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Final**



# **DOVER HIGH SCHOOL PEDESTRIAN SAFETY STUDY**



**DOVER/KENT COUNTY MPO**  
METROPOLITAN PLANNING ORGANIZATION



*The report reflects the views of the authors, who are responsible for the facts and accuracy of the research. The contents do not necessarily reflect the official view of FHWA, FTA, or DelDOT.*

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*The MPO has produced a Title VI Plan to guide the assessment of projects for racial and related discrimination. The study will include a written assessment on whether the area of the project is considered an area covered by the Title VI Plan and whether the project will have a negative impact, a positive impact, or no impact.*

## Preface

Dover Kent MPO is pleased to provide this publication, *Dover High School Pedestrian Safety Study*. Funded by FHWA, FTA, DelDOT, and the City of Dover, this resource is intended to identify the areas around Dover High School that lack adequate sidewalks, pedestrian paths, or other relevant amenities. This information can then be used to improve the pedestrian network within the school’s walk zone, which will allow more students to safely walk to school. Additional information on safety concerns within the walk zone and strategies for improving overall safety are provided.

Dover Kent MPO is responsible to ensure existing and future transportation projects are continuing, cooperative, and comprehensive and as such, appreciates continued support from FHWA, FTA, DelDOT, and our local MPO partners in order to ensure transportation policy information is shared. We are pleased to acknowledge the following collaborators on this project:

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## Introduction

The City of Dover is concerned about the safety of students walking to Dover High School, which is located on Forrest Avenue west of Mifflin Road. While much has been done to provide pedestrian facilities in recent years, the City and Dover Kent County MPO currently do not have a complete inventory of the improvements that are still needed.

After several years of modest public and private construction activity within the two-mile radius of the school, the City is proposing an inventory study of the remaining substandard pedestrian facilities. Dover Kent County MPO (hereafter referred to as Dover Kent MPO) will take advantage of this inventory to identify the most critical gaps in pedestrian networks, as well as the worst of the existing sidewalks that require repairs or changes in alignment. The findings will assist in determining which parts of the walk zone are in the greatest need of improvement and how the changes should be carried out.

The limits of the study are the area within the two-mile radius of the high school, with the primary focus taking place in and around the school's established walk zone. However, general findings may also be applied to other locations; for example, strategies for calming traffic and enforcing speed limits are applicable throughout the City of Dover and in other urban areas in the State of Delaware. Appendices provide maps of the existing conditions and proposed changes, a guide to walk zone improvements, and relevant resources.

## Purpose of Study

The new Dover High School opened in 2014, and even before its opening, several critical sidewalk gaps were identified in the area. Many of these gaps are still present today. These gaps are hazardous to students attempting to walk to school or to nearby businesses, as they are forced to walk close to or within the roadway, putting them dangerously close to vehicle traffic. Furthermore, there are locations that lack adequate crosswalks and traffic signals, which presents another type of hazard. Without crosswalks and traffic signals, motorists do not expect pedestrians to cross the street, which means they will not be watching for students.

With these concerns in mind, this study was conducted in an effort to pinpoint the locations within the school walk zone with the greatest need of improvement. The City of Dover is seeking to improve conditions for pedestrians around Dover High School. Therefore, identifying critical locations is the first step in making beneficial changes. Ultimately, the improvements will make conditions safer for students, school faculty, and motorists; they may also have additional benefits such as improved community health, better air quality, and new opportunities for recreation and education.



## Existing Conditions

### National Trends

The preferred mode of transportation used by students in the United States has shifted from walking, bicycling, and relying on school buses to using private vehicles. Findings from the Federal Highway Administration (FHWA) indicate that in 2001, about 50% of students between the ages of six and twelve arrived at school in a private vehicle; in 1969, by contrast, this number was about 15%.<sup>1</sup> The change can be attributed in part to further distances between schools and homes, but another key factor is the safety conditions of the roads and paths connecting to the school. Land use has played a significant role in limiting students' ability to walk to school.<sup>2</sup>

The percentage of children walking and bicycling to school varies widely by school district. Walk zone requirements determine which students are eligible for bus pickup, and which are close enough to walk to school without a ride. However, even within the radius of a given walk zone, students may not be able to walk safely due to a number of factors. These include the distance to and from school, the path's topography, the extent of sidewalks, the safety of the roadway, the safety of the surrounding area, and other conditions such as the weather and the time of day.

It has been found that children are at an increased risk of being hit by motor vehicles because they do not perceive traffic and road threats as carefully as adults. They are also less likely to be seen by drivers due to their smaller size. Finally, children are at an increased risk of injury and death when hit, as they are smaller than adults and are still developing.<sup>3</sup> These combined factors make children a high-risk demographic, which is why enhanced safety measures are necessary around schools and within walk zones.

Impact speed is one of the most important factors in how severely a pedestrian is injured. Studies have found that a pedestrian hit by a vehicle traveling at 20 mph has a 5% risk of fatality; at 30 mph, the risk climbs to 45%; at 40 mph, the risk of fatality is 85%.<sup>4</sup> These findings highlight the importance of having a safe place to walk, especially for students and other vulnerable groups. While traffic-calming techniques are important in many cases, a sidewalk completely removes pedestrians from the vehicle's approach; in other words, even if traffic is successfully calmed, people are still in the path of the moving vehicles unless a sidewalk is added.

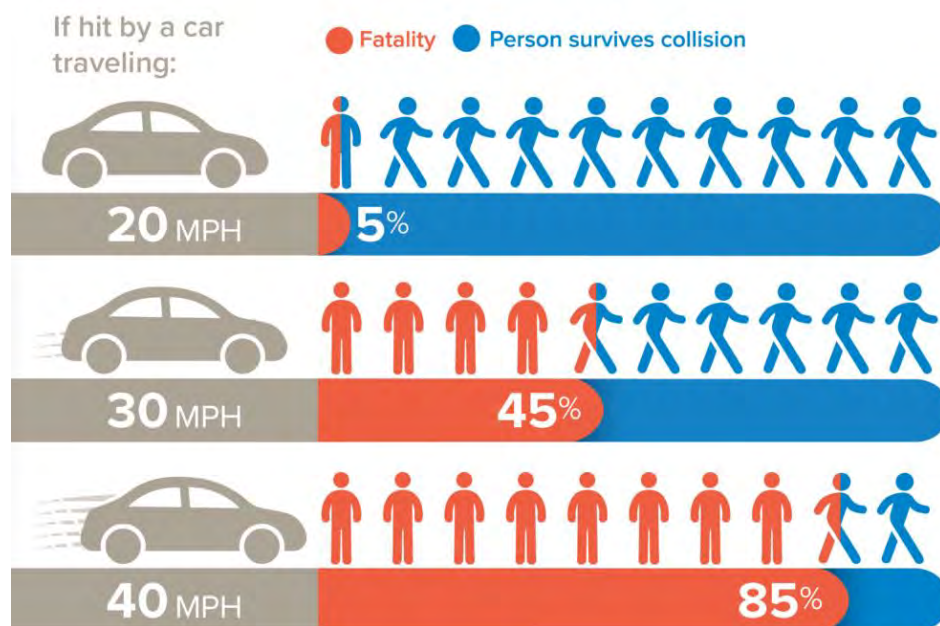
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<sup>1</sup> NHTS Brief: Travel to School: The Distance Factor. Federal Highway Administration, 2008. <https://nhts.ornl.gov/briefs/Travel%20To%20School.pdf>.

<sup>2</sup> *Building an Outdoor Legacy in Delaware*. Delaware Division of Parks and Recreation, 2018. <https://destateparks.com/wwwroot/downloads/SCORP/SCORP%202018.pdf>.

<sup>3</sup> *State-of-the-art review: preventing child and youth pedestrian motor vehicle collisions: critical issues and future directions*. Marie-Soleil Cloutier et al., BMJ, 2021. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7848053/>.

<sup>4</sup> "Bigger vehicles are directly resulting in more deaths of people walking." Steve Davis, Smart Growth America, 2021. <https://smartgrowthamerica.org/bigger-vehicles-are-directly-resulting-in-more-deaths-of-people-walking/>.



National Traffic Safety Board (2017) Reducing Speeding-Related Crashes Involving Passenger Vehicles. Available from: <https://www.nts.gov/safety/safety-studies/Documents/SS1701.pdf>

Figure 1: A graphic that displays the risk of pedestrian fatality when a vehicle is moving at 20 mph, 30 mph, and 40 mph. Source: Smart Growth America; derived from National Traffic Safety Board ([link](#)).

Another concern is the national shift in preferred vehicle type. Larger motor vehicles, especially SUVs, have steadily become more popular in the United States, while sedans have become less popular. The rise in larger vehicles on the road is one of the reasons pedestrian injuries are becoming more severe. In addition, drivers in a pickup truck or large car are less likely to see a small child stepping in front of the vehicle, due to the prominence of the vehicle's blind spots. Note that despite the increasing prevalence of larger vehicles, the size of vehicle is not the only factor, and a sedan or other smaller vehicle can be dangerous to pedestrians for the same reasons as an SUV if it is not driven at a reasonable speed.<sup>5</sup>

A final factor in school pedestrian safety is the students themselves. When walking to and from school, or to a business in the area, students may walk alongside each other in order to talk with one another, which increases the likelihood of being hit by a passing vehicle and can distract them from nearby hazards. In recent years cellular devices have also become a common distraction, and if students are looking at a screen or listening to music while walking, they are not paying attention to their surroundings. (It should be noted that cellular devices are a common distraction for motorists as well as pedestrians.)

<sup>5</sup> Davis, Smart Growth America, 2021. <https://smartgrowthamerica.org/bigger-vehicles-are-directly-resulting-in-more-deaths-of-people-walking/>.

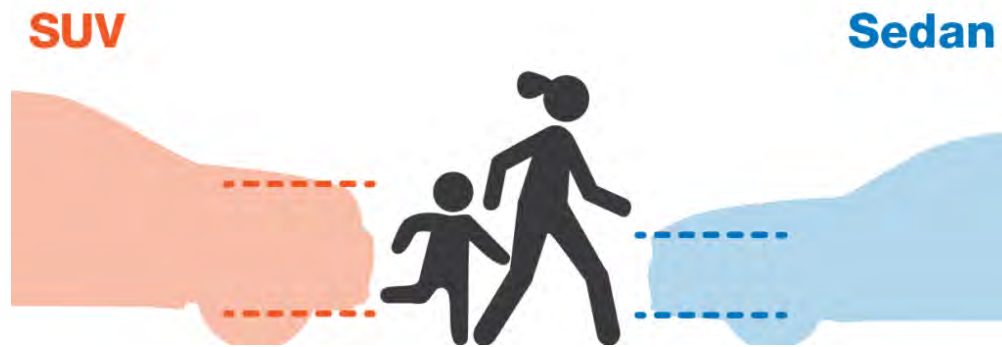


Figure 2: A graphic that shows the typical difference in blind spot size between an SUV and a sedan. Source: Smart Growth America ([link](#)).

The issue of school pedestrian safety has several broad domains associated with it: roadways, motor vehicles, drivers, and pedestrians. No single domain is wholly at fault for a lack of safety; most often it is due to a combination of factors. As such, safety conditions in a school walk zone cannot be improved without addressing each of these domains and understanding their relationship with one another.

In recent years there have been policy changes, awareness campaigns, and other efforts to increase safety for students walking and bicycling to school. However, in many places across the country, the conditions must still be improved before students can do this safely. Sidewalks, pedestrian paths, and similar infrastructure are important for improving the pedestrian network around a school walk zone and giving students the opportunity to walk instead of relying on a motor vehicle. This study, which identifies the gaps in sidewalk networks around Dover High School, may be used in improving the school's own pedestrian network.

## State of Delaware

According to Smart Growth America, the State of Delaware is ranked the 5th deadliest state for pedestrians, based on data collected between 2016 and 2020. Furthermore, the Philadelphia-Camden-Wilmington metropolitan area is ranked 46 among the 100 deadliest metropolitan areas in the United States in regard to pedestrian safety.<sup>6</sup> Most pedestrian fatalities in a given year take place in New Castle County. (For example, New Castle County experienced 20 pedestrian deaths in 2021, which was two-thirds of the total.)<sup>7</sup> However, the issue of pedestrian safety remains a serious concern for City, County, and school officials in Kent County. This is especially true around schools and other critical areas where walking and bicycling are common activities.

<sup>6</sup> "Dangerous By Design 2022." Smart Growth America, 2022. <https://smartgrowthamerica.org/dangerous-by-design/>.

<sup>7</sup> Delaware's Annual Traffic Statistical Report, 2021. Delaware State Police, 2022. <https://dsp.delaware.gov/wp-content/uploads/sites/118/2022/04/2021-Annual-Traffic-Statistical-Report.pdf>.



## Capital School District

The area included in the Capital School District extends as far west as the Maryland border and as far east as the coastline of Delaware Bay. Its northern and southern boundaries are more irregular in shape. To the north is Smyrna School District, and to the south is Caesar Rodney School District. Most of the public schools are concentrated around the City of Dover, with Hartly Elementary School being the primary exception. Students within this area typically attend Capital School District schools, including Dover High School.

The process of using “feeder patterns” delineates which schools a student will attend, based on their proximity to the schools and the density of students in the area. This is especially true for elementary school students; for example, at present, students living on the western side of Bay Road attend South Dover Elementary, whereas students on the eastern side attend East Dover Elementary. However, there is also the option for students to enroll in other public schools through Delaware’s “choice program”.

The state-mandated walk zone around Dover High School, as with other high schools in Delaware, is a two-mile radius. Many roads within the area are hazardous for pedestrians, and there are several “unique hazards” such as four-lane roads that must be considered. As a result, the Capital School District performs “courtesy pickups,” busing students in areas where they would have a difficult time walking to school. Ultimately, this process excludes the majority of the two-mile radius from the walk zone.

Due to the adjustments made to the two-mile radius, the walk zone of Dover High School is not a perfect circle, but rather, an uneven shape that is bent to include and exclude various neighborhoods depending on the existing conditions. North of Forrest Avenue, the walk zone includes the Cranberry Run, Heatherfield, Heatherfield East, Marsh Creek, Mallard Pond, and Hampton Square neighborhoods. Kenton Road serves as the northeastern boundary of the walk zone. To the east, the walk zone includes the Village of Westover neighborhood, as well as the houses along Forrest Avenue as far as Mifflin Road. The Village of Westover and Cannon Mill neighborhoods serve as the southern boundary; in other words, the walk zone does not extend south of Hazletville Road. To the west, the walk zone does not extend beyond the Leander Lakes neighborhood.

Various improvements have been added to the Dover High School walk zone over the years. An example of this is the shared-use path that runs behind several houses on the southern side of Route 8 (Forrest Avenue) and connects to the high school. Another example is the high intensity activated crosswalk (“HAWK”) beacon at the intersection of Forrest Avenue and Dover High Drive. Despite these changes, there are many areas that are still in need of improvement, especially those that are frequented by students. Maps depicting the school walk zone are included in Appendix A of this study.

## State Policy

### Walk Zone Requirements

In the State of Delaware, maximum walk zone requirements are set by the Delaware Department of Education. The walk zone is a one-mile radius around the school for elementary schools, and a two-mile radius for secondary schools. School districts must adhere to this maximum distance set by the state, or create their own standards based on the needs of the community.<sup>8</sup>



The Capital School District performs “courtesy pickups” for many students within the walk zone, as in some places it is very difficult to walk along roads to reach the destination. While the school district is not required by law to do this, it makes the journey to school safer for students in areas with no sidewalks. However, it also adds to the volume of vehicles around the schools, as more buses are needed on a daily basis. This, combined with the high volume of passenger vehicle drop-offs, leads to significant congestion during peak hours.

### Delaware Safe Routes to School Program

The Safe Routes to School (SRTS) Program is a program that states across the country have joined in an effort to improve the safety conditions for children walking and bicycling to school. This program follows the “Six E’s” of Safe Routes to School: engagement, equity, engineering, encouragement, education, and evaluation. Participants have access to resources that assist with setting goals, applying for grants, and seeking out partners. The Safe Routes Partnership is a national grassroots organization that organizes and advocates for improving safety conditions for students. For more information, please refer to their website.<sup>9</sup>



The State of Delaware’s SRTS Program, overseen by DelDOT, was started in 2002 through the passing of legislation (Senate Bill No. 353 of the Delaware 141st General Assembly). It allows DelDOT to create grants for increasing pedestrian and bicycle safety around schools. This state-level policy, much like the Safe Routes Partnership, offers its own resources for improving school walk zone conditions. The *Delaware Safe Routes to School Program Sourcebook* is an example of these resources.<sup>10</sup>

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<sup>8</sup> “1150 School Transportation.” State of Delaware: Administrative Code. <https://regulations.delaware.gov/AdminCode/title14/1100/1150.shtml>.

<sup>9</sup> “Safe Routes to School.” Safe Routes Partnership. <https://www.saferoutespartnership.org/safe-routes-school>.

<sup>10</sup> *Delaware Safe Routes to School Program Sourcebook*. Delaware Department of Transportation, 2006. <https://deldot.gov/Programs/srts/pdfs/srts.pdf>.

## Safe Streets and Roads for All (SS4A)

The Safe Streets and Roads for All (SS4A) discretionary program was established under the 2021 Bipartisan Infrastructure Law. This program is a relevant example of federal funding for improved walking routes to school, though the grants are intended for more than just school walk zones. It is part of the US Department of Transportation’s National Roadway Safety Strategy and its goal of reaching zero roadway fatalities.<sup>11</sup> Eligible recipients include cities, towns, counties, Tribal governments, and MPOs.



The two types of SS4A grants are Planning and Demonstration Grants and Implementation Grants. Outcomes of Planning and Demonstration Grants may include the completion of an Action Plan, feasibility studies, pilot programs for new technology, and similar programs. Outcomes of Implementation Grants are based on the results of the previously completed Action Plan; they may include installing pedestrian safety enhancements, developing bicycle networks, and creating Complete Streets to reduce vehicle speed and separate users. There is also a focus on creating safe routes to school and public transit services in underserved communities. At the time of this study’s completion, the deadline to apply for SS4A during fiscal year 2023 was July 10, 2023.<sup>12</sup> Please visit the SS4A webpage or the Notice of Funding Opportunity (NOFO) for further information.<sup>13</sup>

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<sup>11</sup> “National Roadway Safety Strategy.” US Department of Transportation. <https://www.transportation.gov/NRSS>.

<sup>12</sup> “Safe Streets and Roads for All (SS4A) Grant Program.” US Department of Transportation, 2023. <https://www.transportation.gov/grants/SS4A>.

<sup>13</sup> *Notice of Funding Opportunity (NOFO), FY 2023, SS4A Grant Program*. US Department of Transportation, 2023. <https://www.transportation.gov/sites/dot.gov/files/2023-03/SS4A-NOFO-FY23.pdf>.

## Research Process

### Mapping and Fieldwork

To understand the problem from a spatial point of view, Dover Kent MPO developed several maps to include with the study. These maps depict the walk zones of each of the schools within the Capital School District, the gaps in sidewalk and crosswalk networks around Dover High School, and the areas with the greatest need of improvement to alleviate safety concerns. Maps are provided in Appendix A of the *Dover High School Pedestrian Safety Study*.

Fieldwork included visits to Dover High School and several locations within the school's walk zone. Visits to the high school were assisted by School District staff. This work was conducted primarily in the spring of 2023. Through discussions with School District staff, Dover Kent MPO received valuable insight into the state-level policies that determine the walk zones of elementary and secondary schools, a list of nearby locations that are most in need of safety improvements, and the School District's own actions that assist with getting students to school.

### Literature Review

Dover Kent MPO used available resources to inform the narrative of this study. Types of resources included previously completed studies (such as the 2013 Dover High School pedestrian study), local plans and concepts (such as the 2020 Dover Bicycle and Pedestrian Plan), as well as various resources from the US Department of Transportation (DOT), the Federal Highway Administration (FHWA), and other relevant entities. Literature was used to provide a history of improvements around Dover High School and to understand current plans for the area. The most important resources are discussed in Appendix C; additional resources are provided in footnotes.

### Outreach Activities

One of the primary methods of gathering information for the study was through online surveys for students and parents. Questions in the surveys included how the students typically travel to school, the distance between the school and the residence, and the confidence of students and parents in the current walk zone conditions. The survey was distributed in April of 2023. The results of these efforts are discussed later in the study.

Dover Kent MPO also held a public workshop on May 2, 2023, at the Capital School District offices. This was an opportunity for Dover Kent MPO to engage with the public, discuss study findings, and receive input towards potential alternatives.

## Walk Zone Analysis

Dover Kent MPO used a combination of mapping tools, Google Maps satellite view, fieldwork, and outreach to understand the extent of sidewalks and other amenities within the Dover High School walk zone. The walk zone analysis of the *Dover High School Pedestrian Safety Study* describes any major sidewalk gaps along the roads and other infrastructure gaps, hazards present in the area, and the locations in need of improvement.

## School Traffic

The bus drop-off and pickup area at Dover High School is located on the southern side of the school. At the end of the day, once students are dismissed from classes, they must make their way to the pickup area before the buses leave. School constables and other staff direct students onto the buses and ensure the vehicles are able to depart in a timely manner. Student athletic teams also board buses around this time.

The beginning and end of a school day are the busiest hours for vehicle traffic, with many older students driving themselves, and younger students being dropped off and picked up. This vehicle activity comes in the form of school buses, private vehicles such as passenger cars, and DART buses. Students walking to and from school during these hours are likely to encounter a high volume of traffic, especially near the front of the school. It is important that the area around the school contains adequate walking and bicycling infrastructure, so that students do not have to enter busy roadways or drop-off lanes.



Figure 3 (l): Students exiting Dover High School at the end of the school day.



Figure 4 (r): Students walking towards the buses at Dover High School.



A noticeable backup of vehicles takes place at the end of the day when the buses begin their departure. Due to the location of the parent drop-off and pickup area on the western side of the school, those using personal vehicles will need to wait for the buses to pass before they can leave themselves. This is worth noting because an improvement of the school walk zone would potentially encourage students living close to the school to walk rather than rely on a personal vehicle, which could reduce the overall traffic volume (primarily personal vehicles) and alleviate congestion such as this.



Figure 5 (l): Buses beginning their departure from Dover High School.



Figure 6 (r): A backup of cars caused by the departing school buses.

## Sidewalk and Crosswalk Gaps

The primary purpose of the *Dover High School Pedestrian Safety Study* was to identify gaps in sidewalks within the Dover High School walk zone, as well as a lack of crosswalks and other pedestrian amenities. This section of the walk zone analysis describes the critical locations and what is needed to improve safety conditions. Table 1 lists the primary recommendations for sidewalk and crosswalk improvements, along with traffic signals and other potential changes.

In some cases, some portions of the roads within the wider area may lie outside of the City of Dover (Mifflin Road is an example of this pattern). This emphasizes the need for coordination between City, County, and State when working to improve overall conditions for pedestrians.

*Table 1: A list of locations most in need of improvement within the Dover High School walk zone, including the type of improvement, the status of the improvement, and the benefits that would result from it.*

<b>Location</b>	<b>Type of Improvement</b>	<b>Status</b>	<b>Benefit</b>
Forrest Ave between Dover High Drive E and Mifflin Road (southern side of road)	Shared-use path	Scheduled for 2023 (Senator Bikeway Phase III)	Safer conditions for established walk zone
Forrest Ave between Cranberry Run and Dover High Drive W (northern side of road)	Sidewalk	Not scheduled	Safer conditions for established walk zone
Dover High Drive crossing at entrance to Leander Lakes	Crosswalk	Not scheduled	Safer conditions for established walk zone
Forrest Ave at Dover High Drive W (west of Cranberry Run)	Crosswalk	Not scheduled	Safer conditions for established walk zone
Forrest Ave at Dover High Drive E	Traffic signal	Not scheduled	Easier for motorists to follow than existing HAWK light
Mifflin Road between Forrest Ave and Hazlettsville Road (both sides of road)	Sidewalk	Not scheduled	Potential to extend walk zone; safer conditions
Mifflin Road at intersection with Forrest Ave	Crosswalk	Not scheduled	Potential to extend walk zone; safer conditions
New paths connecting neighborhoods in walk zone to Fox Hall Road and Pebble Valley Drive	Shared-use path	Not scheduled	Potential to extend walk zone
Hazlettsville Road at Cannon Mill Drive and Brittingham Drive	Traffic signal	Not scheduled	Potential to extend walk zone; safer conditions
Hazlettsville Road at Cannon Mill Drive and Brittingham Drive	Crosswalk	Not scheduled	Potential to extend walk zone; safer conditions
Village of Westover and Cannon Mills neighborhoods	Crosswalks	Not scheduled	Safer conditions for established walk zone
Kenton Road between Forrest Ave and Chestnut Grove Road	Sidewalk	Scheduled for completion in 2024	Potential to extend walk zone; safer conditions
College Road between Kenton Road and McKee Road	Sidewalk, crosswalk, intersection	Listed in CTP, construction scheduled for 2027	Potential to extend walk zone; safer conditions

## Route 8 (Forrest Avenue)

The most obvious sidewalk gap along Forrest Avenue is located on the southern side of the road, between the eastern entrance of Dover High Drive and the intersection with Mifflin Road. This gap runs for about 1,450 feet, and there are several residential driveways in the path. The Dover High School pedestrian study from 2013, the City of Dover pedestrian and bicycle plans from 2015, the *City of Dover Comprehensive Plan* from 2019, and the *Dover Bicycle and Pedestrian Plan* from 2020 all make explicit reference to the gap, citing it as an area of concern. (It was listed as the highest priority of all potential projects in the 2015 *Dover Bicycle Plan*.)<sup>14</sup>

The problem has not improved since the school's opening, and to this day students use the shoulder of Forrest Avenue to reach the Wawa convenience store due to the lack of sidewalks. Based on Dover Kent MPO observations and correspondence with city and school district officials, it is clear that this gap is the most critical within the high school's walk zone.



Figure 7: Forrest Ave near Marsh Creek, facing westward. No sidewalks are present on the southern side of the road.

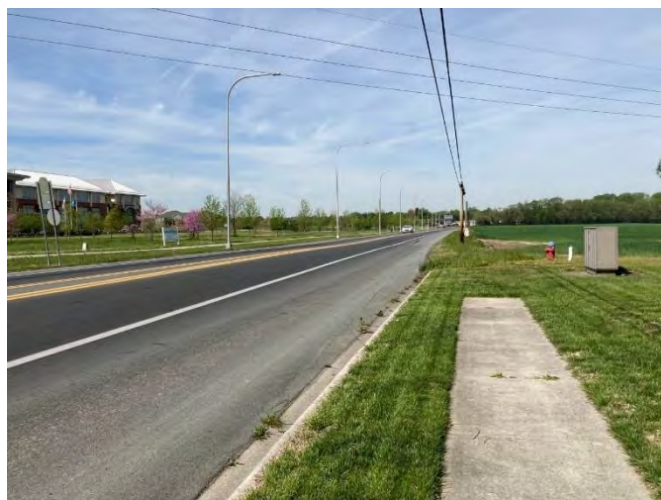


Figure 8: End of the sidewalk on the northern side of Forrest Ave next to Cranberry Run.

There is a second sidewalk gap on the northern side of Forrest Avenue, in between the Cranberry Run neighborhood and the western entrance of Dover High Drive. This gap might not be as critical as the gap previously discussed, as students coming from Cranberry Run and Leander Lakes are able to use the sidewalk on the southern side of the road. Furthermore, there are no businesses in this direction that students would visit on a regular basis, unlike the Wawa location to the east. Nevertheless, the gap should still be considered, as filling it would greatly improve walking conditions on the northern side of the road.

<sup>14</sup> *City of Dover Bicycle Plan*. City of Dover, 2015. <https://evogov.s3.amazonaws.com/media/27/media/74335.pdf>.



The most important street crossings in the Dover High School walk zone are located near the school on Forrest Avenue. The western intersection of Forrest Avenue and Dover High Drive contains a signalized traffic light and a crosswalk running east to west, which allows students to cross Dover High Drive when traffic is brought to a stop. There is no crosswalk connecting the north and south sides of Forrest Avenue at this location; if sidewalks are built on the northern side of Forrest Avenue to connect with the Cranberry Run neighborhood, then a new crosswalk will certainly be needed here.

The eastern intersection, by contrast, contains a high intensity activated crosswalk (“HAWK”), which students can activate when they need to cross Forrest Avenue. Motorists are then instructed to stop or slow down depending on the signal being given. A HAWK beacon generally creates conditions that are safer than an ordinary crosswalk by alerting drivers of the presence of pedestrians. However, many drivers are not familiar with the signals, as they are not commonly used in the State of Delaware. As a result, the success of a HAWK beacon depends on the motorists’ alertness and willingness to yield to pedestrians. A potential solution at this location is to replace the HAWK beacon with a typical traffic signal, which motorists would be more likely to adhere to. The tradeoff is that traffic would likely be slowed and travel time for motorists would increase.



*Figure 9 (r): The western entrance to Dover High School, which uses a traditional traffic light.*



*Figure 10 (l): The eastern entrance to Dover High School, which uses a HAWK light that can be activated as needed.*

Mapping by Dover Kent MPO staff revealed several clusters of crashes along Forrest Avenue. The most prominent of these are located at the intersection with Kenton Road and the intersection with Mifflin Road; to a lesser extent, there are smaller concentrations of crashes at both entrances to Dover High Drive.

## Residential Neighborhoods

The residential neighborhoods within the walk zone, including Village of Westover, Cannon Mill, and Cranberry Run, have adequate sidewalks in most cases. However, the problem with some of these neighborhoods is the absence of crosswalks that connect to Dover High School. An example of this is the crossing between the high school and Leander Lakes: while there are crosswalks running north to south on both sides of the road, there are no crosswalks running east to west across Dover High Drive. For this reason, school faculty such as teachers act as crossing guards at this location to ensure the students can cross safely. New Castle County is an example of a county that provides funding for crossing guards, which adds another measure of protection at its public schools; in Kent County, by contrast, the role is filled by school faculty rather than hired crossing guards. If the County or municipality were to fund crossing guards for Capital School District schools, the walk to school would be considerably safer for students.

Another example of a lack of crosswalks is the entrance to Cranberry Run: there is no crosswalk running north to south across Forrest Avenue, which means students must either head east to the crossing at the Heatherfield East neighborhood, or cross the busy road in front of Cranberry Run without the use of a crosswalk. In place of a crosswalk at Cranberry Run, the sidewalk could be extended westward to the western entrance of Dover High Drive; this, combined with a new crosswalk across Forrest Avenue, would give students a safer and more convenient route for reaching the high school.

During the outreach process, it was brought to the attention of Dover Kent MPO that motor vehicles often speed through the Village of Westover and Cannon Mill neighborhoods, despite the frequent presence of students. The addition of crosswalks at existing gaps, as well as speed control measures (such as radar speed signs), could help improve conditions in these locations.



*Figure 11 (l): Facing westward across the Leander Lakes intersection. Crosswalks do not extend across Dover High Drive at this location.*

*Figure 12 (r): The entrance to the Cranberry Run neighborhood, facing westward. Crosswalks do not extend across Forrest Avenue at this location.*



Adding crosswalks to critical locations such as Leander Lakes, Cranberry Run, and other neighborhoods would be an easy and inexpensive solution to the issue of safety within the school walk zone. Other efforts that complement these changes, such as a crosswalk signal and hired crossing guards, would provide further protection if planned properly.

Some residential neighborhoods in the walk zone are connected by walking paths. For example, paths are located between Mifflin Road and Trafalgar Drive in Village of Westover, and also



*Figure 13: The existing path at Mallard Pond Park in the Marsh Creek neighborhood.*

between the Mallard Pond and Marsh Creek neighborhoods. Extending walking paths between additional neighborhoods would allow the school walk zone to be increased in size, which could reduce vehicle congestion during peak hours if students choose to walk rather than travel in a personal vehicle. New paths could be used to connect the existing Mallard Pond-Marsh Creek path with other streets such as Fox Hall Road and Pebble Valley Drive. (This has been recommended as far back as the 2015 *City of Dover Pedestrian Plan*.) If these changes were implemented, more students could reach the school by walking or bicycling without relying on busy roads.

Roadways are not the only dangerous place for pedestrians in residential areas. In many cases a sidewalk will cross paths with a driveway that connects to a residential property. In such cases, pedestrians may not be aware of a vehicle that is backing out of or entering the property. Conversely, a driver may not be able to see an approaching pedestrian, or they may not be paying attention. An example of this design can be found in the Village of Westover and Cannon Mills neighborhoods, where there are adequate sidewalks, but the paths intersect with many driveways. Additionally, if sidewalks were built to fill the gap on the southern side of Forrest Avenue, driveways would act as a hazard in the same way.



*Figure 14: A typical driveway in the Cannon Mills neighborhood, which intersects with the sidewalk.*

## Two-Mile Radius

There are many roads within the two-mile radius around Dover High School that are not included in the official walk zone. Given the hazardous conditions for pedestrians, the Capital School District has significantly reduced the size of the walk zone. The school district then performs “courtesy pickups” for students so they do not have to walk along busy roads. Major roads that do not fall into the walk zone include Saulsbury Road, Kenton Road, Mifflin Road, and Hazlettville Road. There are several gaps along these roads, such as portions of Mifflin Road, but because they are not within the walk zone, the addition of sidewalks is not as crucial for the sake of immediate school safety. Rather, these improvements would be helpful in extending the walk zone in the future and giving more students the option to walk safely.

To make conditions safer on Mifflin Road, sidewalks could be added on either side of the road. This need was identified in the 2020 *Dover Bicycle and Pedestrian Plan*<sup>15</sup>, though improvements were proposed as far back as the 2013 Dover High School pedestrian study.<sup>16</sup> A crosswalk at the entrance to the walking path would also be helpful, as it would allow people to cross between the east and west sides of the road. Finally, a crosswalk should be added running east to west at the intersection of Forrest Avenue and Mifflin Road. If these improvements were implemented, it may be possible to extend the walk zone to include the neighborhoods around Mifflin Road.

Note that some of the parcels along Mifflin Road lie outside of the City of Dover, though the road itself is maintained by DelDOT. For this reason, coordination between City, County, and State is important in cases such as these, as multiple jurisdictions are involved.



Figure 15 (l): Mifflin Road facing southward. Sidewalks are not present for most of the road.



Figure 16 (r): The entrance to the path between Mifflin Road and Village of Westover. There is no street crossing available to pedestrians here.

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<sup>15</sup> *Dover Bicycle and Pedestrian Plan*. City of Dover, 2020.

<https://doverkentmpo.delaware.gov/files/2021/04/Dover-Bicycle-and-Pedestrian-Plan-2020-FINAL-1.pdf>.

<sup>16</sup> *Dover/Kent County Pedestrian Study, Dover High School: Concept Design Report*. Dover Kent County MPO, 2013. <https://doverkentmpo.delaware.gov/files/2022/05/DHS-Ped-Study-Narrative-Pt-1.pdf>.

Another potential area for improvement is the intersection of Hazletville Road, Cannon Mill Drive, and Brittingham Drive, which could benefit from changes such as a crosswalk and a traffic signal. In its present condition, the intersection does not accommodate pedestrians looking to cross Hazletville Road. Given the close proximity of the Nottingham Meadows neighborhood to Cannon Mills, which already has an extensive sidewalk network, improvements at this intersection could then be used to expand Dover High School's walk zone. An example of these sort of improvements can be seen at the intersection of Hazletville Road, Westover Drive, and Wyoming Mill Road, where both a crosswalk and a traffic signal are present.



*Figure 17: The intersection of Hazletville Road, Cannon Mill Drive, and Brittingham Drive. There is no traffic signal here, and crosswalks are not available to connect either side of Hazletville Road.*

Site analysis revealed that there is a high concentration of crashes at the intersection of Hazletville Road, Westover Drive, and Wyoming Mill Road. Another concentration is found at the intersection of Hazletville Road and Mifflin Road. Despite the traffic lights present at these locations, many crashes have been identified over the past 13 years, which means traffic lights and similar improvements do not automatically remove all crashes from an area. The full map depicting clusters of crashes is available in Appendix A of the study.

Kenton Road is currently scheduled for the addition of sidewalks, bicycle facilities, and other pedestrian improvements. The intersection with Greentree Road has already been signalized, and the remaining work is expected to be finished in 2024. These changes will likely improve the connectivity between Kenton Road and the Dover High School area.

Minor roads within the two-mile radius include Chestnut Grove Road, Deer Track Lane, and Maidstone Branch Road, as well as others. These roads are very dangerous to pedestrians due to the high speed limits (typically between 40 and 50 mph), the lack of sidewalks, and the winding roadways. Fortunately, the Capital School District does not include these roads within the official walk zone of Dover High School.



## Unique Hazards

There are two types of unique hazards within the Capital School District that automatically qualify students for courtesy pickup by school buses. The following section will describe each of these hazards as they pertain to Dover High School. For a full description of how unique hazards are determined, please refer to the Administrative Code of the State of Delaware.<sup>17</sup>

### Four-Lane Roads

According to staff from the Capital School District, four-lane roads are listed as a unique hazard for students of all ages. This means if such a road is located between the students' home and the school, then the students qualify for bus pickup. The more lanes a student needs to cross, the greater the risk will be, especially if there are no refuge islands to accommodate pedestrians.



*Figure 18: The intersection of Forrest Avenue and Saulsbury Road, which contains six lanes of traffic. This intersection is an example of a unique hazard for Capital School District schools.*

Route 8 (Forrest Avenue) is a major four-lane road within the two-mile radius of Dover High School, specifically the area east of the intersection with Mifflin Road. (In some places there are as many as six lanes, as is the case at the intersection with Kenton Road.) In between Dover High School and the intersection with Mifflin Road, Forrest Avenue narrows to two lanes, with a third lane appearing in some places for left turns. There are no four-lane roads within the actual walk zone of Dover High School, given its classification as a unique hazard.

McKee Road and Saulsbury Road were recently studied for improvement to meet future capacity needs. Each of the proposed alternatives would involve either a four- or five-lane road. For this reason, the high school walk zone is unlikely to be extended beyond this road, as it will remain a unique hazard even after improvements are carried out.

<sup>17</sup> State of Delaware: Administrative Code. <https://regulations.delaware.gov/AdminCode/title14/1100/1150.shtml>.

## Railroad Crossings

Specifically for elementary schools within the Capital School District, railroad crossings are listed as a unique hazard, and if students would have to cross any railroad tracks along their route, they are bused to school rather than being asked to walk. This is not the case for secondary schools. However, this does not mean railroads are not dangerous to students attending a middle school or high school.

There are five major railroad crossings along roadways within the two-mile radius around Dover High School. These are located on College Road, Walker Road, Route 8 (W Division Street), Forest Street, and W North Street. Each of these

crossings contains gates on either side of the tracks, which are lowered to prevent motorists and pedestrians from crossing as a train draws closer. Furthermore, trains utilize their whistles to warn people of their approach as they pass through Dover. Even with these measures in place, though, it is possible for pedestrians to ignore or miss the warnings.

Despite the presence of railroad crossings in Dover High School's two-mile radius, there are none present within the actual walk zone, which means railroad crossings are not a significant concern for this school in particular. This hazard is more of a concern with other schools, including William Henry Middle School, Booker T. Washington Elementary School, and Fairview Elementary School; due to the schools' proximity to the railroad tracks, students are more likely to cross the tracks when heading to school. William Henry Middle School will be closing after the completion of the new middle schools in the summer of 2023, and students from Fairview Elementary will be sent to East Dover Elementary in the near future. The tracks will remain a hazard for Booker T. Washington Elementary School, and possibly for the new middle schools on Patrick Lynn Drive.



*Figure 19: The gated railroad crossing at Division Street, facing westward. William Henry Middle School and Booker T. Washington Elementary School are located a few blocks from the tracks. The Senator Bikeway is present on the north side of the road.*



## Bicycle Hazards

Dover High School offers bicycle racks in several locations on its campus. These allow students to lock their bicycles while they are in class. However, based on observations during fieldwork, bicycling to and from Dover High School does not seem to be a popular choice among students, as the bicycle racks were mostly empty during these in-person visits. Out of 15 survey respondents among parents, only one respondent listed “other” means of transportation to and from school as a preferred option (as in options aside from motor vehicles or walking).

As it currently stands, Forrest Avenue is not an ideal location for bicycling. One method of understanding bicycle safety is by analyzing Level of Traffic Stress (LTS), which is measured on a scale between 1 and 4. The area around Dover High School has an LTS of 3, which means it is not suitable for most bicyclists. Speed limit is another key factor. The speed limit for this part of Forrest Avenue is between 35 and 40 mph, but motorists may travel faster than the posted speed limit due to the straight path and wide lanes. Some of the risks on Forrest Avenue will be alleviated with the completion of the Senator Bikeway, which will include a shared-use path that separates bicyclists from passing motor vehicles. The safer conditions may allow more students to take their bicycles to school.

Aside from the residential neighborhoods, most of the other roads have an LTS of 3 or 4, and some even have a speed limit as high as 50 mph. They are not ideal for bicycling in many cases, and a bicyclist must be comfortable with hazardous riding conditions in order to take these routes.



*Figure 20: One of the bicycle racks positioned along the outside of Dover High School.*

## DART Route 101

DART First State currently operates a bus route between Dover Transit Center and Dover High School. Listed as Route 101, this bus route visits Dover High School and stops at several residential and commercial areas along the way. The vast majority of students rely on school buses or personal vehicles rather than public transit; however, during fieldwork, it was observed that some students used the DART bus to leave school at the end of the day. Changes to the transportation infrastructure around Dover High School should be made while keeping the needs of DART buses in mind, and DART First State should also be included in discussions over ways to improve the transportation network. Note that the route is only applicable at the time of this study's completion, and it is likely to change after the findings from the DART Reimagined study are implemented.



Figure 21 (l): A DART bus picking up students at Dover High School.

Figure 22 (r): The Dover High School bus stop, located on the western side of the school.



Figure 23: The current bus route, with the major stops, for DART Route 101. Source: DART First State ([link](#)).

## Outreach Results

### Public Workshop

On May 2, 2023, Dover Kent MPO held a public workshop at the Capital School District offices on Commerce Way. Poster boards were used to display findings of existing conditions and recommended improvements. There were not enough attendees to gather significant feedback from the public; however, those who attended the workshop were able to provide detailed input based on their own experiences within the walk zone.

### Survey Analysis

In the spring of 2023, a survey was distributed to parents on the topic of walk zone safety. Below is a summary of the survey results. Note that some questions allowed for more than one answer.

Question 1 of the survey asked parents which schools their children attend. Out of 18 respondents, 11 of them (61%) said their children attend Dover High School, four of them (22%) said their children attend William Henry Middle School, four of them (22%) said their children attend North Dover Elementary School, three of them (16%) said their children attend Central Middle School, and two of them (11%) said their children attend East Dover Elementary School.

Question 2 of the survey asked parents which modes of transportation their children typically use to get to school. Out of 15 respondents, seven of them (47%) listed the school bus as the preferred mode of transportation, five respondents (33%) listed walking, three respondents (20%) listed a ride from a parent/guardian, and three respondents (20%) listed driving their own vehicle. One respondent (7%) said they use another mode of transportation.

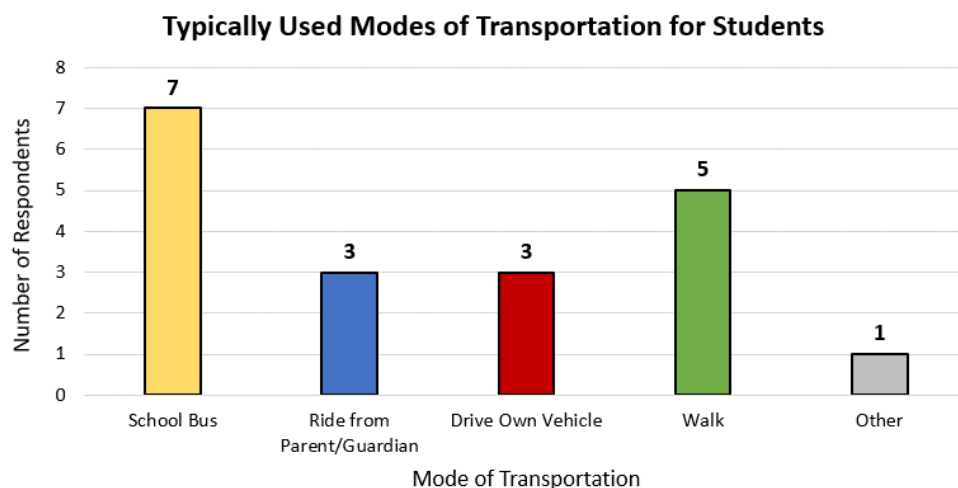
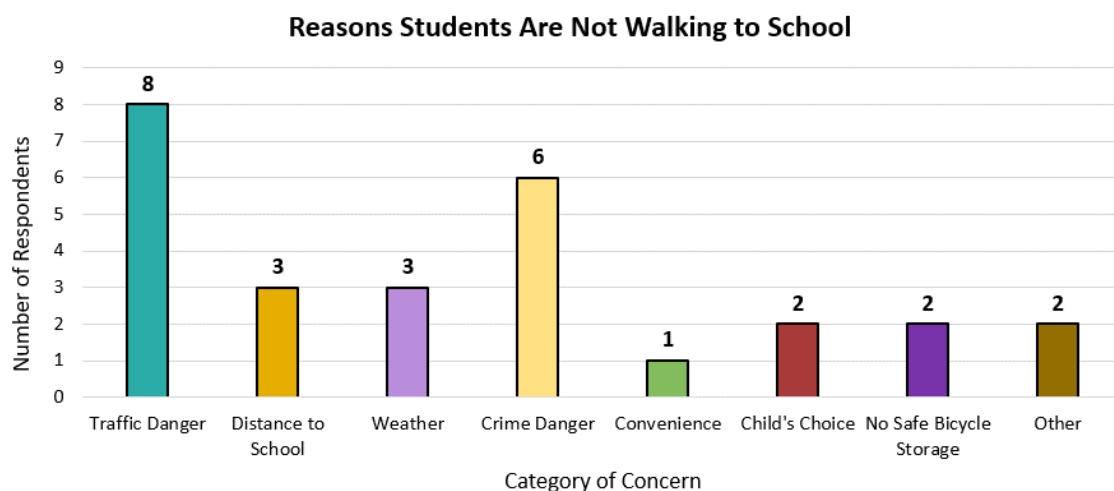


Figure 24: A graph depicting results from Question 2 of the survey. Respondents were asked which modes of transportation their children typically use.

Question 3 asked how far the respondents lived from the school. Out of 16 respondents, four of them (25%) said they lived less than one mile from the school, four of them (25%) said they lived less than two miles from the school, five of them (31%) said they lived between two and five miles from the school, and three of them (18%) said they lived more than five miles from the school.

Question 4 asked whether parents knew they lived within the State-designated walk zone, if they were located within the two-mile radius. Out of 13 respondents, nine of them (69%) said they were not aware that they lived within this area.

Question 5 asked why parents do not allow their children to walk to school, even if they live within the walk zone. Out of 11 respondents, eight of them (73%) listed traffic danger as a concern, and six of them (55%) listed crime danger as a concern. Distance to the school was a concern for three respondents (27%), and weather was also a concern for three respondents (27%). The other factors were less of a concern for these respondents.

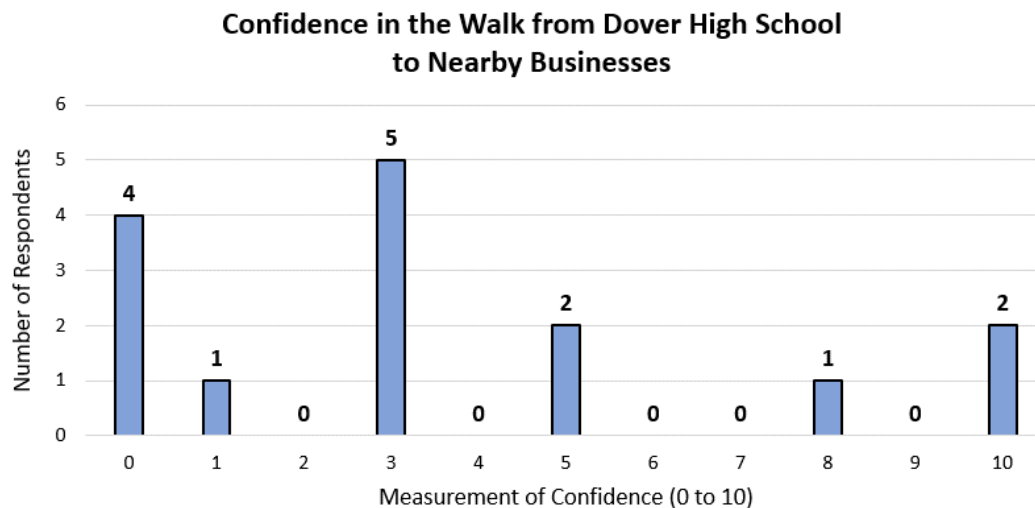


*Figure 25: A graph depicting results from Question 5 of the survey. Respondents were asked why they do not allow their children to walk to school.*

Question 6 asked about respondents' confidence in the current state of the walk zone around Dover High School. Answers were between 0 and 10, with 10 being the highest confidence. Out of ten respondents, two of them (20%) listed 2 as their answer, and two of them (20%) listed 5 as their answer. Other answers received fewer responses. The trend in this data is less visible than with other questions in the survey, as the responses have a fairly even distribution.

Question 7 asked about respondents' confidence in the current state of the walk zone around other Capital School District schools. Answers were between 0 and 10, with 10 being the highest confidence. Out of 11 respondents, three of them (27%) listed 2 as their answer, and three of them (27%) listed 5 as their answer. Other answers received fewer responses. As with Question 6, there is not much of a trend within the responses to this question.

Question 8 asked about respondents' confidence in the students' safety while walking from the high school to nearby businesses. Answers were between 0 and 10, with 10 being the highest confidence. Out of 15 respondents, five of them (33%) listed 3 as their answer, and four of the respondents (27%) listed 0 as their answer. Other answers received fewer responses. Two-thirds of the answers (67%) were a value of 3 or less, meaning the majority of respondents have little to no confidence in their children walking to nearby businesses.



*Figure 26: A graph depicting results from Question 8 of the survey. Respondents were asked to rank their confidence in the safety of walking between Dover High School and nearby businesses.*

Question 9 asked why parents drive their children to school as opposed to letting them take the bus. Out of nine respondents, five of them (56%) said they live outside of the bus area, two of them (22%) listed fear of bullying or assault as a reason, and one respondent (11%) said the bus ride is too long. Three respondents (33%) said they drive their children for another reason.



## Upcoming Changes

### Consolidated Middle Schools

Two new middle schools are being constructed for the Capital School District. These schools will be located on the same campus on Patrick Lynn Drive, and they will help in improving the overall capacity for students. Following the completion of the new schools, Central Middle School will become an elementary school, taking on the students from East Dover Elementary and Fairview Elementary. The two new middle schools, named the Middle School of Innovation and the Middle School of Excellence, are scheduled to open in the fall of 2023.<sup>18</sup>

Note that the changes described above will not take effect immediately. For the 2023-2024 school year, 6th, 7th, and 8th grade students will attend one of the two new middle schools. 5th grade students will remain at William Henry Middle School for the time being. Dover High School students will remain at their current location, and the same is true for all elementary school students. The graphic below explains this pattern.

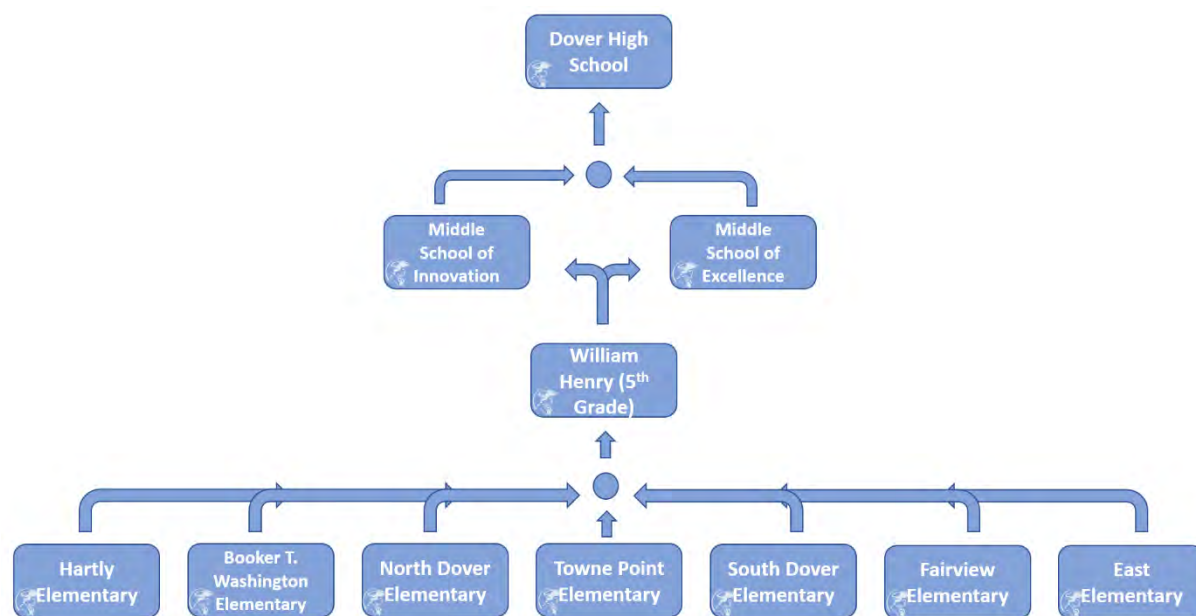


Figure 27: The feeder pattern for Capital School District schools, which will be used during the 2023-2024 school year.

<sup>18</sup> “Updates on the Two Interconnected Middle Schools.” Capital School District. [https://www.capital.k12.de.us/discover\\_capital/construction\\_updates/updates\\_on\\_the\\_two\\_interconnected\\_middle\\_schools](https://www.capital.k12.de.us/discover_capital/construction_updates/updates_on_the_two_interconnected_middle_schools).

## Senator Bikeway

The most critical location identified in this study is the southern side of Forrest Avenue between Dover High Drive and Mifflin Road. During the research process, it was brought to the attention of Dover Kent MPO that this location is part of the ongoing Senator Bikeway improvements. Phase III of the improvements is intended to add an 8' shared-use path between Dover High Drive and Mifflin Road; by completing this portion of the project, a significant sidewalk gap in the walk zone would be filled. This new path would also be linked to the existing path that runs behind several houses on Forrest Avenue and connects to Dover High School.

The project is currently in the design phase, and funding is also being sought. According to DelDOT's Projects Portal, construction is expected to take place sometime in 2023, though this is subject to change.<sup>19</sup> Further details are available in the DelDOT Projects Portal as well as the 2020 Dover Bicycle and Pedestrian Plan.<sup>20</sup>

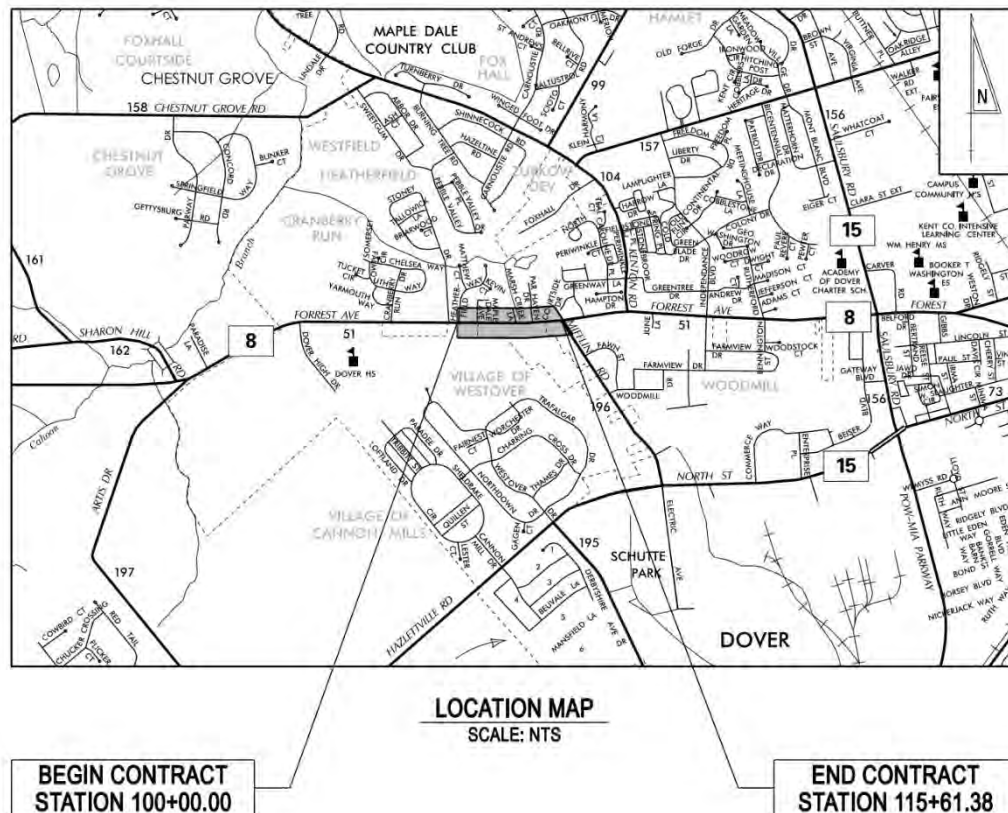


Figure 28: The planned location of the Senator Bikeway Phase III, on the southern side of Forrest Avenue between Dover High School and Mifflin Road. Image courtesy of Century Engineering.

<sup>19</sup> "Project: Senator Bikeway Phase III, Mifflin Road to DHS." DelDOT Projects Portal. <https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T202201601>.

<sup>20</sup> City of Dover, 2020. <https://doverkentmpo.delaware.gov/files/2021/04/Dover-Bicycle-and-Pedestrian-Plan-2020-FINAL-1.pdf>.

## Kenton Road and College Road

The upcoming improvements on Kenton Road between SR 8 and Chestnut Grove Road are expected to make conditions safer for pedestrians. Proposed changes include bicycle and pedestrian facilities, as well as intersection improvements (including the intersection with College Road). DelDOT's Project Portal lists the following update for the project:

“Design and right of way acquisition are underway. The signalization of the intersection of Kenton Road and Greentree Road as an early action project, is substantially complete. The remainder of the project is expected to begin construction in Fall 2023.”<sup>21</sup>

College Road, particularly the section between Kenton Road and McKee Road, is another roadway in the area that is scheduled for improvement. Proposed changes are scheduled to take place in FY 2027. The language describing these improvements, derived from the Capital Transportation Program (CTP), is as follows:

“The proposed improvements of this project consist of widening for shoulders, sidewalk or multi-use path on both sides of College Road; intersection improvements to accommodate bicycles and drainage improvements. Some utility relocations will be necessary, as well as acquisition of right-of-way and easements. Additionally, the entire roadway will be overlaid with new pavement.”<sup>22</sup>



Figure 29: The intersection of Kenton Road and College Road, facing westward.

<sup>21</sup> “Project: Kenton Road, SR 8 to Chestnut Grove Road.” DelDOT Project Portal. <https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201604501>.

<sup>22</sup> *Capital Transportation Program, FY 2023 - FY 2028*. DelDOT, 2022. [https://deldot.gov/Publications/reports/CTP/pdfs/FY23-FY28%20CTP%20Book\\_FINAL.pdf?published11-16-2022](https://deldot.gov/Publications/reports/CTP/pdfs/FY23-FY28%20CTP%20Book_FINAL.pdf?published11-16-2022).

## Conclusion

Although Dover High School has been in use for nearly a decade, there are lingering safety concerns within and around the school's walk zone. The most notable of these is the path to Wawa along Forrest Avenue, which contains a critical sidewalk gap. Other areas do not contain crosswalks, which makes the crossing of busy streets hazardous for pedestrians. Despite these ongoing safety concerns, it is possible to reduce the risk facing students.

There are several things that can be done to improve the safety of Dover High School's walk zone, based on the findings of the *Dover High School Pedestrian Safety Study*. Sidewalks or shared-use paths can be constructed wherever there are gaps present (such as along Forrest Avenue between Dover High Drive and Mifflin Road), and crosswalks and traffic signals can be added at places where students regularly cross the road (such as along Dover High Drive in front of Leander Lakes). There are additional strategies that complement these changes, such as recruiting crossing guards and enacting traffic-calming measures. These ideas are discussed in greater detail in Appendix B of the study.

Several benefits would take place if the changes recommended through this study are carried out. First and foremost, the walking route to school would be substantially safer, as there would be more amenities to ensure students are not in the path of motor vehicles. The decreased risk of hitting a pedestrian would also make the route safer for drivers. If the school walk zone can be extended to include additional safe walking routes, more students may choose to walk rather than use a motor vehicle. As a result, the air quality of the area might be improved due to the reduced number of idling vehicles (both students and parents) on school property. Finally, better pedestrian networks would allow new routes for walking and bicycling, and the improved recreation opportunities would be beneficial to students, faculty, and nearby residents.

There is a wide variety of stakeholders involved in this issue; for example, land along certain roads in the area shifts between the jurisdiction of Kent County and the City of Dover. The Capital School District, DelDOT, Dover Kent County MPO, the parents of students, and property owners are several other relevant stakeholders. As a result, it is necessary for any decision-making to involve as many voices as possible.

## Appendix A - Walk Zone Maps and Charts

The following maps and charts provide different details of the Dover High School walk zone. The first map shows the extent of the Capital School District, with inset maps providing the walk zone of each school. The second map highlights the existing conditions within the high school walk zone; it also uses clusters to depict the concentrations of crashes on roadways between 2009 and 2022. The third map shows the locations that are most in need of improvement based on analysis of the area. The fourth figure is a chart that illustrates the improvements recommended by Dover Kent MPO, which include locations for new sidewalks, pathways, crosswalks, traffic lights, and other alternatives. Information on the chart includes the type of improvement, the location, and whether the work has been scheduled.







# CITY OF DOVER PROJECT SPONSOR: DOVER HIGH WITH WALKOUT/WALK ZONE AREA INDICATED BELOW, WITH EXISTING CONDITIONS OF SIDEWALKS AND PATHS AND CROSSWALKS



**MAP KEY**

- Dover High School
- Dover High School Walk Zone
- Existing Sidewalks & Crosswalks
- 2017 Wetlands (not regulatory)
- Rail Line
- Other Crosswalks
- Pedestrian Trail
- Multi-Use Trail or Pathway

**Improving Areas**

- Salisbury Road Upgrades In Progress
- Dover/Kenton Road - Improvements Scheduled - 2024
- College Road - Improvements Scheduled - 2027

**Local Land Marks**

- Dairy Queen
- McDonald's
- Wawa

**Traffic Incidents**

- Blue
- Red
- Yellow





# CITY OF DOVER PROJECT SPONSOR: DOVER HIGH WITH WALKOUT/WALK ZONE AREA INDICATED BELOW, WITH EXISTING CONDITIONS OF SIDEWALKS, PATHS AND CROSSWALKS INCLUDING STUDY RECOMMENDATIONS





# Walk Zone Analysis

A list of locations most in need of improvement within the Dover High School walk zone, including the type of improvement, the status of the improvement, and the benefits that would result from it.

## Forrest Ave. between Dover High Drive E and Mifflin Rd. (South side)



Type of Improvement: Shared-use path  
Benefit: Safer conditions for established walk zone

Status: Scheduled for 2023  
(Senator Bikeway Phase III)

## Forrest Ave. between Cranberry Run and Dover High Dr. W (North side)



Type of Improvement: Sidewalk  
Benefit: Safer conditions for established walk zone

Not Scheduled



## Dover High Dr. crossing at entrance to Leander Lakes



Type of Improvement: Crosswalk  
Benefit: Safer conditions for established walk zone

Not Scheduled

## Kenton Rd. between Forrest Ave. and Chestnut Rd.



Type of Improvement: Sidewalk  
Benefit: Potential to extend walk zone; safer conditions

Status: Scheduled for completion in 2024

## College Rd. between Kenton Rd. and McKee Rd.



Type of Improvement: Sidewalk, Crosswalk, etc.  
Benefit: Potential to extend walk zone; safer conditions

Status: Listed in CTP, construction scheduled for 2027

## Forrest Ave. at Dover High Dr. W (west of Cranberry Run)



Type of Improvement: Crosswalk  
Benefit: Safer conditions for established walk zone

Not Scheduled

## Forrest Ave. at Dover High Dr. E



Type of Improvement: Traffic Signal  
Benefit: Safer conditions for established walk zone. Easier for motorists to follow than existing Hawk light

Not Scheduled

## Mifflin Rd. between Forrest Ave. and Hazletville Rd. (both sides of road)



Type of Improvement: Sidewalk, Crosswalk  
Benefit: Potential to extend walk zone; safer conditions

Not Scheduled

## New paths connecting neighborhoods in walk zone to Fox Hall Rd. and Pebble Valley Dr.



Type of Improvement: Shared-use path  
Benefit: Potential to extend walk zone

Not Scheduled



## Appendix B - Guide to Walk Zone Improvements

The following section lists potential methods for improving pedestrian safety within a school walk zone. These strategies may not always be applicable, which is why the existing conditions and specific needs of the school district must be considered before changes are implemented. Resources associated with each strategy are provided when possible. The strategies may be applicable to schools, municipalities, counties, or other relevant stakeholders.

There is no single solution to walk zone safety that will solve the entire issue without other measures in place. For example, educating the student body on pedestrian safety does not change the behavior of drivers; conversely, speed enforcement and traffic-calming techniques do not change the behavior of students. Furthermore, even if these steps were both carried out, there still needs to be improvement around the surrounding sidewalk networks and other relevant infrastructure. Each of the broad domains (roadways, motor vehicles, drivers, and pedestrians) needs to be addressed when improving pedestrian safety, rather than just one of them.

### Physical Improvements

#### Sidewalks and Shared-Use Paths

Improving a network of sidewalks and shared-use paths is one of the most effective ways to make conditions safer for pedestrians and bicyclists. These measures remove people from the roadway, which significantly reduces the likelihood of being hit by a passing car. By filling some of the major gaps identified in this study, it removes one of the barriers that keep students from walking to school. This could ultimately reduce the vehicle congestion around the school, as fewer students will need to arrive by car. It should be noted that sidewalks alone will not always keep people safe, as out-of-control vehicles can still clear a curb and hit pedestrians. For this reason, pedestrian networks are most effective when paired with traffic-calming measures.



Accessibility is an important part of sidewalk and path design. DelDOT has implemented its standards for sidewalks with adherence to Title II of the Americans with Disabilities Act (ADA), which requires that pedestrian routes are made accessible for all users. Under DelDOT's current standards, sidewalks must be at least 5' in width when a buffer strip is provided, and 6' in width when there is no buffer strip. A shared-use path must be at least 10' in width. Curb ramps or other types of ramps should be implemented to provide access between the sidewalk and the street. At crosswalks with pedestrian signals, there should be adequate "clear space" to allow for easier access to the button. Another consideration is the presence of barriers such as utility poles, fire hydrants, signage, and trees; these things could make navigating a sidewalk more difficult if not mitigated properly, which is why barriers should be identified before constructing a new sidewalk.

For more information on accessible sidewalks and shared-use paths, please refer to DelDOT's *Pedestrian Accessibility Standards Manual*.<sup>23</sup> ADA sources are also valuable tools for learning about accessibility.

A factor that accompanies the condition of sidewalks and shared-use paths is the availability of lighting along the route.<sup>24</sup> This is especially relevant in the morning or evening as students may be traveling to and from school in the dark. It is important that adequate lighting is used, so that students feel safe when walking or bicycling and they can be seen by motorists.<sup>25</sup>

### Crosswalks and Signals

A lack of crosswalks is another barrier to students attempting to walk to school. Close to the school, there should be crosswalks available at each of the locations most frequently used to cross the road. These are most often placed at an intersection, but they can be used anywhere there is high pedestrian traffic. Clear markings and ADA accessibility are among a crosswalk's most important features. Some crosswalks also utilize a midblock space to give pedestrians a safe refuge from passing vehicles, though this is dependent on the size of the road and the needs of the area.



Signals create additional protection for pedestrians by warning motorists of nearby pedestrians; these could consist of a signalized traffic light, a typical blinking “school zone” sign, or a HAWK beacon. Pedestrians should be able to activate a signal when they need to cross. Alternatively, a school could implement signals that activate during school drop-off and pickup hours, which remind motorists to reduce their speed.

Another aspect of the crosswalk is the use of crossing guards. People in this position are tasked with monitoring traffic around the school, stopping traffic when students need to cross a road, and directing students when it is safe to cross. Crossing guards are most effective in areas with gaps in crosswalks or other pedestrian infrastructure. They should carry a STOP paddle and wear a yellow or orange vest, so they are visible to motorists. The position could be filled by paid staff, school faculty, parents, or even older students that have been trained in walk zone safety.

For more information on federal standards for traffic control around schools, please refer to the *Manual on Uniform Traffic Control Devices* by the FHWA.<sup>26</sup>

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<sup>23</sup> *Pedestrian Accessibility Standards Manual*. Delaware Department of Transportation, 2021.

<https://deldot.gov/Publications/manuals/pedestrianAccessibility/pdfs/2021/Pedestrian-Accessibility-Standards-for-Facilities-in-the-Public-Right-of-Way-2021-Edition.pdf>.

<sup>24</sup> *Pedestrian Lighting Primer*. Federal Highway Administration, 2022.

[https://safety.fhwa.dot.gov/roadway\\_dept/night\\_visib/docs/Pedestrian\\_Lighting\\_Primer\\_Final.pdf](https://safety.fhwa.dot.gov/roadway_dept/night_visib/docs/Pedestrian_Lighting_Primer_Final.pdf).

<sup>25</sup> “Sidewalks.” SRTS Online Guide. <http://guide.saferoutesinfo.org/engineering/sidewalks.cfm>.

<sup>26</sup> “Part 7. Traffic Control for School Areas.” *Manual on Uniform Traffic Control Devices*. Federal Highway Administration, 2009. [https://mutcd.fhwa.dot.gov/htm/2009/part7/part7\\_toc.htm](https://mutcd.fhwa.dot.gov/htm/2009/part7/part7_toc.htm).

## Traffic-Calming Techniques

Traffic-calming techniques are a wide variety of improvements that slow the average speed of traffic in critical areas such as school walk zones. These may include traffic lights, speed bumps, speed humps, rumble strips, roundabouts, traffic circles, medians, chicanes, narrower lanes, fewer lanes, and reduced speed limits. The effectiveness of a given technique will depend on the circumstances, and potential drawbacks should also be considered (such the ability of school buses and emergency response vehicles to navigate changes in the roadway).



Signage is an inexpensive means of notifying motorists of reduced speeds, nearby bus stops, or school crossing areas. However, too many signs can be distracting, and adherence to the sign depends largely on driver awareness. For these reasons, other measures such as changes to the roadway tend to be more effective at calming traffic.<sup>27</sup>

The US Department of Transportation provides resources for traffic-calming, as well as case studies from across the country. These pages should be consulted to begin reviewing resources on the topic of reducing vehicle speed.<sup>28</sup>

## Speed Enforcement

A strategy similar to traffic-calming is the use of speed enforcement in strategic locations. This can be carried out either by law enforcement officers (typically through stationary or mobile patrols), or with the assistance of technology such as radar speed signs, speed cameras, and speedometers. Enforcement can act as a reminder to motorists that they need to reduce their speed and watch for pedestrians. It is most effective in areas where motorists should not exceed the speed limit, such as around sharp turns in the road or near schools and crosswalks. The availability of resources will need to be considered before determining which measures would be most effective in a given area.



For a more complete guide of speed enforcement, please refer to the NHTSA *Speed Enforcement Program Guidelines* document<sup>29</sup>, or the SRTS Online Guide webpage on enforcement.<sup>30</sup>

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<sup>27</sup> "Around the School." SRTS Online Guide. [http://guide.saferoutesinfo.org/engineering/the\\_school\\_zone.cfm](http://guide.saferoutesinfo.org/engineering/the_school_zone.cfm).

<sup>28</sup> "Traffic Calming to Slow Vehicle Speeds." US Department of Transportation, 2019. <https://www.transportation.gov/mission/health/Traffic-Calming-to-Slow-Vehicle-Speeds>.

<sup>29</sup> *Speed Enforcement Program Guidelines*. National Highway Traffic Safety Administration, 2008. <https://rosap.nhtl.bts.gov/view/dot/16480>.

<sup>30</sup> "Enforcement." SRTS Online Guide. <http://guide.saferoutesinfo.org/enforcement/index.cfm>.

## Bicycling

The most effective means of encouraging bicycle use by students is adding the necessary infrastructure to the area. Without a safe bicycle route between the school and the surrounding neighborhoods, students will not be comfortable bicycling and will seek other modes of transportation. A shared-use path is typically the least hazardous route, but if this is not possible, a bicycle lane could be constructed in the road, as long as there is ample space for both motorists and bicyclists. The distance to the school and the nearby hazards (such as street crossings and railroad tracks) must be considered before enacting these improvements.



Another key feature is adequate bicycle parking. These come in a variety of forms, one of the most common being the “grid” style, which allows for the storage of many bicycles but is not the most effective at keeping bicycles upright. It is recommended that bicycle racks are placed in an area that is easy to access and sees frequent traffic to deter theft. The racks should also be kept apart from vehicle traffic, so that students can safely access their bicycles. Bicycle repair stations, a related feature, could be made available near the parking spaces.

The US Department of Transportation provides resources for bicycle and pedestrian safety, including guides to complete streets and the latest research on public health as it pertains to bicycling.<sup>31</sup> For further information on bicycle parking, please refer to the “Bike Parking, Storage and Security” tip sheet by the Safe Routes Partnership.<sup>32</sup>

## Policy Initiatives

Although policy is not the focus of this study, it is important to note the positive impact that policy changes can have on a school walk zone when used effectively. For example, municipal and county policies could be used to designate a specific “safe route” within the walk zone, establish ongoing speed enforcement in residential or school areas, or provide funding for crossing guards. School policies could address topics such as drop-off and pickup protocols for parents.

A SRTS program is already in place in the State of Delaware, which gives public schools a means of creating a plan to shape their own policies and decisions. It is also critical that policymakers coordinate with school district officials, law enforcement, MPOs, and other relevant stakeholders.



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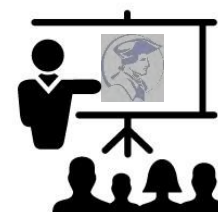
<sup>31</sup> “Expand and Improve Bicycle and Pedestrian Infrastructure.” US Department of Transportation, 2019. <https://www.transportation.gov/mission/health/Expand-and-Improve-Bicycle-and-Pedestrian-Infrastructure>.

<sup>32</sup> “Tip Sheet #3: Bike Parking, Storage and Security.” Safe Routes Partnership, 2011. <https://www.saferoutespartnership.org/sites/default/files/pdf/BikeParkingTipSheet-highres.pdf>.



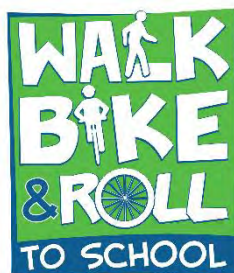
## Education

Public outreach is the first step in teaching the community about school walk zone safety. Outreach can take the form of newsletters, media segments, PSAs through social media, attending local events, handing out items such as reflective safety vests, and other strategies. For further details on pedestrian safety outreach, please refer to the Pedestrian Safety Campaign guide by the Federal Highway Administration.<sup>33</sup> See below for several examples of promotional materials, as well as the Walk, Bike & Roll to School logo.



One way to promote school walk zone safety is for schools to host a “walk to school” or “bike to school” event. This is an effective means of raising awareness around the issue for students and the larger community, and it can lead to long-term changes such as the addition of sidewalks. An event could be done in coordination with national-level efforts (for example, the national Walk and Bike to School Day for 2023 is set for October 4), or it could be an independent event with a separate date, depending on the school’s needs. There are many online resources that can assist a school in creating its own event.<sup>34</sup>

Education can also be a part of a school’s curriculum. The lessons could involve learning about general pedestrian safety concepts such as crosswalks and sidewalks, conveying useful habits such as listening for approaching vehicle traffic, and practicing these habits outside of the classroom. Lesson plans centered around pedestrian safety for children are provided by the National Highway Traffic Safety Administration (NHTSA) and could be adopted by schools depending on their needs.<sup>35</sup>



<sup>33</sup> *Pedestrian Safety Campaign*. Federal Highway Administration, 2008.

[https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-06/ped\\_safety\\_campaign.pdf](https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-06/ped_safety_campaign.pdf).

<sup>34</sup> “Walk Bike & Roll to School.” UNC Highway Safety Research Center. <https://www.walkbiketoschool.org/>.

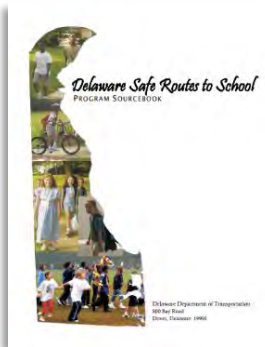
<sup>35</sup> “Child Pedestrian Safety Curriculum.” National Highway Traffic Safety Administration. <https://www.nhtsa.gov/pedestrian-safety/child-pedestrian-safety-curriculum>.

## Appendix C - Relevant Resources

The following is a list of resources that were consulted while researching this study. Descriptions are provided for each resource, as well as a link leading to the available webpage.

### Delaware Safe Routes to School Program Sourcebook (2006)

<https://deldot.gov/Programs/srts/pdfs/srts.pdf>

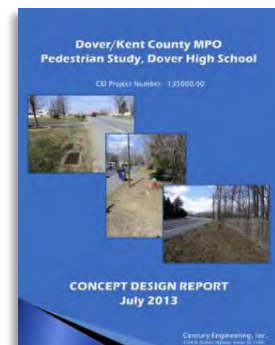


This resource is part of the Delaware Department of Transportation's Safe Routes to School (SRTS) initiative. It acts as a guide for schools interested in starting their own SRTS program, listing the necessary steps such as creating a SRTS committee, mapping the conditions around the school, and determining a course of action. Solutions proposed in the sourcebook include educational programs, speed enforcement, and traffic-calming. The document does not appear to have been updated since 2006; however, it is still useful in that it provides ideas for safety improvements and outreach strategies.

### Dover/Kent County Pedestrian Study, Dover High School: Concept Design Report (2013)

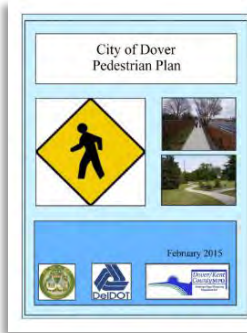
<https://doverkentmpo.delaware.gov/files/2022/05/DHS-Ped-Study-Narrative-Pt-1.pdf>

This study, assembled by Dover Kent County MPO in collaboration with Century Engineering, examines the walking conditions around Dover High School, which was still under construction at the time. Information provided in the study includes the speed limits of roads, sidewalk gaps, and photographs of the existing conditions. Although it has been ten years since the study's completion, many of the issues persist to this day. Therefore, it was an important resource for writing the *Dover High School Pedestrian Safety Study*.



## City of Dover Pedestrian Plan (2015)

<http://evogov.s3.amazonaws.com/media/27/media/74334.pdf>

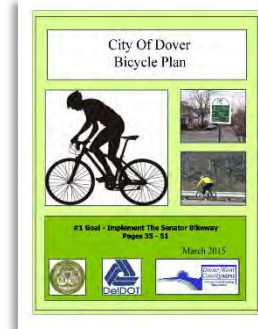


This plan was developed by the City of Dover, the Delaware Department of Transportation, and Dover Kent County MPO. It lists the areas in Dover with the greatest need of improvement for pedestrian access, including the significant sidewalk gap to the east of Dover High School. The plan also lists the improvements that have taken place over the years, such as the sidewalks that were added to the northern side of Forrest Avenue in 2014. Sidewalk improvements to both Forrest Avenue and Mifflin Road, as well as a path connecting nearby neighborhoods, were included as recommendations in the plan.

## City of Dover Bicycle Plan (2015)

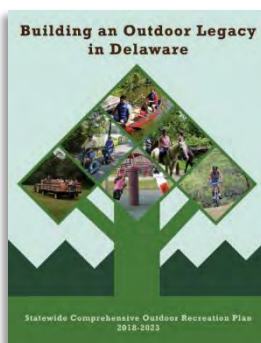
<https://evogov.s3.amazonaws.com/media/27/media/74335.pdf>

This plan was created to outline the various bicycle improvements that need completing within the City of Dover. Phase II of the Senator Bikeway project was listed as the most important priority, which highlights the critical need for improved accessibility around Dover High School. The plan gives many useful details on the planned improvements, as well as photographs of the locations and maps depicting where the shared-use pathway will be constructed.



## Building an Outdoor Legacy in Delaware (2018)

<https://destateparks.com/wwwroot/downloads/SCORP/SCORP%202018.pdf>

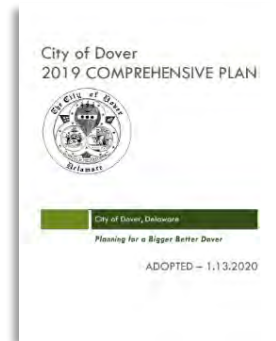


The State of Delaware's latest Statewide Comprehensive Outdoor Recreation Plan (SCORP) was completed in 2018. Overseen by the Delaware Division of Parks and Recreation's Park Resource Office, the plan offers findings into the many ways in which Delaware residents participate in outdoor activities. It describes the existing recreation facilities throughout the state, and it names the many benefits of improved recreation in a community. The document is relevant to the *Dover High School Pedestrian Safety Study* because it cites the safety concerns within school walk zones, and it emphasizes some of the reasons that these issues should be addressed. An update to the plan is currently in process; it is expected to be completed in late 2024.

## City of Dover Comprehensive Plan (2019)

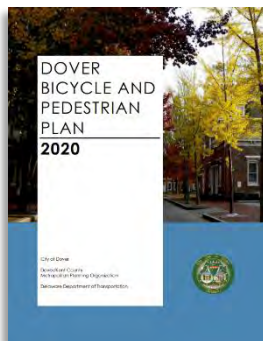
[https://www.cityofdover.com/media/2019%20Adopted%20Comprehensive%20Plan/Dover%202019%20Comprehensive%20Plan%20Adopted%201-13-2020%20Complete\\_wRevised%20LDP%20Maps.pdf](https://www.cityofdover.com/media/2019%20Adopted%20Comprehensive%20Plan/Dover%202019%20Comprehensive%20Plan%20Adopted%201-13-2020%20Complete_wRevised%20LDP%20Maps.pdf)

Like the other resources used in the study, this comprehensive plan describes the sidewalk gaps around Dover High School, especially along Forrest Avenue and Mifflin Road. It also references the existing amenities by the school, such as the HAWK signal on Forrest Avenue. According to the comprehensive plan, “The City is very concerned about public safety in this area and believes it deserves to be included in the CTP and funded at the earliest opportunity.” The plan is recent enough that its material is still highly relevant, and it includes other important topics such as Level of Traffic Stress (LTS) in Dover.



## Dover Bicycle and Pedestrian Plan (2020)

<https://doverkentmpo.delaware.gov/files/2021/04/Dover-Bicycle-and-Pedestrian-Plan-2020-FINAL-1.pdf>



The most relevant section of this plan is the description of Senator Bikeway Phase II, which will cover the area most in need of sidewalks or shared-use paths by Dover High School. The description includes a history of the area and previous recommendations, as well as the larger connectivity that would result from such improvements. A map of the planned shared-use path location, on the south side of Forrest Avenue, is included in this section. (Note that this phase of the Senator Bikeway has since been renamed Phase III.)

## Additional Resources

Other resources used in this study were provided by the US Department of Transportation (DOT), the Federal Highway Administration (FHWA), the National Highway Traffic Safety Administration (NHTSA), the Delaware Department of Transportation (DelDOT), Smart Growth America, and Safe Routes to School (SRTS), as well as others. These resources are referenced using footnotes throughout the study.



# DOVER/KENT COUNTY MPO

METROPOLITAN PLANNING ORGANIZATION

