

Woodbridge Township Coastal Vulnerability Assessment

April 20, 2016



Prepared for the Township of Woodbridge by Sustainable Jersey, and funded by the National Oceanic & Atmospheric Administration (NOAA) for the New Jersey Resilient Coastal Communities Initiative, managed by the NJ Department of Environmental Protection Office of Coastal and Land Use Planning.

**NEW JERSEY
RESILIENT
COASTAL
COMMUNITIES
INITIATIVE**

Woodbridge Township Coastal Vulnerability Assessment Report

I. Introduction

Municipal Coastal Vulnerability Assessment

The Municipal Coastal Vulnerability Assessment (CVA) is both a process and tool to help communities make incisive and sound decisions on near and long-term coastal management, reconstruction, and resiliency measures. The CVA categorizes the degree to which a community's assets (e.g. built, natural, social, etc.) will be impacted by projected sea level rise and storm events, and analyzes the consequences those vulnerabilities pose to the community. By accounting for vulnerability and consequence factors associated with future flood events, local officials will be better informed to make long-term decisions about land use planning, mitigation, adaption measures, and public investments.

The CVA was developed by the New Jersey Resilient Coastal Communities Initiative (RCCI), a post-Sandy project funded by the National Oceanic and Atmospheric Administration (NOAA), and managed by the NJ Department of Environmental Protection's Office of Coastal and Land Use Planning. The tool was created in response to the need for municipalities to be better prepared for the increasing rate of sea level rise and extreme storm events.

II. Municipal Background

Location and Demographics

Woodbridge Township is located in northern New Jersey in the northeast corner of Middlesex County, near the Raritan Bay. The township is bordered by the Arthur Kill to the east, the Raritan River to the South, and the Rahway River to the north. The township encompasses over 24 square miles and borders the municipalities of Carteret, Edison, Perth Amboy and Sayreville in Middlesex County; Clark, Linden and Rahway in Union County; and the Borough of Staten Island in New York City. Many distinct neighborhoods and unincorporated communities exist within Woodbridge Township, including Avenel, Port Reading, Colonia, Sewaren, Woodbridge Proper, Iselin, Keasbey, Menlo Park Terrace, Hopelawn and Fords, all surrounded by a vast network of municipal and county parks. In addition, the township has a heavy industrial presence along the Raritan River and the Arthur Kill.

Woodbridge has a total population of 99,585 according to the 2010 census, making it the sixth most populous municipality in New Jersey. According to the 2010 Census, the population of the township is evenly spread across age groups and the area boasts a median household income well above the state's median household income.

Future Flooding

Woodbridge is faced with a new set of challenges as sea level continues to rise and the intensity and frequency of storms and precipitation persist. Figure 1 shows past and future trends in monthly mean sea level rise using data from The Battery tide gauge station in New York City. Additional data and maps regarding future flood projections, precipitation and climate change are available at Climate Central (<http://www.climatecentral.org>); NJAdapt (<http://www.njadapt.org>); and the NJ Climate Adaptation Alliance (<http://njadapt.rutgers.edu/>).

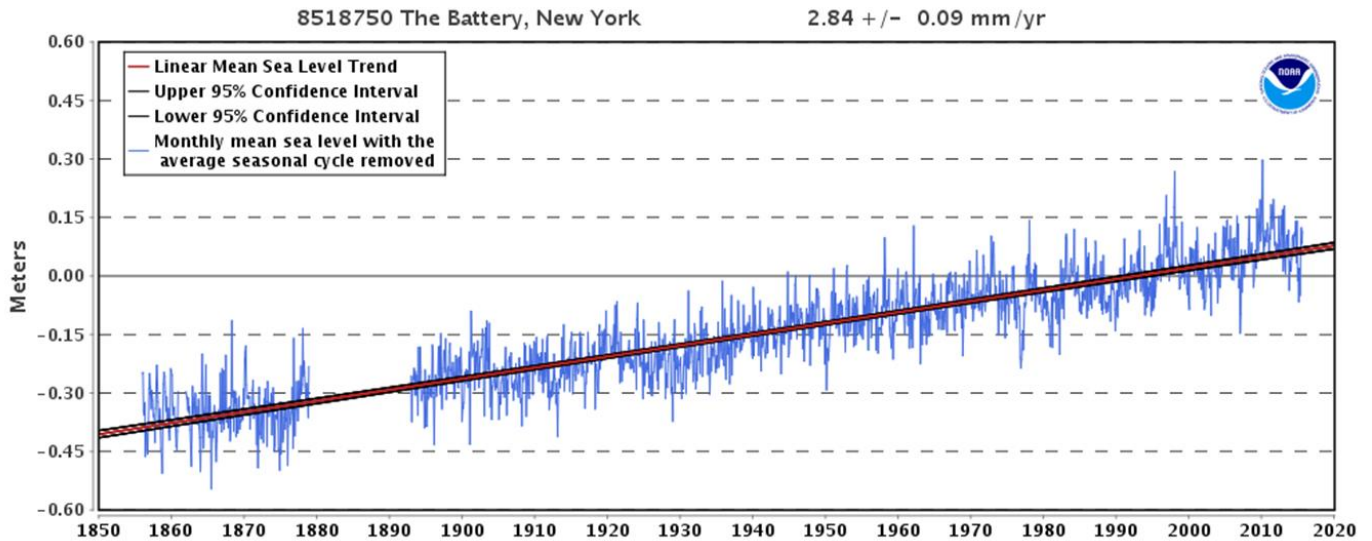


Figure 1. Mean Sea Level Trend at The Battery, NY (NOAA, 2015).

III. Municipal Coastal Vulnerability Assessment – Methodology

The CVA process is a methodical, step-by-step approach for conducting a comprehensive vulnerability assessment of coastal flooding hazards. It identifies the vulnerability of community assets (identified by the municipality) to a series of future flood hazard scenarios, and the associated consequences to the community. The CVA goes beyond a simple analysis of flooding extent and duration by also examining how flooding will affect the functional capacity of buildings, services, infrastructure, businesses, ecological systems, and residents. The three key steps of the CVA are described below:

- ✓ *Identify and map community assets and selected coastal flood hazard scenario(s)*

Geographical Information Systems (GIS) maps are the most effective way of locating and analyzing community assets and flood hazards. Community assets are identified among four categories - Critical Facilities & Infrastructure Systems, Community Resources & Amenities, Natural Resources & Ecosystems, and Districts, Neighborhoods, & Population Clusters – and plotted using GIS. Flood hazard scenarios are selected and are also mapped. Communities are encouraged to use both future sea level rise (daily high tide) and storm surge levels for at least 2050, and, preferably, 2030 and 2100, if available.

- ✓ *Evaluate the vulnerability of community assets.*

Vulnerability is the predisposition of a community asset to be adversely affected by a hazard—in this case, coastal flooding. Vulnerability is measured by the anticipated degree of *exposure* and *sensitivity*.

Exposure is the extent to which community assets may be flooded, measured by magnitude and depth. The magnitude of exposure incorporates the frequency of occurrence (e.g. for high tide, the occurrence would be daily), and the depth of floodwater during the occurrence.

Sensitivity is measured by the extent in which the flooding will impact the following features of the asset¹:

- Durability of the structure or asset (materials, elevated structure, flood mitigation measures, etc.)
- The ability of an asset to continue to provide its key benefits and operations in the aftermath of a storm event
- The ability to move quickly from harm's way.

Each asset is assigned a single vulnerability rating based on the adverse impacts due to exposure and sensitivity to each hazard. A Vulnerability Rating Key provides guidance in the assignment of these ratings. (See Appendix C).

✓ *Evaluate the overall consequences to the community*

Consequence is the degree of impact on the entire community if an asset will be lost or damaged, or if the assets function is impaired. The degree of impact is measured over eight topic areas that can potentially impact the community. The topic areas include: property damage, population displacement, delivery of services, typical operations / daily life, environment, emergency response, hazardous materials, and municipal budget. The Consequences Rating Key in Appendix D provides guidelines for identifying and rating consequences.

IV. Findings: Vulnerability of Assets and Consequences to the Community

Woodbridge initially identified approximately 400 assets to be included in the vulnerability and consequences assessment, but only those assets shown to be impacted by sea level rise and/or a Category 1 Hurricane in 2050 (52 assets in total) were included in the assessment. The assets were identified under four broad categories of potential community assets: Critical Facilities & Infrastructure Systems, Community Resources & Amenities, Natural Resources & Ecosystems, and Districts, Neighborhoods, & Population Clusters. While the majority of assets were assessed individually, some of them were assessed as part of "systems" to ensure the functionality and consequence if one component or asset failed. For example, many of Woodbridge's pump stations are linked together and flow to the main public works building. The pump stations are intricately linked and if one fails other pumps in the series could also fail.

The flood hazards scenarios used for this assessment were projected sea level rise and hurricane category 1 storm surge for 2050. The sea level rise projections are based upon a 2013 study by New Jersey climate scientists,² and used the 2050 mid-range projections in that study, or 1.3 feet of sea level rise. The sea level rise projections were then layered on top of the mean higher high water (MHHW). The storm surge maps were developed using the NOAA SLOSH (Sea, Lake, and Overland Surge from Hurricanes) model, combined with the sea level rise projections. The approximate depth of water is based on LiDAR data.³ Both the 2050 sea level rise and 2050 storm surge maps were obtained from the NJ Department of Environmental Protection (NJDEP).

The community assets were assessed for their vulnerability (exposure and sensitivity) to the above two hazard scenarios, and then for the consequences to the community if the asset was damaged or destroyed. The complete set of data on vulnerability and consequences are included in the CVA Matrix (Appendix A), and summarized in

¹ Sensitivity also includes the natural coping capacity of individuals to move out of harm's way. However, contrary to some definitions, it does not include adaptive capacity since by its inherent definition adaptive capacity is a likely future condition that requires action, e.g. elevating structures. The CVA evaluates sensitivity based on the assets' current conditions.

² Miller et al. December 2013. "A geological perspective on sea-level rise and its impacts along the U.S. mid-Atlantic coast." http://onlinelibrary.wiley.com/doi/10.1002/2013EF00_0135/pdf

³ Note that the projected flood events used in this assessment were generated by several models prepared by state and national agencies and professionals, and are suitable for planning purposes. However, due to the uncertainty of projections and accuracy of certain types of data, the maps should not be the sole resource for conducting site specific analyses.

Table 1 below. Since sea level rise is more likely to occur than a Category 1 hurricane, the township should particularly focus its attention on the assets with high consequences in the sea level rise column. There are also other considerations for interpreting the data in the Matrix and Table 1. The flood hazard maps are based upon the latest technology and best available data, both of which will continue to be updated as new data is generated and technology advances. Additionally, there may be existing topographical features or mitigation measures in place that the assessment did not pick up, which could lower the vulnerability rating of an asset. For these reasons, the Matrix should be used for general planning purposes and not for specific site planning or design, unless site conditions are field verified. More considerations on the use of the data and “next steps” are offered in Section V.

Table 1. Summary of Woodbridge Coastal Vulnerability Assessment Matrix						
Asset Name	Asset Category	Asset Function	Vulnerability Rating		Consequences Rating	
			SLR	CAT1	SLR	CAT1
American Cyanamid	Community Resources & Amenities	American Cyanamid Co. is a superfund site located at Cutters Dock Road.	NA	Low	NA	Low
Buckeye Tank Farm Terminal	Community Resources & Amenities	Ethanol tank farms located in multiple locations along the Arthur Kill. The bulk terminal facility stores and processes ethanol, moving through the region.	NA	High	NA	High
C.P. Chemical & Woodbridge Tow yard	Community Resources & Amenities	C.P. Chemicals was a specialty chemical manufacturing site. The site now serves as a tow yard for Woodbridge Township storing vehicles.	NA	Insignificant	NA	NA
Captain Hooks Marina	Community Resources & Amenities	A private marina.	Insignificant	Moderate	Insignificant	Low
Cliffside Marina	Community Resources & Amenities	A private marina.	Insignificant	Moderate	Insignificant	Low
Conrail Railroad	Community Resources & Amenities	Transports petrol and ethanol to the various tank farms located throughout the region, for storage and transportation.	Low	Low	NA	High
Fedex Distribution Center	Community Resources & Amenities	Fedex main ground parcel center for the region.	NA	High	NA	High
Knot Just Bagels	Community Resources & Amenities	A bagel shop important to the employees of the Township.	Low	Low	NA	Moderate
McMyler Coal Dumper	Community Resources & Amenities	Part of the Reading Railroad "Port Reading" complex, used to pick up and tip 90 ton cars of coal into waiting ships or barges.	Insignificant	Low	NA	Insignificant
Motiva Tank Farm Terminal	Community Resources & Amenities	Ethanol tank farms located in multiple locations along the Arthur Kill. The bulk terminal facility stores and processes ethanol, moving through the region.	NA	High	NA	High
Petro Express Gas Station	Community Resources & Amenities	One of many gas stations found throughout Woodbridge.	NA	Insignificant	NA	Insignificant

Table 1. Summary of Woodbridge Coastal Vulnerability Assessment Matrix Continued

Asset Name	Asset Category	Asset Function	Vulnerability Rating		Consequences Rating	
			SLR	CAT1	SLR	CAT1
Pirates Cove Marina	Community Resources & Amenities	A private marina.	Insignificant	Moderate	Insignificant	Low
Port Reading School #9	Community Resources & Amenities	A public elementary school serving the Port Reading Neighborhood with children in grades kindergarten through fifth grade.	NA	Insignificant	NA	Insignificant
Sewaren Boat Launch	Community Resources & Amenities	Provides a public access point for individuals to launch their boats into the water. Can also provide access to emergency water vessels to gain access to Woodbridge Township if need be.	Insignificant	Insignificant	NA	Insignificant
Wakefern Food Corporation Facility	Community Resources & Amenities	Corporate warehouse for Shoprite.	NA	Low	NA	Low
Walgreens Pharmacy (17 Green St.)	Community Resources & Amenities	One of the many pharmacies serving Woodbridge.	NA	Low	NA	Insignificant
Woodbridge Board of Education Facility	Community Resources & Amenities	School vehicle storage lot for Woodbridge Board of Education.	NA	Insignificant	NA	Insignificant
Woodbridge Municipal Marina & U.S. Coast Guard Auxiliary Station	Community Resources & Amenities	A public marina that also houses a U.S. Coast Guard (USCG) Auxiliary trailer.	Insignificant	High	Insignificant	Moderate
Woodbridge Township Animal Shelter	Community Resources & Amenities	Municipal owned animal shelter and pet adaptation center.	NA	Low	NA	Low
C.P. Chemical Pumping Station	Critical Facilities & Infrastructure Systems	Sewage pump stations are used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow.	NA	Moderate	NA	Low
PSE & G Woodbridge Substation	Critical Facilities & Infrastructure Systems	The Woodbridge substation is a power generation location for PSE & G located in the Keasbey Redevelopment Zone.	NA	High	NA	High
Heyden Pumping Station	Critical Facilities & Infrastructure Systems	The waste water pump station is used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow.	NA	Moderate	NA	Moderate
New Jersey Turnpike (I-95)	Critical Facilities & Infrastructure Systems	The New Jersey Turnpike (Interstate 95) serves as a major freeway, evacuation route, and vital transportation and commuter corridor.	NA	High	NA	High

Table 1. Summary of Woodbridge Coastal Vulnerability Assessment Matrix Continued

Asset Name	Asset Category	Asset Function	Vulnerability Rating		Consequences Rating	
			SLR	CAT1	SLR	CAT1
New Jersey Route 35	Critical Facilities & Infrastructure Systems	New Jersey Route 35 serves as a major highway, evacuation route, and vital transportation and commuter corridor.	NA	High	NA	High
PSE & G-Sewaren Generating Station	Critical Facilities & Infrastructure Systems	Substation located along the Arthur Kill in the Sewaren Neighborhood. The substation supplies power to Woodbridge and Fanwood neighborhoods in the surrounding area.	NA	Low	NA	Insignificant
U.S. Route 9	Critical Facilities & Infrastructure Systems	U.S. Route 9 serves as a major highway, evacuation route, and vital transportation and commuter corridor.	NA	High	NA	High
Waste Water Pump Station (Carborundum)	Critical Facilities & Infrastructure Systems	The waste water pump station is used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow.	NA	Moderate	NA	Low
Waste Water Pump Station (Cliff Road)	Critical Facilities & Infrastructure Systems	The waste water pump station is used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow.	NA	Moderate	NA	Moderate
Waste Water Pump Station (Homestead)	Critical Facilities & Infrastructure Systems	The waste water pump station is used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow.	NA	Moderate	NA	Moderate
Waste Water Pump Station (Keasbey Complex)	Critical Facilities & Infrastructure Systems	The waste water pump station is used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow.	NA	Moderate	NA	Low
Waste Water Pump Station (Koppers Koke)	Critical Facilities & Infrastructure Systems	The waste water pump station is used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow.	NA	Moderate	NA	Low
Waste Water Pump Station (Mileed Way)	Critical Facilities & Infrastructure Systems	The waste water pump station is used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow.	NA	Moderate	NA	Low

Table 1. Summary of Woodbridge Coastal Vulnerability Assessment Matrix Continued

Asset Name	Asset Category	Asset Function	Vulnerability Rating		Consequences Rating	
			SLR	CAT1	SLR	CAT1
Waste Water Pump Station (Saints Field)	Critical Facilities & Infrastructure Systems	The waste water pump station is used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow.	NA	Moderate	NA	Low
Woodbridge Police Pistol Range	Critical Facilities & Infrastructure Systems	A police firearms training facility managed by both Woodbridge Township and Middlesex County to serve as a Pistol Range for not only WPD but all law enforcement entities in Middlesex County.	NA	Insignificant	NA	Insignificant
Woodbridge Township Department of Public Works	Critical Facilities & Infrastructure Systems	The main offices and equipment yard for the Department of Public Works responsible for conducting the crucial labor needed to ensure the town of Woodbridge operates in an efficient manner.	NA	Insignificant	NA	Insignificant
Woodbridge Township Division of Wastewater	Critical Facilities & Infrastructure Systems	Houses all the pumps, machinery, and equipment necessary to ensure the wastewater produced by Woodbridge Township is pumped out of town to be processed in an efficient and sanitary manor.	NA	High	NA	High
Blue Acres Buyout Properties	Districts, Neighborhoods, & Population Clusters	A former residential neighborhood, consisting of 189 homes purchased through New Jersey's Blue Acres Program.	NA	High	NA	Moderate
Fulton Street Neighborhood	Districts, Neighborhoods, & Population Clusters	Residential street located near Downtown Woodbridge containing many historic residences.	NA	Low	NA	Low
Ideal Homes Mobile Home Park	Districts, Neighborhoods, & Population Clusters	Trailer Park consisting of over 300 trailers. The trailer park is located in a floodplain and is prone to flooding events.	NA	High	NA	High
Alvin P. Williams Park	Natural Assets & Ecosystems	Local park and playground located on a peninsula between the Arthur Kill and Smith Creek.	Low	Moderate	Insignificant	Low
Boynton Beach	Natural Assets & Ecosystems	Waterfront property and beach area holding historic significance and ties to one of Woodbridge's original founders.	Moderate	High	High	High
Boynton Park	Natural Assets & Ecosystems	Provides playground facilities to residents of Woodbridge.	NA	Insignificant	NA	Insignificant
Dog Park	Natural Assets & Ecosystems	The dog park provides the proper containment and amenities for Woodbridge residents to be able to safely have their dogs play and socialize in public.	NA	Insignificant	NA	Insignificant
East Green Street Playground	Natural Assets & Ecosystems	Provides playground facilities to residents of Woodbridge.	NA	Insignificant	NA	Insignificant

Table 1. Summary of Woodbridge Coastal Vulnerability Assessment Matrix Continued						
Asset Name	Asset Category	Asset Function	Vulnerability Rating		Consequences Rating	
			SLR	CAT1	SLR	CAT1
Fourth Street Playground	Natural Assets & Ecosystems	Provides playground facilities to residents of Woodbridge.	NA	Insignificant	NA	Insignificant
Joseph Medwick Park	Natural Assets & Ecosystems	An 83 acre park located right along the Rahway River.	NA	Insignificant	NA	Insignificant
Merrill Park & Chain O Hills Road	Natural Assets & Ecosystems	Merrill Park is a 179 acre active and passive recreation park which includes playing fields, picnic areas, playground facilities, and wildlife habitat. Chain O Hills Road is a local access road used by the surrounding residences.	NA	High	NA	High
Parker Press Park	Natural Assets & Ecosystems	The Park provides a meeting area for Woodbridge to hold concerts, food events, shows, and other events.	NA	Insignificant	NA	Insignificant
Saint's Field	Natural Assets & Ecosystems	An active recreation park containing a football field used for Pop Warner Football League.	NA	Insignificant	NA	Insignificant
South Robert Street Park	Natural Assets & Ecosystems	An active recreation park containing playground facilities for use by residents of Woodbridge.	NA	Insignificant	NA	Insignificant
Woodbridge Creek & Wetlands Complex	Natural Assets & Ecosystems	A wetlands complex associated with the rivers and creeks throughout Woodbridge. At the mouth of Woodbridge Creek the wetlands consist of tidal marsh with riparian forest upstream. The entire wetlands area is overrun by phragmites.	Moderate	Low	High	Low

V. Recommendations

This section offers key steps that the township should consider following the vulnerability assessment, and discusses the long-term planning process that is integral to risk reduction and adaptation planning and implementation.

Short-term Considerations

1. Coordinate community outreach and education on flood vulnerabilities

In order for Woodbridge to better prepare for the future impacts of sea level rise and hurricane events, it is important to have an engaged and informed community. The results of this report should be shared with the community either at a public meeting or workshop, but at a minimum by posting it on the municipal website. The township should also consider special outreach to residents and property owners in the most vulnerable areas of Woodbridge, including Woodbridge Proper, Port Reading, Sewaren, and Keasby neighborhoods, educating them about future flood vulnerabilities and working together to find solutions that will protect Woodbridge at large and keep the fabric of the neighborhoods intact.

2. Consider completing a climate risk assessment for the municipal water utilities using EPA's Climate Resilience Evaluation and Awareness Tool (CREAT). The Climate Resilience Evaluation and Awareness Tool (CREAT) was developed under EPA's Climate Ready Water Utilities initiative, and assists drinking water, wastewater, and stormwater utility owners and operators in assessing the risks of climate change to their facilities. The tool is pre-loaded with flood hazard scenarios from which the user can choose for conducting the assessment. Significantly, the tool provides recommended adaptation measures that can reduce risks and help the facility owners and operators begin to take steps towards protection and resilience. Since the CVA does not

include an in-depth analysis of water utilities, this tool is recommended for those facilities that are located in existing or future flood prone areas.

Resources

- U.S. Environmental Protection Agency. [Assess Water Utility Climate Risks with Climate Resilience Evaluation and Awareness Tool.](#)

3. Share the results of the Coastal Vulnerability Assessment with owners and managers of vulnerable and at-risk non-residential properties and work together to develop mitigation and adaptation strategies. Many of Woodbridge’s at-risk assets are owned and managed by private businesses and industries, and public and quasi-public entities. These property owners may be aware of additional risks and vulnerabilities that were not identified in this CVA, or perhaps have already launched efforts to prepare for future risk reduction. Woodbridge is encouraged to reach out to these property owners to discuss the results of this report and future steps that may be taken individually and collectively to protect the properties from future flood hazards.

Suggestions

- Share the results of the CVA with at-risk non-residential property owners and operators.
- Consider convening a workshop or meeting with at-risk non-residential property owners and operators to discuss opportunities to collaborate on adaptation strategies to minimize risks and potential damage to future flood hazards.
- When working with flood-risk private industries in development proposals, redevelopment or other activities, promote the importance of emergency management planning site remediation and the safe storage of toxic materials.

4. Incorporate the results of the Coastal Vulnerability Assessment into the municipal master plan with short-term and long-term strategies for protecting and adapting the community assets and vulnerable areas. As the primary planning policy document for the community, the master plan should identify areas in the community that will likely be impacted by future flood hazards, and offer measures for mitigation and adaptation strategies to protect the community’s assets and properties.

Suggestions

- Include maps of projected sea level rise and future storm events in the land use plan and conservation plan elements of the municipal master plan.
- Identify natural resources that serve as protective flood mitigation measures (e.g. wetlands), and provide recommendations for maintenance and management in the conservation plan element.
- Identify planning policies for mitigation and adaptation strategies to protect properties from future flooding, including sea level rise and extreme storm events, in the land use plan element.

5. Cross-reference the Coastal Vulnerability Assessment in relevant sections of the municipal master plan, floodplain management plan, emergency operations plan and all hazards mitigation plan. Community flood risks are influenced largely by land use and development patterns that are grounded in local master plan policies. Hazard mitigation plans provide strategies to reduce these risks, in the past the plans have typically been stand-alone documents that rely upon structural mitigation measures, with little regard to land use and policy measures. The current trend in hazard mitigation planning is the integration with community plans, a trend which is strongly encouraged for all municipalities. Integrating flood risks and hazard mitigation into all local policy documents, especially master plans and hazard mitigation plans, ensures a coordinated, complementary approach to mitigation, and avoids potential conflicts from competing goals and interests.

Resources

- *Integrating Hazard Mitigation Into Local Planning, Case Studies and Tools for Community Officials*, FEMA, 2013

6. Consider partnering with the state, county or non-profits on an in-stream channel and floodplain restoration for the South Branch Rahway River to address fluvial erosion hazards to public roads and other infrastructure. Fluvial erosion is the natural process of a river adjusting its channel, banks and bed. This erosional process becomes a concern when development and infrastructure are in close proximity to the waterway. Fluvial erosion hazard refers to major streambed or bank erosion and/or channel adjustments after a large flooding event. This erosion becomes a hazard when it threatens public infrastructure, residential homes and commercial and industrial areas. Floodplain and in-stream channel restoration can help stabilize an adjusting stream channel by reducing the erosive stream power on the banks by redirecting the river flow and providing appropriate floodplain access and storage. This restoration techniques could be applied to help reduce conflicts of fluvial erosion and flood inundation hazards along Chain O Hills Road Merrill Park (County Park).

Resource

- The Federal Interagency Stream Restoration Workgroup through USDA Natural Resource Conservation Service. [Stream Corridor Restoration Principles, Processes, Practices](#). Chapter 8.F Streambank Restoration 8-61 (document page 475)

7. Consider expanding and enforcing riparian buffer requirements along all waterways and buffer requirements along wetlands. The riparian ecosystem lies in the transitional zone between an aquatic and upland ecosystem. This ecosystem can encompass both the floodway (river or stream channels and adjoining lands that carry water) and the floodplain (areas flooded during the 1% annual chance flood event). Riparian buffers are lands adjacent to streams, river, lakes and wetlands that are vegetated with native plants. The term is used for these lands because they buffer the aquatic environment from the developed lands adjacent to the waterway. During flood events these buffers also provide “room” for the river channel to expand with the increased flows and limit the property loss and damage. A riparian buffer ordinance could help reduce further degradation of Woodbridge’s stream floodways and floodplain by limiting development, vegetation removal, property storage, and by encouraging the planting of native tree and plants. Reviewing current land-use in areas of frequent tidal and nuisance flooding and where education and enforcement of riparian buffers would be appropriate.

Resource

- The New Jersey Department of Environmental Protection. *Riparian Zone Model Ordinance*. [Stream Corridor Restoration Principles, Processes, Practices](#).

8. Consider the use of living shorelines to protect community assets against shoreline erosion

Living shorelines are a shoreline stabilization practice that address erosion using a hybrid approach of strategically placed plants, stone, sand fill and other structural or organic materials. Living shorelines typically have other co-benefits such as flora and fauna habitat, flood mitigation, water quality and attractive, natural appearances. These practices are an alternative to the traditional hard or “gray” infrastructure (e.g. bulkheads, revetment walls, etc.), which are especially vulnerable to sea level rise and extreme flood events. Boynton Beach may be a good opportunity to install a living shoreline to minimize beach erosion and the impacts of flooding in the beach and surrounding properties.

Resource

- The Nature Conservancy. [Coastal Restoration Explorer Mapping tool](#).

9. Consider revising the municipal stormwater management and sewer plans to reflect the results of the CVA

The municipal stormwater management plan provides strategies for addressing current and future stormwater-related impacts that result from land use development, and strives to minimize flooding and protect community’s water quantity and quality, groundwater recharge and aquatic habitats. Stormwater management strategies include recommended performance and design standards that are incorporated into ordinances, as well as management and maintenance requirements. Increases in the variability of weather patterns and the frequency of extreme weather events occurring in New Jersey are putting stress on municipal stormwater infrastructure systems. Woodbridge’s stormwater infrastructure, including culverts, retention and detention ponds, inlets, catch basins, and stormwater pipes are all vulnerable to increases in flow of which they were not

designed to handle. The township should consider updating the municipal stormwater management plan to include the potential impacts of climate change and promote design and infrastructure projects that are more resilient to climate change. In addition the township may want to review its stormwater management policies and maintenance plans for municipally-owned facilities to assess for potential climate change impacts and whether changes are desirable to make these systems more resilient.

Resource

- The City of Ottawa [Wet Weather Infrastructure Management Plan](#)
- The City of Ottawa. [Adaptive Approaches in Stormwater Management](#)

Adaptation: A Long-Term Planning Process⁴

Planning for the predicted increase in the frequency and severity of flood hazards is a complex and challenging task. Adaptation to these flood hazards requires a longer planning timeframe for which most municipalities are not accustomed. Incremental steps are key to ensuring progress and minimizing public investments on projects that may be compromised by flooding in the near to distant future. This vulnerability assessment is an important first step in planning for these future hazards. The above recommendations provide key steps immediately following the vulnerability assessment to further identify and confirm vulnerabilities and consequences, and to begin thinking about adaptation. This section frames a strategic approach to identifying, assessing, and implementing long-term solutions to reducing flood risks. The process will need to be repeated periodically to respond to new data, changes in the physical environment and the long-term planning horizon.

Identify plans, studies and activities that are needed prior to identifying adaptation strategies

The township should re-convene the CVA committee or any other local flood management committee that includes a similar representation of multiple disciplines, e.g. municipal engineer, floodplain manager, planner, public works official, governing body representative, planning board representative, conservation planner, floodplain manager and emergency management official. This group should determine if there are data gaps or ambiguities in the CVA that need to be addressed to get a complete picture of vulnerability. For example, the community may want to field-verify certain sites or assets to determine if topography or adaptation measures may exacerbate or attenuate the projected flood impacts. If studies or plans are deemed necessary, the committee should identify who might take the lead. Also, the vulnerability and consequence ratings in this assessment should be compared with other current mitigation and planning documents to determine if there are any conflicts that should be addressed. Finally, the committee should determine which of the CVA recommendations will be implemented and who should take the lead.

Identify adaptation strategies

Given that the CVA's purpose is to identify vulnerabilities, not pose solutions, the critical next step is to identify and evaluate potential solutions. Using the vulnerability assessment of community assets and other pertinent data and reports (e.g. the hazard mitigation plan, beach nourishment program, flood management reports) identify the broadest range of possible solutions to reduce flood risks. Depending upon the magnitude of the vulnerabilities and consequences, the community may need to consult with coastal engineers outside of the community to fully realize the range of adaptation measures. DEP and

⁴ The term "adaptation" in this document refers to all measures to minimize flood risks, including "mitigation" projects and strategies, a term which is traditionally used by emergency managers and engineers.

other agencies and organizations may be available to provide workshops or host consultation meetings. This process of identifying adaptation strategies could take several months or more to fully understand the options available to the community.

The township should also determine whether a regional approach to an adaptation project is appropriate, and, if so, arrange for multi-jurisdictional meetings. The county or NJDEP Office of Coastal and Land Use Planning may be able to assist in scheduling or facilitating these meetings.

Once the broad list of adaptation options is created, the committee should select the most desirable projects and strategies to pursue, along with associated timeframes, funding options and project/task leads. The community may also want to conduct a cost-benefit analysis to prioritize adaptation strategies. Most adaptation projects will need to be reviewed the NJ Department of Environmental Protection to ensure they meet permitting requirements. Projects that cannot be approved or funded at this time should be noted and discussed in future iterations of this process.

Engage the Community

Host community meetings to discuss and solicit feedback on the recommended adaptation strategies while also educating the participants about flood risk.

Seek funding opportunities for adaptation planning and mitigation projects. Below is a short list of potential grant programs:

- [NJ Department of Community Affairs \(DCA\) planning assistance grants](#)
- [NJDEP Office of Coastal and Land Use Planning](#)
- [NJDEP Office of Flood Hazard Risk Reduction Measures](#)
- [FEMA Hazard Mitigation grants](#)
- [FEMA Pre-Disaster Mitigation grants](#)
- [FEMA Flood Mitigation Assistance grants](#)
- [US Army Corps of Engineers](#)
- Other Federal grant programs – see the Appendix of the [NOAA Adaptation Guide](#)

Develop an implementation strategy

Adaptation strategies should be integrated into the local hazards mitigation plan, capital improvement plan, master plan and ordinances to coordinate all related land use and adaptation policies and projects in the community. Key individuals and municipal departments should be assigned to lead and/or implement each of the adaptation strategies, along with proposed timeframes and funding options.

Schedule annual meetings

Unfortunately, there may not currently be sufficient resources and assistance available to address all of the community's identified vulnerabilities. Federal and State programs for coastal resiliency are still evolving, and grants, technical assistance, best practices and models, will inevitable become available. The committee should flag the issues for which solutions cannot be found and revisit them in the next adaptation planning process. Key staff should be charged with signing up for state and federal email lists that share grant and program information. And the committee should continue to meet at least once a year, even after all current options for making progress have been exhausted, to consider if new programs or solutions have become available.

APPENDIX A. WOODBRIDGE COASTAL VULNERABILITY ASSESSMENT MATRIX

Asset Name	Asset Category	Asset Description	Asset Function	2050 Depth		Exposure	Sensitivity	Vulnerability Rating		Consequences	Consequences Ratings	
				Sea Level Rise	CAT1 Hurricane			Sea Level Rise	CAT1 Hurricane		Sea Level Rise	CAT1 Hurricane
American Cyanamid	Community Resources & Amenities	Superfund and future development site.	American Cyanamid Co. is a superfund site located at Cutters Dock Road. The Environmental Protection Agency (EPA) identifies sites such as American Cyanamid Co. because they pose or had once posed a potential risk to human health and/or the environment due to contamination by one or more hazardous wastes	NA	0-7	Buildings by railroad largely untouched.	The property is a super-fund site, however current clean-up needs are unknown. The property is unaffected by sea level rise, but a storm surge event may spread contaminants to the surrounding area. The site will be redeveloped in the future, with the intent to raise the grade to bring the property above base flood elevation.	NA	Low	Flood waters could release and spread contaminated soils throughout the area. Extent and type of contaminants unknown.	NA	Low
Bayshore Recycling Corporation	Community Resources & Amenities	Recycling Center	The Bayshore Recycling Corporation is the largest recycling center in New Jersey. The facility receives recyclable material from towns and private companies. The recyclable materials are processed for reuse.	NA	0-1.5	No exposure to sea level rise, may see minimal inundation coming from vegetated canal to the east. Building not exposed.	None	NA	NA	None	NA	NA
Buckeye Tank Farm Terminal	Community Resources & Amenities	Ethanol Storage	Ethanol tank farms located in multiple locations along the Arthur Kill. The sites were previously owned by Hess. The bulk terminal facility stores and processes ethanol, moving through the region. Ethanol is moved to the facility via rail lines, stored in tanks, and finally loaded in tanks on barges moving up river. The floating docks along the Arthur Kill are used for loading onto barges.	NA	1-5.5	No exposure from sea level rise, may see major flooding during a CAT 1 event.	The tanks found throughout the property are susceptible from flooding impacts that can result in damage or destruction tanks.	NA	High	Damage to the tank farm has major and far reaching impacts for Woodbridge, the Raritan River, and neighboring communities. During Sandy, a damaged tank leaked thousands of gallons of chemicals into the Raritan River causing major environmental and public health damage that took months to clean up.	NA	High
C.P. Chemical & Woodbridge Tow yard	Community Resources & Amenities	Township tow yard and former chemical manufacturing location.	C.P. Chemicals was a specialty chemical manufacturing facility located on Arbor Street, on 14 acres of land in Sewaren, New Jersey. The property abuts Woodbridge Creek, which drains into the Arthur Kill. C.P. shut down all operations and has conducted site cleanup activities pursuant to an Administrative Consent Order (ACO) entered into between NJDEP and C.P. in 1991. Ownership of the C.P. property was transferred to the Township of Woodbridge. The site now serves as a tow yard for Woodbridge Township storing vehicles.	NA	1-5	No exposure from sea level rise, may see major flooding during a CAT 1 event.	Any equipment and vehicles that are located at the tow yard are moved prior to a storm event.	NA	Insignificant	None	NA	NA
Captain Hooks Marina	Community Resources & Amenities	Private Marina	A private marina.	0-0.5	1-4	Docks may be inundated with increasing sea level rise.	The marina consists of floating docks and bulkheads, which will rise with sea level rise. The marina itself is unlikely to experience impacts from a storm surge event, however, boats may cause damage and debris to other boats as well as other properties located landward of the marina. Boats may fair well in the waters though with limited to no impacts.	Insignificant	Moderate	Damage to boats is possible, and possible damage to floating docks and piers.	Insignificant	Low
Cliffside Marina	Community Resources & Amenities	Private Marina	A private marina.	0-1.5	7-9	Ramp area possible under water with increasing sea level rise.	The marina consists of floating docks and bulkheads, which will rise with sea level rise. The marina itself is unlikely to experience impacts from a storm surge event, however, boats may cause damage and debris to other boats as well as other properties located landward of the marina. Boats may fair well in the waters though with limited to no impacts.	Insignificant	Moderate	Damage to boats is possible, and possible damage to floating docks and piers.	Insignificant	Low
Conrail Railroad	Community Resources & Amenities	Rail lines	Transports petrol and ethanol to the various tank farms located throughout the region, for storage and transportation. The lines also see occasional freight transporting commercial and industrial goods and materials throughout the region.	NA	0-9	Rail yard area connected to Arthur Kill is the only area inundation, extending half a mile inland. Rail line running through industrial area unaffected.	The track bed may be inundated by storm surge that could erode the track bed and make the rail lines impassable by rail cars.	NA	Low	Trains carrying potentially dangerous chemicals and materials could derail from damaged tracks, releasing potentially dangerous materials into the surrounding industrial, commercial, and residential areas. Depending on the area a rail car was damaged it could impact anywhere between 400-6,000 residents. A damaged rail line could result in a loss of services and transport on a regional level that could result in massive loses to the regions economy.	NA	High
Fedex Distribution Center	Community Resources & Amenities	Distribution Center	Fedex main ground parcel center for the region.	NA	0.5-4.5	No exposure to sea level rise, may see several feet of inundation during a CAT 1 event.	The parking lot and buildings may see several feet of flooding, which could result in the damage and destruction of fleet vehicles and major damage to thousands of parcels processed through the distribution center.	NA	High	Impacts to the facility which cause a shut down for even a few days could result in a huge financial loss to Fedex and a major impact to regional economy. Millions of dollars of parcels could be damaged.	NA	High
Knot Just Bagels	Community Resources & Amenities	Bagel Shop	A bagel shop important to the employees of the Township.	NA	0-1.5	Possible inundation along backside of the building during a CAT 1 event.	The building may experience minimal flooding, but unlikely to impact building, with the exception of damage to equipment found inside.	NA	Low	Flood damage to the building would result in loss of equipment, supplies, and stock for the business. Replacement value of the equipment and supplies could pose a financial hardship for business owner. The financial impact could prevent business from re-opening.	NA	Moderate
McMyler Coal Dumper	Community Resources & Amenities	Historic Coal Dumper located in Port Reading	Part of the Reading Railroad "Port Reading" complex, used to pick up and tip 90 ton cars of coal into waiting ships or barges. The location is no longer in operation and has been left to decay in place. There is a contingent within the community that wish to preserve the historic site, however attempts to preserve the site have been unsuccessful.	0-1	5-7	May see minimal inundation from sea level rise near the Arthur Kill. May see major flooding during a CAT 1 event.	The McMyler Coal Dumper is listed as a historic structure, however, it has remained untouched and unmaintained for years. The structure is composed of reinforced concrete with some wood structures. In a major storm surge event it is likely to fall apart in place, with the chance for some debris to flow out into the Arthur Kill.	Insignificant	Low	The loss of the historic structure would have little to no impact on Woodbridge, however if the building was heavily damaged and large debris was released into the Arthur Kill it could potentially damage downstream buildings.	NA	Insignificant

Motiva Tank Farm Terminal	Community Resources & Amenities	Ethanol Storage	Ethanol tank farms located in multiple locations along the Arthur Kill. The bulk terminal facility stores and processes ethanol, moving through the region. Ethanol is moved to the facility via rail lines, stored in tanks, and finally loaded in tanks on barges moving up river. The floating docks along the Arthur Kill are used for loading onto barges. The floating docks along the Arthur Kill are used for loading onto barges. The site employs approximately 60 personnel.	NA	2.3-9.4	No exposure from sea level rise, may see major flooding during a CAT 1 event.	The tanks found throughout the property are susceptible to flooding impacts that can result in damage or destruction of tanks. During Sandy one tank starting leaking and contaminated Smith Creek. The rail line that operates the movement of ethanol is raised and may experience minor erosion from flood waters.	NA	High	Significant damage was previously seen causing a major spill of over 350,000 gallons of diesel into the Arthur Kill and Smith Creek. Contaminated waters will both impact the local aquatic ecosystem but can contaminate soils and water downstream of the site.	NA	High
Petro Express Gas Station	Community Resources & Amenities	Gas Station	One of many gas stations found throughout Woodbridge.	NA	0-0.5	Possible minimal impacts from a CAT 1 event.	The gas station may see minimal impacts, with little to no damage.	NA	Insignificant	There are numerous other gas stations in the community, losing just one for an extended period of time would have no impact.	NA	Insignificant
Pirates Cove Marina	Community Resources & Amenities	Private Marina	A private marina.	0-0.5	1-4	Docks may be inundated with increasing sea level rise.	The marina consists of floating docks and bulkheads, which will rise with sea level rise. The marina itself is unlikely to experience impacts from a storm surge event, however, boats may cause damage and debris to other boats as well as other properties located landward of the marina. Boats may fair well in the waters though with limited to no impacts.	Insignificant	Moderate	Damage to boats is possible, and possible damage to floating docks and piers.	Insignificant	Low
Port Reading School #9	Community Resources & Amenities	Public School	A public elementary school serving the Port Reading Neighborhood with children in grades kindergarten through fifth grade.	NA	0.2-3.2	Only playground and field area impacted from a CAT1 event, building not inundated.	As only the playground would be inundated the impacts are insignificant.	NA	Insignificant	None	NA	Insignificant
Sewaren Boat Launch	Community Resources & Amenities	Public Boat Launch	Provides a public access point for individuals to launch their boats into the water. Can also provide access to emergency water vessels to gain access to Woodbridge Township if need be.	0.5-1.5	6.5-10.5	Boat launch may see inundation from sea level rise. May see major flooding during a CAT1 event.	Little to no impact from storm surge event, flooding will eventually recede.	Insignificant	Insignificant	None	NA	Insignificant
Wakefern Food Corporation Facility	Community Resources & Amenities	Offices and Distribution Center for Wakefern Food Corporation	Corporate warehouse for Shoprite.	NA	0-2.5	No exposure from sea level rise, minimal inundation from a CAT 1 event.	The area surrounding the buildings, including the parking lots, may see minimal inundation. The buildings are elevated.	NA	Low	The building is elevated and it is likely that trucks and trailers could still drive through the minimal inundation safely, continuing operations with little impact.	NA	Low
Walgreens Pharmacy (17 Green St.)	Community Resources & Amenities	Pharmacy & Retail Store	One of many pharmacies serving Woodbridge.	NA	0-0.5	Only parking lot inundated, maybe minimal impacts to building from CAT 1 Event.	The intersection where Walgreens is located could experience flooding of several inches, which will result in the flooding of the parking lot. The flooding is a result of water unable to drain back to Woodbridge Creek due to tidal surge and limited drainage through Green Street Park and nearby culverts.	NA	Low	A minor closure of the Walgreens will have minimal impacts with other pharmacies located throughout Woodbridge. There may be some financial losses to this individual Walgreens but the impact to the community would be minimal.	NA	Insignificant
Woodbridge Board of Education Facility	Community Resources & Amenities	School Vehicle Storage Yard	School vehicle storage lot for Woodbridge Board of Education.	NA	0.2-1	Affecting parking lot only.	The parking lot may be inundated, however all buses and other vehicles are moved prior to a storm event.	NA	Insignificant	None	NA	Insignificant
Woodbridge Center	Community Resources & Amenities	Community Shopping Mall	Woodbridge Center is one of the largest malls on the East Coast, with approximately 1.5 million square feet of retail space, attracting shoppers from across the region. During times of emergency, Woodbridge Center is also used as an emergency shelter.	NA	NA	No exposure from sea level rise or CAT 1 Hurricane.	None	NA	NA	None	NA	NA
Woodbridge Municipal Marina & U.S. Coast Guard Auxiliary Station	Community Resources & Amenities	Public Marina &	A public marina that also houses a U.S. Coast Guard (USCG) Auxiliary trailer. The USCG Auxiliary serves as an important resource for Woodbridge, contributing to basic marine operations on the Raritan River, including search & rescue, as well as clean up efforts.	0-1.5	5-9	Ramp area possible under water with increasing sea level rise.	The marina consists of floating docks and bulkheads, the docks will rise with sea level rise. The marina itself is unlikely to experience impacts from a storm surge event, however, boats may cause damage and debris to other boats as well as other properties located landward of the marina. Boats may fair well in the waters though with limited to no impacts. The USCG Auxiliary trailer located on the property is currently being raised above the base flood elevation.	Insignificant	High	Damage to boats is possible, and possible damage to floating docks and piers. Loss of the USCG Auxiliary building could hinder clean up and rescue efforts during and after a storm event.	Insignificant	Moderate
Woodbridge Township Animal Shelter	Community Resources & Amenities	Animal Shelter & Pet Adoption Center	Municipal owned animal shelter and pet adaptation center. The animal shelter cares for the homeless and abandoned animals in Woodbridge while providing services that ensure public health and safety.	NA	4-5	No exposure from sea level rise, may see major flooding during a CAT 1 event.	The animal shelter is a two-story, solid concrete block building. During storm events animals are moved to the second floor for safety. In case of mandatory evacuation the shelter has a few vehicles to move and house animals, and agreements are in place to house animals at area veterinarian clinics and hospitals.	NA	Low	If the animal shelter is overwhelmed by a storm event either via inundation or by number of animals, animals will be moved to temporary shelters and/or area veterinarian hospitals and clinics.	NA	Low
C.P. Chemical Pumping Station	Critical Facilities & Infrastructure Systems	Waste Water Pumping Station	A facility containing pumps and equipment used to pump fluids from one place to another. Sewage pump stations are used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow. Designed to handle raw sewage. Sewage is fed into and stored in an underground pit, commonly known as a wet well. The well is equipped with electrical instrumentation to detect the level of sewage present.	NA	1.3	No exposure from sea level rise. Possible minor inundation during a CAT1 event.	The pump is submersible located in a wet well, with the main control panel elevated above ground. In as storm event once the ground is inundated the wet wells will be flooded, but as long as the control panels are not impacted the pump will continue to operate.	NA	Moderate	The pumping station serves a single site and thus if the pumping station was disrupted for a time, the impacts would be minimal.	NA	Low
PSE & G Woodbridge Substation	Critical Facilities & Infrastructure Systems	Electric Power Generation Substation and former EPEC Polymers site.	The Woodbridge substation is a power generation location for PSE & G located in the Keasbey Redevelopment Zone. The site is part of the former EPEC Polymers, the site has since been remediated and wetland restoration efforts are underway. Through a Brownfield Development Area Plan Woodbridge Township hopes clear a path to locate a future energy complex as part of the restoration and redevelopment.	NA	3-5.5	No exposure from sea level rise. May see several feet of inundation during a CAT 1 event.	Due to damage seen during Sandy, the substation is being rebuilt above base flood elevation at the uphill side of the property while the southern section of the property adjacent to the river will be converted to a constructed wetland system which will provide flood storage and ecological value. In turn this property will likely see little impact from storm surge event.	NA	High	The redevelopment and wetlands restoration will help with flood storage, sediment deposition and recharge. The site should develop into a major flood mitigation location and strategy for Woodbridge.	NA	High

Heyden Pumping Station	Critical Facilities & Infrastructure Systems	Waste Water Pumping Station	The waste water pump station is used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow. Sewage is fed into and stored in an underground pit, commonly known as a wet well. The well is equipped with electrical instrumentation to detect the level of sewage present.	NA	3.5-4.5	No exposure from sea level rise. May see several feet of inundation during a CAT 1 event.	The pump is submersible located in a wet well, with the main control panel elevated above ground. In a storm event once the ground is inundated the wet wells will be flooded, but as long as the control panels are not impacted the pump will continue to operate.	NA	Moderate	If the pump station was overwhelmed and shut down it would cause a failure up the line for other pump stations. A failure will result in temporary disruption of services for hundreds of residents and businesses.	NA	Moderate
New Jersey Turnpike (I-95)	Critical Facilities & Infrastructure Systems	Major Freeway & State Designated Evacuation Route	The New Jersey Turnpike (Interstate 95) serves as a major freeway, evacuation route, and vital transportation and commuter corridor.	NA	0-5	Inundation through middle of town and lowest points on the turn pike in the whole state, during a CAT 1 event.	In Woodbridge the NJ Turnpike is at its lowest elevation for the entire state. The Turnpike is a major evacuation route for the area and the state. Major storm events frequently cause the closing of the Turnpike, diverting evacuation routes and causes flooding in the surrounding area. The stormwater infrastructure in and around the Turnpike was recently upgraded to deal with flooding issues which limit flooding to surrounding areas.	NA	High	Locally the Turnpike, when flooded, can cause flooding to surrounding areas and residents. Temporary closure of the Turnpike will impact regional evacuation routes, forcing traffic onto other major roads causing delayed evacuations. Forcing traffic off of the Turnpike and other highways also forces traffic from other areas onto local roads that can cause traffic jams and public safety issues.	NA	High
New Jersey Route 35	Critical Facilities & Infrastructure Systems	Major Highway & State Designated Evacuation Route	New Jersey Route 35 serves as a major highway, evacuation route, and vital transportation and commuter corridor.	NA	0-12	Possible inundation on either side of the 35 bridge on the south end of town during a CAT 1 event.	NJ Route 35 is clear of flooding during a storm event, however the Edison bridge leading North and South may see major flooding on the south end of the bridge, cutting off traffic and evacuation in either direction.	NA	High	Temporary closure of the Route 35 will impact regional evacuation routes, forcing traffic onto other major roads causing delayed evacuations. Forcing traffic off of the well-known routes and onto local roads can cause traffic jams and public safety issues. In addition, NJ 35 Route closure impacts emergency access routes to the hospital be closed off, causing rerouting of EMS services and delays in people getting help.	NA	High
PSE & G-Sewaren Generating Station	Critical Facilities & Infrastructure Systems	Electric Power Generation Station	Substation located along the Arthur Kill in the Sewaren Neighborhood. The substation supplies power to Woodbridge and Fanwood neighborhoods in the surrounding area. PSE & G is currently constructing a replacement substation, when complete the Sewaren station will be demolished.	NA	3-5.5	No exposure from sea level rise. May see several feet of inundation during a CAT 1 event.	The substation was lost during Sandy and rebuilt above base flood elevation. Several feet of water will probably have minimal impact to the substation.	NA	Low	As the power station is elevated the vulnerability is low and the consequences are insignificant.	NA	Insignificant
U.S. Route 9	Critical Facilities & Infrastructure Systems	Major Highway & State Designated Evacuation Route	U.S. Route 9 serves as a major highway, evacuation route, and vital transportation and commuter corridor.	NA	0-5	Route 9 is only inundated just north of the municipal boundaries during a CAT 1 event.	US Route 9 may be inundated during a storm event just North of town next to the Rahway River, however Route 9 is one of three major North-South evacuation routes during an emergency. The state will close the road during flooding events, however no signage or barricades are placed. In the past vehicles have attempted to drive through flooding, getting trapped and in some cases resulting in death.	NA	High	Temporary closure of the Route 9 will impact regional evacuation routes, forcing traffic onto other major roads causing delayed evacuations. Forcing traffic off of the well-known routes and onto local roads can cause traffic jams and public safety issues. In addition, NJ 9 Route closure impacts emergency access routes to the hospital be closed off, causing rerouting of EMS services and delays in people getting help.	NA	High
Waste Water Pump Station (Carborundum)	Critical Facilities & Infrastructure Systems	Waste Water Pumping Station	The waste water pump station is used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow. Sewage is fed into and stored in an underground pit, commonly known as a wet well. The well is equipped with electrical instrumentation to detect the level of sewage present.	NA	0.2-0.7	No exposure from sea level rise. Possible minor inundation during a CAT1 event.	The pump is submersible located in a wet well, with the main control panel elevated above ground. In a storm event once the ground is inundated the wet wells will be flooded, but as long as the control panels are not impacted the pump will continue to operate.	NA	Moderate	The pumping station serves a single site and thus if the pumping station was disrupted for a time, the impacts would be minimal.	NA	Low
Waste Water Pump Station (Cliff Road)	Critical Facilities & Infrastructure Systems	Waste Water Pumping Station	The waste water pump station is used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow. Sewage is fed into and stored in an underground pit, commonly known as a wet well. The well is equipped with electrical instrumentation to detect the level of sewage present.	NA	2-3	No exposure from sea level rise. May see several feet of inundation during a CAT 1 event.	The pump is submersible located in a wet well, with the main control panel elevated above ground. In a storm event once the ground is inundated the wet wells will be flooded, but as long as the control panels are not impacted the pump will continue to operate.	NA	Moderate	If the pump station was overwhelmed and shut down it would cause a failure up the line for other pump stations. A failure will result in temporary disruption of services for hundreds of residents and businesses.	NA	Moderate
Waste Water Pump Station (Homestead)	Critical Facilities & Infrastructure Systems	Waste Water Pumping Station	The waste water pump station is used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow. Sewage is fed into and stored in an underground pit, commonly known as a wet well. The well is equipped with electrical instrumentation to detect the level of sewage present.	NA	3	No exposure from sea level rise. May see several feet of inundation during a CAT 1 event.	The pump is submersible located in a wet well, with the main control panel elevated above ground. In a storm event once the ground is inundated the wet wells will be flooded, but as long as the control panels are not impacted the pump will continue to operate.	NA	Moderate	If the pump station was overwhelmed and shut down it would cause a failure up the line for other pump stations. A failure will result in temporary disruption of services for hundreds of residents and businesses.	NA	Moderate
Waste Water Pump Station (Keasbey Complex)	Critical Facilities & Infrastructure Systems	Waste Water Pumping Station	The waste water pump station is used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow. Sewage is fed into and stored in an underground pit, commonly known as a wet well. The well is equipped with electrical instrumentation to detect the level of sewage present.	NA	1.5	No exposure from sea level rise. Possible minor inundation during a CAT1 event.	The pump is submersible located in a wet well, with the main control panel elevated above ground. In a storm event once the ground is inundated the wet wells will be flooded, but as long as the control panels are not impacted the pump will continue to operate.	NA	Moderate	The pumping station serves a single site and thus if the pumping station was disrupted for a time, the impacts would be minimal.	NA	Low
Waste Water Pump Station (Koppers Koke)	Critical Facilities & Infrastructure Systems	Waste Water Pumping Station	The waste water pump station is used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow. Sewage is fed into and stored in an underground pit, commonly known as a wet well. The well is equipped with electrical instrumentation to detect the level of sewage present.	NA	0.5	No exposure from sea level rise. Possible minor inundation during a CAT1 event.	The pump is submersible located in a wet well, with the main control panel elevated above ground. In a storm event once the ground is inundated the wet wells will be flooded, but as long as the control panels are not impacted the pump will continue to operate.	NA	Moderate	The pumping station serves a single site and thus if the pumping station was disrupted for a time, the impacts would be minimal.	NA	Low
Waste Water Pump Station (Mileed Way)	Critical Facilities & Infrastructure Systems	Waste Water Pumping Station	The waste water pump station is used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow. Sewage is fed into and stored in an underground pit, commonly known as a wet well. The well is equipped with electrical instrumentation to detect the level of sewage present.	NA	0.1-0.6	No exposure from sea level rise. Possible minor inundation during a CAT1 event.	The pump is submersible located in a wet well, with the main control panel elevated above ground. In a storm event once the ground is inundated the wet wells will be flooded, but as long as the control panels are not impacted the pump will continue to operate.	NA	Moderate	The pumping station serves a single industrial site and thus if the pumping station was disrupted for a time, the impacts would be minimal.	NA	Low

Waste Water Pump Station (Saints Field)	Critical Facilities & Infrastructure Systems	Waste Water Pumping Station	The waste water pump station is used for pumping wastewater or sewage from a lower to higher elevation, particularly where the elevation of the source is not sufficient for gravity flow. Sewage is fed into and stored in an underground pit, commonly known as a wet well. The well is equipped with electrical instrumentation to detect the level of sewage present.	NA	1.5-4	No exposure from sea level rise. May see several feet of inundation during a CAT 1 event.	The pump is submersible located in a wet well, with the main control panel elevated above ground. In a storm event once the ground is inundated the wet wells will be flooded, but as long as the control panels are not impacted the pump will continue to operate.	NA	Moderate	The pumping station serves a small recreation site and thus if the pumping station was disrupted for a time, the impacts would be minimal.	NA	Low
Woodbridge Center Parking Lot	Critical Facilities & Infrastructure Systems	Parking Lot & Debris Staging Location	Serves as parking lot for Woodbridge Center. Prior to, during, and after emergency events the parking lot is used for temporary storage and debris staging.	NA	NA	No exposure from sea level rise or CAT 1 Hurricane.	None	NA	NA	None	NA	NA
Woodbridge Police Pistol Range	Critical Facilities & Infrastructure Systems	Police Training Pistol Range	A police firearms training facility managed by both Woodbridge Township and Middlesex County to serve as a Pistol Range for not only WPD but all law enforcement entities in Middlesex County.	NA	8	No exposure from sea level rise. May see several feet of inundation during a CAT 1 event.	The pistol range is devoid of structures with the exception of trailers located on site. The trailers are easily moved and have quick connections that allow the trailers to be moved quickly and easily prior to a storm event. The Woodbridge Police trailer is also located on higher ground.	NA	Insignificant	Police trailer is moved and water would simply flow through and out of the area.	NA	Insignificant
Woodbridge Township Department of Public Works	Critical Facilities & Infrastructure Systems	Public Works Offices & Yard	The main offices and equipment yard for the Department of Public Works responsible for conducting the crucial labor needed to ensure the town of Woodbridge operates in an efficient manner. Responsibilities include operations and maintenance for roads, parks, sanitation, waste water, mechanics, and recycling.	NA	0.5-7	No exposure from sea level rise. May see several feet of inundation during a CAT 1 event.	The building is an old steel fabricating facility, constructed of concrete and metal sheeting. During flood events all vehicles and equipment are moved. The building may be inundated but once water recedes there is little to no damage.	NA	Insignificant	Water would flow through building and flow out, minimal clean up would be required and the building would suffer next to no damage.	NA	Insignificant
Woodbridge Township Division of Wastewater	Critical Facilities & Infrastructure Systems	Main Pumping Station & Control Center for the Division of Wastewater	Houses all the pumps, machinery, and equipment necessary to ensure the wastewater produced by Woodbridge Township is pumped out of town to be processed in an efficient and sanitary manor.	NA	2.5-4	No exposure from sea level rise. May see several feet of inundation during a CAT 1 event.	In the event of a storm event the wastewater facility may see inundation, however the building and equipment may see minimal impacts or damage. The pump room and generator room are above base flood elevation. The control panels and main wiring are raised above base flood elevation and if not inundated the main facility should continue to operate. Wastewater combined with storm water could overwhelm the facility in an extreme event.	NA	High	If the main pump station were to be damaged or service disrupted the impact would be great. If the main facility went down all other facilities and pump stations up the line would stop functioning. As the facility is the closest to the Raritan River, any back up and/or overflow from the system would flow into the river, causing environmental degradation. Wastewater services for Woodbridge and a few surrounding communities would be disrupted for an extended period of time.	NA	High
Blue Acres Buyout Properties	Districts, Neighborhoods, & Population Clusters	Former residential housing area located along Woodbridge Creek and other creeks throughout Woodbridge	A former residential neighborhood, consisting of 189 homes purchased through New Jersey's Blue Acres Program. Blue Acres buyout areas are formerly residential areas that have suffered repeated flooding events over the last 20 to 30 years and have been acquired by municipality to convert back to open space. The Blue Acres buyout program aims to move residents out of flood hazard areas and build up buffer zones which can provide flood protection for the rest of the community during future events.	NA	0-7	No exposure from sea level rise. May see several feet of inundation during a CAT 1 event.	The Blue Acres sites within Woodbridge consist of properties that have been bought-out and properties that did not take part in the program and still contain residential homes. The Blue Acres sites repeatedly flood during storm events, however residents remain. Residents remaining at in the buy-out areas create issue with emergency rescue in these high risk areas and municipal services to limited number of residents. In addition, the residential structures continue to see damage.	NA	High	The bought-out properties will revert back to wetlands and open floodplain, which in time will create flood storage and flood mitigation for Woodbridge as whole. However, residents located throughout the Blue Acres sites that do not participate in the buy-out program will continue to impact emergency services and the need for infrastructure repairs and upgrades.	NA	Moderate
Fulton Street Neighborhood	Districts, Neighborhoods, & Population Clusters	Section of town located in Woodbridge	Residential street located near Downtown Woodbridge containing many historic residences.	NA	0.5-6	No exposure from sea level rise. May see several feet of inundation during a CAT 1 event.	The neighborhood is susceptible to flooding coming from the NJ Turnpike, when the pump station located near the turnpike is overwhelmed. A storm surge event with upwards of 6 ft. of inundation may cause some damage to the first floor of residential structures in the neighborhood. The stormwater infrastructure has recently gone through major upgrades.	NA	Low	Many of the residential structures in the neighborhood are raised, however there may be some damage to a few homes in the neighborhood. Damage to homes would likely be minimal and would not impact residents safety.	NA	Low
Ideal Homes Mobile Home Park	Districts, Neighborhoods, & Population Clusters	Trailer Park located along Woodbridge Creek	Trailer Park consisting of over 300 trailers. The trailer park is located in a floodplain and is prone to flooding events.	NA	0-7	No exposure from sea level rise, but will see major inundation from a CAT 1 event in the future. Almost 75% of the trailer park would be inundated.	Although the trailer park itself would be evacuated prior to a storm surge event, almost 75% of the homes could experience major damage, leaving hundreds homeless. The trailers could also become a concern as debris for the surrounding area and within Woodbridge Creek.	NA	High	Substantial damage to the trailer park could result in the loss of several hundred homes and displace up to a 1,000 residents. In case of a major storm event death could result if residents do not evacuate in time. People trapped in the trailer park would possibly require rescue during the storm event placing public safety officers in danger. Debris would cover a large surrounding area and major clean up would be required.	NA	High
Alvin P. Williams Park	Natural Assets & Ecosystems	Active & Passive Recreation Park	Local park and playground located on a peninsula between the Arthur Kill and Smith Creek.	0.5-1	0-8	SLR affects edges of park. Center of park unaffected by CAT 1.	The park peninsula is made of dredge from Smith Creek and the Arthur Kill. There is contamination under the park which the county had to cap when developed. The cap is susceptible to erosion from storm surge, as witnessed during Sandy, when the cap suffered damage. Sea level rise in 2050 would have minimal impacts and small loses of land.	Low	Moderate	The extent of the remaining contamination is unknown. Contaminated soils suspended into the water column can cause environmental impacts and human hazard when exposed to contaminated water.	Insignificant	Low
Boynton Beach	Natural Assets & Ecosystems	Sea wall located on the Arthur Kill.	Waterfront property and beach area holding historic significance and ties to one of Woodbridge's original founders.	0.7-0.9	2-10	May see inundation along beach front from sea level rise. May see several feet of inundation during a CAT1 event.	Sea level rise contributes to the continued erosion along unprotected areas of the beach and road system. Storm surge events cause major erosion damage all the way back to Cliff Road, as witnessed during Sandy, where water inundated the road, and eroded sidewalks and unprotected land.	Moderate	High	Continued erosion of Boynton Beach from sea level rise and from major storm events will cause local access and emergency services access to be severely hindered. Residents may find their homes cut off from the main road infrastructure. As well continued erosion may cause residential structures to become unstable and uninhabitable.	High	High
Boynton Park	Natural Assets & Ecosystems	Active & Passive Recreation Park	Provides playground facilities to residents of Woodbridge.	NA	0-7	Coming from back along creek, does not impact, tennis courts, or swimming pool area.	Little to no impact from storm surge event, flooding will eventually recede.	NA	Insignificant	None	NA	Insignificant

Dog Park	Natural Assets & Ecosystems	Active Recreation Park	The dog park provides the proper containment and amenities for Woodbridge residents to be able to safely have their dogs play and socialize in public.	NA	1-7	No exposure from sea level rise. May see several feet of inundation during a CAT 1 event.	Little to no impact from storm surge event, flooding will eventually recede.	NA	Insignificant	None	NA	Insignificant
East Green Street Playground	Natural Assets & Ecosystems	Active Recreation Park	Provides playground facilities to residents of Woodbridge.	0-0.5	7	SLR is minor along park's river edge and small areas landwards.	Little to no impact from storm surge event, flooding will eventually recede.	NA	Insignificant	None	NA	Insignificant
Fourth Street Playground	Natural Assets & Ecosystems	Active Recreation Park	Provides playground facilities to residents of Woodbridge.	NA	1-5	No exposure from sea level rise. May see several feet of inundation during a CAT 1 event.	Little to no impact from storm surge event, flooding will eventually recede.	NA	Insignificant	None	NA	Insignificant
Joseph Medwick Park	Natural Assets & Ecosystems	Active & Passive Recreation Park (County-Owned)	An 83 acre park located right along the Rahway River, deemed a Carteret Park.	0-4	4-12	May see inundation along river front from sea level rise. May see major flooding and inundation during a CAT1 event.	Little to no impact from storm surge event, flooding will eventually recede.	NA	Insignificant	None	NA	Insignificant
Merrill Park & Chain O Hills Road	Natural Assets & Ecosystems	Active Recreation Park (County-Owned) & Local Access Road (Municipal-Owned)	Merrill Park is a 179 acre active and passive recreation park which includes playing fields, picnic areas, playground facilities, and wildlife habitat. Chain O Hills Road is a local access road used by the surrounding residences.	NA	0.5-1	Minor flooding along South Branch Rahway River in park.	The park itself will experience minimal impact from a storm surge event. Chain O Hills Road could experience erosion issues from the South Branch Rahway River that runs through the park and along the road. The river has been eroding for years causing Woodbridge to move pumps and is creating sediment build up down stream. A storm event would only exacerbate these issues further and cause Chain O Hills Road to become unstable and unsafe.	NA	High	Continued erosion of the South Branch Rahway River banks will eventually destabilize the Chain O Hills Road, and could exposure and damage the sewer and water mains that are underneath and near the road. The loss of service would impact hundreds of homes in the area, and the loss of the road would cause access and emergency services access issues for the local residents.	NA	High
Parker Press Park	Natural Assets & Ecosystems	Active & Passive Recreation park	The Park provides a meeting area for Woodbridge to hold concerts, food events, shows, and other events.	NA	0.8-2.3	No exposure from sea level rise. May see several feet of inundation during a CAT 1 event.	Little to no impact from storm surge event, flooding will eventually recede.	NA	Insignificant	None	NA	Insignificant
Saint's Field	Natural Assets & Ecosystems	Active Recreation Park	An active recreation park containing a football field used for Pop Warner Football League.	NA	0-5.5	No exposure from sea level rise. May see several feet of inundation during a CAT 1 event.	Little to no impact from storm surge event, flooding will eventually recede.	NA	Insignificant	None	NA	Insignificant
South Robert Street Park	Natural Assets & Ecosystems	Active Recreation park	An active recreation park containing playground facilities for use by residents of Woodbridge.	NA	3-7	No exposure from sea level rise. May see several feet of inundation during a CAT 1 event.	Little to no impact from storm surge event, flooding will eventually recede.	NA	Insignificant	None	NA	Insignificant
Woodbridge Creek & Wetlands Complex	Natural Assets & Ecosystems	Wetlands complex associated with the rivers and creeks throughout Woodbridge	A wetlands complex associated with the rivers and creeks throughout Woodbridge. At the mouth of Woodbridge Creek the wetlands consist of tidal marsh with riparian forest upstream. The entire wetlands area is overrun by phragmites. Due to sedimentation over the years the tide does not reach historically tidal locations. Future dredging projects may return tidal influence further upstream.	0-4	4-12	Area will see possible impacts from sea level rise and a CAT 1 Hurricane.	Wetlands systems with continued daily inundation may convert to open water or mudflats limiting their flood hazard mitigation function to the community. In addition when converted to open water or mudflats all water purification functions are lost limiting ability of the river to bounce back after flooding event.	Moderate	Low	The wetlands along the Woodbridge Creek provide flood storage, slow waters, and a place for sediment to deposit. These flood hazard mitigation properties will be lost if converted to mudflats or open waters, leading to exacerbated flooding and flood damage throughout Woodbridge.	High	Low

Appendix B – Vulnerability Rating Key

Vulnerability Rating Key	
Level	Vulnerability Rating Given Hazard Exposure and Sensitivity
Insignificant	<p><i>Exposure to Flooding:</i> This community asset is located out of harm’s way.</p> <p><i>Physical/Structural Damage:</i> No physical/structural damages expected.</p> <p><i>Disruption/Impairment:</i> No disruption in function, accessibility, or development and delivery of basic services and supplies. No apparent impacts to services provided by, typical operations, routine or daily life.</p> <p><i>Accessibility:</i> Key staff able to access facilities or locations without interruption.</p>
Low	<p><i>Exposure to Flooding:</i> The majority of this community asset is located out of harm’s way.</p> <p><i>Physical/Structural Damage:</i> Minor physical/structural damages expected.</p> <p><i>Disruption/Impairment:</i> Limited disruption in function, accessibility, or development and delivery of basic services and supplies. Limited impacts to typical operations, routine or daily life, if any.</p> <p><i>Accessibility:</i> Key staff able to access facilities or locations with minimal interruption.</p>
Moderate	<p><i>Exposure to Flooding:</i> A significant portion of this community asset is located in harm’s way.</p> <p><i>Physical/Structural Damage:</i> Moderate physical/structural damages sustained.</p> <p><i>Disruption/Impairment:</i> Moderate level of disruption to accessibility or mobility of asset, amenity or population. Moderate level of interruptions to development and delivery of basic services and supplies. Typical operations, routine or daily life moderately affected by flood hazard scenario.</p> <p><i>Accessibility:</i> Secondary evacuation and access routes available for use if/when primary systems fail.</p>
High	<p><i>Exposure to Flooding:</i> The majority of this community asset is located in harm’s way.</p> <p><i>Physical/Structural Damage:</i> Severe level of harm (destruction on property or degradation of function and/or injury) is expected, resulting in a high degree of loss. Asset, amenity or population is unable to withstand flood impacts.</p> <p><i>Disruption/Impairment:</i> Severe, potentially irreparable challenges faced requiring significant changes to asset functioning, community’s daily life or "new normal." Production, provision of services or daily routine expected to sustain high degree of disruption. Significantly reduced operational capacity of community assets and amenities; long term or permanent relocation of asset, amenity or population.</p> <p><i>Accessibility:</i> Severe disruptions to accessibility of asset, amenity or population or the disruption of this assets causes accessibility issues to other community assets. Key individuals, material supplies, core operating systems and functioning interrupted or unavailable.</p>

Appendix C – Consequences Rating Key

Consequences Rating Key	
Level	Given Vulnerability of Assets, Rate the Magnitude or Severity of Consequences
1	Insignificant
	<p><i>Property Damages:</i> Only minor property damage.</p> <p><i>Typical Operations/Daily Life:</i> No impacts or disruptions to typical operations, routine or daily life.</p> <p><i>Environment:</i> No lasting environmental degradation.</p> <p><i>Emergency Response:</i> No adverse effects to emergency response.</p> <p><i>Hazardous Materials:</i> No increase or change in community/ecosystem exposure to toxics or hazardous materials.</p> <p><i>Municipal Budget:</i> Negligible operational costs.</p>
2	Minor
	<p><i>Property Damages:</i> Limited property in narrow affected area damaged or destroyed.</p> <p><i>Typical Operations/Daily Life:</i> Limited disruption to typical operations, routine or daily life.</p> <p><i>Environment:</i> Minor damage or loss to habitat and species or functioning of the systems as a component of “coastal green infrastructure” of the community. Small loss of natural resource base. Increased, but tolerable stress on ecosystem.</p> <p><i>Emergency Response:</i> Slight decrease in emergency response times and effectiveness</p> <p><i>Hazardous Materials:</i> Limited hazardous materials spill, manageable clean-up and remediation.</p> <p><i>Municipal Budget:</i> Additional but tolerable operational costs.</p>
3	Moderate
	<p><i>Property Damages:</i> Substantial property in affected area damaged or destroyed.</p> <p><i>Population Displacement:</i> Long-term population displacement over a broader segment of the population.</p> <p><i>Typical Operations/Daily Life:</i> Daily life is affected such that only redundant systems can be used for an extended duration.</p> <p><i>Environment:</i> Major damage or loss of habitat or functioning of the systems as a component of “coastal green infrastructure” of the community that may be permanent with adverse impacts.</p> <p><i>Emergency Response:</i> Emergency response is strained resulting in significant degradation of response effectiveness and times.</p> <p><i>Hazardous Materials:</i> Large hazardous material spill with significant risk to humans and ecosystems.</p> <p><i>Municipal Budget:</i> High operational costs straining local budgets</p>
4	High
	<p><i>Property Damages:</i> Majority of property in affected area damaged or destroyed</p> <p><i>Population Displacement:</i> Permanent and widespread population displacement.</p> <p><i>Delivery of Services:</i> Long-term interruption of supply and services.</p> <p><i>Typical Operations/Daily Life:</i> Majority of community operations, daily life patterns intensely impacted for an extended period.</p> <p><i>Environment:</i> Permanent degradation of habitat or functioning of the systems as a component of “coastal green infrastructure” of the community.</p> <p><i>Emergency Response:</i> Need for emergency services exceeds full capacity and/or services are degraded and not functioning.</p> <p><i>Hazardous Materials:</i> Hazardous material spill that requires multi-year clean-up and poses significant health or ecosystem risk.</p>

Appendix D – Municipal CVA Committee

Municipal CVA Committee

Woodbridge convened a diverse group of municipal representatives and community leaders to participate in the CVA process facilitated by Sustainable Jersey. The meetings were held on October 14th, 2015, November 13th, 2015 and December 1st, 2015 at the Woodbridge Township Hall. The meeting attendees are shown below.

Appendix E. Woodbridge CVA Participants.		
Participant	Title	Affiliation
Caroline Ehrlich	Chief of Staff / Executive Director	Office of the Mayor / Woodbridge Township Redevelopment Agency
Casey Wagner	Buy Local Liaison	Office of the Mayor
Jeffrey Mayerowitz	Assistant to the Chief of Staff / Grants Officer	Office of the Mayor
Patrick Kenny	Emergency Management Director	Woodbridge
Stacy Hoffman	Office of Emergency Management	Woodbridge
Scott Lee Thompson	Municipal Engineer	Division of Engineering, Department of Public Works
Carmine Barbato	Superintendent	Divisions of Streets and Sewers, Department of Public Works
Marta Lefsky	Director	Department of Planning & Development
Sean Burns	GIS/Tax Map Specialist	Division of Engineering
Nick Angarone	Planner	NJ Department of Environmental Protection
Nathaly Agosto Filion	Resiliency Manager	Sustainable Jersey
Jack Heide	Resiliency Manager	Sustainable Jersey
Emma Melvin	Green Infrastructure Coordinator	Sustainable Jersey