

HASTINGS-ON-HUDSON

100-YEAR WATERFRONT VISION

DECEMBER 2018



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INTRODUCTION



EXECUTIVE SUMMARY

The Hastings-on-Hudson Waterfront Rezoning Committee presented us with the challenging task of creating a 100-year vision plan for a 42-acre industrial waterfront site. The process to arrive at our vision involved significant research into environmental projections, demographic trends, technological advancements, and various case studies from successful development projects around the world. This culminated in a vision of how the site and the Village of Hastings-on-Hudson may look a century from now.

The research process revealed four key categories that our group deemed “priority opportunity areas,” which helped steer additional research as well as our planning process. The first, and what we consider to be the most important priority opportunity area, is Sustainability. Examination of FEMA flood plain maps as well as sea level rise projections illuminated the need to focus heavily on flood mitigation efforts, resiliency, and sustainability. The second priority opportunity area is Economic and Community Development, as the Committee emphasized the importance of designing the site to contribute significant tax revenue to the Village and bolster its economy. Trends in population growth for New York City and Westchester County were of particular focus, as well as trends in changing workplace behaviors and housing and commercial needs. The third area of focus is Transportation, with research focusing on the subject at a variety of scales, from the region, to the village, to the site itself. The research for this priority opportunity area also

focused on anticipated advancements in transportation technologies that may impact land use significantly in the next 100 years. Finally, we looked at Placemaking as the fourth priority opportunity area, as the revitalization of the vacant waterfront site is an opportunity to define the Village of Hastings-on-Hudson’s unique identity and differentiate the site and the Village from nearby communities.

We recognize that the waterfront has been subject to extensive and ongoing study. With these four areas of focus we evaluated two of the redevelopment plans that were created in 2018 for the Village’s waterfront site. We examined the two plans closely, grading each design element with criteria we had laid out as crucial for them to age well over the next century. With these evaluations we were able to highlight areas in each plan that are and will likely continue to be very successful, as well as areas in which these plans fall short. With this insight, we envisioned the future of Hasting-on-Hudson’s waterfront.

Ultimately, the design we produced is malleable, and we encourage the Waterfront Rezoning Committee to focus first and foremost on the priority opportunity areas that we identified to ensure the development on the site ages gracefully. The plan includes a variety of design elements that are focused around the four priority opportunity areas. Additionally, we propose the Village consider mechanisms to reclaim ownership of waterfront property, so that the

community can gain more control over the future of the waterfront while the current landowners could still capture value by developing on a nearby alternative site.

We know the site will be inundated regularly throughout the next 100 years, so it is important to develop the site strategically to ensure that future generations of Hastings-on-Hudson residents can enjoy the space while it serves as a vibrant economic and residential hub, an area for community members to connect with one another, and a space for people to enjoy the natural environment and the stunning views of the Palisades.



THE CHARGE

The Hunter College Fall 2018 Master of Urban Planning graduate studio (“the Studio”) was tasked by the Village of Hastings-on-Hudson’s Waterfront Rezoning Committee to create a 100-year vision for a vacant stretch of waterfront land on the Hudson River (“the Waterfront Site”). Long cut off to the public while it was home to industry and later slated for environmental remediation through the New York State Department of Environmental Protection’s State Superfund Program, this 42-acre site has been a significant source of discussion for its redevelopment potential. With proper foresight and planning, this site can generate enormous opportunities for the Village, its residents, and the Hudson Valley region.

The Studio envisions a revitalized Hastings-on-Hudson waterfront that is sustainable, resilient, economically productive, and culturally vibrant. By identifying the inherent strengths of the site and addressing the future challenges

it will face, the Studio proposes a vision plan for the waterfront (“the Plan”) that reconnects the Village to the Hudson River and ensures its viability far into the future. The Plan shows that the Waterfront Site can serve many of the needs of the community, such as public spaces, transportation services, business opportunities, recreational amenities, restored natural habitats and housing, while being poised to adapt in evolving technological, social and environmental contexts.

Through the next 100 years and beyond, the Plan envisions a waterfront for Hastings-on-Hudson that can serve as a model for Superfund site redevelopment and transform into a dynamic place to live, work, interact, create, play and explore.

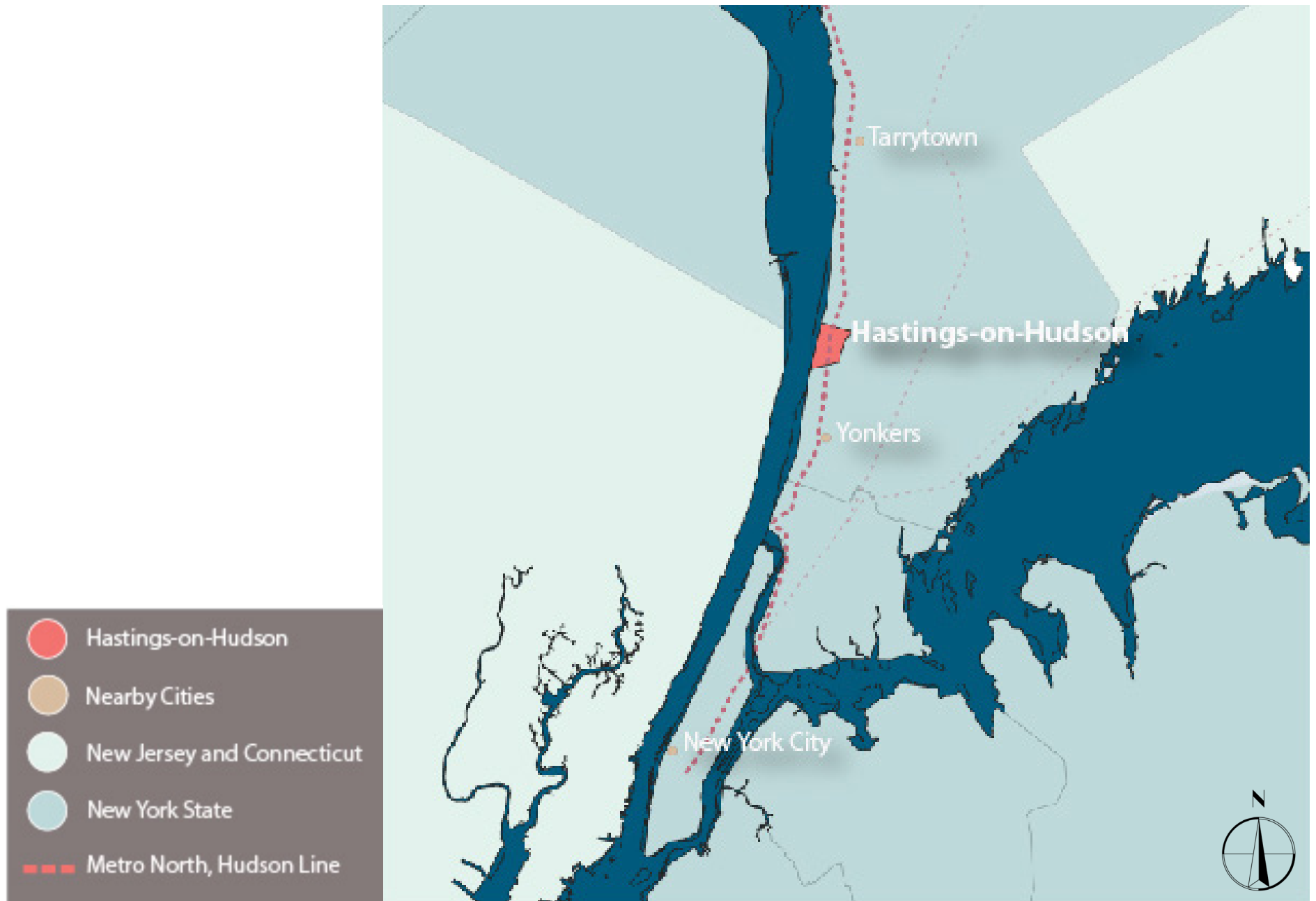


Figure 1 Regional Map

BACKGROUND

VILLAGE OF HASTINGS-ON-HUDSON

The Village of Hastings-On-Hudson, an incorporated village in the town of Greenburgh, New York, is a historic village in the lower Hudson Valley. Located twenty miles north of midtown Manhattan, Hastings-on-Hudson is part of a network of river towns on the eastern banks of the Hudson River.

As of the 2012-2016 American Community Survey 5-Year Estimates, the two-square-mile Village had a population of approximately 7,969. The population has experienced small fluctuations in the last few decades, as shown in Figure 2. Following three decades of decline after reaching peak population at the 1970 Census, the population began to rebound after 2000. Westchester County, by comparison, has recorded a steady population growth since 1980.

Demographically, Hastings-on-Hudson remains a predominantly white village. According to the 2012-2016 ACS, the population is 84.1% white, 4.2% black or African American and 2.2% Asian. The Hispanic or Latino population makes up a growing portion of the population at 7.2% (see Figure 3).

The Village has seen changes in age composition since the turn of the century. Adults between the ages of 25 and 64 make up a decreasing portion of the population and has shrunk from 55.4% in 2000 to 51% in 2016. The most significant change in population is with respect to the 35 to 44 age group, which, at 1,295 people - 16.9% of the population - constituted the largest

group at the 2000 census. By 2016, this age group had fallen to 921 - 11.7% of the population. Meanwhile, the population 65-and-over had grown from 15.5% to 18.8% during this time period.

While the overall Village population and the number of school-age children (5 to 19 years) increased, the proportion

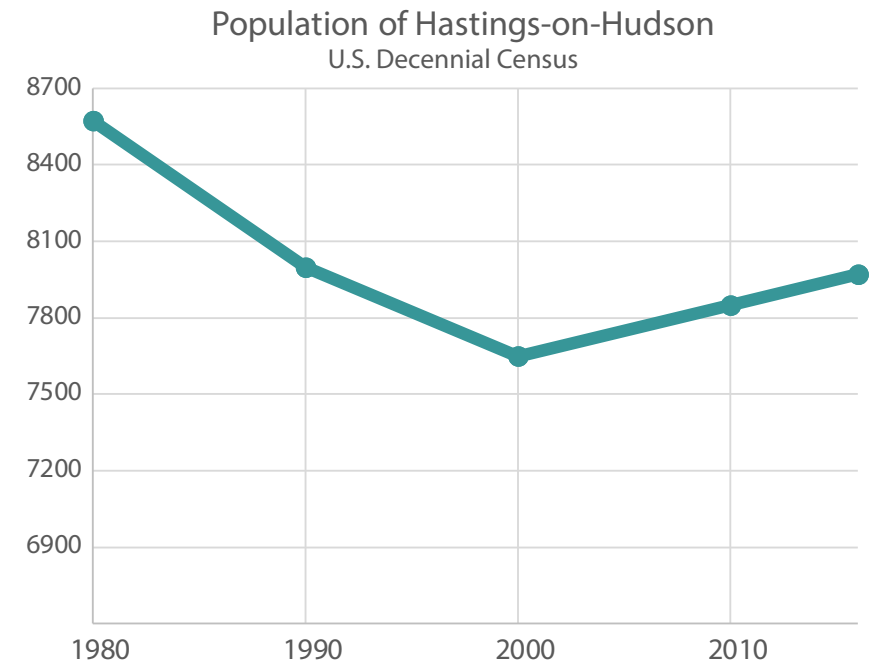


Figure 2: Hastings-on-Hudson Population (U.S. Census Bureau)

of school-age children in the population has hovered around 21% to 23%. Notably, there have been consistent drop-offs in population between the 15 to 19 and the 20 to 24 age groups and again after age 55. These trends may be related: the former coincides with the traditional college-age population

Percentage of Population by Race

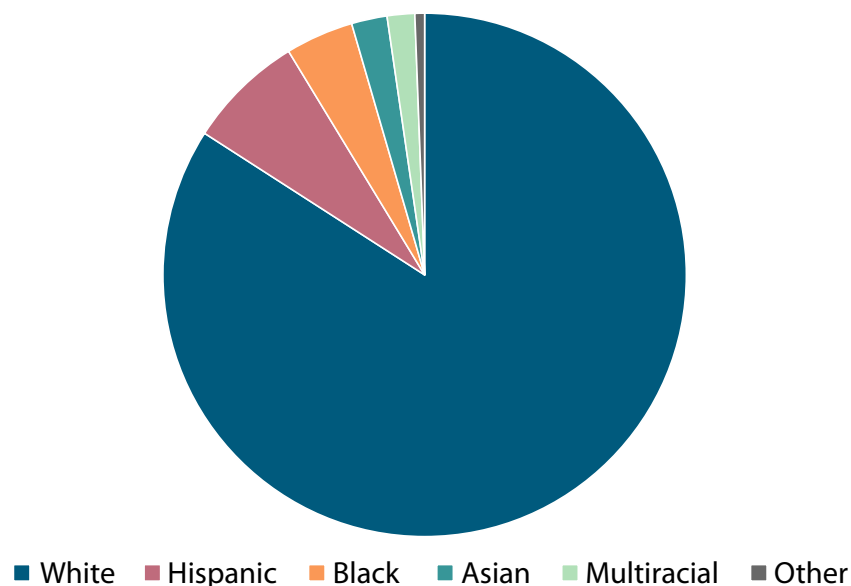


Figure 3: Hastings-on-Hudson Population by Race (U.S. Census Bureau)

and the latter may partially coincide with empty-nesters seeking to downsize, as the majority of homes in Hastings-on-Hudson are single-family residences.

According to the 2012-2016 ACS, the median household income in Hastings-on-Hudson is \$116,798, with 30% of households earning over \$200,000 annually. This is comparable to the median household income of other river towns such as nearby Tarrytown (\$104,231) and Dobbs Ferry (\$120,631), while sitting well above that of Westchester County overall (\$86,226). Similarly, at \$627,100, the 2016 median property value in Hastings-on-Hudson is well above Westchester County's, which stands at \$507,300.

An extensive regional transportation network provides Hastings-on-Hudson with vehicular and rail transit. With its proximity to New York City, a global economic center and significant job supplier, and to White Plains, the Westchester County seat, this transportation network is essential for the day-to-day needs of many Hastings-on-Hudson residents. In 2016, over 28% of Hastings-on-Hudson residents commuted to work via public transit, the primary source of which is the MTA Metro North Railroad's Hudson Line, which has a station near the Village waterfront. Semi-express trains can travel between Hastings-on-Hudson and Grand Central Terminal in as little as 32 minutes. The importance of this transportation resource is evident at the parking lot adjacent to the train station. With over 400 spots, the Village manages

high-demand through long-term parking passes and daily meters (MTA and Village of Hastings, 2018).

The Saw Mill River Parkway runs through Hastings-on-Hudson near its eastern Village line, which is serviced by two exits. U.S. Route 9, which runs north-south connecting cities and towns from New York City to near the Canadian border, cuts through the middle of the village. Within Hastings-on-Hudson, Route 9 becomes Broadway and is a main thoroughfare. Several bus routes serve the Village along Route 9 and Warburton Avenue, connecting the river towns in Westchester and the northern Bronx.

WATERFRONT HISTORY

The subject of the Studio's 100-year vision is a 42-acre waterfront site in the Village of Hastings-on-Hudson. The site extends into the Hudson River directly to the west of the railroad tracks, and is made primarily of industrial fill (HOH Waterfront Committee, 2015). The land was built up in the late 19th and early 20th centuries, with one owner going as far as to sink and fill over a barge in pursuit of expansion (Cashin Associates, 2006). The site is bounded by a privately owned tennis facility to the north and the defunct Zinsser Bridge to the south. The waterfront was the center of industrial activity in Hastings-on-Hudson for over 100 years; today, the site remains vacant as talks between developers and village representatives continue in efforts to decide zoning, potential development, and the remediation process after years of industrial use.

The site's rich industrial history began in 1849 with the Hudson River Steam Sugar Refinery, a brick facility of several stories situated between the river and railroad. The refinery used innovative steam technology to produce sugar, taking water for steam production from the small stream that flows onto the site from the ravine to the east (Hastings Historical Society, 2008). In the winter of 1875, a catastrophic fire completely destroyed the facility, instantly putting 300 of the Village's 1,300 residents out of work. The owners of the refinery moved on, taking their operation to a new building in Brooklyn (Cashin Associates, 2006).

New firms moved in to fill the gap. Hastings Pavement moved onto the site of the ruined sugar refinery in the 1880s. The company specialized in producing impermeable hexagonal paving blocks, most notably used in Central and Prospect Parks in New York City (Hastings Historical Society, 2008). National Conduit and Cable Company moved onto the waterfront in 1891 to produce a new kind of insulated electric cable. National Conduit supplied its specialized electrical

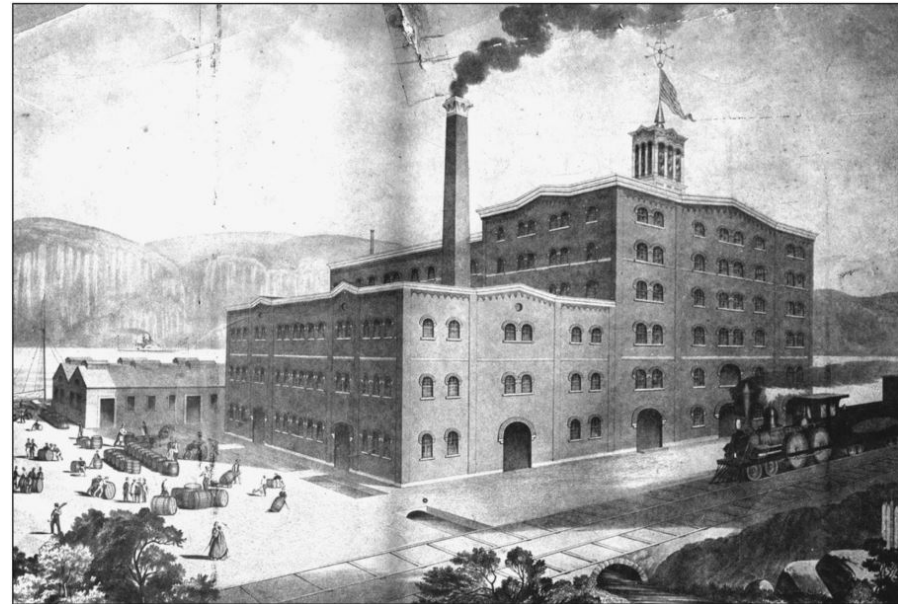


Figure 4: The Hudson River Steam Sugar Refinery (Hastings Historical Society, 2008)

cabling to large utility companies, with its main clientele in North American and European urban centers. The company experienced explosive growth, with its workforce expanding nearly 43-fold in only 17 years (Cashin Associates, 2006).

Frederick G. Zinsser opened a chemical plant on the Hastings-on-Hudson waterfront in 1897 which specialized in the production of wood alcohol, photographic chemicals and dyes. Throughout the plant's time on the Hudson, Zinsser acquired buildings while expanding the property significantly further into the Hudson River with fill. The facility was primed to manufacture mustard gas during World War 1, but hostilities ceased before production began (Hastings Historical Society, 2008).

When the National Conduit and Cable Company succumbed to insolvency in 1921, their production facilities were bought by American Brass, who were subsequently absorbed by Anaconda Copper and Mining Company. Its daughter company, Anaconda Wire and Cable Company, took up residence in the former NC&C buildings. Anaconda Wire produced special fire-resistant cable for Navy Ships during World War II; PCBs from the fire-resistant coating are a central source of environmental contamination on the site (Hastings Historical Society, 2008).

The mid-20th Century brought more turnover to the waterfront. Hastings Pavement ceased production in 1944, though few residents missed the clouds of rock and asphalt

dust their facilities produced (Hastings Historical Society, 2008). The Zinsser Chemical Company came to an end in 1955 when the company was sold to Harshaw Chemical. Moore Tappan Tanker bought the property in 1962 and set up enormous fuel tanks on the southern end of the site (Cashin Associates, 2006). The southern section of the waterfront became the location of a deep water port which would eventually be subdivided, with 8 acres containing fuel-storage infrastructure going to Mobil Oil, and 7 acres to Uhlich Color Company. Mobil operated on the site until 1985; Uhlich abandoned the waterfront in the 1990s (Cashin Associates, 2006).

After years of contaminating the waterfront, 1971 saw Anaconda Cable and Wire charged by the federal government for violating anti-dumping laws. The fines totalled \$200,000, at that time the largest sum ever paid as a penalty for pollution (Hastings Historical Society, 2008). Anaconda continued to operate on the site until it closed in 1975, at which time it manufactured only electrical products and television cabling. ARCO merged with Anaconda in 1977 and was later bought by BP, which still has responsibility for the former Anaconda plant site.

The most recent industrial activity on the waterfront was in 1995 when PTI Holdings, a manufacturer of bicycle helmets and toys, moved onto the waterfront at 1 River Street. On April 13, 2001, a \$335,000 New York State grant was awarded

to purchase and preserve 14.5 acres of the Hastings-on-Hudson waterfront. The grant money was to be used to build a bridge crossing over the train tracks to study access issues along with an overall waterfront redevelopment plan (Brenner, 2000). Since the closing of industrial facilities on the waterfront, there has been a great deal of discussion about redevelopment.



Figure 5: The Anaconda Wire & Cable Company (Hastings Historical Society, 2008)

Today, the 42-acre site remains subdivided amongst three owners. BP ARCO owns the northern 28 acres, which requires environmental remediation due to substantial PCB and heavy metal contamination on and off-shore. The remaining acreage is split evenly, with Exxon in control of the 7 western acres of this southern section, and Argent Ventures, previously Uhlich Corporation, owning the 7 eastern acres closer to the train tracks. The southern section of the site has largely been remediated after years of volatile organic chemical infiltration from manufacturing and fuel storage on the site.

The BP ARCO site has been the subject of legal disputes in the past. Remediation on the site is governed by a Record of Decision (ROD) from the New York State Department of Environmental Conservation (NYSDEC), which demands the site be remediated to the point where it can be safely used for residences with some limitations. A lawsuit brought by Riverkeeper and the Village of Hastings-on-Hudson accelerated the remediation schedule; the negotiated settlement to the lawsuit is expressed in a consent decree, last updated in 2016. The consent decree details further requirements for the remediation as well as conditions for future building construction, including setbacks and height limits.

The last decade of remediation involved demolishing all extant structures on the waterfront, including Building 52, while leaving the water tower intact. The northwest corner

contains the heaviest PCB contamination; BP Arco have removed most subsurface liquid PCB, but a full remediation to a depth of 12 feet is needed for areas of particularly concentrated contamination across the site. BP ARCO will be required to remediate contaminated sediment on the riverbottom. Once design documents are approved by the NYSDEC, full remediation is expected to start in 2019 and take 4 to 5 years to complete (WRC, 2018). BP has engaged in discussions with developers to carry out both remediation and property development; Suncal was recently selected as their developer. Exxon and Argent Ventures have also selected developers.

Over the past twenty years, Hastings-on-Hudson has considered a broad array of planned futures for the waterfront. From 2000-2001 the Regional Plan Association completed a vision plan for the Hastings-on-Hudson waterfront, which led to work being done towards a Local Waterfront Revitalization Plan (LWRP). The document created by the Village contains guiding language for future waterfront plans, though it was never finalized. In 2011, the Village addressed issues concerning the waterfront in its Comprehensive Plan. In 2015, the Waterfront Infrastructure Committee issued a plan that considered the impact of the consent decree on future development, along with suggesting locations for roads and infrastructure in relation to the site. Most recently, the Shoreline Advisory Committee proposed a design for the shoreline, which discussed the location of

specific infrastructural elements to inform BP ARCO's final plans for remediation. In 2017, the Waterfront Rezoning Committee (WRC) was created to devise a new zoning code for the waterfront area, which is currently zoned General Industrial, a use the Village does not believe "...reflect[s] the economic reality of local labor and energy markets" (WRC, 2018). The WRC is expected to complete the new zoning code by the end of February 2020.



Figure 6: Workers at the Anaconda Wire & Cable Company (Hastings Historical Society, 2008)

METHODS



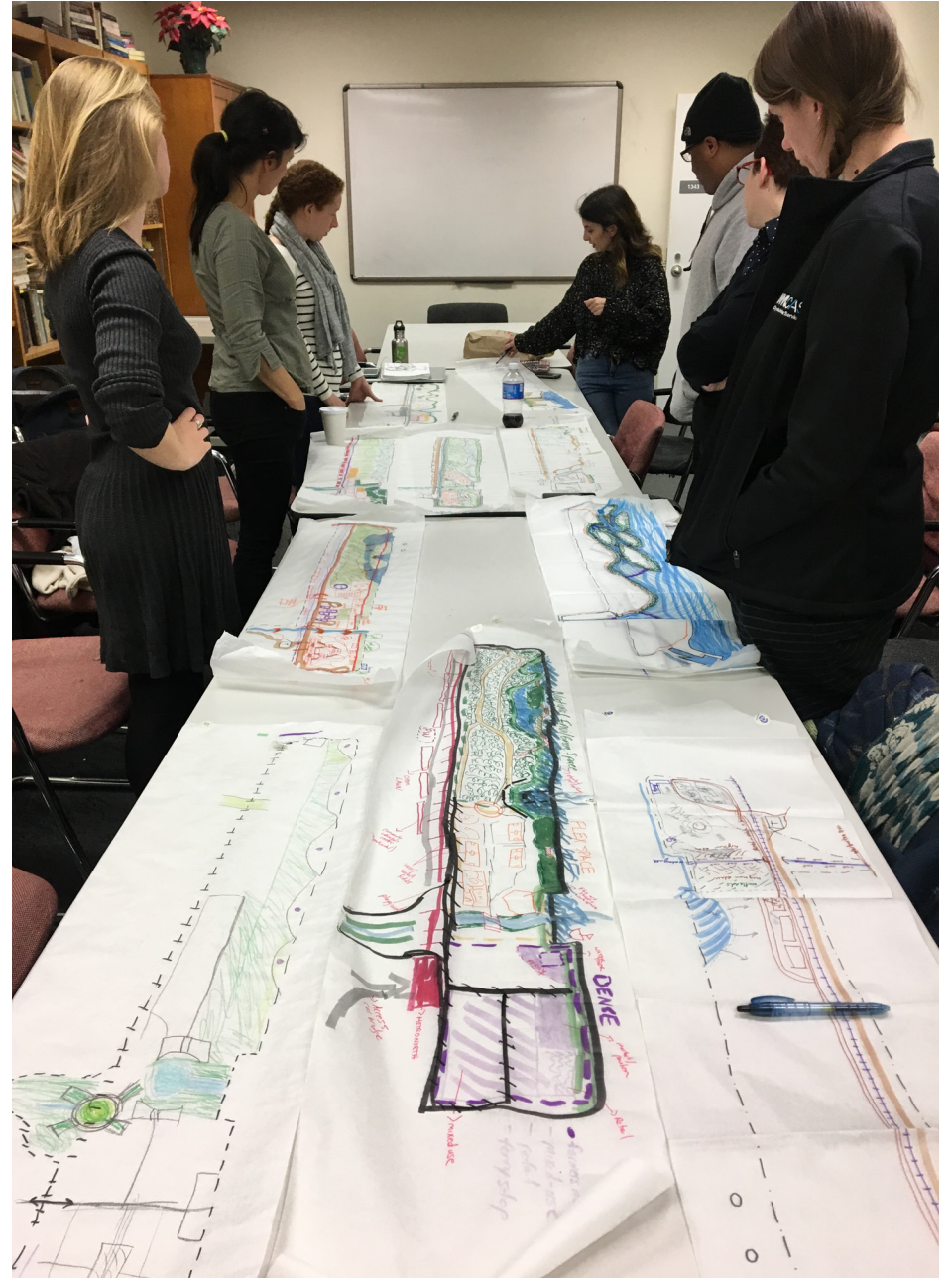


Figure 7: The Hunter Studio team visits the Hastings-on-Hudson waterfront site (top left), sketches conceptual 100-year vision plans (right), and discusses research findings during workshop classes.

METHODS AND APPROACH

THE PLANNING PROCESS

The planning process leading up to the 100-year vision for the Hastings-on-Hudson waterfront consisted of extensive background research and targeted stakeholder engagement.

The first phase was a comprehensive review of existing plans, proposals and regulatory conditions that affect the waterfront site. The waterfront site has been the focus of multiple studies – some dating back to the 1990s and others produced within the past few months – which provide robust information and an understanding of the wide range of possible outcomes for the site. The regulatory limitations resulting from the environmental remediation, such as those imposed by the consent decree, were also studied and taken into account.

The Studio team met with the Hastings-on-Hudson Waterfront Rezoning Committee on three occasions during the research and planning process. A project kickoff meeting was held at Hunter College at the start of the fall 2018 semester to discuss the charge, the larger context of the 2020 waterfront rezoning process, and other recent developments related to the Village and the waterfront. The second meeting consisted of a guided site visit of the waterfront and the Village of Hastings-on-Hudson. At the third meeting, a mid-point check-in held at Hunter College, the Studio team presented preliminary research findings and an approach for the second half of the project. These interchanges between the Studio and representatives from the Waterfront Rezoning Committee provided valuable knowledge to the Studio that underpinned

the subsequent development of a 100-year vision for the waterfront site.

Based on these meetings and preliminary research, the Studio expanded the boundaries of the original study area. In addition to the 42 acres of land on the western side of the railroad tracks between the Tennis Club of Hastings to the north and Railroad Avenue to the south, a strip of land along the eastern side of the railroad tracks was included in the site. This additional area is bounded to the north by the Main Street Bridge, and extends south along Southside Avenue and Railroad Avenue to the Zinsser Bridge. This includes the Hastings-on-Hudson train station facilities, the publicly-owned commuter parking lots on Southside Avenue and Cropsey Lane as well as vacant and publicly-owned parcels along Southside and Railroad Avenues. The total size of this expanded waterfront site is approximately 49 acres.

The Studio also engaged with students in Hastings High School through a survey administered online. Input from this stakeholder group ensured that the thoughts of future generations – and potential future Hastings-on-Hudson residents – were reflected in this study.

The Studio then moved to researching physical and regulatory drivers of change that may affect the waterfront over the 100-year study period. The outcomes of this research produced a core set of assumptions about the future of Hastings-on-Hudson. Based on these assumptions, four priority areas

were selected to inform the development of the Plan, which reflected the most important challenges and opportunities for the future of the waterfront site. As a final step to strengthen these assumptions and priority areas, the Studio picked two existing plans for the waterfront, and evaluated the fitness of each plan's elements in the Studio's developed vision of the future. This process revealed areas of both plans that stood up particularly well, as well as weaknesses that needed to be better addressed in order to ensure that the site functions optimally through the next 100 years and beyond. A new plan for the waterfront is proposed in the second half of this report that seeks to address these gaps and safeguard the future of the waterfront. This process is outlined in subsequent sections.

BUILDING A 100-YEAR VISION: RESEARCH AND ASSUMPTIONS

The Studio reviewed emerging trends and research in planning-related fields that may influence the Hastings-on-Hudson waterfront – or the Village at large – over the next 100 years. The areas of study included climate change, resiliency and sustainability, land use, creative placemaking, demographics, economic trends, and transportation. Findings from these fields were applied at different geographic levels, depending on the nature of the subject. Some were considered at a regional, village or site-specific scale, while others were considered across all three scales. Transportation, patterns of migration, and demographic changes, for instance, were considered at the regional scale, while global issues such as climate change were considered for their influence on land use and regulation at all scales.

To translate this research into a long-term vision, the Studio developed a set of assumptions that defined its vision for the future of the Hastings-on-Hudson waterfront. These assumptions are made with respect to climate change, population and technology.

Significant consideration was given to the site's low elevation and exposure to the tides of the Hudson River. These factors have clear implications for the site's ability to withstand sea level rise, notwithstanding other direct and indirect impacts of climate change. Due to the potential ramifications and risk to life and property that may occur if the impacts of climate change are underestimated, the Studio adopted current

models that present a worst-case-scenario. Flood maps with the highest predicted sea level rise, at least six feet above current levels by 2100, were selected to carry forward into planning assumptions (figure 9). It should be noted that even the most conservative projections would put the majority of the waterfront site in its current state at risk of frequent inundation. This is discussed in further detail in the *Priority Opportunity Areas: Sustainability* section of this report. The outcome presented by these models shapes the physical elements and infrastructure of the waterfront site, as well as suggested land uses. The proposed solutions will address the need for both economically productive and sustainable uses, including increased density closer to the center of the village, while reducing exposure to the risks presented by sea level rise on the waterfront.

Additionally, assumptions about future populations were made which affect village tax revenue, public services, housing and other characteristics of Hastings-on-Hudson. Given geographic constraints and the prevalence of single-family homes in Hastings-on-Hudson, the Studio assumed there will be limitations to population growth and demographic changes without land use changes in favor of higher density. The Studio based population projections on current Village zoning, so key sources of growth in population are derived from build-out of currently vacant and underbuilt land, the conversion of surface parking into housing, and new housing proposed for the waterfront site itself.

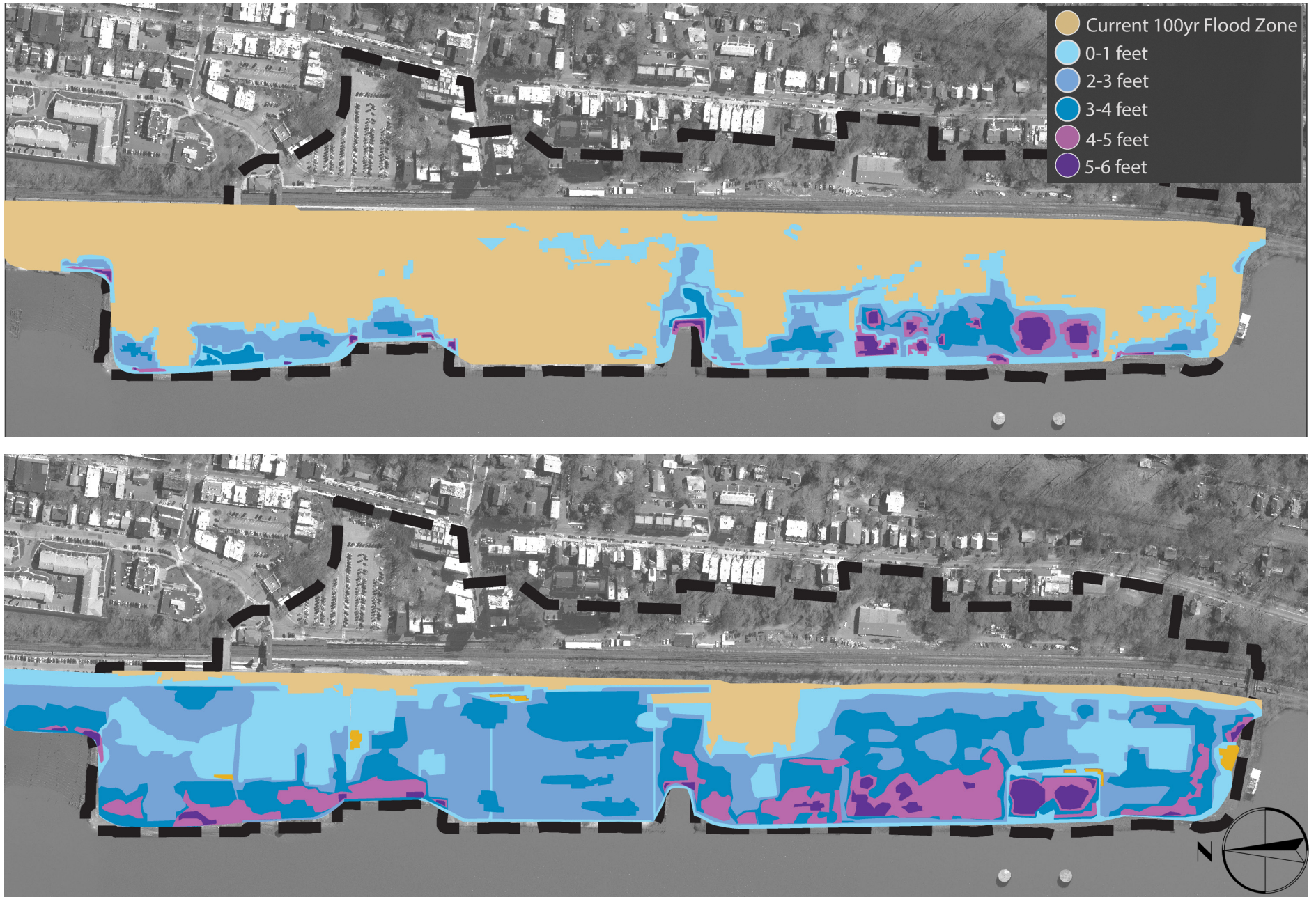


Figure 8 Waterfront Sea Level Rise Maps (Data from Scenic Hudson)

Even the most conservative sea level rise scenarios (top) depict the waterfront site under water. The Studio followed the worst-case scenario for sea level rise, represented in the bottom image.

The Studio expects the economic profile of Hastings-on-Hudson to remain relatively stable, which is intrinsically linked to the expected continued prosperity of the overall New York metropolitan region. Similarly, the social needs of the people living in Hastings-on-Hudson are expected to remain stable; the desire for a sense of community and shared values is crucial and universal. Developing an inclusive waterfront that encourages creative interactions with neighbors, and serves the community and its values is imperative. Population projections and the impact on housing is explored further in the *Priority Opportunity Areas: Community and Economic Development* section of this report.

Potential future advancements in technology were among the most challenging things to incorporate into the 100-year vision. In particular, transportation and energy production technology are two areas where there is a vast range of potential impacts on the waterfront site. The Studio expects autonomous vehicles to be an active part of the transportation landscape within 100 years, bringing with them significant changes to the built and social environments (Ferreira et al., 2014; Nourinejad et al., 2018; Urmson et al., 2008; Waymo Team, 2018). Even minor changes to the nature, cost and timing of technological innovations can create a cascading effect over the length of the study period. The Studio made baseline, research-based assumptions and emphasized flexibility in site design to address the uncertainty inherent in planning within the time frame of the charge.

PRIORITY OPPORTUNITY AREAS

The research and assumptions revealed four focus areas that guided the development of a 100-year vision for the Hastings waterfront. While each of the priority areas are explored individually in the report, they are very much intertwined. These areas were used to evaluate the long-term feasibility of existing plans and to identify strengths and weaknesses that could be applied to the final Plan outlined later in this report. The four priority areas are:

Sustainability: At the United Nations General Assembly in 1987, the Brundtland Commission defined sustainability as “...development that meets the needs of the present without compromising the needs of future generations.” Sustainability is the focal point of the Studio’s 100-year vision, and is woven into every other priority area. The waterfront’s low elevation invites a host of problems due to the direct and indirect effects of climate change. The criterion of sustainability focuses on the physical, technological and ecological aspects of the waterfront and accommodating future development. Those aspects also inform the creation of a resilient waterfront able to withstand the effects of climate change.

Community and economic development: The waterfront redevelopment project should ultimately strengthen the Hastings-on-Hudson community at large. Present day community members have voiced concerns that the waterfront redevelopment could result in an inaccessible enclave that does not serve the larger community; a plan for the waterfront

should ensure that the site is not only accessible to the community, but strengthens it by facilitating interpersonal relations among community members. The village is also facing a high demand for housing, so the development should absorb some of that demand. The site should also bolster the village’s economy. It should not draw attention away from the existing downtown, but rather should complement it. Certain land-use changes could be made to the village in order to create greater connectivity between the two economic hubs.

Transportation: Transportation plays a key role in achieving sustainability goals, impacts the way that people live and work, affects land use and real estate values and has a host of other social and economic implications. All of these elements come together on the waterfront site, making transportation critical to the long-term viability of future development and activity on and near the site. Prioritizing a strong transportation network with both the upland village and regional transportation assets could address logistical challenges, such as the train tracks adjacent to the site, and position the waterfront to become an economically and culturally thriving part of Hastings-on-Hudson. Eschewing the contemporary approach to transportation infrastructure by placing less emphasis on automobiles over other modes, in addition to recognizing the potential impacts of technological innovations, can help maximize accessibility and ensure that the site is able to adapt to changing transportation needs.

Placemaking: Creative placemaking is a “...strategy to improve community well-being and prosperity, while also fostering conditions for cities to define, draw attention to, and distinguish themselves on a global scale” (Schupbach, 2018). The Village of Hastings-on-Hudson can use placemaking as a tool on the waterfront site to enhance its already creative community and attract residents and visitors. Creative placemaking heightens the quality of life in a community while revitalizing buildings and neighborhoods. Placemaking “...animates public and private spaces, rejuvenates structures and streetscapes, improves local business viability, safety, and brings diverse people to celebrate, inspire, and be inspired” (Gadwa Nicodemus, 2012).





SUSTAINABILITY

Carbon Neutrality

As climate change becomes the paramount environmental issue of this century, all communities will have a responsibility to reduce the amount of greenhouse gases released into the atmosphere. Additionally, economists expect that a carbon fee will be instituted in the next decade (IPCC, 2018; Ghilarducci, 2018). Some estimates price carbon at over \$5000 per metric ton, which would make any reliance on fossil fuels very expensive. Given the likelihood of carbon pricing, making the waterfront site carbon neutral is crucial in achieving positive revenue streams. There are two broad categories of action: reduced carbon emissions and carbon sequestration. Carbon reduction can be achieved through energy conservation by requiring good building insulation, solar orientation of buildings, amenities for bicycles, access to public transportation, use of renewable energy, and recycling of resources. Carbon sequestration is accomplished through vegetation and water systems. Vegetation might include vegetable gardens, roof plantings, wall plantings, greenways, a carbon forest, and an eco-bridge. Waterfront sites present unique opportunities to promote carbon sequestration through the inclusion of wetlands, rain gardens, detention ponds, and wildlife habitats (American Institute of Architects, 2018).

Water Neutrality

There are negative environmental, economic, and social

externalities to providing humans with water. Clean water is a limited resource; under future climate and population pressures it will become more scarce. Similar to the concept of 'carbon neutrality,' the idea of water neutrality is to reduce the water footprint of a community. Certain human activities use and pollute large quantities of water. Purifying, pumping and transporting water is energy intensive. Communities should reduce water waste, find alternative sources, and recycle as much water as is feasible (Hoakstra, 2008).

Case Study: Santa Monica Water Neutrality Ordinance

The city of Santa Monica is working to achieve water neutrality by 2020 through increased conservation and maximization of water-efficiency. The city will require all new developments to offset any water use above current use by paying for offsets elsewhere in the city. This translates to retrofits installed in development or elsewhere in the city. The city suggests design options including efficient fixtures, greywater systems, rainwater systems, blackwater systems, and municipal recycled non-potable water. The ordinance will apply to new developments, alterations of existing structures, or modifications to existing water-heavy uses (The City of Santa Monica, 2018).

Account for Natural Water Flows

Climate change is the most prevalent threat to our planet. It will affect populations in many ways including through sea level rise, temperature rise, and increased natural disasters such as flooding and hurricanes. For the Hastings-on-Hudson community, and the Hudson River region as a whole, this is a very real threat. According to the Scenic Hudson Sea Level Rise Mapper (Scenic Hudson, 2018), the sea will rise two and a half feet by the year 2100 if mankind does all it can to curb climate change. If rapid ice melting persists in the Arctic and Antarctica, the seas are projected to rise at least six feet by the year 2100. This projected rise combined with more powerful storms in the future could see even higher storm surges during those events. Whereas the Hastings-on-Hudson community is at a high elevation, the waterfront area is the most vulnerable to sea level rise and flooding in general. Plans for the waterfront site need to take sea level rise into account.

Ecosystem Services

Ecosystem services are the benefits humans receive from an intact and healthy ecosystem. Examples include production of food, clean air and water, protection against natural disasters including flood protection, support of nutrient cycles, regulation of climate, crop pollination, educational opportunities, and recreational activity. Design approaches include promoting both terrestrial and aquatic biodiversity, supporting native plant and animal species (including migratory birds and insects), supporting sustainable land use,

Case Study: Colombo, Sri Lanka

Colombo has received economic value for investment in ecosystem services. A wetland area in the city is calculated to be worth several thousand dollars per hectare for its protection of nearby settlements and industries from flooding.



Case Study: San Francisco Bay Living Shoreline: Nearshore Linkages Project

Located on the city of San Rafael shoreline, this project installed oyster reefs and eelgrass beds along the shoreline. The installation hoped to improve coastal health by reducing erosion and also improving the natural habitat for sealife and plants. Since the project's implementation in 2012, much has been learned in terms of design, implementation, and performance.

Photo: San Francisco Bay Living Shorelines Project



utilizing sustainable and green design, and sustainable use of natural resources.

Waterfront areas, regardless of their use, can incorporate many strategies to improve the natural ecosystem. Living Shorelines are a feature commonly used to support ecosystem services. Living shorelines can provide or restore a habitat for native species of animals and plants. They can also act as wave attenuators, which decrease the energy of wave action, in turn, decreasing erosion of the shoreline. These attenuators can come in the form of oyster reefs, marshes, riprap, and so on.

Resiliency

A resilient community is able to anticipate risk, minimize impact, and rapidly bounce back because it is adaptable in the face of turbulent change (CARRI, 2018). The capacity for resiliency is strengthened by diversity, modularity, tight feedbacks, social capital, innovation and design. Five principles to build for urban resilience include: "... multifunctionality, redundancy and modularization, (bio and social) diversity, multi-scale networks and connectivity, and adaptive planning and design" (Ahern, 2010). Strategies need to be identified that would protect roads, buildings and transportation infrastructure of the Hasting-on-Hudson waterfront.

To achieve a higher level of resilience and security of basic services, a guiding principle is to focus locally: utilize and

secure local resources, such as wind-generated electricity, groundwater, and local food as opposed to depending on nonrenewable resources or resources from far away (Resilient Design Institute, 2018). Another design guideline toward resiliency is redundancy. Redundancy is achieved when multiple systems or components provide similar or backup functions. Systems of communication, energy, transportation, and those that provide essential human needs such as food, water and shelter should be made redundant.

Because resiliency is a broad term and could include a multitude of concepts, the Studio settled on four areas to focus on:

Redundant systems are duplicated systems in which one can take over if the other fails. This creates reliability within the system where the second system can take over for the primary system without significant service compromise. *Diversity* is primarily biological, but can also mean variations of economy, design, form and structure. *Modularity* is the extent to which a system's elements can be taken apart and put back together, with the benefit of flexibility and variation of use. *Innovation and design* will focus on bringing new ideas or methods into the plan. It will also focus on the look and function of the plan.





COMMUNITY AND ECONOMIC DEVELOPMENT

Accommodates Projected Population Growth

It is important that plans for the Village of Hastings-on-Hudson consider the likelihood of a significant increase in population during the next 100 years, within the Village itself and in the surrounding Westchester County. According to American Community Survey data from 2016 and 2017, Westchester County's population is growing at a rate of 1.17%, which exceeds the growth rates of New York City and the United States, which are both at around 0.7%.

Westchester County is seeing significant population growth; as long as New York City continues to grow in population, Westchester County will grow as well. The critical shortage of adequate affordable housing in the city will put pressure on the surrounding communities in the New York metropolitan area to absorb some of the growing population. A 2017 report from the Regional Planning Association indicates that New York City's nearby suburban communities should focus on adding denser housing developments, especially near their commuter rail lines, in order to ensure New York City remains a strong and diverse economic hub that is accessible to people from varying socioeconomic backgrounds well into the future. (RPA, 2017).

While there will be high demand for housing in Hastings-on-Hudson over the next 100 years, certain factors will ultimately limit housing availability in the village and thus limit growth. The primary growth-limiting factor is the finite number of

vacant units and developable lots in the village, and existing Village-wide zoning codes which tend to favor single family dwellings. To develop this 100-year vision, the Studio has settled on the assumption that while there will be growth in population, that growth will ultimately be limited by housing supply. It is important to reiterate that given its proximity to New York City, demand for housing will likely increase over the 100 year timespan. According to the NYCEDC, Westchester County is the number one recipient county when examining net migration from New York City to counties outside the city limits. Table 1 shows the top ten recipient counties of outbound New York City migration from 2011-2015 (NYCEDC, 2018). The existing plans being evaluated should, therefore, include new housing.

Accommodates Changing Commercial and Residential Needs

Residential needs will likely change in the next 100 years. These changes should be reflected in the waterfront site redevelopment through diversity in housing stock and flexibility of commercial spaces.

Census data has shown a decline in the average number of people per household over the past few decades (U.S. Census). Women are also having children later in life in the United States compared to previous generations. Both of these trends could mean that there will be increased demand for a more diverse housing stock that reflects more diverse household

State	County	Net Annual Migration from NYC
New York	Westchester	6,713
New York	Nassau	4,901
New Jersey	Hudson	3,641
California	Los Angeles	2,949
Florida	Broward	2,834
New Jersey	Essex	2,599
Connecticut	Fairfield	2,573
Florida	Palm Beach	1,924
Florida	Miami-Dade	1,581
New York	Broome	1,552

Table 1 Net migration figured from NYC to outside counties 2011-2015, (US Census Bureau ACS)

compositions (Bui, 2018). The current housing stock of Hastings-on-Hudson is predominantly comprised of single-family detached homes. In order for the plans to age well, any new housing developments should offer more diverse options than the existing housing stock in Hastings-on-Hudson.

Based on available data, there is also reason to believe that commercial uses will change in 100 years. In New York City, retailers with brick and mortar establishments are finding it more difficult to remain open, likely due to increased reliance

on online retail. The plan should include flexible commercial space, so that uses can change over time if needed (Hughes, 2017).

Accommodates Telecommuting Trends

National trends in commuter behaviors indicate that more workers are exploring telecommuting options. Increased telecommuting can impact both land use and community needs. An increase in the number of Hastings-on-Hudson residents working from home is already evident in recent years, with an increase of slightly over 5% in the Village from 2012 to 2016. A Gallup poll has revealed that the number of telecommuting workers has increased nationwide by 4% from 2012 to 2017. With technological improvements that will facilitate telecommuting even more in the future, the upward trend is expected to continue (Chokshi, 2017). The plans should acknowledge that commuting trends will continue to change in the next 100 years. While the Metro North will remain a vital lifeline for the workers living in Hastings-on-Hudson, the waterfront site should have the potential to accommodate the increased number of workers who choose to remain in the village during the week due to changes in workplace culture and advancements in telecommuting technologies (Caramella, 2017.)

The Site is Tax Revenue Positive

The industrial waterfront site in Hastings-on-Hudson was tax-

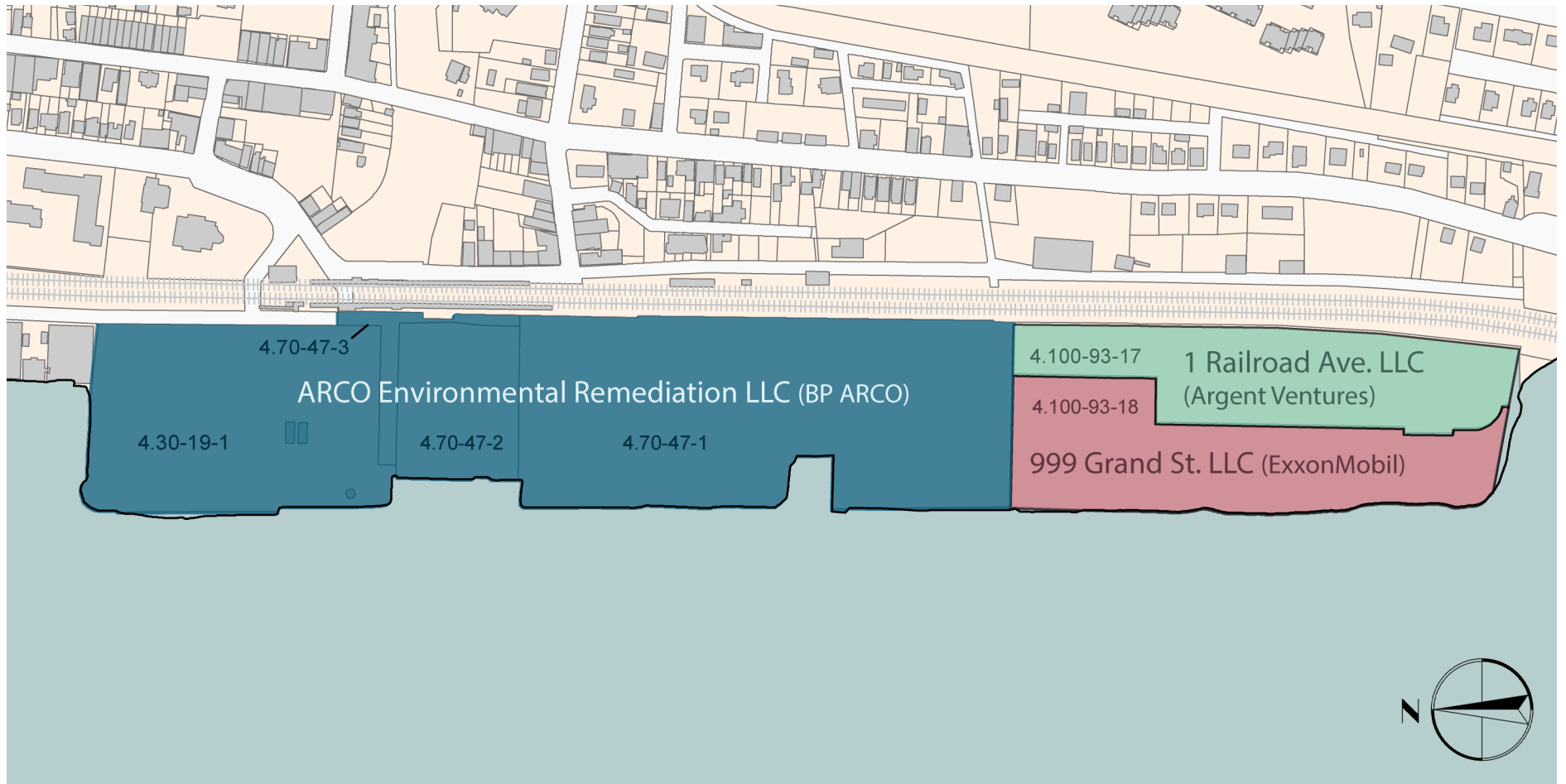


Figure 9: Waterfront Tax Lots and Ownership (Town of Greenburgh Tax Assessment Rolls, 2018)

revenue positive until Anaconda Wire and Cable Company closed its operations in the 1970s. In the 40 years since, the site has not fulfilled its highest and best use, and the Village has not received the maximum potential tax revenue from the parcels on the waterfront. In 100 years, onsite uses should provide positive yearly tax revenue for the Village to avoid the waterfront being a drain on the Village's resources.

Table 6b.3 shows the land assessment, total assessment and tax revenue generated by the waterfront sites in 2016, after the Town of Greenburgh implemented a revaluation and reassessment of property taxes. All assessment information is publicly provided by the Town of Greenburgh. Figure 6b shows the location of all tax parcels.

Using the 2016 assessment values, the three owners of these sites generated a total of \$102,261.60 in taxes for fiscal year 2017/2018. The assessment of all property in the Village that year was over \$1.7 billion, and the Village's proposed 2017-2018 budget reported that property tax revenue totaled \$10,796,010. The waterfront, therefore, produced only 0.95% of the Village's property tax revenue. By contrast, Anaconda Wire and Cable Company accounted for 10% of the local tax base in 1978, three years after it had shuttered its facility (Melvin, 1978). At that time, the company's parcel on the waterfront was taxed at twice the rate of residential property in the Village (Melvin, 1978).

Any improvements on the site after remediation has been completed will increase the assessed value of the property. Residential and commercial uses will generate more tax revenue, while community facility and park uses will carry upkeep costs and likely will not produce any tax revenue from the site itself. Even if community-benefit facilities are privately-owned and operated, the private owners would likely be able to claim tax subsidies which could offset tax-positive uses on the site. Therefore, any public access to the waterfront - whether publicly or privately owned and operated - will diminish the tax revenue generated thereon. In order to estimate potential tax revenue generated by different types of development on the waterfront parcels, the Studio drew from comparative sites within Hastings-on-Hudson.

Revenue generation from private development:

- Residential Comparison:

The multi-family residential buildings at 765 N Broadway are an appropriate comparison for this project. The complex is quite close to the waterfront, and the units have a cooperative ownership structure. The 87 units are on one tax parcel with an area of about 217,000 sf. The 2016 Land Assessment for the parcel was \$1,800,000, and the Total Assessment was \$9,089,800, meaning that the improvements on the site increased its taxable value by 405%. The Studio used this increment when estimating



Owner	Tax Parcel	Acres	2016 Land Assessment	2016 Total Assessment	2016 Tax Revenue*
ARCO Environmental Remediation LLC (northern $\frac{2}{3}$ of waterfront)	4.30-19-1	10.67	\$3,500,300	\$3,804,200**	\$23,716.90
	4.70-47-1	14.8	\$4,672,500	\$5,272,100	\$32,868.37
	4.70-47-2	3	\$1,275,000	\$1,413,300	\$8,811.08
	4.70-47-3	0.46	\$34,500	\$34,500	\$215.09
999 Grand St. LLC (southwest corner of waterfront)	4.100-93-18	8.13	\$4,884,800	\$4,884,800	\$30,453.79
1 Railroad Avenue Ventures LLC (southeast corner of waterfront)	4.100-93-17***	6.37	\$944,400	\$989,500	\$6,168.94
	4.100-93-2	0.05	\$4,400	\$4,400	\$27.43
Total	7 parcels	43.48	\$15,315,900	\$16,402,800	\$102,261.60

Table 2 Waterfront Tax Parcel Assessment

*Calculating tax revenue. Tax rate is \$6.234399 per \$1,000 of total assessed value.

**In 2016, there was a structure on this site that increased the total assessed value. The structure has since been demolished, and the total assessment now equals the land assessment.

***It appears there was a mistake in the assessment for this parcel in 2016. The assessed value was \$6,222,900. It was adjusted in more recent assessments to a more reasonable value, less than \$1 million. Therefore, this calculation uses the 2019 assessed value according to the Town of Greenburgh Assessor's Office.

potential revenue generated from residential development on the waterfront parcels.

- Commercial Comparison:

Office only: 615 Broadway (tax parcel 4.30-23-4). 2016 Land Assessment: \$857,500; 2016 Total Assessment: \$1,786,600. Increment of 108%.

Grocery store: 87 Main St (Foodtown) (tax parcel 4.40-44-1). 2016 Land Assessment: \$1,817,400; 2016 Total Assessment: \$7,087,300. Increment of 290%.

These comparison parcels are not equivalent with the waterfront parcels, but they can provide a guide to determining the tax revenue generated by improvements on the land. For example, while office buildings may increase taxable value by 100%, residential land uses can provide much higher assessed value, and therefore higher tax revenue for the Village.

Costs Associated with Private Development:

In addition to the potential revenue generated through property taxes on waterfront developments, the Village should also consider the costs of private development. Private development would limit public accessibility of the waterfront, which could otherwise be a public park that utilizes the space for recreation and community gathering. Although a developer who builds market-rate housing or

mixed use projects could also fund some public amenities through Community Benefit Agreements, the Village and residents would have little control over them. In addition, the Village should consider additional costs for services provision to business owners and residents on-site.

100-Year Revenue Outlook:

There are other potential sources of revenue that the Village should consider. It is likely that, once environmental remediation of the waterfront is complete, the property value and tax revenue of nearby homes and businesses will increase. Parkland and other amenities will boost property values in the surrounding area. Similarly, there are potential sources of cost savings that could be significant for the Village in 100 years. Carbon-neutral, energy efficient and resilient infrastructure and services will save the Village money not only during recovery from extreme weather events, but in scenarios where there is a high tax on carbon or penalties for systems that do not meet minimum standards of resiliency. In addition, utilities could have a very different cost structure in 100 years due to resource scarcity; microgrids and onsite water purification could help the Village save on utility costs. If the Village wishes to avoid the waterfront being an economic burden, it will be more cost-efficient to focus on building sustainable infrastructure than later defending conventional buildings against the effects of climate change.



The Site Generates Economic Activity for the Village and its Residents

Currently, the Village's downtown provides a base of economic activity, with small shops and restaurants that serve local residents. However, the vitality of Hastings-on-Hudson's downtown is hampered by physical isolation from other parts of the Village. The steep elevation changes down toward the waterfront and the multi-lane, fast-moving traffic on Broadway make it difficult for residents to safely and conveniently access downtown, especially on foot. In 100 years, this could change: more points of access to downtown, adequate sidewalks and crosswalks throughout the Village, and a robust mixed-use and light industrial sector would support economic activity within the Village. The waterfront could play an important role in encouraging economic activity by drawing people toward downtown retail and events. In addition, a waterfront that serves as a regional destination would draw tourists, who could further support business and industry in downtown Hastings-on-Hudson.

By developing the waterfront, a new mixed-use district could be created with a chance to connect to the existing downtown. The northern part of the waterfront site is close in proximity and has both pedestrian and vehicular access to downtown: this area has the greatest potential to support a corridor of economic activity in combination with existing downtown activity. Southside Avenue, which turns into

Railroad Avenue, runs along the east side of the train tracks and provides additional development potential. While the land between the tracks and the road is owned by the railroad company and therefore not developable, the land to the east of this road has potential for increased economic activity. It is zoned variously commercial, residential, and limited industry, and some of the parcels are vacant, Village-owned, or both; this corridor could support mixed-use development that is beneficial to the Village economy.

Any generated activities on the waterfront site should take into account wider Village economic activity, and complement its downtown rather than compete with it. The developed waterfront should provide good circulation and walkability, diverse recreational and cultural opportunities, and on-site commercial amenities that will support the economic viability of the Village. As detailed in the 2011 Comprehensive Plan, the core economic markets in the waterfront could be created through form-based zoning codes, permitting, regulations, and public infrastructure developments that lead to economically-supportive development.





TRANSPORTATION

Village Connectivity

The site's location adjacent to a Metro North train station, beyond which lies the village, presents an opportunity to establish direct connections between the village and the waterfront that leverages their proximity to existing transportation networks. Transportation systems on and adjacent to the site should maximize the quality and quantity of connections between the village and the waterfront, including public transit, streets, bicycle paths and sidewalks. This requires overcoming specific physical barriers between the site and the uplands - namely, spanning the train tracks. Commuter rail and freight service on the Hudson line as well as local thoroughfares are assumed to remain in operation for the 100-year study period, though technological changes may be implemented that affect their physical characteristics or level of service. Additionally, it is crucial that the new and updated transportation infrastructure can accommodate safe and efficient circulation of people and services between the waterfront site and the rest of the village, while discouraging both vehicular through-traffic and increased congestion around the train station.

Regional Connectivity

Major regional transportation routes through Hastings-on-Hudson are long-established and projected to last through the 100-year study period. However, consistent with the Studio's sustainability criteria, redundancy in



Case Study: Olympic Sculpture Park, Seattle, Washington.

The Seattle Art Museum transformed a former industrial site, separated from the waterfront by transportation infrastructure, into the largest green space in downtown Seattle. Through innovative architecture and landscape design, the park's green paths zig-zag over a four-lane road, freight rail tracks, and down forty feet to the Elliot Bay waterfront (Seattle Art Museum, 2017). The park features sculptures, an amphitheater, pavilion, access to the Elliot Bay Trail and views across the Bay to the Olympic Mountains.

Photo: Olympic Sculpture Park, Weiss/Manfredi

transportation systems is also advisable for the waterfront site. While the Studio assumes the continuation and potential expansion of the Metro North commuter rail service and Amtrak, new transportation options for travel in between Hastings-on-Hudson and other regional destinations may become available. Ferry service would provide another regional transportation option to those traveling along the Hudson River corridor, and the waterfront site would be an ideal location for a future ferry terminal. Other regional transportation systems relevant to the waterfront are potential bus rapid transit service and the planned Westchester RiverWalk trail, proposed by the Westchester Planning Department. This multipurpose trail already passes through Hastings-on-Hudson via the Croton Aqueduct trail, to which

Case Study: NYC Ferry

When Hurricane Sandy took major subway routes out of service in New York City, commuters in the outer boroughs turned to ferry service to get to work in Manhattan. An emergency ferry service was introduced between the Rockaways and lower Manhattan due to damage to the area's only subway line, which led to a permanent ferry route that launched in 2017. Redundant transportation systems (and the flexibility of ferry routes) helped keep the city moving and even changed some commuter behaviors (NYCEDC, 2013).

an extension is proposed through the future waterfront site (Westchester County Government, 2018). Accommodating this extension will improve accessibility between the Village and locations along the regional trail and draw visitors to the Village waterfront.

Multimodality

Transportation planning has increasingly shifted its focus from automobility to a multimodal approach. In a 2014 study, the National Center for Transit Research emphasized that multimodal transportation models should provide for and promote “public transportation, bicycle and pedestrian travel...improving accessibility and connectivity between modes (transit stations, intermodal terminals, bicycle and pedestrian facilities), and coordination with land use” (FDOT, 2014). Hastings-on-Hudson has already made strides in this direction with the Complete Streets Policy (Resolution 55:14) adopted in 2014. Multimodal systems give people the option to choose their mode of transportation and are consistent with basic principles of transit-oriented development (TOD). TOD calls for multimodal elements including prioritization of pedestrian access and reducing parking within close proximity to the station (TOD Institute, 2018). These principles are echoed by the RPA Fourth Regional Plan and should be applied to the waterfront site and other areas adjacent to the train station. In the long term, the site's transportation network should include flexible elements to help the village



as a whole adapt to regulatory, physical and technological changes, and not assume the continuation of contemporary auto-dominated transportation systems.

Circulation Within Site

The waterfront is a relatively large area that should contain multiple uses that accommodate different groups of people; there is a need to establish an organized transportation network within the site. Once on the site, people should not

only be able but be encouraged to navigate the recreational and commercial spaces on foot, placing other modes of transportation secondary to pedestrian access. Vehicular access should be limited to areas with appropriate land use for this mode of transportation and excluded from others. Through-traffic should be limited to emergency service vehicles and passenger pick-ups and drop-offs in order to emphasize walking, biking and other alternative and sustainable modes of transportation. Visitors and residents should be able to access the public aspects of the site freely without being impeded by or encroaching on private property, while private property on the site should be clearly private without encroaching on public space or the perception of encroaching on public space. A clear and accessible internal circulation network will be an important aspect of achieving this and maximizing the ability for both public and private parties to use the site.

Technology for the Future of Transportation

The arrival of innovations in transportation technology is dependent on factors such as cost, value of time, private sector innovation and consumer preferences. This contributes to a large range of possibilities for the 100-year vision for transportation in Hastings-on-Hudson, whether shared mobility, connected vehicles, automated vehicles or other innovations reach the market in the next few decades or not. Regardless, some municipalities are invested in being on the



Case Study: Boston Mobility MicroHUBs

The city of Boston is developing “mobility microHUBs” at transit stations and popular destinations. The microHUBs are “designed to provide and identify a range of connected travel choices” through informational kiosks, designated pickup/dropoff locations, free wifi, and other technology (Boston Department of Transportation, 2017).

Photo: Go Boston 2030

cutting edge of transportation technology. By 2018, twenty-six states and forty-five cities were already implementing pilot road technologies for connected vehicles, which allow vehicles to transmit data through roadway networks (Innovation and America's Infrastructure, 2018). Hastings-on-Hudson's waterfront site, as a blank slate, presents an opportunity to avoid the cost of future retrofits for this technology by anticipating these future needs and taking steps to ensure that the site is prepared for physical changes.

Case Study: Brooklyn Bridge Park

Brooklyn Bridge Park, a 1.3 mile linear waterfront park, is primarily accessible to pedestrians and bicyclists. Limited parking is available in the park itself, and visitors are encouraged to use alternative forms of transportation (Brooklyn Bridge Park, 2018). The reduction in surface parking also leaves more open space for vegetation and programming. The site's residential developments are concentrated in a few multifamily buildings dispersed along the site, which separates the transportation activities generated by these sites from the rest of the park. Emergency vehicles can still navigate the park via the pedestrian and bicycle Greenway that runs along the entire length of the park, which has a sufficient width to accommodate these vehicles.



PLACEMAKING

Village Identity-Hastings

Hastings-on-Hudson is one of several river towns along the Hudson River seeking to express its identity in the built environment. Students in Hastings High School stated that the Village's location, natural environment and its small community are some of the characteristics that make it unique. It is important to take into consideration the Village's current assets and realize place-based strategies suitable to the community while showcasing the character of Hastings-on-Hudson. The waterfront site has primarily been used for industrial purposes in the past, which helped shape the history of the Village. As change occurs on the site, the sense of community identity and character should never be lost. There are many ways to express identity in building design, art, wayfinding signs, material usage, and function while preserving historical character. Village identity helps to define a community, which can be used to attract visitors to the area.

Aging in Place

Aging in place refers to the ability for people to remain in their homes or communities throughout all stages of life. The average American had moved 11.2 times in their lifetime as of 2016 (Ihrke, 2017). 48% of moves made by Americans are directly related to housing itself, either downsizing, upsizing, or moving from renting to owning (Ihrke, 2017). When a variety of housing types that meet the needs of all stages of life are provided, transitional stages of life are



Case Study: Bethlehem, Pennsylvania

The Steelstacks in Bethlehem, PA is a former steel operations plant located on the Lehigh River in the South Side Historic District. This once heavily industrialized 1,800-acre site now features a variety of activities and events, from concerts to festivals, while providing the local area with amenities such as a movie theater and art gallery (National Council of the Arts, 2012). The Steelstacks show how a once industrial site can be repurposed and successful while not forgetting about its influential industrial past.

Photo: SteelStacks Arts & Cultural Campus (American Society of Landscape Architects)

better accommodated, allowing residents in those stages to remain in their communities. Placemaking efforts, including the provision of varied housing, can lower the number and distance of required moves, fostering the creation of a community that can grow together.

Connectivity of People to People

In order to encourage a deeper connection to Hastings-on-Hudson, the site must assist people in developing connections to one another. These relationships can be encouraged through design and amenities on the site. This includes recreational amenities, in the form of facilities and equipment provided for active engagement and competition between people for guided activity. Sports fields were among the most commonly requested amenities for the waterfront site in the Hastings High School survey, which would align with this purpose. The site design should encourage community gatherings by providing community centers and other spaces to hold formal and informal events. Spaces should also be flexible to encourage the highest usability and allow people who share similar interests to come together and connect. Since the climate in Hastings-on-Hudson is characterized by hot and humid summers and mild to cold winters, space should be maximized to have uses in all weather conditions. Mixed use, walkable development, especially for those living directly on the site, will encourage interpersonal connection just as much as designated community space.

Connectivity of People to Natural Environment

The waterfront site should focus on preserving sections of the property as open space areas for residents to enjoy. Natural environments affect human health and well-being directly by offering spaces for social interactions and tackling health risks caused by chronic stress, physical inactivity, and lack of social cohesion (Van den Bosch, 2017). Facilities for environmental education could be placed on site, hosting workshops for local schools and other community groups. Signs identifying animal and plant species native to the area along trails could provide passive enrichment to all who pass through the site. The opportunity to enjoy the site and its natural features should be available for both residents and visitors. Site plans should look into reactivating the Hudson River for water recreational activities, featuring a mix of land uses with both active and passive space.

Non-Exclusionary Public Space

To promote the use of the site by the whole Hastings-on-Hudson community, uses with high barriers to participation or exclusive associations should not be prominent. Public spaces “...produced and managed by narrow interests... are bound to become exclusive places” (Madanipour, 2010), so flexible-use spaces that can accommodate a variety of activities should be prioritized. The inclusion of non-commercial enrichment on the site would allow participation regardless of income level, while providing attractions that reinforce



Case Study: Providence, Rhode Island

Providence, Rhode Island revitalized its downtown area through unique uses of its rivers at Waterplace Park and Riverwalk. The park and river-adjacent pedestrian walkway were vital to the revitalization of Providence, featuring a collection of cobblestone paths, plazas, pedestrian bridges, and gondolas inspired by Venice (American Planning Association, 2008). The city partnered with non-profit arts organization WaterFire to install recurring fire installations which have attracted millions of a visitors to Downtown Providence (Waterfire, 2017).

Photo: WaterFire in Providence (waterfire.org)

existing economic activity on the site.

Integration of public and private uses can enhance both, but public space on the site must not be subordinate to private uses. Boundaries between public and private spaces must be sufficiently delineated, as the quality of a public space “... depend[s] on how it is distinguished from the private sphere” (Madanipour, 2010). With the assertion of the accessibility of public space through clear distinctions between public and private uses, high-quality inclusive public spaces can be created onsite.

Hostile architecture is the inclusion of design features specifically meant to prevent or discourage particular uses of space, like spikes on ledges to prevent sitting. Hostile design features antagonize the most vulnerable and create an adversarial relationship between a space and those in it (Petty, 2016). To create and maintain a feeling of inclusive and truly public space, the waterfront should be free of hostile architectural features.







	Fostering Resilient Ecological Development Ennead, 2018	Conceptual Shoreline Design Report Roux Associates, 2018
 Sustainability		
Carbon Neutrality	3	N/A
Water Neutrality	1	N/A
Accounts for Natural Water Flows	3	1
Ecosystem Services	3	3
Resiliency	3	2
 Community & Economic Development		
The Site Plan Accommodates Projected Population Growth	3	N/A
The Site Plan Accommodates Changing Commercial and Residential Needs	3	N/A
The Site Plan Accommodates Telecommuting Trends	3	N/A
The Site is Revenue Positive	3	2
The Site Generates Economic Activity for the Village and its Residents	3	2
 Transportation		
Village Connectivity	3	1
Regional Connectivity	2	1
Multimodality	2	1
Promotes Good Circulation Within the Site	2	1
Promotes Infrastructure for the Future of Mobility	N/A	N/A
 Placemaking		
Village Identity of Hastings-on-Hudson	3	2
Aging in Place	3	N/A
Connectivity of People to People	2	3
Connectivity of People to the Natural Environment	3	3
Non-Exclusionary Public Spaces	2	2

Table 3: Analysis of Existing Waterfront Plans

EXISTING PLAN ANALYSIS

To bolster the priority opportunity areas in the context of the 100-year timeframe, the Studio applied the criteria developed for the four opportunity areas to two existing plans. The first plan, *Fostering Resilient Ecological Development*, was produced by Ennead Architects in 2018. The second plan, *Conceptual Shoreline Design Report*, was produced by Roux Associates in the same year.

The plans are both conceptual in nature. The Studio selected these two plans for their strong analyses, clarity in messaging, level of detail, and for their recent publication dates. These attributes made them good candidates upon which to test and refine the criteria for Sustainability, Community & Economic Development, Transportation, and Placemaking.

Results of the Studio's analysis are summarized in Table 3. Scores were applied based on the level to which the plan's relevant elements were expected to fare in the future envisioned by the Studio. Both plans showed many strengths, but some weaknesses. The Plan proposed by the Studio seeks to address these weaknesses.

Details of the analysis and explanations for the ratings are in the Appendix.



Figure 10 Site Plans by Ennead Architects (top) and Roux Associates.

ANALYSIS





Figure 11: Village District Analysis Map (Westchester County Geographic Information Systems)

VILLAGE ANALYSIS

In order to better understand how the site and its redevelopment might impact the Village of Hastings-on-Hudson in the next 100 years, the Studio examined how the present Village functions as a whole. This analysis focuses on differentiating key village-wide districts, as well as identifying circulation paths and barriers.

Village District Analysis

As shown in figure 11, the analysis revealed eight major categories of land use, or “districts.” The districts are categorized as:

- Industrial
- Riverview Residential
- Upland Residential
- Institutional
- Ball Fields
- Downtown
- Parks
- Forest/Undeveloped

The waterfront site is located within the Industrial District. As previously mentioned, Hastings-on-Hudson has a rich industrial history which dominated the identity of the waterfront and the Village itself for decades. The Industrial District will see the most direct and drastic transformation as a result of waterfront redevelopment.

The analysis shows that the majority of the Village is residential. The Studio divided areas with residential character into two districts, Riverview Residential and Upland Residential. These two districts are differentiated by land-use patterns, topographies, and their relationships with the waterfront. Residents in these two districts may have different concerns surrounding the waterfront redevelopment and its impact on their lives and property.

Schools make up a large portion of land in the Village, leading the Studio to designate an Institutional district category. The Institutional district at the southern end of the Village analysis map is comprised of the Ziccolella Elementary School, Martin Luther King Jr. High School and the Orchard School. The Institutional district at the center of the analysis map includes Hillside Elementary School, Farragut Middle School, and Hastings High School.

Adjacent to the northern Institutional district is an area referred to in this analysis as the Ball Fields district. Although the sports fields therein are owned by Village schools, the Studio made the decision to distinguish the Ball Fields district from the Institutional districts. The Ball Fields district is a large area near the center of the village, situated on main local thoroughfares. The significance of the Ball Fields to the Plan will be highlighted in greater detail later in the report.

The Downtown district contains the majority of the Village’s commercial development. Mixed-use, retail, and office

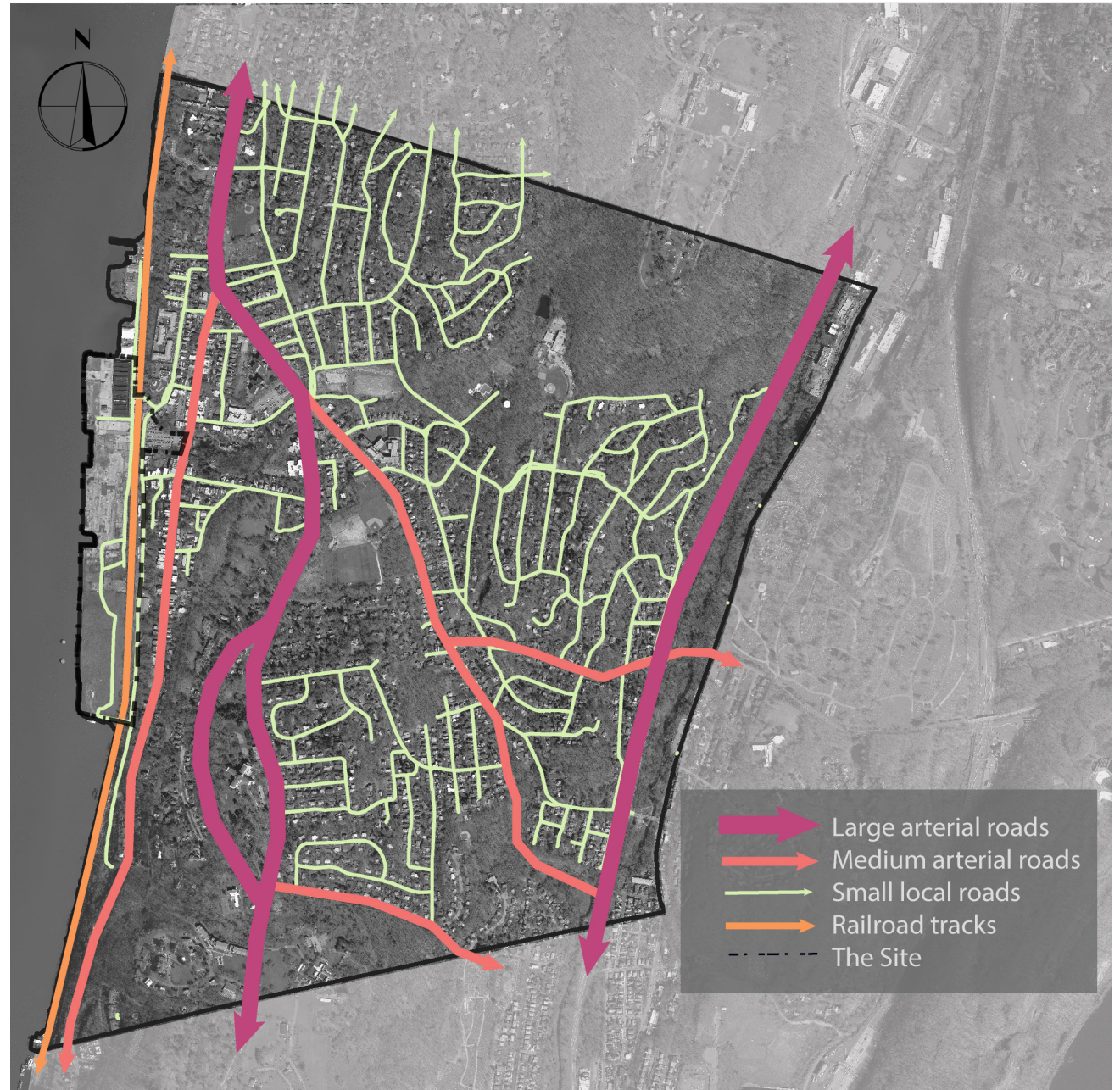


Figure 12: Village Circulation Map (Westchester County Geographic Information Systems)

buildings are concentrated in this district. The Downtown district is relatively dense compared to the residential districts, which primarily feature single family detached houses.

Two significant districts in the analysis are categorized as Parks. These districts encompass Hillside Park in the northeast and Draper park located near the Ball Fields. While there are additional parks within the Village, these two parks in particular stood out based on their sizes and locations.

The final district category is Forest/Undeveloped. One of the two Forest/Undeveloped districts can be found in the southwest corner of the Village, and is known as Lenoir Preserve. This preserved land will likely not be developed. The second Forest/Undeveloped district runs between the Saw Mill River Parkway and Saw Mill River Road. The Town of Greenburgh has identified this relatively undeveloped corridor as a potential hotspot for new development projects in the coming years. Within this district is a relatively new, 66-unit luxury housing development (Cary, 2015). In 2016, a plan for 272-unit housing development in this undeveloped corridor was shelved due to overwhelming backlash from Ardsley community members (Matsuda, 2016).

Village Circulation and Barrier Analysis

The circulation analysis revealed three categories of roadway in the Village carrying large, moderate, and small volumes of vehicular traffic. The larger arterial roadways in the Village

run north and south, while the majority of east and west vehicular movement is done on small local roads. While pedestrians are allowed to cross all of the main arterial roads in the village besides the Saw Mill River Parkway, the highly trafficked arterials serve as a barrier to pedestrian access from the Upland Residential district to the rest of the village.

Three east and west oriented roads, North Street, Spring Street, and Washington Avenue, enable vehicular access to the industrial zone along the waterfront. Just one road, West Main Street, allows vehicular traffic to enter the Site itself.

The Metro North Railroad tracks, running north and south, are a major component in the Village's circulation. The tracks create the single most significant barrier between the village and the waterfront, blocking the entire length of the waterfront with only one vehicular road and one pedestrian bridge providing access across.

The abrupt elevation changes throughout the village impact circulation as well, especially for pedestrians travelling from east to west, as the steep incline can be challenging to navigate (see Figure 14). Some of the most abrupt changes in elevation occur where the easternmost side of the industrial zone meets the rest of the village. There are several staircases built into the land formations as a means to address this hindrance to pedestrian movement.

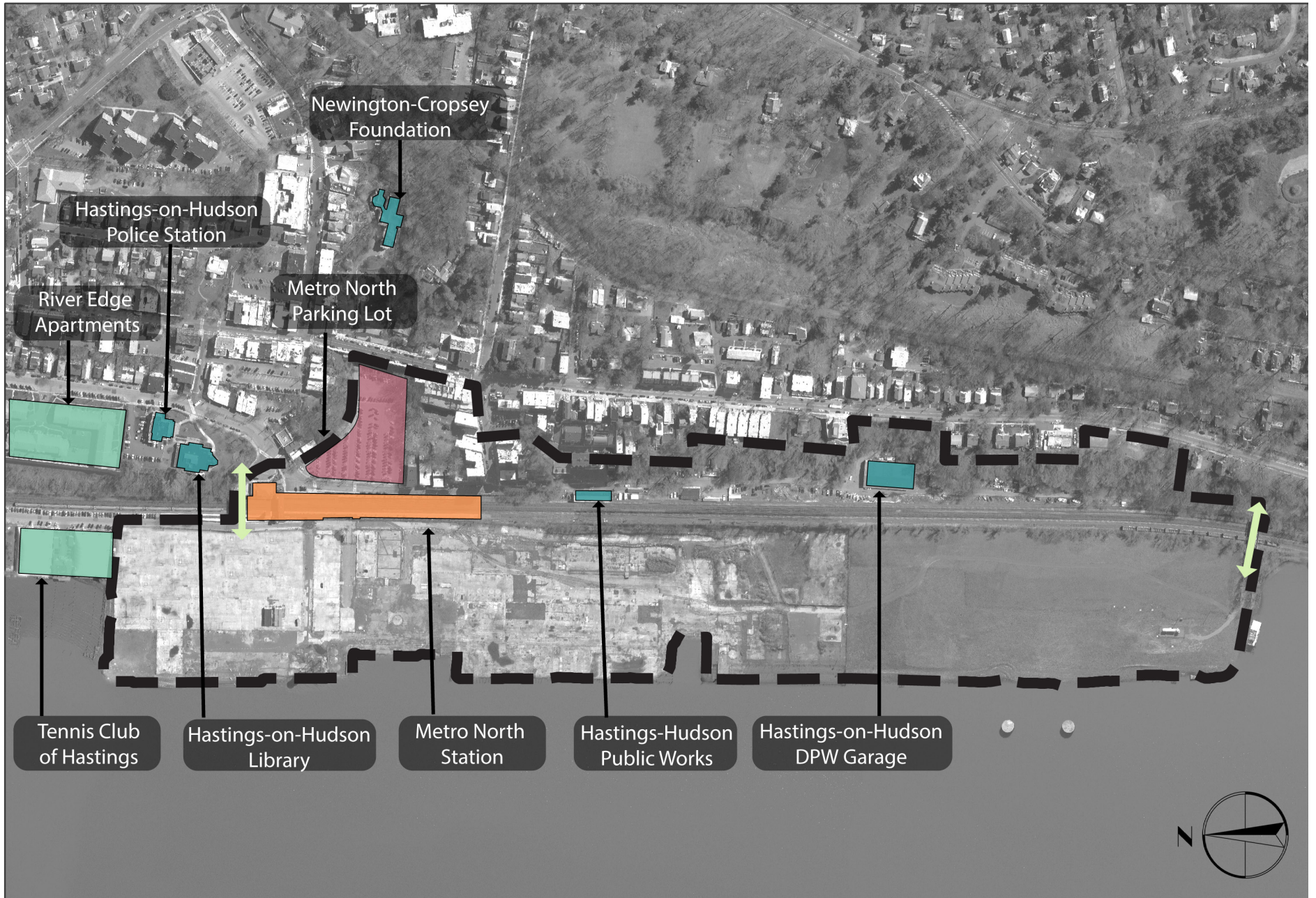


Figure 13: Site Analysis (Westchester County Geographic Information Systems)

SITE ANALYSIS

Currently, the 42-acre waterfront property is zoned for General Industrial, a reminder of past onsite manufacturing and fuel-storage which led to major contamination along the waterfront. Extensive remediation efforts and monitoring are needed before development can occur. Today, the Village of Hastings-on-Hudson's Waterfront Rezoning Committee is in the process of creating new zoning for the site so that the land can once again be utilized to the benefit of the Village.

The waterfront site is located to the west of the Metro-North train tracks. One bridge north of the train station provides the only point of access over the tracks between West Main Street and River Street. A pedestrian bridge connecting Southside/Railroad Avenues to the southern section of the site is in poor condition and can no longer accommodate vehicular traffic. These access points would be insufficient to support future development on the waterfront.

After analysis of FEMA flood maps and available data pertaining to climate change, the elevation of the site became a point of concern. Flooding will occur on the site over the next 100 years if current environmental conditions are not addressed; mitigation strategies should be incorporated into the site design.

The location of the Village along the Hudson River provides residents with incredible views of the Palisades. Village residents take pride in the viewsheds found in the village and express concerns about protecting these views from future

development. The 2015 Waterfront Infrastructure Committee Plan and modifications to the Consent Decree provide guidelines for building height standards and development locations on the site. It should be noted that Hastings-on-Hudson's unique topography sets the Village at significantly higher elevations than what is found on the waterfront.

To the east of the train tracks on Southside Avenue is the parking lot for the Metro-North station. The parking lot covers a stream that could be daylighted and connected to the Hudson River through the waterfront site.

The Studio sees the Metro-North parking lot as an area in downtown Hastings-on-Hudson that can be repurposed in the future, particularly considering ongoing advancements in autonomous vehicle technology. Parking for these vehicles will be provided by smaller, less centrally-located facilities than those that serve current automobiles. Parking schemes have already been devised for autonomous vehicles that decrease required parking space "...by an average of 62% and a maximum of 87%" (Nourinejad et al., 2018) relative to conventional lots. Lots for autonomous vehicles need not be adjacent to or even near their passengers' destinations (Ferreira et al., 2014), liberating downtown properties for better uses and allowing parking to activate underutilized plots outside the central core. Land currently used as parking in Hastings-on-Hudson could serve higher purposes in the future as a result of these advances.

Southside Avenue, where the parking lot is located, is mainly comprised of auto body garages and Department of Public Works facilities. The Studio views this street as a key opportunity for revitalization and enhancement in relation to the waterfront site. Southside Avenue presents a link to the area just outside the waterfront and provides access into the site through a pedestrian bridge connecting to the southern portion of the property.

There are several key sites adjacent to the Hastings-on-Hudson Waterfront, shown in Figure 13. The Village's public library and police station are on Maple Avenue, just over 500 feet from the Metro-North station. The space between the two public facilities is used to host the Village's farmers market. Further north on Maple Avenue are the River Edge at Hastings apartments, home to 113 luxury garden-style co-ops. North of the waterfront site is the Tennis Club of Hastings, which is enclosed in a dome during winter months. The site is also adjacent to the Metro-North station, which serves the Hudson Line that runs from Grand Central Terminal to Poughkeepsie, and is a main source of transportation for many Village residents. Just behind the parking lot is the Newington Cropsey Foundation which is home to an art gallery that has been listed on the National Register of Historic Homes since the 1970s (Newington Cropsey Foundation, 2018). Along Southside Avenue is the Hastings-on-Hudson's Public Works building and garage.

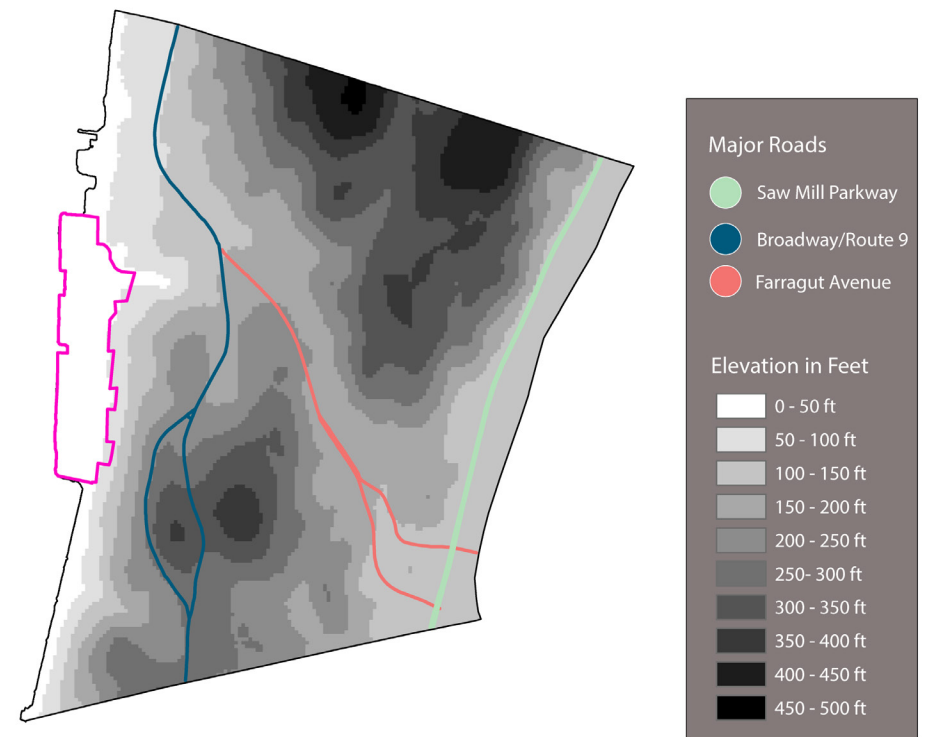


Figure 14: Topographic Map of Hastings-on-Hudson (Westchester County Geographic Information Systems)

POPULATION PROJECTIONS

The following two sections encompass the Studio's population projection for Hastings-on-Hudson in 100 years. The first section focuses on the vacant and underutilized lots in the Village excluding the Plan Area. The second section is more prescriptive, and includes our recommendation for the ideal range of additional housing units that should be built within the Plan area. The recommendation is based on the research outlined in the *Methods* section of this report.

Population Growth in Hastings-on-Hudson (Excluding the Plan Area)

The Studio assumes that future population growth within Hastings-on-Hudson will be limited by the availability of additional housing on vacant land. The 2012-2016 American Community Survey estimated 3,121 housing units in the Village overall; most of these units were single-family homes, while 730 units were in higher-density buildings according to 2009 land use data. We assume that all of the parcels currently in use as single-family residences will remain so in 100 years, and all of the multi-family parcels will likewise have the same number of units in 100 years. Therefore, future population growth will hinge on the development of vacant or underutilized lots in the Village. We model the build-out of these lots in two ways. First, we assume the build-out of all vacant lots at their current zoning. Second, we assume the build-out of current residentially-zoned parking lots.

Build-out of Residential Vacant Lots

This study utilizes land use data from 2009, the most recent publicly available data from Westchester County. In that year, there were 242 vacant lots. The number of lots and acreage per type of zoning district is shown in Table 4 and in Figure 15.

Zoning District	Number of Vacant Lots	Total Acreage of Vacant Lots per Zoning District
Central Commercial	6	0.456
General Industry	5	29.688
Limited Industry	3	0.993
Marine Waterfront	1	0.522
Mixed Use Planned Development	2	6.221
Multi-Family Residence	8	3.240
Multi-Family Residence/Commercial	2	0.243
Multi-Family Residence/Office	2	0.240
One-Family Residence	183	37.852
Public Park, Recreation and Playground	2	0.130
Two Family Residence	23	1.633
Multiple	5	0.553
Grand Total	242	81.772

Table 4: 2009 Land Use Data (Westchester County Data Download)



Figure 15: Vacant Residential Land and Parking Lots (Westchester County Geographic Information Systems)

To conduct the analysis, the Studio eliminated lots within the Plan Area as well as lots in the following non-residential zoning districts:

- Central Commercial
- General Industry
- Limited Industry
- Marine Waterfront
- Public Park, Recreation and Playground
- Multiple Zoning Districts (lot spans the boundary between two different zoning districts)

The remaining vacant lots were analyzed to estimate the number of additional housing units Hastings-on-Hudson will have in 100 years. Lots in one- or two-family residential zoning districts will be built out pursuant to zoning; they likely will not be developed for multi-family housing. Vacant lots in mixed-use or multi-family residential zoning districts, on the other hand, will be able to support more housing units. We analyzed the actual number of housing units in current high-density developments to estimate the average number of units per acre in Hastings-on-Hudson: 57.615 units per acre. The calculation and reasoning can be found in the Appendix. Tables 5 and 6 show the estimated additional housing units on vacant lots.

In total, we estimate that there will be ~802 additional housing units in Hastings-on-Hudson if all vacant lots are built out pursuant to zoning. Assuming an average household size of

Zoning District	Number of Vacant Lots	Total Acreage of Vacant Lots per Zoning District	Potential Additional Housing Units (pursuant to zoning)
One-Family Residence	183	37.852	183
Two Family Residence	23	1.633	46
Grand Total	206	39.486	229

Table 5: 2009 Land Use Data (Westchester County Data Download)

Zoning District	Number of Vacant Lots	Total Acreage of Vacant Lots per Zoning District	Potential Additional Housing Units (based on 57.615 units per acre in high-density developments)
Mixed Use Planned Development	2	6.221	358.446
Multi-Family Residence	8	3.240	186.653
Multi-Family Residence/Commercial	2	0.243	13.9718
Multi-Family Residence/Office	2	0.240	13.8364
Grand Total	14	9.944	572.907

Table 6: 2009 Land Use Data (Westchester County Data Download)

2.56 persons, these units will allow about 2,053 more people to live in Hastings-on-Hudson.

Build-out of Parking Lots

In addition to vacant lots, the Studio assumes that, in 100 years, there will be little need for surface parking lots in commercial, community facility, or residential areas. Instead of driving to these areas and parking on-site, automatic vehicles and the greater availability of shared transportation options will allow people to run errands, get to the train station, or take their families to the park without the need to park a vehicle at their destination. Automatic vehicles will return to docking stations either at a residence or in another designated location (Nourinejad et al., 2018; Ferreira et al., 2014). In addition, growing demand for housing within the Village will cause parking lots to be redeveloped as housing pursuant to zoning. Table 7 shows the number of surface parking lots in the Village by zoning district, as well as the total acreage.

Five additional housing units will be built as the need for surface parking lots fades, adding about 13 people to the population. It should be noted that the four acres of parking in the Central Commercial zoning district could also potentially support housing in mixed-use structures. Three of those parking lots, encompassing about 2.5 acres, are within the Plan Area and will be discussed later in this report. The remaining two parking lots zoned Central Commercial are not

Zoning District	Number of Parking Lots	Total Acreage of Parking Lots by Zoning District	Potential Additional Housing Units (Pursuant to Zoning)
Central Commercial	5	3.986	n/a
One-Family Residence	3	2.886	3
Two Family Residence	1	0.103	2
Grand Total	9	6.975	5

Table 7: 2009 Land Use Data (Westchester County Data Download)

included in this population projection, although they could support additional housing units in the future.

Our population projection is summarized in Figure 16. The 2010 population of Hastings-on-Hudson was 7,849. The Studio estimates that, in 100 years, the residential build-out of vacant lots and parking lots outside of the Plan area will add about 2,066 residents to the population.

Population Growth within the Plan Area

The threat of sea-level rise should be weighed heavily in development decisions on the waterfront, and whatever housing is developed should be strategically placed within the Plan area so as to limit risks to residents. The Studio proposes that all new housing should be concentrated at the northern

end of the Plan area, both east and west of the Metro North train station. Cut and fill will allow for higher elevation at the northern part of the shoreline, while the central and southern parts of the shoreline can act as natural flood-mitigation infrastructure. This eco-shoreline will also serve to protect development along Southside Avenue and Railroad Avenue to the east of the train tracks.

The Studio has identified an area of about six acres immediately to the west of the Metro North station as suitable for mixed-use development, including housing. Using our calculation for number of units per acre in high-density areas (57.615), these six acres could support up to 345 additional housing units. The parcels to the east of Southside and Railroad avenues along the length of the Plan area, including the current parking lot next to the Metro North station, also have development potential. Again, the Studio recommends that residential development is concentrated nearest to the train station; in particular, tax lots 4.70-48-7 and 4.70-48-31, which comprise the parking lot at the north end of the Plan area, are ideal for additional residential development. While some of this site should be reserved for daylighting the stream and park land, about two acres could support medium to high-density housing. We recommend that this area should be developed with up to 75 housing units..

The Studio's analysis finds that the Plan area could support up to 420 housing units. These units would add 1,075 residents

to the total population of Hastings-on-Hudson, pushing the projected population of the Village over 10,000. The Studio's 100-year Vision, described later in this report, presents a recommendation for the ideal number of housing units within the Plan Area that would balance residential development with other needs, such as commercial development and opportunities for job growth.

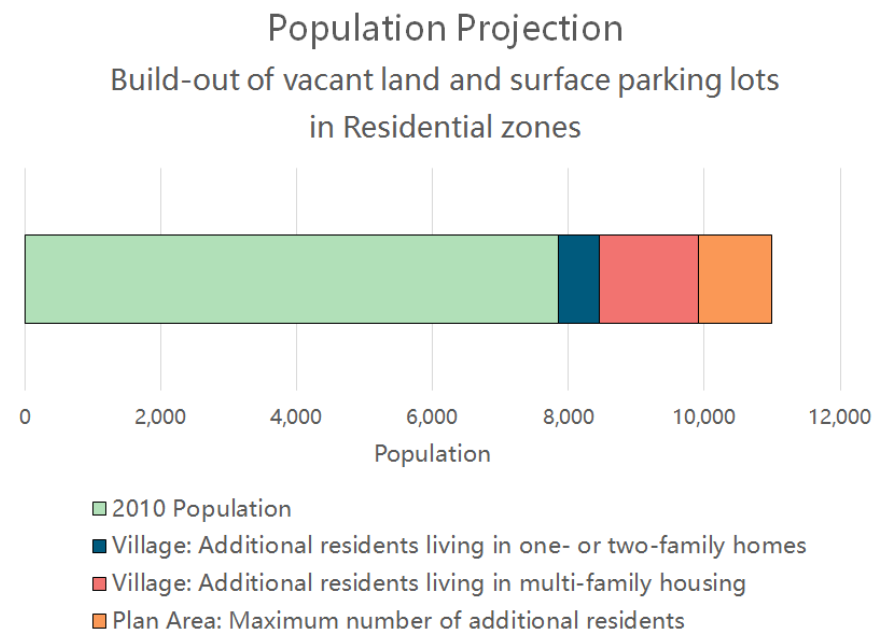


Figure 16 Population Projection

THE PLAN



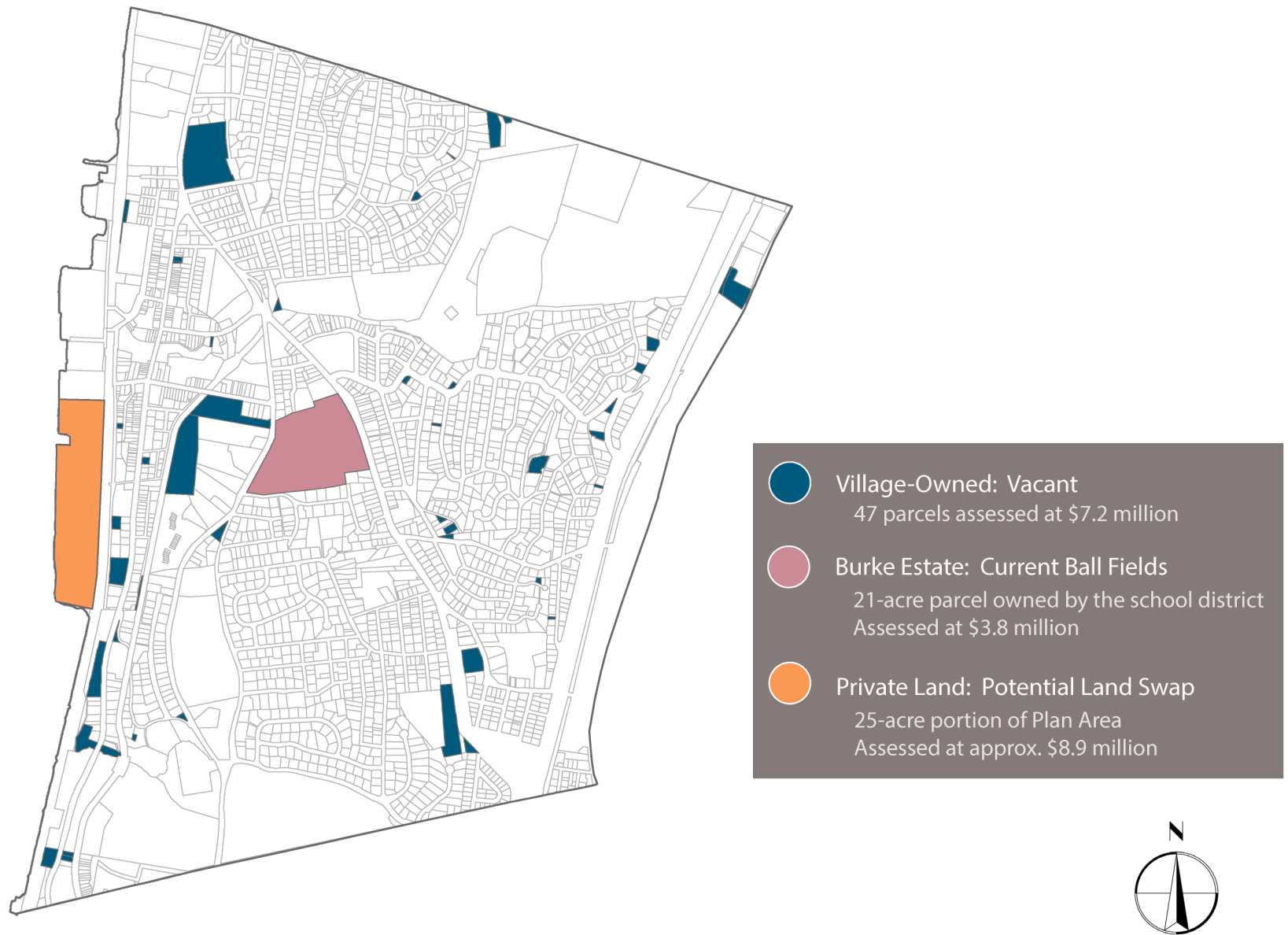


Figure 17: Land Swap Analysis (Westchester County Geographic Information Systems)

RECLAIMING OWNERSHIP

LAND SWAP AND NONPROFIT PARTNERSHIPS

The long-term outlook for low-elevation shoreline areas in the northeast United States is poor: as outlined in the *Research and Assumptions* section of this report, sea-level rise and extreme flood events could devastate any development along the waterfront in Hastings-on-Hudson. This reality necessitates smart and comprehensive design solutions, such as extensive cut and fill, creation of wetlands, and infrastructure that is designed to flood. The Studio recommends that a majority of the Plan area serve as an active, protective, and resilient barrier against the shocks and stresses induced by climate change. Therefore, the Village should seek opportunities to preserve waterfront land for this purpose through a land swap or a transfer of ownership to a nonprofit organization.

Land Swap

The most cost-efficient means by which the Village could take ownership of parts of the Plan area is a land swap. A land swap is a tool used by municipalities or other public entities to preserve privately-owned land as part of larger environmental or historic conservation goals. More recently, some municipalities have proposed land swaps as a tool for economic development. For example, the City of Charlotte recently swapped City-owned land for a 3.2-acre parking lot as part of a larger plan to promote downtown commercial and residential development along a new streetcar line (Spanberg, 2015). Land Swaps are viable when a municipality can offer land to a private entity that is of equivalent assessed value as

the land it is hoping to gain. Land available for the Village to swap is shown in Figure 17.

According to 2018 Tax Assessment Rolls, the Village of Hastings-on-Hudson owns 75 parcels of land. The uses and total assessed value of these parcels are summarized in Table 8.

The 47 Village-owned vacant lots zoned for commercial, residential, or industrial uses are assessed at over \$7.2 million. Some or all of these parcels could be offered to the owners of the parcels on the waterfront in exchange for parts of their property. Another opportunity for a land swap is the Burke Estate, tax parcel 4.80-70-29, which is currently owned by the Hastings-on-Hudson school district and in use as ball fields. This 21-acre property is centrally located and valued at over \$3.6 million. If developed for high-density housing, this parcel could become a vibrant mixed-income enclave and a new source of local property-tax revenue. In addition, residents of these developments would have the ability to walk to the train station, the downtown central commercial district, and to recreational amenities in Draper Park, Hillside Park, and the waterfront. The ball fields currently located on the site represent an underutilization of this valuable location, and could be moved to other sites within the Village. Furthermore, it is feasible for the Village to take control over this site, especially if the school districts in the Town of Greenburgh are consolidated in the future. Therefore, Hastings-on-Hudson

Current Uses	Parcels	Total Assessment Value
Commercial Vacant Land	17	\$4,212,900
Cultural Facilities	1	\$2,421,200
Government Buildings	2	\$2,331,200
Government Highway Garages	1	\$1,424,900
Government owned Public Parks	8	\$11,258,400
Government Parking Lots	4	\$2,143,800
Industrial Vacant Land	1	\$1,100
Land under Water - non-residential	1	\$46,800
One Family Year-Round Residence	4	\$2,957,800
Parking Lot	1	\$1,018,700
Parks - Non public	1	\$291,400
Police/Fire Protection, Signal Equipment	2	\$1,504,200
Recreational Facilities	2	\$4,433,700
Residential Land with Small Improvement	1	\$91,700
Residential Vacant Land	29	\$2,986,200
Grand Total	75	\$37,124,000

Table 8: Village-Owned Parcels (Village of Hastings-on-Hudson Tax Assessment, 2018)

could offer the Burke Estate to the owner of one or more of the waterfront parcels through a land swap.

The exchange would encourage private development of vacant land in the Village, supporting economic development and better availability of housing. This new development would be beneficial for residents: the tax base would continue to grow, while the minimal development on the waterfront would retain views and open space for residents. Most importantly, new housing in the Village should not be built in the waterfront floodplain because it would be dangerous and costly for residents as flooding becomes more severe and frequent over the next 100 years. The exchange could also be an attractive offer for the private owners, as land in other parts of the Village may be more easily and quickly developable than the waterfront parcel: the 2015 Modification to the Consent Decree prohibits development within 100 feet of the waters edge, restricts buildings to a height of 65 feet, and owners must wait until environmental remediation has been completed.

The Sierra Club has developed several guiding principles for land exchanges. Some key things to consider before executing a land swap include:

- Hastings-on-Hudson should conduct the appropriate ecological, cultural, recreational and mineral surveys in addition to environmental impact reviews before executing a land exchange.

- The land exchange should comply with laws and regulations at every level of government.
- Land use restrictions imposed on parcels on the waterfront should be accounted for through an official appraisal process. Restrictions that limit development potential should factor into the appraised value of both the waterfront parcels and the Village-owned land offered for exchange.
- It is important to exercise transparency through public participation throughout each stage of a proposed land swap. In particular, the Village should disclose appraised values and other important information about the proposed exchange early in the process, allowing for public comment.

Nonprofit Partnerships

Partnership with a nonprofit organization could also ensure that a significant portion of the waterfront offers public amenities and natural flood protection. A regional organization with an interest in reconnecting communities with the waterfront may be able to facilitate the redevelopment of the site in a manner consistent with the Village's interests in both economic development and public access.

Municipalities in the Hudson Valley Region have successfully utilized nonprofit partnerships to acquire land for public use. In 1998, the nonprofit organization Scenic Hudson

purchased a stretch of formerly industrial waterfront property in Peekskill, New York. With funding from the city, the land underwent an environmental remediation and redevelopment into a public park. Now known as Scenic Hudson Park at Peekskill Landing, the park connects to the Westchester RiverWalk trail and is adjacent to a Metro North train station and commercial activity.

The Studio recommends that Hastings-on-Hudson explore options to gain ownership of parts of the waterfront site or work closely with a nonprofit partner that can purchase the land and collaboratively work to achieve a welcoming and sustainable plan for the waterfront. The following section describes ideal land uses for four different sections of the Plan area. Two of the sections, which comprise about 25 acres of land on the southern portion of the waterfront, should come into public or non-profit ownership before implementation. They include 14 acres currently owned by 999 Grand St. LLC and 1 Railroad Ave Ventures LLC, as well as another 11 acres owned by ARCO Environmental Remediation, totaling 58% of waterfront acreage. The total assessed value of these parcels comes to approximately \$8,916,791. It is feasible for the Village to assemble available vacant land for exchange or to negotiate with a non-profit organization that has the means to purchase this land. One or a combination of these options could help Hastings-on-Hudson make significant progress toward the Priority Opportunity Areas within 100 years.







Figure 18 Site Plan Areas (Westchester County Geographic Information Systems)

SITE PLAN

THE VISION

The Studio envisions a revitalized Hastings-on-Hudson waterfront that is sustainable, resilient, economically productive, and culturally vibrant. The Studio came to the conclusion the waterfront site should be divided into four sections (Figure 18). Each of the four sections encompasses a main principle based on its location, topography, and accessibility. The original 42-acre waterfront site is divided into 3 sections. Riverview Commons contains the northern section (9.1 acres) of the site closest to the Metro-North train station. This section will be raised with soil cut from other areas of the site and will feature the majority of the site's density and development. Quarry Brook Crossing (9.1 acres) will feature community space and recreational amenities that are designed to flood. Quarry Brook Crossing provides flexible space for the Village as well as recreational opportunities. This section links the area with the highest density, Riverview Commons, to Cattail Park, which will provide most of the available fill. Cattail Park (16.4 acres) contains the southern portion of the site, ending at the Zinsser Bridge. This section will feature a unique topography, natural environment restoration, and will help the rest of the waterfront meet sustainability and resiliency goals. The fourth section, Artist Alley (7.3 acres), is found just outside of the original waterfront site along Southside and Railroad Avenues, bounded by the Metro-North Parking Lot to the north and the Zinsser Bridge to the south. A mix of light-industrial and mixed-use buildings can provide studios and apartment spaces, with potential further residential development on the

site of the Metro-North Parking Lot.

Cattail Park

The southernmost section of the Plan is Cattail Park. The park should have the function of supporting the sustainability and resiliency of the site and the Village at large. As described earlier in this report, sea level rise and an increase in storm-related flooding must be taken into account when planning any development for the site. Therefore, development of the site should be concentrated in areas of higher elevation and in close proximity to services and the village center. As it is furthest from the village center and the Metro North train station, it is logical that the southern end of the park be preserved as open space. Open space supports resiliency by providing natural defenses against flooding, and is also flexible space that can be adapted to different uses based on community needs.

Sustainability should be enhanced on the Cattail Park section of the site through sustainable power generation, food security, and ecosystem protection. Cattail Park should also protect view corridors for the majority of the site.

Cattail Park dedicates 16.42 acres of the waterfront site to open space for the public. One of the the primary functions of Cattail Park should be to offer a quiet place for the residents of Hastings-on-Hudson to enjoy nature, appreciate views and pursue recreational activities. The park is named for the native

wetland plants that grow throughout the Hudson Valley and should be an ecological sanctuary that provides protected habitat for native plant and bird species as seen in Figure 24. The design of the park promote living edges and naturalized vegetation of native plant species.

Quarry Brook Crossing

To the north of Cattail Park is Quarry Brook Crossing, a 9.1 acre portion of the site located between the waterfront's most dense area and the waterfront's most environmentally pristine and natural setting. Situated almost entirely in the 100-year floodplain, Quarry Brook Crossing has the unique task of being designed to flood while providing community and recreational activity space for the Village. This portion of the site will feature the restoration of a once-buried stream running underneath the Metro-North parking lot and onto the site. The stream is named Quarry Brook to honor the village's history of marble quarrying. Small pedestrian bridges will span the daylighted stream to connect the pedestrian paths, bike paths, and esplanade from Quarry Brook Crossing to Riverview Commons. By daylighting the stream, a natural body of water will be restored to the site while creating an engaging feature for residents to experience and enjoy.

With the majority of fill taken from Cattail Park being used to elevate Riverview Commons, Quarry Brook Crossing should be able to withstand regular flooding and leverage sustainable methods in its architecture and recreational spaces. Providing

a combination of active and passive space in a flood prone area will assist the Village towards its goals of community engagement and sustainable resiliency on the waterfront. Buildings on this portion of the site would feature ground level floors with the ability to overcome large amounts of water intake, with the floor space above used for educational and community services.

Quarry Brook Crossing will provide opportunity for community gathering and engagement. After discussions with members of the Waterfront Rezoning Committee and results from a survey administered to Hastings High School students, the Studio gathered that residents of the Village wish for more green space on the site as well as opportunities for engagement like a museum or community gathering space. There is a desire in Hastings-on-Hudson for interaction with the community and the environment.

One of the major functions of the area is to provide residents and visitors an opportunity to interact with one another, fostering that interaction with public spaces like environmental education centers or community sports facilities. Quarry Brook Crossing's flood-conscious design is also financially advantageous since the proposed land use minimizes exposure of critical infrastructure to flood risks.

Building on the studio's goals of sustainability and community development, Quarry Brook Crossing creates space not only for interaction with the community, but also for

interaction with the environment. Members of the Waterfront Rezoning Committee emphasized how Hastings-on-Hudson is an active community which enjoys nature. Cut and fill on this portion of the site creates small islands along the Hudson which connect to the waterfront esplanade through a series of bridges. This provides Village residents the opportunity to interact with nature in a way not previously seen in the area. Quarry Brook Crossing plays an important role in activating the Hudson River which is a crucial element of Hastings-on-Hudson's identity as a river town. By creating a space that is able to adapt to the changing climate and promote community interaction, Hastings-on-Hudson can define itself as a community while protecting itself from future storm events.

Artist Alley

Artist Alley will reside to the east of the waterfront site, across the Metro North rail tracks. The 7.33-acre area is bounded by W. Main Street on the north, Southside & Railroad Avenues on the west and south, and Warburton Avenue on the east. Artist Alley spans the entire length of the adjacent waterfront site. This area has tremendous potential to support economic activity, job creation, and to generate tax revenue for the Village. In order to avoid displacement of existing businesses, support new small businesses, and retain the character of Hastings-on-Hudson, the area will be protected by an Overlay Zoning District.

The Studio recommends that residential development be





concentrated nearest to the train station; in particular, tax lots 4.70-48-7 and 4.70-48-31, comprising the parking lot across from the Metro-North station, are ideal for additional residential development. While some of this site should be reserved for daylighting the stream and park land, about two acres could support medium to high-density housing. The location of the residences promotes walkability and easy access to businesses in downtown Hastings-on-Hudson and the adjacent waterfront. This development would be ideal for an aging population, allowing seniors to live close to downtown amenities as well as the Metro North station.

Light industrial and mixed use is proposed for the vacant parcels along Southside and Railroad Avenues south of Washington Avenue. Development will retain the industrial character of the area but will add space for artist studio housing, appealing to the artistic and creative nature of Hastings-on-Hudson.

Artist Alley's varying topography protects it from any inundation that may affect the waterfront site during future sea level rise. Storm events pose a different threat, as small pockets of Artist Alley, for instance the area between the Department of Public Works garage and the Zinsser Bridge, are currently prone to flooding during a 500 year storm event. The Studio's various design solutions, including cut and fill, designing to flood, and so on, will further protect the vulnerable areas of Artist Alley far into the future.

Artist Alley will also provide and expand green space areas. These areas come in the form of trails, parks, and community gardens. The open space in the denser northern end of the area will make it more attractive for residents and visitors. The existing park can also improve circulation by creating more access points to get to the waterfront area.

Riverview Commons

The Studio identified an area of approximately 9.05 acres on the northern end of the waterfront site called Riverview Commons as suitable for denser development. Riverview Commons provides Hastings-on-Hudson with a space that will expand upon the economic activities of the existing village, respond to housing demand, generate tax revenue, and ultimately serve as a desirable destination for site residents, village residents, and visitors from neighboring communities. As the gateway to the waterfront, Riverview Commons encapsulates all four themes of the Plan's overall vision – sustainability, community and economic development, transportation, and placemaking.

Riverview Commons' location adjacent to the train station and within close proximity to the existing village center position the site to support walkability and economic activity through a commercial corridor reaching the Hudson River. Riverview Commons would receive most of the available fill from excavations of Cattail Park and Quarry Brook, in addition to the clean fill specified in the consent decree.

This gives Riverview Commons the highest elevation of all the areas on the waterfront and, along with protection offered by a continuous bulkhead, provides development and infrastructure with critical protection from sea level rise and storm events. Existing transportation resources could be leveraged and bolstered by new multimodal infrastructure to promote accessibility, safety and efficiency.

Riverview Commons could support higher density development than that currently seen in Hastings-on-Hudson while retaining Village character. Higher density development will be an efficient use of resources and utilities and generate revenue for the Village. The developable land on the 9.05 acre Riverview Commons is reduced to 6.3 acres, following the specifications in the consent decree for a 100-foot setback and "no-build" zone on the northwest corner. Incorporating mixed-use development with multifamily housing and commercial use could promote variety in the types of activities and visitors to Riverview Commons. Using the Studio's calculation for number of units per acre in high-density areas (57.615), the six acres available for development could support up to 363 additional housing units. However, since some of the development will be reserved for commercial, office and community facility space, the Studio recommends that housing is limited to 225 units. Sustainable design and infrastructure incorporated throughout the waterfront site could mitigate the carbon footprints of Riverview Commons residents and businesses, minimize their dependency on

global systems (such as food and energy supplies) and reduce exposure to risk in an uncertain future. Importantly, this development could provide a sustainable source of revenue to fund the expansion of public services to the residents and businesses in Riverview Commons and to support capital and operations costs of public amenities in Cattail Park and Quarry Brook Crossing.



REALIZING THE VISION

The following site plan and renderings of the Studio's Plan represents a potential scenario that could occur on the Hastings-on-Hudson Waterfront Site. Based on the Studio's priority opportunity areas of sustainability, community and economic development, transportation, and placemaking, the plan separates the waterfront site into four distinct areas with principles that drive the site towards a 100-year vision.

The current layout of the Plan shows density decreasing from the north of the site to the south, supporting the Studio's vision of a more resilient development on the waterfront and the implementation of the land swap. Each area incorporates design elements that help achieve specific sustainable goals set out by the Studio, and takes into consideration input received from the Hastings-on-Hudson Waterfront Rezoning Committee and Hastings High School Survey.

The design for each portion of the site, however, is just one scenario and should be taken as a suggestion. Based on the future needs of the Village or developer, the outline and design of the waterfront may be changed or adjusted. The Studio's scenario is one of several design options that can be implemented on the site that may aide future decisions and design strategies.



- 1 Sustainable Buildings
- 2 Mixed Use Buildings
- 3 Commercial Buildings
- 4 Pedestrian Skybridge
- 5 Pedestrian Greenway and Paths
- 6 Watertower

- 7 Flex Space
- 8 Esplanade with Westchester RiverWalk Connections
- 9 Terrace Steps
- 10 Loop Road
- 11 Train Station Entrance
- 12 Ferry Landing

- 13 Pickup/Dropoff Area with Transportation Links
- 14 Subgrade Parking and Service Access
- 15 Ecological Education Center
- 16 Waterfront Esplanade
- 17 Ampitheater

- 18 Bike and Pedestrian Paths
- 19 Multi-Sport Field/Courts
- 20 Hastings-on-Hudson Community Center
- 21 Kayak Launch
- 22 Playground and Splash Space



Figure 19
Conceptual Site Plan



Figure 20



Figure 21



Figure 22



Figure 23 Cattail Park

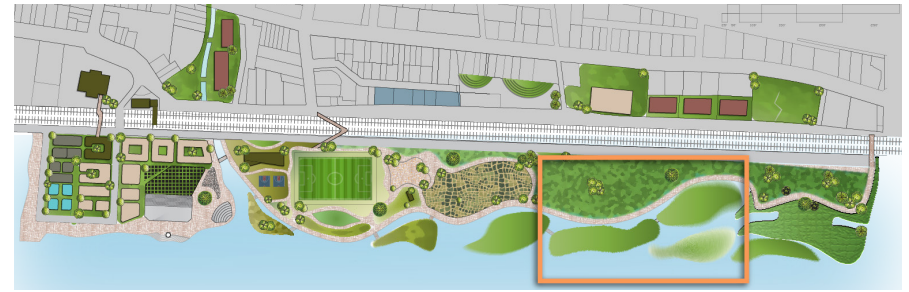
CATTAIL PARK

Cut and Fill Landforms: The most noticeable aspect of Cattail Park is its shape. Cut earth from the Cattail Park section of the site would be taken as fill for Riverview Commons where the majority of development will be located. This would minimize the environmental cost of bringing fill from outside the site. The resulting landforms and elevations would create visual interest while also supporting native species habitat. Cut would be taken strategically to increase shoreline, power a water turbine, and provide public access to the shoreline and living edge.

Islets (mini islands): Five small islands would line the western periphery of Cattail Park. The islands would be formed from the land remaining after the cut and fill process and would create protected habitat for native plants and animals. The islands would also add visual intrigue; the elevation of each island would vary slightly to further enhance the landscape as seen in Figures 20 and 23.

Island Walk: A small walkway would connect three of the islets and offer the public a chance to experience the space and the surrounding landscape in a unique way. Hikers using the walkway would have intimate access to a native species habitat. The walkway would also direct hikers to stay on the path thereby protecting the habitat.

Water Turbine: The Plan includes a compact and discrete water turbine powered by a small inland waterway see Figure 24. Inspired by the engineering designs of the Belgian



company Turbulent, the design is inexpensive, safe for fish and requires minimal maintenance. The inland channel would enhance the park area by adding an interesting water element to the landscape. Energy from the turbine could be fed into a microgrid for the northern end of the site.

Bike Paths: Acting as connectors to the rest of the site, Village, and regional trails, bike trails would create recreational opportunities to residents and visitors alike. The bike lanes would connect to a bike lane through Artist Alley.

Restoration of Existing Bridge: Restoration of the Zinsser Bridge is essential for connectivity to the site. The bridge would be restored primarily for the purpose of pedestrian and bicycle traffic but would also accommodate emergency vehicular traffic. The restored bridge would connect the Artist Alley and other nearby residents directly into the heart of Cattail Park, bypassing the Riverview Commons to reach green space immediately. The bridge would also offer unique views of the Hudson River Valley south of the site with views of New York City skyline.

Community Garden: A raised bed community garden would provide opportunities for waterfront residents living in dense housing to have access to a garden. The gardens would be configured in shapes that are striking in appearance as well as efficient in use of space and in capturing sunlight. The community garden will provide educational opportunities for the adjacent educational facility and Hastings-on-Hudson

schools. Community gathering space, food security, picnic tables and landscaping will provide wider community benefits.

Vistas: Excess landfill would be used in Cattail Park to create mounded vista points from which visitors can enjoy views of the waterfront, Palisades and Hudson River.

Living Shorelines: along the entire site, natural edges are proposed as an alternative to bulkhead or seawalls. A living shoreline acts as a natural buffer that promote various

ecologically activities and requires less maintenance. These proposed ecological activities include wave breaking and absorption through the use of ripraps which in turns reduces erosion, enhances water filtration, and promotes natural animal and plant habitat.



Figure 24 Water Turbines



Figure 25: Constitution Marsh (Audubon Center)





Figure 26 Quarry Brook Crossing

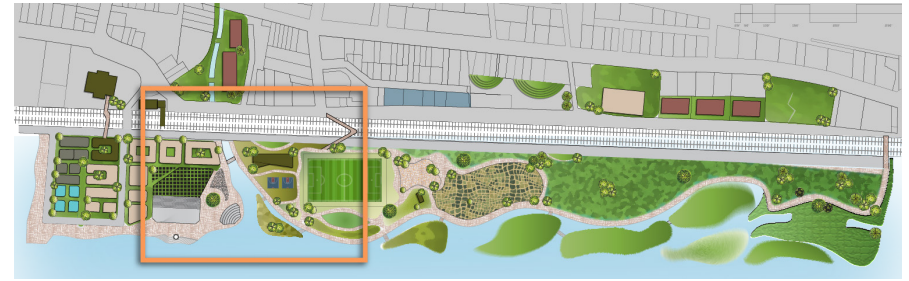
QUARRY BROOK CROSSING

Community Center: The Community Center will be a gathering place for Village residents. A public gym and pool would provide amenities for residents. The facilities will be built to flood-resistant design standards in response to the area's flood risk.

Waterfront Esplanade: The waterfront esplanade continues from Riverview Commons through Quarry Brook Crossing and on to Cattail Park. The esplanade connects the islands, bringing pedestrians and bicyclists to the waterfront. A variation in height along the esplanade would enhance the experience and views for visitors, with these areas varying between raised and at-grade.

Bike and Pedestrian paths: Bicycle and pedestrian paths, in addition to the esplanade, will branch out across the site, connecting residents and visitors to all the site's amenities and providing recreational opportunities. The paths will be 16-feet wide and feature inviting landscapes.

Amphitheater: An amphitheater located at the north side of the mouth of Quarry Brook provides a gathering space for the community to enjoy performances ranging from local school concerts to national tours. The amphitheater features concrete step seating and, with the adjacent lawn, can accommodate approximately 2,000 people. The amphitheater seats face southwest to maximize views of the Palisades and Manhattan skyline and to provide protection from northerly winds on



the Hudson River. The amphitheater also provides flood protection by taking in and retaining water.

Multi-Sport Field/Courts: Multi-purpose sports fields and courts cover a large portion of Quarry Brook Crossing. This type of land use will activate an area for recreational use that should not be densely developed due to risk of flooding. The fields and hard surfaces can be designed to capture rainwater and protect other low-lying areas.

Ecological Education Center: Located on the edge of Cattail Park stands the Ecological Education Center, or EEC, which provides a place to connect with the community and the environment. Environmental programming would be the focus of the EEC. After-school activities, a specialized high school environmental program, summer camp, and Environment Museum can all be located within the EEC. The building will be built with sustainability and flood prevention in mind; its location directly above one of the inlet streams makes it vulnerable to flooding during storm events. The main programming of the building will be featured on the second and third floors with the lower level being used as a flexible but floodable multi-use space. Clear glass overhead doors create a pleasing indoor/outdoor experience, but are designed to break away under high flood pressure to allow water intake and relieve pressure on the structure (Nguyen, 2014). The building would also feature a deck extending out over the inlet with panoramic views of the Palisades.



Figure 26 Riverloop Amphitheatre in Waterloo, Iowa (The Courier website)(top), and Creekside Community Recreation Centre in Vancouver, B.C. (Green Building Brain)

Kayak Launch: Local kayak rental facilities could be relocated to Quarry Brook Crossing adjacent to the Ecological Education Center. This move would make the facilities more accessible, and provide a safer and more visually appealing kayaking journey. Patrons could kayak in the streams and islands created by the cut and fill, keeping them safe from strong currents and passing barge traffic on Hudson River.

Playground and Splash Pad: Providing a playground on the site would not only give children a place to play, explore, and interact with other children, but also a place for parents and caregivers to connect with each other. Adjacent to the playground is a multi-functional splash pad. On summer nights and in the off season, the splash pad would still be functional as a sculpture walk.

Bridge to Washington Avenue: An additional pedestrian access point from Washington Avenue will increase access and circulation to the site by providing direct access to the amenities of Quarry Brook Crossing. Since Washington Avenue is steep in its descent towards the train tracks, the design of a bridge can ease these extreme changes in grade. Therefore, the bridge has been designed as a V-shaped ramp sloping upwards as it extends south from Washington Avenue, changing directions above the tracks before descending northwards where it lands pedestrians along a pedestrian and bike path.

Gazebo: A gazebo west of the sports field provides beautiful views of the Palisades to the west. Informal gathering spaces can be placed throughout the site.



Figure 27 Nutchatch Hollow Environmental Learning and Research Site, Binghamton University (Ashley McGraw Architects)



Figure 28 Artist Alley

ARTIST ALLEY

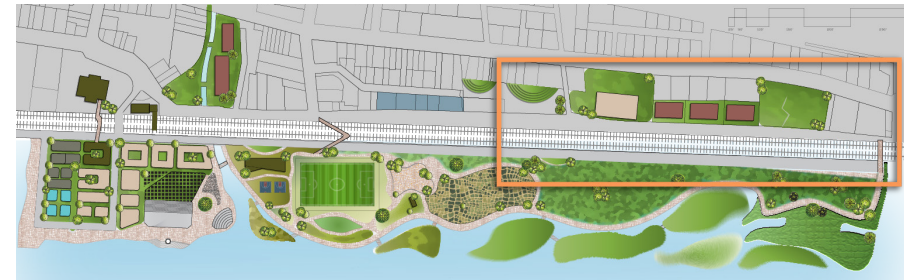
Overlay District: The entire Artist Alley boundary will be an overlay zoning district intended to protect the character of the neighborhood by protecting businesses and longtime homeowners from displacement due to rising property taxes.

Residential Area: Two acres of the current parking lot will be developed with two three-story residential buildings of 25 units each.

Parkland: New parkland will be created on the northern edge of the Metro North commuter rail parking lot. The park will also contain a trail running east under the Warburton Avenue bridge, past the Newington Cropsey Foundation and onto Main Street. Part of the park will be a daylit stream called Quarry Brook. Currently, the stream runs underground through the parking lot and flows out into the Hudson River. The daylit stream in The Plan will be twenty feet at its widest point. Small pedestrian bridges will span over the stream to connect the park with residential areas.

Riverview Park: The existing Riverview Park on Warburton Avenue will feature a zig-zag trail leading from the top of the park down to Southside Avenue, adding an additional pedestrian access point to the site.

Terraced Gardens: Vacant land on Southside Avenue will be turned into a terraced garden. The hilly and steep terrain allows for terraced gardening, bringing use to an otherwise wasted plot.



Art Installation/Mural: The retaining wall at the bottom of the vacant land can be used to set up a space for an art installation or collection of murals. The murals could depict the industrial history of Hastings-on-Hudson or the artistic and creative character of the immediate area. A mural can also be added to the steps of the Quarry Road Trail, similar to Figure 29.

Light Industrial/Flex Space: As artist live-work spaces, these facilities will activate the lower portion of Artist Alley and introduce new economic activities to the village. The spaces can also be used to host events or open-houses where artists can show their work.

Bike Rental: Residents and visitors will have the opportunity to rent bikes for use on the waterfront and in the regional trail system.

Washington Avenue Pedestrian Bridge: A new bridge will be placed on the corners of Washington Avenue and Railroad Avenue/Southside Avenue to add another point of access to the waterfront area. The bridge is curved into a V shape in order to reduce its slope and make it a point of interest.

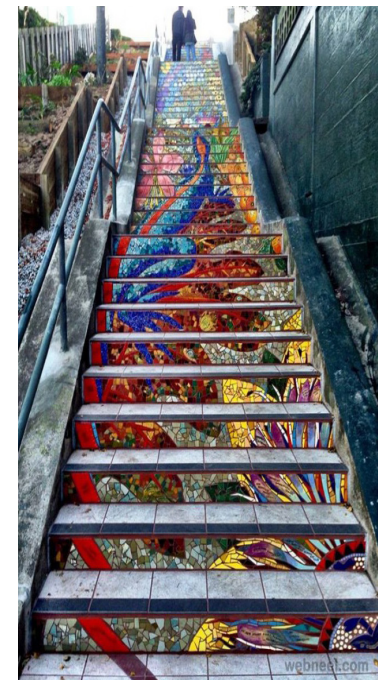


Figure 29: A Decorated Staircase



Figure 30 Riverview Commons

RIVERVIEW COMMONS

Mixed Use Buildings: Mixed use buildings provide space for economic activity, housing and community services. Residential units are located above the first floor to promote activity at the street level and to provide additional protection from flooding. To encourage the formation of an inclusive and stable community, these residential units vary in size and amenities, accommodating individuals and families at different income levels and stages of life. The ground floor is reserved for commercial, retail, community and cultural purposes, similar to the composition of the existing village center, with an emphasis on small businesses and those that provide for the daily needs of those who live and work in Riverview Commons.

Commercial Buildings: In commercial buildings, space will be flexible to meet the future needs of businesses, organizations, and individuals. Businesses or community groups can occupy spaces in these buildings.

Sustainable Buildings: All of the buildings achieve carbon and water neutrality - and could even become net negative carbon consumers - thanks to energy efficient and sustainable design elements and on-site renewable energy generation.

Building Design: The buildings are oriented to maximize natural systems for heating, cooling and ventilation. Green roofs and terraces on each building collect and filter rainwater, clean the air and provide outdoor space for every residence.



Building Systems: Wastewater collected from green roofs and terraces, including rainwater, is stored and reused for the highest purpose possible. Waste heat is also captured and used to generate energy or heat buildings and roadways during cold weather events. A composting facility will process organic waste and supply it directly to the gardens in Cattail Park. Energy demand in Riverview Commons will be met entirely by on-site sources; primarily the water turbines in Cattail Park and by solar panels built into the buildings and other structures. A microgrid will further ensure that Riverview Commons' buildings and infrastructure will remain operational in the event of an emergency that affects the main grid.

Pedestrian Skybridge: Additional pedestrian access is provided via a skybridge connecting the Hastings-on-Hudson Public Library with the rooftop of a public building that features a public garden. An elevator will assist individuals with disabilities to access the rooftop and provide a route to the upland village with minimal grade changes, overcoming a significant elevation barrier to connect the site to the downtown.

Pedestrian Greenway and Paths: Riverview Commons is centered around a broad pedestrian greenway, running east from the waterfront esplanade before turning south to connect to Quarry Brook Crossing. This ribbon park provides connective continuity between the commercial, residential and



Figure 31 The High Line Park (Photo by Iwan Baan)

public spaces in the Commons. The presence of this broad, permeable surface will help to mitigate flooding events in the most densely developed part of the waterfront. The segment running from east to west towards the river promises to create an unforgettable streetscape.

Watertower: The water tower is an iconic symbol for the Hastings-on-Hudson community. By integrating it into public recreation space on the esplanade, it becomes an active part of the landscape instead of distant scenery.

Flex Space: Outdoor markets, festivals and informal gatherings can occur in the ample public spaces provided throughout the site, including this hardscape and sloping lawn. Flexibility in design and programming can ensure this space remains active and publicly accessible throughout the year, especially when organized events are not scheduled.

Esplanade with Westchester RiverWalk Connections: The esplanade proposed in the 2015 Shoreline Conceptual Plan is maintained along the entirety of the waterfront, which links up to the completed Westchester RiverWalk trail through an upland connection with a designated bicycle lane (not pictured in this plan).

Terrace Steps: A large set of stone steps flanks the water tower as it descends into the Hudson river from the esplanade, creating an engaging waterfront feature. These steps echo Hastings-on-Hudson's topography and relationship to the

river, creating a parallel journey across elevation changes into water.

Loop Road: The Main Street bridge leads to a single looping road that directs traffic through the site. The road is wide enough to accommodate a multimodal design and provides dedicated lanes for alternative and public modes of transportation.

Train Station Entrance: An entrance from the site to the site-adjacent side of the Metro-North platform will create a much-needed connection to commuter rail from the west.

Ferry Landing: Should a new ferry system be introduced to communities on the Hudson River, the northwest corner of Riverview Commons would serve as an ideal location for a ferry landing.

Pickup/Dropoff Area with Transportation Links: Pickup/dropoff areas adjacent to the train station and ferry landing, the two on-site transportation hubs, and links between these sites and other modes of transportation will encourage multimodal trips and reduce parking needs.

Subgrade Parking and Service Access: Parking is located underground, which eliminates the aesthetic and economic issues with surface parking. While some options for sub-grade use will not be viable at this elevation, parking remains a suitable use for this space. Basement parking can be provided given it meets National Flood Insurance Program regulations.

The available spaces are limited to on-site residents and employees, as commuters will be able to dismiss their vehicles to park elsewhere, or travel to the site and adjacent train station through alternative modes of transportation. Underground service entrances will reduce traffic blockages on the main loop road and provide efficient access to buildings.



Figure 32: Rendered Concept for the Aberdeen City Garden (Diller, Scofidio + Renfro)

EVALUATING THE STUDIO PLAN



SUSTAINABILITY

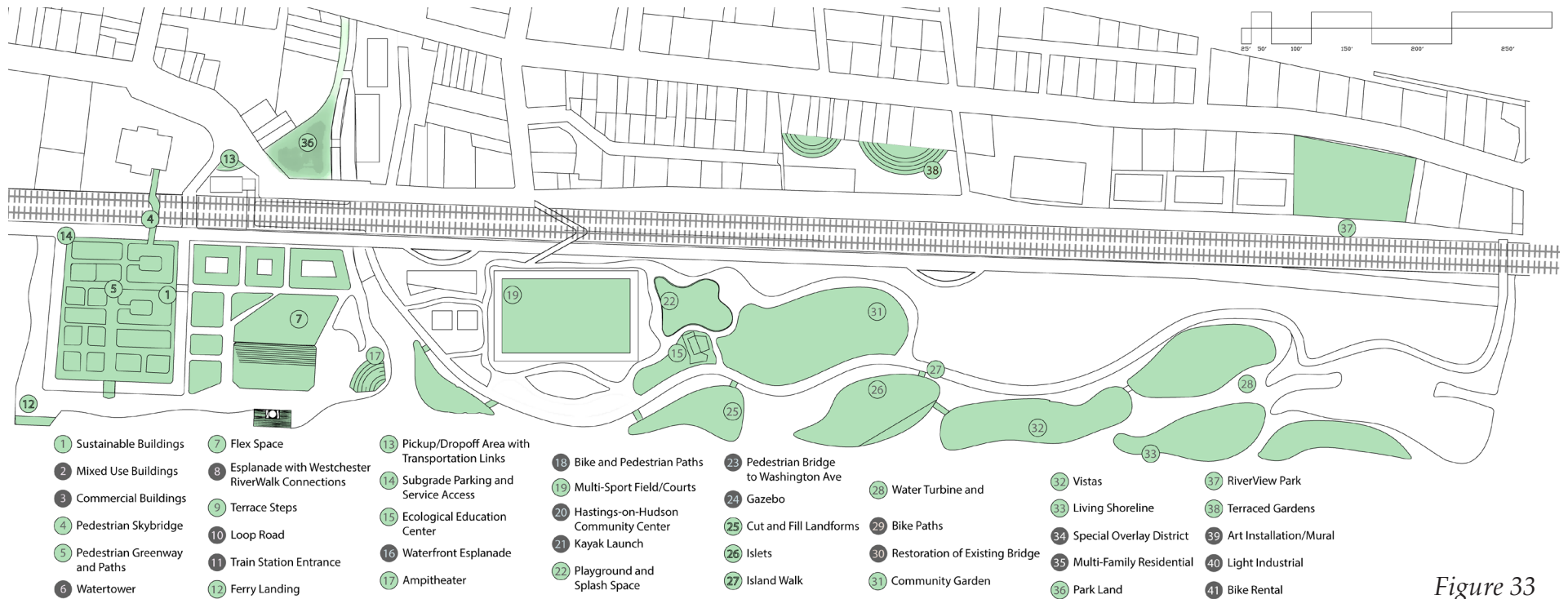


Figure 33

Given its importance to the site, sustainability is woven into the fabric of the Plan. The Studio's standard for sustainability on the waterfront focuses on ecological, physical, and technological elements. The most densely-developed area of the site, Riverview Commons, incorporates sustainability in its design features which could allow the site to achieve carbon and water neutrality. Quarry Brook Crossing accounts for natural water flows by being designed to flood, allowing community members to enjoy its amenities while it serves as an environmental buffer between the village and the elements. Cattail Park nurtures an ecological preserve. Excavations on

this site provides fill to raise Riverview Commons and create natural protective land forms.

The Studio's standards and designs establish a resilient waterfront able to accommodate future generations. The Plan includes:

- Sustainable buildings
- Water Turbine (power generation)
- Amphitheater (built to flood)
- Cut and Fill landforms
- Living Shoreline



COMMUNITY AND ECONOMIC DEVELOPMENT

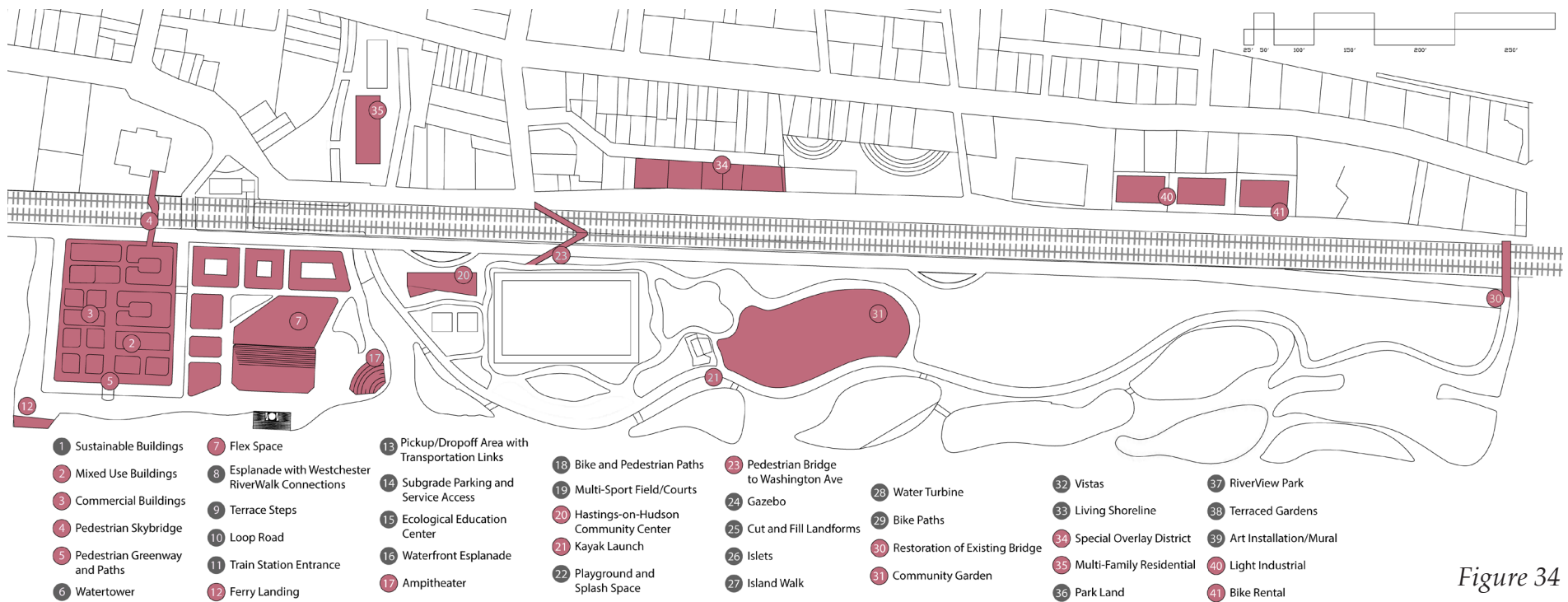


Figure 34

While providing public access to the waterfront is an important goal of the Plan, reconnecting the Hastings-on-Hudson community to the waterfront goes beyond physical access. The Studio envisions a waterfront that economically complements the Village's existing downtown. Between the two areas, a new economic corridor for the village can be created. The Studio designed the waterfront to encourage interactions and activity among Hastings-on-Hudson residents and visitors alike. The Plan also allows the site to become economically sustainable without placing a financial burden on the Village. Along with residential and traditional

commercial space, the Plan includes flexible office spaces to address telecommuting trends.

The Studio designs include:

- Mixed-use buildings
- Light industrial
- Community Gardens
- Flexible Space
- Community Center



TRANSPORTATION

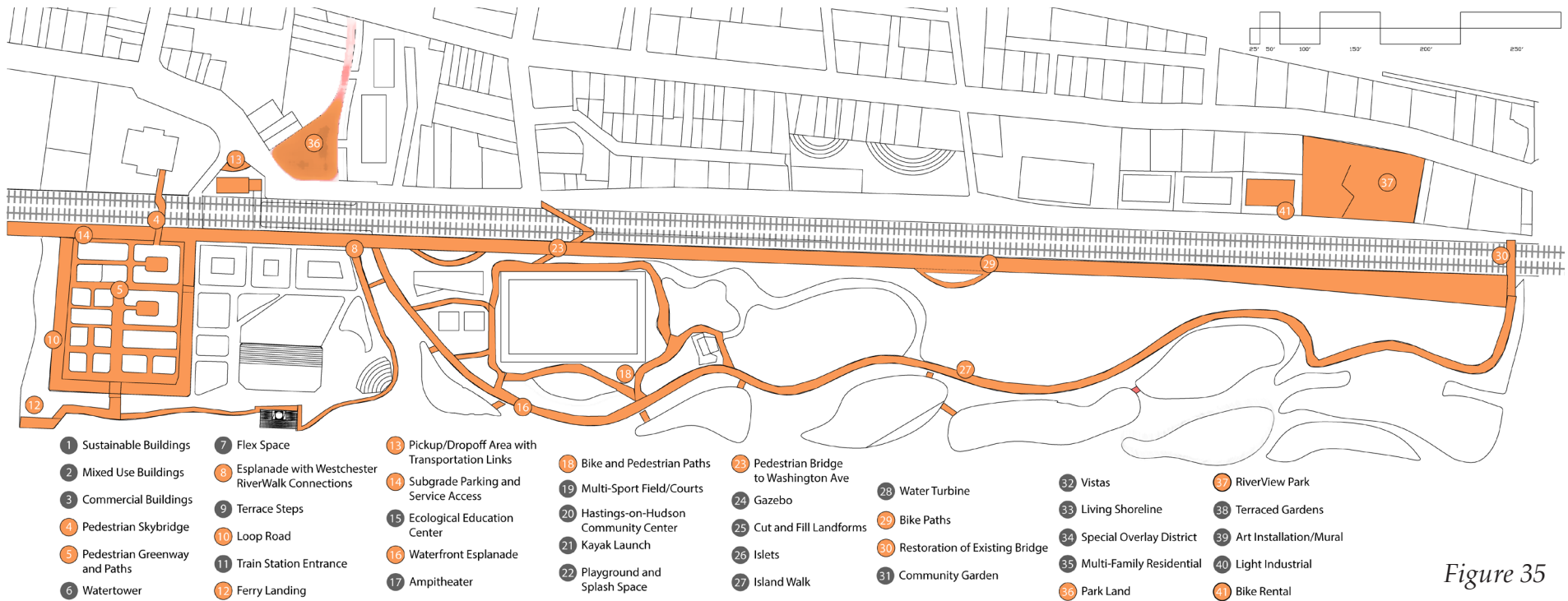


Figure 35

On the waterfront site, the Studio encourages the use of public transportation, walking and biking. A series of bridges and paths link features on the site together and with Village and regional transportation assets. Vehicular access will be limited to discourage through traffic and facilitate pick ups/ drop offs at key locations, but will still provide access for emergency vehicles throughout the site. Parking amenities will be reserved for site residents and employees. The circulation plan addresses the barriers created by the Metro North train tracks and steep terrain through a series of new and refurbished bridges, maximizing the number and quality of connections

between the waterfront and the upland village. The Plan also improves the Village's connectivity to the region at large with a ferry landing and connection to regional bike paths and the RiverWalk esplanade.

Transportation design features include:

- Pedestrian Skybridge
- Washington Avenue Pedestrian Bridge
- Northern Edge Loop road
- Bike Paths
- Restored Southern edge bridge



PLACEMAKING

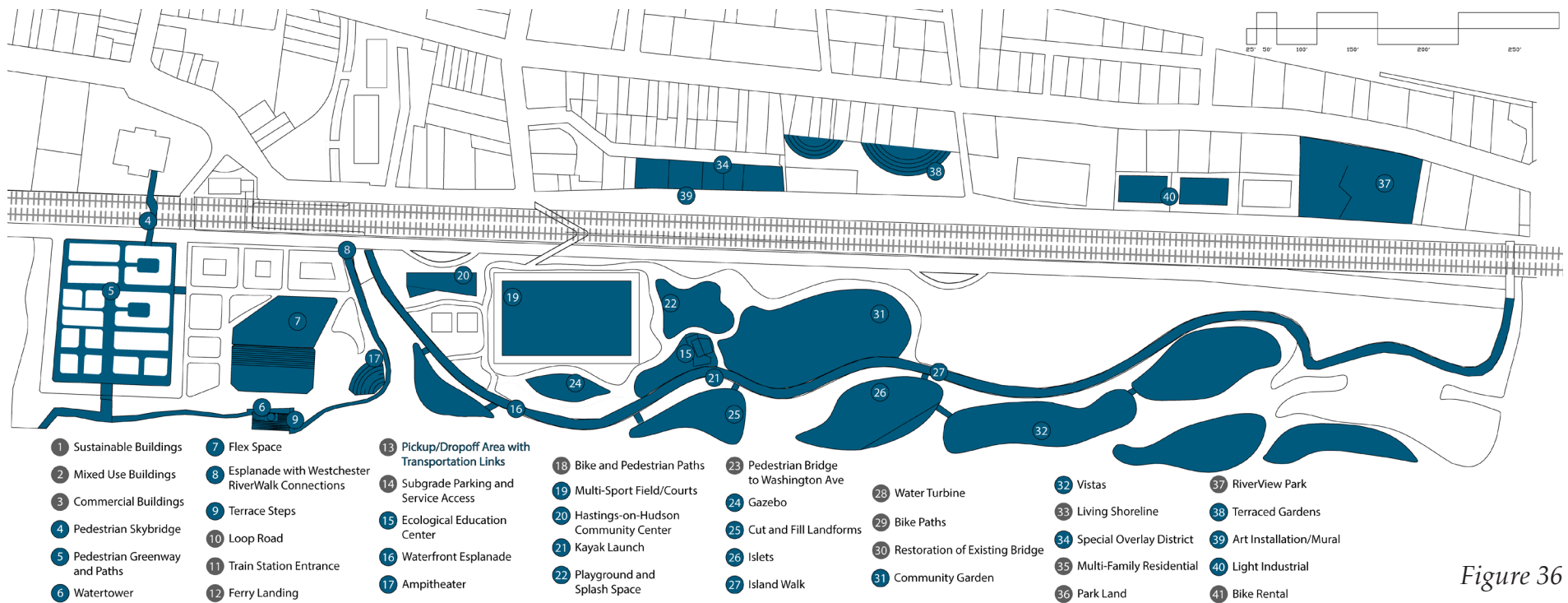


Figure 36

The Studio envisions the Hastings-on-Hudson community strengthening its artistic and creative identity through the development of the waterfront site. The plan can help to establish the Hastings-on-Hudson as a unique destination, differentiating it from nearby villages with riverfront sites. The Plan focuses on design features that will encourage community members to spend more time in public spaces, facilitating social interactions. The Studio also hopes the Plan will help to promote a high quality of life on the waterfront and establish a connection to the natural environment.

Key Placemaking elements in the Plan include:

- Art Installations
- Preserved Watertower
- Island Walk
- Esplanade

CONCLUSION



CONCLUSION

The Hastings-on-Hudson Waterfront Rezoning Committee tasked The Hunter College Master of Urban Planning Studio with creating a 100-year vision for the Hastings-on Hudson waterfront site. The brownfield site, situated on a manmade lot of 42 acres to the west of the Hastings-on-Hudson Metro North train station, was once the industrial hub of the village. The site has since sat abandoned for years. As environmental remediation of the waterfront site continues, the Village hopes to restore the site to the benefit of the community and the Village at large through a rezoning process. The studio sought a solution for the site that would accomplish the Village's goal of a revenue-positive site development while also providing ample open and community space for residents and visitors to enjoy.

Following extensive research into the Village and region's demographics, technological trends and advancements, climate change and flood mitigation practices and technology, as well as best practices in waterfront development, the Studio identified four areas of opportunity for the site: sustainability, community and economic development, transportation, and placemaking. The areas of research, alongside evaluation of existing plans for the site, created the foundation of the Studio's vision for the waterfront.

Climate change is a critical issue, dictating how waterfront land should be developed in order to be sustainable over the next 100 years and beyond. Future sea-level rise and flooding

events will present significant challenges for the site and any development must acknowledge and respond to this reality. Despite the potential risks of the site, the Village stands to benefit greatly from a transformation of the site from its current state of disuse to an area of mixed-use development, public space, open space and natural space.

Open space adds to a community's resiliency, supports natural habitats, and offers an opportunity for people to connect to both nature and people. The site's proximity to Hasting-on-Hudson's village center and the Metro North provide the site with the opportunity to expand the Village's economic and cultural activity. The Plan creates a place for people to experience nature both by land and water, provides diversity in Hasting-on-Hudson's housing stock, and houses key spaces for community engagement, education, and connection.

The Studio recommends that future waterfront planning initiatives also consider alternative land uses and development potential for the land along Railroad Avenue to the east of the Metro North tracks. Activating this space with craftspeople and artist lofts would not only create new economic opportunities for the village, but also create better circulation for the waterfront site.

While there will certainly be pressure from the current private land owners to maximize profit from the waterfront site, development should not exceed what the site can handle

when increased sea-levels and more frequent flooding are considered. The Studio proposes the Village utilize a nonprofit partnership or a land swap process in which publicly-owned land is exchanged for waterfront property in order to gain control of the site's use and development while also satisfying the financial interests of the current land owners.

Moving forward, the Plan should be used to inform land use decisions, to evaluate policy, and as a tool for assessing the sustainability of development plans for the site. With a well-conceived plan that accounts for the environmental challenges this waterfront faces in the future, the site has the potential to be state-of-the-art: a sustainable site that ages well into the future, revitalizes community activity, generates revenue for the Village, and creates a distinctive place for people to enjoy in all stages of life.

APPENDICES



APPENDIX A: ANALYSIS OF EXISTING WATERFRONT PLANS

PLAN #1:

FOSTERING RESILIENT ECOLOGICAL DEVELOPMENT: ENNEAD. 2018

Sustainability

Carbon Neutrality [Score: 3]

The plan objectives state that the development will be a “source-zero consumer of carbon,” which is where buildings use no more energy than is produced on-site by renewable energy sources. A more holistic tally of carbon considers the carbon that is involved in the extraction of the resources used to create construction materials, transportation of those materials to the site, the construction process, the operation of the buildings, and how people live in the buildings.

The plan also includes “design opportunities” presented as a series of small icons. Many of these design opportunities, if incorporated into the plan, would support the goal of carbon neutrality. They include green roofs, high-reflective surfaces, passive solar design, solar shading, energy efficient lighting, daylighting and dimming, solar water heating, heat recovery, green power, efficiency education, monitor energy use, and LEED benchmarking.

The plan further stresses a reduced carbon footprint in the “Energy Strategies” section where it is stated that the design utilizes a strategy to conserve energy with as little input from fossil fuels as possible in the event of flooding or other causes of power-loss. The plan minimizes need through design, and offers an on-site source of green energy through the use of rooftop photovoltaic power generation.

With its attention to the natural ecosystem the plan also indirectly addresses the issue of carbon. Plants living in a healthy ecosystem will naturally sequester carbon, reducing the overall carbon footprint of the site. The plan proposes a combination of dense forest landscape along with natural wetlands and marsh-like landscape, both of which would contribute to carbon sequestration.

Water Neutrality [Score: 1]

Although the plan provides multiple green roofs throughout the site, and minimizes the number of impervious roads and walkways on the site, the plan doesn’t provide a water reuse strategy in order to reduce the water consumption. This plan outlines typology of buildings and specifies uses; water use reduction strategies are not mentioned.

Accounts for Natural Water Flows [Score: 3]

The design assumes that water will one day infiltrate the site, yet simultaneously assumes that people will still live there at that time. We must develop strategies that accommodate these long-term site evolutions, ensuring that this new neighborhood stays connected with the upland portions of the village even during a storm surge event.

The design of the site itself will use four ground-level datums to establish elevation (7’, 16’ [33’ second floor elevation matches the bridge that spans the Metro North railroad tracks] in The Wharf [north] ; 19’ in The Wetlands [south] [full floor

above existing ground level]). These ground level datums go beyond what future predictions believe the sea will elevate to and beyond what a 500-year flood event would rise to.

The plan also has designs for the use of natural landscapes such as wetland marshes, stone riprap, and soft shore beaches. A hard shore structured bulkhead will also be used on the site's northwestern edge.

Ecosystem Services [Score: 3]

The entire concept of this plan is surrounded around restorations of wetlands and marshlands. The plan acknowledges and responds to the threat of imminent sea-level rise by creating an ecological neighborhood with raised housing. This both anticipates the needs of the future village residents and promotes a resilient ecological habitat through the restoration of marshland.

Resiliency [Score: 3]

Redundant Systems: The Ennead plan expresses a variety of ways to produce power on site such as solar water heating, ground source geothermal heat pump, and photovoltaic solar cells for electricity. Ennead stresses the importance of redundant system design, saying that "a resilient design must provide a diversity of energy resources, allowing for backup power during utility interruptions...the electrical grid should be connected with the utility grid, but disconnect when there is a disturbance in the system" (Ennead, 2018).

Diversity: Having redundant systems also means having diverse systems, which this plan includes. As mentioned earlier, the site will be connected to the area utility grid but can also be disconnected and run on its own should a problem occur.

The history of the waterfront combined with Ennead's future vision led to the diverse design of the housing stock. "Our design is directly influenced by three scales of the site's past, present, and future: The scale and east-west directionality of the site's past industrial buildings; the intimate scale of the Village; and, the forest and marshland landscapes of the Hudson River Valley" (Ennead, 2018).

Modularity: The plan shows modularity in the ability of the site's own electrical grid to be separated from the main grid in the event of a problem arising with the main grid.

Innovation & Design: The design of the site covers many areas such as maximizing public space, traffic and circulation, emergency access, pedestrian connections, infrastructure, and view corridors. The balanced cut and fill also minimizes the cost and amount of brownfield remediation by using cut from the south wetlands to provide fill for the north area of the site, creating a varied landscape.

Community and Economic Development

The Site Plan Accommodates Projected Population Growth [Score: 3]

While the plan does not formally acknowledge any anticipated population growth in Hastings-on-Hudson, it does include a significant number of new housing units that could facilitate and absorb population growth in the community. The site also offers employment opportunities for potential new residents with the proposal of commercial spaces and light industrial development. It is clear that the Ennead plan has a focus on growth and economic development.

The Site Plan Accommodates Changing Commercial and Residential Needs [Score: 3]

The Ennead plan includes a hub of mixed-use development at the north end of the site that would include “residential, commercial retail, commercial office, and light industrial” development (Ennead, 2018). Additionally, the plan includes diverse housing stock, with larger apartment buildings, smaller semi-detached housing units, and detached housing units. This typological diversity accommodates the varying needs of home buyers and renters and mirrors the heterogeneous housing stock in the existing community. The denser housing on the site is suitable for projections in housing trends in the United States that are a reflection of the change in the average number of people per household in U.S. homes. The plan highlights ways in which housing on the site will be more environmentally sustainable.

The Site Plan Accommodates Telecommuting Trends [Score: 3]

This plan’s inclusion of office space in close proximity to transportation, public space and varied commercial uses creates a good environment for the development of coworking spaces. The hub of activity created in the “Wharf” area offers a supportive environment for anyone working remotely from the village.

The Site is Revenue Positive [Score: 3]

This plan is very conscious of tax revenue, and therefore strives to “...allow for multiple uses and a diversity of housing sizes and types...” (Ennead, 2018) through private, tax-generating developments. The plan calls for 650 dwelling units averaging 1100 square feet each, as well as 73,550 additional square feet of commercial space, including office, retail, and industrial uses. This is a significant amount of development and would allow the developers to meet their goal of balancing the “...costs of public amenities with an appropriate scale of development” (Ennead, 2018). The large number of residents and businesses on the site would likely produce an economy of scale such that public infrastructure and services costs would not be prohibitive. The sustainable designs in this plan, meanwhile, would minimize potential costs for carbon emissions and energy in the future.

The Site Generates Economic Activity for the Village and its Residents [Score: 3]

The developer of this plan touts a design that will be “...an economic engine for the larger community” (Ennead, 2018). The mixed-use, relatively high-density development at the northern end of the site will complement and support the established businesses in downtown Hastings-on-Hudson. In 100 years, the waterfront as envisioned in this plan could become a hub of economic activity, providing opportunities for retail, office, and light industrial uses.

Transportation

Village Connectivity [Score: 3]

Overall, the plan does very well to address the need for connectivity between the site and the village, promoting the safe and efficient flow of both vehicles and pedestrians from the upland village and the waterfront.

Connection with the village through transportation infrastructure:

Pedestrian: The plan utilizes some of the ideas from previous plans and studies, including the 2015 Waterfront Infrastructure Plan, the Conceptual Shoreline Plan Study and the 2011 Comprehensive Plan, which each include transportation-related criteria, namely, maximizing pedestrian access to the Hudson River. “Connectivity is a central goal of the project” (Ennead, 2018), and it is evident where pedestrian access is concerned.

Bicycle: Some of the renderings seem to show access points with stairways, that are not accessible to bicycles. While the plan does not explicitly address bicycle connectivity, it does allude to the Waterfront Infrastructure Plan’s guidelines, which do specify bicycle access on the Main Street bridge.

Vehicles: The plan utilizes the existing Main Street bridge over the train tracks at the northern end of the site, and a re-opening of the Zinsser Bridge at the southern end of the site as the two vehicular access points from the upland village. The design appears to accommodate direct and efficient access to the site.

Safety of movement of people, goods and services between village and waterfront site: Emergency access is addressed through the plan by ensuring that every residential building is within 150 feet of an access point. It also ensures that the road on the eastern side of the site can serve as a route to provide services to residents and businesses. Should elevated walkways and boardwalks become compromised during flood events, there do not seem to be areas in the site that would be at greater risk to human life.

Improves existing access point(s) to waterfront site: The bridge on the southern end of the site is reopened to vehicular traffic in the Ennead plan. It is not clear from the plan, however, whether improvements to the existing Main Street bridge on the north end of the site has been improved to accommodate additional vehicular and pedestrian traffic. The Waterfront

Infrastructure Plan, however, does assume that the bridge will need to be replaced. Increases number of access points to the waterfront site (addresses railroad and topographic barriers) [YES]: As stated earlier, the plan acts on the work of previous plans and studies to increase the number of access points from upland Hastings-on-Hudson to the waterfront site. Topography is addressed by connecting the bridges further up the hill. The site currently only has one viable connection for both vehicles and pedestrians over the train tracks, which the plan increases to two and five, respectively.

Regional Connectivity [Score: 2]

Overall, the plan does not fully address the site in a regional capacity, and instead focuses on the site itself and access points in the immediate vicinity.

Ferry: The plan anticipates a ferry landing on the northern portion of the site (Anaconda point), where there is a bulkhead, the most commercial activity and within closest proximity to the village hub.

Train: It is unclear by the plans whether pedestrians can access the train station directly from the waterfront side of the tracks. While a minor adjustment, removing the barrier of directing pedestrians up and over the tracks from the train station will help improve overall connectivity between this major mode of regional transportation and the waterfront site a goal which is also supported by the

Waterfront Infrastructure Plan. While the developer does not have purview over the train station itself, it should accommodate for a future waterfront-facing entrance to the station. However, the site design does well to ensure that the waterfront site does not simply become a train station accessory parking lot or traffic bottleneck.

Bicycle: There is no mention of the regional bicycle trails that run through the village or potential linkages with other local and regional bicycle routes, such as the existing Old Croton Aqueduct Trailway, a New York State trail, or Westchester County's plans for a 51.5 mile Westchester Riverwalk, a continuous Hudson River waterfront trail. Current maps depict this trail utilizing the existing Aqueduct trail with a detour through the waterfront site.

Multimodality [Score: 2]

The site plan does well to offer multimodal transportation options and de-prioritizes the use of automobiles in lieu of pedestrian accessibility. Pedestrians, bicycles, ferries, and vehicles are all included in the plan. That said, the plan does not directly address how all these transportation resources will be serving the greater village, which is beyond the scope of the plan. With respect to vehicles, 1300 parking spaces are provided sub-grade on the site for residents, businesses, and site visitors, which is built closer to today's needs than that of the future. Parking needs are expected to decrease with future technology, which would allow for more economically

productive use of available land, even below grade. Looking beyond the boundaries of the site itself could also alleviate some of the parking needs. Additionally, while it is implied that bicycles are allowed on the pathways, it is not clear which pathways can accommodate bicycle use.

Promotes Good Circulation Within the Site [Score: 2]

Pedestrian circulation: The site plan contains a detailed circulation plan that promotes access to the riverfront, especially for pedestrians. The meandering paths and boardwalks that continue throughout the site encourage connection with the water and distributes movement to all areas of the site. However, the private buildings over the “publicly accessible wetlands,” (Ennead, 2018) while separated by grade, may create a perception of a private barrier, discouraging public access to the southern portion of the site.

Automobile circulation: The site plan calls for 1300 parking spots for public and private use. While parking is to be primarily underground and minimized above ground, the cars that occupy the streets create circulation issues for not only automobiles but for pedestrians as well.

Promotes Infrastructure for the Future of Mobility [Score: N/A]

It is difficult to predict what the future of automobiles will be, but there needs to be thought of what the infrastructure can be for the future whether for autonomous vehicles or flying cars.

Placemaking

Village Identity- Hastings on Hudson [Score: 3]

The plan emphasizes resilient development which distinguishes itself from surrounding river towns. The design takes into account the past industrial use, current village layout, and future river ecology. The plan gives Hastings-on-Hudson new waterfront neighborhoods called “the Wetlands” that create an energy efficient mix of urban living and natural surroundings.

Aging in Place [Score: 3]

Ennead’s plan includes mixed use space, pedestrian friendly design, and a varied housing stock that create a conducive environment to aging in place. The plan allows residents to downsize within the Village, remaining in their community or their homes through many stages of life. Residents would have access to essential resources onsite, downtown or a short train or ferry ride to other towns.

Connectivity of People to People [Score: 2]

Ennead’s plan has recreational amenities that will connect residents through competitive play, passive play, and recreation. The plan features a beach, splash pad, riverwalk, and open space for creative use. The only flexible-use space listed is a community center.

Connectivity of People to Natural Environment [Score: 3]

The plan highlights native marshlands and river landscapes as a destination for residents and visitors, supported through the use of elevated pedestrian streets, piers, and boardwalks. The plan leverages the site's spectacular views of the Palisades with a view corridor framed around naturally existing panoramas. The firm looked into previous plans and took into account the specific views of uphill residents.

The plan shows an environmental emphasis, showcasing the marshlands and ecological landscapes as destinations for residents and visitors. The unique elevated housing clusters bring residential uses directly into natural spaces on the new waterfront. Recreational amenities that connect people to the environment like kayaking, riverwalks and open fields can be used together with other community members, or solitarily to encourage individual connection to the environment.

Non-Exclusionary Public Spaces [Score: 2]

While public spaces in the Ennead plan are attractive, they are separated from the village by blocs of commercial and residential use. Without careful attention from the village, public spaces on the site could feel as if they belong primarily to private uses.

Hostile architecture: Good. The Ennead plan does not include hostile architectural elements.

Clear delineation between public and private space: Fair. Public spaces on the Wharf section of the site are accessible primarily through commercial corridors. The water feature, inlet, amphitheater and "Grove" area are encompassed by commercial uses. Only one recreation area, the green space in the northwest corner, is not directly adjacent to a commercial use. Trails and kayaking areas in the Wetlands section run around and under residential buildings. While healthily integrated public and private spaces can be mutually reinforcing, public spaces on this site run the risk of feeling as if they belong to their surrounding private uses.

Includes uses with broad appeal: Fair. The site contains a variety of attractive amenities, including recreation paths, a water feature, inlet, and amphitheater. The site has sparse flexible-use space, however, which could prevent it from adapting to the changing needs of a future population.

Opportunities for non-commercial enrichment: Good. The site includes a public amphitheater that could host lectures, public meetings, music, and other performing arts events. The water feature, inlet and trails also support non-commercial enrichment.

PLAN #2:

CONCEPTUAL SHORELINE DESIGN REPORT, ROUX ASSOCIATES 2018

Sustainability

Carbon Neutrality [Score: N/A]

The scope of the plan does not include any development that would be either carbon positive or negative.

Water Neutrality [Score: N/A]

The plan makes no mention of water neutrality or reduction of water consumption, but the built area in this plan is very limited in comparison to the size of the site. These built areas don't have a specific type of programming assigned to them; they are assumed flexible use. Water usage at these facilities may be limited. Water use reduction solutions could be implemented, but none are indicated.

Account for Natural Water Flows [Score: 1]

The plan acknowledges the threat that climate change poses in the form of sea level rise and increasingly dangerous flooding events. Roux makes reference to FEMA's Flood Insurance Risk Maps and FEMA's Preliminary & Pending National Flood Hazard, which indicates the changes in the base flood elevation for the future. The plan also takes notice of the increase of one-hundred year flood events that climate change will bring, citing the 2009 report by the New York City Panel on Climate Change.

The Roux plan does not address the threat of sea level rise in

its design. As a shoreline plan, it focuses its design on the use of marshes, riprap, various types of wave attenuators, and ways to stop shoreline erosion.

Ecosystem Services [Score: 3]

The plan provides for educational opportunities and recreational activity throughout the site. It also creates an excellent living shoreline. Design features include minimal and shallow shoreline sloping which promotes biodiversity and the establishment of intertidal wetland species. This facilitates plant and animal migration between the river and land in an attempt to restore the built shoreline into a natural shoreline.

Resiliency [Score: 2]

Redundant Systems: The diverse designs for shoreline protection provide redundant systems, like a rock wave break and salt marsh, in which the shoreline will still be protected in the case of one of them fail in some way.

Diversity: The plan uses a diverse array of design solutions to provide protection for the shoreline, which include salt marshes, bulkhead remnants, and riprap.

Modularity: Modularity is not addressed in descriptions of Roux Associates' resistant design elements.

Innovation & Design: This design includes steps, an

esplanade, steps to the marsh in the north of the site, a fishing pier, floating dock, and a path that runs along the southern end of the site.

Community and Economic Development

The Site Plan Accommodates Projected Population Growth [Score: N/A]

This plan does not indicate any consideration for the population growth that Hastings-on-Hudson will experience over the next 100 years. While the plan does offer design ideas that would allow for residents to interact with the site, it does not have a particular focus on the ways in which the site could support an increase in population.

The Site Plan Accommodates Changing Commercial and Residential Needs [Score: N/A]

The Roux Associates plan does not focus on the larger community's commercial or residential needs.

The Site Plan Accommodates Telecommuting Trends [Score: N/A]

As this plan concerns itself only with public space on the waterfront, potential accommodation of future telecommuters is not addressed.

The Site is Revenue Positive [Score: 2]

The proposed Village-owned park in the northwest corner

and along the length of the waterfront site has the potential to become revenue positive in 100 years. The marina and other businesses providing amenities to park visitors could generate modest tax revenue. More importantly, the plan's proposed investments in sustainable and resilient infrastructure could help the shoreline remain intact and protect other developments from damage in the event of a serious flood. These capital investments could minimize ongoing maintenance costs for the Village, though without knowing what other development could occur on the remainder of the waterfront parcels, it is hard to know whether this plan would leave the site tax-revenue positive.

The Site Generates Economic Activity for the Village and its Residents [Score: 2]

Recreational amenities like the boathouse, cafe, viewing plaza, kayak launch and boat docks could help to draw visitors to the waterfront and to the downtown businesses in Hastings-on-Hudson. However, the relative lack of space dedicated to commercial uses means that this plan does not reach full potential for the generation of economic activity.

Transportation

Village Connectivity [Score: 1]

The pedestrian access and ferry landing are the only elements that are included in this plan, as they are physically located in the shoreline area. However, the report could have done more

to show how these elements would connect to the upland village and transportation resources.

Connection with the village through transportation infrastructure:

Pedestrian: The plan is focused on the shoreline of the waterfront site and does not directly address the site's relationship to the upland village or existing transportation resources. However, it does detail plans for continuous pedestrian access throughout the limited site boundaries and, based on stakeholder feedback, chooses the proposed site plan that has the most pedestrian access.

Bicycle: While mentioned early on in the report and again in the public presentation, bicycle paths are not explicitly depicted or explained in the proposed site plan.

Vehicle: Vehicular access falls outside of the scope of this report, as the shoreline is intended to become public parkland and assumes that vehicular access will not be permitted. Roadways are depicted on the site, but are excluded from the shoreline with the exception of one access road.

Safety of movement of people, goods and services between village and waterfront site: This is outside the scope of the plan.

Improves existing access point(s) to waterfront site: The plan

assumes this is dealt with by the waterfront infrastructure committee report and is outside the scope of the project.

Increases number of access points to the waterfront site (addresses railroad and topographic barriers): This is outside the scope and geographic area of the plan.

Regional Connectivity [Score: 1]

Ferry: The potential for future ferry access is assumed a possibility and incorporated into the plans.

Train: The train station falls outside the shoreline area defined by the report and is not explicitly addressed.

Bicycle: N/A. The plan does not clarify whether any bicycle paths will link with local/regional bicycle trails, which this is likely considered outside of the scope of the plan.

Multimodality [Score: 1]

The plan is primarily focused on linear pedestrian access to the waterfront and shoreline activities. This includes ferry access and bicycle-friendly pathways, though bicycles are only briefly mentioned. Vehicular accessways, parking and the train station all lay beyond the boundaries of the shoreline plan and are therefore not within its scope.

Promotes Good Circulation Within the Site [Score: 1]

This plan is primarily focused on pedestrian circulation

throughout the site. ten-foot wide pedestrian pathway and soft trail system would flow through the shoreline and have pathways for access to the river. The Ferry Terminal proposed in the plan has immediate access to the pedestrian path. The plan shows automobile access on the site, but as it is outside the scope of the shoreline plan, does not elaborate on the details of how these modes of transportation will connect to each other or the upland village.

Promotes Infrastructure for the Future of Mobility [Score: N/A]

The plan does not call for any infrastructural consideration of the future of automobiles. f There are many opportunities in the area where infrastructure could be adjusted for anticipated developments in vehicle technology, particularly autonomous vehicles.

Placemaking

Village Identity [Score: 2]

Roux Associates conducted a public charette on identity, and incorporated the results into their design. Meeting participants expressed interest in an arts and education center, preservation of river and Palisades views, an emphasis on the waterfront's industrial heritage, and flexible performance and recreation spaces. The plan also used a June 2013 Village Survey to consider water and land-based uses.

Aging in Place [Score: N/A]

Since this plan only addresses public waterfront facilities, there is not enough information to know if it will provide the built amenities necessary to allow the community to age in place.

Connectivity of People to People [Score: 3]

The Roux plan features many recreational amenities that will help connect people to people through active play, passive play, and recreation. This includes a playground, physical fitness course, nature trails, boathouse and cafe, beach, and boardwalk esplanade. The plan also includes a number of flexible spaces.

Connectivity of People to Natural Environment [Score: 3]

The plan emphasizes the use of sustainable design approaches. It also mentions development and siting of recreational programming events as well as a boardwalk and trails through vegetated shoreline. Roux's approach emphasizes the importance of "...creating flexible programming, using ...ecologically performative features to engage both active and passive space" (Roux, 2018) showing their focus on environmentally-informed design decisions throughout the site. The plan matches habitat creation with conceptual design, with boardwalk viewing platforms built over marsh areas to provide opportunities for environmental

education and appreciation. The pedestrian path and soft trail system are supported by attractive signage, landscape furniture, and sufficient lighting.

Non-Exclusionary Public Spaces [Score: 2]

Hostile architecture: Good. The Roux plan does not include hostile architectural elements.

Clear delineation between public and private space: Good. The Roux plan only addresses the shoreline, showing a design for public space and amenities separate from commercial and residential uses that are outside its scope. The Roux site would be a cohesive space, and clearly separate from any abutting commercial or residential use.

Includes uses with broad appeal: Fair. The site includes extensive flexible-use space which could adapt to a variety of community needs. The inclusion of easily accessible playgrounds, trails and open spaces are also broadly appealing features. The marina at Shoreline B, however, focuses a large public area around expensive private property. The presence of this property will demand measures to protect it, potentially creating feelings of physical and social exclusion at the heart of a public site. Boat ownership is an activity with elite associations and without broad appeal, and could leave the area in its vicinity feeling exclusionary.

Opportunities for non-commercial enrichment: Good. The site

is reserved almost exclusively for non-commercial enrichment. The lack of a designated cultural feature like a stage or amphitheater is offset by ample flexible-use space which could be adapted to meet those needs.

APPENDIX B: HASTINGS-ON-HUDSON HIGH SCHOOL STUDENT SURVEY

A survey was administered to the Hastings-on-Hudson AP Environmental Science class in November 2018. Responses were collected via SurveyMonkey, an online survey software. Below are the questions included in the survey, an analysis and excerpts of student responses.

1. What Grade are you in? [Select one]

- 9th
- 10th
- 11th
- 12th

2. How long have you lived in Hastings-on-Hudson? [Select one]

- I was born here
- I moved here before age 5
- I moved here between age 5 and 10
- I moved here after age 10

3. Have previous generations in your family grown up in Hastings-on-Hudson? [Select all that apply]

- No
- A least one of my parents/guardians grew up in Hastings-on-Hudson
- At least one of my grandparents grew up in Hastings-on-Hudson
- I don't know or this doesn't apply to me

4. Do you agree or disagree with the statement, "I like living in Hastings-on-Hudson"? [Select one]

- I agree
- I disagree
- Somewhere in the middle
 - Please explain why you chose your answer

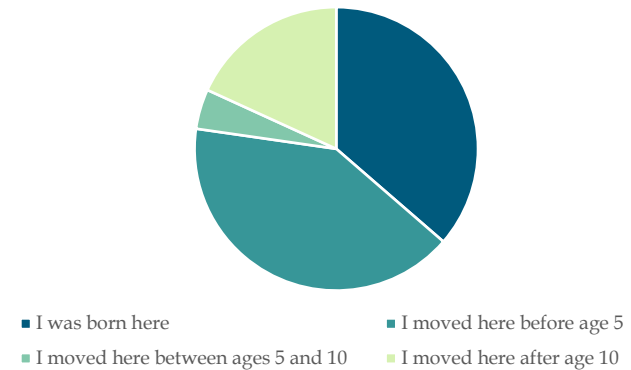
5. Would you live in Hastings-on-Hudson as an adult? [Select one]

- Yes
- No
- Maybe, it depends
 - Please explain why you chose your answer

6. What do you think makes Hastings-on-Hudson unique? [Text box]

7. What would you like to see on the vacant land between the train station and the river? What would make you interested in going there? [Text box]

How Long Have you Lived in Hastings-on-Hudson?



Do you agree or disagree with the statement, "I like living in Hastings"?

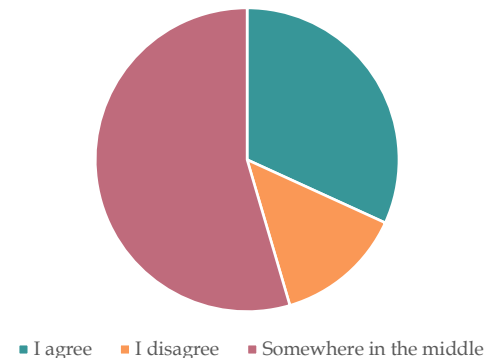


Figure A1 Analysis of responses to the Hastings High School Student Survey

APPENDIX C: HIGH DENSITY RESIDENTIAL ANALYSIS

Calculating the Average Number of Persons per Acre in High-Density Residential Developments

In order to calculate the number of people per acre residing in parcels zoned for high density residential, we used 2009 land use data provided by Westchester County. Although the dataset showed 210 parcels zoned for High Density Residential, many of these were used as one- or two-family residences. 40 of those parcels are sub-categorized as Apartments, however, so we selected these parcels to be included in the calculation. The number of units on these 40 lots totaled 730 and the units per parcel ranged from 4 to 121. The acreage ranged from 0.051 to 7.529. We used the average household size from the 2010 Census: 2.56 persons per unit.

$$\frac{(\text{Acre}_1 + \text{Acre}_2 + \text{Acre}_3 \dots + \text{Acre}_{40})(\text{PPAcre}_1 + \text{PPAcre}_2 + \text{PPAcre}_3 \dots + \text{PPAcre}_{40})}{(\text{Acre}_1 + \text{Acre}_2 + \text{Acre}_3 \dots + \text{Acre}_{40})(40 \text{ parcels})}$$

= 147.494 people per acre on average

There are 147.494 people, or 57.615 units per acre, in high-density residential developments. The Studio will use this calculation to estimate the number of people per acre in future high-density residential developments.

*Table A1 Analysis of High Density Residential Development;
Data sourced from Westchester County*

Parcel	Number of Units	Acreage	People per Acre (assuming HH size of 2.56)
1	10	0.104006	246.1396458
2	4	0.349771	29.27629792
3	6	0.24753	62.05308447
4	4	0.109943	93.13917212
5	12	0.249028	123.3596222
6	34	7.529303	11.56016699
7	13	0.066295	501.9986424
8	10	0.475418	53.84735117
9	6	0.091735	167.4388183
10	121	3.813431	81.22868881
11	5	0.301929	42.39407278
12	8	0.071671	285.7501639
13	7	0.056144	319.1792533
14	14	0.244366	146.665248
15	5	1.07297	11.92950409
16	14	0.59016	60.72929375
17	8	0.078484	260.944906
18	57	1.0383	140.5374169
19	6	0.222213	69.1228686
20	6	0.094716	162.1690105
21	9	0.091972	250.5110251
22	6	0.135321	113.5078813
23	6	0.0509	301.7681729
24	6	0.072489	211.8942184
25	6	0.24665	62.27447801
26	4	0.17072	59.98125586
27	8	0.080696	253.7920095
28	8	0.082103	249.4427731
29	6	0.054781	280.389186
30	9	0.114909	200.5064877
31	85	4.998641	43.53183195
32	6	0.199614	76.94851063
33	57	2.144362	68.04821201
34	42	3.719012	28.91090429
35	8	0.079082	258.9717003
36	6	0.086939	176.6756001
37	11	0.123416	228.1713878
38	87	4.97469	44.77062892
39	4	0.117728	86.98015765
40	6	0.467875	32.82928133
TOTAL	730	34.81931	5,899.368931

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