan recommendations, regulatory approvals/changes and review of capital projects.

Educate Staff on Vision Zero				
Lead: Vision Zero Coordinator Support: Transportation Planners				
Action: Educate staff about Vision Zero:				
 Vision Zero briefing to all staff. O Provide clear and consistent mes roles and responsibilities. Master Planners: 	saging for staff on the importance of Vision Zero,			
 Meet with teams of recently initi 	ated master plans to provide guidance on			
incorporating Vision Zero into their planning effort.				
 Convene a meeting with all mast Zero into master plans 	er plan teams to discuss how to incorporate Vision			
 Incorporate Vision Zero into the 	General Plan.			
Regulatory Planners:				
 Meet with regulatory supervisors to identify opportunities and challenges to incorporating Vision Zero into regulatory review. 				
 Convene a meeting with all regul 	atory reviewers to discuss how to incorporate Vision			
Zero into development review, o	ur authority in code to request Vision Zero			
development review.	ome challenges with incorporating vision zero into			
Justification: Master plan and regulatory staff m	ist understand the principles of Vision Zero to build a			
culture of safety in the Planning Department.				
Resources: Existing Staffing				
Timeline: Short Term				

Continuing Education			
Lead: Vision Zero Coordinator	Support: Transportation Planners,		
	Communications Staff		
Action: Continue education on Vision Zero through	conferences, webinars, etc. for staff to remain		
current on the latest data and solutions as well as the challenges and opportunities associated with			
the integration of Vision Zero into master plans, regulatory review and capital projects.			
Justification: Continuing education allows for an evolution of Vision Zero in our work.			
Resources: Conference and webinar fees			
Timeline: Ongoing			

Incorporate Corridor Master Plans into Department Work Program				
Lead: Area Teams Support: Functional Planning and Policy Divisi				
Action: Based on the analysis conducted in the Problem Verification section, recommend additional master plans to the Planning Department's work program:				
 Potential Corridors High Injury Network: Randolph Road, Georgia Avenue and University Boulevard. Bus Rapid Transit Facility Planning Studies: New Hampshire Ave (FY22 – 24), Old Georgetown Road (FY 24 – 25) Develop procedures with MCDOT on an approach to conducting corridor master plans. 				
Justification : Master-planning provides an effective means of re-envisioning development patterns and the transportation network as multimodal, mixed-use communities.				
Resources: Existing Staffing				
Timeline: Long Term				

Changes to State and Local Policies, Regulations and Laws				
Lead: Vision Zero Coordinator Support: Transportation Planners				
Action: Collaborate with MCDOT to identify changes to state and local regulations that support Vision Zero, including: local authority to reduce speed limits, strengthen access management regulations for development approvals and provide policies that reduce lane widths, target speeds and curb radii outside of urban road code areas.				
Justification: This is an action in Montgomery County's Two-Year Action Plan.				
Resources: Existing Staffing				
Timeline: Medium Term				

Develop a Pedestrian Master Plan				
Lead: Functional Planning and Policy Division Support: Transportation Planners				
Action: Complete a Pedestrian Master Plan for the County to address the unique issues faced by pedestrians and people with disabilities.				
Justification: This is an action in Montgomery County's Two-Year Vision Zero Action Plan.				
Resources: Consultant Support				
Timeline: Ongoing				

	Support: Transportation Planners, Community			
Lead: Vision Zero Coordinator	Planners, Design and Communication Staff			
Action: Based on the analysis conducted in t	the Problem Verification section, incorporate Vision Zero			
into master plans areas through these items	5:			
 Collect pedestrian, bicycle and moto 	or vehicle volume data at signalized and unsignalized			
crossings and mid-block crossings a	nd speed data for specific master plans.			
 Create a more refined evaluation of 	the master plan area:			
 Roadway characteristics conducted in the problem verification section to identify 				
safety issues.				
\circ High-priority areas such as schools, libraries, major transit stations and other public				
facilities for the ability to walk and bicycle comfortably.				
 Develop a master-planning toolkit to address common transportation safety issues. 				
	ffective means of re-envisioning development patterns			
Justification: Master-planning provides an e	B a company of the co			

Timeline: Medium Term

Incorporate Vision Zero into Development Review				
Lead: Vision Zero Coorindator	Support : Transportation Planners, Community Planners and Design Staff			
Action: Incorporate Vision Zero into development review through these items:				
 Educate the development community on V Develop toolkit for regulatory reviewers to 	ision Zero principles. reduce speeds and conflicts by creating a sense of			

- Develop toolkit for regulatory reviewers to reduce speeds and conflicts by creating a sense of enclosure, consolidating access points, creating a finer-grained network of streets and concentrating greater levels of activity, which can result in more frequent, safe crossings and create more activity.
- Establish a Vision Zero finding for regulatory projects.

Justification: Development projects have the ability to improve safety by reducing conflict points and reducing street design speeds.

Resources: Existing Staffing

Timeline: Short Term

Incorporate Vision Zero into the Subdivision Staging Policy					
Lead: Functional Planning and Policy Division Support: Transportation Planners					
Action: Update the Subdivision Staging Policy to reflect an effective transportation safety element:					
 Incorporate safety evaluation and data collection in traffic studies, including travel speed data. Incorporate safety into transportation system performance measures and technical analysis. 					
Justification : The Subdivision Staging Policy currently analyzes motor vehicle mobility but does not evaluate transportation-system safety.					
Resources: Consultant Support					
Timeline: Ongoing					

Capital Project Review					
Lead: Functional Planning and Policy Division Support: Transportation Planners					
Action: Incorporate Vision Zero into recommendations on the capital budget and capital projects:					
 Identify and prioritize transportation safety projects for inclusion in the capital budget based on crash severity, equity, etc. Incorporate a Vision Zero review for mandatory referrals and facility planning studies. 					
Justification : Designing transportation infrastructure to be safe is the primary way to achieve Vision Zero.					
Resources: Existing Staffing					
Timeline: Ongoing					

RESOURCE SUMMARY

This section of the work plan includes an initial summary of the resources that will be needed to accomplish the actions in the work plan, identifies those items that are existing (FY20), proposed (FY21) and potential future (FY22 and beyond) work program items and the level of effort to implement each action (* = relatively easy, *** = relatively difficult).

Action	Section	Resources	Timeline	Applicable Projects and Initiatives	Level of Effort
Develop a Vision Zero Toolkit for Community Organizations	Building Knowledge	Communications Support	Short Term	No	**
Engaging Hard-to- Reach Communities	Building Knowledge	Communications Support	Ongoing	No	***
Educate Community Members, Agency Staff and Appointed/Elected Officials	Building Knowledge	Communications Support	Ongoing	No	***
Vision Zero Electronic Newsletter	Building Knowledge	Communications Support	Ongoing	No	*
Develop a Severe and Fatal Crash Dataset	Problem Verification	CountyStat crash data and existing GIS resources.	Ongoing	No	**
Develop a Multimodal Volumes Data Collection Plan	Problem Verification	Consultant support, existing pedestrian, bicycle and motor vehicle volume data	Short Term	Transportation Modeling for the Pedestrian Master Plan (FY 20)	**
Collect Multimodal Counts and Traffic Speed Data	Problem Verification	New multimodal counts and traffic speed data	Short Term	Data for Vision Zero (FY 20)	*
Estimate Pedestrian, Bicycle and Motor Vehicles Volumes Countywide	Problem Verification	Consultant Support, Existing Pedestrian and Bicycle Counts	Short Term	Request Year End Funds (FY 20)	***
GIS Layers of Variables that are Hypothesized to be Correlated with Severe and Fatal Crashes	Problem Verification	Severe and Fatal Crash Dataset	Short Term	Request Year End Funds (FY 20)	***

Action	Section	Resources	Timeline	Applicable Projects and Initiatives	Level of Effort
Develop Safety Performance Factors	Problem Verification	Severe and Fatal Crash Dataset, Measure of Exposure for Walking and Bicycling, Transportation Network Dataset	Short Term	Request Year End Funds (FY 20)	***
Create a Pedestrian Level of Comfort Map	Problem Verification	Consultant to refine Pedestrian Level of Comfort methodology	Short Term	Pedestrian Connectivity Mapping (FY 20)	***
Develop Procedures for Data Collection and Analysis	Problem Verification	Consultant Support	Short Term	No	*
Develop Complete Streets Design Guide / Roadway Functional Classification Study	Develop Solutions	Consultant Support	Ongoing	Roadway Functional Classification System (FY 19)	***
Educate Staff on Vision Zero	Incorporate Solutions into Work Program	Existing Staffing	Short Term	No	**
Continuing Education	Incorporate Solutions into Work Program	Conference and webinar fees	Ongoing	No	*
Capital Project Review	Incorporate Solutions into Work Program	Existing Staffing	Ongoing	No	*
Incorporate Vision Zero into Development Review	Incorporate Solutions into Work Program	Existing Staffing	Short Term	No	*
Incorporate Vision Zero into the Subdivision Staging Policy	Incorporate Solutions into Work Program	Consultant Support	Ongoing	Policy Area and Local Area Transportation Update (FY 20)	***
Develop a Pedestrian Master Plan	Incorporate Solutions into Work Program	Consultant Support	Ongoing	Pedestrian Master Plan (FY 20)	***
Create a Database to Store Multimodal Counts and Traffic Speed Data	Problem Verification	Existing GIS resources	Medium Term	No	**

Action	Section	Resources	Timeline	Applicable Projects and Initiatives	Level of Effort
Identify Best Practices in Implementing Vision Zero in the Suburbs	Develop Solutions	Consultant Support	Medium Term	No	**
Develop Policies for Street Types and Land Use Context	Develop Solutions	Consultant Support	Medium Term	No	**
Changes to State and Local Policies, Regulations and Laws	Incorporate Solutions into Work Program	Existing Staffing	Medium Term	No	***
Incorporate Vision Zero into Master Plans	Incorporate Solutions into Work Program	Consultant Support	Medium Term	No	*
Incorporate Corridor Master Plans into Department Work Program	Incorporate Solutions into Work Program	Existing Staffing	Long Term	No	*

MONTGOMERY PLANNING VISIONZERO



Attachment C: Recap of Planning Department's Vision Zero Accomplishments in 2019

What is Vision Zero?

Vision Zero is a proven approach to preventing roadway-related deaths and severe injuries. It represents a fundamental change in how we plan and design our roads, shifting from a focus on maximizing motor vehicle efficiency to ensuring that our roads are safe regardless of whether travel is by car, bus, bicycle or foot. Vision Zero recognizes that people will sometimes make mistakes and that our roads should be designed to ensure those inevitable mistakes do not result in severe injuries or fatalities.

Through its 2016 County Council resolution, Montgomery County committed to eliminating traffic fatalities and severe injuries. In 2017, the County Executive released an initial two-year action plan of activities to advance the County toward Vision Zero. Upon completion of the two-year action plan, the County will prepare a ten-year action plan to eliminate traffic fatalities and severe injuries by 2030.



The Planning Department's Role in Vision Zero

Vision Zero is a multidisciplinary effort that requires the support of all County agencies to be successful. The Montgomery County Planning Department has an important role to play in Vision Zero and can support Montgomery County's program with community engagement, stakeholder facilitation, data analysis and a focus on long-term visioning.

- Master Planning: Through master planning, Montgomery Planning engages the community to re-envision our auto-oriented roadways as safe, complete streets for walking, bicycling and driving.
- 2 Development and Capital Projects: The Montgomery County Planning Board helps to implement the safety recommendations in master plans by reviewing proposed development and capital projects.
- 3 Data Analysis: The Planning Department has extensive data collection and analysis resources to identify roadway characteristics that create safety challenges and to propose proven changes to improve safety.
 - Community Support and Engagement: The department provides support for building a Vision Zero constituency.

Learn more at: montgomeryplanning.org/visionzero



Accomplishments in 2019

Planning Department Work Plan

To support the successful implementation of Montgomery County's Vision Zero policy, the Montgomery County Planning Department has developed a work plan that identifies the tasks that the department will be working on to advance Vision Zero. See more at **montgomeryplanning.org/visionzero**.

Hired a Vision Zero Coordinator

The Planning Department has hired its first staff person focusing on Vision Zero, to start work in January 2020. This person will coordinate all Vision Zero activities for the department.

Complete Streets Design Guide

The Planning Department is partnering with the Montgomery County Department of Transportation to develop a Complete Streets Design Guide. A draft guide is nearing completion and a public review will be conducted in early 2020. When complete, the guide will provide policy and design guidance to governmental agencies, consultants, private developers, and community groups on the planning, design, and operation of roadways for all users.

Veirs Mill Corridor Master Plan

In April 2019, the County Council approved the Veirs Mill Corridor Master Plan. This plan recommends short-term strategies to provide continuous walkways and bikeways, improve access to transit and increase connectivity to community facilities and neighborhood uses. In the long-term, the plan recommends the transformation of Veirs Mill Road from a motor vehicle-dominated corridor to a safe, efficient and comfortable complete street that serves all users. To aid this transformation, the plan recommends reduced lane widths, reduced target speeds and additional safe crossing opportunities.

MARC Rail Communities Master Plan

In April 2019, the County Council approved the MARC Rail Communities Master Plan. This plan recommends speed reductions and a road diet along a section of Middlebrook Road, adjacent to Seneca Valley High School.

Aspen Hill Vision Zero Study

In November 2019, the Planning Board approved the Aspen Hill Vision Zero Study. This effort identifies a broad range of solutions—from specific intersection improvements to area-wide policies and strategies—that comprehensively addresses traffic safety in Aspen Hill. Individual traffic safety recommendations are prioritized based on existing safety risks and potential impacts, supported by data collected for the study and from county databases.

Forest Glen / Montgomery Hills Sector Plan

Aligned along a two-mile segment of Georgia Avenue (MD 97) between two central business districts, this plan addresses multimodal safety and access issues that are common among the County's major highways. In cooperation with the State Highway Administration, the plan builds upon the previous master plan's boulevard concept for Georgia Avenue with recommendations to improve pedestrian and bicycle comfort, safety accessibility, and connectivity within the plan area that reflect today's values and modern strategies. Among the first of the County's plans to pilot a pedestrian level of comfort analysis, this plan strives to make significant changes in the walking network based on objective, quantifiable criteria. This plan is currently under review by the County Council.

Pedestrian Master Plan

The Montgomery County Planning Department launched its first Pedestrian Master Plan to improve pedestrian conditions countywide. The plan will identify strategies for making streets safer and more accessible for pedestrians. This project is a recommended activity in the County's Vision Zero Two-Year Action Plan.

Pedestrian Level of Comfort Map Draft

The Planning Department is laying the foundation for the Pedestrian Master Plan by developing a pedestrian network and creating a methodology for assessing how comfortable different areas of the county are for walking. Check out the progress of this map at mcatlas.org/pedplan.

Vision Zero Toolkit

The Montgomery County Planning Department is developing a detailed document for community members to explain Vision Zero concepts and crash mitigation strategies for common crash risks. A draft toolkit is under review by the department.

Fire Department Access Performance-Based Design Guide

The Fire Department Access Performance-Based Design Guide addresses evolving fire department access issues and balances these requirements with the needs of pedestrian and bicycle safety and the protection of natural resources. By identifying safe and sustainable design considerations for fire department access, street intersections, and streetscapes, the design guide streamlines the development review process and will improve the quality of life in Montgomery County. Issued by the Montgomery County Department of Permitting Services, the design guide was produced in collaboration with the Montgomery County Fire and Rescue Service, Montgomery County Department of Transportation, and the Planning Department.

Development Approvals

A number of regulatory approvals will contribute substantially to advancing Vision Zero in the County, including:

- Battery Lane District, Bethesda
- Bethesda Metro Tower, Bethesda
- Cabin John Village, Potomac
- Park Potomac, Potomac
- Poplar Grove, Germantown
- Strathmore Square, Grosvenor
- VOB, White Flint
- Westbard Shopping Center, Westbard







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MEMORANDUM

October 18, 2019

To: David Anspacher Organization: M-NCPPC, Montgomery County Planning From: Frank Proulx PhD, Thomas Hillman AICP, Alia Anderson AICP Project: Montgomery County Safety Performance Function Estimation Methodology

Re: Safety Performance Function Methodology

INTRODUCTION

To advance implementation of its Vision Zero program, Montgomery County is transitioning from a descriptive crash analysis framework to one that integrates predictive analytical methods. With this shift, in addition to focusing safety improvement efforts on locations where high rates of injuries or fatalities have already occurred, the County will also proactively identify and treat locations with similar risk characeristics. This approach seeks to prevent serious injury or fatal crashes from happening throughout the roadway network, including at locations without a recent history of crashes, but where a high risk of future crashes may be suspected based on the characteristics of those locations. This type of analysis can also be used to quantify the expected reduction in crashes from treatments that may be applied to improve safety at these locations.

This document provides specific guidance for Montgomery County staff to implement this approach by estimating and deploying predictive safety performance functions (SPFs). SPFs can be used to predict crash rates for roadway segments or intersections with similar characteristics. SPFs are used to estimate the baseline conditions at a given crash site, to which Crash Modification Factors (CMFs) may be applied to estimate the crash reduction from a given treatment. By modeling and applying SPFs, Montgomery County can understand both sides of the safety coin: where treatments are needed, and the potential effectiveness of treatments that could be applied, as long as a CMF is available.

The SPF analytical method is comprised of the following steps:

- 1. Data Consolidation and Assembly
- 2. Exposure Estimation
- 3. SPF Estimation
- 4. Application

A detailed methodology of each step of the workflow is provided in the following sections. Required skills for SPF estimation and application in this context include: data management, geoprocessing techniques, generalized linear models, basic machine learning, and knowledge of multi-modal (i.e. including bicycle and pedestrian) safety concepts. During and after each step, examine the data or outputs (as necessary) using maps, graphs, or other descriptive statistics. This will serve as an important check to make sure the results make intuitive sense, and that there are no unresolved underlying data issues.

The methodology and commentary contained herein is based on the project team's understanding of available data at the time of preparation, and requires implementation by professionals trained in inferential transportation safety statistical modeling methods. It is intended to yield a relative prediction of locations where safety

treatments may be beneficial, but is not intended to provide a precise determination of conditions at any location. Further data collection, engineering analysis, and design are necessary prior to implementing safety treatments. Motor vehicle crashes are complex occurrences that often result from multiple contributing factors. Reuse and/or alteration of this instrument of service is at the user's sole risk.

1. DATA CONSOLIDATION AND ASSEMBLY

There are two applicable units of analysis to estimate SPFs: roadway segments and intersections. The following steps are necessary to collect and consolidate the data for SPF estimation. Note that while the predictive safety will be applied to all modes of travel, Step 1 focuses on bicycle and pedestrian data because those data are less available.

Section 1. Consolidate Crash- or Volume-Associated Predictors in GIS

Join all variables applicable to each unit of analysis into a single GIS layer for each (i.e. one layer for intersections, and one layer for segments). Any variable that is available and hypothesized to be locally correlated with pedestrian or bicyclist volumes and crash patterns should be included.

- 1. Create Segment GIS Layer
 - a. Common examples for segment data include:
 - Population density (e.g., the overall population density within a ¼ mile buffer of the segment)
 - Employment density
 - Commercial property
 - University locations (e.g., whether the segment is within 1/10 mile of a university)
 - Federal campuses
 - Transit stations / bus stops
 - AADT
 - Bike lanes
 - Sidewalks
 - Number of lanes
 - Speed limit
 - Roadway width
 - Horizontal and vertical alignment (e.g. sharp hills or tight winding roads)
 - Presence, width, and type of median
 - Frequency of Protected Crossings (see steps 2 and 3)
 - Intersection characteristics (see steps 2 and 3)
 - b. Possible additional examples noted by Montgomery County:
 - Functional class
 - Urban road code area
 - Access control
 - Maintenance responsibility
- 2. Create Intersection GIS Layer
 - a. Join relevant segment data from 1.a above to intersection geometries.
 - b. Common examples of intersection data include (note that some of these, such as number of lanes, can be summarized in various ways):
 - i. Number of lanes (e.g., total through-lanes, total through-lanes on highest functional classification approach)
 - ii. Turning bays
 - iii. Turning restrictions
 - iv. Signalization
 - v. Signs
 - vi. Crosswalks (e.g. marked crosswalks present on highest functional classification approach, total number of marked crosswalks)
 - vii. Number of legs on intersection (3, 4, or 5+)

- viii. Highest speed limit
- ix. T or Y intersection (for 3 leg intersections)
- x. Presence, width, and type of median
- xi. Other pedestrian safety improvements (RRFB, HAWK)
- c. Calculate intersection skew in GIS (Optional)
 - i. This step computes the angles between all lines that intersect at an intersection (azimuth).
 - ii. It is not essential to estimate an SPF, but may improve the accuracy of estimates.
- 3. For both segments and intersections, calculate additional statistics that may help predict crash outcomes:
 - a. E.g. Population density within 1/10, 1/4, 1/2 mile
 - b. Proximity to "Town Centers"
 - c. Proximity to train stations (i.e. Metrorail, MARC/Amtrak, and light rail) and bus rapid transit stations.

Section 2. CAVEAT: Install Dates - Possible Approaches

Roadway networks are frequently updated as lane configurations, speed limits, or other characteristics change. Meanwhile, since crashes are statistically rare events, multiple years of data are required in a safety analysis to ensure crash trends reflect real safety issues, rather than unrelated variation alone. To identify the estimated crash rate of a given location typology, it is important to ensure that the underlying data used to define those locations and estimate their SPFs is consistent and reliable. In particular, it is necessary to identify when and where infrastructure conditions have changed during the period of crash data collection, or to otherwise account for this change. Possible approaches to address this issue include:

- 1. If data are available for infrastructure modifications by year (e.g. segments and intersections), the record can be split into multiple records representing "before" and "after" periods around the change, based on an "effective date".
 - a. If this method is used, consider eliminating data from the year containing the "effective date" of the change or any construction preceding it, if known. This helps control for safety effects of construction, which is beyond the scope of this methodology.
 - b. A simplified variation of this is to separately tabulate the crash data and infrastructure condition data for each year, resulting in a dataset with distinct observations for every road unit for each year in the study period. This approach may be vulnerable to "short study window" issues (i.e., too many records with no crashes). It may be worthwhile to eliminate the data from study years in which changes were implemented or construction took place, if known.
 - c. All variations of this approach require volume and infrastructure data to be reasonably accurate for each year
- Stamp each intersection with when it last changed (and only use crashes at that location after that point). This is essentially using only the "after" period from method 1 above and dropping the before period.
- 3. Drop those locations that have substantially changed within the study period. This method may be appropriate where changes have occurred recently but the exact dates are unknown, or if a location has experienced multiple changes over the study period.
- 4. Pick a short enough study window to ensure homogenous conditions.
 - a. If the study window is too short, there may not be enough crash data to estimate an accurate model, and even in short study windows, some infrastructure conditions may have changed. The standard study window to balance these concerns is 3-5 years.

Section 3. Clean Crash Data

1. Ensure crashes are geocoded to accurate locations on the roadway network.

- a. Add X and Y information to any crashes where this is not reported based on other locationbased fields in the crash dataset (e.g. route, cross-street, distance from intersection, etc.).
 - i. Exercise caution when geocoding based on addresses; some crashes with an address only and no route/cross-street information may have occurred in parking lots or otherwise off the roadway network, and these crashes should not be geolocated to the roadway, as this would artificially inflate the safety concern on that portion of the roadway (these are often property damage only crashes in parking lots).
- b. Check existing X and Y coordinates in the dataset for accuracy. Compare tabular location information to the coordinates provided. Adjust or discard crash records as appropriate.
- 2. Code crashes by subsets to be subsequently modeled, for example:
 - Crash Types (Crash types specific to motor vehicles are commonly reported by police and stored in crash databases; crash types relevant to bicyclists and pedestrians should also be modeled)
 - b. Crash Year
 - c. Mode (bicyclist, pedestrian, motorcycle, or motor vehicle; model scooter crashes separately if data is available to distinguish these from pedestrians)
 - i. Caution: A single crash may involve parties using more than one mode, yet is usually coded with a single mode. Often the most vulnerable mode is coded, for example:
 - 1. If a pedestrian is involved, code as a pedestrian crash
 - 2. If a bicyclist is involved, code as a bicyclist crash
 - 3. If a motorcycle is involved, code as a motorcycle crash
 - 4. If none of these are involved, then code as a motor vehicle
 - ii. An alternative coding approach is to default to the mode with the worst injury. In most cases this will result in a similar categorization.
- 3. Join crashes to relevant network attributes (i.e. intersection or segment, as appropriate).
 - a. Some crashes have an intersection Boolean field, which could be used for attribution of intersection and non-intersectino crashes.
 - b. In the asbsence of this Boolean field, or for data cleaning and valiation of the field, intersection crashes can be calculated using geospatial information using one of two common methods:
 - i. Create a defined buffer around an intersection and all crashes within that buffer are intersection crashes (e.g. 50 or 100 feet, or)
 - ii. Create a dynamic buffer that is different for each intersection depending on how many lanes each intersection approach is. More lanes means a wider intersection means the buffer should be bigger.
- 4. Aggregate to units of analysis (e.g., count of crashes based on the variables to be modeled)
 - a. Basic approach: Total # of pedestrian, bicycle, motorcycle, motor vehicle crashes per unit of analysis (i.e., intersection or segment).
 - b. Advanced approach: Total # of crashes per year, per unit of analysis, by mode and crash type to be modeled.

Section 4. Annualize Existing Pedestrian and Bicycle Volume Estimates (Count Data)

If motor vehicle or motorcycle annualized volumes are not available (i.e., only raw counts are available for these modes), the same procedure can be applied to motor vehicle count data to annualize volume estimates.

- 1. Summarize observed pedestrian crossings at the intersection level and bicycle volumes at the segment level, as well as the observation period when that data was collected.
 - a. E.g. Two hour turning movement counts at each intersection with available count data.
- 2. Annualize the short-duration volume data to an "average annual daily traffic" format to account for variation in what the observed short-duration count implies about total activity levels due to factors such as time of day, land use, weather, and season. This can be approached as follows:
 - a. If local permanent counters are available, evaluate the patterns to identify any distinct hourof-day patterns.
 - i. Group counters with similar hour-of-day peaking patterns for pedestrian and bicycle volumes
 - ii. Calculate hour-of-day extrapolation factors

- iii. Assign short-duration count locations to the identified groups based on similar land uses contexts and apply factors to short-duration counts to produce a daily volume for the day the count was collected
- b. Otherwise, select factors from counters from other locales or from the National Bicycle and Pedestrian Documentation Project
- c. Use a day of year calculation (ratio of that date's total volume to the AADT at that location) to extrapolate the short-duration counts, based on the geographically closest permanent count site. This technique adjusts for seasonality and weather effects, which have been shown to dramatically impact bicycle and pedestrian counts.¹
- 3. The resulting Annual Average Daily Bicycle Traffic (AADBT) and Annual Average Daily Pedestrian Traffic (AADPT) values will be used to develop exposure models in the following step.

2. EXPOSURE ESTIMATION

Estimate Annual Pedestrian, Bicycle and Motor Vehicle Volumes at Missing Locations

Develop a predictive model to estimate bicycle, pedestrian, motorcycle and motor vehicle volumes at locations where they do not currently exist. Pedestrian volumes are best modeled at the intersection level. Bicycle, motorcycle and motor vehicle volumes are best modeled at the segment level and used to infer intersection volumes.

- 1. Estimate a Poisson or Negative Binomial model
 - a. Find the best model to predict the annualized counts based on other variables that could predict volumes such as population density, land use, transportation network characteristics, proximity to transit, ACS bicycle and pedestrian commute estimates, or volume estimates from a travel demand model, if available, to predict intersection pedestrian volumes and segment bicycle and motor vehicle volumes.
 - i. Choose which variables to use as inputs for the model using some type of standard approach or technique, based on what skills and resources are available. This might be following the example of previous models or studies completed by the County, following examples from existing literature or reports, or applying some type of statistical or machine learning analysis technique, such as bivariate correlation, decision tree models, random forest models, stepwise model building, etc.
 - ii. Assess model fit. Cross validation is one common method to assess model fit in this context, which can be accomplished using various free software packages.²
 - iii. Generally, avoid including variables that are highly correlated with one another. For example, population density and adjacency to high capacity transit could be highly correlated. This is not a hard and fast rule, but if there are too many variables that are highly correlated, the model will be inefficient and the predictions will be less accurate.
- 2. For motor vehicle volumes, if values are not available from a regional travel demand model, they can either be calculated as above or by using spatial interpolation.
- 3. Once models have been estimated for pedestrian, bicycle, motorcycle and motor vehicle volumes, they must be applied to the full dataset to predict volumes at each intersection and road segment. Any models that were estimated at the segment level should also be aggregated to the intersections that they spatially intersect with; keep in mind that the sum of all segment volumes should be divided by 2 to account for the incoming and outgoing flow (each vehicle that enters also exits, and is thus observed on two segments).

¹ NCHRP Report 797 Appendix D contains additional additional details on the day-of-year factoring approach.

² For example, see documentation on SciKit Learn for more information on cross-validation: https://scikitlearn.org/stable/modules/cross_validation.html

3. SPF ESTIMATION

SPF Estimation follows a very similar workflow to Step 2, with the following notes:³

- 1. Estimate a model for each identified crash type (see Section 1, "Clean Crash Data", item 2a). Minimally, this might include the following:
 - a. Intersection bicyclist, pedestrian, and motor vehicle crashes.
 - b. Segment bicyclist and motor vehicle crashes. Pedestrian segment crashes typically are not modeled as it is difficult to parse out whether these crashes are people on the sidewalk, people accessing cars parked on the block (i.e., walking in the street), or people crossing midblock. In each of these cases, exposure would likely need to be estimated separately, which would require more detail than is available in standard count data.
- 2. Whereas in Step 2 the outcome/dependent variable was traffic volumes, here it is the number of crashes. The critical difference in the modeling approach is that now we must account for "exposure" variables, which are typically transformed using a natural logarithm. Some modeling packages do this implicitly if you indicate that a variable is an exposure variable, and others you must supply the log-transformed variables as a separate input. For intersection models, the relevant traffic volumes are the standard exposure value; for segment models, the length of the segment is also typically taken into account.
- 3. Test for multicollinearity (i.e., using a variance inflation factor test) and choose the best model accordingly.
- 4. If conditions have changed substantially during the observation period, it may not be appropriate to include a given observation directly (i.e., as described previously in Step 1, Section 2). Control for observations where conditions may have changed. For example, with bike lanes, you may have a certain infrastructure condition in the first 4 years of the study period and a separated bicycle lane installed for the final year. There are two common options for dealing with this problem:
 - a. Do not include observations in the model that have changed substantially over the study period
 - b. Split each segment/intersection into multiple observations for the 'before" and "after" period from when they were modified. This approach is more robust, but requires more complicated data management. If this approach is taken, the numer of crashes will need to be separately tabulated for the two time periods, and the number of each years in each will need to be recorded and included in the model as an "offset" variable; i.e., a log-transformed variable whose parameter has been fixed to have a value of 1.
 - i. If reliable infrastructure from the "before" period is unavailable, it's acceptable to discard the "before" period and only look at the after case.
 - ii. If either the before period or the after period is extremely short (say, 1 year), exclude it.

³ See FHWA guidance on this topic for more information: <u>https://safety.fhwa.dot.gov/rsdp/downloads/spf_development_guide_final.pdf</u>.

4. APPLICATION

- 1. Apply the SPF to the full dataset to produce the model-estimated number of crashes for each segment and intersection by mode.
- 2. Apply the Empirical Bayes (EB) method to adjust the SPF predicted value by accounting for the observed value at a given location. This provides a more reliable estimate of crashes. This procedure uses both the the SPF estimate and the observed number of crashes to produce the most reliable estimate of the "true" (expected) crash rate before safety treatment.⁴
- 3. Choose how to use the information for prioritization:
 - a. EB estimates can be used as the expected number of crashes at a given location.
 - b. EB estimates can be used directly to focus on high crash locations, and can be divided by the estimated volumes to identify high risk locations
 - c. The Potential for Safety Improvement (PSI), or the difference between EB predicted number and SPF-Predicted number, can also be used for prioritization; this indicates the theoretical improvements in crash totals that could be made for a "poorly performing" location. This is because the corrected EB value is the best estimate available of current safety conditions at that location, while the SPF provides the estimate of crashes that would be predicted based on all of the variables in the SPF. Sites with an EB value that is higher than the SPF estimate are theoretically experiencing more crashes than similar sites. This "excess" of crashes at that particular site would likely benefit most from safety improvements.⁵

⁵ An example application of this method is available on pages 8-9 of the HSM introduction:

⁴ For an example application of how to calculate EB estimates, see the "before" estimates from the Highway Safety Improvement Manual, section 6.1 Project Evaluation: <u>https://safety.fhwa.dot.gov/hsip/resources/fhwasa09029/sec6.cfm</u>.

<u>http://www.highwaysafetymanual.org/Documents/HSMP-1.pdf</u>. See Figure 1 of HSM Case Study 4: Development of SPF for Network Screening in Illinois for a graphical depiction of this phenomenon: <u>https://safety.fhwa.dot.gov/hsm/casestudies/il_cstd.cfm</u>. Further detail is available in AASHTO Highway Safety Manual Chapter 4: Network Screening Excess Expected Average Crash Frequency with Empirical Bayes (EB) Adjustment.

Attachment E: Letter from the Montgomery County Department of Transportation



DEPARTMENT OF TRANSPORTATION

Marc Elrich County Executive Christopher R. Conklin Director

January 8, 2020

Gwen Wright Montgomery County Planning Board 8787 Georgia Avenue Silver Spring, Maryland 20910

SUBJECT: Montgomery County Planning Department Predictive Safety Analysis

Dear Gwen:

The primary engineering task to achieve Montgomery County's Vision Zero goal is building safety improvements along our transportation network. As a first step, the Montgomery County Department of Transportation (MCDOT) is prioritizing the High Injury Network (HIN) for improvements. While the HIN comprises the most pressing need based on available data, the need for improvement is much broader. Other roadways in the County have similar land use, demand, and design characteristics that need to be identified and addressed.

The Montgomery County Planning Department's predictive safety analysis plans to identify intersections and corridors throughout the County that do not currently exhibit high crash frequency but share similar features to the HIN. These roadways will be the next step in achieving zero fatalities and serious injuries in the County. MCDOT supports the Planning Department's predictive safety analysis project and deems it a vital part of Vision Zero. If you have any questions, please contact John Hoobler at (240) 777-2192.

Sincerely,

7____

Chris Conklin Director

Office of the Director

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