MASTER PLAN

BOROUGH OF PENNINGTON
NEW JERSEY

4. Mobility Plan Element

The Mobility Plan element draft released by the writing team was conditionally adopted by the Planning Board on March 12, 2025, and posted on the Borough website for public comment. Revisions made to address comments received and to ensure consistency with other Plan elements were endorsed by the Planning Board on October 8, 2025. Final changes were approved by the Planning Board on April 8, 2026. This element will be available for comments until April 22, 2026, prior to final adoption at a public meeting of the Planning Board on May 13, 2026.

Contents

Mobility Plan Element Writing Team

Thanks go to the following people who helped create the Mobility Plan element: Roger Demareski, Meredith Moore, Allison Neary, Natalie Shivers, Kristin Tunkel, Rick Smith, Doug Pinelli, with Andy Jackson as chair. Special thanks go to Amy Kassler-Taub for her thorough review of the element.

1. Introduction

The Municipal Land Use Law (MLUL) includes a Circulation Plan as a permitted Master Plan element. N.J.S.A. 40:55D-28(4) describes the element as follows:

"A circulation plan element showing the location and types of facilities for all modes of transportation required for the efficient movement of people and goods into, about, and through the municipality, taking into account the functional highway classification system of the Federal Highway Administration and the types, locations, conditions and availability of existing and proposed transportation facilities, including air, water, road and rail."

Following the lead of Mercer County, we have chosen to name this the **Mobility Plan** element since this implies a broader range of users than the name circulation. The Plan accommodates large vehicles such as cars, trucks and buses on the roads, but also mobility such as walking, bicycling and personal mobility devices, including those that are battery powered. Because of its relatively small size and its location, the Borough's mobility network is sensitive to regional patterns, requiring coordination with regional mobility and proposals. Since the Borough is essentially a fully developed community, opportunities for major mobility infrastructure improvements are limited. With the wide variety of potential users, the system of roadways, sidewalks, bikeways and other pathways should be designed and regulated to maximize safety while ensuring efficient traffic movement.

There are seven categories in the FHA functional highway classification system. The roads in Pennington Borough are shown below under these classifications:

1. Interstates
   None
2. Other Freeway/Expressway
   None
3. Other Principal Arterial
   State Route 31
4. Minor Arterial
   County Route 640 – Pennington Road, South and North Main Street
   County Route 546 – South Main Street to Lawrenceville-Pennington Road
5. Major Collector
   County Route 631 – Ingleside Avenue
   County Route 624 – West and East Delaware Avenue from Route 31 to Stony Brook.
6. Minor Collector
   County Route 623 – Pennington-Harbourton Road
   Broemel Place and Green Street south of Broemel Place
7. Local
   All other Borough roads

The Delaware Valley Regional Planning Commission (DVRPC, see Section 8a below) presents traffic counts on its website https://www.dvrpc.org/webmaps/trafficcounts/. It can be searched by municipality or Zip Code. Traffic counts for roads in and around Pennington have been extracted from data for Zip Code 08534 and presented in Appendix A, Table A1. One set was dated June

2020 (West Delaware Avenue) and the count may have been affected by Covid restrictions, but most data are post-Covid, having been gathered between March 2022 and March 2025.

The counts have been added to a schematic map of Pennington in Figure A1 to give a general picture of traffic flow in and around Pennington. Around 8,500 vehicles per day join Route 31 northbound from Pennington Circle. Of these, ~7,800 travel as far as the North Main Street intersection, meaning a net ~700 leave Route 31 for destinations in Pennington. About 900 vehicles join Route 31 from North Main Street. Around 3,000 vehicles per day enter Pennington via Pennington Road from Pennington Circle and most of these travel as far as the Main Street traffic lights at Delaware Avenue. About 3,300 vehicles per day pass in each direction on East Delaware Avenue and onwards to Pennington-Rocky Hill Road. About 3,200 vehicles leave or join Route 31 on Pennington-Hopewell Road, representing traffic passing through Pennington on Route 31 on the way to or from Hopewell. The DVRPC count does not differentiate between automobiles and trucks. Such data would be useful.

The DVRPC daily count is generated from hourly counts which allows the visualization of how traffic is distributed during the day. Figure A2 shows three examples: southbound Route 31, north of Pennington-Harbourton Road; westbound East Delaware Avenue, east of Main Street; and northbound South Main Street, north of Curlis Avenue. All show morning and afternoon peaks with lesser peaks around lunchtime. Peaks for Route 31 are just under 700 vehicles per hour, Delaware Avenue 300 per hour and northbound Main Street 250 cars per hour. We will explore with DVRPC the opportunity to gather additional data in and around Pennington.

The preparation of this Mobility Plan element included benchmarking the Circulation Plans in the Master Plans of nearby communities: Hopewell Township, Hopewell Borough, Princeton, Bordentown, Lambertville, Stockton, Rocky Hill, and Hightstown. We also reviewed the Circulation and Sidewalk Plan of the 1998 Pennington Borough Master Plan and the circulation sections in the 2005, 2013 and 2023 Master Plan Reexamination reports (Appendix B). Additionally, the findings and recommendations relating to Pennington Borough from the 2002 Route 31 Design Study were reviewed.

The vision and goals for the Mobility Plan element are a subset of the overall Master Plan 2025 vision and goals developed by the Master Plan Committee (MPC) and the Citizens Advisory Committee (CAC-and endorsed by the Planning Board in a public meeting on January 10, 2024. In August 2025, the MPC conducted a web-based survey to seek the input of residents on Housing and Land Use. The survey also yielded responses of relevance to the Mobility Plan.

2. Mobility Plan Vision, Goals and Strategies

Pennington Borough's visions for mobility are:

- To have transportation policies that reduce automobile use in the Borough.
- To provide safe sidewalks for pedestrians of all ages and abilities, and safe routes for bicycles and other low speed personal mobility vehicles, and link them to schools, businesses and adjacent open space and recreation areas.

- To ensure that proposed mobility enhancements respect the preservation of Pennington's historic character and, also, do not impede the passage of emergency response vehicles.
- To manage parking for customers of businesses in the town center while balancing the accessibility needs of business employees and residents.
- To continually improve highway access and crossing management for Route 31.
- To minimize the impacts of transportation on the environment, including greenhouse gas emissions, and air and noise pollution.
- To implement Complete & Green Streets, and Vision Zero policies.
- To promote public and other transit alternatives to reduce traffic congestion and provide services to individuals of all ages and abilities.

The Mobility Plan goals and strategies are blended from five sources:

- The MPC/CAC Master Plan report approved by the Planning Board in a public meeting on January 10, 2024, and presented to the public at an Open House on April 10, 2024.
- The 2023 Master Plan Reexamination report adopted by the Planning Board on May 10, 2023, which reviewed progress on the circulation goals of the 1998 Master Plan, and the reexaminations of 2005 and 2013. See Appendix B.
- The Open Space and Recreation Plan (OSRP).
- The Green Buildings and Environmental Sustainability (GBESE) Plan.
- The Economic Development Plan
- Recommendations pertaining to Pennington in the 2002 Route 31 Design Study.

Background to the topics addressed by the goals will be found in Sections 3-8.

The goals are numbered below, and the associated strategies are listed below each goal.

1. Focus on the safety of vulnerable road users who are not in motorized vehicles.
    a. Develop a robust network of well-lit sidewalks, personal vehicle lanes, sharrows and shared-use paths. Reinforce speed limits with strategic use of traffic control devices and public awareness tools. Where feasible, use narrow lane widths to reduce pedestrian crossing distances and provide safe clearances for pedestrians, cyclists and personal transportation devices. Strive to maintain multimodal infrastructure year-round. Personal vehicle lanes should be kept like roadways and not be a repository for plowed snow, leaf piles, trash cans, etc.
    b. Create infrastructure for pedestrians, bicycles and personal mobility vehicles, including battery-electric powered, while ensuring that new facilities respect the district's historic aesthetic. Explore options for providing State-standard EVSE infrastructure for charging small electric vehicles and be open to State-legal e-scooter and e-bike ride-share proposals.
    c. Follow New Jersey Complete & Green Streets design policies, adopted by Council in 2014 and modified in 2016, when designing and updating Borough roads, and prioritize personal transportation over cars and truck traffic: https://www.nj.gov/transportation/eng/completestreets/pdf/CS_Model_Policy_2020.pdf

d. The design modifications to Borough roads should evaluate the placement of traffic calming measures such as speed bumps to minimize impact on ambulance patients and emergency response times.
e. Follow the principles of Vision Zero, adopted by Council in 2022, which encourages municipalities to adopt achievable goals to prevent traffic-related severe injuries and fatalities: https://www.visionzero4nj.org
f. Install bicycle route signs and pavement marking on those streets best suited and safest for bicycles such as the Great Western Bikeway and other connections to bicycle routes outside the Borough – see the Proposed Bike Route map in the Open Space and Recreation Plan element (OSRP).
g. Make cycling to Toll Gate Grammar School safer by creating protected bike routes where feasible. Evaluate the potential for a bike path on East Curlis Avenue. The width of the current sidewalk has limited capacity due to bicycle & pedestrian use, and car door clearances that overlap the throughway zone.
h. Ensure the safety of pedestrians by keeping sidewalks safe and passable and through the administration of sidewalk maintenance and snow removal ordnances.
i. Encourage NJDOT to upgrade the bridge over the railroad tracks on North Main Street following the recommendations of the Federal Highway Administration for realignment and a wider deck with guardrails. Add sidewalks to reduce the hazard to pedestrians, bicyclists and micromobility vehicles on the sharply curved bridge.

2. Increase the number of ways to move around our area without getting in a car.
   a. Enhance pedestrian, bicycle and personal mobility vehicle linkages to Borough parks and trails into Mercer County.
   b. Plan to construct sidewalks to complete the connectivity in the Borough. Missing links are; North Main Street, east side from Silo Road to Route 31, west side from Railroad Place to Route 31, including the railroad bridge; Route 31, east side from North Main Street to West Franklin Avenue, west side from North Main Street to West Delaware Avenue; East Delaware Avenue, south side from Fitzcharles Drive to the Madison Avenue fire road to link up with the future LHT South Pennington Connector, north side from North Riding Drive to King George Road.
   c. Improve access to safe bicycle routes north and east of the Borough by construction of the South Pennington Connector by LHT. This would extend the Pennington link to the LHT at King George Road to south Pennington neighborhoods. County design of the upgrades to the bridge over Stony Brook on Pennington-Rocky Hill Road, as recommended by the Federal Highway Administration should include a sidewalk with a guardrail and a road crossing for the LHT South Pennington Connector. It would also enhance the safety of pedestrians and bicyclists if the 25-mph zone was extended north of the bridge into Hopewell Township. The current speed limit on the bridge is 45 mph. See also goal 5c addressing flooding concerns on this bridge.
   d. Extend bike-friendly connectivity. Establish a formal link between the Great Western Bikeway (GWB) route and Pennington's Town Center. Prioritize improvements along South Main Street corridor to facilitate safe passage for both local and touring cyclists. Consider a bike lane along South Main Street for rides toward Lawrenceville and to enable cyclists on the GWB to easily divert to visit Pennington's Town Center and/or pass through Pennington as a connection to the Lawrence-Hopewell Trail.

e. Ask Hopewell Township to add personal mobility vehicle lanes on Wellington Drive to allow Borough residents to ride safely to shopping and dining opportunities on Denow Road while avoiding the safety risks of riding along Route 31.
f. Encourage property owners in the Route 31 commercial corridor, whose properties can be safely reached by bicycle from the Borough, to provide bike racks.

3. Manage increased traffic passing through the Borough to and from Hopewell Township's new industrial and residential developments.
    a. Work with the county to ensure good traffic flow at key intersections such as Main St and Delaware, to minimize cut-through traffic on local residential streets.
    b. When addressing the potential impacts of increased traffic from regional developments, ensure that the historic district remains accessible without compromising its charm or safety.
    c. Introduce new signage at the gateways to Pennington to reinforce the speed limit and educate drivers on the need to respect and protect other road users. Review models used in the UK, as described in Section 5a.

4. Reduce congestion on Route 31 and West Delaware Avenue and increase safety for non-car users along this route and in the HMU zone to the west of the railroad tracks.
    a. Develop and implement creative ways to reduce traffic jams at the traffic signal at Route 31 and West Delaware Avenue, while ensuring the safety of pedestrians, bicyclists and other low-speed personal mobility vehicles users crossing Route 31 at West Delaware Avenue.
    b. Encourage NJDOT to upgrade the bridge over the railroad on West Delaware Avenue following the recommendations of the Federal Highway Administration for a wider deck with guardrails to protect the sidewalks. Coordinate bridge design with goal 4a above to improve vehicle flow across the bridge to and through the intersection with Route 31, as envisaged in the proposed Crossroads-Business (C-B) zone.
    c. The Borough should request a copy of the CSX inspection report for the railroad bridge over Broemel Place to assure concerned residents that the bridge is safe. A beautification project to restore the degraded concrete facing can be proposed to CSX, but they state in their Public Project Manual they will not pay for such projects.
    d. Work with Hopewell Township, Mercer County and the State to increase the number of guarded pedestrian/bicycle crossings of Route 31. Currently there are only two in the 2.9 miles between North Main Street and Denow Road, at Ingleside Avenue and West Delaware Avenue. Pedestrian, bicycle and micromobility vehicle crossing at the Pennington Circle is particularly hazardous.
    e. Investigate strategies to reduce truck traffic on Route 31, including recommending to DVRPC a study of the possibility of a roll-on, roll-off truck-train service between I-295 in Ewing and I-287 in Bridgewater using the current CSX route.

5. Address various parking concerns in the Borough.
    a. Work with the Economic Development Commission to find innovative ways to increase the available parking for customers of businesses in the town center while meeting the parking needs of business employees and residents. See the Economic

Development Plan recommendation 3. Mobility, Access and Parking, goal b. for further details.

b. Parking solutions proposed within the historic district should prioritize compatibility with its historic setting.
c. Work with the County to equitably resolve the conflict between the need for residential and commercial on-street parking and the desire for dedicated bike and micro-mobility lanes on Main Street and on Delaware Avenue.
d. Manage temporary right-of-way obstructions to minimize the impact on traffic, particularly vulnerable micromobility vehicles that may need to move into the main traffic flow to avoid them.
e. Look for opportunities to replace impervious parking coverage with pervious cover to improve groundwater replenishment and reduce flooding.

6. Strive to eliminate flooding on all roads in Pennington Borough.
    a. Flooding during heavy storms occurs on Route 31, West Delaware Avenue, Broemel Place, North Main Street, Eglantine Avenue, East Franklin Avenue, Abey Drive, and King George Road. The floods can be hazardous to residents and can impede the passage of emergency vehicles to many parts of the Borough. The Borough should encourage NJDOT and Mercer County to assist with projects to alleviate flooding.
    b. The designs by Mercer County of new bridges over Lewis Brook on Green Street, North Main Street and Eglantine Avenue should be coordinated to maximize flood control from the Broemel Place underpass to east of Eglantine Avenue.
    c. County design of the upgrades recommended by the Federal Highway Administration to the bridge over Stony Brook on Pennington-Rocky Hill Road should include the elevation of the deck and approach roads to be above the level of the floodplain in that area as predicted by the NJ DEP Inland Flood Protection rules adopted in 2023. [See also goal 2b addressing safety concerns on this bridge.]
    d. Increase awareness of flooding hazards to road users and pedestrians to save lives.
    e. Flooding-related infrastructure improvements for mobility should respect the goals of the Municipal Stormwater Management Plan (MSWMP). Improvements close to waterways or wetlands, such as bridge or culvert replacements, should include restoration of the natural systems in the scope of work, where appropriate.

7. Promote the use of electric vehicles (EVs) and other zero-GHG emissions vehicles.
    a. Work with PSE&G to ensure that enough power will be available in Pennington to support electric vehicle charging and the electrification of residences aimed at reducing CO_2 emissions.
    b. Facilitate the installation of Level 2 (220V, 45-amp) or Level 3 (440V, 150+ amp) electric vehicle charging stations at central locations for residents without access to private charging infrastructure. The placement of EV charging stations must balance modern mobility needs with the preservation of historical integrity. All installations must comply with current safety standards regarding accessibility for first responders.
    c. Encourage all new developments to install Level 2 (220V, 45-amp) electric vehicle chargers.
    d. Ease the permitting for the installation of Level 2 electric vehicle charging in existing homes while ensuring they are installed correctly for safety.

e. Support commercial Level 3 charging along Route 31 and in the Borough center to incentivize visitors driving EVs to use local businesses.
f. Replace the Borough operational vehicle fleet with electric or hydrogen-powered vehicles when practical.
g. Advocate with PSE&G to allow vehicle-to-grid and vehicle-to-home bidirectional charging to improve the economics of EV ownership, replace fossil fuel home backup generators and help meet grid demand in peak periods.
h. Ensure that emergency service personnel are trained in EV accident response by the appropriate emergency response personnel and have the right equipment to respond to an EV fire. Provide guidance to residents on how to help when an EV is involved to avoid an electric shock.

8. Enhance public transportation and other alternative transportation options
    a. The Borough should conduct regular surveys to determine where Borough residents travel and under what circumstances they would choose public transport, and what type of services they would use.
    b. Based on needs identified from the surveys, collaborate on regional transportation initiatives with the County and the State.
    c. Encourage the further development of various transit services for the elderly, disabled, and other transportation-dependent people such as those too young to drive and people who do not own a car.
    d. Explore the integration of public and private school transportation services with other transportation services to better serve the needs of the students and the community.
    e. Encourage the expansion or development of private transportation services such as taxis, shuttles, carpools and app-based car services to reduce private car use.
    f. Make information available to the public on transit services using print and electronic media.
    g. Work with neighboring communities in Mercer and Somerset counties to encourage DVRPC's long-term goal to reestablish passenger train service between West Trenton and Bound Brook, with a station in Pennington if the landfill is removed.

9. The Borough should arrange for regular traffic and parking studies in and around Pennington and monitor changes to gauge the effectiveness of actions taken in response to the Mobility Plan.
    a. When the industrial and residential developments in the Township are completed, a comprehensive traffic study should be undertaken to provide recommendations for managing traffic in Pennington. This may be possible by comparing historical and ongoing traffic counts by the Delaware Valley Regional Planning Commission.
    b. Route 31 traffic studies by DVRPC, the State or the County should be designed to generate data of use to Pennington Borough. Long-distance tractor trailer trucks should be counted separately from cars and local delivery trucks.
    c. The Hopewell Valley Regional School District should prepare traffic projections based on student intake from surrounding areas. Items to address would be parking for student drop-off/pick-up at Toll Gate Elementary School, the impact of the Middle and High Schools on Route 31 and West Delaware intersection congestion,

and the impact of the reduced availability of school buses in the Borough, and the effect of the cost to residents on bus use.

d. The Borough should institute a monitoring program to measure the success of the strategies applied in traffic reduction and safety improvement.
e. The Economic Development Commission should conduct regular studies of business parking needs as businesses and conditions change.
f. Consider creating a Mobility Advisory Committee to gather and report the interests of gas/diesel vehicle owners, EV owners, pedestrians, bicyclists, personal mobility vehicle users.

3. Route 31 and its Issues

The section of Route 31 from Pennington Circle to North Main Street was originally constructed as a bypass around Pennington. It is currently a high-traffic commercial corridor. The prevalence of shopping centers and other commercial buildings with large, paved parking lots creates traffic congestion and frequent conflicts between vehicles and pedestrians., particularly at the West Delaware Avenue intersection. Congestion peaks during drop-off and pick-up hours at the Middle and High Schools. Recent storm events have also made this intersection prone to flooding.

As summarized in the introduction and reported in Appendix A, the Delaware Valley Regional Planning Commission (DVRPC) conducts regular traffic counts around the region, see website https://www.dvrpc.org/webmaps/trafficcounts/. Traffic counts for roads in and around Pennington are presented in Table A1 and on a schematic map of Pennington in Figure A1. From 9,000 to 9,500 vehicles per day join Route 31 northbound from Pennington Circle. Of these, around 8,400 travel as far as the North Main Street intersection, meaning around 800 leave Route 31 for destinations likely on the west side of Pennington. About 900 vehicles join Route 31 from North Main Street. About 3,200 vehicles leave or join Route 31 on Pennington-Hopewell Road, representing traffic passing on Route 31 through Pennington on the way to Hopewell Borough. The DVRPC database does not differentiate between cars and trucks and gives no information on seasonal or weekday-weekend differences. Such data would be useful. Figure A2 shows an hourly vehicle count for Route 31 and shows peaks of about 700 vehicles per hour in each direction in the morning and again in the afternoon.

Although only a half mile segment of Route 31 lies within Pennington Borough, it has a major impact on the Borough from Denow Road to North Main St. This corridor serves as the primary north-south artery and includes six gateways into the Borough: Pennington Road, Ingleside Ave, West Delaware Ave, Broemel Place, West Franklin Avenue and North Main Street. Route 31 is the main route out of the Borough to the south and the north. It is of vital interest to the well-being of the many Borough residents who frequent businesses at the Pennington Circle and at the Hopewell Crossing Shopping Center on Denow Road. Pennington Borough must work with Hopewell Township, Mercer County, NJDOT and DVRPC to ensure the interests and safety of the community.

Truck traffic on Route 31 is a major concern to Pennington Borough and Hopewell Township, and to Flemington Borough, Raritan and Somerville. Routes 31 and 202 provide the most

convenient route from I-95/I-295 to I-287/I-87 between the Atlantic states to the south and northern New Jersey, eastern New York, western New England and eastern Canada. Until 1979, through truck traffic was intended to be carried on interstate extension I-95/I-695 to be constructed from a junction north of Route 31 on I-95 (now I-295) to Route I-287. This project was de-designated in 1980 due to local opposition and one result is the current heavy truck traffic on Route 31. See: www.nycroads.com/roads/I-695_NJ/

The Mercer County Mobility Plan uses the de-designation of I-695 as a cautionary example regarding the need to preserve rights-of-way for transportation: "Preserving the possibility of future connections is one of the most important functions of this mobility plan. Several connections in this plan are almost inconceivable today, either because of current environmental regulations or stakeholder opposition. Conditions of the moment, however, should not forever preclude the possibility of a sensible project. For a cautionary example, the de-designation of an interstate link between I-95 in Hopewell Township and I-287 in Somerset County was hailed as a victory for preservationists in the 1970s. Today, the same groups rue the heavy truck traffic on US 206 and NJ 31 that the interstate link would have carried, and development has come anyway, filling in the proposed right of way. Seeking to avoid that fate, this plan identifies projects that may be highly desirable if conditions change."

As input to this Mobility Plan, the 2002 Route 31 Design Study Report was reviewed to identify problems and recommend solutions that are still relevant to mobility today. The Report was prepared for Pennington and Hopewell Township by Dodson Associates with the aid of a Smart Growth Planning Grant and was released after three public meetings. See: https://www.penningtonboro.org/DocumentCenter/View/697/2002-Route-31-Design-Study-PDF

Proposals to widen Route 31 to speed up the flow of traffic from I-95 (now I-295) to Route 202 were discussed in the 2002 Study report and are a continuing concern. The existing Route 31 right of way can accommodate four lanes of traffic and widening has been discussed by NJ-DOT in the past. The 2024-2033 NJ-DOT Statewide Transportation Improvement Program (STIP) shows no proposals for Route 31, https://www.nj.gov/transportation/capital/stip2433/sec3.shtm. As voiced by the community at large during the public meetings held by Dodson Associates in 2002, an undivided four (4) lane highway is not acceptable to Pennington Borough and the surrounding community and will be opposed by Pennington Borough and Hopewell Township. However, it is classed by NJ-DOT as a desirable typical section of 4 lanes on the project plan Planned Projects Quadrant Map 5 in Appendix B of the Mercer County Master Plan.

The DVRPC conducts a Congestion Management Program (CMP) in accordance with Federal guidelines. Its latest report was in 2023, https://www.dvrpc.org/reports/24135.pdf. It explains what is meant by congestion, how it is measured, and how congested sites are ranked so that transportation funds can be most effectively used. It gives congestion data separately for Pennsylvania and New Jersey. Table 7 of the report shows 4 sections of Route 31 being classed as Focus Roadway Corridor Facilities out of 130 such sections in the five NJ counties in the DRVPC region. The section from CR 623 (Pennington Titusville Rd.) to CR 518 (Lambertville Hopewell Rd. is shown as somewhat congested. However, when other criteria are factored in, it gets a low ranking in the allocation of Transportation Improvement Program (TIP) resources compared with other congested sites in the region. A CMP Corridor and Sub-corridor Viewer

map can be found on https://www.dvrpc.org/congestionmanagement/. Clicking on 8C Pennington Borough brings up a "Click here" link to a table of strategies that can be tried to reduce congestion without TIP funding. This data has been copied into Appendix A, following the traffic data. The most promising statement is that it is in the top 20% of NJ sub-corridors for anticipated volume to capacity ratio (V/C) which suggests that it may be in line for funding in the long term. However. It also notes that given the levels of anticipated congestion, adding capacity to existing roads (e.g. 4 lanes for Route 31) and transit capacity-adding strategies are appropriate in this sub-corridor if strategies further up the list cannot adequately address problems without also mixing in new capacity.

Pennington Borough, Hopewell Township and Mercer County should bring their concerns about the Route 31 and West Delaware Avenue intersection to the attention of the DVRPC. As discussed in Section 8a, the DVRPC is currently updating the strategies in its long-range plan, Connections 2050, and is seeking public input on projects to be included in the Transportation Improvement Program (TIP). DVRPC has developed a performance-based Benefit Criteria Evaluation process for new project candidates. Seven benefit criteria are assigned weightings and are used to determine how candidate projects support federal Transportation Performance Measures and align with the vision and goals of the DVRPC plan. Of the seven, this intersection meets three; safety [27%], facility asset condition and maintenance (the frequent flooding) [22%] and reliability and congestion [11%] for an encouraging total weighting of 60%.

DVRPC's long range plan, Connections 2050, presents a table and map of major regional transportation projects in the next 25 years. As discussed in Section 7c below, it includes the re-establishment of passenger service from West Trenton Station to Bridgewater, and on to Newark and New York. An innovative way to reduce truck traffic on Route 31 and Route 202 would be to upgrade this project to accommodate roll-on, roll-off "truck-trains" in addition to the passenger trains. The concept would be to rebuild the line as an electrified double track (it used to be double track until the 1980's, so the track bed is wide enough) and build trains of roll-on, roll-off flat cars. The trains would need to run frequently to be an attractive alternative to driving Route 31/202 for truckers. The rail distance is 25 miles, which would take 30 minutes at 50 mph. The driving trip on Route 31 and Route 202 is 35 miles and takes 55 minutes off-peak. Reduction in fuel cost, driving time and driver stress may make it attractive to truckers and economically viable as an investment. The terminals at each end could be equipped with truck-rated chargers and hydrogen supply, overnight truck parking and food service. Trucks that use Route 206, Route 1 to Route 18, and other routes to and from the northeast may also find it attractive. This potential upgrade to their listed passenger train service re-establishment project should also be discussed with DVRPC.

Returning to the 2002 Route 31 Design Study, specific problems identified in the report that are still relevant today are as follows:

1. Rt. 31 divides the schools and library area to the west from the compact "walking village" of Pennington Borough to the east. Crossing Route 31 can be difficult and dangerous for pedestrians and cyclists, A safer crossing is needed for all and especially for students.

2. Delays of several cycles of the traffic lights on both Route 31 and West Delaware Avenue are experienced at peak hours - encouraging vehicles to seek alternate routes on local streets or County roads.
3. There is an opportunity to locate a new Pennington train station with parking on the east side of the landfill site, integrated with other developments on the site. Recent proposals called for a stop at the Merrill Lynch complex. If the landfill is reclaimed, it would be a good site.
4. Bicycles must compete for space with vehicles while waiting for signals and while riding across Route 31 on West Delaware.

The executive summary of the 2002 Route 31 Design Study report contained 19 general recommendations. The 5 that are still relevant to Pennington Borough today are summarized and edited here:

1. The priority should be to keep traffic on Route 31 rather than displacing it onto local or County roads.
2. Route 31 should not be a high-speed conduit for through traffic that cuts the community apart and requires screening and separation from the surrounding neighborhoods.
3. Prioritize improvement or elimination of dangerous conflicts in turning movements.
4. It is imperative to create a safe crossing at the intersection of Route 31 and West Delaware for pedestrians, bicycles, scooters, skateboards, etc. In 2002, there was much interest in the community in exploring either an aesthetically designed overpass or an underpass if it could be well lit, safe and deal with drainage problems at this low point intersection.
5. The Borough should link the Lawrence Hopewell Trail to Main Street. Facilities for safe and convenient bicycle parking should be provided to enhance commercial vitality in Pennington. Continuing the link along West Delaware Avenue and across Route 31 would help emphasize a unified center stretching to the schools.

It should be noted that 5 recommendations from the 2002 Route 31 Design Study report have been acted on, including those in Hopewell Township that have an impact on Borough residents:

1. The intersection of Route 31 and West Delaware Avenue now has left turn lanes in all four directions and left turn traffic lights. The lights are timed to allow simultaneous pedestrian crossings in all four directions, although there is still a risk of pedestrian conflict with cars turning left or right on a green light.
2. The speed limit in the Pennington Borough section of Route 31 is 35 mph.
3. The intersection of North Main Street and Route 31 now has pedestrian crossings controlled by traffic lights.
4. A concrete sidewalk now runs along the east side of Route 31 from the Pennington Golf Center north to West Franklin Avenue. There is no sidewalk on the west side of Route 31.
5. A full traffic light has been installed at the intersection of Ingleside Avenue and Route 31. The Great Western Bike Trail proposed by Mercer County made it essential to have a safe crossing of Route 31 at Ingleside Avenue.

The 2002 Route 31 Design Study report suggested that Hopewell Township and Pennington Borough should consider commissioning their own study of future transportation/land use growth for the New Jersey Route 31 corridor. This idea may be worth reviving in view of current

congestion and safety concerns, and the new industrial and residential development in the Borough and Township.

The Economic Development Commission has identified challenges for pedestrian, hiker, and cyclist to move between the Town Center and Route 31. Presently, the only available routes are the West Delaware Avenue bridge and the underpass on Broemel Place. These pathways are not pedestrian-friendly and lack the qualities that make travel pleasant or inviting. Residents also report it is difficult to cross West Delaware Avenue west of Burd Street. These obstacles discourage non-vehicular movement and impact the large number of individuals, including potential business customers, seeking to cross Route 31 to reach the HVRSD Campus. The Economic Development Plan offers strategies to address these concerns and improve connectivity for all users:

i. The West Delaware and Broemel railroad crossings need to be improved, making them more welcoming to pedestrians and better lit.
ii. New development and redevelopment (such as the former landfill area and the Blackwell property), should facilitate and encourage the creation of coordinated streetscapes and new, green, encouraging means for pedestrians and cyclists to move between the Town Center and residential areas, and the Route 31 Corridor, coordinating with the Pennington School and the CSX railroad as necessary.
iii. Leverage the redevelopment of significant properties, such as the Landfill, and properties at the intersection of Route 31 and West Delaware Ave, to enhance storm water management and infrastructure improvements for pedestrians and bicycle linkages between residential areas, schools and commercial districts. This improvement would be a significant boost to businesses along Route 31, West Delaware Avenue, in the Landfill property, and even in Town Center, by connecting them to the large high school and middle school populations.

4. Bridges in Pennington

There are seven road bridges in Pennington Borough. All have deficiencies, due either to aging, or inadequacy for current needs. Three bridges are listed in the Federal Highway Administration (FHWA) National Bridge Inventory (NBI), the Pennington to Rocky Hill Road bridge over Stony Brook and the North Main Street and West Delaware Avenue bridges over the CSX railroad tracks. As described below, 2023 NBI inspections found all three to be deficient in several areas and recommended remediation work. The Stony Brook bridge is the responsibility of Mercer County, and the CSX bridges are with NJDOT. The bridge carrying the CSX tracks over Broemel Street is not in the NBI but does not look to be in good condition with spalling concrete clearly visible. It is also subject to frequent flooding under the bridge. Three aging bridges over Lewis Brook, on Green Street, North Main Street and Eglantine Avenue, also flood frequently and are under review by the County for replacement. There is also a tunnel carrying Lewis Brook under the railroad tracks just south of Broemel Place that is showing signs of damage and may be inadequate to carry the amount of water from storms like Ida (2021), resulting in overflow to Broemel Place. This section discusses the issues and concerns with these bridges.

a. Pennington to Rocky Hill Road bridge over Stony Brook

This bridge is structure 1100064 in the FHWA National Bridge Inventory. It was inspected in February 2023, and the results can be found in the inspection report summary at https://infobridge.fhwa.dot.gov/Data/BridgeDetail/26236623 (click on NBI under the data tab on the left for data). The general condition of the bridge is Poor. The substructure is in good condition, the superstructure is in satisfactory condition, but the deck condition is serious. The bridge railings, guardrails and transitions do not meet currently acceptable standards. The deck geometry was appraised as intolerable and in need of corrective action with high priority. The report recommended that the bridge should be rehabilitated due to general deterioration. Responsibility for the work would lie with Mercer County.

The existing bridge provides little protection from motor vehicles for pedestrians and bicyclists crossing the bridge on the raised sidewalk to or from the end of the LHT Pennington Connector. The new bridge design should include a wider sidewalk, preferably with a protective guardrail. LHT has proposed a South Pennington Connector that will start by running from the bridge to Federal City Road along County land on the southeast side of the Pennington-Rocky Hill Road. This will require a road crossing for pedestrians and bicycles close to the bridge. The location and design of the crossing should be part of the bridge project. It would also enhance the safety of pedestrians and bicyclists if the 25-mph zone was extended some distance north of the bridge into Hopewell Township. Currently the speed limit is 45 mph on the bridge.

This bridge was built in 1987 and the type of service it was designed for was "highway-pedestrian". The deck elevation was probably set to be above the 100-year flood as predicted at the time of construction. However, changing climate has resulted in more intense storms and the expected peak height for 100-year floods has been raised. In 2023 the NJ DEP adopted Inland Flood Protection rules that increase the extent of areas regulated by the NJ Flood Hazard Area Control Act. These new regulations increase the fluvial design flood elevation to 3 feet above the FEMA-mapped 100-year floodplain. The geographic extent of the new area has been estimated by Rutgers University and provided at https://www.njfloodmapper.org/ . Figure 1 shows the map for Pennington in the area of King George Road and the Stony Brook bridge. Elevations of the new 100 -year flood height were determined by cross-referencing this map with a Google Earth Pro map and using its elevation tool. The flood height is about 149 feet and the current deck height is 145 feet, which suggests that when the bridge is rehabilitated, the deck should be raised by a minimum of 5 feet. The low point in the road just north of the bridge is 143 feet. The elevation of the approach roads also needs to be raised if flooding is to be avoided. The minimum elevation of King George Road would need to be raised to over 150 feet on the approach to the bridge to avoid flooding.

The County is in the process of designing a new Stony Brook bridge. It is not known whether the new flood height estimates are being taken into account in the design. It is of interest that the maximum flood elevation during tropical storm Ida on September 1, 2021, reached the rear deck of 113 Lewis Brook Road between 10 and 11 pm, as video-recorded by the owner. As shown in Figure 1, that deck is 151 feet elevation, which suggests that tropical storm Ida was already a future 100-year flood and more like Ida will be experienced during the life of the new bridge.

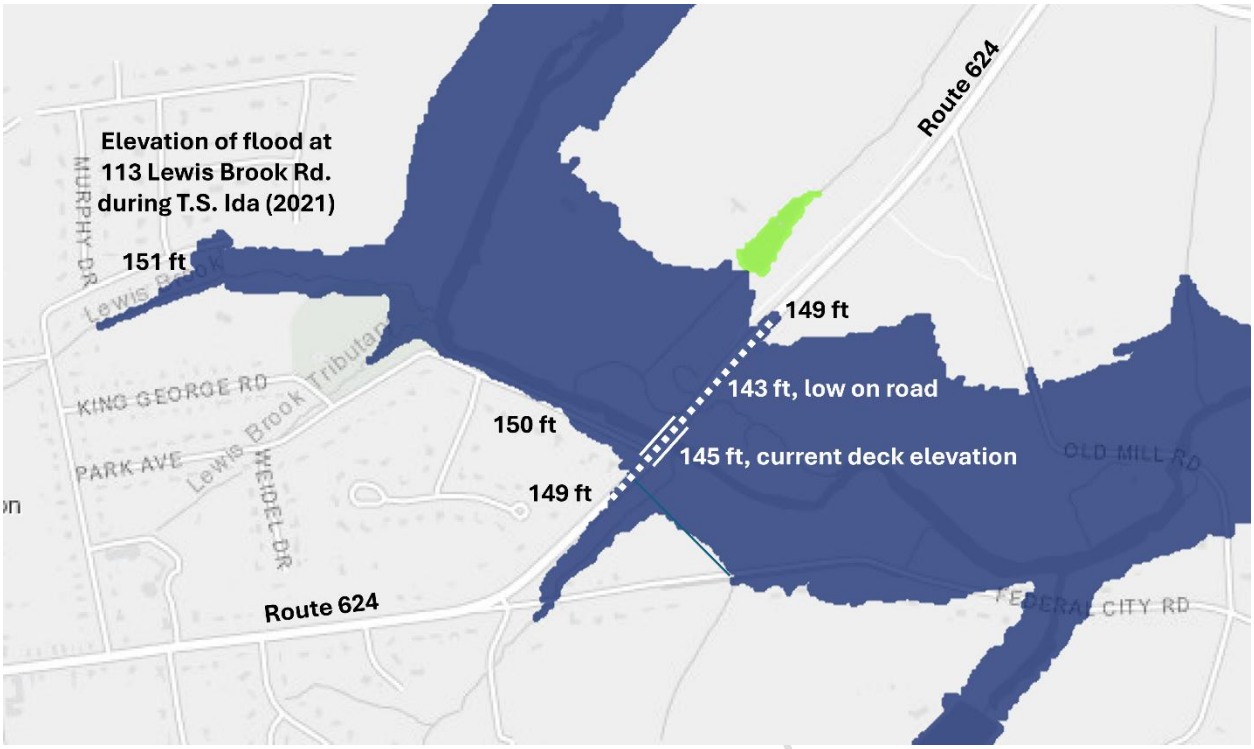

Figure 1. NJ flood elevation (2023) flood in the area of the Stony Brook bridge.

b. North Main Street bridge over the CSX railroad tracks.

This bridge is structure 1150161 in the FHWA National Bridge Inventory (NBI). It was inspected in October 2023, and the results can be found in the inspection report summary on https://infobridge.fhwa.dot.gov/Data/BridgeDetail/26236744 (click on NBI under the data tab on the left for data). The general condition of the bridge is Fair. The structural evaluation said the bridge is equal to the present minimum criteria and the deck geometry is the minimum tolerable. It noted the lack of sidewalks on either side and described the approach alignment as being intolerable and in need of corrective action with high priority. The report recommended that the bridge should be widened. Responsibility for the work is with NJDOT.

This bridge was built in 1996 and the type of service it was designed for was "highway". The other two NBI bridges were designed as "highway-pedestrian". In 1996, Pennington Point was under construction but there was little else that would generate pedestrian traffic on the bridge. There has been considerable development since, to the west the Tree Farm shopping and office areas in 2001-2003, Pennington Public Works in 2006, and Heritage from 2014, and to the east Silo Road from 2000. If the bridge were to be designed now, it would likely be for highway-pedestrian service. Since the improvements recommended are deck widening and realignment, it would be reasonable to request that NJDOT upgrade the bridge to highway-pedestrian and include protected pedestrian/bicycle lanes on both sides.

An alternative to adding pedestrian/bicycle lanes to a wider deck could be to use the piers from the previous road bridge, just north of the current bridge, to support a new pedestrian/bicycle bridge connecting the Baldwin Lake Preserve and the Borough Public Works property. The bridge could be similar in design to the steel bridges on the LHT in Rosedale Park. It would be in Hopewell Township but both Borough and Township residents would benefit, and it could become part of a western extension of the LHT. The County has 20+ feet of right-of-way to the east of North Main Street, giving enough room for realignment and a sidewalk.

Until the bridge is modified, there is a significant hazard to pedestrians and bicyclists from the lack of dedicated, protected sidewalk on the sharply curved bridge. In the near-term, pedestrian warning signs could be installed at both ends of the bridge to alert drivers to the hazard. The speed limit on the bridge is 25 mph, but the short sightlines still make it dangerous.

c. West Delaware Avenue bridge over the CSX railroad tracks

This bridge is structure 1150160 in the FHWA National Bridge Inventory (NBI). It was inspected in October 2023, and the results can be found in the inspection report summary on https://infobridge.fhwa.dot.gov/Data/BridgeDetail/26236745 (click on NBI under the data tab on the left for data). The general condition of the bridge is Fair. It has a timber frame and the deck structure is wood with a bituminous surface. The structural evaluation said the bridge is equal to the present minimum criteria, but the deck geometry appraisal is intolerable and in need of corrective action with high priority. The bridge railings, guardrails and transitions do not meet currently acceptable standards. The report recommended that the bridge should be widened. Responsibility for such work lies with NJDOT.

The bridge was built in 1914 and refurbished in 1975. and the type of service it was designed for was "highway-pedestrian". Observations of the bridge are as follows:

i. The wooden railings on the sides of the bridge do not appear to be strong enough to prevent a vehicle involved in a glancing accident at the top of the bridge from falling onto the railroad tracks, possibly leading to derailment of a train passing under the bridge. They also do not appear to be designed to protect children from fitting through the gaps. Railing design rules are given in the NJ DOT Design Manual for Bridges & Structures, https://www.nj.gov/transportation/eng/documents/BSDM/pdf/2016DesignManualforBridgesandStructures20210729.pdf .
ii. Clearer sightlines to westbound towards traffic stopped at the Route 31 traffic light and to eastbound traffic turning right into the Pennington School are needed.
iii. The bridge does not appear to be safe for pedestrians, bicyclists, and personal mobility users. Existing sidewalks are narrow and not protected from vehicles by a guardrail.
iv. The bridge is surrounded on three corners by woodland and if a forest fire occurs in the area, its timber frame and wooden deck could be threatened.
v. There is an exposed steel pipe on top of the bridge that should be better protected.

If NJDOT begins a study on upgrading the bridge to address the NBI recommendations, the above observations should be brought to their attention by the Borough.

The west side of the bridge leads to the proposed Crossroads-Business (C-B) zone created to recognize that addressing the serious concerns of congestion, safety and flooding at the

intersection of Route 31 and West Delaware Avenue may have land use implications. It would include Block 201, Lots 5, 6 and 7, Block 206, Lot 1, Block 501, Lots 1-4 and Block 502, Lot 2 and the portion of Lot 1 that lies within the Borough. It is recommended that since NJDOT has responsibility for both the West Delaware Avenue railroad bridge and the Route 31 intersection, that an integrated project should be considered to optimize any redesign of the bridge and the intersection for congestion reduction and the safety of pedestrians, bicyclists and personal mobility vehicle users. The road between the bridge and the intersection is County Route 624 and Mercer County would also be involved.

d. The CSX bridge over Broemel Place

According to the plate on the side of the railroad bridge over Broemel Place, it was built in 1937. This bridge is not listed in the National Bridge Inventory. A casual observer may conclude from the damage to the exposed concrete that the bridge is in a state of disrepair. Unlike road bridges over the railroad, which may be repaired or replaced by the transport authority responsible for the road (NJDOT for the two bridges discussed above), the inspection and maintenance or replacement of bridges carrying the railroad over a road or waterway are the responsibility of the railroad owner, CSX in this case.

A 2007 report to Congress from the U.S. Government Accountability Office (GAO) on the Federal role in providing safety oversight of railroad bridges and tunnels does not offer much hope for having the bridge repaired or replaced, see https://www.gao.gov/assets/gao-07-770.pdf. The "Results in Brief" summary of the GAO report contains the following: "Freight railroads use bridge and tunnel condition along with other information, to set investment priorities to generate the greatest private return on their investment. Bridge replacement has a lower rate of return, making it more likely that railroads would invest in other enhancements before rehabilitation or replacement of railroad bridges. The federal role in overseeing railroad bridge and tunnel safety is limited because the Federal Railroad Administration (FRA) has determined that railroads responsible for bridges and tunnels are sufficiently ensuring these structures' stability." The report also states that 50% of the current bridges were built before 1920.

The FRA issued non-regulatory safety advisory 2007-03 on bridges, which recommended annual inspections and reports. The reports are not made public, but the Borough could ask (possibly through NJDOT) for the report on the Broemel Place bridge to assure the public that the bridge is safe. Presumably there is also a report on the Lewis Brook tunnel to the south of Broemel Place. It appears in an 1887 "bird's eye" sketch of Pennington by T. M. Fowler (Fig. 6.3 in Hopewell: A Historic Geography by Hopewell Township Historic Sites Committee, 1990) so it may be over 140 years old. It looks to be in reasonable shape but may be too small to carry the water from future storms, resulting in water overflowing into Broemel Place.

If the bridge is deemed safe, the Borough may propose a "beautification" project to repair the damaged concrete exterior for CSX consideration. CSX rules for construction and improvement projects that may involve the railroad can be found in their online Public Project Manual. If a beautification project is approved, the manual states that CSX do not pay for such projects: https://www.csx.com/index.cfm/library/files/about-us/property/public-project-manual/

e. Bridges over Lewis Brook on Green Street, North Main Street and Eglantine Avenue.

The County is planning to replace all three of these bridges due to their age and dilapidation and because they play a role in flood control. There is no question that they should be replaced, but there is an argument to be made to integrate the design of all three at the same time to manage flood control in that section of Lewis Brook. The elevations of the end points of this section of the brook are 172 feet for the roadbed under the Broemel Place railroad bridge down to 156 feet in the streambed to the east of the Eglantine Avenue bridge. The distance between these two points is ~1900 feet, giving an average gradient of a gentle 0.8%. Critical elements for each bridge are the cross-sectional area to manage the flow volume and the elevation of the stream bed to optimize flow rate across the section.

Each bridge has its quirks:

The Green Street bridge is a partial arch with too little depth to accommodate water flow during a major storm. The backed-up water causes a 4-foot deep flood under the Broemel Street bridge and can only escape towards the Blackwell property by sheet flow across a ~200 feet length of Green Street. Simply replacing the bridge under Green Street will not solve the flooding problem under the Broemel Place bridge as the rectangular tunnel under Broemel Place is too small for the flow coming from the landfill and the pipe carrying stormwater from Route 31 north of the Neurosciences building and from the Straube area is too small. These overflow under the Broemel Place bridge and will continue to cause flooding there. The complex of bridge, pipe and tunnel needs to be considered together to eliminate flooding.

The North Main Street bridge may have sufficient cross-sectional area to carry the Lewis Brook flow but is compromised because much of the flow bypasses the entrance to the bridge. It is supposed to flow under the garage near the bridge, but the pipe is too small for heavy storms. The excess water takes two routes, either across the garage forecourt or down Brookside Avenue and then recombines as sheet flow across North Main Street. The flooding problem in this area and stretching all the way back to Green Street will not be solved until the brook is daylighted all the way to the western inlet of the bridge.

The Eglantine Bridge may need a larger cross-sectional area to carry predicted heavy storm flow and it also has an inlet flow restriction problem. The brook flows into two pipes under the back yards of 20 and 22 East Franklin Avenue and the pipes are too small for heavy storm flow. The excess water floods the back yards of the two properties and continues as sheet flow across Eglantine Avenue. This flooding problem will only be solved if the pipes are replaced by a larger culvert to the bridge inlet, or the brook is daylighted.

5. Complete & Green Streets and Vision Zero

Pennington Borough adopted a customized version of the NJDOT Complete & Green Streets policy in 2016. New Jersey has been recognized as a national leader for advancing Complete Streets, which promote safety for pedestrians, bicyclists and other users of New Jersey roadways. NJDOT adoption of a Complete Streets policy in December 2009 made New Jersey one of the

first ten states in the nation to make Complete Streets an official internal policy. Mercer County adopted a Complete Streets policy in 2012 and incorporated it into its Mobility Plan Element as revised in 2016 (see Section 8c).

The NJDOT policy requires that future roadway improvement projects include safe accommodation for all users, including bicyclists, pedestrians, transit riders and the mobility impaired. Roads should be built to safely accommodate a variety of transportation modes and users of all ages and abilities. Complete & Green Streets are planned, designed, and constructed to blend with the local community, while meeting transportation needs.

Complete & Green Streets improve safety by providing pedestrians, bicyclists, and drivers with adequate facilities and by reducing travel speeds so that all users can safely use the streets together. Complete Streets improve mobility and accessibility by enhancing the quality and availability of the connections between residences, schools, parks, public transportation, offices, and retail destinations. A walkable community improves overall quality of life by creating an environment where people are encouraged to interact and develop a sense of community.

A review of safety research by the Federal Highway Administration (FHWA) found that a variety of facilities commonly found in Complete & Green Streets design (e.g., marked crosswalks, raised medians, pedestrian refuge islands, traffic control devices, careful bus stop placement, safe routes to school, traffic-calming measures, continuous sidewalks, and walkways, etc.) can serve as efficient countermeasures to pedestrian accidents. Bicyclists and other low-speed vehicle users also benefit from Complete & Green Streets due to slower traffic speeds and the provision of low-speed vehicle-friendly facilities. The benefits of Green Streets also come from the use of green infrastructure (e.g., street trees, rain gardens, permeable pavement, etc.) to manage stormwater and reduce flooding.

The NJDOT Complete & Green Streets program falls under the NJFIT (NJ Future in Transportation) initiative. A complete description of the Complete & Green Streets model policy, along with model resolutions and model ordinances can be found in: https://www.nj.gov/transportation/eng/completestreets/pdf/CS_Model_Policy_2020.pdf .

A Complete & Green Streets policy includes several elements; traffic calming, streetscaping, sidewalk plan and pedestrian mobility, and bicycle and other low-speed vehicle paths:

a. Traffic Calming and Streetscaping

Traffic calming strategies and techniques are important for enhancing the safety of pedestrians and users of bicycles and personal mobility vehicles by controlling traffic speed and increasing awareness of other road users. They help to maintain the residential character of Borough streets and can provide clearly marked pedestrian access routes between residential neighborhoods and local facilities, including schools, shops, recreational facilities, and open space outside the Borough. The Borough has initiated the use of roadway modifications such as “chokers” that reduce the width of the road at pedestrian crossings. Other modifications such as raised crosswalks and speed bumps should be considered.

Street trees, especially with branches that overhang the street, can have a calming effect on traffic. The Shade Tree Committee should continue its work to maintain and replace trees lining Borough streets and should continue to work with the County to maintain and replace trees on County roads in the Borough. All streets in the Borough would benefit from a consistent tree maintenance policy. However, accommodating the road, parking spaces, sidewalks, and future bikeways within the right-of-way of Main Street and Delaware Avenue is a challenge that is made difficult by the location of the large trunks of older trees. The root systems of these trees can cause the sidewalk to become uneven and dangerous. In some cases, the trunks are so large that the sidewalk needs to be narrowed. As these large trees die or are removed, the location and eventual size of replacements should be considered as part of the design plan for mobility. This is addressed to a certain extent in Goal 3 "Maintain public safety by reducing hazardous trees and conflicts" in the Pennington Borough Community Forestry Management Plan, which is not part of the Master Plan.

Street lighting, landscaping and furniture (streetscape) play a role in calming traffic and enhancing the pedestrian environment in the downtown area. New sidewalks, decorative streetlights, signs, and benches have been added in the past and this program of beautification should be continued. Enhanced lighting and walkability will support both residents and visitors, encouraging appreciation of the district's historical assets.

Speed limits play a major role in traffic calming, especially when enforced as the police try to do in Pennington. The speed limit in the Borough is 25 mph with one exception, Green Street, which is 30 mph. It is the only street in town with a higher speed limit, even though it is bounded by a Pennington School playing field used recreationally by children of all ages. The start of the 25-mph limit on South Main Street northbound is marked but the sign is partially hidden by a tree branch. The location of the change from 25 to 35 mph going south on South Main Street towards the Circle is unclear as there is no sign on the opposite side of the road from the northbound 25 mph sign. The Borough boundary is just south of Vannoy Avenue, so that is where the 25 mph to 35 mph likely takes place. This should be clearly marked.

The Borough should consider adopting a uniform 25 mph zone with clear zone markings at every gateway. There are 8 "gateways" to Pennington. From Route 31 they are Ingleside Avenue, West Delaware Avenue, Broemel Place, West Franklin Avenue and North Main Street. From the east are Pennington Rocky Hill Road at King George Road and Federal City Road at West Delaware Avenue. From the south is South Main Street at Vannoy Avenue. In addition to these speed measures, the Borough should consider cohesive wayfinding signage at these entry points to reinforce the transition into a slower paced, pedestrian friendly and multimodal environment. For reference, the UK Department for Transport's Circular 01/2013 Revised 2024, is an example of an integrated approach using consistent gateway signage and speed-management practices: https://www.gov.uk/government/publications/setting-local-speed-limits/setting-local-speed-limits . The signage could be modeled on the growing number of "20 mph zones" in the UK that clearly indicate a change in road character, but in Pennington's case would be 25 mph. These often have colored markings and symbols on the roadway in addition to clear speed limit signs on both sides of the road. Specific rules on speed limit signs and road markings can be found in Section 8 of https://assets.publishing.service.gov.uk/media/5c78f895e5274a0ebfec719b/traffic-signs-manual-chapter-03.pdf .

The Borough should work with Hopewell Township to extend the zone markings and signs to all Township streets that can only be accessed through the Borough.

b. Pedestrian, Bicycle, and Personal Mobility Vehicle Routes

The Borough's limited right-of-way on local and County roads requires a cohesive, integrated network of roadways, sidewalks and bikeways. In most of the Borough there is not enough room for separate bikeways, and in several locations narrow roadways with parking spaces are hazardous for other than the most experienced bicyclists. In practice, Borough sidewalks are frequently used by bicycles and other personal mobility vehicles. New Jersey law does not prohibit bicycles or low-speed personal mobility vehicles on sidewalks, but NJ DOT policy discourages bicycles except for young cyclists. Municipalities are allowed to regulate this, but Pennington Borough Code has no such regulations. Safety remains a priority and bicyclists should yield to pedestrians on sidewalks. Sidewalk redesigns should ensure that pedestrians can be protected from bicycles and personal mobility vehicles. Prioritizing pedestrian safety does not mean other vehicles are not important or considered; it means the Borough desires to be a place where safety, comfort, and livability for all ages and abilities is of the utmost concern. Facilitating travel to and through the Borough by means other than conventional cars and trucks will contribute to the feeling of community.

To promote and encourage personal mobility, the Borough should:

- Design and develop a safe, convenient Borough-wide network of pathways for pedestrians, bicycles, wheelchairs and other personal mobility vehicles. Eliminate gaps in the current network that prevent a continuous route to destinations such as schools, businesses, churches, recreational facilities, parks, and open space outside the Borough.
- Indicate clearly which roads are part of the share-the-road programs and evaluate the efficacy of shared lane markers and best practices.
- Designate safe walking, bicycling and low-speed personal mobility vehicle routes to schools, which will benefit children and their parents alike by inculcating healthy habits and independence for the students and reducing the need for parents to chauffeur their children to and from the school and other destinations around town.
- Ensure that the network of pathways is well-maintained year-round and kept clear of obstructions for the safety of users.
- Provide safe and ADA-compliant crosswalks at roadway intersections or intermediary points, where appropriate, especially on routes to schools. Crosswalks should incorporate contemporary best practices, e.g. high visibility signaling and traffic-calming technology to maximize safety for pedestrian and bike/personal mobility.
- Encourage walking and alternate vehicle use for local trips to mitigate roadway congestion and parking demand issues in the downtown core.
- Educate pedestrians, bicyclists, motorists, and other users about the rights and responsibilities of those using Borough roads and other pathways safely. Promote mutual respect among all roadway users through education, enforcement, and encouragement.
- Provide street furniture appropriate to pedestrian and bicyclist needs.
- Develop a downtown bicycle parking plan with appropriate zoning standards.

It is the policy of the previous Borough Master Plan that high volume streets have sidewalks on both sides and that low volume streets, such as cul-de-sacs, loop, and other non-through streets have sidewalks on at least one side, where consistent with potential usage, available right-of-way, environmental concerns, and engineering constraints. This policy is continued in this Plan.

The Borough should update the Circulation/Sidewalk Plan map from the 1998 Master Plan that shows the location of all existing and proposed sidewalks and bikeways in the Borough as of 1998. This update should also indicate where future sidewalks/bikeways and crosswalks could be constructed as funding permits. Priority should be given to the completion of missing links in existing sidewalks and to connecting sidewalks to existing or planned open space pathways.

As noted in the Open Space and Recreation Plan element, the LHT is planning to construct the South Pennington Connector to link the LHT with the Pennington neighborhoods south of East Delaware Ave. It would consist of:

- A crosswalk across East Delaware Avenue at its intersection with King George Road.
- A new bicycle-capable trail along the southeast side of East Delaware Avenue from Stony Brook to the intersection of East Delaware Avenue and Federal City Road. This can be an off-road trail because the land is owned by the County.
- A crosswalk across Federal City Road at that intersection to the fire road access to Presidential Hill.
- Surfacing the fire road up to Madison Avenue, from which cyclists and pedestrians can safely use neighborhood streets to the southeast quadrant of Pennington.

The Greater Mercer Transportation Management Association (GMTMA) published its Greater Mercer Trails Plan in November 2019, see: https://gmtma.org/wp-content/uploads/2020/02/gmtn_report_final_updated_print-v2-1.pdf . This report is a valuable resource on existing trails and future trail plans. Chapter One summarizes engagement and collaboration efforts to understand and evaluate vision, goals, and priorities. Chapter Two establishes the region's baseline conditions and context, and defines mobility and safety needs, existing barriers and constraints, and opportunities for improvement. Chapter Three presents the Framework Plan with hundreds of proposed individual actions to improve multimodal mobility and safety. Chapter Four documents the prioritization methodology and Implementation Matrix of proposed improvements.

A recent addition to the Mercer County Master Plan is the 2020 Bicycle Master Plan https://www.mercercounty.org/home/showpublisheddocument/19206/637352618600000000 .

The New Jersey Bicycle and Pedestrian Master Plan describes initiatives to promote walking and bicycling by providing technical and financial aid. The Borough should consult this plan as it designs and implements its network of pathways. See: https://www.nj.gov/transportation/commuter/bike/pdf/bikepedmasterplanexecsumm2016.pdf#:~:text=The%20New%20Jersey%20Bicycle%20and%20Pedestrian%20Master%20Plan,are%20routine%2C%20convenient%2C%20and%20secure%20throughout%20the%20state .
It recommends that sidewalk and bikeway improvements should be implemented when:

- Roads are due for resurfacing or other routine maintenance
- Grants or other funding is available

- Programs are developed that support a walking and bicycle friendly community and encourage more people to walk or bicycle as a means of daily transportation.

c. Borough Roadway Improvements

In addition to recommendations specific to Route 31 detailed in Section 3, there are improvements that should be considered for Borough streets and County roads:

- The recent realignment and traffic signal timing at the intersection of Main Street and Delaware Avenue has created multi-light-change delays for traffic on Main Street in peak periods. The delays are due to traffic trying to turn left onto East or West Delaware Avenue being prevented from turning by oncoming traffic on both South and North Main Street. Traffic also backs up due to the elimination of the right turn from South Main to East Delaware. The consequence is that many drivers bypass the intersection using Abey Drive and Eglantine Avenue. Some strategies to address this might include, but are not limited to, creating divided light timing for Main Street traffic as is done for Delaware Avenue traffic and creating a left turn lane on northbound South Main Street so that straight ahead and right-turn traffic can proceed without waiting for left-turning cars. This problem is acute for northbound traffic on South Main Street at peak periods and is exacerbated by the (necessary) traffic light hold for pedestrians to cross.
- The bridge replacement planned by Mercer County over Stony Brook on Pennington to Rocky Hill Road should be designed and built to accommodate safe bicyclist and pedestrian crossing of Stony Brook on both sides of the road. It is the sole connector between Pennington Borough and the Lawrence Hopewell Trail (LHT).
- Stormwater and flooding should be investigated and addressed, including the extent of flooding experienced during tropical storm Ida in 2021 and Debby in 2024 on Abey Drive, Broemel Place, Knowles Street, Eglantine Avenue, King George Road and North Main Street.

6. Parking

Anecdotally, parking in the Town Center is perceived as insufficient for local business needs. The Economic Development Commission (EDC) should survey local businesses to quantify this issue, identifying the specific volume and duration of parking required. This analysis should distinguish between all-day employee needs, short-term customer turnover, and the long-term requirements of Town Center residents. The EDC should determine if parking constraints act as an impediment to new business investment. Any proposed parking solutions must prioritize compatibility with the district's historic setting.

Upon completion of the parking study, the Borough should evaluate creative strategies to expand capacity where deficits are identified. This could potentially include a shared parking program, enabling entities with excess capacity, such as religious institutions, schools, and private businesses, to offer public parking. Additionally, the Borough should explore the potential of physical expansion through strategic partnerships or land-use agreements, as well as evaluating the rear-lot portions on the west side of South Main Street to create a centralized public parking

asset. All new parking infrastructure must prioritize pervious materials and design standards compatible with the historic district.

On Main Street and Delaware Avenue, narrow rights-of-way can create conflicts between parked vehicles, cyclists and personal mobility users. Since these corridors are direct routes for travel, the Borough should investigate traffic calming and Complete Street strategies.

7. Zero-GHG-Emission Vehicles

An essential contribution to mitigating the effects of climate change is to limit the emission of greenhouse gases from human activity. Recognizing that cities and states throughout the U.S. are adopting greenhouse gas emission reduction targets and strategies, Pennington Borough Council resolved in Resolution 2021-3.4 that:

1. The Environmental Commission will be responsible for reporting to Council on an annual basis the amount of carbon released by the Borough and the amount of carbon offset.
2. The Environmental Commission will assist the Borough in developing strategies to migrate away from carbon energy sources.
3. Pennington Borough will become Carbon Neutral in all of its operations by 2035.
4. The Environmental Commission will use the Borough's efforts to become carbon neutral as a way to educate and encourage Borough residents and businesses to become carbon neutral.

In response to item 4, the Environmental Commission, with Council approval, will develop a Community Energy Plan following a template developed by Sustainable Jersey under a grant from the New Jersey Clean Energy Program (NJCEP). The template lists seven strategies, the first of which is to reduce energy consumption and emissions from the transportation sector. The transportation strategy contains the following elements:

1. Adopt supportive zoning and regulations for EV infrastructure.
2. Install public chargers and encourage workplace EV charging infrastructure.
3. Improve municipal fleet efficiency and purchase alternative fuel vehicles.
4. Train first responders and non-emergency staff on EVs and charging equipment.

If Borough residents converted to EVs, it is possible to reduce the Borough's annual CO_2e (carbon dioxide equivalent) emissions by over 7,000 metric tons per year, 2.5 tons per year per resident. This is 25 times larger than the reduction of 276 tons that can be achieved by making all municipal operations carbon neutral. See Appendix C for details.

It should be noted that there are two other zero-GHG emissions technologies that are competing with battery-electric vehicles. Both are based on green hydrogen, which can be produced by electrolysis of water using solar or wind electric power generated in excess of grid demand. The first hydrogen technology is the fuel cell, which uses electrochemistry to combine hydrogen with oxygen from the atmosphere to generate electricity and water. The electricity produced will charge a battery and drive an electric motor. The second technology uses hydrogen directly in an internal combustion engine, which could be either a piston engine or a gas turbine. Hydrogen is under test for use in buses, trucks, and rail. These contribute about 25% of the CO2e emissions,

or about 10 MMT CO2e in New Jersey. Whilst Pennington is not home to many trucks or buses, hydrogen filling stations should be considered along with EV battery charging on Route 31.

Two issues being addressed by the EV industry are increasing the energy storage density of batteries to increase range, and battery recharging time. To compare EV to gasoline charging times, the 10 gallons needed for a range of 300 miles with the 30-mpg car takes about a minute to pump at a gas station. For the EV average 2.9 kWh/mile, a charge of 103 (300/2.9) kWh is needed. Appendix C calculates the time needed to deliver 103 kWh for each of the three classes of EV charger:

- Home Level 1 Charger: 120V 20A = 43 hours per 300 miles range
- Home Level 2 Charger: 240V 40A = 11 hours per 300 miles range
- Commercial Level 3, NJ: 480V 310A = 40 minutes per 300 miles range
- Commercial Level 3, max: 480V 730A = 18 minutes per 300 miles range

The actual charging time depends on the EV's battery control system, so times may be longer. Also, the total number of Level 3 charges during the lifetime of an EV battery may be limited due to the high electric current. The analysis tells us that a 120 V Level home charger would only give a range of about 80 miles after an overnight 12-hour charge. This may be sufficient if all car use is local and infrequent, but for many users, a Level 2 charger is needed.

There are currently some financial incentives for Level 1 and Level 2 charger installations in New Jersey. Details can be found on the DEP website https://dep.nj.gov/drivegreen. PSE&G, which serves Pennington Borough, has an Electric Vehicle (EV) Charging Program to support the deployment of residential, mixed-use (commercial), and public Direct Current Fast Charging (DCFC) electric vehicle chargers for a broad range of customers.

A development that is gaining traction is the concept of bidirectional charging. This comes in various forms, vehicle to grid (V2G), vehicle to home (V2H), vehicle to load (V2L), vehicle to vehicle (V2V) and vehicle to everything (VTX). V2G allows utility companies to use EV batteries as a supplemental storage capacity for the grid. Electronic control and smart meters can balance energy withdrawals from car batteries to meet high demand, while charging to meet the anticipated needs of drivers. Avoiding charging in periods of high demand and high cost and promoting off-peak charging at a reduced cost provide economic incentives to V2G EV owners. V2H allows a car battery to be used in place of a fossil-fueled generator to provide power to a home during power outages. It can also be used to replace high-cost, peak demand electricity for powering a home with power from the EV battery and recharging the EV when the grid cost drops. This too will need a smart meter and support from the utility. Pennington Borough should canvas PSE&G for this capability for its residents. V2L allows camping and outdoors equipment to be powered from the EV battery and could be of value to contractors working in remote locations. In both cases it could replace gasoline-powered generators. V2V allows the transfer of charge from one vehicle to another and could help those who run out of charge on the road. V2X does not yet exist but is proposed.

Amendments to the Municipal Land Use Law adopted in August of 2021 included many provisions specific to the installation of electric vehicle supply equipment. The details can be

found in the 2023 Pennington Borough Master Plan Reexamination report, Section C8, Electric Vehicles.

The landscape for personal EVs is changing dramatically. All major domestic and foreign automobile manufacturers have EVs in their portfolio and there is significant growth in the industry. Tariffs have been imposed and proposed to protect domestic manufacturers in many countries, including the US. There is tremendous academic and commercial innovation on EV drive train design and batteries, and the market is continually changing. Competition is fierce and prices are dropping, while quality, reliability and vehicle capabilities are improving. Some states are introducing regulations to limit or eliminate the sale of new fossil fueled cars by a certain date. Under its Zero Emission Vehicle (ZEVB) rules, New Jersey has set 2035 as the last year for the sale of new fossil fueled cars and light trucks, which necessitates the installation of charging stations in homes and public places soon.

Commercial charging stations in the country are becoming profitable as the number of EVs increases, and private investment is taking the place of state-led initiatives. Energy companies such as BP (BP Pulse) and Shell (Shell Recharge) are dedicating forecourt space at gas stations to Level 3 fast chargers, as well as installing standalone charging locations. ExxonMobil has not yet shown signs of interest, but the Exxon gas station at Route 31 and West Delaware may be an option for fast chargers in Pennington. There is a move to harmonize the charging infrastructure so that EVs from different manufacturers will be able to recharge at any charging station.

There is also a need to increase the capacity and robustness of the grid to supply the electricity needed for the growing EV fleet, both personal and commercial, and for the switch to electricity for many domestic and commercial applications. Pennington Borough can only advocate in support of this. Without it, the grid is in danger of becoming unstable in periods of high demand.

A final area to consider is safety. It is generally considered to be safe to charge an EV in an attached garage at home if the charger is installed correctly, used correctly, and maintained periodically. Installation is covered by the NJ Uniform Construction code. The Borough should request that EMS and Fire Department volunteers and professionals receive training and the correct equipment to deal with EVs involved in accidents. Guidance should be offered to Public Works staff if they have problems with the Borough's EV fleet or are the first to arrive at an accident scene and offer help. Similar guidance could also be offered to residents.

The Borough needs to be flexible and nimble with regulations to keep up with rapid developments in the EV field. We should consider allowing EV repair and maintenance facilities to locate in the Borough as these would have minimal impact on the environment and would be good business opportunities. We should educate our residents that as the EV fleet grows, it will be necessary for the state to charge EV owners annually to pay for roads as revenue from the gasoline tax declines.

8. Public Transit

The Greater Mercer Transportation Management Association (GMTMA) was established in 1984, and consists of large and small employers, local governments, authorities and state agencies who share a commitment to providing transportation choices that are good for commuters, good for business and good for the environment. Their website https://gmtma.org has links to a variety of publications and services. GMTMA publishes a Mobility Guide for Mercer County annually. It gives links to timetables, transportation company websites and transport apps. Under community transportation, it covers the following options available to Pennington residents, Mercer County T.R.A.D.E., Hopewell Valley Rides, RideProvide, and Medicaid transportation provided by Modivcare.

While high-frequency transit is most effective in dense urban centers, suburban communities like Pennington Borough rely on a mix of personal vehicles, regional rail, and ride-share services. The personal vehicle remains the primary mode of transportation due to the Borough's low-density surroundings. However, transit is a competitive alternative for long-distance trips, factoring in cost of fuel, tolls, parking fees, and the connections to regional rail hubs and airports.

The Borough should conduct a survey to determine where people travel and under what circumstances they would choose public transport and what type of services they would use. With this data, collaboration on regional transportation initiatives with the Delaware Valley Regional Planning Commission, Hopewell Township, Mercer County and the State will be possible. Below is a summary of current public transit options serving Pennington.

a. Bus Route

The Borough is currently served by NJ Transit Bus route 624, which runs between Pennington and Plum St. at Enterprise Avenue in East Trenton via the Trenton Transit Center. There are 17 services on weekdays running hourly from Pennington from 5:20 am to 8:20 pm with a late bus at 9:50 pm, and 6 services on Saturdays, every two hours between 8:00 am to 6:00 pm. Holiday services are as for Saturdays with the addition of a 6:00 am bus. There is no service on Sundays. Buses circulate with return service from Trenton to Pennington after a waiting time of about 15 minutes at Plum Street. The waiting time at Broemel Place in Pennington is about 40 minutes.

The Trenton Transit Center (TTC) serves as a vital multimodal hub for the Borough, providing access to Amtrak, NJ Transit, SEPTA, and the River Line. To increase ridership and provide a viable alternative to the $20 daily parking fees at the TTC, the Borough should advocate for service needs to encourage ridership, which might include frequency and expanded weekend service.

The Borough should evaluate the feasibility of recapturing underutilized layover time by extending service into the northern section of the Borough, potentially in a loop incorporating Broemel Place, Green Street, Franklin Avenue, Eglantine Avenue, King George Road and East Delaware Avenue.

The Borough should evaluate potential improvements to the rider experience and promote transit as a primary mode of travel. Borough bus stops lack shelter. The NJ Transit Shelter Program will provide for the cost and installation of bus shelters via municipal resolution if a local sponsor assumes maintenance and liability.

b. Mercer County T.R.A.D.E.

Mercer County T.R.A.D.E. (Transportation Resources to Aid the Disadvantaged and Elderly) provides transportation services to Mercer County residents who are senior citizens (60+) or people with disabilities or are economically disadvantaged. Trips are either by subscription or on demand as needed and reservations must be made in advance by phone. Trips are free but there is a $1.00 suggested donation. This service should be promoted within the Borough. https://www.mercercounty.org/departments/human-services/aging-disability-resource-connection/trade-division.

c. Hopewell Valley Rides

Hopewell Valley Rides is a transportation service offered by Hopewell Township. It is available to residents aged 60+ and adults with disabilities within Hopewell Valley (Pennington, Hopewell Borough, Hopewell Twp.) Wheelchair accessible service is available. Rides are provided by car through the RideProvide program. After registering, eligible residents can purchase vouchers for $5 per one-way trip. Rides can be requested by calling RideProvide 48 hours in advance to ensure availability. Rides are available from 8:00 am to 5:00 pm Monday through Friday. Free trips are provided to and from Princeton Healthcare System facilities and RWJ Hospital and other select facilities. A brochure on the service can be found at: https://www.hopewelltwp.org/DocumentCenter/View/129/Hopewell-Valley-Rides-Brochure-PDF

d. Passenger Rail

While the Borough does not have direct rail service, it is strategically positioned within reach of three major regional transit hubs. The Trenton Transit Center is a primary multimodal hub offering local, Northeast Corridor, and long-distance travel. The West Trenton Station provides a direct connection via the SEPTA West Trenton line, offering a commuter route to Center City Philadelphia. Hamilton Station serves as a high-capacity NJ Transit facility on the Northeast Corridor, utilized by residents for its extensive parking and direct services. These stations provide essential links for commuters and long-distance travelers to the Philadelphia and New York metropolitan areas.

The Borough should continue to advocate for the re-establishment of passenger service on the CSX line from West Trenton to Bridgewater (and on to Newark), which is listed on the Delaware Valley Regional Planning Commission's Table of Major Regional Projects (https://www.dvrpc.org/webmaps/mrp2050/#page2) [enter West Trenton in the webpage filter to find this quickly]. It is shown as an illustrative project under Transit Expansion that needs to occur in the next 25 years but has not yet been moved into the Transportation Improvement Program (TIP). It is also shown on the DVRPC map of projects

https://www.dvrpc.org/webmaps/mrp2050/#map. Since DVRPC only covers Mercer County, it only mentions future stations near I-295 in Hopewell Township and in Hopewell Borough, but it is likely to include one or more stations in Somerset County. The table shows a cost estimate of ~$700 million. The Borough should advocate the DVRPC for a strategically located passenger rail station in Pennington Borough, potentially in conjunction with the landfill redevelopment, instead of the Merrill Lynch site.

An interesting discussion on the history and issues of the West Trenton to Bound Brook and Bridgewater rail line can be found online in https://railroad.net/reviving-passenger-service-between-west-trenton-bound-brook-t8100-270.html . Passenger trains last ran on this line in 1981 and there was no stop in Pennington. CSX may resist this change because the overhead electric catenary does not provide enough clearance for their double-decker freight trains. The SEPTA and CSX tracks south from West Trenton were separated recently for this reason. However, two-way scheduling should be easier for CSX with a return to double track and CSX could run the truck trains for profit.

The Borough should engage in a public engagement survey, including residents of Pennington Borough, Hopewell Township and Somerset County for community feedback on reactivation of passenger rail lines, and should stay up to date with the matter through GMTMA or DVRPC.

9. Relationship with Regional Transportation Plans

a. Delaware Valley Regional Planning Commission (DVRPC)

DVRPC is the federally designated Metropolitan Planning Organization (MPO) for the Greater Philadelphia region, established by an Interstate Compact between the Commonwealth of Pennsylvania and the State of New Jersey. Pennsylvania members are Bucks, Chester, Delaware, Montgomery, and Philadelphia counties, plus the City of Chester. New Jersey members are Burlington, Camden, Gloucester, and Mercer counties, plus the cities of Camden and Trenton. DVRPC serves strictly as an advisory agency. Any planning or design concepts as prepared by DVRPC are conceptual and will require engineering design and feasibility analysis. Actual authority for carrying out any planning proposals rests solely with the governing bodies of the states, local governments or authorities that have the primary responsibility to own, manage or maintain any transportation facility.

DVRPC's vision for the Greater Philadelphia Region is a prosperous, innovative, equitable, resilient, and sustainable region that increases mobility choices by investing in a safe and modern transportation system; that protects and preserves our natural resources while creating healthy communities; and that fosters greater opportunities for all. DVRPC's mission is to achieve this vision by convening the widest array of partners to inform and facilitate data-driven decision-making. They are engaged across the region, and strive to be leaders and innovators, exploring new ideas and creating best practices. DVRPC provides services to member governments and others through planning analysis, data collection, and mapping services. Aerial photographs, maps and a variety of DVRPC publications are available to the public. The DVRPC traffic count

data was used in the analysis in Appendix A, as discussed in Sections 1 and 3 above and the DVRPC emissions report results are mentioned in Section 6.

As an MPO, DVRPC conducts the regional Congestion Management Program in accordance with Federal guidelines. Its latest report was in 2023, https://www.dvrpc.org/reports/24135.pdf and the current recommendations for Pennington Borough are discussed in Section 3 above. An update to DVRPC's current strategic plan, Connections 2050, was adopted in September 2025 and can be found on https://www.dvrpc.org/plan/. The Plan serves as a blueprint for prioritizing $78 billion in capital transportation investment in the region by 2050. It considers future population growth, economic trends, environmental concerns, and technological advancements to guide investments in roads, public transit, biking, walking infrastructure, and other transportation modes.

As a member of the DVRPC, Pennington is also a member of the Central Jersey Transportation Forum (CJTF) formed in 1999, https://www.dvrpc.org/centraljerseytf/. CJTF strives to integrate land use and transportation among municipal and county leaders at the border of two Metropolitan Planning Organizations in the Central Jersey area. Facilitated by the DVRPC in coordination with the North Jersey Transportation Planning Authority and New Jersey Department of Transportation, this partnership has maintained progress toward coordinated land use and transportation planning and development, information sharing and collaboration, and the exchange of information and resources. continue this participation to gain technical assistance and influence regional transportation issues.

b. Hopewell Township Master Plan

Since all traffic entering and leaving Pennington Borough does so through Hopewell Township, the Circulation Plan element of the Township's Master Plan and this Mobility element should be largely in agreement on traffic management issues. In addition, since a much larger stretch of Route 31 is in Hopewell Township, any proposals for Route 31 will impact Pennington. The current version of the Township's Master Plan was adopted in May 2002. It can be found at https://www.hopewelltwp.org/DocumentCenter/View/856/Master-Plan-2002-PDF. The Master Plan did not include a circulation plan element, but 12 transportation goals were presented, the first of which was to develop a circulation plan. A Circulation Plan was adopted in March 2006: https://www.hopewelltwp.org/DocumentCenter/View/8613/Circulation-Plan-Element---Adopted-March-9-2006 . The Route 31 aspects of the Plan build off the recommendations in the 2002 Route 31 Design Study, discussed in Section 3 above. There was also a positive discussion on the merits of reestablishing passenger trains on the West Trenton line. At the time it was shown as an NJ Transit candidate project. A Master Plan reexamination report was adopted in December 2021: https://www.hopewelltwp.org/DocumentCenter/View/8410/2021-Periodic-Reexamination-of-the-Master-Plan-and-Development-Regulations-PDF . The only additions to circulation in the reexamination report were related to the Lawrence Hopewell Trail.

c. Mercer County Master Plan

The Mercer County Master Plan was adopted in September 2010 and amended in May 2016. The Master Plan and associated plan elements were developed after three public meetings held in

2006/7, resulting in a Regional Action Plan (RAP). The framework document can be found at: https://www.mercercounty.org/home/showpublisheddocument/1242/636058423221200000

Mercer County's vision for balanced growth throughout the county focuses on four outcomes, two of which concern transportation:

- Adequate level of housing choice and affordability that makes it possible for residents to live in the county throughout their lives.
- Adequate transportation and housing choice to maintain an educated workforce and a stable economy.
- Enhanced core transportation corridors through the implementation of access management, connectivity, and wise land use decisions.
- Continued strategic investment in open space and recreational facilities so that residents and employees enjoy enhanced quality of life in the county.

The Master Plan is divided into three sections; economy, transportation and environment. Under transportation, the key findings from the RAP meetings were

1. Commute times continue to increase.
2. People live further from their jobs or are commuting on congested roads.
3. The automobile continues to dominate personal transportation while public transit usage remains limited.
4. Land use patterns contribute to roadway congestion, auto dependency, and demand for public transit.

Key goals identified were

1. Enhance travel options.
2. Encourage land uses to support transit.
3. Improve social equity in access and mobility.
4. Manage congestion.

The following introduction to Transportation Policies and Strategies is taken directly from the Master Plan Framework document:

"Mercer County is closely linked to a growing global economy through its transportation network. The variety of existing transportation options in the county contributes to residents' quality of life. The county will continue to invest and maintain investments in existing roads, bridges, and airports, and strategically invest in future public transportation projects in order to move people efficiently to and from destinations within the county and beyond to support regional economies.

With aging infrastructure and the increasing costs associated with construction of new roads and bridges, there is an increasing opportunity to improve roadway capacity on existing roads especially where they service redevelopment and new development resulting in centralized land use patterns.

The availability and accessibility of a variety of transportation options for residents and workers in the county, including site conditions that encourage pedestrian activity, is a critical element to

successful, sustainable mixed-income housing development. Planning for denser housing near transit service not only reduces roadway congestion but also addresses social equity objectives by providing mobility and access for population segments with no access or limited access to automobiles and for those populations who have no desire for an auto-dependent lifestyle.

Recognizing that not all workers will live where they work, transportation policy encourages expansion of existing public transportation capacity and roadway improvements that support commuters and appropriately direct freight movement through the county to surrounding metropolitan areas. County input on the effect of state and federal road improvements, especially those directly connecting the surrounding metropolitan areas of Philadelphia and New York City, on county travel patterns will continue to be needed as capital investments are made in the future to support economic growth statewide."

Policies developed for transportation are as follows.

1. Direct growth to transit corridors and centers.
2. Promote compact design, walkable and mixed-use centers, that support transit.
3. Match jobs to housing to reduce long auto commutes to work.
4. Promote strategic capacity expansion to support compact development and multimodal options.
5. Promote county road access management to enhance safety and capacity.

Strategies associated with these policies may be found in the online Framework document.

The County Mobility Plan was also adopted in September 2010 and amended in May 2016: https://www.mercercounty.org/home/showpublisheddocument/1250/636058423231670000
The County is working on an update to the Plan and Pennington Borough has been invited to participate in the process.

Section 4 of the Mobility Plan details policies and associated strategies. The policies are

1. Preserve existing transportation facilities.
2. Improve safety for all travelers.
3. Promote choice of travel mode.
4. Promote land uses that reduce reliance on automobiles.
5. Link transportation improvements to economic and environmental goals.

Strategies associated with these policies may be found in the online Mobility Plan document.

Observations from the County Mobility Plan of relevance to Pennington are as follows:

1. *"Preserving the possibility of future connections is one of the most important functions of this mobility plan. Several connections in this plan are almost inconceivable today, either because of current environmental regulations or stakeholder opposition. Conditions of the moment, however, should not forever preclude the possibility of a sensible project. For a cautionary example, the de-designation of an interstate link between I-95 in Hopewell Township and I-287 in Somerset County was hailed as a victory for preservationists in the 1970s. Today, the same groups rue the heavy truck traffic on US 206 and NJ 31 that the interstate link would have carried, and development has come*

anyway, filling in the proposed right of way. Seeking to avoid that fate, this plan identifies projects that may be highly desirable if conditions change."

2. Route 31 is classed by NJ-DOT as a desirable typical section of 4 lanes on the Planned Projects Quadrant Map 5 in Appendix B. No proposed projects are shown for Route 31.
3. Under Policy 3, Promote choice of travel mode, Freight: Work with NJDOT, DVRPC, and municipalities to develop standard routes for freight vehicles, both through the county and to destinations within the county, including retail and commercial and industrial sites, distribution centers, and intermodal facilities.

d. New Jersey Department of Transportation (NJDOT) Long Range Transportation Plan

The current New Jersey mobility plan is the State Long-Range Transportation Plan (SLRTP), published in October 2008 with the title "Transportation Choices 2030". It can be found at https://www.nj.gov/transportation/works/njchoices/pdf/2030plan.pdf. The goals of the plan are given in Section 5 and are reproduced here with the associated policies. Strategies for each policy can be found in Section 5 of the plan.

1) Maintain and renew transportation infrastructure
   - Fix it first
   - Fix it efficiently
   - Back to basics
2) Integrate transportation and land use planning
   - Champion smart growth
   - Create better "tools"
3) Increase safety and security
   - Make travel safer
   - Reduce risk
4) Improve mobility, accessibility, and reliability
   - Counter congestion with multimodal solutions
   - Improve connections
5) Operate efficiently
   - Reduce delay
   - Give customers choices
6) Respect the environment
   - Promote environmental stewardship
   - Enhance quality of life
7) Optimize freight movement
   - Increase freight system capacity and efficiency
   - Integrate freight into transportation and land use planning
   - Target investments in key freight hubs and corridors
8) Continue to improve agency effectiveness
   - Enhance interagency coordination
   - Improve customer satisfaction
   - Deliver projects and services on time and within budget

The State is currently working on an updated plan "Keep It Moving NJ!" aimed at 2050 https://www.nj2050lrtp.com. No release date for the plan has been given. NJDOT describes the plan as *"a forward-thinking initiative to consider current challenges and anticipate future needs, ensuring that our transportation infrastructure remains robust and resilient. By developing this plan, we aim to create a sustainable and adaptable transportation network that promotes safety, reduces congestion, supports economic growth, and improves the overall well-being of our citizens for decades to come."* They are currently obtaining input from the public and the themes under consideration can be found in the first question of their online survey:

"NJDOT and NJ transit have proposed the following goals for New Jersey. Which three are most important to you?:

1) Maintenance
   - Keep our transportation infrastructure (roads, bridges and public transportation), facilities and equipment in good condition.
2) Eco-friendly
   - Promote a more environmentally friendly transportation system.
3) Effectiveness
   - Improve the effectiveness of transportation agencies.
4) Accessibility
   - Expand equitable access to jobs and services through transportation, especially in areas that do not have as many resources.
5) Resilience
   - Ensure that the transportation system can withstand climate change, extreme weather conditions and emergencies.
6) Partnership
   - Integrate transportation and land use planning
7) Safety
   - Enhance safety and reduce traffic deaths
8) Mobility
   - Make travel more accessible, easier, and reliable
9) Goods movement
   - Identify opportunities to move freight more efficiently
10) Efficiency
   - Operate the transportation system efficiently."

In its Mobility Plan, Mercer County describes its relationship with NJDOT as follows: *"NJDOT is a primary partner with Mercer County for local project implementation through its local aid formula funding (state funds) for bridge and highway maintenance. NJDOT is also a very active participant in developing DVRPC's TIP, since most federal funding goes to projects on state-maintained interstates and federal highways. County participation and support for these projects is vital because federal and state highways are the primary links in the county's transportation network."* This relationship is key to projects on State Route 31 in Pennington and Hopewell Township.

10. Relationship with Other Plan Elements in Master Plan 2025

The Mobility Plan impacts and is impacted by other Master Plan elements as follows:

Land Use Plan Element. This plan relates to the Borough's zoning and potential redevelopment areas. Mobility needs will be impacted by the Borough's development and redevelopment plans. Land required for suggested improvements in roads, sidewalks and trails will need to be incorporated in the Land Use Plan.

Housing Plan Element. The borough has identified areas of redevelopment which have the opportunity for high density housing, including affordable. The impact of these developments on highway access and increased traffic volume needs to be considered in the Mobility Plan. The Plan also should keep abreast of development in areas surrounding the Borough, which may have an impact on Borough traffic and require remediation.

Utility Services Plan Element. The implementation and maintenance of many of the goals and strategies of the Mobility Plan will be the responsibility of the Department of Public Works. We need to be mindful of the capacity of the Department to do this work and build it into the Utility Services Plan. The impact of Mobility projects on local taxes needs to be kept under control so we may retain the diverse age of population we have now instead of people moving away once their children are gone. The Municipal Stormwater Management Plan (MSWMP) is not part of the Master Plan but is referenced in the Utilities Plan. The goals of the MSWMP must be respected when considering mobility infrastructure changes. Improvements close to waterways or wetlands, such as bridge or culvert replacements, should include restoration of the natural systems in the scope of work, where appropriate. Heavy rainfall and flooding, damage from severe storms, and pollutant infiltration from road runoff may impact the operation of Borough utilities.

Economic Development Plan Element. This Plan considers all aspects of commerce and economic development in the Borough. Effective and diverse mobility options are an important piece of economic activity. Parking is critical and a balance of the needs of residents, employees and customers will need to be found. There is also an opportunity to reduce the amount of impervious coverage for parking by replacing it with pervious cover to improve groundwater replenishment and reduce flooding. Many such opportunities exist with business parking.

Open Space and Recreation Plan Element. This Plan makes recommendations on improving access to local recreation facilities and open spaces. These are mostly for cyclists and pedestrians and often require dedicated trails or road lanes. The Mobility Plan and the Open Space and Recreation Plan need to be consistent.

Conservation Plan Element. Conflicts between the Mobility Plan recommendations and the Conservation Plan need to be avoided. The Conservation Plan incorporates the Borough's Community Forestry Management Plan by reference and many of the Borough's trees grow on the rights-of-way of Borough and County Roads. The desire for shade trees and Mobility Plan strategies for space for pedestrians, bicyclists and other personal vehicle users should be consistent.

Green Buildings and Environmental Sustainability Plan Element (GBESE). Several goals and strategies in the GBESE are aimed at reducing the Borough's contributions to climate change. Section D of the GBESE is Land Use and Mobility. The goals in this section and in the Mobility Plan should be consistent. The GBESE includes the Community Energy Plan under development and a significant part of that plan is focused on transportation energy use and greenhouse gas emissions. The goals of the Mobility Plan and the Community Energy plan must be consistent.

Historic Preservation Plan Element. The Pennington Historic Commission supports the aim to enhance mobility but underscores the need to integrate mobility enhancements with the preservation of the Borough's historic character. Improvements in pedestrian and bicycle infrastructure within and around the Historic District should align with Complete Streets policies, ensuring that new facilities respect the district's aesthetic while improving safety and connectivity. Parking solutions within the district should prioritize compatibility with its historic setting. Measures such as strategically placed EV charging stations must balance modern mobility needs with the preservation of historical integrity. Additionally, careful planning is required to address the potential impacts of increased traffic from regional developments, ensuring the Historic District remains accessible without compromising its charm or safety.

Appendix A. Traffic data in and around Pennington

The Delaware Valley Regional Planning Commission (DVRPC - https://www.dvrpc.org) presents traffic counts on its website. DVRPC is the federally designated Metropolitan Planning Organization for the Greater Philadelphia region, established by an Interstate Compact between the Commonwealth of Pennsylvania and the State of New Jersey. It includes Mercer County.

Regional traffic count data is available on https://www.dvrpc.org/webmaps/trafficcounts/. It can be searched by municipality or Zip Code. Traffic counts are reported as Annual Average Daily Traffic (AADT), which represents an estimate of all traffic during a 24-hour period at the location indicated for the year in which it was collected. AADT counts for roads in and around Pennington have been extracted from data for Zip Code 08534 and presented in Table A1. Traffic counts are a daily average based on counts taken over three to five days, depending on location. All counts were taken midweek. Counts are given in both directions for each road. The DVRPC count does not differentiate between cars and trucks. Such data would be useful. The month each count was taken is shown on the table. Most are between March 2022 and March 2025, which are post-Covid, but one set was from June 2020 (West Delaware Avenue), which may have been affected by Covid restrictions. This count was taken June 16-18. The last day of school was June 17, so it only partially included school traffic.

The counts have been added to a schematic map of Pennington in Figure A1. Counts in and out of each junction do not sum exactly as they were done on different dates for different roads. However, a general picture of traffic flow in Pennington can be discerned. Around 8,500 vehicles per day join Route 31 northbound from Pennington Circle. Of these, ~7,800 travel as far as the North Main Street intersection, meaning ~700 leave Route 31 for destinations in Pennington. About 900 vehicles join Route 31 from North Main Street. About 3,200 vehicles leave or join Route 31 on Pennington-Hopewell Road, representing traffic passing through Pennington on the way to or from Hopewell. Around 3,000 vehicles per day enter Pennington via Pennington Road from Pennington Circle. Most of these travel as far as the Main Street traffic lights at Delaware Avenue. About 3,300 vehicles per day pass in each direction on East Delaware Avenue heading to Pennington-Rocky Hill Road.

The DVRPC daily data is generated from hourly counts which allows the visualization of how traffic is distributed during the day. Figure A2 shows three examples: southbound Route 31, north of Pennington-Harbourton Road; westbound East Delaware Avenue, east of Main Street; and northbound South Main Street, north of Curlis Avenue. All show morning and afternoon peaks with lesser peaks around lunchtime. Peaks for Route 31 are just under 700 vehicles per hour, Delaware Avenue 300 per hour and northbound Main Street 350 cars per hour. The Borough should explore with DVRPC the opportunity to gather additional data.

The New Jersey Office of Information Technology (NJOIT - data.nj.gov) also provides annual average daily traffic by location (county and municipality) and route. See: https://data.nj.gov/Transportation/Annual-Average-Daily-Traffic-by-Location-and-Route/dfun-zupj. Data was collected between 2016 to 2019. We chose to use the more recent DVRPC data.

Figure A1. DVRPC Annual Average Daily Traffic counts presented on a schematic map of Pennington

Annual Average Daily Traffic (AADT) is an estimate of all traffic during a 24-hour period at the location indicated for the year in which it was collected. AADT counts for roads in and around Pennington have been extracted from data for Zip Code 08534 and presented in Table A1.

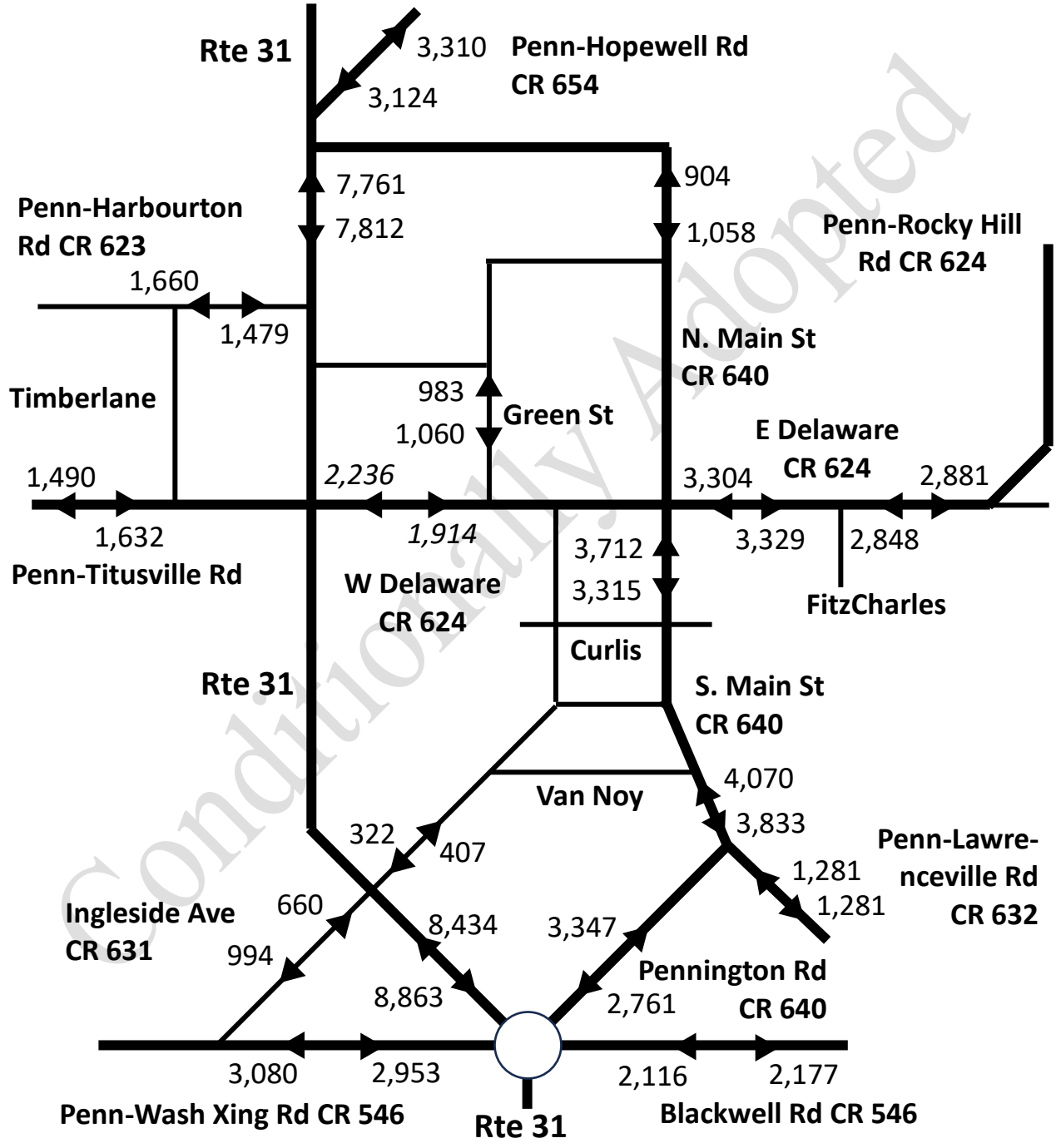

Figure A2. DVRPC hourly traffic counts for three roads

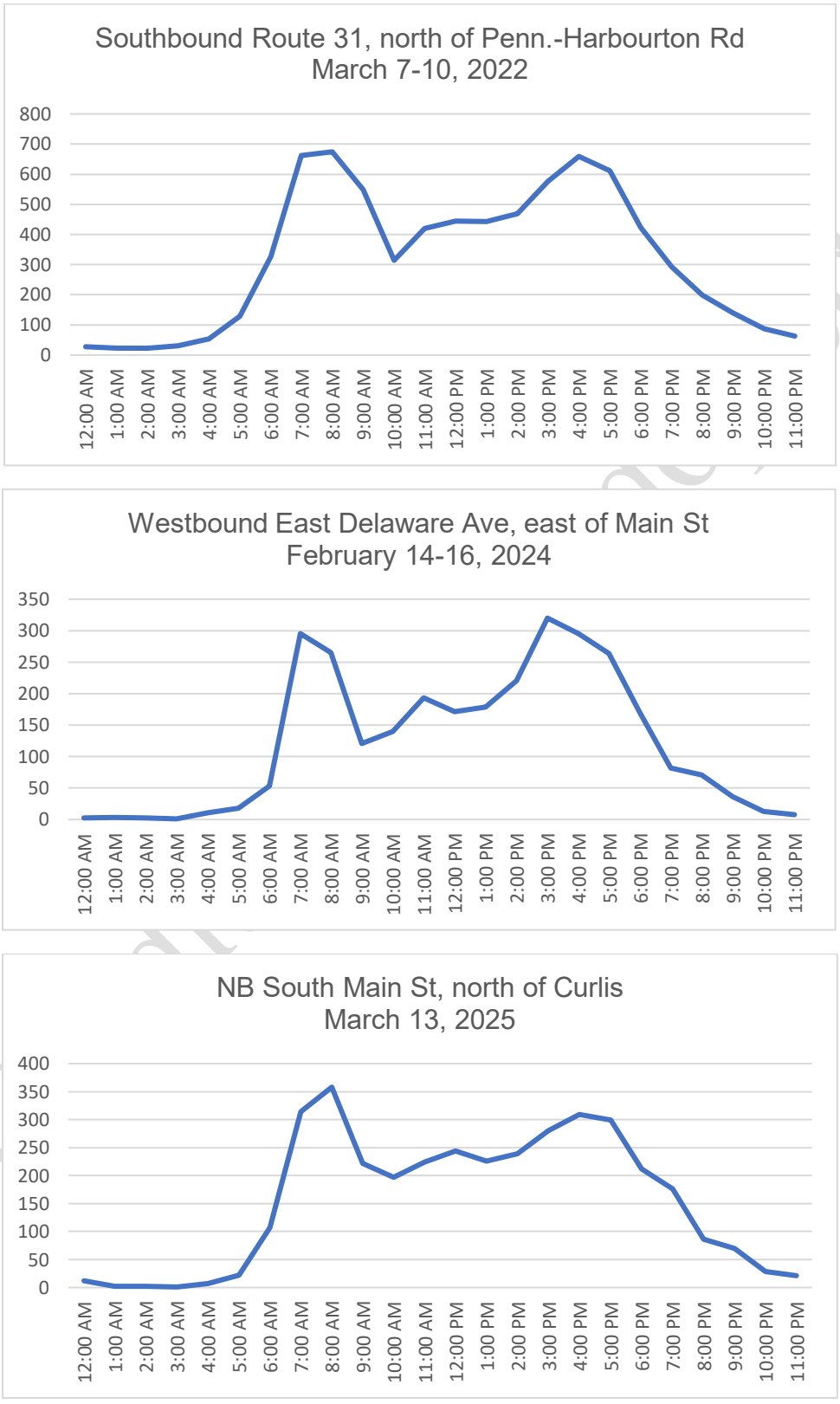

Table A1. Vehicle counts from the Delaware Valley Regional Planning Commission

https://www.dvrpc.org/webmaps/trafficcounts/

Road	Location	Veh./day	Month
NJ 31 - SB	North of West Franklin	7,812	Mar-22
NJ 31 - NB	North of West Franklin	7,761	Mar-22
NJ 31 - SB	South of Search Ave	8,863	Mar-22
NJ 31 - NB	South of Search Ave	8,434	Mar-22
Pennington Titusville Rd - WB	West of Timberlane	1,490	Feb-24
Pennington Titusville Rd - EB	West of Timberlane	1,632	Feb-24
W Delaware Ave - WB	West of Green St	*2,236*	*Jun-20*
W Delaware Ave - EB	West of Green St	*1,914*	*Jun-20*
Green St - SB	South of Broemel Place	1,060	May-23
Green St - NB	South of Broemel Place	983	May-23
E Delaware Ave - WB	East of Main St	3,304	Feb-24
E Delaware Ave - EB	East of Main St	3,329	Feb-24
CR 624 (E Delaware Ave) - SB	East of Fitzcharles	2,848	Feb-24
CR 624 (E Delaware Ave) - NB	East of Fitzcharles	2,881	Feb-24
CR 640 (N Main St) - SB	South of Railroad Pl	1058	Mar-25
CR 640 (N Main St) - NB	South of Railroad Pl	904	Mar-25
CR 640 (S Main St) - SB	North of Curlis	3,315	Mar-25
CR 640 (S Main St) - NB	North of Curlis	3,712	Mar-25
CR 640 (S Main St) - SB	South of Vannoy	3,833	Mar-25
CR 640 (S Main St) - NB	South of Vannoy	4,070	Mar-25
CR 640 (Pennington Rd) - SB	North of the Circle	2,671	Feb-24
CR 640 (Pennington Rd) - NB	North of the Circle	3,347	Feb-24
CR 631 (Ingleside Ave) - SB	North of Search Ave	984	Mar-25
CR 631 (Ingleside Ave) - NB	North of Search Ave	660	Mar-25
CR 631 (Ingleside Ave) - SB	West of Vannoy	322	Mar-25
CR 631 (Ingleside Ave) - NB	West of Vannoy	407	Mar-25
CR 654 (Pennington Hopewell Rd) - SB	North of Woosamonsa	3,124	Mar-23
CR 654 (Pennington Hopewell Rd) - NB	North of Woosamonsa	3,310	Mar-23
CR 623 (Pennington Harbourton Rd) - WB	East of Timberlane Dr	1,660	Mar-25
CR 623 (Pennington Harbourton Rd) - EB	East of Timberlane Dr	1,479	Mar-25
CR 546 (Pennington Wash Xing Rd) - WB	West of Dublin Rd	3,080	Mar-25
CR 546 (Pennington Wash Xing Rd) - EB	West of Dublin Rd	2,953	Mar-25
CR 546 (Blackwell Rd) - WB	East of Circle	2,116	Feb-24
CR 546 (Blackwell Rd) - EB	East of Circle	2,177	Feb-24
CR 632 (Pennington Lawrenceville Rd) - WB	North of Blackwell	1,281	Mar-25
CR 632 (Pennington Lawrenceville Rd) - EB	North of Blackwell	1,281	Mar-25

The DVRPC Congestion Management Process (CMP) analysis of Pennington is as follows:

Corridor 8, Sub-corridor C: Pennington Borough

This sub-corridor area includes Pennington Borough, which has a mix of main street/village and strip development patterns. It is impacted by through truck traffic on NJ 31. It is in the top 20% of NJ sub-corridors for anticipated volume to capacity ratio (V/C), transit score and land use centers.

Priority Congested Corridor and Sub-corridor Area: **No**

Congested Corridor and Sub-corridor Area with Major single-occupant vehicle (SOV) Capacity-Adding Strategies: **No**

Very Appropriate Strategies

1. Signal Improvements
   Strategies, ranging from basic to sophisticated, that improve the efficiency of signals individually and in systems. This includes specific applications, such as for pre-emption for emergency vehicles or buses.
2. Improve Circulation
   Strategies designed to move more vehicles through the existing road system, often using engineering approaches.
3. Walking and Bicycling Improvements
   These are strategies to reduce congestion and promote livability by making it safer and more convenient to travel by walking and bicycling.
4. Turning Movement Enhancements
   Strategies to reduce congestion and crashes through safer turning movements.
5. Land Use/Transportation Policies
   Strategies that reduce congestion by changing land use and development patterns to encourage mobility options and limit new trip generation.
6. Transportation Services for Specific Populations
   This is the provision of services that addresses specific needs or populations and includes employer-supported shuttles for employees. It also includes services oriented towards senior citizens and persons with disabilities.

Strategy Notes

1. Proposed walking and bicycling improvements as part of the Great Western Bikeway project near Pennington.
2. Given the levels of anticipated congestion, adding capacity to existing roads and transit capacity-adding strategies are appropriate in this sub-corridor if strategies further up the list cannot adequately address problems without also mixing in new capacity.
3. Placemaking and non-motorized transportation for corridors like this one that are high in land use centers.

Appendix B. Review of Pennington Circulation Plan components from the 1998 Master Plan and the 2005, 2013 and 2023 Reexamination Reports

1998 Pennington Borough Master Plan, pages 14-15

https://www.penningtonboro.org/DocumentCenter/View/690/1998-Master-Plan-PDF

The following is a summary of the concerns and suggestions in the 1998 Plan:

1. Increased truck traffic on Route 31 since I-287 was completed in northern New Jersey was a concern. A suggestion about widening Route 31 in the Borough and adjacent areas was not deemed acceptable. The existing right of way can accommodate four lanes of traffic. Widening of Route 31 has been part of the State Highway master plan for many years, but no implementation date has been set.
2. Merrill Lynch and Bristol Myers Squibb will likely increase traffic on Borough streets. The Borough should work with the Township, Mercer County, and NJDOT to develop solutions to reduce this impact. Solutions included providing alternate routes and discouraging through traffic with traffic calming techniques.
3. A Town Center Area Concept Plan map suggested an access road to link Green Street with an expanded Town Center parking lot. A walkway/bike path from Borough Hall to Broemel Place and sidewalk to Green Street was also suggested.
4. Street trees, especially with branches that overhang the street, can have a calming effect on traffic. It is recommended that the current excellent street planting program be augmented with an expanded effort to plant additional trees on those streets with high traffic. Special consideration would be given to the main entrances to the Borough, e.g. North and South Main, East and West Delaware, Ingleside, and West Franklin.
5. The 1998 Plan contained a “Circulation and Sidewalk Plan” map. The policy of the Plan is that high volume streets have sidewalks on both sides and that low volume streets, such as cul-de-sacs, loop, and other non-through streets have sidewalks on at least one side. Also shown on the map is a walkway/bike path linkage between Curlis Avenue and Welling Avenue, using the former Baldwin Boulevard right-of-way.
6. It was recommended that the more intensively used crosswalks be designated by permanent crosswalk “pavers."
7. The reactivation of passenger service had been proposed for the West Trenton line. Possible sites for a new station should be explored.

The actions that have been taken regarding 1998 recommendations are as follows:

1. A bike/sidewalk connection from North Main Street to the proposed (Township) development on the west side of Route 31 was installed, with a traffic light.
2. A "four way" pedestrian crossing was implemented at the intersection of Main Street and Delaware Avenue.

2005 Pennington Borough Reexamination Report, pages 9-10 and 25-27.

https://www.penningtonboro.org/DocumentCenter/View/691/2005-Master-Plan-Reexamination-Report-PDF

Due to concern over Route 31, Pennington Borough participated with Hopewell Township in the "Route 31 Design Study" conducted by Dodson Associates with the aid of a Smart Growth Planning Grant. Recommendations for improvements pertaining to Route 31 in Pennington from the Study Report of 2002 are summarized in Section 3. Since these improvements are proposed within the State right-of-way, it was recommended that Pennington Borough and Hopewell Township should continue to work with the State Department of Transportation on the execution of these recommendations.

The following is a summary of the concerns and suggestions in the 2005 Reexamination:

1. Traffic congestion along State Highway Route 31 and Delaware Avenue has increased over the years, especially during the peak hours. The construction of the new Merrill Lynch facility in Hopewell Township to the west of the Borough has brought more traffic along State Highway Route 31 and through the Borough.
2. Truck traffic on Route 31 continues to be a major concern. In 1995, NJDOT announced a six (6) point action plan to address truck safety concerns on Route 31, which included reducing speed limits; implementing a truck safety inspection plan by the State Police; pursuing a permanent truck inspection station; forming a truck safety advisory group including municipal, county and state representatives; and working with the New Jersey Turnpike Authority on a truck-friendly policy to encourage the use of the Turnpike as a major through corridor for commercial traffic.
3. As confirmed by the community at the public meetings held by Dodson Associates during the study, making Route 31 an undivided four lane highway is not acceptable to Pennington Borough and the surrounding community.
4. The report proposes several Route 31roadway improvements in Pennington Borough for consideration, including the following:
    a. A two (2) lane roadway with enhanced striping and medians at the signalized intersections for the safe crossing of pedestrians and bicyclists;
    b. A two (2) lane roadway with either a signalized intersection or a modem roundabout; or
    c. A four (4) lane boulevard with either a signalized intersection or a modem roundabout.

    Since the middle and high schools serve students in Pennington Borough, safe pedestrian and bicycle crossings are high priorities for any improvement plan to the highway.
5. The design of any roadway improvements to State Highway Route 31 should effect the goals and objectives of the Borough of Pennington, as follows:
    a. Any improvements to State Highway Route 31 should not divert through traffic onto other roads through the Borough;
    b. Safe and convenient pedestrian access within designated crosswalks across State Highway Route 31 should be provided; and
    c. No left turning movements should be permitted onto State Highway Route 31, except at signalized intersections.

Additionally, improvements to the State Highway Route 31 intersection with Broemel Place are necessary to alleviate any impediments to emergency vehicle access to and from the Pennington Fire Company and Pennington First Aid Squad facilities on Broemel Place. An emergency vehicle signal, at minimum, should be erected at the intersection.

6. A Streetscape Committee report recommended improvements to Main Street and Delaware Avenue to create a better alignment at the intersection to facilitate the flow of traffic and to provide safe pedestrian crossings.
7. The sidewalk along the north side of East Delaware Avenue should continue eastward to the Borough border at the Stony Brook bridge, then connect with the Lawrence Hopewell Trail along Pennington Rocky Hill Road.
8. Delaware Avenue has been designated through the Borough to its intersection with Federal City Road as a bicycle compatible roadway, as indicated in "Bicycling Mercer County: A Guide To Bicycling In And Around The Capitol County", which was prepared by the Greater Mercer Transportation Management Association with input from local cycling clubs and advocacy groups, the Delaware Valley Regional Planning Commission, Mercer County, the New Jersey Department of Transportation and various municipalities. Improvements to the northeasterly extension of East Delaware Avenue to its connection to the Lawrence Hopewell Trail are recommended to complete the safe bicycle accessibility of the roadway.

Actions that have been taken on 2005 Reexamination recommendations are as follows:

1. A collaborative partnership between non-profit organizations, citizens, private corporations, and local, county and state government lead to the planning of the Lawrence Hopewell Trail. This twenty-mile biking and walking pathway will loop through Lawrence and Hopewell Townships to connect several corporate parks, schools, residential areas and recreational sites, including Rosedale Park and Northwest Mercer County Park east of Pennington Borough.
2. Bristol Myers Squibb received approval from the Hopewell Township Planning Board to build the first link of the proposed pathway along Pennington-Rocky Hill Road from Old Mill Road to the Titus Mill and Wargo Roads intersection.
3. Pedestrian improvements along Route 31 in concert with the 1998 "Circulation and Sidewalk Plan" provide connections between the Straube Center and West Franklin Avenue to the north and between Broemel Place and the U.S. Post Office to the south.
4. The new traffic light at the intersection of the realigned North Main Street with Route 31 provides protected pedestrian and bike crossings and improved left turns onto Route 31.
5. A traffic light at Elm Ridge Road and improvements made by Bristol Meyers Squibb to Pennington-Rocky Hill Road also have helped with the traffic circulation in the eastern portion of the Borough.

2013 Pennington Borough Reexamination Report, pages 8-9

https://www.penningtonboro.org/DocumentCenter/View/686/2013-Master-Plan-Reexamination-Report-PDF

The following is a summary of the concerns and suggestions in the 2013 Reexamination:

1. The need to provide for better traffic and pedestrian circulation in the Route 31 corridor still exists. Although the development of the Shoppes at Pennington along Route 31

incorporated design recommendations found in the 2002 Route 31 Design Study, traffic continues to build on Route 31 creating pedestrian difficulties for crossing the highway and vehicular access problems for traffic crossing or entering the highway.

Additional actions that have been taken on 2005 Reexamination recommendations reported in the 2013 reexamination are as follows:

1. Pedestrian circulation has been addressed since 2005 with the construction of new sidewalks on lower King George Road and on the east side of Sked Street south of Sked Street Park. In addition, pedestrian activated flashing signals have been installed at two crosswalks to improve pedestrian safety primarily for school children crossing South Main Street at Curlis Avenue and crossing West Delaware Avenue at Green Street.
2. Pennington residents on foot or on bicycle will also soon benefit by having access to the Lawrence-Hopewell Trail via the Pennington Connection starting at the Stony Brook bridge on Pennington-Rocky Hill Road.
3. Although not following the expansive scope of the "Streetscape Report", the Borough this year had less costly but significant improvements made to enhance the pedestrian environment in the downtown area. New sidewalks with brick pavers, decorative streetlights and signage, benches, free guards, bollards, and additional trees were included in the improvements. However, many of the recommendations made in the 1998 and 2005 Master Plan documents remain.

[Note: No additions to the circulation plan were made in the 2014 Land Use Plan Amendment.]

2023 Pennington Borough Reexamination Report

https://www.penningtonboro.org/DocumentCenter/View/688/2023-Master-Plan-Reexamination-Report-PDF

Pennington Borough Planning Board adopted its ten-year reexamination report in a public meeting at Borough Hall on May 10, 2023. It reviewed progress on the 1998 Master Plan goals and the additional goals from the 2005 and 2013 reexamination reports and discussed those goals which were not yet met or had been discontinued. It also reported on progress that had been made in the Borough since 2013 through the actions of Borough Council. It then reported changes in assumptions, policies and objectives at the local, county and state levels that need to be considered for the Master Plan and concluded that it was time for an updated plan.

Mobility issues addressed throughout the 2023 Reexamination Report are summarized here.

Concerns remaining from the 1998 Master Plan and 2005 and 2013 reexaminations:

1. The visual quality and historic character of the Borough should be protected and enhanced. Reduce through traffic and enhance pedestrian safety and access.
   - Through traffic and pedestrian safety and access remain a concern. Sidewalks in the area of Main Street and Delaware Avenue were improved under the Streetscape project.
2. The existing distinction between highway business uses and town center housing and business uses should be maintained. Pedestrian linkages between the two business areas should be improved.

- Pedestrian linkages between the two business areas remain as they were in 2013, although the pedestrian environment near Main Street and Delaware Avenue has been improved.

3. The Borough should work toward a more proactive effort on regional issues such as traffic and circulation, open space preservation, community facilities, stream corridor protection, and water quality improvement.
   - Pennington and Hopewell Township have worked together on Route 31 traffic and safety issues. They have not always agreed but have generally worked to influence NJ DOT on safety issues. The Borough prevailed over the Township on the speed limit on Route 31 in the Borough which is set at 35 mph rather than the Township's preferred 40 mph.
4. The 2002 Route 31 Design Study detailed design guidelines for the corridor and for roadway improvements along State Highway Route 31.
   - Certain improvements to the roadway have been constructed along the Route 31 corridor since the time of this recommendation. The intersection of Route 31 and West Delaware Avenue now has left turn lanes in all four directions and left turn traffic lights. The speed limit in the Pennington Borough section of Route 31 is 35 mph, although it is frequently exceeded. The intersection of North Main Street and Route 31 now has pedestrian crossings controlled by traffic lights. A concrete sidewalk now runs along the east side of Route 31 from the Pennington Golf Center north to West Franklin Avenue. There is no sidewalk on the west side of Route 31.

Council actions and concerns on Mobility between 2013 and the 2023 reexamination:

1. The Borough remains concerned about traffic safety particularly at the intersection of Route 31 and West Delaware Avenue given that as many as 100 children and pedestrians cross this intersection daily to get to and from Timberlane Middle School and Hopewell Valley Central High School. A pedestrian fatality occurred there in October 2021, which prompted the Borough Council to pass Resolution 2021-11.14 urging NJDOT to re-visit the 2002 study of the Route 31 and West Delaware intersection in Pennington Borough. In response, the mayor received a letter from the NJDOT indicating that they do not see a problem with the intersection. The Council then passed Resolution 2022-5.19 reaffirming the previous resolution and sent certified copies to the Governor, Senator, Members of the Assembly, and the Mercer County Executive. [In 2025, the lights were retimed to allow simultaneous pedestrian crossings in all four directions, although there is still a risk of pedestrian conflict with cars turning left or right on a green light and with cars turning right at a red light.]
2. Two new Hopewell Township developments taking place on Scotch Road and Washington Crossing Road will have a major impact on traffic. The Scotch Road development, by US Home Corp./Lennar, brings 1077 new living units onto the market. The Washington Crossing Road development by US Home at Hopewell Urban Renewal brings 379 units. The total of 1456 added units exceeds Pennington's existing 1146 housing units. These large residential developments will significantly increase traffic in the area and, of concern to the Borough, will be increased traffic crossing Route 31 at West Delaware Avenue, Ingleside Avenue, and Pennington Circle. In 2014, Borough Council adopted the NJ DOT Complete Streets policy. The benefits of complete streets include improving safety for pedestrians, bicyclists, children, older citizens, and the

mobility challenged, reducing traffic congestion and reliance on carbon fuels, and saving money by incorporating sidewalks, bike lanes, and safe crossings into the initial design of a project to spare the expense of later retrofits. The Council reaffirmed the policy in 2016 but allowed four exemptions, which must be documented and approved by the Council, for the following four conditions, where:

   a. Bicyclists and pedestrians are prohibited by law from using the roadway. Detrimental environmental or social impacts outweigh the need for these accommodations.
   b. The safety or timing of a project is compromised by the inclusion of Complete Streets design practices.
   c. The cost of incorporating new bicycle, pedestrian, and/or public transit facilities is excessive.
   d. The need for and/or probable use of the facility shall be considered in making the determination as to whether an exception should be approved at this time or held for future consideration.

3. In 2021, the Council adopted a resolution in support of the 2020 Mercer County Bicycle Master Plan. In 2022, a resolution was adopted to endorse Vision Zero, which encourages municipalities to adopt achievable goals to prevent traffic-related severe injuries and fatalities based on the following principles:
   a. Deaths and severe injuries caused by traffic accidents are preventable.
   b. Human life and health should be prioritized in all transportation systems and in all aspects of transportation planning.
   c. Human error is inevitable, and transportation systems should be forgiving.
   d. Transportation planning should focus on systems-level changes above influencing individual behavior.
   e. Speed is the single most important factor in crash severity.
4. A "Streetscape Report" prepared by the Streetscape Committee of the Borough set forth recommendations for hardscape and other improvements within the Town Center area and the report was incorporated into the Master Plan by reference. The streetscape improvements recommended in the area around the Main Street and Delaware Avenue intersection are being constructed as funding from NJ DOT's Transport Alternatives is obtained. The first project, to improve curbing on North Main Street was completed in 2014. In 2017 a grant was approved for a Phase II project on improvements on East and West Delaware Avenue and South Main Street. The project is ongoing.
5. The Council is also concerned that the responsibility of adjacent property owners to maintain their sidewalks is often ignored. Chapter 177 of the Borough Code covers repair of sidewalks, snow and ice removal, and the clearance and control of debris and overgrowth. Responsibility for enforcement needs to be clarified.

Changes in assumptions, policies and objectives at the local, county and state levels:

1. The COVID-19 pandemic will have a lasting impact on the State's economy and how its residents and businesses operate and interact with one another in the future.
   a. Pedestrian and bicycle facilities: With the temporary closure of businesses and residents working from home, the desire to walk and bike around the community for recreation increased. It is likely this will create new habits among residents

and increase the demand for safe and convenient pedestrian and bicycle facilities. The Borough should explore how these facilities can be provided between destinations where they do not exist and where enhancements are necessary.

b. Drop-off / Pick-up: Temporary closure of businesses and concern about safety of indoor spaces have generated increased demand for take-out food and deliveries of online purchases and restaurant food. The Borough may be faced with increased demand for customer pick-up locations and home delivery. Such accommodation has already generated reconfigured parking lots and curbside pick-up arrangements. These accommodations have addressed not only health and safety concerns for employees and customers but also enhanced convenience for local businesses.

2. The popularity of electric personal vehicles has grown substantially.
   a. While many owners will conduct charging at their home and will do so in accordance with the applicable building code, many will also need and/or desire to charge while at work, shopping or otherwise away from their homes. This requires electric vehicle charging stations. Support for charging stations is consistent with the Strategy 1 of the *2020 New Jersey Energy Master Plan* which states as a goal: "Reducing Energy Consumption and Emissions from the Transportation Sector, including encouraging electric vehicle adoption, electrifying transportation systems, and leveraging technology to reduce emissions and miles traveled."
   b. Amendments to the Municipal Land Use Law adopted in August 2021 included many provisions specific to the installation of electric vehicle supply equipment, which are detailed in the 2023 Master Plan Reexamination report, Section C8, Electric Vehicles.

Appendix C. Greenhouse Gas Emissions Calculations

It is instructive to estimate the annual CO_2e (carbon dioxide equivalent) emissions reduction possible if Pennington Borough residents converted to electric vehicles. The US EPA reports annual data on CO_2e emissions in the United States, and a breakdown by sector in: https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#transportation .
Data on energy annual usage can be found in charts prepared by Lawrence Livermore National Laboratory from DOE/EIA data in https://flowcharts.llnl.gov/commodities/energy.

In 2021, transportation in NJ used 0.132 Quads (39 TWh) of fossil fuel energy and contributed 40.7 MMT (million metric tons) per year of CO_2e to the atmosphere. At the same time, NJ electricity generation of 0.194 Quads (57 TWh) contributed only 13.5 MMT of CO_2e (this can be converted to 0.52 lb/kWh). If the 39 TWh required to move vehicles came from electricity at the current rate of CO2e production, it would contribute only 9.2 MMT of CO2e (13.5 x 39/57), saving 31.5 MMT (40.7 - 9.2) per year. Personal vehicles (cars, SUVs, pickup trucks and minivans) generate 57% of the emissions, so changing to battery powered electric vehicles in New Jersey would save about 18.0 MMT (57% of 31.5).

The population of Pennington is around 2,800, and of New Jersey is about 9.3 million, so on a proportional basis, the CO_2e reduction from Pennington with all electric personal vehicles would be 5,400 MT (metric tons)/year. This is about 20 times the 276 MT used by Borough operations, which Borough Council resolved to reduce to zero by 2035, as discussed earlier. As New Jersey moves towards its goal of zero CO2e emissions from electric power generation by 2035, the 9.2 MMT from the generation of the electricity to power vehicles would drop to zero and the total CO2e reduction from personal vehicles in New Jersey would be 23 MMT (57% of 40.7). For Pennington, this would be about 7,000 MT per year, which is 2.5 MT per resident per year.

Looking at this on an individual car basis, the average EV gets 2.9 miles/kWh. To go 2.9 miles, a 30-mpg gasoline car uses 2.9/30 = 0.097 US gallons of gasoline and at 19.6 lbs of CO2e per US gallon, CO2e from the gas car = 19.6 x 0.097 = 1.9 lbs/kWh. As detailed above, electricity generated in New Jersey produces 0.52 lbs/kWh, which is 3.7 times lower. (Wyoming and West Virginia electricity generation produces over 2.0 lbs/kWh due to the prevalence of coal-fired power stations so their EVs give no CO2e benefit). Two issues being addressed by the EV industry are increasing the energy storage density of batteries to increase range, and battery recharging time.

To compare EV to gasoline charging times, the reference is that the 10 gallons needed for a range of 300 miles with the 30-mpg car takes about a minute to pump at a gas station. For the EV average 2.9 kWh/mile, a charge of 103 (300/2.9) kWh is needed. There are 3 classes of EV charger, and the time needed to deliver 103 kWh can be calculated for each:

- Home Level 1 Charger: 120V 20A = 2.4 kW. 103 kWh/2.4kW = 43 hours per 300 miles
- Home Level 2 Charger: 240V 40A = 9.6 kW. 103 kWh/9.6kW = 11 hours per 300 miles
- Commercial Level 3, NJ: 480V 310A = 150 kW. 103 kWh/150kW = 40 mins per 300 miles
- Commercial Level 3, max: 480V 730A = 350 kW. 103 kWh/350kW = 18 mins per 300 miles

The charging rate depends on the EV's battery control system, so actual times may be longer. Also, the total number of Level 3 charges during the lifetime of an EV battery may be limited due to the high amperage. The analysis tells us that a 120 V Level home charger would only give a range of about 80 miles after an overnight 12-hour charge. This may be sufficient if all car use is local and infrequent, but for many users, a Level 2 charger is needed.