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Frank Sinatra Drive Visioning and Conceptual Design Plan

Existing Conditions Report

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Introduction

Frank Sinatra Drive from 4th Street to 11th Street is a 3,700-foot-long, curvilinear, scenic waterfront corridor with magnificent views of the Hudson River and Manhattan skyline. Over the past century, Hoboken's waterfront has been transformed from an industrial and maritime shoreline marked by warehouses and finger piers to a post-industrial landscape marked by office buildings, esplanades, and public open spaces. This section of Frank Sinatra Drive remains the only unfinished portion of Hoboken's re-envisioned and revitalized waterfront.

To the west, Frank Sinatra Drive is bounded by the Stevens Institute of Technology's campus on the Castle Point outcrop and two municipal parks (Stevens Park and Elysian Park). To the east, the corridor is bounded by the Hudson River Waterfront Walkway with complementary recreational uses (gazebo, fishing pier, and skateboard park) and two more park spaces (Frank Sinatra Field and Maxwell Place). There is one remaining maritime use to the northeast (Union Dry Dock). To the southeast lies a parking lot and maintenance facility owned by Stevens Institute of Technology.

Currently, Frank Sinatra Drive is a two-lane roadway that carries both northbound and southbound regional and local traffic with parallel parking on both sides. Despite the roadway's length, it has only five intersections (River Street, Frank Sinatra Drive South [at Pier C Park], 5th Street, 11th Street, and Frank Sinatra Drive North) and only two traffic signals (4th Street and 11th Street). In addition, there is a mid-block pedestrian crossing signal located across from Frank Sinatra Field. As a result, these conditions encourage speeding and pose a danger to bicyclists and pedestrians due to the lack of adequate sight distance when traveling around the curves.

The City of Hoboken has initiated the "Frank Sinatra Drive Visioning and Conceptual Design Plan" project to:

- Bring Frank Sinatra Drive, from 4th Street to 11th Street, into compliance with state and federal roadway design standards
- Integrate safer bicycling and walking paths
- Incorporate green infrastructure and low impact design strategies
- Enhance the aesthetic and recreational value and sense of place along this scenic waterfront corridor

This project will build upon the City's current policy and planning objectives by applying the City's "Complete Streets" policy and incorporating recommendations from the City's Bicycle and Pedestrian Master Plan, Hoboken Master Plan, and Green Infrastructure Strategic Plan.

Project Area Map

Historic and Cultural Resources

From the first American brewery to the first baseball game, Hoboken has been the site of many historic events since the early 1600s. A review of the site files of the New Jersey State Museum Bureau of Archaeology revealed that there are no archaeological sites within the boundaries of the project area; however, the following resources are located along or near Frank Sinatra Drive and should be taken into account when planning for the future of the corridor. The full text of the cultural resources study conducted for this visioning effort can be found in the **Appendix**.

Photo No. H-9: Ca. 1890 view of River Road, much widened, betweem 8th and 9th Sts., with section of serpentine stone retaining wall at left. Courtesy Hoboken Public Library.

Photo No. H-5: Ca. 1850 view of Sybil's Cave, on River Walk. Courtesy Hoboken Public Library.

Identified Historic Resources

- **The Stevens Historic District** (Castle Point between 4th Street and 11th Street)—This National Register of Historic Places (NHRP)-eligible district includes the 55-acre campus of Stevens Institute of Technology, the residential blocks of Castle Point Terrace, and two blocks on Hudson Street between Elysian Fields Park and 8th Street. The boundary of the historic district runs generally along the western boundary of the right-of-way for Frank Sinatra Drive at the base of the bluff, although not including the Sybil's Cave site, which is maintained by the City.
- **Elysian Park** (10th Street to 11th Street between Hudson Street and Frank Sinatra Drive)—Originally part of the larger tract known as "Elysian Fields," this green area was first opened in 1845 by members of the Stevens family. It is reported to be the site of the first baseball field.
- **Sybil's Cave** (800 Frank Sinatra Drive)—This NHRP-eligible cave contained a fresh water spring that was opened by the Stevens family in the 1830s as a tourist attraction. A tavern was created near the opening, which drew as many as 20,000 visitors each day in the summer. It was closed to the public in the1800s due to health concerns, and was filled in with concrete during the 1930s. In 2008, Hoboken Mayor Dave Roberts restored and rededicated the site, installing protective wrought iron fencing and an interpretive plaque.

Previously Unidentified Historic Resources

- **Serpentine Rock bluff, Castle Point**—First identified by Hendrik Hudson in his ship logs of 1609, this "cliffe that looked of the colour of a white greene" established Castle Point, Hoboken, as a natural landmark.
- **Castle Point Lookout**—The balustrade of this 100-foot promontory is visible from Frank Sinatra Drive.
- **Rock Retaining Walls**—Four sections of historic rock retaining walls can be found along Frank Sinatra Drive: the foot of 4th Street and 5th Street intersections with Frank Sinatra Drive (pre-1891); near the foot of 7th Street at Frank Sinatra Drive (pre-1909); the section of serpentine rock wall below the Castle Point Lookout (1857); and walls that extend from foot of 9th Street to Elysian Park (sections pre-1904, some pre-1909, some pre-1923).
- **Unmarked Iron artifact**—Found near the eastern sidewalk at the north end of Sinatra Park Soccer Field, at 5th Street and Frank Sinatra Drive, the source of this item is unknown, although it may be over 50 years old. It likely was put in place during the creation of Sinatra Park or the reconstruction of the soccer field. More research is recommended before any disposition of this artifact is undertaken.

Cultural Resources less than 50 Years Old

- **World War II Memorial**—This memorial to the 159 soldiers from Hoboken who died in World War II is located at 4th Street and Frank Sinatra Drive.
- **Frank Sinatra Park**—Located at 4th Street and Frank Sinatra Drive, this waterfront park consists of a soccer field on pilings in the Hudson River, a concrete amphitheater that faces the former site of the World Trade Center, and a small park building.
- **Castle Point Skate Park**—Maintained by the City of Hoboken, this skateboarding park is located along the waterfront at 1101 Frank Sinatra Drive.
- **"We the Surviving Workers" Memorial, Union Dry Dock Grounds**—Found on Frank Sinatra Drive between 9th Street and 10th Street, this memorial is dedicated to the workers of the Hoboken "working waterfront."
- **Walkway and Fishing Pier**—Located at the foot of 8th Street and Frank Sinatra Drive, this was created in 2009 by Mayor Dave Roberts.

Traffic, Safety, and Parking Analysis

The Federal Complete Streets Act of 2009 states that a Complete Street is "... a roadway that accommodates all travelers, particularly public transit users, bicyclists, pedestrians, and motorists, to enable all travelers to use the roadway safely and efficiently." By using a holistic approach that considers the needs of all users, as well as the context of the surrounding urban form, Complete Streets can become a community amenity and asset.

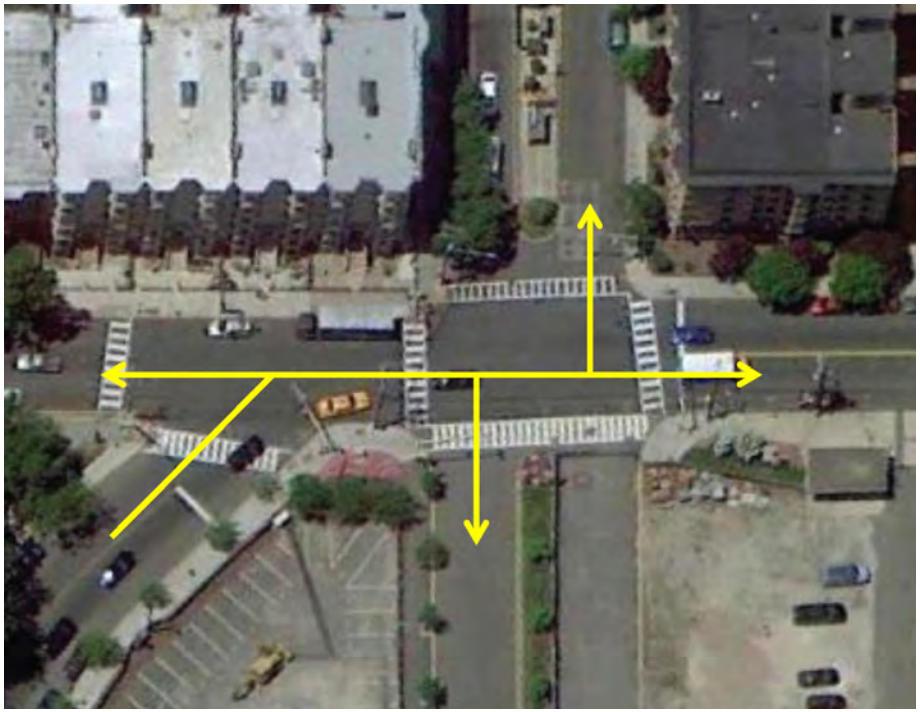
Today, Frank Sinatra Drive acts more like a bypass road between downtown and uptown Hoboken than a scenic route designed for recreation and pedestrian and bicycle safety. This section describes the existing traffic volumes, operating characteristics, crash history, and parking characteristics.

Operating Characteristics

Frank Sinatra Drive is currently a two-way roadway that carries both northbound and southbound traffic with parallel parking provided on both sides of the roadway. This corridor is used by automobiles, transit vehicles, pedestrians, and bicyclists. The posted speed limit within the study area is 35 miles per hour; which is 10 miles per hour higher than the majority of the streets within the City and is 15 miles per hour higher than the City's "Twenty is Plenty" program.

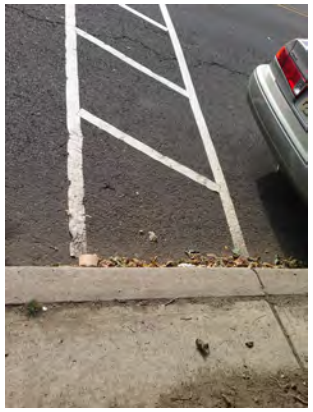
A lack of adequate sight distance around the horizontal curves at Castle Point poses a safety issue. The existing geometry of the roadway was reviewed and compared to New Jersey Department of Transportation (NJDOT) roadway design standards for urban, low speed roadways. The results of this review indicate that the existing horizontal curve radius does not meet the minimum radius required for a 35 miles per hour roadway. In addition, the minimum required stopping sight distance is not available at 35 miles per hour. An exhibit illustrating the existing sight distance is provided in the **Appendix**.

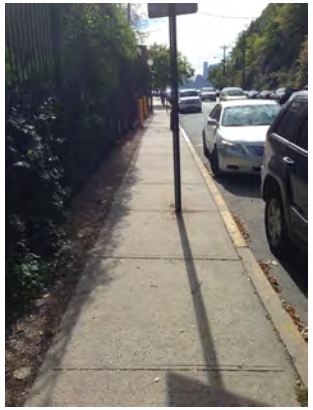
During the peak hours, northbound vehicular traffic on Frank Sinatra Drive consistently queues from the intersection of Hudson Street & 11th Street/ Frank Sinatra Drive south to beyond the skateboard park. Reasons for the vehicular back-ups include an exclusive pedestrian phase every cycle, a skewed northbound approach creating awkward turning angles, split-phased operation between Hudson Street and Frank Sinatra Drive approaches, and one northbound approach lane for vehicles making four different types of turning movements.



The width of the cross-section along the corridor varies as you travel along the roadway. The minimum cross-section width is approximately 51 feet adjacent to Union Dry Dock; with the width of sidewalks on either side of the roadway being approximately 4 feet to 5 feet. The travel lanes at this location are approximately 11 feet in width. A more generous cross-section width is located near Castle Point, where the width is approximately 58 feet. This section has wide travel lanes (approximately 20 feet) with parking only on the east side of the roadway. The sidewalk on the west side of the roadway is approximately 3.5 feet to 4 feet, with overgrown vegetation, and the sidewalk on the east side includes the waterfront walkway, which is 30 feet wide.

An existing, major obstacle to providing a safe environment for pedestrians along this corridor includes the lack of compliance with the Americans with Disabilities Act (ADA) standards. There are several instances where mid-block crosswalks are provided, but no curb ramps exist, or where a sidewalk intersects a driveway without curb ramps. Additionally, the existing sidewalks are narrow and littered with physical barriers which limit the ability of wheelchairs and strollers to be used on the sidewalk. It should be noted that there is an existing ADA accessible loading zone located near the skate park which appears to be ADA compliant.





An existing conditions Level of Service (LOS) analysis was performed using the traffic analysis software Synchro for each of the peak hours based on the traffic data collected. The LOS is measured on a scale of “A” to “F”, with “A” being the best and “F” being the worst. The results of the analysis indicate that each intersection is currently operating at or above LOS D for each peak hour, with the exception of the intersection of

Hudson Street & 11th Street/ Frank Sinatra Drive, which is operating at LOS E during the p.m. peak hour. A summary of the analyses is provided in **Table 1** and worksheets documenting the analyses are provided in the **Appendix**.

Table 1 – 2014 Existing Conditions LOS Summary

Intersection	AM	PM	SAT
	Overall	Overall	Overall
Hudson Street & 4th Street	B	B	B
Hudson Street & 5th Street	B*	B*	B*
Hudson Street & 6th Street	B	B	B
Hudson Street & 11th Street/Frank Sinatra Drive	E	E	D
River Street & 4th Street/Frank Sinatra Drive	C	C	C
Frank Sinatra Drive South & 4th Street/ Frank Sinatra Drive	B*	B*	B*
Frank Sinatra Drive & 5th Street	B*	B*	B*
Frank Sinatra Drive & Frank Sinatra Drive North	A*	B*	B*

* *LOS based on worst-case side street approach because HCM does not provide overall intersection LOS for unsignalized intersections.*

Traffic Volumes

The study area for this project focuses on Frank Sinatra Drive from the intersection of River Street & 4th Street/Frank Sinatra Drive to the intersection of Hudson Street & 11th Street/Frank Sinatra Drive. Due to the recommendations made in the Hoboken Master Plan and the Hoboken Bicycle and Pedestrian Plan of changing the operating characteristics of Frank Sinatra Drive, traffic data was collected outside of the study area along Hudson Street (at 4th Street, 5th Street, and 6th Street) to have the ability to evaluate those impacts if the vision of the community supports those recommendations.

Turning movement volume counts were collected at nine locations during a typical weekday a.m. peak period (7:00 a.m. to 9:00 a.m.) and p.m. peak period (4:30 p.m. to 6:30 p.m.), and during a Saturday midday peak period (11:00 a.m. to 1:00 p.m.). The data was collected on May 1, 2014, and May 3, 2014, and is included in the **Appendix**. The nine count locations included:

- Hudson Street & 4th Street (signal controlled)
- Hudson Street & 5th Street (STOP controlled)
- Hudson Street & 6th Street (all-way STOP controlled)
- Hudson Street & 11th Street/Frank Sinatra Drive (signal controlled)
- River Street & 4th Street/Frank Sinatra Drive (signal controlled)
- Frank Sinatra Drive South & 4th Street/Frank Sinatra Drive (STOP controlled)
- Frank Sinatra Drive & 5th Street (STOP controlled)
- Frank Sinatra Drive & Frank Sinatra Drive North (STOP controlled)
- Mid-block Frank Sinatra Drive near Castle Point (pedestrian/bicyclist count only)

A review of the existing turning movement volume counts indicates that the weekday peak hours generally occur from 8:00 a.m. to 9:00 a.m. and 5:30 p.m. to 6:30 p.m., and the Saturday midday peak hour generally occurs from 11:15 a.m. to 12:15 p.m. Approximately 500 to 700 vehicles per hour were observed traversing Frank Sinatra Drive across each of the peak hours. Heavy vehicles accounted for approximately 7 percent of total traffic during the a.m. peak period and 3 percent of the total traffic during the p.m. peak period and Saturday midday peak period. The majority of the heavy vehicles were shuttle buses and coach buses.

It should be noted that the intersection of Frank Sinatra Drive & Frank Sinatra Drive North has restricted turning movements to/from Frank Sinatra Drive North (no turns are allowed onto Frank Sinatra Drive North and only right turns are allowed from Frank Sinatra Drive North). However, during all peak periods a minimum of 10 illegal movements (left turns to southbound Frank Sinatra Drive) are made.

Pedestrian and bicycle volumes also were collected as part of the data collection for this project. A review of this data indicates that pedestrian activity varies along the corridor and with time of day. Generally, the peak of the pedestrian activity occurs during the Saturday midday peak hour and is highest at the north end of the project area near the intersection of Hudson Street & 11th Street/Frank Sinatra Drive. The pedestrian volume ranges from nearly 100 to more than 900 pedestrians per hour through the intersections.

Generally, the peak of the bicycle activity occurs during the Saturday midday peak. The peak bicycle volume is approximately 100 per hour.

Crash History

Crash data for the study area were used to evaluate corridor safety and identify crash patterns. The City of Hoboken provided crash reports for the latest available 3 years of crash data (January 1, 2011, to December 31, 2013). The primary goal of this analysis was to identify crash patterns and identify potential causes.

During the 3-year period for which crash data was collected, 50 total crashes occurred in the study area, with 10 injuries reported and zero fatalities. A summary of the crashes in the study area is shown in **Table 2**.

Table 2 – Study Area Crash Summary

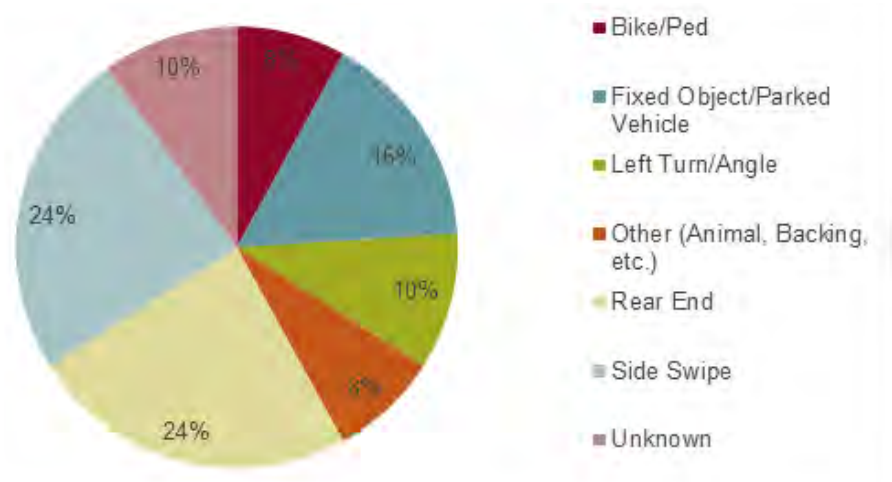
Intersection	Number of Crashes			Total
	2011	2012	2013	
11th Street & Hudson St/Frank Sinatra Drive	6	8	6	20
4th Street & River Street	6	2	4	12
5th Street & Frank Sinatra Drive	4	0	1	5
4th Street & Frank Sinatra Drive	1	0	1	2
6th Street & Frank Sinatra Drive	2	0	0	2
7th Street & Frank Sinatra Drive	2	0	0	2
8th Street & Frank Sinatra Drive	0	2	0	2
9th Street & Frank Sinatra Drive	1	0	1	2
10th Street & Frank Sinatra Drive	1	2	0	3
Total	**23**	**14**	**13**	**50**

Intersections with the highest crash frequency include:

- **11th Street & Hudson Street**
  - **Total Number of Crashes: 20**
  - 7 of the 20 crashes at this intersection were rear end crashes. These crashes are the result of congestion, driver inattentiveness, abrupt stopping, and yielding to pedestrians in the crosswalk. The unique intersection geometry may be a distraction to unfamiliar motorists.
  - 4 of the 19 crashes resulted in personal injury; all others were property damage only.
- **4th Street & River Street**
  - **Total Number of Crashes: 12**
  - Crash types varied at this intersection with rear ends, side swipes, and fixed objects accounting for 8 of the 12 crashes. In addition to previously stated causes, poor sight distance on the northbound 4th Street approach may contribute to the rear end crashes at this intersection. Fixed object crashes are incidents where a moving vehicle struck a parked vehicle at this intersection.
  - 2 of the 12 crashes resulted in personal injury; all others were property damage only.
- **5th Street & Frank Sinatra Drive**
  - **Total Number of Crashes: 5**
  - Crashes at this intersection varied among bike/pedestrian, angle, and side swipe crashes. The angle crash was the result of conflict between through traffic and a turning vehicle at this unsignalized T-intersection. One crash at this intersection involved a pedal cyclist and vehicle which resulted in personal injury.
  - 1 of the 5 crashes resulted in personal injury; all others were property damage only.

A summary of the crashes by crash type is provided in **Figure 1**. As shown, approximately one half of all crashes were either rear end or side swipe crashes. Approximately 80 percent of the rear end and side swipe crashes occurred at the intersections of 11th Street & Hudson Street/ Frank Sinatra Drive and River Street & 4th Street/Frank Sinatra Drive. Maps showing the total number of crashes and the crashes by type at each study intersection are provided in the **Appendix**.

Figure 1 – Study Area Crash Type Summary



Source: Based on crash data provided by the City of Hoboken from 2011 through 2013.

Parking Analysis

Parallel parking is allowed on both sides of Frank Sinatra Drive within the study area with the exception of a few areas located along the horizontal curves and immediately adjacent to cross-street intersections (these gaps in parking provide better sight distance for motorists). There are three types of on-street parking areas along Frank Sinatra Drive:

- Resident Only Permit Parking (green signs)
- Permit Parking Only (white signs), which allow for a four-hour grace period for visitors
- Short-term metered parking via pay stations along the segment between Sinatra Park and 5th Street/Stevens Parking Garage

On the east side of the roadway, there are several stretches of parking that have parallel spaces marked; these are holdovers from a time when each space was metered. Each of the marked spaces is approximately 20 feet in length and 9 feet wide. To estimate the total number of parking spaces available, each of the areas which allow parking were measured to get a total length of available parking space. This total length was then divided by an average vehicle length of 20 feet to estimate the number of parking spaces. There are a total of approximately 115 parking spaces (13 metered and 102 permit) on the east side of the road and approximately 123 parking spaces (11 metered and 112 permit) on the west side of the road. A summary of the parking inventory is provided in **Table 3**.

A windshield survey of the parking usage was performed on May 1, 2014, and May 3, 2014. This data was collected while driving up and down Frank Sinatra Drive and counting vacant parking spaces. Observations were made between 8:00 a.m. and 9:00 a.m. and between 5:30 p.m. and 6:30 p.m. on Thursday, May 1, 2014, and between 12:00 p.m. and 1:00 p.m. on Saturday, May 3, 2014. The results of this survey are presented in **Table 3**.

Qualitative observations of the parking usage within the study area include:

- Permit parking spaces are generally fully utilized during the overnight hours of both weeknights and weekend nights, with little turnover
- More parking turnover occurs during the weekday midday hours than other times throughout the day/week
- Very little double parking occurs, unless all spots are utilized and someone is waiting for a spot

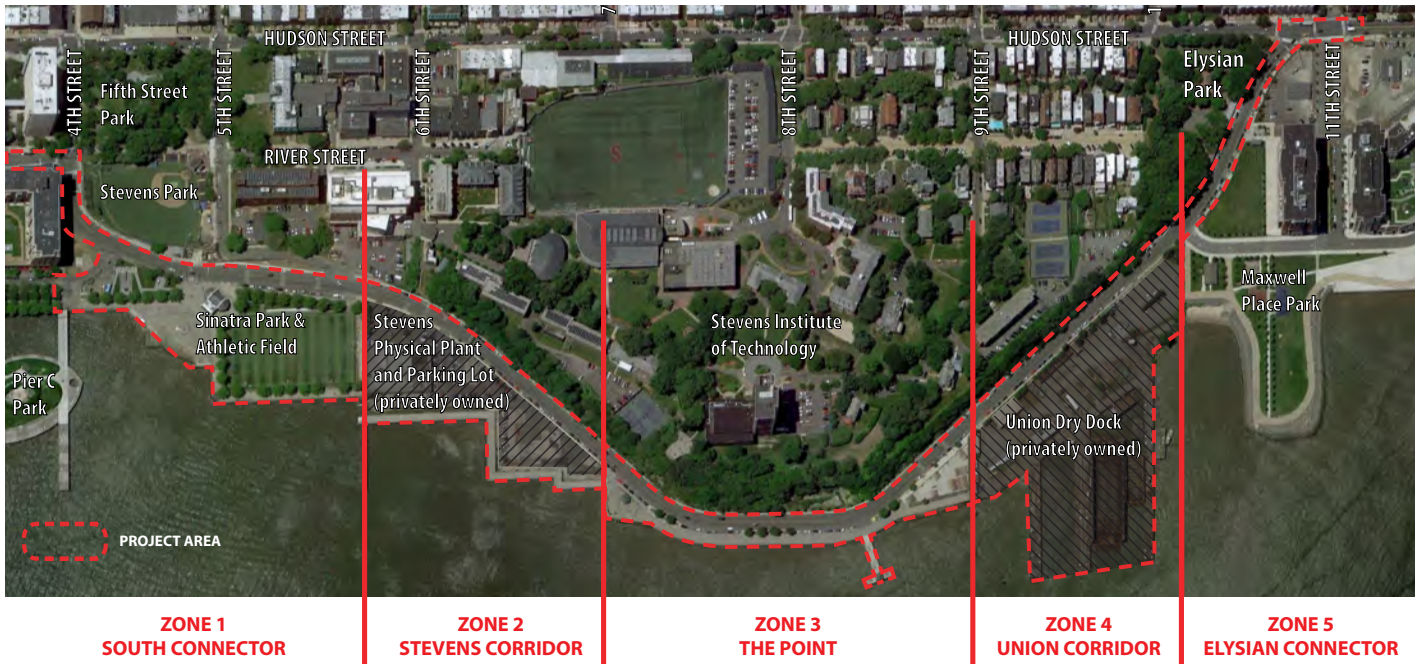
Table 3 – Parking Space Inventory Summary

Area	Type	Parking Area Length	# Spaces	# of Parked Vehicles			
				Interval	AM (5/1) 8:00 a.m. - 9:00 a.m.	PM (5/1) 5:30 p.m. - 6:30 p.m.	SAT (5/3) 12:00 p.m. - 1:00 p.m.
NB	Metered	250	13	0 - 15	9	13	12
				15 - 30	6	13	13
				30 - 45	10	13	13
				45 - 60	10	13	13
	Permit	2,043	102	0 - 15	87	92	94
				15 - 30	88	95	94
				30 - 45	80	94	97
				45 - 60	82	90	93
SB	Metered	215	11	0 - 15	8	11	12
				15 - 30	8	10	12
				30 - 45	7	11	11
				45 - 60	5	12	11
	Permit	2,233	112	0 - 15	92	96	103
				15 - 30	93	98	103
				30 - 45	93	102	105
				45 - 60	89	104	103

Infrastructure Conditions Assessment and Urban Design Analysis

The project study area is a linear section of the Hoboken waterfront that extends between 4th Street and 11th Street. Based upon initial analysis, it appears useful to characterize the project area as five distinct zones based upon physical features, adjacent uses, and urban character along Frank Sinatra Drive. The five zones are as follows:

- Zone 1 – South Connector
- Zone 2 – Stevens Corridor
- Zone 3 – The Point
- Zone 4 – Union Corridor
- Zone 5 – Elysian Connector



Zone 1 – Southern Connector

This zone begins at 4th Street and extends north to the edge of the Stevens Institute Physical Plant site. Within the project area, this zone is most connected to the rest of the City, with connections to the street grid and to the fully-developed sections of Hoboken's waterfront promenade. The zone contains two athletic fields, several public parks, and a WWII Memorial. The area experiences heavy athletic and recreational use.

Character and Use

This zone is a point of transition between the Southern Waterfront/ Hudson River Waterfront Walkway and the project area. At the convergence of 4th Street and Frank Sinatra Drive, the Waterfront Walkway character terminates with an ending of the Class I bike path and tree allee. Here the character transitions to an open recreational feel. Waterfront features include Pier C Park, a WWII Memorial, and Sinatra Park which has an amphitheater, kiosk, and soccer field. Uses include jogging, strolling, ball sports, kayaking, and leisure. The amphitheater gets frequent use for events and performances; however, the kiosk currently is mostly utilized for its public restrooms.

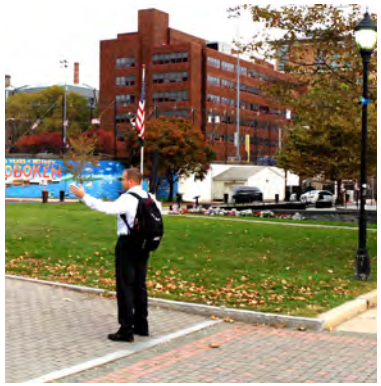
West of Frank Sinatra Drive, the Stevens Park baseball field surface is at the elevation of River Street and therefore faces Frank Sinatra Drive with a tall retaining wall which is decorated with murals. At the south side of the intersection with 5th Street the grade change conceals a service building.

Circulation/Flow

The non-grid road layout at the intersection of Frank Sinatra Drive with both 4th Street and 5th Street creates an awkward connection from southern Frank Sinatra Drive to the project area. Traveling north to the WWII Memorial, the Class I bike path ends abruptly and pedestrian ways are split into a waterfront walkway to the east and a sidewalk along Frank Sinatra Drive to the west.

Topographic changes between the Stevens Park baseball field and Frank Sinatra Drive also mark the beginning of a separation between the street grid and the waterfront as one moves north. Because of the grade change, 5th Street makes no direct right-angle intersection with Frank Sinatra Drive, nor is there a direct pedestrian connection by stair or ramp; rather, 5th Street turns north at a right angle to ramp down to an irregular intersection with Frank Sinatra Drive. The sloping section of the street has a substandard sidewalk and there is no crosswalk for pedestrians to cross Frank Sinatra Drive.






There are continuous sidewalks along the east and west sides of Frank Sinatra Drive; however, the west side sidewalk has unsafe crossings at the 5th Street intersection. Views to the east are spectacular and views from the project area into the Stevens Institute campus are of construction progress and parking/service lots.

Inventory

The variety of site amenities on the waterfront side of this zone includes:

- Benches
- Waterfront railings
- Lamp posts
- Signage
- Bollards – standard and dock cleats
- Bicycle racks
- Trash receptacles
- Paving – pedestrian pavements are concrete, unit and open grid pavers, and unit paved crosswalks; roadways and dedicated bike paths are asphalt
- Planting – groundcover, lawn shrubs and trees. A line of single plane trees extends up to the amphitheater, while the area around the WWII Memorial is mainly turf. The west side of Frank Sinatra Drive has turf and limited street planting.

The retaining walls on the west side of Frank Sinatra Drive are rough stone and mural painted concrete. Fencing along the west side is chain link, and fencing surrounding the soccer field is galvanized steel grill.

Structural Notes

The southernmost portion of the project area, the extension of the Waterfront Walkway, is comprised of fill soils behind a masonry gravity seawall. This structure terminates at the amphitheater, which is characterized as a rocky shore. North of the amphitheater the seaward side of the artificial turf athletic field is built over a relieving platform. The inboard portions of this area, including Frank Sinatra Drive, are underlaid by native and urban fill soils.

Opportunities

The main opportunities in this zone are enhanced connections between the southern Waterfront Walkway and the Frank Sinatra Drive project area, as well as enhanced connections between 4th Street and 5th Street and Frank Sinatra Drive. Continuation of the dedicated bikeway would encourage safe cycling around The Point to Maxwell Place. Enhanced programming for the kiosk would make it more useful as a gateway point for the project area.

Constraints

The location of the WWII Memorial presents a challenge to a direct connection between the southern Waterfront Walkway and Frank Sinatra Drive, as cyclists must navigate around it. Additionally, the topographic difference between the Stevens Park baseball field and Frank Sinatra Drive below makes a direct 5th Street connection challenging; a straight connection may affect adjacent properties. The future uses of the Stevens Institute properties west and east of Frank Sinatra Drive are up for reconsideration in an on-going campus master planning process; so the uses are not fixed at this time.

In terms of storm resiliency, this zone is in Federal Emergency Management Agency (FEMA) flood zone AE, which means all improvements would require a robust stormwater strategy and the ability to withstand inundation during storms.

Zone 2 – Stevens Connector

This zone extends between the southern and northern edges of the privately owned Stevens Institute Physical Plant. The zone is primarily a linear corridor between the Stevens Institute Physical Plant and adjoining parking lot on the east, and steep rock outcrops and vegetation beneath the Stevens Institute to the west. The property on either side of Frank Sinatra Drive is owned by Stevens Institute.

Character and Use

This zone is characterized by its narrow enclosure as a place not for lingering. The sidewalks are enclosed on the east by chain link fencing and on the west by steep rock outcrops. The existing sidewalk width does not meet ADA standards, and exclusive cycling facilities are nonexistent. The bare minimum is provided. The fence along the Physical Plant is in fair condition; however, it is topped by barbed wire and has litter collecting at the base which creates a feeling of neglect.

The main use of this area is for parking and passage. A pedestrian walkway on a pier structure, outboard of the Stevens Physical Plant, maintains a continuous walkway along the waterfront. The parking lot adjoining the Physical Plant is for private parking, and on-street parking separates the sidewalks from the roadway. An elevated utility conduit from the Physical Plant to the Stevens Institute campus crosses Frank Sinatra Drive midway within this zone. There is no planting on the east side of the roadway.

Circulation/Flow

Circulation in this zone runs primarily north/south; however, there is a major point of connection between the Physical Plant and the Stevens Institute campus above at a wood staircase that climbs the steep slope to the Stevens Institute. This staircase provides the only direct connection between the project area and the upper, central area of the Stevens Institute campus. There is also a connection to the Waterfront Walkway just south of the Physical Plant property. The Waterfront Walkway continues outboard of the Physical Plant and reconnects to Frank Sinatra Drive at the north end of the Physical Plant.

Immediately south of the overhead utility conduit, three parking entrances to the Stevens Institute Physical Plant cross the sidewalk on the east side of Frank Sinatra Drive.





Inventory

The variety of site amenities on the Waterfront Walkway:

- Waterfront railings
- Lamp posts
- Trash receptacles
- Paving – unit pavers

There are no amenities along Frank Sinatra Drive in the Stevens Corridor. The generic urban materials include asphalt roadway pavements, concrete curbs and sidewalks, chain-link fencing, and wooden utility poles for roadway and security lighting.

There are no street-related plantings within this section of Frank Sinatra Drive. The steep hillside west of Frank Sinatra Drive is heavily vegetated.

Structural Notes

The Stevens Institute Physical Plant and adjoining parking lot are constructed above fill and the Waterfront Walkway is on piers.

Opportunities

Widening sidewalks, continuing a dedicated bikeway, and enhancing the pedestrian crossings and stairway connection to Stevens Institute campus are all significant opportunities in this zone. Traffic calming along Frank Sinatra Drive would improve pedestrian safety. Selective clearing and trimming of the overgrown vegetation along the west sidewalk would enhance the natural quality and encourage pedestrian use of that edge.

Opportunities to partner with Stevens Institute on a design that encourages safer pedestrian flow through the area and more direct connections could be explored, along with the potential for repurposing the Physical Plant for public open/green space.

Constraints

At present, the future of the privately owned Stevens Institute Physical Plant and adjoining parking lot is undetermined and the location of the building will most likely remain for some time. The widening of the sidewalks appears possible only in the context of reallocation of the total street width. In terms of storm resiliency, this zone is in FEMA zone AE, which means all improvements would require a robust stormwater strategy and the ability to respond to inundation.

Zone 3 – The Point

The Point begins at the northernmost edge of the Stevens Institute Physical Plant and extends to the south edge of the Union Dry Dock. The zone contains a long public Waterfront Walkway, a historic site, a fishing pier, and a skate park. The area gets moderate recreational use.

Character and Use

This zone is characterized by its generously wide waterfront promenade but lacks a variety of uses due to insufficient programming. It is a transition zone between two corridors that is used mainly on weekends and holidays. Uses include jogging, fishing, skateboarding, and relaxing. There is on-street parking with planted islands on the east side of Frank Sinatra Drive. From the Waterfront Walkway, a T-shaped fishing pier extends into the river, with a gazebo at the intersection of the "T." On the west side of Frank Sinatra Drive is a narrow continuous sidewalk and steep vegetated slope. Sybil's Cave, a historic feature, is marked with an interpretive sign and offers a small, fenced seating area; the "cave" itself is sealed behind a gothic stone archway. Waterfront views to the east are outstanding and views to the west are of the vegetated slope.

Circulation/Flow

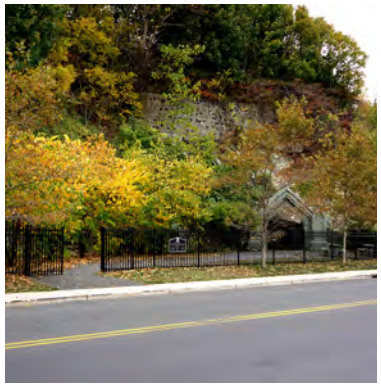
Pedestrian movement is unrestricted and direct from north to south. There are no marked pedestrian crossings within this zone, which attributes to unsafe pedestrian crossings and encourages automobile speeding. The Waterfront Walkway branches off heading north from the skate park, but terminates at the Union Dry Dock property. There is not connectivity west to the Stevens Institute along this zone due to the major topographic change.

Inventory

The variety of site amenities on the waterfront side of this zone includes the following:

- Two gazebos – a larger gazebo near the southern end near Zone 2, and a simpler shade structure on the fishing pier
- Benches
- Waterfront railings
- Lamp posts
- Bollards – standard and dock cleats




- Bicycle racks
- Trash receptacles
- Paving – concrete, unit pavers
- Planting – lawn and trees in raised concrete planters in center, planting at grade around Skate Park. A notable portion of the trees appear stunted, possibly from recent saltwater inundation, regular salt spray, or compromised soil conditions.
- Skate Park – ramps and jumps, surrounded by chain-link fence

Most of the west side of the drive has no amenities. There is a concrete curb with a minimal concrete sidewalk and generic wooden poles for street lighting. At Sybil's Cave, there is:

- A wrought iron-style modern fence and gate
- Crushed stone pavement
- An interpretive sign
- Concrete picnic tables with attached benches
- A gothic stone arch at the cave entrance

Structural Notes

The roadway of Frank Sinatra Drive is on solid ground, likely a combination of the original shoreline and fill placed during its history as an active port. The areas east of the two concrete planters, comprising most of the waterfront public access area, are supported on a relieving platform structure. The fishing pier is a conventional pile-supported structure.

Opportunities

The main opportunities in this zone are enhanced programming and a continuation of the dedicated bikeway which would encourage safe cycling around The Point to Maxwell Place. The area has a great amount of hardscape—storm protection and flooding could be mitigated by green infrastructure. Selective clearing and trimming of the overgrown vegetation along the west sidewalk would enhance the natural quality and encourage pedestrian use of that edge if pedestrian crossings and traffic calming were provided.

Constraints

Traffic speed is a big deterrent to crossing Frank Sinatra Drive and use of the west side of the roadway. Construction of amenities and plantings on the seaward side is complicated by structural conditions and lack of soil. In terms of storm resiliency, this zone is in FEMA zone AE, which means all improvements would require a robust stormwater strategy and the ability to respond to inundation.

Zone 4 – Union Corridor

This zone extends the length of the privately owned Union Dry Dock site. The zone is primarily a linear corridor defined by the Union Dry Dock parking lot on the east, and steep rock outcrops and vegetation to the west. The main use of this area is for parking and passage.

Character and Use

This zone is characterized by its narrow enclosure as a place not for lingering. The sidewalks are enclosed on the east by fencing and on the west by steep rock outcrops. The existing sidewalk width and entry drive crossings do not meet ADA requirements, and exclusive cycling facilities are nonexistent. The fence along the Union Dry Dock is in fair condition. The parking lot is for private use, and on-street parking separates the sidewalks from the roadway. There is no planting on the east side of the roadway.

Circulation/Flow

Circulation in this zone runs only north/south along Frank Sinatra Drive; there are no marked pedestrian crossings within this zone. There is also no access to the waterfront within this zone. The Union Dry Dock site is served by two vehicular entrances, which cross the narrow eastern sidewalk. Because of declining activity on the Union Dry Dock site, traffic volumes entering and exiting the site are low, but still constitute a conflict with north-south use of the roadway.

Inventory

Site amenities on the waterfront walkway include the following:

- Lamp posts – on Union Dry Dock property

There are no amenities along the west side of Frank Sinatra Drive, aside from a narrow concrete sidewalk and street lighting on wooden utility poles.

Structural Notes

Frank Sinatra Drive and the sidewalks are on urban fill soils.

Opportunities

Widening sidewalks, continuing a dedicated bikeway, and creating safe pedestrian crossings are all significant opportunities within this zone. Traffic calming along Frank Sinatra Drive would improve pedestrian safety. Selective clearing and trimming of the overgrown vegetation along the west sidewalk would enhance the natural quality and encourage pedestrian use of that edge.

Potential repurposing of the Union Dry Dock site may offer new opportunities for improving public access along the waterfront and through the street corridor. Connecting the Waterfront Walkway between the Skate Park and Maxwell Park would complete a system of continuous pedestrian circulation along Hoboken's waterfront.

Constraints

At present, the private ownership and current use of the Union Dry Dock site precludes public use of the site. Until future use is determined, this site remains off limits. The widening of the sidewalks would require the loss of on-street parking spaces which may be problematic. In terms of storm resiliency, this zone is in FEMA zone AE, which means all improvements would require a robust stormwater strategy and the ability to respond to inundation.

Zone 5 – Elysian Fields Connector

This zone begins at the north end of the Union Dry Dock property and extends to the intersection of 11th Street & Hudson Street/Frank Sinatra Drive. The zone contains a public lawn, a park with dog run, and a waterfront park. The area gets heavy recreational use. Frank Sinatra Drive North connects to Frank Sinatra Drive between the Maxwell Place Lawn and Maxwell Place Park.

Character and Use

This zone is a point of transition between Frank Sinatra Drive and the neighborhoods along Hudson Street. The character of this zone has a green feel due to the proximity of the parks that serve the neighborhoods. Uses include jogging, strolling, youth playing, kayaking, and leisure. The on-street parking is well used. The west side of Frank Sinatra Drive has a topographic change with high retaining wall, above which sits Hoboken's Elysian Park with a dense canopy of large shade trees.

Circulation/Flow

This zone has adequate width sidewalks, but lacks pedestrian crosswalks except at the intersection of 11th Street & Hudson Street/Frank Sinatra Drive. There is a waterfront walkway which extends along the northern property line of the Union Dry Dock site to the north around Maxwell Place Park. Circulation to Maxwell Place Park and Elysian Park are adequate, but access to the Maxwell Place Lawn is limited by a fence.

Inventory

The variety of site amenities on the waterfront side of this zone includes:

- Benches
- Waterfront railings
- Lamp posts
- Signage
- Bollards
- Drinking fountains
- Bicycle racks
- Trash receptacles
- Paving – concrete, unit pavers
- Planting – groundcover, lawn, and trees

The retaining wall on the western side of Frank Sinatra Drive is concrete.




Opportunities
The main opportunities in this zone are enhanced pedestrian connections between Elysian Park and Maxwell Place Park and a continuation of the dedicated bikeway to encourage safe cycling. Consolidating the double intersection at 11th Street may improve traffic and pedestrian flows.

Constraints
The points of connection between Frank Sinatra Drive and 11th Street will present a challenge to consolidation; a creative solution is needed. The publicly-accessible spaces of the Maxwell Place development—its grass lawn and Frank Sinatra Drive North—remain in private ownership.

Environmental Resource Assessment

This environmental resource assessment provides a precursory review of potential environmental issues and/or constraints for the purpose of identifying potential fatal flaws that might be associated with potential design scenarios for improving Frank Sinatra Drive. As part of this assessment, readily available GIS databases, planning studies, and other publicly available information resources were reviewed. Environmental regulations potentially affecting the project also are discussed. This preliminary assessment would need to be supplemented by additional analysis as determined necessary to support a National Environmental Policy Act (NEPA) compliance document or natural resource agency permits.

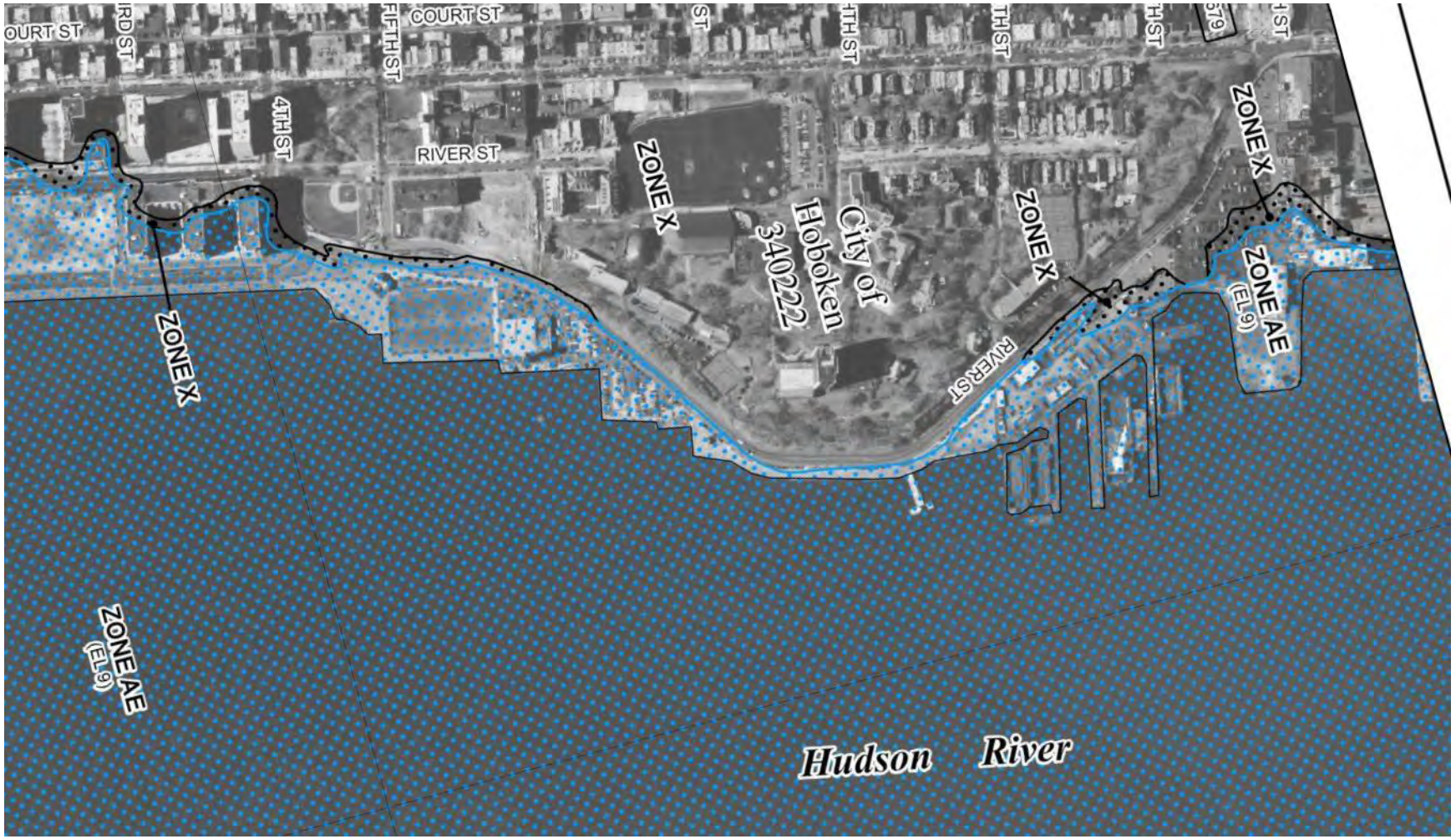
Land Use
Frank Sinatra Drive is an existing roadway corridor within the City of Hoboken. Per the City of Land Use Plan section of the Hoboken Master Plan (adopted 2004), existing land uses adjacent to the project include Stevens Institute of Technology (designated "ED" Education), publicly accessible waterfront (designated "W-2" Central Waterfront), Stevens Park (designated "Public Use"), Elysian Park (designated "Public Use"), and marine resources (designated "W-1" Northern Waterfront).

Wetlands/Water Resources
The closest wetland or waters to the project site is the Hudson River. The Hudson River is identified as "Estuarine and Marine Deepwater". The limits of the Hudson River are located north, east, and south of the project site.

Coastal Zone
New Jersey's coastal zone encompasses tidal waters including the Hudson River and its tributaries as well as non-tidal, transitional, and inter-tidal areas where development activities have the potential to impact coastal waters. The Coastal Zone is managed through the New Jersey Coastal Management Program (NJCMP). Implementing means for the NJCMP include the Coastal Area Facility Review Act (CAFRA), the Waterfront Development Law, and the Wetlands Act of 1970.

Floodplain Resources
The project site is located in an area prone to flooding. According to the FEMA, Flood Insurance Rate Map (FIRM), Map No. 34017C0107D, the project is located within Special Flood Hazard Area – Flood Zone AE, Other Flood Area – Flood Zone X, and Other Area – Zone X. Flood Zone AE is subject to inundation by the 1% annual chance flood, also known as a 100-year storm. The northern and southern reaches of the project site are located within areas mapped as Flood Zone AE. Flood Zone X has a 0.2% chance of annual flooding. Flood Zone X encompasses areas protected by levees from the 1% annual chance flood and extends slightly landward from Flood Zone AE, across the project site. The central portion of the project site lies within Zone X, which is determined to be outside the 0.2% annual chance flood. A map identifying these areas is provided in **Figure 2** below.

Figure 2 – FEMA Flood Zones



Source: Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map (FIRM), Map No. 34017C0107D

FEMA has recently (post-Hurricane Sandy) introduced a preliminary FIRM for Hudson County (Map No. 34017C0107E) that maps larger portions of the project area within Special Flood Hazard Areas. Accordingly, portions of the project site are located within a "Surge Zone" and a larger area is delineated in Flood Zone AE.

Threatened and Endangered Species

The lists of New Jersey's threatened and endangered wildlife species are maintained by the New Jersey Department of Environmental Protection (NJDEP) Division of Fish and Wildlife's (DFW) Endangered and Nongame Species Program (ENSP). The NJDEP lists 50 endangered and 36 threatened wildlife species that occur within the state of New Jersey. In 1994, the Landscape Project was created to develop more precise data on the location of threatened and endangered species habitat. Landscape Project data are reviewed to help determine whether a particular site contains "documented habitat" for state or federal listed species. Within areas of documentation, ground surveys are typically conducted to confirm actual site suitability for a specific documented species.

Hudson County and the project site are located with the Piedmont Plains Landscape unit. The project area encompasses three land cover types as mapped by the Landscape Project: Other Urban or Built-Up Land; Recreational Land; and Tidal Rivers, Inland Bays, and other Tidal Waters. Other Urban or Built-Up Land and Recreational Land are designated Rank 1. Rank 1 is assigned to species-specific habitat patches that meet habitat-specific suitability requirements such as minimum size or core area criteria for endangered, threatened or species concern wildlife species, but that do not intersect with any confirmed occurrences of such species. Tidal Rivers, Inland Bays, and other Tidal Waters are designated Rank 5. Rank 5 is assigned to species-specific habitat patches containing one or more occurrences of wildlife listed as endangered and threatened pursuant to the Federal Endangered Species Act of 1973.

There are four species identified within Species-Based Patch database boundaries associated with the project site. Three have a Species Rank of 2 – Special Concern (State): Little Blue Heron (*Egretta caerulea*), Glossy Ibis (*Plegadis falcinellus*), and Snowy Egret (*Egretta thula*). One species has a Species Rank of 5 – Federally Listed (and State Endangered): Shortnose Sturgeon (*Acipenser brevirostrum*).

The Migratory Bird Treaty Act (MBTA) protects migratory birds not necessary listed as threatened, endangered or having special status. The MBTA applies to common bird species such as Pigeon (*Cepphus Columba*) and others that could be found within or in vicinity to the project site.

There are no vernal or potential vernal pool habitat areas mapped within the project site.

Hazardous Materials

Known Contaminated Site

The project area and vicinity thereof contains a number of active Known Contaminated Sites (KCS). Known Contaminated Sites are properties within the state of New Jersey where contamination of soil or ground water has been confirmed at levels equal to or greater than applicable standards. The list of KCSs may include sites where remediation is either currently under way, required but not yet initiated or has been completed. Based on a review of NJDEP GIS data, there are four KCS sites within 500 feet of the project site. All four sites are active and are identified as follows:

- Stevens Institute of Technology, Castle Point Terrace
- Union Dry Dock and Repair Co., 901 Sinatra Drive
- Stevens Institute of Technology Residential Housing Castle Point, Castle Point Terrace
- Port Authority of New York and New Jersey, 325 River Street

Groundwater Resources

Currently Known Extent (CKE) areas are geographically defined areas within which the local groundwater resources are known to be compromised because the water quality exceeds drinking water and ground water quality standards for specific contaminants. Groundwater Contamination Areas (CEA) identifies those KCS or sites on the Site Remediation Program Comprehensive Site List where groundwater contamination has been identified. One CEA is located just south of Stevens Park, south of the project site. Other CEAs are located northwest of the project site.

The nearest monitoring well in Hudson County (Site No. 404636074024701 located 2 miles northwest of the project site) had a recorded depth to water level of 9 feet below the land surface. Based on the location of the project site adjacent to the Hudson River, groundwater is expected to be at a shallow depth. Groundwater at the project site could be encountered if excavations exceed a few feet below the ground surface.

Underground Storage Tank Facilities

Regulated Underground Storage Tank (UST) facilities in vicinity to the project site and their documented status are located as follows:

- Davidson Laboratory, Castle Point Terrace: Terminated
- Davis Hall, Castle Point Terrace: Terminated
- Hayden Hall, Castle Point Terrace: Terminated
- Jacobus Hall, Castle Point Terrace: Terminated
- Married Student Apartments, Castle Point Terrace: Terminated
- Palmer Hall, Castle Point Terrace: Terminated
- Port Authority of New York and New Jersey (015101), 325 River Street: Terminated
- Port Authority of New York and New Jersey (017665), 325 River Street: Terminated
- Stevens Institute of Technology, Castle Point on Hudson: Effective
- Stevens Institute of Technology, Castle Point on Hudson Carnegie Labor: Effective
- Union Dry Dock & Repair Co., 901 Sinatra Drive: Terminated

Figure 3 identifies the Known Contaminated Sites near the project area and information related to the Piedmont Plains Landscape unit.

Figure 3 – Environmental Considerations

Sources:

NJDEP GIS, NJDEP Digital Data Downloads in ArcView Shapefile format (Search: KCS, CKE, Chromite, UST facilities). http://www.state.nj.us/dep/gis/lists.html.

NJDEP Landscape Project Data, http://www.state.nj.us/dep/gis/landscape.html.

ESRI, aerial imagery.

Green Acres and Potential Section 4(f) Properties

There are no county- or state-owned open space properties located within the project area. The City of Hoboken has 18 public open space areas identified in the municipal Master Plan. Seven parks, one of which is partly privately-held, are located in vicinity to the project site:

- Elysian Park (City, east side of Hudson Street between 10th Street and 11th Street)
- Maxwell Place Park (Private, east side of Frank Sinatra Drive at 11th Street)
- Castle Point Park (City, east side of Frank Sinatra Drive under Castle Point)
- Pocket Park (City, Newark Street at southwestern entrance to City)
- Sinatra Park (City, east side of Frank Sinatra Drive between 4th Street and 6th Street)
- Waterfront Walkway (City and private owners, Bloomfield to 12th Street, Union Dry Dock to Stevens Institute Physical Plant parking lot, Sinatra Park to Hoboken Terminal)
- Stevens Park, Hudson Square (City, between 4th Street, 5th Street, and Hudson Street and Frank Sinatra Drive)

New Jersey's Green Acres Program was created to meet the state's growing recreation and conservation needs through the protection of open space areas. The provisions of the Green Acres Program likely apply to the parks in vicinity to the project area.

Section 4(f) properties include publicly owned public parks, recreation areas, and wildlife or waterfowl refuges, or any publicly or privately owned historic site listed or eligible for listing on the National Register of Historic Places. Section 4(f) legislation requires consideration of 4(f) resources if they are affected by transportation projects.

Socioeconomic Characteristics and Environmental Justice

Environmental justice concerns may arise from effects on the natural or physical environment that produce human health or ecological outcomes or from adverse social or economic changes that disproportionately affect minority or low-income population. A minority population includes races and ethnicities other than White Non-Hispanic. For screening analysis purposes, minority populations are identified where the minority population of the affected area exceeds 50 percent of the total population —a more detailed analysis should occur where the minority population of an area exceeds 50 percent or where the area has a greater percentage of minority persons compared to the state or county level. Low-income populations are identified where more than 50 percent of households are below the poverty line. According to the New Jersey Department of Labor and Workforce Development, 11 percent of persons in Hoboken earn a level of income that is below the poverty line.

The project area is located in the City of Hoboken, within Census Tracts 183.01, 187.01, and 194. Based on 2008-2012 U.S. Census Bureau data, the median income for households within the project area is estimated at $125,472, which is above the poverty income limit. The population is approximately 85 percent White, 3.4 percent Black, 0.1 percent American Indian and Alaska Native, 9.1 percent Asian, 0.3 percent Native Hawaiian and Other Pacific, 0.6 percent Some other race, and 1.5 percent Two or more races.

Based on the Census data, there are no substantial minority or low-income populations within the Census tracts that encompass the project area; therefore, Environmental Justice is not anticipated to be a concern associated with the project.

APPENDIX

Historic and Cultural Resources

Preliminary Cultural Resource Study (MDKA)

PRELIMINARY CULTURAL RESOURCE STUDY
(EXISTING CONDITIONS)

for the

FRANK SINATRA DRIVE VISIONING AND CONCEPTUAL DESIGN PLAN

(Kimley-Horn Project No. 112005000.1.802)

Prepared for:

THE CITY OF HOBOKEN
94 Washington Street
Hoboken, New Jersey 07030

and

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September 2014

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Date taken: April 11, 2014
Photographer: Mary Delaney Krugman, JD, MSHP

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EXECUTIVE SUMMARY

This study is done as part of the "Frank Sinatra Drive Envisioning and Conceptual Design Plan," a study that was begun in March 2014 at the request of the City of Hoboken (the City). The Prime Contractor for this study is Kimley-Horn and Associates of Princeton, New Jersey (Kimley-Horn), which has assembled a project team comprised of various disciplines.

Frank Sinatra Drive between 4th Street and 11th Street is a 3,700'-long, curvilinear, scenic waterfront corridor that allows significant views of the Hudson River and Manhattan skyline. The use of the Hoboken's waterfront has undergone several dramatic transformations over its almost 175 years of use during the early years of the United States. In the early 1800s, it was a scenic and recreational destination; in the late-19th and early-20th Centuries, it evolved into the center of shipping piers and industrial warehouses. Its current iteration is marked by office buildings, esplanades and public open spaces, thanks to several redevelopment projects. The seven-block section of Frank Sinatra Drive that is the subject of this study remains the only unfinished portion of Hoboken's re-envisioned and revitalized waterfront.

The City wishes to apply its "Complete Streets" policy and the best practices of street design to integrate safer bicycling and walking paths along Frank Sinatra Drive to encourage a variety of public uses. Of special importance to this study, the City also seeks to enhance the aesthetic and recreational value and sense of place by including such streetscape design features as interpretive signage, among other amenities.

The firm of Mary Delaney Krugman Associates, Inc. (MDKA) is the Project Team's Historian and Historic Preservation Specialist, aided by William Sandy, Registered Professional Archaeologist. This study of cultural resources found along Frank Sinatra Drive is part of the larger analysis of existing conditions being compiled by the Kimley-Horn team.

The MDKA team identified the environmental setting of the area, considered aspects of its geology, recited the findings of previous studies of the area's prehistory, and traced the area's historical development from the early 19th Century to the present.

Based on its historical research and compilation of other background data, the MDKA team identified three previously identified historic resources that are in, or contiguous to, the project area that are worthy of special note: the Stevens Historic District (SHPO Op. 1991); Sybil's Cave (SHPO Op. 2009); and Elysian Park (also part of Stevens Historic District).

MDKA also identified several individual cultural resources that were not included in previous inventories, i.e., 1) Castle Point Lookout(within the Stevens Historic District) on the Stevens Institute of Technology campus overlooking the FSD and the waterfront park; 2) an unmarked iron artifact (n. d.), near eastern sidewalk at north end of Sinatra Park Soccer Field at 5th Street and FSD; 3) the Serpentine Rock bluff below Castle Point, along FSD; and 4) various masonry retaining walls (one at the foot of 5th Street that connects it to FSD (pre-1891); one near the foot of 7th Street at FSD (pre-1909); the section of serpentine rock ashlar wall below the Castle Point Lookout (1857); and other masonry walls that extend from foot of 9th to Elysian Park (sections pre-1904, some pre-1909, some pre-1923).

Finally, the MDKA team identified several cultural resources that were less than 50 years old: 1) Castle Point Skate Park, 1101 FSD; 2) Frank Sinatra Memorial Park (1998); 4th Street and FSD; 3) Memorial, "We the Surviving Workers"(n. d.), Union Dry Dock Yard , FSD between Ninth and Tenth Streets; 4) WWII Memorial (2008, Dean Marchetto, Arch.), 4th Street at FSD; and 5) Walkway and Fishing Pier, foot of 8th Street and FSD (*ca.* 2009, Dean Marchetto, Arch.). As these features are less than 50 years old, they may have potential as cultural landmarks, but only if found to have only if they are of "exceptional importance," or if they are integral parts of districts that are eligible for listing in the National Register, as per the evaluation criteria of the National Register of Historic Places. To date, this evaluation has not been undertaken. However, given their potential cultural significance, any action that would alter, remove, or relocate these sites should necessitate an evaluation for any adverse effects on the resource or the area.

With regard to archaeological resources, MDKA recommends that, before any conceptual plans are finalized, this preliminary study of the existing conditions regarding cultural resources be expanded into a full Phase IA cultural resource background study. That Phase IA can then be used to predict archaeologically sensitive areas, and to evaluate any archaeological remains that might be encountered in later phases of the project.

With regard to cultural resources (including archaeological sites, historic resources, identified resources less than 50 years of age, and historically significant landscape features), it is recommended that, any proposed plans to disturb archaeologically sensitive sites, or alter, demolish, or relocate cultural resources in or adjacent to the project area be reviewed by a qualified historic preservation specialist so as to provide its comments and recommendations with regard to specific proposed activities that may affect these resources, so as to minimize, mitigate, or avoid adverse effects. After that initial cultural resource review, proposed plans should be submitted to the Hoboken Historic Preservation Commission for its review and comment. Such reviews are not specifically included in this envisioning process, and should be included as plans progress.

STUDY ADMINISTRATION

Project Name: **Frank Sinatra Drive Visioning and Conceptual Design Plan**
(Kimley-Horn Project No. 112005000.1.802)

Project Location: Waterfront along Frank Sinatra Drive (formerly River Road), between 4th and 11th Streets, Hoboken, NJ.

Owner(s)/Agency: **City of Hoboken**
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City of Hoboken - Department of Transportation & Parking
Tel: (201) 653-1919 - www.hobokennj.org

Stevens Institute of Technology
Castle Point on Hudson, Hoboken, NJ 07030
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OVERVIEW

This study is done as part of the "Frank Sinatra Drive Envisioning and Conceptual Design Plan," a study begun in March 2014 at the request of the City of Hoboken (the City). The Prime Contractor for this study is Kimley-Horn and Associates of Princeton, New Jersey (Kimley-Horn), which has assembled a project team comprised of various disciplines.

Frank Sinatra Drive (FSD) between 4th Street and 11th Street is a 3,700' long, curvilinear, scenic waterfront corridor that allows significant views of the Hudson River and Manhattan skyline (Location Maps 1 and 2; Photo 1). The use of the Hoboken's waterfront has undergone several transformations, first being a scenic and recreational destination in the 1800s, which was transformed by the early 20th Century into the site of shipping piers and industrial warehouses, and evolved ultimately to its current iteration, marked by office buildings, esplanades and public open spaces. The section of Frank Sinatra Drive now undergoing scrutiny remains the only unfinished portion of Hoboken's re-envisioned and revitalized waterfront.

The City wishes to apply its "Complete Streets" policy and the best practices of street design to integrate safer bicycling and walking paths along Frank Sinatra Drive to encourage a variety of public uses. The City also wishes to incorporate green infrastructure and low impact development strategies, as well as improve the ecological value of the corridor through a "Green Streets" approach. Finally, the City seeks to enhance the aesthetic and recreational value and sense of place by including such streetscape design features as pedestrian-oriented lighting; street furniture; kiosks; bulletin boards; trash receptacles; wayfinding, gateway and interpretive signage; and other amenities.

The firm of Mary Delaney Krugman Associates, Inc. (MDKA) is the Project Team's Historian and Historic Preservation Specialist, aided by William Sandy, Registered Professional Archaeologist. This study of cultural resources found along Frank Sinatra Drive is part of the larger analysis of existing conditions being compiled by the Kimley-Horn team.

METHODOLOGY

For the first step of the MDKA data-gathering effort for existing conditions along Frank Sinatra Drive, William Sandy, the Project Archaeologist, conducted a review of the materials on file at the New Jersey State Museum, the primary repository for the state's archaeological data, reviewed the reports of previous archaeological investigations of the area, and reviewed materials in his own collections for relevant data of the project area. Mary Delaney Krugman, Principal Historic Preservation Specialist of MDKA, conducted a file review at the New Jersey Historic Preservation Office, which is the repository for a number of cultural resource studies associated with past projects proposed for the current project area. Ms. Krugman conducted historic map and photograph research at the Hoboken Public Library, thanks to the assistance of its helpful staff, the digital collections of the Hoboken Historical Museum, as well as various online repositories and the collections of MDKA. MDKA also provided Kimley-Horn with its compilation of tax map data showing ownership of the various parcels in the project area. MDKA is also grateful to Paul Somerville, long-time member of the Hoboken Historic Preservation Commission and local avocational historian. Ron Hine, Executive Director of Fund for a Better Waterfront, both of whom provided the team with valuable information about the project area.

Ms. Krugman and Mr. Sandy conducted pedestrian reconnaissance in the project area and took digital photographs to document existing conditions relevant to this study, and also took part in the walk-through of the project area with the other members of the Kimley-Horn team, members of the City's staff, and representatives of Stevens Institute of Technology, which owns several parcels of land in the project area along the waterfront.

ENVIRONMENTAL SETTING

Hoboken is located south of the south end of the extensive Palisades Sill (Wolfe 1977: Figure 9-1). The Palisades outcrop stretches for 80 miles along the New Jersey side of the Hudson River, comprising a prominent ridge in the northeast part of the Piedmont Lowland physiographic province. The Palisades are largely composed of columnar igneous basalt columns formed as intrusive rock between the sedimentary strata. Underlying Stevens Tech, and apparent along much of the west side of Frank Sinatra Drive, is vivid green serpentine bedrock. Serpentine is an altered rock made of a hydrous silicate of magnesia and the finer grades are marbles (Sturgis 1902:485).

The Hudson River at this location is a subsequent stream that follows the strike of the weak rock belts. The modern Hudson River, and much of the project area, is underlain by silt, sand, and boulders of the ancient Hudson River Gorge (Wolfe 1977:252).

PREHISTORIC SENSITIVITY

A review of the site files of the New Jersey State Museum's Bureau of Archaeology revealed that there are no registered archaeological sites within the boundaries of the project area.

There have been a number of archaeological background studies and investigations in Hoboken and vicinity (e.g. Greenhouse 1999, 2003; Historic Research 1978, 1980; Parsons 1991; Raber 1986; Sullebarger Associates 1991; Richard Grubb 1996, 2012; Geismar 1998). This study has included a sample of this previous research for insights into what has been found by the previous studies.

One study noted that Hoboken (also known by its Indian name *Hopoghan Hackingh* was the site of a trail junction with links to Manhattan Island near 8th Street, Stevens Institute, and the Hudson River (Geismar 1998: 25). *Hopoghan Hackingh* reportedly translates to "land of the tobacco pipes" (Sullebarger 1991:27). This may be a reference to the serpentine bluffs, which a history of Hudson County reported was the source of Indian pipestone (Van Winckle 1924).

Limited excavations in the uplands in nearby Weehawken found an undated projectile point of local igneous rock (Greenhouse 1999). Early in the 20th Century, ten Precontact sites and a Contact site were documented in southern Jersey City. They included "camp sites" and shell middens. Projectile points included types now known to date to the Archaic and Woodland Periods. All sites are more than one mile south of Frank Sinatra Drive (Skinner and Schrabisch 1913; Richardson 1935a, 1935b, 1935c; Greenhouse 2003).

HISTORICAL GEOLOGY

The Castle Point serpentine was likely the first source of serpentine rock found in New Jersey. It was first noted in the journals of Hendrik Hudson made during his 1609 voyage to "New Netherlands" on his ship, *Half Moon.* On Friday, October 2, 1609, the *Half Moon* anchored near "a cliffe that looked of the colour of a white greene." This cliff is one of the most accurately located landmarks in Hudson's river voyage as it was, without doubt, the green serpentine outcrop at Castle Point, Hoboken (Hall 1909: 824).

The Philadelphia Centennial Exhibit of the State Geological Survey included "Serpentine and Magnesite" from Hoboken (Cook 1876). A landmark study of the geology and minerals of the Castle Point serpentine outcrop was published in 1882 (Darton 1882). By 1890, geologists listed seven different sources of "Serpentine, Hydrous silicate of Magnesium" in New Jersey, including Hoboken, and sites in Morris, Sussex, Warren, and Passaic Counties (Canfield 1890).

Serpentine rock is quite rare, occurring in only a few places in the United States. During the late 18th and early 19th Century, it was first used as a building stone – a period some have called the Folk Period – and used by 19th and early 20th Century American builders who favored vernacular architecture and polychromy as late as 1931 (Dorchester 2001).[1] It is especially notable in this location, not only for drawing the attention of Henry Hudson, but also because it was used to picturesque effect by the Stevens family in its development of its estate and grounds at Castle Point. Two serpentine stone gates on Castle Point were erected *circa* 1856 to mark the entries into the Stevens Estate -- one at Sixth Street near the river (Photo 8), which is still visible from FSD; the other at Eighth and Hudson Streets (no longer extant). In the project area itself, the Stevens family used the serpentine stone to construct the *ca.* 1857 retaining wall along FSD that supports Castle Point Lookout (Photos 10 – 12) (Krugman 2002). As such, the raw serpentine bluff that still glints green along FSD is an important natural feature in the project area.

HISTORY OF RIVER WALK / RIVER ROAD / FRANK SINATRA DRIVE

The project area is located in Hoboken, Hudson County, which was formed from Bergen County in 1840. The Township of Hoboken had been part of the township of North Bergen in Bergen County since 1683. In 1849, it was "set off" from North Bergen, and by 1855, the municipality was incorporated at the City of Hoboken (Snyder 1969:75, 146, 151).

Colonel John Stevens purchased "Hobocken" tract of 276 acres along the Hudson River once owned by Loyalist William Bayard. After confiscation, the large tract was bought by Col. John Stevens in 1784 (Grubb 1996: Fig. 12B; Geismar 1998:26). Stevens was very eager to foster development in the area. He built the first wharves at Hoboken in 1804, the same year that Edwin Stevens, son of the Colonel, made the family's private grounds available to the public as an enticement to settling there (Grubb 2012: 3-2).

[1] Dorchester defines the periods during which serpentine rock was used as a building stone as The Folk Building Period (1727-1843), the Conservative Building Period (1843-1867), the Monumental Building Period (1867-1895), and the Final Building Period (1895-1931).

John Stevens built his substantial home called "Stevens Castle" on the promontory at Castle Point in 1814 (Grubb 1996: 6-6) (Photo H-4). By 1824, the Stevens family ferries were bringing large numbers of day-trippers to Hoboken to enjoy the "semi-public" grounds of the Stevens Estate (Grubb 2012). Stevens also extended the "River Walk" (Photo H-1) - later known as River Road and now FSD - from the ferry terminal at the southern end of Hoboken northward along the Hudson River and around Castle Point for some two miles so that visitors could appreciate the remarkable vista up the river and across to the City of New York.

The Stevens family continued to develop a playground unequaled in the metropolitan area of its day. In the early 1830s, the Stevens family decided to upgrade the landscaping of the riverfront and created "Elysian Fields," which opened as a public pleasure ground. It extended along the Hudson River waterfront from Fifth to Eleventh Streets (1873 G. M. Hopkins, *Atlas of Hudson County,* cited in Grubb 1996; Grubb, 2012: 3-4). By the following year, Elysian Fields attracted some 20,000 visitors per day during the summer (Grubb 2012: 3-4). It was said to be the site of the very first baseball game in 1846 (Geismar 1998:26). As if the skyline and the vistas weren't enough for the visitors, in 1836 they created "Sybil's Cave, a man-made attraction along the waterfront that featured a cave with a fresh water spring (Photos H-5 to H-8) (Geismar 1998: 26). In 1846, the New York Yacht Club, located at the north end of Elysian Fields near what is now 10th Street and Frank Sinatra Drive, hosted the America's Cup Race, the first international yachting completion (Grubb 2012: 3-14). The boat basin where the NYYC was based gradually grew more commercial later in the 19th Century, so that by 1905, piers and ferries replaced private yachts (Photo H-14). Small boathouses for private vessels were still found on the southern end of Castle Point, near the foot of 4th Street (Photo H-10).

The serpentine bluffs at Castle Point were quarried during the mid-19th Century. They were used by the Stevens family in the erection of a number of structures on their estate. It was the source of the stone used for the Sixth Street gatehouse for the Stevens Estate (Photo 8), and for the gate at Hudson Street near Ninth Street (no longer extant), both *ca.* 1857. It was also used for the substantial retaining wall under the Castle Point Lookout (Photo H-9), sections of which are still visible along Frank Sinatra Drive (FSD) (Photos 10 and 12; Sullebarger 1991).

Mid-19th Century saw a shift in the activity around the Hoboken waterfront, including the area along the River Walk. The sections of the walk along the waterfront were widened significantly between *ca.* 1885 and the 1890s (Photos H-3, H-4, and H-9). With the extension of the Morris and Essex Railroad (later the Delaware, Lackawanna and Western Railroad) to the Hoboken ferry, activity began to shift to transportation-related uses and industry, rather than pastoral amusement. Beginning in the 1860s and 1870s, major transatlantic steamship companies built piers on the waterfront including along the River Walk. By 1882, the Holland America Line joined other steamship companies along the Hoboken waterfront, and ultimately operated two piers - one at Fifth Street and the other at Sixth Street along "River Road," as it was then called (Photo H-11).

The character of River Road changed dramatically with the increased commercial activity (Photo H-3). By 1884, Elysian Fields was almost totally built over, except for the northern section, now preserved as "Elysian Park" (Grubb 1996: 6-9; Grubb 2012: 3-20; and see also in Maps: 1881 Bird's Eye view). The waters of Sybil's Cave having been declared unfit to drink, the use of that spot continued as a tavern, which kept its beer cold in the cave's spring; the tavern ultimately became a watering hole for the dockworkers (Photos H-4, H-7, and H-8). The width of River Road was steadily increased by the addition of fill during the 1880s and 1890s, and the edge of the bank was now armored with rip-rap to prevent erosion (Photos H-7 and H-8).

By the end of the 19th Century, pedestrian use of River Road was given over to vehicles. Carts and, later, automobiles could access the waterfront from Fourth and Fifth Streets via a graded entry with a masonry retaining wall (Sanborn 1891; Hopkins 1909; and in Maps: 1904 Bird's Eye view) along River Road, which turned 90 degrees north, and descended down to the waterfront. The incline and retaining wall at Fifth Street is still extant (Photos 5 and 6). The Hoboken Manufacturers' Railroad, also known as the Hoboken Shore Railroad, began its operations in 1897, running 1.5 miles of track between a junction with the Erie Railroad in Weehawken to the Port of New York Authority pier southward at First Street (Photo H-11; in Maps: 1904 Bird's Eye View). It also was associated with a train yard at Sixth Street, and a car float bridge and the associated Pennsylvania Railroad Marine yard at Eleventh Street along the Hudson River (Photo H-12 and H-13). This repair yard is now occupied by Union Dry Dock (Photo 17). Between the marine repair yard at the foot of 10th Street and the steamship piers at the foot of Sixth Street was the Charles Schulz building supply yard, a coal pier, an iron works, and Campbell's 5-story brick warehouse (Brell 1906; Sanborn Maps 1891, 1906; Hoboken Historical Museum, Photo Collections). By 1909, the Hoboken Shore Railroad ran as many as three tracks along the base of the bluffs at Castle Point.

The First and Second World Wars took their toll on the Hoboken waterfront, as did the intervening years of the Great Depression. In 1917, the U. S. Government seized the piers and warehouses of the German-owned steamship companies along the waterfront, which then were used for shipping soldiers, supplies, and war materiel to the European front (Grubb 1996: 6-18). After the war, some ten steamship lines were still based in Hoboken, but with the downturn in the 1930s, there was little activity (Drobbin 1995). The former tavern and other frame buildings that stood around Sybil's Cave were finally demolished in 1937, revealing the long-hidden cave (Grubb 2012: 3-23).

World War II increased the activity on the waterfront, as once again the U.S. Government commandeered Hoboken's piers for military shipping activities (Drobbin 1995). A recent engineering study estimated that improvements were made to the timber supports for River Road and the piers during this period (Haddon 2012). After the war, life was reportedly filled with corruption and violence among the longshoremen who worked the docks, as illustrated in a 1948 series of 24 articles by investigative reporter Malcolm Johnson in the *New York Sun.* The series, entitled "Crime on the Waterfront," won the Pulitzer Prize for Local Reporting in 1949 (later made into the 1954 famous film *On the Waterfront*, starring Marlon Brando).

In 1951, the U. S. government finally sold all the piers it had seized in World War I to the City of Hoboken. By this time, the new importance of air travel and the development of containerized cargo that required deep-water ports undermined the utility of the Hoboken waterfront. The area continued its decline into increasing disrepair (Hartman and Lewis 2003).

It was not until the 1970s, when Hoboken "brownstones" became attractive to a new group of urban homesteaders, did the city's economic rebirth begin in earnest. The Hoboken Shore Railroad – a vestige of the former level of activity on the busy waterfront – was finally discontinued in 1977 (Grubb 2012: 3-20).

In 1985, River Road was renamed "Frank Sinatra Drive" after native son Frank Sinatra (b. 1915; d. 1998) (Stevens Institute of Technology 2014). By the 1990s, a major redevelopment and waterfront renovation at the southern section of the city's waterfront resulted in the creation of several new upscale multi-unit residential buildings and a creation of park on Pier A (Hartman and Lewis 2003).

Efforts to redevelop the waterfront for recreational uses gradually moved northward along Frank Sinatra Drive during the late 1990s. First, a bulkhead was added to shore up the roadway in 1997. In 1998, Frank Sinatra Memorial Park was created along FSD between Fifth and Sixth Streets, complete with an amphitheater, a soccer field, and a park building for ticket sales and restroom facilities (1998, Dean Marchetto, AIA, Arch.; Photos 3 and 4).

In 2007, a major exploration and cleaning of Sybil's Cave was undertaken, which recovered sections of the original carved 19th Century serpentine rock surround at the cave entrance. At the behest of then Mayor Dave Roberts, Sybil's Cave was restored as a cultural site in 2008, encircled with a decorative metal fence and gate, and the cave opening was marked by a new EIFS[2] surround for the cave entrance, its design informed by the original 19th C. surround (Photos 13 and 14).

Also in 2008, a new World War II memorial was designed and installed at the corner of Fourth Street and FSD (2008, Dean Marchetto, AIA, Arch.; Photo 2). A year later, Castle Point Skate Park and the walkway and fishing pier (Photos 15 and 16) were opened to the public.

The Maxwell House coffee plant at 11th and Hudson Streets - an economic power house in Hoboken for decades – closed its doors in 1992, having lost out to a sister plant in Jacksonville, Florida, as to which would stay in business (Nieves 1992). Today, the plant has been redeveloped into a multi-unit residential complex (Photo 24) and a waterfront esplanade called "Maxwell Place Park." A new boathouse informed by folk-vernacular architecture style of the same period as the New York Yacht Club boathouse that once stood nearby the present site, was constructed near the water's edge (Photo 23) and is accompanied by an interpretive plaque dedicated to the history of the NYYC.

All has not been completely copacetic for FSD, however, given the poor state of the infrastructure. Frank Sinatra Memorial Park on FSD between Fifth and Sixth Streets partially collapsed in 2009, as did a section of the drive itself, due to deteriorating timber pilings installed some 60 years before (Haddon 2012). Over the course of some 10 years beginning in 1998, various sections of the roadway either sunk or cracked and became unsafe. It took some four years for the complex repair work to be completed at Sinatra Park: it was reopened in 2013.

The latest campaign in the revitalizing of the Hoboken Waterfront is the current project, which will "envision" a pedestrian- and bike-friendly Frank Sinatra Drive that will increase its use as a public amenity, as well as a thoroughfare. The project will require the cooperation of the several owners of the parcels along the waterfront, i.e., the City, Stevens Institute of Technology, and Union Dry Dock (see Hoboken Tax Maps, Sheets 42 and 43).

[2] EIFS stands for "Exterior Insulation and Finishing System."

HISTORIC AND CULTURAL RESOURCES

The following resources are located in or near the Frank Sinatra Drive and should be taken into account by any project in the area. Adverse effects to these resources should be avoided.

Identified Historic Resources

The Stevens Historic District, Castle Point between 4th and 11th Streets, Hoboken. SHPO Opinion, 2/28/1991 (See Stevens Historic District Map). This National Register-eligible district includes the 55-acre campus of Stevens Institute of Technology, as well as the residential blocks of Castle Point Terrace and the two blocks on Hudson Street between Elysian Fields Park and 8th Street. The district is associated primarily with Stevens Institute, which opened its doors in 1870. The boundary of the historic district runs generally along the western boundary of the right-of-way for Frank Sinatra Drive at the base of the bluff, although reportedly not including the Sybil's Cave site, which is maintained by the City through an easement granted by Stevens Institute (Photos 8 – 10).

Elysian Park, 10th - 11th Streets between Hudson Street and FSD (Photos 15 to 17), which is also included within the boundaries of the Stevens Historic District. Originally part of the larger tract known as "Elysian Fields," this greensward was first opened in 1845 by members of the Stevens family. It was reported to be on or near the site of the first baseball field.

Sybil's Cave, 800 Frank Sinatra Drive. Certification of Eligibility (COE) for the National Register of Historic Places, 5/13/2009 (Photos 13 and 14). Sybil's Cave contained a fresh water spring that was opened by the Stevens family in the 1830s as a tourist attraction. A successful tavern was eventually created near the opening, which became a regional draw for as many as 20,000 visitors on a summer's day. It was closed to the public in the1800s due to health concerns, and was filled in with concrete during the 1930s. In 2008, Hoboken Mayor Dave Roberts restored and rededicated the site, installed protective wrought iron fencing and an interpretive plaque.

Previously Unidentified Cultural Resources

Castle Point Lookout (1857; Photo 10**).** 100' promontory (the highest point in Hoboken) on the Stevens Institute of Technology campus overlooking the FSD and the waterfront park. Balustrade is visible from FSD near the foot of 7th Street. This feature was constructed by the Stevens family *ca.* 1857 as one of the scenic amenities of its estate on Castle Point.

Unmarked Iron artifact (n. d.; Photo 7), near eastern sidewalk at north end of Sinatra Park Soccer Field at 5th Street and FSD (Potential). The source of this item is unknown, although it may be over 50 years old. It was likely put in place during the creation of Sinatra Park, or the reconstruction of the soccer field. More research is recommended before any disposition of this artifact is undertaken.

Stone Retaining Walls (various dates, locations). Several masonry retaining walls from the 19th Century and early 20th Centuries are found along FSD, i.e., at the foot of 5th Street and FSD (pre-1891) (Photos 5 and 6); a section of serpentine stone wall below the Castle Point Lookout (1857) (Photo 10); and walls that extend from foot of 9th to Elysian Park (sections pre-1904, some pre-

1909, some pre-1923) (Photos 15 and 16). These retaining walls, among other things, mark the gradual evolution of the project area from a scenic attraction traversed by pedestrians to a busy waterfront, first teeming with wagons, and later traversed by cars and trains.

Serpentine Rock bluff, Castle Point, along the west side of FSD (historical/geological feature) (Photos 8 to 12). While there are other locations known to have this rock formation, including some six in New Jersey, the bluff at Castle Point was first identified as a by Hendrik Hudson in his ship logs of 1609, and established Castle Point, Hoboken, as a natural landmark. Stone from this outcrop was quarried by the Stevens family and used to construct several features on its property, of which only the gate at 6th Street remains extant. The green face of this outcrop of serpentine remains a striking feature of FSD and should be taken into account as an important element of the historical landscape.

Cultural Resources less than 50 Years Old

These resources are constructed within 50 years, some even quite recently, and are included here as "cultural resources," i.e., designed features, landscapes, facilities, or artifacts that are meaningful to the citizens of Hoboken. As these features are less than 50 years old and may have potential as cultural landmarks, but only if they are found to have "exceptional importance," or if they are integral parts of districts that are eligible for listing in the National Register, using the evaluation criteria of the National Register of Historic Places (Sherfy and Luce 1979). To date, this evaluation has not been undertaken. However, any action that would alter, remove, or relocate these sites should necessitate an evaluation for any adverse effects on the area.

Castle Point Skate Park, 1101 FSD (Photo 15). This skateboarding park is maintained by the City of Hoboken and is located along the waterfront.

Frank Sinatra Memorial Park (1998), 4th Street and FSD (Photos 3 and 4). This waterfront park was built by the City of Hoboken and consists of a soccer field on pilings in the Hudson River, a concrete amphitheater that faces the former site of the World Trade Center, and a small park building (1998, Dean Marchetto AIA, Arch.) for ticket sales and restroom facilities (temporarily closed due to damage from Super Storm Sandy). The Park was closed in 2009 due to the collapse of the timber pilings that supported it. It was reopened in 2013, after new concrete pilings were constructed.

Memorial "We the Surviving Workers," Union Dry Dock Grounds, FSD between Ninth and Tenth Streets (n. d.; Photo 18). Dedicated to the workers of the Hoboken "working waterfront" – "shipyard workers, longshoremen, dock buildings, teamsters, tug, barge and ferry boat crews, deep water sailors, railroad crews and the support men and women who made the Hoboken 'working waterfront' and our city of Hoboken" (presumed to be less than 50 years).

World War II Memorial, 4th Street at FSD (2008, Dean Marchetto, AIA, Arch.; Photo 2). Memorial to the 159 soldiers from Hoboken who died in World War II. The installation is set against the backdrop of the Manhattan skyline and features a small park and a bronze statue of two soldiers supporting each other. Bronze helmets sit on top of 21 rifles behind the statue.

Walkway and Fishing Pier, foot of 8th Street and FSD (2009, Dean Marchetto, AIA, Arch.; Photo 15). Created *ca.* 2009 by Mayor Dave Roberts and maintained by the City of Hoboken.

FINDINGS AND RECOMMENDATIONS

Archaeological Resources

Any proposed plans should be reviewed to ensure that any potential adverse effects to archaeologically sensitive sites are minimized, mitigated, or avoided. This study has accumulated a great deal of information on both the history of Hoboken and on previous cultural resources investigations in the City. Prior to the finalization of any plans that will follow from this "envisioning," a comprehensive Phase IA cultural resources study suitable for review by state and federal agencies should be conducted. Specific construction proposals can then be evaluated for sensitivity to potential archaeological resources and, if need be, archaeologists can test the areas of potential effect to determine the presence or absence of these resources.

One type of resource likely to be encountered by construction along FSD includes wharfs, docks, and piers. The documentary research shows that the project area waterfront was not developed until late in the 19th Century. The Phase IA cultural resource survey described above will be most useful in dating and documenting waterfront structures that may be exposed and impacted by the proposed development, and furthermore, will assist in the development of interpretive signage that will inform visitors to FSD of the rich history of Hoboken's waterfront.

Historic Resources

Frank Sinatra Drive is an area that today has retained more historic resources than perhaps any other location along Hoboken waterfront. The preservation of these historic districts, sites, objects, structures, and historic natural features found within the project site will enhance the public benefit and visitor experience in the area.

While this study has outlined the history of the project area, identified historic resources and areas of archaeological sensitivity and their locations as part of the existing conditions survey, it is premature, at this point, to provide any recommendations as to specific treatments or proposed plans, as they are in the process of just now being formulated in consultation with the public and the City.

However, it is important to look forward in the envisioning process to ultimate development of specific treatment proposals or reconfigurations of the waterfront that may affect historic resources – input that is not anticipated in the current project. State and federal regulatory reviews regarding alignments, ground disturbance, coastal construction and construction activities in other archaeologically sensitive areas, etc. that may potentially affect historic resources, may have a significant effect on the realization of the plans as envisioned.

With that in mind, the MDKA recommendations for the treatment of historic resources (including identified cultural resources less than 50 years of age and historic landscape features) include the following:

1. Review of specific design proposals by cultural resource specialists. Any proposed plans to disturb, alter, demolish, or relocate cultural resources in or adjacent to the project area be reviewed by a qualified historic preservation specialist so as to provide its comments and recommendations with regard to specific proposed activities that may affect historic or

archaeological resources. If cultural resources are potentially affected by the proposed design or treatments, alternatives should be considered so as to minimize, mitigate, or avoid adverse effects;

2. Review by the Hoboken Historic Preservation Commission. After the initial review by a cultural resource specialist, proposed plans or concepts should be submitted to the Hoboken Historic Preservation Commission for its review and comment. Such reviews are not specifically included in this envisioning process, and should be undertaken as the plans progress.

3. Regulatory Analysis. Because it is anticipated that certain proposed actions will be undertaken by the City, or accomplished using local, county, state, or federal funding, a regulatory analysis is recommended so that a comprehensive view of the regulatory requirements that might be encountered with regard to cultural resources be understood. Construction activities of a roadway along the Hudson River waterfront may also encounter other kinds of reviews, including the National Historic Preservation Act §106, the Department of Transportation Act, § 4(f), the Coastal Area Facility Review Act (CAFRA), the National Environmental Protection Act (NEPA), and other county, state, and federal regulations that must be taken into account.

4. Design Consultation. It is recommended that an historic preservation specialist review the design, placement, and content of any interpretive materials, such as plaques and historic markers, as well as street furniture, fencing, or recommended sites or features to be incorporated in the Concept Design Plan.

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APPENDIX A
SITE CHRONOLOGY

CHRONOLOGY

Year	*Description*	*Source*
1609	Hendrik Hudson drops anchor near Castle Point, and describes the **serpentine rock bluffs** in his log book - one of the most accurately described landmarks on his voyage.	Hall 1909: 824
1626	Hoboken tract purchased by the Dutch from Native Americans; one of the first Dutch settlements in the USA.	Drobbin 1995.
1775	Castle Point ferry service begins between Hoboken and NYC.	
1784	John Stevens purchases "Hobocken" tract of 276 acres east of "the Heights" to the Hudson River from William Bayard. Includes "River Walk" (now FSD).	Grubb 1996: Fig 12 B
1804	John Stevens builds first wharves in Hoboken. Edwin Stevens, son of Col. John Stevens III, made family's private grounds available to public as an enticement to settlement.	Grubb 1996: 6-6; Grubb 2012: 3-2
1814	John Stevens builds his home on Castle Point.	Grubb 1996: 6-6
1824	Stevens' family ferries bring large numbers of day trippers to Hoboken to enjoy the semi-public grounds of the Stevens Estate.	Grubb 2012
1826	Stevens extends River Walk from the ferry terminal at the southern end of Hoboken along the waterfront and around Castle Point for some 2 miles.	Grubb 2012: 3-2
1831	Elysian Fields, created and landscaped by the Stevens family, opens as public pleasure grounds, extending along the Hudson River from 5th to 11th Sts.	1873 GM Hopkins *Atlas* in Grubb 1996; Grubb 2012: 3-4
1832	As many as 20,000 visitors per day come to Hoboken during the summer.	Grubb 2012: 3-4
1836	Sybil's Cave, a man-made attraction created by the Stevens family on River Walk/Road at a fresh water spring at the foot of 8th St.	Geismar 1998
1841	Killing of woman near Sybil's Cave serves as the basis for the Edgar Allen Poe detective story, "The Mystery of Marie Roget."	various
1846	The New York Yacht Club, located at the north end of Elysian Fields, hosted the America's Cup Race, the first international yachting completion; and Possibly the first baseball game is played on Elysian Fields Park.	Grubb 2012: 3.14 Geismar 1998:26.
1849	Township of Hoboken set off from North Bergen.	Grubb 1996: 6-9
Ca. 1853	Stevens Castle (Stevens' residence) built on Castle Point (demolished 1959).	Sullebarger 1991: 37
1855	Hoboken reincorporated as the City of Hoboken.	Grubb 1996: 6-9
Ca. 1856	Stevens Estate Gate at 6th St. and east of River St. built of serpentine rock (extant). Other serpentine rock	Hoboken HSI #40-19

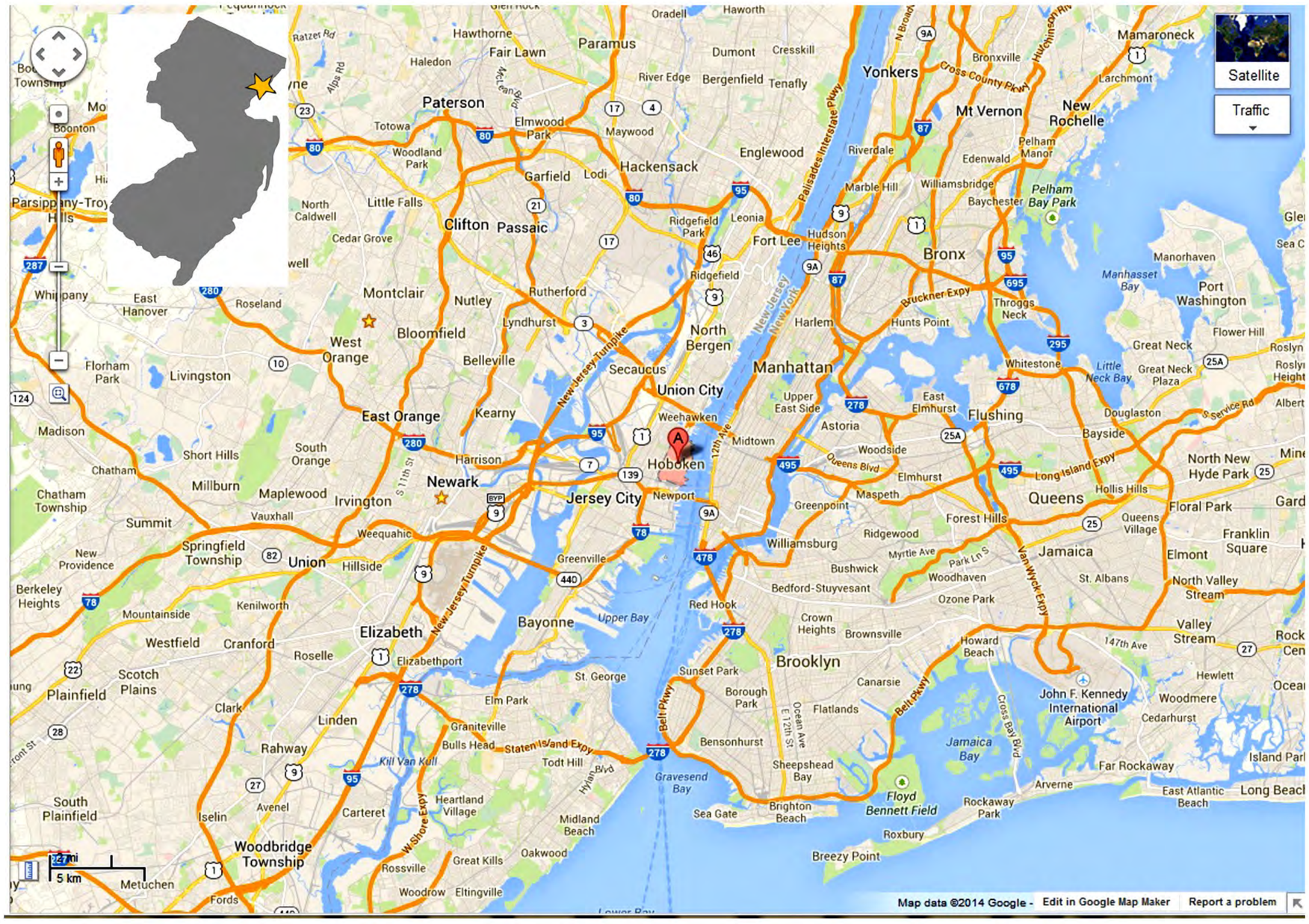
CHRONOLOGY

	structures built as part of 19th C. Stevens Estate were the gate at 9th and Hudson Sts. (no longer extant) and the terrace foundation wall along FSD below Castle Point Lookout (partially extant).	(1986) in Sullebarger 1991.
1857	Morris and Essex RR extended to Hoboken Ferry; terminal built (later the DL&W RR line).	Grubb 1996: 6-18
1860s – 1870s	Major transatlantic steamship companies located on the waterfront, including along FSD.	Grubb 1996: 6-9
1870	Stevens Institute of Technology opens.	Sullebarger 1991: 36
Ca. 1880	Water in Sybil's Cave found no longer potable; cave was closed. A tavern was built in front of the cave, which was then used for cold beer storage.	Grubb 2012: 3-18
1882	Holland America Line begins operations from 5th and 6th Sts, FSD, Hoboken.	Holland America 2014.
1884	Elysian Fields built over except for area now known as "Elysian Park" at Hudson and 11th Streets, although Castle Point still used for recreation.	Grubb 1996: 6-9; Grubb 2012: 3-20
1897	Hoboken Manufacturers' Railroad, also known as the Hoboken Shore Railroad begins operation along River Walk (FSD). 1-1/2 miles of track runs between a junction with the Erie RR in Weehawken south to the Port of New York Authority pier at 1st St., with **a train yard at 6th St., and a car float bridge and associated yard at 11th St.**	Geismar 1998: 26; Grubb 2012: 3-20 to 3-23.
Ca. 1905	River Walk and Sybil's cave no longer a destination, as waterfront given over to wharves and "Chas. S. Schulz" building materials firm.	Grubb 2012L 3-23
1910	The Wilson Line and the Phoenix Line operated from a pier at the foot of 6th St.	1909, 1923 G.M. Hopkins *Atlas*.
1917	U. S. Government seized the piers and warehouses of the German-owned steamship companies along the waterfront.	Grubb 1996: 6-18
1930s	10 steamship lines based in Hoboken, but little activity.	Drobbin 1995
Ca. 1937	Former tavern and other frame buildings that stood around Sybil's cave are demolished; cave revealed.	Grubb 2012: 3-23
1942 – 1945	WWII increased waterfront activity as point of departure for military. Estimated time when timbers under shipping piers were improved.	Drobbin 1995; Haddon 2012.
1949	Malcolm Johnson wins Pulitzer Prize for Local Reporting for 24 pt series "Crime on the Waterfront" [later made into a film shot in Hoboken in 1954 *On the waterfront*]	Pulitzer website; Hoboken Museum
1950s	**Hoboken Shore RR maintains 2 tracks along River Road.**	Grubb 2012: 3-23
1951	US Government sells the City of Hoboken all piers it seized during WWI.	Sullebarger 1991: 30
1977	Hoboken Shore Railroad discontinued.	Grubb 2012:3-20
1985	River Road rededicated as "Frank Sinatra Drive."	Stevens website.
1990s	Major redevelopment and waterfront renovation of the area south of Fourth Street undertaken, which resulted in the creation of a park on Pier A.	Hartman & Lewis 2003.

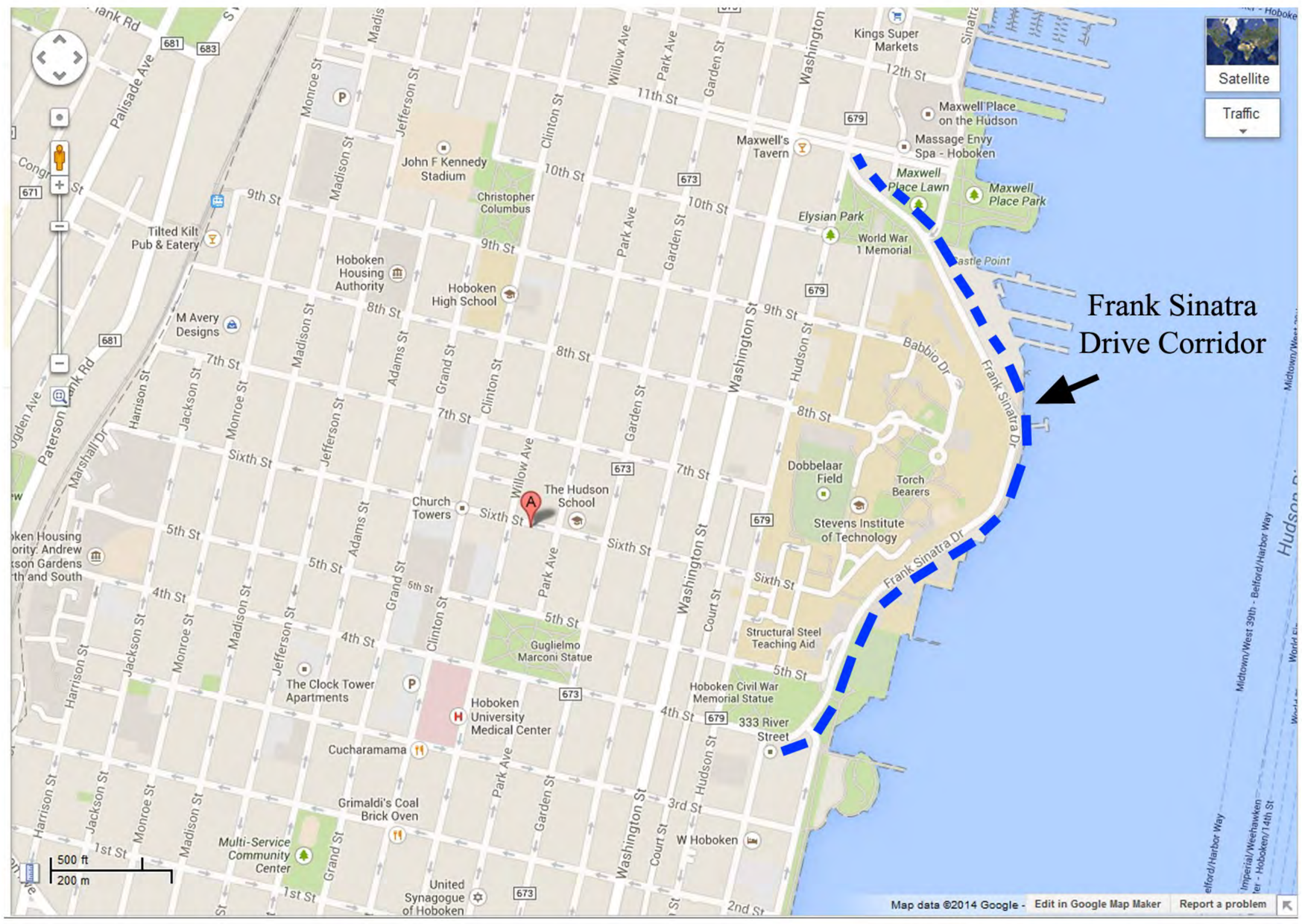
CHRONOLOGY

1997	Bulkhead added to shore up FSD.	Haddon 2012.
1998	Frank Sinatra Park created along FDS between 5th and 6th Sts. With amphitheater, ticket and restroom facilities and soccer field.	Sign at site.
2002	Sections of FSD sink, due to deterioration of timbers under roadway.	Haddon 2012.
2007	A major exploration and cleaning of Sybil's cave recovered sections of the original carved 19th C. serpentine rock surround for the cave entrance. Section of FSD near Castle Point Park near foot of 10th St. collapses.	Grubb 2012:
2008	Mayor Dave Roberts partially reopened Sybil's Cave, encircled the site with a wrought iron fence, and framed the entrance with a portico executed in EIFS, based on an image that appeared in Gleason's Pictorial Drawing-Room Companion magazine in 1854.	Sign at Sybil's Cave, FSD.
2008	WWII Memorial at FSD and 4th St. dedicated.	Sign at site.
2009	Frank Sinatra Park closed due to deteriorating timber pilings; part of FSD collapses due to deterioration of timber pilings.	News article. Haddon 2012
2009	Castle Point Skate Park opened.	News article
2009	Walkway and Fishing Pier at foot of 8th St. and FSD opened.	News article
2013	Frank Sinatra Park reopened after reconstruction of pilings.	News article

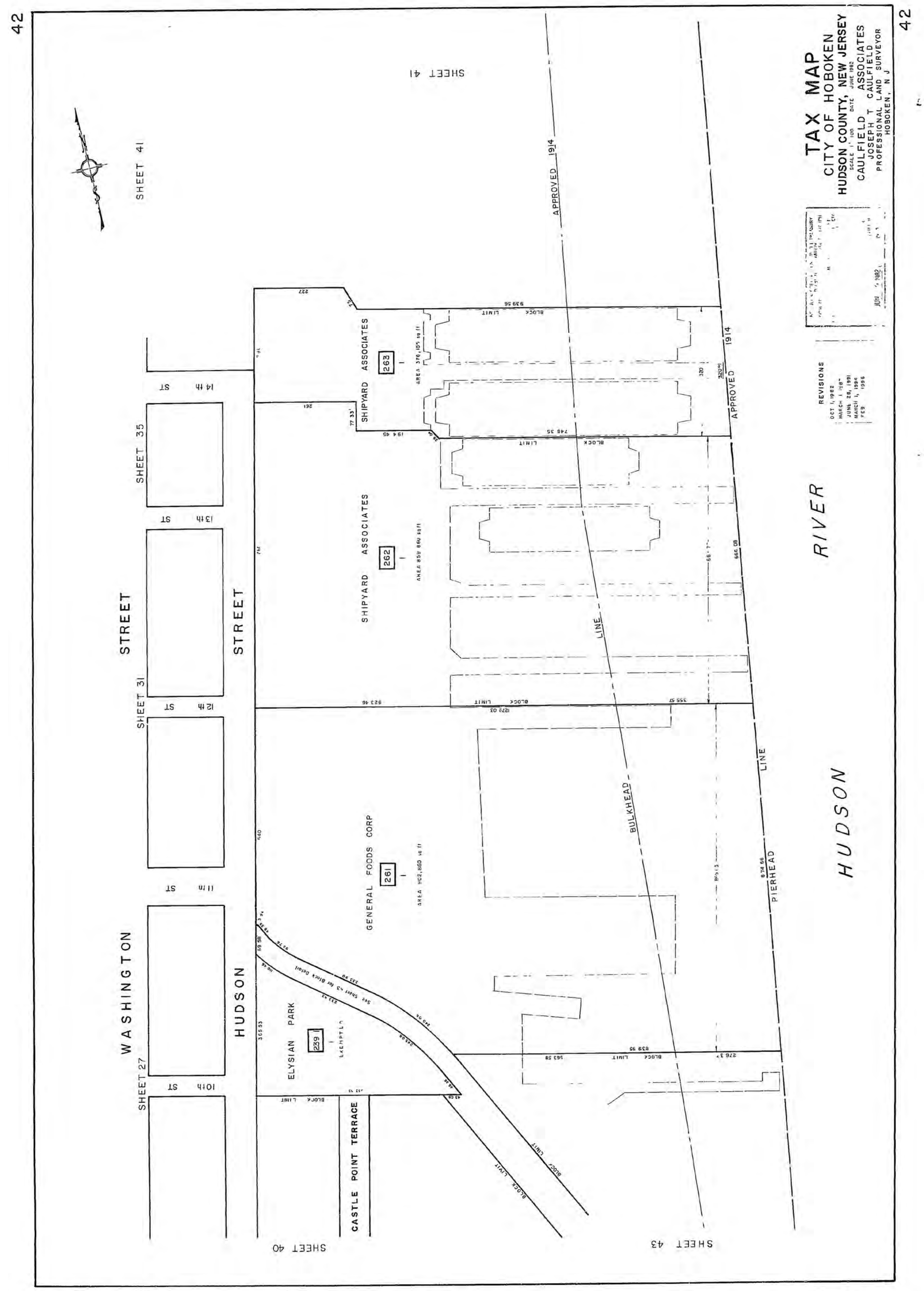
APPENDIX B
MAPS



Location Map 1: Hoboken, NJ. Courtesy of Google Maps.

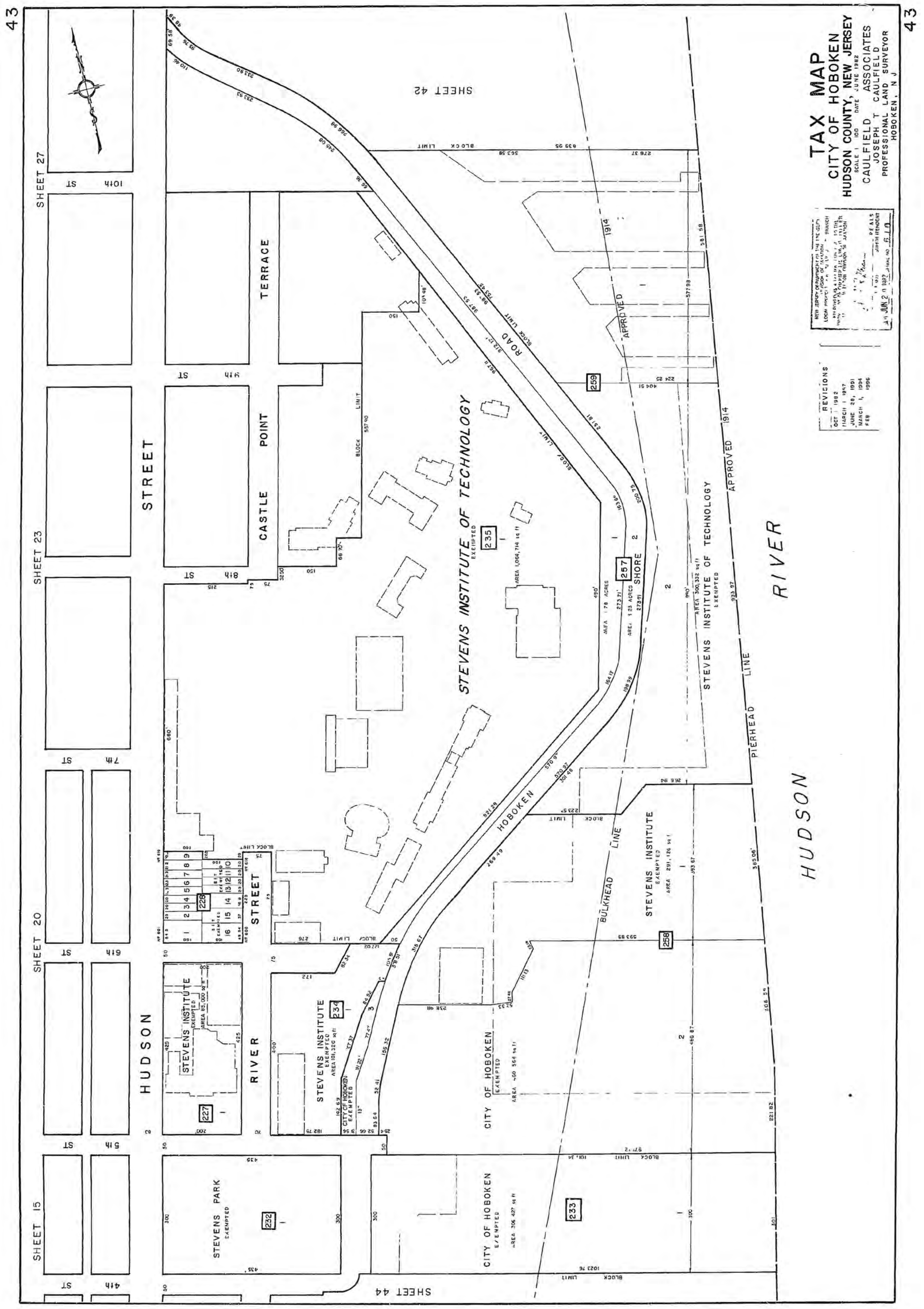


Location Map 2: Project Area. Courtesy of Google Maps.



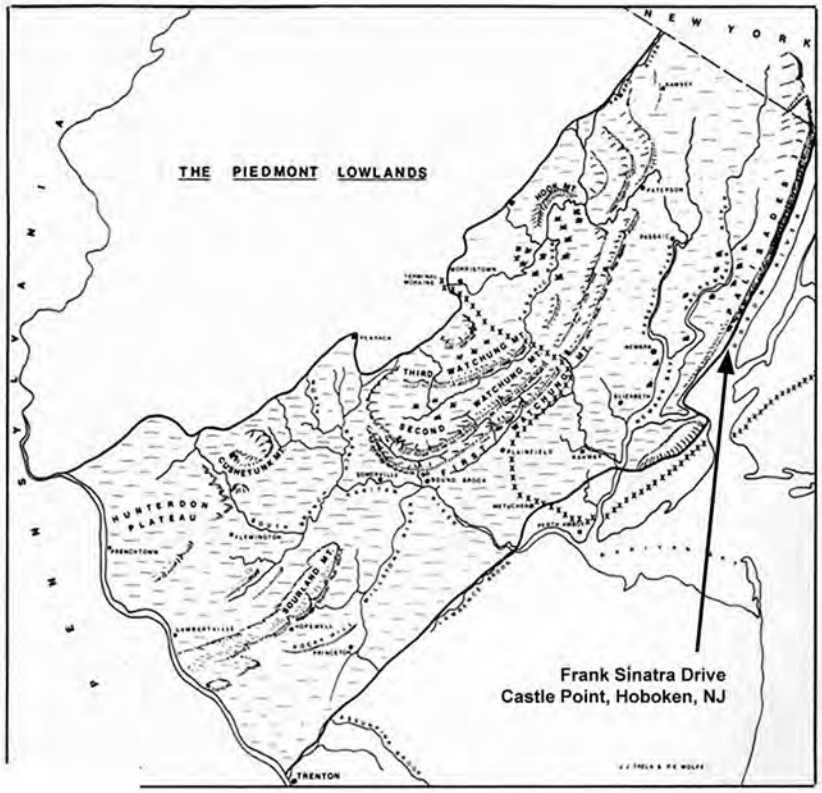
Hoboken Tax Map, Sheet 42, which includes the northernmost section of the project area (to 11th St).

Hoboken Tax Map
Sheet 42

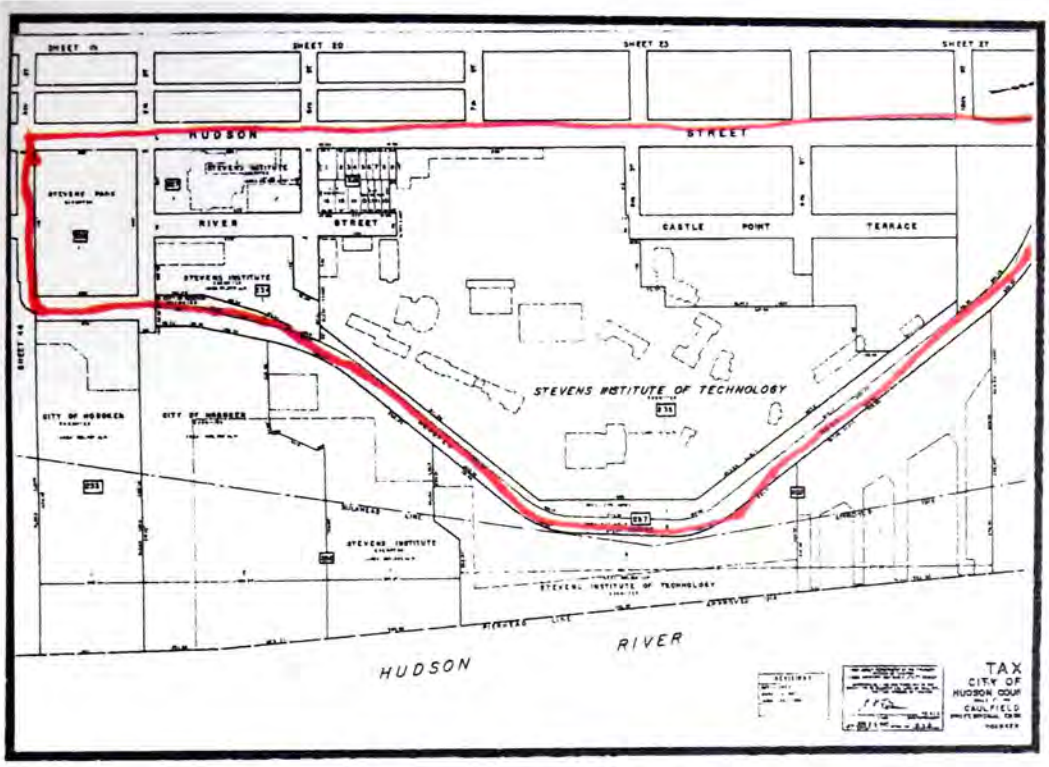


Hoboken Tax Map, Sheet 43, which includes the southern section of the project area (4th to 10th Sts).

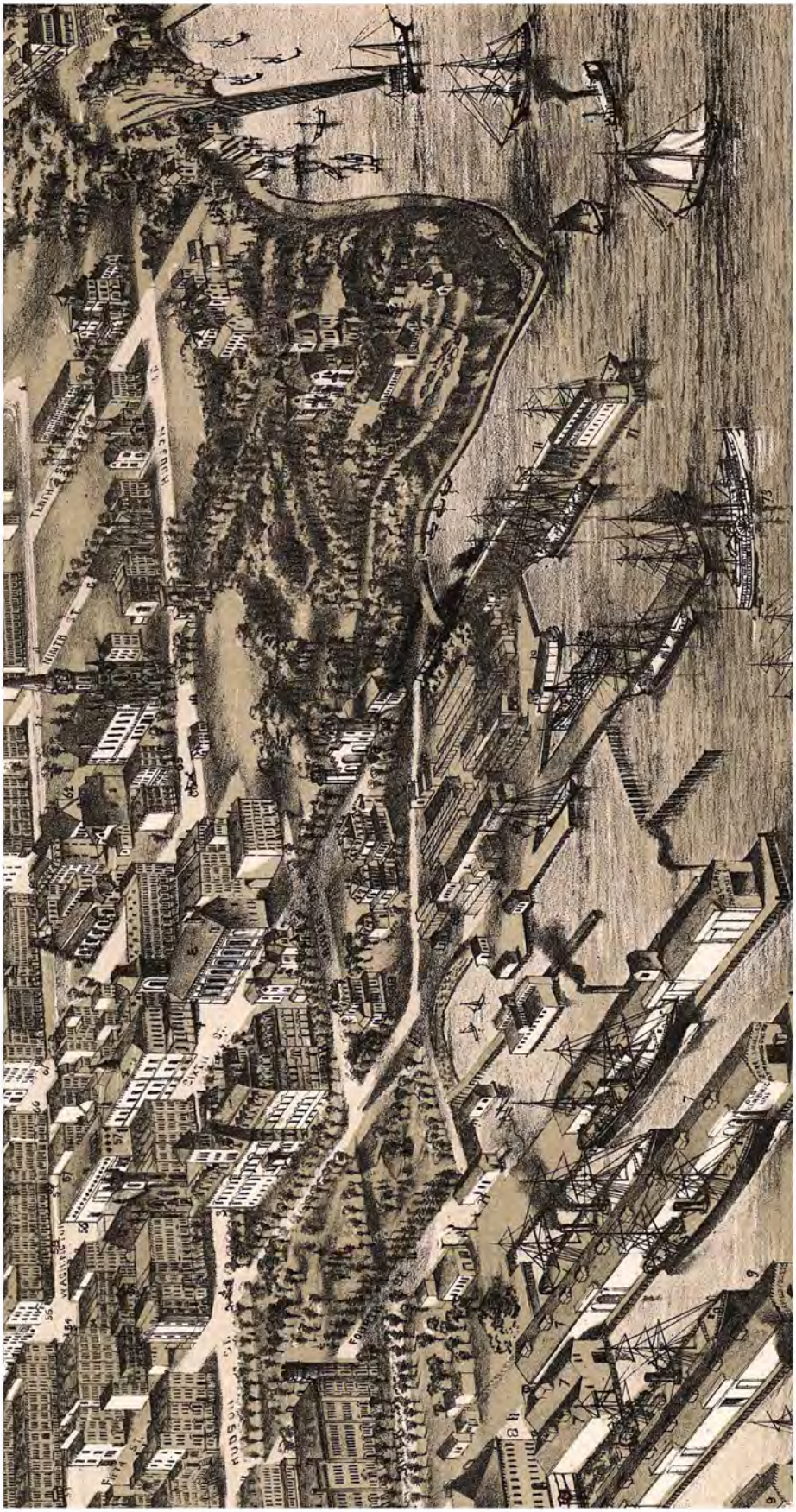
Hoboken Tax Map
Sheet 43



Map of the Piedmont Lowlands Province on which the location of Hoboken is indicated (Wolfe 1977: Figure 9-1).



Tax Map showing rough boundaries of the Stevens Historic District. Courtesy of Arch2, Inc. (2003).



Bird's Eye view of City of Hoboken, NJ (Boston: O.H. Bailey, 1881)), showing project area.

1881

Bird's Eye view of City of Hoboken, NJ (New York: Hughes and Bailey, 1904), showing project area.

1904

APPENDIX C
HISTORIC AND CONTEMPORARY PHOTOGRAPHS

Historic Photographs

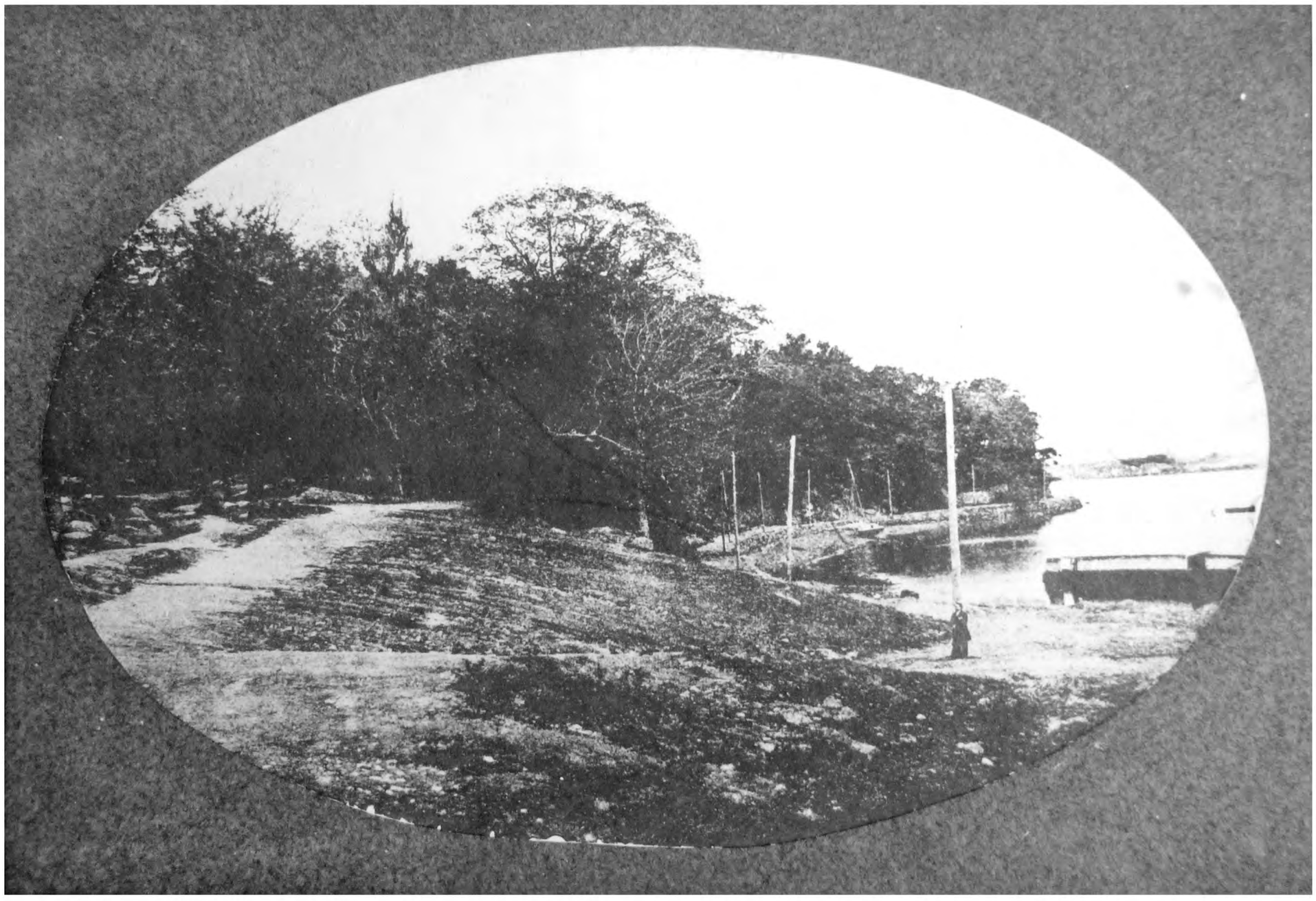


Photo No. H-1: 1865 view of the foot of Fifth Street at River Walk (now Frank Sinatra Drive).

Photo No. H-2: Hudson Square Park, between 4th and 5th Streets, ca. 1875. Courtesy Hoboken Public Library.

Photo H-1
Photo H-2

Photo No. H-3: Ca. 1885 view of River Walk between 9th and 10th Sts. Courtesy Hoboken Public Library.

Photo No. H-4: Ca. 1891 View of River Road, Castle Point, Stevens Castle, and greenhouses, with boats and barges in foreground. Courtesy Hoboken Public Library.

Photo H-3
Photo H-4

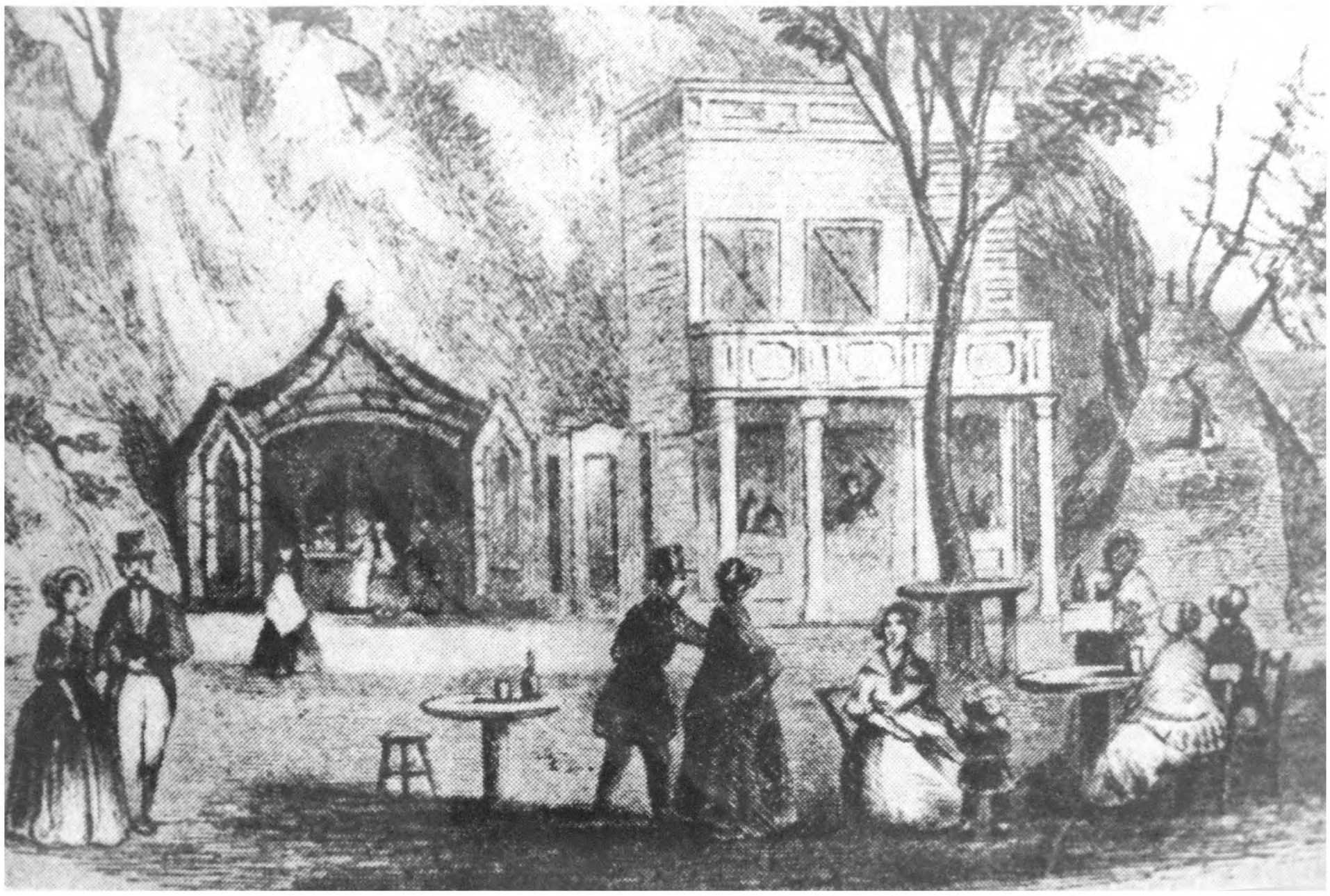


Photo No. H-5: Ca. 1850 view of Sybil's Cave, on River Walk. Courtesy Hoboken Public Library.

Photo No. H-6: Ca. 1884-1888 view from walkway extended into Hudson River near Sybil's Cave, tavern owned by John Eckstein. Courtesy Hoboken Public Library.

Photo H-5
Photo H-6

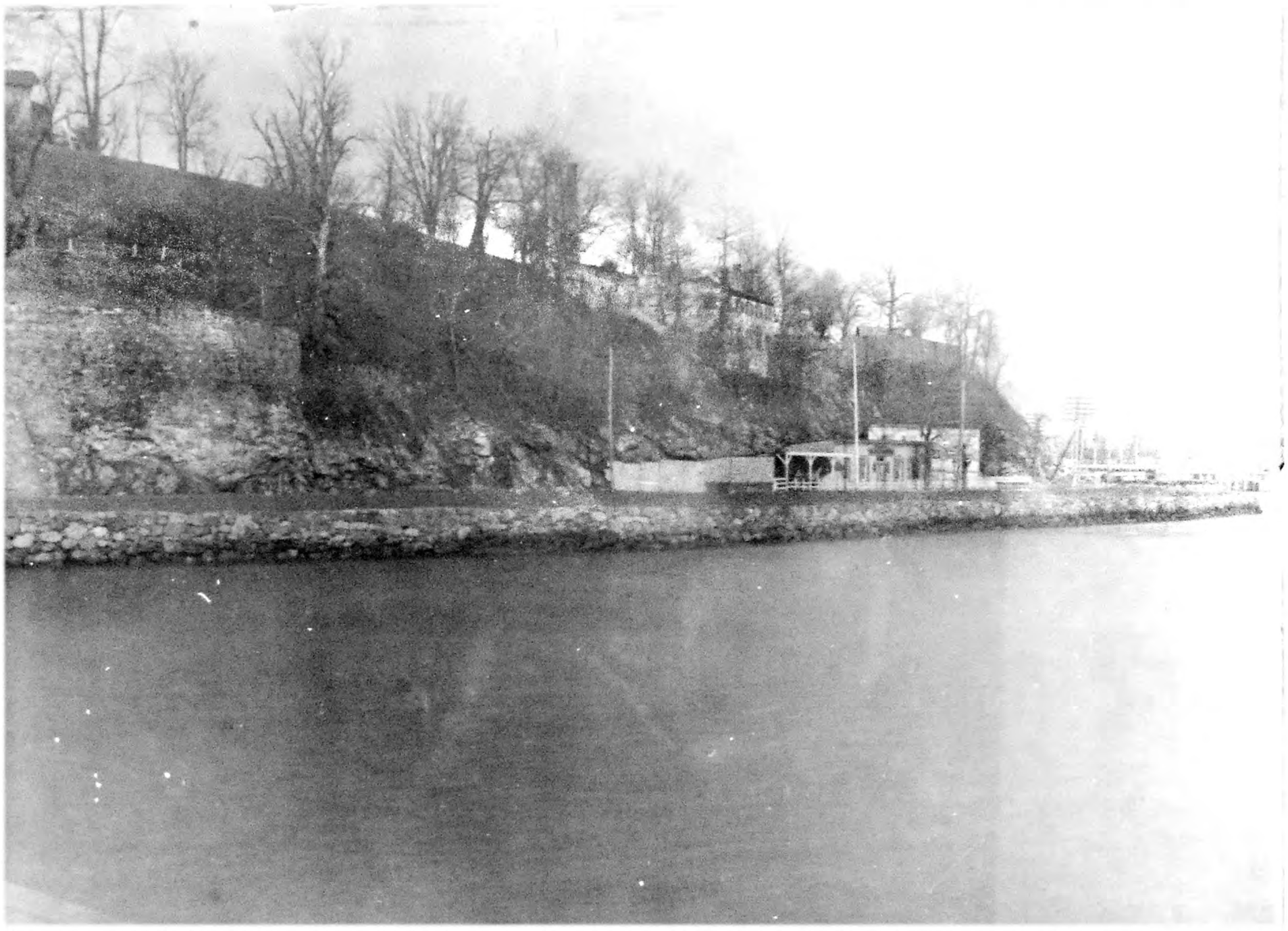


Photo No. H-7: Ca. 1891 view of Sybil's Cave, foot of 8th St. at River Walk. Courtesy Hoboken Public Library.

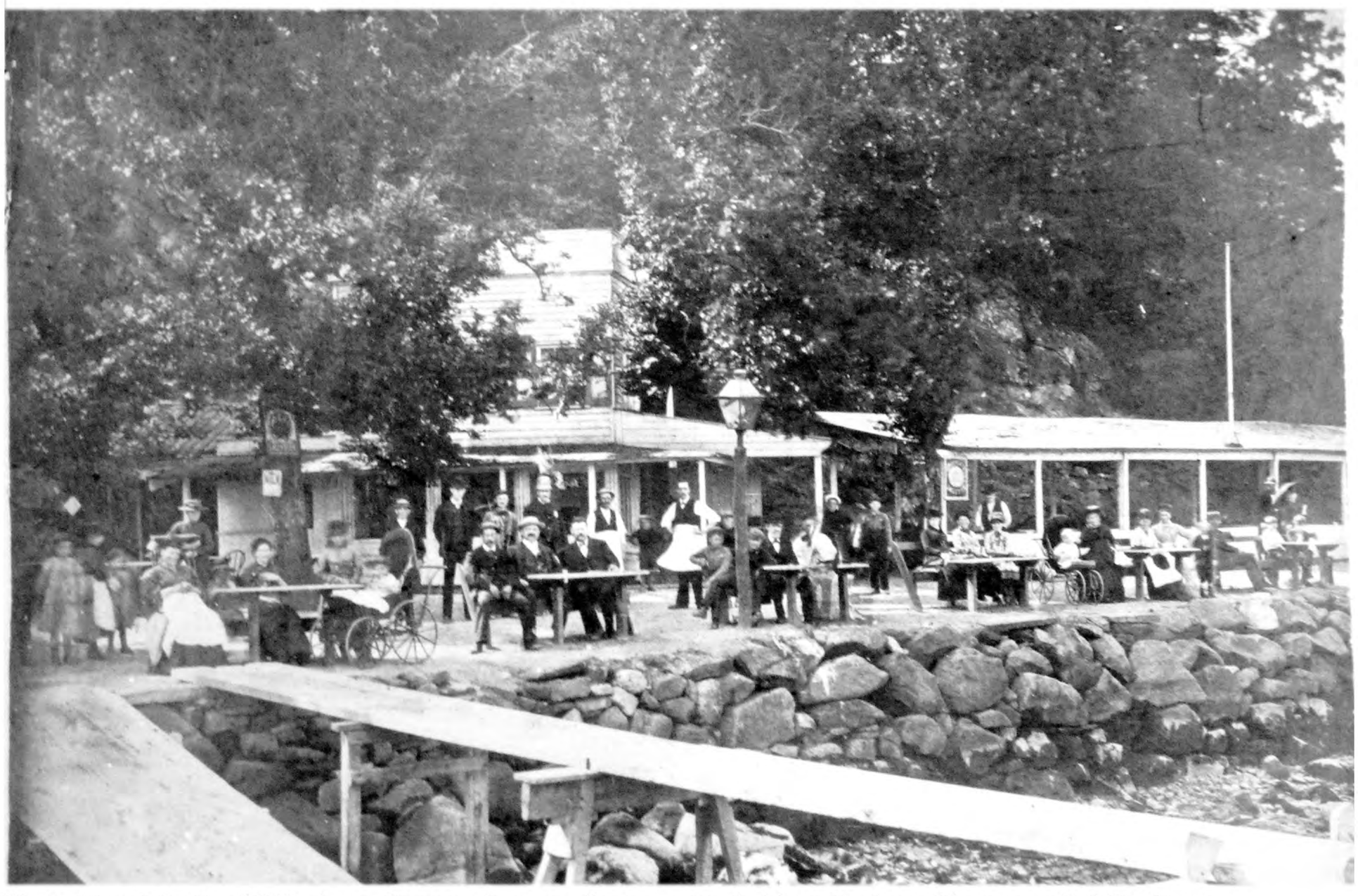


Photo No. H-8: Ca. 1890 view of tavern from walkway extended into Hudson River near Sybil's Cave. Courtesy Hoboken Public Library.

Photo H-7
Photo H-8

Photo No. H-9: Ca. 1890 view of River Road, much widened, between 8th and 9th Sts., with section of serpentine stone retaining wall at left. Courtesy Hoboken Public Library.

Photo No. H-10: Ca. 1905 view of 4th St. Boathouses. Courtesy Hoboken Historical Museum.

Photo H-9
Photo H-10

Photo No. H-11: 1905 view of Pier 5, Holland America Line, near 4th St and River Road, with Hoboken Shore Railroad cars in foreground. Courtesy Hoboken Historical Museum.

Photo No. H-12: 1920s view of Pennsylvania Railroad Marine (now Union Dry Dock), at foot of 8th Street at River Road. Courtesy Hoboken Historical Museum.

Photo H-11
Photo H-12

Photo No. H-13: 1961 view of Pennsylvania Railroad Marine Yards (now Union Dry Dock), with train spur on pier at 11th Street. Courtesy Hoboken Historical Museum.

Photo No. H-14: Ca. 1905 view of 10th St. Boat Basin.

Photo H-13
Photo H-14

Contemporary Photographs

Photo No. 1: View of New York City skyline from Frank Sinatra Drive at 4th Street, looking E (2014).

Photo No. 2: WWII Memorial, FSD between 4th and 5th Streets, looking E (2014).

Photo 1
Photo 2

Photo No. 3: Ticket and restroom facilities in Frank Sinatra Memorial Park, FSD between 4th and 5th Sts., looking S (2014).

Photo No. 4: Ampitheatre in Frank Sinatra Memorial Park, FSD between 4th and 5th Streets, looking S (2014).

Photo 3
Photo 4

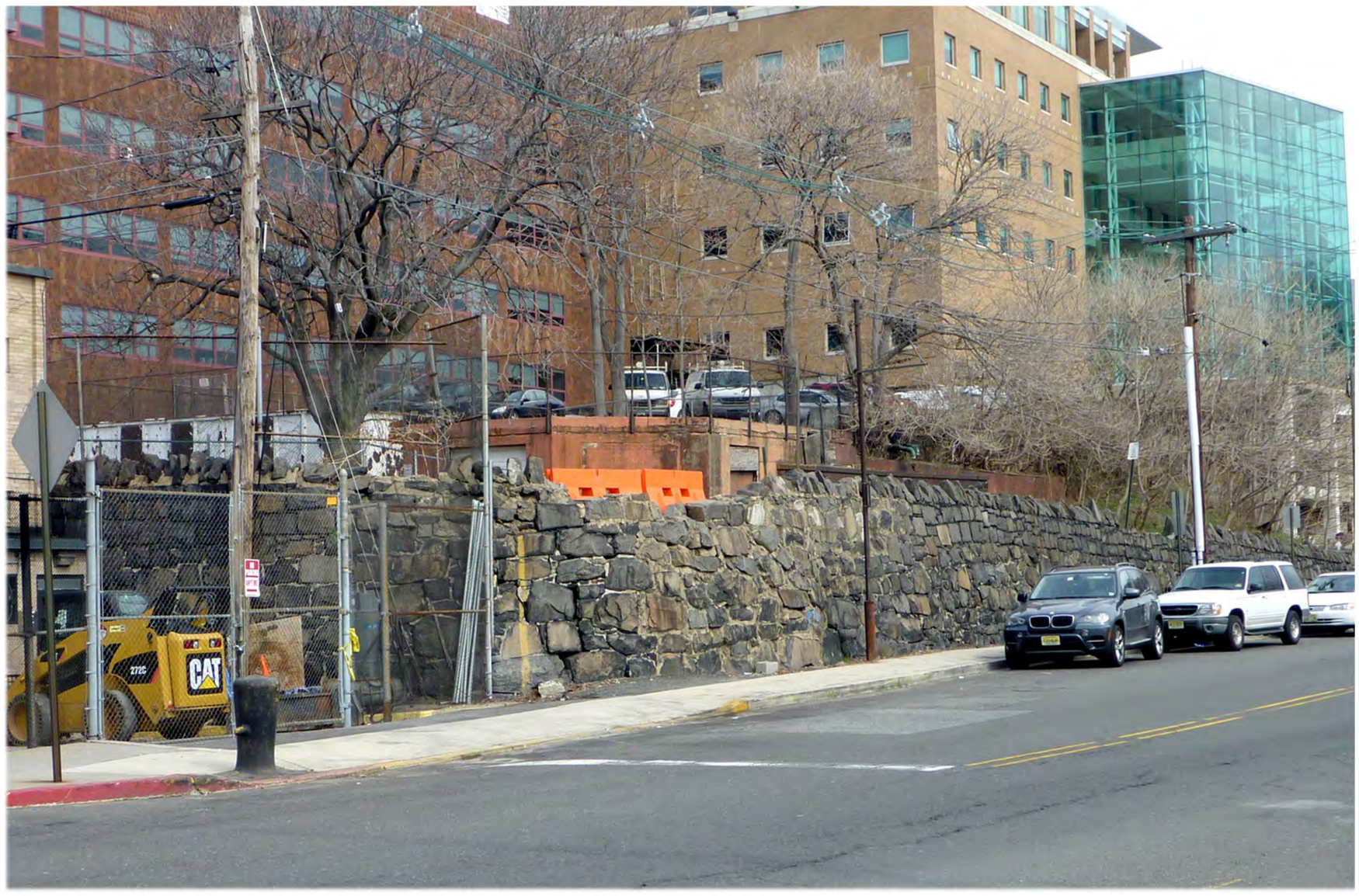


Photo No. 5: Pre-1891 masonry retaining wall at foot of 5th Street at FSD looking N (2014).

Photo No. 6: The north end of the pre-1891 ramp at the foot of 5th St. where it joins FSD, looking SW (2014).

Photo 5
Photo 6

Photo No. 7: Unmarked iron artifact near the foot of 6th Street at FSD, looking S (2014).

Photo No. 8: The serpentine stone gate into the Stevens campus (ca. 1856), as seen from FSD at the foot of 6th St., looking NW (2014).

Photo 7
Photo 8

Photo No. 9: View of Castle Point Lookout and serpentine rock bluff near the foot of 7th Street at FSD, looking W (2014).

Photo No. 10: The ca. 1857 serpentine stone retaining wall below Castle Point Lookout near the foot of 7th St. at FSD, looking NW (2014).

Photo 9
Photo 10

Photo No. 11: View of serpentine stone retaining wall (ca. 1857) and serpentine rock outcrops near the foot of 8th Street at FSD, looking N, with iron fencing around Sybil's Cave site in background (2014).

Photo No. 12: Detail of serpentine stone retaining wall (ca. 1857) near the foot of 8th St. at FSD, looking W (2014).

Photo 11
Photo 12

Photo No. 13: Sybil's Cave site, serpentine rock outcrops and retaining walls of various periods near the foot of 8th Street at FSD, looking W (2014).

Photo No. 14: Detail of new entry portal (EIFS) marking Sybil's Cave (2008) near the foot of bluff at 8th St. and FSD, looking N (2014).

Photo 13
Photo 14

Photo No. 15: The Walkway and Fishing Pier (2008, Dean Marchetto, Arch.) at foot of 8th Street at FSD, looking E (2014).

Photo No. 16: The Castle Point Skate Park between 9th and 10 Sts. at FSD, looking N (2014).

Photo 15
Photo 16

Photo No. 17: The Union Dry Dock yard between 9th and 10th Streets on FSD, looking E (2014).

Photo No. 18: "We the Surviving Workers" memorial in the Union Dry Dock yard between 9th and 10 Sts. and FSD, looking E (2014).

Photo 17
Photo 18

Photo No. 19: The concrete retaining wall (n.d.) marking the boundary of Elysian Park near foot of 10th Street at FSD, looking NW (2014).

Photo No. 20: The edge of Elysian Park near 10 St. and FSD, looking SE (2014).

Photo 15
Photo 16

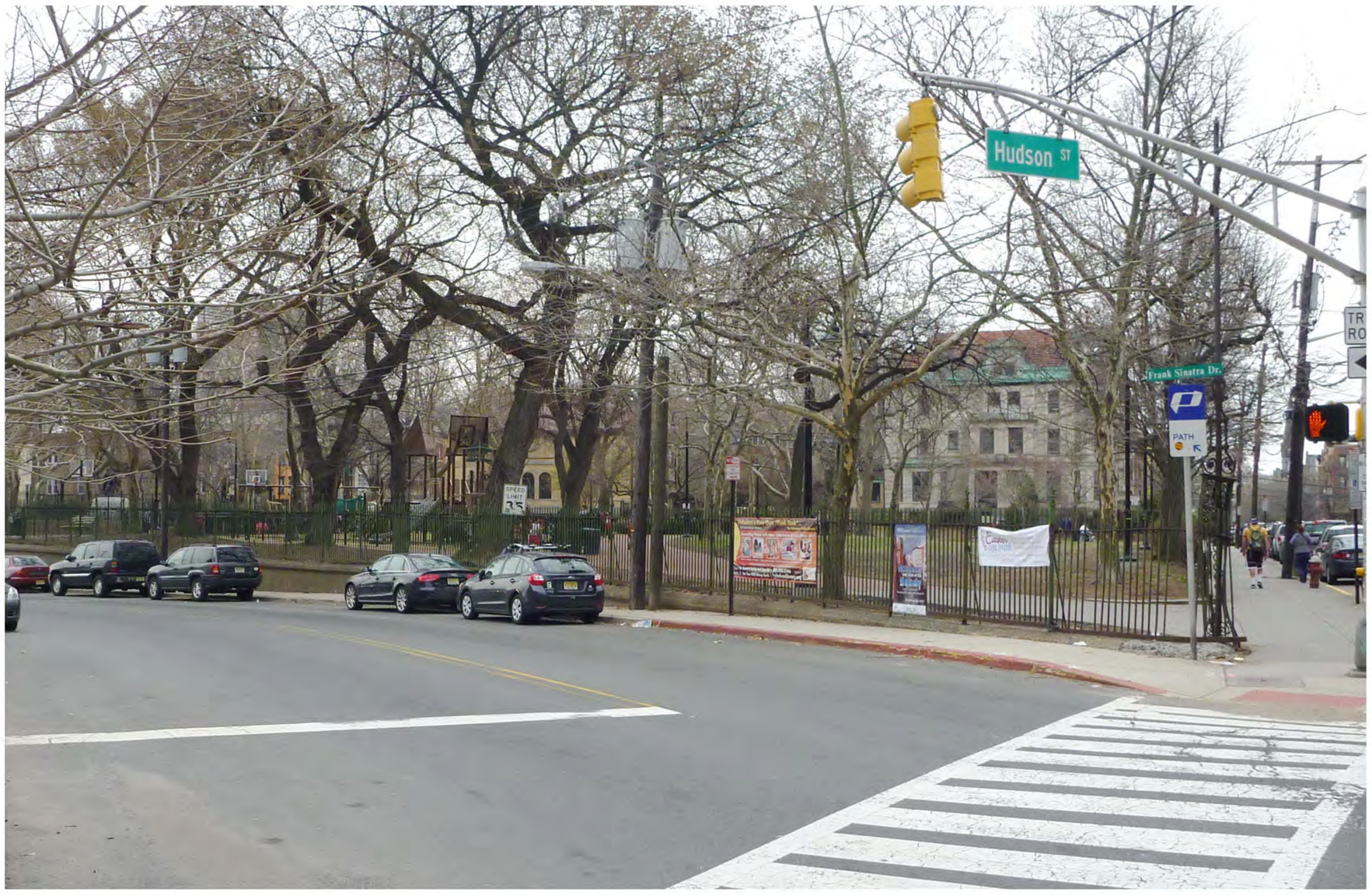


Photo No. 21: The entry to Elysian Park near 11th Street and FSD, looking S (2014).

Photo No. 22: The cove and beach at Maxwell Place Park near the foot of 11th St. and FSD, looking S toward the Union Dry Dock yards (2014).

Photo 21
Photo 22

Photo No. 23: The new boathouse at foot of 11th Street in Maxwell Place Park, looking E (2014).

Photo No. 24: Multi-unit residential development at Maxwell Place at 11th St. and FSD, looking W (2014).

Photo 23
Photo 24

APPENDIX D
TEAM QUALIFICATIONS

MARY DELANEY KRUGMAN

62 Myrtle Avenue
Montclair, NJ 07042
(973) 746-2810 Voice • (866) 755-8505 Fax • mkrugman@mdka.com

EDUCATION

Columbia University, The Graduate School of Architecture, Planning, and Preservation, N.Y., N.Y.
Degree Awarded: Master of Science in Historic Preservation (1995).
Grants: Kinne Research Grant (1994).
Awards: Citation of Recognition, Clio and James Marston Fitch Prize Committee (1994); Faculty Award for Outstanding Thesis, History Sector (1995).

The Columbus School of Law, The Catholic University of America, Washington, D. C.
Degree Awarded: Juris Doctor (1974).

The George Washington University, Washington, D.C.
Degree Awarded: Bachelor of Arts (1970).
Major: Political Science.

Elmira College, Elmira, N.Y. (1966 - 1968).
Honors: Honors Program; Dean's List; Regents Scholarship.
Elected: Class President; Representative, Judicial and Legislative Boards.

AWARDS

2009 Grand Prize Award, Civil/Site Construction, For Excellence in Concrete Design and Construction for Sally's Pond Dam Rehabilitation [Ringwood State Park], Ringwood, NJ. *Team Member; Historic Preservation Specialist.* Presented by the Eastern Pennsylvania & Delaware Chapter, American Concrete Institute (2010).

Outstanding Comprehensive Master Plan Award, City of Hoboken, NJ, Master Plan. *Team member; author of Historic Preservation Element.* Award presented to Team Leader, Phillips Preiss Shapiro Associates, Inc., by the NJ Chapter of the American Planning Association (2004).

2002 NJ Historic Preservation Award from the NJ Historic Sites Council and NJ Department of Environmental Protection for documentation in "Rehabilitation of Bi-County Bridges Nos. A0601 and A0605," presented May 2002.

Honorable Mention, 39th Annual NJ Concrete Awards, to project team for "Rehabilitation of Sally's Pond Dam (2000-2001), Ringwood Manor State Park, Ringwood, NJ," presented May 2002.

Special Citation of Recognition, Clio and James Marston Fitch Prize Committee, Preservation Alumni, Inc., for work in historical documentation: *From Horse to Horsepower: Automobile Row and the Rise of General Motors (1900 - 1926).* Paper. Columbia University, Graduate School of Architecture, Planning, and Preservation (1993), presented October 1994.

Outstanding Thesis Award, History Sector, presented by the faculty of the Historic Preservation Program, Columbia University, Graduate School of Architecture, Planning, and Preservation, for thesis entitled *From Main Street to Mall: The Evolution of the American Branch Department Store* (1995), presented May 1995.

MEMBERSHIPS / AFFILIATIONS

Member of the Bar, NJ (1975 – present); District of Columbia (1974 - present). Currently inactive.
NJ State Bar Association: Land Use Section
Society of Architectural Historians
Vernacular Architecture Forum
Association for Preservation Technology International
International Council on Monuments and Sites/US Chapter (US/ICOMOS)
Society for Industrial Archeology; SIA-Roebling Chapter (NY-NJ)
National Trust for Historic Preservation, NTHP Forum
Preservation Alumni, Inc. (Columbia University, GSAPP); PA Mentoring Program
Preservation New Jersey, Inc.
Montclair (NJ) Historical Society

Positions Held:

Board of Directors, Association for Preservation Technology International, *member* (2000 - 2003); Chair, Outreach and Partnerships Committee (2001 – 2003).
Executive Committee of Preservation Industry Network, a Task Force of the Association for Preservation Technology International, *Member* (1997 - 2001).
Preservation Committee, NJ League of Historical Societies, *Member* (1997-1999).
Board of Trustees, Advocates for NJ History, *member* (1997-1999).
Board of Trustees and Executive Committee, Montclair Historical Society, Montclair, NJ, *Member* (1992 - 1998); *Chair*, Preservation Committee (1994 - 1996); *Member,* "Evergreens" Committee (1994-2001).
Township of Montclair, NJ, Historic Preservation Commission, (1994-1998). *Chair.*

EMPLOYMENT

Mary Delaney Krugman Associates, Inc., Montclair, NJ. *President.* Historic preservation consulting firm (1995 -1996; 1997 - present). Website: http://www.mdka.com

Federal Emergency Management Agency (FEMA), U.S. Department of Homeland Security. *Senior Historic Preservation Specialist.* DR-4086-NJ. Public Assistance Program; Mitigation Assessment Team (MAT) (2012 - 2013).

URS Corporation/NISTAC. *Technical Assistance Contractor-Historic Preservation, Southwest Louisiana Region* for Federal Emergency Management Agency (FEMA), U.S. Department of Homeland Security, DR 1607-Hurricane Rita, ESF-14 (Long Term Community Recovery) and Public Assistance Program (2006).

Heritage Marketplace, Inc., Montclair, NJ. *President.* Publisher of the Internet magazine *Trovare*®, an advertising website for available older and historic properties (1998 - 2001).

Preservation New Jersey, Inc., Perth Amboy, NJ. *Executive Director.* NJ's statewide non-profit historic preservation organization (1996 - 1997).

Krugman, Chapnick & Grimshaw, Saddle Brook, NJ. *Attorney*. Multi-office international and domestic corporate practice (1974-1980).

PROJECTS

Preservation Surveys, Planning Studies, and Community Development:

North End Redevelopment Plan, Ocean Grove, Neptune Twp, NJ. Evaluation of cultural resource issues facing municipal redevelopment area in historic district on behalf of area property owner (2006).

Amended Easton-Somerset Redevelopment Study Area, New Brunswick, NJ. Cultural Resource evaluation on behalf of NJ Books, a commercial owner of property in redevelopment area (2006).

Castle Point Historic District, Hoboken NJ. Consultant on local designation of historic district on behalf of neighborhood (2005).

901-903 Hudson Street, 900 and 907 Castle Point Terrace, Hoboken, NJ. Consultant on three applications for site plan approval before the Hoboken Planning Board and Zoning Board of Adjustment on behalf of objectors (2005).

Verona Landmarks Preservation Commission, Verona, NJ. Consultant for strategic preservation planning and technical assistance (2005).

CLG Design Guidelines Workshop, Glen Ridge, NJ. Workshop on the various approaches to design review through design guidelines for the Glen Ridge [NJ] Historic District Preservation Commission (2004).

Kenilworth Historical Society, Workshops in Historical Documentation, Kenilworth, NJ. Development and presentation of a series of workshops in techniques used in historical research and documentation of historic structures (2004).

Master Plan/Historic Preservation Element Review, Township of Tewksbury, NJ. Review of Master Plan and Historic Preservation Element for compliance with relevant statutes, standards, and guidelines on behalf of property owners (2003).

City of Hoboken, Historic Preservation Commission, Hoboken, NJ. Facilitator of workshop for current Commissioners on the regulatory framework of preservation and the creation of a strategic preservation plan (2003).

Master Plan Historic Preservation Element, City of Hoboken, NJ. Preparation of the Historic Preservation Element of the Hoboken Master Plan, Hudson County, NJ (2003).

Walking Tour: *The Architectural Styles of Historic Kenilworth, NJ*. Historical research; preparation of walking tour brochure; and tour leader for event sponsored by the Kenilworth Historical Society Inc. (2002)

Proposed Athletic Complex, Stevens Institute of Technology, Hoboken, NJ. Expert witness in re an application for site plan approval before the City of Hoboken, NJ, Planning Board, evaluating potential effects of project on historic resources on behalf of neighborhood residents (2001).

Montclair Community Church, Montclair, NJ. Expert witness re design and historic preservation issues re an application for use variance and site plan approval before the Montclair Zoning Board of Adjustment on behalf of neighborhood (2001).

Kip's Castle (1905), Verona, NJ. In re the Application for site plan approval before the Verona and Montclair Zoning Boards of Adjustment and ancillary issues on behalf of neighborhood residents (2000).

Pine Street Historic District (1880-1949), Montclair, NJ. Preparation of comments evaluating a proposed National Register nomination for the Pine Street Historic District, Montclair NJ on behalf of the Montclair Historic Preservation Commission (1999).

Stanhope Historical Society, Stanhope, NJ. Expert witness to Borough Council for marketing strategies for Borough-owned historic properties on behalf of the Stanhope Historical Society (1998).

Oradell Arts and Business Alliance, Oradell, NJ. Advisor re preservation planning and advocacy techniques concerning redevelopment of the historic Hackensack Water Works complex (1997).

Riverdale, NY. Preparation of a preliminary cultural resource survey on behalf of the Riverdale Nature Preservancy (1995 - 1996).

Engineering, Infrastructure:

The George Washington Bridge (1931), Fort Lee, NJ, and New York, NY. Preservation consultant working with Arcadis-U.S., Inc., on behalf of the Port Authority of NY and NJ in connection with the replacement of the suspender cables (2011-2012).

Splitrock Reservoir – Boat Ramp (new), Rockaway Twp, NJ. Historian and team leader for a Phase1a Archaeological Survey of a project site within the Split Rock Furnace Historic District (SR/NR) (2011).

Harsimus Cove Embankment (1875; 1901), Jersey City, NJ. Preparation of expert testimony before the Jersey City Zoning Board of Adjustment on appeal from Historic Preservation Commission decision, on behalf of the Embankment Preservation Coalition, Jersey City, NJ (2011).

Leddell's Pond Dam (ca. 1780), Mendham Twp, NJ. Cultural resource consultant for rehabilitation of National Register-listed 18th Century dam in Lewis Morris County Park, adjacent to Jockey Hollow encampment, Morristown National Historical Park for the Morris County Parks Commission (2009).

Crane Road Bridge (1924) Rehabilitation/Reconstruction, Bronx River Parkway, Scarsdale, NY. Team member, specialist for cultural resources for bridge rehabilitation in National Register listed historic district, serving with Stantec Consultants, Inc. on behalf of Westchester County, NY (2006 - 2011).

Sally's Pond Dam (c. 1895), Ringwood Manor State Park, Ringwood, NJ. Historic preservation and archaeological services for dam reconstruction for the NJ Department of Environmental Protection, Division of Parks and Forestry (2005 – 2008).

Sussex County Bridge No. 1900 Q25 (1911), West Mountain Road. Sparta Township, NJ. Consultant to the Lake Grinnell Association on regulatory and design issues for NJDOT bridge replacement project (2005).

Bridge No. C0607 (1921) Opie/River Road, Hillsborough and Branchburg Townships, Somerset County, NJ. Design consultant in the rehabilitation of a Pratt pony truss bridge and replacement of concrete bridge on behalf of Somerset County (2005).

Lake Musconetcong Dam/Lock 1 West, Morris Canal (ca. 1830; 1926), Stanhope, NJ. Phase 1 background research and design consultation related to dam upgrades on behalf of the State of NJ (2004).

Edison Pond Dam (ca. 1890), Sparta, NJ. Expedited archaeological investigation and design consultation for its rehabilitation on behalf of the State of NJ (2004).

Bridge Nos. B0510, B0511, and B0512 (1916; 1902; and ca. 1892, respectively), Woodfern Road, Hillsborough and Branchburg Townships, Somerset County, NJ. Design consultant in the rehabilitation of two metal truss bridges and replacement of concrete bridge on behalf of Somerset County (2004).

Lake Solitude Dam (1909), High Bridge, NJ. Documentation of history and cultural significance of an early 20th Century masonry buttress dam in preparation for its rehabilitation on behalf of the Borough of High Bridge, NJ (2004).

Application of Canfield Building Associates, LP (Kushner/Westminster Communities), Mine Hill Twp, NJ. Consultant to the Mine Hill Planning Board in the review of the cultural resource aspects of an application for site plan approval concerning a 250-yr old mining property of approximately 200 acres (2002).

Fox Hollow Lake Dam (1926), Sparta, NJ. Preparation of a preliminary Phase I study (documentation) for a dam rehabilitation on behalf of Crepeau Development Corporation (2002).

Sally's Pond Dam (c. 1895), Ringwood Manor State Park, Ringwood, NJ. Rehabilitation of west embankment for the NJ Department of Environmental Protection, Division of Parks and Forestry (2002).

Sally's Pond Dam (c. 1895), Ringwood Manor State Park, Ringwood, NJ. Preservation consultant in restoration of a late 19th Century masonry dam for the NJ Department of Environmental Protection, Division of Parks and Forestry (2001).

The CSX Metal Truss Bridge (1909), St. Lawrence Cement Corporation Greenport Facility, City of Hudson, Columbia County, NY. Evaluation of cultural significance as part of an environmental review conducted under the NY State Environmental Quality Review Act (SEQR) (2000).

The Higginsville Road Bridges (1890; 1893), Somerset - Hunterdon Counties, NJ. Preparation of successful nomination to the NJ and National Registers of Historic Places of two 19th Century metal Pratt through-truss bridges on behalf of Somerset County, NJ (2000).

Parks and Landscapes:

Paterson Urban Park, Paterson, NJ: Master Plan. Cultural resource team member with Field Operations, the New York City landscape and architectural design firm, winner of national competition for development of a Master Plan for a NJ State Park on the site of the Great Falls National Historic Landmark Site (2006-2008).

Goffle Brook County Park (c. 1930), Hawthorne, NJ. Preparation of a successful nomination of this Passaic County Park to the NJ and National Registers of Historic Places on behalf of the Please Save Our Parkland Committee, Hawthorne, NJ (2002).

Commercial Buildings:

Properties to be acquired in Atlantic City, NJ. Conducted a cultural resource investigation on certain properties in Atlantic City as part of due diligence on behalf of Innkeepers, USA (2006).

Former Palace Theatre (1919), Netcong NJ. Preparation of a historic preservation plan on behalf of the Growing Stage Theatre Company, Netcong, NJ, funded by an award from the Morris County Historic Preservation Trust (2007).

Atlantic City Friends Meeting House and School Building (1926), Atlantic City, NJ. Consultant for regulatory issues involving cultural resources for CAFRA permit application on behalf of Innkeepers USA, Palm Beach, FL (2004).

The Fabian Building and Theatre (1925), Paterson NJ. Team leader; project historian in preparation of an Application for Project Authorization concerning a rehabilitation/redevelopment proposal; presentation to the NJ Historic Sites Council (2003).

Former Alexander Hamilton Hotel (1925), Paterson, NJ. Preparation of application for federal rehabilitation tax credits re conversion of former hotel to affordable assisted living on behalf of W+C Properties, LLC (2002).

Majestic Redevelopment Area, Jersey City, NJ. Preparation of applications for federal rehabilitation tax credits re four historic buildings on behalf of developer, Exeter Property Services Corp. (2001).

53 Elm Street (1915), Westfield, NJ. Team leader in preparation of a rehabilitation plan and cost projections for an early 20th Century commercial building on behalf of Downtown Westfield Corporation (2000).

Central Business Historic District (1880-1950), Montclair, NJ. Documentation of four commercial buildings in Montclair's Central Business Historic District and drafted essays for publication on behalf of the Montclair Historic Preservation Commission (2000).

Palace Theatre (1919), Netcong NJ. Preparation of a successful nomination to NJ and National Register of Historic Places on behalf of the Growing Stage Theatre Company, Chester, NJ (1996).

Industrial Buildings:

Harvard Printing Redevelopment/former Monroe Calculating Company Site (1920 – 1942), Orange, New Jersey. Consultant to developer, The Alpert Group LLC, with regard to NHPA Section 106 reviews of redevelopment (in progress).

Maidenform Company Factory Building (ca. 1890; 1905), Bayonne, NJ. Preservation consultant to developer, SilkLofts, LLC, for preparation of Application for Certification for federal rehabilitation tax credits, Parts 1 – 3 (2009 – present).

Interstate Hosiery Mills, Inc. – Bloomfield NJ Plant (1923; addition 1924). Preparer of successful National Register nomination for manufacturing facility as part of an adaptive use project that garnered federal historic rehabilitation tax credits on behalf of developer Mosaic Realty Partners, LLC (2009).

The Brilliant Silk Hosiery Mill / Interstate Hosiery Mills, Inc. Mill Building (c. 1923), Bloomfield, NJ. Preparation of application for federal rehabilitation tax credits re factory conversion to residential units for developer, Mosaic Realty Partners, LLC (2001 - 2006).

Matchless Metal Polish Co. Factory (ca. 1900), Glen Ridge, NJ. Preparation of a preliminary evaluation of project (2001); and preparation of application for federal rehabilitation tax credits (2003-2005).

Baldwin Avenue Machine Shop (ca. 1920), Weehawken, NJ. Evaluation of architectural significance on behalf of Greenhouse Consultants Incorporated, NYC, as part of a Section 106 cultural resource survey required for proposed infrastructure improvements for NJ Transit's Hudson-Bergen Light Rail System (2001).

Historic Tax Credits:

St. Bridget's Parish Buildings (1887 – 1923)**,** Jersey City, NJ. Preservation consultant to developer for preparation of Application for Certification for federal rehabilitation tax credits, Parts 1 – 3 (2011 - present).

Maidenform Company Factory Building (ca. 1890; 1905), Bayonne, NJ. Preservation consultant to developer, SilkLofts, LLC, for preparation of Application for Certification for federal rehabilitation tax credits, Parts 1 – 3 (2009 – present).

The Brilliant Silk Hosiery Mill / Interstate Hosiery Mills, Inc. Mill Building (c. 1923), Bloomfield, NJ. Preparation of application for federal rehabilitation tax credits re factory conversion to residential units for developer, Mosaic Realty Partners, LLC (2001 - 2006).

Former Alexander Hamilton Hotel (1925), Paterson, NJ. Preparation of application for federal rehabilitation tax credits re conversion of former hotel to affordable assisted living on behalf of W+C Properties, LLC (2002).

Matchless Metal Polish Co. Factory (ca. 1900), Glen Ridge, NJ. Preparation of a preliminary evaluation of project (2001); and preparation of application for federal rehabilitation tax credits (2003-2005).

Majestic Redevelopment Area, Jersey City, NJ. Preparation of applications for federal rehabilitation tax credits re four historic buildings on behalf of developer, Exeter Property Services Corp. (2001).

Nominations to the National Register of Historic Places

Stanhope United Methodist Church (1920), Netcong, NJ. Preparation of a Preservation Plan and National Register nomination for the church building on behalf of the congregation, partially funded by a grant from the Morris County [NJ] Historic Preservation Trust (2011-2012).

Interstate Hosiery Mills, Inc. – Bloomfield NJ Plant (1923; addition 1924). Preparer of successful National Register nomination for manufacturing facility as part of an adaptive use project that garnered federal historic rehabilitation tax credits on behalf of developer Mosaic Realty Partners, LLC (2009).

United Synagogue of Hoboken, former Star of Israel Synagogue (1915), Hoboken, NJ. Preparation of a successful National Register nomination for the United Synagogue of Hoboken in connection with a grant from the Garden State Preservation Trust, NJ (2007-2008).

John Jacob Bogert House, Harrington Park, NJ (1830; alt. ca. 1870; ca. 1895). Preparation of a successful nomination of a residence to the NJ and National Registers of Historic Places on behalf of property owners (2003-2004).

Goffle Brook County Park (c. 1930), Hawthorne, NJ. Preparation of a successful nomination of this Passaic County Park to the NJ and National Registers of Historic Places on behalf of the Please Save Our Parkland Committee, Hawthorne, NJ (2002).

The Higginsville Road Bridges (1890; 1893), Somerset - Hunterdon Counties, NJ. Preparation of successful nomination to the NJ and National Registers of Historic Places of two 19th Century metal Pratt through-truss bridges on behalf of Somerset County, NJ (2000).

The John W. Rea House, Hawthorne NJ (c. 1830). Preparation of a successful nomination of a 19th Century Dutch stone vernacular house to the NJ and National Register of Historic Places, on behalf of Please Save Our Parkland Committee, Hawthorne, NJ (1999).

Palace Theatre (1919), Netcong NJ. Preparation of a successful nomination to NJ and National Register of Historic Places on behalf of the Growing Stage Theatre Company, Chester, NJ (1996).

Residential Buildings:

323 Claremont Avenue, Montclair, NJ (ca. 1885). Evaluation of the history and cultural significance of three structures, focused on the significance of the 323 Claremont Avenue to assess various redevelopment strategies.

122 Clinton Avenue, Montclair, NJ (1916). Analysis and report on the architectural style and significance of this early 20th C. Tudor/Craftsman residence for current owners, Peter and Lauren Meyer (2009).

451 Ridgewood Avenue, Glen Ridge, NJ (ca. 1955). Expert testimony on behalf of appellant before the Glen Ridge Planning Board on appeal from Historic Preservation Commission decision (2005).

160 Sussex Street, Jersey City, NJ (ca 1866). Expert testimony before the Jersey City Historic Preservation Commission on preservation issues in an application for new development in the Paulus Hook Historic District (2004).

490 Park Street, Montclair, **NJ (ca. 1903).** Research and documentation of the history and architecture of this early 20th Century residence on behalf of Owners (2004).

8 South Mountain Avenue (ca. 1895). Montclair, NJ. Consultant for historic preservation issues in site plan application on behalf of Applicant, Montclair Homes LLC; consultant for archaeological investigations (2004).

John Jacob Bogert House, Harrington Park, NJ (1830; alt. ca. 1870; ca. 1895). Preparation of a successful nomination of a residence to the NJ and National Registers of Historic Places on behalf of property owners (2003-2004).

131 Bedford Road, Katonah, NY (c. 1897). Evaluation of architectural significance on behalf of applicant in redevelopment proposal pending before the Town of Bedford Planning Board (2002).

"Green Gate," Hoboken, NJ (ca. 1906),. Documentation of the Mu Chapter House, Chi Phi Fraternity, Stevens Institute of Technology, and assistance in ongoing rehabilitation efforts (2002).

The Lenington-Halsey House, Sparta Twp., NJ (c. 1805). Preparation of Historic American Building Survey (HABS)-level documentation and Marketing Feasibility Study in satisfaction of regulatory requirements for a site redevelopment undertaken by Sussex County State Bank (2001).

61 North Mountain Avenue, Montclair, NJ (1865; c. 1900). Expert witness re an application for creation of multi-family housing in historic district before the Montclair Zoning Board of Adjustment on behalf of opponents (2000).

Evergreens, Montclair, NJ (1897). Evaluation the period of significance of National Register-listed as part of a proposed restoration treatment for the Montclair Historical Society and the NJ Historic Trust on behalf of the Montclair Historical Society (2000).

Atsion Mansion (1826) and Store Building (1827). Wharton State Forest, Burlington County, NJ. Project historian for Preservation Plan for Ironmaster's Mansion and company store for the NJ Division of Parks and Forestry (1999).

The John W. Rea House, Hawthorne NJ (c. 1830). Preparation of a successful nomination of a 19th Century Dutch stone vernacular house to the NJ and National Register of Historic Places, on behalf of Please Save Our Parkland Committee, Hawthorne, NJ (1999).

The William Platt House, Montclair, NJ (c. 1890). Researched architectural history of residence for owner (1998).

The Gulick House, Lawrence Twp., NJ (c. 1870). Expert witness in deposition for federal litigation concerning appropriate design solutions in redevelopment of historic property on behalf of developer (1998).

The Rullman House, Red Bank, NJ (c. 1840; 1924), Preparation of report on architectural history and significance of Nineteenth Century residence on behalf of Preservation Red Bank (1997).

Institutional Buildings (Houses of Worship, Libraries, Museums, etc.):

Former James Library, now Museum of Early Trades and Crafts (1900), Madison, NJ. Team historian for Preservation Plan, on behalf of the Museum, partially funded by a grant from the Morris County [NJ] Historic Preservation Trust (2011-2012).

St. Bridget's Parish Buildings (1887 – 1923)**,** Jersey City, NJ. Preservation consultant to developer for preparation of Application for Certification for federal rehabilitation tax credits, Parts 1 – 3 (2011 - present).

Stanhope United Methodist Church (1920), Netcong, NJ. Preparation of a Preservation Plan and National Register nomination for the church building on behalf of the congregation, partially funded by a grant from the Morris County [NJ] Historic Preservation Trust (2011-2012).

United Synagogue of Hoboken, former Star of Israel Synagogue (1915), Hoboken, NJ. Preparation of a successful National Register nomination for the United Synagogue of Hoboken in connection with a grant from the Garden State Preservation Trust, NJ (2007-2008).

Bellevue Avenue Branch Library (1914), Montclair, NJ. Phase IA archaeological survey for this Carnegie Library on behalf of the Board of Trustees of the Montclair Public Library (2006); consultant for historic preservation issues in development of Master Plan for rehabilitation and accessibility upgrades (2007).

United Synagogue of Hoboken (1915), Hoboken, NJ. Team leader and consultant for application for Certification of Eligibility in connection with grant application to the Garden State Preservation Trust (2005).

Union Street: 2003 Street Improvements, Montclair, NJ. Survey of existing conditions and preparation of history and significance report on road paving materials and methods in First Residential Historic District in support of a NJ Application for Project Authorization on behalf of the Twp. of Montclair (2003).

St. Margaret's Home (1853), Red Hook, NY. Research and documentation of history of Home's residents (1853-1930s) on behalf of Greenhouse Consultants Incorporated, New York, NY (2002).

Westfield Board of Education (Former High School Building) (1914), Westfield, NJ. Evaluation of potential eligibility for the National Register of Historic Places on behalf of Downtown Westfield Corporation (2000).

B'Nai Keshet Synagogue/Red Gables (1906), Montclair, NJ. Preparation of grant reports filed with the NJ Historic Trust for grant awarded under the NJ Historic Preservation Bond Program (1998).

Preservation Ordinances, Master Plan Preservation Elements

Township of Montclair, NJ, Historic Preservation Ordinance, enacted June 1994. *Co-author*.

Township of Montclair, NJ, **Historic Preservation Element of Master Plan,** adopted May 1993. *Co-author.*

PUBLISHED WORK

Ribbons and Lines. Weblog. Compilation of essays related to history, environment, and historic preservation. http://ribbonsandlines.blogspot.com (February 2010 - present).

Provided underlying historical research and documentation for Christina Halsey Way, Editor, *The Architectural and Historical Resources of Riverdale, NY: A Preliminary Survey* (Riverdale, NY: The Riverdale Nature Preservancy, October 1998).

"Homeowner Tax Credit on the Horizon." Co-author. *Preservation Perspective,* Summer 1997.

"$11 Million in Preservation Grants Awarded to 27 Historic Sites." *Preservation Perspective,* Fall 1996.

"Endangered NJ." Feature column. *Preservation Perspective,* 1996-1997.

"Heritage Tourism Profits Measured." *Preservation Perspective,* Fall 1996.

"Preservationist to Critics: Let's Build on Common Ground." Op Ed Article. *The Montclair Times* 5 October 1995.

"E Pluribus Unum: An Ethnic History of Montclair, NJ: 1690-1955." In *Montclair, NJ: 1868-1993*. Montclair, NJ: 125th Anniversary Committee, 1994.

"Birthplace of Montclair, the Suburb: The First Residential District." *The Montclair Times* 15 October 1992.

TESTIMONY

Former Marylawn Convent, 428 Scotland Road, South Orange, NJ. Expert Testimony before the South Orange Historic Preservation Commission (in progress).

120 Franklin Avenue, Ocean Grove, Neptune Twp., NJ. Expert testimony before the Ocean Grove Historic Preservation Commission regarding the demolition of a 1920 bungalow on behalf of the owner.

Harsimus Cove Embankment (1875; 1901). Expert testimony before the Jersey City Zoning Board of Adjustment on appeal from Historic Preservation Com'n decision on behalf of the Embankment Preservation Coalition (2011).

Lake Solitude Dam, High Bridge, NJ. Expert testimony in NJ Superior Court on behalf of Borough of High Bridge in condemnation valuation of historic dam (2006).

Expert testimony on behalf of appellant before the Glen Ridge Planning Board on appeal from Historic Preservation Commission decision (2005).

160 Sussex Street (ca 1866), Jersey City, NJ. Expert testimony before the Jersey City Historic Preservation Commission on preservation issues in an application for new development in the Paulus Hook Historic District (2004).

Expert testimony regarding historic preservation issues in re the Application of the Montclair Community Church before the Montclair Zoning Board of Adjustment for use variance and site plan approval on behalf of neighborhood residents (2001).

Expert testimony in re the Application of Kramer Communities, LLC, for use variance for property located at 61-63 North Mountain Avenue, Montclair, NJ, before the Montclair Zoning Board of Adjustment on behalf of opponents (2000).

Testimony before the NJ Legislature's Joint Committee on the Environment, Trenton, NJ, on proposed legislation creating "Garden State Preservation Trust" and proposed allocation of bond funds (1999).

Testimony before the Montclair Township Planning Board in support of application for site plan approval on behalf of developer, New Street redevelopment project, Montclair NJ (1999).

Testimony before the NJ Senate Judiciary Committee on proposed legislation: "NJ Religious Freedom Act" (S. 321) and its potential effects on local land use regulation on behalf of Advocates for NJ History (1998).

Expert testimony in *Laurel Construction Management, Inc. vs. Zoning Board of Adjustment, Twp. of Lawrence, NJ and the Twp. of Lawrence, NJ* (US Dist. Ct, Dist. of NJ) in support of Developer-Plaintiff re proposed adaptive use of a 19th Century residence (1998).

INDEPENDENT STUDIES

Study Tour of the Gaspe Peninsula, Quebec, Canada (2013). Study tour of La Gaspésie, destination of thousands of Irish émigrés during the years of the Great Famine in their homeland. Goal was genealogical research into survivors of the wreck of the Sligo, IE, ship *Carricks of Whitehaven* off Gaspe (1847); tour conducted in concert with a conference on vernacular architecture of the region.

Study Tour of the Western National Parks (2010). Study tour that followed the route of the 1920 Park-to-Park National Highway Dedication Tour. It included field explorations and background study in the history of America's first national parks as well as the architecture and environment that shapes the visitor experience.

Architectural Survey, Cayman Brac, Cayman Islands, British West Indies (1994). Survey of the vernacular architecture of the island of Cayman Brac, funded in part by a Kinne Research Grant from the Columbia University Graduate School of Architecture, Planning, and Preservation (1994).

Cathedral of Santa Maria del Fiore, Florence, Italy. Survey of the computer monitoring system for structural deformation and deterioration of the Brunelleschi dome, in consultation with the Dipartimento di Ingegneria Civile, Università degli Studi di Firenze (1993).

WILLIAM SANDY, RPA
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EDUCATION

B.A. Rutgers University, Anthropology, 1979.
M.A. Rutgers University, Anthropology, 1984.
Registry of Professional Archaeologists 1986.

CAPABILITIES

Principal archeologist with over thirty-four years of experience in all aspects of cultural resource studies; research, excavation, analysis, and report production. Expert on history and archaeology of Morris and Sussex Counties, NJ. Specializations include industrial NJ; American historic and Precontact archeology; subsistence recovery; and education. Meets Secretary of the Interior's Professional Qualifications Standards (36 CFR 61).

EXPERIENCE

2010-Present Sussex County Community College, NJ
Adjunct Professor in the Department of Social Science and History. Taught Anthropology, Cultural Anthropology, Archaeology, and Field Archaeology.

1983-Present Freelance Archeologist
Primary Investigator on projects in Byram and Clinton, New Jersey. Co-Primary Investigator for historic site projects with Mary Delaney Krugman Associates in Split Rock, Musonetcong Lake, Lewis Morris County Park, Ringwood State Park, Paterson, Stanhope, Mine Hill, Montclair, and Sparta, New Jersey. Principal Investigator for projects in Hope and Blairstown, NJ with McCabe Associates. Archeologist/Educator for the Vernon Township Historical Society, NJ at the Black Creek Site from 2007 to 2013. Archaeologist for the Friends of Fishkill Supply Depot. Lecturer on the Prehistory of Morris County for the Morris County Park Commission. Flotation Consultant on numerous projects in NY, NJ, PA, DE, and VA. Archaeologist for the Twp.of Mine Hill, NJ and Towns of Minisink and Montgomery, NY.

2007-Present Historical Perspectives, Inc.
Field Director on over 50 projects throughout NJ, NY, and CT including Tuxedo Reserve, Tuxedo and Sloatsburg, Maple Fields at Wallkill, Wallkill, NY, and Borden Ave. Bridge, New York City, NY.

1988-Present Greenhouse Consultants Inc.
Principle Investigator on numerous projects throughout NY and NJ, including the Jockey Hollow Girl Scout Camp, Mendham and Harding Townships, NJ and Waterfront Commons, Staten Island, New York, NY.

1985-2006 Historic Conservation and Interpretation, Inc.
Project Director of thirty-five projects located throughout NJ and NY, including Fosterfields and several Mount Hope area projects.

1996-2006 BTK Consultants
Principal Investigator on over 50 Phase I, II and III investigations in southern New York.

1980-83, 1991-94 American Museum of Natural History
Assistant site director at the Alta Toquima Village Site, Nevada. Consultant and crew chief on a Spanish mission site on St. Catherine's Island, Georgia.

1981-1983 DeLeuw Cather/Parsons
Senior archeologist on projects in RI, DC, and CT.

1979-1980 Monmouth College Archeology Laboratory

Research assistant on a regional prehistoric study of the New Jersey Pinelands. Assistant director of an archeological field school at the Turkey Swamp Site, Monmouth County Park, Freehold, NJ.

1976-1979 Rutgers University
Site director in New Brunswick, NJ. Crew chief and consultant on four Precontact sites in NJ. Crew member on twelve NJ surveys.

SELECTED PUBLICATIONS AND PAPERS

2013 Phase IA Cultural Resource Survey of the Proposed Halsted Street Water Replacement Project, Route 31, Town of Clinton and Clinton Township, Hunterdon County, New Jersey

2012 Phase IB Cultural Resources Survey of Paulina Lake Dam, Township of Blairstown, Warren County, New Jersey.

2012 Hansen Rock Shelter, A Black Dirt Area Archaeological Preserve. The Bulletin - Journal of the New York State Archaeological Association 126: 46-54.

2012 Phase I Archaeological Survey, New Springville Greenway Bicycle Path, William T. Davis Wildlife Refuge…Staten Island, Richmond County, NY. With Julie Abell Horn. Historical Perspectives, Inc.

2012 Healing the Scar Two: The 2010 Sussex County Community College Archaeological Field School. Archaeological Research at the Black Creek Site, Wawayanda State Park, Vernon Twp., Sussex County, NJ.

2011 Phase 1A Archaeological Survey In re Boat Ramp, Splitrock Resevoir, Rockaway Township, Morris County, NJ. With Mary Delaney Krugman.

2011 *History, Archaeology, and Historic Preservation at Fishkill Supply Depot.* With Mara Farrell. Paper presented to New York State History Conference, Cooperstown.

2011 Archaeological Survey, BMP-SB5, Annadale, New York, New York. With Cece Saunders. Historical Perspectives, Inc.

2010 Phase IB Archaeological Survey Maple Fields at Wallkill, Wallkill, New York. With Julie Abell Horn. HPI.

2010 Phase 1A Archaeology and Intensive Level Architectural Survey of the Paulina Lake Dam and Proposed Improvements to the Dam, Blairstown Township, Warren County, New Jersey. With Wayne T. McCabe & Associates, Inc., Newton, New Jersey.

2010 The Fishkill Supply Depot. *The Dutchess Historian.* Dutchess County, Historical Society, Poughkeepsie, New York. With Mara Farrell

2009 Phase 1A Cultural Resource Survey of the Moravian Distillery, Hope Township, Warren Co., NJ. With Wayne T. McCabe & Associates, Inc., Newton, New Jersey

2009 Preliminary Cultural Resource Survey *in re* Leddell’s Pond Dam Rehabilitation…Lewis Morris County Park, Mendham Twp. Morris Co. NJ. WHJGA Consulting and Mary D. Krugman Associates, Montclair.

2009 Hansen Rock Shelter, A Black Dirt Area Time Capsule. *Occasional Papers Number 3. Incorporated Orange Co. Chapter, NY State Archaeological Association.*

2008 Phase 1B Cultural Resource Survey Tuxedo Reserve….NY. With Faline S. Fox *et al.* Historical Perspectives, Westport, CT.

2006 Additional Cultural Resource Investigations of the proposed Meadow Valley Development Including the Historian and Board Prehistoric Sites, Town of Minisink, Orange County, New York. With Eugene Boesch *et al*.

2005 Towards a Historical Archaeobotany of Delaware. *Bulletin of the Archaeological Society of Delaware* 42:10-43. Available at www.deldot.gov/archaeology/archaeobotany/pdf/del_archaeobotany.pdf

2005 *The Second Level, plus 35.* Report/video on Beverwyck, Morris County, NJ presented to the Council for Northeast Historical Archaeology, Trenton. With Robert Hartman.

2005 A Phase IB Cultural Resource Survey of the Oscar. R. Kincaid House, Boonton Township, Morris County, New Jersey. With Patricia Condell).

2004 Preliminary Cultural Resource Investigations: Proposed Upgrades to Lake Musconetcong Dam… Sussex and Morris Cos., NJ. With M.D. Krugman.

2004 Phase I Cultural Resource Survey of the Jockey Hollow Girl Scout Camp...Morris County, New Jersey. With Paula Crowley.

2004 Cultural Resource Investigations and Design Consultations for the Edison Dam Rehabilitation, Sparta Township, Sussex County, NJ. With M.D. Krugman.

2003 The Prehistory of Beverwyck. *Newsletter of the Archaeological Society of New Jersey*. 202:1-4

2003 In re the Application of Canfield Building Assocs.... Historic Preservation Considerations, Mine Hill, Morris County With Mary Delaney Krugman.

2002 After the Delaware Park Site: Twenty-five Years of Flotation. *Bulletin of the Archaeological Society of Delaware* 39:4-16

1999 Archaeological Investigations of the Longstreet Carriage House, Longstreet Farm, Holmdel Twp., Monmouth Co., NJ.

1994 Phase I Cultural Resource Investigations of the South Beverwyk Road Park & Ride Expansion Site, Morris County, NJ (with Will Roberts *et al*).

1994 Phase I Cultural Resource Investigations of the Cranberry Lake Park & Ride Site, Byram Township, Sussex County, NJ (with Will Roberts).

1992 Stage One Cultural Resource Survey of Study Unit C-13 of the Proposed Mt. Hope Pumped Storage Hydroelectric Facility, Rockaway

and Jefferson Townships, Morris County, New Jersey (with Edward S. Rutsch and Holly van Voorst).

1992 Stage One Cultural Resources Survey of a Portion of the Proposed Electrical Transmission Alignment #C6A of the Proposed Mt. Hope Pumped Storage Hydroelectric Facility, Rockaway Township, Morris County, New Jersey (with E.S. Rutsch).

1992 Stage One Cultural Resources Survey of Three Areas for the Proposed Mt. Hope Pumped Storage Hydroelectric Facility, Rockaway and Jefferson Townships, Morris County, New Jersey (with E. S. Rutsch).

1990 Preliminary Archaeological Investigations of High Breeze Farm (28Sx294), Wawayanda State Park, Vernon Township, Sussex County, New Jersey.

1989 Dr. Charles Conrad Abbott and the Question of Human Antiquity in the New World (with Arthur Joyce et al.). In *Bulletin of the Archaeological Society of New Jersey*. No. 44.

1986 Cultural Resources Investigations of the Proposed Mt. Hope Pumped Storage Hydroelectric Facility and Transmission Lines, Rockaway and Jefferson Townships, Morris County, New Jersey (with E.S. Rutsch et al.).

1985 Flotation Studies and Their Value for New Jersey Archaeology. M.A. thesis, Rutgers University.

1981 The College Farm Site, 28Mi75. *Bulletin of the Archaeological Society of New Jersey*. No. 37.

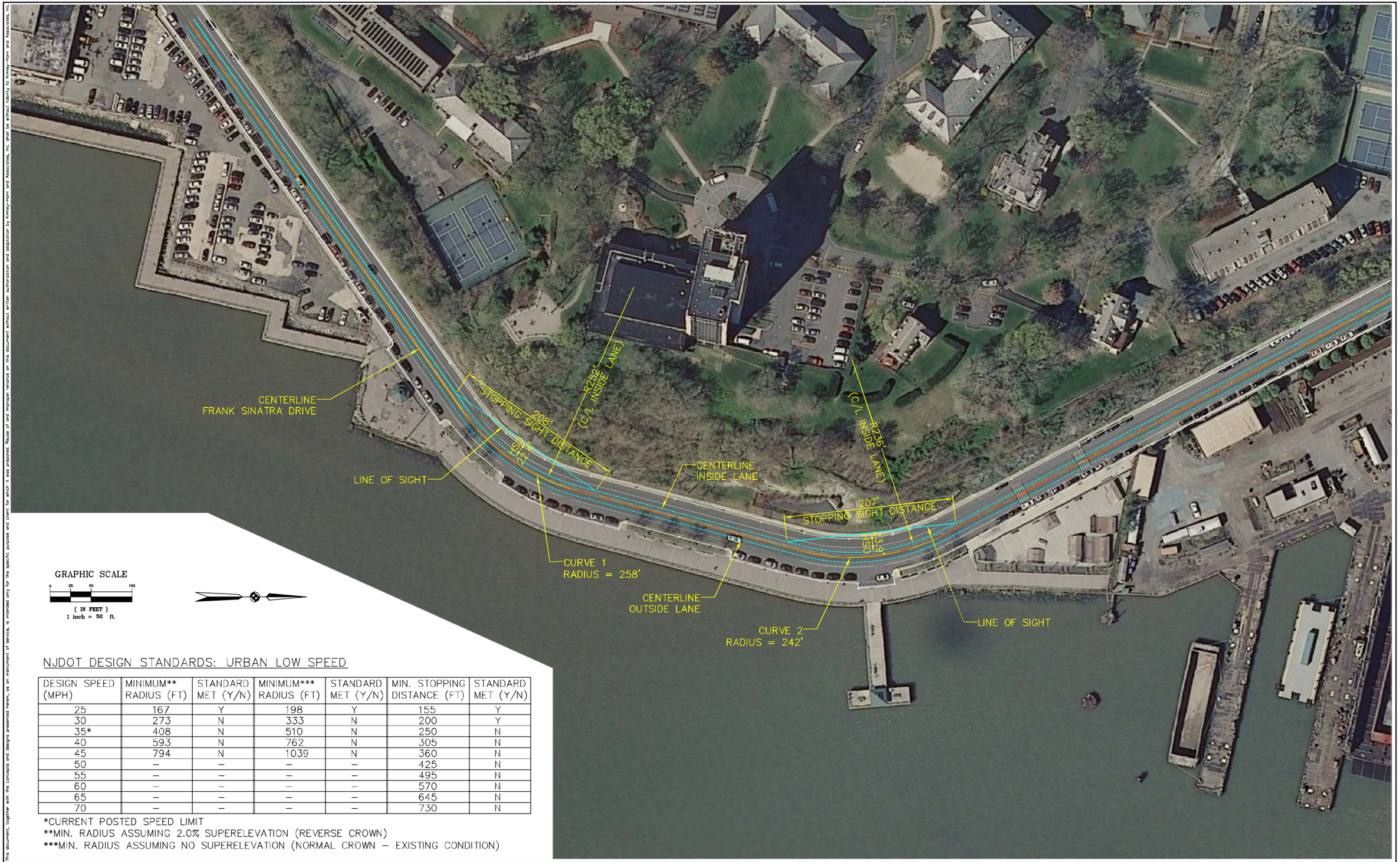
1980 Floral Remains from South Jersey Burial Site Identified. *Newsletter of the Archaeological Society of New Jersey.*

MEMBERSHIPS

Sussex County Historical Society (Life Member)
Archaeological Society of New Jersey (Life Member)(Executive Board-1998)(Special Award of Merit- for work at Beverwyck 2000)
New York State Archaeological Association (Life Member)
Incorporated Orange County Chapter- NYSAA-(Trustee 1999-2000)
Society for Historical Archaeology
Register of Professional Archaeologists (1986-Present)
Friends of Fishkill Supply Depot – Archeologist & Board Member (2009 –present)

Transportation

Sight Distance Exhibit



GRAPHIC SCALE

0 25 50 100

(IN FEET)
1 inch = 50 ft.

NJDOT DESIGN STANDARDS: URBAN LOW SPEED

DESIGN SPEED (MPH)	MINIMUM** RADIUS (FT)	STANDARD MET (Y/N)	MINIMUM*** RADIUS (FT)	STANDARD MET (Y/N)	MIN. STOPPING DISTANCE (FT)	STANDARD MET (Y/N)
25	167	Y	198	Y	155	Y
30	273	N	333	N	200	Y
35*	408	N	510	N	250	N
40	593	N	762	N	305	N
45	794	N	1039	N	360	N
50	–	–	–	–	425	N
55	–	–	–	–	495	N
60	–	–	–	–	570	N
65	–	–	–	–	645	N
70	–	–	–	–	730	N

*CURRENT POSTED SPEED LIMIT
**MIN. RADIUS ASSUMING 2.0% SUPERELEVATION (REVERSE CROWN)
***MIN. RADIUS ASSUMING NO SUPERELEVATION (NORMAL CROWN – EXISTING CONDITION)

No.	REVISIONS	DATE	BY

Kimley»Horn

KHA PROJECT 112005000
DATE 05/27/2014
SCALE AS SHOWN
DESIGNED BY EJD
DRAWN BY EJD
CHECKED BY KWA

FRANK SINATRA DR.
VISIONING & CONCEPTUAL DESIGN PLAN
PREPARED FOR
CITY OF HOBOKEN

HOBOKEN NEW JERSEY

LICENSED PROFESSIONAL

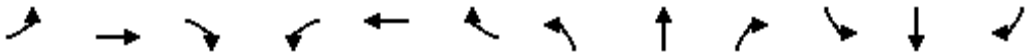
DATE:

EXISTING SIGHT DISTANCE EXHIBIT

SHEET NUMBER
1

Intersection Analysis Worksheets

AM PEAK HOUR ANALYSIS

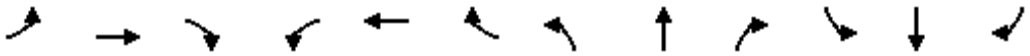


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	58	129	0	0	0	0	0	439	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt											0.986	
Flt Protected					0.985							
Satd. Flow (prot)	0	0	0	0	1835	0	0	0	0	0	1837	0
Flt Permitted					0.985							
Satd. Flow (perm)	0	0	0	0	1835	0	0	0	0	0	1837	0
Right Turn on Red			No	No		No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		114			281			348			352	
Travel Time (s)		3.1			7.7			9.5			9.6	
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.92	0.92	0.92	0.92	0.92	0.88	0.88
Adj. Flow (vph)	0	0	0	66	147	0	0	0	0	0	499	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	213	0	0	0	0	0	556	0
Turn Type				Perm	NA						NA	
Protected Phases					4						2	
Permitted Phases				4								
Minimum Split (s)				20.0	20.0						46.0	
Total Split (s)				35.0	35.0						55.0	
Total Split (%)				38.9%	38.9%						61.1%	
Maximum Green (s)				30.0	30.0						50.0	
Yellow Time (s)				3.0	3.0						3.0	
All-Red Time (s)				2.0	2.0						2.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					5.0						5.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0						4.0	
Flash Dont Walk (s)				11.0	11.0						9.0	
Pedestrian Calls (#/hr)				0	0						0	
Act Effct Green (s)					30.0						50.0	
Actuated g/C Ratio					0.33						0.56	
v/c Ratio					0.35						0.55	
Control Delay					18.9						15.3	
Queue Delay					1.2						0.0	
Total Delay					20.1						15.3	
LOS					C						B	
Approach Delay					20.1						15.3	
Approach LOS					C						B	
Queue Length 50th (ft)					81						188	
Queue Length 95th (ft)					120						271	
Internal Link Dist (ft)		34			201			268			272	
Turn Bay Length (ft)												
Base Capacity (vph)					611						1020	
Starvation Cap Reductn					222						0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.55						0.55	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:SBT and 6:, Start of Green			
Natural Cycle: 70			
Control Type: Pretimed			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 16.6		Intersection LOS: B	
Intersection Capacity Utilization 52.5%		ICU Level of Service A	
Analysis Period (min) 15			

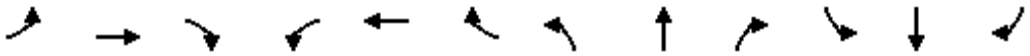
Splits and Phases: 8: Hudson St & 4th St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	48	62	0	0	0	0	0	0	35	357	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.83	0.83	0.92	0.92	0.92	0.92	0.92	0.92	0.83	0.83	0.92
Hourly flow rate (vph)	0	58	75	0	0	0	0	0	0	42	430	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								352				
pX, platoon unblocked												
vC, conflicting volume	514	514	430	618	514	0	430			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	514	514	430	618	514	0	430			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	87	88	100	100	100	100			97		
cM capacity (veh/h)	461	452	625	313	452	1085	1129			1623		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	133	0	472
Volume Left	0	0	42
Volume Right	75	0	0
cSH	535	1700	1623
Volume to Capacity	0.25	0.00	0.03
Queue Length 95th (ft)	24	0	2
Control Delay (s)	13.9	0.0	0.9
Lane LOS	B		A
Approach Delay (s)	13.9	0.0	0.9
Approach LOS	B		

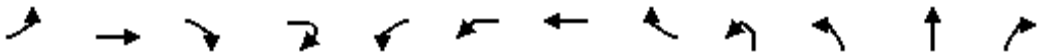
Intersection Summary				
Average Delay	3.7			
Intersection Capacity Utilization	33.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	10	20	0	0	0	0	0	383	84
Peak Hour Factor	0.92	0.92	0.92	0.76	0.76	0.92	0.92	0.92	0.92	0.92	0.76	0.76
Hourly flow rate (vph)	0	0	0	13	26	0	0	0	0	0	504	111

Direction, Lane #	WB 1	SB 1
Volume Total (vph)	39	614
Volume Left (vph)	13	0
Volume Right (vph)	0	111
Hadj (s)	0.10	-0.07
Departure Headway (s)	5.3	3.9
Degree Utilization, x	0.06	0.67
Capacity (veh/h)	607	907
Control Delay (s)	8.6	14.6
Approach Delay (s)	8.6	14.6
Approach LOS	A	B

Intersection Summary				
Delay	14.3			
Level of Service	B			
Intersection Capacity Utilization	35.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	13	50	28	72	4	18	21	7	60	50	192	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.917					0.982				0.989	
Flt Protected		0.996					0.978				0.983	
Satd. Flow (prot)	0	1685	0	0	0	0	1789	0	0	0	1664	0
Flt Permitted		0.972					0.624				0.701	
Satd. Flow (perm)	0	1644	0	0	0	0	1141	0	0	0	1187	0
Right Turn on Red				No				No				No
Satd. Flow (RTOR)												
Link Speed (mph)		25					25				35	
Link Distance (ft)		303					584				294	
Travel Time (s)		8.3					15.9				5.7	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	3%	3%	3%	3%	2%	2%	2%	2%	11%	11%	11%	11%
Adj. Flow (vph)	13	52	29	74	4	19	22	7	62	52	198	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	168	0	0	0	0	52	0	0	0	339	0
Turn Type	Perm	NA			Perm	Perm	NA		Perm	Perm	NA	
Protected Phases		1					1				4	
Permitted Phases	1				1	1			4	4		
Detector Phase	1	1			1	1	1		4	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0		4.0	4.0	4.0	
Minimum Split (s)	9.0	9.0			9.0	9.0	9.0		12.0	12.0	12.0	
Total Split (s)	15.0	15.0			15.0	15.0	15.0		34.0	34.0	34.0	
Total Split (%)	13.6%	13.6%			13.6%	13.6%	13.6%		30.9%	30.9%	30.9%	
Maximum Green (s)	10.0	10.0			10.0	10.0	10.0		26.0	26.0	26.0	
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0		5.0	5.0	5.0	
Lost Time Adjust (s)		0.0					0.0				0.0	
Total Lost Time (s)		5.0					5.0				8.0	
Lead/Lag									Lag	Lag	Lag	
Lead-Lag Optimize?									Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0	
Recall Mode	None	None			None	None	None		None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		10.0					10.0				26.0	
Actuated g/C Ratio		0.12					0.12				0.31	
v/c Ratio		0.86					0.39				0.92	
Control Delay		75.4					43.2				61.8	
Queue Delay		0.0					0.0				0.0	
Total Delay		75.4					43.2				61.8	
LOS		E					D				E	
Approach Delay		75.4					43.2				61.8	
Approach LOS		E					D				E	

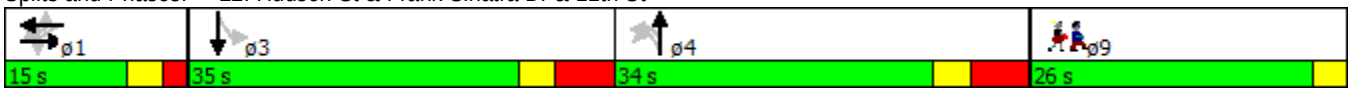
Lane Group	SBL	SBT	SBR	SBR2	ø9
Lane Configurations					
Volume (vph)	9	182	244	37	
Ideal Flow (vphpl)	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	
Frt		0.920			
Flt Protected		0.999			
Satd. Flow (prot)	0	1663	0	0	
Flt Permitted		0.981			
Satd. Flow (perm)	0	1633	0	0	
Right Turn on Red				No	
Satd. Flow (RTOR)					
Link Speed (mph)		25			
Link Distance (ft)		358			
Travel Time (s)		9.8			
Peak Hour Factor	0.97	0.97	0.97	0.97	
Heavy Vehicles (%)	5%	5%	5%	5%	
Adj. Flow (vph)	9	188	252	38	
Shared Lane Traffic (%)					
Lane Group Flow (vph)	0	487	0	0	
Turn Type	Perm	NA			
Protected Phases		3			9
Permitted Phases	3				
Detector Phase	3	3			
Switch Phase					
Minimum Initial (s)	4.0	4.0			4.0
Minimum Split (s)	31.0	31.0			26.0
Total Split (s)	35.0	35.0			26.0
Total Split (%)	31.8%	31.8%			24%
Maximum Green (s)	27.0	27.0			23.0
Yellow Time (s)	3.0	3.0			3.0
All-Red Time (s)	5.0	5.0			0.0
Lost Time Adjust (s)		0.0			
Total Lost Time (s)		8.0			
Lead/Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes			
Vehicle Extension (s)	3.0	3.0			3.0
Recall Mode	None	None			None
Walk Time (s)	4.0	4.0			4.0
Flash Dont Walk (s)	19.0	19.0			19.0
Pedestrian Calls (#/hr)	0	0			0
Act Effct Green (s)		27.0			
Actuated g/C Ratio		0.32			
v/c Ratio		0.93			
Control Delay		54.9			
Queue Delay		0.0			
Total Delay		54.9			
LOS		D			
Approach Delay		54.9			
Approach LOS		D			

Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Queue Length 50th (ft)		88					26				171	
Queue Length 95th (ft)		#199					62				#333	
Internal Link Dist (ft)		223					504				214	
Turn Bay Length (ft)												
Base Capacity (vph)		195					135				367	
Starvation Cap Reductn		0					0				0	
Spillback Cap Reductn		0					0				0	
Storage Cap Reductn		0					0				0	
Reduced v/c Ratio		0.86					0.39				0.92	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 84			
Natural Cycle: 140			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 59.8		Intersection LOS: E	
Intersection Capacity Utilization 72.2%		ICU Level of Service C	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 22: Hudson St & Frank Sinatra Dr & 11th St



Lane Group	SBL	SBT	SBR	SBR2	ø9
Queue Length 50th (ft)		246			
Queue Length 95th (ft)		#434			
Internal Link Dist (ft)		278			
Turn Bay Length (ft)					
Base Capacity (vph)		524			
Starvation Cap Reductn		0			
Spillback Cap Reductn		0			
Storage Cap Reductn		0			
Reduced v/c Ratio		0.93			

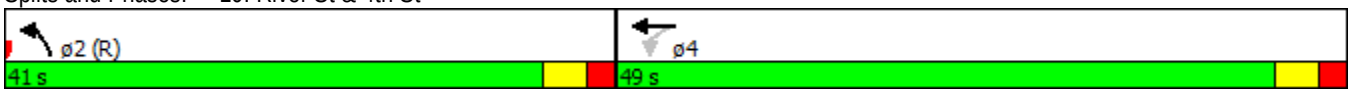
Intersection Summary

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	0	0	162	66	117	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.927	
Flt Protected				0.966	0.977	
Satd. Flow (prot)	0	0	0	1799	1687	0
Flt Permitted				0.966	0.977	
Satd. Flow (perm)	0	0	0	1799	1687	0
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	25			30	25	
Link Distance (ft)	281			236	309	
Travel Time (s)	7.7			5.4	8.4	
Peak Hour Factor	0.92	0.92	0.83	0.83	0.83	0.83
Adj. Flow (vph)	0	0	195	80	141	165
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	275	306	0
Turn Type			Perm	NA	Prot	
Protected Phases				4	2	
Permitted Phases			4			
Detector Phase			4	4	2	
Switch Phase						
Minimum Initial (s)			4.0	4.0	4.0	
Minimum Split (s)			21.0	21.0	21.0	
Total Split (s)			49.0	49.0	41.0	
Total Split (%)			54.4%	54.4%	45.6%	
Maximum Green (s)			44.0	44.0	36.0	
Yellow Time (s)			3.0	3.0	3.0	
All-Red Time (s)			2.0	2.0	2.0	
Lost Time Adjust (s)				0.0	0.0	
Total Lost Time (s)				5.0	5.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)			3.0	3.0	3.0	
Recall Mode			None	None	C-Max	
Walk Time (s)			5.0	5.0	5.0	
Flash Dont Walk (s)			11.0	11.0	8.0	
Pedestrian Calls (#/hr)			0	0	0	
Act Effct Green (s)				19.6	60.4	
Actuated g/C Ratio				0.22	0.67	
v/c Ratio				0.70	0.27	
Control Delay				41.6	7.7	
Queue Delay				0.0	0.0	
Total Delay				41.6	7.7	
LOS				D	A	
Approach Delay				41.6	7.7	
Approach LOS				D	A	
Queue Length 50th (ft)				145	61	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Queue Length 95th (ft)				186	114	
Internal Link Dist (ft)	201			156	229	
Turn Bay Length (ft)						
Base Capacity (vph)				879	1131	
Starvation Cap Reductn				0	0	
Spillback Cap Reductn				0	0	
Storage Cap Reductn				0	0	
Reduced v/c Ratio				0.31	0.27	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 76 (84%), Referenced to phase 2:NBL, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 23.7		Intersection LOS: C	
Intersection Capacity Utilization 35.7%		ICU Level of Service A	
Analysis Period (min) 15			

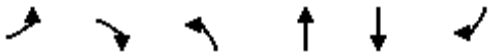
Splits and Phases: 10: River St & 4th St



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	38	97	147	0	0	180
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.94
Hourly flow rate (vph)	40	103	156	0	0	191
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			236			
pX, platoon unblocked						
vC, conflicting volume	348	156			156	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	348	156			156	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	88			100	
cM capacity (veh/h)	649	889			1424	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	144	156	191
Volume Left	40	0	0
Volume Right	103	0	0
cSH	805	1700	1700
Volume to Capacity	0.18	0.09	0.11
Queue Length 95th (ft)	16	0	0
Control Delay (s)	10.4	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.4	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	24.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	36	7	9	271	219	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	41	8	10	311	252	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				802		
pX, platoon unblocked						
vC, conflicting volume	594	262	272			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	594	262	272			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	91	99	99			
cM capacity (veh/h)	462	748	1303			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	49	322	272
Volume Left	41	10	0
Volume Right	8	0	21
cSH	493	1303	1700
Volume to Capacity	0.10	0.01	0.16
Queue Length 95th (ft)	8	1	0
Control Delay (s)	13.1	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	13.1	0.3	0.0
Approach LOS	B		

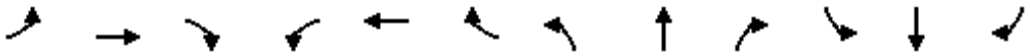
Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	31.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	33	244	0	0	194
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.97	0.97	0.92	0.92	0.97
Hourly flow rate (vph)	0	34	252	0	0	200
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						690
pX, platoon unblocked						
vC, conflicting volume	452	252			252	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	452	252			252	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			100	
cM capacity (veh/h)	566	787			1314	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	34	252	200
Volume Left	0	0	0
Volume Right	34	0	0
cSH	787	1700	1700
Volume to Capacity	0.04	0.15	0.12
Queue Length 95th (ft)	3	0	0
Control Delay (s)	9.8	0.0	0.0
Lane LOS	A		
Approach Delay (s)	9.8	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	22.8%	ICU Level of Service	A
Analysis Period (min)	15		

PM PEAK HOUR ANALYSIS

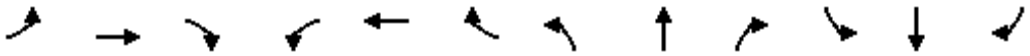


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	64	173	0	0	0	0	0	305	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt											0.979	
Flt Protected					0.987							
Satd. Flow (prot)	0	0	0	0	1839	0	0	0	0	0	1824	0
Flt Permitted					0.987							
Satd. Flow (perm)	0	0	0	0	1839	0	0	0	0	0	1824	0
Right Turn on Red			No	No		No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		114			281			348			352	
Travel Time (s)		3.1			7.7			9.5			9.6	
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.94	0.94
Adj. Flow (vph)	0	0	0	68	184	0	0	0	0	0	324	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	252	0	0	0	0	0	385	0
Turn Type				Perm	NA						NA	
Protected Phases					4						2	
Permitted Phases				4								
Minimum Split (s)				20.0	20.0						46.0	
Total Split (s)				35.0	35.0						55.0	
Total Split (%)				38.9%	38.9%						61.1%	
Maximum Green (s)				30.0	30.0						50.0	
Yellow Time (s)				3.0	3.0						3.0	
All-Red Time (s)				2.0	2.0						2.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					5.0						5.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0						4.0	
Flash Dont Walk (s)				11.0	11.0						9.0	
Pedestrian Calls (#/hr)				0	0						0	
Act Effct Green (s)					30.0						50.0	
Actuated g/C Ratio					0.33						0.56	
v/c Ratio					0.41						0.38	
Control Delay					18.4						12.7	
Queue Delay					2.3						0.0	
Total Delay					20.7						12.7	
LOS					C						B	
Approach Delay					20.7						12.7	
Approach LOS					C						B	
Queue Length 50th (ft)					70						115	
Queue Length 95th (ft)					166						177	
Internal Link Dist (ft)		34			201			268			272	
Turn Bay Length (ft)												
Base Capacity (vph)					613						1013	
Starvation Cap Reductn					238						0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.67						0.38	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:SBT and 6:, Start of Green			
Natural Cycle: 70			
Control Type: Pretimed			
Maximum v/c Ratio: 0.41			
Intersection Signal Delay: 15.8		Intersection LOS: B	
Intersection Capacity Utilization 55.1%		ICU Level of Service B	
Analysis Period (min) 15			

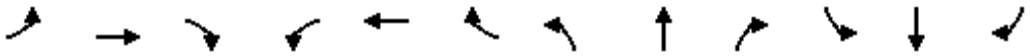
Splits and Phases: 8: Hudson St & 4th St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	77	82	0	0	0	0	0	0	44	323	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.92
Hourly flow rate (vph)	0	79	85	0	0	0	0	0	0	45	333	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								352				
pX, platoon unblocked												
vC, conflicting volume	424	424	333	548	424	0	333			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	424	424	333	548	424	0	333			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	84	88	100	100	100	100			97		
cM capacity (veh/h)	529	507	709	339	507	1085	1226			1623		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	164	0	378
Volume Left	0	0	45
Volume Right	85	0	0
cSH	595	1700	1623
Volume to Capacity	0.28	0.00	0.03
Queue Length 95th (ft)	28	0	2
Control Delay (s)	13.3	0.0	1.1
Lane LOS	B		A
Approach Delay (s)	13.3	0.0	1.1
Approach LOS	B		

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	20	34	0	0	0	0	0	323	100
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	22	37	0	0	0	0	0	351	109

Direction, Lane #	WB 1	SB 1
Volume Total (vph)	59	460
Volume Left (vph)	22	0
Volume Right (vph)	0	109
Hadj (s)	0.11	-0.11
Departure Headway (s)	5.0	4.0
Degree Utilization, x	0.08	0.50
Capacity (veh/h)	658	898
Control Delay (s)	8.4	10.9
Approach Delay (s)	8.4	10.9
Approach LOS	A	B

Intersection Summary			
Delay	10.6		
Level of Service	B		
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	21	48	21	56	2	12	15	2	49	63	279	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.929					0.992				0.990	
Flt Protected		0.993					0.978				0.987	
Satd. Flow (prot)	0	1735	0	0	0	0	1739	0	0	0	1768	0
Flt Permitted		0.947					0.739				0.763	
Satd. Flow (perm)	0	1655	0	0	0	0	1314	0	0	0	1367	0
Right Turn on Red				No				No				No
Satd. Flow (RTOR)												
Link Speed (mph)		25					25				35	
Link Distance (ft)		303					584				294	
Travel Time (s)		8.3					15.9				5.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	1%	6%	6%	6%	6%	5%	5%	5%	5%
Adj. Flow (vph)	22	51	22	59	2	13	16	2	52	66	294	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	154	0	0	0	0	33	0	0	0	445	0
Turn Type	Perm	NA			Perm	Perm	NA		Perm	Perm	NA	
Protected Phases		1					1				4	
Permitted Phases	1				1	1			4	4		
Detector Phase	1	1			1	1	1		4	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0		4.0	4.0	4.0	
Minimum Split (s)	9.0	9.0			9.0	9.0	9.0		12.0	12.0	12.0	
Total Split (s)	15.0	15.0			15.0	15.0	15.0		34.0	34.0	34.0	
Total Split (%)	13.6%	13.6%			13.6%	13.6%	13.6%		30.9%	30.9%	30.9%	
Maximum Green (s)	10.0	10.0			10.0	10.0	10.0		26.0	26.0	26.0	
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0		5.0	5.0	5.0	
Lost Time Adjust (s)		0.0					0.0				0.0	
Total Lost Time (s)		5.0					5.0				8.0	
Lead/Lag									Lag	Lag	Lag	
Lead-Lag Optimize?									Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0	
Recall Mode	None	None			None	None	None		None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		10.0					10.0				26.0	
Actuated g/C Ratio		0.12					0.12				0.31	
v/c Ratio		0.78					0.21				1.05	
Control Delay		64.0					37.2				89.1	
Queue Delay		0.0					0.0				0.0	
Total Delay		64.0					37.2				89.1	
LOS		E					D				F	
Approach Delay		64.0					37.2				89.1	
Approach LOS		E					D				F	

Lane Group	SBL	SBT	SBR	SBR2	ø9
Lane Configurations					
Volume (vph)	10	129	227	53	
Ideal Flow (vphpl)	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	
Frt		0.910			
Flt Protected		0.999			
Satd. Flow (prot)	0	1677	0	0	
Flt Permitted		0.965			
Satd. Flow (perm)	0	1620	0	0	
Right Turn on Red				No	
Satd. Flow (RTOR)					
Link Speed (mph)		25			
Link Distance (ft)		358			
Travel Time (s)		9.8			
Peak Hour Factor	0.95	0.95	0.95	0.95	
Heavy Vehicles (%)	3%	3%	3%	3%	
Adj. Flow (vph)	11	136	239	56	
Shared Lane Traffic (%)					
Lane Group Flow (vph)	0	442	0	0	
Turn Type	Perm	NA			
Protected Phases		3			9
Permitted Phases	3				
Detector Phase	3	3			
Switch Phase					
Minimum Initial (s)	4.0	4.0			4.0
Minimum Split (s)	31.0	31.0			26.0
Total Split (s)	35.0	35.0			26.0
Total Split (%)	31.8%	31.8%			24%
Maximum Green (s)	27.0	27.0			23.0
Yellow Time (s)	3.0	3.0			3.0
All-Red Time (s)	5.0	5.0			0.0
Lost Time Adjust (s)		0.0			
Total Lost Time (s)		8.0			
Lead/Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes			
Vehicle Extension (s)	3.0	3.0			3.0
Recall Mode	None	None			None
Walk Time (s)	4.0	4.0			4.0
Flash Dont Walk (s)	19.0	19.0			19.0
Pedestrian Calls (#/hr)	0	0			0
Act Effct Green (s)		27.0			
Actuated g/C Ratio		0.32			
v/c Ratio		0.85			
Control Delay		44.1			
Queue Delay		0.0			
Total Delay		44.1			
LOS		D			
Approach Delay		44.1			
Approach LOS		D			

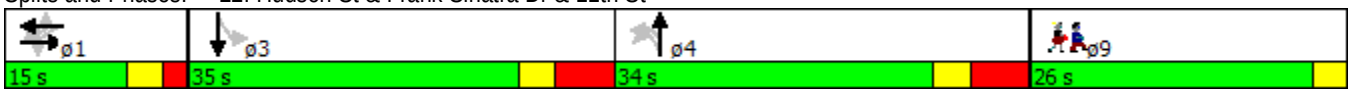
Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Queue Length 50th (ft)		80					16				~260	
Queue Length 95th (ft)		#178					43				#437	
Internal Link Dist (ft)		223					504				214	
Turn Bay Length (ft)												
Base Capacity (vph)		197					156				423	
Starvation Cap Reductn		0					0				0	
Spillback Cap Reductn		0					0				0	
Storage Cap Reductn		0					0				0	
Reduced v/c Ratio		0.78					0.21				1.05	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 84			
Natural Cycle: 140			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.05			
Intersection Signal Delay: 65.4		Intersection LOS: E	
Intersection Capacity Utilization 73.5%		ICU Level of Service D	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 22: Hudson St & Frank Sinatra Dr & 11th St



Lane Group	SBL	SBT	SBR	SBR2	ø9
Queue Length 50th (ft)		215			
Queue Length 95th (ft)		#379			
Internal Link Dist (ft)		278			
Turn Bay Length (ft)					
Base Capacity (vph)		520			
Starvation Cap Reductn		0			
Spillback Cap Reductn		0			
Storage Cap Reductn		0			
Reduced v/c Ratio		0.85			

Intersection Summary

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	0	0	138	110	131	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.919	
Flt Protected				0.973	0.980	
Satd. Flow (prot)	0	0	0	1812	1678	0
Flt Permitted				0.973	0.980	
Satd. Flow (perm)	0	0	0	1812	1678	0
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	25			30	25	
Link Distance (ft)	281			236	309	
Travel Time (s)	7.7			5.4	8.4	
Peak Hour Factor	0.92	0.92	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	144	115	136	202
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	259	338	0
Turn Type			Perm	NA	Prot	
Protected Phases				4	2	
Permitted Phases			4			
Detector Phase			4	4	2	
Switch Phase						
Minimum Initial (s)			4.0	4.0	4.0	
Minimum Split (s)			21.0	21.0	21.0	
Total Split (s)			32.0	32.0	58.0	
Total Split (%)			35.6%	35.6%	64.4%	
Maximum Green (s)			27.0	27.0	53.0	
Yellow Time (s)			3.0	3.0	3.0	
All-Red Time (s)			2.0	2.0	2.0	
Lost Time Adjust (s)				0.0	0.0	
Total Lost Time (s)				5.0	5.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)			3.0	3.0	3.0	
Recall Mode			None	None	C-Max	
Walk Time (s)			5.0	5.0	5.0	
Flash Dont Walk (s)			11.0	11.0	8.0	
Pedestrian Calls (#/hr)			0	0	0	
Act Effct Green (s)				18.1	61.9	
Actuated g/C Ratio				0.20	0.69	
v/c Ratio				0.71	0.29	
Control Delay				44.1	7.0	
Queue Delay				0.1	0.0	
Total Delay				44.2	7.0	
LOS				D	A	
Approach Delay				44.2	7.0	
Approach LOS				D	A	
Queue Length 50th (ft)				138	65	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Queue Length 95th (ft)				201	131	
Internal Link Dist (ft)	201			156	229	
Turn Bay Length (ft)						
Base Capacity (vph)				543	1154	
Starvation Cap Reductn				0	0	
Spillback Cap Reductn				20	0	
Storage Cap Reductn				0	0	
Reduced v/c Ratio				0.50	0.29	

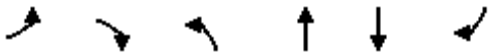
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 75 (83%), Referenced to phase 2:NBL, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 23.2		Intersection LOS: C	
Intersection Capacity Utilization 40.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 10: River St & 4th St

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	48	202	226	0	0	183
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.92	0.92	0.97
Hourly flow rate (vph)	49	208	233	0	0	189
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			236			
pX, platoon unblocked						
vC, conflicting volume	422	233			233	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	422	233			233	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	74			100	
cM capacity (veh/h)	589	806			1335	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	258	233	189
Volume Left	49	0	0
Volume Right	208	0	0
cSH	753	1700	1700
Volume to Capacity	0.34	0.14	0.11
Queue Length 95th (ft)	38	0	0
Control Delay (s)	12.3	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.3	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	33.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	62	24	7	368	141	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	71	28	8	423	162	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				802		
pX, platoon unblocked						
vC, conflicting volume	604	165	168			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	604	165	168			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	97	99			
cM capacity (veh/h)	462	885	1422			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	99	431	168
Volume Left	71	8	0
Volume Right	28	0	6
cSH	533	1422	1700
Volume to Capacity	0.19	0.01	0.10
Queue Length 95th (ft)	17	0	0
Control Delay (s)	13.3	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	13.3	0.2	0.0
Approach LOS	B		

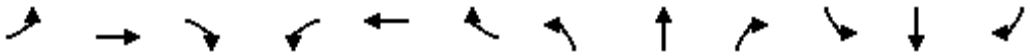
Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	46	424	0	0	208
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	50	461	0	0	226
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						690
pX, platoon unblocked						
vC, conflicting volume	687	461			461	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	687	461			461	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	92			100	
cM capacity (veh/h)	413	601			1100	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	50	461	226
Volume Left	0	0	0
Volume Right	50	0	0
cSH	601	1700	1700
Volume to Capacity	0.08	0.27	0.13
Queue Length 95th (ft)	7	0	0
Control Delay (s)	11.5	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.5	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		32.3%	ICU Level of Service A
Analysis Period (min)		15	

SATURDAY PEAK HOUR ANALYSIS

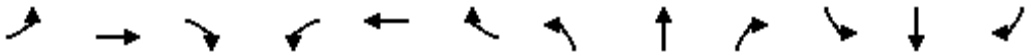


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	67	103	0	0	0	0	0	389	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt											0.982	
Flt Protected					0.981							
Satd. Flow (prot)	0	0	0	0	1827	0	0	0	0	0	1829	0
Flt Permitted					0.981							
Satd. Flow (perm)	0	0	0	0	1827	0	0	0	0	0	1829	0
Right Turn on Red			No	No		No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		114			281			348			352	
Travel Time (s)		3.1			7.7			9.5			9.6	
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.93	0.93
Adj. Flow (vph)	0	0	0	72	111	0	0	0	0	0	418	65
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	183	0	0	0	0	0	483	0
Turn Type				Perm	NA						NA	
Protected Phases					4						2	
Permitted Phases				4								
Minimum Split (s)				20.0	20.0						46.0	
Total Split (s)				35.0	35.0						55.0	
Total Split (%)				38.9%	38.9%						61.1%	
Maximum Green (s)				30.0	30.0						50.0	
Yellow Time (s)				3.0	3.0						3.0	
All-Red Time (s)				2.0	2.0						2.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					5.0						5.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0						4.0	
Flash Dont Walk (s)				11.0	11.0						9.0	
Pedestrian Calls (#/hr)				0	0						0	
Act Effct Green (s)					30.0						50.0	
Actuated g/C Ratio					0.33						0.56	
v/c Ratio					0.30						0.48	
Control Delay					17.3						14.0	
Queue Delay					1.1						0.0	
Total Delay					18.4						14.0	
LOS					B						B	
Approach Delay					18.4						14.0	
Approach LOS					B						B	
Queue Length 50th (ft)					45						155	
Queue Length 95th (ft)					113						233	
Internal Link Dist (ft)		34			201			268			272	
Turn Bay Length (ft)												
Base Capacity (vph)					609						1016	
Starvation Cap Reductn					246						0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.50						0.48	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:SBT and 6:, Start of Green			
Natural Cycle: 70			
Control Type: Pretimed			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 15.2		Intersection LOS: B	
Intersection Capacity Utilization 51.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 8: Hudson St & 4th St



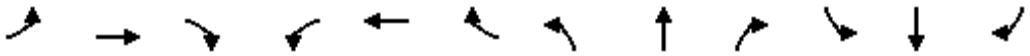
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	46	93	0	0	0	0	0	0	40	385	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.92
Hourly flow rate (vph)	0	49	99	0	0	0	0	0	0	43	410	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								352				
pX, platoon unblocked												
vC, conflicting volume	495	495	410	618	495	0	410			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	495	495	410	618	495	0	410			0		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	89	85	100	100	100	100			97		
cM capacity (veh/h)	475	463	642	306	463	1085	1149			1623		

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	148	0	452
Volume Left	0	0	43
Volume Right	99	0	0
cSH	569	1700	1623
Volume to Capacity	0.26	0.00	0.03
Queue Length 95th (ft)	26	0	2
Control Delay (s)	13.5	0.0	0.9
Lane LOS	B		A
Approach Delay (s)	13.5	0.0	0.9
Approach LOS	B		

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	37.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
26: Hudson St & 6th St

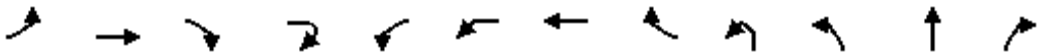
6/12/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	27	30	0	0	0	0	0	327	78
Peak Hour Factor	0.92	0.92	0.92	0.90	0.90	0.92	0.92	0.92	0.92	0.92	0.90	0.90
Hourly flow rate (vph)	0	0	0	30	33	0	0	0	0	0	363	87

Direction, Lane #	WB 1	SB 1
Volume Total (vph)	63	450
Volume Left (vph)	30	0
Volume Right (vph)	0	87
Hadj (s)	0.13	-0.08
Departure Headway (s)	5.0	4.0
Degree Utilization, x	0.09	0.50
Capacity (veh/h)	658	889
Control Delay (s)	8.5	10.9
Approach Delay (s)	8.5	10.9
Approach LOS	A	B

Intersection Summary				
Delay	10.6			
Level of Service	B			
Intersection Capacity Utilization	31.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Lane Configurations												
Volume (vph)	29	37	13	44	6	15	21	8	52	54	224	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.938					0.979				0.988	
Flt Protected		0.988					0.979				0.986	
Satd. Flow (prot)	0	1726	0	0	0	0	1751	0	0	0	1815	0
Flt Permitted		0.903					0.783				0.749	
Satd. Flow (perm)	0	1578	0	0	0	0	1400	0	0	0	1378	0
Right Turn on Red				No				No				No
Satd. Flow (RTOR)												
Link Speed (mph)		25					25				35	
Link Distance (ft)		303					584				294	
Travel Time (s)		8.3					15.9				5.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	2%	4%	4%	4%	4%	2%	2%	2%	2%
Adj. Flow (vph)	31	39	14	46	6	16	22	8	55	57	236	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	130	0	0	0	0	52	0	0	0	381	0
Turn Type	Perm	NA			Perm	Perm	NA		Perm	Perm	NA	
Protected Phases		1					1				4	
Permitted Phases	1				1	1			4	4		
Detector Phase	1	1			1	1	1		4	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0		4.0	4.0	4.0	
Minimum Split (s)	9.0	9.0			9.0	9.0	9.0		12.0	12.0	12.0	
Total Split (s)	15.0	15.0			15.0	15.0	15.0		34.0	34.0	34.0	
Total Split (%)	13.6%	13.6%			13.6%	13.6%	13.6%		30.9%	30.9%	30.9%	
Maximum Green (s)	10.0	10.0			10.0	10.0	10.0		26.0	26.0	26.0	
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0	
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0		5.0	5.0	5.0	
Lost Time Adjust (s)		0.0					0.0				0.0	
Total Lost Time (s)		5.0					5.0				8.0	
Lead/Lag									Lag	Lag	Lag	
Lead-Lag Optimize?									Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0	
Recall Mode	None	None			None	None	None		None	None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		10.0					10.0				26.0	
Actuated g/C Ratio		0.12					0.12				0.31	
v/c Ratio		0.70					0.31				0.89	
Control Delay		56.7					39.5				53.7	
Queue Delay		0.0					0.0				0.0	
Total Delay		56.7					39.5				53.7	
LOS		E					D				D	
Approach Delay		56.7					39.5				53.7	
Approach LOS		E					D				D	

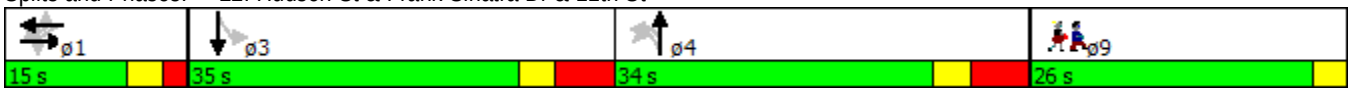
Lane Group	SBL	SBT	SBR	SBR2	ø9
Lane Configurations					
Volume (vph)	19	102	241	46	
Ideal Flow (vphpl)	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	
Frt		0.905			
Flt Protected		0.998			
Satd. Flow (prot)	0	1666	0	0	
Flt Permitted		0.932			
Satd. Flow (perm)	0	1556	0	0	
Right Turn on Red				No	
Satd. Flow (RTOR)					
Link Speed (mph)		25			
Link Distance (ft)		358			
Travel Time (s)		9.8			
Peak Hour Factor	0.95	0.95	0.95	0.95	
Heavy Vehicles (%)	3%	3%	3%	3%	
Adj. Flow (vph)	20	107	254	48	
Shared Lane Traffic (%)					
Lane Group Flow (vph)	0	429	0	0	
Turn Type	Perm	NA			
Protected Phases		3			9
Permitted Phases	3				
Detector Phase	3	3			
Switch Phase					
Minimum Initial (s)	4.0	4.0			4.0
Minimum Split (s)	31.0	31.0			26.0
Total Split (s)	35.0	35.0			26.0
Total Split (%)	31.8%	31.8%			24%
Maximum Green (s)	27.0	27.0			23.0
Yellow Time (s)	3.0	3.0			3.0
All-Red Time (s)	5.0	5.0			0.0
Lost Time Adjust (s)		0.0			
Total Lost Time (s)		8.0			
Lead/Lag	Lead	Lead			
Lead-Lag Optimize?	Yes	Yes			
Vehicle Extension (s)	3.0	3.0			3.0
Recall Mode	None	None			None
Walk Time (s)	4.0	4.0			4.0
Flash Dont Walk (s)	19.0	19.0			19.0
Pedestrian Calls (#/hr)	0	0			0
Act Effct Green (s)		27.0			
Actuated g/C Ratio		0.32			
v/c Ratio		0.86			
Control Delay		45.6			
Queue Delay		0.0			
Total Delay		45.6			
LOS		D			
Approach Delay		45.6			
Approach LOS		D			

Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR
Queue Length 50th (ft)		67					26				190	
Queue Length 95th (ft)		#149					60				#354	
Internal Link Dist (ft)		223					504				214	
Turn Bay Length (ft)												
Base Capacity (vph)		187					166				426	
Starvation Cap Reductn		0					0				0	
Spillback Cap Reductn		0					0				0	
Storage Cap Reductn		0					0				0	
Reduced v/c Ratio		0.70					0.31				0.89	

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 84	
Natural Cycle: 130	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 49.8	Intersection LOS: D
Intersection Capacity Utilization 68.9%	ICU Level of Service C
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 22: Hudson St & Frank Sinatra Dr & 11th St



Lane Group	SBL	SBT	SBR	SBR2	ø9
Queue Length 50th (ft)		210			
Queue Length 95th (ft)		#375			
Internal Link Dist (ft)		278			
Turn Bay Length (ft)					
Base Capacity (vph)		500			
Starvation Cap Reductn		0			
Spillback Cap Reductn		0			
Storage Cap Reductn		0			
Reduced v/c Ratio		0.86			

Intersection Summary

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	0	0	138	83	118	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.922	
Flt Protected				0.970	0.979	
Satd. Flow (prot)	0	0	0	1807	1681	0
Flt Permitted				0.970	0.979	
Satd. Flow (perm)	0	0	0	1807	1681	0
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	25			30	25	
Link Distance (ft)	281			236	309	
Travel Time (s)	7.7			5.4	8.4	
Peak Hour Factor	0.92	0.92	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	0	157	94	134	182
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	251	316	0
Turn Type			Perm	NA	Prot	
Protected Phases				4	2	
Permitted Phases			4			
Detector Phase			4	4	2	
Switch Phase						
Minimum Initial (s)			4.0	4.0	4.0	
Minimum Split (s)			21.0	21.0	21.0	
Total Split (s)			32.0	32.0	58.0	
Total Split (%)			35.6%	35.6%	64.4%	
Maximum Green (s)			27.0	27.0	53.0	
Yellow Time (s)			3.0	3.0	3.0	
All-Red Time (s)			2.0	2.0	2.0	
Lost Time Adjust (s)				0.0	0.0	
Total Lost Time (s)				5.0	5.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)			3.0	3.0	3.0	
Recall Mode			None	None	C-Max	
Walk Time (s)			5.0	5.0	5.0	
Flash Dont Walk (s)			11.0	11.0	8.0	
Pedestrian Calls (#/hr)			0	0	0	
Act Effct Green (s)				17.8	62.2	
Actuated g/C Ratio				0.20	0.69	
v/c Ratio				0.71	0.27	
Control Delay				44.1	6.7	
Queue Delay				0.0	0.0	
Total Delay				44.1	6.7	
LOS				D	A	
Approach Delay				44.1	6.7	
Approach LOS				D	A	
Queue Length 50th (ft)				134	59	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Queue Length 95th (ft)				192	116	
Internal Link Dist (ft)	201			156	229	
Turn Bay Length (ft)						
Base Capacity (vph)				542	1162	
Starvation Cap Reductn				0	0	
Spillback Cap Reductn				0	0	
Storage Cap Reductn				0	0	
Reduced v/c Ratio				0.46	0.27	

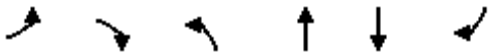
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 75 (83%), Referenced to phase 2:NBL, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 23.3		Intersection LOS: C	
Intersection Capacity Utilization 36.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 10: River St & 4th St

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	45	143	175	0	0	197
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.92	0.92	0.93
Hourly flow rate (vph)	48	154	188	0	0	212
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			236			
pX, platoon unblocked						
vC, conflicting volume	400	188			188	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	400	188			188	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	82			100	
cM capacity (veh/h)	606	854			1386	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	202	188	212
Volume Left	48	0	0
Volume Right	154	0	0
cSH	778	1700	1700
Volume to Capacity	0.26	0.11	0.12
Queue Length 95th (ft)	26	0	0
Control Delay (s)	11.2	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.2	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	28	30	8	252	4	168
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	29	32	8	265	4	177
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				802		
pX, platoon unblocked						
vC, conflicting volume	375	93	181			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	375	93	181			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	97	99			
cM capacity (veh/h)	623	965	1394			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	61	274	181
Volume Left	29	8	0
Volume Right	32	0	177
cSH	762	1394	1700
Volume to Capacity	0.08	0.01	0.11
Queue Length 95th (ft)	7	0	0
Control Delay (s)	10.1	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	10.1	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	33	307	0	0	150
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.97	0.97	0.92	0.92	0.97
Hourly flow rate (vph)	0	34	316	0	0	155
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						690
pX, platoon unblocked						
vC, conflicting volume	471	316			316	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	471	316			316	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	95			100	
cM capacity (veh/h)	551	724			1244	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	34	316	155
Volume Left	0	0	0
Volume Right	34	0	0
cSH	724	1700	1700
Volume to Capacity	0.05	0.19	0.09
Queue Length 95th (ft)	4	0	0
Control Delay (s)	10.2	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.2	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization		26.2%	ICU Level of Service A
Analysis Period (min)		15	

Traffic Count Data

Hudson Street & 4th Street

5/1/2014 - 7 AM to 9 AM							
Traffic	Southbound		Westbound		15-min	Hourly	Peak
	T	R	T	L			
7:00 AM	67	2	16	10	95	416	676
7:15 AM	72	6	11	18	107	471	193
7:30 AM	57	8	14	10	89	523	0.88
7:45 AM	82	9	20	14	125	608	
8:00 AM	93	5	36	16	150	676	
8:15 AM	93	24	29	13	159		
8:30 AM	117	13	30	14	174		
8:45 AM	136	8	34	15	193		

Peds	S	N	W	E	15-min	Hourly	Peak
7:00 AM	9	6	4	8	27	214	423
7:15 AM	15	16	10	12	53	284	
7:30 AM	14	9	19	19	61	341	
7:45 AM	19	18	20	16	73	396	
8:00 AM	23	26	23	25	97	423	
8:15 AM	30	29	28	23	110		
8:30 AM	28	27	30	31	116		
8:45 AM	34	18	28	20	100		

5/1/2014 - 4:30 PM to 6:30 PM							
Traffic	Southbound		Westbound		15-min	Hourly	Peak
	T	R	T	L			
4:30 PM	79	15	31	12	137	533	599
4:45 PM	77	15	27	24	143	532	159
5:00 PM	96	11	29	13	149	548	0.94
5:15 PM	48	8	32	16	104	548	
5:30 PM	78	7	36	15	136	599	
5:45 PM	87	14	42	16	159		
6:00 PM	67	18	48	16	149		
6:15 PM	73	18	47	17	155		

Peds	S	N	W	E	15-min	Hourly	Peak
4:30 PM	21	25	46	46	138	530	530
4:45 PM	25	34	30	50	139	505	
5:00 PM	24	31	40	47	142	481	
5:15 PM	17	35	37	22	111	488	
5:30 PM	20	28	35	30	113	518	
5:45 PM	17	31	36	31	115		
6:00 PM	34	38	43	34	149		
6:15 PM	23	36	45	37	141		

5/3/2014 - 11 AM to 1 PM							
Traffic	Southbound		Westbound		15-min	Hourly	Peak
	T	R	T	L			
11:00 AM	104	17	20	10	151	619	619
11:15 AM	106	14	28	18	166	614	166
11:30 AM	98	14	25	22	159	582	0.93
11:45 AM	81	15	30	17	143	556	
12:00 PM	83	15	34	14	146	560	
12:15 PM	66	20	29	19	134		
12:30 PM	68	13	32	20	133		
12:45 PM	77	23	31	16	147		

Peds	S	N	W	E	15-min	Hourly	Peak
11:00 AM	36	36	30	39	141	636	692
11:15 AM	41	55	45	22	163	657	
11:30 AM	46	60	27	31	164	669	
11:45 AM	50	50	31	37	168	692	
12:00 PM	46	53	23	40	162	684	
12:15 PM	55	55	26	39	175		
12:30 PM	59	51	41	36	187		
12:45 PM	49	44	35	32	160		

Hudson Street & 5th Street

5/1/2014 - 7 AM to 9 AM							
Traffic	Southbound		Eastbound		15-min	Hourly	Peak
	T	L	T	R			
7:00 AM	56	2	7	5	70	318	502
7:15 AM	50	4	7	7	68	351	151
7:30 AM	55	8	7	12	82	409	0.83
7:45 AM	70	6	9	13	98	478	
8:00 AM	72	3	12	16	103	502	
8:15 AM	94	8	10	14	126		
8:30 AM	111	12	12	16	151		
8:45 AM	80	12	14	16	122		

Peds	S	N	W	E	15-min	Hourly	Peak
7:00 AM	14	5	8	10	37	246	465
7:15 AM	13	10	8	8	39	323	
7:30 AM	22	12	15	26	75	407	
7:45 AM	28	16	26	25	95	452	
8:00 AM	36	23	35	20	114	465	
8:15 AM	30	14	43	36	123		
8:30 AM	26	9	42	43	120		
8:45 AM	25	12	31	40	108		

5/1/2014 - 4:30 PM to 6:30 PM							
Traffic	Southbound		Eastbound		15-min	Hourly	Peak
	T	L	T	R			
4:30 PM	79	15	17	14	125	494	526
4:45 PM	70	15	16	18	119	499	136
5:00 PM	72	15	18	20	125	515	0.97
5:15 PM	77	11	15	22	125	526	
5:30 PM	81	13	18	18	130	526	
5:45 PM	80	12	21	22	135		
6:00 PM	79	9	26	22	136		
6:15 PM	83	10	12	20	125		

Peds	S	N	W	E	15-min	Hourly	Peak
4:30 PM	49	16	22	25	112	521	778
4:45 PM	41	20	30	30	121	602	
5:00 PM	53	24	48	37	162	664	
5:15 PM	45	22	25	34	126	738	
5:30 PM	41	36	30	86	193	778	
5:45 PM	52	37	41	53	183		
6:00 PM	58	46	43	89	236		
6:15 PM	39	39	31	57	166		

5/3/2014 - 11 AM to 1 PM							
Traffic	Southbound		Eastbound		15-min	Hourly	Peak
	T	L	T	R			
11:00 AM	92	8	9	27	136	563	564
11:15 AM	93	11	9	23	136	564	150
11:30 AM	103	13	12	22	150	539	0.94
11:45 AM	98	7	12	24	141	490	
12:00 PM	91	9	13	24	137	492	
12:15 PM	69	12	10	20	111		
12:30 PM	68	10	8	15	101		
12:45 PM	77	8	27	31	143		

Peds	S	N	W	E	15-min	Hourly	Peak
11:00 AM	39	33	22	51	145	578	580
11:15 AM	31	27	50	40	148	580	
11:30 AM	34	32	30	46	142	568	
11:45 AM	37	29	29	48	143	559	
12:00 PM	33	30	23	61	147	558	
12:15 PM	29	20	44	43	136		
12:30 PM	43	17	40	33	133		
12:45 PM	39	28	27	48	142		

Hudson Street & 6th Street

5/1/2014 - 7 AM to 9 AM							
Traffic	Southbound		Westbound		15-min	Hourly	Peak
	T	R	T	L			
7:00 AM	64	6	5	1	76	346	497
7:15 AM	66	3	4	5	78	381	164
7:30 AM	56	18	1	2	77	433	0.76
7:45 AM	92	12	4	7	115	448	
8:00 AM	72	34	4	1	111	497	
8:15 AM	109	16	4	1	130		
8:30 AM	75	8	6	3	92		
8:45 AM	127	26	6	5	164		

Peds	S	N	W	E	15-min	Hourly	Peak
7:00 AM	14	11	6	6	37	229	343
7:15 AM	8	14	12	8	42	263	
7:30 AM	15	20	19	7	61	307	
7:45 AM	31	21	26	11	89	343	
8:00 AM	18	25	24	4	71	343	
8:15 AM	22	20	32	12	86		
8:30 AM	29	19	30	19	97		
8:45 AM	20	28	23	18	89		

5/1/2014 - 4:30 PM to 6:30 PM							
Traffic	Southbound		Westbound		15-min	Hourly	Peak
	T	R	T	L			
4:30 PM	85	15	15	9	124	477	477
4:45 PM	86	13	14	2	115	469	135
5:00 PM	93	16	10	4	123	474	0.88
5:15 PM	82	19	9	5	115	457	
5:30 PM	82	25	6	3	116	477	
5:45 PM	80	22	11	7	120		
6:00 PM	75	21	10	0	106		
6:15 PM	86	32	7	10	135		

Peds	S	N	W	E	15-min	Hourly	Peak
4:30 PM	24	25	20	25	94	400	421
4:45 PM	30	23	31	24	108	413	
5:00 PM	20	22	35	21	98	410	
5:15 PM	15	27	25	33	100	419	
5:30 PM	26	21	28	32	107	421	
5:45 PM	20	19	30	36	105		
6:00 PM	32	22	25	28	107		
6:15 PM	22	24	26	30	102		

5/3/2014 - 11 AM to 1 PM							
Traffic	Southbound		Westbound		15-min	Hourly	Peak
	T	R	T	L			
11:00 AM	89	16	7	8	120	427	462
11:15 AM	78	19	6	6	109	435	128
11:30 AM	54	23	11	6	94	442	0.90
11:45 AM	72	19	8	5	104	454	
12:00 PM	94	20	7	7	128	462	
12:15 PM	80	21	6	9	116		
12:30 PM	73	20	7	6	106		
12:45 PM	80	17	10	5	112		

Peds	S	N	W	E	15-min	Hourly	Peak
11:00 AM	24	19	23	24	90	434	507
11:15 AM	20	22	40	26	108	475	
11:30 AM	21	24	29	30	104	486	
11:45 AM	24	39	33	36	132	493	
12:00 PM	34	33	27	37	131	507	
12:15 PM	33	31	30	25	119		
12:30 PM	22	33	24	32	111		
12:45 PM	45	36	36	29	146		

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Site Code: 12486801
Location: Hudson St/Sinatra Dr -- 11th St
Date: 5/1/2014

	Hudson St Southbound					11th St Westbound					Sinatra Dr					Hudson St Northbound					11th St Eastbound				
Start Time	Right	Thru	Thru to Sinatra Dr	Left	U-Turns	Right	Thru	Left	Left to Sinatra Dr	U-Turns	Right to 11th St	Thru to Hudson St	Left to 11th St	Left to Hudson St	U-Turns	Right to Sinatra Dr	Right	Thru	Left	U-Turns	Right	Right to Sinatra Dr	Thru	Left	U-Turns
07:00 AM	4	42	26	8	0	4	2	3	1	0	2	34	6	8	0	0	0	0	0	0	3	1	7	2	0
07:15 AM	2	51	29	4	0	3	3	2	0	0	6	51	7	10	0	0	0	0	0	0	11	2	5	1	0
07:30 AM	13	39	43	2	0	5	1	5	3	0	8	40	8	11	0	0	0	0	0	0	14	4	5	3	0
07:45 AM	9	58	35	1	0	2	3	3	2	0	3	40	10	14	0	0	0	0	0	0	11	4	7	5	0
08:00 AM	13	54	46	3	0	2	5	4	0	0	7	43	15	11	0	0	0	0	0	0	16	5	10	3	0
08:15 AM	8	60	39	2	0	1	7	4	2	0	6	50	12	19	0	0	0	0	0	0	23	6	14	4	0
08:30 AM	6	70	48	3	0	2	6	5	1	0	5	45	10	16	0	0	0	0	0	0	17	6	13	5	1
08:45 AM	10	60	49	1	0	2	3	5	1	0	8	54	13	14	0	0	0	0	0	0	16	11	13	1	0
Total	**65**	**434**	**315**	**24**	**0**	**21**	**30**	**31**	**10**	**0**	**45**	**357**	**81**	**103**	**0**	**0**	**0**	**0**	**0**	**0**	**111**	**39**	**74**	**24**	**1**

Peak Hour: 8:00am - 9:00am
Peak 15: 8:45am - 9:00am
PHF: 0.97

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Site Code: 12486802
Location: Hudson St/Sinatra Dr -- 11th St
Date: 5/1/2014

	Hudson St Southbound					11th St Westbound					Sinatra Dr					Hudson St Northbound					11th St Eastbound				
Start Time	Right	Thru	Thru to Sinatra Dr	Left	U-Turns	Right	Thru	Left	Left to Sinatra Dr	U-Turns	Right to 11th St	Thru to Hudson St	Left to 11th St	Left to Hudson St	U-Turns	Right to Sinatra Dr	Right	Thru	Left	U-Turns	Right	Right to Sinatra Dr	Thru	Left	U-Turns
04:30 PM	5	59	31	3	0	3	4	5	1	0	9	79	14	17	0	0	0	0	0	0	12	5	13	4	2
04:45 PM	8	58	27	1	0	1	4	1	1	0	7	68	9	14	0	0	0	0	0	0	11	5	10	2	0
05:00 PM	12	53	25	2	0	5	4	4	1	0	8	71	17	9	0	0	0	0	0	0	10	2	11	6	0
05:15 PM	10	52	34	3	0	0	4	6	0	0	9	56	12	15	0	0	0	0	0	0	18	6	10	2	1
05:30 PM	10	51	31	1	0	1	2	2	0	0	8	65	20	14	0	0	0	0	0	0	9	8	13	5	2
05:45 PM	17	57	37	5	0	1	3	3	1	0	9	69	11	14	0	0	0	0	0	0	15	4	12	1	0
06:00 PM	15	59	30	2	0	0	5	1	1	0	7	68	18	10	0	0	0	0	0	0	11	2	15	7	1
06:15 PM	11	60	31	2	0	0	5	6	0	0	7	77	14	11	0	0	0	0	0	0	21	7	8	8	0
Total	**88**	**449**	**246**	**19**	**0**	**11**	**31**	**28**	**5**	**0**	**64**	**553**	**115**	**104**	**0**	**0**	**0**	**0**	**0**	**0**	**107**	**39**	**92**	**35**	**6**

Peak Hour: 5:30pm - 6:30pm
Peak 15: 6:15pm - 6:30pm
PHF: 0.95

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Site Code: 12486803
Location: Hudson St/Sinatra Dr -- 11th St
Date: 5/3/2014

	Hudson St Southbound					11th St Westbound					Sinatra Dr					Hudson St Northbound					11th St Eastbound				
Start Time	Right	Thru	Thru to Sinatra Dr	Left	U-Turns	Right	Thru	Left	Left to Sinatra Dr	U-Turns	Right to 11th St	Thru to Hudson St	Left to 11th St	Left to Hudson St	U-Turns	Right to Sinatra Dr	Right	Thru	Left	U-Turns	Right	Right to Sinatra Dr	Thru	Left	U-Turns
11:00 AM	11	53	18	6	0	4	8	5	3	0	5	40	13	9	0	0	0	0	0	0	11	3	9	3	0
11:15 AM	11	61	26	6	0	2	5	6	1	0	8	45	10	15	0	0	0	0	0	0	12	4	5	5	2
11:30 AM	7	61	30	4	0	2	3	2	1	0	6	58	13	15	0	0	0	0	0	0	6	2	7	11	0
11:45 AM	15	57	23	5	0	3	5	3	0	0	5	57	25	8	0	0	0	0	0	0	13	3	14	8	1
12:00 PM	13	62	23	4	0	1	8	4	4	0	12	64	6	14	0	0	0	0	0	0	13	4	11	5	0
12:15 PM	6	52	25	5	0	1	4	3	1	0	8	51	5	11	0	0	0	0	0	0	6	5	2	7	0
12:30 PM	4	44	29	3	0	1	4	2	0	0	5	46	16	11	0	0	0	0	0	0	13	9	12	5	1
12:45 PM	18	44	22	3	0	6	4	3	0	0	2	58	13	12	0	0	0	0	0	0	14	5	11	3	3
Total	**85**	**434**	**196**	**36**	**0**	**20**	**41**	**28**	**10**	**0**	**51**	**419**	**101**	**95**	**0**	**0**	**0**	**0**	**0**	**0**	**88**	**35**	**71**	**47**	**7**

Peak Hour: 11:15am - 12:15pm
Peak 15: 12:00pm - 12:15pm
PHF: 0.95

River Street & 4th Street/Frank Sinatra Drive

5/1/2014 - 7 AM to 9 AM							
Traffic	Northbound		Westbound				
	L	R	T	L	15-min	Hourly	Peak
7:00 AM	26	26	10	32	94	393	482
7:15 AM	19	32	11	33	95	404	145
7:30 AM	12	18	9	20	59	437	0.83
7:45 AM	36	43	17	49	145	482	
8:00 AM	31	28	15	31	105	477	
8:15 AM	30	40	14	44	128		
8:30 AM	20	26	20	38	104		
8:45 AM	42	37	17	44	140		

Peds	S	W	E	15-min	Hourly	Peak
7:00 AM	15	23	3	41	223	515
7:15 AM	9	33	7	49	315	
7:30 AM	9	18	5	32	384	
7:45 AM	18	51	32	101	500	
8:00 AM	37	77	19	133	515	
8:15 AM	24	76	18	118		
8:30 AM	67	57	24	148		
8:45 AM	24	28	64	116		

5/1/2014 - 4:30 PM to 6:30 PM							
Traffic	Northbound		Westbound				
	L	R	T	L	15-min	Hourly	Peak
4:30 PM	34	36	17	30	117	515	573
4:45 PM	33	30	27	37	127	536	150
5:00 PM	30	45	19	42	136	551	0.96
5:15 PM	40	48	18	29	135	558	
5:30 PM	34	49	21	34	138	573	
5:45 PM	34	45	30	33	142		
6:00 PM	26	52	32	33	143		
6:15 PM	37	48	27	38	150		

Peds	S	W	E	15-min	Hourly	Peak
4:30 PM	40	61	30	131	573	574
4:45 PM	49	71	40	160	574	
5:00 PM	51	70	38	159	549	
5:15 PM	39	54	30	123	524	
5:30 PM	39	57	36	132	539	
5:45 PM	41	60	34	135		
6:00 PM	44	58	32	134		
6:15 PM	51	55	32	138		

5/3/2014 - 11 AM to 1 PM							
Traffic	Northbound		Westbound				
	L	R	T	L	15-min	Hourly	Peak
11:00 AM	27	33	21	30	111	471	499
11:15 AM	31	30	19	27	107	474	142
11:30 AM	32	36	20	37	125	482	0.88
11:45 AM	31	39	20	38	128	499	
12:00 PM	24	36	26	28	114	491	
12:15 PM	29	41	13	32	115		
12:30 PM	34	44	24	40	142		
12:45 PM	34	35	13	38	120		

Peds	S	W	E	15-min	Hourly	Peak
11:00 AM	67	59	45	171	540	657
11:15 AM	44	42	39	125	542	
11:30 AM	51	45	28	124	584	
11:45 AM	49	38	33	120	637	
12:00 PM	55	70	48	173	657	
12:15 PM	66	60	41	167		
12:30 PM	86	54	37	177		
12:45 PM	60	45	35	140		

Frank Sinatra Drive & Frank Sinatra Drive South

5/1/2014 - 7 AM to 9 AM							
Traffic	NB	SB	WB		15-min	Hourly	Peak
	T	T	R	L			
7:00 AM	29	40	12	3	84	399	462
7:15 AM	30	46	23	4	103	421	123
7:30 AM	32	44	29	2	107	432	0.94
7:45 AM	34	40	26	5	105	444	
8:00 AM	38	42	20	6	106	462	
8:15 AM	37	40	27	10	114		
8:30 AM	37	48	24	10	119		
8:45 AM	35	50	26	12	123		

Peds	S	N	E	15-min	Hourly	Peak
7:00 AM	0	0	4	4	18	19
7:15 AM	1	0	3	4	19	
7:30 AM	0	0	2	2	18	
7:45 AM	2	1	5	8	19	
8:00 AM	2	0	3	5	15	
8:15 AM	1	0	2	3		
8:30 AM	0	1	2	3		
8:45 AM	2	0	2	4		

Bicycles	Southbound	Northbound	Total	15-min	Hourly	Peak
7:00 AM	3	1	4	4	7	7
7:15 AM	2	0	2	2	3	
7:30 AM	0	0	0	0	2	
7:45 AM	0	1	1	1	2	
8:00 AM	0	0	0	0	4	
8:15 AM	0	1	1	1		
8:30 AM	0	0	0	0		
8:45 AM	1	2	3	3		

5/1/2014 - 4:30 PM to 6:30 PM							
Traffic	NB	SB	WB		15-min	Hourly	Peak
	T	T	R	L			
4:30 PM	34	42	52	4	132	538	659
4:45 PM	31	46	40	8	125	563	170
5:00 PM	50	49	36	7	142	606	0.97
5:15 PM	47	40	42	10	139	628	
5:30 PM	50	44	50	13	157	659	
5:45 PM	66	43	47	12	168		
6:00 PM	58	46	50	10	164		
6:15 PM	52	50	55	13	170		

Peds	S	N	E	15-min	Hourly	Peak
4:30 PM	5	2	4	11	56	96
4:45 PM	5	2	6	13	64	
5:00 PM	4	0	10	14	73	
5:15 PM	6	1	11	18	88	
5:30 PM	9	2	8	19	96	
5:45 PM	3	1	18	22		
6:00 PM	7	2	20	29		
6:15 PM	9	0	17	26		

Bicycles	Southbound	Northbound	Total	15-min	Hourly	Peak
11:00 AM	3	1	4	4	24	36
11:15 AM	2	3	5	5	32	
11:30 AM	2	2	4	4	36	
11:45 AM	6	5	11	11	36	
12:00 PM	7	5	12	12	26	
12:15 PM	4	5	9	9		
12:30 PM	3	1	4	4		
12:45 PM	1	0	1	1		

5/3/2014 - 11 AM to 1 PM							
Traffic	NB	SB	WB		15-min	Hourly	Peak
	T	T	R	L			
11:00 AM	36	27	30	6	99	504	560
11:15 AM	40	38	32	10	120	545	150
11:30 AM	49	50	39	9	147	557	0.93
11:45 AM	45	44	37	12	138	560	
12:00 PM	42	58	32	8	140	549	
12:15 PM	43	49	33	7	132		
12:30 PM	45	46	41	18	150		
12:45 PM	47	47	25	8	127		

Peds	S	N	E	15-min	Hourly	Peak
11:00 AM	10	2	16	28	110	119
11:15 AM	9	1	16	26	113	
11:30 AM	13	2	15	30	111	
11:45 AM	11	1	14	26	109	
12:00 PM	11	3	17	31	119	
12:15 PM	8	1	15	24		
12:30 PM	9	1	18	28		
12:45 PM	10	7	19	36		

Bicycles	Southbound	Northbound	Total	15-min	Hourly	Peak
4:30 PM	4	0	4	4	9	30
4:45 PM	1	1	2	2	11	
5:00 PM	2	0	2	2	19	
5:15 PM	0	1	1	1	24	
5:30 PM	3	3	6	6	30	
5:45 PM	4	6	10	10		
6:00 PM	3	4	7	7		
6:15 PM	3	4	7	7		

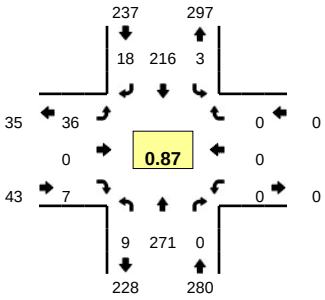
Type of peak hour being reported: Intersection Peak

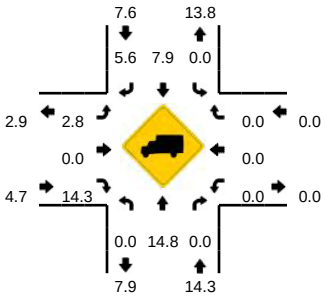
Method for determining peak hour: Total Entering Volume

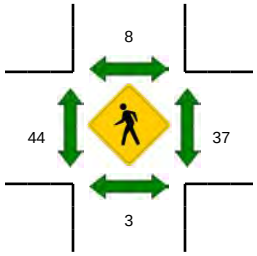
LOCATION: Sinatra Dr -- 5th St
CITY/STATE: Hoboken, NJ

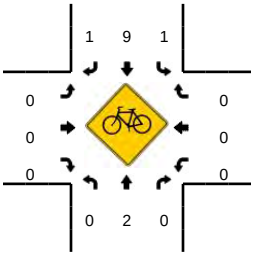
QC JOB #: 12486810
DATE: Thu, May 29 2014

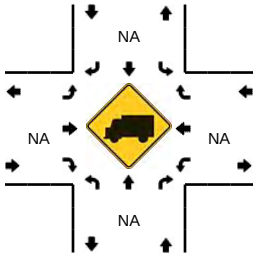
Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:45 AM -- 9:00 AM

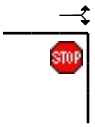


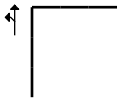


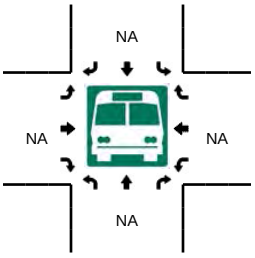












15-Min Count Period Beginning At	Sinatra Dr (Northbound)				Sinatra Dr (Southbound)				5th St (Eastbound)				5th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	46	0	0	0	34	0	1	1	0	0	0	0	0	0	0	82	
7:15 AM	0	49	0	0	0	36	0	0	3	0	0	1	0	0	0	0	89	
7:30 AM	1	45	0	0	0	47	1	1	5	0	1	0	0	0	0	0	101	
7:45 AM	0	61	0	0	0	44	0	0	10	0	1	1	0	0	0	0	117	389
8:00 AM	1	78	0	3	0	50	4	1	6	0	2	1	0	0	0	0	146	453
8:15 AM	1	62	0	1	0	56	4	1	3	0	2	3	0	0	0	0	133	497
8:30 AM	1	56	0	0	0	51	2	1	7	0	1	1	0	0	0	0	120	516
8:45 AM	1	75	0	1	0	59	8	0	7	0	2	8	0	0	0	0	161	560

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	300	0	4	0	236	32	0	28	0	8	32	0	0	0	0	644
Heavy Trucks	0	64	0		0	24	0		0	0	0		0	0	0		88
Pedestrians		4				8				132				32			176
Bicycles	0	0	0		0	4	1		0	0	0		0	0	0		5
Railroad																	
Stopped Buses																	

Comments: **Treat as 3 leg**Video Only

Report generated on 5/30/2014 10:20 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

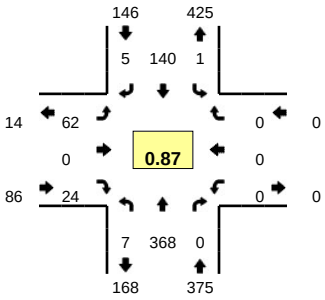
Type of peak hour being reported: Intersection Peak

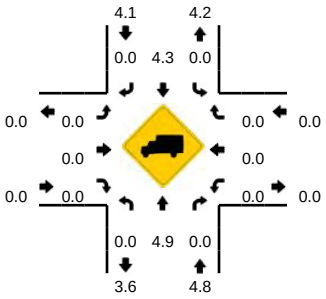
Method for determining peak hour: Total Entering Volume

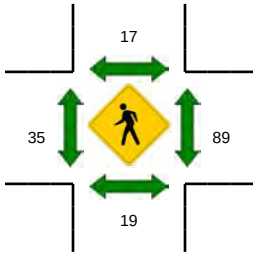
LOCATION: Sinatra Dr -- 5th St
CITY/STATE: Hoboken, NJ

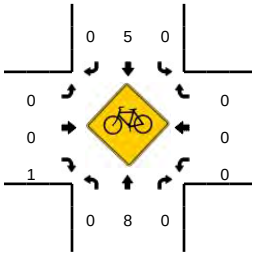
QC JOB #: 12486811
DATE: Wed, May 28 2014

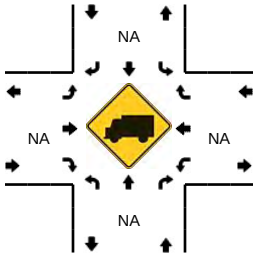
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:30 PM -- 5:45 PM

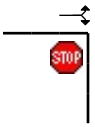


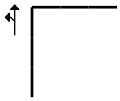


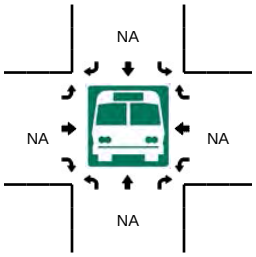












15-Min Count Period Beginning At	Sinatra Dr (Northbound)				Sinatra Dr (Southbound)				5th St (Eastbound)				5th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:30 PM	0	86	0	0	0	26	1	0	6	0	6	1	0	0	0	0	126	
4:45 PM	0	76	0	0	0	29	3	0	8	0	9	2	0	0	0	0	127	
5:00 PM	0	79	0	1	0	38	1	0	18	0	10	1	0	0	0	0	148	
5:15 PM	2	87	0	0	0	30	0	0	17	0	2	0	0	0	0	0	138	539
5:30 PM	0	110	0	1	0	38	3	1	12	0	7	3	0	0	0	0	175	588
5:45 PM	1	92	0	2	0	34	1	0	9	0	5	2	0	0	0	0	146	607
6:00 PM	0	88	0	1	0	35	1	0	12	0	5	3	0	0	0	0	145	604
6:15 PM	1	93	0	2	0	25	1	0	12	0	7	0	0	0	0	0	141	607

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	440	0	4	0	152	12	4	48	0	28	12	0	0	0	0	700
Heavy Trucks	0	20	0		0	4	0		0	0	0		0	0	0		24
Pedestrians		4				12				40				100			156
Bicycles	0	1	0		0	2	0		0	0	1		0	0	0		4
Railroad																	
Stopped Buses																	

Comments: **Treat as 3 leg**Video Only

Report generated on 5/30/2014 10:20 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Frank Sinatra Drive & 5th Street

5/3/2014 - 11 AM to 1 PM												
Traffic	Southbound		Northbound		EB		From Garage		15-min	Hourly	Peak	
	T	R	T	L	Right	Left	L	R				
11:00 AM	30	1	58	1	8	7	2	0	107	471	490	
11:15 AM	32	2	62	0	8	5	3	0	112	487	129	
11:30 AM	38	2	65	4	7	4	1	2	123	490	0.95	
11:45 AM	43	1	65	2	5	10	0	3	129	486		
12:00 PM	41	0	68	2	4	6	0	2	123	458		
12:15 PM	46	1	54	0	6	6	1	1	115			
12:30 PM	38	2	60	2	5	9	1	2	119			
12:45 PM	32	0	52	3	4	10	0	0	101			

Peds	S	N	W	15-min	Hourly	Peak
11:00 AM	5	12	11	28	115	115
11:15 AM	5	10	13	28	115	
11:30 AM	3	15	11	29	113	
11:45 AM	5	11	14	30	113	
12:00 PM	6	11	11	28	110	
12:15 PM	4	9	13	26		
12:30 PM	2	14	13	29		
12:45 PM	3	15	9	27		

The Point Mid-Block Ped/Bike Count

5/2/2014 - 7 AM to 9 AM

Peds		Hourly	Peak
7:00 AM	40	159	159
7:15 AM	42	147	
7:30 AM	39	137	
7:45 AM	38	124	
8:00 AM	28	116	
8:15 AM	32		
8:30 AM	26		
8:45 AM	30		

Bicycles	Northbound	Southbound	Total	15-min	Hourly	Peak
7:00 AM	6	5	11	11	38	39
7:15 AM	4	2	6	6	35	
7:30 AM	7	2	9	9	39	
7:45 AM	8	4	12	12	39	
8:00 AM	5	3	8	8	36	
8:15 AM	6	4	10	10		
8:30 AM	6	3	9	9		
8:45 AM	6	3	9	9		

5/1/2014 - 4:30 PM to 6:30 PM

Peds		Hourly	Peak
4:30 PM	59	268	408
4:45 PM	61	293	
5:00 PM	72	307	
5:15 PM	76	356	
5:30 PM	84	408	
5:45 PM	75		
6:00 PM	121		
6:15 PM	128		

Bicycles	Northbound	Southbound	Total	15-min	Hourly	Peak
4:30 PM	7	4	11	11	30	55
4:45 PM	1	1	2	2	37	
5:00 PM	5	4	9	9	46	
5:15 PM	2	6	8	8	51	
5:30 PM	10	8	18	18	55	
5:45 PM	6	5	11	11		
6:00 PM	7	7	14	14		
6:15 PM	5	7	12	12		

5/3/2014 - 11 AM to 1 PM

Peds		Hourly	Peak
11:00 AM	100	505	604
11:15 AM	133	542	
11:30 AM	112	560	
11:45 AM	160	604	
12:00 PM	137	590	
12:15 PM	151		
12:30 PM	156		
12:45 PM	146		

Bicycles	Northbound	Southbound	Total	15-min	Hourly	Peak
11:00 AM	7	8	15	15	60	68
11:15 AM	8	8	16	16	62	
11:30 AM	6	11	17	17	64	
11:45 AM	2	10	12	12	68	
12:00 PM	5	12	17	17	61	
12:15 PM	11	7	18	18		
12:30 PM	8	13	21	21		
12:45 PM	1	4	5	5		

Frank Sinatra Drive & Frank Sinatra Drive North

5/2/2014 - 7 AM to 9 AM							
Traffic	NW-bound		NE-bound	SW-bound	15-min	Hourly	Peak
	L	R	T	T			
7:00 AM	0	5	52	39	96	431	487
7:15 AM	2	7	60	45	114	451	125
7:30 AM	4	6	64	43	117	459	0.97
7:45 AM	3	8	57	36	104	466	
8:00 AM	5	3	68	40	116	487	
8:15 AM	2	7	63	50	122		
8:30 AM	6	10	60	48	124		
8:45 AM	3	13	53	56	125		

Peds	SE	SW	NE	15-min	Hourly	Peak
7:00 AM	6	6	1	13	57	85
7:15 AM	7	7	1	15	68	
7:30 AM	10	4	1	15	77	
7:45 AM	6	8	0	14	77	
8:00 AM	10	12	2	24	85	
8:15 AM	15	7	2	24		
8:30 AM	9	6	0	15		
8:45 AM	15	6	1	22		

Bicycles	NE-bound	SW-bound	Total	15-min	Hourly	Peak
7:00 AM	5	1	6	6	16	16
7:15 AM	1	4	5	5	11	
7:30 AM	1	0	1	1	10	
7:45 AM	2	2	4	4	12	
8:00 AM	0	1	1	1	12	
8:15 AM	0	4	4	4		
8:30 AM	2	1	3	3		
8:45 AM	1	3	4	4		

5/1/2014 - 430 PM to 630 PM							
Traffic	NW-bound		NE-bound	SW-bound	15-min	Hourly	Peak
	L	R	T	T			
4:30 PM	3	13	103	36	155	643	689
4:45 PM	2	14	107	40	163	666	187
5:00 PM	2	12	110	46	170	664	0.92
5:15 PM	4	10	99	42	155	657	
5:30 PM	4	15	105	54	178	689	
5:45 PM	2	9	104	46	161		
6:00 PM	3	10	100	50	163		
6:15 PM	2	12	115	58	187		

Peds	SE	SW	NE	15-min	Hourly	Peak
4:30 PM	24	2	0	26	131	152
4:45 PM	18	2	0	20	133	
5:00 PM	30	6	2	38	149	
5:15 PM	36	10	1	47	152	
5:30 PM	24	4	0	28	141	
5:45 PM	30	5	1	36		
6:00 PM	38	3	0	41		
6:15 PM	32	2	2	36		

Bicycles	NE-bound	SW-bound	Total	15-min	Hourly	Peak
4:30 PM	5	7	12	12	61	83
4:45 PM	8	7	15	15	74	
5:00 PM	9	8	17	17	71	
5:15 PM	5	12	17	17	83	
5:30 PM	13	12	25	25	83	
5:45 PM	5	7	12	12		
6:00 PM	17	12	29	29		
6:15 PM	10	7	17	17		

5/3/2014 - 11 AM to 1 PM							
Traffic	NW-bound		NE-bound	SW-bound	15-min	Hourly	Peak
	L	R	T	T			
11:00 AM	3	8	72	28	111	488	507
11:15 AM	4	6	80	40	130	507	131
11:30 AM	5	10	74	42	131	506	0.97
11:45 AM	5	9	70	32	116	495	
12:00 PM	3	8	83	36	130	492	
12:15 PM	4	6	80	39	129		
12:30 PM	5	7	84	24	120		
12:45 PM	3	8	75	27	113		

Peds	SE	SW	NE	15-min	Hourly	Peak
11:00 AM	35	10	2	47	186	194
11:15 AM	39	15	3	57	194	
11:30 AM	34	8	1	43	188	
11:45 AM	31	7	1	39	182	
12:00 PM	40	12	3	55	194	
12:15 PM	35	14	2	51		
12:30 PM	31	6	0	37		
12:45 PM	36	13	2	51		

Bicycles	NE-bound	SW-bound	Total	15-min	Hourly	Peak
11:00 AM	4	11	15	15	66	94
11:15 AM	6	10	16	16	73	
11:30 AM	5	5	10	10	73	
11:45 AM	10	15	25	25	94	
12:00 PM	10	12	22	22	91	
12:15 PM	9	7	16	16		
12:30 PM	18	13	31	31		
12:45 PM	7	15	22	22		

Total Crashes Map

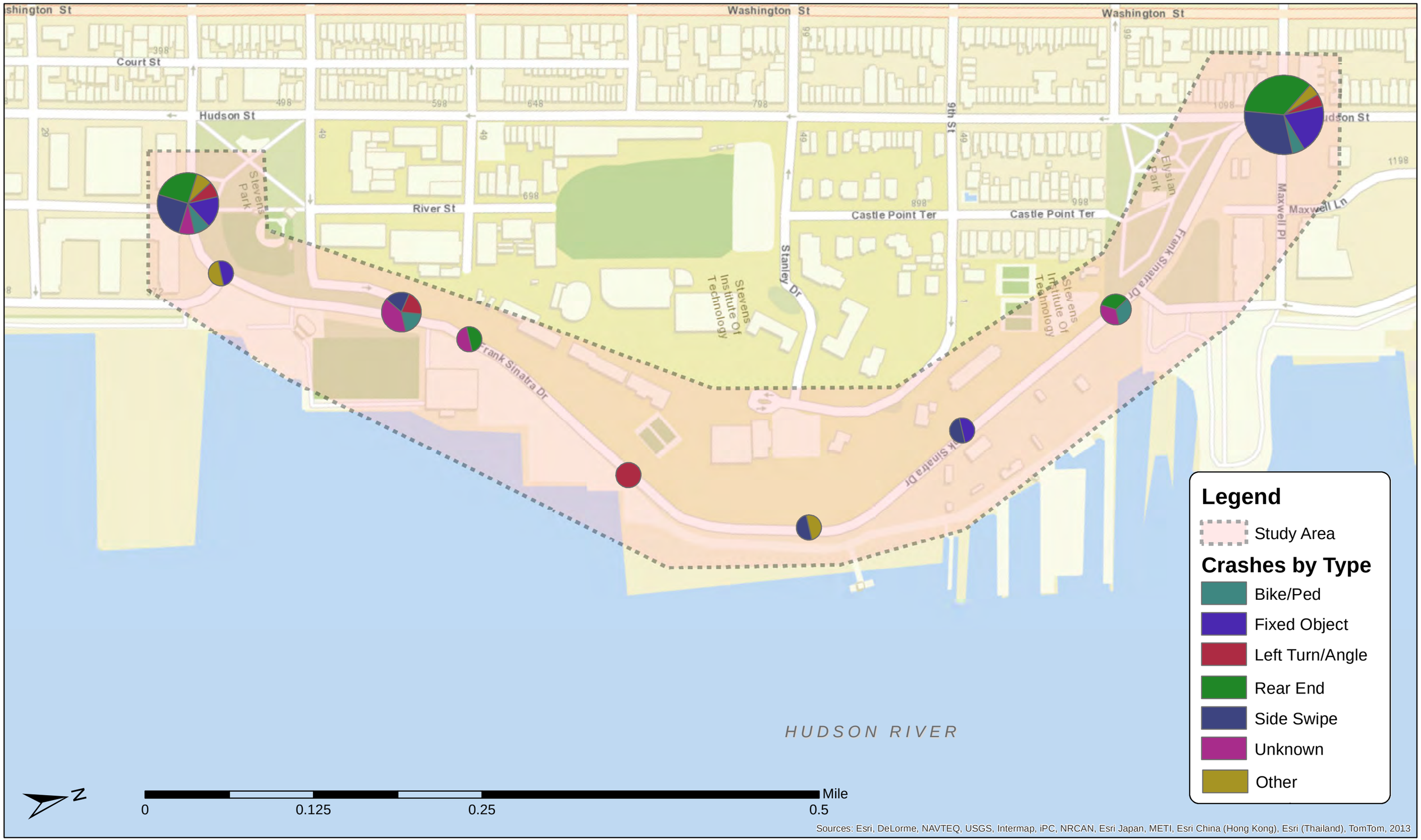
Study Area Total Crashes

Kimley»Horn

Crashes by Type Map

Study Area Crashes by Type

Kimley»Horn



Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013