CAMPUS BICYCLE AND PEDESTRIAN PLAN

April 2014

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Executive Summary

Purpose of the Plan

James Madison University's Bicycle and Pedestrian Plan has been developed to promote multimodal transportation through the implementation of a variety of facility improvement and program development recommendations. The Plan includes short-term, mid-term, and long-term specific projects that have been detailed and prioritized. The Plan will be used by multiple campus organizations working together to improve JMU's transportation system and to achieve the University's commitment to sustainability. The Plan will also expand upon on recent facility improvements, and address the "5E's" of engineering, education, encouragement, enforcement, and evaluation to help enhance JMU's status as a Bicycle Friendly University, a designation received from the League of American Bicyclists (LAB).

Bicycle Pedestrian Advisory Committee (BPAC)

The Plan development was overseen by the Bicycle and Pedestrian Advisory Committee (BPAC) which was made up of faculty, staff, and representatives of various on/off campus organizations (Facilities Management, UREC, Business Operations, Public Safety, Student Life, Office of Disability Services (ODS), and Systems Administration), as well as the City of Harrisonburg staff and representatives from a local bicycle shop.

The BPAC met regularly over the course of the Plan development process to provide the vision, goals and objectives of the Plan; conduct surveys and collect data; assist in Plan outreach activities; identify needs, deficiencies, and opportunities on campus for bicycle and pedestrian improvements; and review Plan concepts and recommendations.

Plan Vision and Goals

One of the primary aspects of the overall Vision for the Plan is the need to develop an interconnected multimodal network linking destinations within the JMU campus and to the broader community. Throughout this process projects that connected the City and University came up as the highest priorities in public input sessions, and in discussions with stakeholders.

This Bicycle and Pedestrian Master Plan will guide future plans with a long-term physical and programmatic vision for our campus. The Plan will focus on developing/completing a seamless cycling network that emphasizes and creates short distances between residential buildings and popular destinations such as academic buildings, dining facilities, recreational facilities and transit stops. It will complement infrastructure planning with education, encouragement, enforcement and evaluation programs to increase usage. The vision inherent in the Plan is to:

- Promote sustainable campus mobility for on and off campus transportation
- Enable connectivity with supporting transit services
- Promote accessibility and ensure compliance with the Americans with Disabilities Act (ADA) for campus paths and streets
- Improve safety, quality of life, and promote health and well-being of the campus population

Survey Results

The University regularly surveys the campus population to obtain their perspectives towards alternative transportation. An active transportation survey was conducted in the spring of 2013, and a bicycle-pedestrian transportation survey was conducted in the winter of 2013-14. The survey results further reinforced the need to develop and implement a Bicycle and Pedestrian Plan for the University. Survey findings were used to formulate project recommendations and inform the entire planning process through BPAC meetings.

Existing Pedestrian and Bicycle Facilities

The pedestrian and bicycle facility network at JMU has developed incrementally over time, and includes a wide variety of facility types. Recent improvements have made significant progress in standardizing and connecting these amenities. Nevertheless, system gaps, user conflicts, and accessibility issues still need to be addressed. The hilly terrain at JMU also poses a challenge to system continuity and accessibility.

Existing facilities include wide walkways on the Quad, sidewalks along roadways, crosswalks, pedestrian signals, Bicycle Lanes, Shared Use Paths, and service drives, which are shared by University service vehicles, pedestrians, bicyclists, skate boarders and others. Walking, cycling, and skate boarding are popular means of transportation and recreation at JMU, and rely on this diverse and sometimes disconnected system of facilities. Recent projects such as the crosswalk and pedestrian signal on Carrier Drive demonstrate JMU's commitment to enhancing its pedestrian and bicycle network. In 2013, the League of American Bicyclists awarded JMU Bronze status as a Bicycle Friendly University.

The City of Harrisonburg's multimodal transportation network includes sidewalks, Bicycle Lanes, Shared Use Paths, crosswalks, and pedestrian signals. Recently, the City has installed Shared Lane Markings on several roadways near downtown. Many of the City facilities directly connect to the JMU campus. The City in 2010 adopted a Bicycle Pedestrian Master Plan, which was amended in 2011.

Projects In-Progress

The City of Harrisonburg is constructing (in phases) an off road Shared Use Path approximately 3.8 miles long, to connect the City's two universities - James Madison University and Eastern Mennonite University. The JMU campus is situated in the middle of this trail and will connect to the south (Bluestone Trail) and north (Northend Greenway). See Figure 9 for this connection, emphasized with a purple highlight.

The Bluestone Trail will be constructed from Stone Spring Road to Port Republic Road (Phase 1) which will connect with the southern edge of the JMU campus at the intersection of Port Republic Road and Bluestone Drive at the campus entrance. From this intersection the University is planning a combination of Shared Use Path (SUP), Bike Lanes, and sidewalks that will extend towards Carrier Drive in one direction, and the Quad in another direction. As part of this overall project, JMU is currently designing a shared use path along the north/west side of Bluestone Drive and the west side of Newman Lake; construction is anticipated in 2014.

The Northend Greenway will extend from Mount Clinton Pike along Blacks Run and terminate at Liberty Street near the Farmers Market. From the Farmers Market a connection is desired to the north side of the JMU campus; various options for making this connection or under evaluation.

The Harrisonburg-Rockingham Metropolitan Planning Organization (MRMPO) is currently finalizing a Bicycle and Pedestrian plan for the MPO region. Rockingham County is also working on its own Bicycle and Pedestrian

Plan. BPAC members are also participating with the development of the MPO's plan to ensure that recommended projects are consistent across jurisdictional boundaries including Rockingham County, the City of Harrisonburg, and James Madison University.

Plan Development

Campus Tours

The project team conducted several tours of the JMU campus (during summer, fall, and winter) to observe and photo-document existing facilities, peak and off-peak usage, and system gaps and deficiencies.

Data Collection and Review

In addition to the survey results described above, various sources of data provided valuable information in the development of project recommendations. These included: pedestrian and bicycle counts (taken by JMU students and also provided by the City); vehicle count and accident data provided by JMU, the City, and Virginia Department of Transportation (VDOT); and even user-provided path preference data provided via the JMU MOVES smartphone application.

Public Meetings

To solicit input from students, JMU employees, and the general public, open meetings were held at key points in the study process to help identify needs and to review preliminary project recommendations.

Plan Framework

The Plan Framework is the skeleton around which the project recommendations were developed. The Framework identifies a network of existing and future corridors that will ultimately serve the University bicycling and walking community by creating a safe, interconnected system for various users and skill levels.

The Plan Framework includes Primary and Secondary Corridors, which were developed by supplementing the JMU Comprehensive Master Plan path system with data and observations about existing multimodal conditions, as well as projected conditions.

Primary Corridors offer a direct route between major on and off campus origins and destinations, including the movement of community members through the JMU campus and connecting to downtown. The primary corridors often follow major vehicular routes and require dedicated bicycle and pedestrian facilities, such as Bicycle Lanes and Shared Use Paths, and high-level amenities to ensure safe travel. Examples of Primary Corridors on campus include: Bluestone Drive, Carrier Drive, Grace Street, Main Street, Mason Street, and Port Republic Road.

Secondary Corridors serve as connectors to the Primary Corridors. They also provide direct route connections to destinations not located along Primary Corridors. Secondary Corridors may contain dedicated bicycle and pedestrian facilities but could be served well by improvements such as Shared Lane Markings. Examples of Secondary Corridors on campus include: Champions Drive, Driver Drive, Duke Drive, Lakeside Service Drive, and Madison Drive.

The Primary and Secondary Corridors were used to identify specific projects in the JMU Bicycle and Pedestrian Master Plan. Existing facilities were overlaid on the Plan Framework to identify deficiencies and missing links

in the overall system. These deficiencies were verified through fieldwork and through comments and input from the campus community, the City and the BPAC.

Project Recommendations

Individual recommendations in this Plan are divided into bicycle projects and pedestrian projects for discussion, recognizing that the two modes function together and often intersect. The recommendations were built from the Plan Framework (see Section 4.2) and include improvements to infrastructure, ancillary facilities and amenities, programs and policies. See section 4.3 for pedestrian recommendations, section 4.4 for bicycle recommendations, and section 4.5 for recommended programs and policies.

This Plan includes recommendations for 28 JMU Campus projects and 27 City projects, with the overall intent to create an integrated multimodal network. The final list of recommended JMU Campus projects includes four (4) intersection (estimated cost $290,000) and one (1) corridor improvement project (estimated cost $350,000), as well as 1.04 miles of sidewalk (estimated cost $496,000), 0.54 miles of Bicycle Lanes (estimated cost $240,000), 0.74 miles of Shared Lane Markings (estimated cost $30,000), and 1.61 miles of Shared Use Path (estimated cost $2.03 million).

Recognizing that projects will evolve over time, these recommended JMU Campus projects have been divided by time frame and summarized in the following four tables. **In Progress** projects represent those that are currently under design/construction, such as the Newman Lake dam and the UREC building expansion. The four time frames refer to the 'Feasibility' column on Table 9.

In Progress	Cost Est
Intersection/Corridor Improvement	$ -
Bike Lane	$ -
Shared Lane Markings	$ -
Shared Use Path	$ 1,201,500
Sidewalk	$ 96,000
Misc.	$ -
Subtotal	**$ 1,297,500**

Projects for **FY 2015 – FY 2018** represent the 'High' feasibility category, which should require 1-3 years to implement. This category includes intersection and corridor improvements along Bluestone Drive and Carrier Drive, as well as sidewalk projects along Newman Drive, Champions Drive, and the Soccer Field Service Drive.

FY 2015 - FY 2018	Cost Est
Intersection/Corridor Improvement	$ 640,000
Bike Lane	$ -
Shared Lane Markings	$ 30,000
Shared Use Path	$ 150,000
Sidewalk	$ 280,000
Misc.	$ 60,000
Subtotal	**$ 1,160,000**

Projects under the **FY 2018 – FY 2026** represent the 'Medium' feasibility category, which should require 3-10 years to implement and will likely be revised over time. These types of projects will be more challenging to construct due to their length, coordination with adjacent projects, or relatively high costs. These projects include Shared Use Paths along Bluestone Drive and the Arboretum Trail, as well as Bicycle Lanes along University Drive, and a sidewalk extension along Duke Drive, through a parking lot.

FY 2018 - FY 2026	Cost Est
Intersection/Corridor Improvement	$ -
Bike Lane	$ 240,000
Shared Lane Markings	$ -
Shared Use Path	$ 680,000
Sidewalk	$ 120,000
Misc.	$ -
Subtotal	**$ 1,040,000**

Projects under the **FY 2026 and Beyond** represent the 'Low' feasibility category, which should require 10 or more years to implement for various reasons. The Grace Street Corridor is the only project within this category. This unique, long-range project is represented in the JMU Comprehensive Master Plan will likely be constructed in segments depend upon coordination with the City, adjacent building renovation projects, and other constraints.

FY 2026 and Beyond	Cost Est
Intersection/Corridor Improvement	$ 1,060,000
Bike Lane	$ -
Shared Lane Markings	$ -
Shared Use Path	$ -
Sidewalk	$ -
Misc.	$ -
Subtotal	**$ 1,060,000**

A summary table of estimated project costs by time frame is included below to summarize JMU's financial commitment to the improvement of bicycle and pedestrian infrastructure.

	Cost Est
In Progress	$ 1,297,500
FY 2015 - FY 2018	$ 1,160,000
FY 2018 - FY 2026	$ 1,040,000
FY 2026 and Beyond	$ 1,060,000
JMU Projects Total	**$ 4,557,500**

Recommended Project Summaries

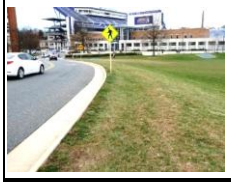
Projects within the next four pages are displayed in order of priority, using the criteria and ranking discussed in Section 5.3. These 28 projects represent the JMU Campus projects, as established by the BPAC with input from public outreach, campus surveys, and coordination with the City.

Each of these projects and descriptions are further defined in Tables 9 and 10 as well as displayed in Figure 10.

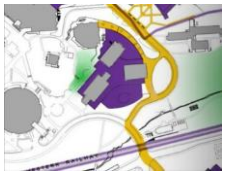
Project Description Table 1

DESCRIPTION	TYPE	LOCATION	TIME FRAME	COST	COMMENTS
PROJECT 1	**NEWMAN DAM GREENWAY TRAIL**				
	Construct a Shared Use Path (10-ft wide) with shoulders. Length: 0.17 mi. (900 ft.)	Newman Dam at Bluestone Drive along south side of Newman Lake and including Greek Row service drive	In Progress: design phase. Scheduled for construction during summer 2014	Funded as part of Newman Dam project	Provides interconnectivity between the Bluestone Trail and West Campus
PROJECT 2	**NEWMAN DRIVE TO BLUESTONE DRIVE**				
	Construct a wide sidewalk on east side of Newman Drive. Length: 0.07 mi. (370 ft.)	Newman Drive from the Greek Row service drive at the NS Railroad, and crossing Bluestone Drive	FY 2015- FY 2018: to complete interconnectivity	$ 40,000	Connects the Newman Dam Greenway Trail to the Quad
PROJECT 3	**NEWMAN DRIVE CROSSING AT BLUESTONE DRIVE**				
	Install pedestrian crosswalk and align with existing sidewalks.	Newman Drive at Bluestone Drive	FY 2015- FY 2018: to complete interconnectivity	$ 20,000	Connects the Newman Dam Greenway Trail to the Quad
PROJECT 4	**MADISON DRIVE AND MASON STREET SHARED LANE MARKINGS**				
	Install Shared Lane Markings (sharrows). Length: 0.09 mi. (475 ft.)	Top of Quad on Madison Drive and extending out Mason Street to MLK Way	FY 2015- FY 2018: to complete interconnectivity	$ 10,000	High bicycle and pedestrian traffic area. Connects the Quad to the City.
PROJECT 5	**ARBORETUM TRAIL SHARED USE PATH**				**FOCUS AREA PROJECT**
	Convert off-road trail into paved Shared Use Path with lighting and signage. Length: 0.32 mi. (1,700 ft.)	End of pavement near Neff Ave to University Blvd	FY 2018- FY 2026	$250,000	High level of survey response and public comments received
PROJECT 6	**BUTLER AVE SHARED USE PATH - BLUESTONE TRAIL CONNECTION**				
	Connect with Bluestone Trail through R2 parking lot. Length: 0.22 mi. (1,170 ft.)	Hillside Dr connecting with Port Repubic Rd	In Progress: design phase. Scheduled for construction during summer 2014	Funded as part of Bluestone Trail project	Connects Bluestone Trail with Newman Dam project
PROJECT 7	**VILLAGE SERVICE DRIVE SEPARATED BICYCLE PATH**				
	Convert existing sidewalk into separated two-way bicycle path and pedestrian path. Length: 0.20 mi. (1,100 ft.)	Between Carrier Dr and Bluestone Dr intersection with railroad crossing	FY 2015- FY 2018: Perform pilot study in the near-term.	$ 40,000	Coordinate with long term redevelopment of Village Hill area

Project Description Table 2

DESCRIPTION	TYPE	LOCATION	TIME FRAME	COST	COMMENTS
PROJECT 8	**NEWMAN DAM SHARED USE PATH AND WIDE SHOULDER**				
	Construct new Shared Use Path along north side of roadway. Length: 0.12 mi. (600 ft.)	Intersection with Port Republic Rd to Lakeside Service Dr (Sonner)	High: In design phase. Scheduled for construction during summer 2014	Funded as part of Newman Dam project	Project will also provide wide shoulder along south side of roadway
PROJECT 9	**STUDENT SUCCESS CENTER SIDEWALK CONNECTION**				
	Construct sidewalk and improve channelization of pedestrians crossing the roadway. Length: 0.04 mi. (200 ft.)	Between Montpelier Hall and the Grace St Parking Deck	FY 2015- FY 2018: Heavy pedestrian area	$ 30,000	Lack of existing sidewalk encourages pedestrians to walk within the roadway
PROJECT 10	**CARRIER DRIVE CORRIDOR IMPROVEMENT**				**FOCUS AREA PROJECT**
	Convert to standard crosswalks, improve pedestrian channelization, and add raised crosswalks where practical. Length: 0.53 mi. (2,800 ft.)	Between CISAT transit shelter and Festival Conference and Student Center	FY 2015- FY 2018: Very heavy pedestrian activity, especially at class change times	$350,000	Needs consistent, standard design for entire corridor
PROJECT 11	**BLUESTONE DRIVE SHARED USE PATH - PHASE 2**				
	Extension of Shared Use Path along north side of Bluestone Dr. Length: 0.27 mi. (1,440 ft.)	Between Lakeside Service Dr (Sonner) and Carrier Dr intersection	FY 2018- FY 2026	$200,000	Parking removal will be needed. Extension of Newman Dam SUP project
PROJECT 12	**BLUESTONE DRIVE SHARED LANE MARKINGS**				
	Install Shared Lane Markings through campus. Length: 0.50 mi. (2,620 ft.)	Between South Main Street and Duke Dr/railroad crossing	FY 2015- FY 2018: Relatively easy project with high visibility for the campus population	$ 10,000	
PROJECT 13	**BLUESTONE/CARRIER INTERSECTION**				**FOCUS AREA PROJECT**
	Improvements to intersection geometry, standard crosswalk treatments, pedestrian channelization and high intensity street lights.	Intersection of Bluestone and Carrier Dr	FY 2018- FY 2026	$140,000	Coordinate with adjacent shared use path projects along Bluestone Dr
PROJECT 14	**CHAMPIONS DRIVE SIDEWALK**				
	Connect sidewalk gap Length: 0.06 mi. (300 ft.)	North side of roadway between Bluestone Dr and football stadium	FY 2015- FY 2018:	$ 30,000	Students currently walk in roadway or across grass because sidewalk does not exist

Project Description Table 3

DESCRIPTION	TYPE	LOCATION	TIME FRAME	COST	COMMENTS
PROJECT 15	**SIDEWALK CONNECTIONS AROUND SOCCER FIELD SERVICE DRIVE**				
	Connect with sidewalks along Carrier Dr, and discourage walking within parking lot. Length: 0.40 mi. (2,100 ft.)	C11 and C12 parking lots near Soccer Fields	FY 2015- FY 2018: Avoid the removal of parking by providing sidewalk around the perimeter of lot	$180,000	Topography constraints. Connects with adjacent shopping center
PROJECT 16	**BLUESTONE/RAILROAD INTERSECTION**				
	Improve pedestrian channelization at signalized intersection and provide standard crosswalk treatments	Intersection of Bluestone and Duke Dr at railroad crossing	FY 2015- FY 2018: Highest bicycle and pedestrian count location	$110,000	Study intersection for possible improvements
PROJECT 17	**CARRIER DRIVE/VILLAGE HILL CROSSING INTERSECTION**				
	Improve pedestrian channelization at signalized intersection.	Intersection of Carrier Dr at Village Hill (north of I-81)	FY 2015- FY 2018:	$ 20,000	Study intersection for possible improvements
PROJECT 18	**BLUESTONE DRIVE SHARED USE PATH - PHASE 3**				
	Extend Shared Use Path created by two previous projects to Duke Dr intersection. Length: 0.16 mi. (800 ft.)	Between Carrier Dr intersection and Duke Dr/railroad; partially through Godwin parking lot	FY 2018- FY 2026: Provides interconnectivity with adjacent projects	$120,000	May require the loss of parking spaces or redesign of parking lot
PROJECT 19	**DUKE DRIVE SIDEWALK CONNECTION**				
	Extend existing sidewalk to Paul St intersection and connect with existing. Length: 0.11 mi. (600 ft.)	Between sidewalk dead end (C5 parking lot) and Paul St	FY 2018- FY 2026	$ 50,000	Students currently walk through parking lot. May require shifting of parking spaces
PROJECT 20	**GRACE STREET CORRIDOR IMPROVEMENTS**				
	Extend roadway around Warren Hall and improve entire corridor for transit, bicycle, and pedestrian amenities. Length: 0.69 mi. (3,600 ft.)	Between High St (South) and new intersection with Bluestone Dr near Mr. Chips	FY 2026 & Beyond: Long-term project	$ 1.06 million	Very long-term project requiring coordination
PROJECT 21	**UNIVERSITY BOULEVARD BICYCLE LANES**				
	Work with City to provide bicycle lanes along University-maintained portion of roadway. Length: 0.54 mi. (2,800 ft.)	Between Convocation Center and CISAT Service Dr	FY 2018- FY 2026	$240,000	Coordinate with City and connect with future adjacent bicycle lane projects

Project Description Table 4

DESCRIPTION	TYPE	LOCATION	TIME FRAME	COST	COMMENTS
PROJECT 22	**SHARED USE PATH CONNECTION TO SOCCER FIELDS**				
	Formalize worn path and connect with existing Shared Use Path. Length: 0.06 mi. (300 ft.)	Between Reservoir St near Walmart and C11 parking lot near Soccer Fields	FY 2015- FY 2018: Connect with adjacent shopping center	$ 50,000	Topography constraints. Existing worn path created by students
PROJECT 23	**DUKE DRIVE/VILLAGE HILL SHARED USE PATH CONNECTION**				
	Construct new Shared Use Path and connect with existing sidewalks. Length: 0.15 mi. (800 ft.)	Connects Carrier Dr and Duke Dr between Village Hill and R1 parking lot	FY 2018- FY 2026: Depends upon future projects in the vicnity	$110,000	Coordinate with future Village Hill redevelopment and potential future parking garage
PROJECT 24	**CHAMPIONS DRIVE SHARED LANE MARKINGS**				
	Install Shared Lane Markings (sharrows). Length: 0.15 mi. (800 ft.)	Between Bluestone Dr and Lakeside Service Dr near football stadium	FY 2015- FY 2018: provides interconnectivity with adjacent projects	$ 10,000	Encourage bicyclist to use the roadway and not the (new) sidewalk
PROJECT 25	**REFUSE PLANT SHARED USE PATH**				
	Establish a path uphill for pedestrians. Length: 0.14 mi. (750 ft.)	Driver Dr uphil to CISAT Service Dr	FY 2015- FY 2018: Relatively high visibility project	$100,000	Topography constraints. Existing worn path created by students
PROJECT 26	**CARRIER LIBRARY SIDEWALK IMPROVEMENTS**				
	Improve sidewalk connection from Quad to Grace St. Length: 0.14 mi. (800 ft.)	Rear of Carrier Library near Phillips Hall and Parking Lot E	FY 2018- FY 2026: Depends upon future projects in the vicnity	$ 70,000	Topography constraints. BPAC project recommendation
PROJECT 27	**FUTURE UREC EXPANSION SIDEWALK**				
	Construct new sidewalk around the front of the future UREC expansion building Length: 0.23 mi. (1,200 ft.)	Connects Driver Dr with Convocation Service Dr, around the south side of building	In Progress: Relatively high visibility project	Funded as part of UREC Expansion project	Ensure direct pedestrian connectivity
PROJECT 28	**CISAT SERVICE DRIVE STAIR CHANNEL**				
	Install narrow channel along handrail to guide bicycle tires up stairs. Enables bicyclists to walk (not carry) bicycle up the stairs.	Stairs between CISAT Service Dr and Driver Dr	FY 2015- FY 2018: Represents low-hanging fruit project	$ 20,000	Several potential design options for retrofitting stairs with this amenity

Programmatic Recommendations

While the facility recommendations described above address the engineering "E", this Plan also focuses on education, encouragement, enforcement, and evaluation. JMU currently undertakes a variety of activities in these areas; the following represent enhancements to those ongoing efforts. These programmatic improvements are an integral part of the overall active transportation framework identified in this Plan, and they should be undertaken concurrently with the above infrastructure improvements.

Educational Programs Summary

- Coordinate efforts with existing Health 101 and Wellness Passport Programs
- Coordinate with existing groups such as Earth Club and Adventure Club
- Coordinate with VDOT Staunton District Bicycle and Pedestrian Coordinator
- Coordinate with City of Harrisonburg for continuity of trails and wayfinding across campus boundaries
- Identify the various lead departments or delegated staff to champion each effort
- Obtain a certified League Cycling Instructor (LCI) and offer cycling skills classes
- Attend first-year and transfer student Orientation events and provide information or branded SWAG
- Attend off campus events such as the Block Party in the Burg
- Organize an Active Transportation Ambassador Program and coordinate with Residence Life
- Organize informational outreach through social media outlets
- Include vehicular (motorist) educational outreach in addition to bicyclists and pedestrians

Encouragement Programs Summary

- Develop a more comprehensive active transportation map for the campus vicinity
- Establish an alternative transportation benefits club (Commuter Alternatives Program) to consolidate all incentives into a single program and designate an administrator or agency
- Expand the Guaranteed Ride Home program
- Coordinate with Parking Services and investigate parking permit restrictions for commuting students who live very close to campus
- Identify potential locations for various amenities:
    - bicycle maintenance station, as well as multiple repair kiosks across campus
    - retrofit locations of covered bicycle racks
    - indoor bicycle cage for long-term storage (summer break)
    - commuter bicycle storage lockers and shower facilities
- Formalize the process for bicycle rack requests, and develop a list of potential locations for installation when funding becomes available
- Formalize the process for minor maintenance and repair efforts through a single crowd-sourcing application such as SeeClickFix or similar applications
- Organize a bike/walk day or weekly event; possibly coordinate with Earth Week

Enforcement Programs Summary

- Coordinate efforts with Public Safety and focus on a stewardship program rather than strict enforcement
- Organize targeted enforcement efforts for congested areas of campus
- Promote the bicycle patrol unit of the Campus Police, and have them serve as stewards for demonstrating bicycling safety on campus
- Distribute the 'Rules of the Road' information cards as handouts to increase awareness

- Investigate a citation warning system (no fee) that includes a coupons for purchase of bicycle helmet or other safety items such as reflectors, or flashing lights
- Investigate other ticket diversion programs that will waive the citation by taking a bicycle education course (Bike Traffic School at UC Davis)
- Encourage the greater participation in the bicycle registration process to aid in theft recovery and authorize the full list of incentives that are available to registered alternative commuters
- Revise the JMU Student Handbook as needed to reflect the above changes

Evaluation Programs Summary

- Continue active transportation surveys
- Document number of participants at orientation and other active transportation events
- Measure the construction of new infrastructure by year, project length, and cost
- Document, prioritize and respond to requests for bike racks and other amenities
- Designate a Bicycle and Pedestrian Coordinator
- Apply for Silver level Bicycle Friendly University status
- Monitor and update this Plan

Implementation Plan

Both funding and staff time can be major constraints for planning and implementing improvements. Some recommendations could be started immediately while others must await campus capital projects. It is therefore important to evaluate, plan and prioritize projects.

The implementation plan suggests a method for carrying out each of the recommendations, including the feasibility (high, medium, and low), cost category, and coordinating agencies (City or VDOT) required. For most of the recommendations, James Madison University will need to take the lead, but often coordination will be required with the City or VDOT.

There are a variety of potential funding sources for campus bicycle and pedestrian improvements. Some of them are internal campus funds for capital improvement projects, others may be the Virginia Department of Transportation (VDOT) funds, and others may be grants or funds made available through partnerships. Section 5.2 discusses potential funding sources for bicycle and pedestrian projects.

Observations and Recommendations

A position of Bicycle and Pedestrian Coordinator should be established, and tasked with hosting continual BPAC meetings, liaison with other JMU departments, and serve an active role in the construction and implementation of the recommended projects and related programs or initiatives.

A variety of campus-wide projects are recommended that support the vision and goals of this plan and complement the facilities and programs described in other sections of this report. Each of the following topics should be separately studied in greater detail because they involve unique site conditions, and will likely involve multiple campus departments. These campus-wide projects represent ‘low-hanging fruit’ that were not included within the prioritization process because they were too numerous and would detract from the recommended projects list (Table 9).

Wayfinding Study

A comprehensive wayfinding study is needed for all modes of transportation across the JMU campus and the City of Harrisonburg. Beginning with the adoption of exterior signage guidelines, JMU should identify a variety of pedestrian-scaled wayfinding signage in addition to bicycle routing and vehicular sign types.

Accessibility Audit

Ensuring accessibility of all crosswalks, curb ramps, and sidewalks is a shared goal of the Office of Disability Services and this plan. A campus-wide audit of streets and sidewalks will have a mutually-beneficial outcome, to formulate a list of short-term improvements that are separate from the recommended projects in this plan.

Crosswalk Audit

This audit should focus on the standardization of crosswalk treatments, and the removal of unsafe crossings due to visibility, accessibility, or other constraints. One example of these types of projects would be the removal of the Champions Drive speed hump and replacement with a standard designed raised crosswalk. A review of the current traffic signal timing by a certified traffic engineer should also be conducted for intersections maintained by JMU, to determine if adequate time is provided for the pedestrian phase.

Champions Drive speed hump

Street Lighting and Callbox Plan

A campus-wide inventory of existing street lighting and callboxes is needed, in addition to new locations that may be observed. Crime Prevention Through Environmental Design (CPTED) concepts should be referenced to provide guidance, as needed.

Future Bicycle Amenity Locations

A list of potential locations for other bicycle amenities, such as covered bicycle racks, repair stations, bicycle locker locations, or commuter shower and changing room facilities should be generated. The list should be audited regularly based on utilization, and locations of highest use should be prioritized, and installed as funding becomes available.

Report Outline

The remainder of this report is presented with more detail and context relating to the planning process that was followed. The report sections are organized in the following order:

1. Introduction and Background
2. Existing conditions
3. Future conditions
4. Recommended projects and programs
5. Implementation

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1 INTRODUCTION AND BACKGROUND

1.1 Plan Development

The JMU Bicycle and Pedestrian Plan was developed over the course of approximately ten months with the input of many members of the University and the Harrisonburg community. These inputs were essential for meeting the transportation needs of the University and the surrounding area, as well as achieving transportation sustainability over the long term.

The Plan development was overseen by the Bicycle and Pedestrian Advisory Committee (BPAC) which is made up of faculty, staff, and representatives of various on/off campus organizations (Facilities Management, UREC, Business Operations, Public Safety, Student Life, Office of Disability Services (ODS), and Systems Administration), as well as the City of Harrisonburg staff and representatives from the Shenandoah Bicycle Coalition as well as a local bicycle shop.

The BPAC met regularly over the course of the Plan development process to provide the vision, goals and objectives of the Plan; conduct surveys and collect data; assist in Plan outreach activities; identify needs, deficiencies, and opportunities on campus for bicycle and pedestrian improvements; and review Plan concepts and recommendations.

1.2 Purpose of the Plan

James Madison University's Bicycle and Pedestrian Plan has been developed to promote bicycle and pedestrian transportation through the implementation of a variety of facility improvement and program recommendations. The Plan includes short-term, mid-term, and long-term specific projects that have been detailed and prioritized. The Plan will be used by multiple campus organizations (e.g. Public Safety, Campus UREC, ODS, Parking Services, Residence Life) working together to improve the campus' bicycle and pedestrian transportation system and to achieve the University's commitment to sustainability and accessibility.

1.3 Campus History and Context

The JMU Bicycle and Pedestrian Master Plan presents opportunities to enhance bicycle and pedestrian mobility and safety as the campus continues to grow and develop. As growth has expanded from the original campus core, different campus neighborhoods have developed over time, presenting a host of transportation challenges. Through the process of renovating existing buildings and the construction of new buildings, opportunities have emerged to add green space and reconnect pedestrian and bicycle paths. The developers of the JMU Bicycle and Pedestrian Plan recognized these challenges and built on previous and continuing efforts to create a campus that is multimodal, connected and safe.

1.4 Plan Vision

The Plan development was overseen by the Bicycle and Pedestrian Advisory Committee (BPAC) which was made up of faculty, staff, and representatives of various on/off campus organizations (Facilities Management, UREC, Business Operations, Public Safety, Student Life, and Systems Administration), as well as the City of Harrisonburg staff and representatives from a local bicycle shop.

The BPAC met regularly over the course of the Plan development process to provide the vision, goals and objectives of the Plan; conduct surveys and collect data; assist in Plan outreach activities; identify needs, deficiencies, and opportunities on campus for bicycle and pedestrian improvements; and review Plan concepts and recommendations. The vision inherent in the Plan is to:

BPAC Meeting

- Promote sustainable campus mobility for on and off campus transportation
- Enable connectivity with supporting transit services
- Ensure compliance with the Americans with Disabilities Act (ADA) for campus paths and streets
- Improve safety, quality of life, and promote health and well-being of the campus population

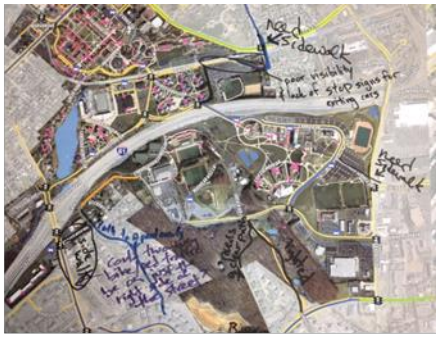
1.5 Goals and Objectives

To support the Plan's Vision, the BPAC developed these Goals and Objectives:

- Goal 1: Promote safety, accessibility, and convenience for bicyclists, pedestrians, and users of mobility devices
    - Objective 1.1: Identify and study intersections with safety and accessibility concerns
    - Objective 1.2: Retrofit existing and coordinate future transit facilities with supportive amenities for bicycle, pedestrian, and users of mobility devices
    - Objective 1.3: Improve bicyclist and pedestrian safety through increased enforcement of the 'rules-of-the-road'
- Goal 2: Establish connections to the City of Harrisonburg's bicycle and pedestrian facilities
    - Objective 2.1: Review and incorporate recommendations from the City of Harrisonburg Bicycle and Pedestrian Plan (adopted 2010)
    - Objective 2.2: Establish on-going dialog with the City's Bicycle and Pedestrian Subcommittee
    - Objective 2.3: Coordinate with Harrisonburg-Rockingham Metropolitan Planning Organization (HRMPO) bicycle and pedestrian planning process
- Goal 3: Enhance the comprehensive system of bicycle and pedestrian facilities on campus
    - Objective 3.1: Identify and connect gaps between existing facilities
    - Objective 3.2: Engage the campus population to provide input on improvements
    - Objective 3.3: Conduct a transportation survey of the campus population
    - Objective 3.4: Prioritize improvement projects for existing facilities and amenities, as well as future construction
    - Objective 3.5: Seek Silver-level Bicycle Friendly University status
- Goal 4: Develop strategies for education and encouragement programs
    - Objective 4.1: Identify peer University best practices
    - Objective 4.2: Coordinate with the city and other state government agencies on community and regional bicycle and pedestrian programs
    - Objective 4.3: Use marketing strategies to promote the culture of bicycling among the campus population

1.6 Outreach Activities

The development of the Plan included several major outreach efforts which are summarized below.



Public comments from campus outreach

Campus Events

In order to receive input and feedback from the broader campus population, two campus outreach events were held. These two events are described in more detail in section 2.3, and the comments received are summarized in Appendix 1.

JMU Moves Smartphone App

The JMU Moves smartphone app is a tool that utilized the GPS capabilities of internet-enabled phones to follow the travel paths of (consenting) participants while making their trips to/from campus. These data were overlaid onto a campus map using geographic information system (GIS) software to visualize the qualitative and quantitative information provided. More than 70 pedestrian trips and more than 125 bicycle trips were logged by 55 different users (unique mobile devices) during the fall 2013 semester.

The pattern of routes through campus was used to inform the BPAC and the consulting design team on the preferred pathways, or possible barriers to mobility, which were then used to prioritize future recommended projects.

JMU MOVES App results
Pedestrians – Yellow
Bicyclists - Blue

Campus Surveys

Two campus-wide surveys were distributed to gauge current travel patterns, determine attitudes about bicycle and pedestrian travel on campus, and solicit ideas for improvements. Summary results are shown in Section 2.2 and the full results are detailed in Appendix 2 and 3.

1.7 Background Resources

The JMU Bicycle and Pedestrian Plan was not developed in isolation – many other plans, documents, and resources were consulted as part of the plan development process. Some of the key companion resources are included:

- James Madison University, *Comprehensive Master Plan (2009)*
- City of Harrisonburg, *Bicycle and Pedestrian Plan (2010)*
- City of Harrisonburg, *Blacks Run Greenway Master Plan (2002)*
- Harrisonburg-Rockingham Metropolitan Planning Organization, *Bicycle and Pedestrian Plan (on going)*
- Various University capital improvement project documents

2 EXISTING CONDITIONS: *WHERE WE ARE*

2.1 Introduction

This section describes the existing bicycle and pedestrian facilities and programs at James Madison University. The purpose is to provide a context to important social, physical, or programmatic elements of mobility and incorporate them into development of this plan.

2.2 Survey Results

The University is continually surveying the campus population to obtain their perspectives towards alternative transportation. An Active Transportation survey was conducted in the spring of 2013, and a bicycle-pedestrian transportation survey was conducted in the winter of 2013-14.

Active Transportation Survey (Spring 2013)

A bulk email invitation was sent to all JMU students and employees to participate in an online survey of transportation conditions at James Madison University. The survey remained open for four weeks between March and April 2013, and received survey responses from 633 individuals, of which 54% were students and 46% were employees. Full survey results are included in Appendix 2 and 3. Key findings include the following:

A majority of respondents currently live within a three (3) mile ride to campus (69%), a distance that is ideal for bicycling, while only 10% live five (5) or more miles from campus. Currently 48% of respondents walk to campus, though a higher percentage aspire to walk more frequently (66%). The same desire was indicated for those who currently ride a bicycle (37%) and those who aspire to ride more frequently (66%). This trend indicates that there are some barriers (either physical or psychological) to promoting biking and walking.

Motorists are perceived as the greatest safety concern to respondents who walk (42%) and bicycle (35%). A higher percentage of respondents indicated that they feel safe walking on-campus (96%) as compared to walking off campus (71%). A similar trend was also indicated by respondents feeling safe bicycling on-campus (68%), as compared with off-campus (41%). Remaining barriers to bicycling include: bad weather (17%), other transportation modes are faster (16%), or a lack of existing infrastructure (e.g. bicycle lanes) off-campus (11%).

Potential improvements to encourage respondents to bicycle more frequently included more bicycle lanes or off-road paths (48%), covered and secured bicycle parking (38%), or changing facilities and showers (21%). Some respondents indicated that they would not ride a bicycle to campus (24%) regardless of improvements.

Bicycle and Pedestrian Transportation Survey (Winter 2013-14)

A different survey was administered between December 2013 and February 2014 to address bicycle and pedestrian transportation specifically. This survey yielded 684 student and 571 employee respondents. Some of the key findings include the following:

Survey respondents were asked how they travel to/from campus, and they were allowed to select more than one mode, which means that the sum of percentages will add to more than 100%. The most frequent student responses were by bus (46%), followed by car (43%), walk (33%), bike (7%), carpool (7%) and other (2%).

Employees were similarly asked how they travel to/from campus and the most frequent response was by car (88%), followed by walk (7%), carpool (5%), bike (4%), bus (3%) and other (2%).

While on campus students indicated that they would either walk (79%) or ride the bus (50%) between buildings, and only 7% respondent that they would drive their car. Employee respondents indicated that walking (65%) was also their primary mode of transportation while on campus, however a much smaller percentage indicated that they used the bus (13%), and a much larger proportion indicated that they drive their car while on campus (33%).

Student respondents indicating that they move their vehicle to a different location on campus once (22%) or twice (6%) represent a potential market for improving bicycling on campus. Employee respondents were asked the same question and the results were lower, employees relocated their vehicle once (19%) or twice (2%).

Physical improvements that would encourage more bicycling to campus included improved transit service (66%) as compared with improved bicycle lanes and facilities (10%). These results may appear to contradict the results from the previous survey, however this question did not allow for multiple answers, meaning that improved transit was more heavily favored as the single alternative.

The length of time between classes (15-minutes) was also mentioned as a possible barrier. Respondents indicated that they would be more likely to walk if they could make it to class on time (58%), if there were more sidewalks (14%), or if they lived closer to campus (12%).

When asked about the gating of West Campus, more respondents agreed (40%) that it has been a positive decision, compared with those who disagreed (28%). When asked about whether they believe that the East Campus should be gated however, more respondents disagreed (72%) than agreed (9%).

2.3 Public Outreach Results

At the beginning of the Plan development process, two campus outreach events were held to solicit public comments and identify key locations or corridors for further evaluation. The first event took place on October 15, 2013. Faculty, staff, students, and visitors were able to view maps of existing bicycle and pedestrian facilities, make comments on needs and deficiencies, and document ideas for improvements. Improvements included the addition of Bicycle Lanes or Shared Lane Markings, sidewalk or Shared Use Path connections, and preferred new bicycle rack locations. Some of the key findings included:

- Need for bicycle dismount zones, including at the Duke Dog Tunnel, the Village Hill, and the Bluestone Campus quad (during certain times)
- Requests for covered bicycle racks, storage lockers, repair stations and other amenities
- Identification of campus locations with poor visibility between motorists and bicyclists
- Strong desire for connecting existing sidewalks and Shared Use Paths, both on and off campus

Public outreach meeting

The second event was held November 20, 2013. Attendees were asked to review (a) preliminary findings of the JMU Moves App, (b) draft framework plan corridors, and (c) draft recommendations based on the previous surveys, BPAC meeting discussions, and other inputs.

2.4 Campus Demographics

James Madison University has the sixth (6th) largest enrollment of students of the 15 Virginia public University system schools, and is continuing to grow (Table 1). The current campus population, including students, staff,

and faculty is approaching 23,000. James Madison functions much like a small city during the academic year, and efficient mobility across campus is important to everyday operations.

Table 1: Recent Enrollment Trend

	2013	2012	2011	2010	2009	2008	2007	2006	2005
Students	19,484	19,258	18,996	18,671	18,232	17,964	17,428	16,970	16,546
Employees	*3,060**	2,956	2,881	2,805	2,807	2,772	2,633	2,537	2,423
Total Population	**22,544**	**22,214**	**21,877**	**21,476**	**21,039**	**20,736**	**20,061**	**19,507**	**18,969**

Data Source: JMU Quick Facts website http://www.jmu.edu/instresrch/factsfig.shtml

**= estimated employee population*

Populations

One purpose of the JMU Bicycle and Pedestrian Plan is to remove barriers that discourage alternative modes (alternative to single occupancy vehicles) of transportation, whether commuting to/from campus or between campus class rooms and residence halls. The campus population exhibits differing commuting patterns depending on whether they are resident or commuter students, or different kinds of employees.

Resident students are by definition already living on campus and do not commute to campus each day. Although some may store their vehicle on campus, resident students primarily walk, bike, or ride the bus as they travel between campus locations. Freshman are not eligible for parking permits as a means of controlling parking demand and (hopefully) instill bicycling and walking as an alternative means of transportation.

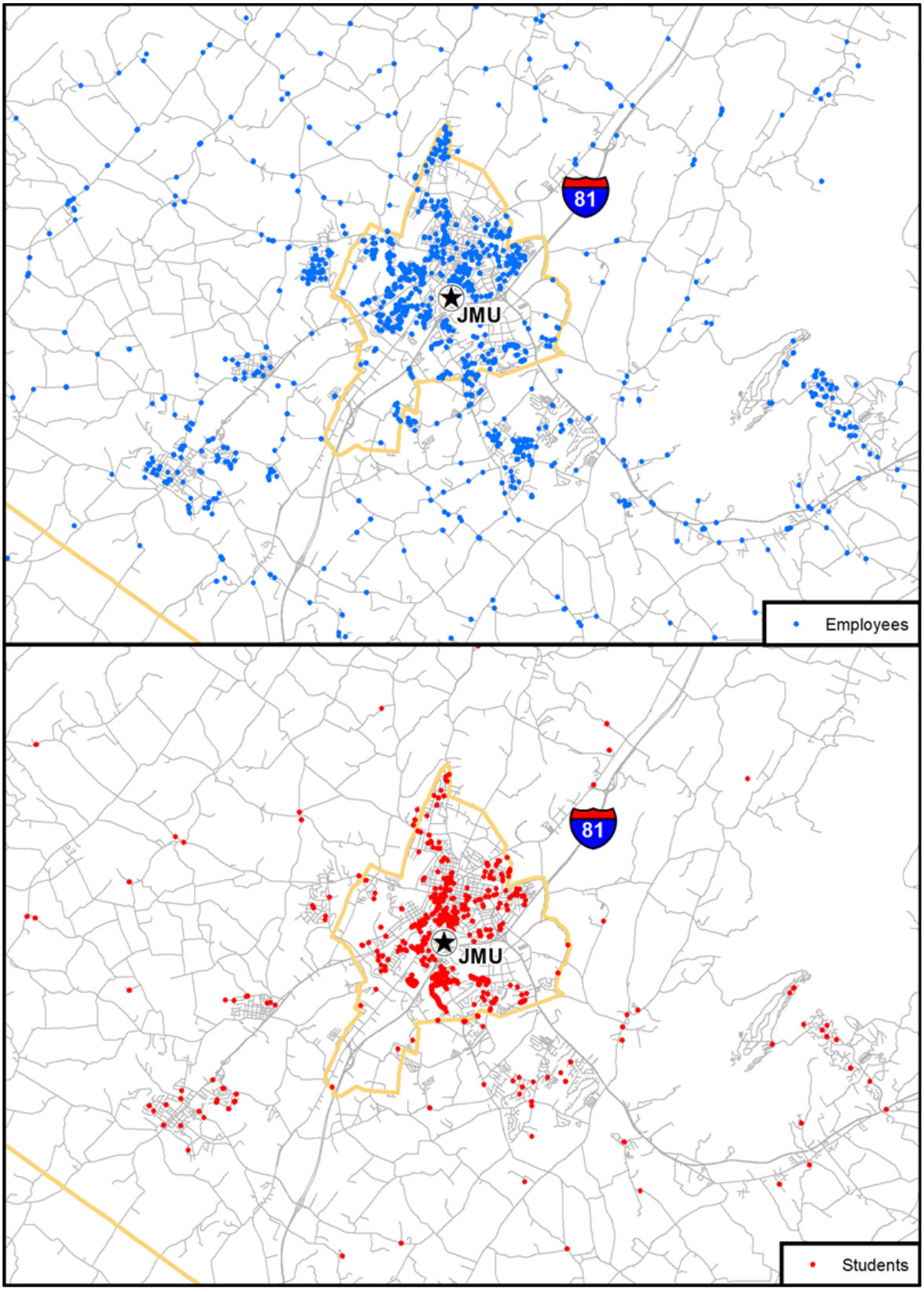
Commuter students constitute the largest population group (about 70%) and commute to campus during the week depending upon individual class schedules. The distances from campus combined with whether their off campus apartments are serviced by transit are key determinants as to whether these students choose to drive or not (parking availability is also a factor in these determinations).

Employees routinely commute to campus each workday, and typically prefer to commuter by automobile, which provides a high level of personal convenience and flexibility. This Plan is intended to remove barriers that may discourage employees from walking or biking from their homes or as well as traveling to/from campus meetings throughout the day.

Where Employees and Students Live (Geocoding Analysis)

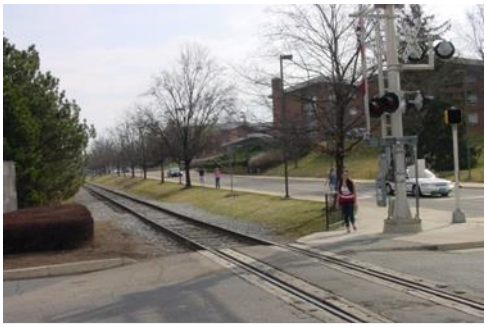
A database of student and employee residential addresses was used for the purpose of identifying possible biking or walking demand areas. The database was geo-referenced with latitude/longitude coordinates using ArcGIS software for mapping purposes. Figure 1 displays the geocoding analysis map from this exercise, centered on the James Madison University campuses. Employee residential locations are relatively distributed around the City and county, meaning that it will be more challenging to convert them from driving to an alternative mode of transportation. Student residential locations however are much more concentrated to the southwest (Port Republic Rd corridor) and southeast (Neff Ave near Reservoir St) of campus, which represented 33% and 12% of the geocoded addresses respectfully. Marketing of alternative modes of transportation should target commuting students living within off campus apartments in these locations.

Figure 1: Residential Address Geocoding Analysis



2.5 General Roadway Conditions and Parking

The physical layout of the campus presents a number of challenges and barriers for pedestrians. Interstate 81 and the railroad tracks, running roughly parallel to each other through campus, create three distinct physical areas. While some pedestrians cross over I-81 on Carrier Drive, others use the pedestrian underpass that connects to the University Recreation (UREC) Center. Because the number of trains operating through campus daily is variable and minimal, pedestrians cross the railroad tracks freely at various uncontrolled points along the stretch through campus.



Railroad crossing near Duke Drive

James Madison University is surrounded (and in some instances separated) by thoroughfares including University Boulevard, Neff Avenue, Port Republic Road (VA-253), South Main Street (US-11), South High Street (Route 42). On the positive, the resident JMU and City population is large enough to support a robust transit system that operates through and near the University, as well as adjacent neighborhood housing for students and employees. JMU contracts with the Harrisonburg Department of Public Transportation (HDPT) for transit service. In 2013 HDPT handled approximately 2.7 million riders, approximately 90% of which were associated with the University.

Functional classification of roadways (Figure 2) involves the grouping of roadways according to their characteristics of travel as set by Federal guidelines. Functional classification is one resource that is used to determine funding for roadway improvements and maintenance. There are three basic functional classification categories: arterials (high mobility), collectors, and locals (high access), with additional categories for interstates and other freeways/expressways, since these are unique facilities. As mentioned above, James Madison University is surrounded on four sides by minor arterials, Port Republic Road, South High Street, MLK Way/Reservoir Street, and Neff Avenue. Internal streets such as University Boulevard, Carrier Drive, Bluestone Drive and Duke Drive are all classified as minor collectors.

Port Republic Road near I-81 interchange

Major Circulation Patterns – East to West

Port Republic Road (VA-253) and Main Street (US-11) are the most heavily utilized roadways near the University based on VDOT Average Daily Traffic (ADT) counts (Figure 3). Port Republic Road includes an interchange with I-81, and functions as a four lane undivided minor arterial traveling along the western edge of campus. Main Street supports traffic from the south side of Harrisonburg heading toward downtown, functioning also as a four lane minor arterial. Due to safety

Main Street pedestrian channelization fence

concerns a pedestrian channelizing fence was installed within the median of Main Street to prevent mid-block crossing of students and employees.

The CISAT Campus is separated from the center of the traditional, historic Bluestone Campus by approximately ¾ of a mile by roadway (Carrier Drive and Bluestone Drive). This distance is approximately 15 minutes by foot, which makes it difficult for students with back-to-back classes (only a 15-minute break between regular classes).

Major Circulation Patterns – North to South

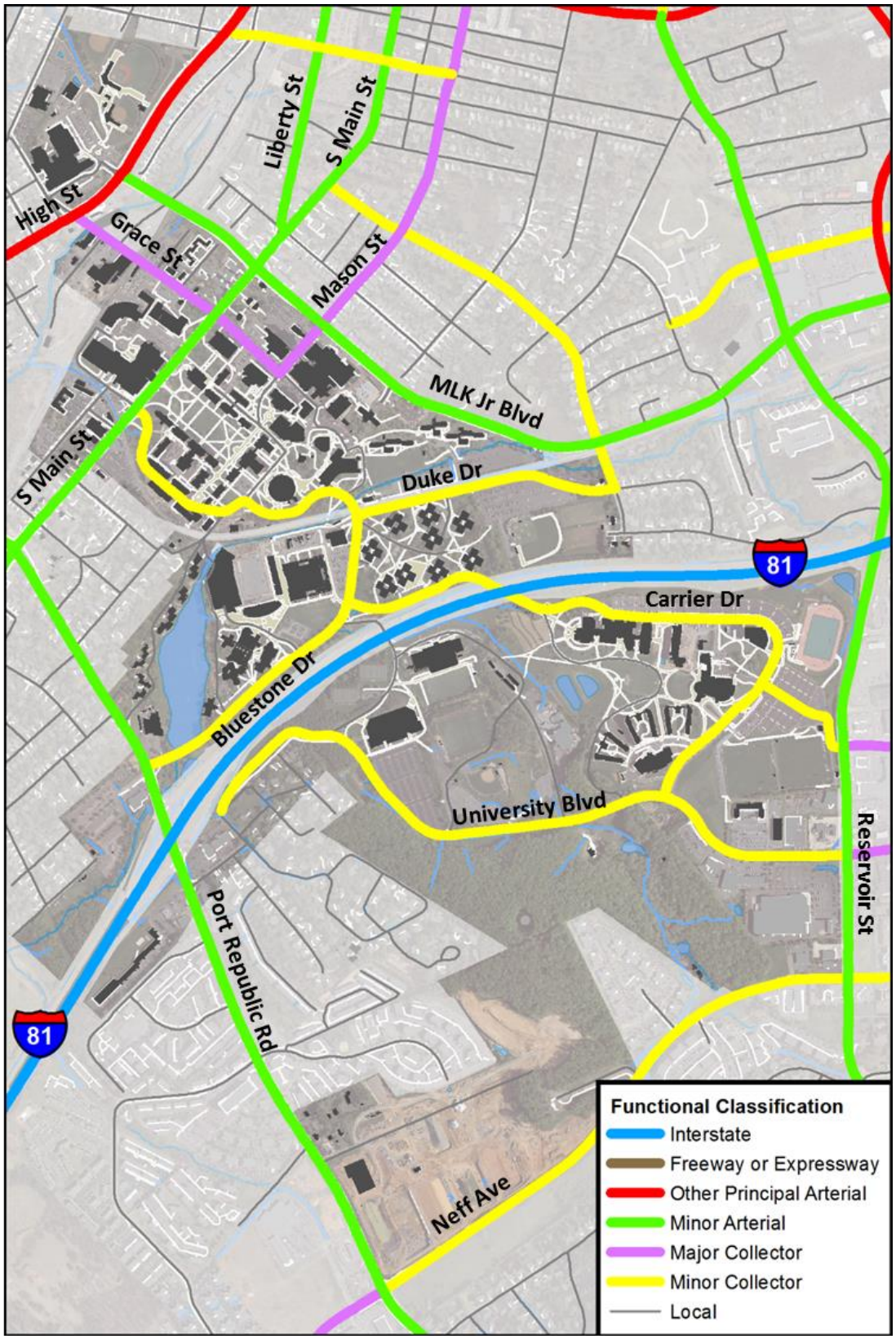
Several physical barriers impede vehicular, bicycle, and pedestrian travel between the East Campus, the Quad, and North Campus. These barriers include Interstate 81, a Norfolk-Southern Railway line, and changes in topography.

The Duke Dog Tunnel connects the Quad and the East Campus underneath Interstate 81. The tunnel is relatively under-utilized by cyclists and pedestrians as compared with the Carrier Drive overpass across I-81, which has sidewalks and Bike Lanes on both sides.

Duke Dog Tunnel

From a broader perspective, the campus is loosely bounded by five roadways, MLK Way and Reservoir Street to the northeast, Neff Avenue to the south, Port Republic Road to the west and Main Street to the north. Because these streets form the de-facto edge of campus it is important to the University that on campus facilities connect seamlessly with off campus sidewalks and bicycle facilities located in the surrounding City area.

Figure 2: Roadway Functional Classification



Traffic Volumes and Congestion

The Virginia Department of Transportation (VDOT) collects daily traffic volume data for state-maintained roadways (http://www.virginiadot.org/info/ct-trafficcounts.asp). These data represent the Average Daily Traffic (ADT) volume and are important for the purposes of this project to identify roadways with lower daily traffic that are more suitable to walking and biking. Table 2 and Figure 3 display the ADT values for the University area. Each roadway is proportional in size based on the count value (displayed on top of each point). This information is useful for comparing relative traffic volumes between roadways, for example, Grace Street supports one-sixth the number of vehicles per day as Port Republic Road.

Table 2: Average Daily Traffic (2012) for Campus-area Roadways

Road Name	2012 ADT
Port Republic Road	24,000
Main Street	20,000
Reservoir Street	20,000
High Street	19,000
MLK Way	15,000
Grace Street	4,100
Bluestone Drive @ Main Street	13,000*
Bluestone Drive @ Carrier Drive	8,200*
Duke Drive	8,800*
Carrier Drive @ Village Hill	13,600*
Carrier Drive @ ECDH	2,900*
University Boulevard	4,300*

Data Source: http://www.virginiadot.org/info/2012_traffic_data_by_jurisdiction.asp and estimates from JMU campus traffic counts (*)

Bicycle and Pedestrian Counts

Multiple bicycle and pedestrian counts have been collected on the JMU campus, at varying locations, days of the week, and count duration (e.g. 15-minutes, 1-hour, 2-hour).

The most comprehensive counts of bicycles and pedestrians took place at 78 locations on campus between Tuesday September 24 and Wednesday September 25 2013. Fifteen minute counts were converted into peak hour counts from the available dataset. The peak 1-hour bicycle count of 115 was collected near Duke Drive near the Tennis Courts, south of the railroad. The second and third highest bicycle count locations were both near Mr. Chips and Bluestone Drive. The peak 1-hour pedestrian count of 1,175 was also observed at the intersection of Bluestone Drive and Mr. Chips. Nearly 800 pedestrians per hour were observed near the intersection of Carrier Drive and Weaver Hall.

Separate bicycle and pedestrian counts were collected by the City of Harrisonburg at eight (8) locations near the JMU campus on Tuesday September 10 and Saturday September 14 2013. These data are not directly comparable because a different methodology was utilized (2-hour counts). The peak 2-hour bicycle count of 195 was observed at the intersection of West Grace Street and Chesapeake Avenue on Tuesday between 10:30 am and 12:30 pm. The peak 2-hour pedestrian count of 412 was observed at the intersection of South Main Street and the JMU campus, during the same time.

Parking Facilities

The campus parking system is managed by the JMU Parking Services, utilizing a parking zone system based on user group and location. Faculty/staff receive the highest level of access within lots that are proximate to office/academic areas. Resident students are eligible to park within lots that are near their residence halls, however not in the same proximity as employees. Commuting students park within the least proximate locations that are located along the periphery of campus, and therefore have the furthest distances to walk, bike, or ride transit. The four existing parking decks are exceptions to this generalization because their parking permits are sold and managed independently from the remaining surface parking lots.

The JMU Comprehensive Master Plan indicates potential future development areas of campus where additional buildings may be located. The Grace Street Corridor and Student Union Addition projects are two examples that will require adjustment or complete removal of existing parking lots in the Bluestone campus area. The process of removing surface parking lots from the campus core represents an opportunity to promote alternative modes of transportation, shifting many from single-occupied vehicles to carpools, transit, or bicycling and walking within campus. New surface parking lots along the periphery of campus will be constructed, however, to compensate for the removal of parking within the campus core. Over time this will mean fewer vehicles driving through the center of campus to find available parking, and therefore fewer potential safety conflicts for bicyclists and pedestrians. It is important to establish safe, consistent, and standard treatments to intersections, crosswalks, and paths along the campus periphery now so that future safety conflicts are minimized or avoided.

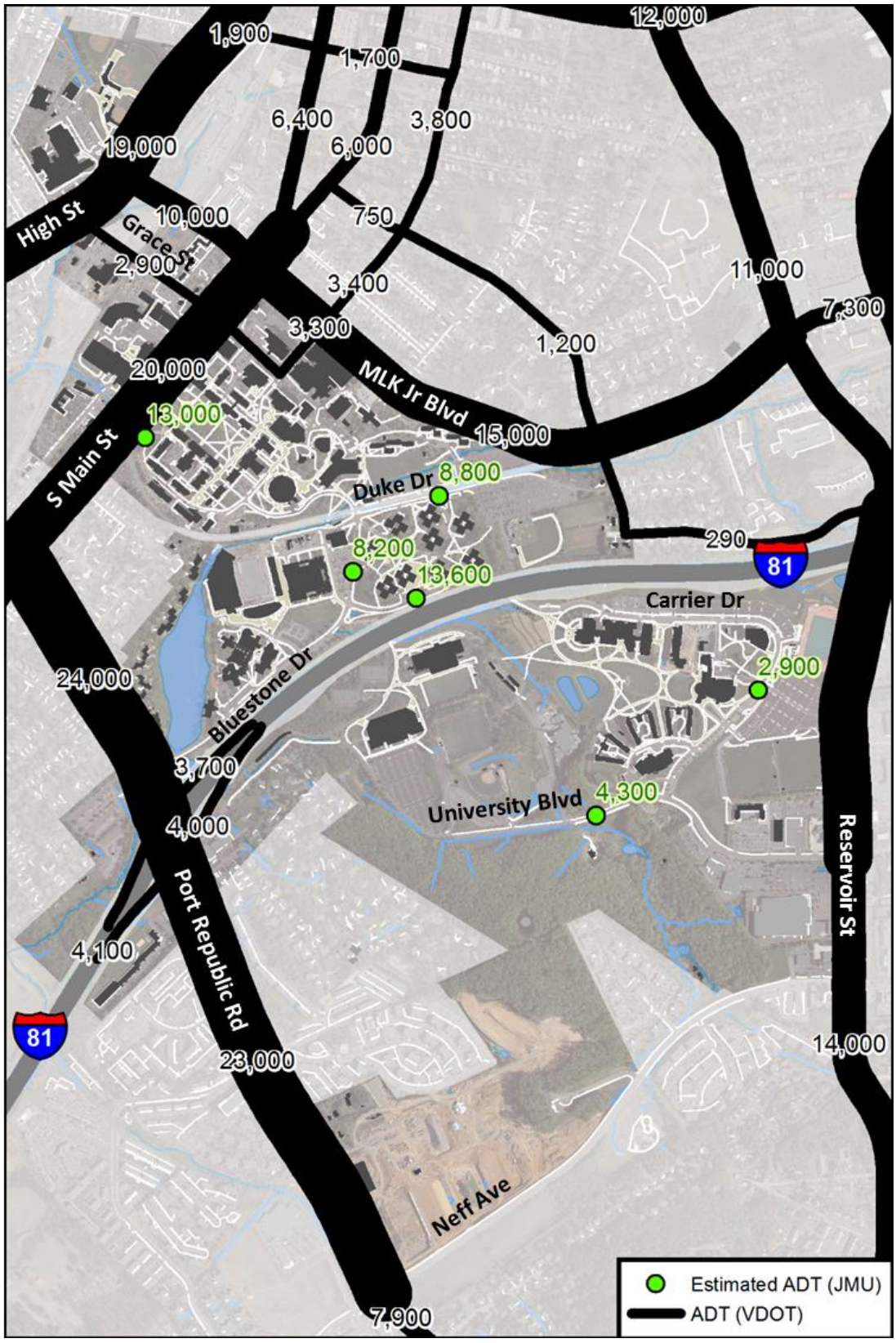
Planned locations for new structured parking decks include:

1. Memorial Hall area (West campus)
2. Hillside Drive area (Mid campus)
3. Duke Drive area near Village Hill (Mid campus)
4. Driver Drive east area (East campus)
5. Driver Drive west area (East campus)

In considering the costs for pedestrian and bicycle facilities, it is important to keep in mind the potential to offset investments in additional parking; surface parking costs approximately $4,500 per space to construct, while structured parking decks cost approximately $20,000 per space to construct. In addition, active transportation investment may help encourage use of transit (in which investments have already been made).

In 2011, traffic control gates were installed along sections of the West Campus. These measures have resulted in traffic reductions of 32% to 37% within the gated roadway sections, and traffic reductions of 2% to 12% for the entire JMU campus. These investments have generally been accepted and have improved overall mobility. However, conflicts among bicyclists, pedestrians, transit, and service vehicles still exist.

Figure 3: Average Daily Traffic (ADT)



Safety Data

Crash data is collected and analyzed by different agencies depending upon which jurisdiction owns and maintains the roadway. Crashes on state maintained roadways are reported to the Virginia Department of Motor Vehicles (DMV). Crashes on City maintained roadway are reported to the Harrisonburg Police Department. Crashes on University maintained roadways are report to the JMU Department of Public Safety.

Public Crash Data

The Virginia Department of Motor Vehicles collects, analyzes, and releases reports of traffic collision data for state maintained roadways on its website. This online resource is limited to the jurisdiction-level (e.g. Harrisonburg), making a direct comparison between university areas impractical. A separate inquiry for additional data requests was not within the scope of work for this plan.

The summary below merely suggests locations near campus that are potential candidates for improved performance measures that would address safety concerns. Resources were obtained from the VDOT website and utilized by this project: http://www.dmv.virginia.gov/safety/#crash_data/index.asp, and displayed in Tables 3 and 4 below.

The 72 reported pedestrian-related collisions within the City of Harrisonburg (2008-12) represent 1.7% of the total collisions. The 28 reported bicycle-related collisions with the city represent 0.7% of total collisions. These percentages seem low relative to the high number of vehicular collisions over the same period, many of which are likely non-injury collision types, such as rear end or sideswipe. The three pedestrian-related fatal collisions represent 43% of the seven total fatal collisions for the city over the same five-year period. The exact location of collisions was not included within this dataset, so it is unknown whether they occurred near the JMU campus or elsewhere within the City of Harrisonburg.

Table 3: Harrisonburg Traffic Collisions by Type (2008-2012)

Type	Fatalities	Injuries	Total Collisions
Bicycle	-	30	28
Pedestrian	3	71	72
Other Types	4	1,491	4,172

Data Source: Virginia Department of Motor Vehicles http://www.dmv.virginia.gov/safety/#crash_data/treds_reports.asp

Roadways within the vicinity of the University are displayed in Table 4 below, along with the approximate number of vehicle collisions occurring within 2012. Port Republic Road and Reservoir Street represent the largest number of reported collisions (13), as well as the highest average daily traffic (ADT) counts. University Boulevard reported the highest rate of crashes per 1,000 ADT. Though University Boulevard reported the highest rate of crashes based on available data, a conclusion on safety cannot be made without a comparison with the statewide average for other 2-lane roadways of similar design speed and traffic volume.

Table 4: Total Collisions for Campus-Area Roadways (2012)

Corridor Name	# of Crashes	ADT	Crashes per 1,000 ADT
University Boulevard	4	4,300	0.93
Reservoir Street	13	20,000	0.65
Port Republic Road	13	24,000	0.54
MLK Way	7	15,000	0.47
Main Street	6	20,000	0.30
Bluestone Drive	1	13,600	0.07
Carrier Drive	-	8,800	0.00
Grace Street	-	4,100	0.00
Forest Hill Road	1	Unknown	-
Neff Avenue	3	Unknown	-

Data Source: Virginia Department of Motor Vehicles http://www.dmv.virginia.gov/safety/crash_data/mapping/#/

Figure 4 displays the approximate location of reported crashes in 2012 near the JMU campus. Several intersection clusters are evident along the JMU campus boundary. Four intersections along Reservoir Street between Neff Avenue and Evelyn Bird Avenue experienced multiple reported vehicle crashes. Main Street between Port Republic Road and MLK Way likewise reported several crashes along the JMU campus boundary. These data suggest that these intersections are potential candidates for improved performance measures.

City of Harrisonburg Crash Data

The City of Harrisonburg provided a geocoded dataset of bicycle and pedestrian crashes between 2008 and 2011 for analysis. It is assumed that these data represent a subset of the VDOT crash data that could were successfully mapped along a roadway corridor. Table 5 represents a four year sample of bicycle and pedestrian crash types within the City of Harrisonburg, these data are also displayed in Figure 5. Table 6 below represents roadways within the City with more than one reported bicycle or pedestrian crash between 2008 and 2011.

Table 5: Harrisonburg Bicycle and Pedestrian Collisions (2008-2011)

Type	2008	2009	2010	2011
Bicycle	4	5	5	7
Pedestrian	6	8	15	6

Data Source: City of Harrisonburg

Table 6: Bicycle and Pedestrian Collisions by Corridor (2008-2011)

Corridor Name	Bicycle	Pedestrian
Main Street	6	10
Port Republic Road	3	4
High Street	2	3
Market Street	1	2
Reservoir Steer	-	3
Mason Street	-	2

Data Source: City of Harrisonburg

Note: Only includes roadways with > 1 reported bicycle or pedestrian crash

Figure 4: Roadway Collisions (VDOT, 2012)

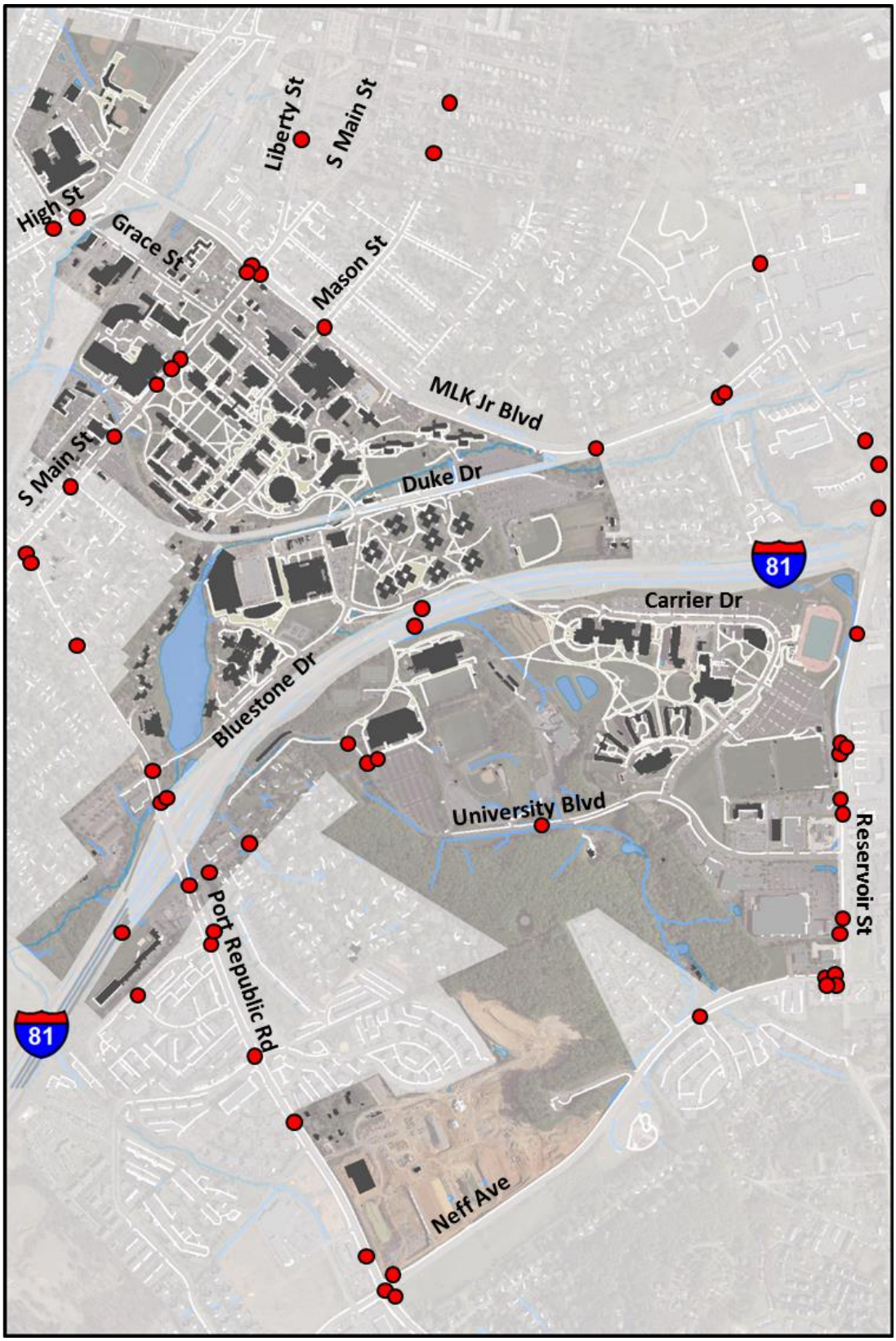
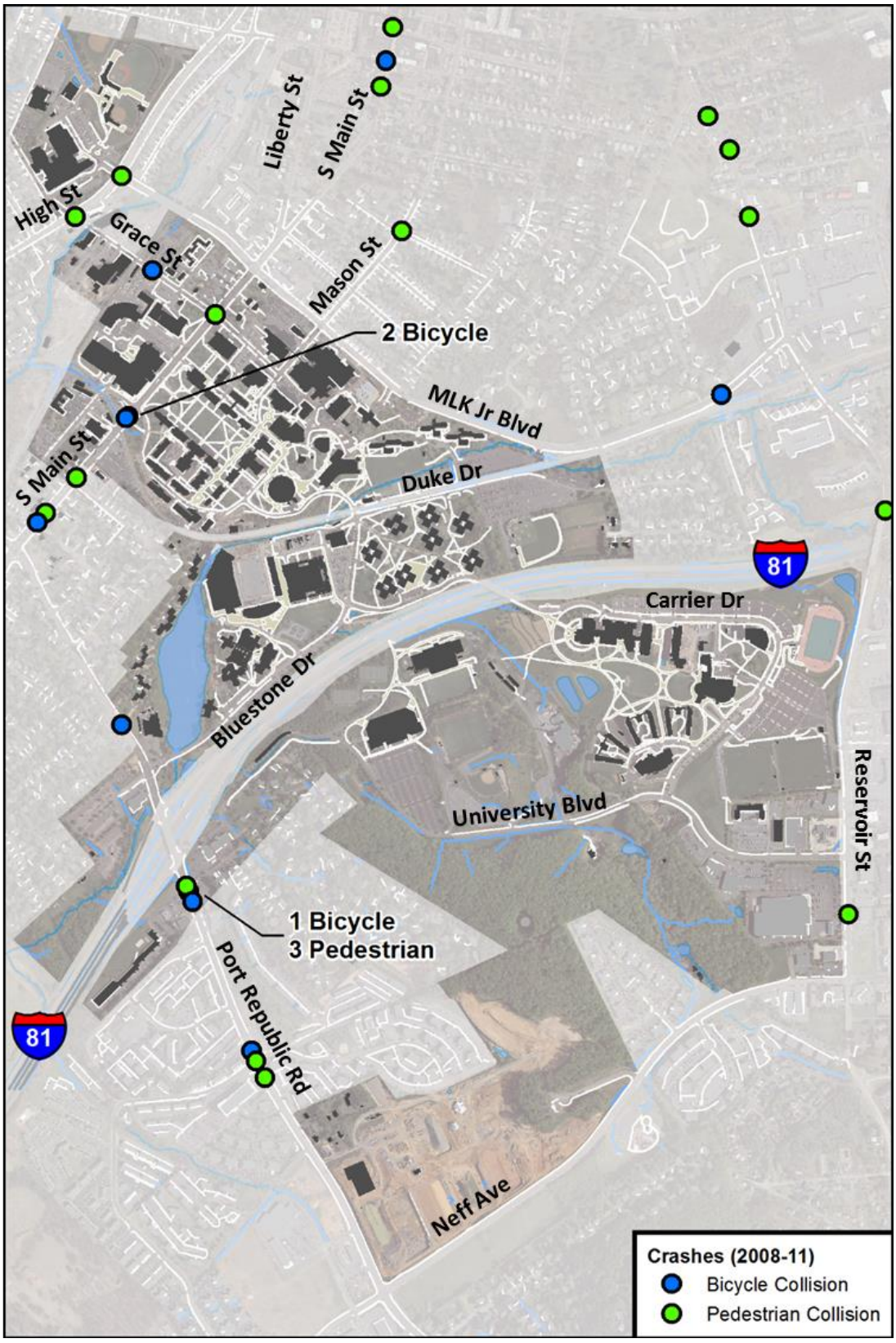


Figure 5: Roadway Collisions (2008-11)



2.6 Existing Pedestrian Facilities

On Campus Pedestrian Facilities

The original campus established in 1908 was constructed around two buildings along Main Street. Sidewalks were easily constructed between campus buildings because of their proximity. The campus has since grown to 721 acres in size, and the pedestrian facilities that link buildings have been constructed in segments over time.

The existing network of pedestrian facilities includes a variety of materials, including brick, asphalt, concrete, and pervious concrete that have been installed, maintained, and replaced over decades of campus growth. Slow and incremental growth of pedestrian facilities is how a network of sidewalks and paths is established for most universities and cities. Heavily traveled pedestrian corridors across the campus have been widened, straightened, or provided with amenities (benches, trash receptacles, shade trees) over time. Service roads are shared by the University service vehicles, pedestrians, bicyclists, skateboarders, users of mobility devices, and others. Underutilized pathways (between buildings or parking lots) have been reconfigured or removed altogether by future building projects. This is the natural evolution of pedestrian facilities.

Carrier Drive east of I-81 features multiple crosswalks that connect with parking lots along the opposite side of the roadway. Over the years additional crosswalks have been added or modified, resulting in an inconsistent standard that can be confusing or even unsafe for pedestrians and motorists. One of the many recommendations of this plan is a campus-wide review of existing pedestrian crosswalk designs.

Skateboarding has become a popular means of low-cost active transportation at JMU, though challenging to maintain safety because this mode of transportation blurs the line between walking and bicycling. The JMU student handbook (section J-101) allows skateboarders to travel on roadways provided that they operate as a driver of a vehicle, as well as travel on sidewalks provided that they operate as a pedestrian. Section J-102.1 of the handbook states skateboarders "…shall use bike lanes or keep as near as safely possible to the far right side or edge of the right traffic lane…" which is contrary to the "duties of drivers of vehicles." These sections of the student handbook should be revised for consistency. Skateboarders are likewise required to yield the right-of-way to pedestrians when passing (J-103.1) on sidewalks.

Off Campus Pedestrian Facilities

Sidewalks exist along both sides of streets within the downtown area of Harrisonburg. The network becomes less connected near the periphery of the University. Neighborhood streets to the west, south, and east of the campus have few sidewalks, although the City is adding sidewalks where practicable and as funding is available. Public comments received at the beginning of this project suggested opportunities for connecting JMU and City of Harrisonburg sidewalks along MLK Way, Paul Street, and Port Republic Road. Survey respondents also supported the need for additional off campus facility connections for both bicycles and pedestrians in the form of sidewalks, Shared Use Paths, or Bicycle Lanes.

2.7 Existing Bicycle Facilities

For the purpose of this Plan existing bicycle facilities are separated by facility type: Bicycle Lanes, Shared Lane Markings ('sharrow'), and Shared Use Path (see Section 4.4 for a complete description). See Figure 6 for existing bicycle facilities near the University.

Campus bicycle facilities are part of a larger system of bicycle facilities in the City of Harrisonburg. Transitions between the campus and its surrounding neighborhoods is a critical element of determining the success of this plan. Campus bicycle systems are identified in the James Madison University Physical Master Plan (2009) and have been implemented over time as the campus has grown and developed. The University coordinates bicycle planning activities with the City of Harrisonburg to maximize opportunities and resources.

On-Road Bicycle Facilities

Bicycle facilities have been constructed incrementally in the same manner as pedestrian facilities. South Main Street (north of MLK Way) is the only city roadway near the University with existing Shared Lane Markings (Figure 6):

Shared Lane Marking

A number of on-road Bicycle Lanes exist within the City of Harrisonburg, and more will be striped as repaving projects occur, in accordance with the City's Plan. Portions of five roadways near the University have been striped with on-road Bicycle Lanes. Gaps still exist in the network that will be striped as needed to connect with other existing Bicycle Lanes. At present Bicycle Lanes exist along (Figure 6):

Bicycle Lane along Carrier Drive

- Carrier Drive
- Devon Ln
- Neff Avenue
- Port Republic Road (VA-253, between I-81 and Neff Avenue)
- S Main St (US-11, south of MLK Way)

The City of Harrisonburg also designates signed bicycle routes along lower volume city streets to limit potential conflicts with vehicles. Signed routes are helpful to remind motorists that bicyclists share the roadway, and to encourage recreational riders to explore the city. There are two signed routes near the University, including:

Signed Route Signs (MUTCD)

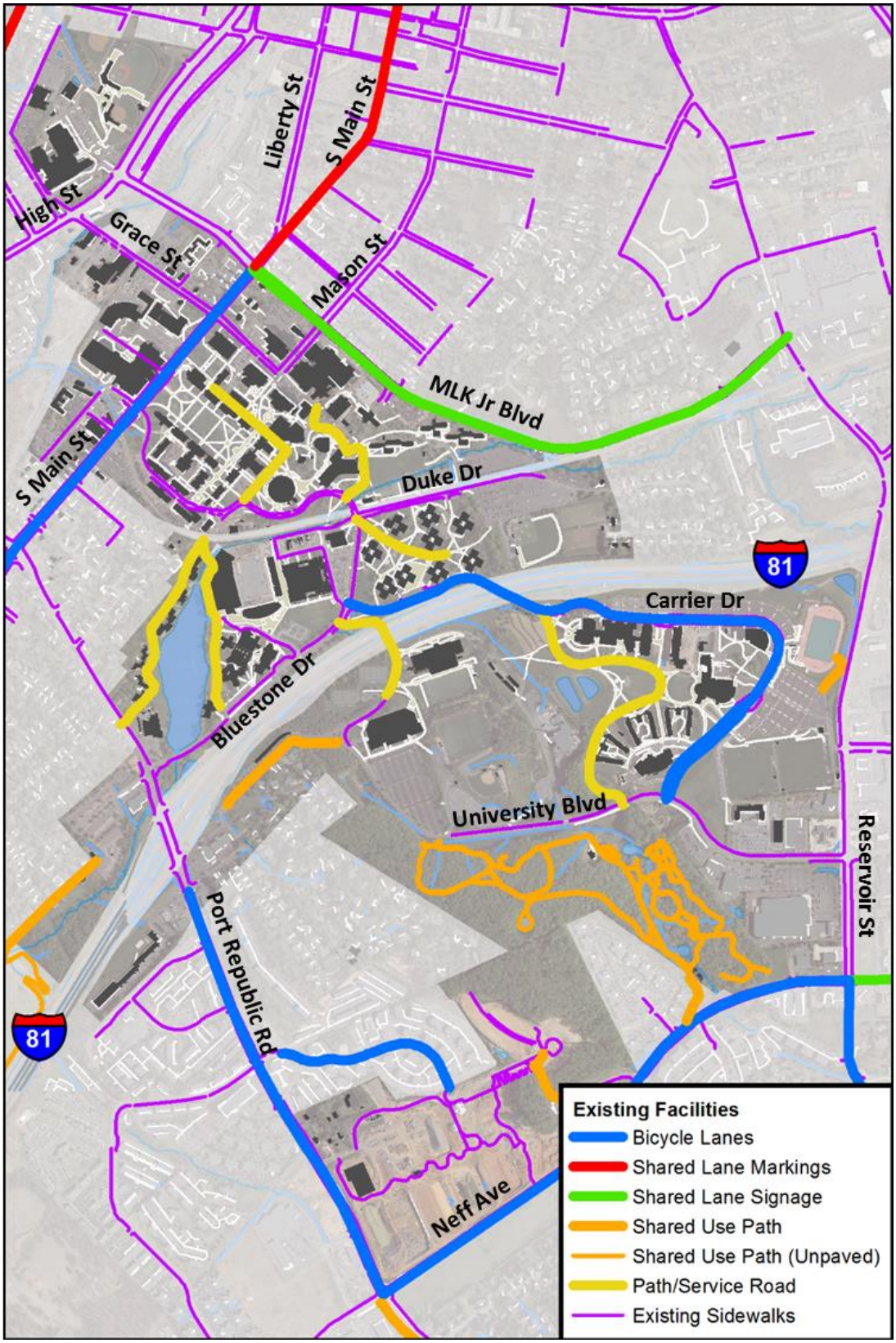
- Neff Avenue (east of Reservoir Street)
- MLK Way (between S Main Street and Reservoir Street)

Off-Road Bicycle Facilities

The Bluestone Trail will be constructed in multiple phases from the JMU campus area to the southwest. Phase 1A from Port Republic Road to Butler Avenue (completion summer 2014) will be followed by Phase 1B (completion winter 2014) from Butler Avenue to Stone Spring Road, and then Phase 2 from Stone Spring Road to Ramblewood Park (2017 or beyond).

To connect with the Bluestone Trail, the University is planning a combination of Shared Use Path (SUP), Bike Lanes, and sidewalks that will extend from Port Republic Road towards Carrier Drive in one direction, and the Quad in another direction.

Figure 6: Existing Bicycle and Pedestrian Facilities



The Northend Greenway will connect Mount Clinton Pike along Blacks Run and terminate near Main Street and Washington Street. The City plans to connect the Northend Greenway to the Farmers Market on Liberty Street (2015 horizon). From the Farmers Market a connection is desired to the north side of the JMU campus; various options for making this connection are under evaluation. Once completed the trail will be roughly 3.8 miles long, connecting the City's two universities (James Madison and Eastern Mennonite Universities).

Short segments of sidepaths exist along Port Republic Road (south of Neff Avenue) and University Boulevard (between Hickory Hill Drive and Locust Hill Drive near the Convocation Center). These facilities are essentially Shared Use Paths that function as sidewalks. Because of their location, sidepaths experience some common safety and functional issues, such as: two-way paths require one direction of bicycle traffic to go against the flow of traffic; sidepaths may encourage wrong-way riding to get on and off the path; confusion at intersections; sidepaths require stops and yields at all driveways; and sidepaths are often blocked by vehicles using driveways.

Sidepath along roadway
Source: PBIC

The Harrisonburg-Rockingham Metropolitan Planning Organization (MPO) is currently finalizing a Bicycle and Pedestrian plan for the MPO region. Rockingham County is also working on its own Bicycle and Pedestrian Plan. BPAC members are also participating with the development of the MPO's plan to ensure that recommended projects are consistent across jurisdictional boundaries including Rockingham County, the City of Harrisonburg, and James Madison University.

On-Campus Amenities

In 2013 the University conducted a survey of all bicycle racks on-campus. Each rack was photographed, measured, classified by type, and bar code tagged. Each bike rack was GPS-located and a database was constructed containing all information (Figure 7). Subsequently surveys were made of bike rack utilization during different days of the week and times of day. The results from the inventory show that there were 334 bicycle racks on campus with a capacity for 2,500 total bicycles. Ten (10) percent of the inventory (274 of the 2,500) was found to be covered bicycle parking.

Friday afternoon was determined to be the peak period, with the largest number of bicycles observed. Wednesday evening was identified as the second-busiest period. Eighteen (18) bicycle racks were observed to be over capacity, more bicycles were parked than the expected capacity of the rack, while a majority of racks (247 of them) were less than half-full (Table 7). This type of study provides the opportunity to relocate several of the bike racks to realize greater overall capacity utilization.

Table 7: Bicycle Rack Occupancy Results

Occupancy	# Racks	% Total
<= 25%	174	52%
26-50%	73	22%
51-75%	44	13%
76-100%	25	7%
>100%	18	5%
	334	

Data Source: JMU; collected from Friday 1 pm peak period

The campus contains a variety of different styles of bike racks – including the "Wave", the "Comb", the "Toast", the "Inverted U", and others. Each bicycle rack style has a varying degree of benefits, from cost, to installation and portability, as well as space efficiency. Fallen bicycles are common with the Wave, Comb, and Toast racks because the bicycle is not supported in two locations, as the inverted-U provides. Fallen bicycles result in an inefficient use of space because adjacent spaces are inaccessible. Bend or damaged front wheels are common with the Comb and Toast style bicycle racks as well because these styles provide a very narrow space for the front tire, which is intended to support the bicycle and prevent it from falling over.

Improper bicycle parking at Comb bicycle rack

The University should adopt a standardized bicycle rack specification; the inverted-U is recommended Association of Pedestrian and Bicycle Professionals (APBP) and has been adopted by the City.

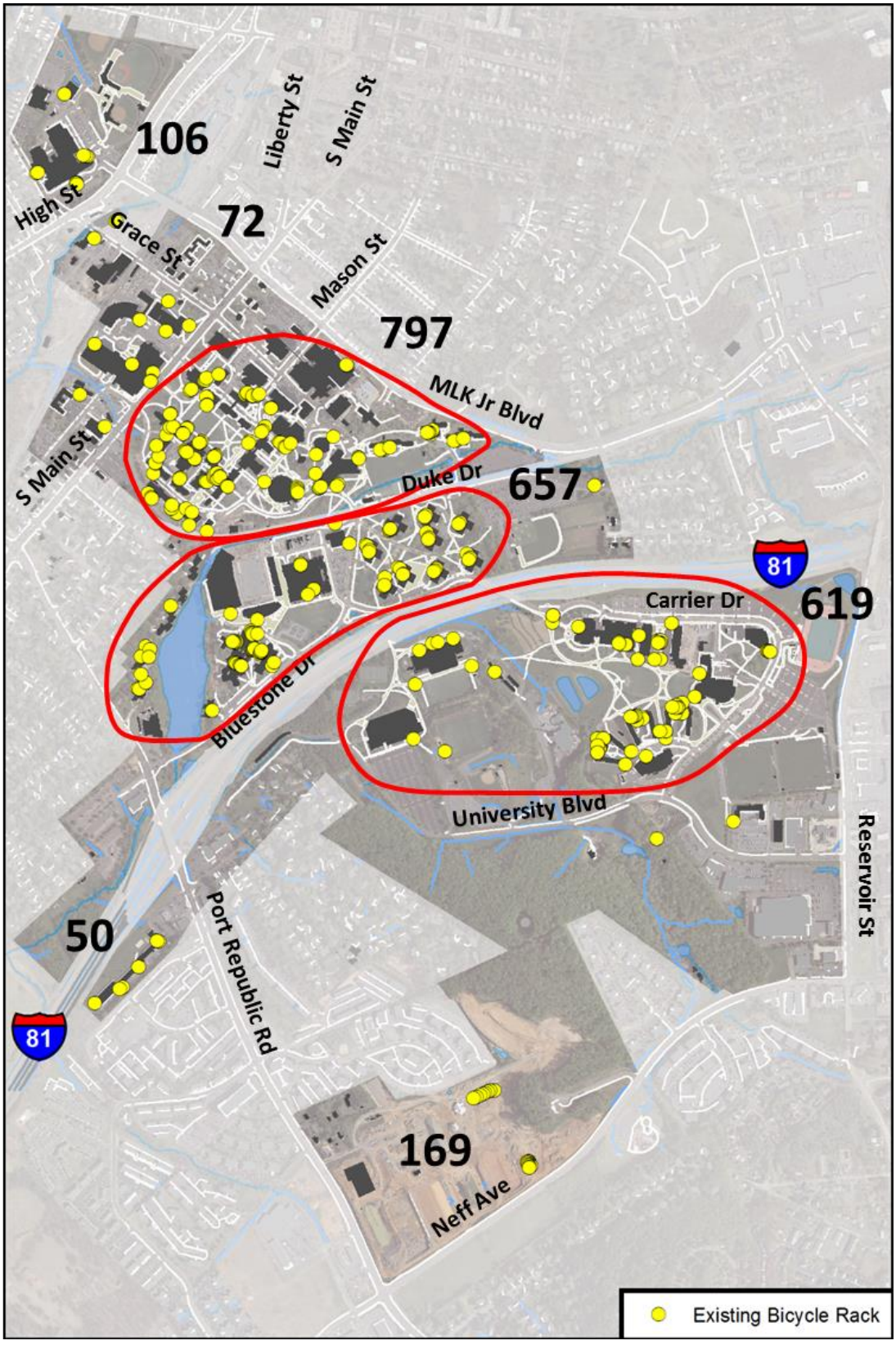
The Wave bicycle rack

The Comb bicycle rack

The Toast bicycle rack

The Inverted-U rack

Figure 7: Existing Bicycle Racks and Capacity



There are a number of shower facilities on-campus that are available to bicycle commuters or those interested in a lunchtime ride or walk. Some buildings may require a membership or University ID card, such as the University Recreation (UREC) building. Other buildings such as utility plants, various locker rooms (such as for athletes, police, etc.), however do not meet the criteria of being open to the general public, and are therefore excluded.

Existing Campus Shower Facilities Open to Bicycle Commuters

- 1077 South Main Street
- Health and Human Services (A2)
- Physics Chemistry Building (A3A)
- Bioscience Building (A3B)
- Blue Ridge Hall
- Convocation Center
- Duke Hall
- East Campus Dining Hall
- Gibbons Hall
- Godwin Hall
- Grace Street House
- Hillcrest House
- Johnston Hall
- Memorial Hall
- Moody Hall
- Performing Arts – Estes
- Performing Arts – Roberts
- Plecker Athletic Center
- University Services Building
- UREC
- Warren Hall

Data Source: JMU Facilities Management

2.8 Campus TDM Programs

The James Madison University Public Safety Department offers a variety of Transportation Demand Management (TDM) programs to encourage students and employees to utilize alternative modes of transportation. Several programs are summarized below. These programs are discussed separately from the transit system that serves the campus, which is detailed in Section 2.9, although all of these programs work together to offer alternatives to driving single occupancy vehicles.

Alternative Transportation

The alternative commuting program at JMU offers benefits and incentives to those who would otherwise drive a vehicle to campus. The program is open to employees who may choose to walk, bike, carpool/vanpool, or ride the bus, as well as students who rideshare. Incentives are different for each type of commuter mode, and include:

- Single-use parking permits for inclement weather (first 3 are free; $3 per day for additional)
- Guaranteed Ride Home (GRH) program for emergencies, available to those registered with Zimride or www.rideshareinfo.org
- Discounted parking permit fees for carpools (split among participants)
- Reserved parking space for vanpools (Fall 2014)
- One-Stop-Shop for information relating to parking and transportation www.jmu.edu/navigatejmu

Bicycle Rental Program

As part of University Recreation building expansion plans, which are scheduled for the fall of 2016, a new Adventure Rental Center will be added that will include a bike repair area and expanded bike rental services (formerly Cycle Share) including mountain bikes. Students and employees are eligible to participate with a valid University ID. Individuals may rent a bicycle for one week at a cost of $7, with a $15 deposit. The goal of this program is not to provide semester-long rentals, but rather to offer a short-term trial period for those looking to purchase a bicycle without the need to spend hundreds of dollars upfront. Results from the Active Transportation survey (2013) indicated that 48% of respondents have heard of the Cycleshare program on campus, which is a target to improve upon for 2014. Additional information can be found at the equipment rental website www.jmu.edu/recreation/informal-recreation/equipment-center/adv-equipment.shtml or at the UREC Adventure Equipment Center 540-568-8722.

This facility will provide a physical location for promotion of the benefits of riding. The Adventure Rental Center will house two work stations staffed by trained student employees who will be able to assist participants with basic bike repairs and maintenance. An outside maintenance station will also be included for self-service. Classroom educational sessions including offering of various programs for wellness passport credit will likely be held at this new facility. JMU is working with HTH 100 to develop a class assignment related to bicycle safety that will begin in the fall of 2014.

Zipcar

Zipcar is short-term rental car program that accommodates students and employees who may not have access to a vehicle during the day. Zipcar offers the

convenience of having a car on campus without the expense or hassle of parking it. The program currently includes two vehicles on campus, available at an hourly or daily rate that includes gas, EZ Pass, and roadside assistance. Additional information can be found at www.zipcar.com/jmu or call 1-866-494-7227.

Zimride

Zimride is an online ridesharing program that matches ride seekers with ride providers. The JMU-Zimride system is a closed system, available only to JMU students or employees. Additional information can be found at www.zimride.jmu.edu/ or by contacting JMU's Transportation Demand Manager at 540.568.4522.

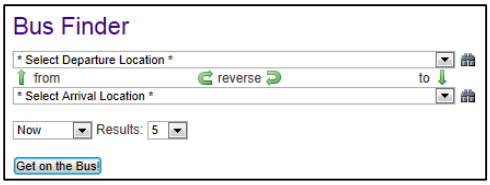
Vanpool

JMU is currently working towards the selection of a vanpool provider and will begin a pilot program of select routes in the fall of 2014. Vanpool participants will receive as an incentive a pre-tax payroll deduction for their parking permit.

2.9 Transit System

The City of Harrisonburg Department of Public Transportation (HDPT) provides transit service under annual contract arrangements to the James Madison University campus. The HDPT operates five (5) fixed routes that serve the City every day (Figure 8). During the academic year there are an additional 12 routes that serve the University area, plus inner-campus shuttles that circulate across campus. The Godwin Transit Center, located near the University book store, serves as the transfer point for the University and two of the five "City routes".

Students and employees who present a university ID are able to ride all transit services for free through the implementation of a student fee program. All transit buses are equipped with bicycle racks, and all buses are also ADA equipped (kneeling, extending platforms, and tie down apparatus).

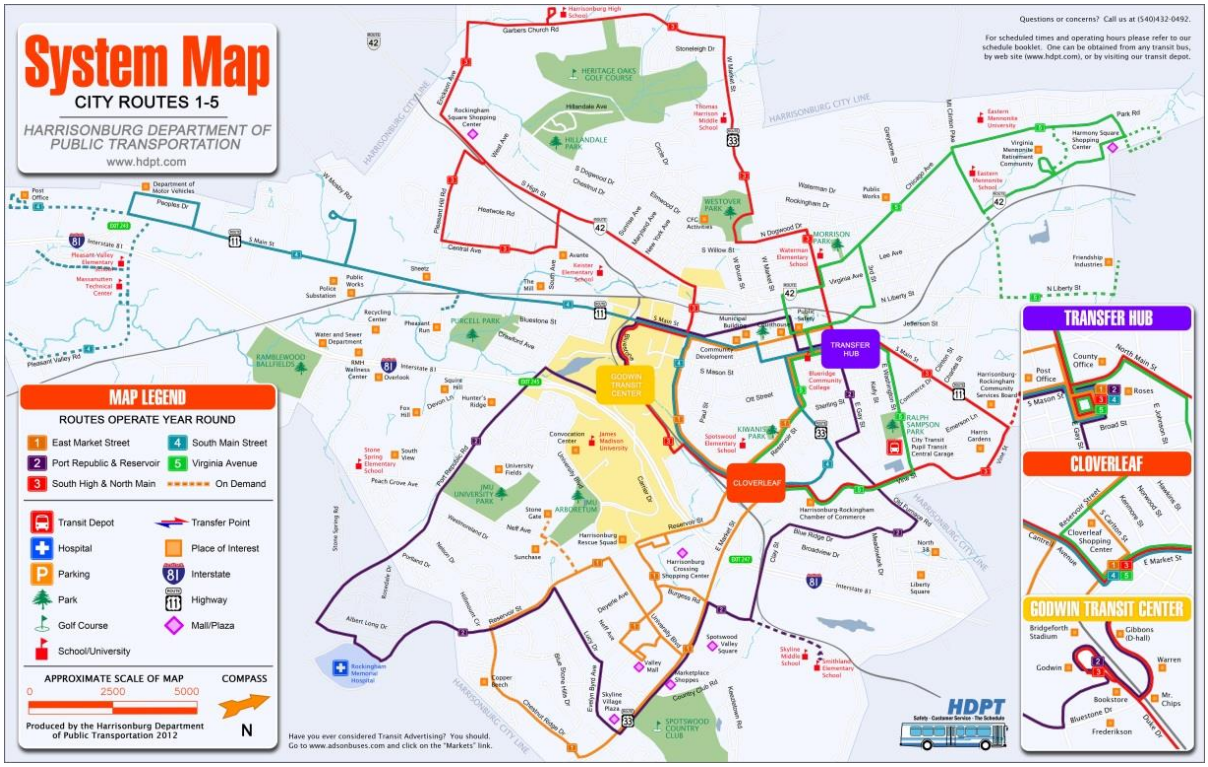


The HDPT system operates weekday and weekend routes throughout the academic year. Route scheduling is adjusted each semester. Route planning can be done by using the University-developed "Bus Finder" application online, or smart phone app. The application enables the user to select departure and destination locations, and planned dates and times of travel, and it returns real time route and time information, including transfers. The Bus Finder application can be found at www.jmu.edu/navigatejmu/busfinder/ where the mobile version can also be accessed.

Real time bus arrival information is also available using the NextBus system (nextbus.com). The NextBus system is a GPS driven system that provides accurate bus arrival time information at any bus stop in the HDPT route structure. Each bus stop sign has a stop number which can be entered into

NextBus, and a QR code that can be scanned by a smart phone, to get the current information. The system can also be accessed on line or by using an Interactive Voice Response system. Additional information about HDPT can be found at www.harrisonburgva.gov/bus-service, or at 540-432-0492.

Figure 8: Existing Harrisonburg Department of Public Transportation System Map (City Routes)



3 FUTURE CONDITIONS: *WHERE WE ARE HEADED*

3.1 Projected Campus Population Growth

James Madison University's population (faculty, staff, and students) is projected to increase at a steady rate, driven in large part by student enrollment increases. By 2020, the total campus population should reach over 24,000, assuming the current ratios of employees to students (Table 8). The campus population growth will require additional facilities and infrastructure, as detailed in the JMU Comprehensive Master Plan.

Table 8: Projected Enrollment Growth

Year	Students	Employees	Campus Population
2019	*20,565*	*3,767*	*24,332*
2018	20,408	3,638	24,046
2017	20,188	3,515	23,703
2016	19,938	3,395	23,333
2015	19,730	3,279	23,009
2014	19,514	3,168	22,682
2013	19,484	3,060	22,544
2012	19,258	2,956	22,214
2011	18,996	2,881	21,877
2010	18,671	2,805	21,476
2009	18,232	2,807	21,039

Note: JMU Institutional Research - http://www.jmu.edu/instresrch/Projections/project.shtml
Grey: Forecasted value

3.2 JMU Comprehensive Master Plan

The JMU Comprehensive Master Plan (2009) provides a long-term vision for campus development, including new and improved roadway corridors and sidewalks for bicycles and pedestrians. The Grace Street Corridor is identified as a potential transportation 'spine' for moving people that would directly connect the Memorial Hall portion of campus with Bluestone Drive near Mr. Chips, including a new roadway extension around the east side of the student union. Improvements along Grace Street include bus pull off areas, improved pedestrian sidewalks and ADA accessible curb cuts. The vision for the Grace Street Extension as outlined by the Comprehensive Master Plan is reflected by Projects 22 and 125 of this Bicycle and Pedestrian Master Plan.

3.3 Planned City Pedestrian and Bicycle Improvements

Staff from the City of Harrisonburg's Public Works Department participated on the BPAC, and helped to identify pedestrian infrastructure improvements in the City area around campus. City staff are working towards the addition of sidewalks and Bicycle Lanes along Reservoir St (south of Neff Avenue) to be constructed in the 2015-17 fiscal years. Sidewalks along the east side of Reservoir St (north of Neff Avenue) are also programmed for 2015-16.

The University has an ongoing program for implementing bicycle improvement projects and maintaining existing facilities. Planned on campus bicycle improvements include replacing the weathered markings along campus streets. These efforts are being coordinated with this Plan and are included in the final recommended projects list (see Section 4).

4 RECOMMENDATIONS: *WHERE WE WANT TO BE*

4.1 Introduction

The recommendations in this Plan are divided generally into bicycle projects and pedestrian projects, recognizing that the two modes function together and often intersect. The recommendations were built from the Plan Framework (see Section 4.2) and include improvements to facilities, ancillary facilities and amenities, programs and policies, roadways, and transit. Section 4.5 highlights a series of focus area concepts that provide depth and conceptual ideas for opportunity areas on campus.

4.2 Plan Framework

The Plan Framework is the skeleton around which project recommendations were developed. The Framework identifies a network of existing and future corridors that will ultimately serve the University bicycling and walking community by creating a safe, interconnected system with the amenities expected by various users.

For the purposes of the JMU Bicycle and Pedestrian Plan, path types were distilled into two major path types: Primary Corridors and Secondary Corridors (Figure 9). The Primary and Secondary Corridors were developed by supplementing the JMU Comprehensive Master Plan path system with data and observations about existing bicycle and pedestrian conditions, as well as projected conditions.

Primary Corridors

Primary Corridors (purple lines on Figure 9) offer a direct route between major on and off campus origins and destinations. They often follow major vehicular routes and require dedicated bicycle and pedestrian facilities, such as Bicycle Lanes and Shared Use Paths, and high-level amenities to ensure safe travel. Examples of Primary Corridors on campus include: Bluestone Drive, Carrier Drive, Grace Street, Main Street, Mason Street, and Port Republic Road. Figure 9 also displays (highlighted in purple for emphasis) the connection made between Bluestone Trail and Northend Greenway through the JMU campus, which was the single most discussed topic of BPAC meetings. Establishing a direct connection with these off campus projects was an essential first step.

Secondary Corridors

Secondary Corridors (orange lines on Figure 9) serve as connectors to the Primary Corridors. They also provide direct route connections to destinations not located along Primary Corridors. Secondary Corridors may contain dedicated bicycle and pedestrian facilities but could be served well by less formal facilities, such as Shared Lane Markings or shared lane signage. Examples of Secondary Corridors on campus include: Champions Drive, Driver Drive, Duke Drive, Lakeside Service Drive, and Madison Drive.

Relationship to Pedestrian and Bicycle Plan Recommendations

The Primary and Secondary Corridors were used to identify specific projects in the JMU Bicycle and Pedestrian Master Plan. Existing facilities were overlaid on the Plan Framework to identify deficiencies and missing links in the overall system. These deficiencies were verified through site visits and input from the campus community and the BPAC. Recommended projects located along primary corridors were prioritized higher than secondary corridors as were projects along secondary corridors versus non-framework plan locations.

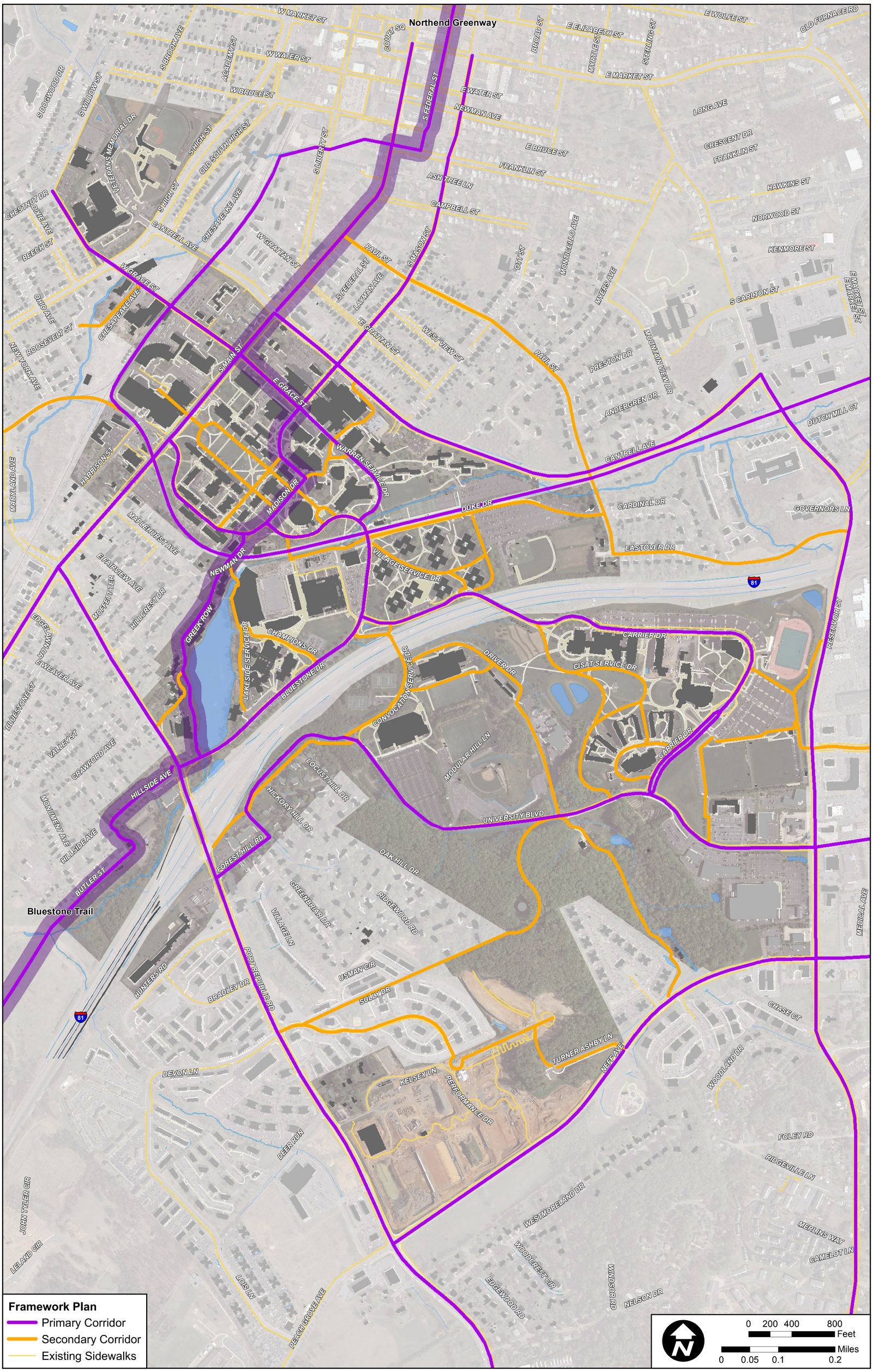

Framework Plan
Primary Corridor
Secondary Corridor
Existing Sidewalks
Northend Greenway
Bluestone Trail
0 200 400 800
Feet
0 0.05 0.1 0.2
Miles

Table 9: Recommended Project List

JMU Campus Projects								Cost Estimates		
Map ID	Location / Intersection	Begin / Near	End / Near	Feasibility	Amenity / Facility Type	Comment	Source	Length (mi)	Cost Category	Cost Group
1	Newman Dam Greenway Trail	Bluestone Dr	Greek Row	In Progress	Shared Use Path	Construct new shared use path around west side of Newman Dam; Include wayfinding signage along Greek Row	JMU Project	0.17	Funded	High
2	Newman Dr / Greek Row	RR tracks	Bluestone Dr	High	Sidewalk	Construct new (extra wide) sidewalk along east side of roadway and connect with existing paths	Steering Committee	0.07	$40,000	Med
3	Newman Dr	Bluestone Dr	Steam Plant	High	Intersection Improvement	Improve pedestrian crossing and sidewalk alignment	Steering Committee		$20,000	Low
4	Mason St (South) / Madison Dr	Alumnae Dr	MLK Way	High	Shared Lane Markings	Install Shared Lane Markings in proper location on roadway	Steering Committee	0.09	$10,000	Low
5	Arboretum Trail Shared Use Path	End of pavement / Property Line	University Blvd	Medium	Shared Use Path	Convert off-road trail into paved shared use path with lighting and signage	Open House	0.32	$250,000	High
6	Butler Ave - Bluestone Dr via R2 Lot	Port Republic Rd	Future Bluestone Trail	In Progress	Shared Use Path	Construct new shared use path within landscaped median of parking lot (R2) and connect with Bluestone Trail	JMU Project	0.22	Funded	High
7	Village Service Dr	Carrier Dr	Future Shared Use Path	High	Bike Path (Separated)	Perform **pilot study** for separated bicycle and pedestrian paths; Study the long-term reconstruction of Village Hill neighborhood	Open House / VHB	0.20	$40,000	Med
8	Newman Dam SUP and wide shoulder	Port Republic Rd	Lakeside Service Dr (Sonner)	In Progress	Shared Use Path	Construct new shared use path along north side of Bluestone Dr	JMU Project	0.12	Funded	Med
9	Student Success Center	Montpelier Hall (being raised)	Grace St Parking Deck	High	Sidewalk	Construct sidewalk and improve channelization of pedestrian crossing of roadway	Steering Committee	0.04	$30,000	Med
10	Carrier Dr (multiple locations)	CISAT / CS transit shelter	Festival Conference and Student Center	High	Corridor Improvement	Perform **pilot study** to: (a) Standardize crosswalk treatments and improve channelization; and (b) Install gates along Carrier Dr	Steering Committee	0.53	$350,000	High
11	Bluestone Dr	Lakeside Service Dr	Carrier Dr	Medium	Shared Use Path	Construct new shared use path along north/west side of Bluestone Dr and connect with adjacent paths	Steering Committee	0.27	$200,000	High
12	Bluestone Dr	Main St (South)	Railroad / Duke Dr	High	Shared Lane Markings	Install Shared Lane Markings in proper location on roadway	VHB Observation	0.50	$10,000	Low
13	Bluestone/Carrier Intersection			High	Intersection Improvement	Improvements to pedestrian crossing, standardized crosswalk treatments and add high intensity street lights	VHB Observation		$140,000	Med
14	Champions Dr (North side)	Bluestone Dr	Football stadium	High	Sidewalk	Construct new sidewalk along North side of roadway and connect with existing	Steering Committee	0.06	$30,000	Med
15	Soccer Field Service Dr	Around parking lot (C11/C12)		High	Sidewalk	Construct new (extra wide) sidewalk around parking lot	Open House	0.40	$180,000	High
16	Bluestone Dr	RR tracks at Mr. Chips		High	Intersection Improvement	Study intersection for improvements to pedestrian crossing	Steering Committee		$110,000	High
17	Carrier Dr	Village Hill crossing		High	Intersection Improvement	Study intersection for improvements to pedestrian channelization	VHB Observation		$20,000	Low
18	Bluestone Dr	Carrier Dr	Railroad / Duke Dr	Medium	Shared Use Path	Extend new shared use path to Duke Drive intersection	Steering Committee	0.16	$120,000	High
19	Duke Dr	Paul St	Sidewalk dead end	Medium	Sidewalk	Construct new (extra wide) sidewalk along roadway and connect with existing	Open House	0.11	$50,000	Med
20	Grace St Corridor	Bluestone Dr (near Mr. Chips)	High St (South)	Low	Multi-Modal Corridor	Extend roadway and add transit, bicycle and pedestrian amenities	Master Plan	0.69	$1,060,000	High
21	University Blvd	Convocation Center	CISAT Service Dr	Medium	Bike Lane (widening)	Work with City of Harrisonburg &/or VDOT to widen roadway and install bicycle lanes (multiple ownership roadway)	Open House	0.54	$240,000	High
22	Shared Use Path connection	Reservoir St	Rear of C11 Lot	High	Shared Use Path	Construct new shared use path along pedestrian path up hill to Soccer Field	Steering Committee	0.06	$50,000	Med
23	Shared Use Path connection	Carrier Dr near I-81	Duke Dr	Medium	Shared Use Path	Construct new shared use path between Ikenberry/White Halls and R1 parking lot	Open House	0.15	$110,000	High
24	Champions Dr	Bluestone Dr	Lakeside Service Dr	High	Shared Lane Markings	Install Shared Lane Markings in proper location on roadway	VHB Observation	0.15	$10,000	Low
25	Path by refuse plant	Driver Dr	Shenandoah Hall	High	Shared Use Path	Construct new shared use path along property line (uphill)	Steering Committee	0.14	$100,000	High
26	Carrier Library (rear)	Phillips Hall	Parking Lot E	Medium	Sidewalk	Improve topography-constrained sidewalk connection behind Carrier Library; connect with future Grace St Extension	Steering Committee	0.14	$70,000	Med
27	Future URec expansion	Driver Dr	University Blvd	In Progress	Sidewalk	Construct new (extra wide) sidewalk around front of future URec Expansion building and connect with existing paths	Steering Committee	0.23	Funded	High
28	CISAT Service Dr (stairs)	Driver Dr (stairs)		High	Stair Channel	Retrofit existing stairs with stair channel (wheel gutter) for bicycles	Steering Committee		$20,000	Low

City Projects								Cost Estimates		
Map ID	Location / Intersection	Begin / Near	End / Near	Feasibility	Amenity / Facility Type	Comment	Source	Length (mi)	Cost Category	Cost Group
101	Federal St Shared Use Path	Farmers Market	Northend Trail	High	Shared Use Path	Work with City of Harrisonburg to connect with off campus Shared Use Path	City Project	2.66	$1,840,000	High
102	Grace St (West)	High St (South)	Main St (South)	In Progress	Bike Lane (widening)	Work with City of Harrisonburg &/or VDOT to install bicycle lanes	Harrisonburg Plan	0.28	Funded	High
103	Port Republic Rd	Forest Hill Rd	Hillside Ave	Medium	Bike Lane (widening)	Work with City of Harrisonburg &/or VDOT to extend bicycle lanes through I-81 ramps	Open House	0.20	$90,000	Med
104	Main St (South)	Grace St (East)	Federal St / Future Shared Path	Low	Shared Use Path	Work with City of Harrisonburg to connect with off campus Shared Use Path; Alternative to Northend Greenway Trail connection	City Project	0.39	$270,000	High
105	Port Republic Rd	Hillside Ave	Main St (South)	Medium	Bike Lane (widening)	Work with City of Harrisonburg &/or VDOT to extend bicycle lanes further north	Open House	0.42	$190,000	High
106	Reservoir St	MLK Way	Neff Ave	Low	Bike Lane (widening)	Work with City of Harrisonburg &/or VDOT to install bicycle lanes	Open House	1.09	$480,000	High
107	Grace St (East) EASTBOUND	Main St (South)	Madison Dr / Mason St (South)	High	Bike Lane (stripe only)	Work with City of Harrisonburg &/or VDOT to install bicycle lanes (uphill)	Harrisonburg Plan	0.14	$10,000	Low
108	Grace St (West) WESTBOUND	High St (South)	Chestnut Dr / Willow St (South)	High	Bike Lane (stripe only)	Work with City of Harrisonburg &/or VDOT to install bicycle lanes (uphill)	Open House	0.17	$10,000	Low
109	Grace St (East) WESTBOUND	Madison Dr / Mason St (South)	Main St (South)	High	Shared Lane Markings	Work with City of Harrisonburg to install Shared Lane Markings in proper location on roadway (downhill)	VHB Observation	0.14	$10,000	Low
110	Grace St (West) EASTBOUND	Chestnut Dr / Willow St (South)	High St (South)	High	Shared Lane Markings	Work with City of Harrisonburg to install Shared Lane Markings in proper location on roadway (downhill)	Open House	0.17	$10,000	Low
111	Shared Use Path connections (x3)	Neff Ave (rear of commercial)	University Blvd	Medium	Shared Use Path	Connect to sidewalks and paths along the rear of the commercial shopping center (3 locations)	Steering Committee	0.15	$110,000	High
112	Bluestone Dr	Port Republic Rd	(connect with existing)	In Progress	Intersection Improvement	Work with City of Harrisonburg &/or VDOT to add crosswalks, ADA curb cuts; revise signal timing for bicyclists	City/VDOT Project		Funded	Med
113	Shared Use Path connection	Port Republic Rd	Existing University Blvd SUP	Medium	Shared Use Path	Work with City of Harrisonburg &/or VDOT to extend Shared Use Path in conjunction with interchange realignment project	Steering Committee	0.12	$90,000	Med
114	MLK Way WESTBOUND	Ott St	Mountain View Dr	High	Sidewalk	Work with City of Harrisonburg &/or VDOT to install sidewalk along north side of roadway	Open House	0.55	$240,000	High
115	Paul St	Ott St	Duke Dr	High	Sidewalk	Work with City of Harrisonburg &/or VDOT to install sidewalk along both sides of roadway	Open House	0.80	$350,000	High
116	MLK Way	Main St	Reservoir St	High	Bike Lane (widening)	Work with City of Harrisonburg &/or VDOT to install bicycle lanes	Open House	0.99	$440,000	High
117	Forest Hills Dr / University Blvd	Port Republic Rd	Oak Hill Dr	High	Sidewalk	Work with City of Harrisonburg &/or VDOT to install sidewalk along both sides of roadway	Open House	0.27	$120,000	High
118	Port Republic Rd	Main St (South)	Hillside Ave	Medium	Sidewalk	Work with City of Harrisonburg &/or VDOT to install sidewalk along west side of roadway	Steering Committee	0.36	$160,000	High
119	Mason St (South)	MLK Way	Downtown	High	Shared Lane Markings	Work with City of Harrisonburg to install Shared Lane Markings; study the long term facility type options	Open House / VHB	0.71	$10,000	Low
120	Shared Use Path connections	Sully Dr / Devon Ln	JMU Property Line	Medium	Shared Use Path	Work with City of Harrisonburg to connect with off campus roadway	Open House / VHB	0.15	$110,000	High
121	University Blvd	CISAT Service Dr	Reservoir St	High	Bike Lane (widening)	Work with City of Harrisonburg &/or VDOT to widen roadway and install bicycle lanes (multiple ownership roadway)	Open House	0.38	$170,000	High
122	High St (South)	Grace St (West)	(connect with existing)	High	Intersection Improvement	Work with City of Harrisonburg &/or VDOT to improve safety for bicyclist and pedestrian crossings	Steering Committee		$50,000	Med
123	Neff Ave	Arboretum Trailhead	Sunchase Dr	Medium	Intersection Improvement	Work with City of Harrisonburg &/or VDOT to improve safety for bicyclist and pedestrian crossings	Steering Committee		$80,000	Med
124	Bridge over Blacks Run (creek)	Roosevelt St	Chesapeake Ave	Medium	Shared Use Path	Work with City of Harrisonburg to construct bridge and shared use path to connect roadways	Steering Committee	0.04	$290,000	High
125	Grace St (West/East)	Main St (South)	High St (South)	Medium	Corridor Improvement	Work with City of Harrisonburg to standardize crosswalks, add ADA ramps, and improve channelization	Steering Committee	0.42	$270,000	High
126	Walnut Ln	MLK Way		High	Stairway	Work with City of Harrisonburg to install stairway to MLK Jr Blvd sidewalk	Steering Committee		$20,000	Low
127	Bradley Dr	Hunters Rd	Rockingham Hall	High	Sidewalk	Work with City of Harrisonburg to connect sidewalk across property boundary	Steering Committee	0.01	$10,000	Low

Note:

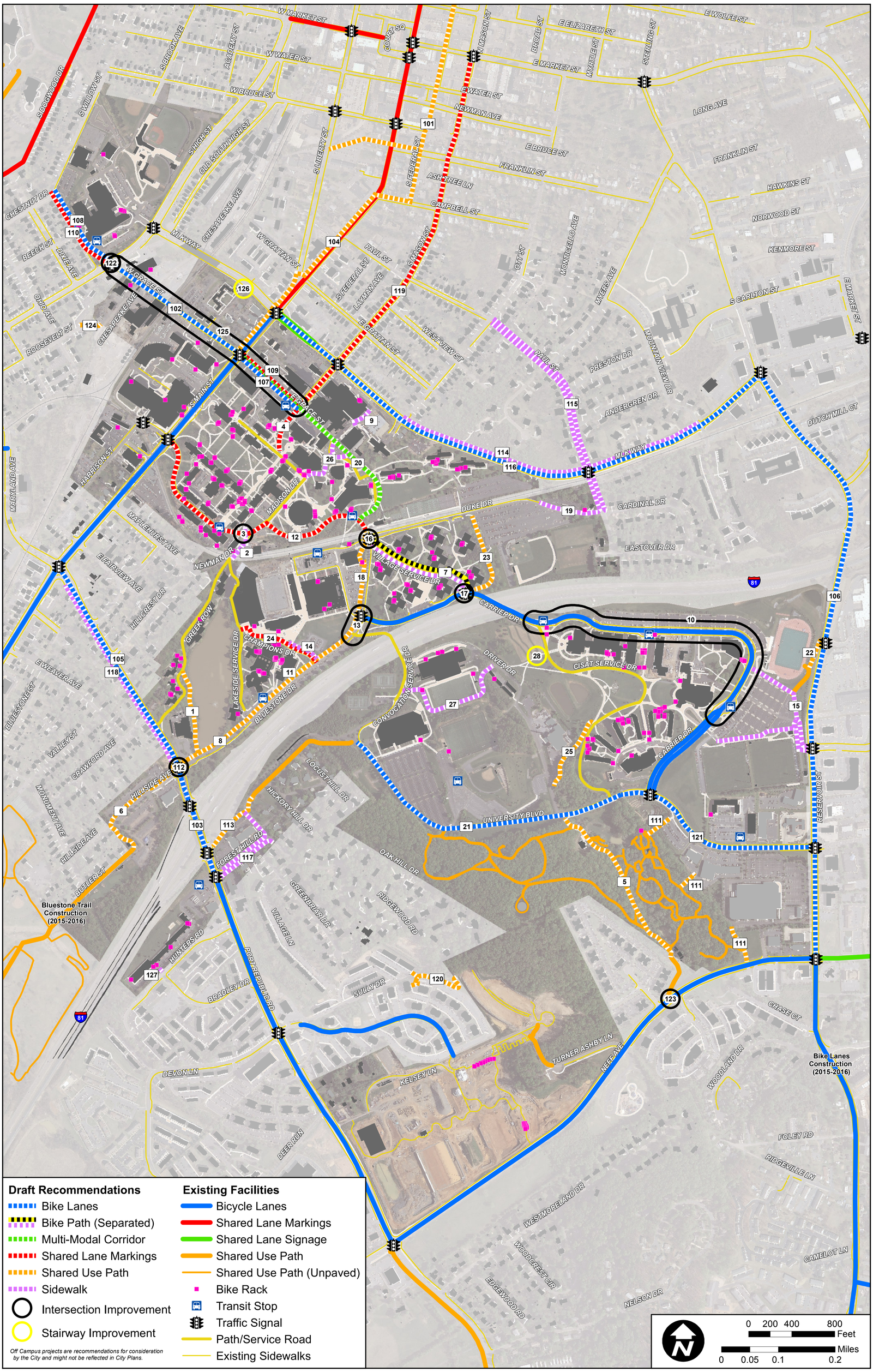
1. Projects in this table have been prioritized based on the process described in report section 5.3.
2. Off Campus projects are recommendations for consideration by the City and might not be reflected in City Plans.
3. 'Map ID' column corresponds with the label number displayed on Figure 10 Recommended Project Map.
4. 'Cost Category' column represents planning-level unit costs for construction only. Does not include site-specific costs.

Feasibility Categories

In Progress	**0-1 years to implement**. Refers to projects that are currently under design or review.
High	**1-3 years to implement.** Refers to projects that are more-quickly constructed, and/or would cost less money to complete.
Medium	**3-10 years to implement.** Refers to projects that follow the short-term projects, and build upon their success.
Low	**10+ years to implement.** Refers to projects that are more difficult to construct, and would require coordination. These projects relate to Campus Physical Master Plan projects.

Cost Groups

<= $25k	Low
$25k - 100k	Med
> $100k	High


Draft Recommendations
Bike Lanes
Bike Path (Separated)
Multi-Modal Corridor
Shared Lane Markings
Shared Use Path
Sidewalk
Intersection Improvement
Stairway Improvement
Off Campus projects are recommendations for consideration by the City and might not be reflected in City Plans.
Existing Facilities
Bicycle Lanes
Shared Lane Markings
Shared Lane Signage
Shared Use Path
Shared Use Path (Unpaved)
Bike Rack
Transit Stop
Traffic Signal
Path/Service Road
Existing Sidewalks
Bluestone Trail Construction (2015-2016)
Bike Lanes Construction (2015-2016)
0 200 400 800
Feet
0 0.05 0.1 0.2
Miles

4.3 Pedestrian Project Recommendations

The Pedestrian portion of the Plan is comprised of pedestrian paths and sidewalks, which connect existing sidewalk dead ends, connect to transit stops, indicate heavily utilized (worn) foot path. A second category of pedestrian projects include intersection improvements, such as the addition of standard crosswalks and associated signage, realignment of intersection geometry, or pedestrian channelization. Pedestrian Plan projects are detailed in Table 9 and illustrated on Figure 10.

Facility Types

The *Guide for the Planning, Design and Operation of Pedestrian Facilities* (American Association of State Highway and Transportation Officials, 2004) provides standards of practice for pedestrian facility types and their proper application, summarized below with citations as needed.

Pedestrian Paths and Sidewalks

The campus outreach events discussed in Section 2 helped to identify many locations that are in need of sidewalk connections. Additional locations were otherwise identified during field work on campus. All newly constructed or improved sidewalks are required to meet ADA standards. **(AASHTO 3.2)**

On-campus sidewalks should be wider than the four foot minimum width concrete sidewalk. Campuses function more similar to a central business district, where the minimum sidewalk width standard is ten feet. Sidewalks should have a minimum two foot vegetative strip (grass) to separate vehicles from pedestrians, however this may not be feasible in all locations. **(AASHTO 3.2.3)**

Depending upon the site conditions and the flow of pedestrians through the area the typical on-campus sidewalk width should range between 6-12 feet, with portions that require 12 feet or wider sidewalks to accommodate the volume of pedestrians between classes. Two recommended sidewalk projects include Project 26 near the Carrier Library, and Project 15 around the perimeter of a parking lot near Reservoir Street and Carrier Drive. These types of projects are displayed as purple-dashed lines on Figure 10.

Facility Improvements

Intersection and Corridor Improvements

Recommended intersection and corridor projects (black circles on Figure 10) represent a variety of enhancements that are unique to the site conditions, including the installation or relocation of accessible pedestrian crossing signals, the installation or timing of traffic signals for pedestrian movements, pavement markings, curb cut reconfiguration, and/or pedestrian channelization for safety and limiting mid-block crossing.

The intersection at Newman Drive and Bluestone Drive (Project 3) is recommended for improvement to align a new sidewalk (Project 2) and provide standard ADA curb cuts and new crosswalk markings for pedestrians. This is intended to prevent pedestrians from walking within the roadway along Newman Drive, and safely connects them with an existing sidewalk along the north side of Bluestone Drive and into the Quad.

Project 10 represents a series of intersection improvements that should be made along the Carrier Drive corridor. The BPAC recommended a two-phase approach: (a) install standard crosswalk treatments (near-

term) as well as post-and-chain for improved channelization of pedestrians; and (b) install vehicular traffic control gates (long-term) along Carrier Drive in two locations (Hanson Hall and Leeolou Alumni Center).

Project 13 includes recommended improvements to two intersections located 180 feet apart. The intersection of Carrier Drive and Bluestone Drive currently has three different pedestrian crosswalk markings, and only three are marked. The right-turn lane onto Carrier Drive is recommended for removal following the installation of traffic control gates (in the long-term) along Carrier Drive (Project 10). This would allow for the intersection geometry to be revised for improved pedestrian safety. The adjacent intersection of Bluestone Drive and the C9 parking lot, near the Duke Dog Tunnel, is recommended for standard ADA curb cuts and a crosswalk across Bluestone Drive to help pedestrians reach the tunnel.

Projects 13, 16, and 17 are similar pedestrian improvement projects. All three involve the standardization of crosswalk markings and channelization to discourage mid-block crossing, despite unique site conditions.

Project recommendations were made with preliminary engineering judgment that is appropriate for a planning-level of analysis. All recommendations will require a full survey of existing site conditions, and follow standard design and construction process review.

ADA Improvements

The purpose of the Americans with Disabilities Act (ADA) is to ensure that all persons have an equal opportunity to access public spaces. Diminished mobility, limited vision or hearing, or even reduced cognitive skills are all design considerations for ADA projects. Disabilities may be permanent or temporary, for example a broken leg requiring crutches, or a wheel chair. Pedestrian facilities that are designed to accommodate persons with disabilities will likewise benefit all users.

Pedestrian improvements are required to meet the standards of the Americans with Disabilities Act (ADA) of 1990 (see *2010 ADA Standards for Accessible Design*). Typical improvements include accessible curb cuts at intersections, signalization for the visual and hearing impaired (e.g. the HAWK pedestrian crossing system), ensuring that sidewalks and paths are free of obstructions, and accessible access to transit facilities.

New or retrofitted facilities must ensure pedestrian access for all, as mandated by the ADA, as a base level of compliance. JMU should build upon these guidelines, as directed in the Comprehensive Master Plan by emphasizing enhancements that will accommodate all pedestrians with disabilities, persons using crutches or walkers, or persons using mobility devices such as a scooter, wheelchair, Segway, or stroller, as well as able-bodied pedestrians.

Potential barriers to accessibility may include light poles, signage, fire hydrants, or telecommunication boxes along sidewalks, as well as steeply sloped sidewalks, ramps, driveways, roadways, or railroad crossings, as well as missing sections of sidewalks and curb cuts that are misplaced, or missing entirely.

Campus-wide Improvement Projects

A variety of campus-wide projects are recommended that support the vision and goals of this plan and complement the facilities and programs described in other sections of this report. Each of the following topics should be separately studied in greater detail because they involve unique site conditions, and will likely involve multiple campus departments. These campus-wide projects represent ‘low-hanging fruit’ that were

not included within the prioritization process because they were too numerous and would detract from the recommended projects list (Table 9).

Wayfinding Study

A comprehensive wayfinding study is needed for all modes of transportation across the JMU campus and the City of Harrisonburg. Beginning with the adoption of exterior signage guidelines, JMU should identify a variety of pedestrian-scaled wayfinding signage in addition to bicycle routing and vehicular sign types. Proper sizing and location for each sign should be further studied by a certified engineer. Placement of wayfinding signs within the right-of-way would require an encroachment agreement with either the City or VDOT.

Accessibility Audit

Ensuring accessibility of all crosswalks, curb ramps, and sidewalks is a shared goal of the Office of Disability Services and this plan. A campus-wide audit of streets and sidewalks will have a mutually-beneficial outcome, to formulate a list of short-term improvements that are separate from the recommended projects in this plan.

Crosswalk Audit

Similar to the accessibility audit, an inventory of crosswalk locations and markings is recommended. This audit should focus on the standardization of crosswalk treatments, and the removal of unsafe crossings due to visibility, accessibility, or other constraints. One example of these types of projects would be the removal of the Champions Drive speed hump and replacement with a standard designed raised crosswalk.

Champions Drive speed hump

A review of the current traffic signal timing by a certified traffic engineer should also be conducted for intersections maintained by JMU, to determine if adequate time is provided for the pedestrian phase. The City of Harrisonburg Public Works department is responsible for any traffic signals beyond the JMU campus.

Street Lighting and Callbox Plan

Campus safety is also a shared goal of this plan. Several recommended projects include the installation of lighting fixtures to improve visibility of pedestrians at intersections, or along a Shared Use Path. A campus-wide inventory of existing street lighting and callboxes is needed, in addition to new locations that may be observed. Crime Prevention Through Environmental Design (CPTED) concepts should be referenced to provide guidance, as needed.

Future Bicycle Amenity Locations

Capitalizing on the bicycle rack inventory that was initiated in the fall of 2013, JMU should assess possible locations for other bicycle amenities, such as covered bicycle racks, repair stations, bicycle locker locations, or commuter shower and changing room facilities. A campus-wide inventory should be completed first and used to generate a list of possible amenities. The list should be audited regularly based on utilization, and locations of highest use should be prioritized, and installed as funding becomes available.

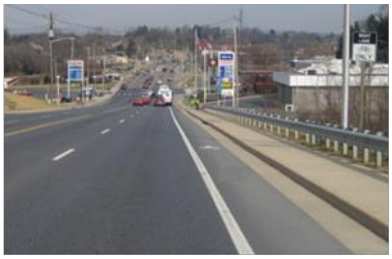
4.4 Bicycle Project Recommendations

Facility Types

There are several possible ways to accommodate bicycles depending on conditions. The most common facility types are: shared roadways (signed or unsigned), Bicycle Lanes, Wide Outside Lanes, Shared Lane Markings, and Shared Use Paths. The *Guide for the Development of Bicycle Facilities* (American Association of State Highway and Transportation Officials, 2012) defines each of these facility types and their proper application, summarized below. Standards and design guidelines for construction, markings, and signage of these facilities are detailed in Section 4.5.

Bicycle Lanes

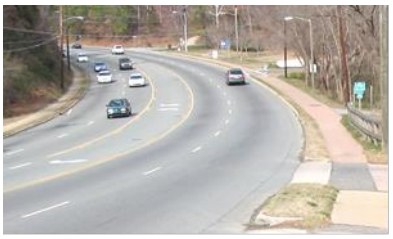
Bicycle Lanes are intended to delineate the right-of-way for bicyclists and motorists and to provide for movements that are more predictable by each. Typical Bicycle Lanes are no less than four feet wide (not including the gutter) and are striped and marked with standard markings (see Section 4.5). Bicycle Lanes are usually located on the curbside of the street, but may be located between the travel lane and parallel parking if there is sufficient width to avoid the 'door zone'.



Bicycle Lane along Port Republic Road

Wide Outside Lanes

Unmarked and unstriped lanes, commonly known as Wide Outside Lanes, can also be successfully implemented. Typically, Wide Outside Lanes are travel lanes that are shared with motorists that are a minimum of 14 feet wide. The expectation is that bicycles keep to the curb side and motor vehicles can pass within the lane. As with shared roadways, bicyclists using Bicycle Lanes and Wide Outside Lanes are expected to make the same movements and follow the same traffic rules as motorists.



Wide Outside Lane
Source: PBIC

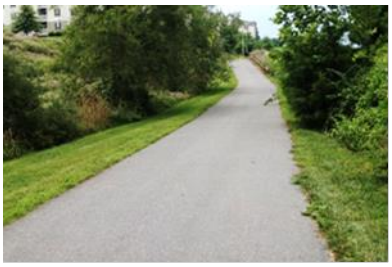
Shared Lane Markings

An alternative option that is becoming more commonplace is the use of Shared Lane Markings (also known as share-the-road-arrows or "sharrows"). Shared Lane Markings may be used to increase motorist awareness of bicyclists and encourage safe passing, help prevent wrong-way bicycling, and aid bicyclists in positioning themselves laterally to avoid getting "doored" or where lanes are too narrow for motorists and bicyclists to travel side by side. For pavement marking and signage guidelines, see Section 4.5. Shared Lane Markings are most appropriate for roadways with speed limits less than 35 mph.

Shared Lane Markings along Market St

Shared Use Paths

Shared Use Paths should be used on corridors that are not served by streets, and should offer opportunities not provided by the road system. At JMU the Arboretum Trail is the best example of a typical Shared Use Path. They provide recreational opportunities and can serve as direct commuter routes if cross-flow by automobiles and pedestrians is minimized. Shared use paths are appropriate along stream corridors and water/sewer easements. University campuses have successfully incorporated Shared Use Paths and off street dedicated bicycle paths, especially in areas of campus with limited vehicular traffic.



Shared Use Path at JMU

Sidepaths

A Shared Use Path that is located adjacent to a roadway may also be referred to as a Sidepath. A five (5) foot vegetative buffer strip is typical, to provide separation from vehicles. In general, streets with low speeds and multiple intersections and driveways should have on street Bicycle Lanes, Shared Lane Markings, or no marked facilities at all, rather than sidepaths. Having bicycles on the street in these situations has proven to be safe for bicyclists, and also can act as traffic calming for vehicular traffic. Off-street bicycle paths should be considered in areas adjacent to higher-speed streets or streets with inadequate width for standard Bicycle Lanes, or in areas used for recreational purposes with few vehicular intersections. This guidance, however, is not mandated for strict interpretation and there are conditions where engineering judgment may allow a 10 foot wide Sidepath.

Sidepath near Brevard (NC)
source: PBIC

Bicycle Facility Application

Campuses across the United States have had varying success implementing each of the five major bicycle facilities noted above. In general, bicycle travel is enhanced when a high quality network of bicycle facilities is developed. On most campuses, more than one facility type is used.

The *Guide for the Development of Bicycle Facilities* notes: "In selecting the proper facility, an overriding concern is to assure that the proposed facility will not encourage or require bicyclists or motorists to operate in a manner that is inconsistent with the rules of the road…An important consideration in selecting the type of facility is continuity. Alternating segments of Shared Use Paths and Bicycle Lanes along a route are generally inappropriate and inconvenient because street crossings by bicyclists may be required when the route changes character."

Facility Improvements

Recommended Bicycle Plan projects are detailed in Table 9 and illustrated in Figure 10.

On-road Improvements

Bicycle Lanes are displayed as blue dashed lines on Figure 10 and are recommended for portions of University Boulevard and E Grace Street (uphill direction), where sufficient roadway width is available to accommodate them without costly relocation of the curb and gutter. Several additional Bicycle Lane projects area

recommended for off campus roadways that coordinate with the City of Harrisonburg's Bicycle and Pedestrian Master Plan.

Shared Lane Markings are displayed as red dashed lines on Figure 10 and recommended for narrow campus streets with lower speed limits and fewer vehicles, such as Bluestone Drive north of Duke Drive (Project 12) as well as Champions Drive (Project 24) near the stadium, and a short segment of Madison Street (Project 4).

Recommended Ancillary Facilities and Amenities

Bicycle Parking

The location, supply, and design of bicycle parking are important considerations in determining the effectiveness of this amenity. In general, bicycle parking should be provided in proximate locations to major campus building entrances. For the most congested areas of the Bluestone Campus it is recommended that bicycle racks also be provided along the rear entrances of buildings to minimize the potential conflict with pedestrians within the quad.

Inverted-U rack style

Public comments collected at the beginning of this project supported the need for JMU should pursue an adopted standard bicycle rack style (the Inverted-U) and work toward replacing non-standard racks over time. This style is preferred by the Association of Pedestrian and Bicycle Professionals (APBP) and experienced riders because the bicycle is supported in two locations while locked, and the bicycle will typically not fall onto its side. Fallen bicycles lead to problems of inefficiency, especially near residence halls where bicycle may be parked for multiple days at a time, often blocking access to multiple parking locations. Wheel damage from the Comb of Toast style bicycle racks is further justification for the replacement of non-standard bicycle racks over time. Stickers placed on the bicycle rack (photo below) may be applied to illustrate the proper placement of the bicycle.

Proper bicycle parking sticker

Data collected from the bicycle rack utilization survey indicated that the areas of greatest bicycle usage include the (a) residence hall side of the Quad (65%); (b) Performing Arts area (54%); and (c) the Skyline residence hall area. This type of data collection should be conducted each fall and spring semester to inform decision-making in response to requests for new bicycle rack installation.

The University should also continue to investigate and identify opportunities for additional covered bicycle parking to provide weather protection and security for bicyclists. Covered bicycle parking can be incorporated into building overhangs, awnings, and breezeways. In addition, transit shelters and campus parking decks often have suitable locations for covered bicycle parking or bicycle cages, providing longer term storage options and allowing people who commute by car to easily store and retrieve their bicycle for trips around campus. Bicycle lockers also provide long-term storage and excellent weather and theft protection. It is recommended that bicycle lockers be placed in proximity to the Godwin Transit Center to enable an easy transition from bus to bike, as well as within existing parking garages.

Although there are several existing bicycle rack styles on campus at present, the University with guidance from the Association of Pedestrian and Bicycle Professionals (APBP) standards is working towards the adoption of a standard bicycle rack style for all future installations. The rack is an inverted-U style rack with 18" vertical spacing between pipes allowing for the bicycle to be supported and secured in two locations, rather than just the wheel. All new bicycle rack installations will match the standard type, and the existing variety will be slowly replaced as funding is available. The University maintains a static Bicycle Rack Map that locates bicycle racks on campus (http://www.jmu.edu/navigatejmu/BicycleTravel.shtml). The University is currently developing a dynamic online map of bicycle racks and air pump stations that will be rolled out in the fall of 2014.

Bicycle Stations

A bicycle station is a small building or shed that provides bicycle commuters with a place to make minor repairs or inflate tires, as well as provide information on bicycle programs or amenities on campus. Bicycle stations can be staffed by volunteers or they can be self-serve stations that are periodically maintained.

Basic recommended components of a bicycle station are: (a) an air pump, (b) secure bicycle parking, and (c) bicycle map/route information. Optional amenities may include (d) bicycle repair, (e) a small coffee shop, or (f) a shower and changing facility. Three recommended locations for a future bicycle station include the UREC Center (part of expansion plans), the Godwin Transit Center, and the Planetarium (or vicinity) near Grace Street. Only one station is recommended for construction at a time, and its success will help determine the demand for and placement of a second bicycle station.

A much smaller-scaled version of a bicycle station is a repair kiosk, which only includes an air pump and assorted repair tools. These kiosks are far less expensive than the stations because they are non-sheltered. The repair kiosks should be strategically located across campus in bicycle parking areas with high demand and use and visibility. Security and maintenance of these repair kiosks is a primary concern, as they are often the target of vandalism because they are unstaffed.

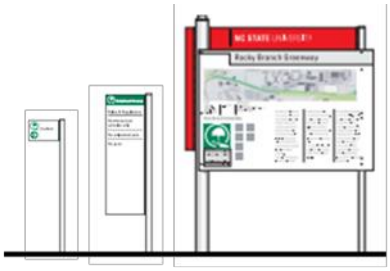
JMU has installed two air pump stations on campus. One is located near Warren Hall (photo), and the other is located within the transit shelter near the JMU bookstore.

Air station near Warren Hall

Wayfinding

A consistent signage program that utilizes standard signage types will make bicycle movements more predictable and increase safety for bicyclists, pedestrians, and motorists alike.

Additional wayfinding or trail information may be appropriate for most Shared Use Path projects, especially when located at a trail split, where one direction continues on the path and the other heads to a nearby sidewalk. Other wayfinding signage possibilities exist along the University property boundary, such as the Bluestone Trail near Hillside Drive, to guide community users through the unfamiliar campus.



Sample directive, rules, and trailhead sign types (NC State University)

The JMU Comprehensive Master Plan includes examples of directional signage and campus wayfinding sign types as well as recommended locations for more large-scale campus entrance and gateway signage along major roadways. JMU should develop a comprehensive exterior signage plan to establish design criteria for a standard set of small, medium, and large scaled signage types and locations, as well as standard colors and fonts. These standards would apply to building identification signs, vehicular and street signs, trail or path wayfinding signage, as well as bicycle directive signs. Two examples of exterior signage plans include the University of Virginia in nearby Charlottesville, VA (http://officearchitect.virginia.edu/index.php/item/192-signage-standards) as well as North Carolina State University located in Raleigh, NC (http://ncsu.edu/facilities/campus_signage/exterior/index.htm), which JMU could reference for the creation of its own standard.

The Manual for Uniform Traffic Control Devices (MUTCD) contains guidance and instruction for bicycle wayfinding in section 9B.20. These national standards must be used in conjunction with campus signage, especially for those facilities that are parts of systems that connect to bicycle systems in the City of Harrisonburg. A point of emphasis should be placed on using consistent, standard signs required by state and federal transportation agencies, which users have seen before and expect to encounter.

Standard wayfinding signage MUTCD

Shower Facilities

Section 2.7 includes a lists campus buildings with shower and changing facilities that are available to students and employees. Feedback from public outreach, BPAC, and the League of American Bicyclists recommended that the University retrofit campus buildings to accommodate bicycle commuter shower facilities in conjunction with any future renovation or capital improvement projects.

Additional Gating of Campus Roads

One possible improvement for future consideration, though not a formal recommendation of this plan, is the potential to add traffic control gates to a portion of the East Campus, specifically along Carrier Drive between the Village Area and the C-10 parking lot. Additional traffic impact study would be needed in order to assess and implement this measure.

4.5 Recommended Programs and Policies

Bicycle improvements are often discussed in terms of the "Five E's" of bicycle planning and design: Engineering, Education, Enforcement, Encouragement and Evaluation. Together, the "Five E's" measure the effectiveness of systems and programs and ensure that the needs of all users are met. The engineering component will have limited impact towards building a bicycle and pedestrian culture without these complementary programmatic improvements, policies and incentives.

The Engineering component of this Plan have been detailed in section 4.3 Pedestrian Recommendations, and section 4.4 Bicycle Recommendations. The remaining four E's (Education, Enforcement, Encouragement and Evaluation) are discussed below.

Educational Programs

In addition to infrastructure improvements for pedestrians (section 4.3) and bicycles (section 4.4), it is important to improve the information available for both current and potential bicyclists, and to inform the campus community (motorists included) and general public about rules of the road, and general safety. JMU's Office of Environmental Stewardship and Sustainability is one example of how alternative transportation topics fit into broader goals and initiatives for the University community, such as reducing carbon emissions, or living a healthy, active lifestyle.

Exemplary universities with a series of unique educational programs include Stanford University (http://transportation.stanford.edu/alt_transportation/BikingAtStanford.shtml) and UC Davis (http://taps.ucdavis.edu/bicycle), the only two Platinum-level Bicycle Friendly Universities. Virginia's highest ranking bicycle friendly university is Virginia Commonwealth University (http://www.bikes.vcu.edu/about/), which has achieved its Silver-level designation, something that JMU is actively working towards.

Educational programs capitalize on marketing efforts to provide background information that all users may not be aware of, especially if they are new to campus or infrequent bicyclists. In the State of Virginia the Department of Transportation (VDOT) maintains information to educate bicyclists and motorist on the existing state laws and to promote safety (http://www.virginiadot.org/programs/bk-proginfo.asp). The 'Rules of the Road' apply to all modes of transportation including motorists, which reinforces the importance of the Educational component.

National resources for bicycle and pedestrian educational outreach include the League of American Bicyclists (LAB), which advocates for their Bicycle Friendly America campaign and includes JMU as a Bronze-level Bicycle Friendly University. The League certifies League Cycling Instructors (LCIs) to help teach proper roadway cycling techniques and safety strategies. The LAB website contains links to additional resources http://www.bikeleague.org/. Staff from the University Recreation (UREC) should actively work towards training one or more staff members to become League Cycling Instructors to lead bicycle safety courses, as well as basic bicycle maintenance and repair instruction. Bike Ambassadors is the term that VCU uses to describe their instructor-mechanics.

On a local level, the University collaborates with City and regional partners to develop education and safety programs that benefit the University community. Current outreach programs designed for campus bicyclists include a voluntary bicycle registration program (to prevent theft), a bicycle rental program called JMU Cycle Share, and Guaranteed Ride Home offerings to employee cyclists who participate in the campus Transportation Demand Management (TDM) program (see Section 2.8). These existing programs have educational and encouragement components.

Attending first-year and transfer student Orientation events is an effective strategy for promoting active transportation. Each year a new group of students arrive on campus and many will choose to walk, bike, or ride transit if they see other students doing the same. Offering information on the variety of facilities, amenities, programs, incentives, and events that are happening are all useful education outreach strategies. University staff should coordinate with other campus organizations, such as the Earth Club or the Outdoor Adventure Club to ensure that first-year and transfer student Orientation events include bicycle and pedestrian educational information.

The University might consider an Active Transportation Ambassador Program that uses a peer education

model to promote mobility safety and distribute information to the campus community. This type of program could be administered through Residence Life, with coordination among several campus departments to direct interest from all departments/programs.

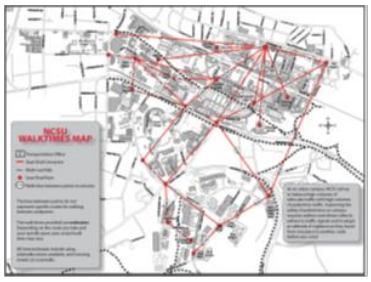
For information and public outreach many universities are utilizing social media, such as Facebook, Twitter, and podcasts to reach their audience. Creating a campus transportation account will help spread information on new Shared Use Path construction, Bicycle Lane markings along new roadways, or even details on an upcoming event on campus. Educational programs are more effective when they are delivered through several different media to ensure that all interested parties are made aware, rather than simply supporting a single page website that may be difficult to find.

List of Potential Educational Programs or Enhancements

- Coordinate efforts with existing Health 101 and Wellness Passport Programs
- Coordinate with existing groups such as Earth Club and Adventure Club
- Coordinate with VDOT Staunton District Bicycle and Pedestrian Coordinator
- Coordinate with City of Harrisonburg for continuity of trails and wayfinding across campus boundaries
- Identify the various lead departments or delegated staff to champion each effort
- Obtain a certified League Cycling Instructor (LCI) and offer cycling skills classes
- Attend first-year and transfer student Orientation events and provide information or branded SWAG
- Attend off campus events such as the Block Party in the Burg
- Organize an Active Transportation Ambassador Program and coordinate with Residence Life
- Organize informational outreach through social media outlets
- Include vehicular (motorist) educational outreach in addition to bicyclists and pedestrians

Encouragement Programs

The University currently posts a campus bicycle parking map and is working towards dynamic improvements, however it is recommended that a more comprehensive campus Walk-Bike map be developed. The improved map should show the approximate distance and travel time for walking (3 mph) or bicycling (6-8 mph) to specific destinations, as well as routes to, around, and between each of the campus precincts. Connections to off campus facilities should differentiate between exclusive and shared facilities. The map should also indicate where amenities are located, such as restrooms, shower and changing room facilities, bicycle repair stations, covered or long-term bicycle parking, and other helpful information for bicycle commuters. Rules of the road and safety information could also be included, if space is available.



Sample walk times map.
source: NCSU

Maps should be distributed on campus, at local bicycle shops, and incorporated into first-year and transfer student Orientation programs in parallel with information on parking. Additional components of this map could include nearby apartments and transit routes to help students choose convenient modes of transportation to and from campus. Materials should be available at the student union, library, gym, residence halls, parking services office, or anywhere students congregate.

Sample bicycle map.
source: UVA

JMU currently offers a Guaranteed Ride Home voucher program for students and employees. This program could be rolled into a much larger alternative transportation incentives program that promotes the variety of resources and benefits that are available. Another encouragement program includes the three daily parking permits (for inclement weather) that are free of charge to those who register their bicycle. The BPAC recommended that this limit be increased to 10 or more per year by coordinating with Parking Services.

Freshman are not eligible to obtain parking privileges on the JMU campus, with limited exceptions on a case-by-case basis. This is a common practice at many universities to help control demand for limited parking resources. Further limiting the availability of on campus parking permits for students who live within a certain distance of campus is an effective strategy that encourages the use of alternative transportation. This type of program requires the coordination from Parking Services, as well as the University administration, Public Safety, and the Harrisonburg Department of Public Transportation which operates the buses. This type of program should begin with a modest half-mile or one-mile distance and gradually increase over time. Examples of other Universities with similar parking restrictions is available through the Association for the Advancement of Sustainability in Higher Education (AASHE) www.aashe.org/resources/campus-car-bans and similar resources.

The University may also consider other campus programs to raise awareness, promote cooperation, and create culture of biking and walking on campus. Such programs may include a bicycle benefits club, which offers incentives to registered alternative transportation commuters like a limited number of daily parking passes, access to commuter storage lockers and shower facilities, bicycle lockers or indoor bicycle cages, and campus events that promote bicycling. The campus bookstore should offer basic bicycling items such as reflective apparel, tire flat repair kits, safety equipment such as helmets, and even bicycle locks. A full complement of bicycle equipment should be available at nearby off campus retailers. The University could partner with bicycle retailers to offer discount coupons for items that are not available on campus.

The University should locate spaces for a bicycle repair and maintenance center on the Bluestone Campus (in addition to the UREC expansion), as well as additional storage options. Commuter bicycle lockers should be provided near transit stops as well as the student center as these are primary destination points. The approximate cost of bicycle lockers will depend greatly upon the quantity ordered (typically sets of 4), the level of quality (economy or heavy duty), and any unique style or branding requirements (color, weatherproof, electronic locking system). Typical costs could range from $1,000 to $4,500 per storage locker, and installation costs for the concrete pad would not be included.

Sample bicycle locker
source: FHWA

A secured indoor bicycle cage within residence halls or potentially within the lower level of a parking garage, should be identified for long-term bicycle storage during winter, or even over summer break as an alternative to abandoning a bicycle that won't fit into an over-packed vehicle. UC Davis offers secured bicycle storage over the summer for a $20 fee (http://taps.ucdavis.edu/bicycle/services/summer_storage).

Sample indoor bicycle cage

Bicycle rack installation requests are currently made by individual building coordinators to the Facilities Management. A centralized bicycle rack request system should be established to document, investigate, and prioritize all potential locations for additional bicycle racks on campus. Funding for the equipment and

installation is not always available, so the system is necessary to establish a prioritize list that is 'shovel-ready.' A similar system could be integrated for roadway maintenance of worn Bicycle Lane markings, street sweeping and snow removal, or even pothole repair. All transportation-related topics could potentially be rolled into a crowd-sourcing application account, such a SeeClickFix (www.seeclickfix.com). For this type of system to function a designated University liaison should be tasked with managing the account and disseminating the request to the appropriate campus department, such as public safety, parking, or facilities and grounds.

Other encouragement opportunities could include non-competitive bicycle themed events, and social opportunities, such as a bicycle parade, bicycle fashion show, Christmas ride with Santa, or a Halloween-themed bicycle decoration contest.

Potential Encouragement Programs or Enhancements

- Develop a more comprehensive bicycle and pedestrian map for the campus vicinity
- Establish an alternative transportation benefits club (Commuter Alternatives Program) to consolidate all incentives into a single program and designate an administrator or agency
- Expand the Guaranteed Ride Home program
- Coordinate with Parking Services and investigate parking permit restrictions for commuting students who live very close to campus
- Identify potential locations for various amenities:
    - bicycle maintenance station, as well as multiple repair kiosks across campus
    - retrofit locations of covered bicycle racks
    - indoor bicycle cage for long-term storage (summer break)
    - commuter bicycle storage lockers and shower facilities
- Formalize the process for bicycle rack requests, and develop a list of potential locations for installation when funding becomes available
- Formalize the process for minor maintenance and repair efforts through a single crowd-sourcing application such as SeeClickFix or similar applications
- Organize an active transportation day or weekly event; possibly coordinate with Earth Week

Enforcement Programs

Enforcement of regulations and policies can be critical to maintaining a safe bicycling and walking environment. Enforcement may include basic traffic regulations for automobiles, jaywalking for pedestrians, or bicyclists riding the wrong way on streets or riding on campus sidewalks through designated dismount zones. Enforcement is especially critical at high volume intersections with conflict points and areas of known safety issues, such as:

- Bluestone campus quad (should designate dismount zones)
- S Main Street tunnel (dismount zone signage needed)
- Village Hill service drive near the intersection of Bluestone Drive and Duke Drive
- Carrier Drive near the ISAT Building and transit shelter

University Police can use targeted enforcement efforts at key problem areas to raise awareness and enforce applicable laws. It is also recommended that the University Police collaborate with the City Police on enforcement programs in those areas shared by multiple jurisdictions. Campus Police could establish a bicycle patrol unit, serving as certified instructors of safe bicycle techniques. Bicycle 'Rules of the Road' cards are effective educational materials that explain the current state laws and responsibilities of motorists and cyclists. Cards may be adapted to match local government or university police laws, and branded to match the University active transportation program.

Enforcing the safe operation of a bicycle along city and campus streets depends greatly on the education and encouragement components. Universities should emphasize the importance of bicycle safety through positive reinforcement, as much as practical. University police officers should have a visible presence on campus, which in-turn will promote voluntary compliance, rather than require strict enforcement. Theft prevention is equally as important as safety. Public Safety should seek opportunities to promote and distribute u-lock style bicycle locks.

Sample 'Rules of the Road' card Durham, NC

A bicycle registration program is common to campus police departments to aid in theft prevention and recovery. Bicycle owners are required by regulation to register their bicycles, however the voluntary rate of participation is generally low. The University should investigate an online bicycle registration process for added convenience. Other strategies to improve bicycle registration involve marketing and promotional outreach during campus Orientation events, advertisements at transit shelters, within the student center, or even at the parking department. The key component is redundancy; the more often the message can be reinforced the more likely bicycle owners will voluntarily register. Incentives such as branded promotional materials (reflective stickers, riding gloves, or bags) or even a limited number of daily parking passes are other strategies to improve registration. Enforcement of bicycle registration is the last line of defense, and may serve as another opportunity for positive reinforcement by partnering with local bicycle shops to offer no-fee warning citations that include a discount coupon for helmet or u-lock purchases. Other ticket diversion opportunities include waived citations if the student/employee completes a bicycling education class, or rewarding gift certificates for riders who are 'caught' following the law.

At the end of each spring semester there are usually dozens of abandoned bicycles scattered across campus. The duty of tagging these abandoned bicycles (after a 120-day tagging period) falls to the Campus Police, and removal falls to the Facilities Management Departments. Many universities, including JMU, sell this property through campus surplus or auction depending upon state and local laws. James Madison currently operates a Surplus Bicycle Program which repurposes abandoned bicycles by partnering with a local bicycle repair shop for making repairs and upgrades.

Enforcement Programs or Enhancements

- Coordinate efforts with Public Safety and focus on stewardship rather than strict enforcement
- Organize targeted enforcement efforts for congested areas of campus
- Promote the bicycle patrol unit of the Campus Police, and have them serve as stewards for demonstrating bicycling safety on campus
- Distribute the 'Rules of the Road' information cards as handouts to increase awareness
- Investigate a citation warning system (no fee) that includes a coupons for purchase of bicycle helmet or other safety items such as reflectors, or flashing lights
- Investigate other ticket diversion programs that will waive the citation by taking a bicycle education course (Bike Traffic School at UC Davis)
- Encourage the greater participation in the bicycle registration process to aid in theft recovery and authorize the full list of incentives that are available to registered alternative commuters
- Revise the JMU Student Handbook as needed to reflect the above changes

Evaluation and Planning Programs

This Plan is intended to be a living document that changes over time. The existing conditions in the spring of 2014 have been documented and a number of recommended engineering, educational, encouragement and enforcement improvements are being presented. Monitoring JMU's progress is a necessary step towards satisfying the vision, goals, and objectives of this Plan. Evaluation of programs will involve the measurement of many aspects, from the number of registered bicycles, bicycle racks, and Orientation events attended, to the financial resources spent on the construction of accessible sidewalks, Shared Use Paths, or Bicycle Lanes. Anything that can be measured, should be measured and tracked over time to demonstrate progress of these programs. With this information collected JMU will likely have the justification to renew its Bicycle Friendly University application and apply for the silver-level status.

All bicycle racks were inventoried in 2013, and a utilization study was conducted to identify locations of high demand. These types of data should be collected regularly so that the University may more efficiently distribute its resources based on demand. This information should also be used to prioritize new rack installation requests, rather than haphazardly installing bicycle racks based on a single complaint or phone call. Similarly all pedestrian and bicycle crashes on campus should be documented and geo-located to the nearest intersection, which could be used to prioritize intersection improvement projects.

To undertake the continual evaluation of bicycle and pedestrian programs JMU should establish a full-time Bicycle and Pedestrian Coordinator position who is tasked with coordination of the BPAC, seeking grant funding for improvement projects, and serve as liaison with other JMU departments as well as the City. The coordinator position should attend first-year and transfer student Orientation events and present materials for the bicycle registration process, alternative transportation incentives, as well as provide giveaways to encourage more students to ride rather than drive.

JMU should reach out to researchers on campus to investigate the economic impact of bicycling at the JMU campus. Similar studies have been conducted on the investment costs of bicycle facilities, or the economic benefit of bicycling on tourism.

Evaluation of Programs or Enhancements

- Continue active transportation surveys
- Document number of participants at orientation and other active transportation events
- Measure the construction of new infrastructure by year, project length, and cost
- Document, prioritize and respond to requests for bike racks and other amenities
- Designate a Bicycle and Pedestrian Coordinator
- Apply for Silver level Bicycle Friendly University status
- Monitor and update this Plan

4.6 Facility Standards and Design Guidelines

As the University implements the recommendations in the JMU Bicycle and Pedestrian Master Plan it will be important to do so in a consistent and predictable manner. The facility standards and design guidelines in this section establish the baseline for a variety of improvements and should be referred to as improvements are implemented and constructed. These standards and guidelines are comprised of best-practices nationally and from other communities, and are referenced as such for quick reference to specific sections of these

standards. Following these national design standards will ensure that pedestrians and bicyclists encounter predictable, safe, and consistent treatments that have been established through credible research by licensed civil engineers. Failure to implement proper design standards could result in liability exposure to the University.

Current Laws and Policies

In March 2010, the US Department of Transportation (DOT) provided a Policy Statement to reflect the DOT's support for the development of fully integrated active transportation networks. The statement noted that it is the DOT policy to incorporate safe and convenient walking and bicycling facilities into transportation projects. Every Transportation agency, including state level Departments of Transportation, have the responsibility to improve conditions and opportunities for walking and bicycling, and to integrate walking and bicycling into their transportation systems. The DOT policy is based on various sections of the US Code and Code of Federal Regulations in Title 23-Highways, Title 49-Transportation and Title 42-The Public Health and Welfare.

Virginia General Laws

Chapter 8 of the Code of Virginia Title 46.2 (Motor vehicles) describes "Every person riding a bicycle, electric personal assistive mobility device, electric power-assisted bicycle … shall have all of the rights and duties applicable to the driver of a vehicle, unless the context of the provision clearly indicates otherwise."

Additional laws covering operation of bicycles on roadways and bicycle paths are also covered in 46.2-905. As in every state, laws are subject to change. The Virginia Department of Transportation (VDOT) maintains a website which includes links to the status of RI General Laws, safe riding tips, bicycle facility maps, and status of construction projects: http://www.virginiadot.org/programs/bk-default.asp

Design Standards and References

Advances in the bikeway design standards and reference are expanding at an ever increasing rate. At the time of this plan (April 2014), a multi-office Federal Highway Administration (FHWA) Workgroup is implementing several initiatives to improve safety and accommodations for pedestrians and bicyclists. The FHWA Workgroup will conduct research, enlist contractor support, leverage cooperative agreements, and partner with stakeholders in order to accomplish the following:

- Synthesize and provide information and outreach about design flexibility.
- Describe the Manual on Uniform Traffic Control Devices experimentation process, projects being evaluated, and the schedule for updating the Manual.
- Develop case studies for improving pedestrian and bicyclist safety and accommodation with a focus on intersections, bike signals and boxes, and appropriate designs for various street contexts.
- Revise and update regulations relating to pedestrians and bicyclists.
- Promote the Department of Justice/Department of Transportation Joint Technical Assistance on the Title II of the Americans with Disabilities Act Requirements to Provide Curb Ramps when Streets, Roads, or Highways are Altered through Resurfacing, released by the U.S. Department of Justice and FHWA on June 28, 2013.

The following is a summary of national and state accepted standards and references. Note that these standards and references may be updated and revised in the near future. The applicable websites noted below should be reviewed on a regular basis to verify the status of these references.

AASHTO Guide for the Development of Bicycle Facilities 2012 Fourth Edition

The intent of the American Association of State Highway Transportation Officials (AASHTO) Guide is

> "… to provide guidance to designers and planners by referencing a recommended range of design values and describing alternative design approaches. Good Design practice involves engineering cost-effective solutions that balance safety and mobility for all transportation modes… This guide is therefore not intended to be a detailed design or traffic engineering manual that could supersede the need for application of sound principles by the knowledgeable design or traffic engineering professional."

The Guide provides information on bicycle planning, operation and safety, and guidance on design of on-road bikeways, off-road shared-use paths and bicycle parking as well as maintenance of bicycle facilities.

AASHTO Guide for the Planning, Design and Operation of Pedestrian Facilities 2004 First Edition

The purpose is to improve the planning, design, and operation of pedestrian facilities along streets by focusing on identifying effective measures for accommodating pedestrians on public rights-of-way. Appropriate methods for accommodating pedestrians, which vary among roadway and facility types are included.

Manual on Uniform Traffic Control Devices 2009 Edition (MUTCD)

Traffic control devices (TCDs) for both on-road and off-road bikeways are defined in the *Manual on Uniform Traffic Control Devices 2009 Edition*. The Manual is the national standard for the signs, markings and signals installed on our streets and bikeways. FHWA has issued two (2) revisions to the 2009 edition; the latest dated May 2012, available as a PDF free-of-charge at www.mutcd.fhwa.dot.gov. The Manual is supported by the *Virginia Supplement to the 2009 Manual on Uniform Traffic Control Devices for Streets and Highways 2011 Edition.* Part 9 of the Manual and VA Supplement detail devices specifically related to bicycle facilities.

FHWA also periodically issues Interim Approvals allowing the interim use, pending official rulemaking, of a new traffic control device, a revision to the application or manner of use of an existing traffic control device, or a provision not specifically described in the MUTCD.

Traffic control devices installed on the JMU campus must conform to the national Manual and VA Supplement. Requests to use non-standard "experimental" TCDs shall be submitted to the VA Office of the State Traffic Engineer prior to submission to the Federal Highway Administration (FHWA). The process is outlined in Part 1 of the MUTCD. FHWA maintains a website with links to PDF versions of the current Manual, and latest revisions, Interim Approvals and examples of experimental TCDs currently under evaluation at: www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design_guidance/mutcd_bike.cfm. The VA Supplement is available at www.virginiadot.org/business/virginia_mutcd_supplement.asp.

Standard Highway Signs and Markings (SHSM) 2012 Supplement, FHWA

The new edition contains the details for all signs and pavement markings in the 2009 MUTCD, expanded sign design guidelines, and details for symbolic traffic and lane-control signal indications. It is available as a PDF free of charge at the FHWA website noted above.

Emerging Design Guides and References

The following publications provide useful guidance and options for construction of bikeways particularly at intersections. Note that while these publications contain useful information and guidance, they have not been accepted as standards by any state level transportation department or the FHWA

- *Institute of Transportation Engineers (ITE) Traffic Control Devices Handbook, 2nd Edition* has an expanded chapter on TCD's related to bikeways. Chapter 14, *Bicycle Facilities,* contains expanded discussions regarding the installation of bicycle related TCD's. The Handbook is available for purchase from the ITE on-line bookstore.
- *Institute of Transportation Engineers Designing Walkable Urban Thoroughfares: A Context Sensitive Approach 2010* emphasizes thoroughfares in "walkable communities"-compact, pedestrian-scaled villages, neighborhoods, town centers, urban cores and other areas where walking, bicycling and transit are encouraged. The manual is available at the ITE on-line bookstore.
- *Complete Streets Initiatives* – The Complete Streets program seeks to implement bicycle transportation systems in US cities. These initiatives are part of a national movement to provide equal consideration for all modes of transportation. As such, planners, designers and bicycling advocates are looking for new and innovative ideas to make our streets and neighborhoods more welcoming to http://www.smartgrowthamerica.org/complete-streets/complete-streets-fundamentals/resources
- *NACTO Urban Bikeway Design Guide 2nd Edition (UBDG)* contains easy to understand graphics and dimensions for various emerging design treatments particularly at intersections. The Guide is available for purchase from NACTO on-line.
- *CROW Design manual for bicycle traffic 2007* – CROW is the Netherlands' national information and technology platform for infrastructure, traffic, transport and public space. The manual is intended as a guide that provides designers standards and guidance to make the bicycle a fully-fledged participant in the traffic and transport system. The CROW manual is available for purchase on-line.

If the University feels a non-standard treatment will provide benefits, then the process to obtain permission from FHWA (as noted above) should be followed. Also, FHWA maintains a website on the status of various emerging bicycle facility design treatments and examples of current experiments using non-standard devices at http://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design_guidance/mutcd_bike.cfm

Additional information relating to specific design standards, which are subject to change, are found in Appendix 4 and 5.

4.7 Focus Area Concepts

A few areas of campus were discussed frequently during the campus outreach sessions, in the survey, and during work with the BPAC as areas that deserved more detailed planning and attention. This Plan includes conceptual plans and ideas for five areas:

- Port Republic Road @ Bluestone Drive (Figure 11) connecting with the Bluestone Trail
- Carrier Drive @ Bluestone Drive (Figure 12)
- Carrier Drive @ CISAT Campus (Figure 13)
- Arboretum Trail (Figure 14)
- Main Street Shared Use Path (Figure 15) connecting with the Northend Greenway

The focus area concepts are found on the following pages. **These concepts are not intended as final designs.** Rather, they are intended to identify potential solutions that could be carried forward into more detailed study and analysis. While these focus areas are not comprehensive examples of campus bicycle and pedestrian issues, they are illustrative and represent possible approaches to address safety issues and positive impact on bicyclists and pedestrians.

Figure 11– Port Republic Rd @ Bluestone Dr/Hillside Ave Focus Area

Site Constraints/Issues:

- High traffic volumes along Port Republic Road
- Limited number of crosswalk locations
- Multiple adjacent projects

Conceptual Approach:

1. Connect future Bluestone Trail shared use path with intersection crossing
2. Connect future Newman Dam shared use path project
3. Provide standardized crosswalk treatments, per MUTCD guidelines
4. Provide ADA-accessible curb ramps and pedestrian crossing signals

Figure 12– Carrier Dr @ Bluestone Dr Focus Area

Site Constraints/Issues:

- Wide intersection crossing for pedestrian
- Sidewalk dead end along Bluestone Dr
- Limited number of crosswalk locations
- Non-standard crosswalk treatments

Conceptual Approach:

1. Connect future shared use path project along Bluestone Dr
2. Provide standardized crosswalk treatments, per MUTCD guidelines
3. Provide ADA-accessible curb ramps and pedestrian crossing signals (relocate signal pole)
4. Revise curb-line and turning radius in conjunction with (potential) new gate equipment on Carrier Dr

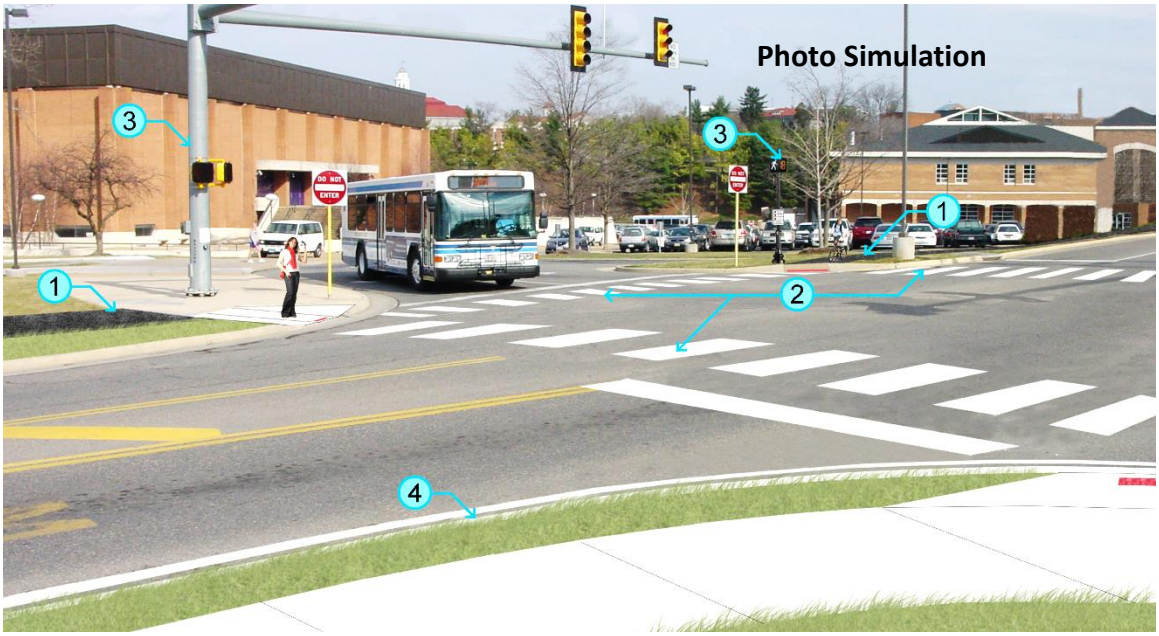


Figure 13– Carrier Dr @ CISAT Campus Focus Area

Site Constraints/Issues:

- Non-standard crosswalk treatments
- Unsafe midblock pedestrian crossing
- Various stop-controlled intersections
- Lack of corridor consistency

Conceptual Approach:

1. Study entire corridor for consistent treatment options
2. Provide pedestrian channelization with post-and-chain treatments, and ensure standardized crosswalk treatments and signage, per MUTCD guidelines
3. Provide ADA-accessible pedestrian crossing speed tables around transit stop area
4. Provide standardized bicycle lane treatments, per MUTCD guidelines

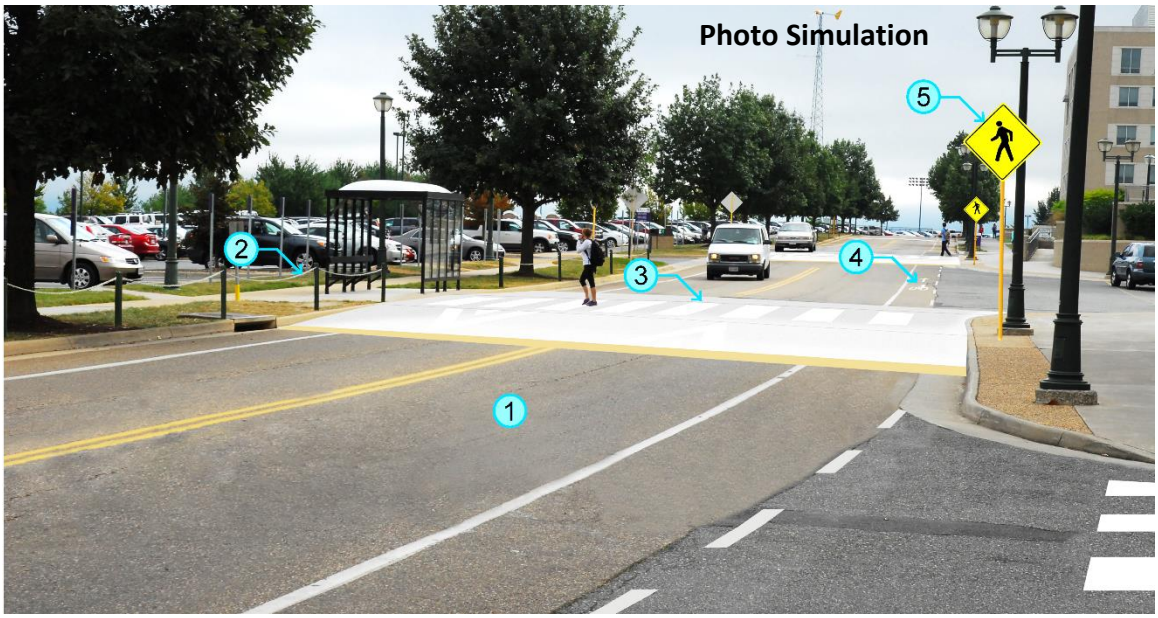


Figure 14– Arboretum Trail Focus Area

Site Constraints/Issues:

- Unpaved portion of trail
- Perceived safety issues due to lack of lighting
- Connects with multiple off campus apartment complexes

Conceptual Approach:

1. Convert trail to 10’ wide standard paved shared use path, with 2’ improved shoulders
2. Provide bollard-style lighting solution, as needed
3. Provide standard wayfinding signage near start/end of trail
4. Trim or remove overgrown vegetation for improved visibility

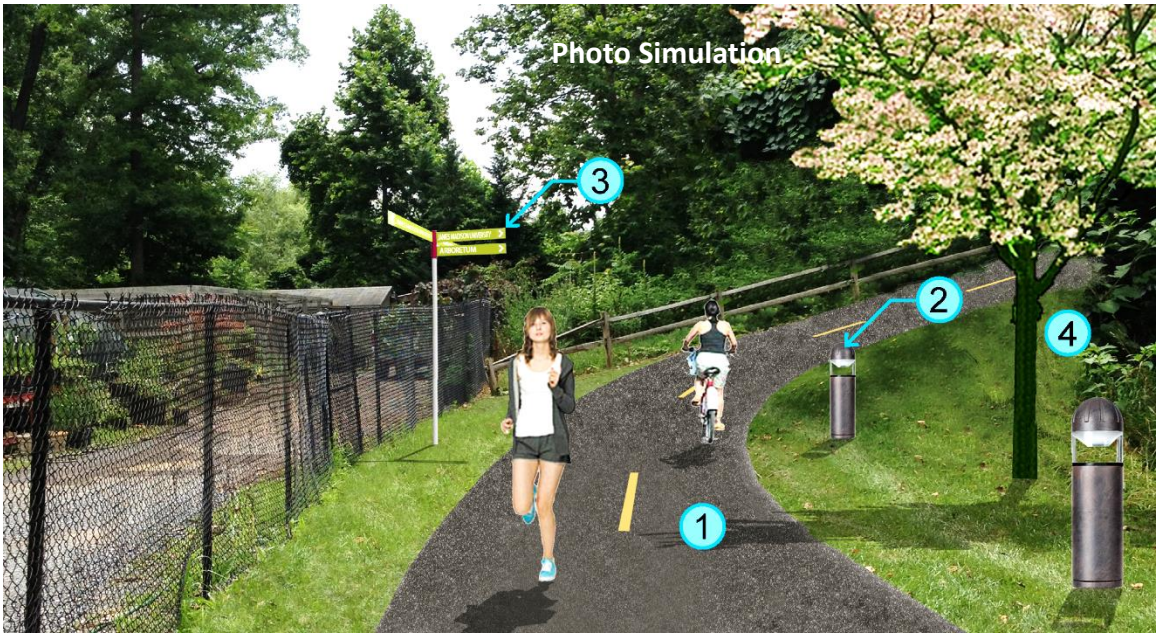


Figure 15– Main St Focus Area

Site Constraints/Issues:

- Narrow existing 5’ wide concrete sidewalk
- Connects with multi-jurisdictional trail/path corridor projects
- Auto-centric corridor with limited amenities for pedestrians

Conceptual Approach:

1. Convert existing sidewalk to standard 10’ wide shared use path, with planting strip and vegetation
2. Provide standard wayfinding signage at intersections
3. Provide ADA-accessible curb ramps and pedestrian crossing signals, as needed
4. Relocate signage as needed within the right-of-way

5 IMPLEMENTATION PLAN: *HOW WE ARE GOING TO GET THERE*

5.1 The Key: Implementation

While some of the recommendations in the JMU Bicycle and Pedestrian Master Plan are long-term, it is critical that the Plan be useable and effective in the short- and mid-terms. Both funding and staff time can be major constraints for planning and implementing improvements. Additionally, some recommendations could be started immediately while others must await campus capital projects. It is therefore important to evaluate, plan and prioritize projects.

The implementation plan suggests a method for carrying out each of the recommendations. Table 11 displays for each recommendation, the feasibility (high, medium, and low), cost category, and coordinating agencies (city or VDOT) required. For most of the recommendations, James Madison University will need to take the lead, but often coordination will be required with the City or VDOT.

5.2 Funding

Some recommendations have little cost, but others will require capital investment or ongoing funding. Overall, while the total bicycle and pedestrian investment may be substantial in the long term, when compared to investments required to fund automobile improvements (e.g., new roadways, parking decks), those bicycle and pedestrian investments are relatively small.

There are a variety of potential funding sources for campus bicycle and pedestrian improvements. Some are internal campus funds for capital improvement projects, others may be the Virginia Department of Transportation (VDOT) funds, and others may be grants or funds made available through partnerships. Some key potential funding sources include the following:

Campus funding sources

- Capital improvement projects (requires coordination with new construction projects)
- Maintenance programs (roadways, sidewalks, Greenways and Multi-use Paths, signage)

City of Harrisonburg funding sources

- Capital Improvement Program (CIP) http://www.harrisonburgva.gov/capital-improvement-program
- Neighborhood Traffic Calming Program (NTCP) http://www.harrisonburgva.gov/neighborhood-traffic-calming-program

State and federal funding sources

Transportation Improvement Program (TIP) funding

The Statewide Transportation Improvement Program (STIP) is Virginia's federally required transportation improvement program that identifies those transit and highway construction and maintenance projects that will utilize federal funding, or for which federal approval will be required. The federal requirement for updating the STIP is four years; however VDOT elects to update the STIP every three years to ensure that our plan never lapses.

The STIP includes all federally funded and regionally significant transportation projects, multimodal projects (highway, passenger rail, freight, public transit, bicycle and pedestrian) and projects on roadways in Virginia's National Parks and National Forests.

Virginia provides many opportunities for the public to provide input on transportation projects and priorities as part of the continuing transportation planning process for the development of the STIP and the state required Six Year Improvement Program. These opportunities include federally required public involvement for each MPO's TIP, Fall Transportation Meetings and Spring Public Hearings.

The STIP must also include all projects in a Metropolitan Planning Organization Transportation Improvement Plan (MPO TIP) as well as projects in non-MPO areas.

The Harrisonburg-Rockingham Metropolitan Planning Organization (HRMPO) Transportation Improvement Program (TIP) is a prioritized, fiscally-constrained, multi-year list of federally funded transportation projects and improvements within the HRMPO area. The TIP must also be multi-modal, including highway and transit-oriented projects. Under federal law, the TIP must cover at least a four-year program of projects and be updated at a minimum of every four years. In addition, projects in the TIP must be prioritized at the regional level and have clearly identified funding sources. http://www.hrvampo.org/MPO-Web/DesktopDefault.aspx?tabid=68. For JMU Campus projects that involve City streets, the University would need to coordinate with City officials on making requests for TIP funding.

Transportation Alternatives Program (TAP)

On July 6, 2012, the new transportation bill "Moving Ahead for Progress in the 21st Century" (MAP-21) was signed into law. This two-year transportation bill became effective Oct. 1, 2012, and included significant changes to the Transportation Enhancement (TE) Program set forth in SAFETEA-LU. MAP-21 established the Transportation Alternatives Program (TAP) which combined several programs including many of the prior Transportation Enhancement (TE) activities, the Recreational Trails program and the Safe Routes to School (SRTS) program.

In SAFETEA-LU, there were 12 eligible transportation enhancement activities. Under MAP-21, there are four defined eligible activities for the Transportation Alternatives Program (TAP), including one called "transportation alternatives," which replaces the 12 prior transportation enhancement activities with ten qualifying eligibilities.

In addition to eliminating some previously eligible transportation enhancement activities, modifications were made that more narrowly define the types of projects that qualify for funding. The overall theme of the revisions appears to expand the eligibilities from strictly enhancing the transportation system to include planning, construction and design related to compliance with existing federal regulations.

Not only did MAP-21 change the eligible activities, it also made changes in how the federal funds will be distributed. MAP-21 states that once funds are taken off the top to fund the Recreational Trails Program, the remaining TAP funds will be split, with 50 percent of these remaining funds being distributed based on population and 50 percent being distributed anywhere statewide.

The Commonwealth Transportation Board (CTB) established an interim TA policy for the FY14 allocations and adopted an updated TA Program Policy on July 17, 2013 to guide future fiscal year selections. Potential

candidates for this funding source might be the Carrier Drive Corridor Improvements, the Arboretum Trail enhancements, or the Bluestone Drive shared use path.

Highway Safety Improvement Program (HSIP)

Moving Ahead for Progress in the 21st Century Act (MAP-21) was passed into law July 2012 to authorize the federal fiscal years 2013 and 14 surface transportation programs for highways, highway safety, and transit . MAP-21 continues the core HSIP, administered by FHWA, structured and funded to make significant progress in reducing highway fatalities and severe injuries on all public roads.

VDOT previously developed a HSIP that involved the identification of high-crash spots or corridor segments, an analysis of crash trends and existing conditions, an economic evaluation of safety project benefits and the statewide prioritization and scheduling of improvement projects. Updates to the program, process and reporting are now needed to comply with MAP-21

- Information on all of MAP-21 FHWA programs: http://www.fhwa.dot.gov/map21/summaryinfo.cfm
- Information on the MAP-21 HSIP elements: http://www.fhwa.dot.gov/map21/summaryinfo.cfm

Additional information will be added as the FHWA provides federal regulations on the implementation of the new HSIP requirements. VDOT's HSIP previously consisted of the following programs:

- Highway Safety Program (HSP)
- Bicycle and Pedestrian Safety Program (BPSP)
- Highway-Rail Grade Crossing Safety Program (H-RGCP)

Intersection improvement projects are the likely candidates for this type of funding, such as Carrier Drive (Projects 10 and 17) and Bluestone Drive (Projects 13 and 16). The stipulation is that JMU must own and maintain the roadway. The City of Harrisonburg must apply for funding for off campus intersection improvement projects.

State and Community Highway Safety Grant Program

Highway Safety Funds are used to support State and community programs to reduce deaths and injuries on the highways. In each State, funds are administered by the Governor's Representative for Highway Safety. Pedestrian Safety has been identified as a National Priority Area and is therefore eligible for Section 402 funds. Section 402 funds can be used for a variety of safety initiatives including conducting data analyses, developing safety education programs, and conducting community-wide pedestrian safety campaigns. Since the 402 Program is jointly administered by NHTSA and FHWA, Highway Safety Funds can also be used for some limited safety-related engineering projects.

Additional information is available from the following web sites:

- NHTSA 402 Programs and Grants
- Traffic Safety Fact Sheets for Section 402 and Related Programs
- Uniform Guidelines for State Highway Safety Programs
- Traffic Safety Fact Sheets—Links to laws

Virginia Recreational Trails Program

The Recreational Trails Program (RTP) is a matching reimbursement grant program that provides for the creation and maintenance of trails and trail facilities. The Federal Highway Administration (FHWA) funds the program, which DCR administers in Virginia.

RTP funds come from federal gasoline tax revenues, some of which are used for recreation activities and for non-gasoline tax supported roads. FHWA prescribes many of the regulations governing this program. Grants may go to registered nonprofit organizations, city governments, county governments or other government entities but must be considered in accord with guidance from the Virginia Recreational Trails Program Advisory Committee. The RTP requires that 30 percent of trail program funds be used for motorized (ATV, OHV, dirt-bikes, etc.) recreational trail uses, 30 percent for non-motorized recreational trails uses, and 40 percent for proposals with the greatest number of compatible recreational purposes and/or those that provide for innovative recreational trail corridor sharing (multiple-use trails).

This is a matching reimbursement program. The sponsoring entity must be able to finance the project while requesting periodic reimbursements. All projects must have at least a 20 percent match. Proposals for planning, gap analysis or feasibility studies are ineligible, as are projects involving condemnation.

RTP grants are for recreational trails, not trails with more utilitarian transportation value. Grants usually run from $25,000 to $200,000. The Arboretum Trail (Project 5) is the most likely candidate for these funds.

5.3 Project Prioritization

The recommended projects were developed through an iterative process involving many campus stakeholders, with significant help from University employees and the BPAC. The results from the campus survey and feedback from the campus outreach events were key in providing depth to the recommendations.

Once the draft list of recommended projects was developed, the BPAC identified factors by which each project could be prioritized. This prioritization process is the basis of this implementation plan.

The prioritization factors were:

- **Safety:** does the project meet an identified safety need, and/or provide separation from vehicles where feasible?
- **Connectivity:** does the project complete a missing link?
- **Constructability:** what is the relative ease of implementation of the project? Does it coordinate with other capital projects? What is its relative cost?
- **Survey Preference**: does the project correspond with an identified need from the survey?
- **Sustainability:** does the project directly promote the use of sustainable modes of transportation?
- **Campus Priority:** is there strong support for the project from the BPAC and campus community in the short-term?

Recommended projects were assigned values between 0 and 5 for each prioritization factor category. The process of assigning values is admittedly subjective. The purpose of this process was to reflect the input received from public outreach and BPAC comments to relatively rank projects against one another. For example, there are 12 recommended on campus Shared Use Path projects ranging in total priority scores from 7 to 19. The Newman Dam Greenway (Project 1; 19 points), the Arboretum Trail (Project 5; 16 points) and the

Butler Ave – Bluestone Trail (Project 6; 16 points) all received high priority scores for connectivity and campus priority because they directly connect to other Shared Use Paths and were discussed at length during public meetings and during BPAC meetings.

The same can be stated for two of the seven on campus sidewalk projects. The Newman Drive/Greek Row (Project 2; 19 points) and Student Success Center (Project 9; 15 points) sidewalk projects were scored heavily for the safety, connectivity, and campus priority factors because they were heavily discussed as important connections between the Newman Damn Greenway, through the JMU campus, and toward the Federal Street Shared Use Path (Project 101). Remaining sidewalk projects were scored relatively lower because they did not directly connect to these longer corridors of discussion.

Lower prioritization scores does not imply that these projects are not equally important or meaningful. This process is simply a method for prioritizing which project to construct first.

5.4 Implementation Process

Recommended projects from Table 9 and displayed on Figure 10 have been reviewed, ranked, and ordered based on their priority factor rankings as described in Section 5.3. The project ID number represents the general sequence of implementation that is recommended by the project stakeholders group. Table 10 displays additional information for these recommended projects relating to the prioritization process.

On campus projects are ordered from 1 to 28, and off campus recommendations are ordered 101 to 127, and will require additional coordination with stakeholders outside of the University. While the prioritization system and feasibility categories (low, medium, and high) are useful for day-to-day implementation of the many projects in this Plan, there should also be flexibility to change the order of project implementation as other campus projects evolve, complementary roadway projects are initiated, or other opportunities for incremental improvements should arise. The purpose of presenting these projects as an implementation plan rather than an alphabetical list is to reflect the relative importance based on feedback and discussion that took place during this lengthy planning process.

Table 10: Implementation Plan Project List

JMU Campus Projects								Cost Estimates			Prioritization Factors							
Priority Rank	Location / Intersection	Begin / Near	End / Near	Feasibility	Amenity / Facility Type	Comment	Source	Length (mi)	Cost Category	Cost Group	Safety	Connect-ivity	Construct-ability	Survey	Sustain-ability	Campus Priority	Total Points	Priority Rank
1	Newman Dam Greenway Trail	Bluestone Dr	Greek Row	In Progress	Shared Use Path	Construct new shared use path around west side of Newman Dam; Include wayfinding signage along Greek Row	JMU Project	0.17	**Funded**	High	1	5	3	2	3	5	19	1
2	Newman Dr / Greek Row	RR tracks	Bluestone Dr	High	Sidewalk	Construct new (extra wide) sidewalk along east side of roadway and connect with existing paths	Steering Committee	0.07	$40,000	Med	2	5	3	2	2	5	19	2
3	Newman Dr	Bluestone Dr	Steam Plant	High	Intersection Improvement	Improve pedestrian crossing and sidewalk alignment	Steering Committee		$20,000	Low	1	5	3	2	1	5	17	3
4	Mason St (South) / Madison Dr	Alumnae Dr	MLK Way	High	Shared Lane Markings	Install Shared Lane Markings in proper location on roadway	Steering Committee	0.09	$10,000	Low	-	5	3	1	3	5	17	4
5	Arboretum Trail Shared Use Path	End of pavement / Property Line	University Blvd	Medium	Shared Use Path	Convert off-road trail into paved shared use path with lighting and signage	Open House	0.32	$250,000	High	1	5	3	2	2	3	16	5
6	Butler Ave - Bluestone Dr via R2 Lot	Port Republic Rd	Future Bluestone Trail	In Progress	Shared Use Path	Construct new shared use path within landscaped median of parking lot (R2) and connect with Bluestone Trail	JMU Project	0.22	**Funded**	High	1	3	2	2	3	5	16	6
7	Village Service Dr	Carrier Dr	Future Shared Use Path	High	Bike Path (Separated)	Perform **pilot study** for separated bicycle and pedestrian paths; Study the long-term reconstruction of Village Hill neighborhood	Open House / VHB	0.20	$40,000	Med	2	-	5	-	3	5	15	7
8	Newman Dam SUP and wide shoulder	Port Republic Rd	Lakeside Service Dr (Sonner)	In Progress	Shared Use Path	Construct new shared use path along north side of Bluestone Dr	JMU Project	0.12	**Funded**	Med	2	2	3	2	3	3	15	8
9	Student Success Center	Montpelier Hall (being raised)	Grace St Parking Deck	High	Sidewalk	Construct sidewalk and improve channelization of pedestrian crossing of roadway	Steering Committee	0.04	$30,000	Med	5	1	3	-	1	5	15	9
10	Carrier Dr (multiple locations)	CISAT / CS transit shelter	Festival Conference and Student Center	High	Corridor Improvement	Perform **pilot study** to: (a) Standardize crosswalk treatments and improve channelization; and (b) Install gates along Carrier Dr	Steering Committee	0.53	$350,000	High	3	-	4	-	2	5	14	10
11	Bluestone Dr	Lakeside Service Dr	Carrier Dr	Medium	Shared Use Path	Construct new shared use path along north/west side of Bluestone Dr and connect with adjacent paths	Steering Committee	0.27	$200,000	High	2	2	2	2	3	3	14	11
12	Bluestone Dr	Main St (South)	Railroad / Duke Dr	High	Shared Lane Markings	Install Shared Lane Markings in proper location on roadway	VHB Observation	0.50	$10,000	Low	-	2	2	1	3	5	13	12
13	Bluestone/Carrier Intersection			High	Intersection Improvement	Improvements to pedestrian crossing, standardized crosswalk treatments and add high intensity street lights	VHB Observation		$140,000	Med	4	-	2	-	1	5	12	13
14	Champions Dr (North side)	Bluestone Dr	Football stadium	High	Sidewalk	Construct new sidewalk along North side of roadway and connect with existing	Steering Committee	0.06	$30,000	Med	1	4	3	-	2	2	12	14
15	Soccer Field Service Dr	Around parking lot (C11/C12)		High	Sidewalk	Construct new (extra wide) sidewalk around parking lot	Open House	0.40	$180,000	High	2	3	2	1	2	2	12	15
16	Bluestone Dr	RR tracks at Mr. Chips		High	Intersection Improvement	Study intersection for improvements to pedestrian crossing	Steering Committee		$110,000	High	3	2	2	-	1	3	11	16
17	Carrier Dr	Village Hill crossing		High	Intersection Improvement	Study intersection for improvements to pedestrian channelization	VHB Observation		$20,000	Low	3	2	2	-	1	3	11	17
18	Bluestone Dr	Carrier Dr	Railroad / Duke Dr	Medium	Shared Use Path	Extend new shared use path to Duke Drive intersection	Steering Committee	0.16	$120,000	High	2	2	1	2	2	2	11	18
19	Duke Dr	Paul St	Sidewalk dead end	Medium	Sidewalk	Construct new (extra wide) sidewalk along roadway and connect with existing	Open House	0.11	$50,000	Med	2	3	1	1	2	2	11	19
20	Grace St Corridor	Bluestone Dr (near Mr. Chips)	High St (South)	Low	Multi-Modal Corridor	Extend roadway and add transit, bicycle and pedestrian amenities	Master Plan	0.69	$1,060,000	High	2	1	1	-	3	3	10	20
21	University Blvd	Convocation Center	CISAT Service Dr	Medium	Bike Lane (widening)	Work with City of Harrisonburg &/or VDOT to widen roadway and install bicycle lanes (multiple ownership roadway)	Open House	0.54	$240,000	High	1	-	1	2	2	3	9	21
22	Shared Use Path connection	Reservoir St	Rear of C11 Lot	High	Shared Use Path	Construct new shared use path along pedestrian path up hill to Soccer Field	Steering Committee	0.06	$50,000	Med	-	1	3	-	1	4	9	22
23	Shared Use Path connection	Carrier Dr near I-81	Duke Dr	Medium	Shared Use Path	Construct new shared use path between Ikenberry/White Halls and R1 parking lot	Open House	0.15	$110,000	High	1	1	2	1	2	2	9	23
24	Champions Dr	Bluestone Dr	Lakeside Service Dr	High	Shared Lane Markings	Install Shared Lane Markings in proper location on roadway	VHB Observation	0.15	$10,000	Low	-	-	3	1	3	1	8	24
25	Path by refuse plant	Driver Dr	Shenandoah Hall	High	Shared Use Path	Construct new shared use path along property line (uphill)	Steering Committee	0.14	$100,000	High	-	2	1	1	2	1	7	25
26	Carrier Library (rear)	Phillips Hall	Parking Lot E	Medium	Sidewalk	Improve topography-constrained sidewalk connection behind Carrier Library; connect with future Grace St Extension	Steering Committee	0.14	$70,000	Med	1	1	2	-	1	2	7	26
27	Future URec expansion	Driver Dr	University Blvd	In Progress	Sidewalk	Construct new (extra wide) sidewalk around front of future URec Expansion building and connect with existing paths	Steering Committee	0.23	**Funded**	High	-	2	2	-	1	1	6	27
28	CISAT Service Dr (stairs)	Driver Dr (stairs)		High	Stair Channel	Retrofit existing stairs with stair channel (wheel gutter) for bicycles	Steering Committee		$20,000	Low	-	1	2	-	1	1	5	28

City Projects								Cost Estimates			Prioritization Factors							
Priority Rank	Location / Intersection	Begin / Near	End / Near	Feasibility	Amenity / Facility Type	Comment	Source	Length (mi)	Cost Category	Cost Group	Safety	Connect-ivity	Construct-ability	Survey	Sustain-ability	Campus Priority	Total Points	Priority Rank
101	Federal St Shared Use Path	Farmers Market	Northend Trail	High	Shared Use Path	Work with City of Harrisonburg to connect with off campus Shared Use Path	City Project	2.66	$1,840,000	High	1	5	1	3	3	3	16	101
102	Grace St (West)	High St (South)	Main St (South)	In Progress	Bike Lane (widening)	Work with City of Harrisonburg &/or VDOT to install bicycle lanes	Harrisonburg Plan	0.28	**Funded**	High	2	-	2	3	3	5	15	102
103	Port Republic Rd	Forest Hill Rd	Hillside Ave	Medium	Bike Lane (widening)	Work with City of Harrisonburg &/or VDOT to extend bicycle lanes through I-81 ramps	Open House	0.20	$90,000	Med	3	3	-	3	3	3	15	103
104	Main St (South)	Grace St (East)	Federal St / Future Shared Path	Low	Shared Use Path	Work with City of Harrisonburg to connect with off campus Shared Use Path; Alternative to Northend Greenway Trail connection	City Project	0.39	$270,000	High	1	5	1	2	3	3	15	104
105	Port Republic Rd	Hillside Ave	Main St (South)	Medium	Bike Lane (widening)	Work with City of Harrisonburg &/or VDOT to extend bicycle lanes further north	Open House	0.42	$190,000	High	3	2	-	3	3	3	14	105
106	Reservoir St	MLK Way	Neff Ave	Low	Bike Lane (widening)	Work with City of Harrisonburg &/or VDOT to install bicycle lanes	Open House	1.09	$480,000	High	2	1	2	3	3	3	14	106
107	Grace St (East) EASTBOUND	Main St (South)	Madison Dr / Mason St (South)	High	Bike Lane (stripe only)	Work with City of Harrisonburg &/or VDOT to install bicycle lanes (uphill)	Harrisonburg Plan	0.14	$10,000	Low	2	-	2	3	3	3	13	107
108	Grace St (West) WESTBOUND	High St (South)	Chestnut Dr / Willow St (South)	High	Bike Lane (stripe only)	Work with City of Harrisonburg &/or VDOT to install bicycle lanes (uphill)	Open House	0.17	$10,000	Low	2	-	2	3	3	3	13	108
109	Grace St (East) WESTBOUND	Madison Dr / Mason St (South)	Main St (South)	High	Shared Lane Markings	Work with City of Harrisonburg to install Shared Lane Markings in proper location on roadway (downhill)	VHB Observation	0.14	$10,000	Low	3	-	2	2	3	3	13	109
110	Grace St (West) EASTBOUND	Chestnut Dr / Willow St (South)	High St (South)	High	Shared Lane Markings	Work with City of Harrisonburg to install Shared Lane Markings in proper location on roadway (downhill)	Open House	0.17	$10,000	Low	3	-	2	2	3	3	13	110
111	Shared Use Path connections (x3)	Neff Ave (rear of commercial)	University Blvd	Medium	Shared Use Path	Connect to sidewalks and paths along the rear of the commercial shopping center (3 locations)	Steering Committee	0.15	$110,000	High	2	2	2	2	2	3	13	111
112	Bluestone Dr	Port Republic Rd	(connect with existing)	In Progress	Intersection Improvement	Work with City of Harrisonburg &/or VDOT to add crosswalks, ADA curb cuts; revise signal timing for bicyclists	City/VDOT Project		**Funded**	Med	3	3	2	-	1	3	12	112
113	Shared Use Path connection	Port Republic Rd	Existing University Blvd SUP	Medium	Shared Use Path	Work with City of Harrisonburg &/or VDOT to extend Shared Use Path in conjunction with interchange realignment project	Steering Committee	0.12	$90,000	Med	1	2	1	3	3	2	12	113
114	MLK Way WESTBOUND	Ott St	Mountain View Dr	High	Sidewalk	Work with City of Harrisonburg &/or VDOT to install sidewalk along north side of roadway	Open House	0.55	$240,000	High	2	3	-	2	2	3	12	114
115	Paul St	Ott St	Duke Dr	High	Sidewalk	Work with City of Harrisonburg &/or VDOT to install sidewalk along both sides of roadway	Open House	0.80	$350,000	High	1	3	2	2	2	2	12	115
116	MLK Way	Main St	Reservoir St	High	Bike Lane (widening)	Work with City of Harrisonburg &/or VDOT to install bicycle lanes	Open House	0.99	$440,000	High	2	-	-	3	3	3	11	116
117	Forest Hills Dr / University Blvd	Port Republic Rd	Oak Hill Dr	High	Sidewalk	Work with City of Harrisonburg &/or VDOT to install sidewalk along both sides of roadway	Open House	0.27	$120,000	High	2	3	1	2	2	1	11	117
118	Port Republic Rd	Main St (South)	Hillside Ave	Medium	Sidewalk	Work with City of Harrisonburg &/or VDOT to install sidewalk along west side of roadway	Steering Committee	0.36	$160,000	High	1	3	-	2	2	3	11	118
119	Mason St (South)	MLK Way	Downtown	High	Shared Lane Markings	Work with City of Harrisonburg to install Shared Lane Markings; study the long term facility type options	Open House / VHB	0.71	$10,000	Low	1	-	1	2	3	3	10	119
120	Shared Use Path connections	Sully Dr / Devon Ln	JMU Property Line	Medium	Shared Use Path	Work with City of Harrisonburg to connect with off campus roadway	Open House / VHB	0.15	$110,000	High	-	2	-	3	3	2	10	120
121	University Blvd	CISAT Service Dr	Reservoir St	Medium	Bike Lane (widening)	Work with City of Harrisonburg &/or VDOT to widen roadway and install bicycle lanes (multiple ownership roadway)	Open House	0.38	$170,000	High	1	-	1	2	2	3	9	121
122	High St (South)	Grace St (West)	(connect with existing)	High	Intersection Improvement	Work with City of Harrisonburg &/or VDOT to improve safety for bicyclist and pedestrian crossings	Steering Committee		$50,000	Med	3	-	2	-	1	3	9	122
123	Neff Ave	Arboretum Trailhead	Sunchase Dr	Medium	Intersection Improvement	Work with City of Harrisonburg &/or VDOT to improve safety for bicyclist and pedestrian crossings	Steering Committee		$80,000	Med	3	2	1	-	1	2	9	123
124	Bridge over Blacks Run (creek)	Roosevelt St	Chesapeake Ave	Medium	Shared Use Path	Work with City of Harrisonburg to construct bridge and shared use path to connect roadways	Steering Committee	0.04	$290,000	High	1	3	-	-	2	2	8	124
125	Grace St (West/East)	Main St (South)	High St (South)	Medium	Corridor Improvement	Work with City of Harrisonburg to standardize crosswalks, add ADA ramps, and improve channelization	Steering Committee	0.42	$270,000	High	2	1	-	-	1	3	7	125
126	Walnut Ln	MLK Way		High	Stairway	Work with City of Harrisonburg to install stairway to MLK Jr Blvd sidewalk	Steering Committee		$20,000	Low	-	2	2	-	1	1	6	126
127	Bradley Dr	Hunters Rd	Rockingham Hall	High	Sidewalk	Work with City of Harrisonburg to connect sidewalk across property boundary	Steering Committee	0.01	$10,000	Low	-	2	2	-	-	1	5	127

Note:

1. Projects in this table have been sorted by Priority Rank, which is based on Total Points (high to low).
2. Off Campus projects are recommendations for consideration by the City and might not be reflected in City Plans.
3. 'Priority Rank' column corresponds with the label number displayed on Figure 10 Recommended Project Map.
4. 'Cost Category' column represents planning-level unit costs for construction only. Does not include site-specific costs.

Feasibility Categories

In Progress	**0-1 years to implement.** Refers to projects that are currently under design or review.
High	**1-3 years to implement.** Refers to projects that are more-quickly constructed, and/or would cost less money to complete.
Medium	**3-10 years to implement.** Refers to projects that follow the short-term projects, and build upon their success.
Low	**10+ years to implement.** Refers to projects that are more difficult to construct, and would require coordination. These projects relate to Campus Physical Master Plan projects.

Cost Groups

<= $25k	Low
$25k - 100k	Med
> $100k	High

Prioritization Factor Scores

-	N/A
1	Low
2	|
3	Medium
4	|
5	High

APPENDIX 1

October 2013 - Open House Meeting – Public Comments Received from Various Sources

The following bicycle/pedestrian topics were discussed at the initial outreach meeting. Campus Areas are included in parentheses (Bluestone Campus).

1. RECOMMENDED ON CAMPUS FACILTIES

Bike Path

- Village Service Dr – separate bicycle path and pedestrian path, with pavement markings and signage (Mid Campus)

Bike Lane

- Extend/connect bicycle lanes along Devon Ln and Turner Ashbury Ln (East Campus)
- Port Republic Rd between I-81 ramps (Mid Campus)
- W Grace St between High St and Chestnut Dr (or sharrows) (West Campus)

Share-the-Road-Arrow

- W Grace St between High St and Mason St (or beyond)(West Campus/Bluestone)

Shared Use Path / Greenway Trail

- Arboretum Trail Greenway between Neff Ave and University Blvd, pave and add lighting (East Campus)
- Devon Ln (University Park) to Arboretum Trail Greenway (through or around Putter Ct neighborhood) (East Campus)
- Newman Dam Greenway Trail between Bluestone Dr and Duke Dr
    - Connect to (city) Bluestone Trail near Newman Dam (Mid Campus)
- Connect to (city) Northend Greenway Trail along existing Norfolk Southern railroad corridor near Chesapeake Ave between W Grace St and Cattrell Ave (Bluestone Campus)
- Connect Duke Dr to Carrier Dr along east side of Kenberry / White hall (Mid Campus)
- Neff Ave to University Blvd along west side (rear) of commercial developments (East Campus)

Sidepath / Sidewalks

- Soccer Field Service Dr between Reservoir Rd and Carrier Dr (East Campus)
- Forest Hill Rd between Port Republic Rd and Oak Hill Dr (East Campus)
- Duke Dr between sidewalk dead end and Paul St (Mid Campus)

Roadway Extensions

- E Grace St from dead end to Bluestone Dr (Bicycle Lanes) (Bluestone Campus)
- Madison Dr from dead end to E Grace St (Sharrow) (Bluestone Campus)

2. RECOMMENDED ON CAMPUS AMENITIES

Bike Parking

- Standard bike rack style for U-lock
- Memorial Hall Greenhouse (West Campus)
- Wine-Price Hall (Bluestone Campus)

Covered Bike Parking

- Quad (Bluestone Campus)
- Music Building
- Co-locate with transit shelters

Stair Channels / Wheel Gutters

- Lots of them along East Campus paths

Other Intersection Safety Considerations

- Duke Dr at Bluestone Dr – dangerous (Bluestone Campus)
- S Mason St @ N6 parking lot entrance (Bluestone Campus)

- Raised intersection tables

Programs / Events / Classes

- Bicycle Safety Expo (helmets, lights, instruction)
- Bicycle Maintenance 101
- Bicycle Commuting 101
- Freshman & New Student Orientation for bicycling on/off campus
- Healthy Lifestyles marketing
- Encouragement programs to promote safety by drivers
- Helmet give-aways
- Social cycling events/clubs
- Apartment finder maps with bicycle and transit routes
- Marketing @ bus shelters with walk/bike times
- Partnerships with local bicycle shops for reduced-price bikes
- Share-a-bike program
- Car-free campus center; periphery parking master planning
- Limited number of daily parking vouchers for registered bicycle commuters (CAP)
- Warning tickets by campus police → Discounted helmet at store

3. DISCUSSED OFF CAMPUS FACILITIES

Share-the-Road-Arrow

- Oak Hill Drive (loop) (East Campus)

Shared Roadway / Wide Outside Lane

- Share the Road signs along campus periphery roadways

Bike Lane

- Port Republic Rd between Forest Hill Rd and Main St (Cycle track?) (East-Mid-Bluestone)
- Forest Hill Rd between Port Republic Rd and Convocation Service Dr (Mid Campus)
- Cantrell Ave between Main St and Reservoir Rd (share the road existing)
- Willow St between W Grace St and Bruce St (West Campus)
- S Mason St from campus to E Elizabeth St

Greenway Trail

- Connect to (city) Northend Greenway Trail along existing Norfolk Southern railroad corridor near Chesapeake Ave between Cattrell Ave and Liberty St

Sidepaths / Sidewalks

- Paul St between Ott St and Cattrell Ave
- Paul St between Cattrell Ave and Cardinal Dr / Duke Dr
- Cantrell Ave between Ott St and Mountain View Dr
- Village Ln connection to Sully Dr (off road)

Other Roadway/Facility Considerations

- Ridgewood Rd connect with University Park property
- Lighting along Cantrell Ave between Mason St and Paul St
- High Street @ Veterans Memorial Dr / Cantrell Ave – sidewalk grade changes (West Campus)
- Connect existing facilities – especially near major off campus apartment complexes:
    - Chestnut Ridge Dr

4. DISCUSSED OFF CAMPUS AMENITIES

Other Intersection Safety Considerations

- Cantrell Ave @ Mason St – dangerous intersection
- Cantrell Ave @ Ott St – dangerous intersection
- Main St @ Grace St – bike boxes? (only with bike lanes) (Bluestone Campus)

- Neff Ave between Putter Cr and Sunchase Dr
- Port Republic Rd @ I-81 NB off/on ramps
- Port Republic Rd @ Hillside Ave
- Reservoir St @ Evelyn Byrd Ave
- Reservoir St @ University Blvd – more crosswalks
- Reservoir St @ Neff Ave – crosswalks

Misc. suggestions for new facilities, amenities, and educational programs that JMU may offer in the future…

1. Enforce existing traffic laws for bicyclists and motorists;
2. Enforce the yield to pedestrians law;
3. Make [bicyclists] put playing cards in the spokes.
4. Until there's a safer route from Keezletown to Harrisonburg on bike, I don't feel like I can ride my bike to work safely. [Keezletown is southeast of Harrisonburg, past the Valley Mall, which is SE of campus]
5. I'd love to see a bike path get put in before all that farm land is subdivided and we have a lot more people to negotiate road frontage for a bike lane.
6. If the city would install a bike lane on VA-42 [High St] in Harrisonburg I'd be grateful as well.
7. More [covered bike parking] places (within bus shelters) to park our bikes. I'm near Bioscience.
8. Earn-a-Bike program rather than a Cycleshare program. The University of Louisville's program discussed here at AASHE: http://louisville.edu/sustainability/operations/earn-a-bike-program.html
    - *Parking Permit Cash-out Program; Earn $400 voucher toward local bike shop purchase*
9. I typically bike to work. If JMU can negotiate with the city to extend the Port Republic Rd bike lane [800'] across the I-81 [bridge] all the way to Bluestone Drive that would be a real benefit.
10. I am not sure the gates made it any safer for bikers or for (inattentive) students lulled perhaps into a false sense of safe passage inside the closed gates:
    - Students step dangerously out in front of me. For example, I was bicycling legally inside the gates yesterday about noon. Two students were not looking for bikes on the roads, and never looked to their left before stepping out onto Bluestone Drive.
    - I have also had occasional near misses inside the gates with vehicles. Some vehicles seem to be going faster now that there are fewer motor vehicles on Bluestone Drive.
11. Last game day (6 hours before the game) a football parking guard would not let me ride my bike on the short road [Lakeside Service Dr] to the parking deck by the stadium. I was trying to avoid riding on Port Republic Road. I wanted to ride my bike across the bridge behind the stadium.
12. Possible solution to the, "lights/no lights" issue along the Arboretum bike path leading to the city bike path up to Neff Ave: http://www.takepart.com/article/2013/10/30/starpath-glow-in-the-dark-roads-provide-energy-free-illumination?cmpid=tp-ptnr-upworthy
13. Create storage sites on campus next to bike racks where students may store their helmets and other items. Students are responsible for bringing their own locks and other regulations may be set in place, but right now I don't bike with a helmet because I feel uncomfortable taking it into class, and I don't want to risk theft by leaving it attached to my bike.
14. Encourage partnerships with City of Harrisonburg and Harrisonburg Downtown Renaissance to create more areas for bike parking, such as the heart of downtown.
15. Increase partnership with City of Harrisonburg to create more bike lanes and markings for bikes (i.e., South Mason, Cantrell, Grace Street).

16. For future construction on campus, consider more separated forms of bike paths- paths that truly can only be used for biking purposes. In example, while studying abroad as a student with JMU's exchange program in Malmo, Sweden, I discovered that bicycles are the predominant form of transportation for many people in the city- regardless of age and/or other demographics. The bike paths were segmented from the roadways (separated bike paths; or buffered cycletrack).

APPENDIX 2

Prepared for Bicycle & Pedestrian Advisory Committee - July 2013

Submitted by Dr. Stephanie Baller and Dr. Elise Barrella

With assistance from: Ms. Anna Bryant, Ms. Alisha Myers, Ms. Kathryn McDonald, Ms. Emily Harmon

The campus Active Transportation Survey was conducted over four weeks in March and April 2013 to obtain information on student, faculty, and staff's behaviors and attitudes toward active travel modes in order to establish a baseline for future studies. Participants responded to questions concerning bicycling, walking, and skateboarding for transportation purposes as well as questions pertaining to physical activity.

Transportation Questionnaire

Summary of Demographics

H1. Your status at JMU is classified as:

	Frequency	Percent
Student	339	53.6
Employee	291	46.0
Total	630	99.5
Missing	3	.5
Total	633	100.0

H2. If student, what year are you by credit hour?

	Frequency	Percent
Undergraduate, freshman	46	14.2
Undergraduate, sophomore	59	18.3
Undergraduate, junior	83	25.7
Undergraduate, senior	135	41.8
Total	323	100.0

H3. If faculty/staff, select your classification:

	Frequency	Percent
Staff - Part Time	21	7.2
Staff - Full Time	88	30.3
Faculty - Part Time	14	4.8
Faculty - Full Time	124	42.8
Administrative - Part Time	1	0.3

	Administrative - Full Time	42	14.5
	Total	290	100.0

H5. What is your sex?

		Frequency	Percent
	Male	225	35.9
	Female	389	62.0
	Prefer not to say	13	2.1
	Total	627	100.0
Missing		6	
Total		633	

H6. With which race do you identify?

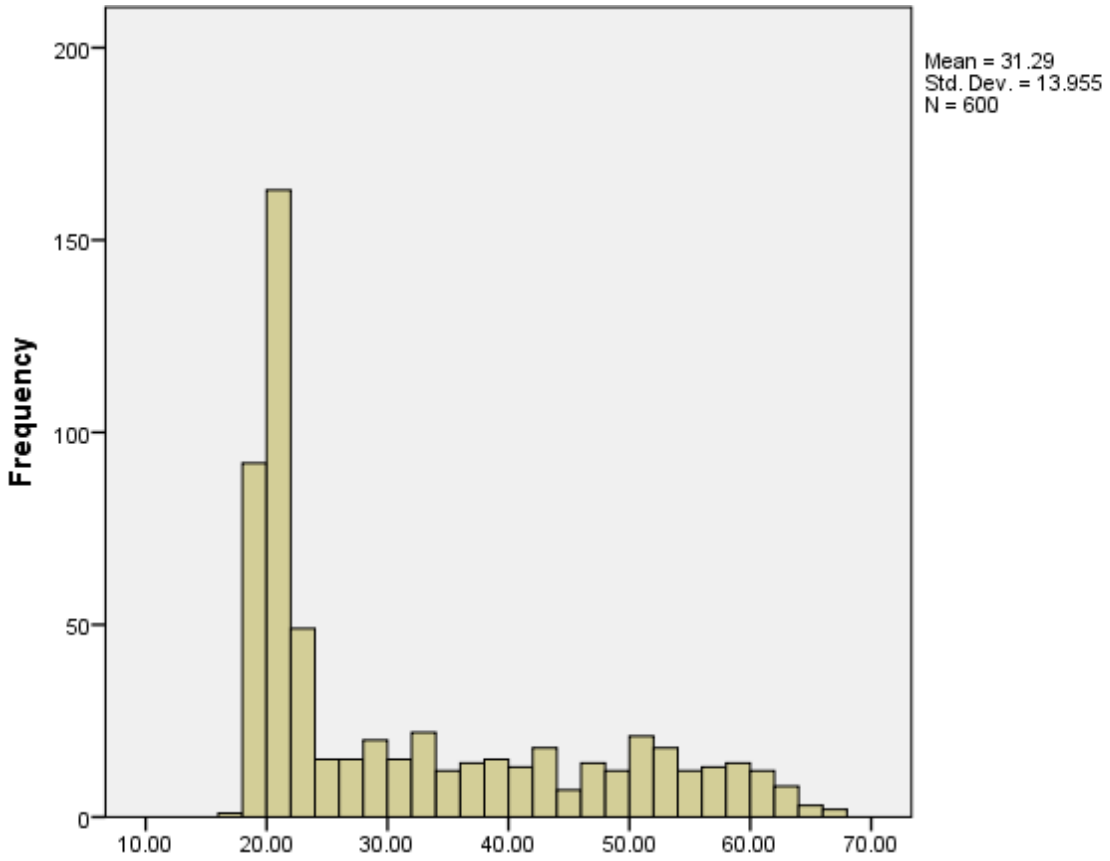
		Frequency	Percent
Valid	African American / Black	10	1.6
	Asian	13	2.1
	Hispanic / Latino	7	1.1
	White / Caucasian	535	85.9
	Multi-racial	15	2.4
	Other	8	1.3
	Prefer not to say	35	5.6
	Total	623	100.0
Missing		10	
Total		633	

H8. Which of the following best describes the proximity of your home to campus via roadway?

		Frequency	Percent
Valid	On campus	75	11.9
	<1 mile	104	16.5
	1 - 1.9 miles	156	24.8
	2 - 2.9 miles	103	16.3
	3 - 4.9 miles	66	10.5
	5 - 10 miles	30	4.8
	11 - 20 miles	45	7.1
	>20 miles	51	8.1

	Total	630	100.0
Missing		3	
Total		633	

H9. As of January 1, 2013, how old are you? (in years)



H10a. Do you currently have any physical or other health condition that limits the amounts of walking you can do?

		Frequency	Percent
	Yes	53	8.5
	No	562	89.8
	Prefer not to say	11	1.8
	Total	626	100.0
Missing		7	
Total		633	

H10b. Do you currently have any physical or other health condition that limits the amount of bicycling you can do?

		Frequency	Percent
	Yes	55	8.8
	No	555	88.9
	Prefer not to say	14	2.2
	Total	624	100.0
Missing	System	9	
Total		633	

H10c. Do you currently have any physical or other health condition that limits the amount of skateboarding you can do?

		Frequency	Percent
	Yes	63	10.1
	No	530	85.3
	Prefer not to say	28	4.5
	Total	621	100.0
Missing		12	
Total		633	

Summary of Travel

A1a. THE MOST RECENT TIME you used the mode: Passenger or driver in a vehicle (for example, a car, truck, motorcycle, or taxi)

		Frequency	Percent
	Last 7 Days	583	92.8
	Last Month	27	4.3
	Last 3 Months	9	1.4
	Last Year	3	.5
	Not Used in Last Year	6	1.0
	Total	628	100.0
Missing		5	
Total		633	

A1b. THE MOST RECENT TIME you used the mode: Public transit (for example bus, train, or ferry)

		Frequency	Percent
	Last 7 Days	268	44.8
	Last Month	97	16.2
	Last 3 Months	64	10.7

	Last Year	69	11.5
	Not Used in Last Year	100	16.7
	Total	598	100.0
Missing		35	
Total		633	

A2a. In the last 7 days (up to yesterday), on how many days did you: Have access to a working BICYCLE.

	Frequency	Percent
0 Days	354	56.4
1 Day	6	1.0
2 Days	2	.3
3 Days	2	.3
4 Days	2	.3
7 Days	262	41.7
Total	628	100.0
Missing	5	
Total	633	

A2b. In the last 7 days (up to yesterday), on how many days did you:-Have access to a working MOTOR VEHICLE like a car, truck or motorcycle that you can use either as a driver or a passenger (exclude taxis)

	Frequency	Percent
0 Days	52	8.2
1 Day	23	3.6
2 Days	17	2.7
3 Days	9	1.4
4 Days	8	1.3
5 Days	4	.6
6 Days	5	.8
7 Days	513	81.3
Total	631	100.0
Missing	2	
Total	633	

Results for Pedestrians

C1. Have you WALKED for commuting, errands, or leisure in the last year?

	Frequency	Percent
Yes	**609**	**96.2**
No	24	3.8
Total	633	100.0

C2. Check one box for each line below to tell us THE MOST RECENT TIME you used each type of travel

C2a. Walk to or from public transit

		Frequency	Percent
	Last 7 Days	285	47.6
	Last Month	77	12.9
	Last 3 Months	49	8.2
	Last Year	57	9.5
	Not Used in Last Year	47	7.8
	Never Used	84	14.0
	Total	599	100.0
Missing		8	
Total		609	

C2b. Walk to a destination OTHER THAN public transit (for example to a job, store, park, or friends house)

		Frequency	Percent
	Last 7 Days	413	68.0
	Last Month	99	16.3
	Last 3 Months	38	6.3
	Last Year	35	5.8
	Not Used in Last Year	13	2.1
	Never Used	9	1.5
	Total	607	100.0
Missing		2	
Total		609	

C2c. Walk for recreation, exercise, or to walk to dog

		Frequency	Percent
	Last 7 Days	354	58.7
	Last Month	127	21.1
	Last 3 Months	59	9.8
	Last Year	34	5.6
	Not Used in Last Year	19	3.2
	Never Used	10	1.7
	Total	603	100.0
Missing		6	
Total		609	

C3. In the last 7 days (up to yesterday), on how many days did you:

C3a. Walk to OR from public transportation (for example to a bus or train stop)

	Frequency	Percent
0 Days	313	51.7
1	40	6.6
2	39	6.4
3	40	6.6
4	31	5.1
5	51	8.4
6	22	3.6
7 Days	69	11.4
Total	605	100.0
Missing	4	
Total	609	

C3b. Walk to OR from work or school

	Frequency	Percent
0 Days	300	49.5
1	59	9.7
2	32	5.3
3	28	4.6
4	16	2.6
5	57	9.4
6	16	2.6

	7 Days	98	16.2
	Total	606	100.0
Missing		3	
Total		609	

C3c. Walk to get somewhere OTHER than work, school, or public transit (for example to go shopping, see a friend or eat a meal. Do NOT include trips with no destination such as walking solely for exercise)

		Frequency	Percent
	0 Days	192	31.7
	1	83	13.7
	2	105	17.3
	3	54	8.9
	4	39	6.4
	5	25	4.1
	6	14	2.3
	7 Days	94	15.5
	Total	606	100.0
Missing		3	
Total		609	

C3d. Walk for exercise and recreation, without having a destination

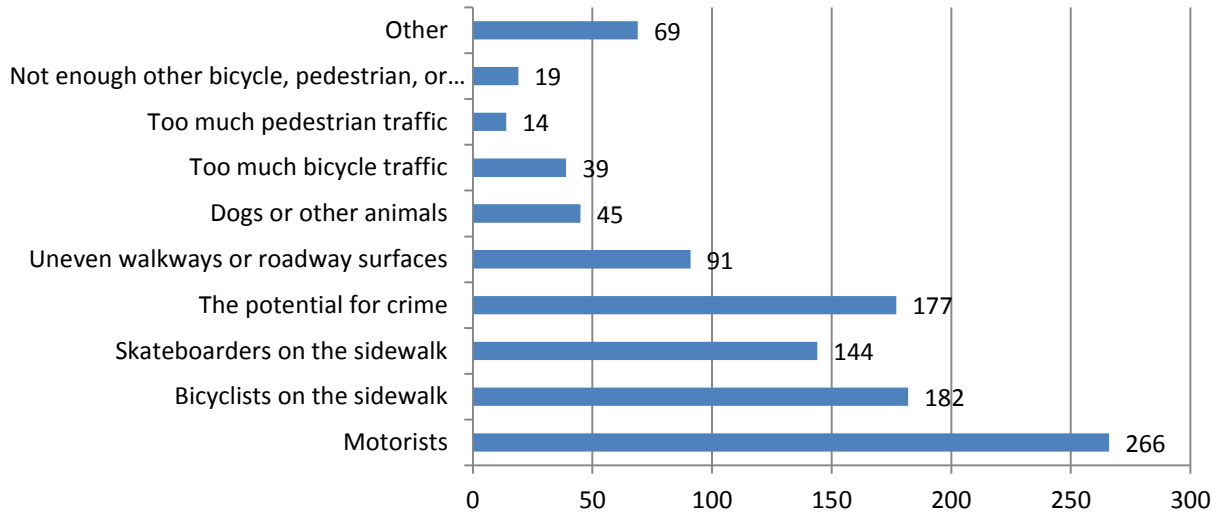
		Frequency	Percent
	0 Days	231	38.3
	1	95	15.8
	2	86	14.3
	3	56	9.3
	4	39	6.5
	5	16	2.7
	6	10	1.7
	7 Days	70	11.6
	Total	603	100.0
Missing		6	
Total		609	

C4. What is the main reason you chose to walk instead of use some other form of transportation?

		Frequency	Percent
	Walking is cheaper	45	7.4
	Walking is faster	61	10.0
	My peers walk	9	1.5
	For exercise	145	23.9
	For recreation	15	2.5
	Don't have access to a motor vehicle	40	6.6
	Availability of pedestrian infrastructure ON campus (sidewalks, crosswalks, etc)	27	4.4
	Availability of pedestrian infrastructure OFF campus (sidewalks, crosswalks, etc)	3	.5
	Availability / cost of vehicle parking on or near campus	32	5.3
	Enjoy walking	126	20.8
	Good weather	43	7.1
	To reduce my carbon footprint	23	3.8
	Other	38	6.3
	Total	607	100.0
Missing		2	
Total		609	

See Appendix 1 for "Other" responses

C5. When you walk, do you feel threatened for your personal safety because of any of the following?



See Appendix 2 for "Other" responses

Attitudes toward Walking (All Participants)

C6. Please rate your attitudes toward travel on and around the JMU campus.

C6a. I would like to walk more than I do now

		Frequency	Percent
	Strongly Disagree	27	4.3
	Disagree	147	23.4
	Agree	261	41.6
	Strongly Agree	154	24.5
	N/A	39	6.2
	Total	628	100.0
Missing		5	
Total		633	

C6b. I would feel safe walking on JMU's campus

		Frequency	Percent
	Strongly Disagree	2	.3
	Disagree	16	2.5
	Agree	261	41.5
	Strongly Agree	345	54.8
	N/A	5	.8
	Total	629	100.0
Missing		4	
Total		633	

C6c. I would feel safe walking in Harrisonburg

		Frequency	Percent
	Strongly Disagree	20	3.2
	Disagree	145	23.2
	Agree	330	52.8
	Strongly Agree	122	19.5
	N/A	8	1.3
	Total	625	100.0
Missing		8	
Total		633	

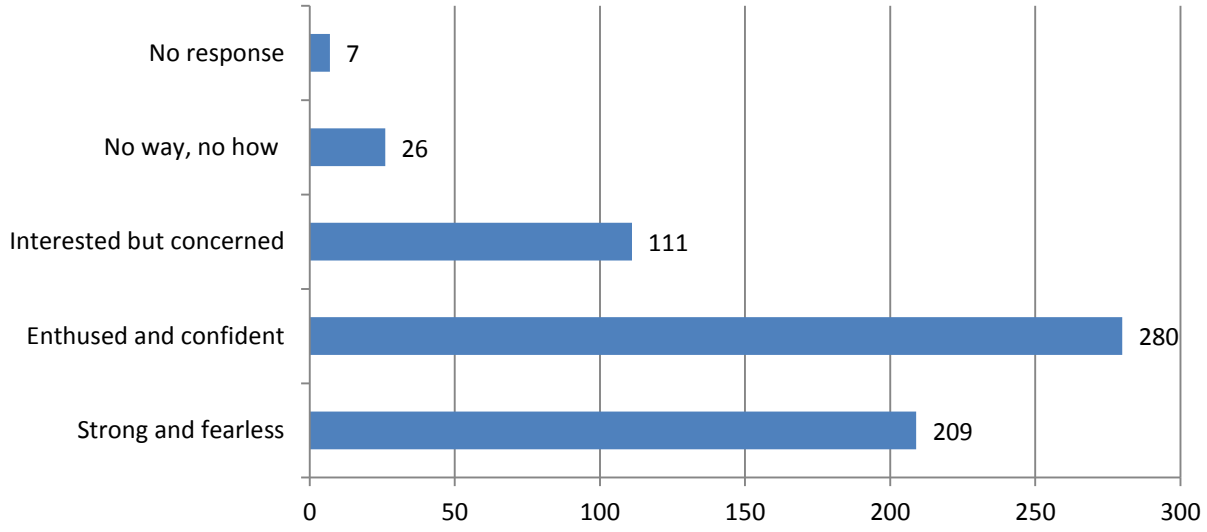
C6d. I would be more likely to walk for transportation if there were additional sidewalks or off-road paths on campus

		Frequency	Percent
	Strongly Disagree	36	5.8
	Disagree	170	27.2
	Agree	205	32.7
	Strongly Agree	145	23.2
	N/A	70	11.2
	Total	626	100.0
Missing		7	
Total		633	

C6e. I would be more likely to walk for transportation if there were additional sidewalks or off-road paths in Harrisonburg

		Frequency	Percent
	Strongly Disagree	36	5.7
	Disagree	128	20.4
	Agree	201	32.1
	Strongly Agree	212	33.8
	N/A	50	8.0
	Total	627	100.0
Missing		6	
Total		633	

C7. Which description best expresses your willingness to walk for transportation



C8. What is the primary reason you never commute by walking / have not walked more recently?

		Frequency	Percent
	I walk every day	161	25.8
	Bad weather / wrong season	124	19.9
	Too busy / no opportunity	31	5.0
	Disability / other health impairment	9	1.4
	Inadequate lighting for sidewalks at night	10	1.6
	Availability of pedestrian infrastructure ON campus (sidewalks, crosswalks, etc)	1	.2
	Availability of pedestrian infrastructure OFF campus (sidewalks, crosswalks, etc)	27	4.3
	Transportation is faster using another mode	156	25.0
	Don't have someone to walk with	5	.8
	Other	99	15.9
	Total	623	100.0
Missing		10	
Total		633	

See Appendix 3 for "Other" responses

C9. Please rate the following statements

C9a. I cross the street only where there is a designated crosswalk

		Frequency	Percent
	Never	16	2.5
	Sometimes	167	26.5
	Frequently	357	56.6
	Always	90	14.3
	N/A	1	.2
	Total	631	100.0
Missing		2	
Total		633	

C9b. I cross the street mid-block where there is not a crosswalk

		Frequency	Percent
	Never	76	12.1
	Sometimes	409	65.2
	Frequently	124	19.8
	Always	17	2.7
	N/A	1	.2

	Total	627	100.0
Missing		6	
Total		633	

C9c. I obey pedestrian signals at intersections

		Frequency	Percent
	Never	10	1.6
	Sometimes	116	18.4
	Frequently	268	42.5
	Always	236	37.4
	N/A	1	.2
	Total	631	100.0
Missing		2	
Total		633	

C9d. I walk at night

		Frequency	Percent
	Never	106	17.0
	Sometimes	311	49.8
	Frequently	171	27.4
	Always	34	5.4
	N/A	3	.5
	Total	625	100.0
Missing		8	
Total		633	

C9e. When I walk in the dark, I wear reflective clothing or use other lights or reflectors

		Frequency	Percent
	Never	317	50.6
	Sometimes	137	21.9
	Frequently	47	7.5
	Always	36	5.7
	N/A	90	14.4
	Total	627	100.0
Missing		6	
Total		633	

Results for Bicyclists

B1. Have you used a BICYCLE for commuting, errands, or leisure in the last year?

	Frequency	Percent
Yes	**274**	**43.3**
No	359	56.7
Total	633	100.0

B2. Check one box for each line below to tell us THE MOST RECENT TIME you used each type of travel

B2a. Bicycle to or from public transit

		Frequency	Percent
	Last 7 Days	28	10.4
	Last Month	20	7.4
	Last 3 Months	13	4.8
	Last Year	34	12.6
	Not Used in Last Year	175	64.8
	Total	270	100.0
Missing		4	
Total		274	

B2b. Bicycle to a destination OTHER THAN public transit (for example to a job, store, park, or friend's house)

	Frequency	Percent
Last 7 Days	101	36.9
Last Month	27	9.9
Last 3 Months	36	13.1
Last Year	81	29.6
Not Used in Last Year	29	10.6
Total	274	100.0

B2c. Bicycle for recreation or exercise (do not include riding a stationary bicycle)

	Frequency	Percent
Last 7 Days	72	26.4
Last Month	37	13.6
Last 3 Months	38	13.9
Last Year	103	37.7
Not Used in Last Year	23	8.4

	Total	273	100.0
Missing		1	
Total		274	

B3. In the last 7 days (up to yesterday), on how many days did you:

B3a. Bicycle to OR from public transportation (for example to a bus or train stop)

		Frequency	Percent
Valid	0 Days	245	90.4
	1	8	3.0
	2	6	2.2
	3	3	1.1
	5	3	1.1
	7 Days	6	2.2
	Total	271	100.0
Missing		3	
Total		274	

B3b. Bicycle to OR from work or school

		Frequency	Percent
Valid	0 Days	171	62.9
	1	11	4.0
	2	13	4.8
	3	13	4.8
	4	14	5.1
	5	23	8.5
	6	7	2.6
	7 Days	20	7.4
	Total	272	100.0
Missing		2	
Total		274	

B3c. Bicycle to get somewhere OTHER than work, school, or public transit (for example to go shopping, see a friend or eat a meal. Do NOT include trips with no destination such as biking solely for exercise)

		Frequency	Percent
Valid	0 Days	180	66.2
	1	25	9.2
	2	24	8.8

	3	14	5.1
	4	6	2.2
	5	6	2.2
	6	2	.7
	7 Days	15	5.5
	Total	272	100.0
Missing		2	
Total		274	

B3d. Bicycle for exercise and recreation, without having a destination

		Frequency	Percent
	0 Days	188	69.6
	1	38	14.1
	2	17	6.3
	3	5	1.9
	4	3	1.1
	5	4	1.5
	6	4	1.5
	7 Days	11	4.1
	Total	270	100.0
Missing		4	
Total		274	

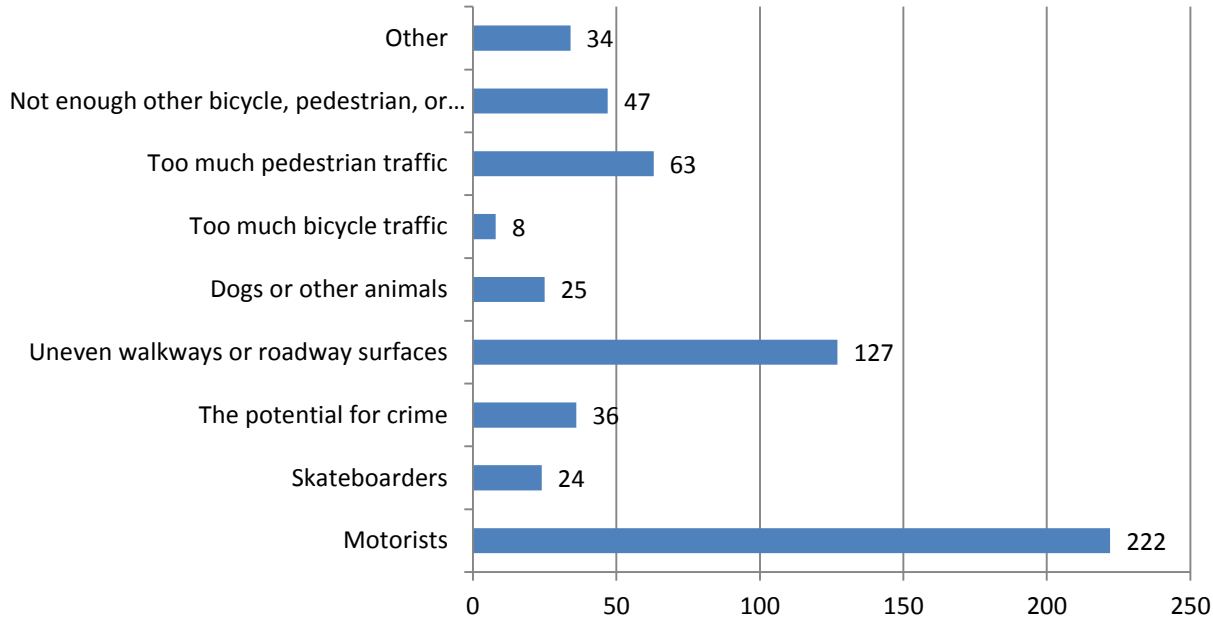
B4. What is the main reason you choose to ride a bike instead of some other form of transportation?

	Frequency	Percent
Bike is cheaper	27	9.9
Bike is faster	43	15.7
My peers ride a bike	1	.4
For the exercise	53	19.3
For recreation	26	9.5
Enjoy biking	43	15.7
To reduce my carbon footprint	35	12.8
Don't have access to a motor vehicle	14	5.1
Bicycle infrastructure ON campus (bike lanes, sharrows, etc)	2	.7
Availability of bicycle parking or storage	4	1.5
Availability/cost of vehicle parking on or near campus	11	4.0

	Other	15	5.5
	Total	274	100.0

See Appendix 4 for "Other" responses

B5. When you do bike, do you feel threatened for your personal safety because of any of the following:



See Appendix 5 for "Other" responses

B6. Please rate the following statements:

B6a. I ride on the sidewalk when using my bicycle for transportation

		Frequency	Percent
	Never	60	22.0
	Sometimes	138	50.5
	Frequently	53	19.4
	Always	13	4.8
	N/A	9	3.3
	Total	273	100.0
Missing		1	
Total		274	

B6b. I stop at all stop signs or red lights when riding a bicycle

		Frequency	Percent
	Never	3	1.1
	Sometimes	49	18.1

	Frequently	68	25.2
	Always	144	53.3
	N/A	6	2.2
	Total	270	100.0
Missing		4	
Total		274	

B6c. I secure my bicycle to a bicycle rack

		Frequency	Percent
	Never	8	3.0
	Sometimes	26	9.6
	Frequently	22	8.1
	Always	195	72.0
	N/A	20	7.4
	Total	271	100.0
Missing		3	
Total		274	

B6d. I bike at night

		Frequency	Percent
	Never	71	26.2
	Sometimes	125	46.1
	Frequently	60	22.1
	Always	6	2.2
	N/A	9	3.3
	Total	271	100.0
Missing		3	
Total		274	

B6e. When riding my bike in the dark, I wear reflective clothing, use a headlight, or use other lights or reflectors

		Frequency	Percent
	Never	29	10.7
	Sometimes	38	14.0
	Frequently	29	10.7
	Always	116	42.6
	N/A	60	22.1

	Total	272	100.0
Missing		2	
Total		274	

B6f. I ride in bike lanes where available

		Frequency	Percent
	Never	3	1.1
	Sometimes	16	5.9
	Frequently	47	17.3
	Always	198	72.8
	N/A	8	2.9
	Total	272	100.0
Missing		2	
Total		274	

B6g. I ride my bike facing traffic, that is riding against the direction of cars

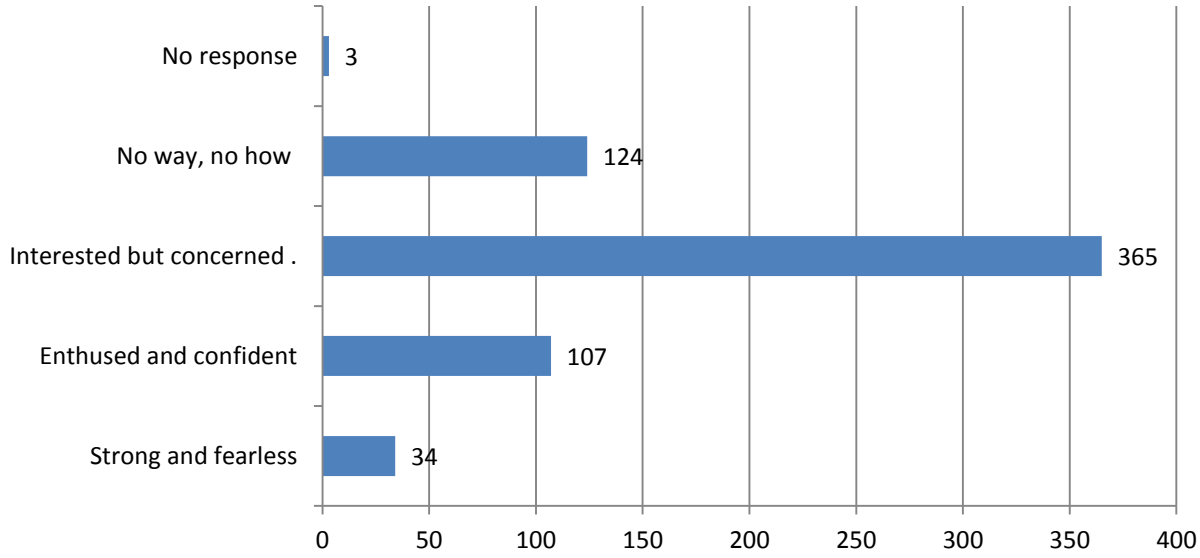
		Frequency	Percent
	Never	187	68.8
	Sometimes	50	18.4
	Frequently	14	5.1
	Always	12	4.4
	N/A	9	3.3
	Total	272	100.0
Missing		2	
Total		274	

B6h. I wear a helmet when I ride a bike

		Frequency	Percent
	Never	61	22.4
	Sometimes	32	11.8
	Frequently	38	14.0
	Always	139	51.1
	N/A	2	.7
	Total	272	100.0
Missing		2	
Total		274	

Attitudes toward Bicycling (All Participants)

B7. Which description best expresses your willingness to use a bicycle for transportation



B8. What is the primary reason you never commute by bike / have not ridden a bike more recently? (choose one)

		Frequency	Percent
	I bike every day	33	5.3
	Bad weather / wrong season	102	16.2
	Too busy / no opportunity	26	4.1
	Bike is broken/do not have access to a bike	108	17.2
	Bicycle infrastructure ON campus (bike lanes, sharrows, etc)	11	1.8
	Bicycle infrastructure OFF campus (bike lanes, sharrows, etc)	68	10.8
	Availability of bicycle parking or storage	9	1.4
	Disability / other health impairment	13	2.1
	Don't have someone to ride with	4	.6
	Transportation is faster using another mode	94	15.0
	Don't know how to ride a bike	13	2.1
	Other	147	23.4
	Total	628	100.0
Missing		5	
Total		633	

See Appendix 6 for "Other" responses

B9. Please rate your attitudes toward travel on and around the JMU campus:

B9a. I would like to bike more than I do now

		Frequency	Percent
	Strongly Disagree	58	9.2
	Disagree	99	15.7
	Agree	232	36.8
	Strongly Agree	183	29.0
	N/A	59	9.4
	Total	631	100.0
Missing		2	
Total		633	

B9b. I would feel safe riding a bicycle on JMU's campus

		Frequency	Percent
	Strongly Disagree	41	6.6
	Disagree	121	19.4
	Agree	284	45.6
	Strongly Agree	149	23.9
	N/A	28	4.5
	Total	623	100.0
Missing		10	
Total		633	

B9c. I would feel safe riding a bicycle in Harrisonburg

		Frequency	Percent
	Strongly Disagree	107	17.0
	Disagree	236	37.6
	Agree	205	32.6
	Strongly Agree	52	8.3
	N/A	28	4.5
	Total	628	100.0
Missing		5	
Total		633	

B9d. I would be more likely to ride a bicycle for transportation if there were additional bicycle lanes or off-road paths on campus

		Frequency	Percent
	Strongly Disagree	42	6.7
	Disagree	92	14.6
	Agree	218	34.7
	Strongly Agree	222	35.4
	N/A	54	8.6
	Total	628	100.0
Missing		5	
Total		633	

B9e. I would be more likely to ride a bicycle for transportation if there were additional bicycle lanes or off-road paths in Harrisonburg

		Frequency	Percent
	Strongly Disagree	41	6.5
	Disagree	80	12.7
	Agree	190	30.1
	Strongly Agree	269	42.6
	N/A	51	8.1
	Total	631	100.0
Missing		2	
Total		633	

B9f. I would be more likely to ride a bicycle for transportation if there were more amenities available on campus (like changing stations, bike racks, and/or covered storage)

		Frequency	Percent
	Strongly Disagree	46	7.3
	Disagree	118	18.8
	Agree	212	33.7
	Strongly Agree	169	26.9
	N/A	84	13.4
	Total	629	100.0
Missing		4	
Total		633	

Results for Skateboarders

D1. Have you used a SKATEBOARD for commuting, errands, or leisure in the last year?

	Frequency	Percent
Yes	**30**	**4.7**
No	603	95.3
Total	633	100.0

D2. Check one box for each line below to tell us THE MOST RECENT TIME you used each type of travel

D2a. Skateboard to or from public transit

		Frequency	Percent
	Last 7 Days	8	27.6
	Last Month	5	17.2
	Last 3 Months	4	13.8
	Last Year	7	24.1
	Never Used	5	17.2
	Total	29	100.0
Missing		1	
Total		30	

D2b. Skateboard to a destination OTHER THAN public transit (for example a job, store, park or friend's house)

		Frequency	Valid Percent
	Last 7 Days	17	58.6
	Last Month	4	13.8
	Last 3 Months	2	6.9
	Last Year	4	13.8
	Never Used	2	6.9
	Total	29	100.0
Missing		1	
Total		30	

D3. In the last 7 days (up to yesterday), on how many days did you:

D3a. Skateboard to OR from public transportation (for example to a bus or train stop)

	Frequency	Percent

	0 Days	17	58.6
	1	1	3.4
	3	2	6.9
	4	2	6.9
	5	1	3.4
	7 Days	6	20.7
	Total	29	100.0
Missing		1	
Total		30	

D3b. Skateboard to OR from work or school

	Frequency	Percent
0 Days	15	50.0
1	1	3.3
2	1	3.3
3	2	6.7
4	3	10.0
5	2	6.7
6	2	6.7
7 Days	4	13.3
Total	30	100.0

D3c. Skateboard to get somewhere OTHER than work, school, or public transit (for example to go shopping, see a friend or eat a meal.) Do NOT include trips with no destination such as skateboarding solely for exercise.

	Frequency	Percent
0 Days	13	43.3
1	1	3.3
2	5	16.7
3	2	6.7
4	3	10.0
5	1	3.3
6	1	3.3
7 Days	4	13.3
Total	30	100.0

D3d. Skateboarding for exercise and recreation, without having a destination

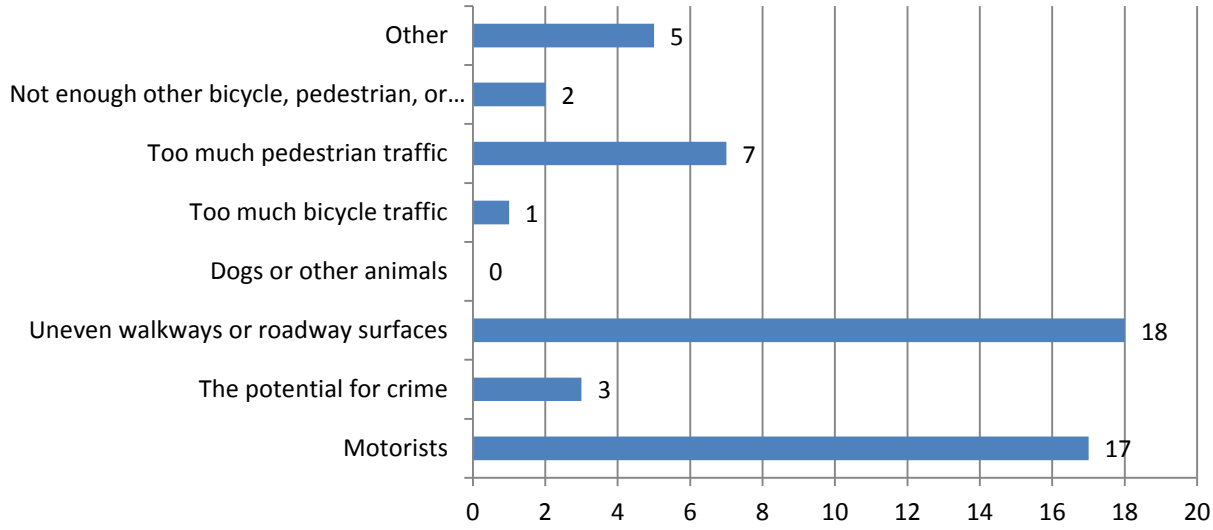
	Frequency	Percent
0 Days	12	40.0
1	2	6.7
2	3	10.0
3	5	16.7
4	3	10.0
6	1	3.3
7 Days	4	13.3
Total	30	100.0

D4. What is the main reason you choose to skateboard instead of use some other form of transportation.

		Frequency	Percent
	Skateboarding is faster	5	17.2
	For recreation	2	6.9
	Don't have access to a motor vehicle	1	3.4
	Enjoy skateboarding	17	58.6
	To reduce my carbon footprint	1	3.4
	Other	3	10.3
	Total	29	100.0
Missing		1	
Total		30	

See Appendix 7 for "Other" responses

D5. When you skateboard, do you feel threatened for your personal safety because of any of the following:



See Appendix 8 for "Other" responses

D6. Please rate the following statements

D6a. I ride on the sidewalk when using my skateboard for transportation

		Frequency	Percent
Valid	Sometimes	16	53.3
	Frequently	10	33.3
	Always	2	6.7
	N/A	2	6.7
	Total	30	100.0

D6b. I stop at all stop signs or red lights when riding a skateboard

		Frequency	Percent
	Never	2	6.7
	Sometimes	8	26.7
	Frequently	7	23.3
	Always	11	36.7
	N/A	2	6.7
	Total	30	100.0

D6c. I skateboard at night

	Frequency	Percent
Never	2	6.7
Sometimes	17	56.7
Frequently	8	26.7
Always	1	3.3
N/A	2	6.7
Total	30	100.0

D6d. When riding my skateboard in the dark, I wear reflective clothing, use a headlight, or use other lights or reflectors

	Frequency	Percent
Never	18	60.0
Sometimes	6	20.0
Frequently	1	3.3
Always	2	6.7
N/A	3	10.0
Total	30	100.0

D6e. I ride my skateboard in bike lanes where available

	Frequency	Percent
Never	3	10.0
Sometimes	7	23.3
Frequently	10	33.3
Always	8	26.7
N/A	2	6.7
Total	30	100.0

D6f. I ride my skateboard facing traffic, that is riding against the direction of cars

	Frequency	Percent
Never	7	23.3
Sometimes	10	33.3
Frequently	7	23.3
Always	4	13.3
N/A	2	6.7
Total	30	100.0

D6g. I wear a helmet when I skateboard

	Frequency	Percent
Never	11	36.7
Sometimes	7	23.3
Frequently	4	13.3
Always	6	20.0
N/A	2	6.7
Total	30	100.0

Attitudes toward Skateboarding (All Participants)

D7. What is the primary reason you never commute by skateboarding / have not skateboarded more recently?

		Frequency	Percent
	I skateboard every day	5	.8
	I have never skateboarded / not interested	394	63.0
	I do not own a skateboard	141	22.6
	Bad weather / wrong season	11	1.8
	Too busy / no opportunity	2	.3
	Disability / other health impairment	10	1.6
	Not safe to skateboard ON campus	5	.8
	Not safe to skateboard OFF campus	4	.6
	Transportation is faster using another mode	19	3.0
	Don't have someone to skateboard with	1	.2
	Other	33	5.3
	Total	625	100.0
Missing		8	
Total		633	

See Appendix 9 for "Other" responses

Overall Attitudes concerning JMU Active Transportation

E1. Please rate your attitudes toward travel on and around the JMU campus.

E1a. I would be more likely to bicycle, walk, or skateboard to campus if parking spaces were more expensive or less available

		Frequency	Percent
	Strongly Disagree	187	29.8
	Disagree	125	19.9
	Agree	133	21.2
	Strongly Agree	75	11.9
	N/A	108	17.2
	Total	628	100.0
Missing		5	
Total		633	

E1b. I would be more likely to bicycle, walk, or skateboard to campus if my route were less hilly

		Frequency	Percent
	Strongly Disagree	100	15.9
	Disagree	158	25.2
	Agree	178	28.4
	Strongly Agree	124	19.8
	N/A	67	10.7
	Total	627	100.0
Missing		6	
Total		633	

E1c. I would be more likely to bicycle, walk, or skateboard to campus if I lived closer

		Frequency	Percent
	Strongly Disagree	51	8.1
	Disagree	93	14.8
	Agree	197	31.4
	Strongly Agree	185	29.5
	N/A	101	16.1
	Total	627	100.0
Missing		6	
Total		633	

E1d. I would be more likely to walk, bicycle, or skateboard to campus if my friends / roommates / co-workers did

		Frequency	Percent
	Strongly Disagree	119	19.0
	Disagree	175	27.9

	Agree	155	24.7
	Strongly Agree	73	11.6
	N/A	105	16.7
	Total	627	100.0
Missing		6	
Total		633	

E1e. I feel like the University facilitates the use of active transportation modes on and around campus

		Frequency	Percent
	Strongly Disagree	41	6.6
	Disagree	137	21.9
	Agree	318	50.9
	Strongly Agree	65	10.4
	N/A	64	10.2
	Total	625	100.0
Missing		8	
Total		633	

E1f. I would use active modes of transportation more often if there was a financial incentive to do so

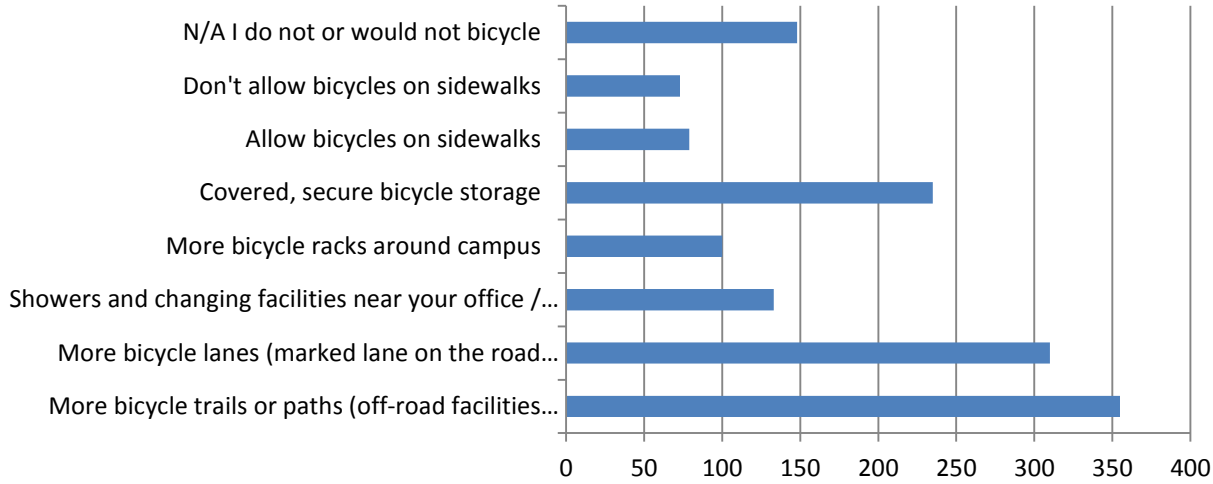
		Frequency	Percent
	Strongly Disagree	80	12.8
	Disagree	145	23.2
	Agree	175	28.0
	Strongly Agree	155	24.8
	N/A	70	11.2
	Total	625	100.0
Missing		8	
Total		633	

E2. Are you familiar with the JMU Bicycle Library called Cycleshare?

		Frequency	Percent
	Yes, I have used it	19	3.0
	Yes, and I plan to use it in the future	19	3.0
	Yes, but I do not plan to use it	168	26.8
	Yes, I have heard of it but I am not sure what it is	95	15.1

	No, I have not heard of it	327	52.1
	Total	628	100.0
Missing		5	
Total		633	

E3. What bicycle infrastructure changes would most influence your choice to bicycle more? (n=633)



Summary of Qualitative Feedback – Mapping Questions

<u>On-campus locations requiring improvements</u>

In the survey, participants were asked to select a place on the campus map that need bicycle and/or pedestrian improvements and to describe the improvements that are needed. The top responses for on campus in order from most mentioned to least mentioned were: Bluestone Area/Quad (25 mentions), Bluestone Dr. (21 mentions), Port Republic Rd. (20 mentions), Main St. (19 mentions), Grace St. (19 mentions), and the Village (15 mentions). The rest of the areas had less than 10 mentions.

The major issue on campus was the need for public safety education and enforcement (121 mentions). This section included responses that mention an unsafe feeling when traveling on campus, due to a variety of reasons. Some mentioned not enough lighting (7 mentions) when traveling to and from Memorial hall, others said that the bikers on campus, mostly the areas of the Village hill and the Quad, did not obey the traffic laws and were a cause of concern for many of the pedestrians and cars, while others did not feel safe leaving their bikes on campus because of theft.

Another major concern mentioned was the need for more bike lanes throughout campus (107 mentions). This was particularly important for Bluestone Drive. The pedestrians thought that this would help alleviate the bike congestion on the sidewalks.

And the bikers wanted to be separated from the buses and the students, especially during high traffic times. An additional 48 respondents specifically mentioned secluded bike trails away from the road or sidewalks.

88 respondents wanted road traffic modifications. This category included finding alternate routes for cars on campus, altering roads to ensure pedestrians, bikers, drivers, and skaters safety and finding efficient transport during high traffic times such as during class changes. Bikers wanted roads widened and bike lanes put in, while pedestrians wanted better sidewalks (39 mentions), walking trails (16 mentions), crosswalks (22 mentions), and walk signals (8 mentions). Concern for crosswalks and walk signals were centered on the Grace St., Mason St. and Cantrell Ave. intersections. One participant also commented on the Main St/Grace St intersection, observing that "there is a four-way pedestrian stop here, so students can walk diagonally on the light. This is great, but then students think they can do this at other lights and they are put in danger when they do so. There should be diagonal lines or paving stones across this intersection to indicate that this intersection is special and diagonal crossing is safe here." Many drivers also wanted the roads widened because they felt unsafe being so close to the pedestrians, bikers, buses, and other cars.

Out of 52 mentions about bike racks, 25 of them mentioned a specific need for covered bike parking. Bikers wanted more parking on campus in general. Many did not mention specific places for bike racks, but instead said that they would like to have more parking everywhere. Along with bike racks, faculty members expressed the need for showers or places to change on campus (14 mentions). They said that it is hard to dress suitably if biking on campus unless they had a place to change that included lockers. Many of these respondents even gave locations such as Harrisonburg High School and Montpelier as areas for possible locker/ shower rooms.

<u>Off-campus locations requiring improvements</u>

In the survey, participants were asked to select a place on a map of the area surrounding campus that need bicycle and/or pedestrian improvements and to describe the improvements that are needed. The top responses for off campus included: Reservoir St. (38 mentions), Main St. (30 mentions), Port Republic Road (28 mentions), Mason St. (14 mentions), High St. (13 mentions), and Cantrell Ave. (12 mentions).

Off campus suggestions were very similar to the on campus results. The largest need found was more bike lanes and trails (171 mentions; 17 specifically for bike trails). Many mentioned the areas where bike lanes end, such as Cantrell Ave, and expressed the need for their extension. Other major areas for bike lanes were Main Street in the downtown area, Port Republic Road, University Blvd., Market Street, and Neff Avenue. One participant commented: "I would bike more often if there were more bike lanes and paths. I would love to be able to take my children biking on our weekly errands to

the store, etc but right now I do not feel safe to do so. Safety is the #1 concern for me. Make it safer for bikers and I'll happily ride every day."

One hundred (100) of the respondents wanted more and better sidewalks throughout Harrisonburg. Reservoir Street was most identified as needing sidewalks, with Neff Avenue being second. The high number of responses regarding the need for sidewalks related to having to travel on the side of the road or through mud to get to some destinations in Harrisonburg. Connecting the residential areas, such as Charleston Townes and Copper Beach apartments, to highly utilized areas, such as Walmart, Valley Mall, or campus, was expressed multiple times by respondents. Crosswalks (37 mentions), walking signals (18 mentions), and walking trails (10 mentions) followed several comments on sidewalks.

The next area of concern for off campus was the need for public safety education and enforcement. Many drivers and pedestrians expressed the need for biker education. A primary area for increased education is regarding bikers' need to avoid travel on the sidewalks. However, many bikers also commented that in Harrisonburg it is hard to stay on the roads due to narrow roads, absence of bike lanes, and parking on roadsides. Bicyclists expressed that it is safer for them to be on the sidewalks. One participant explained that "It is difficult to bike on narrow roads that don't have bike lanes, and motorists get frustrated, thinking that bikes should be on the sidewalk (which is illegal)." Another concern was pedestrian education. The largest area of concern was for the students crossing Main Street between Bluestone Drive and Grace Street. Enforcement of jaywalking or the addition of more crosswalks was frequently suggested in responses.

Road and traffic modifications were mentioned in responses 64 times and expressed similar concern to the on campus traffic modifications. Most wanted better traffic patterns with rush hour and wider roads. Roads needing widening included Main St., Reservoir St., and Mason St. They also expressed concerns for the maintenance of the roads in Harrisonburg (ex. potholes), minor traffic pattern changes (ex. putting in clearer road paint to tell drivers, pedestrians, bikers what is safe at an intersection), and also signal changes (ex. making some signals longer and others shorter). One participant commented that "the intersection of Port Republic and South Main has a terrible signal schedule" for pedestrians.

Focus on Safety

The largest safety concerns for both on- and off-campus respondents were focused around general safety. On-campus respondents were mostly concerned with the Village hill and the high amount of multi-modal traffic this particular area sees. Pedestrians worry about cyclists and skaters traveling too quickly down the hill, while cyclists and skaters feel there is not a safe way for them to travel throughout that area. The Quad

was another heavily mentioned location on campus. Many felt that because of the large amount of brick/stone walkways, bicyclists and skaters tend dominate the paths and weave between those who are walking. On-campus concerns for not feeling safe due to cyclists and skateboarders far outweighed on-campus concerns for educating or enforcing those on bikes or skateboards. A total of 72 respondents who noted there was a need for some sort of public safety education and enforcement mainly discussed how scared or in danger they felt, while 24 focused on education and 25 focused on enforcement.

For off-campus, 73 respondents focused on the unsafe conditions pedestrians and cyclists face as they try to travel along roads or in areas that lack a sidewalk or bike lane. There were 9 responses concentrated on how those on bicycles or on foot must educate themselves on how to travel safely, while there were 22 responses that placed attention on the need to have less jaywalking, to distribute fines to those who bike on sidewalks, and to create more strict regulations for those who drive distracted (text messaging, failing to yield for pedestrians, etc.).

Overall, most of the respondents felt there was a possibility of getting hit by not only cars, but also bicycles and skateboards. In areas where traffic tends to be heavy (campus entrances at Port Republic Road and South Main Street, Grace Street, Cantrell Ave, and Reservoir Street), respondents expressed a lack of safety with the length and irregularity of crosswalks cycles and also need to educate the high amount of people jaywalking across the street that do not utilize available tunnels or crosswalks.

Summary of common on- and off-campus problem areas

Main Street was cited as a problem area in response to both questions. Since it runs through campus, many students cross it to attend classes. This has been an issue for a couple of years and drivers are still concerned. They suggest more effective enforcement of the jaywalking laws to deter people from walking out in front of the cars. Main Street was also a concern because of its narrow roadway and parking on the roadsides. Many respondents felt unsafe walking, biking and even driving through downtown due to the fear of a collision.

Also, both maps included comments discussing the need for more bike lanes. Most respondents that commented on bike lanes said that nearly anywhere that a bike lane could be added would be beneficial. They expressed the lack of adequate space on the side of the road results in hazards for both bikers and drivers, as bikers travel at a slower pace on roads but pose a threat to pedestrians on sidewalks. This happens in many areas of Harrisonburg both on campus (Village Hill, Quad) and off campus (Main St., Port Republic Rd.).

Lastly, both areas called for better enforcement or education, especially regarding biking. Many comments mentioned bikers traveling on sidewalks and endangering pedestrians. However, this could be addressed by including more bike lanes as mentioned previously. Pedestrian education and enforcement was also mentioned. Respondents mentioned pedestrians crossing at crosswalks when they were not given the right-of-way, pedestrians not paying attention to their surroundings (talking on a cell phone) and walking out in front of cars, and also pedestrians crossing without a crosswalk.

Preliminary Analysis of Physical Activity Questions (IPAQ Instrument)

Summary Demographics (IPAQ Questions)

H5. What is your sex? * H1. Your status at JMU is classified as Crosstabulation

Count

		H1. Your status at JMU is classified as		
		Student	Employee	Total
H5. What is your sex?	Male	67	92	159
	Female	151	122	273
	Prefer not to say	1	2	3
Total		219	216	435

H6. With which race do you identify? * H1. Your status at JMU is classified as Crosstabulation

Count

		H1. Your status at JMU is classified as		
		Student	Employee	Total
H6. With which race do you identify?	African American / Black	2	2	4
	Asian	4	2	6
	Hispanic / Latino	1	0	1
	White / Caucasian	196	193	389
	Multi-racial	7	6	13
	Other	2	1	3
	Prefer not to say	7	12	19
Total		219	216	435

H7. Please respond to the following statements-I am regularly physically active * H1. Your status at JMU is classified as Crosstabulation

Count

		H1. Your status at JMU is classified as		
		Student	Employee	Total
H7. Please respond to the following statements-I am regularly physically active	Strongly Disagree	4	9	13
	Disagree	14	20	34
	Neither Agree nor Disagree	30	27	57
	Agree	91	96	187
	Strongly Agree	80	66	146
Total		219	218	437

H8. Which of the following best describes the proximity of your home to campus via roadway? * H1. Your status at JMU is classified as Crosstabulation

			H1. Your status at JMU is classified as		
			Student	Employee	Total
H8. Which of the following best describes the proximity of your home to campus via roadway?	On campus	Count	42	1	43
		% within H1. Your status at JMU is classified as	19.2%	0.5%	9.9%
	<1 mile	Count	47	26	73
		% within H1. Your status at JMU is classified as	21.5%	12.0%	16.7%
	1 - 1.9 miles	Count	61	44	105
		% within H1. Your status at JMU is classified as	27.9%	20.3%	24.1%
	2 - 2.9 miles	Count	37	40	77
		% within H1. Your status at JMU is classified as	16.9%	18.4%	17.7%
	3 - 4.9 miles	Count	17	24	41
		% within H1. Your status at JMU is classified as	7.8%	11.1%	9.4%
	5 - 10 miles	Count	3	22	25
		% within H1. Your status at JMU is classified as	1.4%	10.1%	5.7%
	11 - 20 miles	Count	2	35	37
		% within H1. Your status at JMU is classified as	0.9%	16.1%	8.5%
	>20 miles	Count	10	25	35
		% within H1. Your status at JMU is classified as	4.6%	11.5%	8.0%
Total		Count	219	217	436
		% within H1. Your status at JMU is classified as	100.0%	100.0%	100.0%

H7. Please respond to the following statements-I am physically fit * H1. Your status at JMU is classified as Crosstabulation

Count

		H1. Your status at JMU is classified as		
		Student	Employee	Total
H7. Please respond to the following statements-I am physically fit	Strongly Disagree	6	11	17
	Disagree	21	25	46
	Neither Agree nor Disagree	27	44	71
	Agree	104	89	193
	Strongly Agree	60	47	107
Total		218	216	434

H7. Please respond to the following statements-I consider myself to be a healthy person * H1. Your status at JMU is classified as Crosstabulation

Count

		H1. Your status at JMU is classified as		
		Student	Employee	Total
H7. Please respond to the following statements-I consider myself to be a healthy person	Strongly Disagree	2	4	6
	Disagree	11	14	25
	Neither Agree nor Disagree	24	21	45
	Agree	117	129	246
	Strongly Agree	64	48	112
Total		218	216	434

Summary of Physical Activity Data

Group Statistics

	H1. Your status at JMU is classified as	N	Mean	Std. Deviation	Std. Error Mean
Sedentary Minutes Total	Student	219	392.3059	187.36659	12.66106
	Employee	218	465.7569	183.59694	12.43475
Vig_METmins_wk	Student	218	1556.8073	1713.69452	116.06604
	Employee	218	1290.4587	1811.74478	122.70684
Mod_METmins_wk	Student	218	942.0183	1184.06297	80.19486
	Employee	218	864.3127	1196.11826	81.01135
Walk_METmins	Student	213	1469.2901	2025.18969	138.76371
	Employee	218	1086.5409	1927.94604	130.57698
Total_Min_PA	Student	218	184.5642	135.74206	9.19361
	Employee	218	156.3511	127.81388	8.65665
MVPA_METmins_Wk	Student	217	2489.8802	2338.67471	158.75958
	Employee	218	2154.7714	2551.90265	172.83666

Student-Employee Comparisons

Crosstab

			H1. Your status at JMU is classified as		
			Student	Employee	Total
A1. Check one box for each line below to tell us THE MOST RECENT TIME you used the following type of...-a) Passenger or driver in a vehicle (for example, a car, truck, motorcycle, or taxi)	Last 7 Days	Count	197	207	404
		% within H1. Your status at JMU is classified as	90.4%	95.0%	92.7%
	Last Month	Count	13	6	19
		% within H1. Your status at JMU is classified as	6.0%	2.8%	4.4%
	Last 3 Months	Count	5	3	8
		% within H1. Your status at JMU is classified as	2.3%	1.4%	1.8%
	Last Year	Count	2	1	3
		% within H1. Your status at JMU is classified as	0.9%	0.5%	0.7%
	Not Used in Last Year	Count	1	1	2
		% within H1. Your status at JMU is classified as	0.5%	0.5%	0.5%
Total		Count	218	218	436
		% within H1. Your status at JMU is classified as	100.0%	100.0%	100.0%

Crosstab

			H1. Your status at JMU is classified as		
			Student	Employee	Total
A2. In the last 7 days (up to yesterday), on how many days did you:-Have access to a working BICYCLE.	0 Days	Count	128	93	221
		% within H1. Your status at JMU is classified as	58.7%	42.9%	50.8%
	1 Day	Count	2	1	3
		% within H1. Your status at JMU is classified as	0.9%	0.5%	0.7%
	2 Days	Count	1	1	2
		% within H1. Your status at JMU is classified as	0.5%	0.5%	0.5%
	3 Days	Count	1	0	1
		% within H1. Your status at JMU is classified as	0.5%	0.0%	0.2%
	4 Days	Count	0	2	2
		% within H1. Your status at JMU is classified as	0.0%	0.9%	0.5%
	7 Days	Count	86	120	206
		% within H1. Your status at JMU is classified as	39.4%	55.3%	47.4%
Total		Count	218	217	435
		% within H1. Your status at JMU is classified as	100.0%	100.0%	100.0%

Crosstab

			H1. Your status at JMU is classified as		
			Student	Employee	Total
B1. Have you used a BICYCLE for commuting, errands, or leisure in the last year? Do not include use...	Yes	Count	104	99	203
		% within H1. Your status at JMU is classified as	47.5%	45.4%	46.5%
	No	Count	115	119	234
		% within H1. Your status at JMU is classified as	52.5%	54.6%	53.5%
Total		Count	219	218	437
		% within H1. Your status at JMU is classified as	100.0%	100.0%	100.0%

Crosstab

			H1. Your status at JMU is classified as		
			Student	Employee	Total
C1. Have you WALKED for the purposes of commuting, errands, across campus, or leisure in the last ye...	Yes	Count	214	208	422
		% within H1. Your status at JMU is classified as	97.7%	95.4%	96.6%
	No	Count	5	10	15
		% within H1. Your status at JMU is classified as	2.3%	4.6%	3.4%
Total		Count	219	218	437
		% within H1. Your status at JMU is classified as	100.0%	100.0%	100.0%

Crosstab

			H1. Your status at JMU is classified as		
			Student	Employee	Total
D1. Have you used a SKATEBOARD for commuting, errands, or leisure in the last year?	Yes	Count	16	1	17
		% within H1. Your status at JMU is classified as	7.3%	0.5%	3.9%
	No	Count	203	217	420
		% within H1. Your status at JMU is classified as	92.7%	99.5%	96.1%
Total		Count	219	218	437
		% within H1. Your status at JMU is classified as	100.0%	100.0%	100.0%

Crosstab

			H1. Your status at JMU is classified as		
			Student	Employee	Total
E1. Please rate your attitudes toward travel on and around the JMU campus.-a) I would be more likely to bicycle, walk, or skateboard to campus if parking spaces were more expensive or less available	Strongly Disagree	Count	43	82	125
		% within H1. Your status at JMU is classified as	19.7%	37.8%	28.7%
	Disagree	Count	40	45	85
		% within H1. Your status at JMU is classified as	18.3%	20.7%	19.5%
	Agree	Count	60	38	98
		% within H1. Your status at JMU is classified as	27.5%	17.5%	22.5%
	Strongly Agree	Count	38	17	55
		% within H1. Your status at JMU is classified as	17.4%	7.8%	12.6%
	N/A	Count	37	35	72
		% within H1. Your status at JMU is classified as	17.0%	16.1%	16.6%
Total		Count	218	217	435
		% within H1. Your status at JMU is classified as	100.0%	100.0%	100.0%

Crosstab

			H1. Your status at JMU is classified as		
			Student	Employee	Total
E1. Please rate your attitudes toward travel on and around the JMU campus.-b) I would be more likely to bicycle, walk, or skateboard to campus if my route were less hilly	Strongly Disagree	Count	20	50	70
		% within H1. Your status at JMU is classified as	9.2%	23.1%	16.1%
	Disagree	Count	55	62	117
		% within H1. Your status at JMU is classified as	25.2%	28.7%	27.0%
	Agree	Count	67	45	112
		% within H1. Your status at JMU is classified as	30.7%	20.8%	25.8%
	Strongly Agree	Count	63	30	93
		% within H1. Your status at JMU is classified as	28.9%	13.9%	21.4%
	N/A	Count	13	29	42
		% within H1. Your status at JMU is classified as	6.0%	13.4%	9.7%
Total		Count	218	216	434
		% within H1. Your status at JMU is classified as	100.0%	100.0%	100.0%

Crosstab

			H1. Your status at JMU is classified as		
			Student	Employee	Total
E1. Please rate your attitudes toward travel on and around the JMU campus.-c) I would be more likely to bicycle, walk, or skateboard to campus if I lived closer	Strongly Disagree	Count	15	19	34
		% within H1. Your status at JMU is classified as	6.9%	8.8%	7.8%
	Disagree	Count	34	30	64
		% within H1. Your status at JMU is classified as	15.7%	13.8%	14.7%
	Agree	Count	70	65	135
		% within H1. Your status at JMU is classified as	32.3%	30.0%	31.1%
	Strongly Agree	Count	61	75	136
		% within H1. Your status at JMU is classified as	28.1%	34.6%	31.3%
	N/A	Count	37	28	65
		% within H1. Your status at JMU is classified as	17.1%	12.9%	15.0%
Total		Count	217	217	434
		% within H1. Your status at JMU is classified as	100.0%	100.0%	100.0%

Crosstab

			H1. Your status at JMU is classified as		
			Student	Employee	Total
E1. Please rate your attitudes toward travel on and around the JMU campus.-d) I would be more likely to walk, bicycle, or skateboard to campus if my friends / roommates / co-workers did	Strongly Disagree	Count	30	56	86
		% within H1. Your status at JMU is classified as	13.8%	25.8%	19.8%
	Disagree	Count	42	77	119
		% within H1. Your status at JMU is classified as	19.4%	35.5%	27.4%
	Agree	Count	77	30	107
		% within H1. Your status at JMU is classified as	35.5%	13.8%	24.7%
	Strongly Agree	Count	42	10	52
		% within H1. Your status at JMU is classified as	19.4%	4.6%	12.0%
	N/A	Count	26	44	70
		% within H1. Your status at JMU is classified as	12.0%	20.3%	16.1%
Total		Count	217	217	434
		% within H1. Your status at JMU is classified as	100.0%	100.0%	100.0%

Crosstab

			H1. Your status at JMU is classified as		
			Student	Employee	Total
E1. Please rate your attitudes toward travel on and around the JMU campus.-e) I feel like the University facilitates the use of active transportation modes on and around campus	Strongly Disagree	Count	11	18	29
		% within H1. Your status at JMU is classified as	5.0%	8.3%	6.7%
	Disagree	Count	44	47	91
		% within H1. Your status at JMU is classified as	20.2%	21.8%	21.0%
	Agree	Count	117	112	229
		% within H1. Your status at JMU is classified as	53.7%	51.9%	52.8%
	Strongly Agree	Count	28	17	45
		% within H1. Your status at JMU is classified as	12.8%	7.9%	10.4%
	N/A	Count	18	22	40
		% within H1. Your status at JMU is classified as	8.3%	10.2%	9.2%
Total		Count	218	216	434
		% within H1. Your status at JMU is classified as	100.0%	100.0%	100.0%

Crosstab

			H1. Your status at JMU is classified as		
			Student	Employee	Total
E1. Please rate your attitudes toward travel on and around the JMU campus.-f) I would use active modes of transportation more often if there was a financial incentive to do so	Strongly Disagree	Count	12	36	48
		% within H1. Your status at JMU is classified as	5.5%	16.8%	11.1%
	Disagree	Count	48	49	97
		% within H1. Your status at JMU is classified as	22.0%	22.9%	22.5%
	Agree	Count	55	64	119
		% within H1. Your status at JMU is classified as	25.2%	29.9%	27.5%
	Strongly Agree	Count	74	48	122
		% within H1. Your status at JMU is classified as	33.9%	22.4%	28.2%
	N/A	Count	29	17	46
		% within H1. Your status at JMU is classified as	13.3%	7.9%	10.6%
Total		Count	218	214	432
		% within H1. Your status at JMU is classified as	100.0%	100.0%	100.0%

E2. Are you familiar with the JMU Bicycle Library called Cycleshare? * H1. Your status at JMU is classified as Crosstabulation

			H1. Your status at JMU is classified as		
			Student	Employee	Total
E2. Are you familiar with the JMU Bicycle Library called Cycleshare?	Yes, I have used it	Count	10	0	10
		% within H1. Your status at JMU is classified as	4.6%	0.0%	2.3%
	Yes, and I plan to use it in the future	Count	11	3	14
		% within H1. Your status at JMU is classified as	5.0%	1.4%	3.2%
	Yes, but I do not plan to use it	Count	62	63	125
		% within H1. Your status at JMU is classified as	28.4%	29.0%	28.7%
	Yes, I have heard of it but I am not sure what it is	Count	42	31	73
		% within H1. Your status at JMU is classified as	19.3%	14.3%	16.8%
	No, I have not heard of it	Count	93	120	213
		% within H1. Your status at JMU is classified as	42.7%	55.3%	49.0%
Total		Count	218	217	435
		% within H1. Your status at JMU is classified as	100.0%	100.0%	100.0%

Responses to C4, Other

It easier to wlk nthan to find parking
Again, all of the above, basically.
bus inconvenient/closer destination
bus stops at my dorm infrequnetly
Buses sometimes take forever
Campus is impossible to get around driving
Conditions too bad to bike
convenience. traffic is still awful on campus and parking is worse
don't feel safe and the weather
Easier than driving / parking in most circumstances OR trips to short for driving
Easier to walk up hills than to bike up hills.
for exercise, don't have access to a motor vehicle
I have legs
I walk because I am in walking distance of downtown and campus! It's a great way to get outside and get a little exercise! Why drive if I can literally just walk a block down the street? :)
I walk from my parking to my office daily, walk for exercise at least 4 times a week
If not riding a bike or using a skateboard, I walk.
JMU is trying to reduce car traffic on campus and I am trying to help
JMU parking; I usually have to walk 7-10 mins to class from my parking spot
Live next to campus
More convenient. The bus stop is as far away as most of my classes.
My daughter takes my car when she has clinicals at the hospital.
Nearly all of the above apply. Except I do have a car, and I walk in all weather.
Parking on campus is awful and its too cold or icy to bike.
Rainy/snowy, therefore don't want to bike.
Recent weather has prevented more walking opportunities, but like walking for excercise and for environmental purposes
Reliability.
Safer than bicycling
The bus schedule is terrible. Buses leave too closely together and at night the bus driver for bus 33 is rude and leaves early.
The bus schedule isn't always conducive to my class schedule
to get fresh air
too hard to find parking if you move your vehicle...easier to walk to destinations on campus.
typically I bike across campus, but on day I need a car on campus then I walk rather than drve
Usually the best/only way to get around campus
walking the dog
When I need to carry something that I can't carry on a bike. Like a pie!
With JMU resident parking situation, my car is too far away to conveniently access

Responses to C5, Other

Areas not well lit when it is dark.
at night
Beligerant fraternity members, drunkards, and motorists who turn without signals and ignore stop signs/red lights.
Bicyclists/skateboarders tend to have no respect for walkers. I have been nearly run over multiple times.
Cars, trucks, busses - I have to walk on street or cross 4 lanes without light
Chains across shortest routes.
depends where one's walking
distracted walkers - mobile phone use
Don't feel threatened
dont feel threatened
Drivers who feel the need to text rather than focus on road and surroundings.
Facilities Management Vehicles
gaps in ice/ snow removal on Harrisonburg city sidewalks
I do not feel threatened
I don't feel threatened
I don't feel threatened when I walk around campus
I fear bikes more than cars.
I have been run off the sidewalk by "Jimmy Trucks" (JMU vehicles) going too fast. I have written asking that the sdewalks be for pedestrians (unless emergency vehicle with lights and sirens on). The campus policy of allowing vehicles on sidewalks makes
I only walk during the day.
Im afraid of Dinosaurs
Lack of sidewalks
lack of sidewalks in city neighborhoods
lack of sidewalks; turning cars
Lighting issues (I don't like walking in dark areas)
Live too far to walk to campus or other errands
N/A
N/A I do not really feel threatened when walking.
Narrow sidewalks/lack of sidewalks
No
no sidewalk
no sidewalks
No sidewalks available
No spaces along roads set aside to walk on
no threat
none
None of the above
Not enough crosswalks or crossing lights at intersections throughout Harrisonburg.
Not enough people clear their walks in the winter. Not enough sidewalks, or sidewalks too narrow and too close to street
Not enough sidewalks
not enough sidewalks in areas I walk
not enough sidewalks in Harrisonburg (Reservoir street)
Not enough sidewalks or crosswalks for pedestrians off-campus

Other pedestrians distracted by electronic devices (significant hazard).hazard).
People make a right on red or green without looking to their right for pedestrians crossing when they have the sign.
people texting and bumping into me
police
Pollution
Poorly lit streets; inadequate sidewalks
potential for crime at night
railroad tracks
Sections of no sidewalks going towards Copper Beech
Sidewalks that begin and end willy-nilly. What's up with that. They just end or begin in the middle of a road. You have to keep crossing back and forth across the road or walk on the grass.
Students do not know how to walk on the sidewalks so that others coming in the opposite direction may pass by without having to step into the street or into a flower bed. It's ridiculous.
students standing around on the sidewalk
the city has done a great job at building more sidewalks
The extremely wait for walk lights at most intersections in Harrisonburg encourages jay walking which is dangerous
The lack of off-campus infrastructure.
The sidewalks off campus make no sense and will randomly terminate, with no crosswalk to get to the other side of the road. On campus is pretty walker friendly, but we could use another bus stop by Gibbons, so that I don't have to walk to Carrier from Var

Threat of violence
To get to campus, sidewalks and crosswalks are on again/off again. Pathetic!
usually walk with partner(s) and don't feel that my safety is threatened

Responses to C8, Other

Again..I am a mother of four. I need quick and convenient access to my vehicle during the day and immediately after work (often for the purposes of picking up kids for activities, appointments, etc.
All of my classes are in one building
Bad weather and transportation is faster by car and I have to be available with car in case of emergency with child
biking is faster
commute is too far for walking
Comute is over 20 miles
destinations are too far from my residence
distance
distance and what I need to carry w/ me
distance for commute. However I walk to and from meetings on campus most of the time.
distance from campus
distance from home - not a safe walk through Harrisonburg
Distance I live from school
Distance is too far from home
Distance to work or stores from my house - not realistic
distances
Don't like to walk home late at night
Driving seems safer
Driving takes 10-15 minutes, the bus takes about 30 minutes (plus requires leaving/arriving at a certain time) and walking takes about 45 minutes. As much as I appreciate alternative forms of transportation, an extra hour of walking each day = 100s of hou

frequently have other errands after work that require a car
Have had to go non-walkable places during work hours.
Home is to far away from work
i bike
I bike
i bike!!
I bike.
I do commute by walking every day
I do walk sometimes, but the distance is great enough that I do not have the time to spare after hours every day. (I work two jobs, time is crucial)
I go home every day at lunch to let my dog out. I can't do that if I don't have my car here at work.
I have a 30 mile commute, and walking 16 hours a day would be inconvenient.
I have a 40 mile commute.
I have a bicycle and I use that
I have a child in school and I need acess to a vehicle should she need to go home because of illness.
I live 15 miles from campus.
I live 16 miles away.
I live 16 miles from campus
I live 25 miles away
I live 30 miles away - I would never get here!
I live 30 miles away from campus.
I live 5 miles away

I live 50 miles from JMU
I live in Massanutten and it isn't possible to walk to work.
I live more than 30 miles away from campus
I live over 10 miles from work.
I live too far from campus to reasonably commute by walking (4 miles).
I pay for a parking permit and I live too far away from campus.
I ride a bike
I think you screwed up this question - check the first answer option
I usually bike to work but walk if it's rainy/snowy so I don't get so wet
I walk as much as possible; if not walking, I take the shuttle to the Quad or get dropped off near my office
I walk nearly every day--sometimes a drive or bike because I have off campus meetings or appointments immediately before or after work
I walk when I can, when I don't have a timetable to hold to, and when my schedule makes it viable. I don't want if the weather is bad, if I have to walk after dark, or if I have more than about four miles to go one way.
It does tend to get darker the farther down you go South Mason Street towards downtown. More lighting would be great!
JMU was closed for three days
live an hour away--no sidewalks, time of day coming and leaving work
Live more than 10 miles away
live over 40 miles away
live to far from campus
live too far away
live too far away for most activities
live too far away for whole commute on foot
Live too far away from anything, rural area
Live too far away from Harrisonburg to walk to work
Live too far away to be feasible.
Live too far from campus
Live too far from town
Live too far, need a car at work
Load too large to carry.
Location of where I live is 4 miles from campus which is too far for me to walk
longboard
My classes are only in one building on campus
my commute is 18 miles.
my commute is 30 miles one way
no purpose to be walking, I ride the bus and/or walk to/from all of my classes, but don't walk to other destinations that are super far away or just randomly walk around
Not always safe off campus
nothing near my apartment complex
off campus appointments - most of Hburg is not navigable on foot
Often have commitments after work that require me to use a car to get to (can't walk to them due to distance or time it would take to walk there).
Reservoir St/University Blvd, of 4 pedestrian directions, three have no crosswalk, intersection has one crosswalk. Pathetic!
Riding a bike is faster.

See comment above regarding students and sidewalks.
takes too much time
Time constraints
time needed to walk the distance to work is too much for my schedule
too far
Too Far away
Too far of a commute
Too far to walk
Too far to walk to work in a reasonable length of time. Also, much of the road is NOT pedestrian friendly. Would want to walk with someone else. Will not walk after dark - too dangerous.
too lazy
Too many hills and takes too much time
too slow - biking is faster
Walk for exercise and would never consider walking a mode of transportation.
Weather and schedule permitting the time to walk to destination
weather, faster transportation
Work inside most of the day and then drive home
Work too far away

Responses to B4, Other

Basically, all of the above. It is faster, more fun and cheaper
cheaper, faster, enjoy it and the exercise. cant pick just one
Didn't want to walk
don't have access to a motor vehicle, is faster than walking, is more convenient than a bus
I do not ride a bike
I don't bike in snow or rain, or if in a hurry
I ride to work because it is cheaper, faster, get exercise, I enjoy it, reduced carbon foot print, parking ease, cost of parking.
I skate
I was trying out a loaned bike.
if the weather is nice, it's better than taking the bus
Job policies and insurance requirements keep me from utilizing a bicycle unless certified by a State qualified trainer. Use bike off campus and off work
Many of these apply equally
N/A I do not use a bike as transportation.
not applicable for campus, only pleasure
The destination was too close to warrant driving.

Responses to B5, Other

at night just in general some of the darker places on campus, being seen but also seeing the roadway
bike in a safe area for recreation
Bike lanes are not consistent around town
cars
Cars, Buses, Trucks kill pedestrains and the roads are not safe.
distracted (texting) drivers!
dont feel threatened
I don't think there is too much pedestrian traffic, but the pedestrians are not mindful of their surroundings
Inadequate bike lanes
inadequate bike paths
inadequate bike paths for my route
Lack of safe bicyle routes - bike paths or lanes
Lack of sidewalks/bike lanes on the roads
loose gravel
Many cell phone drivers are oblivious to bike riders.
need shower after bicycle, inconvenient at work
no barrier between bicycle lane and motor vehicle lane (except on Chicago ave)
No bike lanes where I need to ride (Mason St)
No bike lanes, especially on Cantrell!
Not being able to see around walls/curves with hedges and other things that obscure my vision.
Not enough bicycle training for people who ride bikes and, especially, those who don't ride bikes.
not enough bike paths
Not enough room on side of road to bike/no sidewalks
not enough room on the road with cars
On again/off again bike lanes. Pathetic!
parked cars
Pedestrians that don't know what to do around bikes.
police
pollution
small shoulders on roads
street sweeper, roadkill in bike lane, bikers biking the wrong way in the bike lane
too much car traffic
weather conditions

Responses to B8, Other

The is in harrisonburg are killer particularly on campus and I don't want to show up to class sweaty and gross. and an injury but you won't let me pick two bubbles.
A friend began taking me to work on their way to work.
Because its illegal to ride on sidewalks and I've had too many close-calls with motorists texting while drivig and drifting into the bike lane
Bikes are expensive. True long-term cost would be lower, but I do not have enough overhead in my annual income to meet the up front expense.
Biking makes me sweaty which does not bode well for interactions with students.
Campus is too hilly, needs to be terraformed.
Combination - don't feel comfortable, class schedule does not make biking viable (leave class around 9pm Monday evenings, do not feel comfortable walking or biking home alone after dark, and I walk other days.)
combination of weather and too much effort.
commute is too far to go by bicycle
Commute to work is too long, however, would like the benefit of biking while on campus if bike was accessible
Concerned for my personal safety.
Convenience, Fear of riding bikes
Currently living abroad with no bike
Danger of motorists and other people/ inexperience of riding
Did not bring bike to college
difficult terrain for biking, also do not have a good enough bike to handle that terrain
distance
Distance - Live too far from city
distance from campus and lack of facilities to shower etc when I get here
Distance from campus and route that I would need to take
distances
Distances to commute / run errands to great for a bicycle
Don't care to
don't feel safe
don't feel safe on the roads
Don't have a bike
Don't like being sweaty.
Don't like biking
Don't like biking; prefer to walk.
Dress code at the office complicates bike riding
drive children to school on way to work
fear of traffic, bodies, stop lights
getting to old and live 5 miles from campus
Hard to transport what I need to carry
Haven't ridden a bike in years
Hills
hills too steep in this area
I am able to carpool during the academic year.
I am expected to look nice when I arrive to work. I don't want to be hot and sweaty all day from riding a bike to work.

I am not fit enough to bike around this hilly campus
I come home from work in the dark and do not ride my bike in the dark so I find another way to get home from work.
I commute by bike every day
I commute to work daily, cannot travel safely on 33East
I do commute by bike
I do not live in Harrisonburg.
I do not live in town. The time to communte on a bike is pretty long. Do not always feel safe on the roads I would have to ride on.
I don't like riding a bike, too hard on hills
I don't like to ride a bike - I walk to do errands, etc.
I don't own a bike
I either ride a bike or use a skateboard to get on campus and return home
I enjoy walking. Also uncomfortable riding a bike in traffic without bike lanes.
I feel it is unsafe due to the number of bad drivers on campus
I have a 30 mile commute to work.
I have four children. I need quick and convenient access to my vehicle often during the day and especially immediately after work.
I have so much stuff and so often wear dresses and skirts, the bike does not seem great for that. I don't own a bike, but right now it's too cold anyway.
I have to go between class and home uphill both ways.
I haven't had a bike for a few months, and currently prefer walking to work (I live just over 2 miles from JMU_
I just have no interest in riding a bike
I like to walk some times.
I live 12 miles from campus...and can't ride a bike to work.
I live 15 miles from campus.
I live 16 miles from campus
I live 22 miles from work. If I would even consider the commute by bike, there are no road shoulders of the 9 miles of rt 602, and no bike lanes on the 10 miles of rt 33.
I live 30 miles away and would not bike on 81 even if I DID have a bike
I live 40 miles away - too far.
I live 50 miles from JMU
I live an hour a way over the mountain--not safe to ride a bike on the mountain and length of time and time of day
I live far from campus and riding a bike would be completely impractical.
i live in Staunton - so i do ride to and home from work, but it is logistical challeng since i can't do both in the same day due to time constraints.
I live on campus
I live over 40 miles away
I live so close its easier to walk.
I live too far away -- staunton
I pay for a parking permit, I'm from the area and I'm a commuter.
I prefer to walk
I ride most days when weather and light allow.
I take the bus to campus every day
I use my longboard

I usually walk--it is more pleasant the riding in traffic around here. faster for getting to work by the time a gather and put away all the bike gear at each end.
I walk
I walk because I am 5 minutes away. If I bike, I would have to push my bike up a big hill to get home.
I walk every day.
I walk to my office
I walk to work, use the bus between campuses
I walk. Don't need a bicycle.
I was once hurt riding a bike. I have no desire to ride on the roads.
I would ride to work but I wear business attire and I don't want to ride in a dress or dress slacks.
I'm satisfied with walking - a bike seems inconvenient at work.
In addition to some of the above, I also require to carry several items with me to and from my office
In case of a family emergency, need to respond quickly. Taking care of elder parent.
Inconvenient to park it and lock it everywhere
It's unsafe in Harrisonburg
Its easy to just walk
Lack of practical facilities available for me to shower/change after I ride to campus (I realize that I could go to UREC, but I teach on the quad and that would add even more time to my commute).
Live 16 miles away
Live in Rockingham Cty and too far from campus
Live more than 10 miles from work
Live over 30 miles from campus
Live to Far away from Campus 20+ mi9les
Live too far away
Live too far away (over 30 miles from campus)
Live too far away to be feasible.
Live too far away to bike to campus. Also need to drop kids off in mornings and need space for them in the vehicle.
Live too far from campus
Live too far from town
Live too far from work
Live too far from work, need car at work
Live too far out in the country to be able to get anywhere in a decent amount of time
Live way too far away.
more than 1 hour commute by vehicle on i-81
Must drop off son at school in the AM
My bike is messed up right now.
My commute is 30 miles one way
my home is 25 miles from work; no bike on campus
My lock broke and my bike got stolen
N/A
NA - always commute by bicycle
Need to drop kids at day care
No covered storage to keep bike dry in wet weather on campus
No easy way to get cleaned up and groomed after bike commute
No place to lock up bike AND I have to bike up a huge hill to get home!
No safe bike paths in county/city/JMU

No safe place to store the bike overnight on campus and too much of a pain to transport it to campus every day.
Old age presents risks.
Picking up and dropping off kids before and after work.
Riding a bike is gay and the people on bikes are reckless and endanger the pedestrians
Safety - I'd be jeopardizing my own safety and the safety of others. Riding a bike in many situations is a selfish choice. I'm not anti-bicycle, I love bicycles, this is just a failure of our infrastructure and both drivers and cyclists. So often I see bi

scared to bike near cars & dislike hills
see previous statement regarding riding certification and insurance policies
Simply have no interest. I am a walker.
Snow covers road's edges leaving no place to bike!! Need more bike lanes.
the hills of harrisonburg would kill me
The main reason is that it would be a pretty long ride from my house to campus. I won't ride a bike after dark or without a bike lane, and heavy and or fast traffic scares me. Once I'm on campus, it's easier to walk - and I don't have a bike on campus.
Too far away
Too far of a commute
Too many darn hills
Too many hills around campus
Traffic too dangerous. Bike lanes not effective.
Transport my child to school
waiting for my dad to fix my bike at home
Walking is better exercise
walking is more practical
Walking seems just as easy, if not easier
Would never use a bike as a mode of transportation and have no desire to do so.
wtf - i ride every day

Responses to D4, Other

For exercise and it is faster
If not biking or walking, I skateboard.
N/A

Responses to D5, Other

N/A
On again/Off again sidewalks and bike lanes. Pathetic!
police
steepness of pathways causes you to go REALLY fast

Responses to D7, Other

at my age I would need surgery if I fell
biking is faster
dangerous, not skilled
do not skateboard and do not like sharing sidewalks and walking paths with skateboards.
Don't skateboard and would never consider skateboarding a mode of transportation.
i bike
I don't have the skill to skateboard at all
I don't know how to skateboard.
I don't know how.
I have absolutely no desire to skateboard
I have skateboarded but I don't want to now.
I'm not a douche bag
Incapable of balancing
It's a toy
Live too far away
Live too far away to be feasible.
low interest
N/A
no one should be allowed to skateboard on side walks or roadways on campus, entirely too dangerous for them and pedestrians
Not interested
Not practical
Not safe to skateboard
Nowhere to skate on and off campus
Really??!!
Skateboarders are Douche Bags, plus i cant skate
Skateboarding is dangerous
Skateboarding is for little kids and Tony Hawk.
skateboards are inherently dangerous
Too many pedestrians. People tend to get angry at skateboarders as well.
Would need to relearn how to skateboard; toting items may be difficult as well as having the attire (shoes) when conducting business meetings and the risk of fall/injury

APPENDIX 3

March 2014 –Transportation Survey – Summary of Results

Prepared for Bicycle & Pedestrian Advisory Committee - March 2014

The campus Transportation Survey was conducted between December of 2013 and February of 2014 to obtain information on student, faculty, and staff's travel modes in order to establish a baseline for future studies. Participants responded to questions concerning bicycling, walking, and skateboarding for transportation purposes. Results have been split into two sections: **Students**, and **Employees**

STUDENTS - Total Respondents: 684, 80% Completion Mean

1st Ranking
2nd Ranking
3rd Ranking

1) Housing

Off Campus Residents	(65%)
On Campus Residents	(35%)

2) On Campus Living

Village Area	(30%)
Skyline Area	(26%)
Bluestone Area	(17%)
Lake Area	(14%)
Hillside Area	(9%)
Tree Houses	(5%)

3) Off Campus Living

Other	(29%)
Copper Beach	(11%)
North 38	(8%)
Southview	(6%)
Sunchase	(6%)
Mill	(6%)
Stonegate	(5%)
University Fields	(4%)
Pheasant Run	(4%)
South Main Street	(3%)
Charleston Townes	(3%)
Squire Hill	(3%)
Aspen Heights	(2%)
Urban Exchange	(2%)
Hunters Ridge	(2%)
Devon Lane	(2%)
Commons	(1%)
The Overlook	(1%)
865	(1%)
Campus View	(0%)

4) Miles from Campus

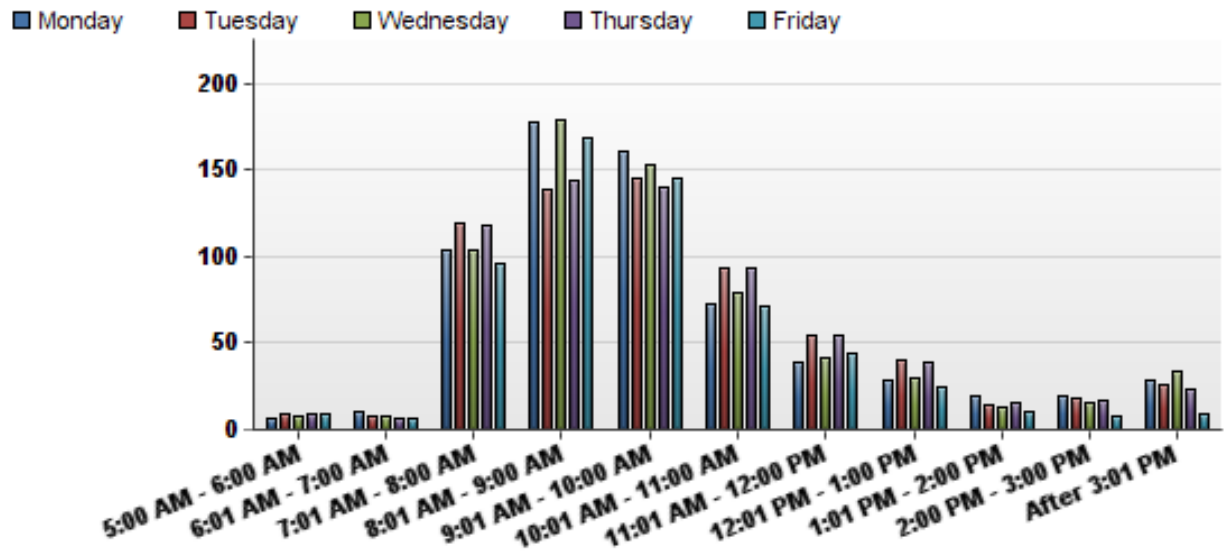
Minimum Value =	0.0
Maximum Value =	50.00
Average Value =	3.73

5) Number of trips TO/FROM residence (including your first trip) on typical school day

1 Trip (38%)
2 Trips (39%)
3 Trips (15%)
More than 3 Trips (9%)
* Average = 1.95

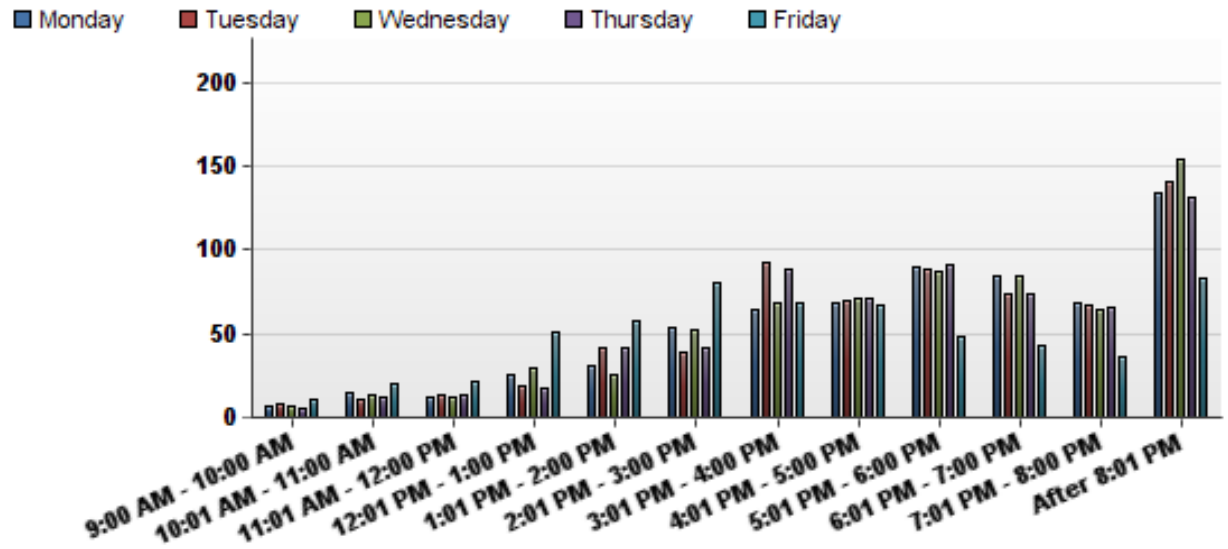
6) I start my day on campus between the following times on a typical school day

	Mon	Tues	Wed	Thurs	Fri	Total
5:00 AM - 6:00 AM	7	9	8	9	9	42
6:01 AM - 7:00 AM	10	8	8	6	7	39
7:01 AM - 8:00 AM	103	118	103	117	95	536
8:01 AM - 9:00 AM	178	139	179	144	169	809
9:01 AM - 10:00 AM	161	145	153	140	145	744
10:01 AM - 11:00 AM	73	94	79	93	72	411
11:01 AM - 12:00 PM	39	55	42	54	44	234
12:01 PM - 1:00 PM	28	40	30	39	25	162
1:01 PM - 2:00 PM	19	14	13	15	10	71
2:01 PM - 3:00 PM	20	18	16	17	8	79
After 3:01 PM	29	26	34	23	9	121



7) On a typical school day I return from campus to my residence for final time between the following times

	Mon	Tues	Wed	Thurs	Fri	Total
9:00 AM - 10:00 AM	7	8	7	6	11	39
10:01 AM - 11:00 AM	15	11	13	12	20	71
11:01 AM - 12:00 PM	12	13	12	13	22	72
12:01 PM - 1:00 PM	26	19	30	17	51	143
1:01 PM - 2:00 PM	31	42	25	42	58	198
2:01 PM - 3:00 PM	53	39	51	42	79	264
3:01 PM - 4:00 PM	65	92	68	88	68	381
4:01 PM - 5:00 PM	69	69	71	70	67	346
5:01 PM - 6:00 PM	90	89	87	91	48	405
6:01 PM - 7:00 PM	85	74	85	74	43	361
7:01 PM - 8:00 PM	69	67	65	66	36	303
After 8:01 PM	134	141	154	131	83	643



8) Primary mode of transportation TO/FROM campus

I take the bus	(46%)
I drive a car	(43%)
I walk	(33%)
I carpool with others	(7%)
I ride a bike	(7%)
I skateboard/longboard	(1%)
Other	(1%)
- park at wall-mart and walk from there	
I ride a motorcycle/scooter/moped	(0%)
I roller blade	(0%)

9) Primary mode for getting around on campus is:

I walk	(79%)
I take the bus	(50%)
I drive a car	(7%)
I ride a bike	(5%)
I skateboard/longboard	(1%)
I carpool with others	(0%)
I ride a motorcycle/scooter/moped	(0%)
Other	(0%)
- service vehicle	
I roller blade	(0%)

10) While on campus, I get ON the bus at the following locations

Festival	(42%)
Warren Hall	(40%)
ISAT/CS	(32%)
PHYS/CHEM	(28%)
Varner House	(28%)
Hoffman Hall	(22%)
Other	(20%)
- Godwin	
- Hanson	
- Miller	
- Chandler	
- Hanson	
- Wampler	
- Frederickson	
- Art Studio	
I do not use the bus	(17%)
Memorial Hall	(15%)
Grace Street	(3%)

11) While on campus, I get OFF the bus at the following locations

Festival	(55%)
Varner House	(47%)
Warren Hall	(46%)
ISAT/CS	(41%)
PHYS/CHEM	(35%)
Memorial Hall	(20%)
Hoffman Hall	(19%)
Other	(18%)
- Godwin	
- Miller	
- Hanson	
- Showker	
- Wampler	
Grace Street	(4%)

12) When driving on or to campus, I park in these lots

I do not park on campus	(46%)	
Festival C11/C12		(23%)
Grace Street Parking Deck		(22%)
East Campus Library C10		(19%)
Warsaw Avenue Deck	(13%)	
Other =	(12%)	
- C Lots		
- R Lots		
- Costco		
- Convocation Lot		
- Walmart		
- Bookstore		
- Forbes		
- Art Studio		
Hillside	(12%)	
Champions Deck		(12%)
PHYS/CHEM, ISAT C10		(11%)
Convocation Lots		(9%)
Memorial		(9%)
Rockingham		(1%)
Blue Ridge		(1%)

13) I typically move my car to different locations on campus during the day

Never	(57%)	
Once per day	(22%)	
I do not drive	(14%)	
Twice per day	(6%)	
Three times per day	(1%)	
More than three times per day	(0%)	

14) I would drive a car less if

Bus services were improved (66%)
- more night hours
- buses were less full
- more frequent routes, especially on weekends
- more buses from memorial
- more buses off campus and downtown
- busses more suited to class times
- buses were on time
- more friendly and appropriate bus drivers
- more buses to shopping center
- accurate bus schedule app

Other (20%)
- drive because it is the only way to get to school on time
- wouldn't change, too lazy
- if parking was worse
- monorail system on campus
- if weather was not a factor
- there were incentives for not driving

There were more bike lines and facilities (10%)
- bikes lanes from north west side of town
- side walks need improvement on south/north high street
- more safe lanes on reservoir street

I could vanpool (4%)

15) I would be more likely to ride a bike if

There were continuous bike lanes to/from the City and around campus (25%)
If I felt safer biking on/to campus (24%)
Other (18%)
- less hills
- feel like my bike would not be stolen
- lived closer
- if it felt typical of the campus
- more covered bike racks on campus to protect my bike

If pedestrians and bike lanes were separated (13%)
If JMU had a bicycle share program (8%)
There were secure bike shelters on campus (6%)
There were shower and locker facilities on campus (3%)
There were more bike racks on campus (2%)
If there was a service technician on campus (1%)

16) I would be more likely to walk if

I could make it to my classes on time (58%)
There were more sidewalks (14%)
Other (12%)
- lived closer
- less hills
- less dangerous with bikers
- weather
- more street lights

I felt safer walking on/to campus (11%)
Vehicular traffic continues to increase (5%)

17) I think bicycle riders should be required to wear helmets when riding on campus

Agree	(36%)
Neither Agree nor Disagree	(41%)
Disagree	(23%)

18) I think skate boarders and long boarders should be required to wear helmets on campus

Agree	(40%)
Neither Agree nor Disagree	(40%)
Disagree	(20%)

19) Indicate overall assessment of traffic congestion on a average school day on West Campus/Quad side (0 = no congestion, 10 = gridlock)

0	(2%)
1	(6%)
2	(8%)
3	(14%)
4	(13%)
5	(20%)
6	(13%)
7	(12%)
8	(7%)
9	(3%)
10	(2%)

20) Indicate overall assessment of traffic congestion on a average school day on East Campus (0 = no congestion, 10 = gridlock)

0	(1%)
1	(3%)
2	(9%)
3	(10%)
4	(12%)
5	(16%)
6	(13%)
7	(13%)
8	(10%)
9	(7%)
10	(7%)

21) I think gating West Campus (Quad Side) was a good idea

Agree	(40%)
Neither Agree nor Disagree	(32%)
Disagree	(28%)

22) I think that East Campus should be gated

Agree	(9%)
Neither Agree nor Disagree	(19%)
Disagree	(72%)

23) There are sufficient handicap services available on campus

Agree	(38%)
Neither Agree nor Disagree	(54%)
Disagree	(9%)

24) I think the most important transportation needs at JMU are

Bus concerns

- more night campus shuttle
- more frequent buses
- better bus schedules to and off campus
- improve bus app
- more reliable bus service
- more bus stops to businesses besides wall-mart and mall
- buses to downtown

Parking Concerns

- more parking decks/spots
- more commuter parking
- decrease parking prices
- sell certain number of parking passes
- parking deck on east campus

Bike Concerns

- bike sharing program
- separate ramp for bikes/wheelchair
- trails in areas around campus to allow easy and quick access
- more bike lanes
- secure shelters
- helmet enforcement
- teach bike traffic rules
- unsafe bikers
- more visible cycling infrastructure would encourage bike users
- bike lanes separate from sidewalks and not so close to car and bus traffic
- educate people on biking
- work with city to incorporate bikers
- safer and wider regions for students to bike

Other

- add sidewalk along Hillside/Bell Service drive
- more crosswalks
- more time between classes
- monorail system
- better access for handicap students
- organized carpool incentive
- take down gates
- zimrides not as available
- stop signs
- pedestrian safety (enforce pedestrian right of way at crosswalks)

25) Status at JMU

Freshman	(23%)
Sophomore	(20%)
Junior	(25%)
Senior	(25%)
Grad Student	(7%)

26) Sex

Male	(23%)
Female	(77%)

27) Prior coming to JMU, I lived in

Overwhelmingly Virginia

Summary of STUDENT Results

The Bicycle/Pedestrian Transportation survey conducted in 2013 adequately represented each class level of James Madison University's undergraduate program. More than half of the respondents were female, typical of our universities demographic level. Most respondents of the survey were off campus residents who approximated they resided an average of 3.73 miles from campus. Looking over the data, there are specific results that should be noted.

The average number of trips students take to and from their residence (round trip) came out to be 1.95. Very few students are making more than two trips and once on campus, they typically never move their car to different locations.

The majority of students indicated that they start their day on campus between 8:01 - 9:00 AM. It should also be noted that between 7:01 - 10:00 is when there is a noticeable increase in student activity on campus and therefore the heaviest congestion time in the morning for students. The results for when students return from campus to their residence for their final time was more scattered throughout the day then compared to when they start. The majority of students return after 8:01 pm. Generally as time progresses throughout the day, we see more and more students are leaving for campus.

To get to and from campus, an almost exact amount of respondents primarily take the bus or drive a car rather than walk. While getting around on campus, walking was the clear primary choice of transportation. Of the students who use the bus to travel, the Festival bus shelter was the number one stop used for students when getting both on and off the bus.

The next set of questions were used to see what changes would make students choose an alternative means of transportation. From the data shown, over half of the respondents would drive a car less if bus services were improved. When looking though the responses, the most common suggestion was that they would like more night hours for buses, more buses off campus, downtown, and to memorial especially on weekends. Also students would like to see the buses more suited to class times. Finally students would use the bus system more if they were on time and if an accurate bus schedule app was created. From the results, students felt very passionate about the bus system and seem to be willing to drive less if these changes were taken into consideration.

In order for students to ride a bike instead of driving to campus, students expressed interest in continuous bike lines to/from the city around campus and if they felt more safe biking on or to campus. In order for students to be more likely to walk, over half of the respondents said "if I could make it to my classes on time." This was the dominant response.

Overall, students felt strongly about making changes to the current transportation systems in place at school. The majority of students would like to see changes in the bus system more than changes in parking or bike/pedestrian lanes. Please note question twenty four to see the list of concerns students feel are the most important transportation needs.

EMPLOYEE Total Respondents: 646, 571 Completed, 88% Completion Mean

1st Ranking
2nd Ranking
3rd Ranking

1) Miles of residence from campus (i.e. bookstore)

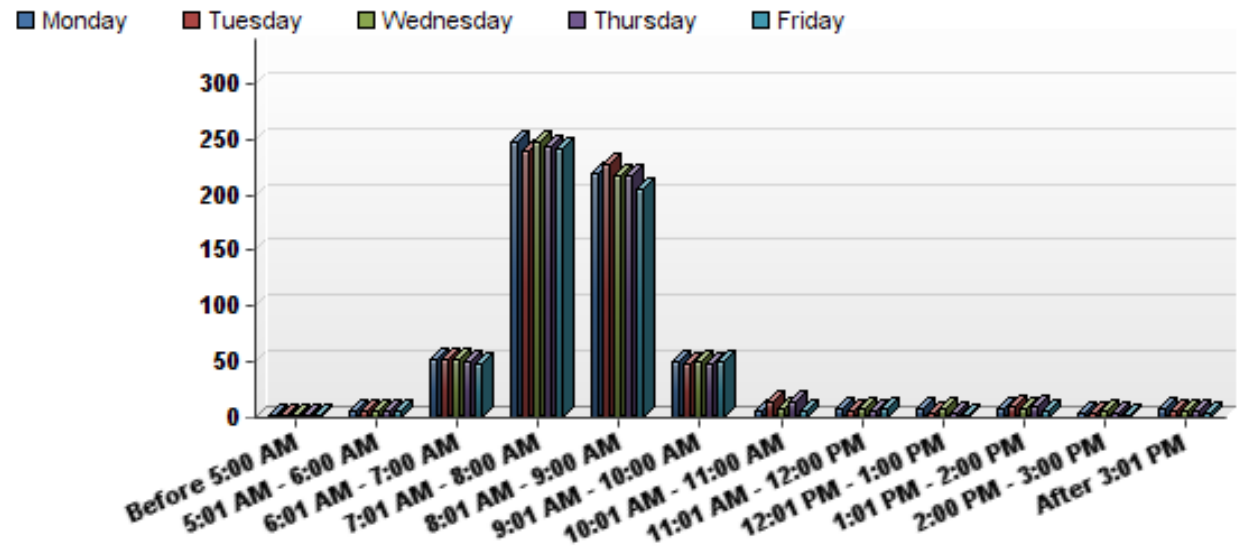
Minimum Value = 0.0
Maximum Value = 50.00
Average Value = 13.06

2) On a typical work day I make the following number of trips to campus

1 Trip (80%)
2 Trips (14%)
3 Trips (0%)
More than 3 Trips (6%)
* Average = 1.33

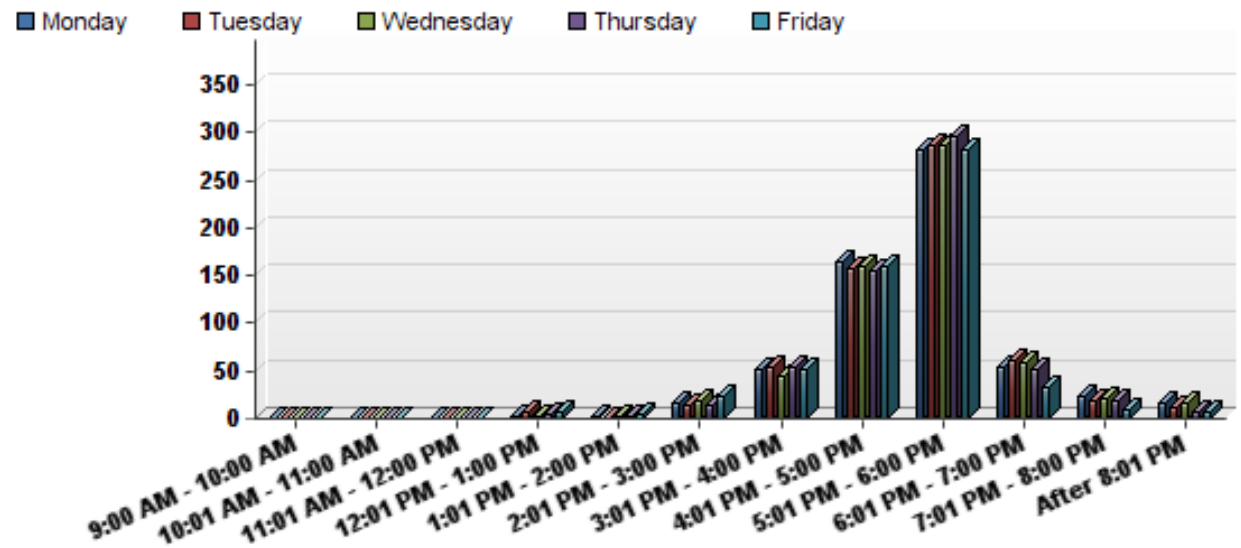
3) On a typical work day I arrive on campus between the following times:

	Mon	Tues	Wed	Thurs	Fri	Total
Before 5:00 AM	3	3	3	3	3	15
5:01 AM - 6:00 AM	7	7	7	6	6	33
6:01 AM - 7:00 AM	53	53	52	51	48	257
7:01 AM - 8:00 AM	248	240	248	244	242	1222
8:01 AM - 9:00 AM	220	227	218	217	206	1088
9:01 AM - 10:00 AM	50	48	51	49	51	249
10:01 AM - 11:00 AM	7	15	9	14	7	52
11:01 AM - 12:00 PM	9	6	8	7	9	39
12:01 PM - 1:00 PM	8	5	9	5	2	29
1:01 PM - 2:00 PM	9	10	9	10	6	44
2:01 PM - 3:00 PM	4	5	6	4	2	21
After 3:01 PM	9	6	6	6	5	32



4) On a typical work day I leave campus for the final time between the following times

	Mon	Tues	Wed	Thurs	Fri	Total
9:00 AM - 10:00 AM	1	0	1	0	1	3
10:01 AM - 11:00 AM	0	1	0	0	0	1
11:01 AM - 12:00 PM	0	1	0	1	0	2
12:01 PM - 1:00 PM	2	6	2	5	6	21
1:01 PM - 2:00 PM	2	1	3	3	4	13
2:01 PM - 3:00 PM	17	15	18	15	24	89
3:01 PM - 4:00 PM	52	53	45	54	52	256
4:01 PM - 5:00 PM	164	157	159	154	160	794
5:01 PM - 6:00 PM	281	286	287	296	282	1432
6:01 PM - 7:00 PM	55	60	59	51	34	259
7:01 PM - 8:00 PM	24	18	22	19	9	92
After 8:01 PM	16	11	16	7	6	56



5) Primary mode of transportation to/from campus is:

I drive a car	(88%)
I walk	(7%)
I carpool with others	(5%)
I ride a bike	(4%)
I take the bus	(3%)
I ride a motorcycle/scooter/moped	(1%)
Other	(1%)

- BRCC Shuttle
- 1/2 bus, 1/2 car
- scooter when warm enough
- drive during cold months, ride a bike during warm months
- a split transportation evenly between a bike and carpooling
- transit driver
- I drive December - March
- I primarily ride a bike, but am driving now due to pregnancy

I roller blade	(0%)
I skateboard/longboard	(0%)

6) Primary mode for getting around on campus is:

I walk			(65%)
I drive a car			(33%)
I take the bus		(13%)	
Other			(5%)

- state vehicle
- equal between car and bus
- university provided
- department vehicle
- state truck

I ride a bike			(2%)
I ride a motorcycle/scooter/moped		(1%)	
I carpool with others			(0%)
I roller blade			(0%)
I skateboard/longboard		(0%)	

7) While on campus, I get on the bus at the following locations (select all that apply)

I do not use buses			(67%)
Warren Hall			(11%)
ISAT/CS			(9%)
Varner House		(8%)	
Other			(6%)

- Festival
- Harrison
- UREC stop
- Carrier Drive
- Ghandi House
- Wampler
- Miller

Memorial Hall		(6%)	
Hoffman Hall			(6%)
PHYS/CHEM			(5%)
Godwin Transit Center		(3%)	
Grace Street			(3%)

8) While on campus, I get off the bus at the following locations (select all that apply)

Festival	(47%)	
Warren Hall		(38%)
ISAT/CS		(37%)
Varner House	(27%)	
Memorial Hall	(18%)	
PHYS/CHEM		(17%)
Hoffman Hall	(15%)	
Grace Street		(10%)
Other		(9%)

- Wampler Hall
- Festival
- UREC Stop
- Godwin

9) When driving on or to campus, I park in these lots (select all that apply)

D2			(18%)
North Campus Lots			(18%)
Other			(17%)

- Whitesel building
- D8
- Showker
- By the Annex
- Showker
- UREC
- Godwin
- E, Q Lot
- 220 University Blvd
- Steam Plant
- Ice House
- Arboretum

P Lot/G Lot			(14%)
Warsaw Avenue Deck		(13%)	
Massanutten			(13%)
Cantrell Avenue (MLK) Parking Deck		(12%)	
Grace Street Parking Deck			(12%)
I do not park on campus		(7%)	
Festival		(7%)	
Champions Deck			(7%)
Memorial Lots		(5%)	
Forbes/Anthony Seeger		(5%)	
Blue Ridge			(3%)
Convocation Lots			(2%)

10) I typically move my car to different locations on campus during the day

Never		(77%)
Once per day	(19%)	
Twice per day	(2%)	
Three times per day	(0%)	
More than three times per day	(0%)	
I do not drive		(1%)

11) I would drive a car less if (rank order of preference)

Answers	First Choice	Second Choice	Third Choice
Bus services were improved	38%	55%	8%
I could vanpool	32%	29%	38%
There were more bike lanes and facilities	30%	16%	54%

12) I would be more likely to ride a bike if (rank order of preference)

Answers	First Choice	Second Choice	Third Choice	Forth Choice	Fifth Choice
There were continuous bike lanes to/from the City and around campus	45%	36%	13%	4%	2%
JMU had a bicycle share program	12%	10%	26%	23%	29%
There were more secure bike facilities and shelters on campus	4%	15%	33%	37%	10%
There were shower and locker facilities on campus	10%	13%	15%	27%	35%
I felt safer biking on/to campus	29%	26%	13%	9%	24%

13) I would be more likely to walk if (rank order of preference)

Answers	First Choice	Second Choice	Third Choice
I felt safer	20%	36%	44%
I could make it to my class rooms on time	43%	23%	34%
There were more sidewalks	37%	41%	22%

14) Bicycle riders should be required to wear helmets when riding on campus

Agree	(59%)
Neither Agree nor Disagree	(28%)
Disagree	(13%)

15) Skate boarders and long boarders should be required to wear helmets on campus

Agree	(59%)
Neither Agree nor Disagree	(28%)
Disagree	(13%)

16) If more time between classes was allocated, I would be more likely to use an alternative means of transportation (i.e. biking, walking, etc) to travel across campus

Agree	20%
Neither Agree nor Disagree	60%
Disagree	20%

17) Indicate overall assessment of traffic congestion on a average school day on West Campus/Quad side (0 = no congestion, 10 = gridlock)

0	(2%)
1	(7%)
2	(7%)
3	(13%)
4	(10%)
5	(21%)
6	(9%)
7	(12%)
8	(2%)
9	(4%)
10	(3%)

18) Indicate overall assessment of traffic congestion on a average school day on East Campus (0 = no congestion, 10 = gridlock)

0	(1%)
1	(5%)
2	(9%)
3	(11%)
4	(9%)
5	(23%)
6	(9%)
7	(12%)
8	(11%)
9	(7%)
10	(4%)

19) Gating West Campus (Quad Side) was a good idea

Agree	(48%)
Neither Agree nor Disagree	(25%)
Disagree	(26%)

20) East Campus should also be gated (Leeolou to Hanson)

Agree	(23%)
Neither Agree nor Disagree	(26%)
Disagree	(51%)

21) There are sufficient handicap transportation services available on campus

Agree	(20%)
Neither Agree nor Disagree	(64%)
Disagree	(16%)

22) I think the single most important transportation need at JMU is

Bike Concerns

- Make the campus more bike/pedestrian friendly
- Separate lanes for bikers and pedestrians
- More bike lanes and covered bike racks
- Way to rent bikes/segways for on campus travel
- Make biking/walking more attractive, offer incentives
- Build a bike culture
- Widen roadways to accommodate bikers and connect with city bike paths

Safety Concerns

- Enforcement of safety regulations for both pedestrians and bikers
- Enforcement of traffic laws at crosswalks
- Side walks on both sides of the road
- JMU vehicles driving on sidewalks puts bikes at risk
- Education of drivers and pedestrians about their respective responsibilities
- Consistent signage and crosswalk identifications

Parking Concerns

- Additional parking available for residents and visitors
- Increased metered parking
- Increase towing on campus
- Centralized parking decks
- Increased handicap parking
- More accessible parking closer to offices and buildings
- Better signs in the parking deck indicating the flow of traffic
- Limiting number of student cars on campus to help decrease traffic congestion and parking issues
- East Campus Parking deck for commuters
- Mirrors should be installed inside parking decks
- A pickup and drop off location for carpool

Bus Concerns

- Shift change shuttle service
- Sufficient busses for students to get to classes on time
- More frequent buses at peak times to allow for less congestion
- Easier to understand bus schedules
- Make bus service more attractive and accessible for those not living in student housing
- Improve bus line to accommodate new Student Success Center
- Scheduling of commuter bus services that is aligned closer to JMU employees work schedules.
- Bus routes from campus to downtown and downtown to campus on a very frequent basis
- Bus drivers very unsafe
- Pull off areas at all bus stops

Additional Comments

- Way for faculty/staff to schedule pick ups
- Better timing of traffic lights
- Faculty should have pass to get through gates

24) Please indicate

Male	(39%)
Female	(61%)

Summary of Results

The Bicycle/Pedestrian Transportation Survey conducted in 2013 was released to all faculty and staff of James Madison University after the Student Bicycle/Pedestrian Transportation survey was completed. With 646 respondents, there was an even representation of both faculty and staff with a higher percentage being female. Almost all of respondents only make one trip to campus from their residence which on average is reported to be approximately thirteen miles from the bookstore.

From the data collected, the highest amount of faculty and staff report arriving on campus between 7:01 AM and 8:00 AM, an hour earlier then students reported arriving in the previously conducted survey. It should be noted that between 7:01 AM until 9:00 AM the data clearly shows this is the most congested time for faculty and staff. On a typical work day, the results indicate that most respondents leave campus for the final time between 5:01 PM and 6:00 PM. The results of the survey illustrate that most all faculty and staff are arriving and leaving campus around approximately the same time, leading to heavier congestion at concise parts of the day.

The clear primary mode of transportation used by faculty and staff to get to and from campus is driving a car and never changing locations once parked. Almost ninety percent of respondents report using a car while less then ten percent walk and less then five percent ride a bicycle. Compared to the students, faculty and staff report less diverse transportation modes to get to and from campus. While on campus, most faculty and staff report walking almost double the amount of those who drive. Most faculty and staff (over fifty percent) also report not using the bus services on campus. This is partially due to unclear bus schedules and the overcrowded services.

The next set of questions were used to analyze what changes would make faculty and staff choose an alternative means of transportation. Unlike for students, there was no clear preference for what would make them drive a car less. Although close to half of participants in the current survey revealed that if there were continuous bike lanes to and from the city and around campus, they would be more inclined to ride a bike. This answer choice was also the number one selection for the student survey. In order for faculty and staff to walk more, they communicated the need to be able to make it to their class rooms on time. There was also a desire to have more sidewalks in order to make walking more of an appealing option.

Overall in terms of biking, faculty and staff would like to see a bike culture that is safer and that incentives students to drive less and switch to biking. The concerns for biking are very similar to the same desires articulated by the student results of the previous survey.

The faculty and staff respondents voiced more concerns about the safety on campus. More enforcement of traffic laws and responsibilities for pedestrians, bikers, and drivers was a frequent concern. Both the student survey previously conducted and the faculty and staff survey especially expressed concerns of bikers speeding through campus and making pedestrians feel uneasy.

In terms of parking, a majority of the faculty and staff participants feel that they do not have enough spaces to park and the spaces available are too far from their office or place of work on campus. Several also strongly felt that they would appreciate more metered parking and increased enforcement of parking laws.

Similarly to the concerns of the students, the faculty and staff that responded to the survey suggested that there is a need for more frequent buses, more routes downtown, and better suited schedules to class times.

In terms of additional concerns, many people verbalized that they would appreciate a way for faculty and staff to schedule pick ups in order to carpool. In terms of limitations, few respondents did make it clear that they will only drive due to physical conditions or the need to be professionally dressed. Furthermore, faculty and staff felt either very strongly about gating the entire campus to cut congestion while others strongly request they are taken down or that faculty and staff are given a pass to go through them. Unlike for students, the gate situation is a high issue of importance to them. Please note question twenty two to see the list of concerns faculty and staff feel are the most important transportation needs.

***Any percentages in survey that do not add up to 100% is because the survey allows for more than one answer to be selected

APPENDIX 4

PEDESTRIAN FACILITY DESIGN GUIDELINES

Traffic control devices are used to regulate, warn, and guide all traffic. When used appropriately they can improve safety and access for vehicles and pedestrians, alike. Selection of the appropriate traffic control devices to address pedestrian safety is dependent on several factors, including pedestrian volume, vehicle speed, traffic volume, and crossing distance. The level of conflict between vehicles and pedestrians dictates the selection of an appropriate treatment. The Virginia Supplement to the 2009 Manual of Uniform Traffic Control Devices (MUTCD) provides detailed guidance on the use of all traffic control devices and should be the authoritative reference document.

Sidewalks

Campus sidewalks should be wider than the four foot minimum width, especially in congested areas of the University. A four foot vegetative planting strip between the roadway and the back of curb is recommended to function as a buffer between vehicles and pedestrians and help to limit unsafe mid-block crossing of the roadway. In some problematic locations of the JMU campus the University has installed post-and-chain within several areas to prevent the flow of pedestrians across roadways and encourage them to use intersection crosswalks. **(AASHTO 3.2)**

Design criteria for new or retrofit facilities are outlined in the ADA Accessibility Guidelines (ADAAG), and were developed by the U.S. Access Board. The guidelines form the minimum criteria that are required. The most recent ADAAG information and guidance may be found at http://www.access-board.gov/.

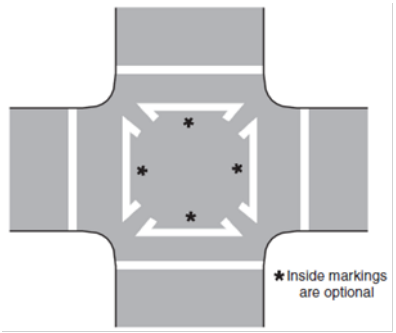
Signals and Signs

One of the primary areas where pedestrians and vehicles may come into conflict is at intersections. Pedestrian safety treatments at intersections are generally divided into three levels based on pedestrian activity and potential for conflict with vehicular traffic. The hierarchy of pedestrian safety treatments generally includes signs and pavement markings, beacons, and traffic signals.

The MUTCD provides warrants for traffic signals based on pedestrian volume and crash history. State supplements to the MUTCD, should also be reviewed for specific guidance regarding the selection and design of traffic control devices for pedestrians.

All-Pedestrian Signal Phase and Leading Pedestrian Phase

The Manual on Uniform Traffic Control Devices (MUTCD) provides criteria for evaluating the suitability of signal control to address pedestrian activity or safety at an intersection. Traffic signals provide the greatest degree of traffic control and the ability to separate vehicle and pedestrian flows. Signal improvements may include designing proper timing schemes and signal phasing to balance the vehicle and pedestrian phases.



Crosswalk markings for an all-pedestrian signal phase intersection

An all-pedestrian signal phase incorporates a traffic signal phase where all motorists are stopped and all pedestrian may cross in any direction, including diagonally. Pedestrian phases may be used where there is high pedestrian volume or frequent conflicts between turning vehicles and pedestrians. The JMU campus has three signalized intersections on

campus with an existing all-pedestrian signal phase: Grace Street at S Main Street; Bluestone Drive at Carrier Drive; and Bluestone Drive at Duke Drive.

Another signal phase that improves pedestrian safety without causing significant delays in vehicular traffic is known as a Leading Pedestrian Phase. This phase enables pedestrians to enter the intersection about 4-5 seconds before the lights change for vehicular traffic so that the pedestrians become "established" in the intersection and are more visible to drivers making turns. A Leading Pedestrian Phases has been installed by the City at the Bluestone Drive intersection with S Main Street.

Standard Curb Ramps

Curb ramps are the link between sidewalks and the roadway for persons who may be using a scooter, wheelchair, Segway, crutches, or persons with mobility restrictions that make it difficult to step up and down high curbs. Curb ramps must be installed at all pedestrian crossing intersections and midblock locations. The slope of curb ramps must not exceed 1 in/ft (maximum grade of 8.33 percent) and a maximum slope on any side flares of 1:10.

Multi-directional crossing intersections must have separate curb ramps for each crosswalk rather than a single ramp per corner for both crosswalks. The separate curb ramps improve orientation for visually impaired pedestrians by directing them toward the correct crosswalk. Similarly, tactile warning pads alert pedestrians to the sidewalk and street edge **(Pedestrian Design for Accessibility)**. All newly constructed and altered roadway projects must include curb ramps. In addition, all existing facilities should be audited and retrofitted to meet the same standard.

Standard Crosswalk

The MUTCD recommends three standard crosswalk markings, and encourages the consistent use of one of them. The high-visibility crosswalk (also referred to as longitudinal line) standard is most appropriate for urban areas, including campuses, where pedestrian activity is high. The standard crosswalk marking is six feet wide, with alternating stripes and gaps of 12-24 inch wide thermoplastic material. **(MUTCD 3B.18)**

High-visibility crosswalk standard

Mid-Block Crosswalk

The In-Street Pedestrian Crossing (R1-6) sign may be used at a non-signalized pedestrian crosswalk to increase road users' awareness of pedestrians and remind them of laws regarding the right-of-way. The In-Street Pedestrian Crossing sign, if used, should be placed at the crosswalk in the roadway on a lane-line, center line, or center island/refuge. A pair of yield line (Do Not Block Intersection Markings) pavement markings shall be installed for motorists between 20-50 feet from the crosswalk. **(MUTCD 3B.18)** A licensed traffic engineer should review the placement of these signs within the roadway using the standard design vehicles for bus (WB-40) and single-unit truck (SU). Snow removal is a consideration for the proper placement of these in-street signs.

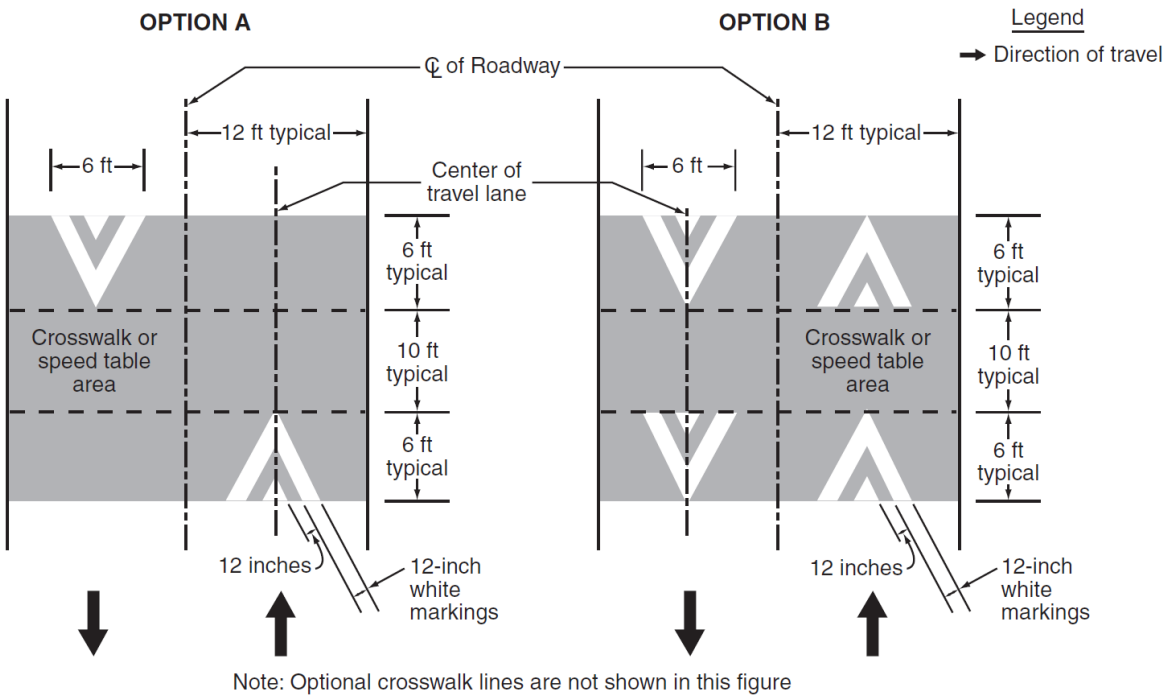
In-street pedestrian crossing sign
NC State University, Raleigh (NC)

Speed Table with Crosswalk

A raised speed table with pedestrian crossing is standard treatment for slowing vehicles and channelizing pedestrians. The pedestrian crossing should align directly with adjacent sidewalks or paths for ADA considerations and to discourage pedestrians from crossing (diagonally) between vehicles. The maximum slope of the table should be 1" rise over 1' run, meaning that for a 6" rise to match an adjacent curb. Standard design and markings for these treatments is provided in MUTCD section 3B.25 (Figure 3B-30). The pedestrian crossing sign (W11-2) with a diagonal downward pointing arrow (W16-7P) plaque shall be used in advance of the crosswalk **(VA Supplement to MUTCD, 2C.50)**.

Speed table with raised crosswalk
NC State University, Raleigh (NC)

Suitable locations for speed tables include direct connections with primary sidewalks or paths, heavily used transit stops, major academic buildings or residence halls, or other locations with frequent roadway crossing. Retrofitting a roadway for a speed table with crosswalk requires site level engineering work that ensures compliance with ADA requirements, traffic control requirements, and stormwater drainage.



Pavement markings for speed tables with crosswalk (MUTCD)

BICYCLE FACILITY DESIGN GUIDELINES

Shared Roadways

R4-11

On-road bikeways along roadways where bicycles may be operated unless prohibited by statue or regulation. Usually bicycles and motor vehicles share the same travel lane. The Bicycles May Use Full Lane sign may be used in locations where it is important to inform road users that bicyclists might occupy the center of the travel lane. The Bicycles May Use Full Lane (R4-11) sign shall only be used on roadways where no on-road bicycle facilities exist, such as bicycle lanes, wide curb lanes, or adjacent paved shoulders usable by bicycles, and where substandard width travel lanes are too narrow for bicyclists and motor vehicles to operate side by side. The R4-11 sign should only be used on roadway segments where travel lanes are delineated with longitudinal pavement markings or other methods **(VA Supplement to MUTCD 9B.06)**. The R4-11 sign should not be used on undivided unmarked roadways, such as service drives.

Shared Lane Markings or "Sharrows"

The Shared Lane Marking is intended to assist bicyclists with lateral positioning in a shared travel lane. The marking also encourages bicyclists to ride outside of the door zone of parked cars and to discourage wrong way riding. The marking also alerts road users to the lateral position bicyclists are likely to occupy in the travelled way.


Shared Lane Markings

Minimum offset from the face of curb or pavement edge to the center of the SLM is 4 feet without on-street parking and 12 feet with on-street parking. SLMs can be used to connect short gaps between sections of bike lanes. Note that the MUTCD and VA Supplement prohibits the use of SLMs in bike lanes or marked shoulders. As per the Standards and guidance contained in the MUTCD and VA Supplement, SLMs should not be used on roadways with speeds greater than 35 mph. However, it is recommended the University refer to the guidance in the VA Supplement and the ITE TCD Handbook for additional information on the placement of SLMs

Shared Lane Markings should be placed immediately following an intersection and spaced thereafter at intervals no greater than 250 feet **(VA Supplement to MUTCD, 2011)**. Shared Lane Markings should not be used on undivided unmarked roadways, such as service drives.

Paved Shoulders

A shoulder is the portion of the roadway contiguous with the travelled way that accommodates stopped vehicles, emergency use and support of the roadway pavement. The AASHTO Guide notes that a shoulder should be at least 4 feet wide to be considered a suitable width for bicycle travel.


Sample paved shoulder

Bicycle Lanes

Striping and Markings

The Bicycle Lane should be striped to create at least five feet of usable pavement from the curb or parking area, with a minimum useable surface of four feet. "Useable surface" may include up to one foot of a concrete gutter pan, provided that the transition between pavement surface and concrete gutter pan is very smooth. Wider bake lanes should be provided on streets with high motor vehicle speeds and/or traffic volumes, or where pedestrians, drains, grates or other obstacles may exist in the Bicycle Lane. Regular maintenance to Bicycle Lanes is imperative. Bicycle Lanes should be constructed to the same standards as the adjacent roadways. **(AASHTO, Guide for the Development of Bicycle Facilities)**

Standard Bicycle Lane

Buffered Bicycle Lane no parking

Bicycle Lanes shall be striped with a six inch wide longitudinal pavement marking. A dashed line should be used in intersections or taper areas to denote an extension of the lane using two foot line segments with four foot gaps. **(Manual on Uniform Traffic Control Devices, MUTCD, 3A.06)** Alternately, Bicycle Lanes can be terminated at intersections to indicate that cyclists should utilize travel lanes for through and turning movements. Bicycle Lanes shall always be striped to the left of dedicated right turn lanes if utilized at intersections, in order to avoid turning movement conflicts. When the right through lane is dropped to become a right turn only lane, the bicycle lane markings should stop at least 180 feet before the beginning of the right-turn lane. Through bicycle lane markings should resume to the left of the right turn only lane **(VA Supplement to the MUTCD, 9C.04-10)**.

Buffered Bicycle Lane with parking

Symbols, and/or arrow markings used to denote Bicycle Lanes should be placed at the beginning of the Bicycle Lane and at periodic intervals thereafter (500 maximum), based on "engineering judgment. **(MUTCD 9C.04)**

Whenever possible, curb opening inlets should be used for drainage. If this is not feasible, any drainage grate within a Bicycle Lane should be retrofitted so that it is flush with the pavement surface, contains no gap between frame and grate, and does not contain slots that are parallel to the roadway. Where grates, utility covers, or other obstructions cannot be eliminated, a solid white line should be applied to guide the bicyclist around the obstruction. **(MUTCD 9C.06)**

Signage

The Bicycle Lane sign (R3-17) and supplemental plaques (R3-17aP and R3-17bP) may be used to indicate the presence of a marked Bicycle Lane. They should be placed in advance of, at the end of, and at periodic intervals along marked Bicycle Lanes "as determined by engineering judgment based on prevailing speed of bicycle and other traffic, block length, distances from adjacent intersections, and other considerations." **(MUTCD 9B.04)**

R3-17

R3-17aP

R3-17bP

Shared Use Path

Sample urban shared use path

An off-road facility physically separated from motorized vehicular traffic by an open space or barrier. Shared-use paths can be used by pedestrians (including skateboarders, wheelchairs and joggers). Standards and guidance for the design of shared use paths are contained in the AASHTO Guide, MUTCD and the VA Supplement.

The Shared Use Path should be at least 10 feet wide and typically paved with bituminous concrete. A minimum two foot wide graded area should be maintained adjacent to both sides of the path, with a maximum 1:6 slope. Three feet or more may be necessary for areas with adjacent obstructions such as trees, poles, walls or fences. Shared Use Paths greater than 10 feet wide are encouraged where possible, especially near heavily utilized areas of campus. The required vertical clearance to any obstructions should be eight feet or more. **(AASHTO, Guide for the Development of Bicycle Facilities)** Shared Use Paths are the most expensive per mile to construct, however they provide the highest level of accommodation for users.

Separated Bike Path

There are locations on the JMU campus where it is desirable to have designated pavement areas for each mode of travel on a Shared Use Path. Examples include service drives (Village Hill, CISAT, Greek Row) as well as the path behind the rear of the UREC building.

R9-7

The bicycle and pedestrian paths should be delineated by a solid white line and appropriate bicycle and pedestrian symbol pavement markings. The Shared Use Path restriction sign (R9-7) may be installed as a supplement. The symbols for bicycle (left) and pedestrian (right) may be alternated as needed. **(MUTCD 9B.12)**

Stair Channels

Stairs can be a formidable barrier for bicyclists. Stair channels (also referred to as bicycle troughs, or wheel gutters) can be installed on the sides or center of long stairs on hills to allow bicyclists to place the wheels of the bicycle in a narrow guided track and push the bicycle up or down the stairs without having to carry it or push it on the stairs. Existing stairs can be retrofitted to add this amenity. Caution must be exercised while retrofitting stairs for this amenity. The channel should be narrow enough to guide a bicycle tire, and located close to the handrail to discourage skateboarders and bicyclists from unsafely using this as a ramp.

Example of a stair channel
Lafayette, IN

2012 AASHTO Guide for the Development of Bicyclist Facilities – General Considerations for Bikeway Types

Type of Bikeway	Best Use	Motor Vehicle Design Speed	Traffic Volume	Classification for Intended Use	Other Considerations
Shared lanes (no special provisions)	Minor roads with low volumes, where bicyclists can share the road with no special provisions.	Speeds vary based on location (rural or urban).	Generally less than 1,000 vehicles per day.	Rural roads, or neighborhood or local streets.	Can provide an alternative to busier highways or streets. May be circuitous, inconvenient, or discontinuous.
Shared lanes (wide outside lanes)	Major roads where bike lanes are not selected due to space constraints or other limitations.	Variable. Use as the speed differential between bicyclist and motorists increases. Generally any road where the design speed is more than 25 mph.	Generally more than 3,000 vehicles a day.	Arterials and collectors intended for major motor vehicle traffic movements.	Explore opportunities to provide marked shared lanes, paved shoulder, or bike lanes for less confident bicyclists.
Marked shared lanes	Space-constrained roads with narrow travel lanes, or road segments upon which bike lanes are not selected due to space constraints or other limitations.	Variable. Use where the speed limit is 35 mph or less.	Variable. Useful where there is high turnover in on-street parking to prevent crashes with open car doors.	Collectors or minor arterials.	May be used in conjunction with wide outside lanes. Explore opportunities to provide parallel facilities for less confident bicyclists. Where motor vehicles allowed to park along shared lanes, place markings to reduce potential conflicts with opening car doors.
Paved shoulders	Rural highways that connect town centers and other major attractors.	Variable. Typical posted rural highway speeds (generally 40-45 mph).	Variable.	Rural roadways; intercity highways.	Provides more shoulder width for roadway stability. Shoulder width should be depend on characteristics of the adjacent motor vehicle traffic, i.e. wider shoulders on higher-speed and/or higher-volume roads.

Type of Bikeway	Best Use	Motor Vehicle Design Speed	Traffic Volume	Classification for Intended Use	Other Considerations
Bicycle lanes	Major roads that provide direct, convenient, quick access to major land uses. Also can be used on collector roads and busy urban streets with slower speeds.	Generally, any road where the design speed is more than 25 mph.	Variable. Speed differential is generally a more important factor in the decision to provide bike lanes than traffic volumes.	Arterials and collectors intended for major motor vehicle traffic movements.	Where motor vehicles are allowed to park adjacent to bike lane, provide a bike lane of sufficient width to reduce probability of conflicts due to opening vehicle doors and objects in the road. Analyze intersections to reduce bicyclist/motor vehicle conflicts.
Bicycle boulevards	Local roads with low volumes and speeds, offering an alternative to, but running parallel to, major roads. Still should offer convenient access to land use destinations.	Use where the speed differential between motorists and bicyclists is typically 15 mph or less. Generally, posted limits of 25 mph or less.	Generally less than 3,000 vehicles per day.	Residential roadways.	Typically only an option for gridded street networks. Avoid making bicyclists stop frequently. Use signs, diverters, and other treatments so that motor vehicle traffic is not attracted from arterials to bicycle boulevards.
Shared use path: independent right-of-way	Linear corridors in greenways, or along waterways, freeways, active or abandoned rail lines, utility rights-of-way, unused rights-of-way. May be a short connection, such as a connector between two cul-de-sacs, or a longer connection between cities	N/A	N/A	Provides a separated path for non-motorized users Intended to supplement a network of on-road bike lanes, shared lanes, bicycle boulevards, and paved shoulders.	Analyze intersections to anticipate and mitigate conflicts between path and roadway users. Design path with all users in mind, wide enough to accommodate expected usage. On-road alternatives may be desired for advanced riders who desire a more direct facility that accommodates higher speeds and minimizes conflicts with intersection and drive-way traffic, pedestrians and young bicyclists.

Type of Bikeway	Best Use	Motor Vehicle Design Speed	Traffic Volume	Classification for Intended Use	Other Considerations
Shared use path: adjacent to roadways (i.e., sidepath)	Adjacent to roadways with no or very few intersections or driveways. The path is used for a short distance to provide continuity between sections of path on independent rights-of-way.	The adjacent roadway has high-speed motor vehicle traffic such that bicyclists might be discouraged from riding on the bicycle.	The adjacent roadway has very high motor vehicle traffic volumes such that bicyclists might be discouraged from riding on the roadway.	Provides a separated path for non-motorized users. Intended to supplement a network of on-road bike lanes, shared lanes, bicycle boulevards, and paved shoulders. Not intended to substitute or replace on-road accommodations for bicyclists, unless bicycle use is prohibited.	Several serious operational issues are associated with this facility type. See Sections 5.2.2 and 5.3.4 for additional details.

APPENDIX 5

PART 9 TRAFFIC CONTROL FOR BICYCLE FACILITIES

PART 9
TRAFFIC CONTROL FOR BICYCLE FACILITIES

CHAPTER 9B. SIGNS

Section 9B.01 Application and Placement of Signs

Standard:

01 **Bicycle signs shall be standard in shape, legend, and color.**

02 **All signs shall be retroreflectorized for use on bikeways, including shared-use paths and bicycle lane facilities.**

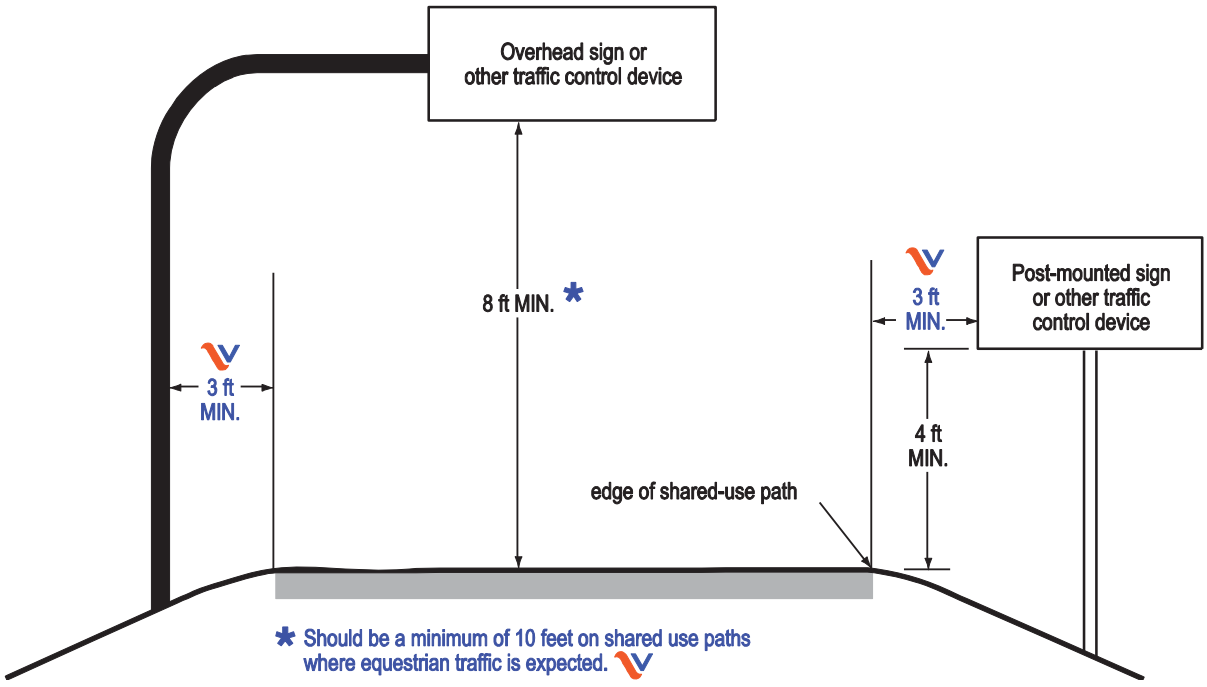
03 **Where signs serve both bicyclists and other road users, vertical mounting height and lateral placement shall be as provided in Part 2.**

04 **Where used on a shared-use path, no portion of a sign or its support shall be placed less than 3 feet laterally from the near edge of the path, or less than 8 feet vertically over the entire width of the shared-use path (see Figure 9B-1(VA) in this Supplement).**

Guidance:

05 *Where used on a shared-use path where equestrian traffic is expected, no portion of a sign or its support should be placed less than 10 feet vertically over the entire width of the shared use path (see Figure 9B-1(VA) in this Supplement).*

Figure 9B-1(VA). Sign Placement on Shared-Use Paths



Standard:

06 **Mounting height for post-mounted signs on shared-use paths shall be a minimum of 4 feet, measured vertically from the bottom of the sign to the elevation of the near edge of the path surface (see Figure 9B-1(VA) in this Supplement).**

Guidance:

07 *Signs for the exclusive use of bicyclists should be located so that other road users are not confused by them.*

08 *The clearance for overhead signs on shared-use paths should be adjusted when appropriate to accommodate path users requiring more clearance, such as equestrians, or typical maintenance or emergency vehicles.*

Section 9B.03 STOP and YIELD Signs (R1-1, R1-2)

Standard:

01 **STOP (R1-1) signs (see Figure 9B-2) shall be installed on shared-use paths at points where bicyclists are required to stop.**

02 **YIELD (R1-2) signs (see Figure 9B-2) shall be installed on shared-use paths at points where bicyclists have an adequate view of conflicting traffic as they approach the sign, and where bicyclists are required to yield the right-of-way to that conflicting traffic.**

Support:

03 The Code of Virginia, § 46.2-904 states that a person riding a bicycle on a shared use path shall have the same rights and duties as pedestrians. This should be taken into consideration when determining points at which bicycles are required to stop or yield.

Option:

04 A 30 x 30-inch STOP sign or a 36 x 36 x 36-inch YIELD sign may be used on shared-use paths for added emphasis.

Guidance:

05 *Where conditions require path users, but not roadway users, to stop or yield, the STOP or YIELD sign should be placed or shielded so that it is not readily visible to road users.*

06 *When placement of STOP or YIELD signs is considered, priority at a shared-use path/roadway intersection should be assigned with consideration of the following:*

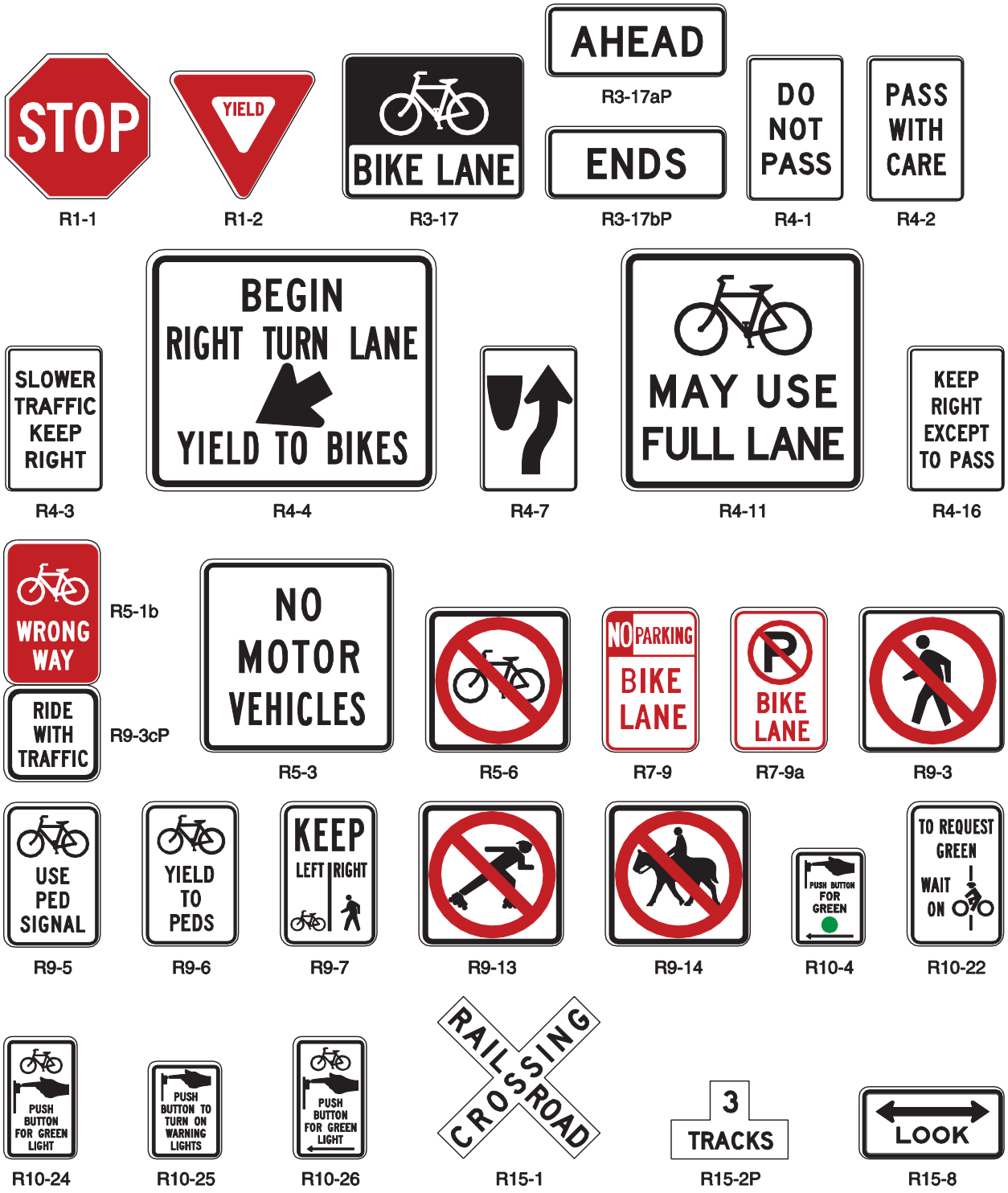
A. Relative speeds of shared-use path and roadway users,

B. Relative volumes of shared-use path and roadway traffic, and

C. Relative importance of shared-use path and roadway.

07 *Speed should not be the sole factor used to determine priority, as it is sometimes appropriate to give priority to a high-volume shared-use path crossing a low-volume street, or to a regional shared-use path crossing a minor collector street.*

Figure 9B-2. Regulatory Signs and Plaques for Bicycle Facilities



08 *When priority is assigned, the least restrictive control that is appropriate should be placed on the lower priority approaches. STOP signs should not be used where YIELD signs would be acceptable.*

Section 9B.06 Bicycles May Use Full Lane Sign (R4-11)

Option:

01 The Bicycles May Use Full Lane sign may be used in locations where it is important to inform road users that bicyclists might occupy the center of the travel lane.

02 Section 9C.07 of this Supplement describes a Shared Lane Marking that may be used in addition to or instead of the Bicycles May Use Full Lane sign (when used in accordance with the Standard in Paragraph 3) to inform road users that bicyclists might occupy the travel lane.

Standard:

03 **The Bicycles May Use Full Lane (R4-11) sign (see Figure 9B-2) shall only be used on roadways where no on-road bicycle facilities exist, such as bicycle lanes, wide curb lanes, or adjacent paved shoulders usable by bicycles, and where substandard width travel lanes are too narrow for bicyclists and motor vehicles to operate side by side.**

Support:

04 The Code of Virginia, § 46.2-905, item 3, allows bicyclists not to ride as close as safely practicable to the right curb or edge of the roadway when “substandard width” lanes make is unsafe to continue along the right curb or edge.

05 The Uniform Vehicle Code (UVC) defines a "substandard width lane" as a "lane that is too narrow for a bicycle and a vehicle to travel safely side by side within the same lane."

Guidance:

06 *The R4-11 sign should only be used on roadway segments where travel lanes are delineated with longitudinal pavement markings or other methods (the R4-11 sign should not be used on undivided unmarked roadways).*

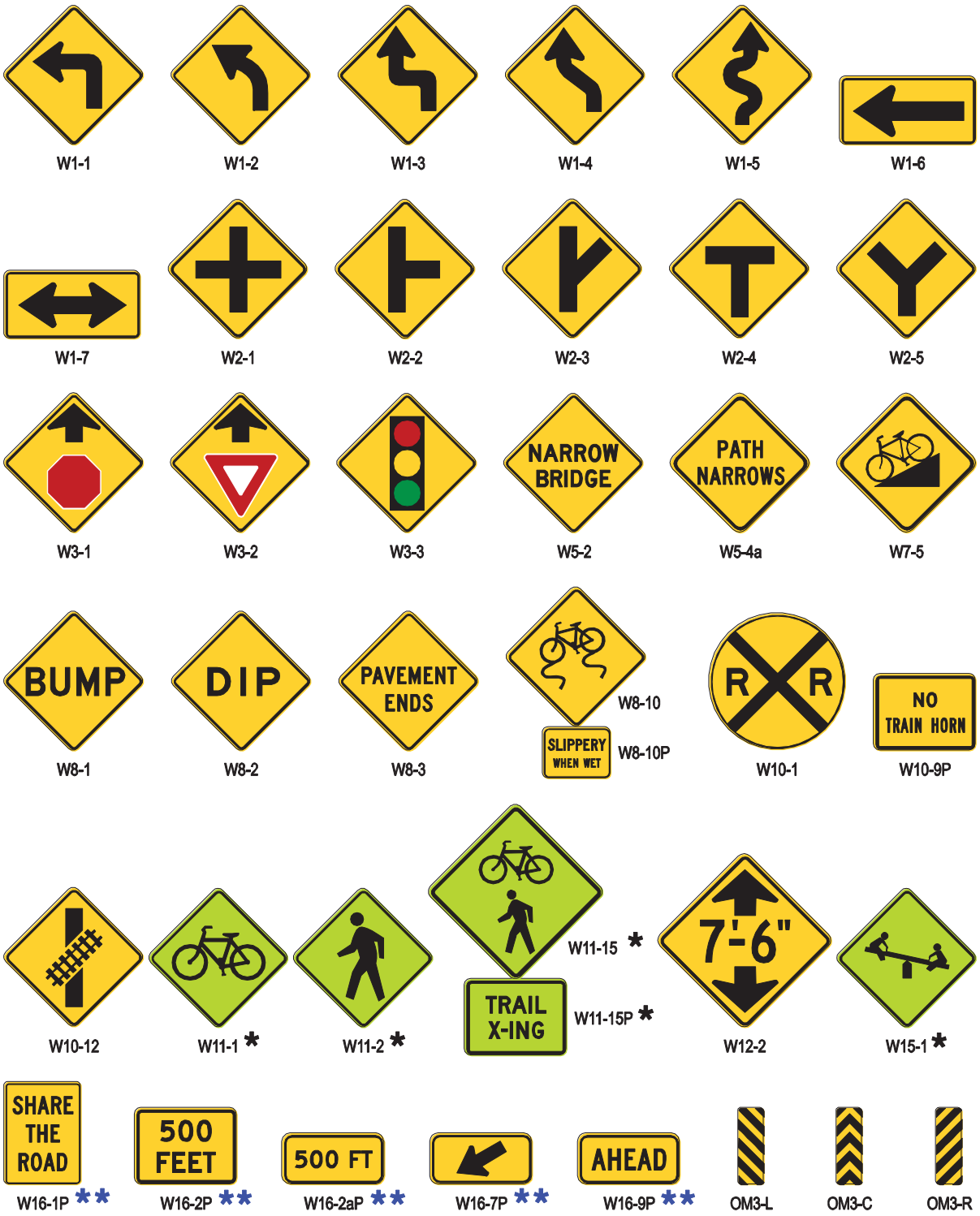
07 *The R4-11 sign should not be placed on roadways that have a speed limit above 35 mph.*

Section 9B.18 Bicycle Warning and Combined Bicycle/Pedestrian Signs (W11-1 and W11-15)

Support:

01 The Bicycle Warning (W11-1) sign (see Figure 9B-3(VA) in this Supplement) alerts the road user to unexpected entries into the roadway by bicyclists, and other crossing activities that might cause conflicts. These conflicts might be relatively confined, or might occur randomly over a segment of roadway. See Section 9B.19 of this Supplement for additional information on use of the Bicycle Warning (W11-1) sign along with the Share the Road (W16-1P) supplemental plaque.

Figure 9B-3(VA). Warning Signs and Plaques and Object Markers for Bicycle Facilities



* A fluorescent yellow-green background color ~~may~~ shall be used for this sign or plaque.
** The background color of the plaque ~~should~~ shall match the color of the warning sign that it supplements.

Option:

02 The combined Bicycle/Pedestrian (W11-15) sign (see Figure 9B-3(VA) in this Supplement) may be used where both bicyclists and pedestrians might be crossing the roadway, such as at an intersection with a shared-use path. A TRAIL X-ING (W11-15P) supplemental plaque (see Figure 9B-3(VA) in this Supplement) may be mounted below the W11-15 sign.

03 A supplemental plaque with the legend AHEAD or XX FEET may be used with the Bicycle Warning or combined Bicycle/Pedestrian sign.

Guidance:

04 *If used in advance of a specific crossing point, the Bicycle Warning or combined Bicycle/Pedestrian sign should be placed at a distance in advance of the crossing location that conforms with the guidance given in Table 2C-4.*

Standard:

05 **Bicycle Warning and combined Bicycle/Pedestrian signs, when used at the location of the crossing, shall be supplemented with a diagonal downward pointing arrow (W16-7P) plaque (see Figure 9B-3(VA) in this Supplement) to show the location of the crossing.**

06 **A fluorescent yellow-green background color with a black legend and border shall be used for Bicycle Warning and combined Bicycle/Pedestrian signs and supplemental plaques.**

~~*Guidance:*~~

07 ~~*When the fluorescent yellow-green background color is used, a systematic approach featuring one background color within a zone or area should be used. The mixing of standard yellow and fluorescent yellow-green backgrounds within a zone or area should be avoided.*~~

Section 9B.19 Other Bicycle Warning Signs

Option:

01 Other bicycle warning signs (see Figure 9B-3(VA) in this Supplement) such as PATH NARROWS (W5-4a) and Hill (W7-5) may be installed on shared-use paths to warn bicyclists of conditions not readily apparent.

02 In situations where there is a need to warn motorists to watch for bicyclists traveling along the highway, the SHARE THE ROAD (W16-1P) plaque (see Figure 9B-3(VA) in this Supplement) may be used in conjunction with the W11-1 sign.

03 The Bicycle Warning Sign (W11-1) and SHARE THE ROAD supplemental plaque (W16-1P) assembly may be considered at the following locations, if observation reflects routine bicycle use:

- Where shared-use paths end at roadways.
- Where shoulders or wide curb lanes drop prior to features such as narrow bridge or overpasses.

- Where there has been a significant history of bicycle crashes involving vehicles.
- Where roadway improvements needed to address bicycle safety issues are not practical due to physical or environmental constraints.

04 A Bicycle Warning sign (W11-1) and SHARE THE ROAD supplemental plaque (W16-1P) assembly may be considered where all of the following conditions exist:

- A bike lane ends,
- The speed limit is 40 MPH or greater, and
- A hazard exists, such as a narrow bridge or overpass, narrow lane, parallel parked vehicles, or a downstream intersection with many turning vehicles. (The end of a bike lane, by itself, is not a hazard.)

Standard:

05 **A Bicycle Warning sign (W11-1) and SHARE THE ROAD supplemental plaque (W16-1P) assembly shall not be used as a substitute for a bike route sign or where a jurisdiction wants to communicate a general policy statement.**

Guidance:

06 *If used, other advance bicycle warning signs should be installed at least 50 feet in advance of the beginning of the condition.*

07 *Where temporary traffic control zones are present on bikeways, appropriate signs from Part 6 should be used.*

Option:

08 Other warning signs described in Chapter 2C may be installed on bicycle facilities as appropriate.

Guidance:

09 *A Bicycle Warning sign (W11-1) and SHARE THE ROAD supplemental plaque (W16-1P) assembly should not be used where a bike lane ends and the speed limit is 35 MPH or less. Such circumstances could include a college or university campus, a central business district, or other area characterized by low speeds and a large amount of interaction between bicycles and motorized vehicles.*

CHAPTER 9C. MARKINGS

Section 9C.04 Markings for Bicycle Lanes

Support:

01 Pavement markings designate that portion of the roadway for preferential use by bicyclists. Markings inform all road users of the restricted nature of the bicycle lane. Typical pavement marking details are shown in Figure 9C-V1 in this Supplement.

Standard:

02 **Longitudinal pavement markings shall be used to define bicycle lanes.**

Guidance:

03 *If used, bicycle lane word, symbol, and/or arrow markings (see Figure 9C-3(VA) in this Supplement) should be placed at the beginning of a bicycle lane and at periodic intervals along the bicycle lane based on engineering judgment.*

Standard:

04 **Except as provided in Paragraph 5, if bicycle lane markings are used, the helmeted bicyclist symbol marking (see Figures 9C-3(VA) and 9C-V1 in this Supplement) shall be used.**

Option:

05 The bike symbol or bike word message may be used to supplement the helmeted bicyclist symbol marking on a limited basis if engineering judgment determines a need for it. Such circumstances include new installations of bike lanes in an area of Virginia where drivers may be less familiar with the meaning of the helmeted bicyclist symbol.

Standard:

06 **If the bicycle lane symbol marking is used in conjunction with word or arrow messages, it shall precede them.**

Option:

07 If the word, symbol, and/or arrow pavement markings shown in Figure 9C-3(VA) in this Supplement are used, Bike Lane signs (see Section 9B.04 of the MUTCD) may also be used, but to avoid overuse of the signs not necessarily adjacent to every set of pavement markings.

Standard:

08 **A through bicycle lane shall not be positioned to the right of a right turn only lane or to the left of a left turn only lane.**

Support:

09 A bicyclist continuing straight through an intersection from the right of a right-turn lane or from the left of a left-turn lane would be inconsistent with normal traffic behavior and would violate the expectations of right- or left-turning motorists.

Figure 9C-V1. VDOT Pavement Marking Standard (Typical Pavement Markings for Bicycle Lane)

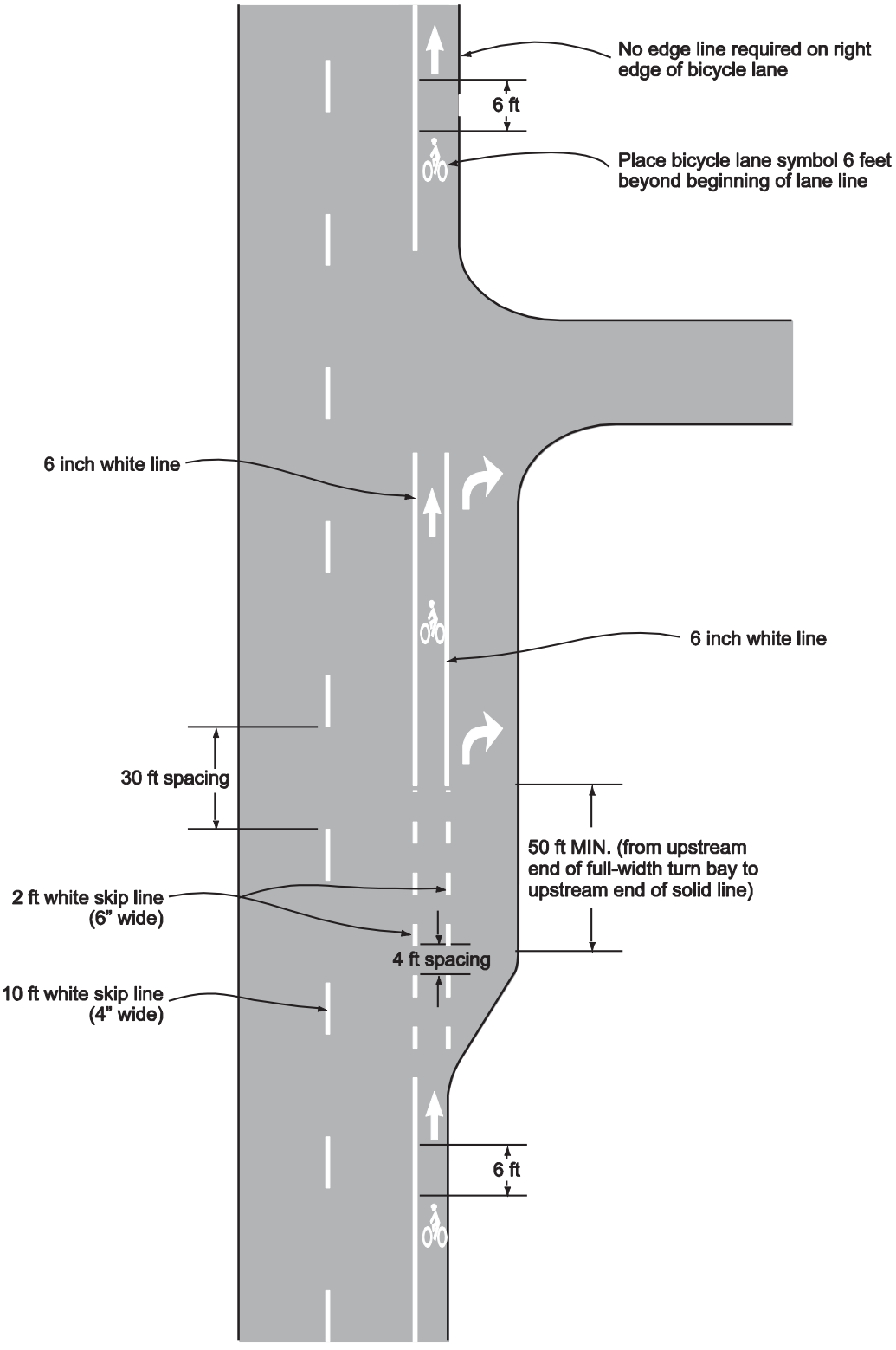
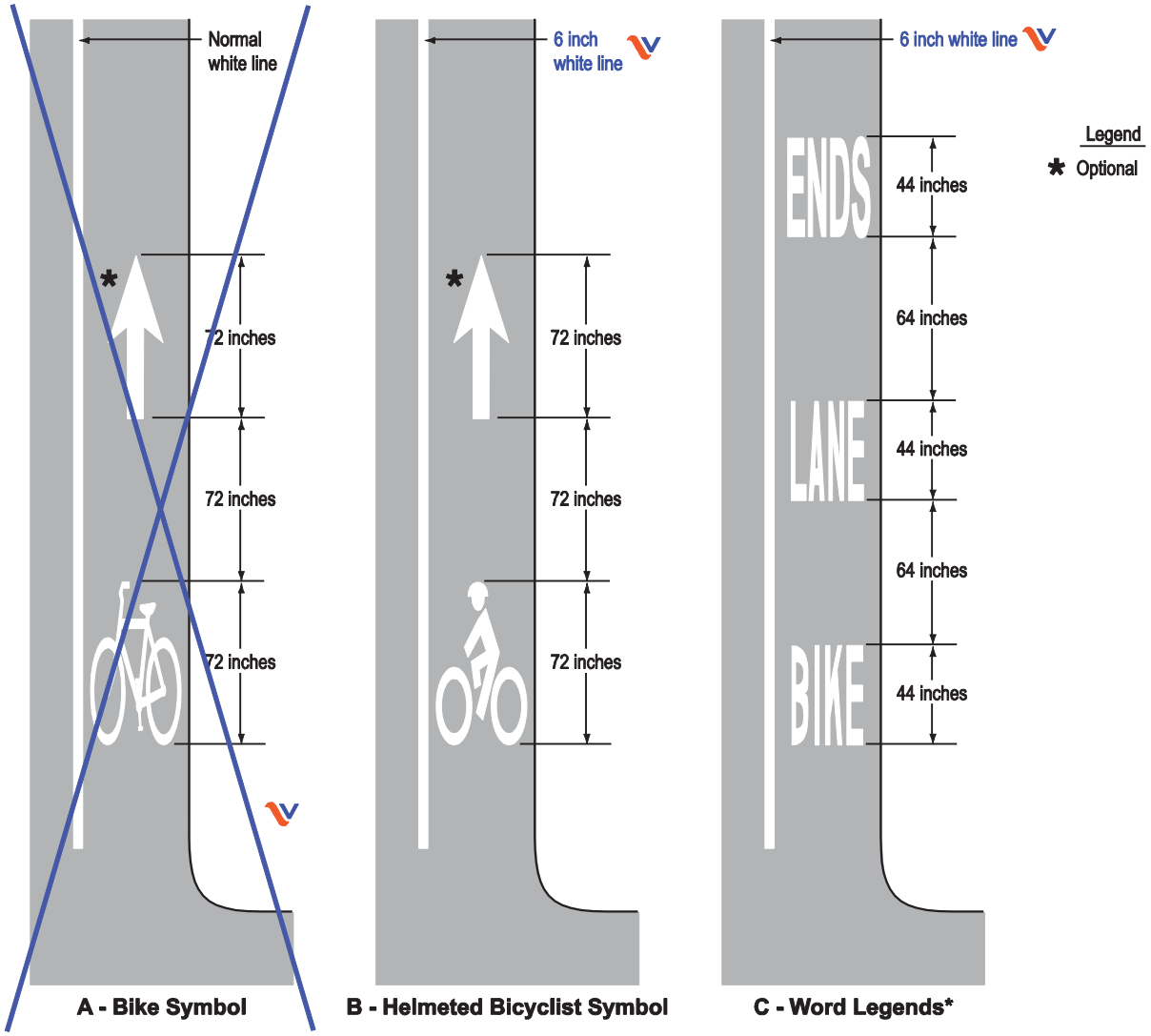


Figure 9C-3(VA). Word, Symbol, and Arrow Pavement Markings for Bicycle Lanes



Note: Drawing C is for placement details of word legends when used. However, word legends may be utilized in addition to, but not substituting for, the Helmeted Bicyclist symbol which is required.

Guidance:

10 *When the right through lane is dropped to become a right turn only lane, the bicycle lane markings should stop at least 180 feet (see Figure 9C-V2 in this Supplement) before the beginning of the right-turn lane. Through bicycle lane markings should resume to the left of the right turn only lane.*

Support:

11 An example of bicycle lane markings at locations where the right through lane is dropped to become a right turn only lane is shown in Figure 9C-V2 in this Supplement.

Guidance:

12 *An optional through-right turn lane next to a right turn only lane should not be used where there is a through bicycle lane. If a capacity analysis indicates the need for an optional through-right turn lane, the bicycle lane should be discontinued at the intersection approach.*

13 *Posts or raised pavement markers should not be used to separate bicycle lanes from adjacent travel lanes.*

Support:

14 Using raised devices creates a collision potential for bicyclists by placing fixed objects immediately adjacent to the travel path of the bicyclist. In addition, raised devices can prevent vehicles turning right from merging with the bicycle lane, which is the preferred method for making the right turn. Raised devices used to define a bicycle lane can also cause problems in cleaning and maintaining the bicycle lane.

Standard:

15 **Bicycle lanes shall not be provided on the circular roadway of a roundabout.**

Guidance:

16 *Bicycle lane markings should stop at least 100 feet before the crosswalk, or if no crosswalk is provided, at least 100 feet before the yield line, or if no yield line is provided, then at least 100 feet before the edge of the circulatory roadway.*

Support:

17 Examples of bicycle lane markings at right-turn lanes are shown in Figures 9C-1(VA), 9C-4(VA), and 9C-5(VA) in this Supplement. Examples of pavement markings for bicycle lanes on a two-way street are shown in Figure 9C-6(VA) in this Supplement. Pavement word message, symbol, and arrow markings for bicycle lanes are shown in Figure 9C-3(VA) in this Supplement.

Standard:

18 **Pavement markings consisting of arrow and bicycle lane symbols shall be placed at the beginning of the bicycle lane at right turn lanes. Markings shall also be placed at the end of the bicycle lane at right turn lanes if the solid white line separating the bicycle lane from the right turn lane is greater than 100 feet in length.**

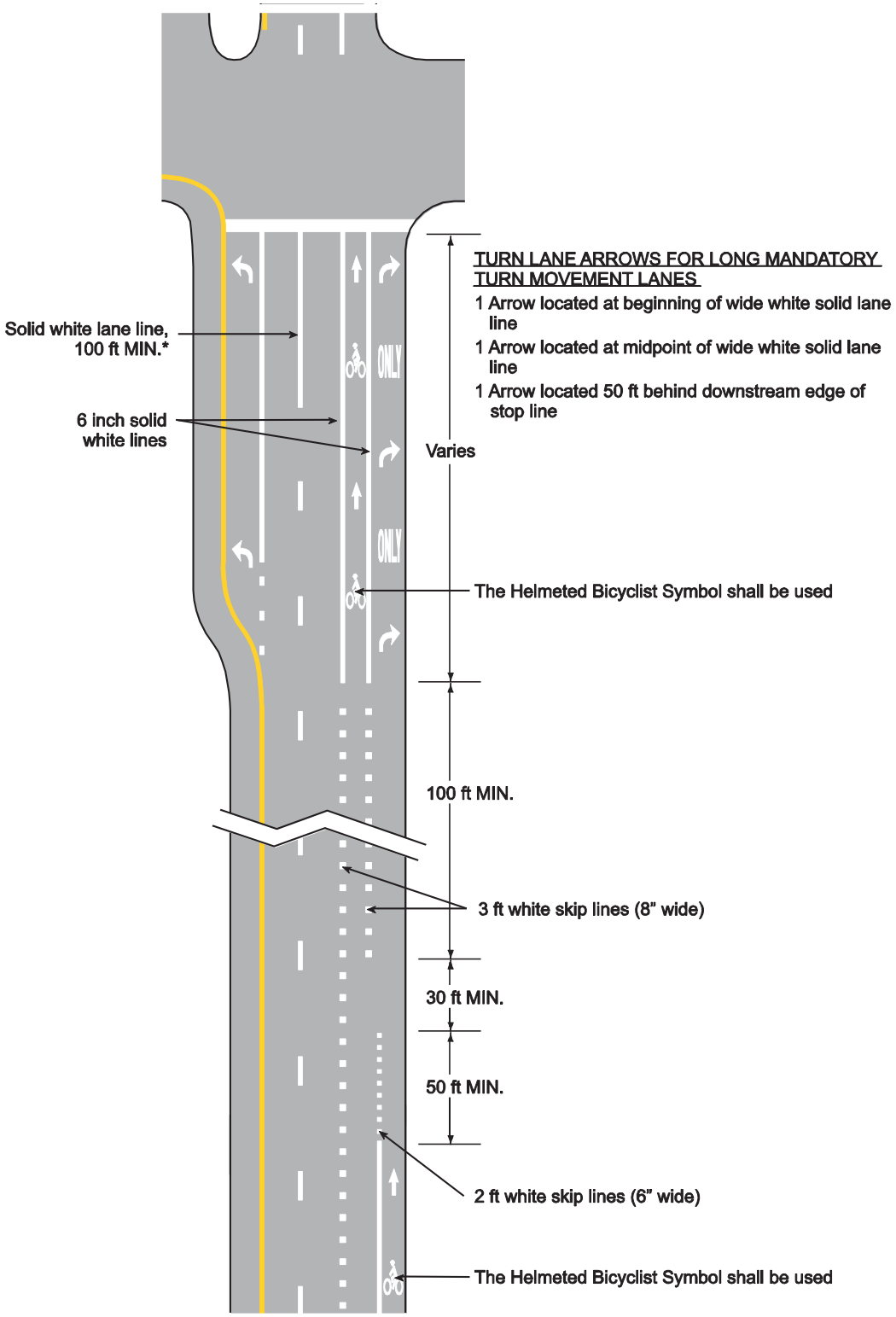
19 **Bicycle lane symbols shall be placed a maximum of 500 feet apart.**

Guidance:

20 *The bicycle lane pavement line marking should be a minimum of:*

- *4 feet from the edge of pavement on curb and gutter roadways (where the face of the concrete gutter pan meets the edge of the pavement).*
- *5 feet from the face of a curb on roadways without a gutter pan (where the face of the concrete curb meets the edge of pavement).*
- *4 feet from the edge of the pavement on roadways without curb and gutter (where the edge of asphalt meets the shoulder or roadside).*

Figure 9C-V2. Example of Bicycle Lane Markings at a Right Turn Lane Drop at an Intersection



* Minimums are recommended distances where spacing allows or is feasible

Figure 9C-1(VA). Example of Intersection Pavement Markings—Designated Bicycle Lane with Left-Turn Area, Heavy Turn Volume, Parking, One-Way Traffic, or Divided Highway

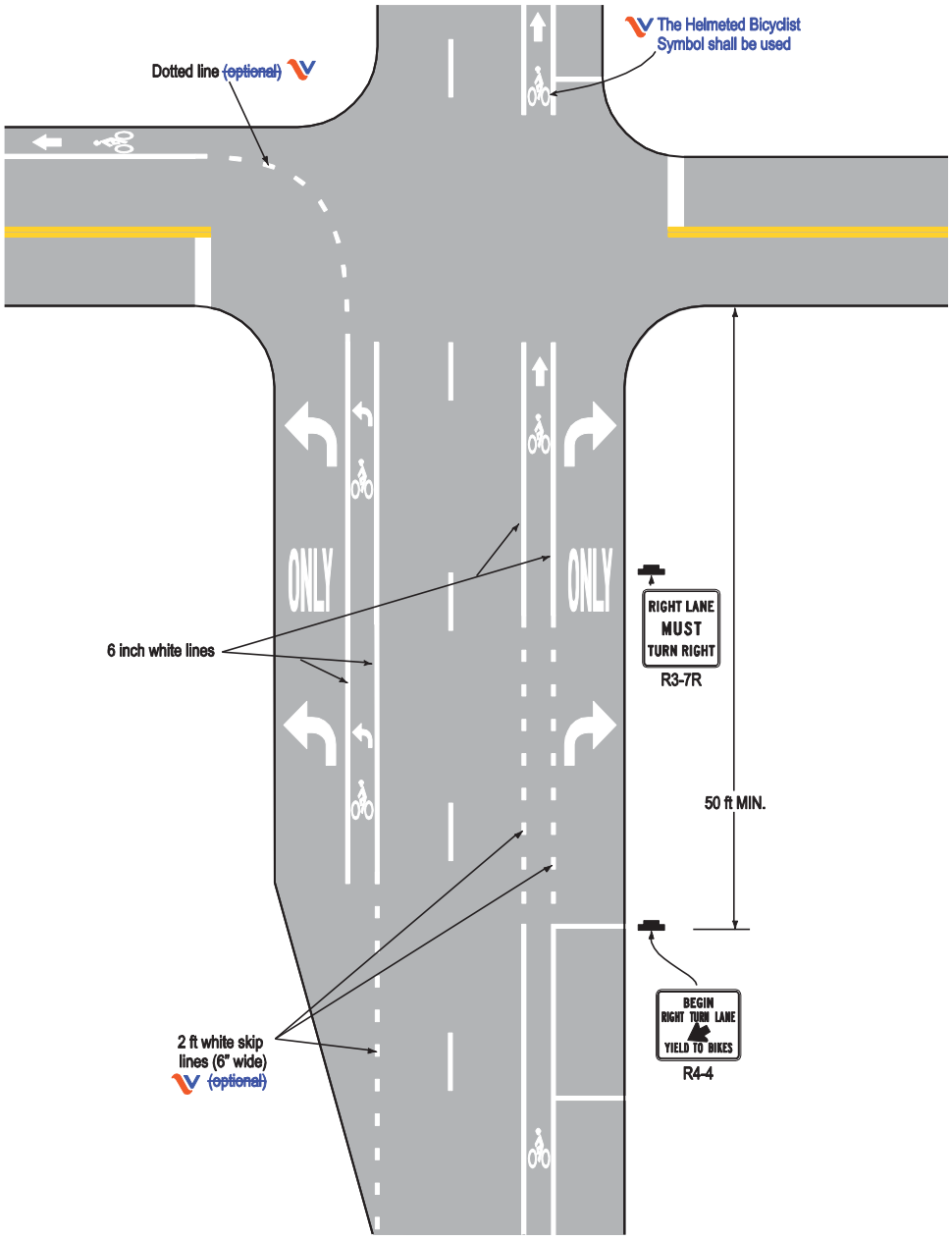


Figure 9C-4(VA). Example of a Bicycle Lane Treatment at a Right-Turn Only Lane

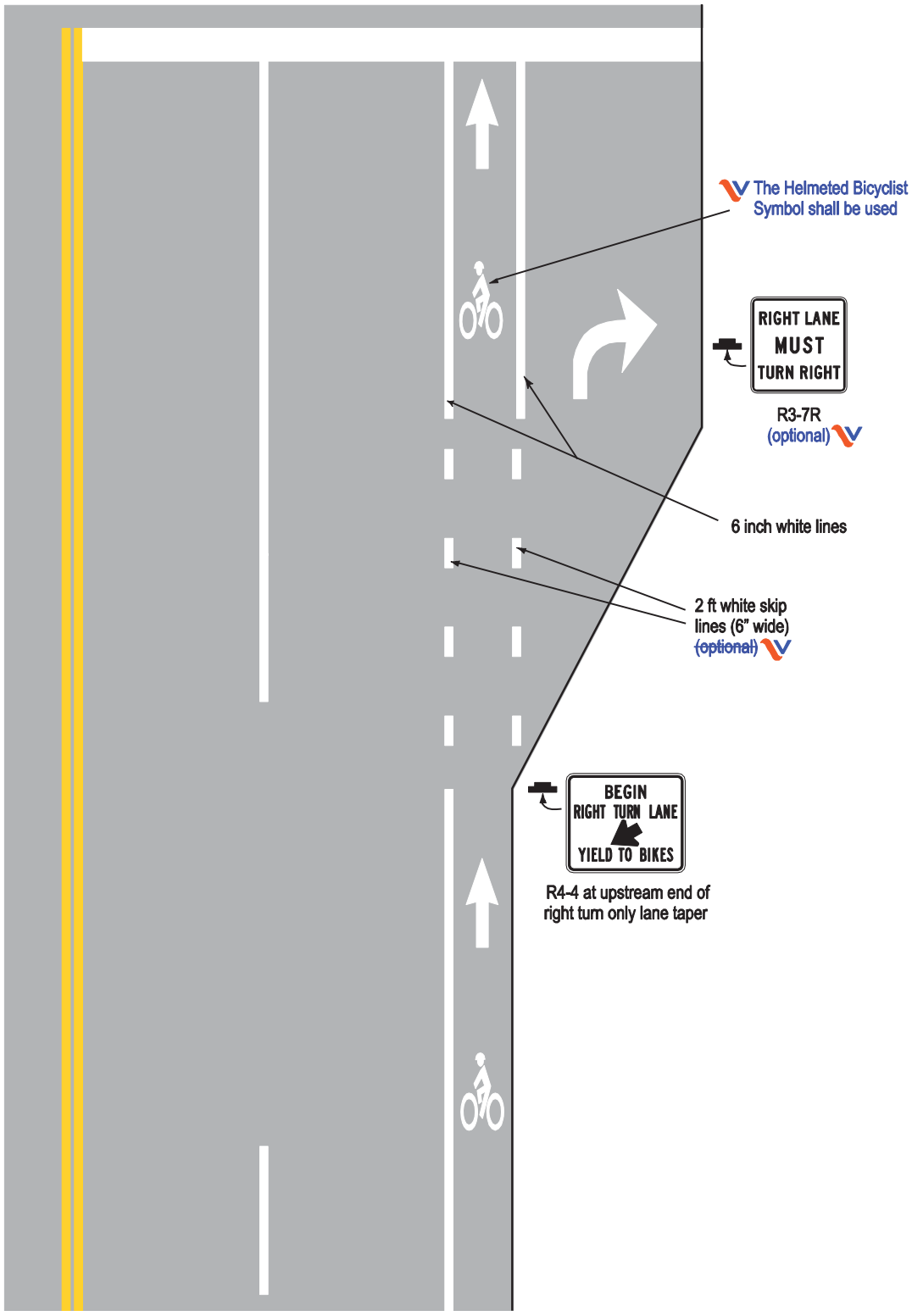


Figure 9C-5(VA). Example of Bicycle Lane Treatment at Parking Lane into a Right-Turn Only Lane

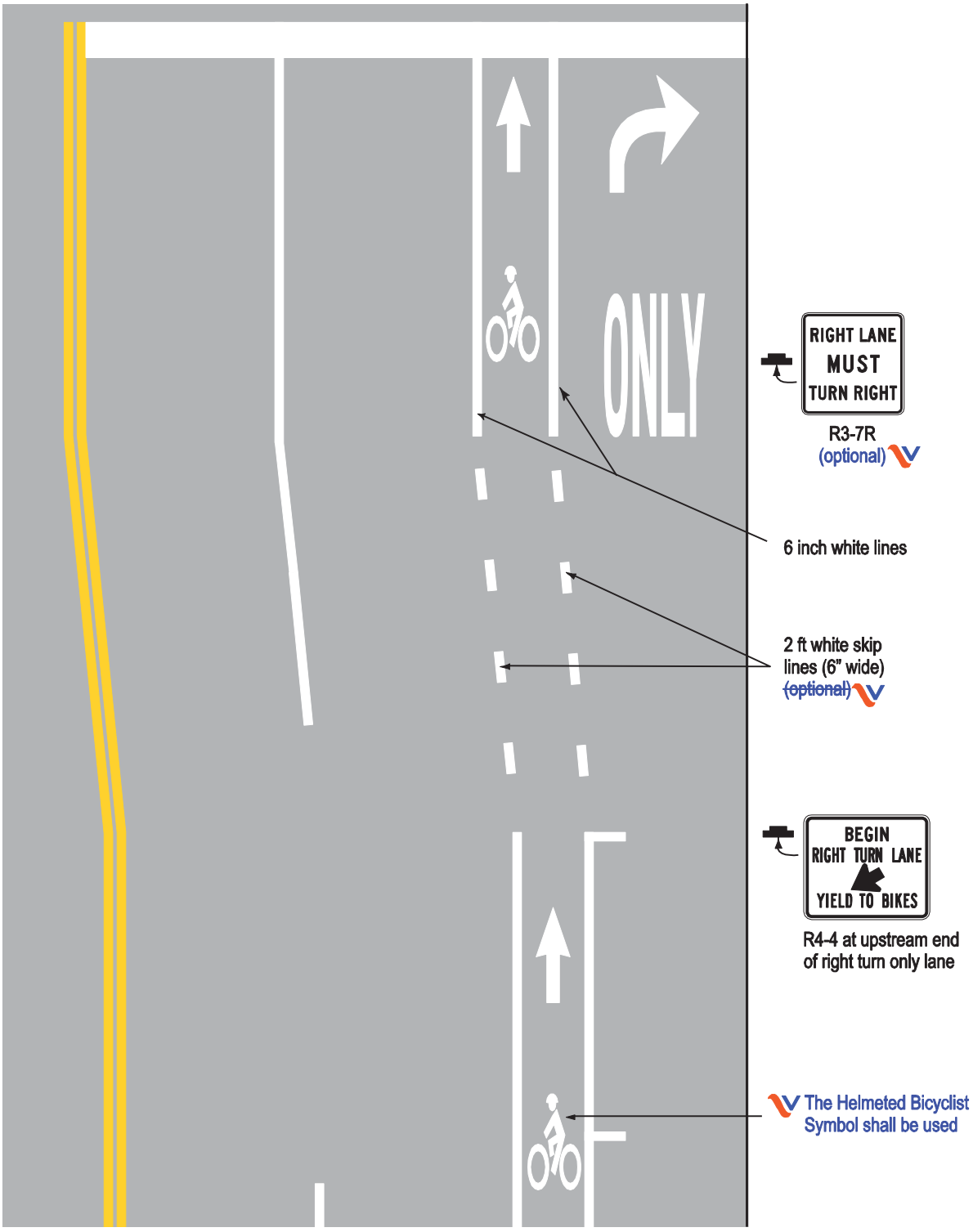
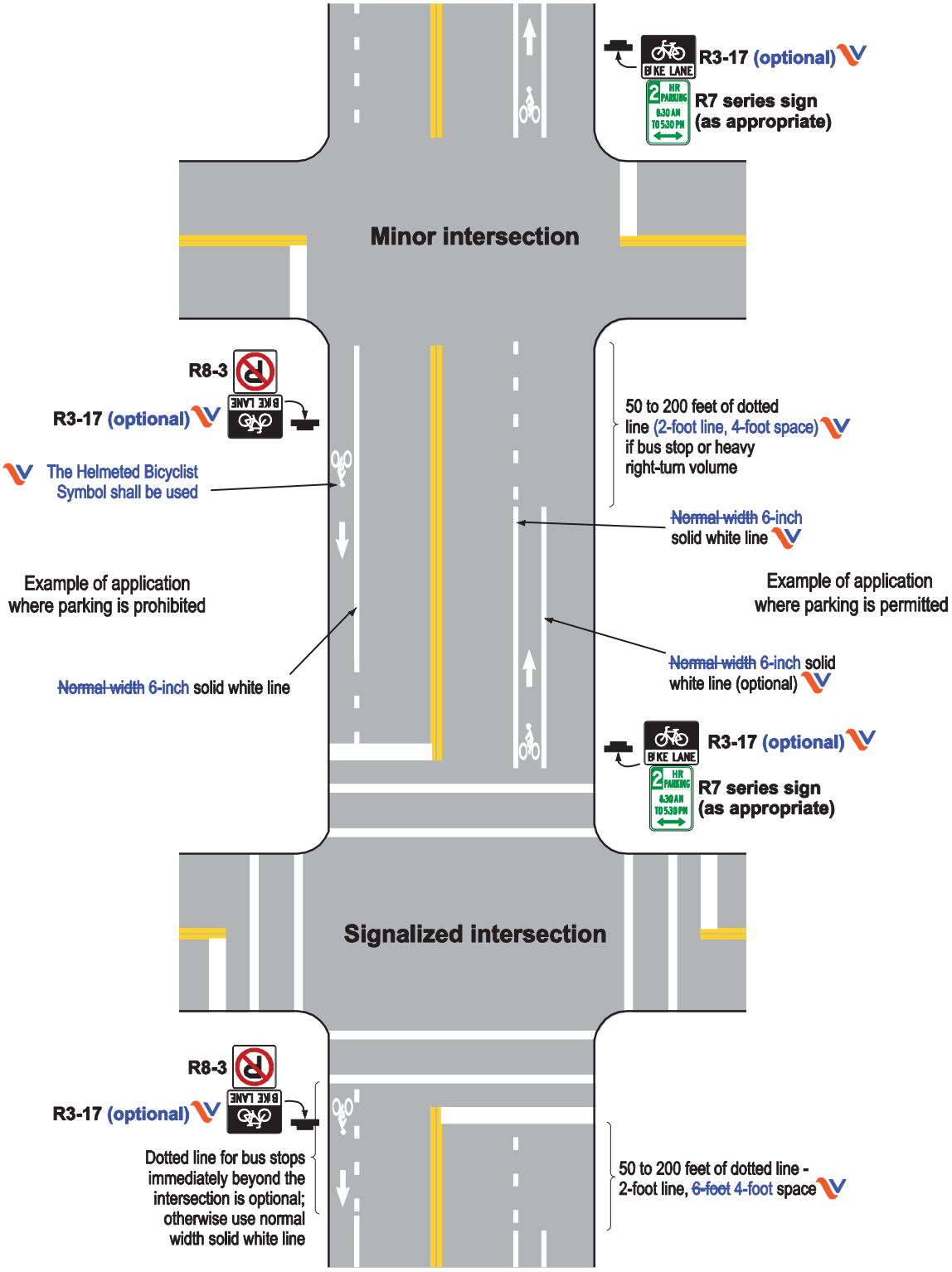


Figure 9C-6(VA). Example of Pavement Markings for Bicycle Lanes on a Two-Way Street



Option:

21 On asphalt roadways where the bicycle lane is beside curb and gutter and the asphalt portion of the bicycle lane is of insufficient width to allow placement of the bicycle symbol entirely on the asphalt, the symbol may be reduced and sized to fit entirely on the asphalt.

Standard:

22 **If the bicycle symbol is reduced, it shall be reduced to no less than 4 feet in length.**

Support:

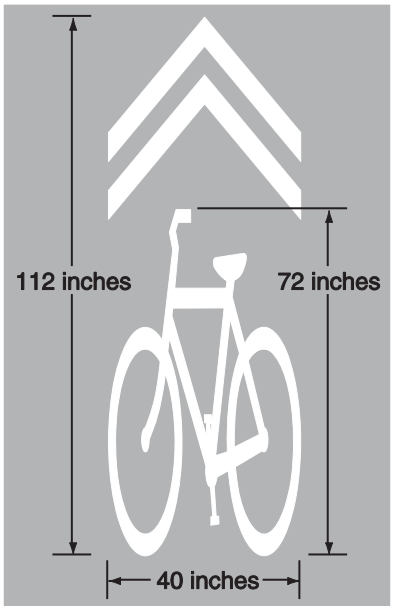
23 Typical bicycle lane pavement marking details are shown in Figure 9C-V1 in this Supplement.

Section 9C.07 Shared Lane Marking

Option:

01 When determined to be an appropriate use, the Shared Lane Marking shown in Figure 9C-9 may be used to address defined safety issues. Specifically, they may be used as follows:

Figure 9C-9. Shared Lane Marking



A. To assist bicyclists with lateral positioning in a shared lane with on-street parallel parking in order to reduce the chance of a bicyclist's impacting the open door of a parked vehicle,
B. To assist bicyclists with lateral positioning in lanes that are too narrow for a motor vehicle and a bicycle to travel side by side within the same traffic lane,
C. To alert road users of the lateral location bicyclists are likely to occupy within the traveled way,

D. To encourage safe passing of bicyclists by motorists,
E. To reduce the incidence of wrong-way bicycling, where it is routinely observed,
F. To indicate more appropriate positioning away from the curb or the edge of the traveled way on wide outside lanes,
G. At multi-lane intersections where there is insufficient width to provide a bicycle lane, and conflicts make it desirable to indicate proper positioning,
H. On steep downgrades where bicycle speeds are high and parking is present, since bicyclists may choose not to use a bike lane when traveling at high speeds adjacent to parked vehicles,
I. Where a bike lane ends and the roadway continues with a posted speed of 35 mph or less, or
J. In short segments between intermittent segments of bike lanes.

Guidance:

02 *The Shared Lane Marking should not be placed on roadways that have a speed limit above 35 mph.*

Standard:

03 **Shared Lane Markings shall not be used:**

A. On shoulders or in designated bicycle lanes,
B. To provide wayfinding guidance to bicyclists,
C. On a shared-use path or other facility where motor vehicle traffic is prohibited,
D. As a substitute for bicycle lanes where roadway geometric conditions permit bicycle lanes to be marked, or
E. In an exclusive turn lane.

Option:

04 Shared Lane Markings approaching an intersection may be used in the right most through-lane next to an exclusive right turn lane to accommodate daily bicycle through movements when there is a designated on-road bicycle lane on the receiving/far side of the intersection to receive the bicycles from the right most through lane.

Guidance:

05 *In order to prevent overuse of the Shared Lane Markings, judgment should be applied that takes into account daily bicycle volumes, daily vehicle volumes, and bicycle-vehicle conflicts; or a documented safety issue.*

06 *If used in a shared lane with on-street parallel parking, Shared Lane Markings should be placed so that the centers of the markings are at least 11 feet from the face of the curb, or from the edge of the pavement where there is no curb. The parking lane width should be considered and the Shared Lane Marking adjusted accordingly.*

07 *If used on a street without on-street parking that has an outside travel lane that is less than 14 feet wide, the centers of the Shared Lane Markings should be at least 4 feet from the face of the curb, or from the edge of the pavement where there is no curb.*

08 *If used, the Shared Lane Marking should be placed immediately after an intersection and spaced at intervals not greater than 250 feet thereafter.*

09 *The Shared Lane Marking should only be used on roadway segments where travel lanes are delineated with longitudinal pavement markings or other methods (the Shared Lane Marking should not be used on undivided unmarked roadways).*

Option:

10 Section 9B.06 in this Supplement describes a Bicycles May Use Full Lane sign that may be used in addition to or instead of the Shared Lane Marking to inform road users that bicyclists might occupy the travel lane.

APPENDIX A – HOW TO OBTAIN RELATED DOCUMENTS AND WEB RESOURCES

Support:

01 Below is a list of web links to related documents and internet resources that are referenced in this Supplement:

A. The Code of Virginia - http://leg1.state.va.us/000/src.htm

B. Code of Virginia definition of Limited Access Highway - http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+33.1-57

C. Design and Use Policy for Clearview Alphabet - http://mutcd.fhwa.dot.gov/resources/clearviewdesignfaqs/index.htm

D. Virginia Department of Historical Resources - http://www.dhr.virginia.gov

E. Virginia Department of Transportation – http://www.virginiadot.org

F. Virginia Historical Highway Markers - http://www.dhr.virginia.gov/hiway_markers/hwmarker_info.htm

G. VDOT Guidelines for the Installation of In-Roadway Warning Lights - http://www.virginiadot.org/business/resources/IRWL_20Final_20Guidelines_2012-14-05.pdf

H. VDOT Guidelines for the Installation of Marked Crosswalks - http://www.virginiadot.org/business/resources/Marked_20Crosswalks_20Final_20Guidelines_2012-14-05.pdf

I. VDOT Highway Safety Corridors - http://www.virginiadot.org/programs/ct-highway-safety-corridor.asp

J. VDOT Road and Bridge Specifications - http://www.virginiadot.org/business/const/spec-default.asp

K. VDOT Road and Bridge Standards - http://www.virginiadot.org/business/locdes/Standards_TOC.asp

L. VDOT Road Design Manual – http://www.virginiadot.org/business/locdes/rdmanual-index.asp

M. VDOT Traffic Engineering Division Memoranda - http://www.virginiadot.org/business/traffic_engineering_memoranda.asp

N. VDOT Traffic Engineering Design Manual – http://www.virginiadot.org/business/locdes/traffic-engineering-manual.asp

O. VDOT 2035 Highway Plan (Corridors of Statewide Significance) – http://www.vtrans.org/2035_surface_plan.asp

P. Virginia Standard Highway Signs Book – http://www.virginiadot.org/business/resources/TED/final_MUTCD/Standard_Highway_Signs_Book.pdf

Q. Virginia Work Area Protection Manual – http://www.virginiadot.org/business/resources/wztc/Virginia_WAPM_2011_web.pdf

Support:

02 Below is a list of documents that are referenced in this Supplement and available through means other than web links:

A. Maintenance Division Best Practices Manual – Please submit a written request to:

Virginia Department of Transportation
Maintenance Division
1401 East Broad Street
Richmond, VA 23219