



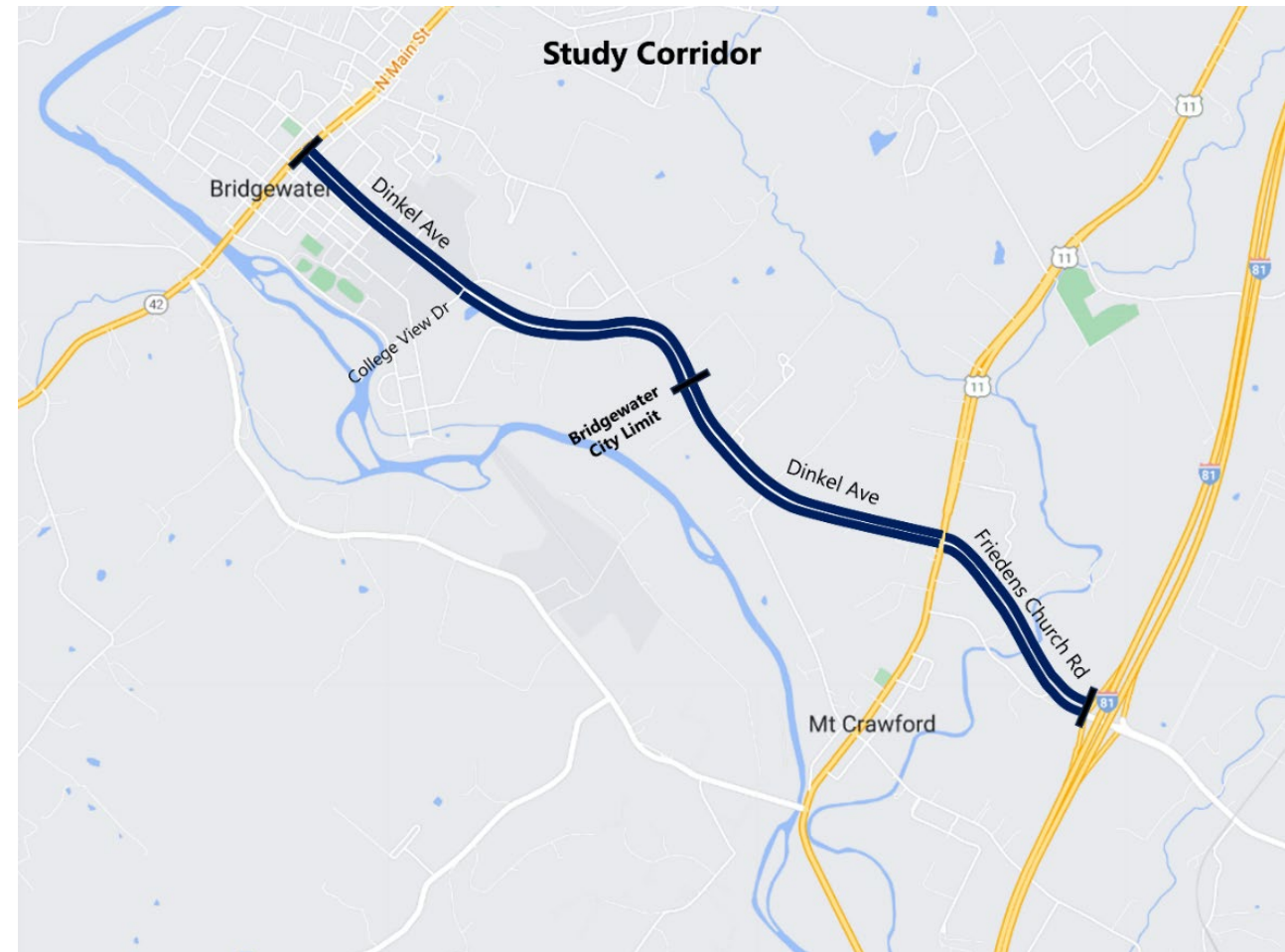
Dinkel Avenue / Friedens Church Road Small Area Study Project Summary to HRMPO Policy Board

Presented by
Sean Becker, P.E. PMP

June 20, 2024

Project Background and Corridor Overview

- Diverse corridor runs 3.28 miles through Rockingham County from I-81 Exit 240 to Main Street (VA-42) in Downtown Bridgewater
 - 2 lanes along Dinkel Ave, 4 lanes along Friedens Church Rd
- Study Goals:
 - Companion to Rockingham County Comprehensive Plan Updates
 - Analyze existing conditions
 - Forecast future corridor development
 - Analyze future conditions
 - Recommend potential improvements
 - Develop proposed cross sections



Project Team

- › Ann Cundy – CSPDC
- › Zach Beard – CSPDC
- › Garreth Bartholomew – CSPDC
- › Paula Melester – CSPDC
- › Ansley Heller – CSPDC
- › Brad Reed – VDOT Staunton Planning
- › Adam Campbell – VDOT Staunton Planning
- › Alex Wilmer – Town of Bridgewater
- › Don Komara – VDOT Harrisonburg Residency
- › Jeremy Mason – VDOT Staunton Planning
- › Dylan Nicely – Rockingham County
- › Casey Armstrong – Rockingham County
- › Libby Clark – Town of Mount Crawford
- › Royce Hylton – Town of Mount Crawford
- › Neal Dillard – Town of Mount Crawford
- › Shane McCabe – VDOT Staunton Planning
- › Stephen King – Rockingham County
- › Kayla Yankey – Rockingham County
- › Sean Becker – VHB Project Manager
- › Majeed Algomaiah – VHB Technical Lead
- › Chris Daily – VHB Project Support

Study Timeline

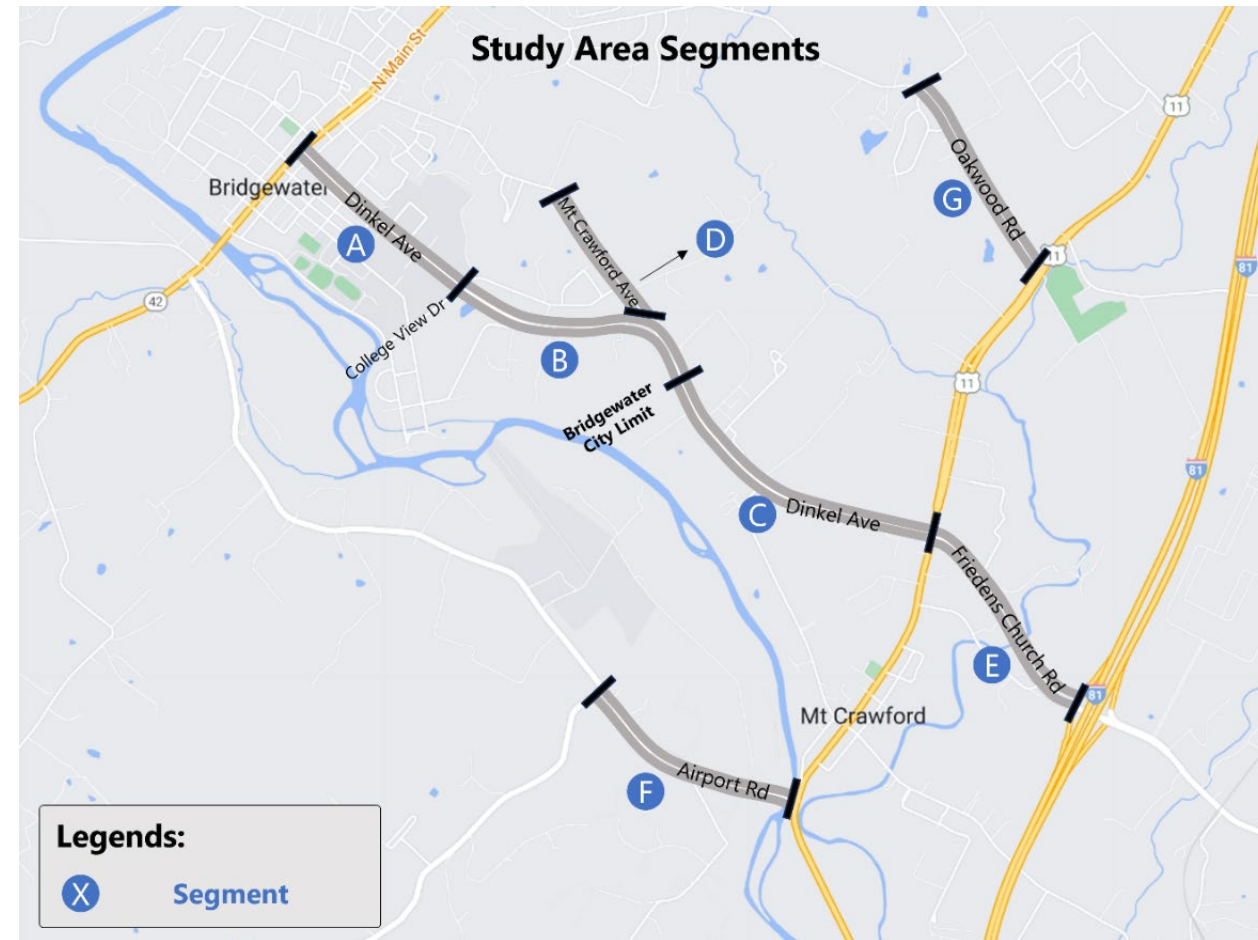


Traffic Data Collection

- Traffic data collection was conducted on Tuesday October 10, 2023 and Wednesday October 11, 2023
- 48-hour Tube Count with Vehicle Classification at:
 - Dinkel Ave between N Liberty St and N 3rd St
 - Dinkel Ave between College View Dr and Mt Crawford Ave
 - Dinkel Ave between Old Bridgewater Rd and Shenandoah's Pride Dairy entrance
 - Mt Crawford Ave between College View Dr and Dinkel Ave
 - Friedens Church Rd between US-11 and future Parsons Ct
 - Airport Rd between US-11 and VA-698 / Wise Hollow Rd
- 12-Hour Turning Movement Count with Vehicle Classification at:
 - Dinkel Ave & Mt. Crawford Ave
- 6-Hour AM/PM Peak Turning Movement Count with Vehicle Classification at:
 - Dinkel Ave & VA-42
 - Dinkel Ave & Don Liten Pkwy
 - Dinkel Ave & Old Bridgewater Rd
 - Dinkel Ave & US-11

Existing Conditions Analysis

- Corridor divided into 4 segments to analyze operations using Highway Capacity Software (HCS)
- Selected Measure of Effectiveness:
 - Follower Density
 - Percent Time Spent Following
 - Modeled Average Speed
 - Friedens Church Road utilized Density as MOE due to 4 lane cross section



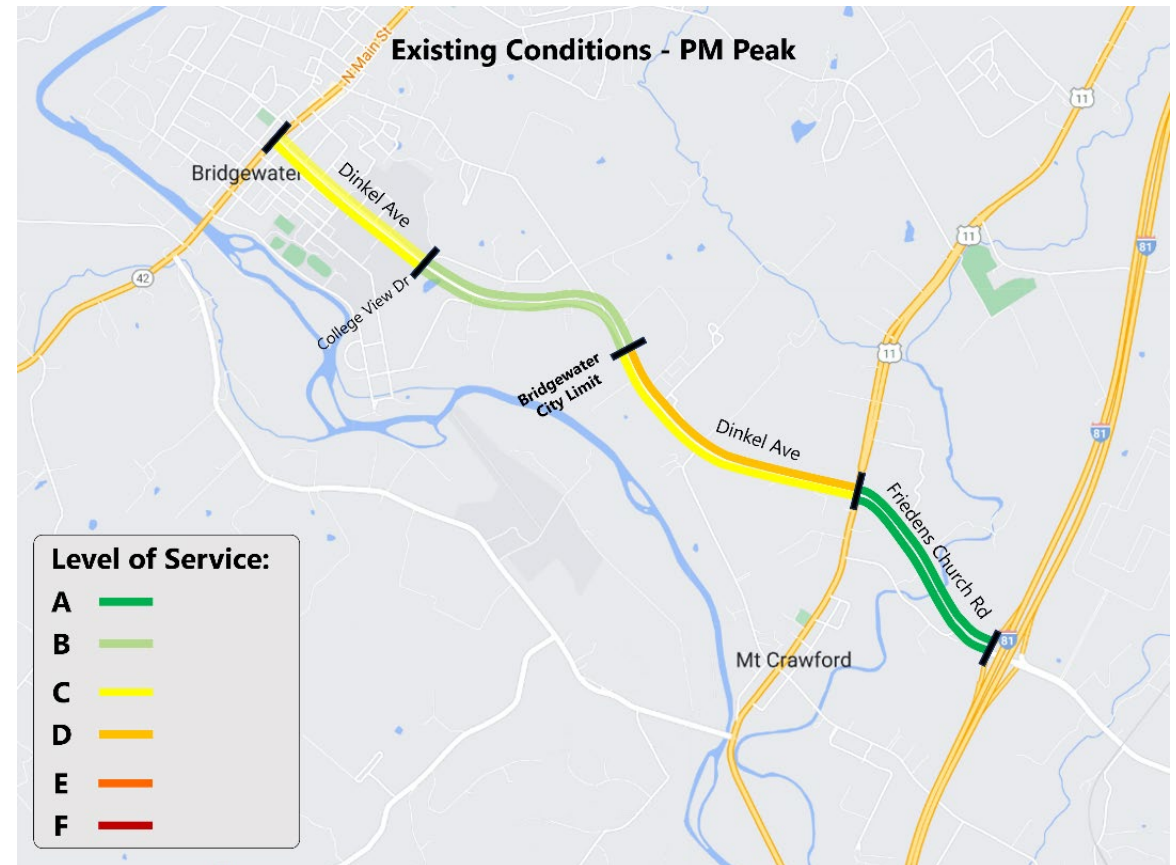
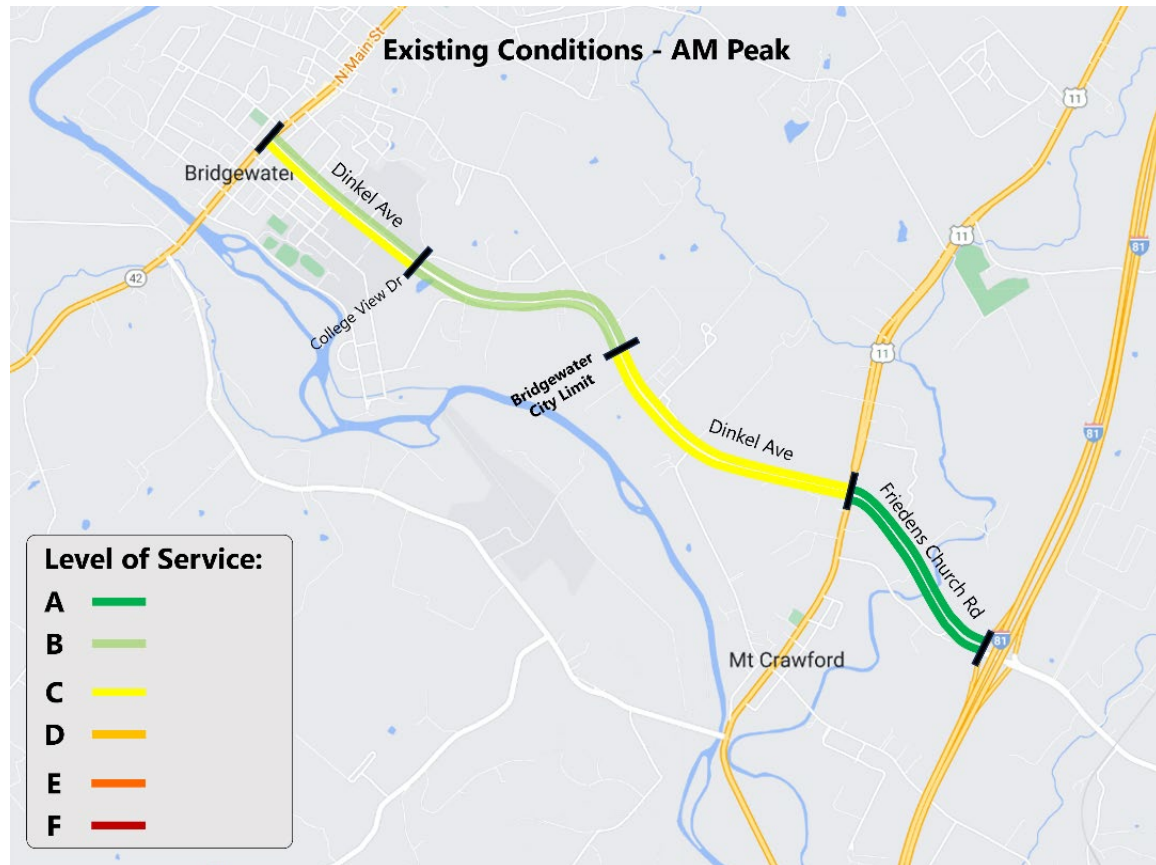
Existing Conditions Analysis Results

- Level of Service (LOS) shows acceptable existing corridor operations in AM and PM peak hours
- All segments are operating well under capacity by volume to capacity ratio (v/c)

Segment Details					AM				PM			
ID	Road	Start	End	Direction	v/c Ratio	Follower Density (followers/mi/ln)	LOS	Percent Followers (%)	v/c Ratio	Follower Density (followers/mi/ln)	LOS	Percent Followers (%)
A	Dinkel Ave	N Main St	College View Dr	NB	0.16	4.8	B	45.0	0.22	7.6	C	51.7
				SB	0.19	6.2	C	48.6	0.19	6.4	C	49.1
B	Dinkel Ave	College View Dr	Bridgewater City Limit	EB	0.23	4.4	B	52.0	0.21	3.9	B	50.1
				WB	0.23	4.4	B	51.9	0.24	4.7	B	53.0
C	Dinkel Ave	Bridgewater City Limit	US 11	EB	0.33	6.6	C	60.0	0.30	5.9	C	57.9
				WB	0.28	5.2	C	55.9	0.38	8.2	D	64.0
E	Friedens Church Rd	US 11	I-81 Ramps	EB	0.14	-	A	-	0.23	-	A	-
				WB	0.20	-	A	-	0.21	-	A	-

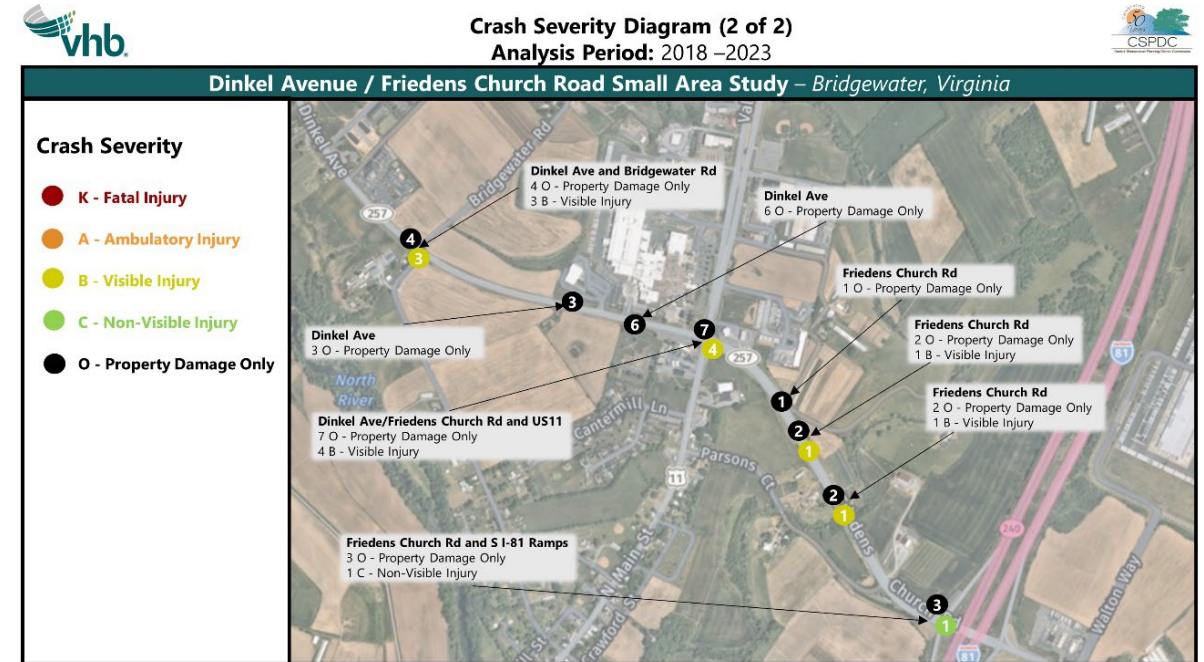
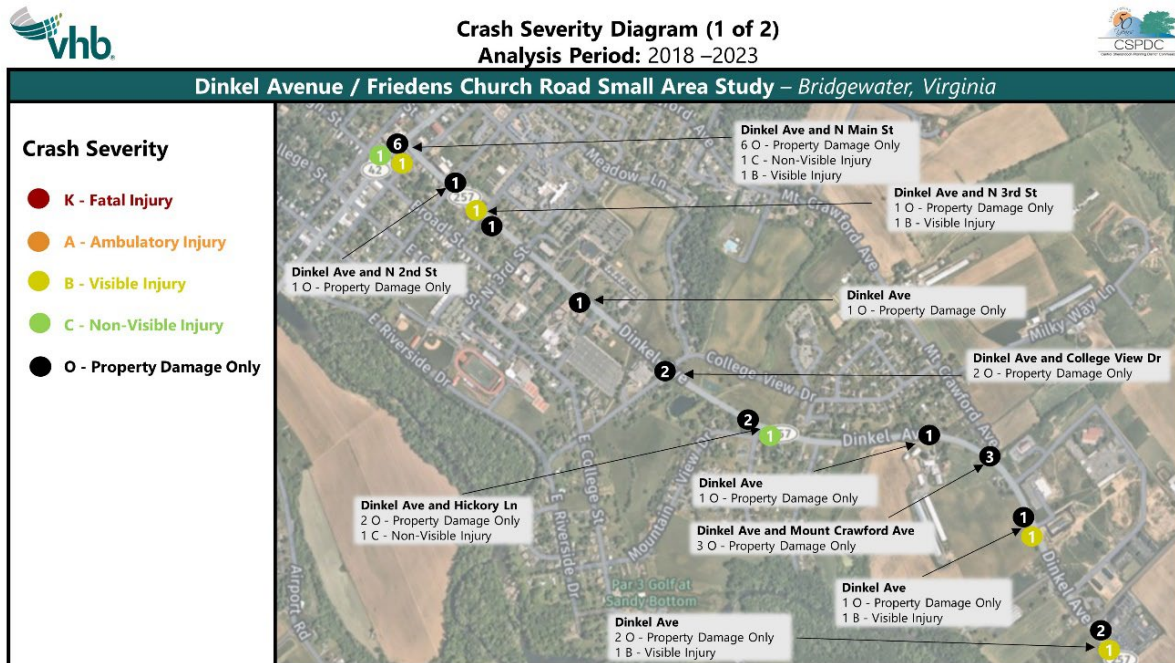
HCS Existing Results

- All segments operating acceptably in AM and PM Peak hour modeled conditions



Crash Analysis

- Review of crash data from 2018 to 2023 shows no fatal or severe crashes
- No hotspots or recurring crash trends noted along the corridor



Public Engagement - MetroQuest

- MetroQuest Survey open from January 31, 2024 to February 23, 2024
- 915 unique responses logged
- Key Findings
 - Main corridor uses are to access I-81 and shop/run errands (20% of respondents each)
 - Survey responses indicated priorities for minimizing traffic congestion and improving safety along the corridor
 - Substantial feedback about corridor operations during I-81 incidents and with future developments

Study Corridor Priority	Ranked 1 (top)	Ranked 2	Ranked 3	Ranked 4	Ranked 5	Average
Minimizing traffic congestion	159	120	44	27	36	2.12
Improved safety and traffic calming	130	132	82	40	11	2.16
Efficient freight access and movement	34	52	111	50	51	3.11
More pedestrian facilities (sidewalks)	43	48	66	85	82	3.35
More bicycle facilities (bike lanes)	32	43	46	76	86	3.5
Expanded transit service	21	8	36	78	77	3.83

Study Corridor Priorities

Future Development Analysis

- Developments categorized into one of three categories when forecasting traffic volumes:
 - Known, Anticipated, or Speculative

- Sources for future development analysis:
 - Rockingham County Comprehensive Plan
 - Town of Mount Crawford Comprehensive Plan
 - VDOT Staunton Planning resources
 - Numerous meetings with Town and County Stakeholders
 - Buc-ee's OSAR

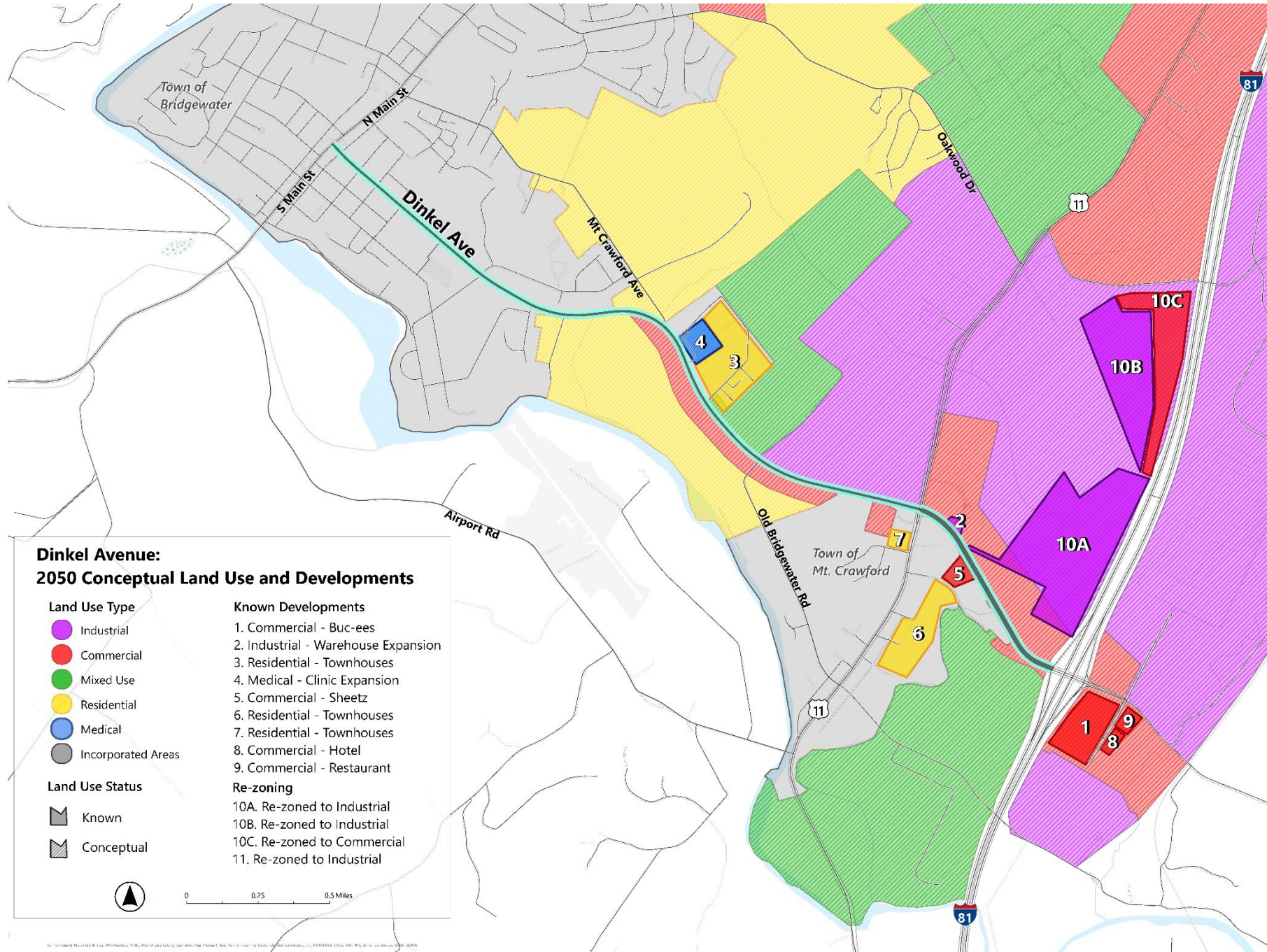
#	Category	Comment	Size	Opening Year	Source	Status
1	Commercial	Buc-ees	74,000 SF	2024	Buc-ee's Operations and Safety Analysis Report	Known
2	Industrial	Warehouse	11,000 SF	2024	Rockingham County, VA	Anticipated
3	Residential	Townhouses	130 Units	2024	Town of Bridgewater	Known
4	Medical	Clinic	5,100 SF	2024	Town of Bridgewater	Known
5	Commercial	Sheetz	18 Pumps	2024	TIA from VDOT	Known
6	Residential	Townhouses	263 Units	2025	TIA from VDOT	Known
7	Residential	Townhouses	17 Units	2025	Town of Mount Crawford	Known
8	Commercial	Hotel (Next to Buc-ees)	250 Rooms	2035	Buc-ee's Operations and Safety Analysis Report	Anticipated
9	Commercial	Restaurants (Next to Buc-ees)	5,000 SF	2035	Buc-ee's Operations and Safety Analysis Report	Anticipated

Future Developments

#	Category	Comment	Size	Opening Year	Source	Status
10A	Industrial	Rezoned Land to I1	127.7 Acre	2040	Rockingham County	Speculative
10B	Industrial	Rezoned Land to I1	54.7 Acre	2040	Rockingham County	Speculative
10C	Commercial	Rezoned Land to B1	43.8 Acre	2040	Rockingham County	Speculative
11	Industrial	Rezoned Land I1	81.9 Acre	2040	Rockingham County	Speculative

Rezoning of Parcels

Future Developments and Parcel Rezoning

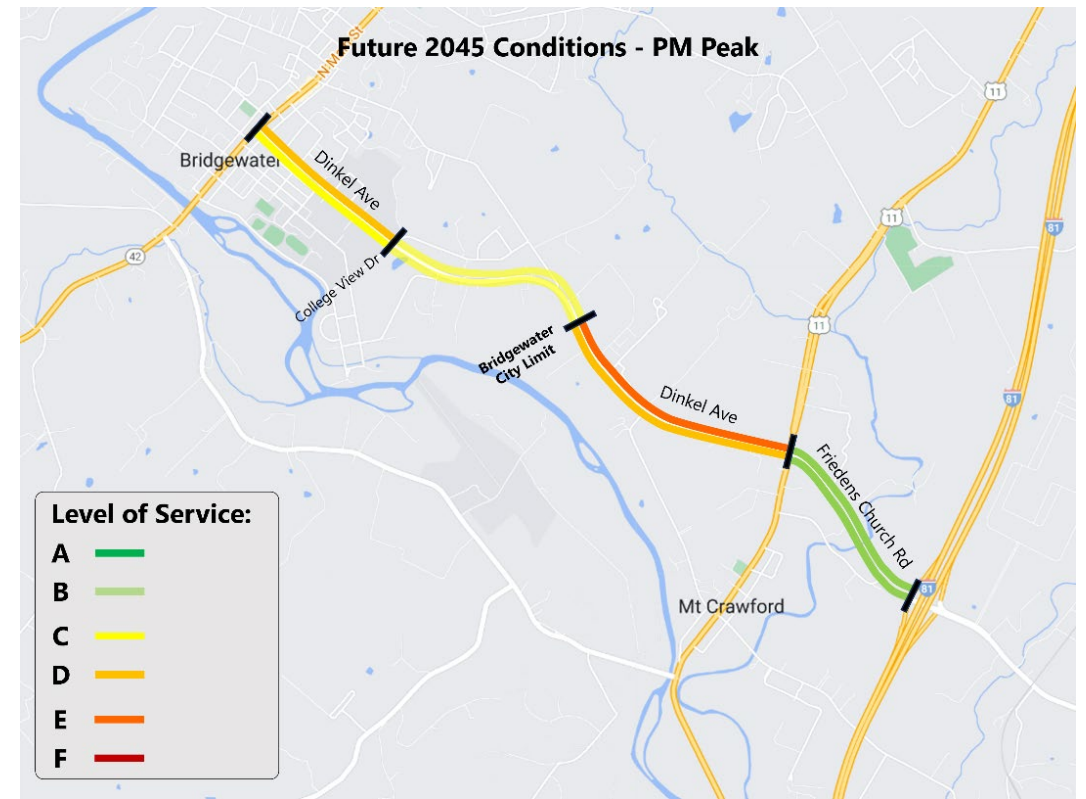
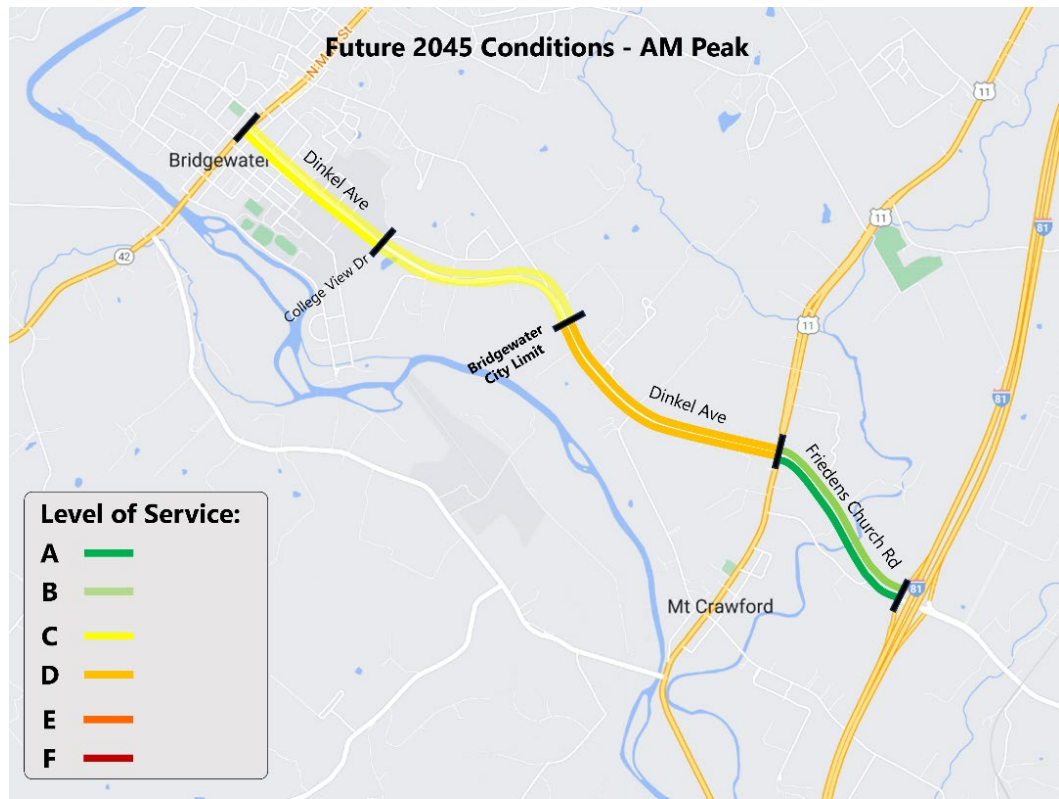


Existing and Future Volume Comparison

Segment Details		Peak Hour Volumes						Percentage of Peak Hour Volume Change Since 2023			
		Existing (2023)		Future Interim Year (2035)		Future Forecast Year (2045)		Future Interim Year (2035)		Future Forecast Year (2045)	
ID	Direction	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
A	NB	202	351	264	424	295	484	31%	21%	46%	38%
	SB	285	258	345	327	403	364	21%	27%	41%	41%
B	EB	313	326	376	403	437	448	20%	24%	40%	37%
	WB	289	359	361	433	402	494	25%	20%	39%	38%
C	EB	453	476	569	620	661	688	26%	30%	46%	45%
	WB	412	577	551	714	613	812	34%	24%	49%	41%
E	EB	464	694	606	902	815	1014	31%	30%	76%	46%
	WB	607	665	802	846	906	1039	32%	27%	49%	56%

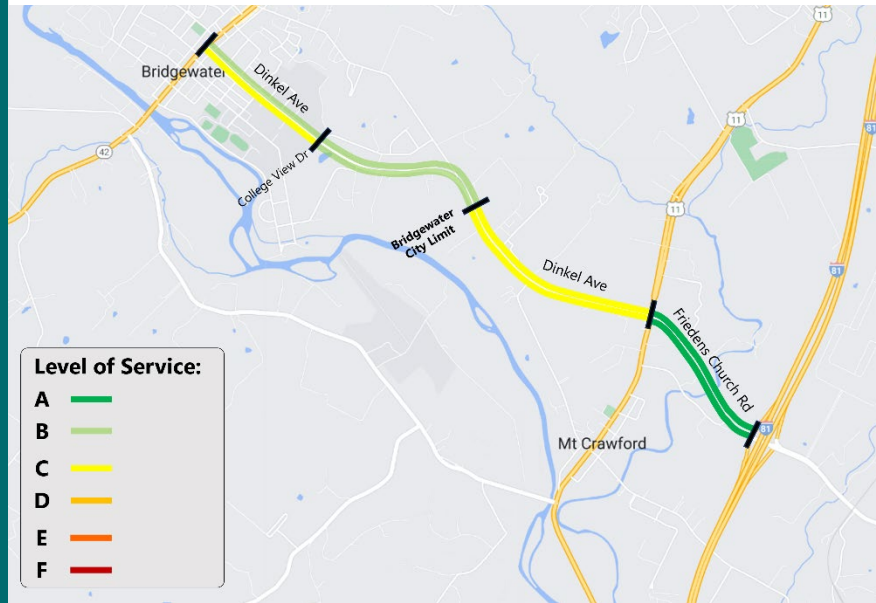
Future Corridor Analysis Results

- Minimal reduction in segment LOS during AM and PM peaks
- Reduction in LOS between Bridgewater City Limit and US-11 consists of minimal reduction in modeled average speed
- Model results show traffic operations will remain acceptable in 2045 model

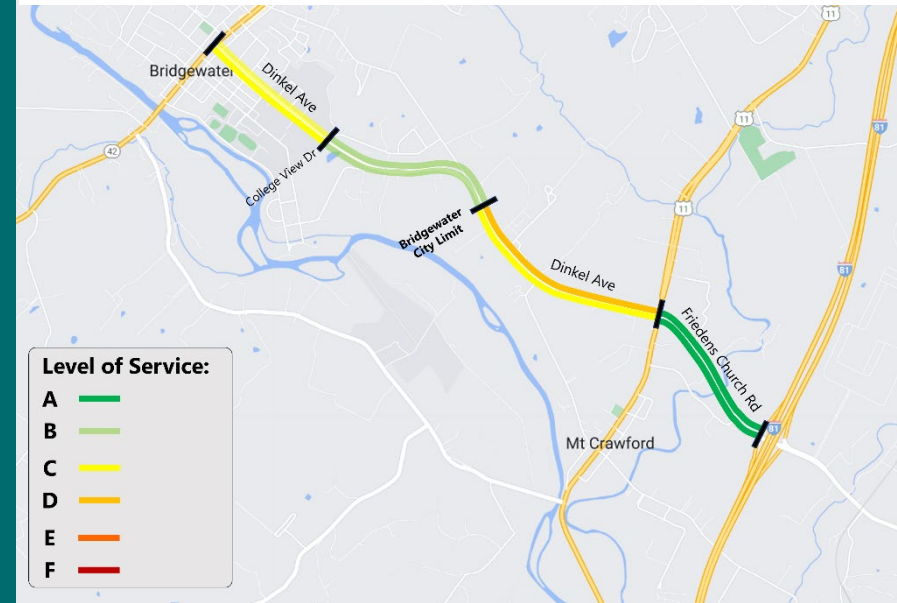


DINKEL AVENUE MODELED LEVEL OF SERVICE

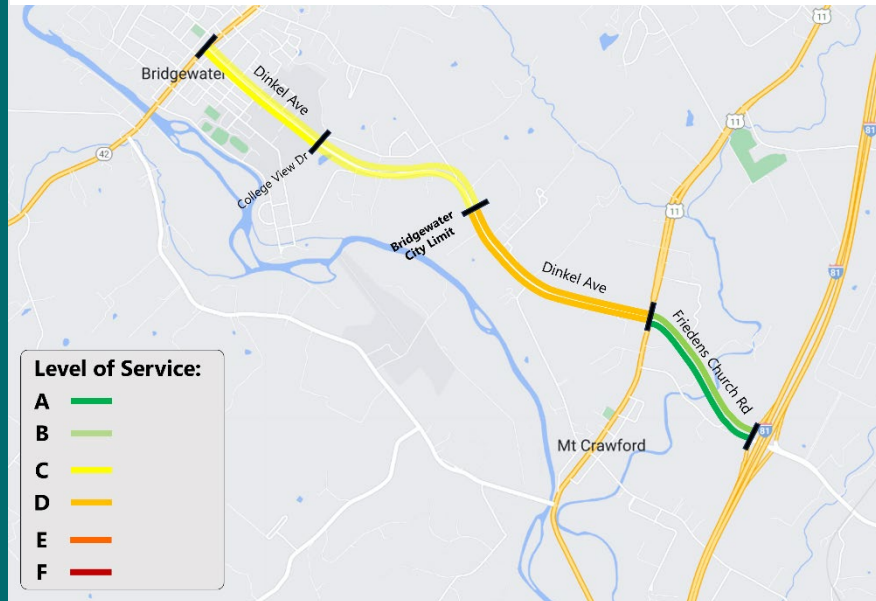
Existing Conditions - AM Peak



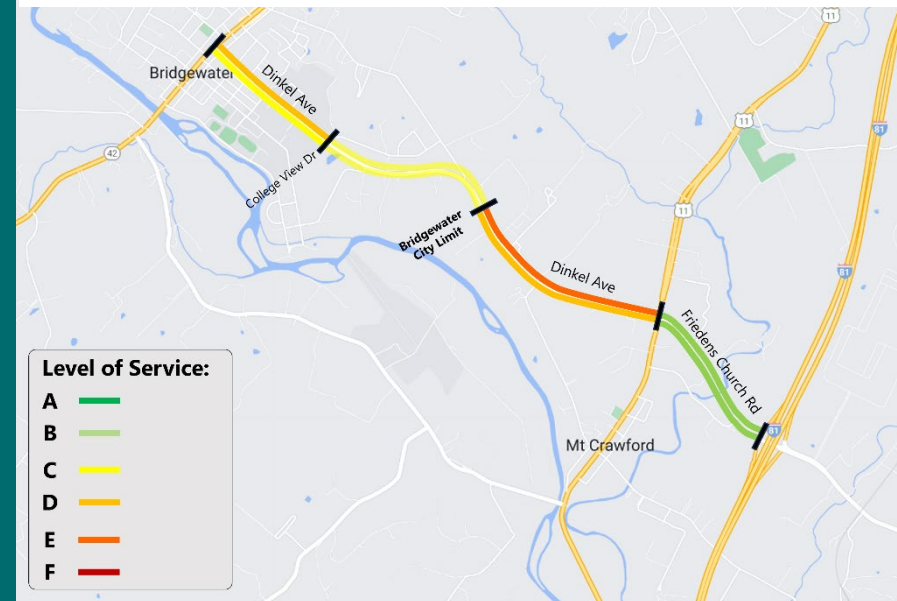
Existing Conditions - PM Peak



Future Forecast Year (2045) Conditions - AM Peak

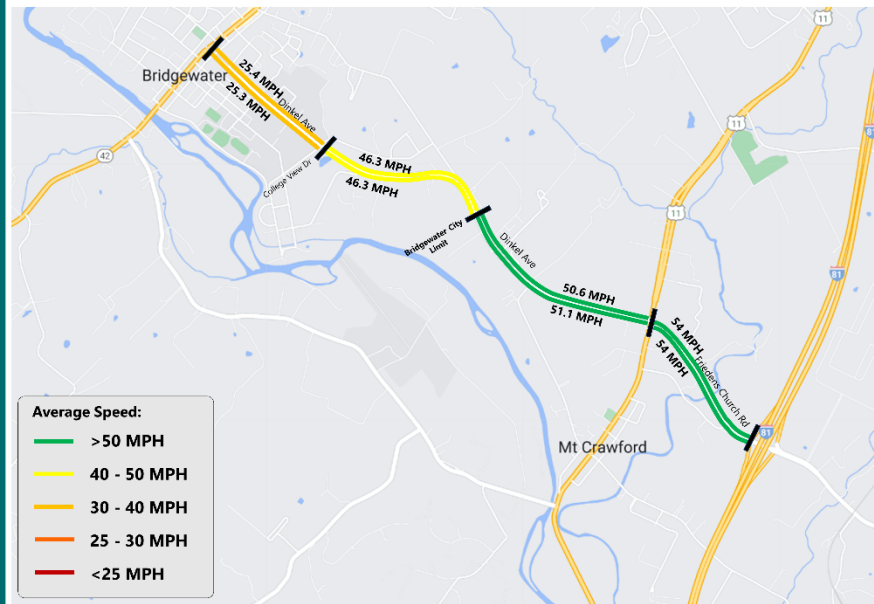


Future Forecast Year (2045) Conditions - PM Peak

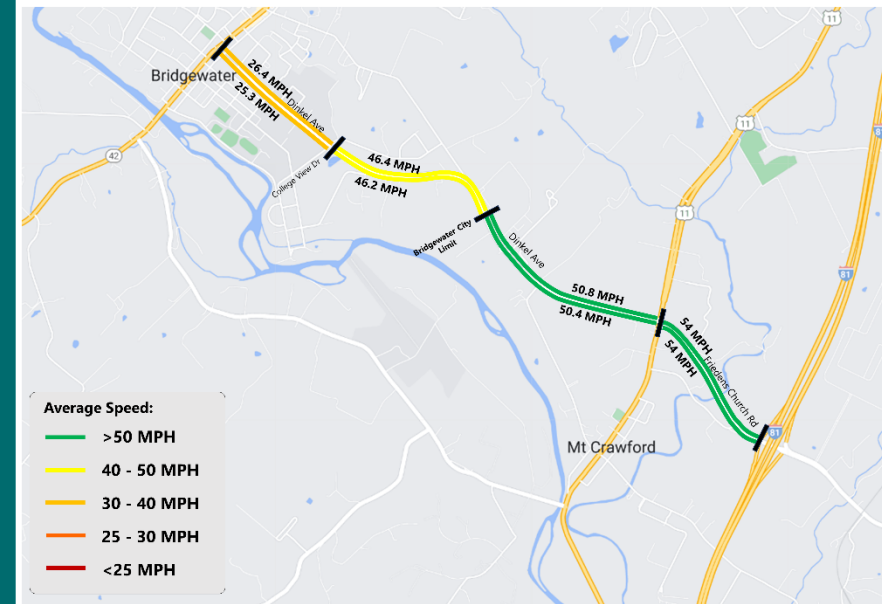


DINKEL AVENUE MODELED SPEED RESULTS

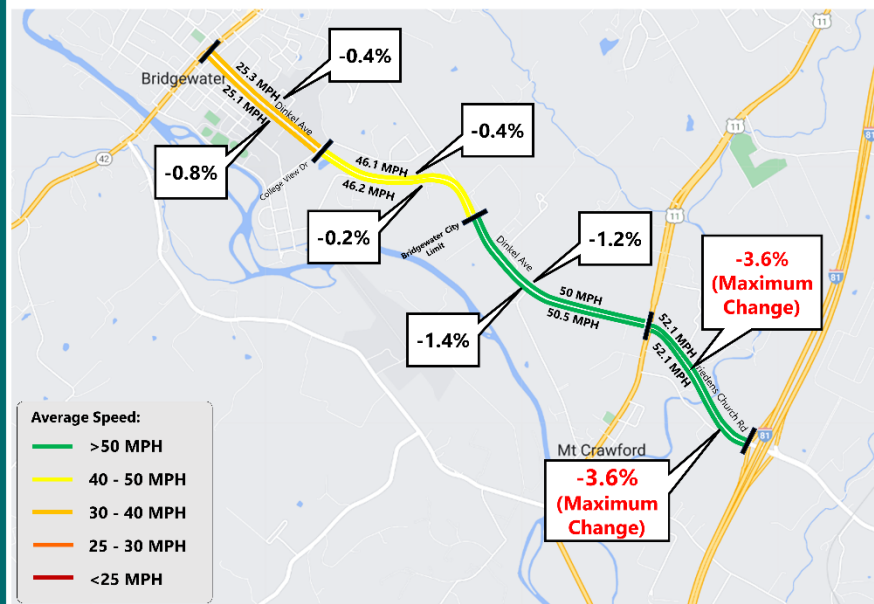
Existing Conditions - AM Peak



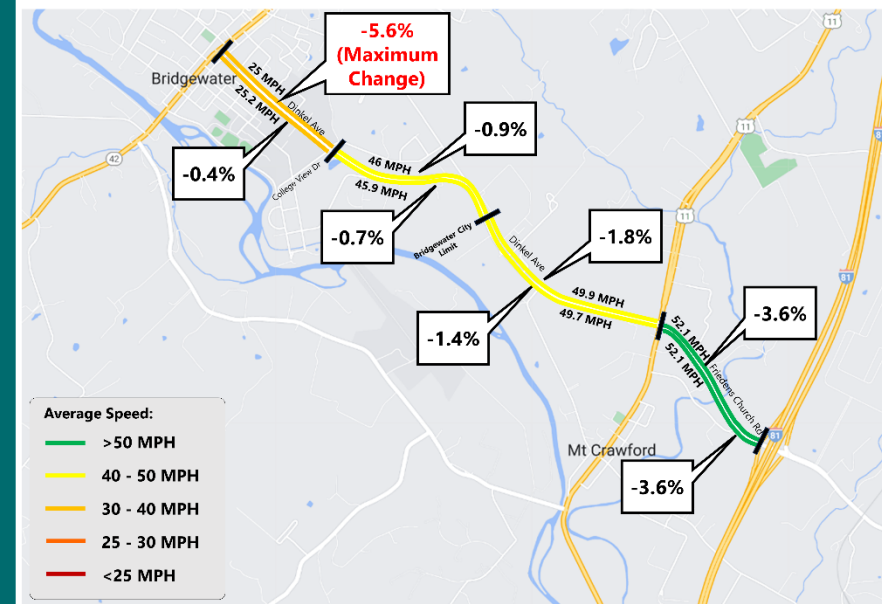
Existing Conditions - PM Peak



2045 Future Conditions - AM Peak



2045 Future Conditions - PM Peak

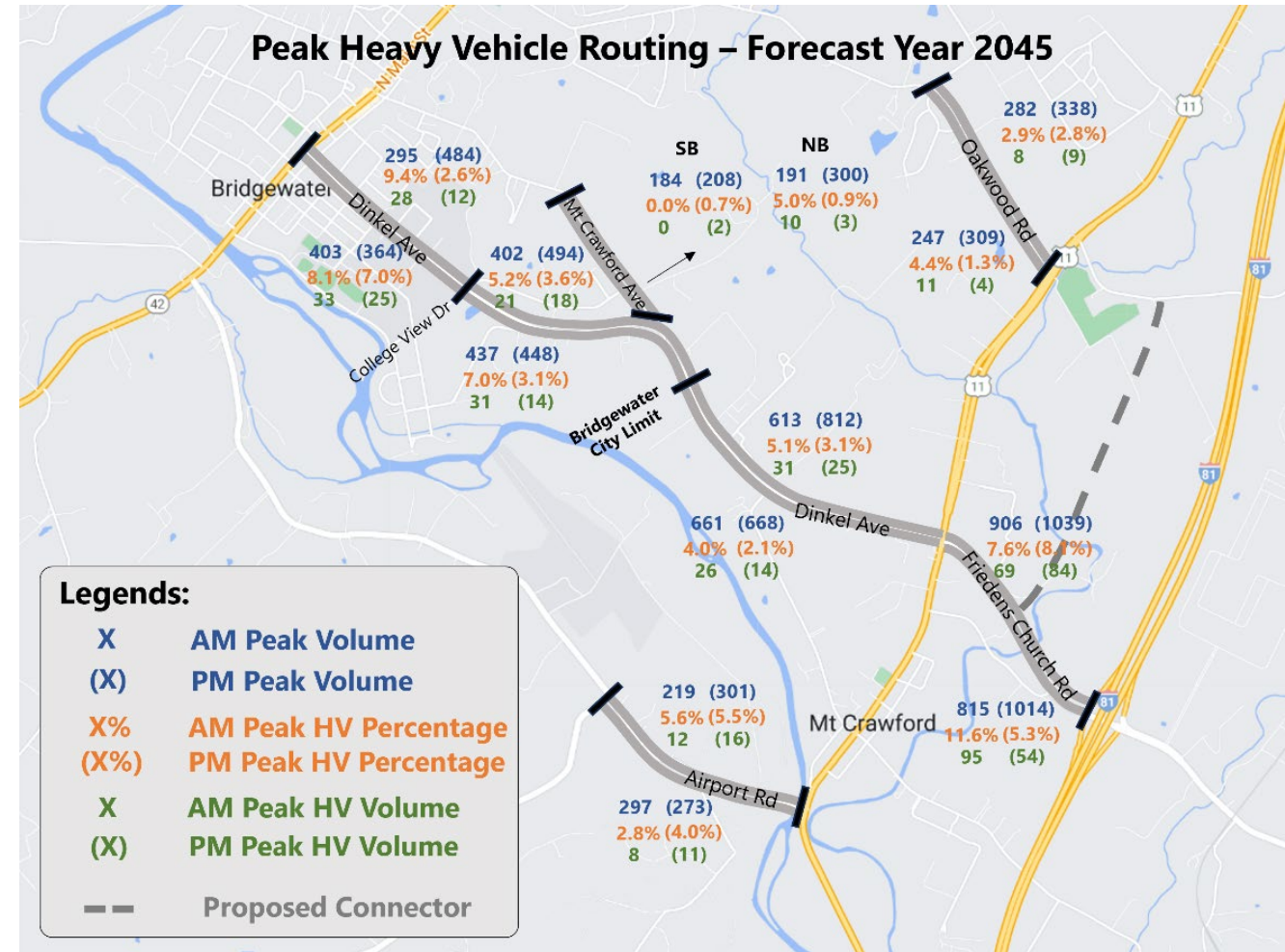


Public Engagement – In Person

- In-Person public meeting May 21, 2024
- 44 citizen, organization, and local government attendees
- Key Takeaways
 - Feedback from public on access management between US-11 and Mount Crawford Ave
 - Questions about regional travel patterns connecting I-81 / US-11 and VA-42
 - Some feedback about desire for bicycle, pedestrian, and transit options to improve mobility
 - Public has concerns about congestion along corridor, particularly during I-81 congestion incidents

Future Truck Routing

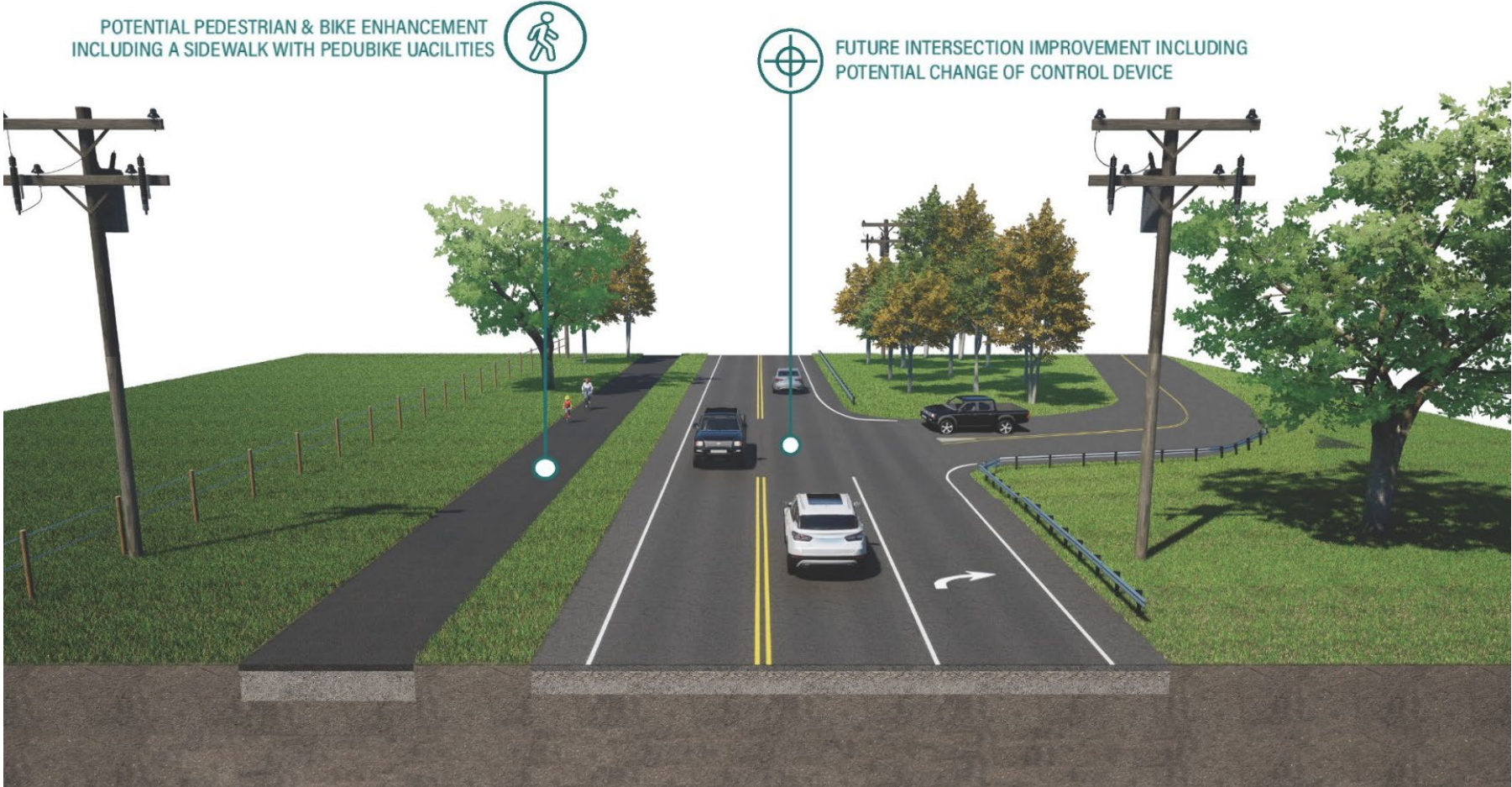
- Existing truck volumes center on the study corridor
 - 54 heavy vehicles in peak hour
- Future modeled truck volumes likewise center on the study corridor
 - 95 heavy vehicles in peak hour
- Proposed connector may change travel patterns along Friedens Church, reducing volumes on US-11



Future Potential Cross Sections

Dinkel Avenue at Mount Crawford Avenue Potential 2045 Cross Section

*Based on the existing conditions and 2045 volumes:



Dinkel Avenue At Volunteer Drive

Potential 2045 Cross Section

*to preserve corridor capacity, anticipate consolidation of existing commercial entrances



Dinkel Avenue at US-11

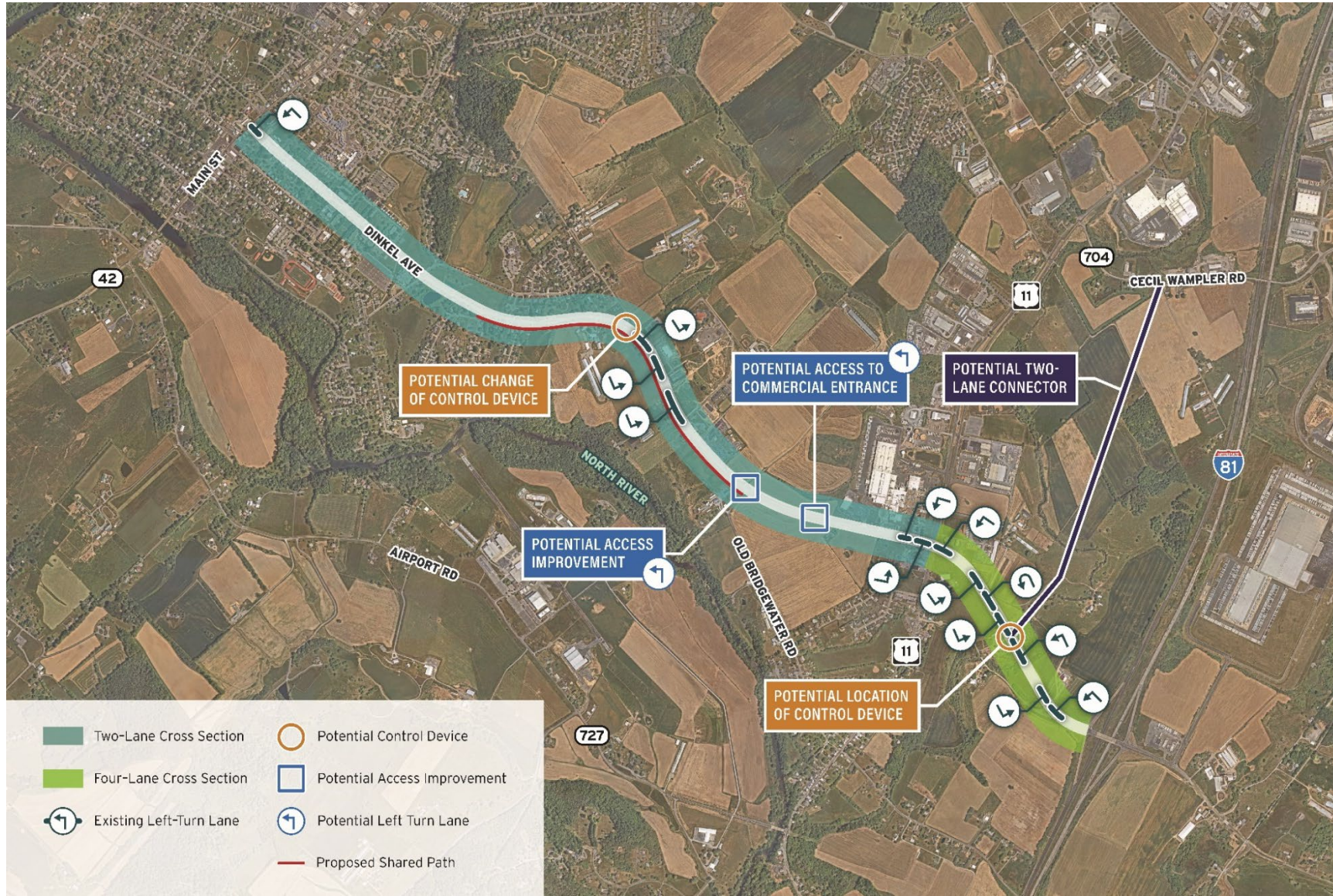
Potential 2045 Cross Section

Potential Pedestrian
Infrastructure



↑
TO US-11

Summary of Potential Improvements



Key Takeaways

- Existing and Future corridor operations are acceptable based on measures evaluated included Percent Time Spent Following LOS, v/c ratio, and modeled average speed
 - Expanding the cross section of Dinkel Avenue is not recommended based on developments considered in the future analysis
- Additional study needed to assess
 - Appropriate Traffic Control at Dinkel Ave and Mount Crawford Ave
 - Potential turn lane or access management improvements on corridor between Mount Crawford Ave and US-11

Opportunities for Future Studies

- Model updates in response to corridor land use changes or new developments
- Traffic control device study including signal justification report (SJR) at the following locations:
 - Dinkel Ave and Mt Crawford Ave
 - The future possible connector between Friedens Church Road and Cecil Wampler Road
- Access management evaluation for turn lanes and access points between Mount Crawford Avenue and US-11



Questions?

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