BALTIMORE

COMPLETE STREETS

Legislation

2010 Resolution

SECTION 1. BE IT RESOLVED BY THE MAYOR AND CITY COUNCIL OF BALTIMORE, That the Department of Transportation and the Department of Planning are directed to plan for, design, and construct all new City transportation improvement projects to provide appropriate accommodations for pedestrians, bicyclists, transit riders, motorists, and persons of all abilities, while promoting safe operation for all users. This can be accomplished through the incorporation of construction elements such as special bus lanes, transit stops, improved pedestrian street crossings, median islands, accessible pedestrian signals, curb extensions, sidewalks, ADA compliant ramps, and bike lanes.

- Not binding
- Vague in goals/open to interpretation
- Plenty of outs
- Resulted in:
  - Sharrows on arterials
  - Bike lanes between parking and high-speed traffic
  - Minimum width sidewalks next to high-speed traffic
  - And on and on

2018 Ordinance

§ 40-7. System to ensure safety, etc., and convenience of all users.

This Transportation System must be designed and operated in ways that ensure the safety, security, comfort, access, and convenience of all users of the streets, including pedestrians, bicyclists, public transit users, emergency responders, transporters of commercial goods, motor vehicles, and freight providers.

(Ord. 18-197.)

§ 40-8. System to include connected facilities accommodating all travel modes.

This Transportation System must include integrated networks of connected facilities accommodating all modes of travel.

(Ord. 18-197.)

§ 40-9. System to promote walking, biking, and public transit.

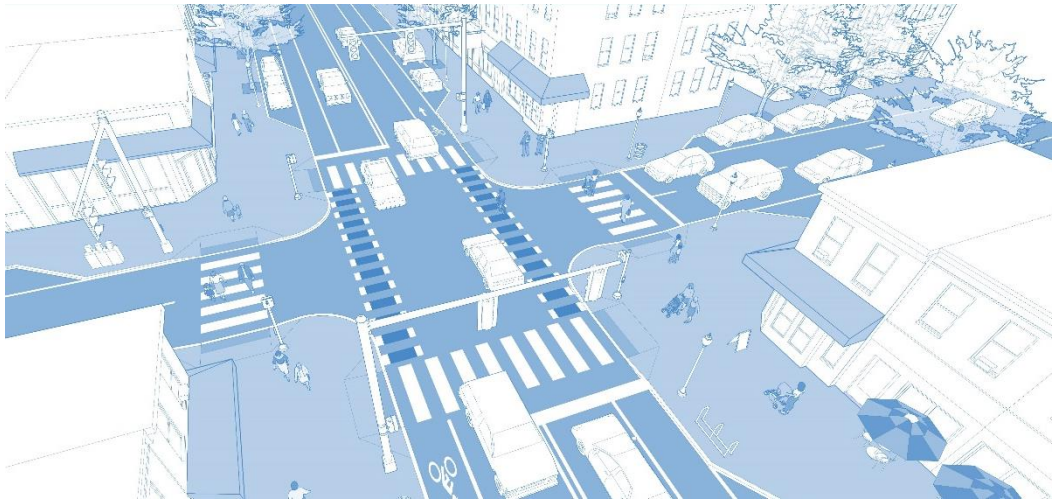
This Transportation System must, to the greatest extent possible, promote walking, biking, and public transit.

(Ord. 18-197.)

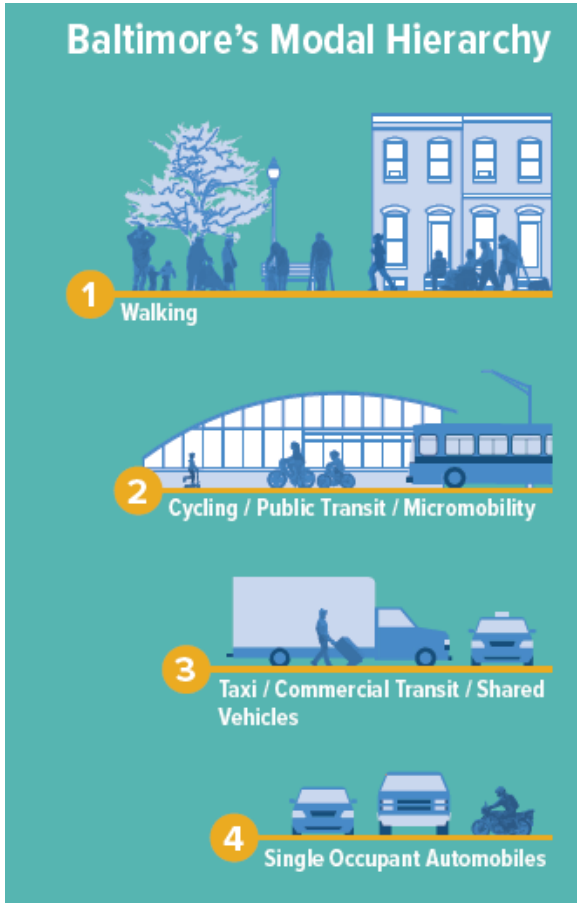
- Binding/Part of City Code
- Included specifics like:
  - Lane widths
  - Design vehicles
  - Setting design/target speeds
- Not just technically providing for all modes, but prioritizing other modes and emphasizing convenience, comfort, and safety
- Includes equity component

What are Complete Streets?

- **Complete Streets are Safe, Intuitive, Comfortable, and Convenient for all non-automotive modes and all abilities**
- **Baltimore's Complete Streets program puts people walking first**
- **Complete Streets are reflective of the community**



Starts with Overall Modal Hierarchy and Guiding Principles



System Performance

1. **Address Safety First:** Baltimore streets will be designed with a prioritization to eliminate severe injuries and fatalities.
2. **Be Accessible by Everyone**: Baltimore streets will be accessible by all modes, for people of all ages and abilities.
3. **Improve Mobility**: Baltimore streets will efficiently and reliably move people and goods to, from and around the City.

Community Enhancement

4. **Ensure Equity**: Baltimore streets will reflect equitable opportunities for travel regardless of race, income, age, disability, health, English language proficiency, and vehicular access.
5. **Reflect Baltimore's Unique Communities**: Baltimore streets will exhibit neighborhood values, be sustainable, promote economic vitality, and encourage healthy lifestyles through active transportation.
6. **Be Sustainable**: Baltimore street design methods will align with the City's broader goals of urban sustainability and protecting the environment. Complete Streets designers will utilize best practices in stormwater management, tree placement, streetlighting, public open space,

System Performance

1. Address Safety First
   - This principle directs City design engineers to prioritize the safe movement of pedestrians and bicyclists above motor vehicle throughput and delay.

How Will This Manual Result in Change?

Project Prioritization Process

How we select our projects

Project Delivery Process

How we leverage the work we do to implement Complete Streets

Design Guidance

How we design the roads and public space

Precursor

- **Highways aren't Streets and Streets aren't Highways**

- **The Guidance I'm talking about is only applicable to our Streets**

Project Prioritization Process

Project Prioritization Process

Local Roads

Step 1: Set PCI Threshold

Establish a PCI threshold that triggers mandatory prioritization for roadway resurfacing to avoid future more costly reconstruction.

Step 2: Set PCI Ranking

Establish a PCI ranking to identify and map roadways in poor condition.

Step 3: Apply Equity Assessment

With the available resurfacing budget, apply the equity assessment by prioritizing projects on roadways in poor condition using the following chart as a guide

Equity Ranking	Percentage of Resurfacing Projects
4–5	55%
2–3	35%
1	10%

Collectors and Arterials

Step 1: Set PCI Threshold

Establish a PCI threshold that triggers mandatory prioritization for roadway resurfacing to avoid future more costly reconstruction.

Step 2: Set PCI Ranking

Establish a PCI ranking to identify and map roadways in poor condition.

Step 3: Apply Weighted Resurfacing Factors

Use the following chart to prioritize resurfacing projects on a weighted scale:

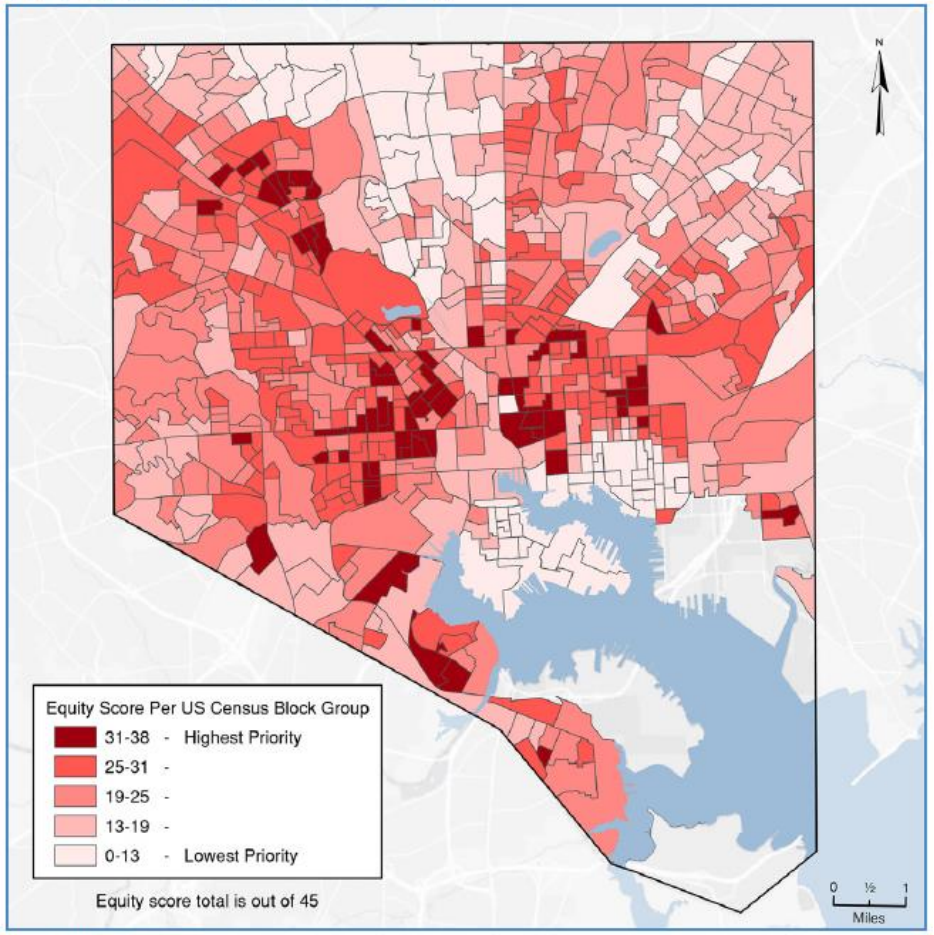
An assessment for each factor should be scored and mapped, with written justification for the score assigned.

Resurfacing Factor	Weighting
Equity	25%
PCI	25%
Traffic Volume	25%
Safety	25%

Additional Considerations

- The equity assessment is the primary factor in the prioritization process of local roads.
- Per the project delivery process, safety improvements and Complete Streets treatments should be considered and implemented when possible during the resurfacing process.

Figure 19. Equity Analysis for Baltimore City

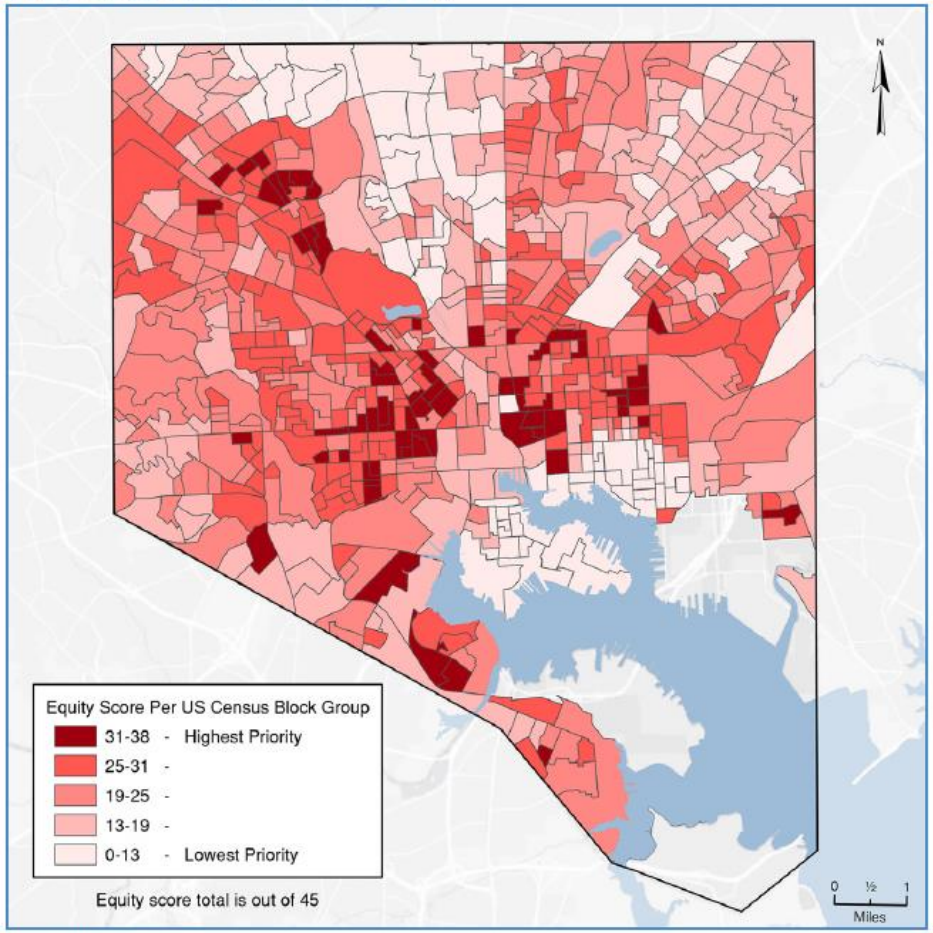


BCDOT / Wallace Montgomery

- **Identify Areas in Need based on Equity including:**
  - **Race**
  - **Income**
  - **Poverty**
  - **Education**
  - **Transit Dependency**
  - **Age**

Project Prioritization Process

Figure 19. Equity Analysis for Baltimore City



BCDOT / Wallace Montgomery

Capital Improvement Projects (CIP)

Project Prioritization Process

Step 1: Evaluate CIP Factors

Evaluate and rank areas and/or projects using the following factors

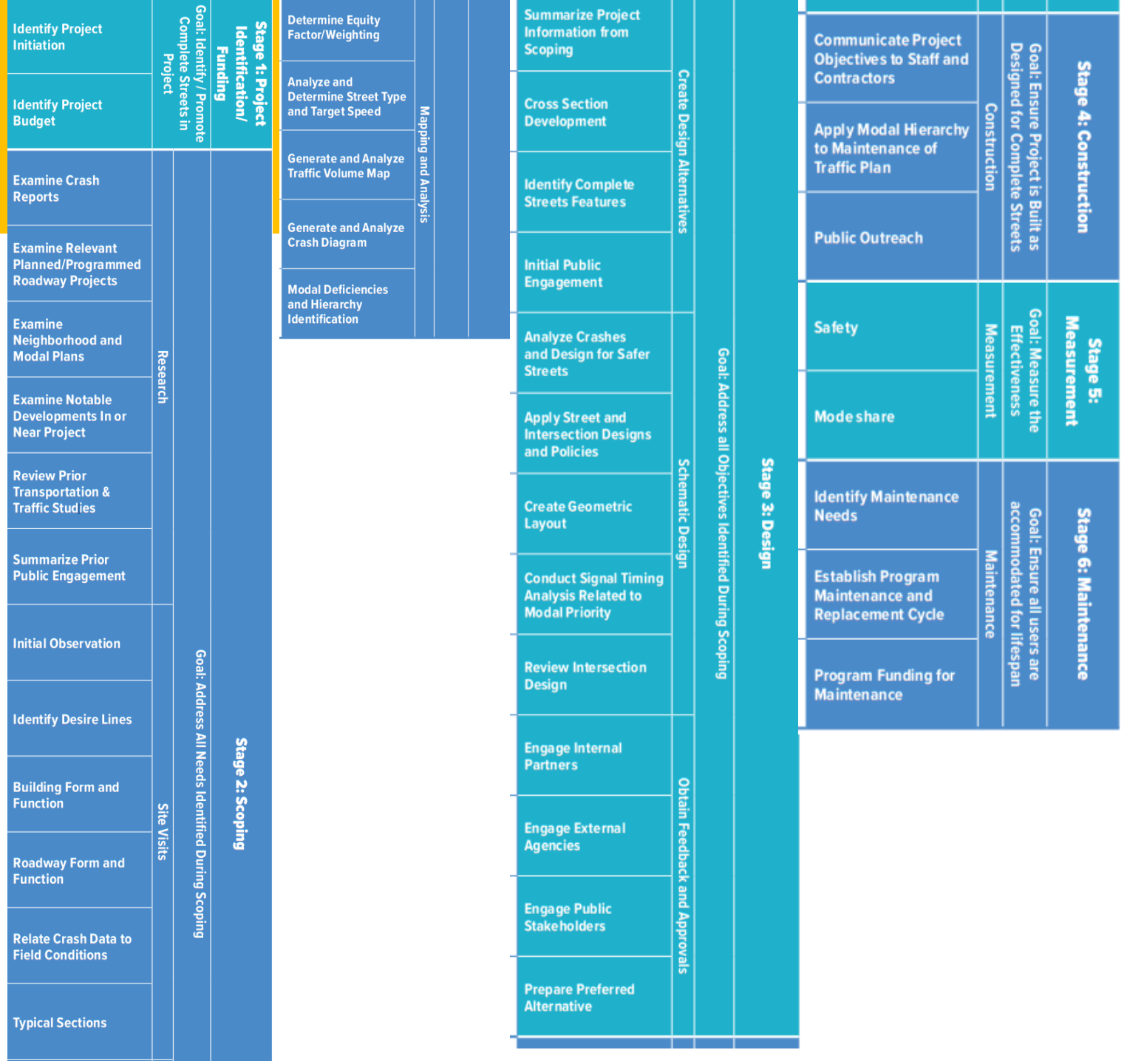
CIP Factor	Description	Weighting
Equity	Equity assessment of geographic area	2
Infrastructure Condition	Condition of the current infrastructure	1
Economic Development Potential	Potential economic development resultant from infrastructure investment	1
Safety	How well projects/roadways in the area align with the TowardZERO Baltimore Initiative and have the potential to address safety issues	1
Existing or Planned Work by Other Departments	Potential to leverage/ combine resources from projects being planned or constructed by other departments	1
Transit Dependency and Commute Times	Transit dependency of the population in the geographic area. Consider average commute times and the potential for projects in this area to improve commute times.	1

Project Delivery Process

The Project Delivery Matrix

Lessons Learned

- Who is going to do these tasks?
- Is the project development process organized to have projects follow the delivery process?
- How much more staff is needed?
- Who makes final decisions?



Design Guidance

Street Types

Previous Practice When Designing

- **FHWA Functional Classification + Some other things (popularity contest)**

New Mentality

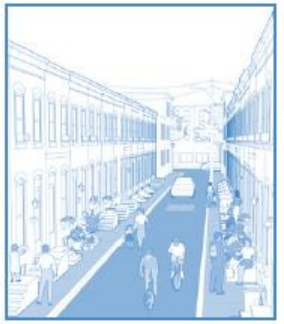
- **Functional Classification is just a small part**
- **Land Use/Context matters more**

See Downtown Commercial on page 12.

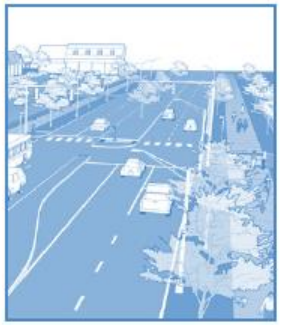
See Downtown Mixed-Use on page 14.

See Urban Village Main on page 16.

See Urban Village Neighborhood on page 18.

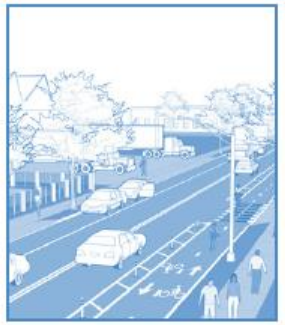


See Urban Village Shared on page 19.

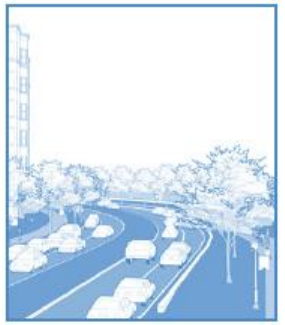


See Urban Center Connector on page 20.

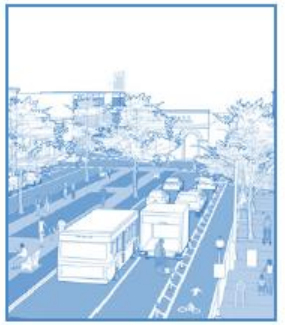
See Neighborhood Corridor on page 22.



See Industrial Access on page 24.



See Parkway on page 26.



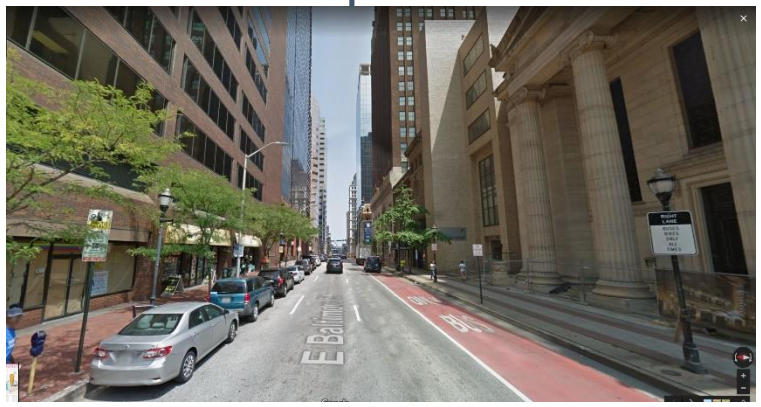
See Boulevard on page 28.

Design Guidance

Street Types

Example: Baltimore Street (Minor Arterial) Changing Context = Different Street Design Needs

W. Baltimore Street - near Arlington St



Baltimore Street - near Charles St

E. Baltimore Street - near S. East Ave

Design Guidance

Priorities and Dimensions based on Street Type

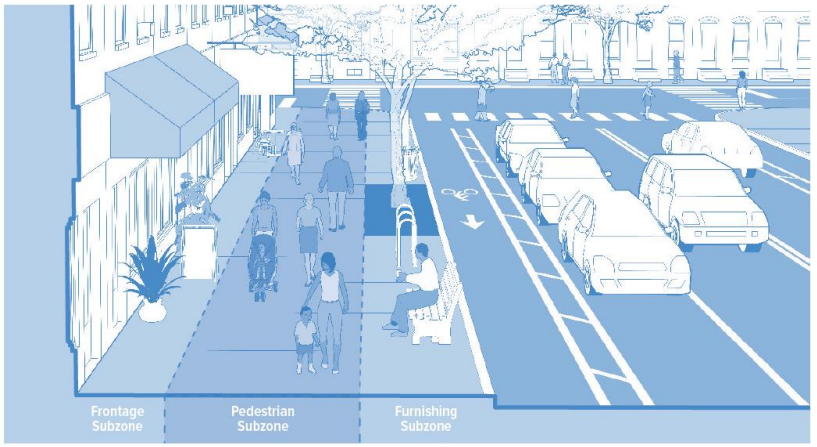


Table 1. Limited Right-of-Way Priorities

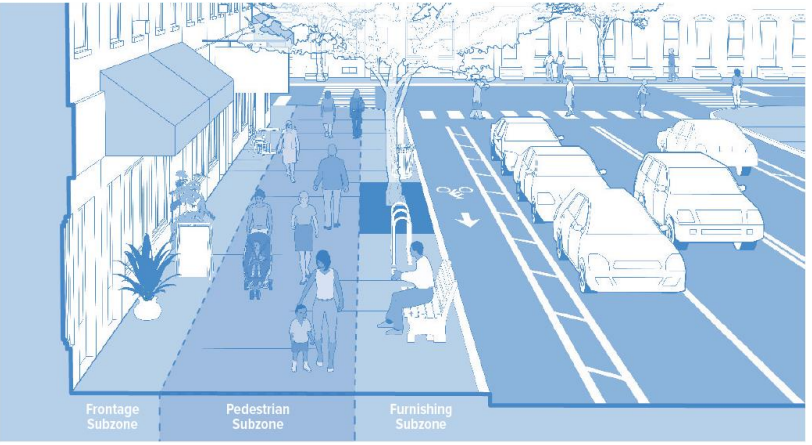
	Sidewalk Zone		Roadway Zone			
Street Type	Pedestrian Subzone	Furnishing Subzone	Curbspace	Curbside Lane Subzone	Travelway Subzone	Median Subzone
Downtown Commercial	1	2	3	6	4	5
On Bicycle Network	1	2	4	3	5	6
On Transit Network	1	2	4	3	5	6
On Truck Route	1	2	4	6	3	5
Downtown Mixed-Use	1	2	3	6	4	5
On Bicycle Network	1	2	4	3	5	6
On Transit Network	1	2	3	4	5	6
On Truck Route	1	2	4	6	3	5
Urban Village Main	1	2	3	6	4	5
On Bicycle Network	1	2	4	3	5	6
On Transit Network	1	2	3	5	4	6
On Truck Route	1	2	4	6	3	5

Table 2. Sidewalk Zone Requirements

		Subzone		
Street Type	Requirements	Frontage	Pedestrian (1,2)	Furnishing (2)
Downtown Commercial	Maximum	—	—	—
	Target	2’	12’	7’
	Constrained	0’	8’	4’
Downtown Mixed-Use	Maximum	—	—	—
	Target	2’	10’	7’
	Constrained	0’	8’	4’
Urban Village Main	Maximum	—	—	—
	Target	2’	8’	7’
	Constrained	0’	5’	3.5’

Design Guidance

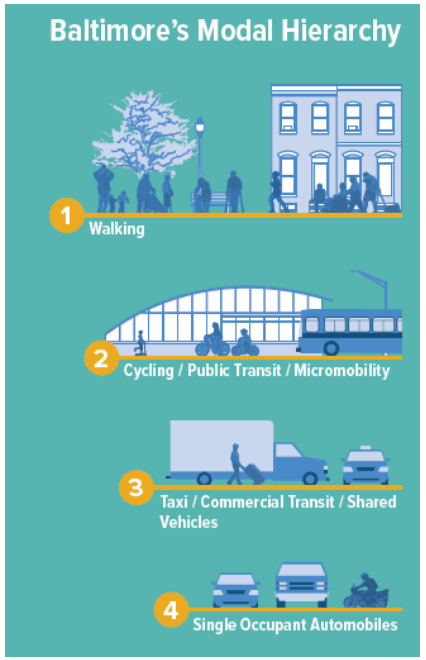
Priorities and Dimensions based on Street Type



- **Why aren't people using the sidewalk here?**
- **Stop putting sidewalks with no buffer to traffic. Satisfying the minimum for accessibility does not equal safety or comfort.**
- **Reevaluate "can't" when considering roadway capacity**
  - **"We can't reduce the road from 4 lanes to 3 lanes because it would be too congested"**
- **We designed a street that's only comfortable in a car; therefore people only drive; then we say "Why would we reappropriate space. No one's walking?"**

Design Guidance

What if we followed these priorities in the past?



- **Baltimore City before MLK Jr. Blvd was built = 10th most populous city.**
  - **Today = 30th most populous city.**
- **What would have happened if something like the street below was built instead of an 8-lane urban highway?**
  - **Driving would have been more difficult in exchange for better transit, better bikability, safer streets, more commercial activity, better tree canopy, increased connectivity between Downtown and West Baltimore**

Sidewalk, Trees, Auto Lane, Auto Lane, Auto Lane, Auto Lane, Trees, Auto Lane, Auto Lane, Auto Lane, Auto Lane, Trees, Sidewalk

Sidewalk, Bike Lane, Parking/Trees, Auto Lane, Bus Lane, Trees, Bus Lane, Auto Lane, Trees, Bike Lane, Sidewalk

These are about the same width

Speed Limits, Target Speeds, and Design Speeds by Street Type

- **Set Speed Limits and Design/Target Speeds by Street Type**

- **Requires enabling legislation for widespread implementation (that almost passed)… maybe next year**

Table 10. Target Speeds by Street Type

	Target Design Speed (MPH)
Downtown Commercial	
Base Target Speed. However, if:	25
On Bicycle Network (Separated/Buffered Bike Lanes)	25
On Transit Priority Network	25
On Truck Route	25
Downtown Mixed-use	
Base Target Speed. However, if:	25
On Bicycle Network (Separated/Buffered Bike Lanes)	25
On Bicycle Network (Traditional Bike Lanes)	20
On Transit Priority Network	25
On Truck Route	25
Urban Village Main	
Base Target Speed. However, if:	20
On Bicycle Network (Separated/Buffered Bike Lanes)	20
On Bicycle Network (Traditional Bike Lanes)	20
On Transit Priority Network	20
Urban Village Neighborhood	
Base Target Speed. However, if:	20
On Bicycle Network (Separated/Buffered Bike Lanes)	20
On Bicycle Network (Traditional Bike Lanes)	15

(table continues next page)

Changing the Guidelines

From Smart Growth America, Dangerous by Design

Source: Smart Growth America, Groundhog Day

Is there some level of carnage we could reach where local, state, and national transportation policymakers and leaders would finally wake up to the crisis at hand? What would it take? Is it 7,000 fatalities a year? 8,000? What's the magic number?

What would it take for them to finally choose to stand athwart history and yell "STOP?" And then join us and others in saying:

- Stop prioritizing speed over the safety of all people
- Stop choosing to move cars fast at all costs
- Stop thinking we can educate people out of an engineering problem
- Stop ignoring the impact of ever-enlarging trucks and SUVs on the likelihood of being killed by one
- Stop blaming the victims who are struck and killed
- Stop treating every street or road like it serves the same purpose
- Stop thinking that cars moving fast = a prosperous economy
- Stop thinking that enforcement isn't tainted by issues of systemic racism
- Stop making it impossible to cross the street
- Stop valuing some lives more than others
- Stop repairing dangerous roads in well-to-do neighborhoods or prosperous downtowns while leaving the most dangerous ones unchanged in Black neighborhoods

We need to wake up from this Groundhog Day.

Changing the Guidelines

- **Adapt Guidelines to Local Conditions**
  - **Baltimore's courteous, patient drivers**
  - **Limited resources and money to perform studies on every corridor**
  - **Stop pretending that the current manuals = 100% safe**
- **Employ Guidance to Implement Change Without Red Tape, Informed by Crash Data**

Operational Practices (Do's and Do Not's)

Left-Turn Phasing

Roadways with three or more through lanes in each direction should have protected-only signal phasing for any signalized left-turn movements. In general, exclusive/permissive signal phasing should not be implemented on roadways on which the left-turn lane has three or more opposing lanes. The requirements of left-turning drivers to assess both a gap in 3+ lanes of traffic and any conflicting pedestrians in the crosswalk to the left can increase the likelihood of an angle crash or pedestrian-involved crash.

"Sure, I can assess a gap in 4 lanes of opposing traffic while simultaneously giving the pedestrian in the crosswalk that's 90 feet away the right of way because the sign tells me so"

Changing the Guidelines

AUTOTURN™

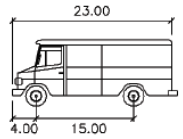
- **Use as a practical check, but don't depend on it.**
- **Baltimore City's historic roads weren't designed for trucks in mind but still serve trucks… and they're safer.**

Design Vehicle by Street

Design vehicles vary by Street Type, and exceptions should be considered to design for smaller vehicles on specific intersection corners that do not need to accommodate a bus or a truck.

General Design—DL-23

This is a standard delivery vehicle often used for package delivery services to both residential and business locations. The DL-23 shall be the design vehicle on any street that does not accommodate a transit route or a truck route. This is based on the most recent edition of NACTO *Urban Street Design Guide* as specified in Baltimore City Code Art. 26 Subtitle 40 Complete Streets SS 40-27(B).



DL–23

	feet
Width	: 8.50
Track	: 8.50
Lock to Lock Time	: 6.0
Steering Angle	: 40.4

Table 9. Standard Radii for Intersection Design/ Redesign and Quick-Build Projects

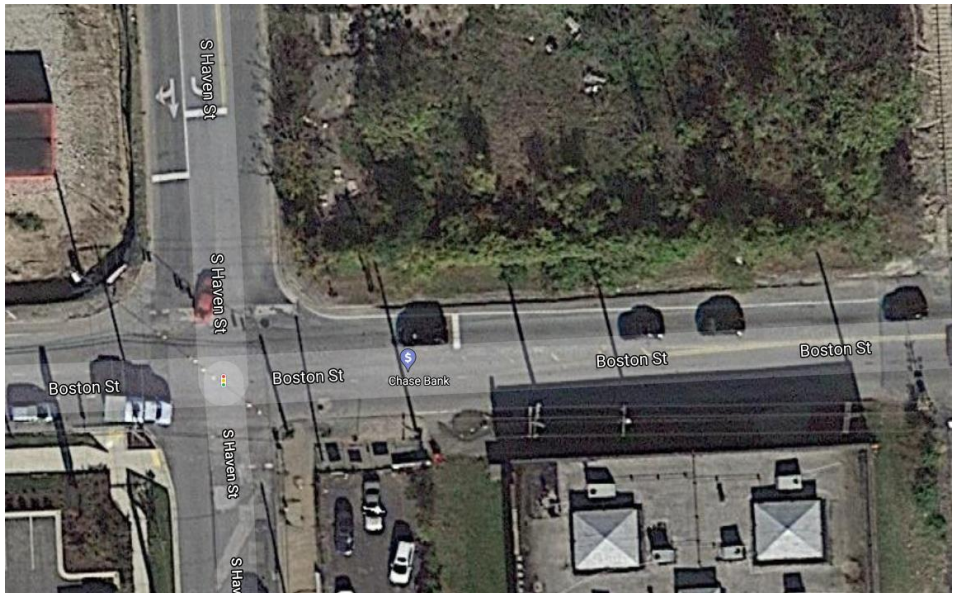
Street Intersections	Effective Curb Radius
Residential Streets	10 feet
Mixed Use/Commercial (Not Transit/Truck Routes)	15 feet
Transit Streets	20 feet
Local Truck Routes	25 feet
Major Truck Routes	25–30 feet

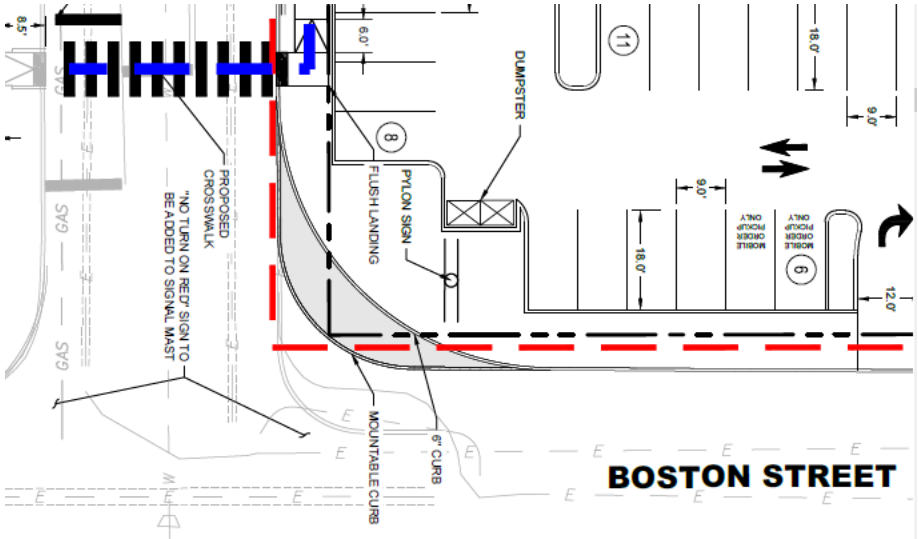
» A crawl speed of less than 5 mph should be assumed for turning simulations of large vehicles on truck and transit routes. On smaller streets or access points for deliveries, a "stop and turn full lock" approach should be used in simulation of the control vehicle turn.

Changing the Guidelines

- **Check Crash History**
- **Curb radii: If it's not broke, don't fix it**
- **Perceived "difficulty" or "dysfunction" does not mean unsafe. It's often safer this way**

Trucks Make This Turn





Changing the Guidelines

Number of Through Lanes

Consistency in the number of through lanes on a corridor should be a priority to prevent aggressive driving and passing maneuvers. Unless additional lanes can be justified by a significant traffic source or turning movement, the number of through lanes should be kept the same. For example:

- Projects on roadways that transition from 2-through lanes to 4-through lanes to 2- through lanes should be analyzed for conversions to a consistent 2-through lanes.

Lane additions that are justified through a significant traffic generator or turning movement should stay consistent downstream until dropped as high-volume turning movements or other "sinks." If the lane drop does not occur at a high-volume "sink," or turning movement, the lane addition should be considered for removal.

Lane Drops

Merging lane drops, or lane drops that occur at low-volume turning movements should be avoided when possible. In the context of an urban environment, lane drops create opportunities for aggressive drivers to speed in order to get ahead of queued traffic before or after an intersection. Consistency in through lanes should be considered. Projects that occur on roadways with existing lane drops should investigate methods of eliminating these conditions by extending the segment in which the number of lanes is reduced.

Lane Drops at Intersections

Existing intersections with safety issues/high crash rates should be prioritized for safety treatments, whether through a quick-build program or longer-term capital improvement projects. Lane drops that occur just prior to or after those intersections should be eliminated, as while they may increase traffic capacity slightly, they can increase the speed differential between lanes and increase the likelihood of aggressive driving, passing, and merging.

Similarly, lane additions for capacity reasons should not occur at or just before an intersection. Removing situations in which this condition exists can help prevent aggressive lane changes/passing and ambiguous right-of-way assignment through intersections where the number of through lanes increases just before an intersection and decreases shortly after.

Changing the Guidelines: Bike Safety, Ped Safety

Table 3. NACTO's Choosing an all Ages & Abilities Bicycle Facility, Modified to be Baltimore-Specific

Roadway Context				All Ages & Abilities Bicycle Facility
Target Motor Vehicle Speed	Target Motor Vehicle Volume (Single Direction ADT)	Motor Vehicle Lanes	Key Operation Considerations	
Any			Any of the following: • high curbside activity • high frequency bus service • high levels of motor vehicle congestion • high number of turning conflicts	Separated Bike Lanes or Shared-Use-Path
<10 mph	Less relevant	No Centerline or single lane one-way	Pedestrians share the roadway	Urban Village Shared Street
≤20 mph	1,000–2,000		<50 motor vehicles per hour in the peak direction at peak hour	Bicycle Boulevard, Contra-Flow Bike Lane (1)
≤25 mph	500–1,500			
	1,500–3,000	Single lane each direction or single lane one-way	Low curbside activity or low congestion pressure	Traditional or Buffered Bicycle Lane, Left-Side Bike Lane (1), Buffered Counterflow Bike Lane (1) or Separated Bicycle Lane
	3,000–6,000			Buffered Bicycle Lane, or Protected Bicycle Lane
	>6,000			Separated Bicycle Lane
	Any	Multiple lanes per direction		Separated Bicycle Lane
>25 mph	≤6,000	Single lane each direction	Low curbside activity or low congestion pressure	Separated Bicycle Lane, or reduce speed
>25 mph		Multiple lanes per direction	Low curbside activity or low congestion pressure	Separated Bicycle Lane, reduce to Single Lane or reduce speed
>25 mph	>6,000	Any	Any	Separated Bicycle Lane
High-speed limited access roadways	Any	Any	High pedestrian volume	Shared-Use-Path with Separated Walkway or Separated Bicycle Lane

Passive Measures

Providing passive measures such as stop signs, pedestrian crossing signs, and striped crosswalks may be appropriate at unsignalized intersections on lower volume roads that operate at their intended target speeds. Passive measures are acceptable crossing treatments on streets that:

- Are classified as local or collector
- Operate at a target speed of <25 mph
- Have Average Daily Traffic of <8,000 vehicles per day
- Are only one lane in each direction

See Intersection Types below for further design guidance.

Active Measures and Raised Crosswalks

Providing active measures such as rectangular rapid flashing beacons or other flashing lights, or raised crosswalks may be appropriate on medium volume roadways that operate at their intended target speeds. Active measures are acceptable crossing treatments on streets that:

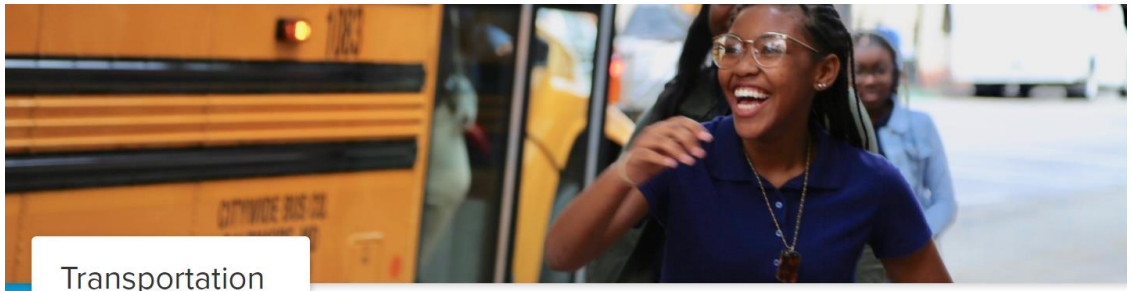
- Are classified as a collector or arterial
- Operate at a target speed of <25 mph
- Have Average Daily Traffic of <12,000 vehicles per day
- Are only one lane in each direction

Signalized Crossings

High volume multi-lane roadways that experience higher speeds require special attention to make crossings all ages. Both passive measures and active measures to assist in pedestrian crossings rely on driver compliance in yielding to pedestrians. Because driver behavior differs from city to city, the approach to providing for increased pedestrian safety should adapt to the driver behavior exhibited in each city; therefore deviation from national guidance may be warranted. In general, signalized crossings including a full-signal, pedestrian signal, or HAWK signal are recommended treatments on streets that:

- Are classified as arterial
- Operate at a speed of >25 mph
- Have Average Daily Traffic of >12,000 vehicles per day
- Are multiple lanes in one direction

See Intersection Types below for further design guidance.



Transportation

Students are eligible for transportation based on the distance from home to school:

- Elementary school students who live more than 1 mile from their neighborhood school receive yellow bus service.
- Middle school students who live more than 1.5 miles from their neighborhood or citywide school (selected through middle school choice) receive a One Card for use on the MTA.
- High school students who live more than 1.5 miles from their school receive a One Card for use on the MTA.

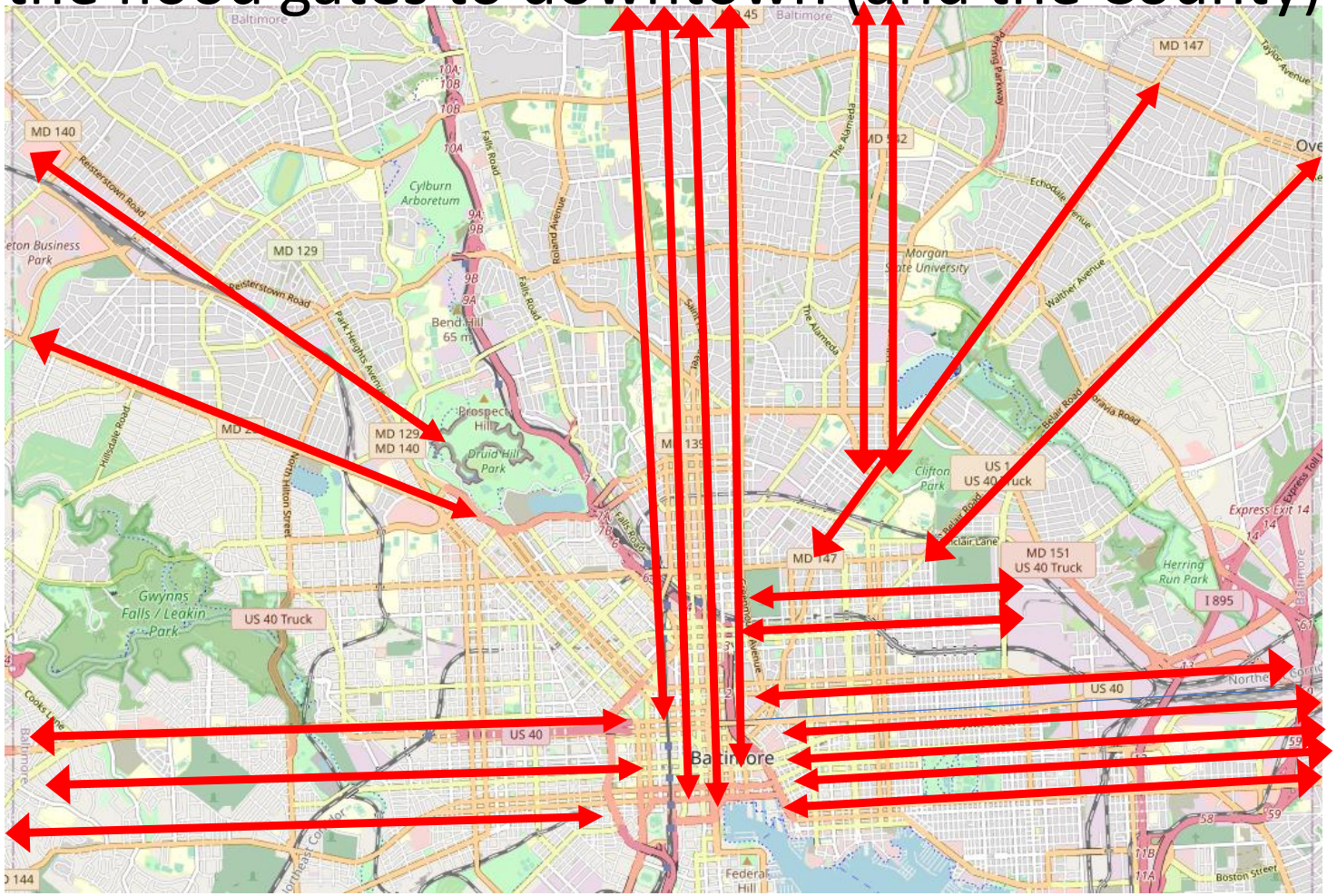
Changing the Guidelines: Traffic Signals

Traffic Signal **Operations**

- Focuses on proper signal timing by street type
  - Shorter cycles especially for narrower roads
  - Emphasis on reducing “Excessive Green Time” to calm traffic
  - Transition from Corridor-Based to Balanced Signal Timing

- Basic “Do’s and Don’ts”
  - Eliminate multiple turn lanes phased concurrent with pedestrian movements
  - Only protected left-turn phasing when there are three opposing travel lanes

How timings have been set in the past… open the flood gates to downtown (and the County)

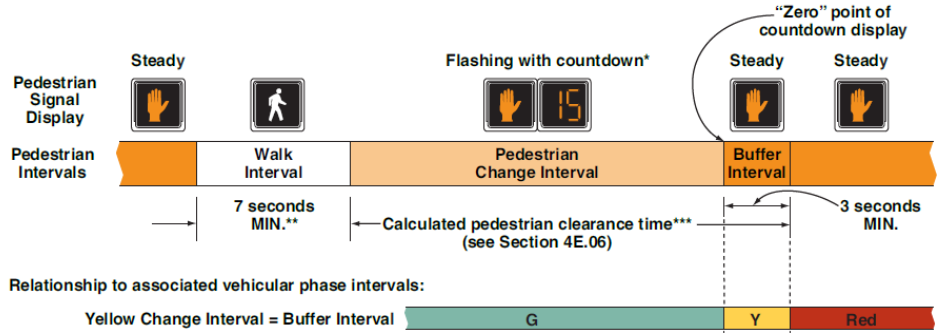


Changing the Guidelines: Traffic Signals

Table 8. Desirable Signal Timing Based on Street Type

Street Type	Timing Method	Peak Hours Cycle Length (sec.) (3)	Non-Peak Hours Cycle Length (sec.) (3)	Clearance Intervals	Pedestrian Phases	Coordination	Green Time Allocation
Downtown Commercial	(1)	60-90	60	(4)	(5)	(7)	(8)
Downtown Mixed-Use	(1)	60	40-60	(4)	(5)	(7)	(8)
Urban Village Main	(1)	60	40-60	(4)	(5)	(7)	(8)
Urban Village Neighborhood	(1)	60	40-60	(4)	(5)	(7)	(8)
Urban Village Shared Street	(1)	60	40-60	(4)	(5)	(7)	(8)
Urban Center Connector	(1), (2)	90-120	60-90	(4)	(6)		(9)
Neighborhood Corridor	(1)	60	40-60	(4)	(5)	(7)	(8)
Industrial Access	(1), (2)	90-120	60-90	(4)	(6)		(9)
Parkway	(1), (2)	90-120	60	(4)	(6)		(9)
Boulevard	(1)	60-90	60	(4)	(5)	(7)	(8)

- Keep Signal Cycles Short
- COVID-19 Pandemic has shown Excessive Green Time leads to speeding



12 If pedestrian volumes and characteristics do not require a 7-second walk interval, walk intervals as short as 4 seconds may be used.

- Stop Letting Level of Service Make Decisions
- Our Roads Designed before HCM/LOS are safer than the ones designed after

How You Can Get in Touch

Thank You!

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