Green Infrastructure Feasibility Study

July 27, 2021

Park Drive Redevelopment Project • Rome, New York

Owner: **City of Rome Community and Economic Development**

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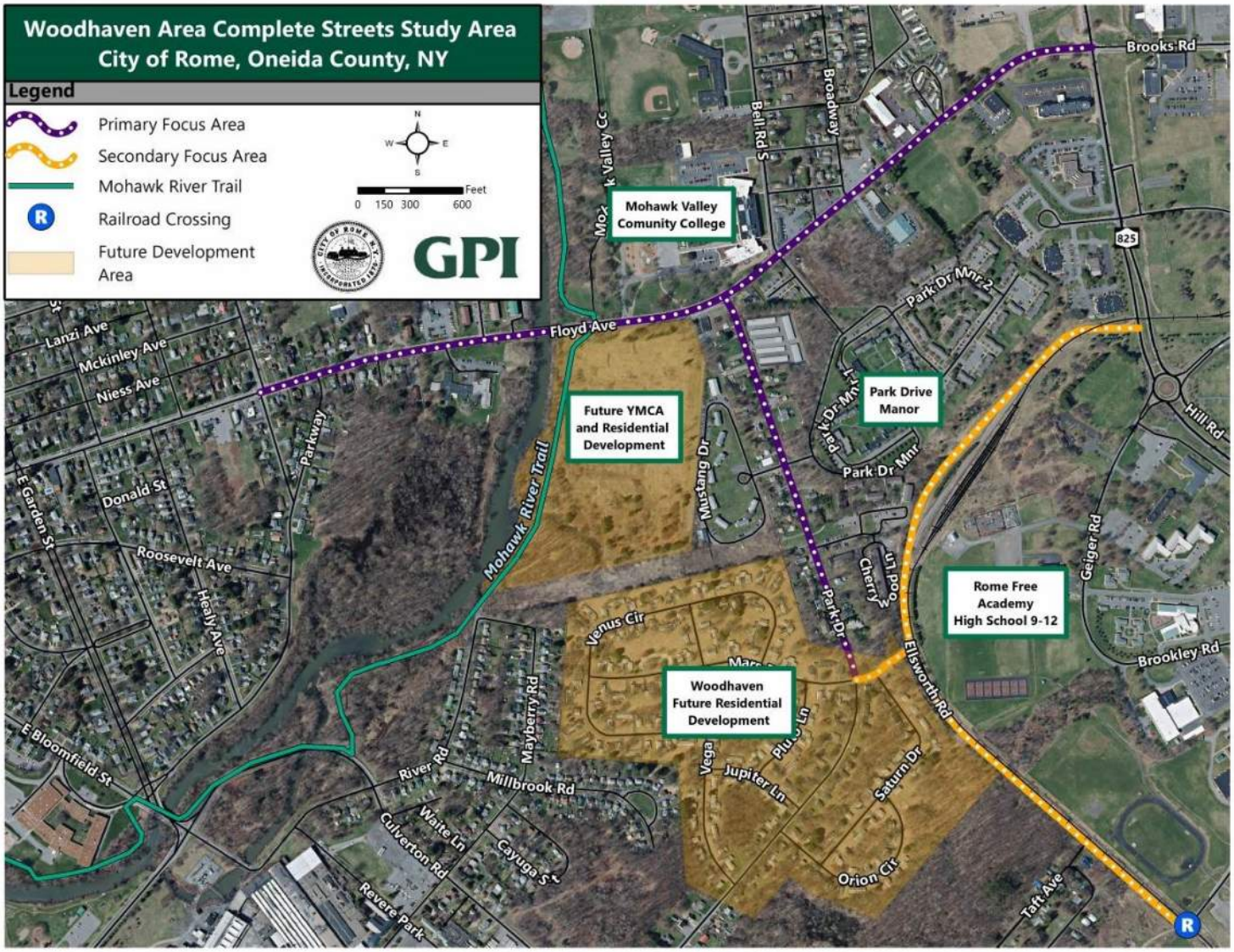
1.0 Executive Summary

The City of Rome located in Oneida County, New York is considering various improvements to the Floyd Avenue/ Park Drive corridors. The area has experienced a significant amount of development especially along NY 825 which has increased both vehicular traffic as well as a need for non-motorized means of access. The buildout is expected to continue with the development of the Woodhaven subdivision and future YMCA development. The Woodhaven subdivision will total around 100 new single-family homes and may include a number of condominiums. The YMCA parcel will include a YMCA and other buildings that continue mix-use used retail on the first floor with apartments occupying the second and third floors.

To provide a proactive approach to identifying and addressing the area needs the City contracted a Complete Streets study (see Appendix A) in December 2020 that is tasked with developing concepts that create a more safe and efficient transportation system that takes into consideration the needs of all travelers, including pedestrians, cyclists, transit riders and motorists. The study has developed recommendations that include pedestrian and cyclist accommodations, green infrastructure techniques, repaving roadways, and landscape screening features. Notably the study seeks to identify various ways to interconnect existing infrastructure such as the Mohawk River Trail and NY 825 sidepath to areas along Floyd Avenue and Park Drive.

Shown in the map below the Woodhaven Area Complete Streets Study primarily focuses on Floyd Avenue, from its intersection with Oakwood Street to State Route 825 (Hill Road), with an ancillary focus on Park Drive, between Floyd Avenue and Vega Drive, and Ellsworth Road along its entire length. The Study Area is largely dominated by residential development with a variety of housing types and densities, as well as a variety of commercial development and educational uses. Major traffic generators within and surrounding the Study Area include Griffiss Business & Technology Park, the Mohawk Valley Community College (MVCC), the Rome Free Academy, and the Jerry C. Clough Pre-K. Future traffic generators include the Air City Lofts, B-240, YMCA parcel development, and the Woodhaven Development.

Park Drive is a key roadway for the area because it provides the linchpin between the development on Floyd Avenue to population centers to the south. Along Floyd Avenue is diversified development including the apartments, single-family homes, the MVCC, restaurants, and various businesses. To the south of Park Drive are mostly single-family homes. For motorists, Park Drive provides the most direct connection between Floyd Avenue and E. Dominic Street (NY 365).



Study Area Map

The prevailing concepts for Park Drive continue to be discussed with the City in order to provide a design that best fits within the available Right-of-Way (ROW) while including Green Infrastructure practices. There are three primary concepts for the Park Drive improvements, each with Green Infrastructure techniques incorporated into the new streetscape designs that extend from Floyd Avenue to Mars Drive. The concepts (described below) will need to be reviewed and discussed with City Officials but are intended to demonstrate what design options are feasible based on the existing conditions and available information.

CONCEPT #1: Park drive is to be reconstructed with full depth asphalt restoration in its current alignment while providing new sidewalks and infiltrating bioretention areas with tree plantings pits. The new roadway will be curbed and provide sidewalks on both sides of the roadway.

CONCEPT #2: The Park Drive alignment is to be shifted several feet to the west to provide sufficient room for a five-foot sidewalk along the southbound travel lane, a five- to ten-foot-wide grassed maintenance area between the roadway and a ten foot wide permeable pavement sidepath (permeable pavers are also being considered).

CONCEPT #3: Park Drive is to be reconstructed with full depth asphalt restoration in its current alignment, similar to Concept #1. The new roadway will be curbed to collect stormwater into a storm sewer network that outlets into plunge pools (if necessary) before flooding into bioretention areas. Located towards the east of the roadway would be a sidepath similar to the one presented in Concept #2.

These three preliminary concepts will be provided to the City to discuss the required elements of long-term maintenance, the existing limitations at the site, and the available resources the City has in order to ensure the practice's functionality. Regular discussions and design updates with the City will provide an improved streetscape design with incorporated Green Infrastructure elements that can reasonably be maintained with the City's available resources.

2.0 Project Objectives

To guide the reconstruction of Park Drive, are some of the objectives that were developed as part of the Complete Streets Study. Listed below, the following goals provided direction in the development of the concepts presented in Chapter 5.

Goals

- To improve pedestrian safety and connectivity between residential areas on Park Drive to Floyd Avenue
- To incorporate environmentally friendly green infrastructure to improve drainage for adjacent driveways
- To identify alternatives to improve traffic conditions and driver safety
- To develop concepts that minimize impacts to adjacent property owners

3.0 Existing Conditions

Park Drive is an uncurbed, two-lane roadway that is classified by the New York State Department of

Transportation as an Urban Major Collector. Park Drive is unique in that south of Floyd Avenue for the first 0.40 miles the road is within the City's jurisdiction. South of that the road becomes private property within the future Woodhaven Development. South of the development the roadway becomes City jurisdiction again and becomes Gansevoort Avenue south of Vega Drive.

Summarized in **Table 3.1** are some of the design requirements that would be required for Park Drive during a design project. These widths are based on Chapter 2 of the NYSDOT Highway Design Manual and were used as part of the alternative layout presented in Chapter 5 of this report.

Roadway	Roadway Classification	Travel Lane Width (feet)	Turning Lane (feet)	Parking Lane (feet)	Shoulder Width (feet)
Park Drive	Major Collector	10 (minimum)[3] 12 (desirable)[3]	11 (minimum)[1] 12 (desirable)[1]	7 (minimum)[4] 8 (desirable)[4]	0 (minimum)[2] 4 (desirable)[2]

1. Based on vehicular traffic that is comprised of more than two percent heavy vehicles (buses, box trucks etc.
2. Shoulder width is based on a roadway that is curbed and will accommodate bicycle travel in an adjacent shared use trail.
3. Assumes the roadway is curbed.
4. In residential areas only (non-commercial).

Table 3.1: Roadway Classification and Criteria

General Characteristics and Conditions

Park Drive is a 30 mph, unstriped roadway with a total pavement width of approximately 24 feet. It is uncurbed and in poor condition with frequent alligator, longitudinal and traverse cracking throughout the entire pavement width. Due to the lack of pavement edge definition (curbing or shoulder) there are frequent areas of asphalt degradation along the edges that are one to two feet wide (see Exhibits 2.1A/B). The existing utilities include sanitary sewer and water that are located within the roadway itself. Located in the northbound should is an existing gas line and over utility lines. Benefitting the design concepts previously presented the available ROW which is based on Oneida County tax parcels is about 80 feet wide.

Exhibits 2.1A: Looking South from Floyd Avenue

Exhibit 2.1B: Park Drive (Looking North)

A dig ticket through DigSafe NY (811) allowed GPI to conduct preliminary soil testing along the eastern side of Park Drive to assess the feasibility of several Green Infrastructure techniques. The preliminary tests provided 3-to-4-foot soil profiles, as well as infiltration rates at the four testing locations. All test locations had an extremely similar soil profile consisting of 8 to 12 inches of topsoil with organics, above a mixture of sand and 2-to-6-inch stones. A single deep excavation was made at test location #5 which confirmed the consistency of the stone and sand subsoil down to a depth of 6.5 feet. The deep test did not encounter groundwater or bedrock at any depth. Specific test results for each location are included in Appendix B. However, a lack of proper drainage facilities has led to areas of ponding visible in Google Earth Street View (see Exhibits 2.1C/D).

Exhibits 2.1C/D: Park Drive (Looking South)

Preliminary Soil Exploration:

Several locations were selected along Park Drive that were identified as preferred locations for the

proposed Green Infrastructure practices. These practices utilize native soils with infiltration capacity for stormwater management which requires knowledge of the underlying soils. Initial preliminary soil explorations were performed at the locations identified along Park Drive (see Appendix B) to assist the concept level design development in coordinating the available Green Infrastructure practices into the Park Drive streetscape. The preliminary soil testing involved coordination with the City of Rome, Dig Safely NY (811), and the testing crew to ensure existing underground utilities would not be impacted by the testing completed.

In relatively short order, Dig Safely NY was able to mark underground utility locations and approve four (4) of the six (6) requested locations for the preliminary soil tests to be completed. A crew from the City was able to establish a time to meet onsite with the necessary excavation equipment to assist in the preliminary soil explorations. An initial pit was excavated at the approved locations to a depth of approximately 36 inches to allow for a smaller 4-inch diameter hole to be dug at the bottom of the pit for testing. The overall depth of testing was desired to be 60 inch however onsite soils included large rocks that impeded further digging. A stake with screws set one inch apart (vertically) was set at the bottom of the four-inch hole to provide a consistent metric for each test. Testing was completed by pouring water into the bottom of the further excavated area until the top screw was covered by the water and a stopwatch was utilized to time how long one inch of water drained into the soils. Each test was repeated a minimum of four (4) times in all locations to provide a stabilized infiltration rate used for the preliminary location of Green Infrastructure practices.

An additional "deep test" was excavated at one location to visually confirm depths of layers and changes within the native soils. This test was only visual and serves as a validation/clarification of soils depicted on online soil mapping provided by the USGS (see Appendix C). The results of both the infiltration and deep tests are outlined below with photos of the test attached in Appendix D.

Online mapping indicated that the Park Drive ROW contains a single type of soil, 33A - Alton-Urban land complex, zero to three percent slopes. The "Soil Survey of Oneida County, New York" describes this soil type as "areas of a very deep, nearly level, somewhat excessively drained Alton soil and areas of Urban land on broad outwash plains, mostly in the City of Rome". The soil survey also describes the typical soil profile as having a top layer of dark brown gravelly loam with rock fragments from zero to nine inches, with subsoils having a yellowish brown very gravelly sandy loam with 35-55% rock fragments to a depth of 72 inches.

Rainfalls in days prior to the testing were intended to serve as the "presoak" for the tests. Testing results were analyzed for consistency and results that varied from subsequent soil tests were excluded from the stabilized rates identified below.

Test Location #1: This test was not approved by Dig Safely NY due to underground utilities.

Test Location #2: Soils in this area largely matched the soil description above. The top layer was approximately nine inches of topsoil with smaller rocks (less than two inches), above a yellowish-brown sand and stone mix. Stones within the subsoils ranged from two to six inches in size and limited hand excavation in this location.

Preliminary excavation – 32 inches
Test hole depth – 14 inches
Total test depth – 46 inches

Timing of one inch drop in water:
#1 - 1:03
#2 - 1:25
#3 - 1:28
#4 - 1:34

Stabilized Rate: ±1:30 per inch or ±40 inches/hour.

Test Location #3: Soils in this area also largely matched the soil description above. The top layer was approximately eight inches of topsoil with smaller rocks (less than two inches), above a brown sand and stone mix. Stones within the subsoils ranged from two to six inches in size and limited hand excavation in this location. A layer of brown sand without rocks was encountered at approximately 48 inches however it was unclear whether or not this was a consistent soil quality.

Preliminary excavation – 38 inches
Test hole depth – 20 inches
Total test depth – 58 inches

Timing of one inch drop in water:
#1 - 1:23 - EXCLUDED
#2 - 4:02
#3 - 4:21
#4 - 4:41

Stabilized Rate: ±4:30 per inch or ±13inches/hour. First test was excluded as an outlier.

Test Location #4: This test was not approved by Dig Safely NY due to underground utilities.

Test Location #5: Soils in this area also largely matched the soil description above. The top layer was approximately eight inches of topsoil with smaller rocks (less than two inches), above a brown sand and stone mix. Stones within the subsoils ranged from two to six inches in size and limited hand excavation in this location. Test location #5 also included the "deep test" which is outlined below.

Preliminary excavation – 36 inches
Test hole depth – 12 inches
Total test depth – 48 inches

Timing of one inch drop in water:
#1 - 1:02
#2 - 1:18
#3 - 1:42
#4 - _:__ - Test not completed due to hole collapse.

Stabilized Rate: ±1:30 per inch or ±40 inches/hour. The hand excavated test hole collapsed during the fourth test however the previous test rates were fairly consistent and should serve as an adequate representation of the infiltration capacity.

Test Location #6: Soils in this area also largely matched the soil description above. The top layer was approximately eight inches of topsoil with smaller rocks (less than two inches), above a brown sand and stone mix. Stones within the subsoils ranged from two to six inches in size and limited hand excavation in this location. It was identified by an individual from the City's excavation crew that this location previously served as a driveway and that subsoils may be additionally compacted in this location.

Preliminary excavation – 36 inches
Test hole depth – 12 inches
Total test depth – 48 inches

Timing of one inch drop in water:
#1 - 2:35
#2 - 2:35
#3 - 3:42
#4 - 4:33

Stabilized Rate: ±4:00 per inch or ±15 inches/hour.

Deep Test @ Location #5: Upon completion of infiltration testing at Location #5 a deep test was performed. The City employees excavated the test pit to a depth of ±6.5 feet (±78 inches) to allow for a visual confirmation of the subsoils. This test largely matched the soil descriptions provided by the County and online soil mapping provided by the USGS. The top zero to nine inches was a dark loamy topsoil with a few smaller rocks, and the subsoils were a yellowish-brown sand with ±50% rocks about two to six inches in size. The subsoils identified within the deep test were consistent with subsoils identified at all completed testing locations and appear to serve as a verification of the soil descriptions provided by County and online resources.

4.0 Project Description

Park Drive Improvements: Park Drive is a paved road that serves the nearby residential and commercial uses and is in need of repairs. Further subsurface investigations will be required to evaluate the conditions of the existing subbase and asphalt to determine if it can be salvaged. Based on the existing cracking it is unlikely that a similar mill and inlay will mitigate the damage and that a full depth pavement replacement is justified. Currently there are three primary design alternatives that incorporate Green Infrastructure elements. This project location is optimal for Green Infrastructure as the soils facilitate infiltration, but the existing topography is also extremely flat. The lack of slope coupled with the surrounding development eliminates any suitable points of discharge for a conventional closed drainage system.

The existing underground utilities within the right-of-way will be more easily accessible for repairs/replacements during construction, which allows for utility work (if needed) to address aging infrastructure with any of the proposed concepts. The concepts will continue to be designed so that their footprint eliminates the need ROW acquisitions or easements. Further detailed explanations of each concept are provided below to outline the design elements incorporated in the concepts.

> **CONCEPT #1:** The overall goal of this concept is to create a pedestrian and traffic friendly streetscape lined with tree planting pits to reduce the visual impact to the surrounding residential buildings. The roadway would retain as much of the existing Park Drive alignment as feasible and provide curbing along both edges of the pavement. Sidewalks will be installed on both sides of Park Drive to provide a pedestrian friendly access, but bicyclists will be forced to utilize the travel lanes and operate under a shared use condition. Infiltrating bioretention areas in conjunction with tree pits will be located along the edges of the northbound sidewalk and planted with low growth trees or shrubs to avoid impacting overhead wires. Catch basins and piping convey rainfall from the paved roadway into the bioretention areas and tree pits, where

it will infiltrate into the ground or be absorbed by the trees. The tree plantings in pits should sufficiently retain and infiltrate stormwater based on the preliminary soil investigations along Park Drive. Other design elements that would be needed for Concept #1 include coordinating the proposed design to accommodate or relocate the existing utility poles and establishing new driveway connections for each residence along Park Drive.

CONCEPT #2: The centerline of the roadway would be shifted at least five feet west which necessitates a full depth replacement regardless of pavement condition. In this case curbing can be incorporated in one of two scenarios. In the first scenario curbing would be installed along just the southbound travel lane or in scenario two along both travel lanes. In both instances a southbound sidewalk would be constructed, and the roadway would be superelevated so that it slopes towards the northbound travel lane. To better accommodate bicyclists a ten-foot wide sidepath consisting of porous pavement (or pavers) would be constructed along the eastern edge of the existing ROW. Separating the sidepath from the roadway would be a grass filter strip of varying width but not less than five feet to meet design standards. In the event the northbound travel lane is uncurbed the runoff velocity would be slowed by a lightly graded filter strip (approximately one to two percent) before it would reach the porous pavement. The filter strip is necessary to maximize the longevity of the porous pavement and minimize overall maintenance by removing sediments prior to filtering through the sidewalk. In this scenario the filter strip also minimizes the deleterious effects of snow removal in the winters and would provide space to maintain the existing utility pole locations.

Under a second scenario where the northbound travel lane is curbed the runoff would be collected into separate drywells or bioretention areas. In this case depending upon final layout taking into consideration utility impacts the bioretention areas could be placed adjacent to the northbound travel lane where drop curb inlets allow runoff to flow into the bioretention areas. This eliminates the cost and future maintenance of a stormwater drainage system. By constructing curbing the roadway becomes grade separated from any green infrastructure and the proposed sidepath. Under either scenario the drawback to this concept is the porous pavement as it requires more regular maintenance than other practices.

CONCEPT #3: Similar to Concept #1, this concept involves a full depth reconstruction of Park Drive and new curbing but incorporates the porous pavement sidepath presented in Concept #2. In this case the roadway may or may not be superelevated towards the east, but it will provide conveyance via a closed drainage system. The stormwater would be conveyed into plunge pools for velocity control (if necessary) before leaching into adjacent bioretention areas. The bioretention areas may be elongated along Park Drive, or in consolidated areas to reduce the overall footprint of the project. The drawback for this concept is the additional

maintenance associated with both the porous pavement as well as the bioretention areas that need occasional mulching, planting and weeding.

Consistent with all concepts will be improvements such as new lane striping, signage improvements, and various landscaping necessitated by the impacts of the project. Along Park Drive, the WQv that would be treated will be calculated based on the assumed area of the roadway (26-foot pavement width) and one five-foot sidewalk which totals approximately 1.62 acres and is entirely impervious. Also calculated in the area for a ten-foot wide sidepath that is 2,275 feet long which totals 0.52 acres. Using 100 percent impervious area for the 2.14 acres project area resulted in a WQv of 8,118 cubic feet or 0.186 acre-feet. This is based on a 90th percentile rainfall event of 1.1 inches or less for stormwater runoff in a 24-hour period. The total WQv expected to be reduced by using green infrastructure practices is 8,118 cubic feet or 0.186 acre-feet.

Shown in Appendix E are two examples of bioswales that are installed by the City of New York Department of Environmental Protection. (NYCDEP). These examples show a basic layout for what the City of Rome has envisioned as infiltration devices. The Type 3 design utilizes drop curb inlets that direct the water into the structures as opposed to Type 3D that uses catch basins and piping. As a preliminary calculation the project will require 3,100 square feet of bioretention area to provide 100% of the necessary storage volume. This is area will be split into various segments that would be established once a full survey is completed that identify utility and property conflicts. The total area will likely be reduced a small amount by integrating in a future number of tree pits. It is noted that this project would be eligible for a 75% redevelopment credit that applies to existing impervious areas which would result in a greatly reduced treatment volume. Despite this possibly the City intends to pursue a more aggressive option that treats the entire WQv. As noted in Section 7.0, the project has allocated $300,000 to ensure that the green infrastructure for the project is adequately funded and can integrate multiple treatment alternatives.

5.0 Project Schedule

The schedule for construction of a future project on Park Drive including green infrastructure practices will be controlled by the timing of a grant award. Assuming an award occurs on January 1, 2022 the following schedule highlights the key project milestones. It is noted that this schedule assumes that no ROW will have to be obtained as part of the project.

GI Feasibility Study	**Completed July 2021**
Preliminary Design	**Spring/Summer 2022**
Final Design	**Fall/Winter 2022**

Project Letting, Award	**Spring 2023**
Construction Begins	**Late Spring 2023**
Construction Complete	**Late Summer 2023**

6.0 Anticipated Regulatory Approval and Permits

The following regulatory approvals and permits are anticipated as part of a future on Park Drive:

- NYSDEC – State Pollutant Discharge Elimination System (SPDES) General Permit (GP-0-20-001)
- SHPO – Historic and Cultural Resources
- SHPO/FHWA – Section 106 Consultation
- FHWA – Endangered Species Act
- NYSDOT/FHWA – National Environmental Policy Act (NEPA)
- City of Rome – State Environmental Quality Review Act (SEQRA)

A SPDES General Permit GP-0-20-002 will be required because the project is expected to have more than two acres of soil disturbance. A Stormwater Pollution Prevention Plan (SWPPP) with the appropriate sediment and erosion control measures will be developed.

The project will employ effective erosion and sediment control practices during construction, as set forth in NYSDOT's statewide stormwater and erosion and sedimentation control specifications, standard construction details, and design and construction guidance procedures.

Soil erosion plans and details will also be developed during the advance detail design phases of the project in accordance with Section 209 Soil Erosion and Sediment Control of the NYSDOT Standard Specifications in order to satisfy the SWPPP. These plans and details will include both temporary and permanent measures to prevent soil erosion and provide fences, seeding, mulching, and stabilized construction access points.

7.0 Project Cost Estimate

The conceptual costs for Park Drive improvements are based on prices published in NYSDOT's Pay Item Catalog. The total length of roadway and trail is estimated to be about 2,280 feet with the green infrastructure component broken out as bio-swale tree pits and a porous pavement sidepath shown below. It noted that the City will be contributing local funding to cover the additional costs associated with the roadway, sidewalk, and consultant costs.

Item	Estimated Cost
Excavation (3,390 CY)	$84,800
Asphalt (2,880 Tons)	$277,000
Subbase (2,270 CY)	$147,500
Granite Curbing (4,560 LF - both sides of road)	$228,000
Drainage	$94,600
Signing & Striping	$21,400
Landscaping & Restoration	$40,000
Estimated Roadway Cost:	**$832,500**
Bio-swale Tree Pit Construction Cost (~15 Locations)	$300,000
Estimated Bio-swale Tree Pit Cost:	**$300,000**
Excavation (700 CY)	$17,500
Porous Asphalt (450 Tons)	$205,000
Subbase (566 CY)	$79,200
Geotextile Fabric (2,850 SY)	$5,700
Estimated Porous Pavement Sidepath Cost:	**$307,400**
Excavation (1267 CY)	$31,700
Subbase (211 CY)	$13,700
Concrete (451 CY)	$293,000
Estimated Sidewalk Cost:	**$338,400**
Design (15%)	$280,000
Construction Inspection (15%) (Tree Pit/Sidepath Only)	$96,000
Soft Costs (10%)	$187,000
Inflation/Contingency (20%)	$375,000

Total Project Cost (rounded): **$2,720,000**

The City of Rome is excited to incorporate green infrastructure practices into a future project on Park Drive. The project will be the first piece of the puzzle that transforms the Floyd Avenue/ Park Drive corridors from a segmented group of businesses and neighborhoods into a cohesive, connected community. The City of Rome is fully committed to meeting the 10% local match requirement of the grant.

Appendices

Appendix A – Floyd Avenue Complete Streets Report (Draft)

City of Rome

WOODHAVEN AREA COMPLETE STREETS STUDY

April 5, 2022

COMPLETE STREETS

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Appendix A: Maps

APPENDIX B: MEETINGS

1.0 INTRODUCTION

1.1 Study Area Description

The Woodhaven Area Complete Streets Study Area primarily focuses on Floyd Avenue, from its intersection with Oakwood Street to State Route 825. Additionally, the Study includes assessment and visioning of the Park Drive corridor, between Floyd Avenue and Vega Drive, the interior roads of Woodhaven, and Ellsworth Road along its entire length. The area is largely dominated by residential development with a variety of housing types and densities, as well as a variety of commercial development and educational uses. Major traffic generators within and surrounding the Study Area include Griffiss Business & Technology Park, the Mohawk Valley Community College, the Rome Free Academy, the Jerry C. Clough Pre-K, the Mohawk River Trail, the Griffiss Sculpture Garden Trail, and the John Kost Memorial Softball and Rome Youth Baseball Association facilities. Future traffic generators include the former B-240 mixed use redevelopment, future YMCA parcel development, and the Woodhaven Development.

Project Vision

The purpose of the Woodhaven Area Complete Streets Study is to evaluate the existing conditions within the Study Area, identify mobility and safety needs and develop alternative "Complete Streets" design concepts to create a more safe and efficient transportation system that takes into consideration the needs of all travelers, including pedestrians, cyclists, transit riders and motorists.

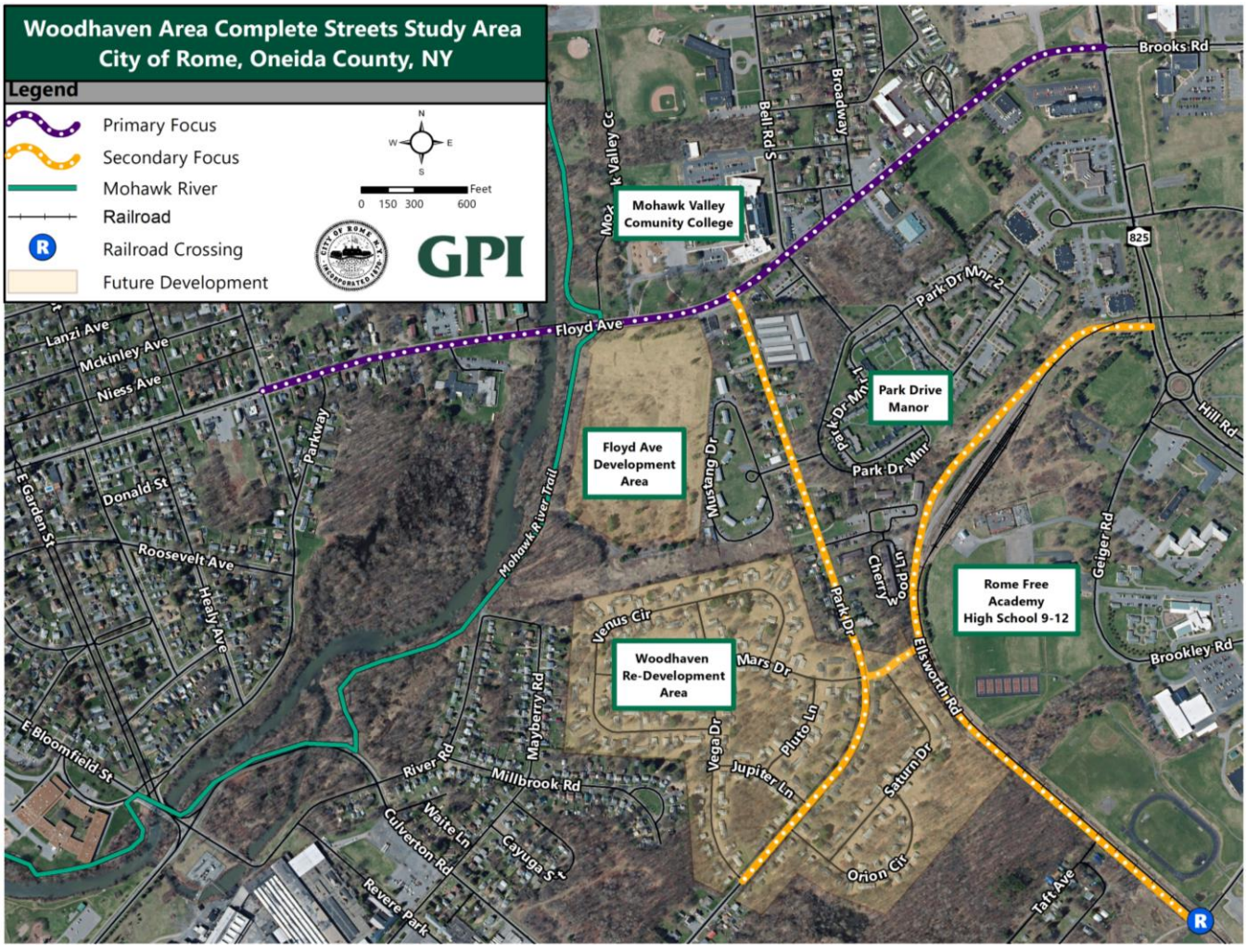


Exhibit 1.1.1: Study Area Map

1.2 Project Goals

To guide the process of this Complete Streets Study, the City developed several goals that should be satisfied at the conclusion of the project. Listed below, the following goals provided direction in the development of the concepts presented in Chapter 4.

Goals

- To improve pedestrian and alternative transportation safety and connectivity between residential areas, commercial development, and surrounding trail systems on Floyd Avenue
- To identify improvements for Park Drive such as sidewalks and improve drainage for adjacent driveways
- To identify the preferred trail connection between the Mohawk River Trail and the Griffiss Sculpture Garden Trail
- To identify alternatives to improve overall traffic conditions and driver safety
- To develop concepts that minimize impacts to adjacent property owners
- To incorporate environmentally friendly green infrastructure

1.3 Complete Streets Explained

Complete Streets are roadways designed to enable safe, attractive, and comfortable access and travel for all users of all ages and abilities. Complete Streets consider the convenient access and mobility on the road network by all including motorists, pedestrians, bicyclists, and public transportation users by incorporating complete streets design features.

Complete Streets are streets for everyone and support active living. They are designed and operated to enable safe access for all users. Motorists, pedestrians, bicyclists, and public transportation users of all ages and abilities are able to safely move along and across a complete street. Complete Streets make it easy to cross the street, walk to shopping areas, and bicycle to work by redefining the roadway, providing safe street crossing locations, shortening crossing distances, and slowing travel speeds. Complete Streets are designed to balance safety and convenience for everyone using the road as shown in **Exhibit 1.3.1**.

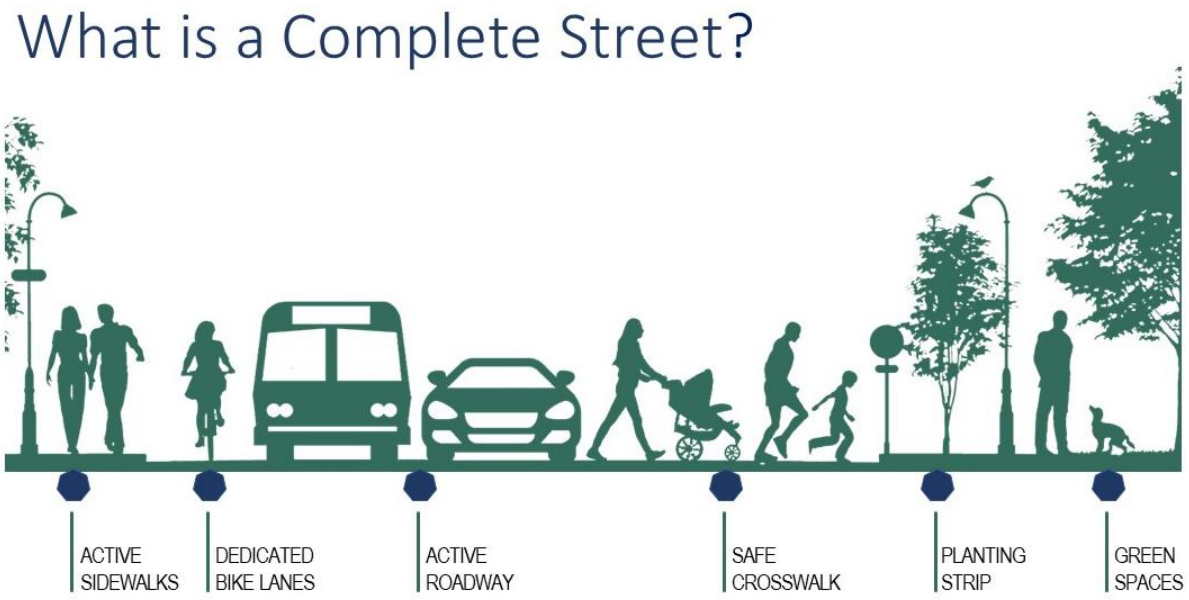


Exhibit 1.3.1: What is a Complete Street?

The components that go into a Complete Streets project that will be frequently mentioned throughout this report are summarized in the Tree of Complete Streets below (**Exhibit 1.3.2**). A Complete Streets design will feature many if not all of these components in an effort to support and accommodate all users regardless of age or mobility.

Exhibit 1.3.2: The Tree of Complete Streets

1.4 Complete Streets Codes

The Floyd Avenue/Park Drive corridor was identified as an area within the City that is in need of area-wide improvements as a response to future demands that will be generated by the proposed Woodhaven Development and new YMCA multi-use developments. The City of Rome recognizes the importance of creating Complete Streets that enable safe travel by all users, including pedestrians, bicyclists, and motorists, and for people of all ages and abilities. The alternatives developed within this Study are aimed to ensure compliance with an Americans with Disabilities Act (ADA) transition plan that the City is developing. The Study lays the groundwork to ensure that there are reasonable and accessible pedestrian paths within the City's right-of-way (ROW) suitable for all users including those with disabilities. The Sustainability Appendix to the Rome Comprehensive Plan, adopted in September of 2018, includes the following Transportation Policies in support of multimodal transportation improvements:

- Transportation Policy #1: As new development or redevelopment occurs, it should **promote greater connectivity utilizing a "Complete Streets" philosophy**, where rights-of-way are designed and operated to enable safe access for all users.

- Transportation Policy #2: The City must **encourage alternate modes of transportation** in order to reduce transportation costs, improve air quality, ease traffic and parking congestion, and provide accessibility for all individuals.
- Transportation Policy #4: Smart Growth and Complete Street practices must be recognized as an opportunity when maintaining existing infrastructure.

The City's Zoning Code also supports Complete Streets through the following code language:

- Sec. 80-22.3. - General right-of-way standards: All public and private rights-of-way **must** be improved as complete streets

Oneida County has similar language that is contained within their 2025-2040 Guiding Principles. Among them the County is to have a "an integrated transportation systems that considers Safety for all users and all modes." Another principle states that an "emphasis will be placed on designing capital project that routinely consider accommodations for non-motorized modes of transportation"

In addition, the Griffiss Business and Technology Park which encompasses part of Floyd Avenue has language within their development policies as follows:

- "Pedestrian ways should be paved, lighted and tree lined to provide for and encourage pedestrian movement from place to place…"
- "A comprehensive street planting and sidewalk program should be implemented within the public right-of-way and should be coordinated with site landscaping to form a continuity of greenspace and pedestrian circulation."

Together these codes and policies require that any new improvement to the Study Area evaluate the feasibility of implementing Complete Streets components.

1.5 Design Standards

Any future project within the Study Area will need to adhere to various standards and references. Any project regardless of roadway classification or jurisdiction that is funded with federal or state aid will have to meet New York State Department of Transportation (NYSDOT) standards contained within the Highway Design Manual (HDM). The HDM addresses everything from roadway design to drainage to pedestrian accommodations. With using state or federal funding the project must also follow the Right of Way Mapping Procedures Manual when addressing proposed work outside of the City's highway boundary on private property. Contrary to this process is when roadways under the City's jurisdiction are funded exclusively with local funds. In this case the City's zoning codes can act as the prevailing design standard. In either case also applicable are the following refences:

1. The Manual on Uniform Transportation Control Devices – Addresses signage layout, striping, and traffic signal design
2. American Association of State Highway and Transportation Officials (AASHTO) Green Book – Roadway and intersection design
3. AASHTO Guide for the Development of Bicycle Facilities – The design of on and off-road bicycle facilities and supporting features such as wayfinding signage and amenities.
4. Highway Capacity Manual – Analyzes the performance of signalized and unsignalized intersections for both vehicles and pedestrians.
5. National Association of City Transportation Officials Urban Street Design Guide – The design of various roadway and intersection concepts that integrate pedestrian, bicycle, and transit design elements.

2.0 EXISTING CONDITIONS

2.1 Existing Roadway Infrastructure

2.1.1. Roadway Classification and Jurisdiction

Functional classification is a well-established system utilized by the Federal Highway Administration (FHWA) for grouping streets and highways into classes based on roadway characteristics and intended services. Basic to this process is the recognition that individual roads and streets cannot serve travel independently; rather, most travel involves movement through a network of roads. Thus, it is necessary to determine how to channelize travel within the network in a logical and efficient manner. Functional classification defines the extent to which roadways provide for through travel versus the extent to which they provide access to land parcels. For example, an interstate highway provides service exclusively for through travel, while a local street is used exclusively for land access. Each roadway has a classification number based on its location, access, and capacity characteristics.

Floyd Avenue is classified by NYSDOT as an Urban Minor Arterial whereas Park Drive is classified as an Urban Major Collector. Other side streets including Oakwood Street, Ellsworth Road, Bell Road, and Broadway are considered local roads without a classification. All roadways noted above are within the City of Rome jurisdiction with the exception of Park Drive. Park Drive is unique because south of Floyd Avenue for the first 0.40 miles the road is within the City's jurisdiction. South of that the road becomes private property within the future Woodhaven Development. Similarly, the access roads off of Park Drive are also roadways within the future Woodhaven Development. Ellsworth Road is also considered private property as its ownership is divided between the City of Rome Board of Education and the Oneida County Industrial Development Agency (IDA).

Summarized in **Table 2.1.1** are various design requirements that are applicable to the roadways within the Study Area. Both Floyd Avenue and Park Drive are based on Chapter 2 of the NYSDOT Highway Design Manual whereas all the roadways classified as local roadways are based on City of Rome standards. Classifications such as an arterial or collector are assigned based on the character of service and how the individual roadway factors into the overall transportation. Also influencing the classification are the traffic volumes. The standards for a local roadway within the City are based on the guidelines provided in Rome City Code §80.22 Right-of-Way and Access Standards.

Table 2.1.1: Roadway Classification and Criteria

Roadway	Roadway Classification	Travel Lane Width (feet)	Turning Lane (feet)	Parking Lane (feet)	Shoulder Width (feet)
Floyd Avenue	Minor Arterial	11 (minimum)[1] 12 (desirable)[1]	11 (minimum)[1] 12 (desirable)[1]	8	0 (minimum)[2] 4 (desirable)[2]
Park Drive	Major Collector	10 (minimum)[3] 12 (desirable)[3]	11 (minimum)[1] 12 (desirable)[1]	7 (minimum)[4] 8 (desirable)[4]	0 (minimum)[2] 4 (desirable)[2]
Ellsworth Road	Minor Two-Lane Local Street	11	10 (minimum) 11 (desirable)	Not Specified	6[5]
Venus Circle	Minor Two-Lane Local Street	10 (minimum)	Not Specified	7 (minimum)	Not Specified
Mars Drive	Minor Two-Lane Local Street	10 (minimum)	Not Specified	7 (minimum)	Not Specified
Vega Drive	Minor Two-Lane Local Street	10 (minimum)	Not Specified	7 (minimum)	Not Specified
Jupiter Lane	Minor Two-Lane Local Street	10 (minimum)	Not Specified	7 (minimum)	Not Specified

Roadway	Roadway Classification	Travel Lane Width (feet)	Turning Lane (feet)	Parking Lane (feet)	Shoulder Width (feet)
Pluto Lane	Minor Two-Lane Local Street	10 (minimum)	Not Specified	7 (minimum)	Not Specified
Saturn Drive	Minor Two-Lane Local Street	10 (minimum)	Not Specified	7 (minimum)	Not Specified
Orion Circle	Minor Two-Lane Local Street	10 (minimum)	Not Specified	7 (minimum)	Not Specified
Floyd Ave Access Road (to future YMCA)	Neighborhood Two-Lane Divided Street	10 (minimum)	Not Specified	7 (minimum)	10 (minimum) (center median)

Source: 2020 NYS DOT Local Road Listing.
Notes:
1. Based on vehicular traffic that is comprised of more than two percent heavy vehicles (buses, box trucks etc.
2. Shoulder width is based on a roadway that is curbed and will accommodate bicycle travel in an adjacent shared use trail.
3. Assumes the roadway is curbed.
4. In residential areas only (non-commercial).
5. Based on a traffic volume that's greater than 2000 vehicles per day.

2.1.2. General Characteristics and Conditions

Floyd Avenue

Floyd Avenue is generally a 30 mile per hour (mph), two-lane roadway with 13-foot travel lanes with limited segments that also include one to two-foot striped shoulders. West of Park Drive the pavement does widen into to a total width of 30-32 feet but that eventually tapers back the closer to Oakwood Street. The only locations where additional turn lanes have been added is the right turn movement from Floyd Avenue onto Park Drive and the right turn from Floyd Avenue on to Oakwood Street.

Exhibit 2.1.2A: Floyd Avenue (looking East)

There is evidence that part of Floyd Avenue was recently paved in a segment beginning 850 feet east of NY 825 and extending to within 350 feet of the Mohawk River Bridge. In this segment the pavement is in excellent condition while in the remainder of Floyd Avenue the pavement is in good condition with frequent signs of longitudinal and traverse cracking.

Floyd Avenue has a mix of curbed and uncurbed segments. Near the intersection of NY 825, Floyd Avenue is curbed on both sides, while just 850 feet east of NY 825 the road transitions from curbing into concrete gutters that drain into a closed drainage system. The concrete gutters end at the Bell Road intersection and convert back to curbing for the remainder of the Floyd Avenue.

Within the Study Area is a mix of residential and commercial properties with a significant number of curb cuts. A notable safety concern is between Bell Road and NY 825 where there is a concentration of business parking areas. The ingress/egress points into the properties are largely undefined with wide expanses of asphalt and no curbing (see

Exhibit 2.1.2). These features are potentially problematic for pedestrians using the existing sidewalks due to the lack of driveway definition and refuge areas.

Park Drive

Park Drive is a 30 mph, unstriped roadway with a total pavement width of approximately 24 feet. Between Floyd Ave and Mars Drive, the roadway is uncurbed and in fair to poor condition with frequent alligator, longitudinal and traverse cracking throughout the entire pavement width. Due to the lack of pavement edge definition (curbing or shoulder) there are frequent areas of asphalt degradation along the edges that are one to two feet wide. Due to the lack of proper drainage also has led to areas of ponding visible in Google Earth Street View (see **Exhibits 2.1.2B/C**). Beginning at Mars Drive and extending south to Vega Drive the roadway narrows to a pavement width of about 20 feet and incorporates a concrete gutter on both sides of the road which empties into drywells. Also beginning at Mars Drive is a four-foot-wide sidewalk along the southbound travel lane that continues south and ends at Vega Drive. At Vega Drive Park Drive becomes Gansevoort Avenue.

Exhibits 2.1.2B/C: Park Drive (Looking South)

Ellsworth Road

Ellsworth Road is an unstriped roadway that parallels the railroad line for about 9/10th of a mile. For much of its length the roadway has little to no separation from the railroad tracks nor does it have any physical barriers to prevent access. South of its intersection with Mars Drive the road is open to traffic but its connection to the Rome Free Academy is often gated to prevent crossing of the railroad tracks (**Exhibit 2.1.2C**). The City has indicated that whenever the gates are opened in such cases as sporting events a guard is stationed at the crossing for additional safety. The total pavement width in this area ranges from 27-29 feet in width and is in fair condition.

North of Mars Drive the roadway is partially blocked by jersey barriers to prevent motorized access. The paved surface varies between 16-21 feet wide and is in fair to poor condition. The road terminates about 50 feet before it reaches NY 825. Although not signed the roadway is used as unofficial connection for pedestrians and bicyclists to access the NY 825 Trail. Near its termination the railroad tracks cross over Ellsworth Road at an approximate 20-degree skew making the crossing problematic crossing for bicyclists (**Exhibit 2.1.2D**).

Exhibit 3.1.2C/D: Ellsworth Drive

2.1.3. Traffic Volumes and Conditions

Both current and historical traffic volumes are available from the NYSDOT Traffic Data Viewer for the study area. The available data summarized in **Table 2.1.3** are the combined two-way volumes within the given segment. The totals indicate the volume on Floyd Avenue have reduced in the past seven years by about eight to eleven percent while on Park Drive volumes have remained more consistent.

Table 2.1.3A: Historical Traffic Volumes

Roadway Segment	Annual Average Daily Traffic Volumes (Year)		
Floyd Avenue - NY 825 to Park Drive	7,200 (2012)	6,950 (2015)	6,400 (2019)
Floyd Avenue – Park Drive to Garden Street	7,500 (2011)	7,000 (2016)	6,900 (2019)
Park Drive – From Floyd Avenue to Vega Drive	2,000 (2012)	2,230 (2015)	1,950 (2019)

The travel speeds recorded by NYSDOT were in two of the three Study Area segments. On Floyd Avenue in 2019 between NY 825 and Park Drive the recorded 85th percentile speed was 38-mph while on Park Drive in 2015 the speed was 37-mph.

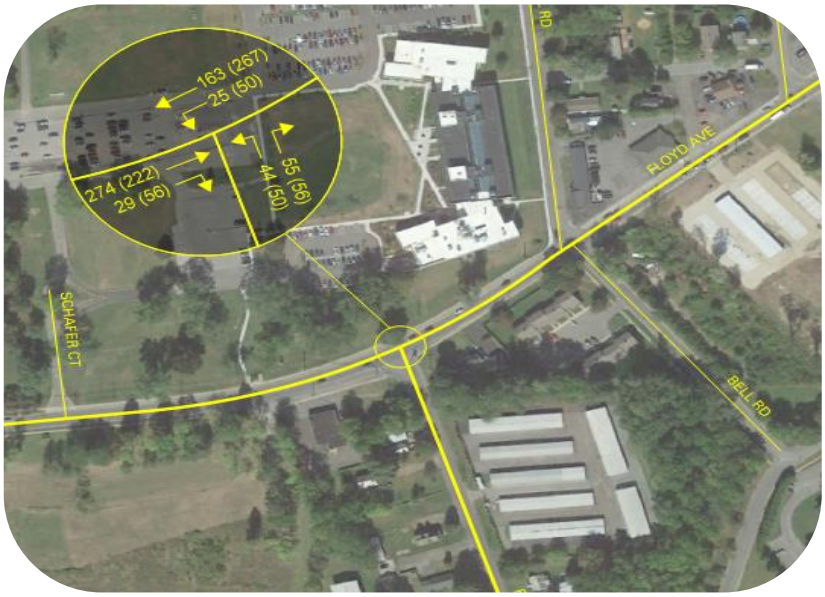


Exhibit 2.1.3A: Existing Turning Movement Volumes

To augment the available traffic data turning movement counts for both the AM and PM peak hour were conducted at the intersection of Floyd Avenue and Park Drive in December 2020. The volumes have been compared to the 2019 volumes from NYSDOT and adjusted to account for the drop in vehicle traffic due to travel changes induced by the Covid-19 pandemic. The AM peak hour counts were increased by a factor off 1.9 whereas the PM peak hour was adjusted by a factor if 1.6. These counts shown in the future below were done to get a baseline of how well the intersection currently functions and to evaluate

the redesign concepts presented in Chapter 5 of this report. It is important to note that the existing traffic signal currently has coordinated phasing with both the Floyd Avenue/Park Drive and the Floyd Avenue/Bell Road intersections. For modeling purposes, the Bell Road signal was omitted as part of level of service (LOS) evaluation as the future development of the Woodhaven Development will have a much more significant impact to the Floyd Avenue/Park Drive intersection. Due to the preliminary stage of the site plans of the Woodhaven Development and future YMCA parcel, a build condition analysis was not presented in this report and may be part of a more throughout traffic impact study in the future.

Table 2.1.3: Level of Service Table

The LOS service **(Table 2.1.3)** shown to the right was evaluated using Synchro 11 software which automates the procedures contained in the Highway Capacity Manual, Sixth Edition. The LOS is graded A through F, with A being optimal conditions and F being failing condition with significant congestion. The delay in table is the number seconds the average vehicle will experience while traveling through the study intersection. The peak hour counts were used to evaluate the performance of the intersection for the existing conditions and to evaluate the alternatives presented in Chapter 5 of this report. Based on the results, the intersection performs very well and would only slightly improve with additional geometry improvements. The LOS C for Park Avenue is likely due to the timings of the coordination with the Bell Road intersection and not a function of the traffic volumes on that approach.

Floyd Avenue - Park Drive Complete Streets Level of Service Table			
		AM Peak Hour	**PM Peak Hour**
Existing Condition	Eastbound	A (5.5)	A (5.8)
	Westbound	A (5.3)	A (6.6)
	Northbound	C (20.8)	C (22.7)
	Overall	**A (8.0)**	**A (8.7)**
Optimized Condition	Eastbound	A (4.9)	A (4.6)
	Westbound	A (4.6)	A (5.0)
	Northbound	B (13.7)	B (13.7)
	Overall	**A (6.7)**	**A (6.2)**
WB Left Turn Condition	Eastbound	A (4.9)	A (4.6)
	Westbound	A (4.7)	A (5.0)
	Northbound	B (13.7)	B (13.7)
	Overall	**A (6.3)**	**A (6.2)**
Roundabout Condition	Eastbound	A (5.2)	A (5.0)
	Westbound	A (4.3)	A (5.3)
	Northbound	A (4.9)	A (4.5)
	Overall	**A (4.9)**	**A (5.1)**

2.1.4. Utilities

A review of the utilities along Floyd Avenue indicated there is an existing closed drainage system whose 24-inch trunk line runs along the eastbound side of the roadway slightly off of the pavement edge. Catch basins are located on both sides of the roadway with a combination of concrete gutters and traditional curbed roadways. Also located along the eastbound side of the roadway is both a four-inch gas main and a sanitary sewer main. The gas main is located about ten feet from the pavement edge whereas the sanitary sewer is located within the eastbound trave lane. The water main that serves Floyd Avenue is located in the westbound travel as evidenced by existing valves boxes in the roadway. The overhead utility poles are located south of Floyd Avenue and are set back form the roadway about ten feet or more. Once the utility lines reach Park Drive the switch sides and are located north of the roadway to the western terminus of the Study Area on Oakwood Street.

On Park Avenue the sanitary sewer that serves the residential housing is in the southbound travel lane whereas the water main is located in the northbound travel lane. It is noted that the sanitary sewer main does not connect to the Floyd Avenue sewer main, but the water main does connect at the Floyd Avenue/Park Drive intersection. There is no

closed storm drainage system on Park Drive as rainfall sheet flows from the roadway into surrounding lawns. South of Mars Drive there are drywells that are fed by concrete gutters. The watermain and sanitary sewer both continue to Vega Drive which is evident by the water hydrants and manhole covers in the roadway. The overhead utility poles are located typically within three to five feet of the northbound pavement edge until Mars Drive. South of Mars Drive the utility poles at times are located both sides of the roadway and occasionally equipped with cobra head lighting. Bisecting Park Drive is an overhead transmission line which acts as a divide between the Woodhaven Development and future YMCA parcel. The overhead lines are operated by National Grid and with proper permitting may be used to construct a trail or roadway connecting the two parcels.

On Ellsworth Road there are no overhead utility poles or underground utilities.

2.1.5. Bridges and/or Culverts

There is one bridge (BIN 2206520) in the Study Area that spans the Mohawk River that is maintained by the City. It was constructed in 1987 and last inspected in August 2018. A project to replace the bridge deck has been let by the City of Rome and will be completed in 2021. The existing sidewalk shown in **Exhibit 2.1.5** will be replaced in kind so pedestrians will continue to use the sidewalks whereas bicyclists will travel under a shared use condition on its 16-foot travel lanes.

Exhibit 2.1.5: Floyd Ave Bridge (BIN 2206520)

2.1.6. Street Lighting

Within the Study Area, Floyd Avenue has existing street lighting that is provided by cobra heads that are primarily mounted to existing utility poles. Similarly, Park Drive has street lighting, but the cobra heads have a greater separation between lights than Floyd Avenue. Ellsworth Road has no existing street lighting.

2.1.7. Parking

Within the Study Area all parking for the local businesses is provided by privately-owned parking lots with no on-street parking. As part of characteristics identified in section 3.1.2 the parking is located adjacent to the existing concrete

Exhibits 2.1.7: Floyd Avenue Parking Conditions

gutter which creates a potential conflict with pedestrians and bicyclists. Some of the parking spaces as shown in **Exhibit 2.1.7A** show that are as motorists exit their vehicles the door is opened into the sidewalk putting it in direct conflict with pedestrians. Similarly, there are parking spaces located adjacent to the sidewalk where a vehicle can overhang into the sidewalks obstructing the path of pedestrians.

The existing parking in some locations also poses a risk to other motorists as shown in **Exhibit 2.1.7C**. The peripheral parking spaces allow patrons to park near the roadway but when the lot is full the only means of exiting is to back into the roadway notably on Broadway.

2.2 Multi-Modal

The area sounding Floyd Avenue and encompassing the Business and Technology Park has a variety of non-motorized alternatives. Critical to the area and the use of these facilities is the interconnectivity. **Exhibit 2.2** was developed by the Mohawk Valley EDGE (Economic Development Growth Enterprises Corporation) in an effort to evaluate the conditions of the existing pedestrian network in close proximity to Griffiss Park. The map identifies existing infrastructure as well as barriers or notable gaps in pedestrian connectivity that could be improved in the future. The Condition & Gap Analysis is updated regularly by the EDGE staff and is being utilized to identify opportunities to fill the gaps, improve pedestrian crossings, and improve travel patterns to and from existing pedestrian generators within and around the Study Area.

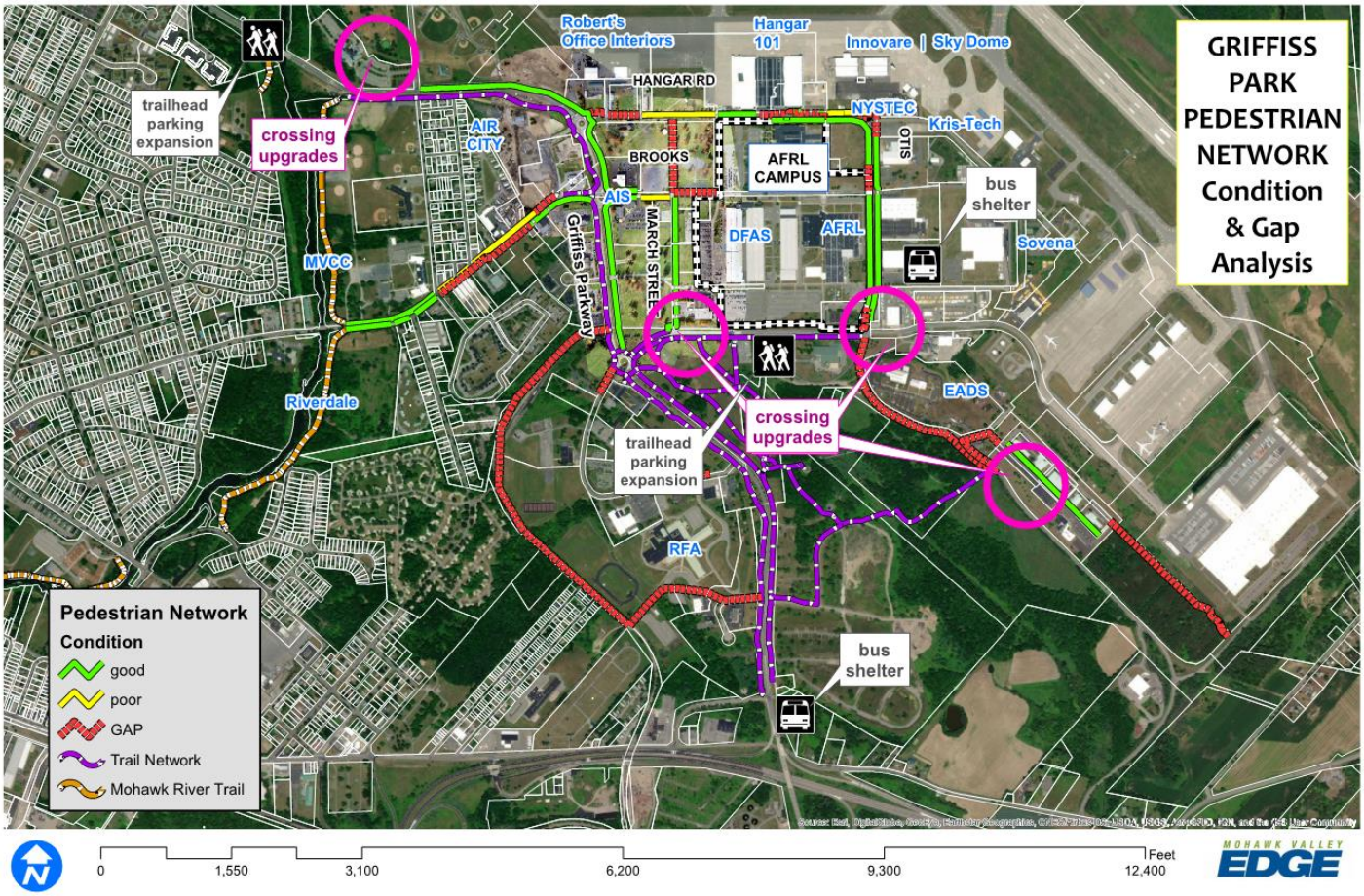


Exhibit 2.2: Griffiss Park Pedestrian Network Condition & Gap Analysis

2.2.1. Sidewalk Conditions

Floyd Avenue

Along Floyd Avenue there are sidewalks generally on both sides of the road that interconnect surrounding businesses and residences. On the north side of Floyd Ave, the sidewalk runs continuously from NY 825 to Oakwood Street, whereas the southern side has a missing link between Bell Road and Nunn's Medical Equipment located at 1340 Floyd Avenue. The sidewalks are in varying condition with some segments that have been recently constructed and others that

are in fair condition but do not meet Public Right-of-Way Accessibility Guidelines (PROWAG) design standards. A cursory review shows areas with broken panels, widths of less than five feet, vertical discontinuities, and cross slopes that exceed two percent. One section of sidewalk between Nunn's Medical Equipment and Park Drive does not have any vertical separation from the roadway as it runs along the backside of the concrete gutter. A review of the curb ramps shows that the majority of roadway and driveway crossing either do not have ramps or have ramps that lack detectable warnings, have vertical discontinuities etc.

Park Drive

There are no existing sidewalks or pedestrian amenities on Park Drive between Floyd Ave and Mars Drive. A section of sidewalk exists between Mars Drive and Vega Drive along the southbound travel lane; however, the sidewalk is currently in poor condition and measures less than four feet making it not compliant with PROWAG. Remnants of the same sidewalk system exist along the roadways within the demolished Woodhaven housing development. Once Park Drive transitions into Gansevoort Ave, the sidewalk system discontinues, and pedestrians and bicyclists must share the roadway with motor vehicles.

Ellsworth Road

There are no existing sidewalks or pedestrian amenities on Ellsworth Road.

2.2.2. Bicycle Facilities

There are no dedicated bicycle facilities that can be used to travel along Floyd Avenue, Park Avenue or Ellsworth Road. Bicyclists are expected to ride under a shared use condition within the Study Area.

2.2.3. Multi-use Trails

There are two multi-use trails that can be accessed from Floyd Avenue. Near NY 825 is a multi-path that is located on the western side of NY 825 and runs for approximately 2.2 miles. The trail extends from the northern terminus of the Mohawk River Trail (MRT) (as of December 2020) down to an access road off of NY 825 (Wright Drive) to NY 365 (E. Dominic Street). The other trail is the location where the MRT crosses Floyd Avenue east of the Mohawk River Bridge (**Exhibit 2.2.3**). The trail extends south to its southern terminus on River Street (total length is 4.2 miles).

There are no official trail connections on Park Drive or Ellsworth Road. There is the potential to develop connections on both roadways that are discussed in Chapter 5 of this report.

Exhibit 2.2.3: Mohawk River Trail Crossing

2.2.4. Mass - Transit

Public transportation is an important mode of transportation in the City of Rome. It provides mobility to those unable to drive, including young people, senior citizens, those with disabilities, and drivers who cannot afford to own a car. An efficient transit system also captures "choice riders" – those that choose to travel by bus. Taken together, these transit trips offer an environmental benefit compared to automobile trips through reduced fuel use and emissions and reduced congestion in heavily traveled corridors.

There are two public transit providers that serve the Study Area, Centro, and Oneida County Rural Transit (OCRT) operated by Birnie Bus Service, Inc. Public Commuter Service. Both providers offer wheelchair accessible buses. Along Floyd Avenue, OCRT Bus Route 521 services MVCC daily. Centro Bus Route 6 runs along Floyd Avenue and services stops

between Freedom Plaza and Griffiss Technology Park. Bus Route 7 runs along Floyd Avenue from Griffiss Technology Park before it turns down Park Drive and continues onto Freedom Plaza

There are 9 bus stops on Floyd Avenue between Oakwood Street and State Route 825, as follows:

1. Oakwood Street
2. Parkway Drive
3. Leffingwell Avenue
4. Lori Lane
5. MVCC – East of Schafer Ct – Exhibit 3.2.4
6. Park Dr
7. Bell Road South
8. Broadway - near Grande's restaurant
9. Hill Rd (NY 825)

In addition to Floyd Avenue there are two stops on Park Drive at Cherrywood Lane and at Park Drive Manor.

Shown in **Table 2.2.4** is a summary of the ridership provided by Centro from January 1, 2019 to December 31, 2019. The three most heavily used stops are at NY 825, MVCC **(Exhibit 2.2.4A)** and at Bell Road. As the stop at MVCC already has an existing shelter and connecting sidewalk the need for improvement is minor. The stops that would benefit the most would be at the Bell Road S. stop shown in **Exhibit 2.2.4B** and at the Hill Road stops.

Table 2.2.4: Centro Ridership

2019 CENTRO RIDERSHIP SUMMARY (AVE RIDERSHIP PER DAY)								
	ROUTE #6				ROUTE #7			
	WEEKDAY		WEEKEND		WEEKDAY		WEEKEND	
FROM DOWNTOWN	B	A	B	A	B	A	B	A
Floyd Ave/Oakwood St	0.24	0.31	0.02	0.19				
Floyd Ave/Parkway Dr	0.19	0.22	0.19	0.25				
Floyd Ave/ Leffingwell Ave	2.61	1.36	0.81	0.92				
Mohawk Valley Community College	2.31	4.02	0.79	0.67				
Park Dr/ Cherrywood Lane					1.41	0.45	2.02	0.88
Park Drive Manor					2.23	1.00	1.77	0.29
Park Dr/Floyd Ave					0.05	0.10	0.10	0.02
Floyd Ave/Bell Rd S	4.36	5.88	3.85	4.54	1.66	0.42	0.88	0.17
Floyd Ave/Broadway	0.56	1.36	0.63	0.75	0.20	0.11	0.35	0.33
Floyd Ave/Hill Rd (NY 825)	0.16	0.19	0.56	0.62	0.67	0.70	0.87	0.90
TO DOWNTOWN								
Floyd Ave/Oakwood St	0.06	0.01	0.10	0.02				
Floyd Ave/Lori Lane	0.87	0.14	0.75	0.12				
Mohawk Valley Community College	5.35	0.30	1.62	0.27				
Floyd Ave/Bell Rd S	3.04	0.29	2.73	0.37				
Floyd Ave/Hill Rd (NY 825)	4.91	1.09	7.73	1.75				

Key: B = Boarding, A = Alighting

Exhibit 2.2.4A: Floyd Avenue Bus Stop

Exhibit 2.2.4B: Floyd Avenue Bus Stop

The Bell Road S. stop currently lacks any accommodations such as a shelter, bench or trash receptacle yet based on the ridership is the most consistently used stop on any of the routes. Contrary to the sign (see arrow in **Exhibit 2.2.4B**) which indicates the stop is handicapped accessible, the stop lacks a 60" x 96" level landing area for bus boarding and lacks a curb ramp for access to other sidewalk segments. Improvements to the sidewalk for improved access and would be funded and constructed as part of a larger Complete Streets project for Floyd Avenue whereas funding for a bus shelter or other amenities would need to be discussed with Centro further.

The NY 825 (Griffiss Veterans Memorial Parkway) stops are located on the eastern and western approach of the roundabout at Floyd Ave and Brooks Rd. The stops are not signed, nor do they have any amenities. The stop on Bus Route #6 that goes downtown has a strong ridership for both weekday and weekends making it logical candidate for improvements.

To maximize the ridership potential of the Centro bus line it is critical that any Complete Streets project develop as many interconnections as possible to available bus stops. According to guidance published by the Federal Highway Administration on pedestrians accessing transit systems, a mass transit user is willing to walk only ¼ to ½ mile to a transit stop **(Exhibit 2.2.4C)**. For this reason, not only is it important to have various bus stops on Floyd Avenue and Park Drive but they also must have supporting pedestrian facilities in place. A review of the bus stops within the project area shows that the travel distance for riders is within the ½ mile threshold and is often much less. With adequate stops the next step is providing the supporting facilities to facilitate access to the bus stops.

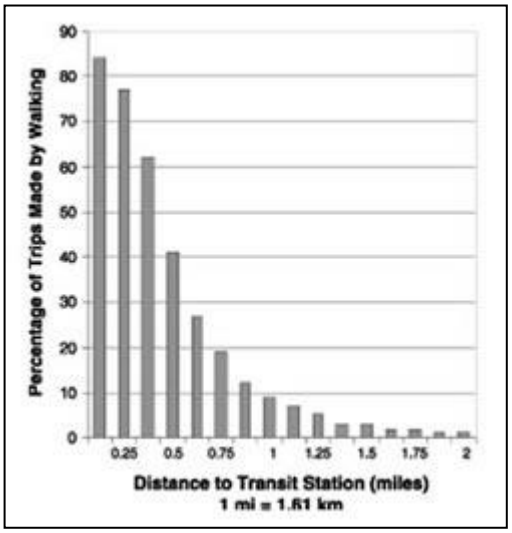


Exhibit 2.2.4C: FHWA Recommended Walking Distance to Transit Stop

2.2.5. Freight

There is an existing rail line that cross NY 825 (Hill Road) to access parts of the Griffiss Air Force Base and travels along Ellsworth Road before continuing south. Based on available data the rail line sees about one train per day but that varies based on fluctuations in delivery needs.

2.3 Vehicular and Pedestrian Accidents

To analyze vehicular and pedestrian safety within the Study Area accidents within a four-year period from 2017 to 2020 were obtained from the City and summarized in **Table 2.2.1** below. In total there were 13 accidents with the majority

occurring at the Floyd Avenue/Park Drive intersection. When compared to the state average for a three-leg urban, signalized intersection the accident rate for the intersection is nearly three times higher than the state average. According to the most recent accident rates published the statewide average is 0.32 accidents per million vehicles entering (MEV) the intersection. Using 2019 volumes recorded by NYSDOT the intersection sees approximately 7,500 vehicles per day which results in an accident rate of 0.91 per MEV.

A review of the MV-104 accident reports reveals no discernible pattern that is leading to this high accident rate. The reports of the seven rear end accidents are the result of driver inattention and following too closely. The two right turn accidents were caused by poor weather conditions and the fixed object was the result of reckless driving. There is nothing to indicate the existing geometry, speed or other environmental factors played a role in these accidents. The remaining three accidents are again due to poor driving or an animal strike.

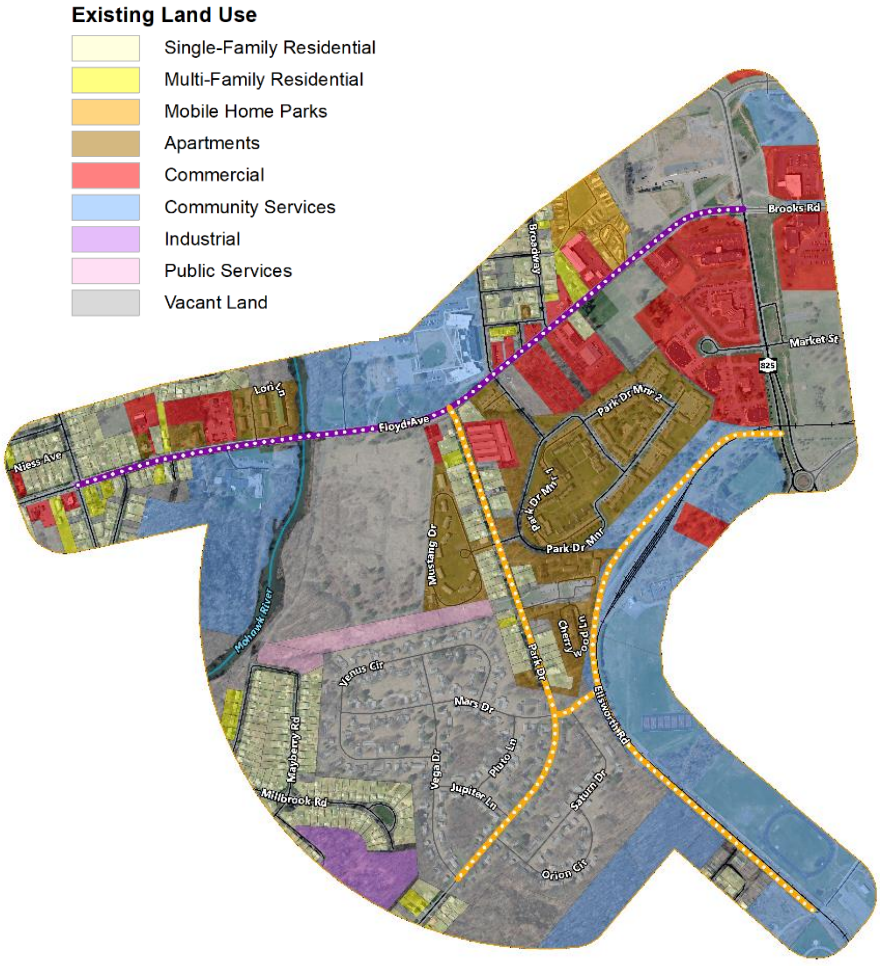
Table 2.2.1: Floyd Avenue Accident Summary

Location	Types of Collision	Number	Percentage
Floyd Ave/Bell Rd Intersection	Backing Unsafely (into vehicle)	1	8%
	Fixed Object	1	8%
Floyd Ave/ Park Dr	Right Turn	2	15%
	Rear End	7	53%
	Fixed Object	1	8%
Mohawk River Trail Crossing @ Floyd Ave	Animal Hit	1	8%

2.4. Study Area Land Use & Zoning Districts

2.4.1. Existing Land Use

As illustrated **Exhibit 2.4.1A**, based on the 2020 Oneida County Real Property Tax database, the existing land uses in the Study Area is primarily vacant land, followed by community services (educational facilities, hospitals, cemeteries, government-owned properties) single-family residential and a mix of commercial establishments located along Floyd Ave. Example service establishments and places of employment include Colonial Park Rehabilitation & Nursing Center, Rome Pre-owned Auto Sales, Grande's Pizzeria, CPJ's Restaurant & Pub, El Jaracho Mexican Restaurant & Bar, A&L Self Storage, Eye Care Center of Rome, Acchino Auto Body, Nunn's Home Medical Equipment, the Hampton Inn and Stewarts Shops. Example educational land uses include the Mohawk Valley Community College (MVCC) Rome Campus and the Rome Free Academy. The Study Area also contains a variety of residential types including single-family, apartments near Lori Lane, and



Detailed map can be viewed in Appendix A

apartments/townhouses in Park Drive Manor. and Barile's Mobile Home Park near Floyd Ave and Broadway. There largest area of vacant land within the Study Area is the Woodhaven Development Area, owned by the City of Rome.

Table 2.4.1 below summarizes the land use types and current acreage within the Study Area. The largest landowners within the Study Area holding vacant lands are the City of Rome and Oneida County IDA.

Table 2.4.1: Study Area Land Use Summary

Land Use Category	Real Property Class Code(s)	Approximate Total Acreage	Percent Total Acres
Single-Family Residential	210	50.12	11.36%
Multi-Family Residential	220,230,280	6.51	1.48%
Mobile Home Parks	416	5.33	1.21%
Apartments	411	44.33	10.05%
Commercial (restaurants, auto dealers, storage, office, hotels)	414,421,431,432,438,449,463,464,465,482,484,486	59.47	13.48%
Community Services (schools, colleges, health offices, cemeteries)	612,613,642,652,695	108.93	24.70%
Industrial	710	6.12	1.39%
Public Services (electric substations and power generation facilities)	872,874	6.15	1.39%
Vacant (vacant residential and commercial land)	311,312,330,331,380	154.08	34.94%
	Approximate Total Acres	**441.04**	**100.00%**

Source: Oneida County Real Property Tax Parcel Information, 2020

2.4.2. Existing Zoning

The purpose of zoning is to positively influence and shape the City by regulating land use type, building size (height and width), lot coverage (placement of buildings), and building density. The Study Area zoning is shown on **Exhibit 2.4.2B** and is comprised of commercial, recreational, and residential uses. **Figure 2.4.2B** shows that zoning in the Study Area is largely dominated by the Griffiss Business Zoning District, the Woodhaven Redevelopment Zoning District, the Institutional Campus Zoning District, as well as four different residential zoning districts; R-1-5, R-1-8, R-2, and R-3, and Open Space and Natural Area zoning districts.

Floyd Ave, west of the Mohawk River, to the intersection of Oakwood St is dominated by residential zoning districts R-1-5 and R-1-8. The R-1-5 single-family residential district "is intended to provide for a neighborhood environment of single-family detached and attached dwellings on lots that are more compact than those found in the R-1-8 district. Limited non-residential uses that are compatible with surrounding residential neighborhoods may be permitted."[1] The R-1-8 single-family residential district "is intended to provide for a neighborhood environment of single-family detached and attached dwellings. Limited non-residential uses that are compatible with surrounding residential neighborhoods may be permitted."

The area paralleling the Mohawk River is zoned Natural Area. The NA district "is intended to protect and preserve existing natural areas such as forest areas and waterways. Natural areas are maintained in a predominantly

[1] City of Rome Zoning, Chapter 80, Sec. 80-6.1.

undeveloped state, though very limited development may be allowed for passive recreation and educational purposes but must be compatible with and cause little impact to these areas."

The Mohawk Valley Community College and the Rome Elementary School are zoned Institutional Campus. This zoning district "is intended to accommodate large institutional uses, such as healthcare institutions and schools, to allow for their expansion in a planned manner while protecting the surrounding neighborhoods."

To south side of Floyd Ave between the Mohawk River and Park Drive is primarily dominated by the Woodhaven Redevelopment Zoning District. This district "is intended to create a dynamic, sustainable and attractive mixed-use neighborhood with a focus on recreation. The Woodhaven Redevelopment District will harmonize single-family, two-family, multiple-unit, and mixed-use structures to attract a broad spectrum of families, professionals, retirees, and students. In the context of a multiple-use, intermodal Greenbelt concept, this district will connect to existing municipal streets, sidewalk, and trails in the surrounding neighborhoods and prioritize the preservation and enhancement of natural resources, urban trees, and public greenspaces along the Mohawk River area to maximize the environmental, financial, and social benefits. The redevelopment of this area will also serve to prioritize and enhance the physical connection to the Rome Free Academy High School, and the Griffiss Business and Technology Park. The Woodhaven Redevelopment District seeks to realize the community's vision for the most dynamic, sustainable, and attractive mixed-use neighborhood in Upstate New York with a high standard for design and a practicable phased redevelopment strategy. Design objectives strive to provide a sustainable mixed-use revitalization plan to advance Smart Growth principles and include:

Exhibit 2.4-2B: Existing Zoning
Detailed map can be viewed in Appendix A

- Mix land uses.
- Compact building designs.
- Create a range of housing opportunities and choices.
- Create an accessible and multi-generational, walk-able community.
- Foster distinct, attractive communities with a strong sense of place.
- Preserve open space, natural beauty, and critical environmental areas.

- Engage the waterfront of the Mohawk River.
- Strengthen and direct development toward existing communities.
- Provide a variety of multimodal transportation choices.

The Woodhaven Redevelopment Zoning District is surrounded by an Open Space District, which creates a greenspace buffer around these future development areas. The Open Space District "is intended to provide and protect open space and public recreational facilities, both outdoor and indoor".

The area to the east of Park Drive is within the R-3 Zoning District, which is currently occupied by Park Drive Manor Apartments and Cherrywood Apartments. The R-3 multi-family residential district "is intended to provide for an environment of various dwelling types, including single-family detached and attached, two-family, and multi-family dwellings. Limited non-residential uses that are compatible with surrounding residential neighborhoods may be permitted."

The R-2 single-family residential district is located north of Floyd Ave between Bell Rd South and Broadway, and off of Ellsworth Rd adjacent to St Peter's Cemetery along Taft and Brennon Avenues. The R-2 district "is intended to provide for a neighborhood environment of single-family detached and attached dwellings, and two-family dwellings. Limited non-residential uses that are compatible with surrounding residential neighborhoods may be permitted."

Finally, the Griffiss Business Zoning District is intended to encourage "high quality, state-of-the-art business and technology center, within a work environment that blends operational efficiency with a pleasing atmosphere"[2]. The Oneida County IDA currently owns approximately 90 acres of vacant land within the Study Are that are regulated within the requirements of this zoning district.

2.4.3. Study Area Planned Development

The Study Area historically experienced a major decline in housing occupancy due to the closing of the Griffiss Air Force Base; however, as illustrated in the image below, the Study Area is now at the heart of a number of major re-development plans. While not all plans have been approved by the City, if approved, these proposed developments will transform the area with a variety of land uses, leading to an increase in traffic from patrons of local businesses, changes in the traffic circulation patterns from new residents, and a demand for Complete Streets to serve the multi-modal needs of existing and future residents, students, business patrons and business owners. Future planned developments include but are not limited to the following public and private investment that will likely transforming the area:

[2] City of Rome Zoning, Chapter 80, section 80-8.2.

NY 825 Complete Street (complete)

Griffiss Business Park Development (ongoing)

Orgill Distribution Facility (complete)

B240 Multi-Use Development (in progress)

Eyecare Center of Rome (complete)

MVCC Campus expansion(complete)

Woodhaven parcel development (future)

YMCA & Residential Units (future)

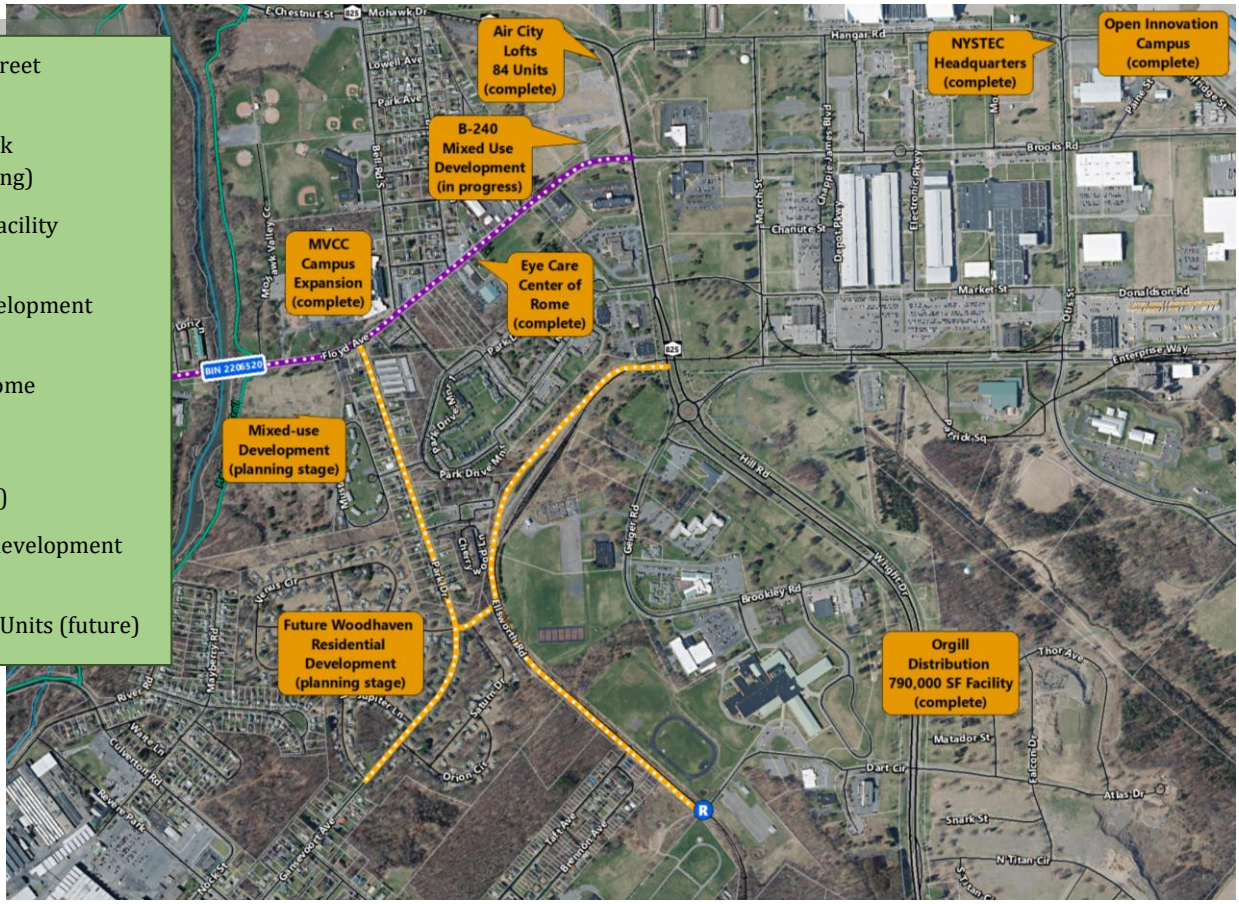


Exhibit 2.4.3: Regional Developments

3.0 PUBLIC OUTREACH & ENGAGEMENT

The City utilized a Community Outreach Process to inform the public as best as possible about the planning process and its findings, as well as to solicit public views and suggestions for recommended future improvements to the Study Area. To encourage participation the project, the methods used to solicit public input throughout the planning process were:

- Two Virtual Stakeholder Meetings
- A Community-wide on-line survey
- A Virtual Public Information Meeting

3.1. Stakeholder Meetings

The City hosted two Virtual Stakeholder Meetings were held in January and February of 2021 to identifying community priorities, views, and suggestions for recommended future improvements to the Study Area. Each session was attended by a diverse range of stakeholders including representatives from the Rome Common Council, developers (i.e., Griffiss Local Development Corporation), large landowners, Oneida County Metropolitan Planning Organization, Rome City School District, Mohawk Valley Community College, Centro, and local business owners. Participants discussed existing conditions within the Study Area, identified local challenges, provided feedback on future opportunities, and brainstormed future solutions. **Table 3.1.1** summarizes the key issues and opportunities identified by the meeting participants. Other meeting materials are contained in **Appendix B.** The feedback obtained through these outreach efforts formed the basis for the development of conceptual recommendations for the Study Area.

Table 3.1.1. Stakeholder Meeting Summary

Issues	Opportunities
Gaps in the sidewalk system along Floyd Ave between Park Drive and NY 825. Need to safely connect workers in the Griffiss Park, hotel patrons and residents to and from restaurants business on Floyd Ave	Address a longstanding connectivity and pedestrian network issues with multi-use trails in and around the neighborhoods. Work with Griffiss Park Landowners Association to develop a priority network to fill the gaps on Floyd and connect to Griffiss Park
Auto and bike/ped safety issues at the Mohawk River Trail crossing at the east end of the Floyd Ave bridge	Establish an improved bike /ped crossing at this location with a raised crosswalk and/or a Rectangular Rapid Flashing Beacon
Lack of safe bike/ped connections between existing neighborhoods and business on Floyd Ave	Fill the gaps with sidewalks and/or off-road multi-use paths along Floyd Ave
Lack of landscaping and protective buffers between sidewalks and roadway between the MVCC entrance at Bell Rd S and the Bariles Mobile Home Park	Reconfigure the travel lanes of Floyd Ave and install curbing to allow for a widened buffer for landscaping
Need for more defined bus stops with ADA compliant features	Work with CENTRO to evaluate needs and determine where improvements should be made to best serve the community
Lack of snow removal on existing sidewalks	Enforce the existing City code for snow removal
Traffic movement delays between Bell Rd and Park Drive	Evaluate the feasibility of removing the Bell Road traffic signal
Lack of pedestrian or bicycle accommodations on Park Ave	Install sidewalk or multi-use trail on one or both sides of Park Dr. Make trail connection in and around the proposed Woodhaven Development
Drainage issues on Park Dr Between Floyd Ave and Mars Dr	Utilize green infrastructure to address stormwater. Potential use of infiltration practices (e.g., infiltration basins, infiltration trenches/chambers, drywells, infiltrating bioretention practices and porous pavement

Issues	Opportunities
Lack of pedestrian or bicycle accommodations on Ellsworth Rd	Utilize existing pavement to construct a multi-use trail along Ellsworth Rd. Existing road width would allow for the delineation of a separated pedestrian and bike path with landscape buffered on both sides
Need for formal connection to the multi-use path on NY 825 from both Floyd Avenue and Ellsworth Road	Construct a multi-use trail along Ellsworth Rd connect to the existing trail on NY 825. Safety improvements will be necessary for rail crossing
Lack of formal pedestrian connections between to the School and nearby neighborhoods on Taft and Brennen	Coordinate with the School District and residents to identify safety needs for students and develop alternatives to improve connections

3.2. Complete Streets Community Survey

The Complete Streets Community Survey was designed to better understand the needs and concerns of residents, property-owners, and business-owners within the Study Area. The on-line survey asked 14 multiple choice questions pertaining to the existing multi-modal transportation amenities, pedestrian and bicyclist safety, and desire for specific types of improvements within the Study Area. The survey was available electronically on the City's website between February 2021 and March 2022. The public was notified of the survey via an announcement on the City's Facebook page, a flyer distributed via email, and a post card mailed to property-owners within the Study Area. In total, 238 surveys were completed online. The survey results are summarized below.

3.2.1 Survey Results

Demographics of Survey Respondents

The survey asked a few demographic questions to better understand the make-up of the survey sample. Of those who responded to the first question, more females (61%) than males (37%) participated, while 2% chose not to respond to the question. The age range of respondents varied; however, the majority (60%) were over the age of 45, with the second highest group between the ages of 35 and 44 (23%), and the remaining under the age of 34. The majority of respondents were White or Caucasian (86%).

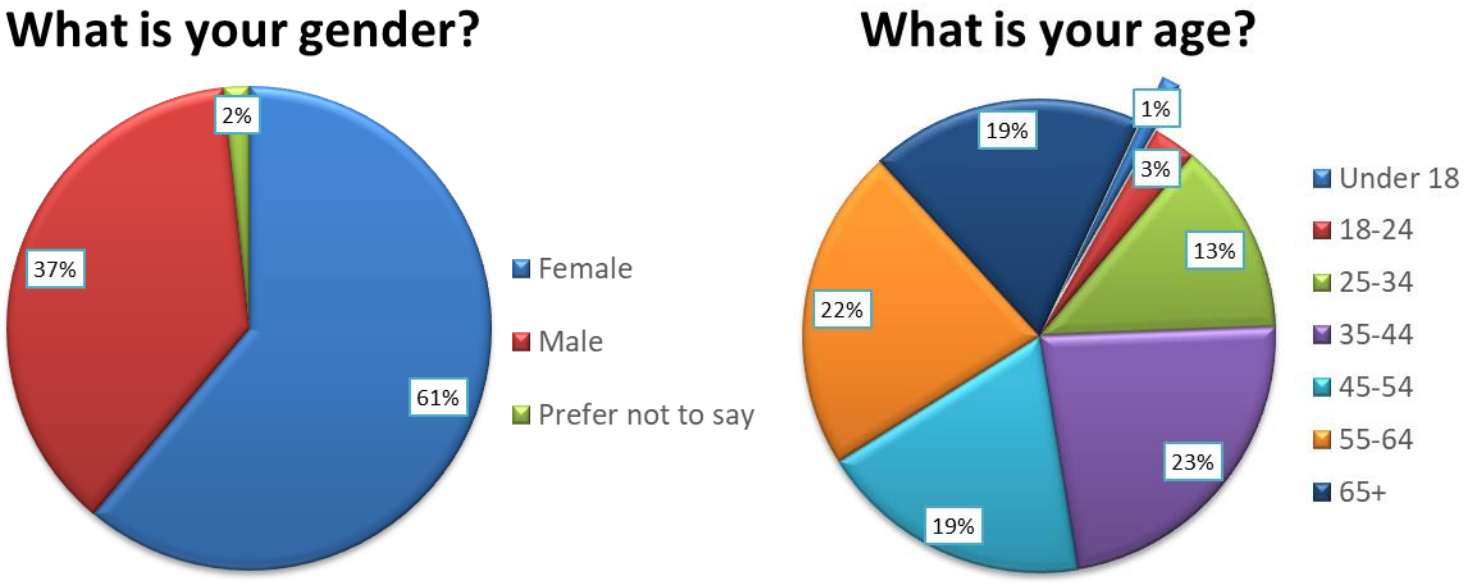


Figure 3.2.1A: Survey Respondent Demographics

Where Survey Respondents Live and Work

More than half of the respondents (68%) live within or near the Study Area, while most (61%) do not work within or near the Study Area.

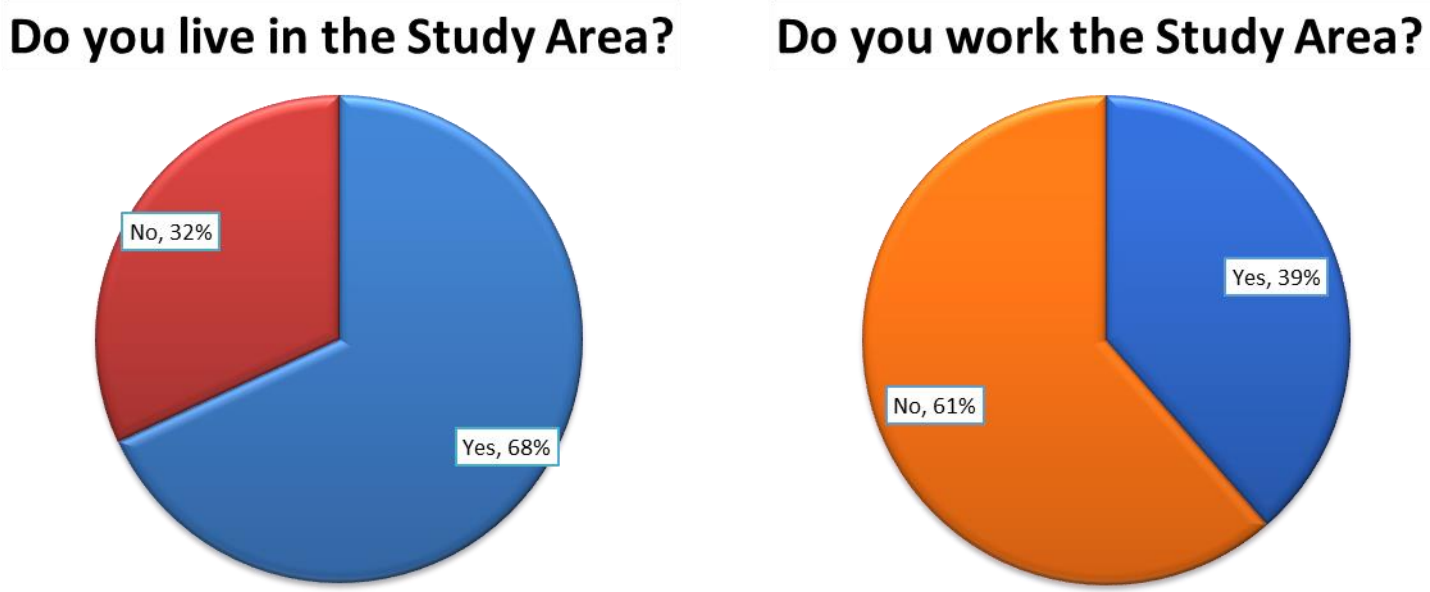


Figure 3.2.1B: Where Survey Respondents Live and Work

Forty three percent (43%) of respondents identified themselves as a resident of the Study Area, and 4% identified themselves as a business owner, and 15% were an employee of a business within the Study Area. A total of 3% identified themselves as staff or faculty of the Rome Free Academy or MVCC, and only 2% were students of the Rome Free Academy or MVCC.

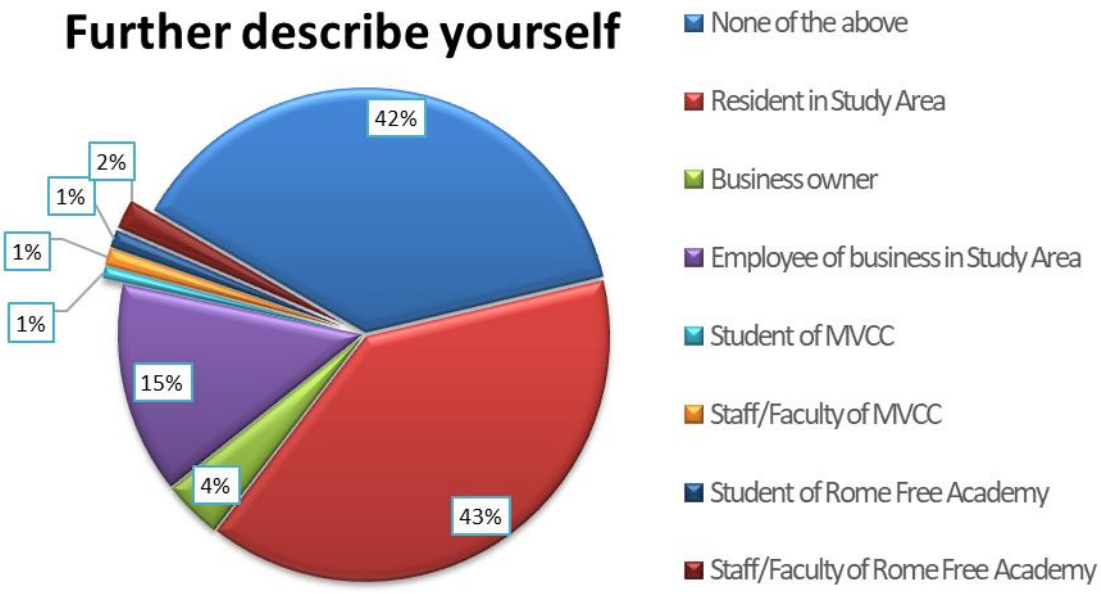


Figure 3.2.1C: Further Details About Respondents

How Survey Respondents Get Around

When asked what type of transportation they frequently use within the Study Area, the vast majority (86%) stated that they frequently drive in the Study Area and 41% stated that they frequently walk within the Study Area. Only 26% of respondents stated that they ride a bike within the study area, and only 8% use public transportation (bus) within the Study Area.

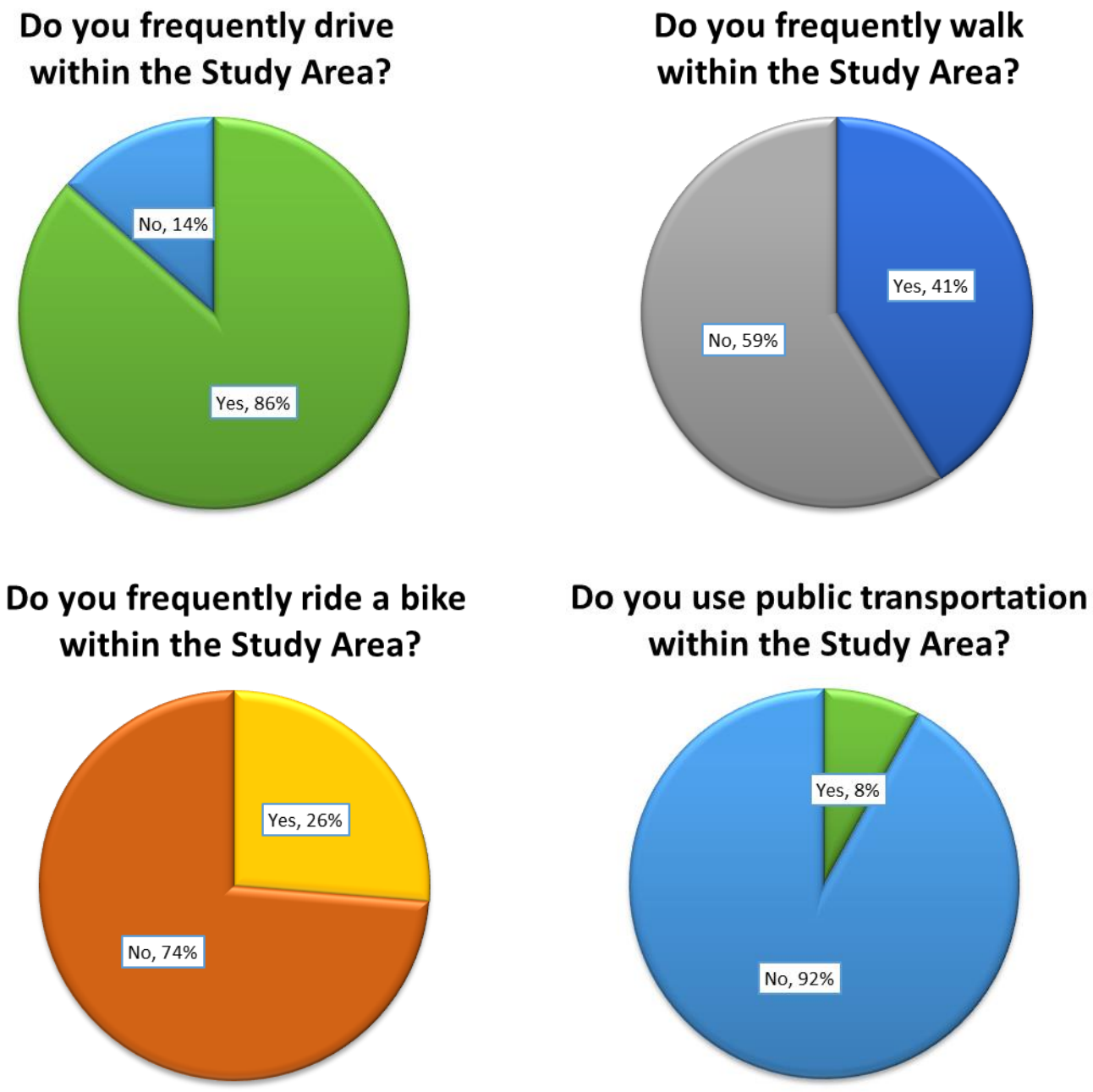


Figure 3.2.1D: How Survey Respondents Get Around

Perception of Pedestrian & Bicyclist Safety

When asked if they have experienced or witnessed unsafe conditions between motorists, pedestrians, and/or bicyclists within the Study Area, the majority of respondents (68%) said yes, while only 32% said no.

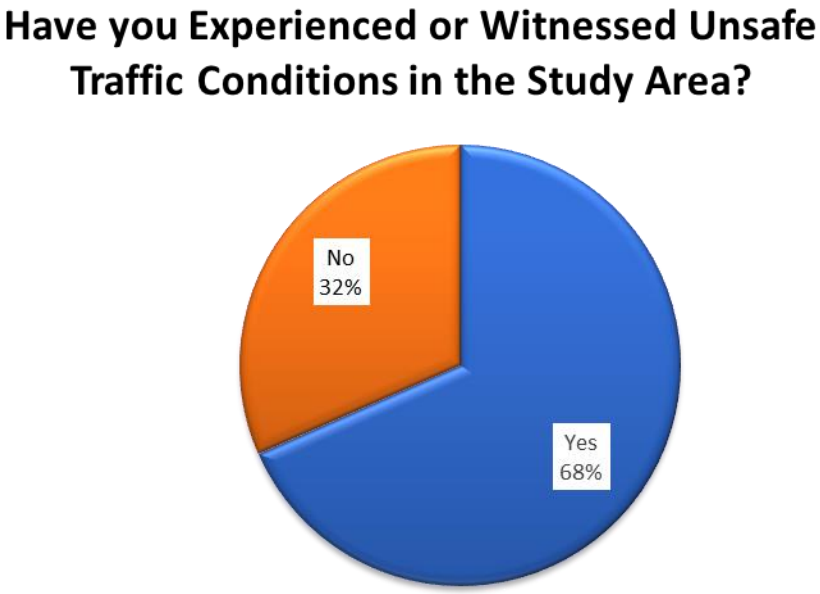


Figure 3.2.1E: General Perception of Pedestrian & Bicyclist Safety in the Study Area

When asked if they feel safe from traffic while walking within the Study Area, half of the respondents indicated that they *did not* feel safe while walking, while 39% indicated they *did* feel safe while walking, and 10% remained neutral on the subject.

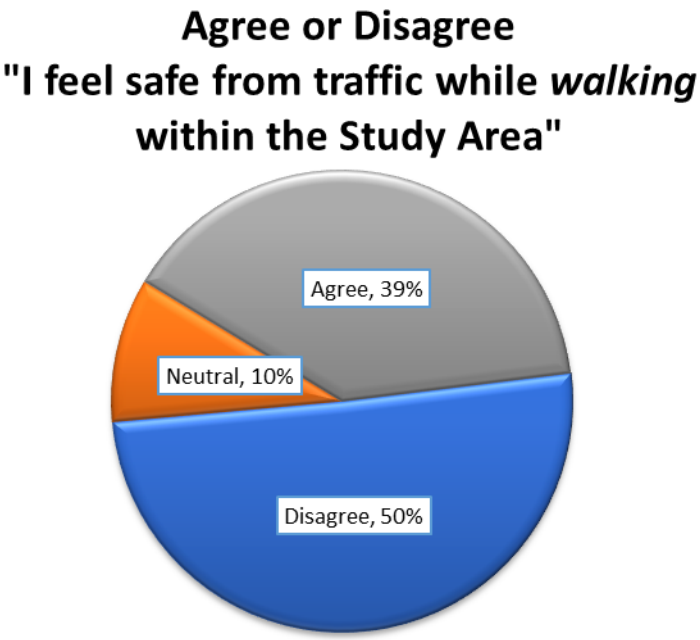


Figure 3.2.1F: Perception of Pedestrian Safety in the Study Area

When asked if they feel safe riding a bike in the Study Area, the results showed that most respondents (59%) *did not* feel safe while biking in the Study Area, 31% indicated they *did* feel safe while biking, while 10% remained neutral.

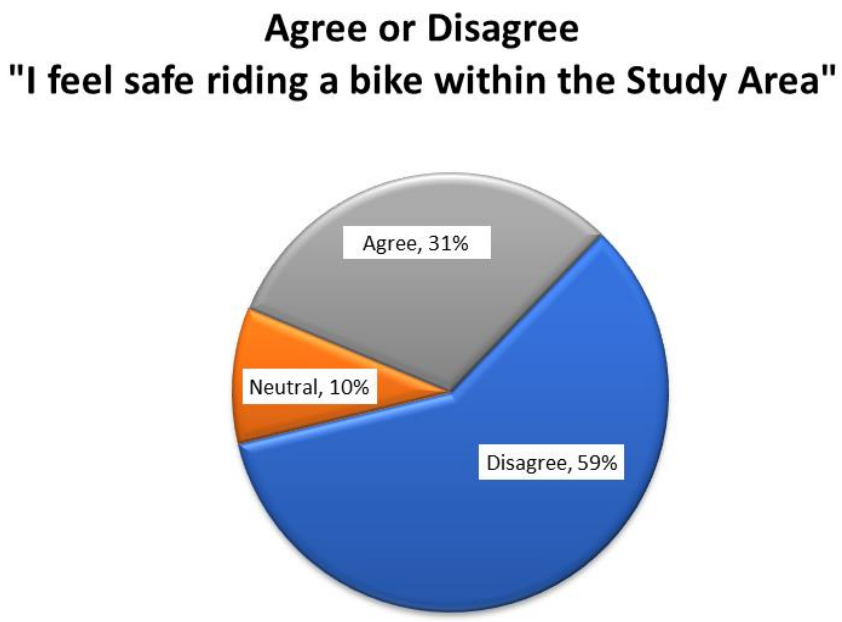


Figure 3.2.1G: Perception of Bicyclist Safety in the Study Area

Ranking Importance of Complete Streets Improvements

When asked the rank the importance of different types of Complete Streets improvements in the Study Area (with 1 being the most important, and 5 being the least important), many survey participants (34%) favored improving sidewalks, followed by building of new multi-use paths separated from traffic (33%); making street crossings more saft (18%); slowing traffic speeds (15%) and finally the least important category according to survey respondents was improving bus stops and bus shelters (4%).

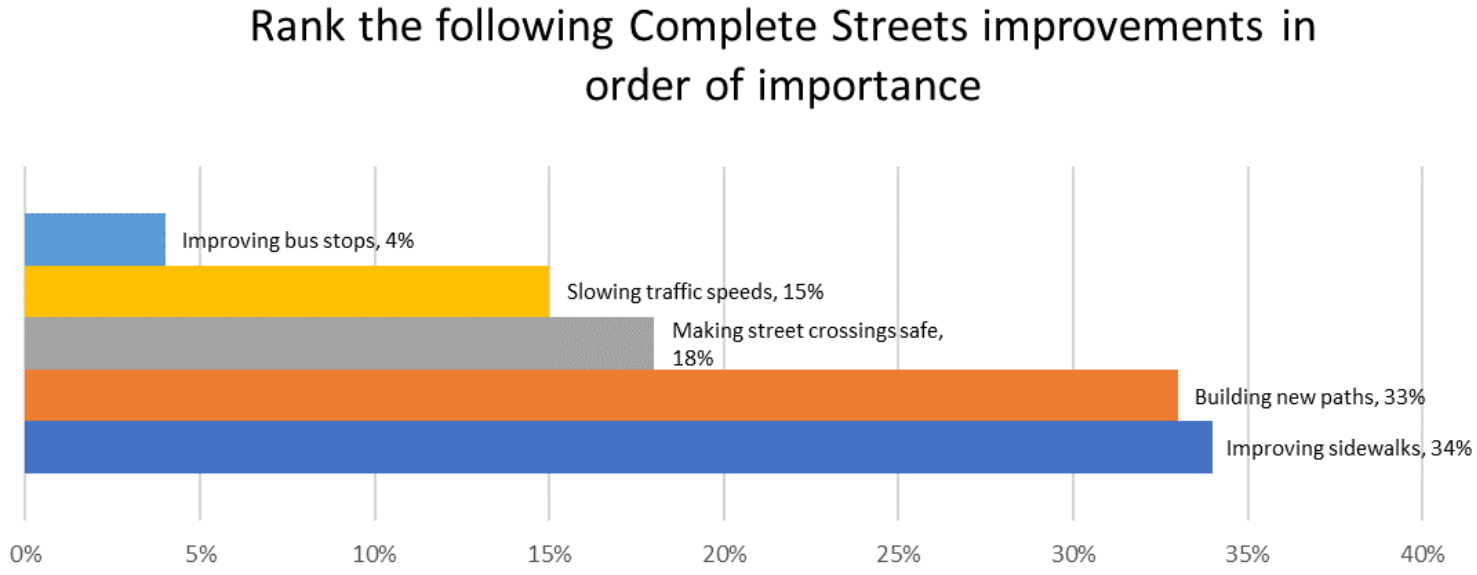


Figure 3.2.1H: Ranking of Need for Complete Streets Improvements

3.3. Public Information Meeting

The City hosted an on-line Public Informational Meeting on March 10, 2022, to provide the public with a review the Project Area's existing conditions and the overall project goals, the engineering considerations for roadway improvements, and the conceptual improvements for the Project Area. Nearly 40 people attended the meeting. The meeting provided the public with an opportunity to comment on the proposed concepts and ask questions. A copy of the PowerPoint presentation is included within Appendix B.

3.1.1 Summary of Q&A

The following is a summary of the frequently asked questions answered during the Public Informational Meeting.

Q. Are there plans to connect the new developments to existing bike paths?

A. The Mohawk River Trail is successfully providing a multimodal purpose, and the Floyd Ave corridor is a natural fit to extend that system. The Study has proposed safe crossing improvements near the Rome Campus of the Mohawk Valley Community College and at the Griffiss International Sculpture Garden Trail. The City is seeking funding to extend the Mohawk River Trail and provide connections in various locations.

Q. Will the bike lanes be physically separated by from car traffic? Without physical separation most people won't feel very safe, as paint is not protective, and usage may not be as high as hoped.

A. Depending on the existing right of way there are options of using shared road markings and bike lanes separating vehicles from other modes of transportation on Park Dr and Floyd Ave. Public feedback on the conceptual improvements presented in this plan is paramount to this decision-making process.

Q. Will Woodhaven be 100% residential, or is there a plan for commercial spaces (cafes, studios) within the development?

A. As part of the previously adopted Woodhaven Revitalization plan, the local zoning was updated to a form-based district. The district is very diverse in its potential uses. The initial plans for the area are envisioned to be primarily residential, with the 250-lot proposed subdivision. The YMCA parcel we know is the front 30 acres adjacent to Floyd Ave envisioned to be more mixed use, similar to Air City Lofts, with recreational and civic opportunities, and possibly some garden style apartments with connected garages. This will give the area a little bit of a different style than just a single-family residential unit or an apartment unit, it's kind of a hybrid of both. Industrial uses have not been considered at this time, but cafes and other small commercial business unit uses would be viable for that front 30 acres, as the rest of Floyd AV is a strong commercial corridor.

Q. Are there considerations of lowering speed by way of road design rather than relying on enforcement? No biker that I know of feels protected by sharrows. More of a concern with higher pedestrian users if there is no physical separation.

A. Going back to the engineering considerations, Floyd Ave now posted at 30 miles an hour. However, the roadway is wide, with two 13-foot lanes and a shoulder in some areas. One of the design considerations if we were to plan for a separate off road bicycle side path would be to narrow those lanes down, which has a tendency of slowing traffic. If there is no appetite for a separate off-road facility, the travel lanes do have to stay a little bit wider for an on-road bike lane. Other devices we talked about for improving safety are raised crosswalks to lower the overall speed in the corridor, and speed feedback signs which have been shown to be highly effective in reducing speeds.

Q. The opening of Taft Ave may face resistance. Opening Taft Ave for foot/bike traffic could be a good compromise. Residents on Taft Ave do not want that connection for vehicles, only pedestrian connection.

A. It is very important to the City to engage the public and gather feedback regarding the Plan's conceptual recommendations. We would be remiss if we didn't include considerations for connecting Taft Ave and Brennan Ave to Ellsworth Road since it is adjacent to the Study Area. The City will explore these concepts further and gather more feedback from the local residents and School District representatives in the future.

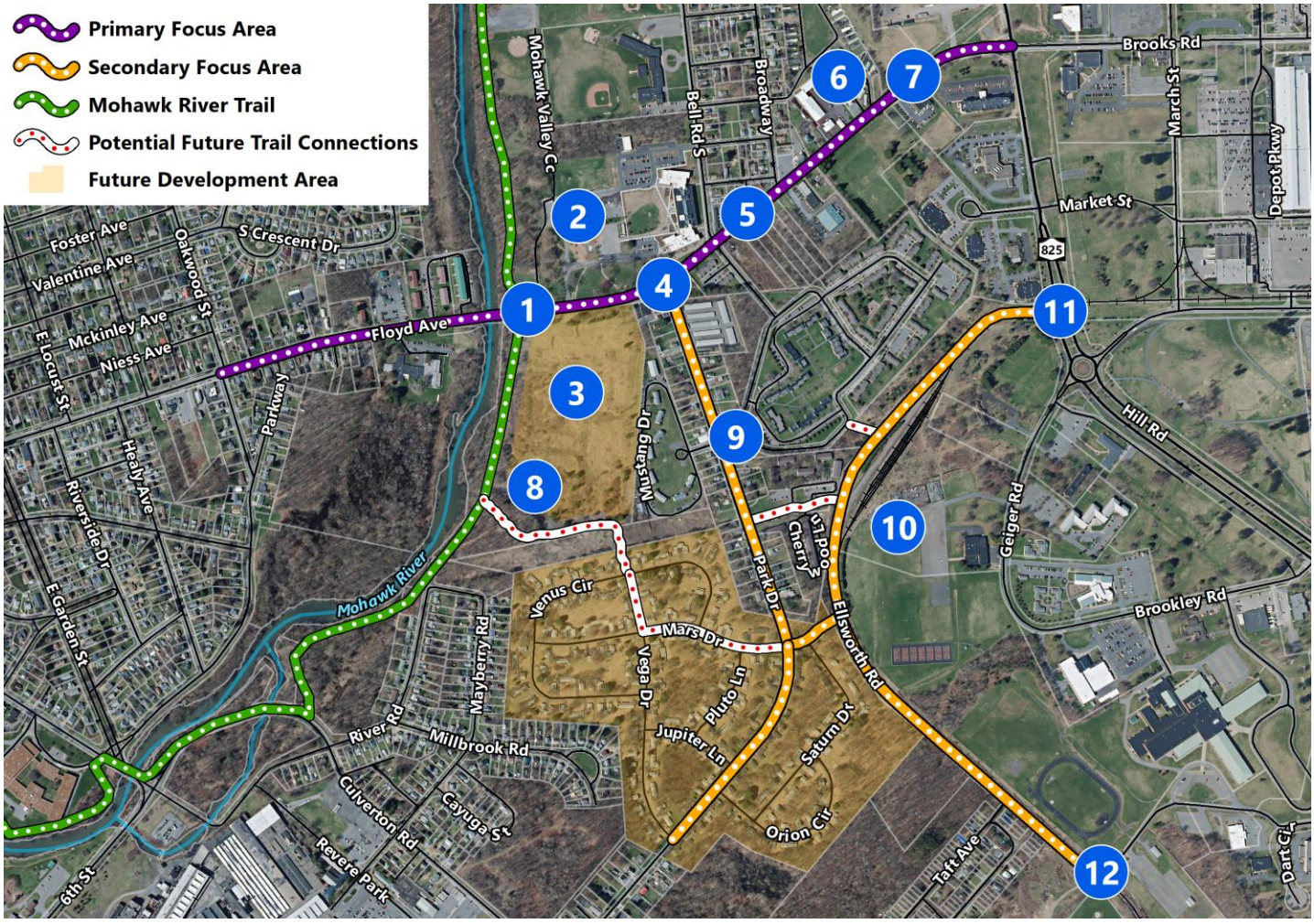
Q. More commercial mixed in with the residential areas via mixed zoning would be helpful to avoid a feeling of suburban sprawl, is there any plan for that? As long as those can be accessed easily via bike or walking it will be beneficial.

A. The current zoning the Woodhaven Area is a form-based zoning district. You could have several mixed uses within the district or even in the same building as long as the building design is of a certain character that fits the criterion within the district. Building form, massing and design in the driving factor, not necessarily the use, so long as the use would not be considered a nuisance to the overall quality of life to the residential aspect of the district.

4.0 DESIGN CONCEPTS & RECOMMENDATIONS

4.1 Overall Connectivity Plan

Based on the existing conditions analysis, stakeholder feedback, and input received from the public survey and public information meetings, a series of transportation improvement concepts were developed for each of the focus areas as shown in **Exhibit 4.1**. In many instances, concerns were related to neighborhood connectivity and traffic safety; therefore, the proposed alternatives focused on creating new multi-modal connections between each section of the study area, as well as conceptual traffic calming measures to improve pedestrian and bicycle comfort within the study area. It is noted that many of the elements identified should be incorporated into any roadway alternative to improve



connectivity within the study area.

Exhibit 4.1: Study Area Concepts

1) Mohawk River Trail Crossing	**7)** Floyd Avenue Complete Streets Typical Sections
2) Mohawk Valley Community College Driveway Improvements	**8)** Future Trail Connections
3) YMCA Improvements	**9)** Park Drive Improvements
4) Floyd Avenue/ Park Drive Intersection	**10)** Ellsworth Road (northern segment)

5) Floyd Place and Broadway Re-alignment	**11)** Ellsworth Railroad Crossing Improvement
6) Driveway Access Management	**12)** Ellsworth Road (southern segment)

The overall plan identifies several bicycle and pedestrian connectivity improvements as well as traffic calming elements to improve quality of life in the Study Area. While a number of these improvements are described in further detail below, many of the traffic calming elements can be applied throughout the City beyond the Study Area boundary. As such, it is useful to think of these traffic calming elements as a "Toolbox" with many different treatments that can be incorporated into future projects to calm traffic and promote pedestrian safety and comfort.

4.2 Conceptual Design Elements and Alternatives

Below are detailed breakdowns of the different design components that have been developed and evaluated throughout this project. It is important to note that the cost of each improvement is represents the installed cost of materials whose price is based on initial layouts. The estimates were developed based on recent bid prices or the average bid prices taken from the Pay Item Catalog which is maintained by NYSDOT. They do not take into consideration costs for right-way acquisition, design services, construction inspection, inflation, or soft costs such as work zone traffic control, survey, field change payment etc.

4.2.1 Floyd Avenue Mohawk River Trail Crossing

The Mohawk River Trail crossing on Floyd Avenue sees over 6,000 vehicles per day and is located on straight section of roadway that can lead to increased travel speeds. To increase trail user safety a raised crosswalk shown in **Exhibit 4.2.1A** would be constructed in conjunction with the installation of rectangular rapid flashing beacons. The raised crosswalk provides a physical element that will slow vehicle speeds while the beacons will provide advanced warning to motorists. In **Exhibit 4.2.1B** is a rendering on a raised crosswalk along with the supporting signage that is shown in the Empire State Trail Design Guide. Based on existing drainage patterns two catch basins and supporting piping will be required to drain stormwater that would otherwise be ponded by the raised crosswalk.

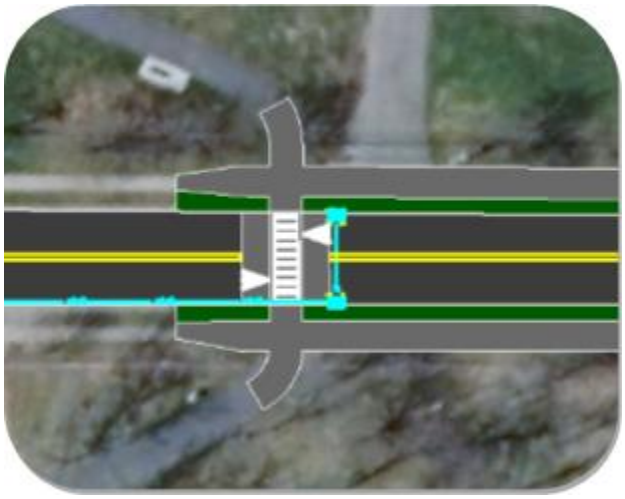


Exhibit 4.2.1A: Raised Crosswalk

Exhibit 4.2.1B: Raised Crosswalk

4.2.2 Mohawk Valley Community College Driveway Improvements

To reduce conflicts points on Floyd Avenue the access to the Mohawk Valley Community College would be limited to a single access driveway. The current entry driveway located about 420 feet from the Mohawk River bridge (dashed redline in **Exhibit 4.2.2**) would be converted to a full access driveway while the western driveway (dashed yellow) that is used for exiting vehicles would be restricted to use as a multi-use trail connection or for periodic use such as sporting events or emergency vehicles. As a trail connection the driveway could be enhanced with benches, trash receptacles, lighting etc. A second option would be the complete removal of the driveway and converting the area into a larger contiguous green space. Depending upon what happens with the YMCA this general area may benefit from a new bus stop that could be co-located with a transit stop.

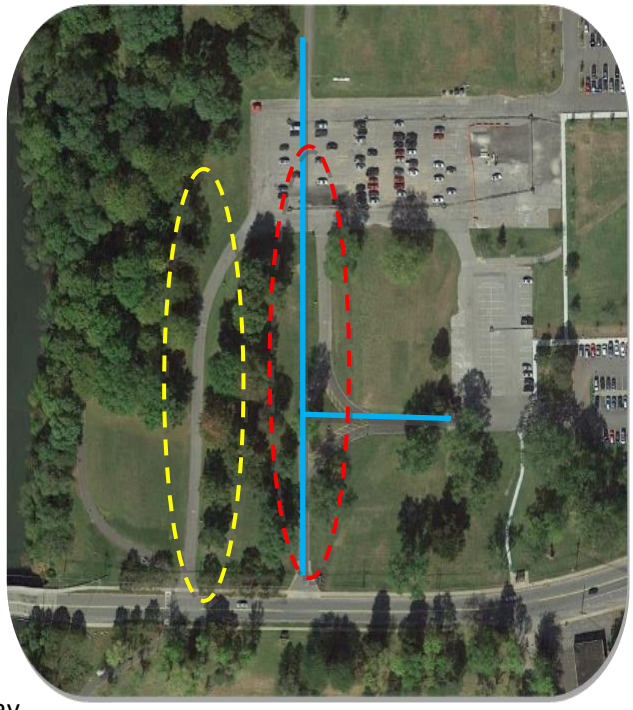


Exhibit 4.2.2: MVCC Driveway Improvements

Internally to the Mohawk Valley Community College the access road that has right turn in/right turn out access would need to be configured to a traditional tee intersection as shown in blue. Secondly the access road currently bisects the northern parking lot to access sports fields located north of **Exhibit 4.2.2**. The driveway should be aligned to the northern access which would require the parking lot be reconfigured. As part of any design effort, the realignment would be a compromise of achieving ideal traffic circulation while minimizing impacts such as tree clearing and utilizing existing paved surfaces to reduce costs.

4.2.3 Floyd Ave Development Parcel

The property located of Floyd Avenue is in the concept development stage where initial site plans include the YMCA building, residential housing, and dining. The City has indicated that as part of the project an interior parking area with green space would remaining as City owned. This parking area then can be used in part as a signed trail head for the Mohawk River Trail.

Exhibit 4.2.3: Preliminary Floyd Ave Mixed-Use Development Site Plan

4.2.4 Floyd Avenue/Park Drive Intersection

The intersection of Floyd Avenue and Park Drive currently operates at a LOS A on Floyd Avenue and LOS C on Park Drive. The intersection will inevitably see increased traffic once the area has been developed. To accommodate the future growth three alternatives were developed with increasing benefits as well as cost. Each of the following alternatives assumes a 10-foot asphalt trail will be constructed on both sides of the roadway as shown in gray with pedestrian crosswalks on all three approaches.

Exhibit 4.2.4A: Alternative #1

Alternative #1 – Developed as a low-cost alternative the existing geometry, pavement, and curbing would be retained. The cost of new asphalt trail segments and sidewalk shown in exhibit 4.2.4A are included in the cost estimates in sections 4.2.7 and 4.2.9. This alternative retains the existing traffic signal while replacing the existing pedestrians and installing pushbuttons with new crosswalks. This alternative facilitates the movement of pedestrians and bicyclists but does not address increases in traffic volumes. To incorporate the pedestrian crossing the coordination between the signal may or may not be retained and further study would be required.

Exhibit 4.2.4B: Alternative #2

Alternative #2 (Preferred Alternative) - This alternative would construct a new left turn lane on the westbound approach of Floyd Avenue which widens the roadway enough to require a new traffic signal. Similar to Alternative #1 new pedestrian signals will be installed along with new striping. Again, the cost of any sidewalk or asphalt trail is included in other sections of this report. Due to the re-alignment of Park Drive to form a conventional T-intersection the pavement will be replaced on Park Drive to re-establish the roadway crown and replace damaged areas. The left turn lane is designed to accommodate future housing in the Woodhaven Development. The alternative may require ROW takings from the surrounding properties.

Exhibit 4.2.4C: Alternative #3

Alternative #3 – The final alternative consists of a 90-foot-wide roundabout that is suitable to handle commercial vehicles such as delivery vehicles but would not support a tractor trail. The roundabout would likely require ROW taking especially from the Mohawk Valley Community College, but the design ensures the continuous flow of traffic through

the intersection and removes any future signal maintenance. Implementation of roundabout is considered more environmentally friendly as the continuous flow of vehicles eliminates the emissions provided by idling vehicles.

4.2.5 Floyd Place/Broadway Improvements

As part of the Floyd Avenue redesign and improved access management the intersections of Floyd Place and Broadway shown in **Exhibit 4.2.5** below can be changed to provide benefits to both motorized and non-motorized users. The connection to Floyd Place would be removed and filled with new landscaping and potentially converted into a small pocket park for local residence. The removal of Floyd Place also reduces the number of conflict points along Floyd Avenue. Any vehicles using Floyd Place would be re-directed onto Emerson Avenue then to Broadway. Since Broadway would see a minor increase in vehicular traffic the intersection would be re-aligned to Floyd Avenue to remove the existing skew. The changes shown in **Exhibit 4.2.5** would likely be accomplished by utilizing existing City owned ROW. The re-alignments will impact existing drainage patterns thereby likely requiring new stormwater catch basins. As an added safety measure the parking shown to right of Broadway (red oval) would need to be adjusted or partially removed. Curbing would extend from Floyd Avenue along Broadway to prevent vehicle from backing into the roadway from the parking spaces. The cost of any such improvements is included in the cost for Floyd Avenue improvements shown in section 4.2.7.

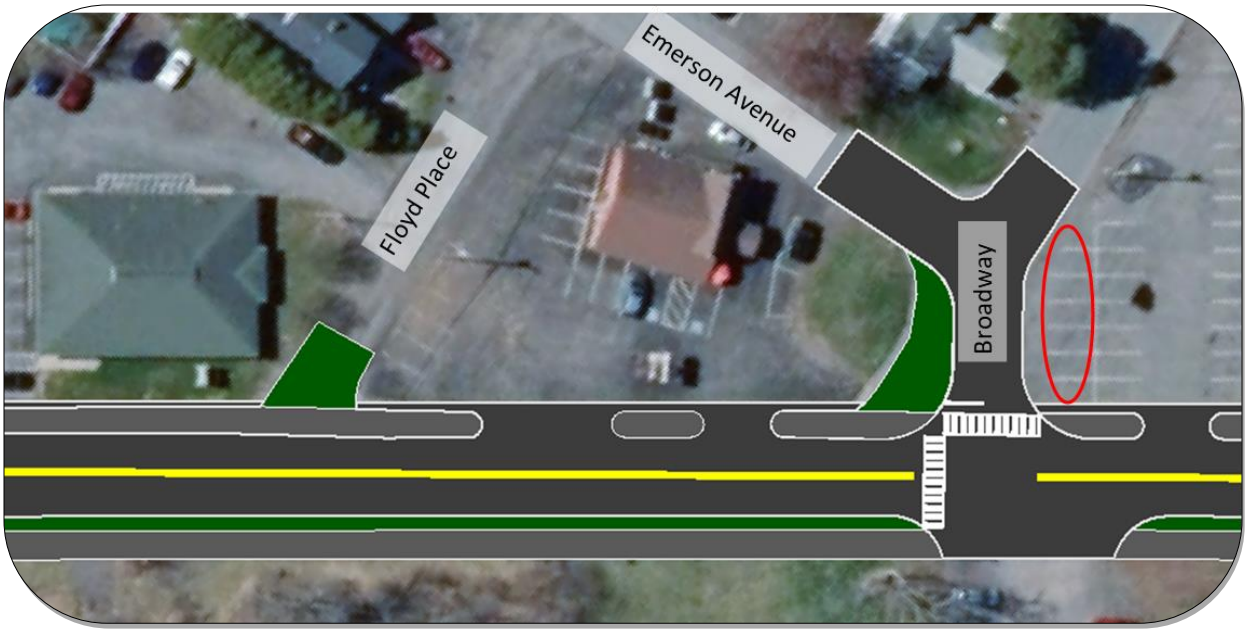


Exhibit 4.2.5: Alternative #3

4.2.6 Floyd Avenue Access Management & Drainage Improvements

The other aspect of Floyd Avenue that would benefit from improved access management are the existing driveways that are located within a 1,200-foot segment located east of Bell Road. The driveway as shown in section 2.1.7 is an example of the long expanses of concrete and asphalt with no delineation. This condition can inevitably lead to driver confusion and fail to provide safe crossings for pedestrians/bicyclists. Shown in **Exhibit 4.2.5**, new curbing and sidewalks would be

constructed to define driveway openings to create protected space for pedestrians that is separated both horizontally and vertically. The sidewalk areas could consist of solely concrete or incorporate grassed areas and landscaping to "soften" the existing hardscape.

Two known issues that would have to be addressed during a design project are the limitations on existing highway boundary and drainage impacts. The highway boundary along Floyd Avenue along these businesses frontages is 50-feet wide meaning some of the improvements shown would be within private property thereby requiring easements or property acquisitions. Secondly, the implementation of curbing will create areas of ponding during storm events that have to be drained. Existing drainage patterns indicate the driveways generally slope toward the roadway meaning rainfall may become trapped along the backside of new curbing/sidewalk. This condition can be mitigated by introducing new catch basins and connecting into the existing storm sewer system. Alternatively, implementation of green infrastructure such as grassed dry swales or biofiltration as shown in **Exhibit 4.2.6A/B** can be used as collection areas that allow rainwater to infiltrate back into the soil. To provide space for green in infrastructure it is likely the travel lanes and shoulder width would have to be set near their minimum widths to retain adequate frontage along the north side of roadway. The cost of any such improvements is included in the cost for Floyd Avenue improvements shown in section 4.2.7.

Exhibit 4.2.6A/B: Example Grassed Swale & Biofiltration

4.2.7 Floyd Avenue Complete Streets Design

As part of transforming Floyd Avenue into a Complete Street, any project would need to construct sidewalks, trails, or bike lanes to provide continuity through the Study Area. The general cross section that would be developed would extend from NY 825 to Park Drive as shown in **Exhibit 4.2.7A**. Depending on ROW, utility impacts, and additional community input the roadway would be curbed with 11–12-foot travel lanes and zero-to-four-foot shoulders. On the south side of the roadway a five-foot maintenance strip would be backed with a 10-foot asphalt multi-use trail. On the north side of Floyd Avenue, a sidewalk and/or landscaping strip would be constructed. The improvements to the north side are much more flexible as the sidewalk width, landscaping, and driveway improvements can be tailored to each individual property owner. For instance, the improvements could help develop small, landscaped areas that may facilitate outdoor dining, but would come at a cost of increased ROW impacts.

Exhibit 4.2.7A: Floyd Avenue Potential Cross Section
Looking East Near the Broadway and Floyd Avenue Intersection

West of Park Drive, the cross section of Floyd Avenue would look similar with the same travel lane and shoulder widths. The major difference is the sidewalk on the northern side would be replaced by a ten-foot asphalt multi-use trail that is separated from the roadway by a five-foot maintenance strip (see **Exhibit 4.2.7B**). The area is currently mostly grassed or undeveloped providing additional space for an asphalt trail on both sides of the roadway. The trails would terminate when they reach the Mohawk River Trail but could transition into bicycle lanes that could be used to cross the bridge over the Mohawk River (see **Exhibit 4.2.7C**). The proposed bridge design has 16-foot travel lanes which can be converted to 11-foot vehicle lanes with five-foot bicycle lanes. It is important to note that to ensure the safety of bicycle riders as they transition from the sidepath to the bicycle lane the raised crosswalk should be built in concert. This is especially important in the westbound direction to slow drivers as the bicycle lane begins. To accomplish this the roadway would require modifications to the existing curb line with new striping and signage.

Exhibit 4.2.7B: Floyd Avenue Potential Cross Section, between the Mohawk River Trail Crossing and Park Drive - Looking East Near MVCC and Floyd Ave Re-Development Area

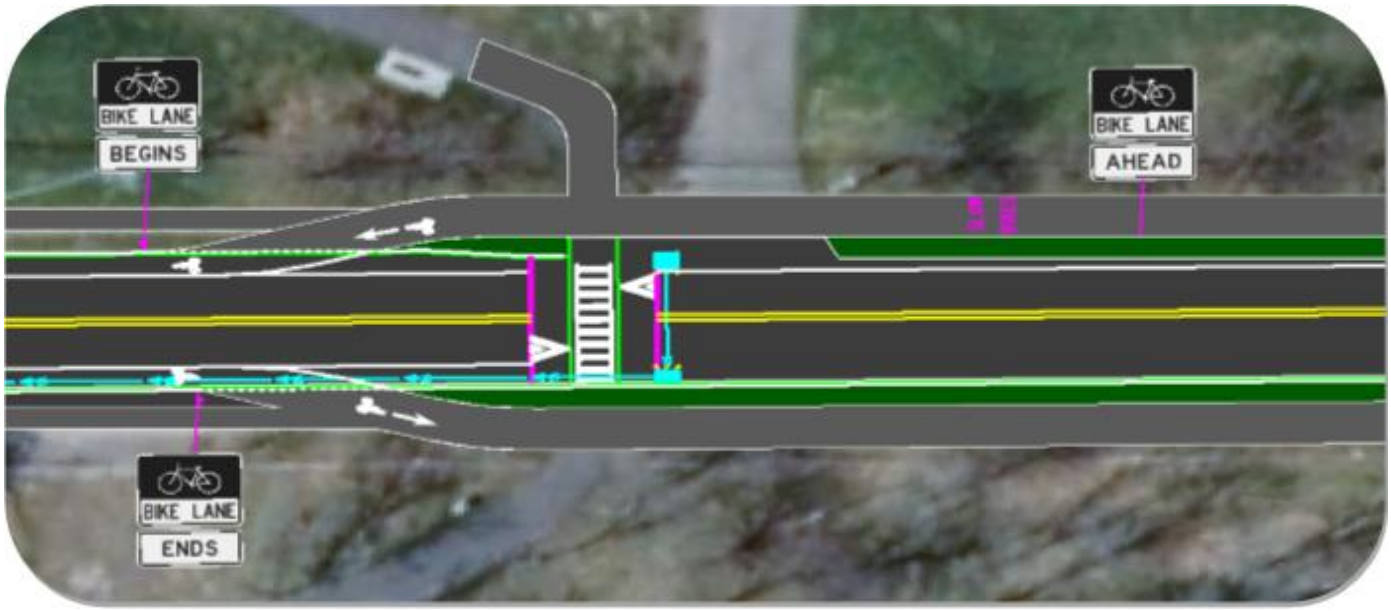


Exhibit 4.2.7C: Floyd Avenue Transition from Off-road Multi-use Trail to Bicycle Lanes

To provide additional traffic calming, various elements notable on-street parking and bump-outs were considered and ultimately not pursued. The proximately of the buildings to Floyd Avenue do not provide enough space for on-street parking without significantly impacting the adjacent parking lots. The only potentially viable alternative would be to install parking on the southern side of the roadway, but this may not be feasible due to ROW limitations and utilities. This design also forces motorists to walk across the roadway to access nearby businesses which is not desirable from a safety standpoint and would likely be underutilized given the number of parking lot spaces available.

As part of the complete street design, it is recommended that a lighting analysis be performed for the area especially given the anticipated increase in pedestrian and bicycle activity. The current overhead lighting is mounted to existing utility poles and spaced infrequently. Additionally, a study could identify the areas darkness that not only make non-motorized uses more comfortable during low light conditions but helps illuminate them to turning motorists.

-

4.2.8 Future Trail Connections

In an effort to increase the interconnectivity of the various trails, businesses, and residential areas the City has indicated that the site plans for the future Woodhaven Development will maintain a 50-foot buffer around the existing property. This buffer will be used to construct future trails that join the Mohawk River Trail to Park Drive and Ellsworth Road. The construction of a trail will require a Use and Occupancy Agreement with National Grid as sections of the trail will travel along their existing pole line. After exiting the Woodhaven Development, the future trail would intersect onto Park Drive where several options exist for its connection to Ellsworth Road. Depending upon ROW, utility impacts, site constraints as trail could be constructed along Park Drive down it the Ellsworth Road intersection or could be constructed along Cherrywood Lane to make a connection midway along Ellsworth Road as shown in **Exhibit 4.2.8** in the dashed circle. It is noted that Cherrywood Lane is private and would require an easement or acquisition for construction.

Exhibit 4.2.8: Ellsworth Road Connections

The second connection would be a short spur that would join the Ellsworth Road to Park Drive Manor one or more locations in the oval above. The connection would be constructed through the existing forested area to provide an easy access for the local residents to the trail system.

4.2.9 Park Drive Complete Streets Design

The segment of Park Drive between Floyd Avenue and Mars Drive is comprised generally of single-family residences but has connections to nearby apartment buildings. The current roadway is devoid of any non-motorized amenities so a complete street cross section as shown in **Exhibit 4.2.9A** would incorporate, at minimum, a five-foot sidewalk on both sides of the roadway. Within the sidewalks would be curbed 11-foot travel lanes and shoulders varying between zero

and four feet depending upon final alignment. Ideally the shoulders should be wider but can be narrowed if that facilitates the construction of pedestrian amenities. The existing ROW on Park Drive is about 80 feet wide which provides the necessary width for these improvements. Depending upon utility impacts and green infrastructure layouts there is also the potential to install an asphalt trail on the northbound side of the roadway.

South of Mars Drive and extending down to Vega Drive the City intends to maintain an 80-foot ROW which coupled with the Woodhaven Development being proposed on an empty parcel allows for flexibility in a complete street layout. At a minimum the City would like to see a layout similar to **Exhibit 4.2.9B** where an asphalt sidepath is constructed along the northbound side with a five-foot sidewalk along the southbound side. Ideally the Woodhaven site plans would incorporate a second ten-foot sidepath on the southbound side (not shown) to remove bicycles entirely from the roadway. The pedestrian amenities are separated from the roadway by a five-foot buffer. The travel lanes would be 11 feet with three-foot shoulders. The City has also indicated that the overhead electric lines within the Woodhaven Development will be placed below grade.

Exhibit 4.2.9B: South of Mars Drive

The impact of this transformation is the additional need for storm drainage. The road currently lacks any drainage infrastructure to collect the concentrated runoff caused by the installation of curbing. Based on available soil maps the area is comprised of Type A soils that are well draining meaning the area is suitable for various types of green infrastructure similar to those covered in section 4.2.6. If desired segments of Park Drive could be constructed with permeable pavement or with curb cuts designed to channel storm runoff into adjacent green infrastructure as shown in **Exhibits 4.2.9C and 4.2.9D**. As another alternative, the City has indicated they utilize drywells which could also be used as an infiltration practice.

Exhibit 4.2.9C: Tree Pits

Exhibit 4.2.9D: Bioswale Curb Cut

The City has indicated that they are concerned about the potential for high vehicle speeds on Park Drive notably nears Mars Drive. As the parcel develops the unregulated access that existing today in the project area will be replaced with buildings, signage, and striping that all contribute to a developed roadway that reduces speed. If speed remains a reoccurring issue the City could opt to construct a raised crosswalk as shown in **Exhibit 4.2.9E.**

Exhibit 4.2.9E: Park Drive & Mars Drive Raised Crosswalk Conceptual Improvements

4.2.10 Ellsworth Road (Northern Segment)

The northern segment of Ellsworth Road between Mars Drive and NY 825 is a paved surface in fair condition. It provides access only for railroad track maintenance which makes it ideal as a transformative trail area dedicated for non-motorized users. In discussions with the Mohawk Valley Economic Development Growth Enterprises (MVEDGE), a concept similar to the rendering shown in **Exhibit 4.2.10A** was considered in the past. Using the paved surface, separate spaces would be striped for both pedestrians and bicyclists. A physical barrier would also be installed such as timber fencing, landscaping, or raised berms to discourage trail users from accessing the railroad track. Depending upon condition at the time of installation, the roadway may require a mill and inlay of the asphalt to provide a smooth walking surface suitable for ADA compliance. As part of the improvements solar lighting could be installed to provide additional visibility and safety in low light conditions well as landscaping amenities such as benches or waste receptacles. The improvements would terminate at the southern end at Mars Drive and at northern end of Ellsworth Road where they would intersect the existing trail system that parallels NY 825.

Exhibit 4.2.10A: Conceptual Improvements for Ellsworth Road (Mars Dr. to NYS 825)

At Mars Drive the existing roadway will be reconfigured with striping, signage and landscaping to guide traffic especially the vehicles traveling north on Ellsworth Road. The travel lanes would be 10-11 feet wide but would be widened at the corner to facilitate travel due to the radii. If desired new sidepaths or sidewalks could be constructed linking Park Drive to both segment of Ellsworth Road as shown in Exhibit **4.2.10B**. It is important to note that between the existing roadway and forested area there is a 40 to 50-foot swath that is available to reconstruct the area that serves both motorists and non-motorists alike. This allows the City to be very creative and flexible in final layout.

4.2.11 Ellsworth Railroad Crossing Improvement

One concern that the City has indicated about Ellsworth Road is the skew angle of the railroad crossing. The angle is less than 20 degrees which for bicycles can cause the rear wheels to lose traction and potentially bind within the crossing itself. To address this the proposed bicycle trail alignment will introduce a sharp curve on the western side of the track to force riders to cross the tracks at a perpendicular angle. The bike lanes can be striped or physically defined with landscaping to guide bicyclists into the sharp turns. Additional signing would be required to warn of the sharp corners as well as the railroad crossing itself. Shown in the **Exhibit 4.2.11**, the crossing can be constructed within the existing parcel owned by the Oneida County IDA. The cost of the crossing improvement is including in the cost of the northern segment of Ellsworth Road in section 4.2.10.

4.2.12 Ellsworth Road (Southern Segment)

Ellsworth Road south of Mars Drive is periodically opened to vehicular traffic so the transformative approach that could be taken with the northern segment is not applicable. To support trail users, a section of the paved surface could be striped or physically delineated from the remaining travel lanes. Striping would be a low-cost option compared to the installation of timber fencing or other permanent separation. To further split motorized versus non-motorized users a section of the asphalt could be removed thereby creating a grassed or vegetated strip about five feet wide that captures stormwater runoff. The intent is to provide a clear divide of the roadway which in turn will provide a level of traffic calming by narrowing the existing pavement. In discussions with the City there are no immediate plans to improve the railroad crossing nor remove the gate preventing access to the Rome Free Academy so any trail improvement would likely terminate at this location. The potential for a trail connection onto Taft Avenue or Brennon Avenue has been discussed in the past and always met with resistance by the homeowners in that area; however, this opportunity could be revisited in the future.

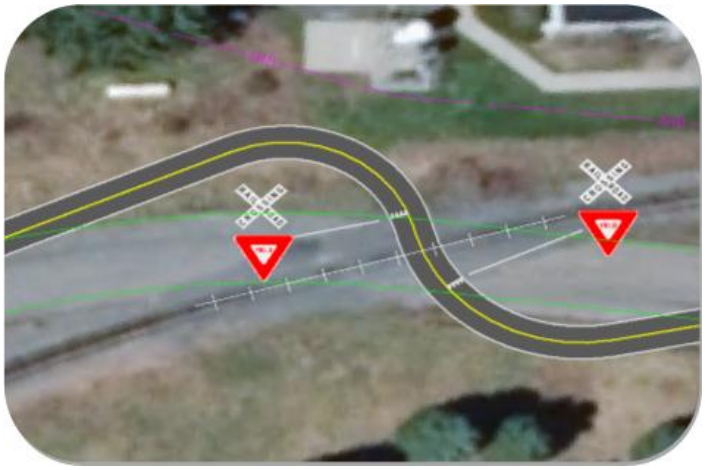


Exhibit 4.2.11: Ellsworth Road Rail Crossing Near NYS 825

4.2.13 Alternatives Summary

Concluding this report is **Table 4.2.13** below. The table is intended to act as a high-level summary of the various segments of the project area that have been evaluated and provide an overall assessment of their complexity for design and construction moving forward.

Table 4.2.13: Alternatives Summary

Alternatives Summary Table			
Segment	**Design Requirements**	**Constructability**	**Key Takeaways**
Mohawk River Trail Crossing	NYSDOT Standard Sheet 608-07	Simple – Standardized Layout	Low-Cost Safety Improvement.
MVCC Driveway	Requires survey/ coordination with MVCC	Simple to Moderate	Many possibilities but lower priority in overall project.
Floyd Avenue Development Parcel	Depends upon final site design and follows City design standards.	Complex	Includes new access driveway, sidewalks, water, sanitary/ storm sewer, lighting, electric and landscaping.
Floyd Avenue/Park Drive Intersection	Requires survey/ ROW acquisition	Moderate to Complex	Requires additional study to establish geometry needs which will be based on Woodhaven site plan and YMCA parcel buildout/ final layout influenced by surveyed highway boundary.
Floyd Avenue Access Management	Part of a Floyd Avenue Complete Streets project.	Moderate	Requires coordination with property owners and if federally funded will require following ROW acquisition process.
Future Trail Connections	Depends on location.	Simple	Lower priority until other alternatives have been constructed.
Park Drive Complete Streets Layout	Likely part of a federally funded application – requires survey, highway boundary determination.	Moderate to Complex	Requires full depth pavement construction and new pedestrian accommodations. Green infrastructure will be used extensively to treat stormwater runoff.
Ellsworth Road (northern segment)	Requires survey	Simple to Complex	This segment can be used as a blank slate so funding is the one major limiting factor as to what can be constructed.
Ellsworth Road Railroad Crossing	Part of an Ellsworth Road reconstruction project.	Simple	The railroad crossing has very low daily volumes but is required to improve safety for bicyclists crossing over the tracks.
Ellsworth Road (southern segment)	Requires survey	Simple to Moderate	Low priority for the project.

Appendix B – Infiltration Test Location Plan and Field Notes

GPI

Project:		MADE BY:	DATE:
Project No:		CHECKED BY:	DATE:

#2

~~#1~~ 3½"

14"

19" Topsoil

Test #1	1:03	1" Drop
2	1:25	
3	1:28	
4	1:34	

NG 3½

N

N

GNYP

~~NG~~

GPI

Project:		MADE BY:	DATE:
Project No:		CHECKED BY:	DATE:

#3

~~#2~~

38"

20"

- 8" top soil
- brown sand w/ 2"-6" rocks
- 48" hits brown sand

TEST #	
1	1:23
2	4:02
3	4:21
4	4:41

NM 5

NG 6

GPI

Project:		MADE BY:	DATE:
Project No:		CHECKED BY:	DATE:

#5

36"

12"

TEST # 1 1:02

2 1:18

3 1:42

NRM 11

10'

DEEP

6.5'

0"-8" TOPSOIL

9"-78" SAND (BROWN) w/ 2"-6" STONE

NRM 11½

10'

GPI

Project:	MADE BY:	DATE:
Project No:	CHECKED BY:	DATE:

#6 36"

12"

48"

8" TOP

↓ SAND w/ 2"-6" STONE

3 56

3 52

4 00

4 38

TEST #1 2:35

2 2:35

3 3:42

4 4:33

NOV 13

Appendix C– Oneida County Soil Report

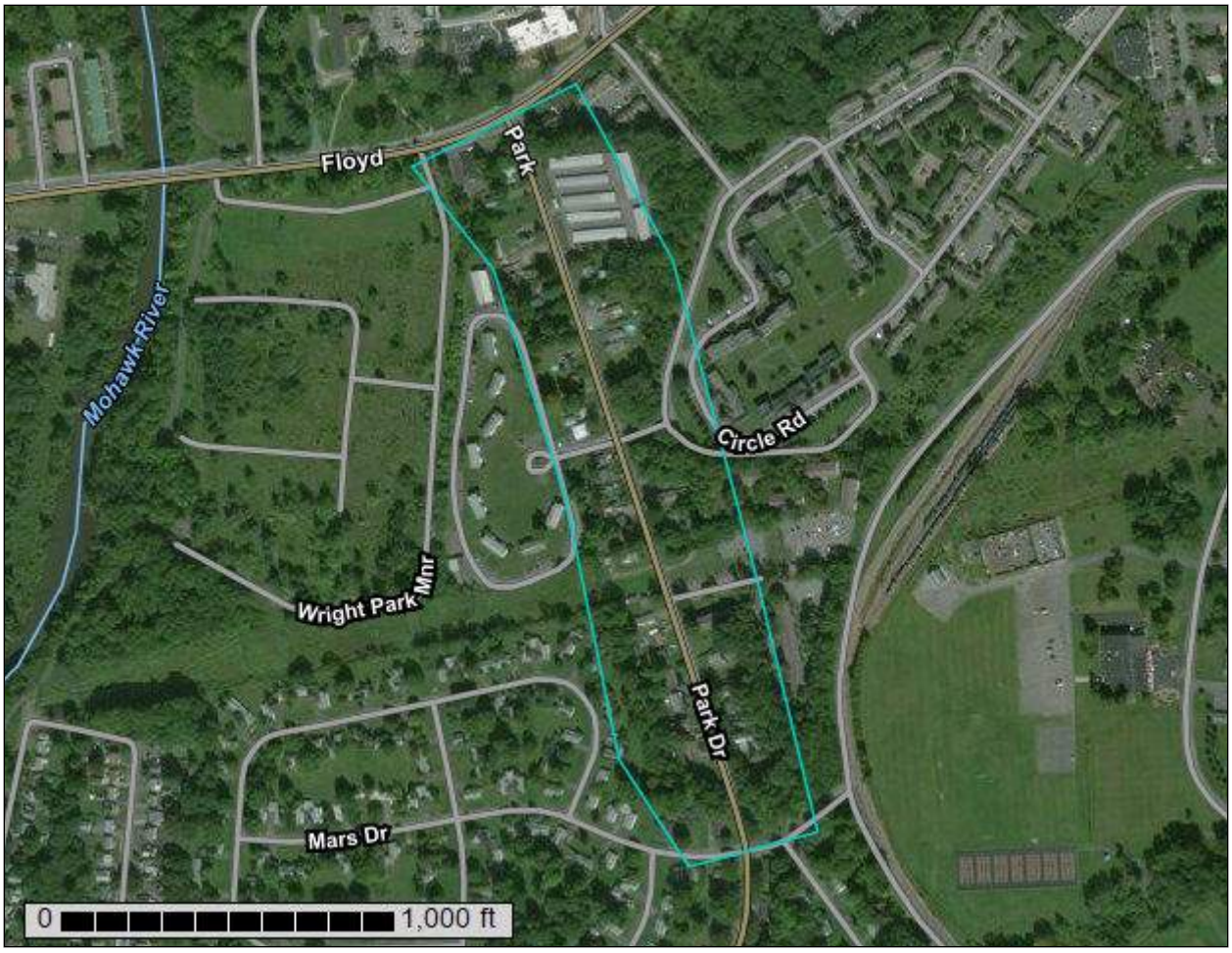
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Oneida County, New York



June 3, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

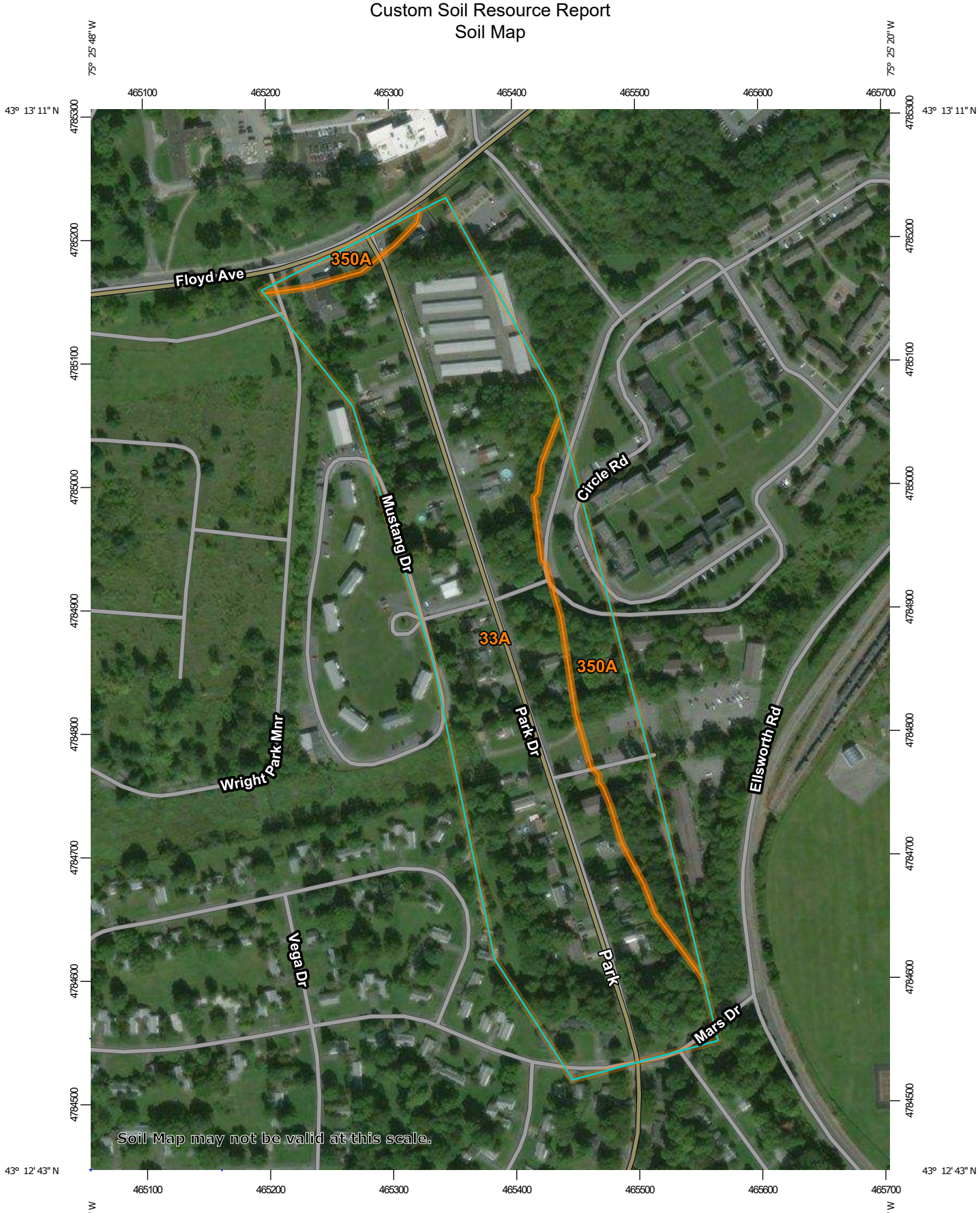
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:4,180 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Oneida County, New York
Survey Area Data: Version 23, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 3, 2013—Sep 27, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
33A	Alton-Urban land complex, 0 to 3 percent slopes	22.3	82.9%
350A	Alton gravelly loam, 0 to 3 percent slopes	4.6	17.1%
Totals for Area of Interest		**26.9**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Oneida County, New York

33A—Alton-Urban land complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9v9h
Elevation: 250 to 1,000 feet
Mean annual precipitation: 30 to 46 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Alton and similar soils: 40 percent
Urban land: 30 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alton

Setting

Landform: Deltas, outwash plains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from acidic rocks, with some limestone below 40 inches

Typical profile

Ap - 0 to 9 inches: gravelly loam
Bw1 - 9 to 24 inches: very gravelly fine sandy loam
Bw2 - 24 to 40 inches: very gravelly sandy loam
BC - 40 to 58 inches: very gravelly sandy loam
2C - 58 to 72 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water capacity: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F101XY005NY - Dry Outwash

Hydric soil rating: No

Description of Urban Land

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 0 inches to manufactured layer

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: Unranked

Minor Components

Udorthents

Percent of map unit: 10 percent
Hydric soil rating: No

Castile

Percent of map unit: 8 percent
Hydric soil rating: No

Unnamed soils

Percent of map unit: 7 percent
Hydric soil rating: No

Fredon

Percent of map unit: 5 percent
Hydric soil rating: No

350A—Alton gravelly loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9v9m
Elevation: 250 to 1,000 feet
Mean annual precipitation: 30 to 46 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 120 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Alton and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alton

Setting

Landform: Deltas, outwash plains, terraces
Landform position (two-dimensional): Summit

Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from acidic rocks, with some limestone below 40 inches

Typical profile

Ap - 0 to 9 inches: gravelly loam
Bw1 - 9 to 24 inches: very gravelly fine sandy loam
Bw2 - 24 to 40 inches: very gravelly sandy loam
BC - 40 to 58 inches: very gravelly sandy loam
2C - 58 to 72 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water capacity: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F101XY005NY - Dry Outwash
Hydric soil rating: No

Minor Components

Howard

Percent of map unit: 7 percent
Hydric soil rating: No

Knickerbocker

Percent of map unit: 5 percent
Hydric soil rating: No

Castile

Percent of map unit: 4 percent
Hydric soil rating: No

Chenango

Percent of map unit: 4 percent
Hydric soil rating: No

Windsor

Percent of map unit: 3 percent
Hydric soil rating: No

Fredon

Percent of map unit: 2 percent
Hydric soil rating: No

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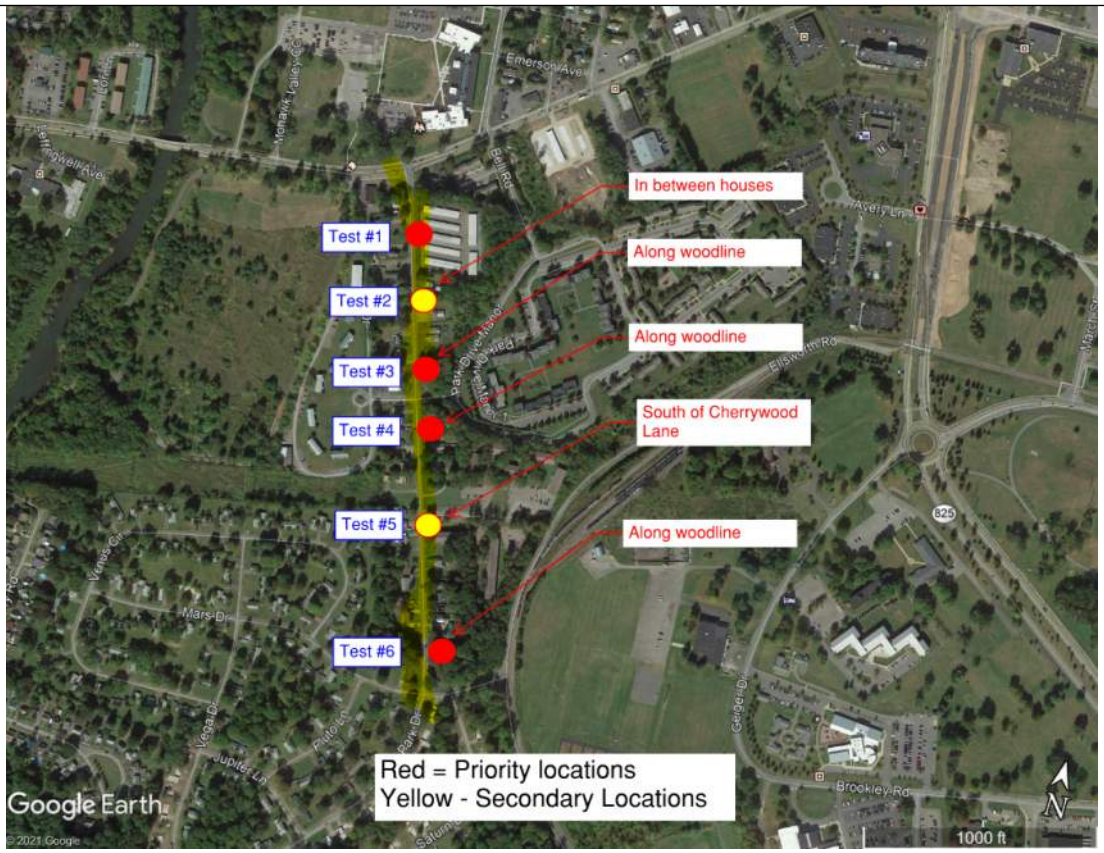
Appendix D– Infiltration Test Site Photographs



Test Location Key Plan

Percolation Test Pit #2

Percolation Test Pit #3

Percolation Test Pit #5

Percolation Test Pit #6

Deep Test Pit at Test #5 Location

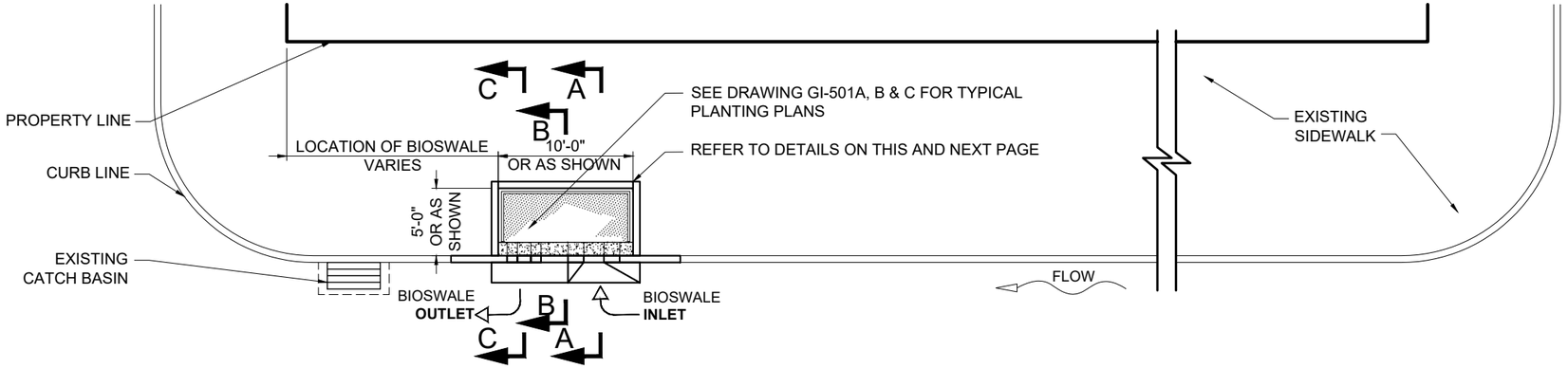
Appendix E – Infiltration Bioretention Examples

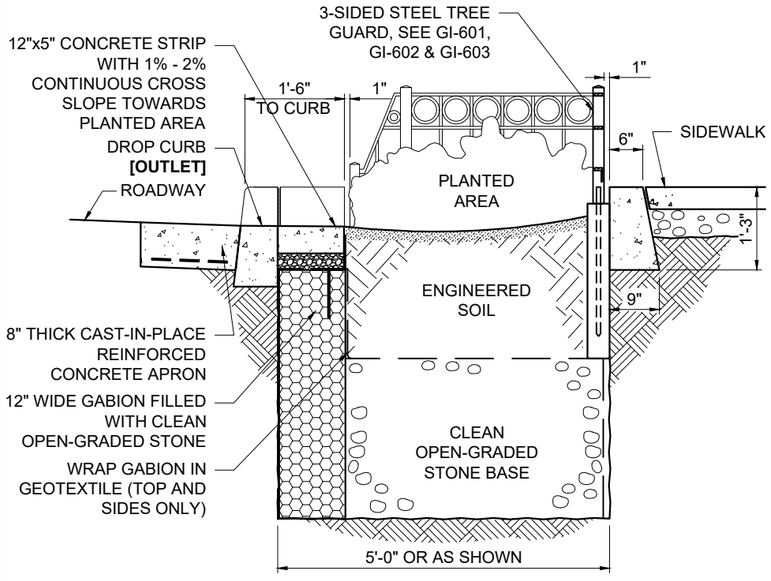
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL PLANNING & ANALYSIS – GREEN INFRASTRUCTURE DESIGN & CONSTRUCTION

STANDARD FOR 10'x5' R.O.W. BIOSWALE TYPE 3

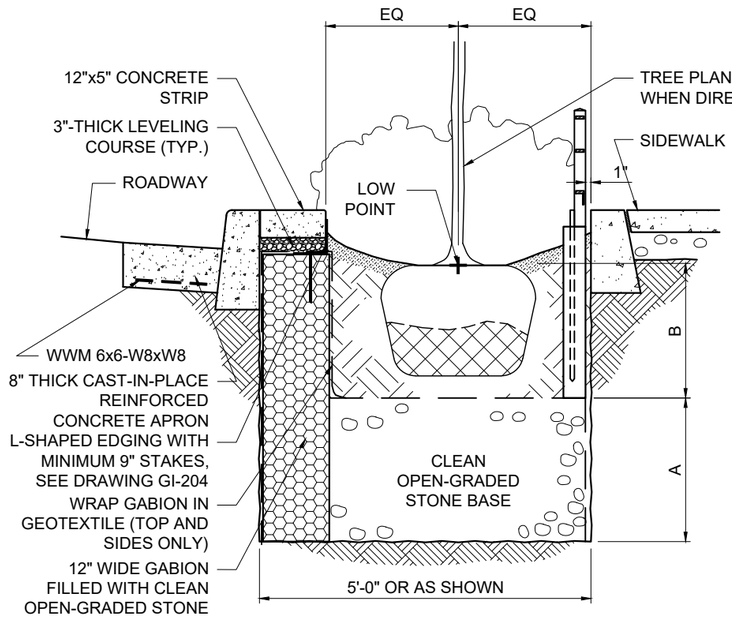
- NO CONNECTION TO SEWERS

GI–117

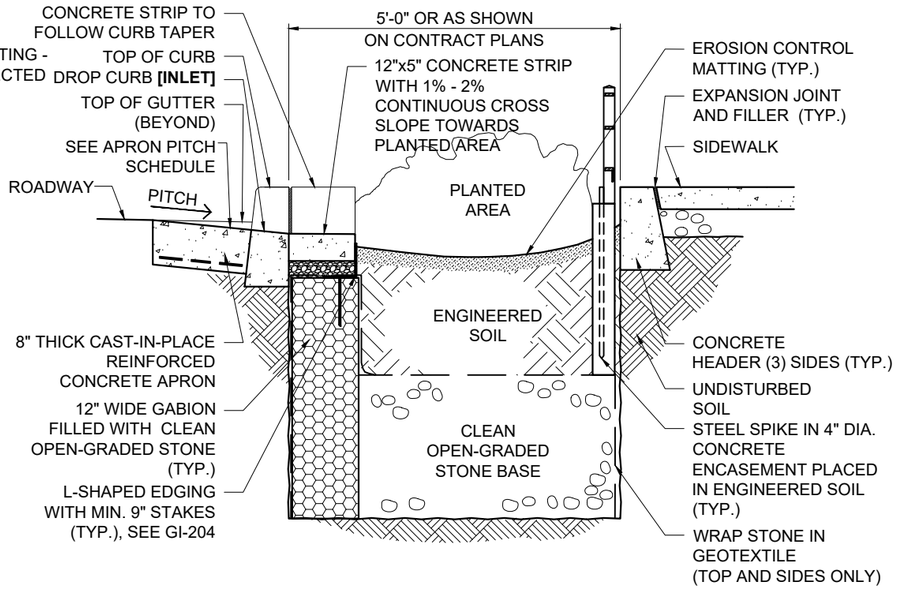




SECTION C-C
AT BIOSWALE OUTLET



SECTION B-B
AT MIDSECTION [LOWEST POINT]



SECTION A-A
AT BIOSWALE INLET

NOTE:
1. CAST-IN-PLACE CONCRETE STRIP REQUIRES IMPERMEABLE LINER UNDERNEATH
2. ALL INLET AND OUTLET COMPONENTS INCLUDING TAPERS TO BE CAST-IN-PLACE

DEPTH SCHEDULE		
ROWB	A	B
WITH TREE	2'-6"	2'-0"
NO TREE	3'-0"	1'-6"

Roopesh Joshi
P.E.
MANAGING DIRECTOR,
GREEN INFRASTRUCTURE DESIGN & CONSTRUCTION

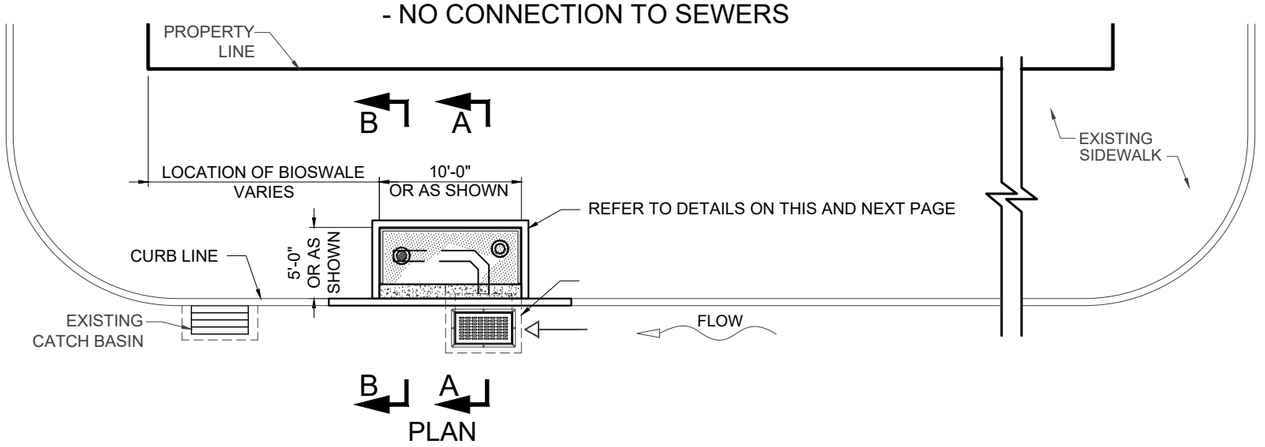
06-17-2020
DATE

GI–181

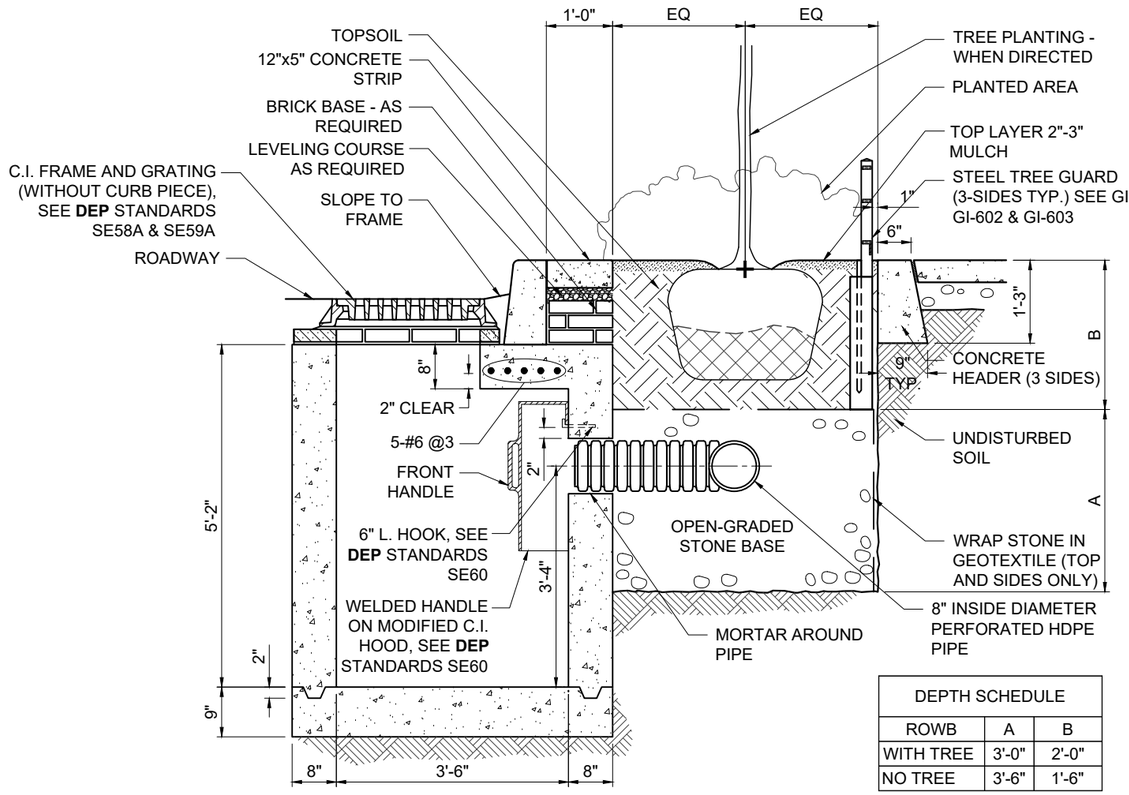
CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS – GREEN INFRASTRUCTURE

STANDARD FOR 10'x5' R.O.W. BIOSWALE TYPE 3D

- NO CONNECTION TO SEWERS

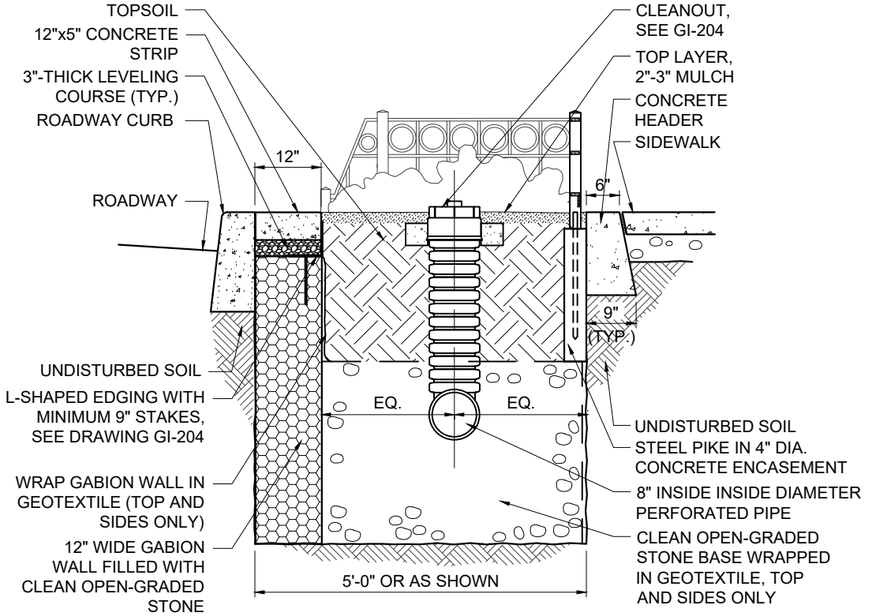


PLAN



DEPTH SCHEDULE		
ROWB	A	B
WITH TREE	3'-0"	2'-0"
NO TREE	3'-6"	1'-6"

SECTION A-A



SECTION B-B

NOTE:
CAST-IN-PLACE CONCRETE STRIP REQUIRES IMPERMEABLE LINER UNDERNEATH

Roopesh Joshi
P.E.
MANAGING DIRECTOR,
GREEN INFRASTRUCTURE DESIGN & CONSTRUCTION

06-17-2020
DATE

Appendix F – Water Quality, Infiltration Bioretention, and Porous Pavement Worksheets

Version 1.6
Last Updated: 03/28/2014

Total Water Quality Volume Calculation

WQv(acre-feet) = [(P)(Rv)(A)] /12

Is this project subject to Chapter 10 of the NYS Design Manual (i.e. WQv is equal to post-development 1 year runoff volume)?.....	No

Design Point:	1	
P=	1.10	*inch*

Manually enter P, Total Area and Impervious Cover.

Breakdown of Subcatchments

Catchment Number	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Rv	WQv *(ft^3)*	Description
1	1.62	1.62	100%	0.95	6,145	Roadway
2	0.52	0.53	101%	0.96	2,009	Sidepath
3						
4						
5						
6						
7						
8						
9						
10						
Subtotal (1-30)	2.14	2.15	100%	0.95	**8,154**	**Subtotal 1**
Total	2.14	2.15	100%	0.95	**8,154**	**Initial WQv**

Identify Runoff Reduction Techniques By Area

Technique	Total Contributing Area *(Acre)*	Contributing Impervious Area *(Acre)*	Notes
Conservation of Natural Areas	0.00	0.00	*minimum 10,000 sf*
Riparian Buffers	0.00	0.00	*maximum contributing length 75 feet to 150 feet*
Filter Strips	0.00	0.00	
Tree Planting	0.00	0.00	*Up to 100 sf directly connected impervious area may be subtracted per tree*
Total	**0.00**	**0.00**	

Recalculate WQv after application of Area Reduction Techniques

	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Runoff Coefficient Rv	WQv *(ft^3)*
"<<Initial WQv"	2.14	2.15	100%	0.95	8,154
Subtract Area	0.00	0.00			
WQv adjusted after Area Reductions	**2.14**	**2.15**	100%	0.95	8,154
Disconnection of Rooftops		0.00			
Adjusted WQv after Area Reduction and Rooftop Disconnect	2.14	2.15	100%	0.95	**8,154**
WQv reduced by Area Reduction techniques					0

Runoff Reduction Volume and Treated volumes						
	Runoff Reduction Techiques/Standard SMPs		**Total Contributing Area**	**Total Contributing Impervious Area**	**WQv Reduced (RRv)**	**WQv Treated**
			(acres)	**(acres)**	**cf**	**cf**
Area/Volume Reduction	Conservation of Natural Areas	RR-1	0.00	0.00		
	Sheetflow to Riparian Buffers/Filter Strips	RR-2	0.00	0.00		
	Tree Planting/Tree Pit	RR-3	0.00	0.00		
	Disconnection of Rooftop Runoff	RR-4		0.00		
	Vegetated Swale	RR-5	0.00	0.00	0	
	Rain Garden	RR-6	0.00	0.00	0	
	Stormwater Planter	RR-7	0.00	0.00	0	
	Rain Barrel/Cistern	RR-8	0.00	0.00	0	
	Porous Pavement	RR-9	0.52	0.52	1973	
	Green Roof (Intensive & Extensive)	RR-10	0.00	0.00	0	
Standard SMPs w/RRv Capacity	Infiltration Trench	I-1	0.00	0.00	0	0
	Infiltration Basin	I-2	0.52	0.52	1973	0
	Dry Well	I-3	0.00	0.00	0	0
	Underground Infiltration System	I-4	0.00			
	Bioretention & Infiltration Bioretention	F-5	1.62	1.62	4160	1985
	Dry swale	O-1	0.00	0.00	0	0
Standard SMPs	Micropool Extended Detention (P-1)	P-1				
	Wet Pond (P-2)	P-2				
	Wet Extended Detention (P-3)	P-3				
	Multiple Pond system (P-4)	P-4				
	Pocket Pond (p-5)	P-5				
	Surface Sand filter (F-1)	F-1				
	Underground Sand filter (F-2)	F-2				
	Perimeter Sand Filter (F-3)	F-3				
	Organic Filter (F-4	F-4				
	Shallow Wetland (W-1)	W-1				
	Extended Detention Wetland (W-2	W-2				
	Pond/Wetland System (W-3)	W-3				
	Pocket Wetland (W-4)	W-4				
	Wet Swale (O-2)	O-2				
Totals by Area Reduction →			0.00	0.00	0	
Totals by Volume Reduction →			0.52	0.52	1973	
Totals by Standard SMP w/RRV →			2.14	2.14	6133	1985
Totals by Standard SMP →			0.00	0.00		0
Totals (Area + Volume + all SMPs) →			2.66	2.66	8,106	1,985

Infiltrating Bioretention Worksheet

(For use on HSG A or B Soils without underdrains)

WQv ≤ VSM + VDL + (DP x ARG)

VSM = ARG x DSM x nSM

VDL (optional) = ARG x DDL x nDL

Design Point:	1

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
1	1.36	1.36	1.00	0.95	5158.96	1.10	Infiltration Bioretention
Enter Impervious Area Reduced by Disconnection of Rooftops		0.00	100%	0.95	5,159	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						*ft^3*	

Infiltrating Bioretention Parameters				
Treatment Volume	WQv	5,159	*ft^3*	
Enter depth of soil Media	DSM	1.50	*ft*	*2.5 - 4 ft*
Enter depth of drainage	DDL	3.00	*ft*	*≥ 0.5 ft*
Enter ponding depth above surface	DP	0.5	*ft*	*≤ 0.5*
Enter porosity of Soil Media	nSM	0.20		*≥20%*
Enter porosity of Drainage	nDL	0.40		*≥ 40%*
Required Bioretention Area	ARG	2579	*sf*	
Bioretention Area Provided		2600	*ft2*	
Native Soil Infiltration Rate		7.00	*in/hr*	*Okay*
Are you using underdrains?		No		
Total Volume Provided		5,200	*ft^3*	*Sum of storage Volume Provided in each layer*

Determine Runoff Reduction			
Runoff Reduction	**4,160**	***ft^3***	***This is 80% of storage volume provided or WQv whichever is less***
Volume Treated	999	*ft^3*	*This is the portion of the WQv that is not reduced in the practice*
Sizing √	*OK*		*Check to be sure Area provided ≥ Af*

Porous Pavement Worksheet

Ap = Vw / (n x dt)

Ap	Required porous pavement surface area	*ft2*	
Vw	Design Volume	*ft3*	
n	porosity of gravel bed/resevoir		*Assume .4 for gravel*
dt	depth of gravel bed/resevoir		

Design Point:	**1**

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
2	0.52	0.53	1.01	0.96	2008.93	1.10	Sidepath

Enter Soil Infiltration Rate			
Soil Inflitration Rate		*in/hour*	*Infiltration rate should be a minimum of 0.5 in/hr.*

Calculate Required Surface Area				
Design Volume	Vw	2,009	*ft^3*	
Are underdrains being used?		No	-	
Porosity of Gravel Bed	*n*	0.40	-	
Gravel Bed Depth	dt	0.50	*ft*	
Required Surface Area	Ap	10,045	*sf*	
Surface Area Provided		22,750	*sf*	*Dimensions of pavement can be provided here*
Storage Volume Provided		4,550	*ft^3*	

Determine the Runoff Reduction			
RRv	**2,009**	*ft^3*	

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