Druid Park Lake Drive Complete Streets Feasibility Study Project Report

February 2022

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Table of Contents

1 Executive Summary

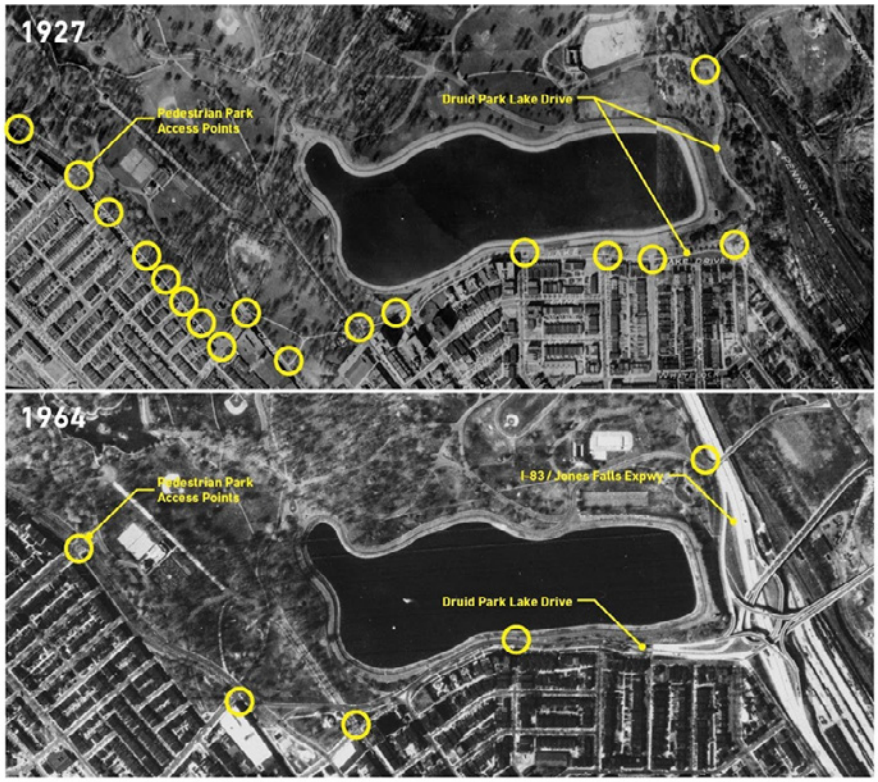
In 2020, the Baltimore City Department of Transportation (BCDOT) initiated a study and concept design for Druid Park Lake Drive, a 2.3-mile corridor in Central West Baltimore, Maryland that extends around the historic Druid Hill Park from I-83 to Greenspring Avenue's northern entrance. Druid Park Lake Drive is a significant transportation corridor that runs along the recreational, historic and community assets in and around Druid Hill Park. While the Druid Park Lake Drive corridor borders the United States' third-oldest public park and beautiful historic neighborhoods, the roadway is designed with the characteristics of a highway, rather than a neighborhood-scale roadway. Originally a two-lane residential street, the current alignment of Druid Park Lake Drive is now a 4-to-9-lane arterial road that carries high-speed vehicle traffic, lacks safe pedestrian, bicycle and transit infrastructure and effectively creates a barrier between neighboring communities and Druid Hill Park. The neighborhoods bordering Druid Park Lake Drive are predominantly Black and have experienced generations of disinvestment, racial discrimination, poor public health and decreased quality of life, emphasizing the importance of improving this corridor and reconnecting these communities to Druid Hill Park.

Through the Druid Park Lake Drive Complete Streets Feasibility Study, BCDOT and the WSP USA lead consultant team analyzed the Druid Park Lake Drive corridor based on Complete Streets principles and conducted a robust public engagement process. The result iso three concept designs that provide safe and accessible connections for people traveling on foot, wheelchair, bicycle, transit, e-scooters, and cars.

Background

BCDOT initiated the Druid Park Lake Drive Complete Streets Feasibility Study in 2020 in response to grassroots advocacy and public safety

Figure ES1: **Pedestrian Crossings on Druid Park Lake Drive before and after construction of Druid Park Lake Drive, 1927 and 1964**



concerns raised by the communities bordering Druid Park Lake Drive, non-profit organizations, and public officials. Building upon years of public outreach led by The Access Project (TAP) for Druid Hill Park, advocacy by community members and support by public officials, the communities around Druid Park Lake Drive called for the roadway to be redesigned using Complete Streets design principles to prioritize safety for all modes

of travel, accessibility for individuals with disabilities, multi-modal infrastructure, and an aesthetic that honors the historic relevance and green character of the surrounding communities and park.

The importance of this project lies in elevating equity and redressing past harm to communities of color caused by racially discriminatory policies of the 20th century. Druid Park Lake Drive, in its current form, is a result of these policies, including "redlining" that denied investment to minority communities and infrastructure decisions that prioritized fast car commutes over safe pedestrian access. In the 1950s, Druid Park Lake Drive was proposed as a feeder road to the Jones Falls Expressway (I-83). Despite community opposition, the one-lane road surrounding Druid Hill Park was expanded to its current four-to-nine-lane roadway alignment designed to allow for efficient car throughput to I-83. While the expanded roadway allowed for fast car commutes from the suburbs to downtown Baltimore, the construction of Druid Park Lake Drive cut surrounding neighborhoods off from Druid Hill Park by creating a highway-sized roadway up to 145 feet wide, providing minimal pedestrian crossing opportunities and excluding multi-modal infrastructure. Druid Park Lake Drive has denied safe access from neighboring communities to Druid Hill Park, one of the area's greatest assets, for over 70 years.

Addressing Equity

Equity is a driving factor for the redesign of Druid Park Lake Drive, and ensuring access for all modes, ages and abilities is a key component in creating an equitable corridor. Demographic data for the area within a half-mile and quarter-mile radius of the corridor illustrate what equity means in the context of Druid Park Lake Drive. Of the 88,000 people living within a half mile of Druid Park Lake Drive, 30 percent live below the poverty line, 22 percent live with a disability and 93 percent are people of color.[1] Nearly half of households living in the neighborhoods around the Druid Park Lake Drive do not have access to a car. These community members get around by walking, cycling, using wheelchairs, riding scooters and catching transit. Building infrastructure to allow these residents to safely use Druid Park Lake Drive is key in advancing equity.

Through the public outreach process, residents of neighborhoods adjacent to Druid Hill Park informed the study team that they are afraid to walk, use a wheelchair or bike from their communities to Druid Hill Park because the roadway is so unsafe for these modes of transportation. The corridor has very few intersections for pedestrians to cross, and the intersections that do exist are inhospitable to non-vehicular modes because of long crossing distances and poorly marked crosswalks.

The Big Jump shared-use path, built in 2018 to provide a safe pedestrian and bicycle connection between the Reservoir Hill and Remington neighborhoods, is one of the only opportunities for cyclists, wheelchair riders and micro-mobility riders to safely travel on the corridor. The Big Jump extends from Wyman Park Dr. over the 28th St. Bridge and ends at Madison Ave. East of Madison Ave. There is only one short segment of bicycle lane in front of the Parks and People Foundation. Beyond these limited bicycle paths, the corridor has no infrastructure for bikes and other micro-mobility devices. Basic safety and accessibility measures for these modes are not present along Druid Park Lake Drive, despite the demonstrated need and desire for these facilities.

[1] American Community Survey, 2015-2019 Five-Year Estimates

Long-Term Vision

Public outreach for the Druid Park Lake Drive Complete Streets Feasibility Study produced the following long-term vision for the corridor: ***We envision a reimagined Druid Park Lake Drive that is safe, built for the human scale and accessible for all ages, abilities, and modes of transportation. This future corridor will closely align with the City's Complete Streets principles, while creating a functional, vibrant, and aesthetically pleasing roadway that reclaims roadway space to re-establish safe multimodal connections between surrounding communities and the park and embraces the area's natural beauty and historic significance. Through the redesign of this corridor, we aim to elevate health equity, allow communities to support aging in place, and support expanded transit service to Druid Hill Park.***

Concepts for the Druid Park Lake Drive Complete Streets Feasibility Study were developed to meet six goals to expand safe access between neighborhoods and the park for all modes of travel:

1. Improve safety of Druid Park Lake Drive for all users, including pedestrians, individuals with disabilities, cyclists and micro-mobility users, transit users, and drivers.
2. Reconnect neighborhoods to Druid Hill Park.
3. Reduce speeding on the corridor.
4. Highlight historic landmarks on the corridor.
5. Ensure the entire corridor is ADA compliant.
6. Increase corridor beautification and green aesthetics.

Developing Complete Streets Concepts for Druid Park Lake Drive

The concepts developed through the Druid Park Lake Drive Complete Streets Feasibility Study were developed using Complete Streets guidance as detailed in Baltimore City's Complete Streets Manual (2021) and guidance from resources such as the National Association of City Transportation Officials (NACTO) design guides. Through a public outreach process, review of existing plans and studies, discussions with Baltimore City agencies, and application of Complete Streets design principles and best practices, the Project Team developed three concepts for a reimagined Druid Park Lake Drive.

The development of these concepts was guided by key principles outlined in the Complete Streets Manual and several key questions, listed below.

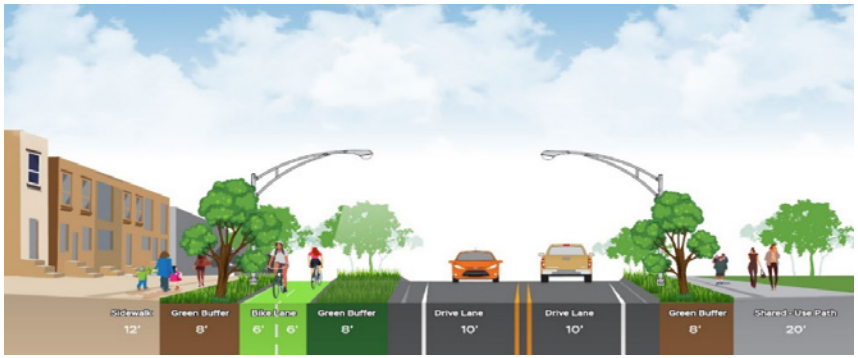
Guiding Complete Streets principles:

- Address Safety First
- Be Accessible by Everyone
- Improve Mobility
- Ensure Equity
- Reflect Baltimore's Unique Communities
- Be Sustainable

Guiding Questions for Druid Park Lake Drive Concept Design:

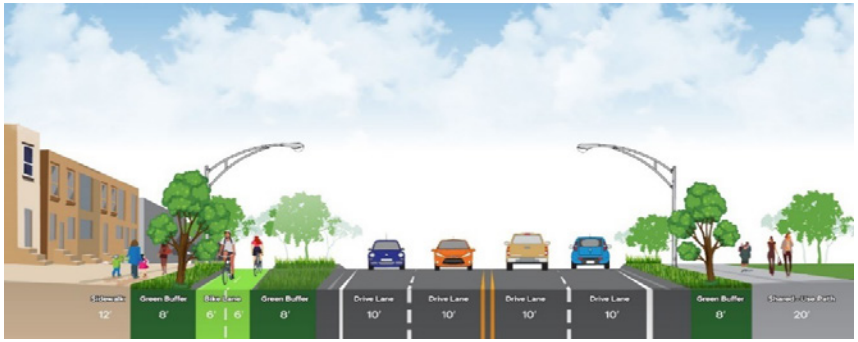
- How do we create a roadway that is safe, accessible and pleasant for people traveling on foot and using mobility devices such as wheelchairs?
- How do we create a corridor that allows for safe and convenient travel by bicycle?
- How can we eliminate confusion and safety risks at intersections?
- Are there opportunities to return roadway space to Druid Hill Park?
- Can we integrate transit priority infrastructure to improve the reliability of transit on the corridor?
- Are there opportunities to integrate trees and green infrastructure to the corridor to increase resiliency and mirror the natural landscape of the park?
- Can we reorient the roadway design to highlight historic elements of the park, such as the historic archway on Madison Ave.?
- Are there opportunities to expand connectivity by converting one-way streets to two-way streets?
- Can we minimize impacts to local neighborhood roads?

The three concepts were designed to address equity of park access and significantly improve safety for all roadway users, focusing on the most vulnerable users: pedestrians, cyclists, micro-mobility users and users of mobility devices such as wheelchairs. Typical sections of the three concepts – single-lane, hybrid and two-lane – are illustrated below.



Single lane concept: One lane per direction

Hybrid concept: One lane westbound and one lane eastbound



Two-lane concept: Two lanes per direction

A detailed discussion of the three concept options is included in Section V: Concepts and an evaluation of the concepts is included in Section VI: Concept Evaluation. The Project Team developed all concepts to incorporate safe and connected infrastructure for all modes of travel by repurposing existing roadway space to better serve non-vehicular modes of traffic. All three concepts achieve the following:

- More than double the number of existing pedestrian access points to the park
- Add ADA-compliant and continuous sidewalks on the entire corridor
- Add a buffered two-way cycle track and shared-use path entirely separated from traffic
- Simplify intersections
- Add protected infrastructure for bicycles and pedestrians at intersections
- Add landscaping throughout the corridor
- Provide easy and safe to access the park from surrounding communities

Public Feedback

An extensive public outreach process was conducted throughout the planning process to gain input from community members surrounding the project area.

a. The Project Team held ***one-on-one interviews with community leaders*** at the beginning of the project to collect information about the corridor, identify community concerns and priorities, and establish points of contact to distribute project information to communities.

b. The Project Team reviewed ***existing plans and studies*** to understand public input gained through previous outreach and planning efforts.

c. The Project Team held a ***community stakeholder visioning exercise*** with community leaders and representatives from organizations around the project area to identify the vision, goals and objectives for the Druid Park Lake Drive project.

d. ***A virtual field tour*** was developed using ArcGIS Online and distributed to community stakeholders. This platform allowed stakeholders to add comments to an online map to point out the primary concerns on the Druid Park Lake Drive corridor.

e. The Project Team attended ***meetings with community groups*** throughout the project to provide project information to the public and to present concepts for the redesigned corridor. The Project Team joined community organizations' regularly scheduled meetings to meet community members where they already gathered.

f. BCDOT and the Project Team held ***two public meetings*** via Zoom to present project information, goals and concepts to community members.

g. The Project Team held ***pop-up events*** in public venues, such as the Druid Hill Farmers Market, Juneteenth celebrations, Cloverdale Basketball Court and Druid Hill Park. These events provided an opportunity for the Project Team to share information with the public, provide hard copies of comment cards and answer questions about the project.

Adapting to the challenges presented by COVID-19, the Project Team used several methods to meaningfully engage communities and other stakeholders while gathering in person was restricted.

- MURAL, an interactive online platform, was used to generate input from participants through a variety of activities on a virtual "whiteboard". Participants were able to add comments in real-time, vote on preferred images and ideas, and add words and images to represent their preferences.
- A virtual meeting room format was used for a public meeting to simulate an in-person presentation and allow participants to easily navigate information about the project online.
- The Project Team provided hard copies of meeting announcements and comment cards to community leaders, who distributed them door-to-door to their communities.
- The Project Team mailed postcards to addresses within a quarter-mile of the corridor to ensure that community members without internet access were provided the opportunity to fill out the comment card.
- The Project Team provided hard copies of the project presentation and comment card at libraries and BCDOT offices to provide another venue for community members to fill out the comment card.

The comment card generated 959 responses from members of the public. The results of the comment card show that public support leans heavily towards the single-lane concept, with 81 percent of respondents (779 respondents) stating that they prefer this concept. Only 18 percent of respondents (170 respondents) stated that they prefer the two-lane option and one percent (15 respondents) of respondents prefer the hybrid option. More detailed analysis of the comment card results is included in Section III: Public Outreach.

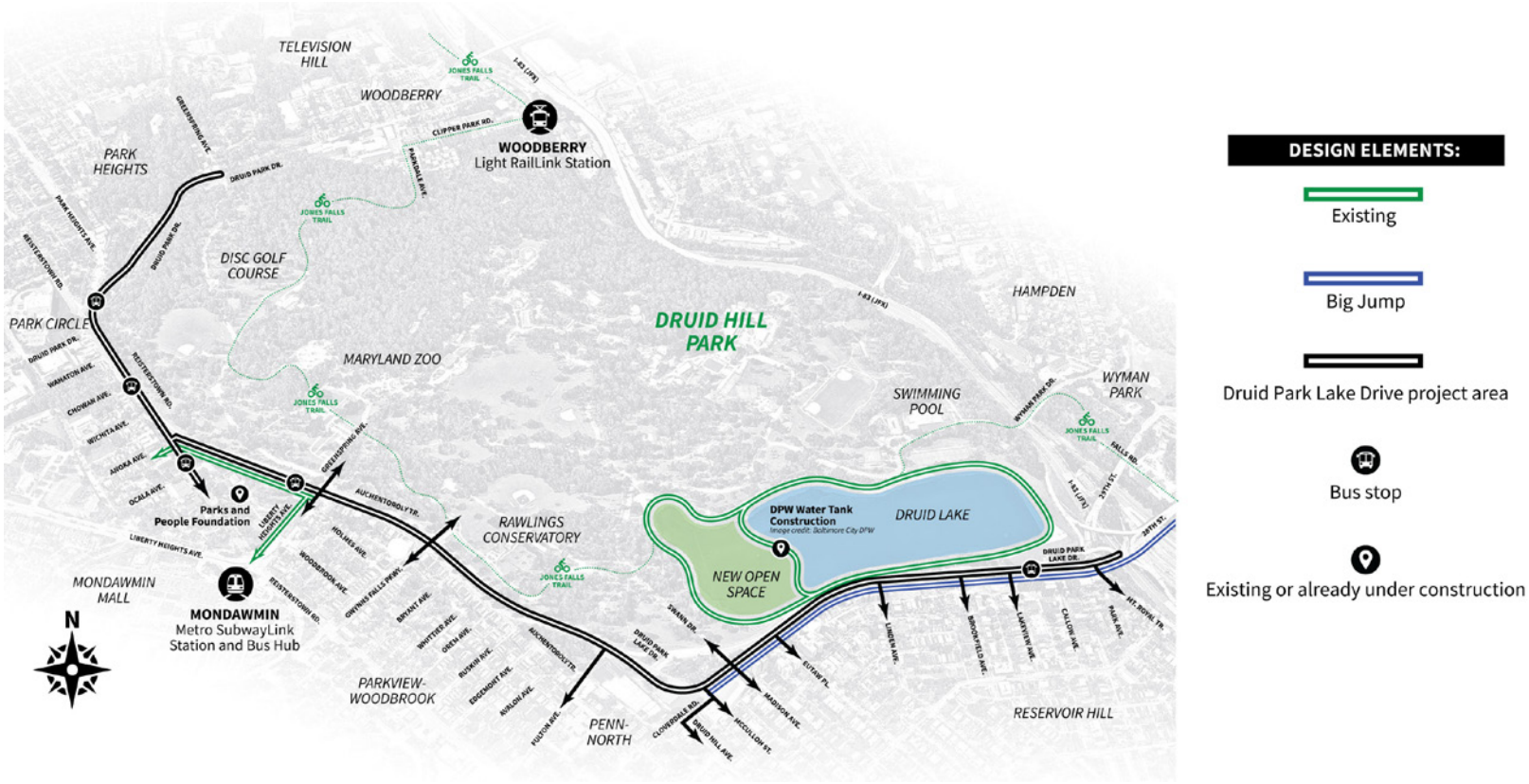
Moving Forward

The 15% design concepts developed through this study are a starting point for the advancement of a design that transforms the Druid Park Lake Drive Corridor to make it safe and easy for community members to walk, jog, bike, use a wheelchair, ride an e-scooter and use transit to access the world-class park in their backyards. Additional inputs, such as an origin-destination analysis, topographic and utility survey, advanced traffic modeling, and additional coordination with partner agencies will inform a selection of a preferred concept to advance to higher levels of design.

1 Background

Baltimore City DOT and a consultant team from WSP USA conducted the Druid Park Lake Drive Complete Streets Feasibility Study between December 2020 and January 2022. The purpose of this project was to provide an analysis of the Druid Park Lake Drive corridor and develop concept design options for the corridor using Complete Streets principles to improve the safety, accessibility, multi-modal infrastructure and aesthetics of the corridor. The project limits include the 2.3-mile Druid Park Lake Drive corridor from the I-83 off-ramp to the second entrance of Greenspring Avenue, as shown in **Figure 1**. *The corridor changes names several times over the length of the roadway; maps and roadway signs show that portions of the corridor are named Auchentoroly Terrace, Reisterstown Rd., and Druid Park Dr. For the purposes of this report, all portions of the corridor identified in* **Figure 1** *will be referred to as "Druid Park Lake Drive".*

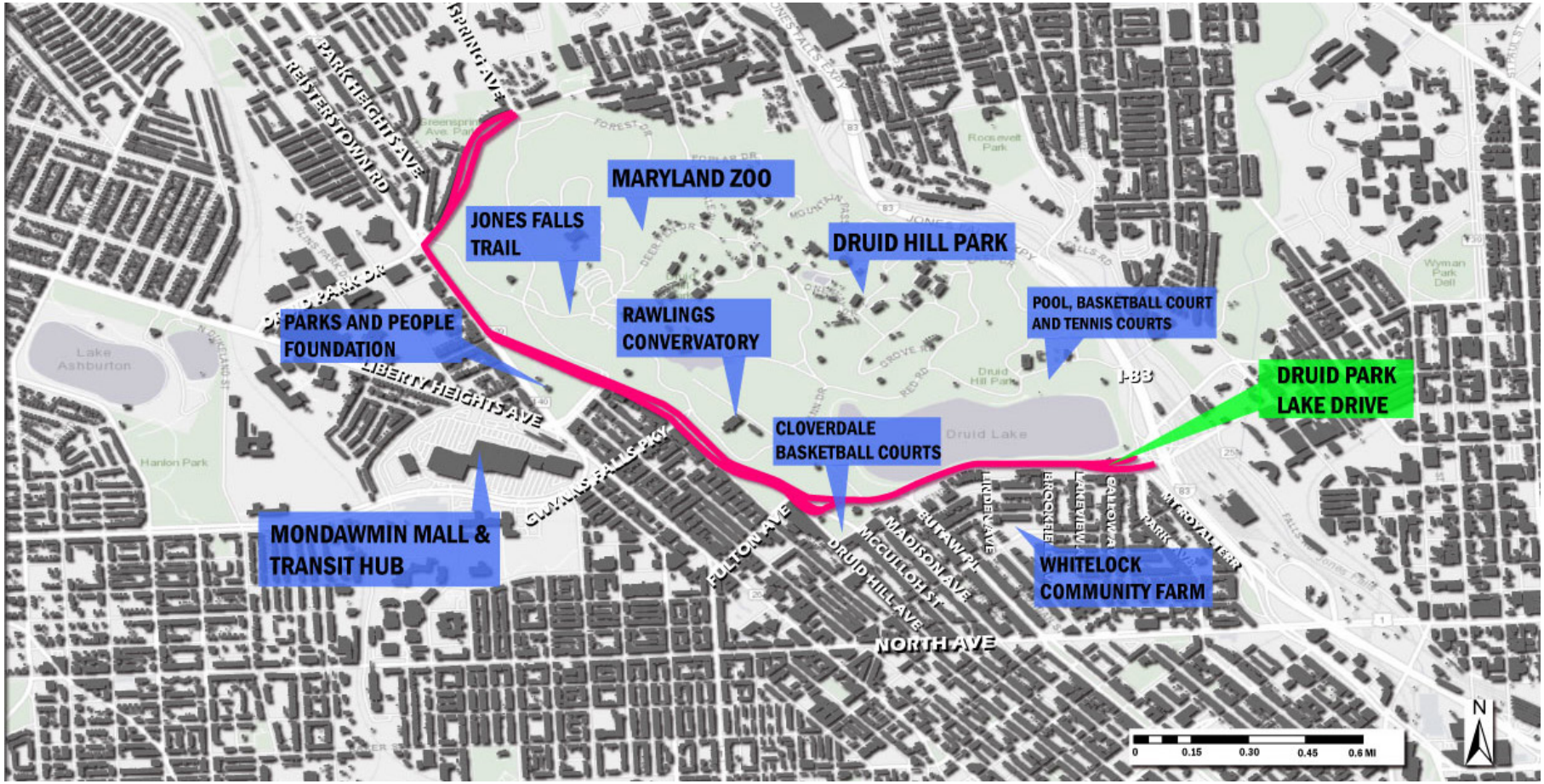
Figure 1: Druid Park Lake Drive Project Area



Corridor Assets

The area surrounding Druid Park Lake Drive is rich in community and regional assets, with eight historic neighborhoods directly adjacent to the corridor, Druid Hill Park serving as a recreational and cultural anchor, the Maryland Zoo attracting visitors from across the region, several non-profit and religious organizations operating around the corridor, and community-scale parks and basketball courts providing local recreational opportunities. **Figure 2** *identifies key assets around the Druid Park Lake Drive project.*

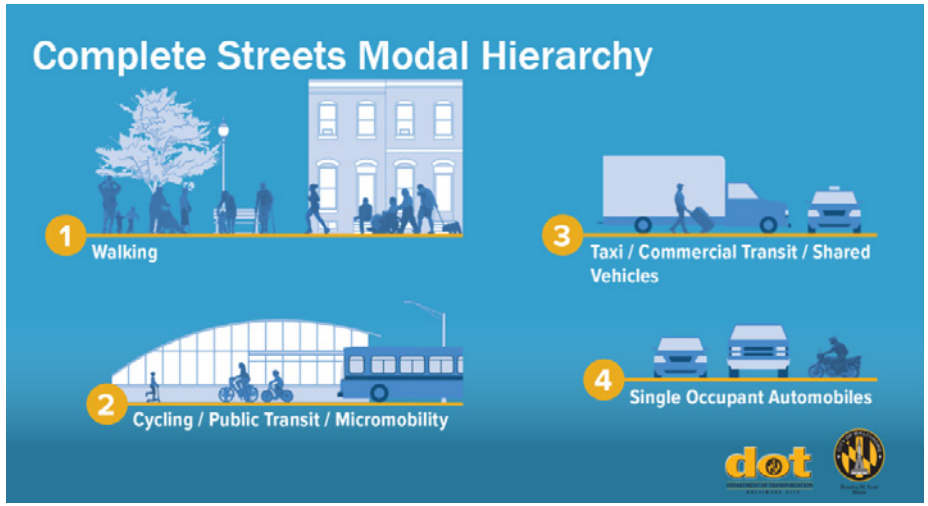
Figure 2: Assets in the Druid Park Lake Drive Study Area



Complete Streets Design Considerations

The concepts developed through this project used the Complete Streets principles and design guidance established in Baltimore City's 2021 Complete Streets Manual. This manual provides guidance for roadway design to maximize safety for the most vulnerable users: pedestrians, cyclists, public transit users and micro-mobility users. The modal hierarchy established in the Complete Streets Manual challenges past practices of designing roadways primarily for the throughput of cars and reorients street design towards the safe movement of people traveling through their neighborhoods on foot, by bike, with wheelchairs and on transit. This approach contributes to more vibrant communities by improving walkability, enhancing safety, and emphasizing equity.

Figure 3: Baltimore City Complete Streets Modal Hierarchy



System Performance:

1. Address safety first
2. Be accessible by everyone
3. Improve mobility

Community Enhancement

4. Ensure equity
5. Reflect Baltimore's unique communities
6. Be sustainable

The concepts for Druid Park Lake Drive were developed to meet the Complete Streets Manual's guiding principles and evaluated on their performance in these areas. The Project Team used the Complete Streets Manual's recommendations for widths and configuration of travel lanes, sidewalks, bicycle lanes and intersections to develop the Druid Park Lake Drive concept designs. Specific references to sections of the Complete Streets Manual are included in Section IV: Design Considerations.

Figure 4: DPLD / Gwynn Falls Parkway Intersection

Figure 5: Concept Development Process

2 Vision, Goals and Objectives

"We envision a reimagined Druid Park Lake Drive that is safe, built for the human scale and accessible for all ages, abilities, and modes of transportation. This future corridor will closely align with the City's Complete Streets principles, while creating a functional, vibrant and aesthetically pleasing roadway that reclaims roadway space to re-establish safe multimodal connections between surrounding communities and the park and embraces the area's natural beauty and historic significance. Through the redesign of this corridor, we aim to elevate health equity, allow communities to support aging in place, and support expanded transit service to Druid Hill Park."

Vision

The vision for Druid Park Lake Drive was established through visioning meetings with community stakeholders, institutional partners within a half-mile of the Druid Park Lake Drive corridor, and City and State agencies. Through two collaborative public and interagency working sessions, a vision statement was set for the project, in addition to goals and objectives to guide concept designs.

Goals & Objectives

Goals

1. Improve safety of Druid Park Lake Drive for all users, including pedestrians, individuals with disabilities, cyclists and micro-mobility users, transit users, and drivers.
2. Reconnect neighborhoods to Druid Hill Park.
3. Reduce speeding on the corridor.
4. Highlight historic landmarks on the corridor.
5. Ensure the entire corridor is ADA compliant.
6. Increase corridor beautification and green aesthetics.

Table 1: Project Objectives

Safety	Accessibility	Multi-Modal Access	Aesthetics
▸ Design for pedestrian and bike safety ▸ Reduce number and width of lanes ▸ Reduce car speeds ▸ Remove highway-sized roads ▸ Support aging in place through safe infrastructure ▸ Improve intersection safety	▸ Reduce intersection width ▸ Ensure ADA accessibility ▸ Improve connections to Mondawmin Mall ▸ Add crosswalks at side streets to connect communities to Druid Hill Park ▸ Explore pedestrian bridge where grades make at-grade crossing challenging	▸ Add permanent shared-use path ▸ Improve pedestrian infrastructure ▸ Add transit service and stops ▸ Improve bike connections to the park ▸ Improve signal timing for pedestrians	▸ Add public art ▸ Add lighting ▸ Make neighborhood and park feel contiguous ▸ Highlight historic elements ▸ Add continuous landscaping on the corridor

3 Existing Conditions Analysis

Figure 6: DPLD / Gwynn Falls Parkway Intersection

The Project Team performed an existing conditions to provide a baseline understanding of the issues, safety, traffic and demographic characteristics on and around the Druid Park Lake Drive corridor. The Project Team conducted site visits, reviewed existing plans and studies, performed a desktop review of geographic data, studied crash data, collected traffic count data, and analyzed American Community Survey data.

Existing Plans and Studies

More than 30 plans and studies have been developed for the communities, parks and transportation infrastructure surrounding Druid Park Lake Drive. Four studies have been developed specifically for Druid Park Lake Drive, providing recommendations for safety and accessibility improvements on portions of the corridor. These studies point to the need for safer, more accessible, and multi-modal design for Druid Park Lake Drive and exhibit the efforts of City, State, institutional and community partners to plan for improvements in the area surrounding Druid Hill Park.

Table 2 provides an overview of plans, studies, policy documents, and projects in and around the Druid Park Lake Drive study area. Appendix A contains a detailed summary of these plans and studies.

Table 2: **Existing Plans and Studies Related to Druid Park Lake Drive**

Druid Park Lake Drive Plans and Studies	Neighborhood/Park Plans	Transportation Plans and Policy Documents	Ongoing Planning and Construction
▸ Druid Hill Park Neighborhood Access Project (2017) ▸ NDC Plan to Connect Reservoir Hill to Druid Hill Park (2015) ▸ TAP Druid Hill Auchentoroly Mondawmin Report (2020) ▸ Big Jump Evaluation (2020)	▸ Parks and People Strategic Plan (2015) ▸ Rawlings Conservatory Master Plan (2006) ▸ Renewing Druid Hill Park (1995) ▸ Penn North Area Master Plan (2006) ▸ Park Heights Master Plan (2008) ▸ Liberty Heights Corridor Comprehensive Real Estate and Economic Development Assessment (2015) ▸ Greater Rosemont and Mondawmin (GRAMA) Master Plan (2014) ▸ LINCS Liberty Heights Avenue (2016) ▸ John Eager Howard INSPIRE Plan (2017)	▸ Big Jump Evaluation Report (2020) ▸ City of Baltimore Bicycle Master Plan (2015; 2017) Amendment) ▸ MDOT MTA Regional Transit Plan (2020) ▸ Transit Network Improvements and Regional Transit Corridors Technical Report (2020) ▸ Complete Streets Manual (2020) ▸ Baltimore Greenway Plan (2019)	▸ Druid Lake Vision Plan (2021) ▸ Parkview Recreation Center (Planning is ongoing) ▸ DPW Druid Tanks Project (Completion 2022) ▸ Druid Hill Park Swimming Pool (Completion 2022) ▸ North Ave. Rising (Completion 2022) ▸ Ashburton Tanks Project (Completion 2022)

Issues on the Corridor

The Project Team broke the corridor into five analysis segments and conducted an in-depth examination of the issues for each segment. Using site visits and desktop review, these conditions of these segments were viewed through the four project themes: safety, accessibility, multi-modal access and aesthetics. Based on this analysis, issues on the corridor were consolidated under these four themes to identify the issues to address through concept design. Appendix D includes a chart with characteristics of the corridor by segment.

Primary Issues on the Druid Park Lake Drive Corridor

SAFETY

- ***Druid Park Lake Drive is a wide roadway with high-speed vehicular traffic.*** Between Fulton Ave. and Liberty Heights Ave., Druid Park Lake Drive has between 3 and 5 travel lanes per direction. This encourages high vehicular speeds and frequent lane changes.
- ***Druid Park Lake Drive has insufficient pedestrian crossing opportunities into Druid Hill Park.*** Druid Park Lake Drive between I-83 and Greenspring Ave. has only seven intersections allowing pedestrian crossings into Druid Hill Park. Long distances between crosswalks makes it challenging for residents of surrounding neighborhoods to access the park and causes many people to jaywalk across uncontrolled traffic because of the inaccessibility of safe crossing opportunities.

Figure 7: Druid Park Lake Drive between Fulton Ave. and Gwynns Falls Ave.

  - There are no pedestrian crossings east of Linden Ave., requiring pedestrians traveling from the eastern end of the corridor (closest to the I-83 ramp) to walk 1/3 mile to access Druid Hill Park. Likewise, the distance between the Fulton Ave. and Gwynns Falls intersections is 1/3 mile and the distance between Liberty Heights Ave. and Park Heights Ave. is over a half-mile.

- ***Pedestrian crossing distances on Druid Park Lake Drive are long.*** Long crossing distances make it more difficult for pedestrians to cross the street safely and comfortably, discourages people from walking to nearby destinations and creates challenges for individuals using mobility devices, such as wheelchairs.

Figure 8: Druid Park Lake Drive at Madison Ave.

- The average intersection crossing distance on Druid Park Lake Drive is 70 feet. The longest crossing distances are at Fulton Ave. (100 feet), Gwynns Falls Ave. (145 feet), Liberty Heights Ave. (105 feet) and Park Heights Ave. (120 feet). For comparison, the crossing distance of a two-lane street is 20-24 feet and crossing distance of a four-lane street is 40-48 feet (assuming there is no median).

- ***Intersections are complex and poorly designed, creating confusion and safety risks for drivers and pedestrians.***

  - The Fulton Ave. intersection is overly complex and does not have clear wayfinding for drivers. This often causes last-minute lane changes, heightening risk of crashes.
  - The wide median at Gwynns Falls Ave. creates a two-stage left turn with two separate signals, causing left turning movements to back up in the intersection. This also causes many motorists to run the red light, putting pedestrians at risk.
  - High volumes of left turning movements at major intersections on the corridor create safety concerns for pedestrians.

Figure 9: Druid Park Lake Drive at Fulton Ave.

  - The Reisterstown Rd. intersection has an unsignalized slip lane that is poorly marked, causing many cars to make last-minute lane changes that elevate crash risk.

ACCESSIBILITY

- ***Intersections are not well marked and are not all ADA accessible.***

  - Crosswalks on the corridor have fading paint and are not striped to meet current standards.
  - Signals have unreliable pedestrian phases, causing many pedestrians to cross without a pedestrian signal.
  - Many sidewalks do not have ADA curb ramps.

- ***Sidewalks on the Druid Hill Park side of the corridor end abruptly and are not all ADA compliant.***

  - Many sidewalks have obstructions, such as light poles and fire hydrants, making them too narrow for mobility devices, such as wheelchairs, to pass.

Figure 10: Cyclist on Reisterstown Rd. Segment of Druid Park Lake Drive

MULTI-MODAL ACCESS

- ***Beyond the Big Jump shared-use path, bicycle infrastructure is minimal.***
  - The corridor only has short segments of bicycle infrastructure, which are not continuous and do not adequately protect cyclists from traffic.
  - Intersections do not integrate features for safe bicycle crossings.

- ***Pedestrian infrastructure has gaps in safety and accessibility.***
  - Sidewalks are in poor condition, are narrow in many places, are obstructed by light poles and fire hydrants in some locations and are not continuous.

AESTHETICS

- ***Loss of historic connections to Druid Hill Park.***
  - The historic park entrance through the Madison Avenue archway no longer serves as a gateway to the park.
  - Original pedestrian entrances to the park were eliminated, leaving only seven entrances within the project limits.

- ***The corridor is automobile-dominated and does not reflect the character of the neighboring park and historic neighborhoods.***
  - The highway-like design of Druid Park Lake Drive and inability to safely use the corridor outside of a car detract from the historic character of the surrounding neighborhoods and park.

Crash Data

Crash data were obtained through the Maryland Statewide Vehicle Crashes dataset (Maryland State Police) available on the Maryland Open Data Portal. The dataset contains crash data through Q2 of 2021; due to the timing of this report, the crash count included in this report does not include data for the 3rd and 4th quarters of 2021.

Table 3 contains a summary of crashes by type from 2018 through the 2nd quarter of 2021. An average of 76 crashes occurred per year on the Druid Park Lake Corridor (I-83 ramp to second Greenspring Ave. entrance) between 2018 and 2020, with an average of 18 injury crashes and 57 property damage crashes per year. No fatal crashes occurred during this period. During this period, twelve crashes involved pedestrians and twelve involved cyclists. **Figure 11** illustrates crash hotspots on the Druid Park Lake Drive corridor in 2020. The highest concentrations of accidents was at the intersections of Druid Park Dr. & Park Heights Ave., Swann Dr. & Reisterstown Rd., and Linden Ave. & Druid Park Lake Dr.

Figure 11: 2020 Crash Hotspots

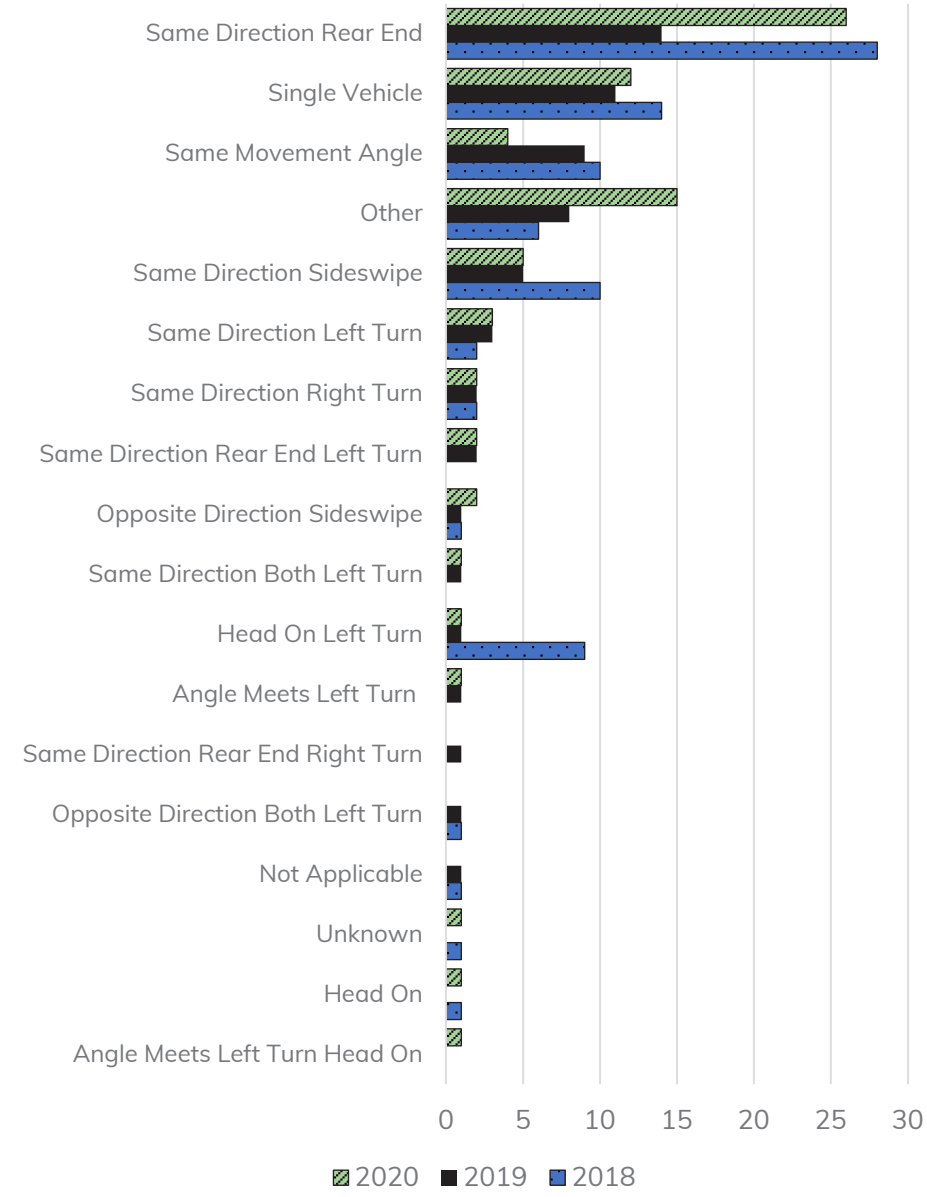
PROJECT TAKEAWAYS - CRASH DATA

- Most crashes on Druid Park Lake Drive occur at or near intersections. Redesigning intersections on the corridor, especially Linden Ave., Madison Ave., Reisterstown Rd., and Park Circle, is an important component in reducing crash risk.
- The intersections with the highest number of crashes are characterized by merging lanes and confusing intersections. Designing intersections to be simple, clear, predictable and well-marked is an important factor in improving safety.
- The Park Circle intersection and the Reisterstown Rd. connection have among the highest crash levels along the Druid Park Lake Drive corridor due to their lack of signalization, poor wayfinding, and corresponding last-minute lane changes. Drivers traveling northbound from Liberty Heights Avenue are travelling at high speeds from the Liberty Heights Avenue signal to the Reisterstown and Park Circle intersections, which has likely contributed to safety concerns and traffic violations on this roadway segment. Creating a clearer intersection at Reisterstown Rd. is important for improving the corridor's safety.
- The predominant collision types on the corridor are same direction rear end, single vehicle collisions (e.g. vehicle hits an object, but not another vehicle), same direction sideswipes (typically associated with vehicles merging into another lane), same movement angle (typically associated with vehicles colliding while turning in the same direction), and "other" types of collisions. This suggests that reducing merging opportunities, designing for slower vehicle speeds and clarifying intersection turning movements will help to reduce crashes.

Table 3: Annual Crash Data 2018-2021

YEAR	Injury Crash	Property Damage Crash	Fatal Crash	Grand Total
2018	24	63	0	87
2019	16	46	0	62
2020	15	63	0	78
2021 (through Q2)	9	25	0	34
Total	64	197	0	261

Figure 12: Collision Type – Crashes on Druid Park Lake Drive



Traffic Operations

Traffic turning movement counts were taken on Druid Park Lake Drive from January 5 through January 19, 2021. Counts were taken at the following locations:

- Druid Park Lake Drive at Linden Ave.
- Druid Park Lake Drive at Eutaw Place
- Druid Park Lake Drive at Madison Ave.
- Druid Park Lake Drive at McCulloh St.
- Druid Park Lake Drive at Fulton Ave.
- Druid Park Lake Drive at Druid Hill Ave.
- Druid Park Lake Drive at Gwynns Falls Pkwy
- Druid Park Lake Drive at Liberty Heights Ave.
- Druid Park Lake Drive at Reisterstown Rd.
- Druid Park Lake Drive at Park Circle
- Druid Park Lake Drive at Greenspring Ave.

At the time of data collection, Mt. Royal Terrace was fully closed to traffic from Druid Park Lake Drive. Additionally, Linden Ave. was closed to left turns in the westbound direction due to construction. Therefore, these turning movements are reflected as having no traffic.

Construction associated with the Druid Lake Tanks project required the closure of one lane of eastbound traffic on Druid Park Lake Drive while water pipes were being installed under the roadway. When traffic counts were collected, the roadway configuration between Madison Avenue and Mt. Royal Terrace included one lane in the eastbound direction and two lanes in the westbound direction.

Traffic counts were taken during the COVID-19 pandemic, so traffic volumes in many areas were lower than historic traffic volumes. To account for the possibility of underrepresenting non-pandemic traffic conditions, the Project Team compared the traffic counts collected in 2021 to historic traffic volumes at the I-83 ramp to determine whether they were significantly lower than expected volumes. This analysis indicated that traffic counts were not significantly lower, so no adjustment factor was used for the traffic counts.

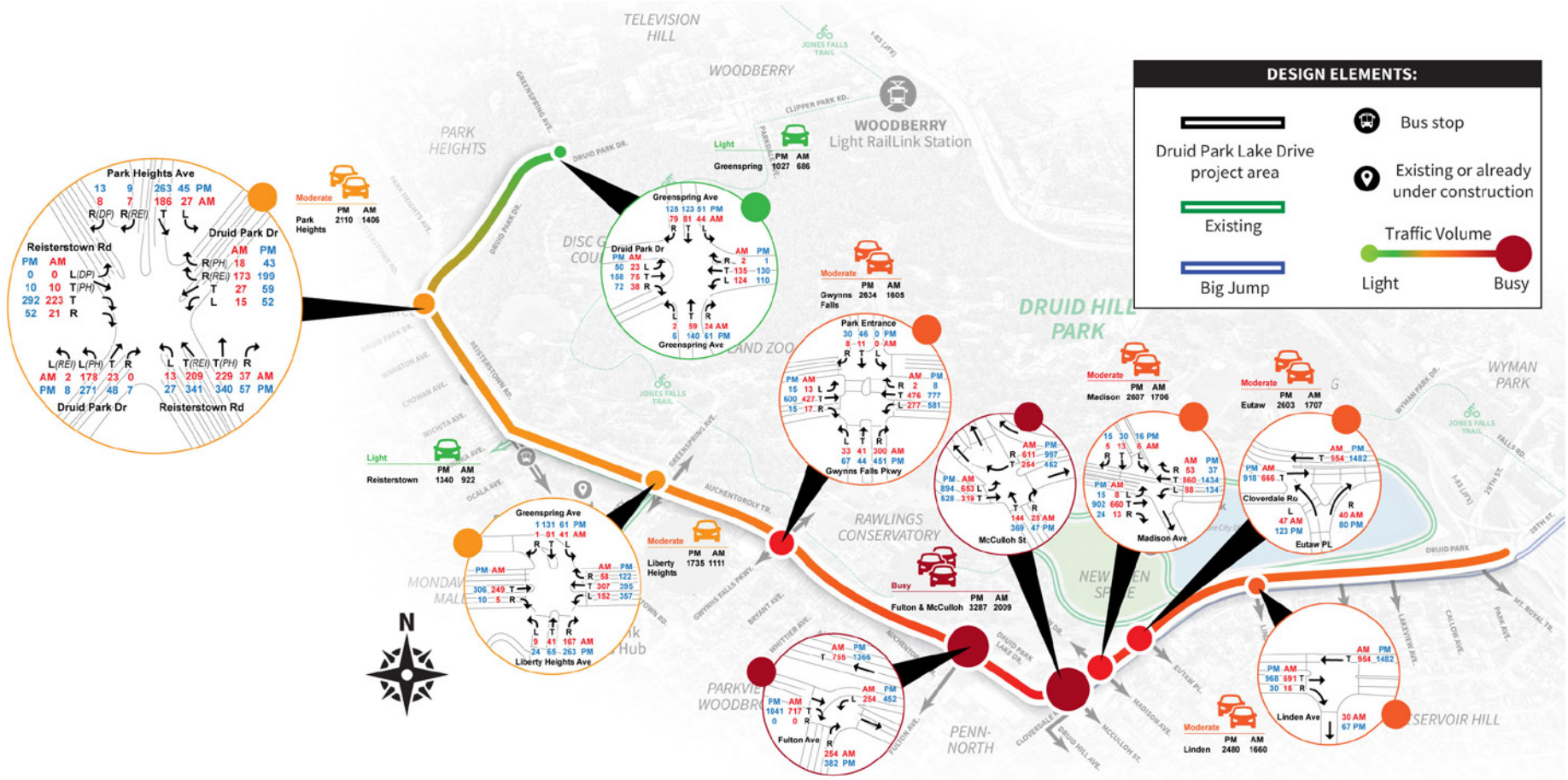
The Project Team analyzed turning movement counts to determine the one-hour AM peak hour and one-hour PM peak hour. The process evaluated the total volume across the study area network during AM and PM peaks. The AM peak hour was determined to be 7:45 AM to 8:45 AM, and the PM peak hour was determined to be 4:15 PM to 5:15 PM. Individual locations could have varying peaks that differ from the study area peak. The intersections with the highest total traffic volumes during peak periods were McCulloh St., Fulton Ave. and Madison Ave. The intersections with the highest volume of left turns were Fulton Ave., Gwynns Falls Pkwy, and Liberty Heights Ave.

Figure 13 is a traffic flow map showing the turning movement counts at each intersection on the Druid Park Lake Drive corridor.

Project Takeaways – Traffic Operations

- Traffic counts illustrate that traffic is heavier in the westbound/northbound directions than in the eastbound/southbound direction for both AM and PM peak periods, indicating that travel demand is lower heading east towards I-83.
- Traffic counts show higher traffic volumes heading west from I-83 and decreasing volumes further northwest on the corridor. Based on existing traffic volumes, fewer travel lanes are needed in lower-volume portions of the corridor north of Liberty Heights Avenue.

Figure 13: Turning movement counts at intersections on Druid Park Lake Drive



Demographic Characteristics

Demographic and commuting data were obtained from American Community Survey 2015-2019 Five-Year Estimates. **Figure 14** includes a summary of key characteristics of the communities within ¼ mile and ½ mile of the Druid Park Lake Drive corridor, including carless households, personal vehicle commuters, transit commuters and individuals with disabilities.

A majority of residents around the corridor are Black, Hispanic, Asian or Indigenous, including 88 percent of residents within a quarter mile and 84 percent of residents within a half mile. About 30 percent of people living within both a quarter mile and half mile of the corridor live in poverty.

Figure 14: Community characteristics within 1/4 mile and 1/2 mile of Druid Park Lake Drive

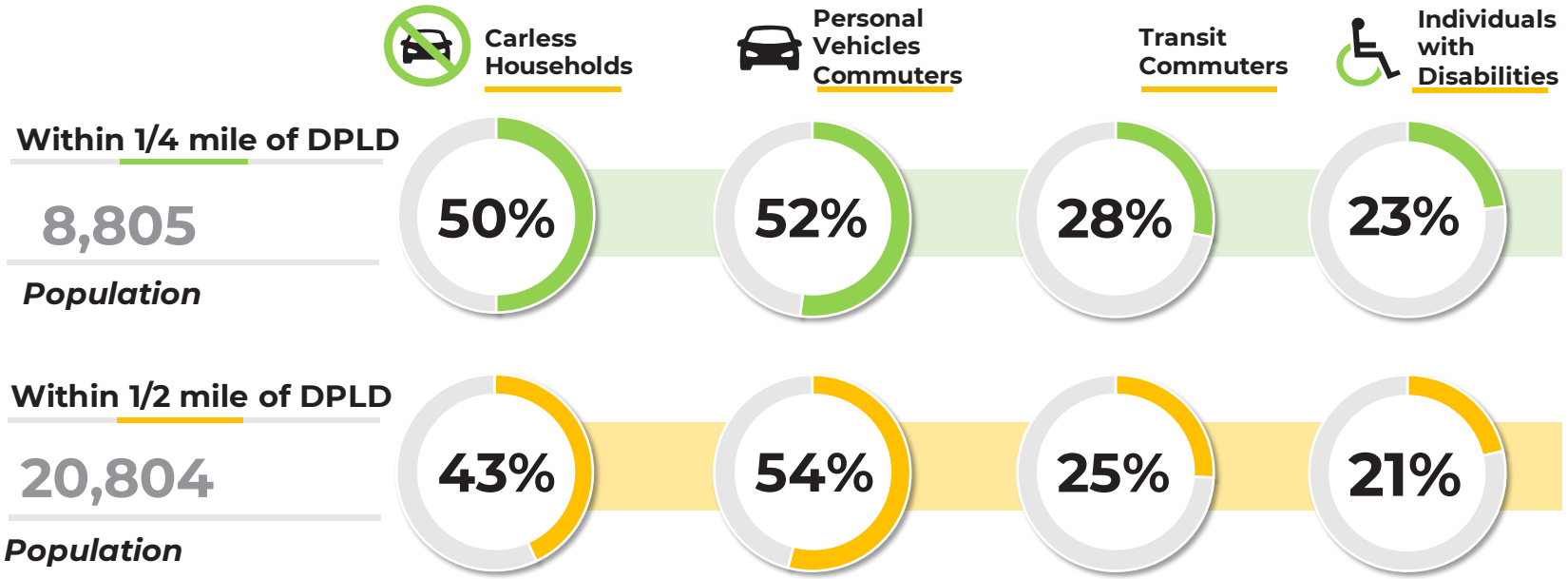


Figure 15: Environmental Justice Populations

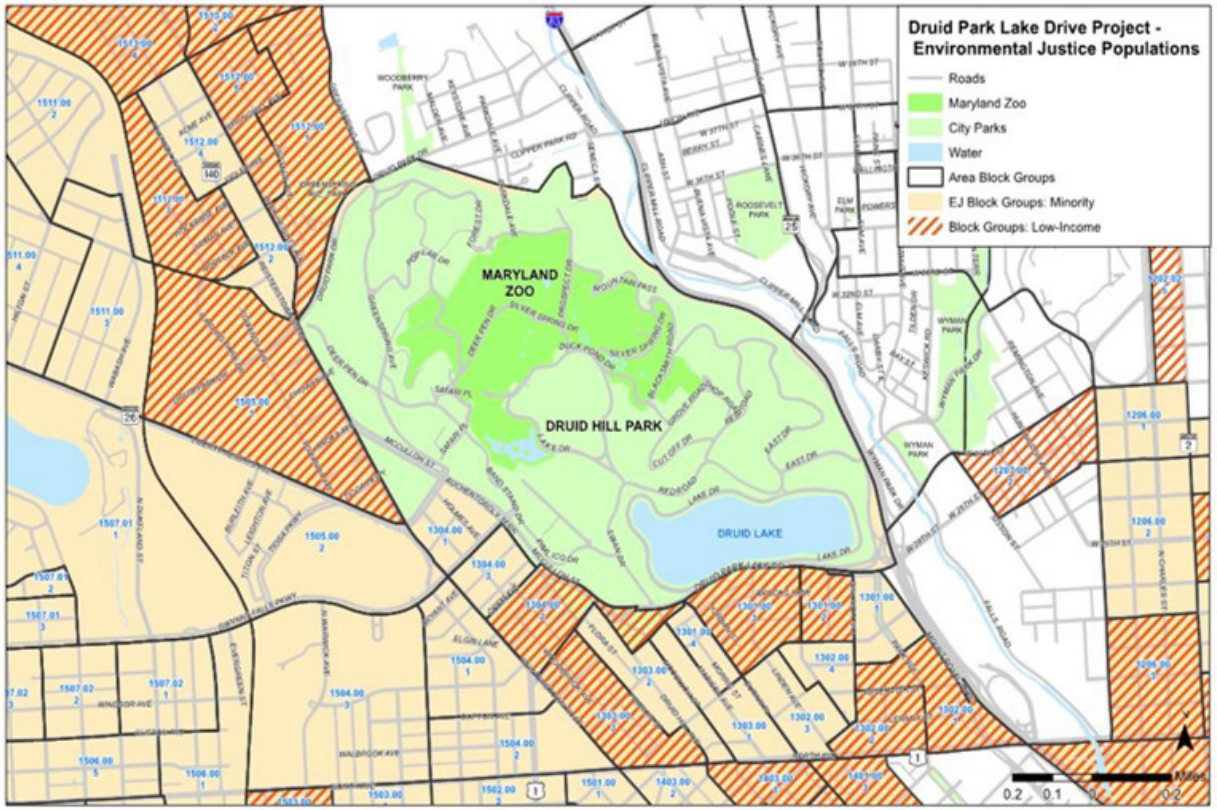


Figure 15 illustrates Environmental Justice populations, including majority Black and majority low-income census block groups. As defined by the US Department of Transportation (USDOT), Environmental Justice (EJ) is the fair treatment and meaningful involvement of all people, regardless of race, ethnicity, income, national origin, or educational level with respect to the development, implementation and enforcement of environmental laws, regulations and policies.

Project Takeaways – Demographic Characteristics

- The demographic characteristics of the communities surrounding Druid Park Lake Drive underline the importance of improving this corridor as a step towards better serving communities of color and ensuring that these communities can safely travel without a personal vehicle.
- Half of households in the communities around Druid Park Lake Drive do not have access to a car, illustrating the need for safe infrastructure for pedestrians, bicycles, micro-mobility and mobility devices.
- Almost a quarter of residents of the communities around Druid Park Lake Drive have a disability, underlining the importance of making the entire corridor ADA compliant.


Druid Park Lake Drive
Lysol
MORE

4 Public Engagement and Interagency Coordination

Public Engagement

The Project Team performed community engagement throughout the project, using several engagement formats to gather input from community members in the visioning, goal setting, concept development and concept review processes. Due to the COVID-19 pandemic, opportunities to engage the public in person were significantly reduced. However, the Project Team used a combination of online meetings and in-person engagement with communities to ensure that community members were provided with project information and able to contribute their opinions on the project visioning and concept designs. Over 75 community organizations and public agencies were contacted, engaged and informed throughout the project.

One-On-One Interviews with Community Leaders – December 2020-January 2021

The Project Team held interviews with key stakeholders from the communities surrounding Druid Park Lake Drive to gather information about community concerns about Druid Park Lake Drive and discuss project goals. Interviewees were identified based on their leadership in the communities surrounding Druid Park Lake Drive.

- Woodberry – Patricia Adams, of the Woodberry Community Association.
- Reservoir Hill - Suzanne Rackl, of the Reservoir Hill Improvement Council.
- Penn North - Linda Grey, a representative of Penn North as a block captain. She was interviewed at the suggestion of Annie Hall, of the Penn North Community Association.
- Park Heights and Park Circle - Yolanda Jiggetts, of Park Heights Renaissance.
- Leon Pinkett, the former Baltimore City 7th District Councilman.
- Graham Coreil-Allen, of the Access Project- Druid Hill and the New Auchentoroly Terrace Association.

A summary of the interviews is included in Appendix B.

Community Stakeholder Visioning Exercise – February 25, 2021

The Druid Park Lake Drive Community Stakeholder visioning session was held with a group of stakeholders from the communities surrounding Druid Park Lake Drive to gather input on the project's vision and goals. The Project Team used MURAL, a collaborative online platform, to provide information about the Druid Park Lake Drive project and generate real-time input from community leaders, elected officials and representatives of organizations around the project area. They provided their thoughts on themes to guide concept design, preferred street typology and elements to incorporate into the project's vision statement and goals. A detailed summary of the input generated through the Community Stakeholder Visioning Exercise is included in Appendix B.

Virtual Field Tour

An online, collaborative "virtual field tour" map gave community members the ability to post issues and concerns about the existing conditions of Druid Park Lake Drive. The ArcGIS Online map allowed users to place comments describing the issues at locations they identified. This map provided valuable input to the Project Team on issues to address through concept designs.

Meetings with Community Groups

The Project Team participated in community group meetings to describe the project, gather input and answer questions. The Project Team met with the following community groups over the course of the project:

- New Auchentoroly Terrace Association
- Park Heights/Park Circle
- Go Northwest Communities
- Garwyn Oaks and Panway
- Reservoir Hill Improvement Council
- Reservoir Hill Association

Public Meeting #1 – April 28, 2021

A public meeting was held on April 28, 2021 via Zoom to introduce the Druid Park Lake Drive project, provide an overview of the project's vision and goals, identify issues on the corridor, and present design elements to consider incorporating into the design concepts. This meeting had 114 participants.

Public Meeting #2 – October 7, 2022

A public meeting was held on October 7, 2021 to present draft concept designs to the public. The meeting was held online in a virtual room that participants could "walk" through to learn about the design process and view draft concepts. This meeting had 107 participants. The meeting included a presentation of the draft concepts and evaluation. The full presentation can be found here. Both public meetings were advertised through flyers distributed in communities, social media, emails to over 800 individuals who signed up for communications, and advertisements in the Baltimore Times and Afro-American newspapers.

Pop-up Events

The Project Team hosted several pop-up events to provide in-person information to community members around Druid Park Lake Drive. These pop-ups provided an opportunity to share information, answer questions and provide comment cards to community members who were unable to attend the online meetings and who had not received information about the project through other channels of communication. Pop-ups were held at the Druid Hill Farmer's Market, Park Heights Juneteenth celebration, Cloverdale Basketball Court, Druid Hill Park, and in the Reservoir Hill and Penn North communities.

Figure 16: Pop-up at Druid Hill Farmer's Market

Distribution of Electronic and Paper Comment Cards

Comment cards were developed and distributed to the public for two phases of the project:

1. Initial data collection – A comment card was distributed to understand community members' existing relationship with Druid Park Lake Drive, what modes they use to travel and what they would like to see improved on the corridor. This comment card was distributed via social media, email and on the project website. Hard copies were provided to community leaders upon request to distribute to households in their communities.

2. Public feedback on preliminary concepts – A comment card was distributed after the second public meeting to gather feedback on the preliminary concepts presented. This comment card was distributed through social media, email, and on the project website. Hard copies were provided to community leaders by request and provided at Enoch Pratt Public Library's Penn North and Walbrook branches.

Postcards

Postcards advertising the comment period for concept designs were mailed to homes within a quarter-mile of Druid Park Lake Drive. The postcard provided a link to the online comment card.

Interagency Coordination

The Project Team held interagency stakeholder meetings with City, State and organizational stakeholders to establish goals for the project and gain input on draft concepts. Appendix B contains a detailed summary of the interagency stakeholder meetings.

Stakeholders included in the interagency stakeholder group include:

- Baltimore City Department of Transportation (BCDOT)
- Baltimore City Department of Recreation and Parks (BCRP)
- Baltimore City Department of Planning (DOP)
- Baltimore City Department of Public Works (DPW)
- Baltimore City Department of Housing and Community Development (DHCD)
- Baltimore Development Corporation (DBC)
- Maryland Department of Transportation Maryland Transit Administration (MDOT MTA)
- Office of Sustainability
- Mayor's Office
- Baltimore Police Department and Mayor's Bicycle Advisory Committee (MBAC)
- The Maryland Zoo
- City Council Representative (Councilman James Torrence)
- Baltimore City Fire Department

The Project Team held two meetings with the interagency stakeholder group:

1. ***Visioning and Goal Setting: April 9, 2021***
   The purpose of this meeting was to discuss the vision, goals and objectives of the Druid Park Lake Drive project. Through this meeting, the Project Team provided information about the project, existing plans and studies, key themes, community stakeholder outreach and data analysis performed on the corridor. The interagency group provided input to the Project Team through two collaborative exercises focusing on key issues on Druid Park Lake Drive and considerations for design options for the corridor being assessed by the Project Team. **Figure 16** shows an example of a collaborative exercise performed during this session. The meeting provided valuable input for the Project Team to guide the design of concepts.
2. ***Concept Review: August 19, 2021***
   The purpose of the interagency concept review meeting was to present draft concepts for Druid Park Lake Drive to the interagency stakeholder group and receive input on proposed designs. The Project Team presented proposed concept designs, including multi-modal infrastructure, intersections, number of travel lanes, green features, and safety elements. Participants provided comments on concepts for each segment of the corridor, which the Project Team used to make revisions to concepts.

   Key Takeaways from Interagency Stakeholder Concept Review Meeting:
   - Investigate trees and a more park-like boulevard
   - Improve safety
   - Increase connectivity to park for all modes
   - Simplify intersections
   - Reduce lanes/pavement and speeds
   - Shift roadway
   - Concerns about two-lane roundabout
   - Look at signal timing and additional signals/crossings
   - Go big and change perceptions!
   - Concerns about a pedestrian bridge

The Project Team used MURAL for both interagency stakeholder meetings to show presentation materials and allow for participants to provide input. Participants were able to add sticky notes with comments directly onto the presentation and upload images of examples of design elements to consider.

3. ***Additional Agency Coordination Meetings***
   In addition to the larger Interagency coordination meetings, the Project Team met with MDOT MTA and the Baltimore Fire Department and Police Department to understand considerations for transit and emergency response on the corridor.

The MDOT MTA meeting was used to evaluate the location and design of the dedicated bus lanes proposed on Reisterstown Rd., which is a component of MDOT MTA's longer-term bus priority program. The meeting also included a discussion of the potential for additional bus stop locations and route realignment on Druid Park Lake Drive. It was determined that additional investigations would need to be conducted during the next phase of design to determine the viability of transit enhancement considerations.

Coordination meetings with Baltimore's Fire and Police Departments led to additional design options for BCDOT to consider, including design options for emergency vehicle access.

Figure 17: Collaborative Exercise in Interagency Visioning Workshop Using MURAL

5 Design Considerations

Using the vision, goals and objectives established through public outreach and interagency coordination, the Project Team identified design elements to incorporate into the concepts for Druid Park Lake Drive. The Project Team developed concepts using design guidance from the Baltimore City Complete Streets Manual, National Association of City Transportation Officials (NACTO) guides, research from the Federal Highway Administration (FHWA), the National Cooperative Highway Research Program (NCHRP), Transportation Research Board (TRB), Manual on Uniform Traffic Control Devices (MUTCD), peer reviewed journals, and case studies from cities throughout the United States.

Street Typology

Baltimore City's Complete Streets Manual provides design guidance for roadways based on their street typology. The characteristics of Druid Park Lake Drive fit within the "parkway" or "boulevard" street types. The Baltimore City Complete Streets Manual describes the characteristics of these street types as follows:

Parkway: "Extends through or along natural areas or large parks where there is a desire to maintain or create a park-like feel to the street. Adjacent land uses can include low-density residential, recreational or institutional facilities, parkland or natural areas. Elements often include wide planted medians and shared-use paths alongside the road instead of sidewalks. Parkway design should focus on minimizing impacts to the adjacent natural areas and maintaining the park-like character. This may be accomplished by using more natural construction materials such as wood or stone, and by installing shared-use paths rather than sidewalks, among other strategies. Transit is occasionally present on parkways. This Street Type should have a target speed ranging from 25-35 mph, depending on the modal priority of the street. Curb cuts / access points should be limited to minimize conflict points between vulnerable users on sidewalks, bike facilities and vehicles in travel lanes."

Boulevard: "Boulevards are defined by a grand scale and urban design characteristics such as wide sidewalks lined with street trees and furnishings. These roadways often have wide planted medians or curbside landscaping. Boulevards connect important civic and natural places and often feature longer block lengths. Significant, mature tree cover combined with promenades or median malls provide great walking and social spaces. Boulevards have higher-density buildings and more active land uses along both sides of the street than Parkways. Medians may also accommodate light rail or bus rapid transit service. These streets support frequent transit in many cases and therefore, on-street parking and loading may be limited to off-peak hours. This Street Type should have a target speed of 20-25 mph, depending on the modal priority of the street."

Elements of both the parkway and boulevard design apply to Druid Park Lake Drive and the concept designs prepared by the Project Team borrow from each of these roadway typologies to fit the unique context of the corridor. While the corridor is adjacent to a park and the park-like feel of the roadway is an important element of design, the area's high-density land use and grand characteristics better reflect a boulevard design.

Figure 18: Parkway Street Type (Baltimore Complete Streets Manual)

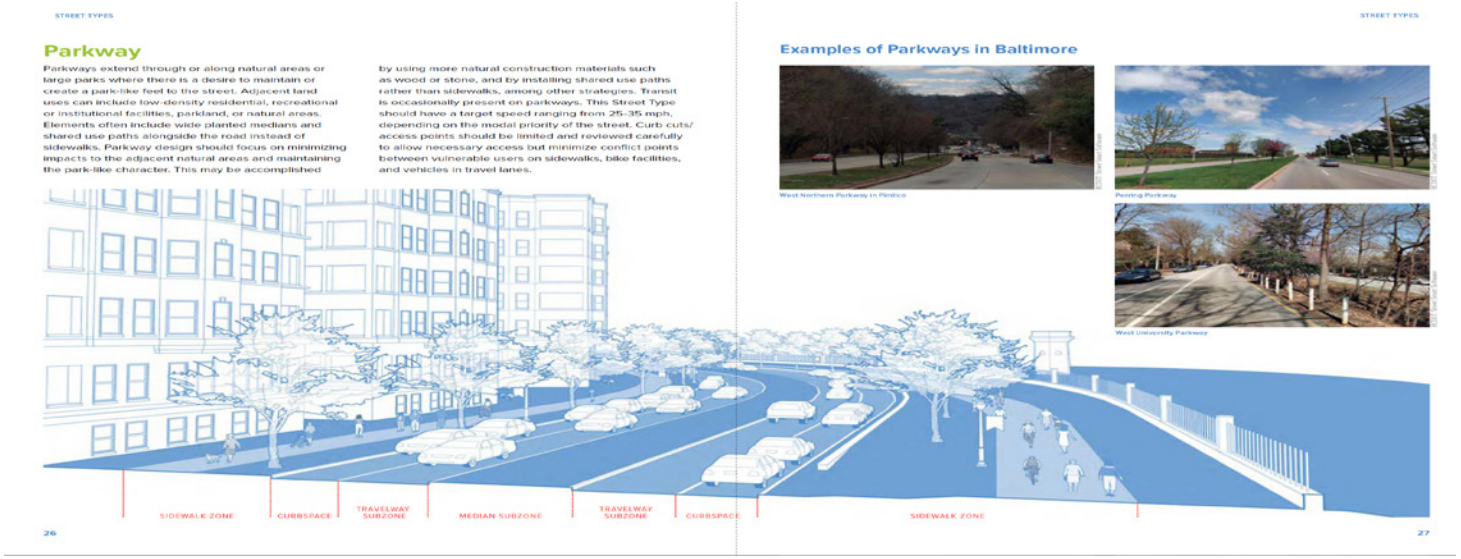
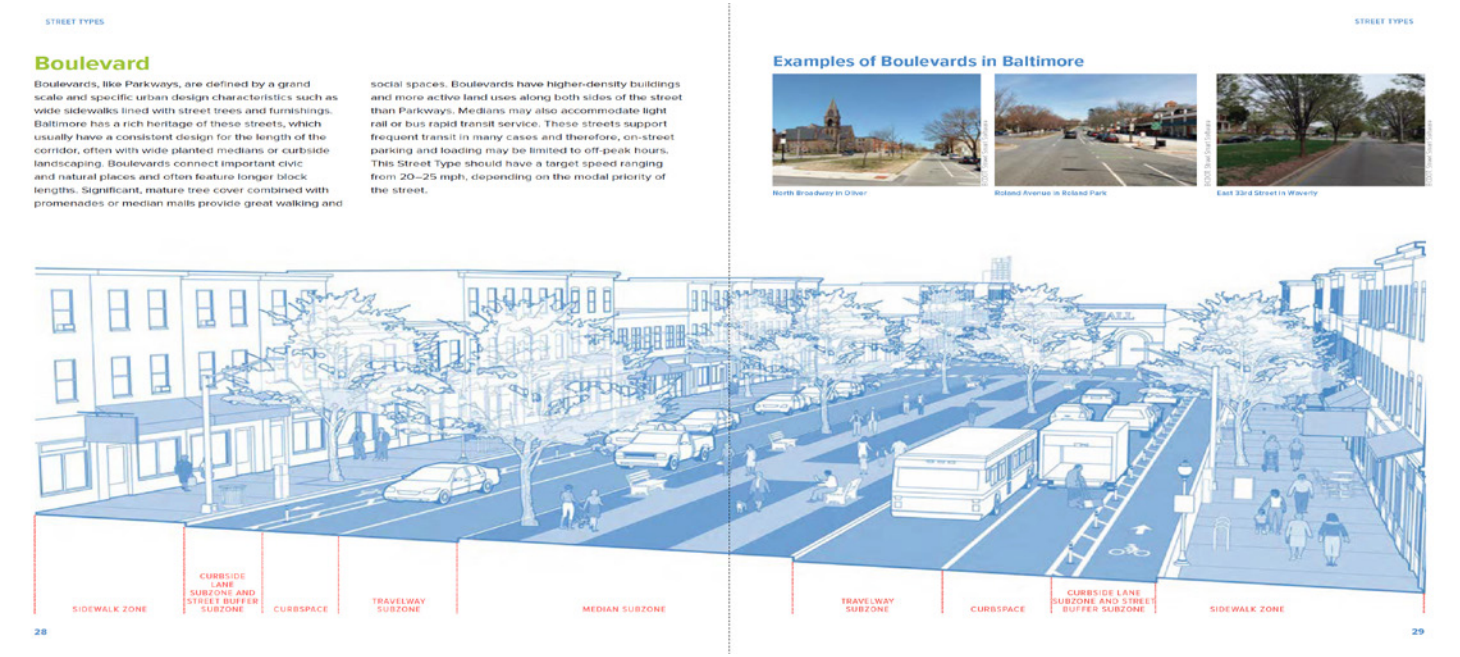


Figure 19: Boulevard Street Type (Baltimore Complete Streets Manual)

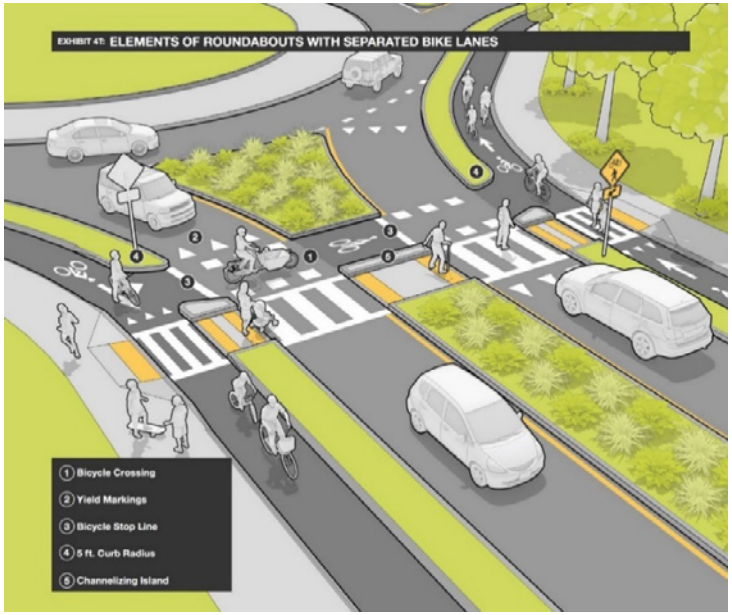


Intersection Design

In the context of Druid Park Lake Drive, intersections serve as gateways to Druid Hill Park and should be designed with this role in mind. For greatest pedestrian safety and convenience, the alignment of crosswalks should be perpendicular to the street alignment to provide the most direct and shortest crossing distance. Several types of intersection, each designed for pedestrian and bicycle safety, were considered for Druid Park Lake Drive.

Roundabout

Figure 20: Pedestrian and Bicycle Crossings at Roundabouts



Source: MassDOT Separated Bike Lanes Manual

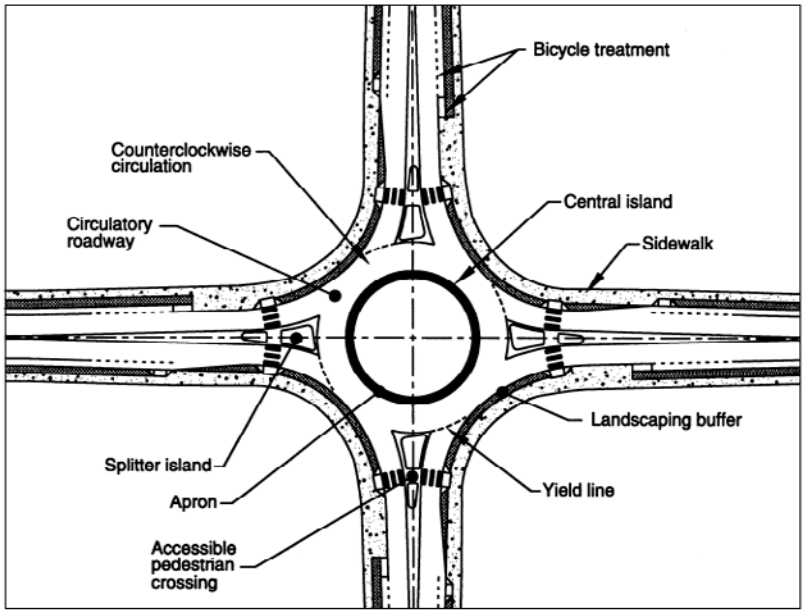
A roundabout is a circular intersection in which traffic travels counterclockwise around a central island. Traffic must yield to traffic circulating within the roundabout, forcing vehicles to slow down while approaching the intersection to monitor oncoming traffic. The yield control of entering traffic and geometric curvature of the intersection cause vehicles to enter and circulate the roundabout at slower speeds, making the roundabout a strong traffic calming design at intersections.[2]

Roundabouts can be designed to enhance safe pedestrian and bicycle movements. Crosswalks at roundabouts are set back from the entrance of the roundabout, as shown in **Figure 20**, to distance pedestrians from vehicles entering and exiting the roundabout, increase the visibility of pedestrians waiting to cross the intersection, and minimize the conflict points between vehicles and pedestrians. The pedestrian crossing has a refuge area within the center "splitter island", allowing pedestrians to cross in two stages, with only one direction of vehicular traffic at a time. Roundabouts are safer for pedestrians than stop-controlled intersections, which have turning movements from multiple directions, because vehicle traffic in roundabouts only comes from one direction and generally at lower speeds.[3]

Roundabouts also tend to have fewer conflict points compared to traditional signal-controlled intersection designs. This is true for both vehicle-to-vehicle conflicts as well as vehicle to non-motorized users (i.e., pedestrians, bikes etc.). Traditional intersections can have as many as 32 potential conflict points, while single lane roundabouts have just 8 conflict points.

Additional safety elements for pedestrians at roundabouts can include "Yield to Pedestrians" signs, pedestrian-activated flashing beacon lights and raised crosswalks that further alert drivers to pedestrians' presence at crosswalks.

Figure 21: Elements of a roundabout with bicycle and pedestrian treatments



Source: USDOT-FHWA Pub. # FHWA RD 00-06

2 www.nacto.org/docs/usdg/nchrprpt672.pdf
3 www.nacto.org/docs/usdg/nchrprpt672.pdf

One challenge with pedestrian crossings at roundabouts is that they can be less safe for visually impaired pedestrians. Because roundabouts do not have traffic signals, and therefore do not have a timed pedestrian crossing phase with audible pedestrian crossing signals, they lack the auditory cues to guide vision impaired pedestrians on the appropriate time to cross the street. Potential treatments to improve safety for pedestrians with visual impairments include placing the crosswalk further from the entrance of the roundabout to reduce auditory ambiguity, adding a zig-zag crosswalk, and adding a pedestrian hybrid beacon (PHB) (signal) to the entrance of the roundabout to provide dedicated crossing time and auditory cues for pedestrians.[4]

Roundabouts create opportunities for safer bicycle infrastructure than traditional intersections. As illustrated in **Figure 21**, roundabouts can be designed with buffered bike lanes on the outside of the roundabout, completely separated from traffic, and bicycle crossing markings can be added parallel to pedestrian crosswalks. This configuration makes cyclists more visible to approaching traffic and shortens the crossing distance.

Roundabout Benefits:

- Slows vehicular traffic
- Minimizes pedestrian crossing distance and reduces pedestrian-vehicle conflict points
- Minimizes vehicle-vehicle conflict points
- Reduces risk of serious pedestrian injury

Protected Intersection

Protected intersections are controlled intersections (either signalized or controlled by stop signs) designed to improve safety for cyclists crossing the street where vehicles are turning. The protected intersection has raised “corner islands” at all corners of the intersection, which serve as protection for cyclists approaching the intersection and tighten the vehicle turning radius at the intersection, requiring vehicles to slow their turning speeds. The corner islands also improve the visibility of cyclists at intersections because cyclists wait in front of vehicular traffic (protected by the concrete barrier) to cross the intersection, rather than parallel to vehicles.

Figure 22: Protected Intersection

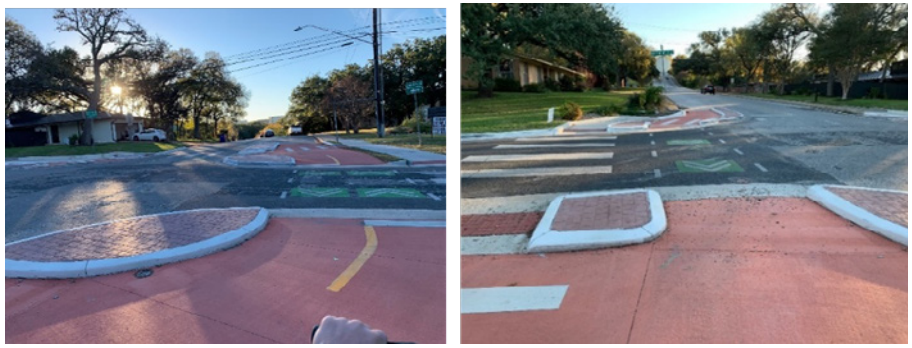
Rather than mixing bicycle crossings with vehicular traffic at intersections, the protected intersection includes a buffer-separated bicycle path and corner islands that fully separate cyclists from vehicular traffic as far into the intersection as possible.

Protected Intersection Benefits:

- Protects cyclists from vehicular traffic by continuing the separated bicycle path further into the intersection than bicycle infrastructure such as bike boxes and combined bike/turn lanes
- Increases visibility of pedestrians for motorists
- Slows vehicular traffic by tightening turning radius

4 Rebekka Apardian, Bhuiyan Monwar Alam,Methods of Crossing at Roundabouts for Visually Impaired Pedestrians: Review of Literature, International Journal of Transportation Science and Technology, Volume 4, Issue 3, 2015, Pages 313-336, ISSN 2046-0430, https://doi.org/10.1260/2046-0430.4.3.313. (https://www.sciencedirect.com/science/article/pii/S2046043016301307)

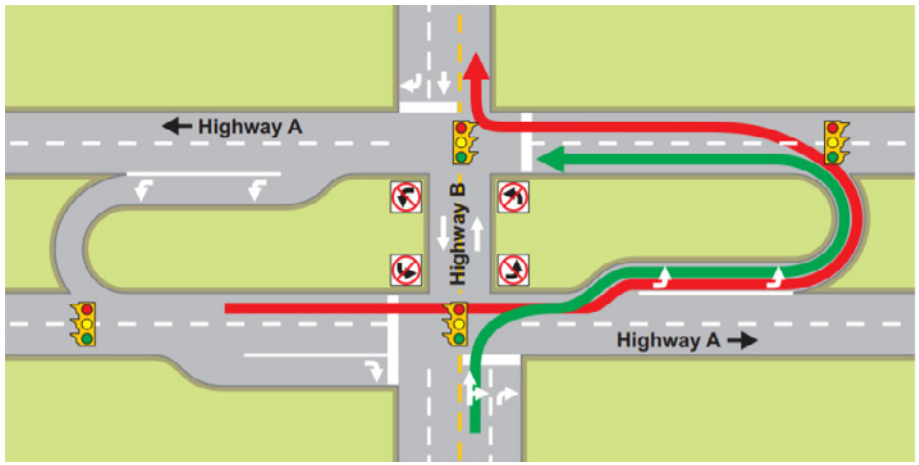
Figure 23: Protected intersection in Austin, TX



Michigan Left

A Michigan Left is an intersection at which left turns are restricted and vehicular traffic continues straight through the intersection to a U-turn at a median crossover. Left turning movements create safety risks because they have many points of potential conflict with other vehicle, pedestrians and cyclists. Research has shown that eliminating left turns improves safety for roadway users, significantly reducing the number and severity of crashes at intersections. It also has the potential to relieve congestion. Another benefit of the Michigan Left is that it reduces the crossing distance for pedestrians by eliminating left turn lanes from intersections, allowing a narrower roadway at key crossing points within the intersection.

Figure 24: Michigan Left



Benefits:

- Eliminating left turns reduces conflict points at intersections, improving safety for motorists, bicycles, pedestrians and other roadway users.
- Eliminating left turn lanes reduces the crossing distance for pedestrians.

As seen in the Druid Park Lake Drive crash data, most crashes were concentrated at traditional intersections and many involved turning-related collisions. The Michigan Left is one option to address concerns with left turns seen at traditional intersections.

Intersection Landscaping

Landscape elements should be added near intersections to highlight pedestrian crossings and increase pedestrian safety. Landscape measures could include increasing the intensity of landscape plantings in the vicinity of intersections with major deciduous trees, ornamental trees in wide medians, and low-growing shrubs, grasses, perennials and other groundcover. Additional measures to increase pedestrian safety include installing colored or paver crosswalks. A well-landscaped intersection can not only provide visual punctuation along the corridor but also make motorists more aware of the presence of pedestrian crossings.

Pedestrian Safety

The Sidewalk:

The sidewalk is an important design element in a street environment. The width of the sidewalk should follow the Baltimore City Complete Streets Design Manual, as illustrated in **Table 4**. The recommendations in the manual include widths for three sidewalk sub-zones: Frontage Subzone, Pedestrian Subzone and Furnishing Subzone, as illustrated in **Figure 25**. The manual recommends a target sidewalk width of 18’ for parkways and 24’ for boulevards. The minimum, or “constrained”, sidewalk width is 10’ for parkways and 13’ for boulevards.

Figure 25: Baltimore Complete Streets Manual Sidewalk Zones

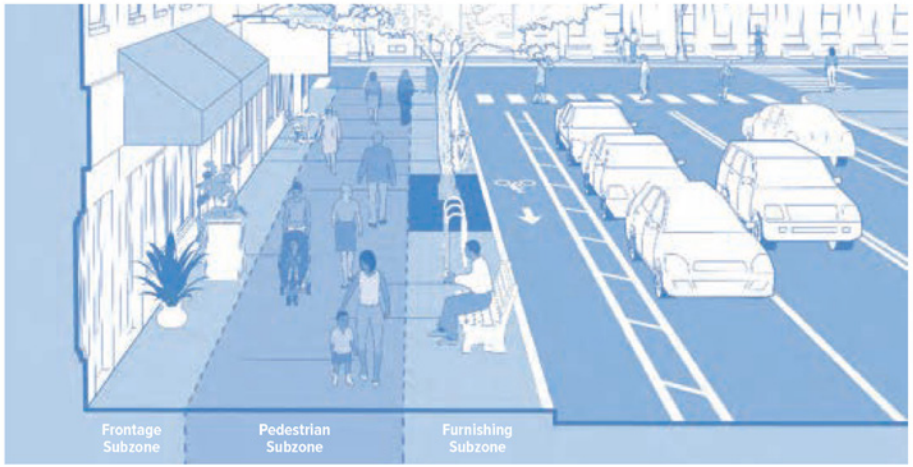


Table 4: Baltimore Complete Streets Manual - Guidance for Sidewalk Width

Street Type		Frontage Subzone	Pedestrian Subzone	Furnishing Subzone	Total Sidewalk Width
Parkway	Maximum	-	-	-	-
	Target	2’	6’	10’	18’
	Constrained	0’	5’	5’	10’
Boulevard	Maximum	-	-	-	-
	Target	2’	12’	10’	24’
	Constrained	0’	8’	5’	13’

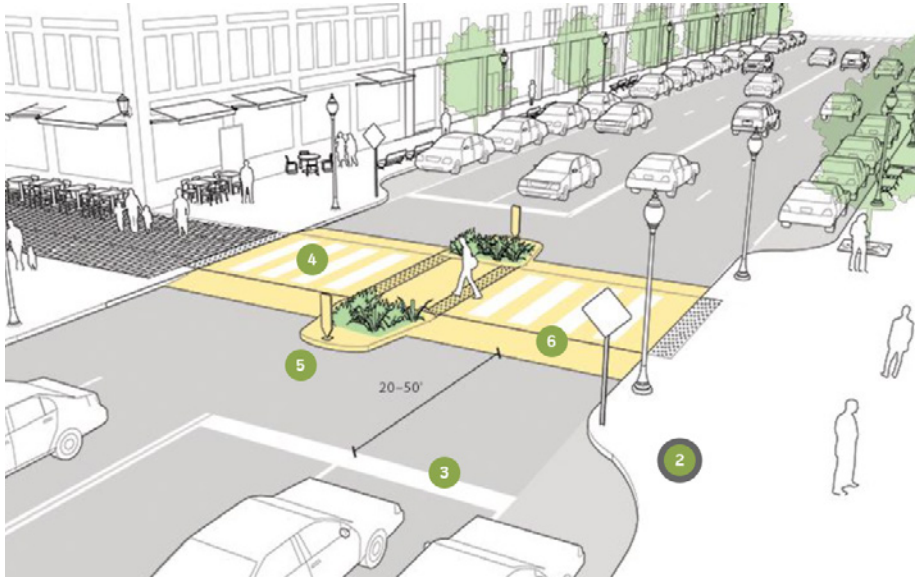
The chosen sidewalk construction material must be durable and skid resistant to ensure pedestrian safety under all weather conditions. Deciduous trees with high branches are recommended along the sidewalk to provide shade but should minimize obstructions to pedestrians. Flowering trees with low branches that would impede pedestrian traffic are discouraged.

Signal Timing

Signal timing plays a significant role in pedestrian safety at intersections. Providing adequate pedestrian crossing time for the width of the roadway allows pedestrians of all abilities to safely cross. Converting pedestrian-actuated signals to fixed-time signals with a pedestrian crossing phase in each cycle ensures that pedestrians have an opportunity to cross during every traffic signal cycle. A leading pedestrian interval, which builds in several seconds of time for pedestrians to begin crossing the street before traffic receives a green signal, reduces conflict between pedestrians and turning vehicles.

Mid-block Crossings

Figure 26: Raised Midblock Crosswalk



Source: NACTO

The mid-block crossing is a design element that allows for more pedestrian crossing opportunities in areas where intersections are far apart, such as in the Auchentoroly Terrace portion of the corridor. A mid-block crossing is recommended in locations with high pedestrian demand and locations where

transit stops are not located at intersections. Midblock crossings can include several elements to improve safety for pedestrians:

- Stop lines at midblock crossings should be set back 20-50 feet to ensure that the person crossing is visible to approaching drivers.
- Medians may be added to the center of the crossing to allow a two-stage crossing for pedestrians.
- Curb extensions may be added to reduce the crossing distance and influence vehicles to slow down when approaching.
- The crosswalk may be combined with a speed table to slow down approaching vehicles.
- Vertical elements, such as bollards or overhead signage, can help alert drivers to the midblock crossing.

Pedestrian actuated signals, hybrid beacons or rapid flash beacons may be considered to signal to motorists to stop for a crossing pedestrian.

- Raised crosswalks can improve visibility of the midblock crosswalk and slow vehicular traffic.

Figure 27: Maryland Ave. Cycle Track, Baltimore, MD

Street Lighting

Lighting should be provided for both the pedestrian scale to light the sidewalk and for the roadway. At intersections and mid-block crossings, lighting should be provided at both approaches 10 feet in advance to illuminate the front of the pedestrian crossing and eliminate their shadow. Lighting at bus stops also improves safety for transit riders waiting and arriving at bus stops

Bicycle Safety

Safe bicycle infrastructure is an integral component of Complete Streets and an important element in creating equitable opportunities for mobility. The two bicycle lane types under consideration for Druid Park Lake Drive are two-way protected bicycle lanes and contraflow bicycle lanes paired with a sharrow.

Two-way Protected Bicycle Lane

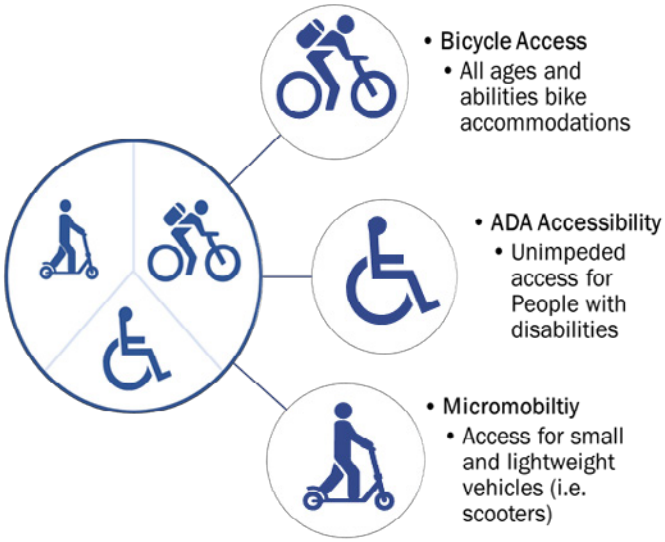
Two-way protected bicycle lanes combine both directions of bicycle traffic and fully separate the lanes from traffic with a buffer. They are often separated from vehicular traffic with bollards, green buffers, curbs, or painted buffers. Two-way cycle tracks reduce collisions with moving or parked cars that can occur with standard painted bike lanes. They are also particularly useful when most of the destinations along a corridor are located on one side of the street, reducing the need for crossing to the other side.

Figure 28: Two-way protected bike lane with landscaped buffers

Source: PELA Design, Inc.

In addition to allowing bicycle traffic, two-way protected bicycle can serve a wide range of users, including individuals using wheelchairs, strollers, micro-mobility and other non-motorized wheeled devices (**Figure 28**). The benefits of this separated infrastructure extend to more than just bicycles and have far-ranging benefits.

Figure 29: Users of two-way protected bicycle lanes



Contraflow Lane and Sharrows

The combination of a sharrow with a contraflow bike lane is a strategy used to incorporate two directions of bike travel with a one-way lane of traffic. Sharrows are used in wide travel lanes with low vehicular speeds and volume. They are marked by painted arrows on the street and allow bikes to share the vehicle travel lane with cars. Contraflow lanes are bike lanes along one-way streets that allow bicycles to travel against vehicular traffic. They are separated with a double yellow line or a buffer and create greater accessibility for cyclists along the corridor. Coupling a sharrow with a contraflow lane creates two directions of bicycle traffic without using as much space of a completely separated two-way cycle track. However, sharrows and contraflow lanes create more opportunities for collisions between bicycles and vehicles and are generally considered less safe for cyclists than a buffered two-way cycle track.

Bicycle Lane Dimensions

Figure 30: Contraflow Lane and Sharrow in Chicago, IL

The Baltimore Complete Streets Manual provides guidance on the dimensions of bicycle infrastructure for each street typology. **Table 5** includes the dimensions recommended for the parkway and boulevard street types, which are those most applicable to Druid Park Lake Drive. While the manual recommends a minimum 3-foot buffer for separated bicycle infrastructure, the Project Team recommends at least an 8-foot buffer to allow adequate room for street trees to grow.

Table 5: Bicycle Lane Dimensions, Baltimore Complete Streets Manual

Street Type	Requirements	Shared-Use Path (includes 3' min buffer)	Separated Bike Lane (includes 3' min buffer	Two-Way Separated Bike Lane (includes 3' min buffer)	Buffered Bike Lane	Traditional Bike Lane	Shared Facility
Parkway	Maximum	-	-	-	8'	N/A	N/A
	Target	12'	10'	15'	8'	N/A	N/A
	Constrained	10'	8'	11'	6.5'	N/A	N/A
Boulevard	Maximum	-	-	-	8'	7'	N/A
	Target	12'	10'	15'	8'	6'	N/A
	Constrained	10'	8'	11'	6.5'	5'	N/A

Transit Accessibility

Dedicated Bus Lanes

Dedicated bus lanes are sections of the roadway designed exclusively for buses. Dedicated bus lanes allow for transit to have consistent travel times regardless of the level of vehicular traffic on the corridor, improving on-time performance during peak periods., This transit priority treatment is appropriate on routes that have multiple high-frequency bus routes. Building on its bus network redesign through BaltimoreLink in 2017, MDOT MTA is investing in transit priority corridors throughout the bus system. MDOT MTA identified Reisterstown Rd., which runs on a portion of the Druid Park Lake Drive corridor, as a location for dedicated bus lanes.

Figure 31: Dedicated bus lane on North Ave. in Baltimore, MD

Conversion of One-Way Streets to Two-Way Streets

Many of the streets intersecting Druid Park Lake Drive are one-way streets with multiple lanes. Studies show that multi-lane one-way streets induce higher car speeds and reduce pedestrian and cyclist safety.[5][6]

In comparison to one-way streets, two-way streets have been shown to better support multi-modal travel, have lower vehicular speeds and lower fatal crash rates, reduced crime rates, higher property values and greater economic vitality due to improved connectivity and multi-modal activity. Two-way streets improve circulation and allow people to access their destinations more directly.[7] A Canadian study of one-way and two-way streets in Hamilton, Ontario found that the injury rate was 2.5 times higher on one-way streets than on two-way streets and 3 times higher for children from the poorest neighborhoods than for those from wealthier neighborhoods.[8]

Local Access Road

A low-speed, local access road adjacent to the primary roadway of Druid Park Lake Drive is an option for the Auchentoroly Terrace portion of Druid Park Lake Drive to further reduce speeds in front of residents' homes. A portion of Auchentoroly Terrace currently has a local access road that provides low-speed access to the adjacent neighborhood and space for resident parking. One concept option for Druid Park Lake Drive is to extend this local access road further to the north to expand the low-speed, neighborhood-scale road. With the lower-speed traffic on this roadway, residents would have low-volume and low-speed roadway directly adjacent to their homes. An example of this application is on Charles St. approaching the Johns Hopkins University Homewood campus, shown in **Figure 32**.

Figure 32: Local Access Road Example on Charles St. in Baltimore, MD

5 Riggs, William, 2017, How multi-lane, one-way street design shapes neighbourhood life: collisions, crime and community.
6 Walker, G., Kulash, W., HcHugh, B., 2015: Are we strangling ourselves on one-way networks?
7 Ibid.
8 Wazana A, Rynard VL, Raina P, Krueger P, Chambers LW. Are child pedestrians at increased risk of injury on one-way compared to two-way streets? Can J Public Health. 2000 May-Jun;91(3):201-6. doi: 10.1007/BF03404272. PMID: 10927849; PMCID: PMC6979836