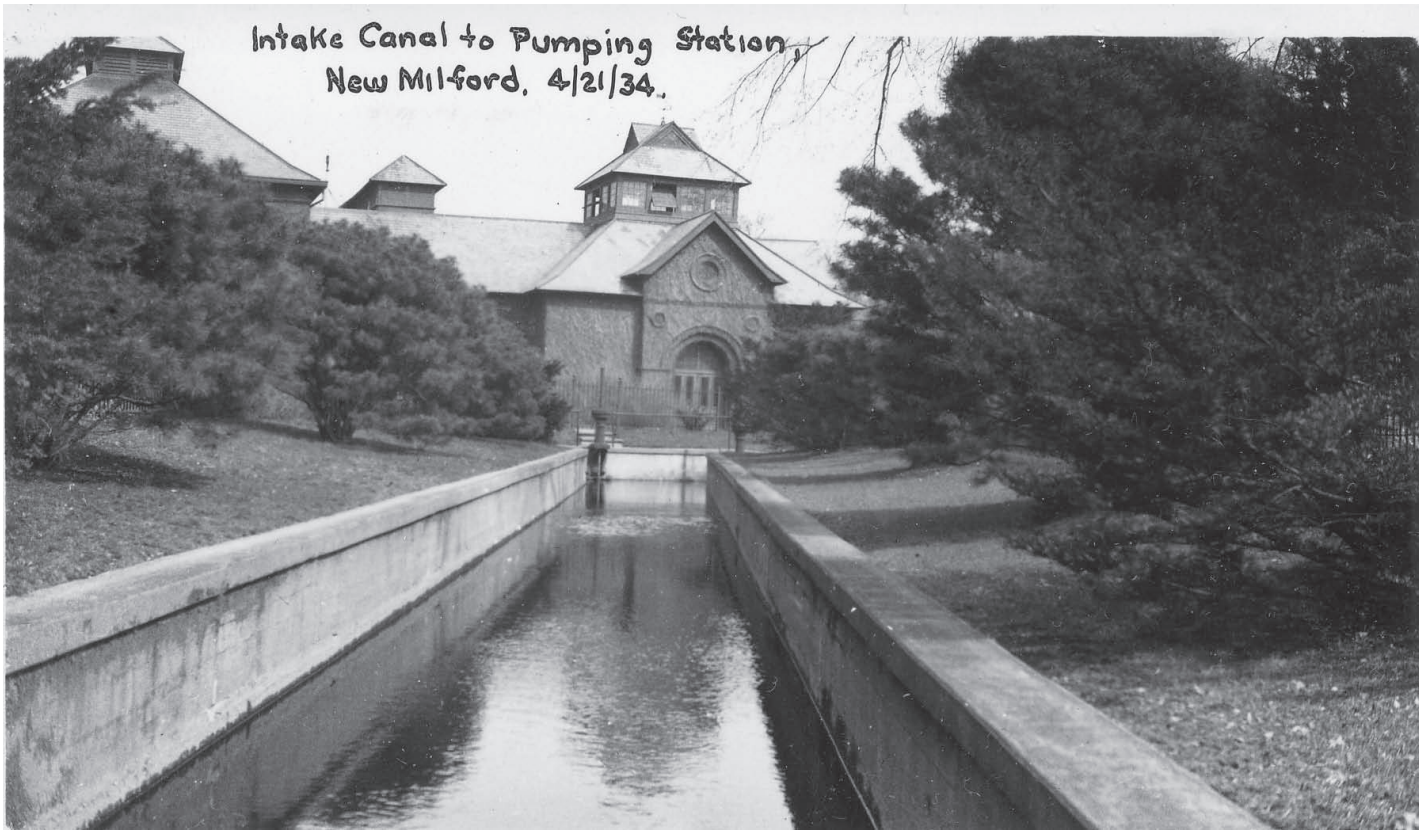
Van Buskirk Island
Cultural Landscape Report

2/2012



Van Buskirk Island County Park
New Milford Plant of the Hackensack Water Company County Historic Site
New Milford Avenue, Elm Street and Madison Avenue

Boroughs of Oradell and New Milford
County of Bergen, New Jersey

Department of Landscape Architecture
Center for Urban Environmental Sustainability
School of Environmental and Biological Sciences
Rutgers, The State University of New Jersey

CUES
Center for Urban Environmental Sustainability

RUTGERS
School of Environmental and Biological Sciences

Project

Van Buskirk Island Cultural Landscape Report
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New Milford Plant of the Hackensack Water Company County Historic Site
New Milford Avenue, Elm Street and Madison Avenue
Boroughs of Oradell and New Milford
County of Bergen, New Jersey

Oradell: part of Block 120, lot 1; Block 121, lot 6; Block 122, lot 1; Block 123, lot 1; Block 1213

New Milford: Block 1301, lot 1*, lot 2, Block 1308, lot 1; part of Block 1309, lot1*; Block 1524, lot 1; Block 1523 lot 2
(*not owned by Bergen County)

Total study area approx. 40.3 acres

Prepared by

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0 Executive Summary

Bergen County Division of Cultural and Historic Affairs applied for and was awarded funding from the New Jersey Historic Trust to assist in protection, stabilization and prevention of further deterioration of the Hackensack Water Works (HWW) historic structures. Bergen County Open Space, Recreation, Farmland and Historic Preservation Trust Fund committed resources to develop a Cultural Landscape Report, whose goal is to preserve the integrity of the historic vernacular landscape, provide access for the general public, and create a framework for long-term sustainable use. This Report follows the Secretary of the Interior's Standards (National Park Service - NPS) for Treatment of Historic Properties and Guidelines for the Treatment of Cultural Landscapes.

The Hackensack Water Company's New Milford Plant opened in 1882, was expanded eight times, and operated continuously until 1990; the site has been abandoned since 1993 since its transfer to Bergen County. The plant is an exceptional example of American industrialization, exemplifying the struggle to provide pure water for an expanding population in the late 19th and early 20th centuries. The HWW site was added to New Jersey's Register of Historic Places on June 21, 2001, and to the National Register of Historic Places on August 22, 2001. The 2001 listing includes the principal historic structures: pump station (c. 1882-1911), filtration plant (c. 1903-1955), and coagulation/settling basin (c. 1903-1906). The 13.31 acres under historic preservation are located in the Borough of Oradell on Lot 1, Block 123 (July 1985 Tax Map). This Cultural Landscape Report includes acreage beyond the historic 13.31 acres because research shows that the integrity of the historic landscape is dependent on inclusion of additional significant elements. These additional elements include the whole of Van Buskirk Island and the site of workers' housing. Although part of the functional HWW, a parcel south of New Milford Avenue between River Road and Madison Avenue used to dump dredge from the coagulation basin is not included in the Report because this area has little historic significance.

The HWW is an example of a *historic vernacular landscape*, defined by NPS Guidelines as "a landscape that evolved through use by the people whose activities or occupancy shaped that landscape." NPS includes industrial complexes in this definition. The post-Civil War era from 1882 when the first building was erected until 1936 is the most significant period affecting the site's appearance. The overall landscape significance is very high because the HWW is one of the few remaining examples of a historic water treatment facility where human activities that shape the landscape—water collection, treatment, and delivery—are still clearly visible. A comparison between HWW and other water treatment facilities built and operated during the same period shows the completeness and integrity of the HWW site is unique. One can visualize the "way-of-the-water" and grasp the interplay between natural resource use and U.S. industrial expansion. The landscape retains a remarkable resemblance to the site's historic appearance, leading to the overall assessment of *High Landscape Integrity*. As defined by NPS, a *Rehabilitation Approach* will ensure that significant features and the overall integrity of the historic landscape will be retained. This approach allows the site to be reused, accessible and enjoyable for the public at large. At the same time, any reuse options must preserve the ecological services and habitat values associated with the site.

Pre-1882

Van Buskirk Island is located on the Piedmont Plateau portion of the Atlantic Slope, underlain by shale and sandstone associated with traprock ridges dating from the Triassic Era. The ending of the last Ice Age, approximately 10,000 years ago and subsequent retreat of the Wisconsin glacier marked the beginning of river and marshland development along New Jersey's eastern coastline. In tidal lands upriver of Newark Bay that were sheltered from the wave action and storms of the Atlantic Ocean, estuarine and freshwater marshes formed. Earliest recorded

humans who made use of the natural resources of the Hackensack River were members of the Lenape Nation. Hackensack, Tappan, and Pascack tribes farmed in the Hackensack Valley and construction of the Oradell Reservoir unearthed Lenapi artifacts. Therefore, it appears that the first human users of the Van Buskirk Island historic site were Native Americans.

European settlers viewed the marshes as swamps in need of reclamation for crop cultivation. Most early settlers were farmers who also built mills on the Hackensack River. Mill dams were an early feature built to harness the energy of the tidal portion of the Hackensack River. The first permanent settlers in New Milford built a mill dam near the site of the "Old Bridge" that provided power for mills, a place to cross the Hackensack River, and the northern most stopping point for boats traveling between New Milford and New York City. Early maps indicate that Van Buskirk Island was a spit of land at the head of tide curving out from the western bank of the Hackensack River. A mill raceway was there prior to the American Revolution.

Lawrence Van Buskirk, the first Van Buskirk settler acquired 1,076 acres in 1681 south of what was then known as New Bridge Road. Houses and farms clustered around Van Buskirk's mill , which stood at the foot of New Milford Avenue, then known as Mill Road. The original saw mill on the property prior to the American Revolution was converted to a tannery and a bleaching mill, and subsequently into a grist mill that ran continuously for forty-five years. The mill was located on the present day Hackensack Water Works site on the island named for the Van Buskirk family. There is evidence the island "grew" as a result of a canal dug along the west bank of the river by John and Jacob Van Buskirk. John Van Buskirk owned another mill north of the current Oradell Avenue bridge that was sold to Jacob Voorhis. When this mill burned the water rights were purchased by Albert Ackerman. In 1863, the property was purchased by William Veldran, who operated a combination saw-grist mill for three additional generations until selling the mill and water rights to the Hackensack Water Company in 1901 for the construction of the Oradell reservoir.

Although farming dominated in the valley, other local industries were supported by the area's natural resources. Commercial fisherman caught herring and shad from the river and local red ware pottery was produced using the Hackensack River's red clay.

Post-1882

On March 4, 1870 the railroad came to the Hackensack Valley, changing the valley forever and providing direct rail access to New York City. At this time the Hackensack River waters around Van Buskirk Island were clear – canoe clubs, swimming, fishing, and boating brought tourists from New York City to Oradell and New Milford. Residents of the Hackensack Valley had depended on backyard wells and cisterns for a fresh drinking water supply. New development and ensuing population growth required major improvements in water pumping and distribution capacity to provide reliable and clean water. In 1881 HWW Company signed a contract with Hoboken to supply drinking water, and in November 1881 the company purchased the 11-acre Van Buskirk Island for $50,000. In 1882 the water treatment plant opened the first structures built on the site at a cost of $537,500: a 135' high chimney on a 9" thick foundation; a settling basin with a diameter of 110'.; and a 48" brick conduit to the pump well. After the drought of 1893, HWW bought the Veldran Mill and water rights located half a mile north of the Water Works plant. A reservoir was created by removing trees in a large area above "Beaver Dam," a slough off the Hackensack River north of Grove St. in present day Oradell. The 200' wide, ½ mile long reservoir held about 250,000 gallons of water. The swamp at Oradell Avenue and First Street was filled with sand dredged from the reservoir basin. In 1911, low lying forest adjacent to the reservoir was cleared and dredged to enlarge water storage capacity. In 1912 a timber crib dam was built, creating a reservoir that extended several miles upstream into Emerson. In 1921 the timber crib dam was replaced with a 22' high concrete dam. Reservoir water storage capacity increased to 1,600,000,000 gallons by dredging land in Harrington Park and Closter, which flooded the Pascack Creek, the Hackensack River, and the Dwarskill.

In June 1906 a new filter plant opened, *initiating a generation of*

water filtration technology that laid the groundwork for all subsequent U.S. water treatment plants. Research and techniques of mechanical filtration were pioneered by the Hackensack Water Company, one of the first complete filtration plants in the U.S., and one of the first to use powdered activated carbon in the filtration process, a significant innovation developed by HWW employee George Spalding. Today this technology is standard in water treatment systems worldwide. From a historic point of view, the HWW complex must be considered an exceptional example of American industrialization.

Cultural Landscape Evaluation & Significance

The historic vernacular landscape has an outstanding association with the 1882 to 1936 Period of Significance when HWW was a major water treatment facility. After changes were made to the coagulation basin in 1936 the historic landscape was completed, and remained nearly unchanged until the 1990 closure of the HWW operation. It is necessary to define the Cultural Landscape Period of Significance from 1882–1936 in order to include all of the landscape character defining features, a time period slightly longer than the Period of Significance (1882-1931) referenced in the National Register of Historic Places. The landscape analysis describes change and continuity between historic conditions of 1936 and the 2010 existing conditions. It is in the nature of industrial sites to frequently undergo change as technologies and processes advance. Evolution of the HWW landscape is catalogued in plans and diagrams presented in this report. When assembled together these fragmentary pieces of historic documentation paint a broad picture of operations and functions that complete the landscape narrative. Examination of the historical significance associated with the landscape determines defining elements, their integrity, and how landscape features convey the character of the property. NPS defines landscape integrity as "the authenticity of a property's historic identity, evinced by the survival of physical characteristics that existed during the property's historic or prehistoric period." The settlement history of Van Buskirk Island and the Van Buskirk family provide a window into New Jersey's history at a very specific location. This is a contribution to the broad patterns of U.S. History *(NPS Criterion A)*. The most substantial creation of a historic vernacular landscape occurred with the building of the HWW and the adjacent infrastructure, as well as construction of upstream reservoirs. Most significant is the activated carbon water treatment innovation developed by George Spalding. This engineering technology contributes to the significance of the site's distinctive technology *(NPS Criterion C)*. Although most evidence of early settlement history was altered by development of the HWW buildings and infrastructure, the site yields important information related to the industrial history of the U.S. *(NPS Criterion D)*.

The significance of a property is contingent on its integrity and association: integrity in the landscape through levels of continuity that extend from the historic period to the present; and association to a historic event or person. NPS guidelines allow evaluation of a property's ability to evoke the character associated with the Period of Significance. This Report references NPS' seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association:

1.Location is defined as the place where the historic property was constructed or where the historic event occurred. The current location of the Hackensack Water Works remains consistent with that of its historical period, with a small reduction in size due to loss of the 'lagoon' used for dumping coagulation sludge. Due to this continuity the overall integrity of location for the site remains High.

2. Design is defined as the combination of elements that create the form, plan, space, structure and style of a property. Design includes such elements as organization of space, proportion, scale technology, ornamentation and materials. To maintain a high level of design integrity a property's design will express a strong level of continuity in spatial organization and continue to convey the intent and narrative of its Period of Significance. The design for water movement and production is still present in the landscape, structures, and machinery. The completeness of the design of landscape and engineering elements gives the Hackensack Water Works a High level of design integrity.

3. Setting is defined as the physical environment of a historic property. It involves how the property is situated

and its relationship to surrounding features and open space. It is the unique ecological position of the site and its contrasting proximity to suburban development that has been a defining characteristic of the HWW. This strong ecological connection and its physical and emotional relationship to the surrounding community are still present. This continuity of character that is present today in the historical landscape gives the site a High level of setting integrity.

4. Materials are defined as the physical elements that were combined to form a historic property. The materials are the physical components of which the integral landscape elements are constructed. The addition of post-1936 features are scattered throughout the site: signage, fencing, and the wastewater clarifier reduce the material integrity. This combination of historic elements combined with elements from later periods and damage gives a Moderate level of material integrity.

5. Workmanship is defined as the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory. Two levels of workmanship exist: the engineering of the technical infrastructure and the "soft changes" in the landscape such as the introduction of the lawn and plantings. The wrought iron elements of the intake grate are of particular beauty and artisanal quality that reflect the level of craft present during the period of significance. There is also an argument for including the complex web of subgrade piping that carried water through the complex. The expressions of workmanship within the landscape of the Hackensack Water Works result in a Moderate level of integrity with a high potential for improvement.

6. Feeling is defined as a property's expression of the aesthetic or historic sense of a particular period of time. Although details of this emotional response will vary from individual to individual, it can be assumed that members of a common social and cultural group will share similar experiences. The HWW still conjures a sense of an industrial America through its elements and spatial composition. The natural riparian zone and the Hackensack River frame the site, providing the feeling of entering a new and entirely different space that is separate from the surrounding suburban fabric. This contributes to the very unique juxtaposition of a beautiful industrial complex within a lush environment. Overall the integrity of the site's ability to capture and convey the feeling of its natural and industrial past is High.

7. Association is defined as the direct link between an important historic event or person and a historic property. HWW retains many of its character defining elements that strongly convey its natural and industrial past. The most major change to the 1936 condition was the 1955 addition to the filtration plant, which altered the site's 1936 appearance. However, it is important to note that these changes continue the narrative of the primary function of the HWW. The next big landscape modification was the demolition of workers' housing constructed in 1902 south of New Milford Avenue. The five houses and the 1882 home of the first HWW superintendent D.W. Chase were demolished in the mid1980's. The loss of the 1882 coal house altered the original spatial organization and created a new visual element in the landscape narrative. The filling-in of the intake canal has considerably weakened the visual connection of the movement of water into the facility. Although elements have been added and removed the spatial and volumetric relationships retain a remarkable resemblance to the historic organization.

Over all, the site has a very high significance as a historic vernacular landscape because it is one of the very few remaining examples of a water treatment facility landscape where the forces that shaped the landscape—water collection, treatment, and delivery—are still clearly visible today.

Recommendation & Approaches

The lack of systematic management and maintenance has contributed to deterioration of the site. A long term treatment of the site must include management strategies for the Van Buskirk Island natural habitat areas and the historic core of the site, where a focus on maintaining ornamental lawns and decorative plantings would be appropriate. Pathway building and maintenance can increase accessibility to the site, while maintaining the historic industrial character and protecting natural habitats.

The fact that historic HWW functions have ceased make a *Preservation* approach, as defined by NPS,

difficult. Restoration is defined as the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time. *Restoration* standards allow for the depiction of a landscape at a particular time in its history by preserving the period of significance and removing materials from other periods. Rehabilitation makes possible *compatible uses* for a property through repair, alteration and additions, while preserving portions or features that convey its historical, cultural or architectural value. Rehabilitation standards acknowledge the need to alter or add to a cultural landscape to meet continuing or new uses while retaining the landscape's historic character. Maintenance and upkeep of the historic vernacular landscape make identification of appropriate uses for the HWW site absolutely essential. Most elements of the landscape can be maintained at a reasonable cost, and revenue generating uses can conceivably cover these expenses. The rehabilitation approach is because the landscape was an outcome of intensive use in the first place. The fairly robust structural quality of main landscape elements makes them well suited to be used for passive recreation. Commercial uses may also be considered as long as they do not require any substantial built features that would significantly alter the overall appearance of the site.

Public Input

Because public support is critical in developing long-term options for the site, the first public Design Charrette was led by Rutgers Center for Urban Environmental Sustainability (CUES) on November 14, 2009. The meeting included members of the local historic and environmental communities, as well as residents of Oradell and New Milford. The County of Bergen, the Mayors of New Milford and Oradell, the Water Works Conservancy, and the Hackensack Riverkeeper provided names of fifty invitees. Thirty-two individuals were able to participate in the discussions, which provided public input related to rehabilitation and reuse of the site. *The most impressive outcome of the day was an overall public consensus of the historic and environmental importance of the Hackensack Water Works site, and participant flexibility in ensuring that environmental and historic concerns held equal importance as possible solutions were considered. The ability of stakeholders with differing viewpoints to discuss reuse options demonstrated that historical controversies could be overcome. This was a critical step in gaining support from Bergen County officials and staff, as well as local residents. The ideas and concerns of participants were a highly valuable input for developing a landscape preservation treatment plan.* There were many areas of agreement, including concerns about flooding on Van Buskirk Island and the issue of automobile circulation and parking options.

A second Design Charrette was held (September 15, 2010) to discuss future reuses of the site. Members of the Bergen County recreational, business, theatrical, food services, and educational communities were invited to share their professional expertise. Long-term economic sustainability necessitates inclusion of businesses with the potential to contribute financial resources for ongoing operation and maintenance costs. *The development of a public/private partnership holds the greatest promise for ensuring that the entire HWW complex creates a vibrant space for local residents and visitors.*

Conclusion

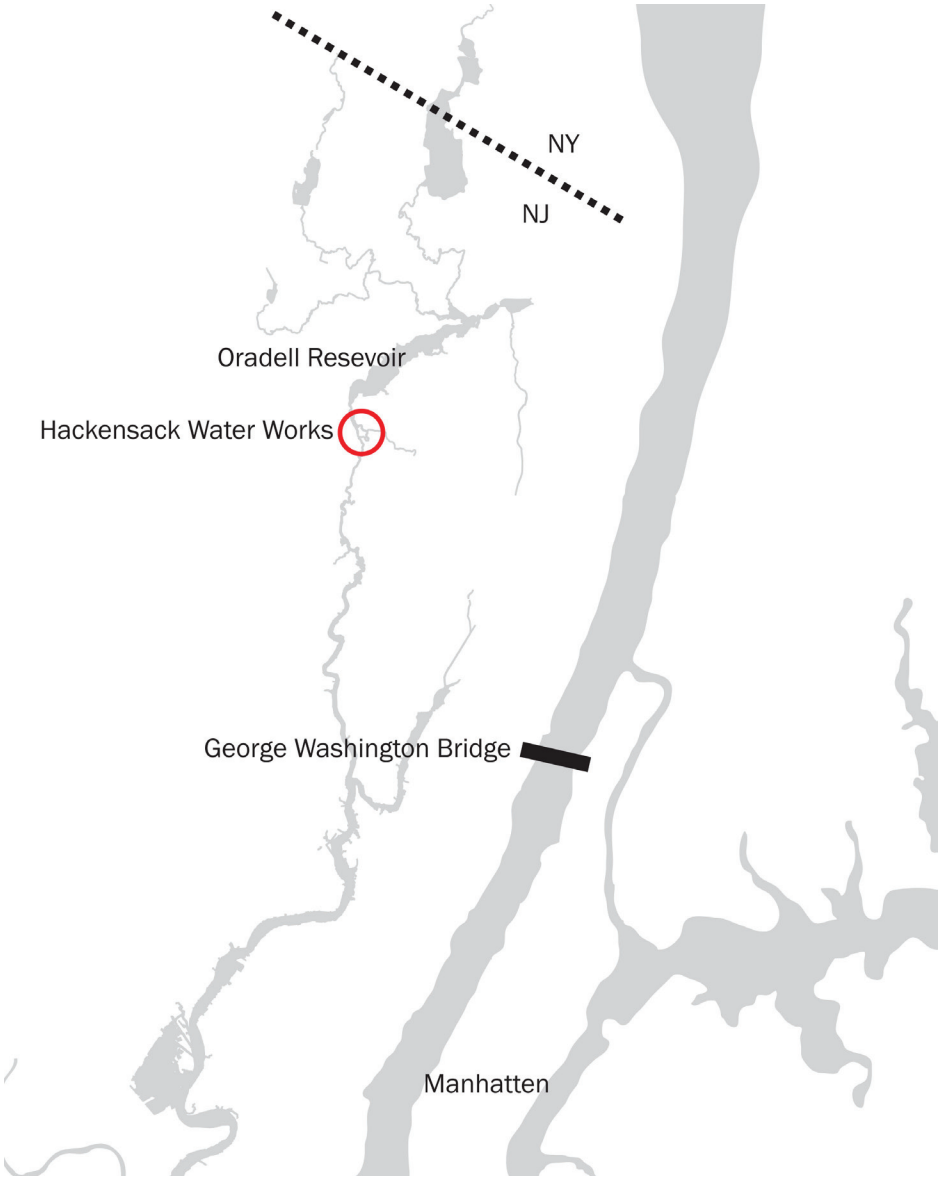
Although the size and complexity of the site create major challenges, they also provide an opportunity for a carefully planned and significant restoration and rehabilitation. Analysis of the existing landscape conditions shows that the Hackensack Water Works on Van Buskirk Island is a unique example of a historic vernacular landscape of national significance. It is a post-industrial site without the hazards of contamination and is thus highly suitable for rehabilitation.

Content

1 Introduction, Scope of Work and Methodology

1.1 Introduction

Figure 1: Regional location



The cultural landscape changes affecting Van Buskirk Island occurred as a direct result of human interactions with the natural Resources provided by the Hackensack River Valley. The presence and use of the river allowed human access to this naturally rich land for the earliest inhabitants of the Hackensack watershed. The river provided easy access to points south, creating a country-city symbiosis within the influential New York City region.

This makes the site an example of a historic vernacular landscape, defined by the National Park Service Guidelines as “a landscape that evolved through use by the people whose activities or occupancy shaped that landscape” (NPS 2009). The National Park Service includes industrial complexes in this definition. The present appearance of Van Buskirk Island, however, is not the result of design intent, as would be the case with a historic designed landscape. The historic value of this historic vernacular landscape lies in the several layers of uses which shaped the site over 300 years.

Figure 2: Center left of the image shows the historic buildings and the coagulation basin on Van Buskirk Island in 2007.

The post-Civil War century from 1882 when the first Hackensack Water Works Building was erected, until 1936 is the most significant period affecting the site's appearance today.

The intention of this report is to investigate the historic built environment as well as natural elements that are evidence of the rich cultural and industrial history of Van Buskirk Island. The report's overall goal is to develop guidelines for future sustainable uses of the buildings and grounds.

Earliest recorded humans who made use of the natural resources of the Hackensack River were members of the Lenape Nation. The earliest European explorers paved the way for Dutch and French Huguenot colonists. In 1677 David des Marest (Demarest) received a deed for the land which included present day Oradell. The area was settled by, among others, the Demarest, Cooper (Kyper), Van Buskirk and Van Wagoner Families. Most early settlers were farmers who also built grain grinding mills on the Hackensack River. The 1,076 acres acquired in 1681 by Lawrence Van Buskirk, the first Van Buskirk settler, were located south of what was then known as New Bridge Road.

Strong commercial ties were developed with the growing city of New York through trading of natural resources that supported the city dwellers in return for material goods produced in the city. The colonial economy depended on local farming, and the Hackensack River transported farm crops to New York City. Ties to pro-British New York

Figure 3: 1882 Pump House

and Europe resulted in strong Hackensack Valley support for the British during the Revolutionary War.

It is estimated that one-third of the New Jersey population of 120,000 were active or potentially active Loyalists to the British Crown. The area that today includes Oradell, New Milford, and Van Buskirk Island was considered a "no-man's land" during the Revolution and was subject to raids and pillage from both sides as armies gained or lost ground.

Around 1802 dams were built along the oxbow section of the Hackensack River. This area includes the northern-most navigable waters of the river, a major shipping route for the schooners that regularly sailed to and from New York. Starting in pre-Revolutionary War times, mills and docks built here helped the Hackensack Valley to become an important commercial center.

In 1881 the Hackensack Water Company (HWC) signed a 10-year contract with the city of Hoboken to supply its drinking water. By November of 1881 the Company purchased the 11-acre Van Buskirk Island for $50,000, an ideal site with a dependable water supply near a rail line. The water treatment plant opened in 1882. This facility and its supporting reservoirs were expanded multiple times. The treatment facility operated continuously until 1990. The plant itself was expanded eight times on Van Buskirk Island, which is now located in the Borough of Oradell.

In 1993, when a new water treatment facility opened in Haworth, NJ, the island and the treatment plant were given to the County of Bergen, along with $1 million to preserve the historic structures. Since this time there have been a number of different proposals for re-use of the site. A consensus has not been achieved. Therefore, no adaptive reuse has been formulated in the eighteen years since the County acquired the property. Only limited measures have been taken to protect the historic structures against rain and flood damage, and vandalism.

The following *Van Buskirk Island Cultural Landscape Report* is part of a long-term planning and public outreach process, whose goal is to preserve the cultural and ecological significance of the island and its historic structures. Bergen County Division of Cultural and Historic Affairs applied for and was awarded funding by the New Jersey Historic Trust to assist in the protection, stabilization and prevention of further deterioration of the historic structures. In addition, the Bergen County Open Space, Recreation, Farmland and Historic Preservation Trust Fund is committing resources to the future adaptive re-use of Van Buskirk Island. These funds are being used to develop a Preservation Plan (Mark B. Thompson Associates) that focuses on the historic significance, structural integrity, and rehabilitation of the buildings, and this Cultural Landscape Report.

The development of these materials and guidelines has been integrated into the outreach and design process and will contribute to the creation of a sustainable rehabilitation plan for the site. The Plan includes recommendations related to short-term emergency repairs and long-term adaptive re-use solutions for Van Buskirk Island parkland and buildings.

1.2 Site Context and Boundary

Figure 4: Study area cultural landscape report and outline and historic preservation, mostly owned by Bergen County.

In 1990 the Hackensack Water Company/United Water Resources (The Water Co.) owned 46.8 acres of land including Van Buskirk Island located in the Hackensack River. The Preservation Plan for the New Milford Plant of the Hackensack Water Company characterizes the historic preservation status of the site as follows:

> "In 1981 the New Milford Plant of the Hackensack Water Company was included in the Bergen County Historic Sites Survey as a historic district. This district included the entire Van Buskirk Island along with the adjacent workers' housing located between New Milford and Elm Street and Madison Avenue bridges. Survey staff recommended that this district was eligible for listing on the State and National Registers of Historic Places. The State Historic Preservation Office Opinion determined the site was eligible for listing on the National Register of Historic Places (In 1991). In 1998 John Bowie Associates prepared a historic structures report and Historic American Engineering Record (HAER) documentation of the plant for the County. It was listed in the New Jersey and National Registers of Historic Places in 2001. In 2000 the site appears to have been granted status as an "American Treasure" in the Save America's Treasure program, but is not currently listed as a National Historic Landmark". [1]

The 2001 listing included the principal historic structures: The pump station (c. 1882-1911), the filtration plant (c. 1903-1955), and the coagulation/settling basin (c. 1903-1906). While the Hackensack Water Works structures are historically known as the New Milford Plant of the Hackensack Water Company, the buildings are physically located in Oradell. The 13.31 acres under historic preservation are located on Lot 1, Block 123 on the July 1985 Tax Map of the Borough of Oradell. The property is bordered on the south by New Milford Ave., the east by Elm Street, and in the north and west by the western arm of the Hackensack River.

1.3 Scope of Work

The scope of this Cultural Landscape Report expands beyond the 13.31 acres containing the principal historic structures. Research shows that the integrity of the historic cultural landscape and its embodiment of the local vernacular are dependent on the inclusion of additional significant elements. These include the whole of Van Buskirk Island, as well as the site of former workers' housing south of the Hackensack River bend. Parcels west and north of the Hackensack River are included in this report because pedestrian access at these locations will enhance a complete experience of the historic vernacular landscape.

A parcel south of New Milford Avenue between River Road and Madison Avenue that was used to dump dredge from the coagulation basin is not included in the study area although it was part of the functional Hackensack Water Works complex. After the completion of the mandatory cleanup process by United Water this property showed little historic significance. Only the still vegetated 30 feet buffer zone along the Hackensack River is included in the report because it is considered relevant to the comprehensive experience of the historic vernacular landscape of Van Buskirk Island.

This report takes a multi-disciplinary approach that encompasses the fields of landscape architecture, landscape ecology, hydrology, archeology, landscape history and historic architecture. The goal of the report is to develop a framework for the long-term sustainable use of the site, preserve the integrity of the historic vernacular landscape and provide access for the general public. The results of the research is documented in six chapters: After this introductory Chapter One, a chronological overview of the Hackensack Water Works landscape history is discussed in Chapter Two. Chapter Three describes individual features of the landscape, their history and evolution, and an assessment of current conditions. Chapter Four evaluates the significance and integrity of individual elements and their role in defining the landscape character. Chapter Five addresses the treatment of the landscape, and based on the *Secretary of the Interior Standards for the Treatment of Historic Properties,*suggests appropriate landscape preservation treatment approaches.

2 Landscape History

2.1 Pre-Historic and Native American Era

2.1.1 Land Formations

Van Buskirk Island is located on the Piedmont Plateau portion of the Atlantic Slope, underlain by red shale and sandstone that is associated with traprock ridges dating from the Triassic era.[2] The reddish-brown and white sandstone is still seen in the earliest houses built by European settlers, and the red sandstone plain provided a fertile soil for the Hackensack River watershed.

The ending of the last Ice Age, approximately 10,000 years ago and the subsequent retreat of the Wisconsin glacier marked the beginning of river and marshland development along New Jersey's eastern coastline. The water areas of New Jersey[3] are equal to 18% of the land area (1,303 square miles versus 7,419 square miles, respectively), and so cultural activities related to water ecosystems played a prominent role in the lives of the state's various human populations. In New Jersey's tidal lands upriver of Newark Bay, which were sheltered from the wave action and storms of the Atlantic Ocean, estuarine and freshwater marshes formed.[4]

2.1.2 Human Inhabitants

Earliest archaeological records indicate that Paleo-Indians roamed New Jersey approximately 10,000-8,000 B.C.E., at the time of the retreat of the Wisconsin Glacier.[5] New Jersey coastal marshes provided food and agricultural land for the Lenape Indians, who lived and roamed the tri-state area of New York, New Jersey, and Pennsylvania.[6] Lenape encampments were established along the coastal estuaries during the summer months, with permanent settlements occurred along the major waterways.[7]

The Lenape used a large amount of land "lightly."[8] Cleared land was farmed until the natural fertility was exhausted. The site was then abandoned, and the village moved to new fertile land, practicing a primitive form of crop rotation, where the abandoned fields ultimately re-vegetated. They raised a number of agricultural crops, including corn, squash, beans, rice, cranberries, blueberries, and tobacco.

The Lenape were hunter-gathers who relied entirely on natural recourses, their survival depending to a large degree on seasonal food opportunities and local non-food commodities.[9] It is believed that between 6,000 and 12,000 Lenape (approximately 12 to 30 people per 100 square miles) lived in New Jersey prior to the arrival of the European colonists.[10]

The Lenape's first contact with Europeans was in 1524, when Verrazano anchored off Sandy Hook to explore the lower New York and Raritan Bays.[11] Representing the Dutch East India Company, Henry Hudson arrived 85 years later. Within 20 years of Hudson's arrival, the Dutch and other settlers were often in deadly conflict with the local native population.[12]

After the arrival of Europeans, the Lenape began trading fur pelts for tools. They began hunting fur-bearing animals "relentlessly to satisfy the insatiable European demand."[13] The Europeans introduced beer, rum, and endemic diseases to the Lenape. It is estimated that up to 90% of entire villages were destroyed as a result of the "Europeanization" process.[14]

The Lenape concepts of "owner-

2.2 European Settlement

2.2.1 First European Settlers in Bergen County

ship", "land use", and "territoriality" were quite different from the European view of property rights.[16] They were flexible about boundaries and ownership of land. Control of territory was collective, and Lenape groups peacefully respected the hunting and fishing grounds of other groups.[16] Each geographic Lenape group had a sachem, or head of family, who the Europeans mistakenly assumed had the rights of a king, including the right to sell land.[17] After trading land to the newcomers, the Lenape often returned to continue their use of traditional communal resources.[18] The settlers protected themselves with several deeds after trading axes, coats, kettles, pistols, and liquor for Indian "land rights." In return for 1,000 pounds, the Indians agreed in 1758 to abandon their claim to any land in New Jersey that they did not actually hold.

Hackensack, Tappan, and Pascack tribes cultivated corn and squash in the Hackensack Valley. They also hunted and fished here.[19] Archeological evidence suggests two Native American villages[20] were located in present day Oradell, NJ. Lenape relics and artifacts, including flint arrow heads and stone implements, have been recovered[21] in present day Oradell. Construction of the Oradell Reservoir unearthed additional artifacts. Based on these artifacts, it appears that the first human users of the Van Buskirk Island historic site were Native Americans.

While these indigenous people viewed the New Jersey rivers and marshlands as life-sustaining landscapes with great spiritual significance, the European settlers perceived the marshes as swamps in need of reclamation.

The Dutch colonists viewed the New World as a "paradise" – a "New World Eden." Boats were one of the earliest forms of transportation, and early European trading outposts were first established along the Hackensack River.

Relations with the Native Americans were not always peaceful. In 1640, the Dutch sea captain David DeVries purchased from the Lenape 62 acres of fine maize land[22] in present day New Milford. He lost his farm and barns in the 1643 Indian uprising when the Lenape burned northern settlements.[23] At the time of the transfer of New Netherlands to the British in 1664, there were no Europeans living in what was to become Bergen County.[24]

2.2.2 New Netherlands Under Brittish Rule

When the English took control of New Netherlands from the Dutch, Charles II gave Nova Caesaria[25] (the land between the Hudson and Delaware rivers that included the Hackensack River valley) to his brother the Duke of York. The Duke then leased New Jersey to two Proprietors, Lord Berkeley and Sir George Carteret.[26] The Proprietors were responsible for both governing the colony and for its land sales.[27]

In 1676, Proprietary New Jersey was divided into two distinct and separately governed provinces: East Jersey and West Jersey. The Hackensack Valley was in East Jersey. Citizen resentment against the Proprietors' feudal exercise of power ultimately led to riots and "abuses" of government officials. Queen Anne joined the East and West Jerseys into one royal colony in 1702, and appointed a royal Governor to rule the "notoriously unruly Jerseyans."[28]

2.2.3 First Sustainable New Milford Settlement

When the Dutch transferred power to the English on June 23, 1664,[29] fur trading had caused the near disappearance of the beaver, which resulted in the collapse of beaver dams. The draining of beaver ponds caused the subsequent exposure of rich black fertile soils suitable for farming.[30] The English shifted the colonial economy from fur trading to dense agriculture in their efforts to produce wealth for landlords and tax revenues for the Crown.[31] The need was also great for cheap New Jersey farmland due to the influx of colonists from both England and the older established colonies of New York and Connecticut, where the "best" lands were now taken.[32] These new farmers supplied products to the growing commercial center of New York City, marking the beginning of a city-countryside symbiosis that continued for over three centuries.[33]

The first permanent settlers in present day New Milford were French Huguenots seeking religious freedom from the persecutions that were occurring in Europe. Some of these settlers (Bergen County) came from Bergen op Zoom, a Dutch community 18 miles north of Antwerp. That European settlement was surrounded by marshy grounds similar to the New Milford land adjacent to the Hackensack River.

David des Marest moved his family to New Amsterdam with other Huguenots in 1663.[34] The family first settled on Staten Island, and then moved to Nieuw Haarlem. There, David resented having to support the Dutch Reformed Church in addition to his own beliefs. This personal religious conflict prompted his move to New Jersey.[35] On June 8, 1677, David des Marest, purchased 7,500 acres of land from the Lenapes.[36] At this time, the marshlands surrounding the Hackensack River were inhabited by mink, muskrat, beaver, and wild birds, which survived well into the 19th century.[37] In 1681, four years after David Demarest purchased his land, Lawrence Van Buskirk acquired 1,076 acres abutting the Demarest land south of what was then called New Bridge Road. Demarest subsequently purchased additional land west of the Hackensack River in what is now Oradell.[38]

2.2.4 Local Governance Divisions & Authority

In 1683, East Jersey was divided into four counties – Bergen, Essex, Middlesex and Monmouth. Bergen County contained 60,000-acres.[39] In 1693, Bergen County was divided into Hackensack and Bergen Township.[40] The New Milford area was part of Hackensack Township.[41] In 1871 Palisades Township was formed as part of Hackensack Township. Between 1894 and 1903 this township was in turn subdivided with parts eventually going to the creation of New Milford. The settlement of, and the name "New Milford," predates that of "Oradell." However, the histories of the two towns and Van Buskirk Island are intertwined.

2.2.5 Farming Economy & European Colonial Growth

By the end of the 1600's nearly all the land in the Hackensack Valley had been distributed via patents,[42] and the valley was filled with Dutch, French, English and other families of northern European descent engaged primarily in farming.[43] Both the Dutch and English colonists introduced agricultural practices that were prevalent in Europe in the 1600's. These traditions included the reclamation of fertile, low-lying marshlands for crop cultivation. New World reclamation projects required a technological understanding of both tidal cycles and engineering. The first permanent settlers in New Milford built a mill dam near the site of the "Old Bridge," also called Demarest's Landing.[44] It provided power for mills, a place to cross the Hackensack River, and the northern most stopping point for boats traveling back and forth between New Milford and New York City.

The rich soil of the Hackensack Valley produced cabbage, corn, beans, wild hemp, flax, tobacco, and watermelon. New Milford was one of the most prosperous and comfortable farming areas in the British Colonies, and this prosperity was often built on the slave economy that supported farming.[45] Wheat was the principal cash crop,[46] and mill dams were an early feature built to harness the energy of the tidal portion of the Hackensack River. These dams were an important component in the human impact that occurred at the head of tide portion of the Hackensack River. Early maps indicate that Van Buskirk Island was a spit of land curving out from the western bank of the Hackensack River at the head of tide, and a mill raceway was there prior to the American Revolution.[47]

2.2.6 Van Buskirks Prosper

Descendants of the original Hackensack Valley settlers were prominent in public affairs from the earliest days of New Netherlands. Lawrence Van Buskirk had two sons, Abraham and Andrew. Abraham practiced surgery from his home in what is now Teaneck, while Andrew remained in New Milford and operated a tavern at New Bridge as well as the local "stagecoach." This "Flying Machine" was a stage wagon that regularly ran twice a week between the head of tide in New Milford and Paulus Hook, transporting people and delivering food and lumber to New York City, and returning with material goods produced in the city.[48]

Houses and farms clustered around Van Buskirk's mill that stood at the foot of New Milford Avenue, then known as Mill Road.[49] A dam was built to power the mill which was used at various times as a tannery, bleaching mill, button factory, and a woolen mill.[50] By the 1770's, the community of New Milford had two grist mills, a saw mill, a Latin school, and two or three taverns.[51] The town was bordered[52] by the river crossings at Old Bridge to the north and New Bridge, built in 1739[53] to the south.

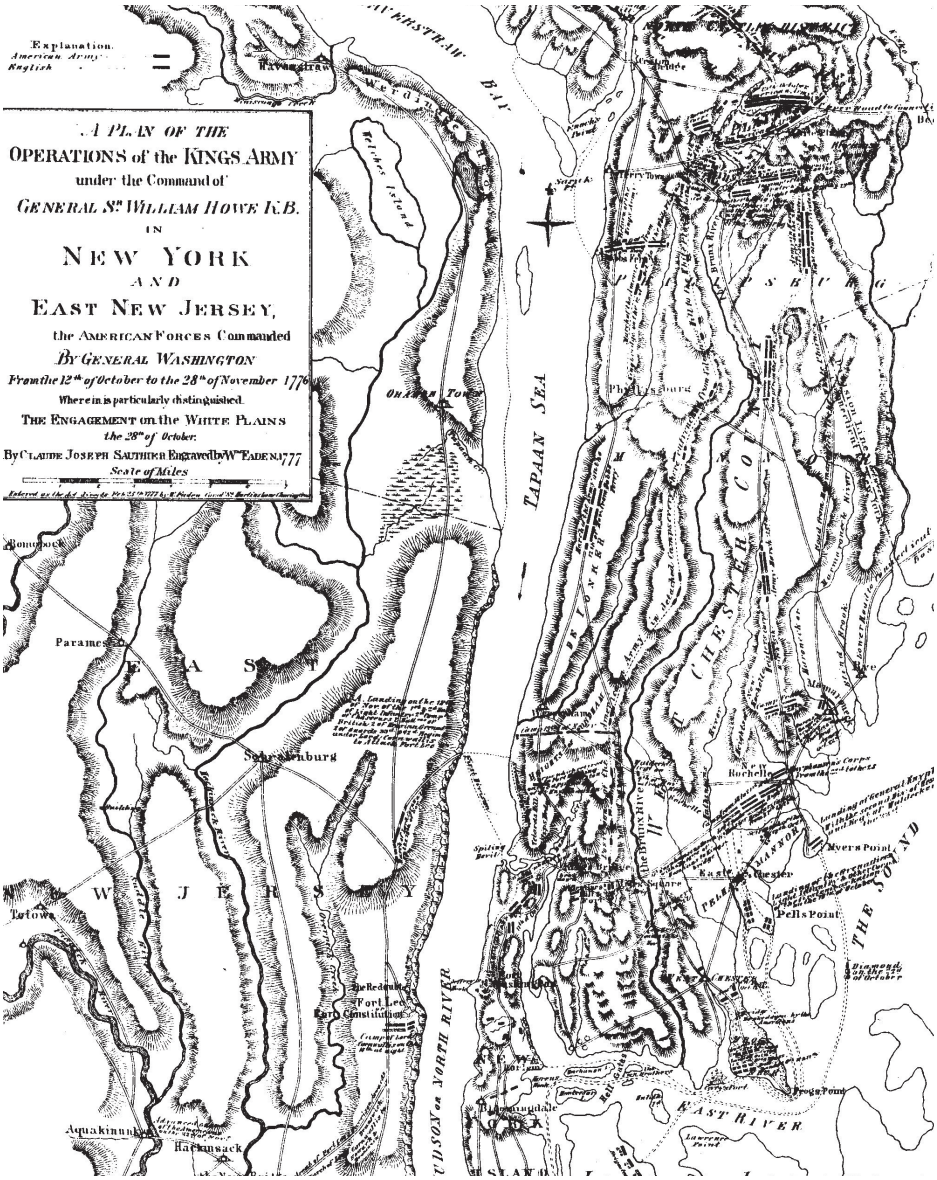


Figure 5: New York and New Jersey 1776

2.2.7 Governance & the Revolutionary War

Many male members of the original founding families became pillars of the Hackensack Valley community and were active in local politics. A group of political figures that included Lawrence Van Buskirk were elected to County offices for two decades prior to the Revolutionary War. The Van Buskirk family retained strong business ties with Tory New York City, as well as strong religious ties with Europe. The family belonged to the branch of the Dutch Reform Church that believed in importing ministers trained in Amsterdam rather than American trained ministers, the cause of a major schism that contributed to later community divisions during the Revolutionary War. It is estimated that one-third of the New Jersey population of 120,000 were active or potentially active Loyalists. Their sheer numbers and the proximity to British-occupied New York resulted in a six-year civil war within the state.[54] During the Bergen County elections of 1774 Lawrence Van Buskirk was named a Justice. The following year at the Bergen County Committee of Correspondence, Lawrence's son Abraham Van Buskirk was chosen as a deputy to represent Bergen County at the Continental Congress. The following September, Abraham Van Buskirk was elected as Bergen County's representative to the Provincial Congress and John Van Buskirk was elected to the Bergen County Committee of Observation & Correspondence – the group that executed resolutions and orders of the Continental Congress.

2.2.8 Hackensack Vally No-Man's Land

During the Revolutionary War, the Hackensack Valleys no-man's land around present day New Milford and Oradell was called the Neutral Ground[55] - a region of bitter infighting resembling a local Civil War, as partisans from both sides conducted raids and guerilla warfare.[56] At the beginning of the war, Hackensack and New Bridge were main sources for British provisions and intelligence.[57] As the war persisted, both British and American armies over-ran and controlled the area that included New Milford, Oradell, and Van Buskirk Island as they plundered the rich local farms.[58] Because of their location between two warring factions, the citizens of Bergen County were exposed to internal and external "enemies" when the area became a center for British activities and a choice spot for foragers.[59]

2.2.9 Van Buskirks and the "Greencoats"

The Van Buskirk family support for the British manifested itself after war broke out. Abraham Van Buskirk became a Lieutenant Colonel in the 4th Battalion of New Jersey Volunteers and participated in the successful British victory at the fall of Fort Lee.[60] [He enlisted over 100 men who rendered service to the British.] The following year his brother Andrew was "taken up" for his Tory activities and sent to Fishkill as a prisoner because he was "cruel to our friends [Patriots], plundering them."[61]

Abraham resigned from the Provincial Congress rather than take an oath of abjuration and helped British Regulars take Patriots as prisoners.[62] His Greencoat battalion protected farmers who wanted to sell their produce to the British in New York during the winter months, and he "destroyed old neighbors" by leading Tory raiding parties in 1776-1777.[63]

On July 11, 1777 the New Jersey Committee of Safety drew up a list of 48 men to be arrested. It included: Andrew Van Buskirk, John Van Buskirk,and Daniel Van Buskirk. Andrew and John were also on the list, judged guilty, and held in a Morristown jail.[64] On August 23, 1777 American forces attacked Staten Island and took Andrew's son Lieutenant Jacob Van Buskirk prisoner.[65] When the British finally withdrew from New York City, Johannes Jacobus Van Buskirk surrendered to the New York militia and was tried for treasonable correspondence with the British, and ultimately acquitted of these charges.[66] Jacob Van Buskirk escaped after Cornwallis' surrender at Yorktown and Abraham Van Buskirk joined Benedict Arnold in The Burning of New London.[67]

The winter of 1779-80 was the harshest in recorded history, and it followed the fall of 1779, when the worst drought was recorded. During the fall, the streams that powered the mills on the Hackensack went completely dry.[68]

2.3 Industrial Revolution & Nineteenth Century

2.3.1 Mills, Schooners, and the Mail

Although they fought on the losing side in the Revolution,after the war the Van Buskirk's returned to their lives in New Milford and the family resumed their place in the business community. On August 10, 1837 Jacob and John Van Buskirk purchased 11-acres from John Nightingale for $5,500.[69] This parcel was bounded on the north by New Milford Avenue (then called Old Landing or Old Dock Road) and extended eastward from Kinderkamack Road to the eastern shore of the Hackensack River.[70] This property included the site of the future Hackensack Water Company, a mill on the river, and three sandstone houses. One is still standing at 465 New Milford Avenue east of Kinderkamack Road in Oradell.[71]

The original mill on the property had begun as a saw mill before the Revolution, and was subsequently converted to a tannery and a bleaching mill. Jacob Van Buskirk converted the mill again into a grist mill that produced ground rye, buckwheat, wheat, and feed.[72] It ran continuously for forty-five years and was inherited by Jacob's sons, Jacob Jr. and Henry.[73]

Jacob's mill was located on the present day Hackensack Water Works site on the island named for the Van Buskirk family.[74] There is evidence that the island "grew" as a result of a canal that was dug along the west bank of the river by John and Jacob Van Buskirk. Long Swamp Brook, a tributary of the Hackensack River, powered Jacobus Demarest's grist mill, and then turned west to join the river where the Hackensack Water Works now stands (north of Main St. in New Milford).[75] Today, storm sewers have altered these original water flows.

John Van Buskirk and his son Luke owned and operated another mill north of the current Oradell Avenue bridge. This mill was sold to Jacob Voorhis, whose family operated it for three generations until the mill caught fire and burned to the water's edge.[76] The water rights were purchased by Albert Ackerman. He re-built the mill which subsequently caught fire and burned to the ground a second time.[77] In 1863, the property was purchased by William Veldran, who rebuilt the mill and with later additions of millstones, operated it as a combination saw-grist mill for three additional generations[78] until selling the mill and water rights to the Hackensack Water Company in 1901 for the construction of the Oradell reservoir.

The Jacob Van Buskirk mill was one of the busiest in the region; in addition to the mill, the family operated two schooners from the island.[79] During this period the river was a chief artery for regional transportation and was wider and deeper than it is today.[80] Jacob's schooner, the Kate Lawrence, was built in Nyack, NY in 1855 and was said to be the "most famous and outstanding vessel to sail the Hackensack."[81] Specially designed boats called "lemon-squeezer" barges were built in two parts that could be un-coupled to navigate the New Milford reaches of the Hackensack River. These unique boats traversed the wharves at the head of tide where flour and produce were loaded for transport to New York City.[82]

Jacob Van Buskirk was appointed Postmaster in 1847, and his home became the "Spring Valley" postmark on the Closter to Park Ridge stagecoach route that carried mail

and passengers.[83] Jacob Jr. was issued a Commission in 1862 by President Lincoln's Postmaster General[84], and followed his father as Postmaster,[85] living in the remaining sandstone house on New Milford Avenue, which served as the Oradell post office from 1863 – 1879.[86] In addition to delivering the mail, Jacob Jr. made daily deliveries of flour and grain produced by the Van Buskirk grist mill.[87]

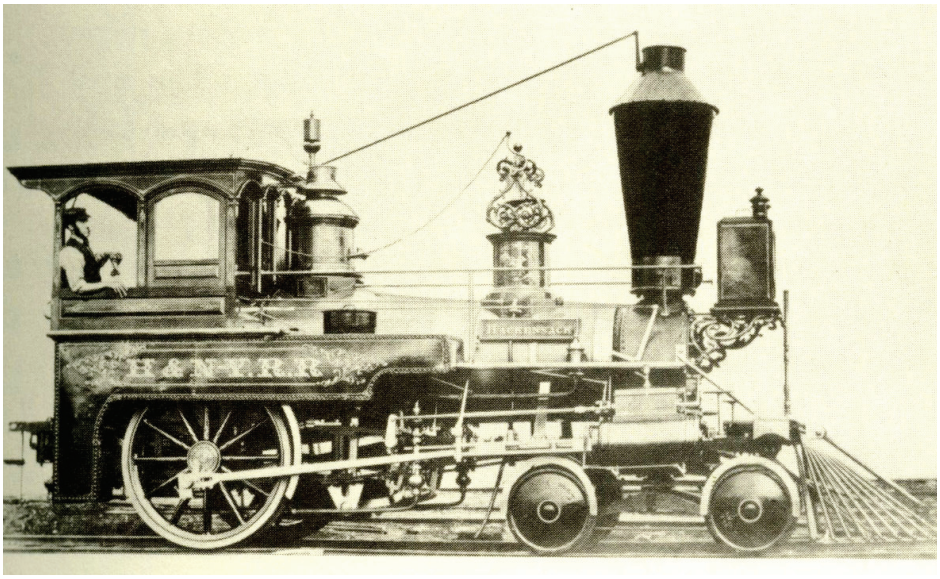


Figure 6: First locomotive on Hackensack & New York Railroad. Walter A. Lucas Collection.

Figure 7: New Milford and Oradell in 1876. The rail road line is following the Hackensack River.

2.3.2 The Railroad Arrives

Before the arrival of a railroad, the Hackensack River was the highway that fueled expansion of the prosperous farming community. By 1850 Hackensack Township produced 750,000 bushels of wheat, rye, and corn, which kept the local mills busy.[88] Although farming predominated in the valley, there were other local industries supported by the area's natural resources. Commercial fisherman caught herring and shad from the river and local red ware pottery was produced using the Hackensack River's red clay.[89] Furniture was manufactured in New Milford up until the time of the Civil War (1860).[90]

On March 4, 1870 the railroad came to the Hackensack Valley, providing direct rail access to New York City. There were two railroad stations that serviced New Milford and Oradell – one at New Milford Avenue and one on the north side of Oradell Ave.[91] Adventure travel was marketed to city dwellers as the chance to "feel in perfect safety – enable thousands of our citizens to pass a leisure day in the country in the enjoyment of pure air and enchanting scenery."[92]

2.3.3 Creation of "Delford"

Because the farms in present day New Milford and Oradell were now near railroad stations the landowners enjoyed a rise in property values. Railroads also attracted waves of immigrants to northern New Jersey. Oradell became a small scale summer resort as families from New York City visited to enjoy the boating, fishing, and swimming in the Hackensack, which had a reputation as an attractive and safe river.[93] The Delford Hotel was constructed in the hopes that Oradell would become a prosperous resort enclave.[94] At this time the Hackensack River waters around the island were clear – canoe clubs were part of the community social life and swimming, fishing, and boating were attractions bringing tourists from New York City to River Edge, Oradell, and New Milford.[95]

The arrival of the railroad changed the Hackensack Valley forever.

In 1878 the New Jersey Legislature passed the Borough Act, making it possible for a township to establish itself as an independent borough with land area not to exceed four sq. miles or a population of 5,000. At this time, Oradell was a scattered collection of houses and farms that included twenty dwellings, a store, the Van Buskirk home that housed the post office, one hotel and a school house.[96] The houses were clustered around Kinderkamack Road and Oradell Avenue. New Milford began at the southern border of Ridgewood Road and continued eastward to the Hackensack River. At the northern end of New Milford, along the east bank of the Hackensack River (opposite the HSW) Gustav Peetz purchased a large farm tract and began developing the "Peetzburgh" section of New Milford. The Hackensack Water Works site was located in the New Milford of this era, which disappeared when Delford was formed.[97] Delford, was created in 1894 from parts of Midland, Palisades, Washington, and Harrington Townships. The name was created by combining the last syllables of Oradell and New Milford.

From the time the Hackensack Water Works opened in 1882 the tax rate for this eastern section of Midland Township climbed steadily until it was much higher than the rate in other parts of the township. However, the tax revenues raised went to the western side of the township.[98] Midland Township was proposing a $50,000 bond issue for macadamizing the streets; the proposed east Midland portion of the tax to repay the bonds was $2,400, but this part of the Township would only be receiving $600 worth of road work.[99] Resident protests were ignored by elected officials, and on February 19, 1894 a Committee of five that included Jacob Van Buskirk,[100] was formed to propose a new borough. The new village of Delford was formed to "better direct and protect residents by receiving greater benefits from their own taxes,"[101] and included the entire village then known as New Milford, the western part of present day Oradell, and part of Midland Township.

Voters approved the formation of the Borough of Delford on March 7th, 1894. The first mayor was sworn in by Andrew Van Buskirk, the Notary

Public, who was appointed Borough Clerk. However, he resigned the position at the next Council meeting. Pete Van Buskirk was appointed borough tax collector.[102]

Community life in Delford was tied to the river. Canoeing, skating, and horseback riding were common pastimes. Almost everyone owned a canoe and on Sundays a canoe parade would paddle upstream five miles to Harrington Park.[103] Night fisherman caught eel and catfish in the Hackensack River. At this time, Elm Street was known as "Sand Street" and was lined with shacks owned by the descendants of Bergen County slaves.[104] The Borough of Delford lasted until 1920 when it was renamed Oradell. In 1922 the present day Borough of New Milford was incorporated.[105]

2.4 The Hackensack Water Company

2.4.1 The First Hackensack Water Company

The growing population in the Hackensack Valley depended on backyard wells and cisterns for their fresh drinking water supply.[106] New development and the ensuing population growth required major improvements in water pumping and distribution capacity to provide a reliable and clean water supply to residents. Charters were granted to companies who pledged to meet this demand.

The first water company charter was granted to Charles Voorhis and the Cherry Hill Water & Gas Company in 1867.[107] Two years later, on March 12, 1869, a second water charter for the Hackensack Water Company was granted to a group of Hackensack citizens, lead by Garret Ackerson.[108] In the same year on September 24 the "Black Friday" financial collapse occurred, causing hundreds of financiers to go bankrupt and jeopardizing the Ackerson charter that would be voided if work on the water system did not start by March 12, 1874.[109] To raise money, Ackerson issued stock in his company on July 14, 1873. Voorhis subscribed to a controlling interest because the Ackerson charter was more advantageous than his own.[110]

2.4.2 The Reorganized Hackensack Water Company

During the "Panic of 1873," Voorhis gained control of the Hackensack Water Company. Voorhis hired Bacot & Ward of Jersey City to design the Hackensack Water Works system and kept the project moving forward.[111]

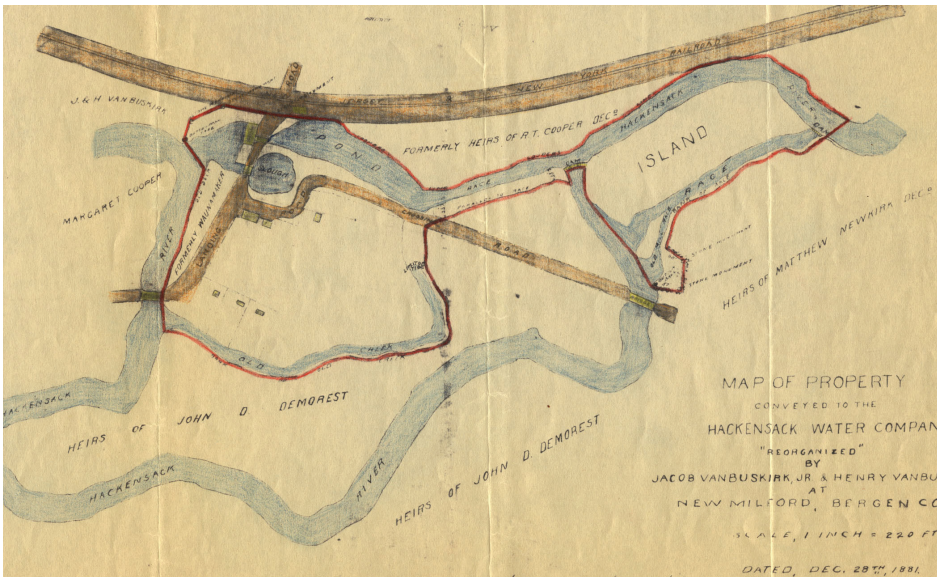
The original Hackensack Water Company was created to supply fresh drinking water to the 4,500 people living in Hackensack. Engineering plans called for a pumping station in present day River Edge[112] to transport Hackensack River water up to a height of 125 ft. into a constructed brick reservoir built on the crest of Cherry Hill[113] (later named Zabriske Hill) at the site of John C. Zabriske's farm on present day Reservoir Avenue. The water then flowed by gravity through iron pipes down into Hackensack, located south of Cherry Hill. It cost $50,000 to lay pipes from Essex St. in present day Hackensack to within 1,500 ft. of the newly built reservoir, the land having been taken by condemnation.[114] The reservoir was finished on August 25, 1874. By October, pipes to lower Main St. in Hackensack had been finished, and Hackensack Water Company service began on October 21, 1874.[115]

Albert R. Leeds of Stevens Institute of Technology calculated that the Hackensack River could supply 20,000,000 gallons of clean water a day, enough to supply the City of Hoboken for its projected 30 year future growth.[116] This larger customer base would be financially beneficial to the company. The Hackensack Water Company applied for and was granted a supplemental permit to supply "all of Bergen County east and south of the Saddle River" with water.[117] However, this plan was disrupted as a depression followed the Panic of 1873. Train service was stopped between November 1875 and June 1876. The Hackensack treasury was empty, and the Hackensack Water Company had financial problems that were exacerbated when customers stopped paying their bills or discontinued their service. In addition, the Hackensack Improvement Commission defaulted on their hydrant rents.[118] The Hackensack Water Company tried unsuccessfully to sell discounted, tax-free bonds, and in March 1879 (exactly ten years after receiving the water charter) the Hackensack Water Company, Bergen County's first corporate water system, went bankrupt.[119]

Following the bankruptcy of the Hackensack Water Company, its assets were acquired by the Bacot & Ward engineering firm, which had taken bonds as payment for constructing the Cherry Hill reservoir system.[120] The Hackensack Water Company was reorganized in 1880. It negotiated a ten-year contract, with the City of Hoboken to begin on November 1, 1882, to supply water to its population of 30,000.[121] This expansion required millions in capital financing and a new water intake from the Hackensack upriver of the original Cherry Hill intake.[122]

2.4.3 Building the 20th Century Hackensack Water Company

Figure 8: Property acquired by Hackensack Water Works Company in 1881.

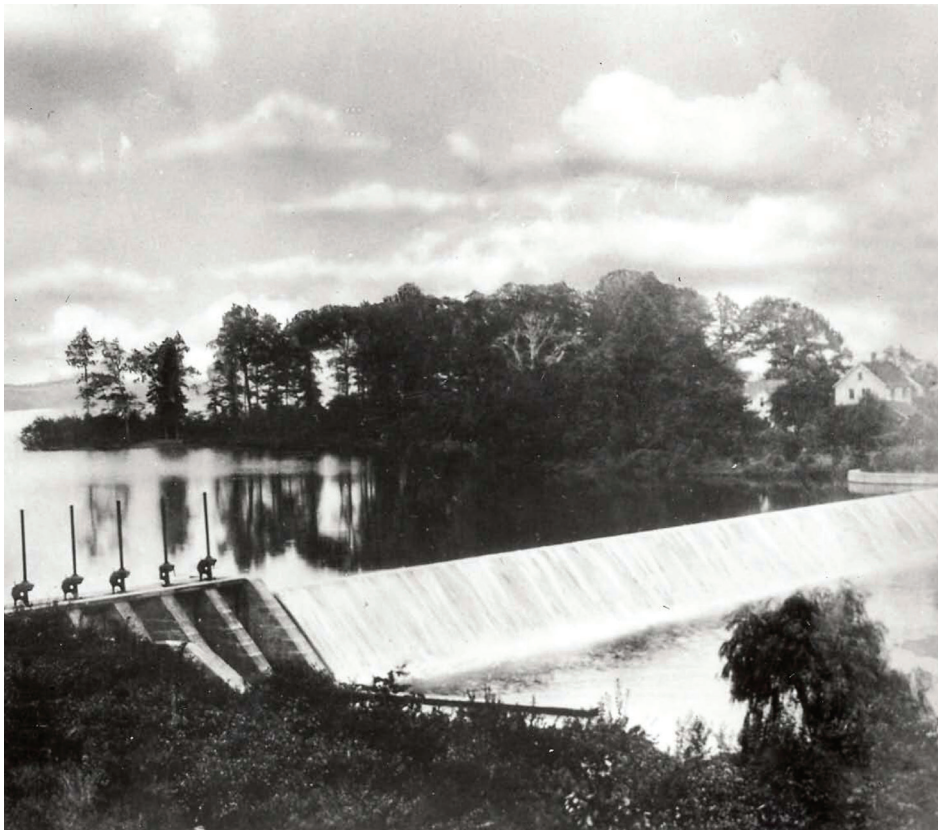


The island site of the Van Buskirk mill was an ideal intake site for the water company because there were dams already in place. On November 25, 1881 the Hackensack Water Company purchased 11 acres, including the mill of J. & H. Van Buskirk located on Van Buskirk Island in present day Oradell. In 1882 the first structures were built on the site at a cost of $537,500: a 135 ft. high chimney on a 9 in. thick foundation; a circular settling basin with a diameter of 110 ft.; and a 48 in. brick conduit to the pump well.[123] In addition to the pumping station that was built on the north side of New Milford Avenue, a boiler and coal house were built on the south side of the street.[124] On November 1, 1882, Hackensack River water began flowing to Hoboken. Four years later Englewood was added to the distribution system.[125] To support the Hudson County expansion a water tower was built in Weehawken.[126]

Periods of drought, flooding and increased water demands of the growing population drove the expansion decisions of the reorganized Hackensack Water Company. After the drought of 1893, the company negotiated to buy the Veldran Mill property and the Veldran water rights located half a mile north of the Hackensack Water Works New Milford Plant. The site was on an island that divided the Hackensack River into two channels. Two dams had been placed at the head of tide that drove the mill wheel.[127] These assets were acquired by the Water Company but were leased back to the Veldrans for $1 a year for another twenty-two years before the mill was dismantled and construction of a reservoir began in 1902.[128]

2.4.4 "Reclaiming" the Swampland and Constructing Reservoirs

Figure 9: Oradell Reservoir

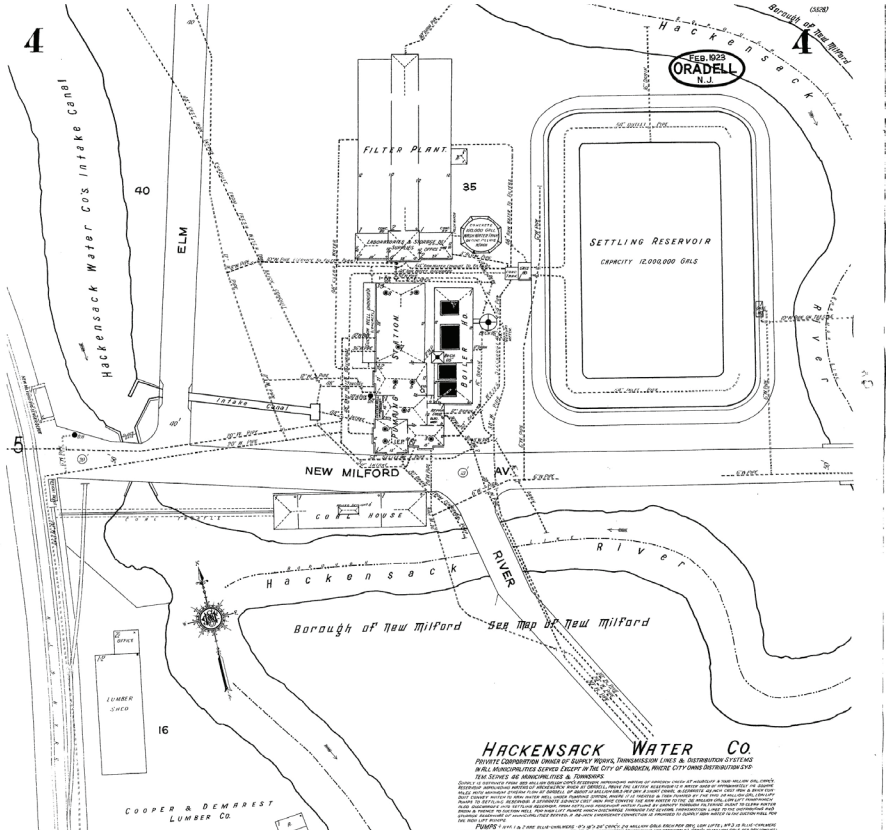


To create the water storage reservoir the company chopped down trees in a large area above "Beaver Dam," a slough off the Hackensack River located above the Picnic Grove north of Grove St. in present day Oradell.[129] The 200 ft. wide, ½ mile long lake was constructed on an area that was previously a "dense growth of timber and underbrush, a veritable wilderness" and the newly created reservoir held about 250,000 gallons of water.[130] To fill in the swamp at Oradell Avenue and First Street, sand was dredged out of the reservoir basin.[131]

The first attempts to dredge the swamps of the northernmost picnic grove on both sides of the Hackensack River failed because the dredges were too small and so the project was abandoned.[132] A local Oradell contractor (Miles Tierney) traveled to the Isthmus of Panama to study the equipment being used to build the Panama Canal. He copied the equipment used for this project.[133] Woodcutters removed trees and cleared land on both sides of the river channel, from the middle of Oradell to the northeast as far as present day Haworth and Harrington Park.[134] Swimming and boating were now prohibited and the boat houses and camps that were along the river disappeared. But there was no restriction on skating when the ice on the lake froze and professional skaters from the New York City Hippodrome skated on the frozen reservoir.[135] Skating was eventually banned by the water company when someone skated onto thin ice, fell in and drowned.[136]

A second reservoir was added in October 1900 when the Spring Valley Hackensack Water Works and Supply Company was purchased to protect the water supply from pollution. This was the first extension of the company into the New York State portion of the watershed.[137] Weather challenged the Hackensack Water Company as periods of drought alternated with flooding. Following the extreme drought in the spring of 1903, the company made plans to build a third reservoir on the Pascack Creek at Woodcliff, five miles north of the New Milford intake.[138] While this reservoir was under construction in October 1903, the "worst storm in history"

Figure 10: Sanborn map of 1923.



inundated the Hackensack Valley, completely washing out the partially built Woodcliff dam and destroying the reservoir construction. Twenty-five inches of water flooded the New Milford pumping station and men were held prisoner in the Hackensack Water Works by the flood waters. It took over two weeks to pump out the building.[139] This flood destroyed the Oradell Avenue dam and the borough itself was cut in half by the flood waters.[140]

Although there were public protests about the Woodcliff Reservoir submerging large tracts of land, obliterating public highways, and the possibility of creating a public hazard if the dam gave way, the protests were futile. The Woodcliff Reservoir was dedicated on April 1, 1905 (some considered it an April Fool's joke), and the Borough changed its name to "Woodcliff Lakes."[141] Numerous floods occurred at the turn of the 20th century when the water tables were higher. The 1904 flood caused severe damage in the Pascack Valley.[142]

Before the creation of the reservoirs the local population fished, trapped, and hunted in the Hackensack River and the forests upstream of the Elm Street dam, where herring was fished. At the north end of Grove Street near a bend in the river, groves of chestnut and hickory trees provided picnic areas and a place for revival meetings held by the Black churches.[143] Construction of the reservoir and dam wiped out dwellings and farms, altered the topography of the land and the Hackensack River, and changed the local economy by providing jobs at the Hackensack Water Company.[144]

In 1911, the low lying forest adjacent to the Oradell reservoir was cleared and dredged to enlarge its storage capacity. In 1912 a timber crib dam was built that created a reservoir which extended several miles upstream into Emerson.[145] The dredging projects continued in River Edge and New Milford until 1913, prompting public complaints about the muddy water that was spoiling the sand bathing beaches.[146] During construction of the reservoir, giant snapping turtles living in the swamps and weighing 25 to 50 pounds were found.[147]

Under the direction of the Hackensack Water Company engineer and conservationist, George Spalding, the fenced area around the reservoir was converted into a large sanctuary where no hunting or trapping was allowed.[148] The company established a patrol that watched for trespassers and poachers hunting for otter, mink, and muskrat. The company also undertook a reforestation that attracted birds, including osprey.[149] Passes were provided that allowed locals to go inside the enclosure. Fishing permits for bass and carp were issued.[150]

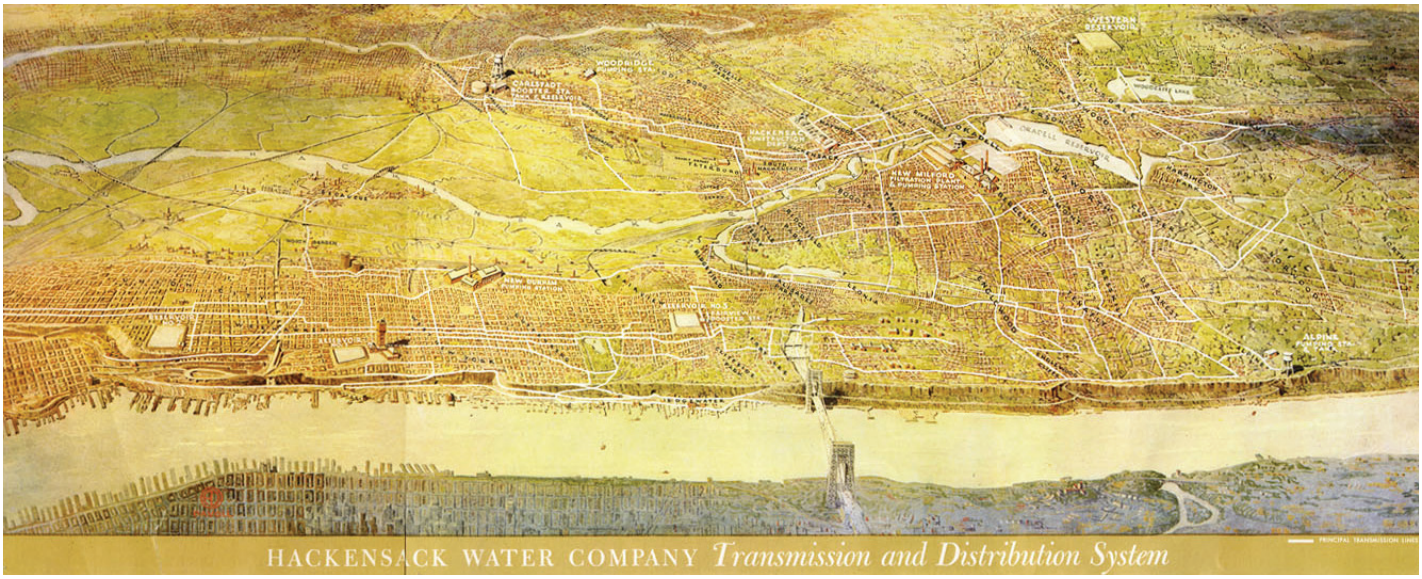
Resevoir construction increased the amount of water available. However, the quality of the drinking water did not always meet customer expectations. To respond to complaints that the water smelled "fishy" and contained unacceptable amounts of algae (as well as Bergen Record newspaper articles and County Medical Association stories questioning the safety of Hackensack River water), on May 4, 1903 the Hackensack Water Company Board of Directors voted to construct an innovative Fuller-System filtration plant.[151] The following year filters containing fifty carloads of sand from Sea Girt, NJ, plus charcoal and crushed stone were constructed.

In June 1906 the new filter plant formally opened, ***initiating a generation of water filtration technology that laid the groundwork for all subsequent U.S. water treatment plants.***[152]

Research and techniques of mechanical filtration were pioneered by the company. And it was one of the first complete filtration plants in the U.S., as well as one of the first to use powdered activated carbon in the filtration process.[153] Most significant was the innovation by George Spalding, who conceived the idea of activated carbon in water treatment. By 1931 the Water Company decided to use this system permanently and installed it at its Oradell plant. This technology is now standard in water systems around the world.

2.4.5 Bergen & Rockland County Growth

Figure 11: Post-war water transmission and distribution system.



Between 1890 and 1910 the Hudson County population doubled, becoming more densely populated with newly arrived immigrants. By 1910, only 49.8% of the people living in New Jersey were descended from native-born parents.[154] As customer growth continued unabated in Hudson and Bergen Counties the Hackensack Water Company needed to further expand its pumping, filtration, and reservoir water storage capabilities.

Water company capacity was further strained when World War I broke out and Camp Merritt, located at the intersection of Knickerbocker Road and Madison Avenue in present day Dumont, became the embarkation point for over 1 million enlisted men.[155] By 1920, thousands of suburban houses were going up in Bergen County, necessitating enlarging the Oradell Reservoir in 1921 by replacing the timber crib dam with a twenty-two ft. high concrete dam.[156] Reservoir water storage capacity was increased to 1,600,000,000 gallons by dredging land in Harrington Park and Closter, which flooded the Pascack Creek, the Hackensack River, and the Dwarskill.[157]

The 1920's marked a period of economic challenges and further expansion for the Water Company. When Hoboken, the community that financed the reorganized water company, left the distribution system in 1923, it cost the company revenue from hundreds of thousands of gallons a day, as well as the cost of the built treatment capacity and the distribution system.[158] However, by 1924 the Hackensack Water Company was supplying 26,000,000

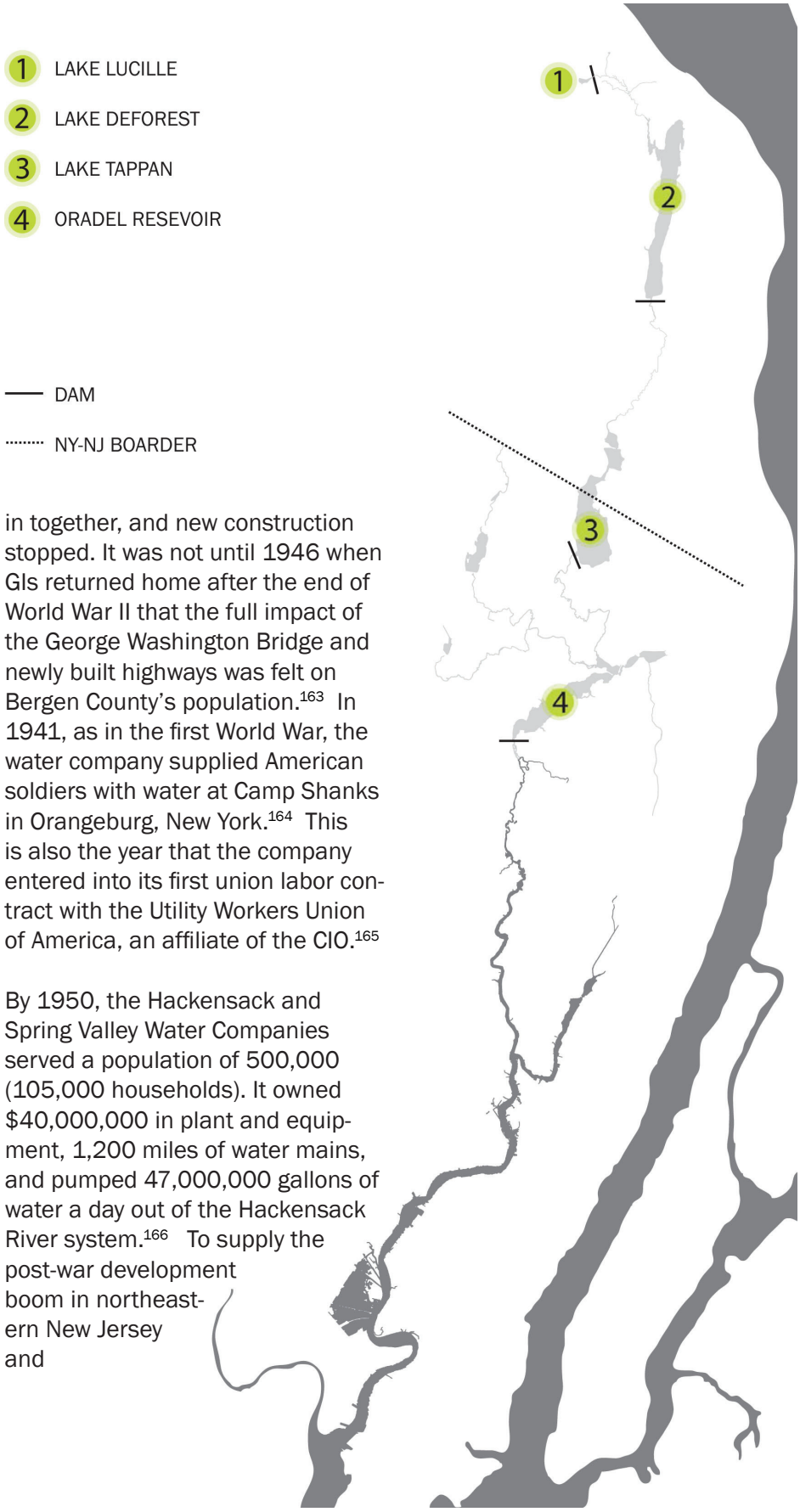


Figure 12: Reservoirs feeding the Hackensack Water Works Intake.

to 30,000,000 gallons a day to Union City, Guttenberg, Weehawken, West New York, and Secaucus in Hudson County, and Hackensack, Englewood, and other communities in Bergen County.[159] By 1926, the company had experienced growth of almost 1,000-fold in just over forty years, fueled by the new affluence of the working class and the mass exodus from New York City and Hudson County tenements to the newly developing suburbs.[160] Bergen County's population rose 78% between 1920 and 1930. As water demand rose each year, the company continued to acquire land to develop the Hackensack River as a water source.[161] The water company built another reservoir at Riverdale and laid thousands of feet of pipe under newly paved streets in advance of the County's projected development in order to keep up with the building boom.[162]

Although it was anticipated that the opening of the George Washington Bridge in 1931 would accelerate Bergen County's growth, the stock market crash of 1929 curtailed water use as mortgages were foreclosed, families moved in together, and new construction stopped. It was not until 1946 when GIs returned home after the end of World War II that the full impact of the George Washington Bridge and newly built highways was felt on Bergen County's population.[163] In 1941, as in the first World War, the water company supplied American soldiers with water at Camp Shanks in Orangeburg, New York.[164] This is also the year that the company entered into its first union labor contract with the Utility Workers Union of America, an affiliate of the CIO.[165]

By 1950, the Hackensack and Spring Valley Water Companies served a population of 500,000 (105,000 households). It owned $40,000,000 in plant and equipment, 1,200 miles of water mains, and pumped 47,000,000 gallons of water a day out of the Hackensack River system.[166] To supply the post-war development boom in northeastern New Jersey and

2.5 Landscape History Summary

Rockland County, New York, two additional reservoirs were needed, and an interstate project commenced in Clarkstown, New York. A reservoir holding 20,000 gallons and supplying 200,000 people was built by damming a long, narrow swamp that had high hills on both sides. Lake DeForest cost $8,000,000 and was dedicated in March 1959.[167]

By 1968 the number of households served by the water company increased by 81% to 190,000; investment in plant and equipment increased 225% to almost $130,000,000, miles of water mains increased 100% to 2,400 miles, and pumping capacity increased 111% to 99,000,000 gallons per day.[168] The last reservoir to be added to the Hackensack Water Company system was Lake Tappan, in 1967. This added 43% more storage capacity and covers 1,255 acres in River Vale and Old Tappan, New Jersey and Clarkstown, New York.[169] By 1960 it became clear that the original Hackensack Water Works plant could not be enlarged to meet the needs of Bergen County. A second plant was constructed and came on line in Haworth in 1964. In the same year the company purchased the Bogota Water Company and the Borough of Franklin Lakes Municipal Water System. The following year the New York Spring Valley Company bought the Haverstraw and West Haverstraw Stony Point Water Supplies.[170] During this period of water company consolidation, the state was once again threatened with a severe drought (1963-1965) and Governor Richard Hughes declared a State of Emergency in July 1965 when the reservoirs were at 50% capacity after annual rainfall of 26.01 inches (normal rainfall in New Jersey is 42-50 inches).[171]

This landscape history reveals the close relation between human water use and the shaping of the landscape. Although the Native Americans utilized natural resources they left little imprint on the landscape. Dutch and French settlers laid the cornerstone for the mill and transportation enterprises that supported New Jersey's growing population in the 19th century. The most substantial influence on the historic vernacular landscape occurred with the building of the Hackensack Water Works and the adjacent infrastructure on Van Buskirk Island, as well as the construction of upstream reservoirs for a consistent and secure water supply. The history of public water supply in Bergen County is a story about human dependency on natural recourses. At the same time, it is the history of the creation and expansion of a tight web of infrastructure connections between the site and the region. The making of this historic vernacular landscape of Van Buskirk Island is a focal point of collection, treatment and distribution of the natural resource called water.

3 Landscape Existing Conditions

3.1 Introduction to the Van Buskirk Island Existing Condition

After decades of growth and intensive use, the treatment and pumping of water on Van Buskirk Island was terminated in 1990. In 1991, the remaining water quality laboratory moved to the Haworth Water Treatment Plant. In 1993 Van Buskirk Island and its facilities were donated to Bergen County along with a relatively small amount of money ($1 million) to preserve the historic structures. During the ensuing time period there have been a number of different proposals for reuse of the site, but a consensus has never been reached. Therefore, no adaptive reuse has occurred in the eighteen years since Bergen County acquired the property. Only the most basic measures have been taken to protect the historic structures against rain and flood damage.

The following narrative begins at the point when Bergen County took responsibility for the site and summarizes some of the discussions that kept the County from taking aggressive steps to preserve and maintain the site. This period is characterized by low maintenance of the grass areas along Elm Street, and a complete lack of maintenance of the avenue off areas north of New Milford and the overgrown land on the southern portion of the property, west of Madison Avenue. In the southern portion of the Island east of Madison Avenue the turf grass was maintained while the adjacent United Water facilities were still in use. Aside from these low maintenance areas, a high degree of neglect and decay characterizes most of Van Buskirk Island since 1993.

The effect of this period on the historic vernacular landscape will be documented in the following section. It will begin with a brief history of the site for the period of 1993 to 2010. This will be followed by a more detailed look at the character-defining elements of the landscape in 2010. *The United States Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes (Guidelines)*[172] are discussed as they pertain to each landscape area on the existing conditions plan. This section provides descriptions and conditional assessments of vegetation and built elements, leading to a summary of the existing conditions of the site.

Descriptions and conditional assessments of vegetation and built elements are provided, leading to a summary of the existing conditions of the site.

The primary sources for the existing conditions plan include a 2006 aerial image as well as detailed field notes and observations by the Rutgers Department of Landscape Architecture. The diverse components of the site require a distinction between ecological and historical values, ensuring that both aspects are considered within their appropriate value system. These individual assessments will then be combined as the second step in an overall evaluation of the site.

A discussion on the existing ecological value of the vegetation is based on field work conducted and documented by Dr. Sasha Eisenman and plant ecologist Ari Novi in 2009.
Detailed field notes, observations, and a series of existing condition photographs by the Rutgers Department of Landscape Architecture provide the material for evaluating the vegetation as characteristic elements of the historic vernacular landscape.

Figure 13: Smoke stacks, pump house, filtration buildings and garages facing the coagulation basin

Figure 14: Managed area along Elm Street

Figure 15: Forest south of New Milford Avenue

3.2 Recent Landscape History

Figure 16: Rutgers students exploring the space between the main buildings and the basin.

The recent significant changes in the vernacular cultural landscape were initiated by the transfer of water treatment facilities to the Haworth plant in 1990. The uses that had filled the historic buildings with function and which shaped the landscape ended, leaving questions of possible future uses unsolved. The reason for an almost two decade long conflict were opposing opinions among the general public, as well as among key stakeholders. These differences can be summarized as a conflict of values between historic preservation and environmental preservation. The former seeking solutions with relatively more intensive adaptive re-use, while the latter argued for the reduction of human involvement and activity on the Island.

From a purely historic point of view, the Hackensack Water Works complex must be considered an exceptional example of American industrialization. As discussed in Chapter 2, it exemplifies the country's challenge in the late 19th and early 20th centuries to provide pure drinking water for the rapidly expanding population. For this reason and the lack of plans for preservation and adaptive reuse, Preservation New Jersey designated the Hackensack Water Works as one of the state's 10 Most Endangered Sites in 1996. To address this issue, citizens in favor of historic preservation formed the Hackensack Water Works Conservancy in 1997. This nonprofit organization is dedicated to saving the historic structures on site. Through the efforts of the Conservancy, the site was placed on the New Jersey and National Registers of Historic Places in 2001.[173] In 2002, the National Trust for Historic Preservation designated the Hackensack Water Works as one of America's 11 Most Endangered Historic Places. In spite of this strong support by the historic community, developing a Preservation Plan that would guide the public stewardship of the Hackensack Water Works, as required by a New Jersey Historic Sites Council Resolution,(confirmed by the New Jersey Department of Environmental Protection in 2003) turned out to be difficult because of significant public controversy over the site's future.

The local environmental community viewed the expansion of the Hackensack Water Company as an example of the degradation of natural resources, which had an incredibly negative environmental impact on the Hackensack River and its watershed. Local environmental organizations lobbied for repairing this historic damage by tearing down newer structures, allowing the oldest structures to deteriorate and the island to naturally re-vegetate. This scenario would return the island to a passive natural resource within the highly urbanized Bergen County ecosystem. The positive ecological effects of the subsequent natural rehabilitation would enhance the function and sustainability of Hackensack River wetlands.

The conflict between these two antithetical positions created a stand off for redevelopment of, and public access to, the Hackensack Water Works site for over a decade.

In January 2007, Bergen County agreed to allow Rutgers University students to use the site for an academic landscape architecture design studio. Rutgers was granted

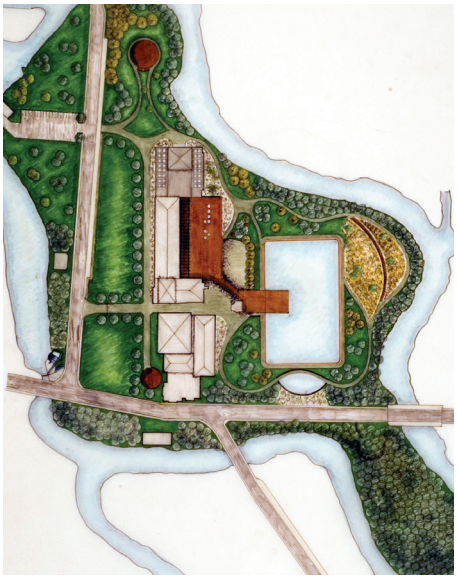
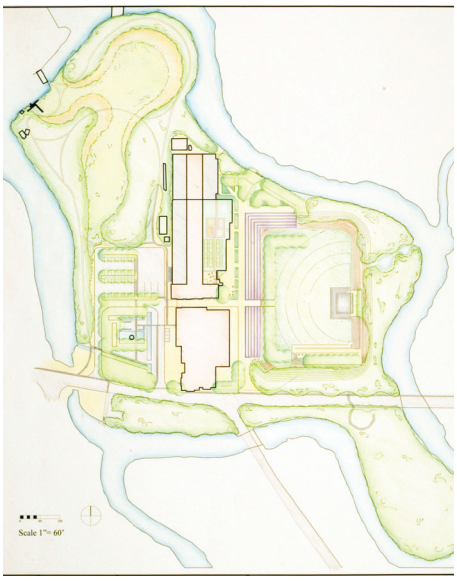


Figure 17-23: Rutgers student designs.



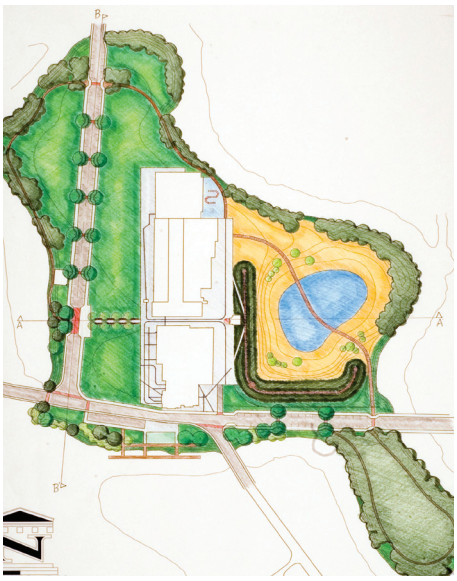


Figure 24: Comprehensive Landscape Plan Version 1; Initial Consensus
Figure 25: Comprehensive Landscape Plan Version 2; Long Term Vision

access to the site and allowed to tour the historic buildings. This made it possible for the landscape architecture students to address questions associated with reuse of the Hackensack Water Works at Oradell, NJ. Under the guidance of Dr. Wolfram Hoefer and Richard Bartolone, and in close cooperation with Dr. Beth Ravit (Dept. of Environmental Sciences), the class developed possible scenarios solutions for future use of this publicly owned parkland and the on-site historic structures.

The development and presentation of the students' designs opened up a communication process between major stakeholders (Bergen County, historical preservationists and environmentalists) that had been stalemated for almost two decades. In order to begin a new public dialogue, the Rutgers Center for Urban Environmental Sustainability (CUES) organized a series of meetings with the local historic preservation and environmental groups. These meetings presented the opportunity to begin a dialogue and potentially reach a compromise between major stakeholders. As an outcome of these meetings, and in order to continue to move this project forward to the next stage, in 2008 CUES funded development of two versions of a comprehensive restoration plan: a short-term and long-term scenario. These designs integrated elements from the seven original student proposals and Rutgers bioengineering students explored site hydrological conditions.

The preliminary landscape concept addressed the environmental conditions of the island in relation to possible reuses. The concept provided suggestions on aspects of architecture (adaptive, building reuse) and aspects of engineering (probable impact of the proposed redesign on surface water hydrology). The study demonstrated that it is possible to develop appropriate adaptive reuse of the historic buildings, while maintaining the ecological quality of the site under existing environmental conditions, including the potential for flooding events. A major outcome of Rutgers outreach was developing an understanding between Bergen County and the various stakeholders that there is common ground for transforming the Hackensack Water Works site into an exceptional public amenity.

After Rutgers provided this outreach, Bergen County decided to re-open a dialogue regarding preservation and adaptive reuse of the site. Bergen County Department of Parks applied for and was awarded funding by the New Jersey Historic Trust to assist in the protection, stabilization and prevention of further deterioration of the historic structures, and for preparation of a preservation plan. In addition, the Bergen County Open Space, Recre-

Figure 26: Intensive discussions at public design charette November 14, 2009.

ation, Farmland and Historic Preservation Trust Fund is committed to the preservation of Van Buskirk Island's heritage. The Tust was provided to develop a Preservation Plan (Mark B. Thompson Associates) that focuses on the historic significance, the structural integrity, the rehabilitation of the buildings, and to prepare this Cultural Landscape Report (Rutgers University) that details the cultural and ecological significance of Van Buskirk Island and recommends an approach to preserve its unique landscape character.

Because public support is of particular importance for finding long-term options for the site, the first public Design Charrette was held on November 14, 2009. With the overall goal of fostering a productive communication process, the charrette included members of the historic and environmental communities, as well as residents of neighboring Oradell and New Milford who might be immediately affected by any changes on the site. Bergen County, the mayors of New Milford, Oradell, and the Water Works Conservancy, and the Hackensack Riverkeeper provided names of invitees. A criteria attribute for these participants was the ability to have an open and productive dialogue with individuals holding divergent viewpoints. Fifty people were contacted, and thirty-two of these individuals were able to participate in the Charrette. This included a design group of four local teenagers whose interest in the project based on either historical or environmental aspects.

Analysis of the group discussions documenting concerns, potentials and creative design recommendations showed some consistency. The concern of flooding on Van Buskirk Island was a common issue raised by nearly all participants. There was a general consensus for the need of a design that could withstand and reduce future flooding through smart stormwater management. The question of using pervious surfaces[174] was frequently mentioned throughout the discussions. Clearly, the local residents had observed flooding because that problem was an issue in almost every group. All groups saw the need for a new design that would withstand a flood event.

Personal experiences also shaped Charrette participants' recommendations for re-use of the site. For some residents, the facility evoked a strong emotional connection and there was concern and anguish over degradation of the historic buildings. This concern was also coupled with a strong interest in introducing public activity back to the site. Other participants voiced opinions about the thriving ecological experience the site has to offer. For this group, providing an opportunity for visitors to experience the natural qualities of the site through local walks and strong neighborhood connections was crucial. The issue of automobile circulation was also another theme in the discussions. Parking and the future use of Elm Street was a topic discussed by most groups. It became obvious that any solution for Elm Street, such as repair and reopening of the bridge, would have a strong impact on the future park.

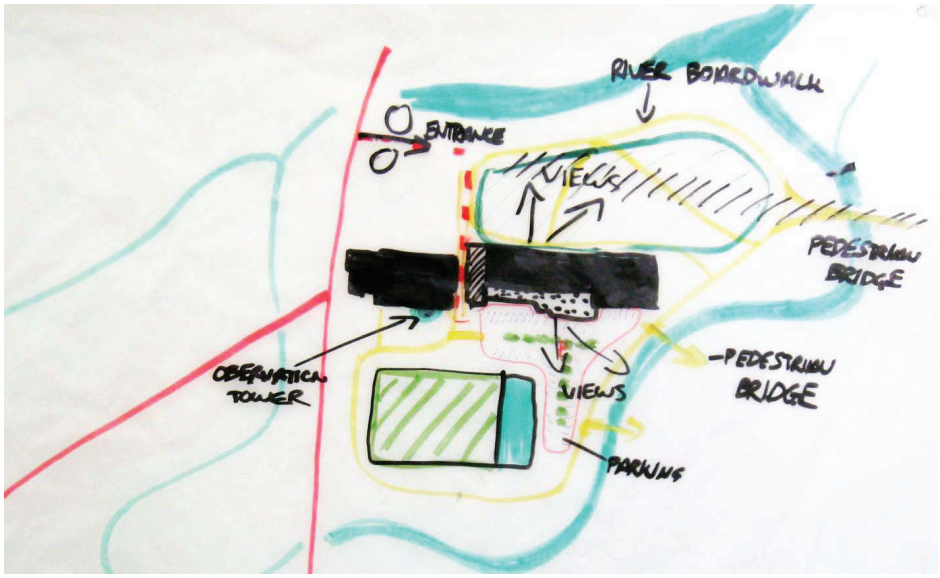


Figure 27: One of numerous charette sketches developed by participants.

The most impressive outcome of the day was an overall public consensus of the historic and environmental importance of the Hackensack Water Works site, and participant flexibility in ensuring that both concerns held equal importance as possible solutions were considered. The ideas and concerns of participants were a highly valuable input for developing a landscape preservation treatment plan (see Chapter 5). The ability of stakeholders with differing viewpoints to sit together and discuss re-use options created a new feeling that the historical controversies could be overcome. This was a critical step in gaining support from Bergen County and the local residents.

On September 15, 2010, a second Design Charrette was held to discuss, future reuses of the site. Members of the Bergen County business community were invited to come and share their professional expertise. Participants with recreational, business, theatrical, food services, and educational experience were given a tour of the Van Buskirk Island buildings and grounds and asked to share their

Figure 28: Concerns expressed by each working group at the public Design Charrette 9/14/2011.

						Concerns
X	X	X	X	X		Flooding
	X					Prevent debris build-up on fences after flooding
		X	X			Limit impervious surfaces
X		X	X		X	Increased vehicular traffic
			X	X	X	Parking
X				X	X	Walkable access/ Connectivity
X						Proximity to existing residential areas
			X			ADA accessibility
X		X				Safety
			X			Vandalism
	X			X		Preservation
	X	X				Integrity of historic structures
	X					Parkland/open space
	X					Recreation
			X			No active recreation
			X			Avoid additional lighting
		X				Balance: environment, history, people
					X	Gathering space in basin

						Potentials
X		X			X	Cultural center
					X	Community center
X		X				Concerts
X		X			X	Restaurant/snack bar
X		X			X	Theater
X						Gallery
	X			X	X	Museum
				X		Preservation center
X		X	X		X	Education
			X			Historical education
X						Connection between architecture and landscape
	X					Energy sustainability/solar panels
	X					Parking
X	X	X	X			Master gardening/urban agriculture
	X					Farmer's market
		X	X	X		Separate use in basin
		X				Children playground
		X				Biking/skate board
			X			Exercise route
		X				Teenager hang-out
		X				Party
		X				Gathering
X						Dog park(s)
		X				Camping
X		X	X			Passive recreation/trails/hiking
		X	X			Birding
		X				ID plants
		X	X			Canoe
				X	X	Close Elm Street, pedestrian bridge only
			X			Connection to greenway system / main street
X			X			Ecological preservation
X						Artificial ponds
				X		Recreational wetlands
	X					More trees
				X		Filtration plant converted into "Water Court"
			X	X		Demolish 1955 building
		X				Drainage: underground retention
			X			Resource water
			X			TV/Film

Figure 29: Potentials expressed by each working group at the public Design Charrette 9/14/2011.

vision for re-use of the site. The tour was followed by two group discussions. In the first group session, members with similar expertise discussed options that incorporated site and building elements into reuses informed by their professional background. Then groups were reconfigured, creating mixed backgrounds with the intent to find unique and synergistic combinations of re-uses.

The long-term economic planning for rehabilitation and maintenance of the site necessitates the inclusion of business models with the potential to contribute financial resources for the ongoing operational and maintenance costs. The development of a public/private partnership holds the greatest promise for ensuring that the entire Hackensack Water Works complex rises to its greatest potential, and creates a vibrant space for local residents and visitors.

3.3 Current Programs for the Site

Up to this point the public discussions, as well as the professional research and planning efforts, have had only limited physical impacts on the site itself.

Currently the site accessibility is very limited. Only the maintained area along Elm Street is open to passive recreation by the public. The temporary closing of the Elm Street Bridge 2009/10 provides a safe zone for pedestrians, bicycles and skate boards on the street.

Due to safety hazards it is not prudent to open up additional sections of the Hackensack Water Works until the chimneys are repaired. The Bergen County Parks Department has provided temporary signage with information about the buildings and the landscape. This increased the attractiveness of the Elm Street area as a destination for passive recreation and will further foster ongoing public support.

Figure 30: People taking advantage of closed Elm Street.
Figure 31: Signage provides information about history, environmental value and the potential future of Van Buskirk Island.
Figure 32: Banners draw attention of passers by.

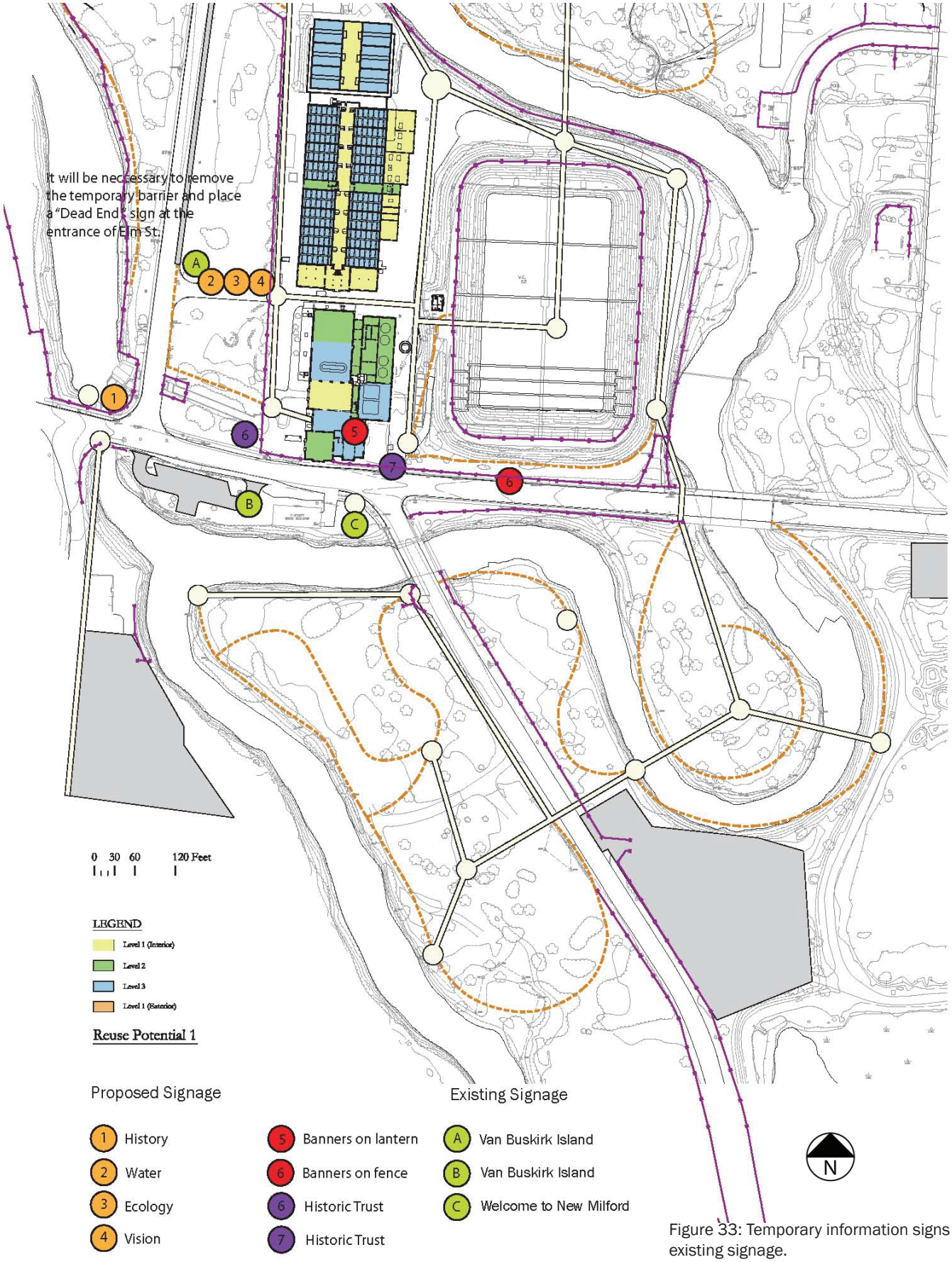


Figure 33: Temporary information signs and existing signage.

3.4 Current Maintenance

Figure 34: Mown vegetation at the sedimentation basin.

As of spring 2010, maintenance by Bergen County Parks Department is limited to the grass areas along Elm Street and a small portion of grassland east of Madison Avenue adjacent to a United Water facility still in use by the company. There has been a complete lack of maintenance of the fenced off areas north of New Milford Avenue, as well as the overgrown land on the southern portion of the property, west of Madison Avenue. A high degree of neglect and decay characterized most of Van Buskirk Island between 1993 and 2010.

In spring 2010, Bergen County Parks Department took the initiative to clear vegetation from the outer banks of the coagulation basin in an attempt to improve the site's overall appearance.

Figure 35: Short Term Maintenance Suggestions Legend

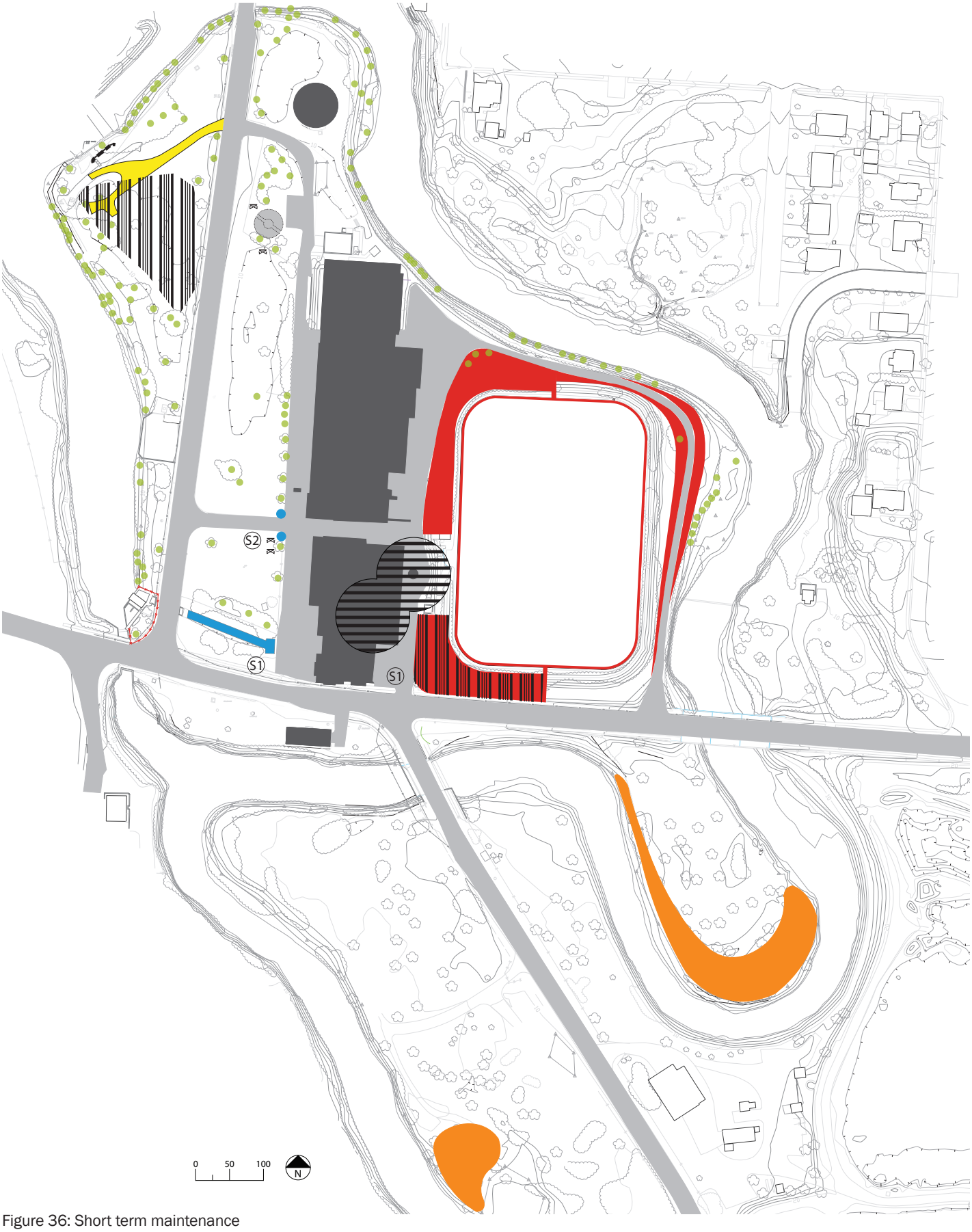


Figure 36: Short term maintenance suggestions Spring 2010, partly implemented

3.5 Character and Existing Conditions Plan

This section describes the character of Van Buskirk Island in 2010 and refers to the existing conditions plan (figure 38). The plan delineates significant elements of the vernacular landscape using color coded descriptors of landscape material and composition as identified from available sources. Most of the information is collected through field work (Rutgers University), supplemented by a CAD file provided by Bergen County. Additional information was provided by the Bergen County Department of Parks and the United Water Company. The book "The Hackensack Waterworks" was also a highly valuable resource.[175]

This plan should not be used for construction purposes as it is not field-verified. Information pertaining to site layout, land cover, and location of features was taken from aerial images. [The existing conditions plan highlights elements of the vernacular landscape with color coded symbols to identify their type and material.] Also listed in the symbol key are graphic codes used to identify small-scale features. The existing conditions plan was developed as a 32x36 inch document in 30-scale. The reproduction in this report shows the property at approximately 1"=80' 0" - scale.

The unique character of Van Buskirk Island was shaped by a variety of distinctive features since construction of the first Hackensack Water Works building on the island. These features, as well as elements reminiscent of the first mill on the island, will be compared over the historical periods of the site in an effort to track changes and continuity of the property and its characteristics, and to serve as a foundation for future rehabilitation work. *The United States Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes (Guidelines)* names features that define the character of the landscape because they form a series of interrelated, specific aspects of the historic vernacular landscape.

These features include:

- Spatial organization, land patterns, land use and visual relationships
- Topography and natural systems
- Vegetation
- Circulation
- Hydrology and water features
- Structures, site furnishings and objects

These features of the existing conditions of the Van Buskirk Island landscape are described in the text that follows.

Code	Scientific Name	Common Name
A.a.	Ailanthus altissima	Tree of Heaven
A.p.	Acer platanoides	Norway Maple
A.r.	Acer rubrum	Red Maple
A.s.	Acer saccharinum	Silver Maple
B.a.	Betula alleghaniensis	Yellow Birch
B.n.	Betula nigra	River Birch
C.g.	Carya glabra	Pignut Hickory
C.b.	Catalpa bignonioides	Southern Catalpa
C.c.	Carya cordiformis	Bitternut Hickory
C.f.	Cornus florida	Flowering Dogwood
F.a.	Fagus americana	American Beech
F.p.	Fraxinus pensylvanica	Green Ash
J.c.	Juniperus chinensis	Chinese Juniper
J.n.	Juglans nigra	Black Wallnut
L.t.	Liriodendron tulipifera	Tulip Tree
M.a.	Morus alba	White Mullberry
P. x a.	Platanus x acerifolia	London Plane Tree
P.d.	Populus deltoides	Eastern Cottonwood
P.m.	Pseudotsuga menziesii	Douglas Fir
P.o.	Platanus occidentalis	Sycamore
P.p.	Picea pungens	Colorado Spruce
P.s.	Pinus strobus	White Pine
Pr.s.	Prunus serotina	Black Cherry
Py.c.	Pyrus calleryana	Callery Pear
Q.a.	Quercus alba	White Oak
Q.b.	Quercus bicolor	Swamp White Oak
Q.c.	Quercus coccinea	Scarlett Oak
Q.p.	Quercus palustris	Pin Oak
Q.r.	Quercus rubra	Red Oak
Q.v.	Quercus velutina	Black Oak
R.p.	Robinia pseudoacacia	Black Locust
S.a.	Sassafras albidum	Sassafras
T.a.	Tilia americana	Basswood
T.b.	Taxus baccata	English Yew
Ts.c.	Tsuga canadensis	Eastern Hemlock
U.a.	Ulmus americana	American Elm

Figure 37: Existing Conditions Plan Tree Symbols

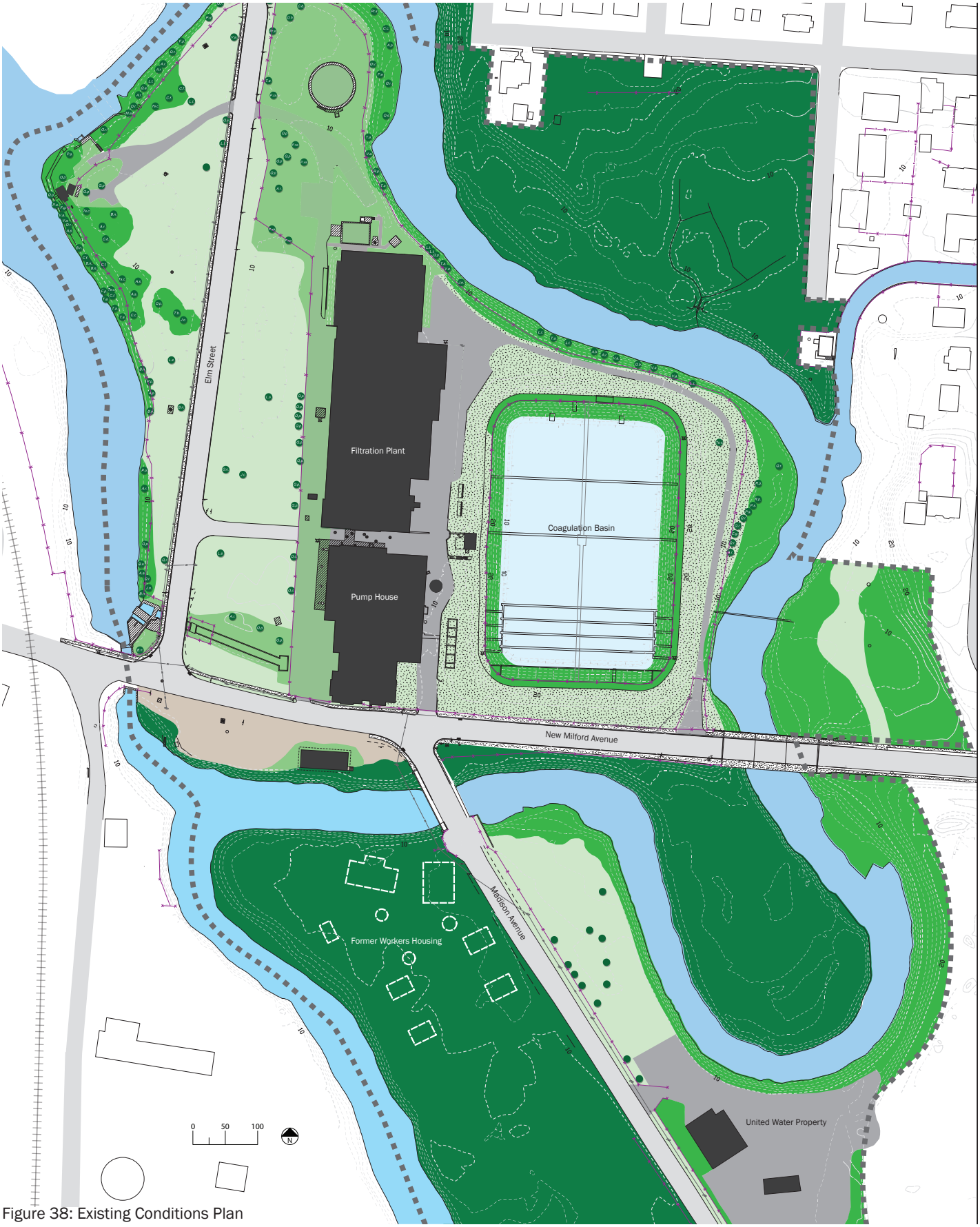


Figure 38: Existing Conditions Plan

Recently Cleared Vegetation

Mowed Grass

Volunteer Growth

Vegetation Shaping Spatial Borders

Forested

Spatially Dominant Trees

Compacted Topsoil With Sparse Vegetation Growth

Impervious Surface

Impervious Surface With Significant Volunteer Growth

Sidewalk

Concrete Pad

Metal Lid

Basement Access

Manhole

Sewer

Signage

Fence

Metal Guardrail

Fire Hydrant

Curb

Utility Pole

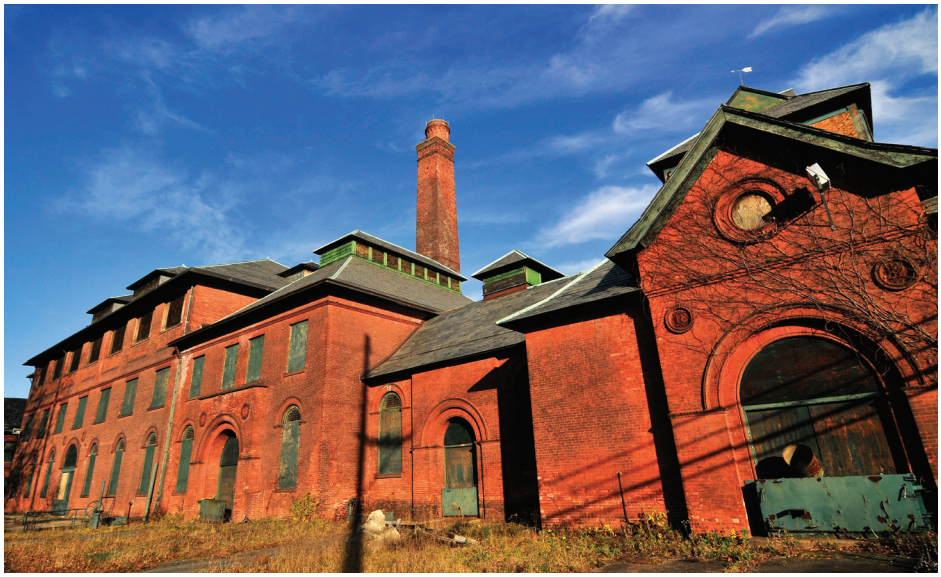
Overhead Wire

Tank

Figure 39: Existing Conditions Plan Legend

3.5.1 Spatial Organizations, Land Patterns, Use and Visual Relationships

Figure 40: The smoke stacks are a landmark at the intersection of New Milford Avenue and Madison Avenue.
Figure 41: The unique western façade.



The spatial organization of Van Buskirk Island is an outcome of the industrial use of the site which utilized the natural water course of the Hackensack River. The staged development of a complex system of water collection, treatment and distribution lead to the existing placement of buildings and artificial landscape features and altered the site's natural features. The most dominant features on site today are the pump house, the filtration plant and the coagulation basin. The two smoke stacks add to the high visibility of the structures from New Milford and Madison Avenues. Located parallel to Elm Street, the building lawn provides the western edge with a large open space that is confined in the north by significant trees and shrubs. The site is rather open and undefined towards New Milford Avenue in the south.

This landscape is intersected by Elm Street (still closed in 2011 to traffic due to an unsafe historic bridge) and the main driveway leading [from Elm Street] in between the buildings in the direction of the coagulation basin. (Refer to section 4.1 for more information about the lawn intersected by Elm Street).

Figure 42: Main entrance from Elm Street.
Figure 43: Closed Elm Street bridge.
Figure 44: In the coagulation basin.

The spatial experience behind the buildings is unique. The building facades and the berm of the coagulation basin create a long, narrow space that widens towards its northern end where the berm bends eastward. Dense trees and shrubs provide an enclosure towards the north that continues along the northern and western edge of the basin creating long and narrow spaces. South of New Milford Avenue there are no space-defining artificial features. The 1979 pump house at the intersection of New Milford and Madison Avenues does not contribute to spatial definition. Most of the land south of New Milford Avenue is covered by forest, providing enclosure of the interior and creating spatial boarders at the exterior edge. This is also true for the forested parcels west and north of the site.

3.5.2 Circulation

Figure 45: Closing of Elm street allows recreational use.

The existing vehicular and pedestrian circulation in the study area consists of paved roadways or sidewalks. On the north end of the site the Elm Street Bridge was recently closed due to structural weakness. Closure of Elm Street to vehicular traffic transformed the street into a convenient and safe pedestrian circulation route. Lack of cars has radically changed the quality of the street life in contrast to New Milford and Madison Avenues. New Milford Avenue experiences heavy vehicular traffic throughout the day, although adjacent sidewalks allow for safe pedestrian passage. Madison Avenue is also heavily trafficked and does not have sidewalks, which results in less frequent pedestrian circulation.

The high volume of vehicular traffic occurs in part because motorists utilize New Milford Avenue as a convenient connection between Kinderkamack Road (CR 503) and Washington Avenue/Schraalenburgh Road (CR 39). CR 503 and CR 39 are major north – south connector roads that have a significant influence on traffic volume through the study area. There are no manmade traffic calming devices in place. However, one can regularly observe Canada Geese crossing New Milford Avenue which causes motorists to slow or stop completely.

Pedestrian circulation is limited to sidewalks on New Milford Avenue and the Elm Street roadway in part because much of the study area is currently fenced off and lacks a trail system. The existing conditions plan (figure 38) shows the location of the fencing around the Hackensack Water Works buildings and coagulation basin, which prevents public access. Additionally, the forested areas south of New Milford Avenue do not enhance pedestrian use. The forest east of Madison Avenue is fenced off and the forest west, where there are remnants of the old workers' housing, does not have any trail system. One will most often observe pedestrians walking or riding bikes along Elm Street and occasionally venturing to the northwest corner of the study area.

The USGS Water Quality Monitoring Station is located on the northwest corner of the study area, west of

the diversion dam. This location provides a scenic view of the Hackensack River and is also the foraging ground of the Black Crown Night Heron. The New Jersey Audubon Society has taken a particular interest in the site for its important bird habitat value. Access to the area is provided by a paved roadway that runs perpendicular to Elm Street. Surrounding the station is a mixture of gravel and impervious surface which allows for some pedestrian circulation. The large maintained lawn area to the west of the building is occasionally utilized by pedestrians but has no defined pathways.

Currently, most of the visitors to the study area are people who are passing by or taking a shortcut through the site. There are no defined gathering spaces; people usually move through en route to a particular destination. The most frequently observed form of transportation through the study area is vehicular, but it is also common to see many people walking or riding bikes on Elm Street.

Figure 46: Diagram shows the closed section of Elm Street within the local traffic context with Black Crown Night Heron foraging habitat highlighted.

3.5.3 Topography and Natural Systems

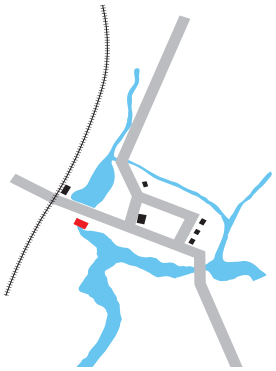


Figure 47: Diagram based on a historic map of New Milford published in 1876 (figure 76). The main infrastructure on site was the Van Buskirk Mill, shown in red, Milford Avenue, and the railroad line.

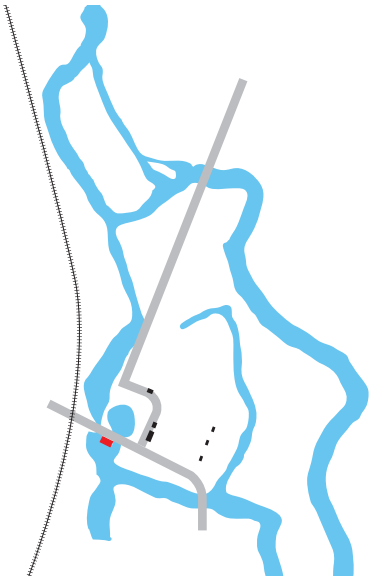


Figure 48: Diagram based on a map of property conveyed to the Hackensack Water Company in 1881 (figure 8). This map shows the river as a similar overall shape as it is today. Two major differences from the previous diagram are: the settling pond that was used to power Van Buskirk's Mill; and the "Old Creek" that extended into the island. The pond was used to power the mill and pulled water via a canal dug from the southern side of the river.

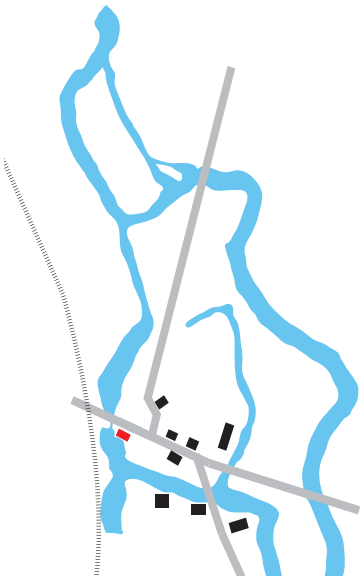


Figure 49: Diagram based on the 1900 USGS 15' quadrangle Paterson survey. The very large scale of thids map makes detailed analysis difficult. However, the comparison with historic photographs (figure 57, 47 75) allows the conclusion that Van Buslirk Mill and the superintendant's house were still standing, while additional workers' housing was errected south of the river.

The site is situated in the Hackensack River Valley. While the terrain of the island and the adjacent land is generally flat and low-lying, the valley walls to the east and west have steep slopes with maximum elevations of over 130 ft. The study area is dominated by soil classified in SCS hydrologic soil group B. Group B soils are typically composed of 10 to 20% clays and 50% to 90% sand, indicating a moderately low runoff potential for the site.

Van Buskirk Island lies approximately 10 feet above sea level in the Hackensack River. The landform of the coagulation basin rises over 20 feet above sea level. The river is tidal on the south and east sides of the island. The site itself is a man-made island, created long ago by the displacement dam built on the northern end of the island to divert part of the river's flow to the western side where water was collected via an intake channel.

The diagrams above show the major alterations to the island between 1876 and 1923.

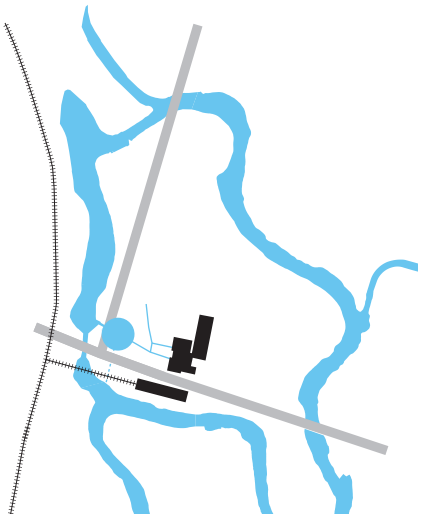


Figure 50: Diagram based on the General Plans and Sections, proposed Intake and Appurtenances for the Hackensack Water company from 1911 (figure 69) and a photograph of the first settling basin (figure 68). It illustrates the landscape prior to building the first coagulation basin in 1905 (compare also building sequence diagram figure 67). During this period, the Water Company used Van Buskirk's Mill pond location as a settling pond. The photograph of the pond (figure 69) shows the intake pulling water from the southern stretch of the river under New Milford Avenue.

Figure 51: Diagram based on historical map from the G. and W.S. Bromley, Atlas of Bergen County in 1912. A major change was the addition on the modern intake canal. The shape of the intake differs from later maps and the shape of the river seems to have been simplified. Furter additions of buildings and infrastructure are shown. Most noticable is the addition of the coagulation basin and the construction of the workers housing south of New Milford Avenue.

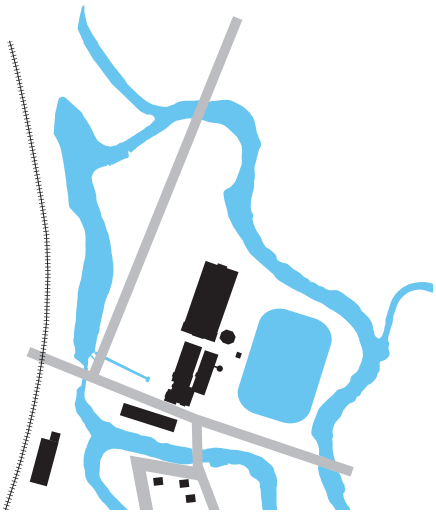
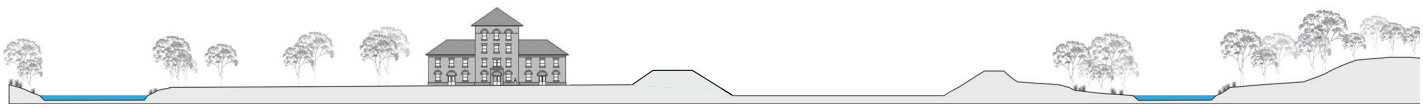


Figure 52: Diagram based on the 1923 Sanborn Map of the Hackensack Water Company (figure 10). This map is the most recent in our set of historic maps and is very similar to what is seen on site today. The overall shape of the river relates to current site conditions. Most of the infrastructure is still in place.

Figure 52a: This section illustrates the local topography, with the berms of the basin as significant elevations.



3.5.3.1 Vegetation

In September 2009 a comprehensive plant inventory was conducted by Dr. Sasha Eisenman, (Rutgers University Department of Plant Biology), and Ari Novy, (Rutgers University Department of Landscape Architecture and Graduate Program in Plant Biology). They drafted a report which catalogues both the plant species and plant communities in the study area. (See Appendix) The vegetation map shows the location of wetland plant communities, riparian vegetation along the river, maintained ornamental vegetation along Elm Street, and deciduous forest east of Madison Avenue. The inventory of 145 species (43% of them native) representing 66 plant families is somewhat surprising considering the high human impact in this densely populated suburban region. The vegetation study, along with an earlier wildlife study, informs our conclusions about the site's local ecology.

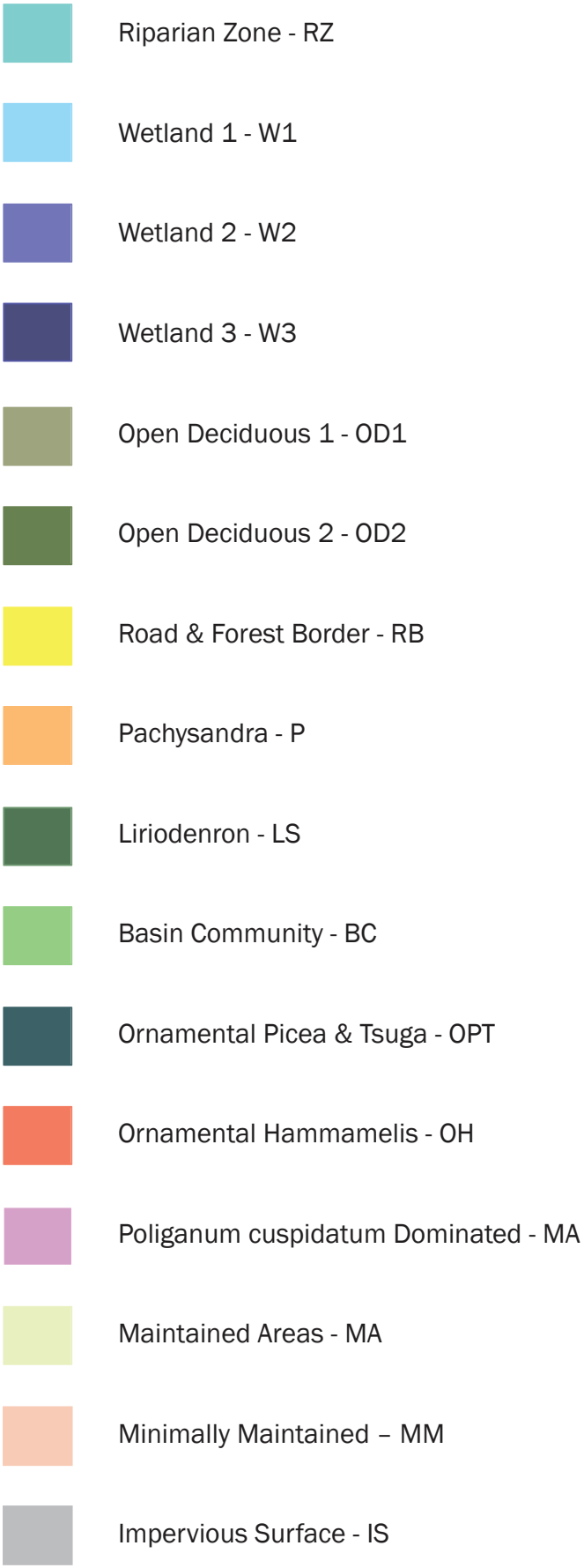


Figure 53: Plant Communities Legend.

Figure 54: Plant communities surveyed in September 2009.

3.5.3.2 Ecology

Van Buskirk Island is part of the Hackensack River riparian zone. The building of the Hackensack Water Works and the adjacent infrastructure has changed the natural conditions of the island. Maintained grassy areas and horticultural plants dominate both sides of Elm Street. (Refer to section 4.1 for information on the gracious lawn). The island's peripheries consist of densely vegetated habitat which supports wildlife. There are fresh water wetlands and associated riparian zones along the river channel. Most of the trees along the river are native and their root systems help to stabilize the stream banks. The River Birch (*Betula nigra*), Sycamore (*Platanus acerifolia*), Basswood (*Tilia americana*) and American Elm (*Ulmus americana*), a few of the most common trees on the island, are great perches for birds hunting for fish in the river.

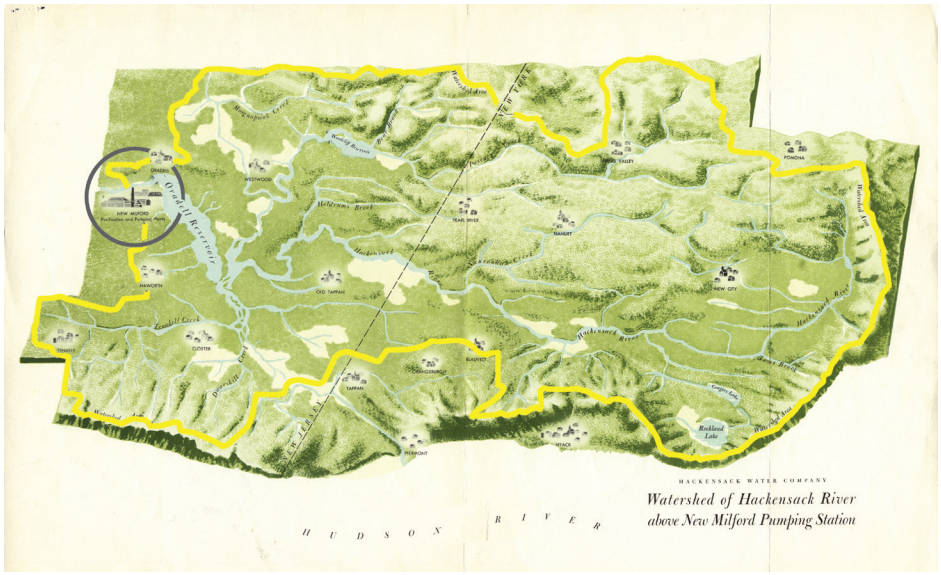
Heavy water flows, high oxygen levels and a coarse sandy river bottom provide valuable habitat for fish and other marine wildlife. Many fish are stranded behind the dams at the northern tip of Van Buskirk Island, making a rich foraging ground for birds such as the Black-crowned Night Heron (*Nycticorax nycticorax*). Other wildlife on the island includes the Eastern Painted Turtle (*Chrysemys p. picta*) and the Little Brown Bat (*Myotis lucifugus*).

The peninsula south of New Milford Avenue is an assemblage of native plants as well as some ornamental and naturalized non-natives, creating the character of a mature forest canopy. A similar forest covers the site of the former workers housing at the southern end of the property. Though the buildings are gone, the remaining ornamental plants such as Mock Orange (*Philadelphus sp.*) and the Doublefile Viburnum (*Viburnum plicatum*) still tell the story of the gardens around former homes. Some of the plants are thriving. A Tulip Tree (*Liriodendron tulipifera*) has produced a thicket of seedlings and shoots, and the ground cover Pachysandra terminalis is spreading.

Figure 55: The Black-crowned Night Heron finds foraging grounds along the northern edge of Van Buskirk Island.

3.5.3.3 Regional Ecology

Figure 56: Portion of the Hackensack Watershed upstream of Van Buskirk Island



When considering the regional ecology of Van Buskirk Island, the intimate connection to the river suggests ecological health occurs at a watershed scale. A watershed is a region of land whose topography funnels and directs water to one location as the Hackensack River and its tributaries funnel into Newark Bay. In a natural watershed over 90% of the rainfall collects above and below the soil surface before the majority of the precipitation begins its journey downstream. Natural watersheds are uniquely connected landscapes whose boundaries may cross many artificially drawn state and municipal lines.

The Hackensack River Watershed is a landscape that has been manipulated for centuries. Today the watershed hydrology is dominated by the presence of four man-made Water Company dams. The watershed begins in New York State at the origin of the Hackensack River in Lake Lucille. The dam structures create lakes and water reservoirs located in the river's upper reaches at the Oradell Reservoir (NJ), Lake Tappan (NJ), Lake DeForest (NY), and Lake Lucille (NY). (See figure 12)

Human actions have also impacted the lower portions of the Hackensack River system. The Hackensack Meadowlands, now dominated by the Common Reed (*Phragmites australis*)and Cord Grass (*Spartina alterniflora*), was once an Atlantic White Cedar (*Camaecyparis thyoides*) swamp before the arrival of Dutch settlers in the 1600's. Using techniques from their home country, the Dutch channeled and drained the land, harvested the peat, and grazed cattle on the high marshes. These activities altered the natural ebb and flow of tidal influence, allowing the salt water to migrate further upstream. The last surviving historic Atlantic White Cedar died in 1939 as a direct result of restricted fresh water flow down the Hackensack River that was caused by the damming of the Oradell reservoir.

Figure 57: Flood from 1902, impacting the Pumping Station and the Superintendent's house.

3.5.3.4 Hydrology and Water Features

In December 2007, Dr. Robert Miskewitz and Jillian Thompson developed a preliminary hydrologic analysis for the proposed rehabilitation of the study area. The hydrology report was developed to better understand the impact of the Hackensack River on the study area. The Van Buskirk Island study site is located approximately 0.5 miles south of the Oradell Reservoir; the island is surrounded by the Hackensack River. The 290 acres of the Hackensack River subwatershed, from Oradell to the New Milford gauge is upstream of the displacement dam and feeds both the eastern and western branches of the Hackensack River. The Hirshfield Brook subwatershed drains nearly 3000 acres of land into the eastern branch of the river. The remaining two subwatersheds in the hydrologic study area lie downstream of the island at the head of tide, whose effects are present even on the northern end of the island. Although flooding is a naturally occurring phenomenon, severe flooding events are worsened by the high rate of impervious surfaces in the watershed as well as atypical water release from the Oradell reservoir that may occur during large storm events.

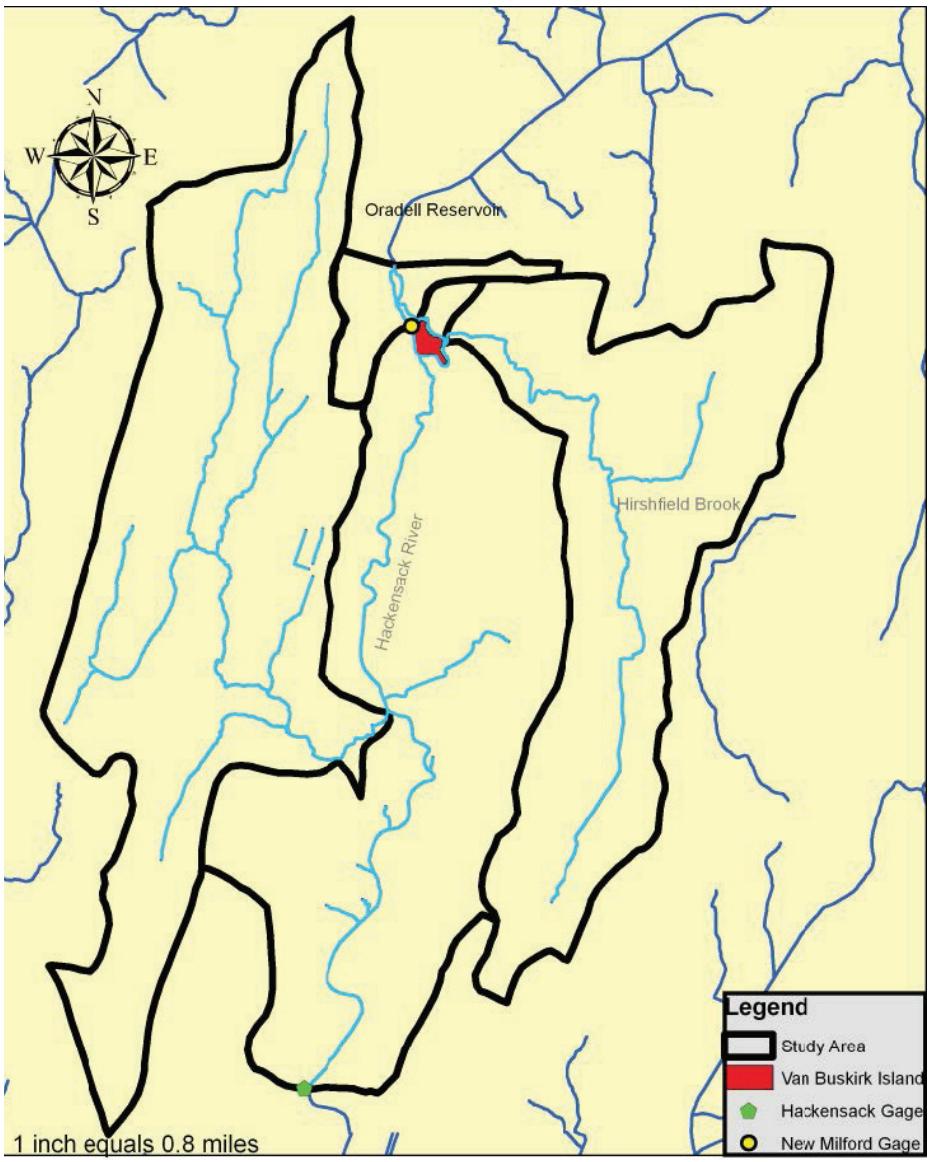


Figure 58: Subwatersheds impacting flooding on Van Buskirk Island

3.6 Summary

Since Bergen County took over responsibility for the site in 1993, use of the site has been very limited. Due to the minimal maintenance along Elm Street and a lack of maintenance on most of the site, a high degree of neglect and decay characterizes most of the landscape of Van Buskirk Island. Due to safety concerns, the most dominant features—pump house, filtration plant and coagulation basin—are fenced off. Only areas adjacent to Elm Street are accessible. The recent closure of that street has transformed it into a convenient and safe pedestrian walkway. Currently, most of the circulation in the study area is people who are passing by or cutting through. There is very little recreational use in the accessible open spaces. The spatial organization of Van Buskirk Island is an outcome of the industrial use of the site, which utilized the natural water course of the Hackensack River. The two smoke stacks make the historic ensemble visible from a great distance, further enhancing its significance for the neighborhood.

The hydrology of the Hackensack River watershed has been strongly impacted by human use as a drinking water resource. However, the Hackensack River is still an important ecological corridor within densely developed Bergen County. Van Buskirk Island is a core element of the river's riparian zone, a valuable foraging ground for rare birds and habitat for other wildlife.

4 Landscape Analysis and Evaluation of Significance and Integrity

4.1 Introduction to Landscape Analysis, Significance, and Integrity

The cultural landscape analysis seeks to reveal the changes in the vernacular landscape of the study area over the past century. The process is utilized to understand the significant elements that are paramount in telling the story of the cultural landscape. In order to identify these elements it is necessary to compare and contrast the cultural landscape during the period of historic significance to the present day existing conditions.

The period of significance referenced in this (historic vernacular landscape) report of Van Buskirk Island is longer than the period of significance referenced in the National Register of Historic Places (1882-1931). After the changes were made to the coagulation basin in 1936, the historic vernacular landscape was completed and remained nearly unchanged until closure of the Hackensack Water Works in 1990. Therefore, it is necessary to define the cultural landscape period of significance from 1882–1936 as opposed to 1882–1931, in order to include all of the landscape character defining features.

This landscape analysis seeks to explore the level of change and continuity between the historic conditions of 1936 and the 2010 existing conditions. Additionally, it is crucial to understand the degree to which the existing cultural landscape evokes the character of the historic cultural landscape.

By identifying change, continuity, and character-defining features in the cultural landscape, it is possible to assess the level of historic landscape integrity. The purpose of this process is to discern the true landscape character-defining elements within the study area. Any future preservation, restoration or development approach has to take into consideration possible effects on individual historic elements, as well as the impact on landscape-integrity created by the entirety of these elements. The concept of integrity as defined by the National Park Service was derived from an ecological model: the unity and completeness of natural systems seen as "*places of adapted fit with many species integrated into long persisting relationships, life perpetually sustained and renewed [through] cycling and recycling of energy and materials.*" In order to successfully understand and borrow from this ecological model, it is imperative to use the value of unity, completeness or wholeness in the historical record as a dynamic process and not a static inventory. As a result, the concept of integrity can be applied to the analysis of significance of the historic vernacular landscape[176].

This practice of defining landscape significance through an understanding of landscape integrity will be discussed throughout this chapter. By analyzing the historic landscape and the present landscape, conclusions will be drawn as to what the most significant elements are and how they are relevant in reading the true history of the cultural landscape.

In telling the story of landscape throughout history requires one to "determine the most appropriate values and directions for a project."[177] The evaluation of landscape integrity will also consider the importance of the Hackensack Water Works as a landmark for those living in or passing through Oradell and New Milford.

4.2 Landscape Analysis

The purpose of the landscape analysis will be to ascertain levels of change and continuity of the historic vernacular landscape. Evolution within the landscape at the Hackensack Water Works are catalogued in landscape plans and diagrams presented in this report. These documents serve as a visual aid for elemental and defining characteristics of the Hackensack Water Works' historic catalogued landscape. The compilation of information is the result of an inventory of existing landscape conditions (Chapter 3), the result of research and review of historic photographs, aerial photography, Clifford Zink's "The Hackensack Water Works", United Water documents, and the Historic American Engineering Record performed during the properties nomination process to the National Parks Service's Register of Historic Places. The fragmentary pieces of historic documentation (When assembled together) paint a much broader picture of operations and functions that complete the landscape narrative. By examining layers of history contained within the landscape of the Hackensack Water Works, we will be able to determine the character and narrative defining elements, their integrity, and how they feature in conveying the character of the property. This is the basis for assembling a landscape treatment approach within the guidelines of the National Parks Service.

To determine the character and levels of change across the Hackensack Water Works facility, the method used is to compare the existing conditions of the property (figure 38) and the 1936 conditions of the property (figure 59). While considering the change since the 1936 conditions, it will also be pertinent to examine the conditions that existed within the property prior to 1936.

Figure 59: 1936 Conditions Plan.

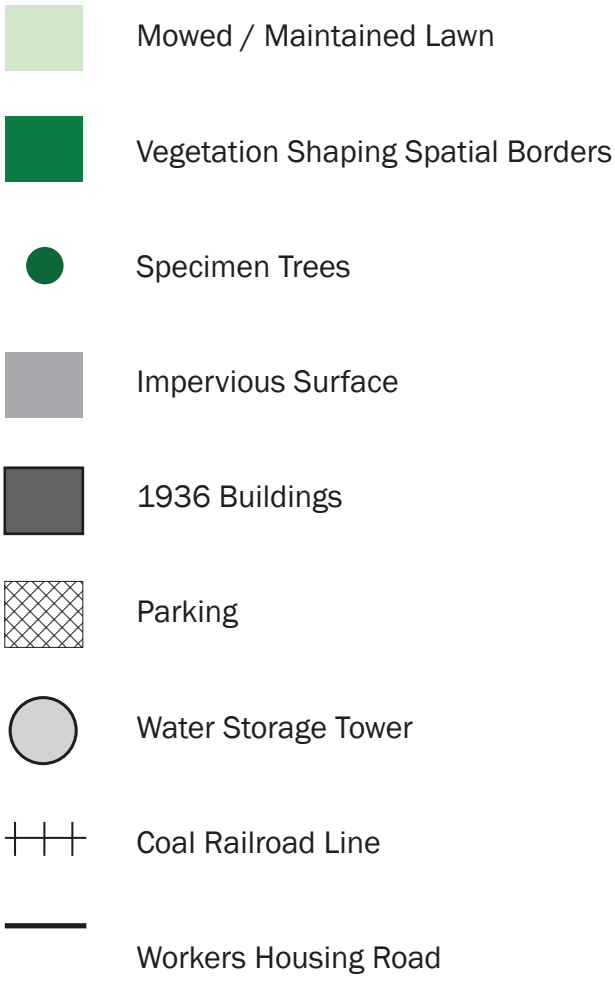


Figure 60: 1936 Conditions Plan Legend

It is in the nature of industrial and utilitarian sites to frequently undergo change as technologies and processes advance. The historical narrative of the cultural landscape of the Hackensack Water Works is no different. The Landscape Integrity Diagram (figure 65) illustrates the change in these landscape elements and will assist in the evaluation of the historic landscape. Because of the necessary complexity of the diagram, the narrative follows a division of the property into four segments that can be more easily examined to observe levels of change (figure 64).

Section 1 of the diagram includes the property west of Elm Street bordered by the Hackensack River and New Milford Ave (Oradell: part of Block 120, lot 1;) . The concrete and iron intake grates (c. 1911, figure 78) that once fed the intake canal with raw water for processing are included within the historic landscape recognized by the National Register of Historic Properties (NR). The structure itself remains relatively intact, however, it is not in use and overgrown. The addition of sidewalks and the realignment of

Figure 61: Weir.
Figure 62: USGS monitoring station

Elm Street have obscured a clear relationship between the landscape and the intake structures. The sidewalk runs the length of Elm Street and continues throughout the community. After being damaged in a flood the original wrought-iron fence was taken down and replaced by a chain link fence. Remnants of the original fence are stored in the pumping station. There was also the addition in 2010, of temporary signage along the northern portion of Elm Street.

The northern portion of this section also includes three small structures, the concrete weir, and the paved access road. The structures and access road were installed post-1936 and function as a USGS monitoring station.(See figure 61 and 62) The weir, though no longer original to the historic period, has been a constant element within the landscape at this location along the Hackensack River since colonial times. A similar structure can be seen in the 1881 survey of the land purchased by the reorganized Hackensack Water Company. (See figure 8.) Also in this section is the Elm Street Bridge. Because of the road closure, this bridge is no longer accessible by vehicles, but remains intact and is an important part of the vernacular landscape. *"The Elm Street Bridge is a wrought-iron, Pratt pony truss structure built in 1892. The bridge is one of only three pony truss bridges in New Jersey that employs Phoenix column construction, a significant technological innovation that contributed to the popularity of iron truss bridges in the 1870's. The Phoenix column was made of four riveted wrought-iron channel sections. It was much stronger than the cast iron members previously used in bridge construction. Invented by Samuel J. Reeves of the Phoenix Iron Company, Phoenixville, Pennsylvania, the column was used until the early 1890's, when the built up-box supplanted it in popularity. The bridge is significant as a rare example of Phoenix column construction. The sidewalk was added in 1964."* [178]

Vegetation on this portion of the property has remained relatively unchanged. Although there has been a natural succession of a riparian edge plant community which creates spatial borders, the visual perception remains consistent.

Section 2 consists of the majority of the property recognized by the National Register (Oradell: Block 123, lot 1), and contains many of the landscape elements that functioned in the processes of the Hackensack Water Works. This historic portion is bordered by Elm Street and New Milford Avenue to the west and south, and the Hackensack River in the north and east. Also included in section 2 is the undeveloped parcel of land across the Hackensack River that has remained unchanged since 1936 (Oradell: Block 1213; New Milford: Block 1301, lot 1, (owned by the Borough of New MIlford); Block 1301, lot 1, Block 1524, lot 1; Block 1523, lot 2).

Beginning at the northern portion of the historic section, the first change in the landscape is the 1976 addition of the wastewater clarifier and the equalization basin. These elements did not function in the processing of pure drinking water for the public, but functioned within the internal system of the Hackensack Water Works. Next, the 1955 addition to the filtration building caused

Figure 63: Elmstreet Bridge (c. 1892), Phoenix column truss

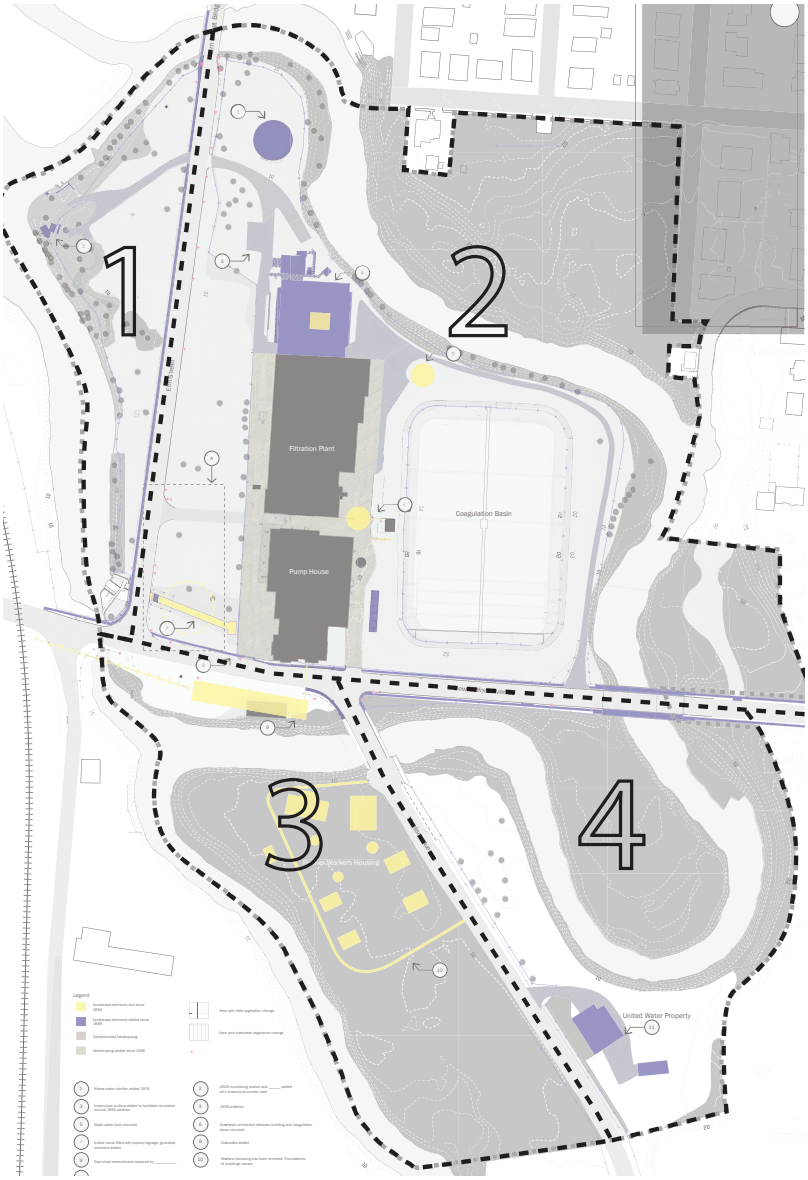


Figure 64: Quadrants of landscape integrity.

Quadrant 1:
Oradell: part of Block 120, lot 1;

Quadrant 2:
Oradell: Block 123, lot 1; Block 1213
New Milford: Block 1301, lot 1, (owned by Borough of New MIlford); Block 1301, lot 2, Block 1524, lot 1; Block 1523, lot 2;

Quadrant 3:
Oradell: Block 121, lot 6;
New Milford: Block 1308, lot 1;

Quadrant 4:
Oradell: Block 122, lot 1;
New Milford: part of Block 1309, lot 1 (owned by United Water).

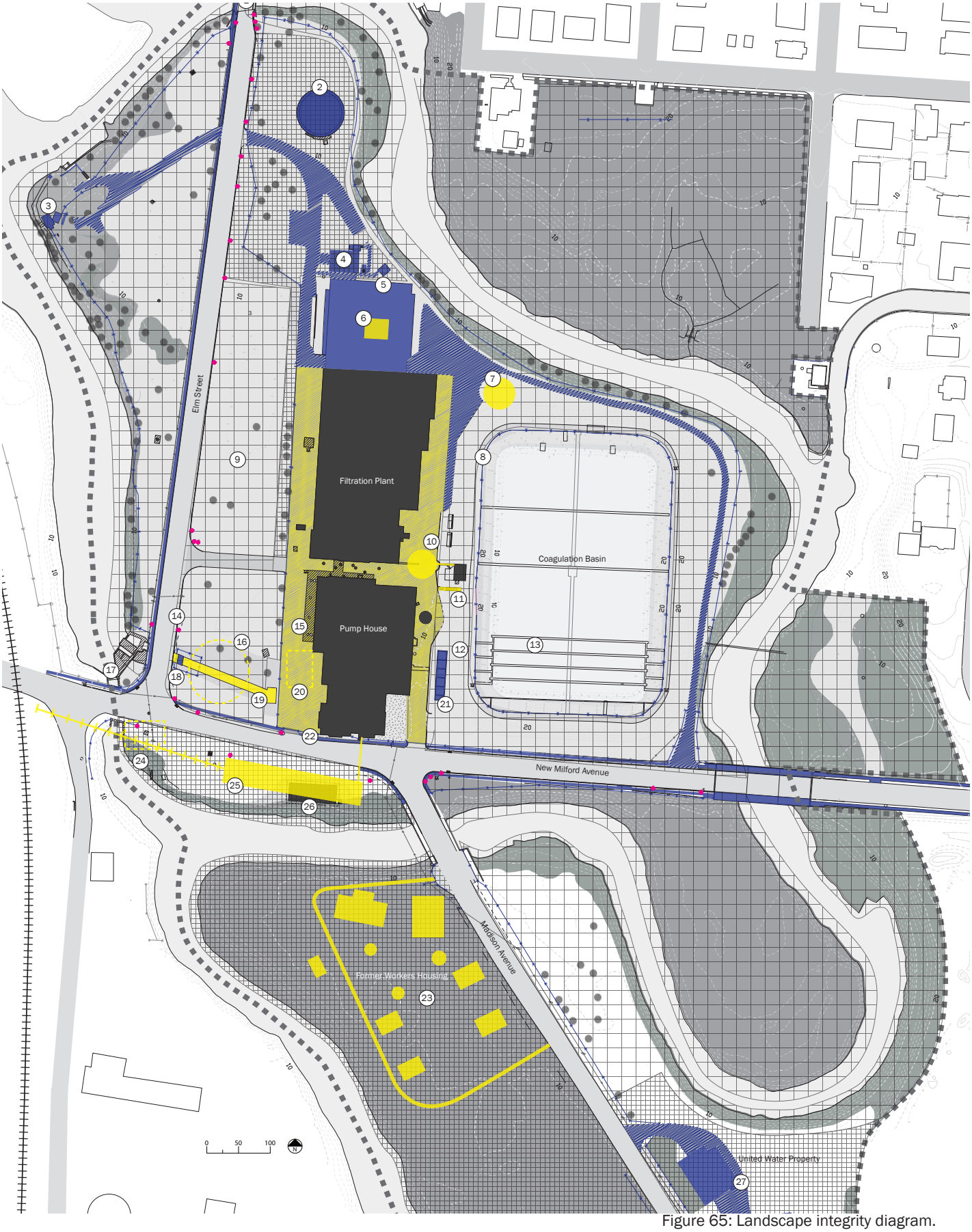


Figure 65: Landscape integrity diagram.

1. 1892 Elm Street Bridge
2. Waste Water Clarifier
3. USGS Monitoring station,Hydrologic unit 02030103, and adjacent weirs
4. Equalization Basin (added in 1976)
5. 1955 addition
6. Lime House shown in 1936 General Plan
7. 1935 Wash Tank (removed)
8. Hydrant (removed)
9. Gracious Lawn
10. 1904 Wash water tank removed in 1935
11. 1905 Coagulation Basin stairs
12. Banks of the coagulation basin
13. 1911 intake canal filled with topsoil
14. Guardrail and signage along Elm Street and New Milford Avenue
15. Significant assembly of underground pipes
16. Original 1880's Settling Basin (removed)
17. Intake
18. Water Main and surrounding chain-link fen
19. 1911 Intake Canal
20. Approximate first location of Superintendent House
21. Concrete Support structure for tank
22. Sidewalks installed
23. Workers Housing
24. Approximate location of Van Buskirk Mill
25. 1882-1886 Coal House, rail connection an overhead steam pipe
26. United Water utility building
27. United Water utilities

Landscape elements lost since 1936

Landscape elements added since 1936

Signage

Compromsed hardscaping

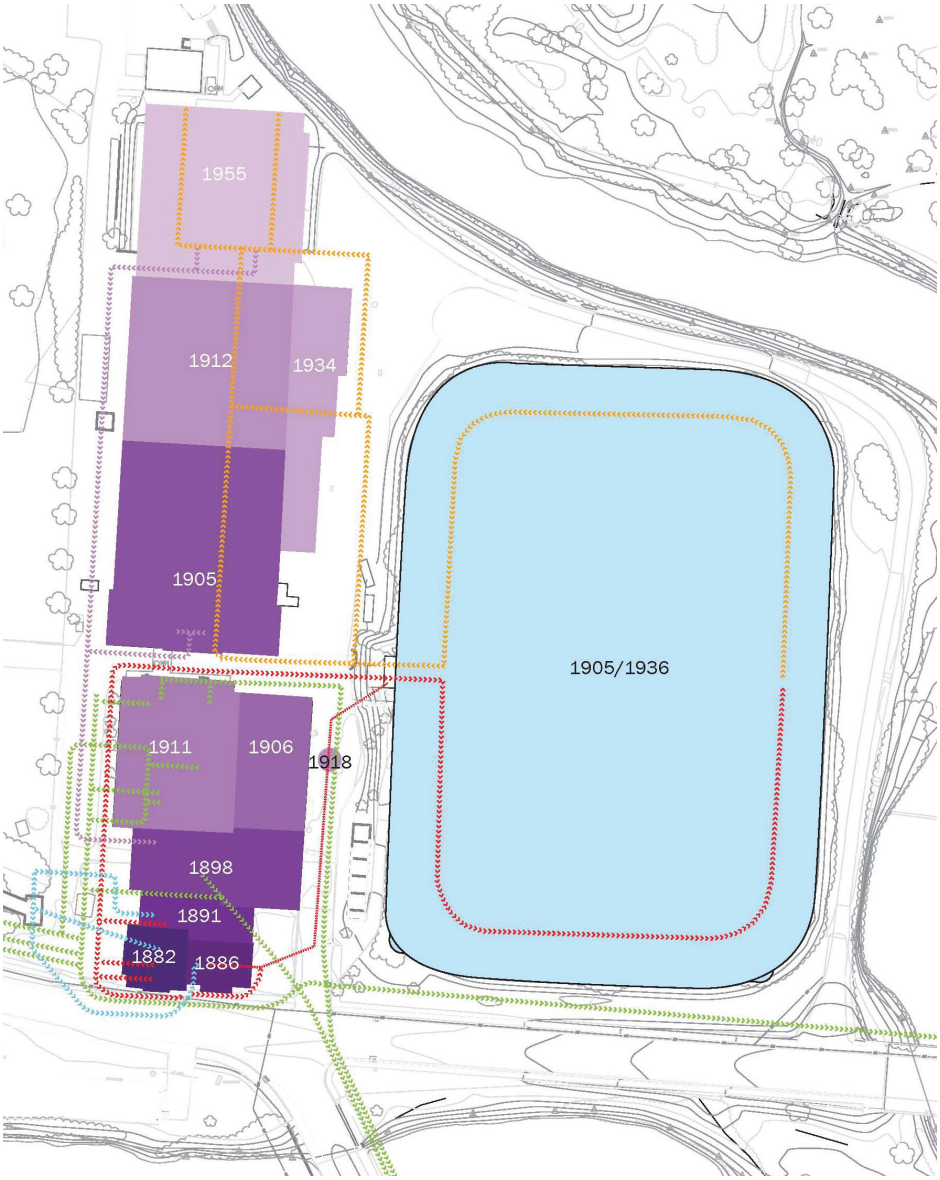
Hardscaping added since 1936

Area with little vegetation change

Area with substatial vegetation chang

Figure 66: Landscape integrity legend.

Figure 67: Building Sequence Diagram showing the continuous addition of buildings to meet the growing demand for water between 1882 and 1955.



several changes in the landscape. This structure resulted in significant circulation changes as additional impervious surface was added around the 1955 portion of the filtration building and the coagulation basin.

Moving further south into the property in Section 2, the next element that has been altered since 1936 is the removal of the 1935 wash water tank that supplied fresh water to the facility. This structure replaced the 1905 wash water tank, both of which were designed by the New York engineering firm Hering & Fuller. Adjacent to the site of the 1905 wash water tank are the infrastructure remains of the elevated pipe that carried the chemical coagulant from the filtration house to the gate house. The pipe and a portion of the support no longer exists, though a steel support extending from the filtration house is still present. Next to the gate house the original coagulation basin stairs (c. 1905) remain, although recent maintenance efforts caused some damage. Also removed during this maintenance effort was a unique apple tree containing

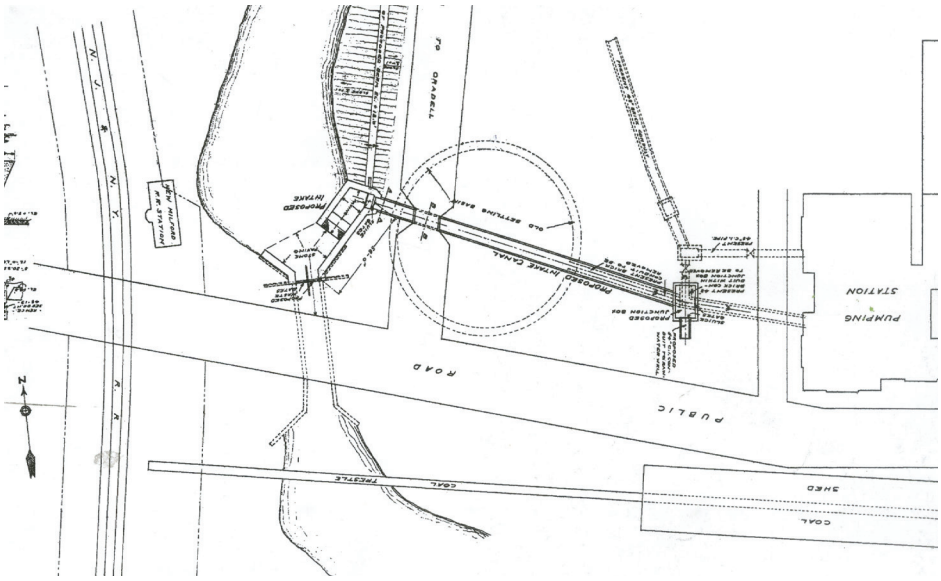
Figure 68: The first settling basin west of the pump house.
Figure 69: A 1911 plan showing the approximate location and scale of first settling basin marked by the circular dotted line.

multiple grafted species,(figure 80) which was planted and tended by a long-time employee of the facility. The concrete support structure used to hold oil tanks was added after 1936.

Moving to the portion of Section 2 adjacent to Elm Street, the Integrity Diagram (figure 65) reveals multiple changes between the 1911 intake grates and the pump house. Prior to the 1905 construction of the coagulation basin this section was the location of the old settling area, shown in figure 68 and 69. Also existing at this point in time, the residence of the superintendant of the Hackensack Water Works was located to the northwest of the 1882 pump house. The house was later moved south of New Milford Avenue within the workers housing area (See discussion, Section 3).

The asphalt in front of the filtration house marks the location of a significant assembly of underground pipes (figure 67).

The intake canal (c. 1911) was the exposed channel (figure 98) carrying the raw river water, which came



through the intake grating from the "equalizing basin" to the pump house. Since the decommissioning of the Hackensack Water Works in 1990, the intake canal has been filled with soil, although iron elements still remain exposed above the surface. The portion closest to Elm Street is now the location of a main water line. This water main protrudes above the ground surface and is surrounded by chain link fence (figure 79). A guardrail between the chain link fence and Elm Street has been added to the landscape along with 18 different signs along Elm Street and New Milford Avenue.

Section 2 includes additional changes to the historic landscape. The addition of a chain link fence surrounding a majority of the complex currently prevents public access. The fence significantly changes the visual perception of the property and differs from an "open door" policy that would invite "passersby and local children to take a look at the fascinating steam pumps inside."

Vegetation within this section has remained relatively the same and still defines spaces much the same way it did through the period of significance. Ornamental vegetation has changed over the life of the facility and historic photos show a shrub border (that no longer exists) along the western edge of the hardscaping surrounding the buildings facing Elm Street, (figure 73). The Plant Communities Map (figure 54) also shows the presence of ornamental *Taxus* and *Hammemalis*. The lawn beginning at the western façade of the buildings and extending towards the river provides a platform to view the architecture. This lawn dates back earlier than most of the modern Hackensack Water Company buildings and can be seen in early photographs and drawings. The blank canvas of the lawn provides an open view of the façade and allows visitors to see architectural detail and building signage. The view from Elm Street towards the western façade is the quintessential view of the Hackensack Water Works. To preserve this view the lawn is a valuable asset establishing the sense of place of the Hackensack Water Works and should be maintained.

The changes within the landscape of Section 3 (Oradell: Block 121, lot 6; New Milford: Block 1308, lot 1) consists mainly of elements that have been removed from the site. The first of these is the Van Buskirk Mill that existed at the time the water company purchased of the property (figure 8). It can be seen in an 1890 photo (figure 74). Also on this small strip of land, south of New Milford Avenue were the coal shed and boiler house (one building). This structure included a rail tressle that extended from the primary rail lines west of the current site boundary and an overhead steam pipe that crossed New Milford Avenue. Currently a pump house constructed in 1979 occupies this location.

The remainder of Section 3 lies south and east of the Hackensack River and west of Madison Avenue. It is the former site of the workers' housing. Structures included houses, garages and an access road. A photo from 1905 (figure 70) shows parts of two houses for the employees who lived on site. The complex also included the house of superintendant D.W. Chase. This house was originally located just north of the 1882 pump house, and is shown

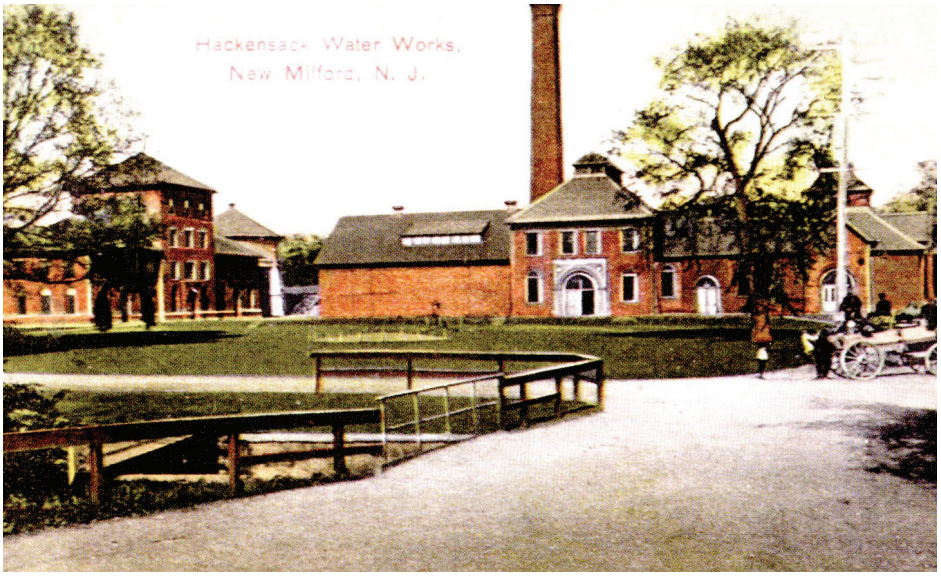


Figure 70: Gracious lawn, 1906

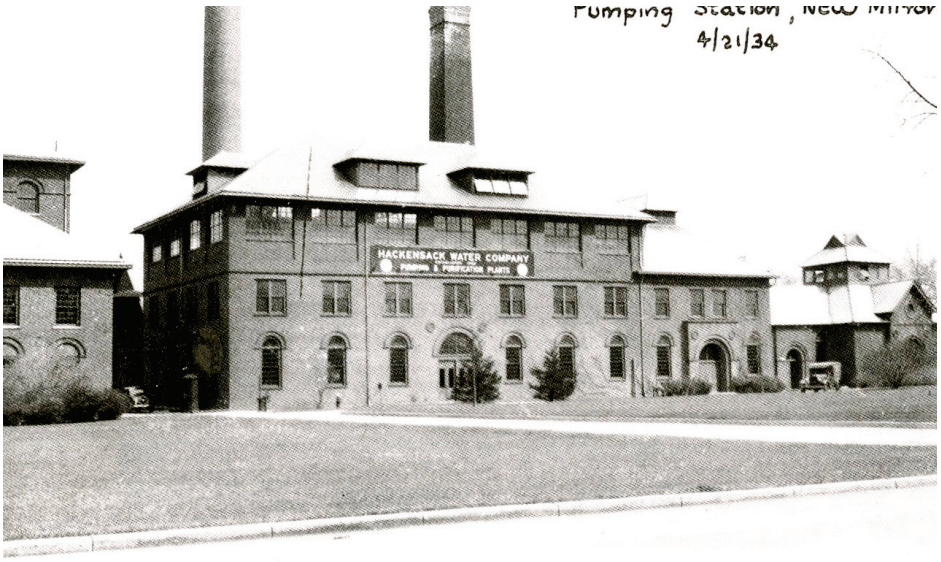


Figure 71: Gracious lawn, 1934

Figure 72: Gracious lawn, 1965

Figure 73: Areal image ca. 1930.

there in a photo of the spring flood of 1902 (figure 57). The superintendant's house was later moved to the employee housing area. These houses were razed sometime after 1985. Comparison to the 1936 plan and current conditions show that vegetative communities have begun to reclaim this landscape through natural succession. But the building foundations are still present along with large patches of the ornamental ground cover, *Pachysandra*.

Section 4 (Oradell: Block 122, lot 1; New Milford: part of Block 1309, lot 1, owned by United Water) contains the least amount of change since 1936. The portion of secondary growth forest on the peninsula south of New Milford Avenue has remained unchanged since the period of significance and historic photos and documents show little use of this portion of the property by the water company. The secondary growth forest is presumably the result of harvesting timber by early settlers. However, the visual character of the peninsula south of New Milford Avenue might be rather similar to the visual experience of Native Americans or early settlers. The apparently low human impact

Figure 74: The Van Buskirk Mill on New Milford Avenue, formerly Landing Road, on the southwest corner of the island, ca.1890.

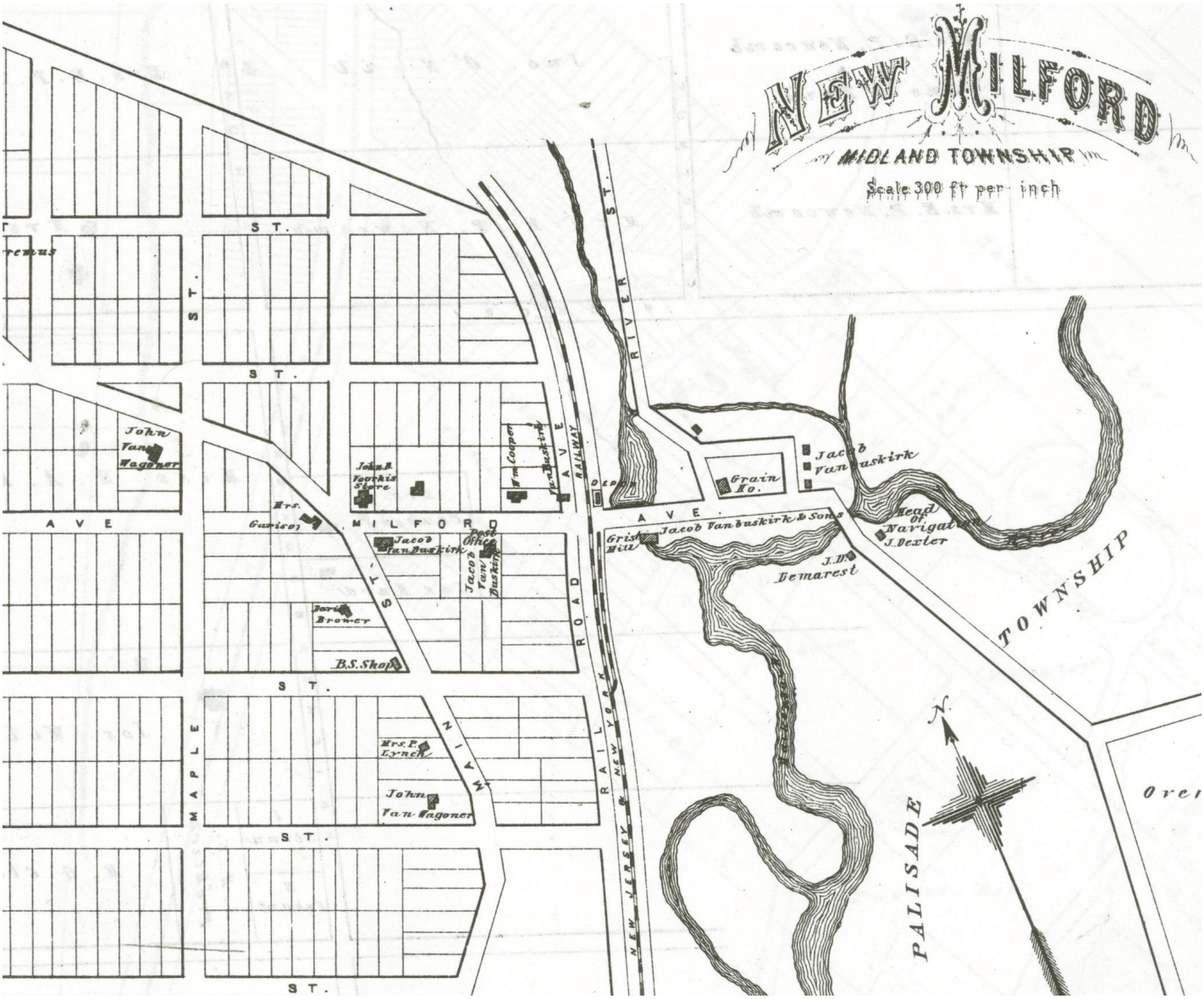
makes this section unique within the whole ensemble of the Water Works site.

After 1936, the water company began to utilize the southern portion of the property along Madison Avenue as a utility area. The northern portion was maintained as lawn with ornamental vegetation.

While we attempt to define the integrity of the landscape by a comparison of current and historic conditions it is also important to consider changes that cannot be drawn on paper. The Hackensack Water Works as a functioning facility within the context of the community was a constant for nearly a century. The closing of the facility, the subsequent decades of inactivity and the lack of access to the site has changed the dynamic of the relationship between the building, the landscape, and the community in a way that is contradictory to their historic use.

Figure 75: Postcard, ca. 1905, showing the coal house on the left and the workers housing on the right.

Figure 76: Historic map published in the 1876 Atlas of Bergen County, NJ.



4.3 Landscape Significance

Figure 77: U.S. Department of the Interior, National Park Service. National Register of Historic Places Criteria for Evaluation.

Criterion A - Associated with events that have made a significant contribution to the broad patterns of United States history

Criterion B -Associated with the lives of persons significant in the past

Criterion C - Embodying the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a distinguishable entity whose components may lack individual distinction

Criterion D - Yielding or may be likely to yield, important information in prehistory or history

Using National Parks Service guidelines for evaluating landscapes provides an avenue for understanding the significance of the Hackensack Water Works as a historic vernacular landscape. The significance of a property is contingent on its integrity and association: integrity in the landscape through levels of continuity that extend from the historic period to the present; and association to a historic event or person. These embody the characteristics of vernacular aesthetics or approaches to art or construction, or the potential to yield important information. The National Register of Historic Places defines these criteria of eligibility as outlined in figure 72. The discussion of significance follows these criteria, evaluating the outcomes of the historic research (Chapter 2) and preparing the discussion of landscape integrity that follows.

The landscape's history shows the close inter-relationship between human use and the landscape. The indigenous Lenape people saw the New Jersey rivers and marshlands as life-sustaining lands with great spiritual significance. They left little imprint on the landscape. Dutch settlers laid the foundation for the mill and transportation enterprises for the area's growing population in the 19th century. Van Buskirk Island is significant in that its mills were built at the northern-most navigable waters of the Hackensack River during the time when the river was a major shipping route for the schooners that regularly sailed to and from New York City. Starting in pre-Revolutionary-War times, the Island's mills and docks helped it to become a locally important industrial center. Further, the Van Buskirk family was involved in the creation of New Jersey and the family history reflects conflicts amongst the "unruly Jerseyans" throughout the War of Independence. Although it is difficult to document specific significant historic events on Van Buskirk Island, the settlement history of the Island and the Van Buskirk family provides a window into New Jersey's history at a very specific location. We consider this as a contribution to the broad patterns of United States History (Criterion A).

There is little evidence of significance of the site under Criterion B (lives of persons significant in the

past) as no individual Van Buskirk family member can be considered to be that significant. There is no indication of other significant individuals associated with the island.

The most substantial creation of a historic vernacular landscape occurred with the building of the Hackensack Water Works and the adjacent infrastructure on the island, as well as the construction of upstream reservoirs. The history of water use in Bergen County is an exemplary tale of human dependency on natural resources. At the same time it is the history of the expansion of a tight web of infrastructure connections between the site and the region, through the development of the historic Van Buskirk Island as a focal point for collection, treatment and distribution of the natural resource water. Most significant is the innovation made by George Spalding, who conceived the idea of activated carbon in water treatment. By 1931 the HWC decided to use this system permanently and installed it at its Oradell plant. This technology is still the standard used in water treatment systems around the world. This engineering technology contributes to the significance of the site under Criterion C (distinctive technology).

Although most evidence of early settlement history was altered by development of the Hackensack Water Works buildings and infrastructure, the site yields important information related to the industrial history of the U.S. (Criterion D).

Over all, the site has a very high significance as a historic vernacular landscape because it is one of the very few remaining examples of a water treatment facility landscape where the forces that shaped the landscape—water collection, treatment, and delivery—are still clearly visible today.

4.4 Landscape Integrity

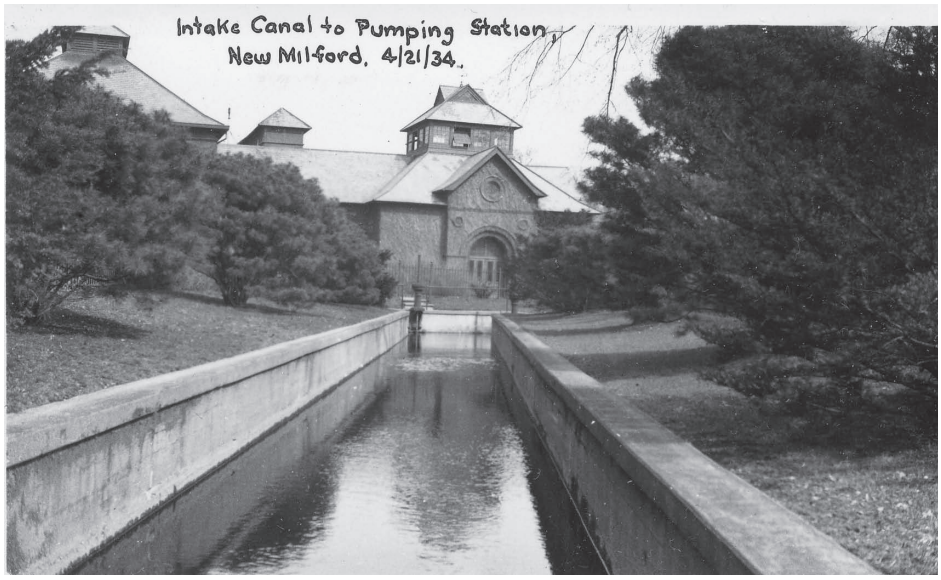


Figure 78: Intake canal in 1934.
Figure 79: In 2010 the intake canal is filled in. Subsequent vegetation provides hints as to where it was located. The chain link fence in the foreground protects a main water line control feature, unfortunately obscuring the visual connection to the intake gate.

Landscape integrity defined by the National Park Service (NPS) is "the authenticity of a property's historic identity, evinced by the survival of physical characteristics that existed during the property's historic or prehistoric period."[179] The period of significance starts in 1882 and ends around 1936 when most of the landscape features were in place. In order to discuss the landscape integrity with reference to the above mentioned National Parks Service definition of integrity, we will compare the 1936 existing conditions plan (figure 59) with the landscape integrity diagram (figure 65). This comparison will reference the National Parks Service's seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association. This allows the evaluation of the property's ability to evoke the character associated with the period of significance.

The seven aspects of integrity will be described as defined by the National Parks Service and then evaluated through a ranking of low, moderate, and high. These rankings of "low", "moderate" and "high" integrity are based on the levels of change and continuity within the landscape. "High" integrity means that little change has occurred and that the landscape evokes clearly the character of the period of significance.

4.4.1 Location

Location is defined as the place where the historic property was constructed or where the historic event occurred.

The location of a property is critical to the overall landscape narrative. When a property has changed location or has been greatly altered since its period of historical significance the site's ability to convey its use, meaning, and character is hindered. The current location of the Hackensack Water Works remains consistent with that of its historical period, with a small reduction in size due to loss of the 'lagoon' used for dumping coagulation sludge. Due to this continuity the overall integrity of location for the site remains "**high**".

4.4.2 Design

Design is defined as the combination of elements that create the form, plan, space, structure and style of a property. Design results from the conscious decisions made during the original conception and planning of a property (or its significant alteration) and applies to activities as diverse as community planning, engineering, architecture and landscape architecture. Design includes such elements as organization of space, proportion, scale technology, ornamentation and materials.

To maintain a high level of design integrity a property's design will express a strong level of continuity in spatial organization and continue to convey the intent and narrative of its period of significance. The assemblage of elements that are currently present on site are not the work of one designer or engineer, but a conversation of parts that together build up to the 1936 period of the greatest historical significance. The design for water movement and production of potable water is still present, though arguably veiled, in the landscape, structures, and machinery. While the current site conditions have shown deterioration from lack of use, the completeness of the design of landscape and engineering elements gives the Hackensack Water Works a "**high**" level of design integrity.

Figure 80: The elements leading up the coagulation basin contribute to the completeness of landscape and engineering elements.

4.4.3 Setting

Setting is defined as the physical environment of a historic property. Where location refers to the specific place a property was built or an event occurred, setting refers to the character of the place in which the property played its historic role. It involves how, not just where, the property is situated and its relationship to surrounding features and open space.

The setting of a site often defines the character of the place. It may go beyond the geographical location and include the climate, topography, plant material, circulation, and furnishings.

It is the unique ecological position of the site and its contrasting proximity to suburban development that has been a defining characteristic of the Hackensack Water Works. This strong ecological connection and its physical and emotional relationship to the surrounding community are still present.

The setting of the Hackensack Water Works is the confluence where development, natural resources, and innovative engineering came together in a unique combination between 1882 and 1936 serving public needs. This continuity of character that is present today in the historical landscape gives the site a "**high**" level of setting integrity.

Figure 81: The presence of the coagulation basin contributes to the high level of design integrity.

4.4.4 Materials

Materials are defined as the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property. The choice and combination of materials reveal the preferences of those who created the property and indicate the availability of particular types of materials and technologies.

The materials are the physical components of which the integral landscape elements are constructed. Throughout most of the landscape the red brick of the buildings is the dominant material. Considering the landscape artifacts themselves, concrete, stone and wrought iron are common materials. While a majority of these landscape elements remain on site it can also be said that they remain original.

The addition of post-1936 features are scattered throughout the site: signage, fencing, and the wastewater clarifier reduce the material integrity. This combination of historic elements combined with elements from later periods and damage gives a "**moderate**" level of material integrity.

Figure 82: The red biick of the buildings is the visually doninant material on site.
Figure 83: Concrete used as material.
Figure 84: Natural stone used as material.

Figure 85: Wrought iron mechanism at intake canal.
Figure 86: Complex piping system in the pump house.

4.4.5 Workmanship

Workmanship is defined as the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory. It is the evidence of artisans' labor and skill in constructing or altering a building, structure, object or site. Workmanship can apply to the property as a whole or to its individual components.

Two levels of workmanship exist: the engineering of the technical infrastructure and the "soft changes" in the landscape such as the introduction of the gracious lawn and plantings adjacent to Elm Street.

Considering the technical infrastructure, the wrought iron elements of the intake grate are of particular beauty and artisanal quality that reflect the level of craft present during the period of significance. There is also an argument for including the complex web of subgrade piping that carried water through the complex.

In contrast to the well documented evolution of the engineered elements of the landscape, there is no evidence of a particular landscape design intent found through this research. The analysis of historic photographs of the landscaping in front of the buildings facing Elm Street (4.2, figures 70-72) revealed that the changes of ornamental vegetation over the life of the facility did not alter the spatial arrangement significantly. Therefore one can assume that the presence of a maintained lawn as foreground for the buildings has been a general approach. Fortunately, this important view was preserved by the ongoing maintenance by the Bergen County Parks Department after 1993. One can assume that the other sections of the landscape were maintained according to the demands of safety and access to technical infrastructure.

The expressions of workmanship within the landscape of the Hackensack Water Works results in a "**moderate**" level of integrity, but with a high potential for improvement (see chapter 5).

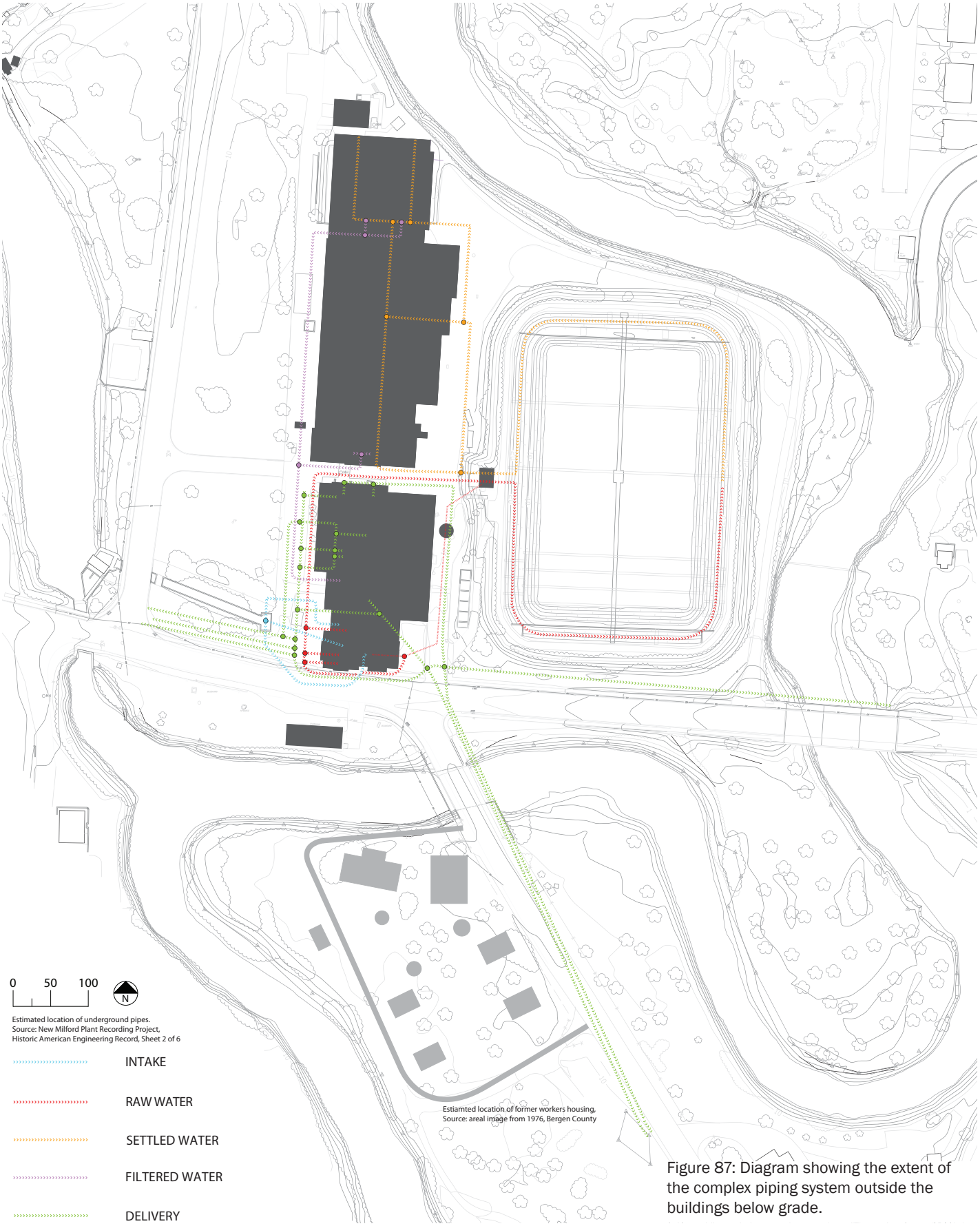


Figure 87: Diagram showing the extent of the complex piping system outside the buildings below grade.

4.4.6 Feeling

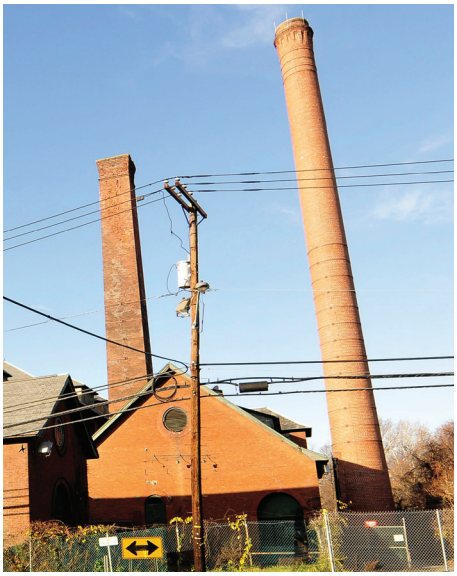


Figure 88: Landmark smoke stacks.
Figure 89: Pump Old #7 is considered a symbol for historic values.
Figure 90: The Hackensack River carries meaning as a symbol for environmental values.

Feeling is defined as a property's expression of the aesthetic or historic sense of a particular period of time. Feeling results from the presence of physical features,which taken together convey the property's historic character. The process of analyzing a site according to the National Parks Service integrity criteria can apply to any property. When the elements of these criteria come together to evoke the senses and emotions of visitors. The property has integrity of feeling. The feeling a landscape conveys is dependent on individual perceptions filtered through personal experiences. Although details of this emotional response will vary from individual to individual, it can be assumed that members of a common social and cultural group will share similar experiences. Such shared experiences were evident during the first public charrette as documented in: "Hackensack Water Works at Oradell, Charrette & Public Meeting, November 14, 2009."

The Hackensack Water Works still conjures a sense of an industrial America through its elements and spatial composition. The natural riparian zone and the Hackensack River frame the site, providing the feeling of entering a new and entirely different space that is separate from the surrounding suburban fabric. The physical presence of the smoke stacks, immediately visible upon entering Van Buskirk Island, engage visitors with its industrial heritage.
All this contributes to the very unique juxtaposition of a beautiful industrial complex within a lush environment, adding to the inimitable genius loci of the place. Overall the integrity of the site's ability to capture and convey the feeling of its natural and industrial past is "**high**".

4.4.7 Association

Association is defined as the direct link between an important historic event or person and a historic property. A property retains association if it is the place where the event or activity occurred and is sufficiently intact to convey that relationship to an observer. A property that can quickly convey its connections to the people or events through its landscape elements and their relationship to the built environment is considered to have a "high" level of integrity of association.

The Hackensack Water Works retains many of its character defining elements that strongly convey its natural and industrial past. The site is a rare example where water harvest, coagulation, filtration and delivery can be observed in such close proximity. In this analysis, the coagulation basin is an integral part of the historic vernacular landscape and is significant in telling the story of the cultural landscape. To understand its story, one must read the multiple significant historic elements and comprehend their meaning in relation to the entirety of the study area. Removing the coagulation basin from the study area would result in a major change of the historic vernacular landscape and the true history of the site would be severely jeopardized.

Today, the depth of the landscape's significance may not at first be apparent. There is no obvious evidence of Native Americans activity nor of activity of early Bergen County settlers, as there are no above ground remnants present of the Van Buskirks on site. It is not apparent to visitors that the early dams provided an opportunity to harvest drinking water, which was used by the Water Company. On the other hand, the technological innovations and engineering practices evident in equipment used on site and the interconnection with the larger landscape--the movement of the water from intake, coagulation, filtration and delivery is still there. This leads to the conclusion that the overall level of the association is "**high**". Chapter 5 will expand on measures that will help to convey even more readily the Water Works' association with important events and people.

The historic vernacular landscape has an outstanding association with the 1882 to 1936 period of significance when the Water Works were a major water treatment facility.

4.5 Landscape Analysis, Significance and Integrity Conclusion

Many of the landscape changes at the Hackensack Water Works happened over the working life of the facility. These changes can be seen in the natural evolution of the landscape through the maturation and change in vegetation massing that define spatial borders and spatial characteristics and overall loss of ornamental vegetation through removal or general lack of maintenance. Alterations within the landscape also were the result of human interaction within the site through modifications of structures, spatial organization and circulation.

In conclusion, the Landscape Integrity Diagram (figure 65) reveals that one of the biggest changes to the Hackensack Water Works facility is the absence of regular use, maintenance and public access, as shown by the installation of a chain link fence prohibiting access to most of the property.

The most major change to the 1936 condition was the 1955 addition to the filtration plant. The impact of this structure is apparent in the new circulation patterns that developed around the buildings. This also resulted in closer interaction between the built environment and the ecological corridor of the Hackensack River. While the 1955 landscape changes alter the site's 1936 appearance, it is important to note that these changes continue the narrative of the primary function of the Hackensack Water Works: the purification of water for the citizens of Bergen County. The next big modification of the landscape came with the demolition of the workers housing south of New Milford Avenue. The vernacular houses constructed in 1902 and extant until the mid-1980's consisted of five dwellings for water company employees and their families and the 1882 home of the first superintendent D.W. Chase. The superintendent's house was moved to this location in 1898 during the pump house expansion. In addition, the loss of the 1882 coal house, which was replaced by the 1979 United Water Company building along the south side of New Milford Avenue, altered the overall original spatial organization and created a new visual element in the landscape narrative.

Other elements in the landscape that were created or destroyed during the 20th century included include the 1976 equalization and water clarifier on the north side of the filtration building. Two previous wash water tanks were located within the complex: the first to the west of the coagulation basin and the second, designed by George Fuller's engineering firm, located on the northwest corner of the coagulation basin. They both played a role in the movement of water through the site. Additions to the landscape include the USGS station and electrical buildings located on the north side of the property near the diversion dam. Also built here were an impervious paved access road and three small structures. Sidewalks have also been along both sides of New Milford Avenue. Since 1936, the water company has utilized a portion of their property as a vehicle storage area with the addition of several buildings and impervious surface along Madison Avenue.

Lastly, the filling-in of the intake canal has considerably weakened the visual connection of the movement of water into the facility.

This report takes into consideration the immediate property contained within the site boundary recognized by the National Parks Service and adjacent property included in the current boundaries of Van Buskirk Island Park. When evaluating the levels of change in this dynamic and utilitarian landscape, the greatest impact and change was when operations ceased and the water company moved to a modern Haworth facility in 1992. This was the catalyst for the deterioration of vital elements in the landscape that worked in tandem to assist in interpreting the Hackensack Water Works today. Although elements have been added and removed over time as can be expected within a working landscape, the overall spatial and volumetric relationships retain a remarkable resemblance to the historic organization. The context of the site and its relationship to the surrounding community has remained relatively intact through natural spatial borders and vegetative buffers.

4.6 Analytic Comparison of Other Water Works Facilities

Reviewing other examples of water works facilities that were built and operating during the same time period as the Hackensack Water Works provides the context in which to evaluate the significance of the historic vernacular landscape of Van Buskirk Island.

The main criteria for selecting sites for comparison were:

- Time of construction
- Time of service
- Interconnection with Landscape
- Availability of information

It turned out that the last criterion become the limiting factor. Because it is imperative to collect as-built construction drawings, aerial photography, site photographs, and informational text in order to make a complete analysis, some of the sites research were not included in this analysis. Among the sites investigated but not chosen were (1) Cleveland, Ohio (2) Durham, North Carolina and (3) Montgomery, Alabama.
Sufficient information was available for (1) Shreveport Water Works Company - Shreveport, Louisiana (2) Robert B. Morse Water Filtration Plant - Silver Spring, Maryland and (3) Kalaupapa Water Supply System - Kalaupapa National Park, Hawaii. These facilities were selected based on their construction dates, periods of operation and interconnection with the landscape. The following discussion will show similarities and differences between these water treatment facilities and the Hackensack Water Works site.

Through the analytic comparison it became obvious that the completeness of the remaining artifacts and infrastructure at The Hackensack Water Works is unique. Even among well preserved sites that are made accessible to the public it is rare that visitors can experience the “way-of-the-water,” and make visual connections to how the system once functioned, as is still possible on Van Buskirk Island today.

4.6.1 Shreveport Water Works Company: McNeil Street Pumping Station

Shreveport, Louisiana
1887-1980
Designed by Fuller

The Shreveport Water Works Company, McNeil Street Pumping Station relates most closely to the Hackensack Water Company. [Out of the examples researched for this report] Both facilities share comparable construction and operation dates, as well as the same engineer, Fuller. Because of this there were many similarities in layout, materials and process.

Constructed in 1887, the Shreveport Water Works facility was originally designed to provide water for the local fire company. Later the facility was improved to supply drinking water. Improvements and additions continued into the 1980's until the steam powered machine equipment was retired due to inefficiency. The historic site is now a public museum.[180]

"*The historic significance of McNeill has been recognized by a number of national organizations. It is on the National Register of Historic Places and is a National Historic Landmark, the only one in Shreveport or Northwest Louisiana. The American Waterworks Association has designated it an Historic American Water Landmark. In 1999, the American Society of Civil Engineers designated McNeill a National Historic Civil Engineering Landmark*."[181]

The impact on the landscape is comparable to that ofthe Hackensack Water Works. Almost the entire facility has been preserved and much of the infrastructure is still in place. Earthwork such as the berm around the coagulation basin alters the elevation significantly. Comparing the current aerial (figure 85) and the HAER as-built drawing (figure 84) one can see that the infrastructure is intact.

Designed by Fuller within the same decade, the red brick buildings and landform relate closely to the Hackensack Water Works site. The two most obvious visual landmarks reminiscent of Hackensack Water Works are the smoke stack and the settling basin.

Presence of infrastructure:

Intake: Although the intake of water is similar to Hackensack, in that the water source is adjacent to the buildings (from a river). It differs because the infrastructure was underground and not visible. Other than the initial threshold one would have no visual connection in regards to the connection from the river to the buildings. The Cross Bayou River was originally tapped through an underground suction line housed in a wooden tunnel. In 1911 this system was changed to siphon.

Settling Basin: Although Shreveport Water Work's settling basins differ from Hackensack in that there were two separate settling basins, the overall impact on the landscape is similar. The grassy berm leading up to the uncovered basins, their proximity to the buildings, and the overall scale of the infrastructure, is comparable to what is found at the Hackensack Water Works site. The fact that the basins were uncovered is typical of the time period and is not found at all water works sites.

Smoke Stack: The smoke stacks found at the Hackensack Water Works are a visual symbol of its sense of place. Their scale allows them to be seen from a distance and serves as a local landmark. A similar circular smoke stack is at the Shreveport site. It is different from the Water Works Smoke Stack in that it has a square base and it is connected to the buildings. The presence of smoke stacks with water works facilities is common, but the size, form and materials vary from site to site. The similarity of the smoke stacks in Shreveport and Oradell could be due to the fact that they shared the same engineering company and were in use during the same time frame.

Wash Water Tank: The wash water tank at the Hackensack Water Works was removed, but in Shreveport it still stands and its form and materials relate to what stood in Oradell.

Waste Water Clarifier: It is not shown in as-built drawings or historic photographs.

Support Structures for Tanks: It is not shown in as-built drawings or historic photographs.

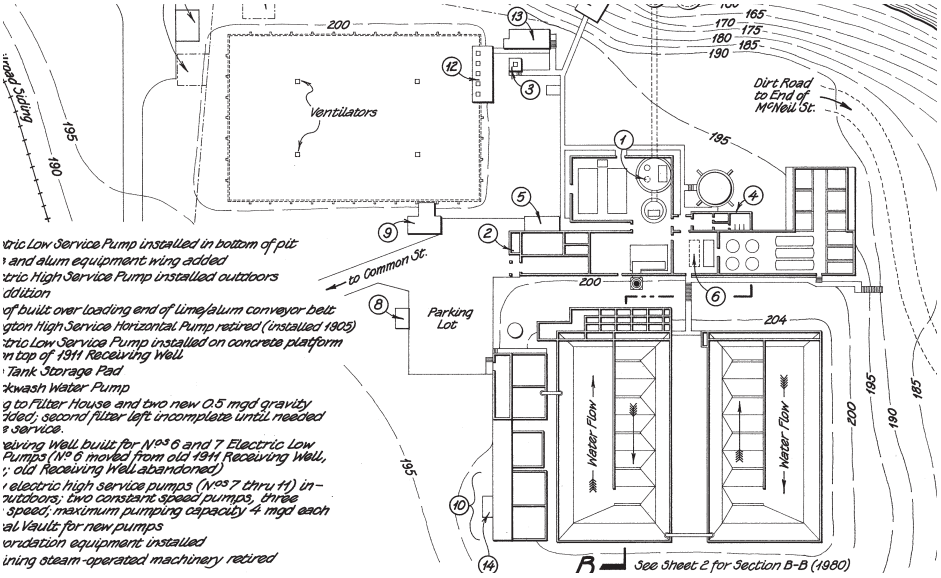


Figure 91: HAER as-built plan.

Figure 92: GOOGLE Earth aerial image, current conditions.

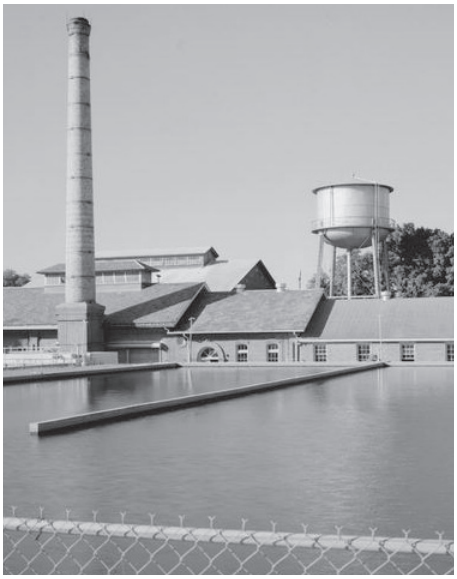


Figure 93: Historic image taken from the coagulation basin berm.

Figure 94: Historic birdseye image taken from South-East side of site.

4.6.2 Robert B. Morse Water Filtration Plant: Burnt Mills Filtration Plant

Silver Spring, Maryland
1936-1962
Designed by Robert B. Morse

The Burnt Mills Filtration Plant was built between the years of 1934-36 in order to provide the suburbs of Washington DC with clean drinking water. Restrictions in the landscape, such as existing roadways, waterways, and hilly topography inspired designer Robert B. Morse to create an innovative engineering complex. Instead of the typical separation of filtration steps, and landmark rectangular reservoirs and basins of this time period, Morse created circular modules that housed most of the filtration steps. Housed in the filter assemblies were coagulation basins, filters, and water storage. The need for a separate preliminary sedimentation basin was due to landscape restrictions. Morse had wanted to include the preliminary sedimentation within the filter assemblies but the topography would not allow for the additional diameter necessary to house the basin. The Burnt Mills Filtration Plant was placed on stand-by for emergency use in 1951 but was rendered obsolete in 1961. Today the buildings still stand and the footprint of the preliminary sedimentation basin is apparent in its re-use as a parking lot. Although the combined filtration system and the circular forms did not become a trend, it is without question what Morse what created was an engineering marvel.[182]

This site worked with the landscape. The placement of all buildings and machinery depended on space and topography restrictions. Major alterations that are still seen today are the two buildings and the parking area associated with them. [183]

The infrastructure of the Robert B. Morse site was built during the period of the cultural landscape significance(Hackensack Water Works). The same time of the HWW's most modern advancements. Similarities in infrastructure can be seen between both facilities. The most obvious connection is the raised, uncovered sedimentation basin.

Currently the site is owned and maintained by the Maryland-National Capitol Park and Planning Commission and is used for recreational purposes. After the plant was rendered obsolete in 1961, all machinery was removed from the site.[184] Due to the loss of infrastructure the historic integrity of this site is low. An understanding of the filtration process based on interaction with landscape elements is difficult because of the loss of key infrastructure.

Presence of infrastructure:

Intake: The intake at the Burnt Mills Filtration Plant is similar to the Hackensack Water Works because it comes directly from the Northwest Branch River and is in close proximity to the structures. It differs from HWW because it goes into an underground pipe system after the initial threshold.

Settling Basin: Although the form and relationship to other filtration infrastructure is very different than what is found at the Hackensack Water Works, the idea of an uncovered coagulation basin is comparable. Morse designed this for cost-saving measures and argued that it would not effect production. Unlike the grassy berms used in Oradell, Morse did not compensate for a gradual grade change to access the infrastructure. Instead, he used retaining walls. The footprint of the preliminary sedimentation basin can still be seen through the current parking lot. A section of the retaining wall was taken down to allow vehicular access.

Smoke Stack: Iconic smoke stacks like the ones seen in Oradell are not present at the Burnt Mills Filtration Plant.

Wash Water Tank: Two wash water tanks were used at the Burnt Mills Filtration Plant but have been demolished. The tanks were separate from the filtration assembly structures and their location can be seen in the aerial as-built drawing. Their specific materials and form are not identified in the as-built drawings or photographs.

Waste Water Clarifier: Not seen in as-built drawings or historic photographs.

Support Structures for Tanks: Not seen in as-built drawings or historic photographs.

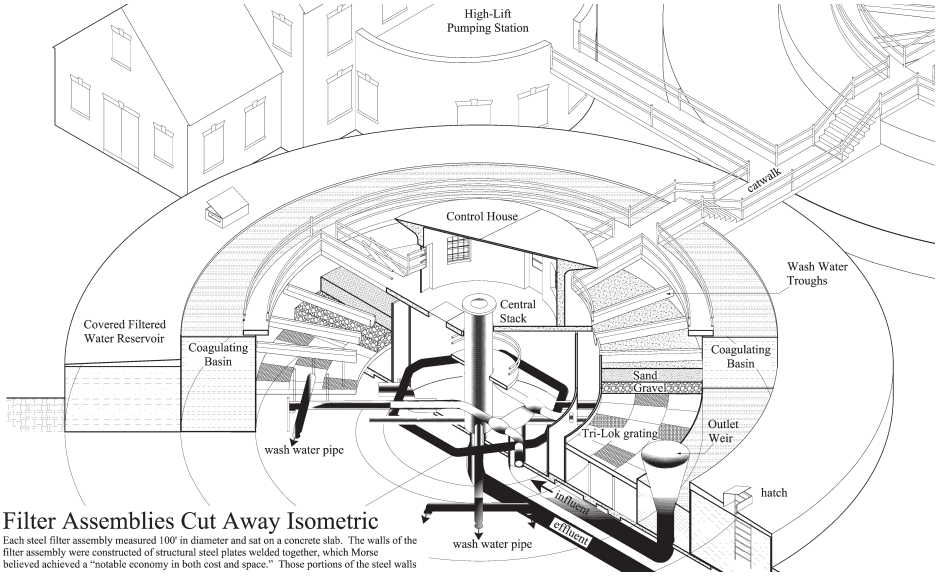
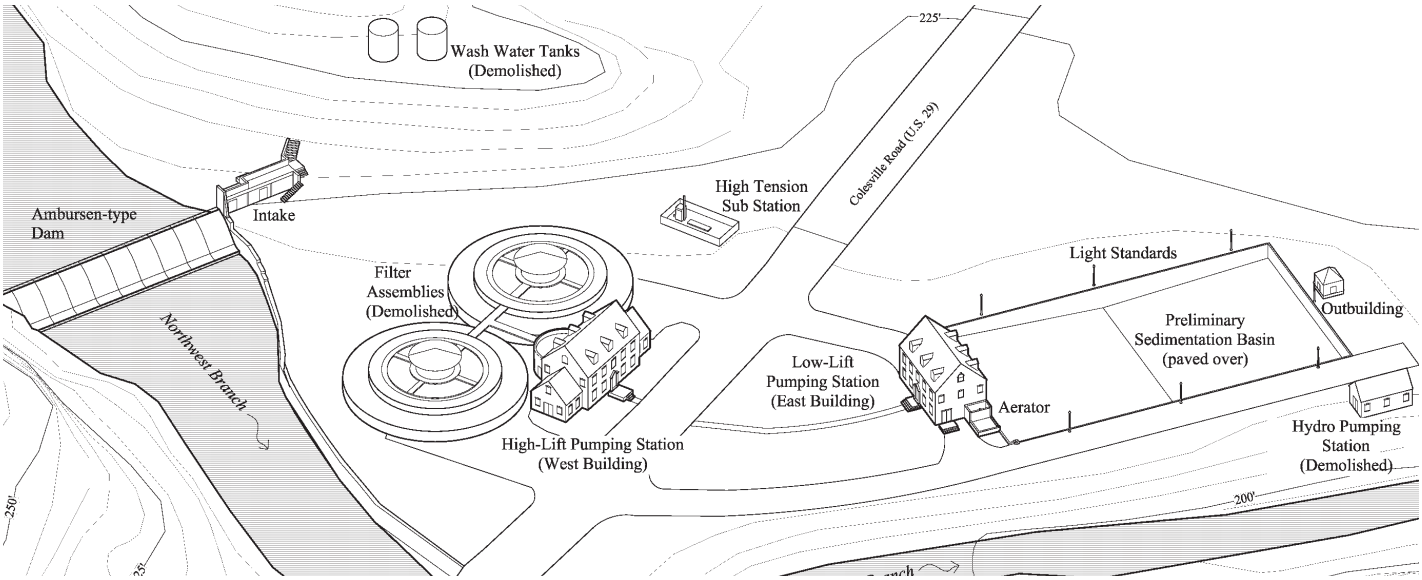


Figure 95: HAER as-built detail of filration assembly

Figure 96: GOOGLE Earth aerial image, current conditions

Figure 97: HAER as-built birdseye drawing



4.6.3 Kalaupapa Water Supply System

Kalaupapa National Park, Hawaii
1873-1983

Construction of the Kalaupapa Water Supply System began in 1873. Its purpose was to supply clean drinking water to the residents of the Makanalua Peninsula on the island of Molokai. This settlement consisted of individuals afflicted with leprosy (Hansen's disease). In early days, the residents acquired water from valley streams by transporting it in cans back to the settlement. This method was dependable for most of the year but in dry seasons water would sink into the ground and therefore was not in constant supply. Because of this the Board of Heath provided funds to construct the first reservoir and a series of pipes to transport water into the settlement. The system was expanded and utilized until a cure for the disease was found in the 1960's. With population numbers decreasing and no new residents coming to the island the Kalaupapa Water Supply System was rendered obsolete and was taken out of service.[185]

Although the Kalaupapa Water Supply System was created and operated during the same time period as the Hackensack Water Works, the infrastructure in Oradell was far superior to that found on the island of Molokai. Kalaupapa serviced a far smaller scale and was built within an extremely different landscape. Compared to other Water Works facilities of its time Kalaupapa's infrastructure was integrated into a larger area as opposed to one singular location. The system became part of the landscape, working with its topography and natural resources, drawing water from very different sources.

Kalaupapa gathered most of its water from catch basins that would fill with rainfall from the mountainous regions. Water was transported through a series of pipes to filtration stations and the settlement. The system relied on the catch basins for the most part, but an intake dam was constructed for a more reliable water source. Instead of having a filtration plant housed in a building, Kalaupapa did not have a core complex. Ruins of the system exists today scattered about the island as a reminder of the island's unique history.

Today, the site of the Kalaupapa Water Supply System is a national park.[186] The infrastructure of the system has not been protected by any historic preservation. Its ruins continue to degrade.

Presence of infrastructure:

Intake: Kalaupapa's intake was a later addition to the system, but one did exist that tapped into a stream. Remnants can still be seen on the island. A photograph of its remains can be seen in the color photograph to the right.

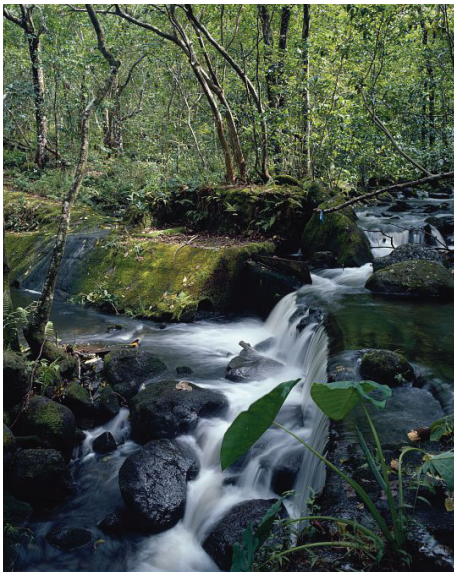
Settling Basin: A small settling basin was a part of the system. A photograph of its remains can be seen on the following page.

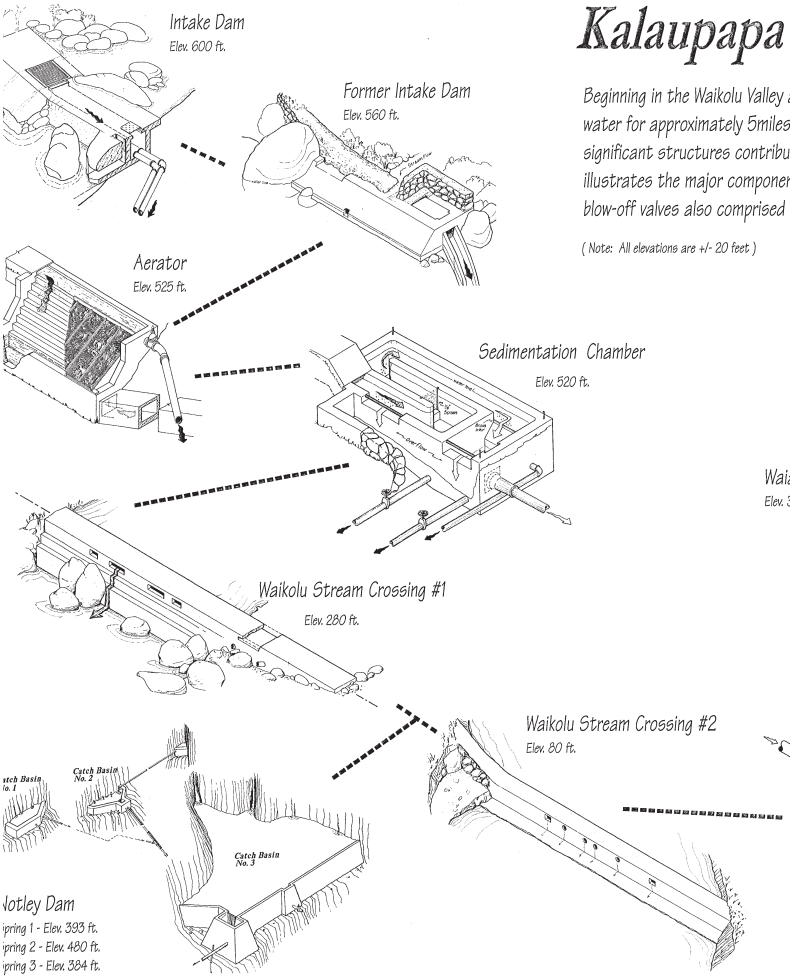
Smoke Stack: Not present in this system. This was probably due to the fact that the Kalaupapa system did not include a pump house or any central filtration buildings. The system was primitive and did not utilize the type of infrastructure found in other systems of its time.

Wash Water Tank: Not present in this system.

Waste Water Clarifier: Not present in this system.

Support Structures for Tanks: Not present in this system.





Kalaupapa Water Supply System Schematic

Beginning in the Waikolu Valley at an elevation of 600 feet above sea level, the Kalaupapa Water Supply System carried water for approximately 5miles to the communities of Kalawao and Kaluapapa. Throughout its course more than a dozen significant structures contributed to the processing or delivery of clean water for the residents. This schematic illustrates the major components of the system, however, smaller features such as pipe crossings, reduction boxes, and blow-off valves also comprised the complete pipeline.

(Note: All elevations are +/- 20 feet)

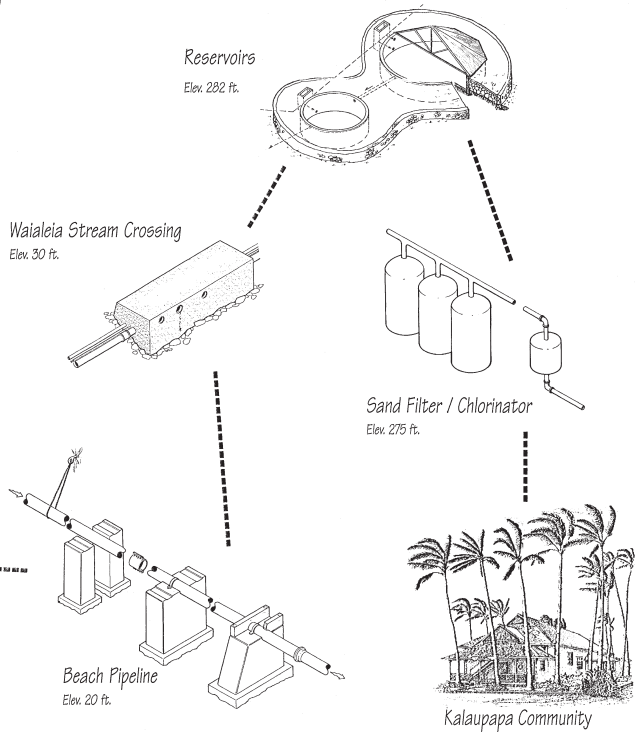


Figure 98: Current state of dam
Figure 99: Historic image of resevoirs
Figure 100: Historic Image of sedimentation basin
Figure 101: HAER drawings of water system infrastructure and process

5 Landscape Preservation Treatment Alternatives, Approach, and Plan

5.1 Introduction to Landscape Preservation Treatment

With the history, character, and existing conditions of the Hackensack Water Works explored in the previous sections, the cultural landscape treatment will now be discussed. In determining the most suitable actions and preservation plan to ensure a sustainable future, a full consideration of the four possible treatment approaches discussed in *The Secretary of the Interior's Standards for the Treatment of Historic Properties and the Guidelines for the Treatment of Cultural Landscapes* will be considered.

The most prominent features on the study area are the Hackensack Water Works pumping and filtration buildings. Although the buildings were built in stages over 50 years the red brick façade remains constant throughout. The two large smokestacks sit on the eastern side of the main pump house. These smokestacks make the Hackensack Water Works visible from much further away than just New Milford Avenue and Madison Avenue.

These buildings are the centerpiece of the ensemble and are the main feature and objects in this historic vernacular landscape along with the intake structures and the coagulation basin. As was discussed before, the specific significance of this site lies in the clear comprehensible relationship between intake, coagulation, filtration and delivery—the way of the water through the site. All treatment of individual objects and potential uses of the site in general have to consider this highly significant aspect of this historic site.

The Hackensack River and its riparian zone is an important ecological corridor within densely developed Bergen County and the section in the study area is of particularly high importance as foraging ground for rare birds and habitat for local and transitory wildlife. The value for bird watching and other forms of passive recreation is further enhanced by the forested areas south of New Milford Avenue. This assemblage of native plants as well as some ornamentals and naturalized non-natives creates the character of a mature forest canopy.

The main buildings and the coagulation basin are fenced because of security issues. The fencing is standard chain link and in some areas there is an abundance of vegetative growth covering it. Fencing can also be found along the western edge of Van Buskirk Island, running adjacent to the Hackensack River. The forested land on the southeastern portion of Van Buskirk Island and around the United Water property is also fenced.

An immediate goal is to provide public access and on site information related to the cultural and environmental values of the site. This is essential to increasing public support for preservation and adaptive re-use of the site. The following guidelines will provide direction for defining and implementing possible future uses for the site.

5.2 Landscape Treatment Alternatives

Because of the complexity of the HWW and Van Buskirk Island, each approach as defined by the *The Secretary of the Interior's Standards for the Treatment of Historic Properties and the Guidelines for the Treatment of Cultural Landscapes* is discussed below with reference to specific elements or sections of the site.

A particular consideration is given to the eight factors listed in the treatment guidelines for cultural landscapes issued by the National Park Service. A discussion of these factors with the goal of finding a consistent and appropriately holistic approach for the historic vernacular landscape of Van Buskirk Island provides the philosophical framework for guiding the selection of appropriate treatment approaches.

The dynamic interdependence between *change and continuity* of this cultural landscape has been evident since the first dam was built to power the Van Buskirk Island mill in the 18th century. The initial Water Works facility continued to use that dam while adding a pond. The rapid growth of the facilities caused a continuous evolution of the historic vernacular landscape until the major elements were completed in 1936. Therefore the period of significance is defined as 1882-1936 (see 4.1). The absence of use and maintenance after 1992 lead to a significant deterioration of the landscape. Any future treatment should acknowledge this history and allow for uses that provide the appropriate balance between change and continuity.

Van Buskirk Island is not the product of a specific landscape design intention, but instead tells the story of human dependency on the natural water resource. Its *relative significance in history* is related to technical innovation (Spalding process of activated carbon in water treatment, see 4.3).

The analysis of the *geographical context* has shown the intense interconnectivity between the site and its surroundings. On a regional scale, reservoirs feeding the Hackensack Water Works are located as far away as New York state, providing water for Bergen and Hudson Counties in New Jersey (see 2.4.5). On a local scale, the smoke stacks make the historic ensemble visible from the surrounding neighborhood. While the site is an integral part of the local road pattern, pedestrian accessibility has room for improvement (see 3.5).

Discussing landscape significance and integrity (4.3, 4.4) it became evident that both are closely related to the historic *use* of the site and that abandoning the site is a major threat to the historic vernacular landscape.

Archeological resources are documented for the former workers housing south of New Milford Avenue. The complex and well documented system of subgrade pipes in the close vicinity of the pump house and the filtration plant must be protected. Due to the substantial subgrade changes throughout the site there is no evidence of any Native-American settlement.

Because of its very high relevance, the *natural systems* of Van Buskirk Island and its surroundings were investigated with the help of vegetation ecologists, while information

on wildlife habitat was taken from earlier wildlife studies (3.5.3). Any future treatment or use of the site must consider the value of the riparian zone of the Hackensack River and its floodplain, as well as the native plant habitats south of New Milford Avenue.

The lack of systematic *management and maintenance* has contributed to the deterioration of the site, while current management endeavors (3.4) have addressed single incidents. A long term treatment of the site must include management strategies for the Van Buskirk Island natural habitat areas as well as the historic core of the site, where a focus on maintaining ornamental lawns and decorative planting would be appropriate. Pathway building and maintenance can increase accessibility to the site, while maintaining the historic industrial character and protecting natural habitats.

The comparison with similar water treatment facilities (4.6) has shown that the completeness of the remaining artifacts and infrastructure is exceptional. Any future *interpretation* strategy must highlight the clearly visible "way-of-the-water" on this site.

5.2.1 Preservation

Preservation is defined as the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features as they have evolved over time rather than extensive replacement and new construction. New exteriors are not within the scope of this treatment. "*Preservation standards require retention of the greatest amount of historical fabric, including the landscape's historic form, features and details as they have evolved over time.*"

The landscape integrity analysis has shown that major elements such as the coagulation basin have remained relatively intact, as has the overall context of the site and its relationship to the surrounding community. The layout and basic fabric of the major landscape elements were the outcome of the specific functions of water treatment and delivery. However, the fact that these historic functions have ceased will make a detailed preservation approach difficult.

5.2.2 Restoration

Restoration is defined as the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time, by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. "*Restoration standards allow for the depiction of a landscape at a particular time in its history by preserving the period of significance and removing materials from other periods*".

The overall significance of the historic vernacular landscape can very well be observed. However, individual elements of the site such as the intake canal have deteriorated considerably. Although it may be desirable to restore that canal or at least make its historic outline visible, an overall restoration approach will not be necessary for the overall site because the important visual narrative of the site can be secured through appropriate documentation. Further, a complete restoration of all industrial infrastructure present at the period of significance may create obstacles for appropriate adaptive reuse.

5.2.3 Rehabilitation

Rehabilitation is defined as the act or process of making possible a compatible use for a property through repair, alteration, and additions while preserving those portions or features that convey its historical, cultural, or architectural value. "*Rehabilitation standards acknowledge the need to alter or add to a cultural landscape to meet continuing or new uses while retaining the landscape's historic character*."

Necessary maintenance and upkeep of the historic vernacular landscape make the identification of appropriate uses for the site absolutely essential. While most elements of the landscape can be maintained at a reasonable cost, revenue generating uses can conceivably cover these expenses. The rehabilitation approach is chosen for the HWW because the landscape was an outcome of intensive use in the first place. Since the historic and cultural significance are well-grounded in these uses it will be impossible to restore the historic uses.

The fairly robust structural quality of main landscape elements makes them well suited to be used for passive as well as active recreation. Commercial uses may also be considered as long as they do not require any substantial built features that will significantly alter the overall appearance of the site. Because well-chosen uses will draw visitors to the site and increase public support for sustainment of the complex historic vernacular landscape, the rehabilitation treatment approach is considered appropriate. Evidently any possible rehabilitation concept for the landscape has to be developed in close consideration of possible adaptive reuse of the buildings.

5.2.4 Reconstruction

Reconstruction is defined as the act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location. "*Reconstruction standards establish a framework for re-creating vanished or non-surviving landscape with new materials, primarily for interpretation purposes.*"

The assessment of historic documents has provided evidence that numerous important objects have been destroyed and/or replaced by more modern features. These ongoing changes are amongst the main characteristics of this historic vernacular landscape, thus reconstruction is not considered as a valuable option for historic elements that have disappeared. Rather it is suggested that information about such elements be provided in a future signage/information system on site.

5.3 Landscape Treatment Approach

The discussion above has shown that the rehabilitation approach is the most appropriate choice for Van Buskirk Island. This flexible approach will ensure that significant features as well as the overall integrity of the historic vernacular landscape will be retained while allowing the site to be reused as a vital part of the 21st century, accessible and enjoyable by the public at large.

5.4 Landscape Preservation Treatment Recommendations and Plan

Any future developments on Van Buskirk Island must follow the above described landscape treatment approach. At the same time it is inevitable that any reuse options also consider the ecological services and habitat values of the site.

Limited accessibility—along with complete absence of use—was identified as a main reason for the ongoing deterioration. As soon as existing safety hazards of the buildings are solved it is strongly recommended that the size of fenced areas be reduced to the absolute minimum. This will increase human use of the park and help to reduce vandalism.

Any long term improvements and developments on Van Buskirk Island should follow the recommendations shown in the Recommendations Plan (figure 95).

Overall, improved connectivity to the adjacent neighborhoods is strongly recommended (Figure 94 red arrows). This historic vernacular landscape provides rich cultural experiences along with the opportunity to enjoy its natural beauty. Pathways and additional crossings of the Hackensack River will bring pedestrians and bicyclists from Oradell and New Milford to the site and will integrate the importance of the Hackensack Water Works as a landmark for local citizens. Along with walkways and possible rest areas, a cohesive information and interpretive signage system is suggested, telling the story of the people who used the landscape and who in turn shaped it.

The recommended measures are organized in zones, and consider particular existing qualities, historic preservation and restoration necessities, and the potential for appropriate rehabilitation.

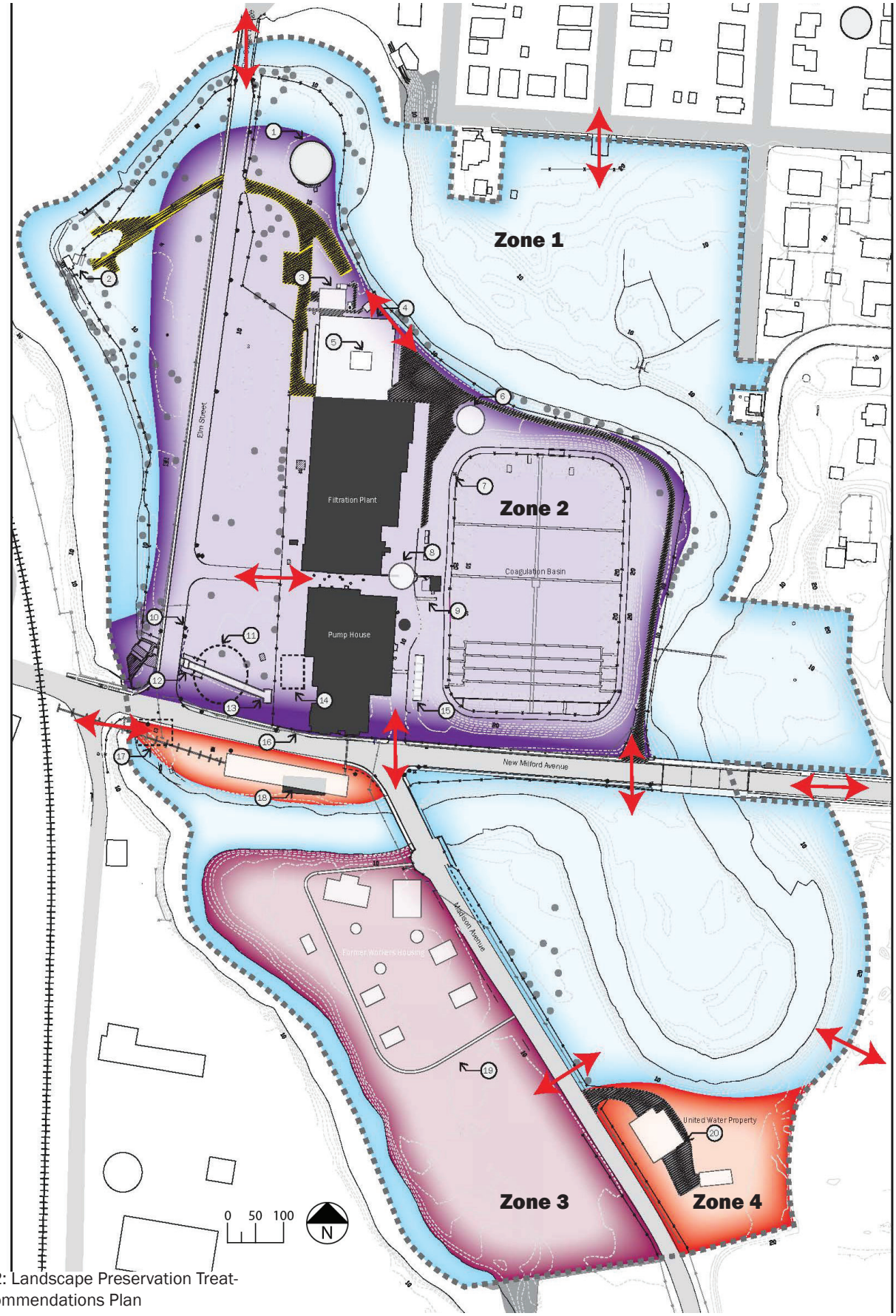


Figure 102: Landscape Preservation Treatment Recommendations Plan

5.4.1 Zone 1: Focus on Habitat Quality and Ecological Services (Blue)

Zone 1 includes most of the on site riparian zone of the Hackensack River and the small peninsula south of New Milford Avenue. Northward it opens up to the diversion dam forging ground. It is suggested that pathways be introduced that will provide public access to this water-dominated landscape. After all, the water was the reason why the Hackensack Water Works were built in the first place. It is important that the future visitor pathways have the lowest possible impact on the natural environment, while providing access to natural features for activities such as bird watching. Further, it is suggested that the spread of invasive species such as Japanese knotweed (*Plygonum cuspidatum*) will be monitored and controlled.

This zone contains two vernacular landscape elements:

(1) 1892 Elm Street Bridge
Although Bergen County has decided to replace the load bearing elements of the historic bridge and open it up to traffic again (FOOTNOTE Bridge report), ***the suggestion is offered to proceed with necessary bridge repairs, but keep the bridge closed, maintaining safe circulation for pedestrians and bicyclists.***

(3) USGS monitoring station, Hydrologic Unit 02030103, and adjacent weirs provided a constant water flow to the intake canal, created a barrier for fishes and provided food for wading birds foraging grounds.

5.4.2 Zone 2: Focus on Historic Preservation and Restoration of Artifacts (Violet)

Zone 2 can be described as the "historic core" of the site. Here, increased public access will help reduce vandalism. This zone has the extraordinary long-term potential for a path system directing people along the sequence of intake—coagulation—filtration—delivery: the potential to create a "Way of the Water Tour."

Suggestions for individual measures include:

(2) Waste Water Clarifier:
Low historic significance but evidence of continuous landscape change and recent function of facility. Preserve. Potential for look out.

(4) Equalization Basin (added in 1976):
Low historic significance but evidence of continuous landscape change and recent function of the facility. Preserve.

(5) 1955 addition
Although the building is post-period of significance of the historic vernacular landscape, it is considered significant from an architectural point of view. Preserve. A sustain-

able building use concept, coordinated with the older historic building uses is highly recommended.

(6) Lime House shown in 1936 General Plan
There is no remainder of this building on site. No action, but worth mentioning in commentary for visitors.

(7) 1935 Wash Tank, (removed.):
There is no remainder of this structure on site. No action, but worth mentioning in commentary for visitors.

(8) Hydrant, removed
Set of hydrants around parameter of basin presumably in context of coagulation basin use. Rebuild.

(9) Gracious lawn
Open lawn is a consistent landscape feature since the first Water Works buildings. Maintain.

(10) 1904 Wash water tank removed in 1935
There is no remainder of this structure on site. No action, but worth mentioning in commentary for visitors.

(11) 1905 Coagulation Basin stairs:
Essential for experience of water flow within the facility. Restore.

(12) Banks of the coagulation basin:
Essential for the spatial experience of the coagulation process. Mowing of banks, erosion control and management of woody plants that line the top of the basin.

(13) Basin interior structures
The wooden flocculators and other basin interior elements are important to understand the coagulation process. Integrate in adaptive re-uses.

(14) Guardrail and signage along Elm Street and New Milford Avenue
Later additions that impact the visual appearance of the site. Evaluate with respect to future visitor needs.

(15) Significant assembly of underground pipes
Only manholes indicate the significant subsurface pipe system. Opportunity to daylight the pipes according to future landscape design.

(16) Original 1880's Settling Basin, (later removed):
There is no remainder of this structure on site, however, the outline of the basin should be shown on site as it explains the gradual expansion of the Hackensack Water Works facility. It may be included in a future landscape design.

(17) Intake
The wrought iron mechanism at the intake is a significant example of artisanal workmanship. Preserve, reinstall wrought iron fence currently stored in the pump house.

(18) Water Main and surrounding chain-link fence:
The fence has a very negative visual impact on the site. Alteration or demolishing (preferable) is strongly encouraged.

(19) 1911 Intake Canal:
Essential for experience of water flow within the facility. Interpret as part of rehabilitation.

(20) Approximate first location of Superintendent House:
There is no remainder of this structure on site. No action, but worth mentioning in commentary for visitors.

(21) Concrete Support structure for tank:
Low historic significance but an example of continuous landscape change and recent function of facility, preserve if not in conflict with future re-use, potential documentation.

(22) Sidewalks installed:
Low historic significance but important for safe access to the site. Renovation and widening where necessary.

5.4.3 Zone 3: Focus on Past Landscape Change (Purple)

Today, this zone east of Madison Avenue appears as a second growth forest. Upon examination, foundations of former workers houses were found along with large patches of ornamental ground cover providing evidence of former development. Pathways along with a visitor information system will illustrate and explain the developmental evolution of the area. Temporary artistic intervention might be considered here, interpreting landscape change.

(23) Workers Housing:
There is no remainder of this building on site. No action, but worth mentioning in commentary for visitors.

5.4.4 Zone 4: Focus on Service Infrastructure (Red-Brown)

Zone 4 marks the small portions of the study area providing limited historic or ecological experiences. Zone 4 is considered appropriate for locating parking and service infrastructure necessary for future uses of Van Buskirk Island.

(24) Approximate location of Van Buskirk Mill:
There is no remainder of this structure on site. No action, but worth mentioning in commentary for visitors. Reasonable to recommend an archaeological investigation.

(25) 1882-1886 Coal House, rail connection and overhead steam pipe:
There is no remainder of this structure on site. No action, but worth mentioning in commentary for visitors. Suitable for parking or service buildings.

(26) United Water utility building:
No historic significance.

(27) United Water Utilities:
No historic significance, suitable for parking or service buildings

5.5 Landscape Preservation Treatment Alternatives, Approach and Plan; Conclusion

Historic research—supported by an inventory and analysis of the existing landscape conditions—shows that the Hackensack Water Works on Van Buskirk Island is a unique example of a historic vernacular landscape of national significance. It is a post-industrial site without the hazards of contamination and is thus highly suitable for rehabilitation with the potential of establishing the Hackensack Water Works as a special place.

Although the size and complexity of the site create major challenges, they also provide an opportunity for a carefully planned and significant restoration and rehabilitation. The existing recreational qualities of the landscape make it logical to increase public access to the site in the short term by creating pathways and a partial re-positioning of fences. The use of Elm Street since the bridge was closed shows how it attracts visitors.

We suggest building on the potential for recreation that is already present at Van Buskirk Island by creating a public park. This will give people access to the natural beauty and cultural history of the site, while also preserving sensitive habitats and nationally significant historic architecture. For any short or long term improvements made to Van Buskirk Island it is imperative to preserve and appropriately maintain the ecologically valuable habitats.

Research shows how indispensable the structural integrity of the buildings and the water treatment infrastructure is for the integrity of the island as a historic vernacular landscape. It is essential to introduce sustainable practices uses for the historic buildings that will secure their rehabilitation, preservation and future maintenance, while rehabilitating their cultural landscape. Continuing the ongoing public outreach process will foster community agreement and buy-in by local citizens through the sincere consideration of their expressed concerns.

The unique qualities of Van Buskirk Island, the achieved community agreement and the buy-in of major stakeholders provides a positive and supportive environment for the upcoming important decisions to be made by Bergen County.

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Images

Figure 79: In 2010 the intake canal is filled in, volunteer vegetation provides hints to where it was. RU

Figure 80: The elements leading up the coagulation basin contribute to the completeness of landscape and engineering elements. RU

Figure 81: The presence of the coagulation basin contributes to the high level of design integrity. RU

Figure 82: The red biick of the buildings is the visually doninant material on site.

Figure 83: Concrete used as material. RU

Figure 84: Natural stone used as material RU

Figure 85: Wrought iron mechanism at intake canal. RU

Figure 86: Complex piping system in the pump house. RU

Figure 87: This diagram shows the extend of the complex piping system outside the buildings below grade. RU

Figure 88: Landmark smoke stacks RU

Figure 89: Pump Old #7 is considered a symbol for historic values. RU

Figure 90: The Hackensack River ravine carries meanings as symbol for environmental values. RU

Figure 91: HAER as-built drawing of Shreveport Water Works facility. Historic American Buildings Survey/ Historic American Engineering Record/ Historic American Landscapes Survey, 1933-Present

Figure 92: Current conditions of Shreveport Water Works. GOOGLE Earth.

Figure 93: Historic image of Shreveport Water Works. Historic American Buildings Survey/Historic American Engineering Record/Historic American Landscapes Survey, 1933-Present

Figure 94: Historic birdseye image of Shreveport Water Works. Historic American Buildings Survey/Historic American Engineering Record/Historic American Landscapes Survey, 1933-Present

Figure 95: HAER as-built detail of filtration assembly at Robert B. Morse Water Filtration Plant. Historic American Buildings Survey/Historic American Engineering Record/Historic American Landscapes Survey, 1933-Present

Figure 96: Current conditions of Robert B. Morse Water Filtration Plant. GOOGLE Earth.

Figure 97: HAER as-built drawing of Robert B. Morse Water Filtration Plant. Historic American Buildings Survey/ Historic American Engineering Record/ Historic American Landscapes Survey, 1933-Present

Figure 98: Photograph of the current condition of Kalaupapa dam. Historic American Buildings Survey/Historic American Engineering Record/Historic American Landscapes Survey, 1933-Present

Figure 99: Historic Image of Kalaupapa Water Supply System resevoirs. Historic American Buildings Survey/Historic American Engineering Record/ Historic American Landscapes Survey, 1933-Present

Figure 100: Historic image of Kalaupapa Water Supply System sedimentation basin. Historic American Buildings Survey/ Historic American Engineering Record/ Historic American Landscapes Survey, 1933-Present

Figure 101: HAER drawing of Kalaupapa Water Supply System infrastructureand process. Historic American Buildings Survey/Historic American Engineering Record/Historic American Landscapes Survey, 1933-Present

Figure 102: Landscape Preservation Treatment Recommendations Plan (Zones) 11x17 RU

Vegetation Mapping

Plant Communities

Riparian Zone (RZ)
This zone makes up the river's edge and the slopes immediately adjacent. This area is primarily composed of native tree species whose roots serve to stabilize the stream banks. Many of these trees are quite sizable and stately. The most common species include *Betula nigra, Platanus occidentalis, Tilia americana,* and *Ulmus americana*. There is very little herbaceous or shrub layer in this area. This area contains a good number of native tree species. (For a more complete list, see the accompanying tree inventory.) A limited number of invasives, such as Acer platanoides, could be considered for removal in order to protect the current native characteristic of the existing tree assemblage.

Wetland 1 (W1)
This wetland consists of a wet depression adjacent to the Hackensack River in the western side of the forested area adjacent to Madison Ave. This hydrology of this wetland is most likely controlled by precipitation and river water level. The depression itself is open and sparsely vegetated; however the border of the wetland is highly invaded by Polygonum cuspidatum.

Wetland 2 (W2)
This wetland is a primarily herbaceous and shrub dominated wetland directly adjacent to Madison Ave. It has a fairly high degree of species diversity although many of the species are non-natives commonly associated with disturbed wet areas. In this case, the diversity and species composition are mediated by activities associated with maintenance of the road and its border. The hydrology is most likely controlled by precipitation and run-off from the roadway.

Wetland 3 (W3)
This wetland is a wet depression between the main building and a round concrete structure/access road in the northernmost section of the property. The vegetation is dominated by wet-site tolerant weeds (e.g. *Cyperus esculentus, Rubus sp.* and *Toxicodendron radicans*) typical of a wet site which is occasionally mowed.

Open Deciduous 1 (OD1)
This area contains the bulk of deciduous forest located on the peninsula adjacent and south of New Milford Ave. The area is an assemblage of native plant communities as well as some ornamental and naturalized non-natives communities, some of which were probably planted by previous property owners. The overall character of the area is a mature forest canopy. The mature trees are well spaced leaving an open and easily navigable understory with a moderate shrub layer. Some small plots are dominated by non-natives (e.g. *Pachysandra terminalis*) but overall the area consists of more native plants than non-natives. Much of the species diversity in the herbaceous layer is located in an open area near to the road where disturbances favor a diverse assemblage of native and non-native meadow species.

Open Deciduous 2 (OD2)
This area consists of the deciduous forest delimited by Madison Ave. and the Hackensack River on the southern end of the property. This area is characterized by a mature tree canopy but is interspersed with several disturbed areas which alter the plant communities. For example, there are abandoned access road,

debris piles, trash and remnants of a building. In some cases the topography consists of mounds and hollows which are probably remnants of previous human activity and development. Like OD1, most of the plants are present due to natural succession, however some ornamentals (e.g. *Philadelphus sp*. and *Viburnum plicatum*) were probably planted. The area also contains several large areas dominated by near monocultures of a single species, including *Liriodendron tulipifera* and *Pachysandra terminalis*. These areas have been separately delineated on the vegetation map and are discussed in their own sections.

Road and Forest Border (RB)
This is a species rich area comprising the transition area between forest/riparian zone and maintained lawn/roads along Madison and New Milford Aves. The diversity is most likely attributed to disturbance associated with maintenance of the lawns and roads. It is not uncommon that areas of this type are very species diverse due to the varied conditions created by disturbance. Furthermore, these areas are often characterized by an assemblage of cosmopolitan native and non-native weeds.

Pachysandra monoculture (P)
These areas are near monocultures of Pachysandra terminalis. The monoculture excludes other plants from the herbaceous and shrub layers, but is often covered by a canopy of surrounding tree species. These areas are most likely remnants of planted horticultural P. terminalis that have escaped and naturalized.

Liriodendron patch (LS)
This is an area contained within OD2. This area is densely populated with young Liriodendron tulipifera trees. It is bordered on the north side by several ornamental specimens (e.g. Picea abies, Pinus strobus, and Taxus baccata) that may be remnants of human plantings. At times, the density of L. tulipifera makes navigation difficult.

Basin Community (BASIN)
This area is dominated by non-native and colonizing tree species on the inner and outer slopes of the large settlement ponds adjacent to the main buildings. The three most common species are Ailanthus altissima, Platanus occidentalis, and Populus deltoides. This growth is incredibly dense though a trail, possibly maintained by deer, at the top of the slope allows access. There is a fairly dense shrub layer consisting mostly of Rosa sp. in certain parts.

Ornamental Picea and Tsuga (OPT)
This area consists of dense plantings of Picea sp. and Tsuga sp. near the northernmost point of the property. These plantings are improperly spaced and negatively impacted both by crowding and shading from adjacent mature trees.

Ornamental Hammamelis (OH)
This area consists of two mature, healthy specimens of ornamental Hammamelis sp. planted in between the two areas of OPT near the northernmost point of the property.

Polygonum cuspidatum dominated (Pc)
These areas consist of extremely dense monocultural stands of Polygonum cuspidatum generally found bordering wetland or riparian areas. They are not easily navigated but may serve in stabilizing the soil of otherwise highly erodible floodplain and river border.

Maintained Areas (MA)
These areas consist of primarily large expanses of maintained turfgrass and specimen tree plantings. They can be found east and west of Elm Street. For a list of tree species, see accompanying tree inventory map.

Minimally Maintained (MM)
These areas consist of areas surrounding the settlement ponds. They contain trails and access roads and are occasionally trimmed, but are not maintained as turfgrass. As a result, they are primarily an assemblage of native and non-native, shrub, vine and herbaceous species.

Impervious Surfaces (IS)
These areas consist of building and paved surfaces on the property which do not support plant community establishment.

Plant List

The following list was compiled from observations made by Sasha Eisenman, and Ari Novy on September 1st and 8th, 2009 and June 22nd, 2010. The entire island and the adjacent forested area south of New Milford Ave. were surveyed. Scientific names and family designations used in the list follow Rhoads and Block (2007). Plants not native to North America are marked with an asterisk (USDA, NRCS 2011). Potentially planted species are included in the list and designated as "hort.". If identification of a species was not possible, the genus name is given alone.

Adoxaceae:
*Viburnum dentatum, Viburnum plicatum**

Alliaceae:
*Allium vineale**

Amaranthaceae:
*Dysphania ambrosioides**

Anacardiaceae:
Rhus typhina, Toxicodendron radicans

Apiaceae:
Daucus carota, Sanicula marilandica*

Apocynaceae:
*Apocynum cannabinum, Asclepias syriaca, Vinca minor**

Araliaceae:
*Hedera helix**

Aristolochiaceae:
Asarum canadense

Asteraceae:
Achillea millefolium, Ageratina altissima var. altissima, Ambrosia artemisiifolia, Arctium sp.*, Artemisia annua*, Artemisia vulgaris*, Bidens frondosa, Carduus nutans*, Centaurea nigra*, Cirsium vulgare*, Erechtites hieraciifolia, Erigeron philadelphicus, Eupatorium serotinum, Euthamia graminifolia, Lactuca serriola*, Solidago gigantea, Solidago juncea, Solidago rugosa, Symphyotrichum cordifolium*

Balsaminaceae:
Impatiens capensis

Berberidaceae:
*Berberis thunbergii**

Betulaceae:
Alnus glutinosa, Alnus serrulata, Betula nigra*

Bignoniaceae:
Campsis radicans, Catalpa bignonioides

Brassicaceae:
Alliaria petiolata, Lepidium virginicum*

Buxaceae:
*Pachysandra terminalis**

Cannabaceae:
*Humulus japonicus**

Caprifoliaceae:
Kolkwitzia amabilis (hort.), Lonicera japonica, Lonicera morrowii**

Caryophyllaceae:
Arenaria serpyllifolia, Dianthus armeria*, Silene antirrhina, Saponaria officinalis**

Celastraceae:
*Celastris orbiculatus**

Hypericaceae:
*Hypericum perforatum**

Commelinaceae:
*Commelina communis**

Convolvulaceae:
Calystegia sepium

Cornaceae:
Cornus florida

Cucurbitaceae:
Sicyos angulatus

Cyperaceae:
Carex scoparia, Carex tribuloides, Carex vulpinoidea, Cyperus erythrorhizos (Erik Kiviat, personal communication), Cyperus esculentus, Cyperus microiria*, Eleocharis obtusa, Eleocharis palustris, Scirpus atrovirens*

Ericaceae:
Rhododendron sp. (hort.)

Euphorbiaceae:
Euphorbia maculata

Fabaceae:
Desmodium paniculatum, Lotus corniculatus, Melilotus alba*, Robinia pseudoacacia, Trifolium spp.**

Fagaceae:
Fagus grandifolia, Quercus bicolor, Quercus palustris, Quercus rubra

Geraniaceae:
Geranium carolinianum

Hamamelidaceae:
Hamamelis sp. (hort.)

Hydrangeaceae:
Deutzia scabra, Philadelphus sp. (hort.)*

Iridaceae:
Sisyrinchium angustifolium

Juglandaceae:
Carya cordiformis, Juglans nigra

Juncaceae:
Juncus effusus

Lauraceae:
Lindera benzoin

Lythraceae:
*Lythrum salicaria**

Magnoliaceae:
Liriodendron tulipifera

Malvaceae:
Tilia americana

Menispermaceae:
Menispermum canadense

Moraceae:
*Morus alba**

Nymphaeaceae:
Nuphar lutea

Oleaceae:
*Ligustrum vulgare**

Onagraceae:
Circaea canadensis ssp. canadensis

Polypodiaceae:
Onoclea sensibilis

Phytolaccaceae:
Phytolacca americana

Pinaceae:
Picea abies (hort.), Pinus strobus, Tsuga canadensis (hort.)

Plantaginceae:
*Plantago lanceolota**

Platanaceae:
Platanus occidentalis

Poaceae:
*Dactylis glomerata**, *Dichanthelium acuminatum*, *Digitaria sanguinalis**, *Echinochloa muricata*, *Elymus repens**, *Glyceria striata*, *Leersia virginica*, *Microstegium vimineum**, *Phragmites australis**, *Setaria faberi**, *Setaria pumila**, *Tridens flavus*

Polygonaceae:
*Fallopia japonica**, *Persicaria pensylvanica*, *Persicaria maculosa**, *Persicaria punctata*, *Persicaria virginiana*, *Rumex obtusifolius**

Potamogetonaceae:
Potamogeton foliosus

Ranunculaceae:
*Clematis terniflora**

Rosaceae:
Geum canadense, *Malus sp.**, *Potentilla norvegica ssp. monspeliensis*, *Prunus serotina*, *Pyrus calleryana**, *Rosa multiflora**, *Rubus flagellaris*, *Rubus occidentalis*, *Rubus phoenicolasius**

Rubiaceae:
*Galium mollugo**, *Cephalanthus occidentalis*

Salicaceae:
Populus deltoides

Sapindaceae:
*Acer ginnala**, *Acer negundo*, *Acer platanoides**, *Acer rubrum*, *Acer saccharinum*
*Scrophulariaceae: Verbascum thapsus**
*Simaroubaceae: Ailanthus altissima**
Smilacaceae: Smilax rotundifolia
Solanaceae: Solanum carolinense, *Solanum dulcamara**, *Solanum nigrum*

Taxaceae:
*Taxus baccata**, *Taxus sp. (hort.)*

Typhaceae:
Typha angustifolia

Ulmaceae:
Ulmus americana

Urticaceae:
Boehmeria cylindrica

Verbenaceae:
Verbena urticifolia

Vitaceae:
*Ampelopsis brevipedunculata**, *Parthenocissus quinquefolia*, *Vitis labrusca*