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author // sharon moskovits
advisor // david king
reader // michael fishman
ABSTRACT

Ferry service is an integral component of the current transit network in New York City. In 2011, the New York City Economic Development Corporation identified the New York City ferry network as the second largest ferry network in the world with a total of 20 ferry routes, 70 vessels, and an annual ridership of 30 million. The majority of ferry systems in the New York City area are operated by private entities; currently there are four private ferry operators in the region: NY Waterways, NY Water Taxi, Liberty Landing Ferry, and Seastreak. Of these, NY Waterway has the largest network of ferry lines, including several major New York City to New Jersey crossings, and the East River ferry line. With an announcement by Mayor Bill de Blasio for the expansion of ferry services by 2017, it is important and timely to understand the current state of ferry service in New York City in order to plan for the future. This study analyzes the role of ferry services within the larger transit network in New York City and its significance as a complementary mode of transit. Particular focus is made to the East River Ferry line, as it is subsidized by the NYC EDC and serves as a model for future ferry expansion. Surveys were conducted with current ferry riders in order to gauge the benefits of this service and user preferences. Results suggest that living or working within close proximity of a ferry landing is the primary reason users choose this mode of transit.
New York City has one of the largest and most robust transit networks in the world. This is in large part due to the wide variety of transit modes offered, ranging from publicly provided rail and bus service, to private ride sharing services and livery vehicles. Each form of transit offers unique benefits to the network at large; this can been seen through more direct service, time savings, or congestion relief. Such services are integral components of the larger New York City transit network.

Ferries are one of these complementary modes of transit. Ferry service can provide a variety of benefits for the larger transportation network. Ferries are unique as a mode of transportation in that the service is waterborne. New York City has 520 miles of waterfront; this offers the city the chance to maximize on its natural landscape as a way to improve transit service in the region.

Historically, ferries were the sole mode of transportation between Manhattan and the outer boroughs of New York City. Although ferry services in the region witnessed a sharp decline in the mid-20th century, the mode has since been revived through the establishment of a robust and primarily privatized ferry network. In 2011, the NYC EDC identified ferry service in New York City as the second largest ferry network in the world, behind Istanbul, with a total of 20 ferry routes, 70 vessels, and an annual ridership of 30 million – two-thirds of which can be attributed to Staten Island Ferry service (NYC EDC, 2011; Roberts, 2014).

Currently, four distinct private companies and the publicly provided Staten Island Ferry offer varying ranges of ferry service in the region. The largest of these is NY Waterway, which operates the East River Ferry line, four Hudson River lines connecting New York City to New Jersey, and two lines in the Hudson Valley region. Several of the privately operated ferry lines that operate within the bounds of New York City currently receive public subsidy by the New York City Economic Development Corporation (NYC EDC). The subsidies are part of a larger effort to revitalize the New York City Waterfront, and are strongly tied to real estate development initiatives of the NYC EDC. Major ferry lines that receive subsidy include the East River Ferry, operated by NY Waterway, and New York Water Taxi ferry lines.

On February 3rd, 2015, Mayor Bill de Blasio announced an ambitious plan to significantly expand ferry service in New York City. The expansion plan, which is based on a 2013 ferry expansion study conducted by the NYC EDC, is set to begin implementation in 2017 and seeks to
bring ferry service to new regions of New York City along the East River, including Astoria and the Lower East Side, as well as reinstate the Rockaway ferry service that was terminated in 2014. The administration identified that it would set aside $55 million in capital funds for the expansion; the proposed service would require anywhere from $10 to $20 million per year in operational subsidies (Flegenheimer, 2015). The new service plan also promises to lower fare prices to be compatible with current MTA subway and local bus fares (de Blasio, 2015). With the impending expansion of ferry service throughout the New York City region, it is imperative to understand what lessons can be learned from the current state of ferry service in order to improve service in the future.

The purpose of this study is to analyze how privatized ferry services fits within the larger transit network in New York City, as well as learn about the characteristics of ferry passengers and why they choose to use this mode of transit. As such, this study offers a descriptive analysis of current ferry operations and ridership. While this study includes a discussion of all ferry operators within the New York City region, particular focus is made to the East River Ferry, which serves as a model the current administration seeks to replicate in its plan for expansion of ferry service (EDC: Citywide Ferry Study 2013: Preliminary Report, 2013). I hypothesize that living or working within close proximity to a ferry landing is the primary reason users choose ferry transit in New York City.
Ferry service in New York Harbor dates back to the very beginning of the region’s early colonial history. As a result of Manhattan being an island, much of the early public transportation methods between the settlement of New Amsterdam (now lower Manhattan) and surrounding regions were in the form of ferries. The first regular public ferry service can be traced back to 1642 between the Dutch colonial settlement of New Amsterdam and the western edge of Long Island, in a settlement later referred to as Breuckelen. Breuckelen, which was incorporated in 1646, was one of six Dutch settlements in the current borough of Brooklyn, New York (New Netherland Institute, 2015). The ferry between New Amsterdam and Breuckelen, known as the ‘Old Ferry,’ was operated by Cornelis Dircksen Hooglandt, who is considered the “earliest ferryman of whom records speak” (Valentine, 1853; Booth, 1859). The service docked at his property in New Amsterdam, which occupied much of the area of Peck Slip in Manhattan (Valentine, 1853).

In 1654, New Amsterdam passed what is considered to be the first ferry ordinance in North America. The ordinance required that all ferries must receive a license from the government to operate, that shelter must be provided for passengers at all ferry docks, and that ferry service must adhere to a regular schedule. It also regulated ferry fees for people and animals. The advent of this regulation was the first instance of government involvement in ferry transportation in New York City. Although the Dutch colonial government established ferry regulations, all ferry services offered during Dutch rule were operated by private entities and individuals (Millstein, 1983).
Throughout New York City’s colonial history, ferry service expanded beyond the bound of the East River; it was also present along the Hudson River and to Staten Island. The first ferry along the Hudson River was established in 1661, connecting New Amsterdam to the settlement of Communipaw, now known as Jersey City (Eftimiades, 1989). During British rule of the American colonies, several ferry franchises were granted by the government in the New York City area. In 1700, under the administration of Richard Coote, first Earl of Bellomont, Samuel Bayard began regular ferry service between Weehawken, New Jersey and Manhattan. A franchise was also granted to Johannes Verveelen in 1667 to operate a ferry along the Harlem River to Broncksdie, now the neighborhood of Harlem, in Manhattan. A similar franchise was granted for service to Staten Island in 1712. Additional ferry services provided by private individuals and franchised by the government were also offered between New York City and northern regions of New York State via the Hudson River (Adams, 1996).

Ferry boats used throughout the 17th and 18th century were either row boats, flat scows, or sail boats (Millstein, 1983). The most common ferry boat was the Periauger, a flat-bottomed sail boat with two masts (New Jersey Historical Society, 1918). These boats were small in size, which limited ridership to a few passengers per trip. They were also particularly susceptible to harsh weather conditions, such as strong winds and heavy tides, which often effected service frequency. Although ferry service was the sole mode of public transportation between Manhattan and its neighbors, it was severely limited by the technology of the boats at the time. It wasn’t until ferry team boats – a boat powered by the propulsion of eight horses or mules – and steam boats were introduced in 1814 that ferry service expanded to become a major mode of public transit in New York City (Ringlwalt, 1886; Millstein, 1983).

With the advent of steamboat ferries in the early 19th century, regular passenger ferry service boomed throughout New York City. On May 10, 1814, the Nassau, the first steam boat with regularly scheduled ferry service between Lower Manhattan and Brooklyn Heights, took its maiden voyage. It was operated by the Fulton Ferry company, which was established by Robert Fulton and William Cutting in 1814 (Roberts, 2014). The company monopolized steam boat service along the East River until 1836.

In 1836, the South Ferry company was established, providing steamboat ferry service between Whitehall Street in Manhattan and Atlantic Avenue in Brooklyn (The Brooklyn Daily Eagle, 1886). The Fulton Ferry Company and the South Ferry Company merged in 1839 to become the New York and Brooklyn Union Ferry Company, which was restructured and renamed several times, finally as the Union Ferry Company of Brooklyn in 1854. The company dominated ferry service between New York and Brooklyn, purchasing several other New York City to Brooklyn ferry lines, including the Roosevelt Street Ferry, the Gouverneur Street Ferry, the Catharine Ferry, and the Wall Street Ferry (The New York Times, 1880).

According to Kenneth T. Jackson, a Columbia University history professor, regular steam boat ferry service between Brooklyn and Manhattan can be attributed to the rapid growth and expansion of Brooklyn. The standardized and reliable service made it possible to live in Brooklyn and still work in Manhattan. By 1883, there were 18 ferry boats that operated between Manhattan and Brooklyn, taking a total of 43 million passengers annually. Steam boats allowed for higher capacity ships than earlier forms of ferry transportation, had more reliable service schedules, and were more resilient in harsh weather conditions (Roberts, 2014).

While the Union Ferry Company of Brooklyn dominated ferry service between New York and Brooklyn, other ferry companies provided service along the Hudson River and to Staten Island. In 1822, the incorporated Hoboken Steamboat Company began regular steamboat ferry service between Hoboken in New Jersey and Barclay Street in New York. The ferry service, later operated by the Delaware, Lackawanna and...
Western Railroad beginning in late 19th century, ran for 145 years, finally terminating service in 1967. Throughout the 19th and early 20th century, the majority of ferry lines along the Hudson River were operated by railroad companies. Railroad companies that operated ferry lines included the Pennsylvania Railroad Company with service to Jersey City; the West Shore Railroad Company with service to Weehawken; and the New York Central Railroad Company with service to North Weehawken (Adams, 1996).

Steamboat ferry service between Manhattan and Staten Island was established in 1817 by the Richmond Turnpike Company. In 1838, the ferry service was purchased by Cornelius Vanderbilt, an established figure in steamboat industry. Under Vanderbilt, the service came to be known as the Staten Island Ferry. By 1864, the ferry service was sold one again to the Staten Island Railroad Company, and again in 1884 to the Baltimore & Ohio Railroad Company. Finally, the ferry service was acquired by the City of New York in 1905. That year, the city purchased five new ferryboats for the line, considered the largest and fastest ferryboats of the time. Each was named after one of the newly incorporated boroughs of New York City (Adams, 1996). The Staten Island Ferry continues to provide ferry service between Manhattan and Staten Island to date; it remains publically operated by the city, under the jurisdiction of the New York City Department of Transportation (NYC DOT, 2015).
The construction of bridges and tunnels connecting Manhattan to Brooklyn and New Jersey led to a sharp decline in ferry ridership. Bridges and tunnels not only facilitated vehicular traffic between the boroughs of New York City and New Jersey, but also enabled train and subway service between regions separated by water. Brooklyn–Manhattan ferry service declined dramatically after the construction of the Brooklyn Bridge in 1883, eventually resulting in the discontinuation of the last ferry line operated by the Union Ferry Company of Brooklyn in 1924. Ferry service between Manhattan and New Jersey continued through the mid-20th century. The Hoboken ferry was the last remaining trans-Hudson ferry of this period, discontinuing service due to limited ridership in 1967 (Adams, 1996). By 1967, the publically run Staten Island Ferry was the lone remaining regular passenger ferry service from what had once been a large network of waterborne transit (EDC: Citywide Ferry Study 2013: Preliminary Report, 2013).

The 1980s marked a rebirth for ferry service in New York City, which came in the form of various privately operated ferry lines. During this period, three new privately run ferry lines were implemented. The first was run by Arcorp, now New York Waterways, and ran between the 38th street pier in Manhattan and New Jersey. The second line was operated by Harbor Commuter Company and ran between Monmouth County in New Jersey and Pier 11 in Manhattan along the East River. A third ferry line, operated by NY Waterway, began service in 1989. The implementation of the line came about due to the overcrowding of the PATH train, which is operated by the Port Authority. As a means to provide congestion relief to the overcrowded PATH trains, the Port Authority opted to use ferries to supplement service between Hoboken and Downtown Manhattan. This option was deemed more feasible and cost effective than expanding PATH service. New York Waterways won the Port Authority bid for rights to operate ferry line between Hoboken and the World Financial Center (Regional Plan Association, 2006).

The period between the 1980s and 2001 saw a high turnover of ferry lines and operators. During this period, a total of 47 private ferry services started up, however, by September 2001, only 20 of these services remained in operation (Regional Plan Association, 2006).

Ferry service in New York City was further revitalized immediately after the events of September 11, 2001. The temporary suspension of the Port Authority trans-Hudson (PATH) rail service connecting New Jersey to Lower Manhattan created a gap in the transit network (Vilian, 2012). The flexibility and lack of infrastructure required in implementing ferry service made it ideal for filling this need (Weisbrod, 2003). As a result, the revitalization of ferry service in New York City was born out of disaster response. This similarly occurred in the case of the Rockaway ferry service, which ran from 2012 to 2014 and was operated by Seastreak. This service was established as a response to Superstorm Sandy and the temporary suspension of A-line subway services to the Rockaways (EDC, 2012). Though ferry ridership decreased by roughly 30% after the reopening of PATH service to Lower Manhattan post 9-11, the establishment of the ferry line sparked a greater influx of privatized ferry services in New York City (Vilian, 2012).
CURRENT FERRY SYSTEMS
Currently, the East River Ferry operates one of the largest and most heavily used ferry services within the bounds of New York City. As of 2013, the East River Ferry carries over 3,250 average daily riders on weekdays and has served over 1.2 million total riders. The East River Ferry was born out of larger New York City initiatives meant to induce the revitalization of the New York City waterfront. Both the New York City Economic Development Corporation (NYC EDC) and the Waterfront Vision and Enhancement Strategy (WAVES), a multi-agency program established in 2011, identified the expansion of ferry service as a component of this agenda.

As part of this initiative, the NYC EDC released an RFP for a 3-year pilot ferry line along the East River. New York Waterway won the bid for the 3-year pilot program, and received a 9.3 million subsidy for duration of the program, or 3.1 million per year. (EDC: Comprehensive Citywide Ferry Study, 2011). In 2013, the contract was extended for an additional 5 years through 2019. New York Waterway will continue to receive 3.1 million per year for the remainder of the contract. The subsidy is allocated to offsetting the operating costs of the ferry service. (NYC EDC: Citywide Ferry Study, 2013).

The East River Ferry offers year-round daily service. The service includes seven stops that operate all year and one stop that operates seasonally. These stops include: East 34th Street and Wall Street/Pier 11 in Manhattan; Hunters Point South/Long Island City in Queens; and India Street/Greenpoint, North 6th Street/North Williamsburg, Schaefer Landing/South Williamsburg, and Brooklyn Bridge Park/Dumbo in Brooklyn. In the summer, the route also includes a stop at Governors Island. The two stops in Manhattan are the terminal stops for the ferry route. Headway for the ferryboats is 20 to 30 minutes during peak commuting hours and 30 minutes to one hour during off peak hours on weekdays. During weekends, the boats run every 45 minutes to one hour. Service decreases during winter months, when ridership is low, and increases during the peak ridership seasons in the fall, summer, and spring (East River Ferry, 2014).

Two different vessels are used by the East River Ferry. On weekdays 3 medium catamarans that hold 149 passengers are used. On weekends, the East River Ferry runs 2 large catamarans that hold 399 passengers (NYC EDC: Citywide Ferry Study, 2013; McGeehan, 2012). In 2015, while maintenance was being done on the East River Ferry fleet, New York Water Taxi took over.
operations of the line during off-peak hours and throughout the weekends (East River Ferry, 2015).

The ferry line also offers a complementary shuttle bus for passengers who purchased a ferry ticket, connecting passengers from the East 34th Street stop to Midtown Manhattan (NYC EDC: Citywide Ferry Study, 2013). The buses operate during morning and evening peak commute hours, from 6:49 AM - 9:49 AM and 4:39 PM - 7:09 PM, Monday through Friday. The East River Ferry shuttle buses utilize existing MTA NYCT bus stops for their bus route, however, they do not connect to other modes of public transit (East River Ferry: Midtown Shuttle Bus, 2014).

Although fares on the East River Ferry are noticeably higher than those on an MTA NYCT subway or bus, they are relatively low compared to other ferry routes in New York City. A single ride is $4 on weekdays and $6 on weekends. All day passes are available for $16 on weekdays and $18 on weekends; monthly packages are available for $160. The East River Ferry also allows bicycles aboard the ferryboats for an additional surcharge (East River Ferry, 2015).

Ridership on the East River ferry has far exceeded original projections by the NYC EDC. Annual ridership in 2013 was 1.2 million versus the initial annual ridership estimates of 400,000. The line has an average daily ridership of 3,250. Daily weekday ridership steadily rose from 2011 to 2013, with an annual growth of 120% from 2011 to 2012 (NYC EDC: Citywide Ferry Study, 2013).

In July 2012, the NYC EDC conducted a summer ridership survey to assess ridership satisfaction on the East River ferry. The survey found that 85% of riders are New York City residents and 66% use the ferry services for commuting to work. Weekday ridership on the line has remained relatively stable throughout the year; however, weekend ridership fluctuated dramatically based on the season, rising significantly during the summer months (NYC EDC, 2012).

Current farebox revenue covers 64% of all operating costs. Operating subsidies offered by the NYC EDC are relatively low per passenger. East River Ferry subsidies total $2.22 per passenger. This is on par with the NYCT local bus subsidies of $2.20 per passenger and significantly lower than that of the Staten Island Ferry, which requires a subsidy of $4.86 per passenger. New York Waterway is responsible for the remaining operating costs and capital costs for the ferryboats (NYC EDC: Citywide Ferry Study, 2013). Aside from the Greenpoint ferry landing, which is owned by the private real estate firm RedSky Capital, the ferry landings used by the East River Ferry are owned and maintained by the NYC EDC (Anuta, 2014).
NY WATERWAY HUDSON RIVER LINES

In addition to the East River Ferry, NY Waterway also operates several Hudson River Line ferry routes connecting New York City to New Jersey, as well selected locations in Hudson Valley, NY. This study will focus on their services in the New York City region and connections to the New Jersey. NY Waterway operates four distinct lines between New York City and New Jersey; these include the Manhattan Midtown line, the Manhattan Pier 11 line, the Manhattan World Financial Center line, and the New Jersey Paulus Hook line (NY Waterway, 2015).


Fare prices range from $6 to $21.50 for a single ride depending on the length of the trip. Discounts for seniors as well and multi-ride packages for a discounted price are also available. Packages include a 10-trip bundle, a 40-trip bundle, a 7 day pass, a 30 day pass, and a monthly pass. There is an option to bring a bike aboard the ferry for an additional bike surcharge, ranging from $1 to $3 or to purchase a discounted monthly and bike pass (NY Waterway, 2015). All NY Waterway lines are completely privately funded and do not receive public subsidy. Frequency of service also ranges depending on the line. As of 2010, average daily ridership for all NY Waterway Hudson River lines was 11,276 (Sustaining Ferry Service in New York, 2011).
NY WATER TAXI

Similar to the East River Ferry, New York Water Taxi operates solely within the limits of New York City. The company, which also hosts several site seeing boat tours, operates two distinct commuter ferry lines, one between the IKEA store in Red Hook, Brooklyn, Van Brunt Street in Red Hook, and Pier 11 in Manhattan; the other between Pier 84 at West 44th Street and the World Financial Center, both in Manhattan.

The IKEA ferry lines operates on weekdays every 45 minutes from Manhattan between the hours of 2 pm to 7:15 pm. Weekday fare prices are $5 one-way, but those who make a purchase of $10 or more at IKEA can redeem the price of their ticket as credit on their IKEA purchase. Weekend service is free and runs every 50 minutes from Manhattan between the hours of 11:30 am to 8:40 pm (New York Water Taxi, 2015). New York Water Taxi receives operating subsidies from the NYC EDC. As of 2010, average daily ridership for all New York Water Taxi lines was 372 passengers (Sustaining Ferry Service in New York, 2011).

The West Side line discontinued service in the fall of 2014 due to cold weather conditions. According to a New York Water representative, the service is expected to resume (Tinsley, 2015).

LIBERTY LANDING

Liberty Landing Ferry, owned by the Hornblower Company, operates a single commuter ferry route connecting the Liberty Landing Marina and Warren Street in New Jersey to the World Financial Center in Manhattan. The service operates between 6 AM to 9 PM on weekdays, and 9 AM to 8 PM on weekends with a 30-minute headway. As of 2010, average daily ridership for the Liberty Landing Ferry was 192 passengers (Sustaining Ferry Service in New York, 2011).
Seastreak operates two ferry lines in the New York City Area. One line connects New York City to New Jersey and another operates solely between locations in New Jersey (Seastreak, 2015). From the fall of 2012 through October 2014, Seastreak also operated a Rockaway BART line, connecting Manhattan to the Brooklyn Army Terminal and the Rockaways, in Queens. This service was initiated after damage from Sandy forced the shutdown of the MTA NYCT A train to the Rockaways. The service was terminated due to the high subsidies required to sustain the service (Flegenheimer, 2015).

In addition to its New York operations, Seastreak operates a seasonal ferry service (April through October) between New Bedford, Massachusetts and the ports of Oak Bluffs and Vineyard Haven on Martha’s Vineyard. The Martha’s Vineyard division operates daily service utilizing two high-speed catamaran ferries with capacity of up to 149 passengers (Seastreak, 2015).

Seastreak operates a fleet of five vessels; four with capacities of up to 505 passengers and one with capacity of up to 149 passengers. As of 2010, average daily ridership for all Seastreak lines was 2,401 (Sustaining Ferry Service in New York, 2011).

The Staten Island Ferry is the largest single ferry system in the United States, ferrying 70,000 passengers daily between Whitehall Terminal in Lower Manhattan and St. George Terminal on the northern shore of Staten Island (NYC EDC: Citywide Ferry Study, 2013; The Staten Island Ferry, 2015). The ferry line is currently the only fully public ferry service in the New York City area. It was first established in 1817 by the Richmond Turnpike Company, changing ownership several times before the rights of the ferry service were transferred to the City of New York in 1905 (Adams, 1996). It is currently operated by the New York City Department of Transportation (NYC DOT, 2015).

The Staten Island Ferry is the only form of public transportation connecting Staten Island to the rest of New York City. The only other method of transportation to and from the Island is by vehicular bridges to Brooklyn and New Jersey. As such, the Staten Island Ferry has very high ridership, particularly when compared to other ferry service in New York City, and is heavily relied upon by Staten Island residents. As of 2013, average daily ridership of the Staten Island Ferry totaled 70,000 (NYC EDC: Citywide Ferry Study, 2013).
The Staten Island Ferry operates 24 hours a day, all year long. Headway ranges from 15 minutes to 1 hour, with more frequent service during peak commuting hours. The ferry service has a five-boat fleet of various classes that range in capacity from 1,107 to 5,200 passengers (NYC DOT, 2015).

From 1905 to 1975, fares for the Staten Island Ferry were $0.05; a fare increase to $0.25 took place in 1975. In 1990, the fare doubled to $0.50 (Reed, 2008). The fare was abolished in 1997 as to not provide an additional tax on transportation to Staten Island, due to the lack of other public transit systems to the island (Sontag, 1997). The fare remains free on the Staten Island Ferry and the service is fully subsidized by the City at $4.86 per passenger (NYC EDC: Citywide Ferry Study, 2013).
On February 3rd, 2015, Mayor Bill de Blasio announced an ambitious plan to significantly expand ferry service in New York City. The expansion plan, much of which is based on a 2013 route analysis study conducted by the NYC EDC, is set to begin implementation in 2017 and seeks to create a five-borough ferry system in New York City. The plan consists of five planned routes, three of which will be implemented in 2017, with the remaining two set to begin in 2018. An additional proposed route to Coney Island Creek is also under consideration. The expansion plan also seeks to widen ridership by making ferry service more affordable; all of the new lines will charge fares that are on par with NYCT local bus and subway fare, which is currently $2.75. Although little information has been released thus far on the expansion plan, the majority of planned routes were evaluated by the NYC EDC in their 2013 Citywide Ferry Study. This study offers valuable information on the projected costs and performances of the proposed lines. An RFP was announced on March 30th 2015 by the NYC EDC who are seeking private ferry operators to operate the prosed ferry lines.

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Table 2: Summary of Ferry Expansion Plan
The first three routes to be implemented in 2017 are the Rockaway line, South Brooklyn line, and Astoria line. The Rockaway line is based on the former Rockaway ferry service that was active from November 2012 through October 2014; the expansion plan seeks to reinstate this same service, connecting the Rockaway Peninsula in Queens to the Brooklyn Army Terminal and Pier 11 on Wall Street in Manhattan (Signore, 2015).

The original Rockaway service in 2012 was operated by Seastreak in partnership with the NYC EDC. It was implemented to fill a service gap caused by damage to the A line stations in the Rockaways after Superstorm Sandy. The line was geared towards commuters, running hourly from the Rockaways between 6am to 10am and hourly from Manhattan from 3pm to 8pm (NYC EDC: New Rockaway Ferry Service, 2012). The route, which was originally intended to operate for eight weeks, was extended through the following year, and then extended once again through October 2014 due to its significant popularity with Rockaway residents (Nessen, 2014).

Despite its popularity with local Rockaway residents, the line received heavy subsidies from the NYC EDC in order to remain operational. Fares for the service were $3.50 one way; however, according to the EDC, subsidies required to sustain the service totaled $30 per passenger (Nessen, 2014). This is particularly high when compared to public subsidies of other ferry services; the Staten Island ferry, which does not charge any fares, is subsidized by $4.86 per passenger, and the East River Ferry currently receives a subsidy of roughly $2.22 per passenger (NYC EDC: Citywide Ferry Study, 2013).

According to the EDC, the original service was terminated because it was financially unsustainable (Flegenheimer, 2015). In the 2013 route evaluation study conducted by the NYC EDC, ferry service for this route would require three vessels for 40 minute headways and 2 vessels for 60 minute headways. Daily commuter potential for the line was estimated at 3,111 passengers, with a capture rate of 31% at a fare of $2.50. Although operating costs have proven to be substantial for this service, implementing this line would require minimal capital costs as no additional ferry landings would need to be built (NYC EDC: Citywide Ferry Study, 2013).
The South Brooklyn line is also set to begin service in 2017. This line would include six stops in total, connecting Pier 11 in Manhattan to Fulton Ferry Landing in DUMBO, Atlantic Avenue, Red Hook, Brooklyn Army Terminal, and Bay Ridge in Brooklyn (Signore, 2015).

According to the NYC EDC, estimated cost for one way service for a portion of the line (not including stops at the Brooklyn Army Terminal and DUMBO) would run at $247 and would take 30 minutes from start to end. Pier 11, Fulton Ferry Landing, Pier 6 at Atlantic Avenue, Van Brunt Street in Red Hook, and Brooklyn Army Terminal are all existing ferry landings. This line would only require the construction of a terminal at Bay Ridge. Cost of construction for the landing, including all upland infrastructure, is estimated at $5.47 million. The route would require 2 vessels for 30 minute headways and 3 vessels for 20 minute headways. At a fare of $2.75, the NYC EDC estimates daily commuter ridership to be at 6,717 with a capture rate of 14% (NYC EDC: Citywide Ferry Study, 2013).

The immediate surroundings of ferry terminals are important in projecting demand and usage of a ferry landing. Within a ½ mile radius of terminals in Dumbo, Atlantic Ave, and Bay Ridge, there are high proportions of residential uses, indicating a large potential base of ferry riders. Although Red Hook and Brooklyn Army Terminal have higher proportions of industrial uses, both are growing areas in terms of residential uses. All terminals, aside from Pier 11 and Dumbo, do not have any subway stations within a ½ mile radius of the ferry landing. This suggests a need for additional transportation options in these waterfront locations.
The Astoria route is the third line that is planned for 2017. This line would connect Astoria in Queens to Roosevelt Island South, Long Island City North, E 34th Street, and Pier 11 (Signore, 2015). Planned developments currently underway in Astoria and Long Island City North are estimated to create high demand for ferry service to these corridors. Additionally, Roosevelt Island lacks sufficient existing transportation options; it is currently served by a single stop on the F subway line and a tram to E 59th Street in Manhattan. Demand for transportation options to the Island are estimated to increase due to the development of a Connell University Campus.

Two vessels would be required to operate at 41 minute headways and four vessels would be needed for 20 minute headways. The NYC EDC estimates that the line would have a 16% capture rate at a fare of $2.75, with an average daily commuter ridership of 30,065. New ferry landings would need to be built at Astoria, Roosevelt Island, and Long Island City North. The estimated costs, including all upland infrastructure, would total $7.2 million, $7.2 million, and $5.6 million respectively. At $5 fares, the NYC EDC estimates that the line would require $2.7 million in annual operational subsidies per year (NYC EDC: Citywide Ferry Study, 2013). Actual subsidy requirements for the line will likely be significantly higher due to the proposed reduced fare.
Two additional routes are planned to begin service in 2018: the Soundview line, and the Lower East Side line. The Soundview line will connect Soundview in the Bronx to the Upper East Side in Manhattan, stopping at E 90th and E 62nd Streets, and then continuing on the Pier 11 at Wall Street (Signore, 2015). The neighborhoods surrounding the terminals of E 90th St, E 62nd St, and Soundview are all heavily residential. This indicates a potential to capture high ridership levels at these locations. They also lack adequate public transit options, particularly a lack of access to the subway. No subway line stops within the vicinity of Soundview, and E 90th St and E 62nd St only have access to subway lines over half a mile inland in Manhattan.

The EDC projects that ferry connection to Soundview will offer substantial time savings by 50 minutes to an hour when compared to commuting by bus or subway. While E 90th Street includes an existing ferry landing, landings would be required to be built at Soundview and E 62nd Street. Capital costs for the new landings are projected to total $9.3 million and $7.2 million respectively. At a fare of $2.75, the NYC EDC projects daily commuter ridership to total 14,122 passengers, with a capture rate of 13% (NYC EDC: Citywide Ferry Study, 2013).
The Lower East Side line, also planned for 2018 service, will connect Long Island City North in Queens with E 34th Street, E 23rd Street, Grand Street, and Pier 11 in Manhattan (Signore, 2015). Though both the neighborhoods of the E 23rd Street and Grand Street terminals are heavily residential or mixed-use, the lower east side in particular (Grant Street) is especially residential. Much of the neighborhood includes large-scale public housing projects; ferry service to this destination can benefit these residents as subway access to this area is lacking.

The line would require the construction of two new terminals specific to the Lower East Side line: E 23rd Street and Grand Street. The E 34th Street and Pier 11 landings are already existing terminals, and the Long Island City North landing is planned for the Astoria ferry line, which will begin service in 2017, prior to the Lower East Side line. The projected costs for the E 23rd Street terminal is $6.1 million and $5.8 million for the Grand Street terminal. At a fare of $2.75, the NYC EDC projects a capture rate of 12% with a daily commuter ridership of 20,326 passengers (NYC EDC: Citywide Ferry Study, 2013).
An additional route is also proposed for Coney Island, however this line remains under evaluation and has yet to be confirmed. The proposed route would connect Coney Island Creek in Brooklyn to Stapleton in Staten Island and Pier 11 in Manhattan (Signore, 2015).

Stapleton has potential to capture high ridership due to several new projects underway in the neighborhood; in particular, the NYD EDC Stapleton waterfront redevelopment plan, a planned mixed-use development on a 35-acre decommissioned U.S. Naval Base, will likely benefit from additional accessibility by ferry transport. Stapleton, like much of Staten Island, lacks adequate transit access, with the Staten Island Ferry being the only public transit connection to the other boroughs of New York City. An additional ferry route to Staten Island can broaden the reach of travel to and from the borough. Additionally, Coney Island Creek, a heavily residential neighborhood, also lacks sufficient subway and transit access.

The route was not evaluated in the 2013 NYC EDC Citywide Ferry Study, thus no information is available on projected subsidies and capital costs associated with the ferry line.
One of the greatest advantages that ferry service can provide is redundancy for the New York City transit system. While other forms of transit, such as buses, subways, and rail, are limited by fixed infrastructure routes, ferries are not bound by fixed-route service. As such, their routes are flexible and can be tailored to provide service on a case by case basis. This flexibility is particularly vital in the cases of disaster evacuation and post-disaster recovery (MW A, 2013).

In disaster evacuation situations, existing transit infrastructure can often be strained. Redundant transportation options are essential to speedy evacuation planning as to limit the burden on a single mode of transit. Ferries serve as a transit redundancy measure in New York City and their route flexibility is particularly vital in evacuation planning. In recent years, ferries has been essential in last minute evacuation efforts (MW A, 2013).

During the events of September 11, 2001, a massive and unplanned effort to move people off of the island of Manhattan, particularly within and around the area of lower Manhattan, utilized ferries as a major resource for evacuation. Following the destruction of the first tower, the Coast Guard made a call out to all boats in the New York City vicinity to assist in evacuation efforts. With several modes of land-based transit temporarily suspended in lower Manhattan following the attack, evacuation assistance via boat was vital in moving people out of Lower Manhattan (DuLong, 2011). Roughly 17% of all people evacuating the area used ferries as their transportation mode for evacuation. This was the second most heavily utilized form of public transportation for evacuation, closely following light rail services (Zimmerman and Sherman, 2010). Several private ferry companies contributed their resources in assisting this effort. New York Waterway used 22 of their ferry boats to
Ferry roughly 160,000 people to the surrounding areas of New Jersey, Brooklyn, and Queens. Their boats also served as ambulances to transport injured firefighters and relief personnel after the attack. Several other private ferry and cruise lines also contributed to the evacuation effort, including Seastreak and the Circle Line (DuLong, 2011).

Ferries have also been particularly useful in filling transportation gaps in post-disaster situations. Following the September 11 attacks, subway, rail, and bus service in Lower Manhattan was severely affected. 1,800 feet of subway tunnel infrastructure for the 1 and 9 lines, as well as key infrastructure for the N, R lines, were damaged (McCall, 2001). Directly following the attack, several 1, 9, N, R, A, C, and E train stations were temporarily closed for roughly a week (Kennedy, 2002). Some bus lines were also suspended during this time due to road closures as a result of debris (MWA, 2013). Ferry service helped fill this temporary gap in transit; although the NY Waterway had to temporarily relocate ferry service departing from the World Financial Center to Pier 11 along Wall Street, ferry service was relatively unaffected.

The major resource offered by ferry transit after 9-11 was filling the transportation gap created by the closure of the World Trade Center PATH train station. Unlike the temporary closure and quick recovery of the subway and bus services, the PATH train station took two years to be rebuilt and reinstate full service. NY Waterway’s ferry service connecting New Jersey to Manhattan helped to fill this gap; throughout the two year period of suspended PATH train service, average daily ridership aboard trans-Hudson ferries nearly doubled (Weisbrod, 2003; MWA, 2013).

Following the damage of Superstorm Sandy in October, 2012, ferries were once again utilized to fill post-disaster gaps in the transportation system. Staten Island was particularly hard hit by the storm; in order to help ease transports from Staten Island, where damage to roads and personal vehicles were extensive, temporary ferry service was established connecting Great Kills, Staten Island to Pier 11 and E 34th Street in Manhattan. The service was active for eight weeks following the storm and was operated by New York Water Taxi in partnership with the New York City Department of Transportation (NYC DOT, 2012).

Similarly, temporary ferry service following Sandy was also implemented in the Rockaways in Queens, another region that was severely impacted by the storm. The ferry service was implemented to fill a gap caused by service suspension to the A train station in the Rockaways (NYC EDC: New Rockaway Ferry Service, 2012). Subway service to the station was not reinstated until May 2013, a total of seven months after the events of Superstorm Sandy (MTA, 2012). The Rockaway ferry service was provided by Seastreak, in partnership with the NYC EDC, between the Rockaways, Pier 11, and E 34th Street (The major resource offered by ferry transport, New Rockaway Ferry Service, 2012). Though intended as a temporary solution, the popularity of the Rockaway ferry resulted in the service being extended first through January 2013, and finally through October 2014, when it was eventually terminated. The route was also later altered to include connection to the Brooklyn Army Terminal (Nessen, 2014).
Ferry service has assisted in other disaster and emergency situations. On January 15, 2009, when US Airways flight 1529 crashed in the Hudson River, NY Waterways deployed three ferries to assist in the rescue effort, in conjunction with assistance from police, fire, and Coast Guard vessels (MW A, 2013; Rockoff and Holmes, 2009). One of the NY Waterway ferries was the first rescue boat on the scene, arriving within minutes of the crash (MSNBC, 2009). In cases such as these, the flexibility of ferry service routing allowed for quick response to emergency situations, as well as the provision of public transportation options to areas that required additional transit service following a disaster.

There are, however, some issues when private ferry companies, which make up the majority of the ferry network in New York City, are called upon to assist in an emergency response capacity. Private ferries operate at a financial loss when they respond to unplanned emergency situations. Such was the case with the September 11 evacuations (MW A, 2013). In San Francisco, the Water Emergency Transportation Authority (WETA) oversees both ferry transportation as well as some aspects of waterborne emergency response. The agency seeks retroactive subsidies from FEMA or the State of California to help offset losses for their emergency response services (San Francisco Bay Area WETA, 2009).

Capital costs associated with implementing a new ferry line include the cost of building a ferry landing and the cost of procuring ferry vessels. Ferry terminal landings typically run between $4 million to $7 million in New York City, however costs may be higher if the site requires additional accessibility measures, such as a pedestrian bridge to connect to the terminal. This estimate is for a two-ship dock and includes the cost of constructing the shelter or terminal, benches, bike racks, and ticket machines. The typical vessels utilized for ferry transport in New York City are medium catamarans. New medium catamarans can cost between $3.5 million to $5 million, however, only two to three vessels are required for a full functioning ferry line, depending on service frequency (NYC EDC: Citywide Ferry Study, 2013).

These capital costs are relatively low when compared to other large scale transportation projects in New York City. The first phase of the Second Avenue Subway, which when complete will connect 96th Street and Second Avenue to 63rd Street and Lexington Ave, with three new stations built, will cost roughly 4.5 billion in capital costs to complete (CBS, 2014). As shown through this case, building new underground infrastructure is costly; ferries can provide an alternative solution for fast and express transit that is not susceptible to traffic patterns and delays.

Figure 46: NY Waterway ferries assist in US Airways flight 1529 rescue effort
Figure 47: E 34th ferry terminal
This study examines the ridership preferences of East River Ferry users. The East River Ferry was chosen as a model for this study due to its subsidy by the EDC, its multi-nodal nature, and its service frequency that encourages commuter ridership. As proposed ferry expansion in New York City seeks to replicate this model, it is imperative to understand how users utilize this service in order to improve ferry service in the future.

In order to evaluate East River Ferry ridership preferences, I administered a survey aboard the East River Ferry line. The purpose of the survey was to understand why passengers choose this mode of transit, how often they ride ferries, their origin and destination locations, and basic demographic information. The survey was conducted at various times throughout the week in order to understand ridership tendencies of both regular and occasional users.

The survey was conducted from January 14, 2015 through February 18, 2015. A total of 61 respondents completed the survey. Of the 61 survey responses, 31 were administered over the weekend, between the hours of 2pm to 5pm; and 30 were administered on a weekday, between the hours of 1pm to 7pm. The times were chosen in order to balance responses of commuters and occasional users. All survey respondents completed the survey while aboard the ferry and returned the completed form to the respondent before departing the ferry. Only adults ages 18 and over were surveyed; no other specific exclusions applied.

All survey data was de-identified. Respondents were not be asked their name or any identifiable information during the survey process and instead were provided an identification number. I stored all hard copies (paper form) of completed surveys in a locked file drawer in my home. I was the only one with access to the locked drawer. I transcribed the survey data onto an electronic spreadsheet that was stored on my computer hard drive. Privacy for all survey respondents was maintained through the confidentiality procedures of the study outlined above.
FERRY USER DEMOGRAPHICS

The majority of surveyed ferry users live in New York City. Of the 61 survey respondents, 57 currently reside in New York City; one is from New Jersey; one from Long Island, New York; one from Colorado; and two from outside the United States. Of the survey respondents who currently reside in New York City, 55% are from Brooklyn, 34% from Manhattan, 9% from Queens, and 2% from Staten Island. These results are in line with the service route of the East River Ferry, which consists of four stops within Brooklyn, two within Manhattan, and one within Queens.

The remaining survey demographic data indicates several other cohesive characteristics.
that define an average ferry user. Most riders identified themselves as Caucasian and were younger in age, with most being between 25 to 44 years old. 46% were between the ages of 25 to 34, and 26% between the ages of 35 to 44. Gender was more evenly split, with 56% of survey respondents being male, and 44% female.

Personal annual incomes of the survey respondents varied greatly. Of those who listed their personal annual income, roughly 17% identified their income as between $40,000 to $69,000, and roughly 17% listed a personal annual income from $100,000 to $129,000. Roughly 15% of respondents listed their personal annual income, roughly $70,000 to $99,000. Roughly 17% listed their personal annual income, roughly $100,000 to $129,000, and roughly 17% listed their personal annual income between $130,000 and $159,000. Another 17% identified their income as between $160,000 and $189,000. Roughly 10% of respondents listed their personal annual income, roughly $190,000 to $219,000. Roughly 5% of respondents listed their personal annual income, roughly $220,000 to $249,000. Roughly 2% of respondents listed their personal annual income, roughly $250,000 to $300,000. Roughly 6% of respondents listed their income over $300,000.

Table 5: Annual personal income of survey respondents, n = 53

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<th>Income</th>
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<td>17.0%</td>
</tr>
<tr>
<td>over $300,000</td>
<td>6</td>
<td>11.3%</td>
</tr>
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</table>

FERRY TERMINAL USAGE // ORIGIN LOCATION

The survey also asked respondents to identify at which ferry terminals they boarded the ferry and planned to exit the ferry. This data is helpful for understanding how riders use the ferry service and which ferry terminals are most heavily used by riders. Riders were also asked to identify the neighborhood they were coming from before boarding the ferry, totaling 36.1% of respondents, following closely by 32.8% coming from work, and 24.6% from home. 86% of riders who were coming from a social/ recreational activity were surveyed on a weekend afternoon from 3 to 5 pm. Similarly, most people who were coming from home did so on the weekend during the afternoon. However, the majority of riders coming from work entered the ferry during weekday commuting hours, from 5 to 7pm.

Of the riders who entered the ferry at the E. 34th Street terminal, 47.1% began their journey in Midtown East, 17.6% in both Murray Hill and Midtown, 11.8% in Flatiron, and 5.9% in Gramercy. All of these are neighborhoods directly surrounding the location of the terminal. The majority of respondents who entered at this location listed their origin location as work, while 18% identified as coming from home, and 12% as coming from a social/ recreational activity.

7% of all survey respondents entered the ferry at the Hunters Point South terminal in Long Island City. Of these, all began their journey in Long Island City, with 75% coming from home and 25% coming from a social/ recreational activity. Additionally, another 7% of those surveyed listed their origin terminal as coming from a social/ recreational activity before boarding the ferry, totaling 36.1% of respondents, following closely by 32.8% coming from work, and 24.6% from home. 86% of riders who were coming from a social/ recreational activity were surveyed on a weekend afternoon from 3 to 5 pm. Similarly, most people who were coming from home did so on the weekend during the afternoon. However, the majority of riders coming from work entered the ferry during weekday commuting hours, from 5 to 7pm.
India Street in Greenpoint, Brooklyn, all of which began their journey in Greenpoint, with 50% coming from a social/ recreational activity, 25% coming from work, and another 25% from home.

Survey respondents who began their journey at the North 6th Street terminal in North Williamsburg all listed Williamsburg as their origin neighborhood. 46% of these riders identified as coming from a social/ recreational activity, while 40% listed their origin as coming from a social/ recreational activity.

Only one respondent entered the ferry at the Schaeffer Landing terminal in South Williamsburg, Brooklyn. This respondent listed Williamsburg as their origin location and were coming from a social/ recreational activity.

The majority of surveyed riders who entered the ferry at the Pier 11 terminal began their trip in the neighborhood in which the terminal is located, with 94% coming from the financial district, and only 6% from the nearby Chinatown. 47% of these respondents were coming from work, 46% from a social/ recreational activity, and 7% from home.

Of all the survey respondents, 8% listed Brooklyn Bridge Park in DUMBO, Brooklyn as their origin terminal. Of these, 40% began their trip in DUMBO, 20% in Brooklyn Heights, 20% in Midtown Manhattan, and 20% in the Financial District in Manhattan. 40% were coming from work, another 40% from home, and 20% from a social/ recreational activity.

The majority of surveyed riders who entered the ferry at the Schaeffer Landing terminal in South Williamsburg began their trip in the neighborhood, with 94% coming from the financial district, and only 6% from the nearby Chinatown. 47% of these respondents were coming from work, 46% from a social/ recreational activity, and 7% from home.

FERRY TERMINAL USAGE // EXIT LOCATIONS

The most common terminals in which surveyed riders entered the ferry were the North 6th Street terminal in North Williamsburg, Brooklyn, accounting for 27% of all respondents; the Brooklyn Bridge Park terminal in DUMBO, Brooklyn with 25% of all respondents; and E. 34th Street in Midtown Manhattan, accounting for 22% of surveyed riders. Most riders were either going to work or home after leaving the ferry, with 37.5% of all respondents making up the former, and 38.9% the latter. 40% were going to the neighborhood of Williamsburg, which accounted for all riders who exited from both the North 6th Street terminal in North Williamsburg and the Schaefer Landing terminal in South Williamsburg.

Of the surveyed riders who planned to exit the ferry at E. 34th Street, 33.3% were going to Midtown East, 25% to Midtown, 16.7% to Murray Hill, and 8.3% to Chelsea, Midtown West, and the Upper East Side respectively. The majority of these respondents were going to a social/ recreational activity, making up 31% of all riders exiting at E. 34th Street, and 23% were going home.

Only one respondent exited the ferry at the Hunters Point South terminal in Long Island City; this rider planned to end their journey at home in Long Island City. Likewise, only one surveyed rider planned to end their trip at India Point in Greenpoint, they too were heading home. Of those who exited the ferry at North Williamsburg, all listed their final destination in the neighborhood of Williamsburg, Brooklyn; 63% were going home and 31% to a social/ recreational activity. Those exiting at the Schaefer Landing terminal in South Williamsburg made up 12% of all surveyed riders. The majority of these riders, 84%, listed their final destination as Williamsburg, 42% were going home, 29% to a social/ recreational activity, and another 29% to work.

Survey respondents who exited at the DUMBO terminal listed their final destination in several
neighborhoods surrounding the Brooklyn terminal location; 58% were going to a location in DUMBO, 21% to Brooklyn Heights, and another 21% to Park Slope. The majority of these riders were going these locations for a social/ recreational activity, making up 73% of all respondents who listed DUMBO as their exit terminal. Those exiting at the Pier 11/ Wall Street terminal in Manhattan made up 10% of all surveyed riders, the majority of them listing the Financial District as their final destination. Of these, 50% were going home and 33% to work.

The most common mode of transportation to and from the ferry was walking. Over 82% of riders walked both to and from the ferry, while 12% walked only one way, and 7% used another mode of transit both ways. This highlights that being within close proximity of a ferry terminal is one of the major reasons for choosing to ride the ferry. Fewer than half of the passengers ride the ferry to and from work on a regular basis; the remaining surveyed passengers identified the subway as their primary mode for commuting. The majority of recreational users who did not use the ferry for commuting purposes were surveyed on the weekend.

**TRANSPORTATION PREFERENCES // BICYCLE TICKETS**

The East River Ferry allows users to bring bicycles aboard the ferry for an additional fee. The majority of surveyed riders did not purchase a bicycle ticket for their ferry ride, however, more did show an interest in purchasing one in the future. The survey asked respondents whether they purchased a bicycle ticket for their current ride, have ever purchased a bicycle ticket on the East River Ferry, or plan to purchase one in the future. Only one of the surveyed riders purchased a bicycle ticket for their current ride; however, 3.6% of respondents answered that they had purchased one in the past, and 32.2% acknowledged a desire to purchase a bicycle ticket in the future. The proportion of riders who purchased a bicycle ticket is likely low due to the weather conditions during the time the survey was administered, as it was conducted in the winter season. There is a likelihood that this number would rise in warmer weather conditions.

**TRANSPORTATION PREFERENCES // PROXIMITY**

All survey respondents were asked which mode of transportation they used or planned to use to get to and from the ferry terminal. An overwhelming majority of surveyed passengers listed walking as their mode both ways, highlighting a proximity effect for riding the ferry. A total of 89.8% of riders walked from their starting location to the ferry; the average walking distance was identified...
use the ferry to travel to work, 68% were surveyed over the weekend. An overwhelming number of these passengers, 72%, identified the subway as their primary mode of transit to and from work.

<table>
<thead>
<tr>
<th>Type of Mode</th>
<th>To the Ferry</th>
<th>From the Ferry</th>
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<tr>
<td>Subway</td>
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<td>4</td>
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<tr>
<td>Other</td>
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<td>3</td>
</tr>
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</table>

as 6.3 blocks, however, distances ranged from 1 block to as most 20 blocks. The second most common mode of transportation to the ferry was the subway, making up 6.1% of respondents. Similarly, 85% of riders answered that they planned to walk from the ferry terminal to their final destination. The average walking distance listed was 6.6 blocks, with distances ranging from 1 to 25 blocks. 20% of those who listed walking as their transportation mode to the ferry walked 10 blocks or more to the ferry terminal; while 30% listed they would walk 10 blocks or more from the ferry to their final destination.

**TRANSPORT PREFERENCES // COMMUTING**

Many of the survey passenger’s acknowledged using the East River Ferry as their primary mode for commuting. This made up 39% of all respondents, while 61% listed other modes of transportation to get to work. Of those who did not

<table>
<thead>
<tr>
<th>Type of Mode</th>
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<th>From the Ferry</th>
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<tbody>
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<tr>
<td>Other</td>
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</tr>
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**TRANSPORT PREFERENCES // FARE PRICES**

Fare prices can be considered an issue with ferry use as they tend to be higher than fare prices of the MTA subway and local bus services. The passenger survey asked riders how much they were willing to pay for a one way trip to or from work. The goal was to understand if price was a major deterrent for using the ferry service for commuting, or if prices could be raised and still attract ridership. The results were mixed; 34.6% of listed $4.00 as the maximum price they would be willing to pay, this is in line with the current weekday fare price of the East River Ferry; 23.1% listed $2.50 as the maximum price, which was the current fare price of the East River Ferry; 17.3% listed $5 as the maximum they would be willing to pay, this is in line with the local bus fare at the time of the survey; while 29.5% listed over $5 as the maximum they would be willing to pay for a single trip to or from work.

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</tr>
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</table>

**Transport Preferences // Ride Regularly**

This study is also interested in the specific transportation preferences of those who ride the East River Ferry regularly. For the survey, regular ridership was defined as riding the ferry one or more times per week. 44 out of the 61 surveyed riders identified as riding the ferry regularly; however 27.3% of those who identified as regular East River Ferry riders listed riding less than one time per week. These riders

<table>
<thead>
<tr>
<th>Ride Year Round</th>
<th># of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>19</td>
</tr>
<tr>
<td>No</td>
<td>42</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fare Prices</th>
<th># of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.25</td>
<td>1</td>
</tr>
<tr>
<td>$2.50</td>
<td>12</td>
</tr>
<tr>
<td>$3.00</td>
<td>6</td>
</tr>
<tr>
<td>$3.50</td>
<td>1</td>
</tr>
<tr>
<td>$4.00</td>
<td>18</td>
</tr>
<tr>
<td>$5.00</td>
<td>9</td>
</tr>
<tr>
<td>$6.00</td>
<td>2</td>
</tr>
<tr>
<td>over $6.00</td>
<td>3</td>
</tr>
</tbody>
</table>

**Figure 52: how many times per week ride the east river ferry, n = 44**

**Figure 53: how long have been riding the east river ferry, n = 44**
often ride the ferry every other week or once per month. As they self-identified as regular riders, their results were included in the analysis of regular users of the service.

The majority of regular East River Ferry riders use the ferry 1 to 3 times per week, making up 31.8% of this group; 15.9% use the service 4 to 6 times week, 13.6% 7 to 9 times per week, and 11.4% 10 or more times per week. The majority of regular riders have been using the service for 2 or more years, making up 29.5% of the group, followed by 27.3% who have been riding the East River Ferry for 1 to 2 years. Most ride the ferry year round, with only 18.6% being selective about the season in which they ride the ferry. However, this data may not be reflective of all ferry riders as this survey was conducted in the winter. A study by the EDC identified ridership to be the highest during the summer months and the lowest during the months of January and February (EDC: Citywide Ferry Study 2013: Preliminary Report, 2013).

TRANSPORT PREFERENCES // OTHER FERRIES

The survey results reveal that regular ridership of the East River Ferry does not translate into riding other ferry lines regularly. Only two passengers (4%) acknowledged riding other ferry lines regularly, and 46% rode another ferry line at least once in the past year. The most popular ferry line used by regular East River Ferry riders was the New York Water Taxi IKEA line, with 23.9% of the respondents riding this line in the past year. This was followed closely by the NY Waterway Hudson River Lines and the Staten Island Ferry with 19.6% and 17.4% of respondents respectively.

The survey also asked riders to rate their satisfaction with various aspects of the East River Ferry service. Overall, passengers were satisfied or very satisfied with most aspects of the ferry line. Reliability of service and frequency of service rated the most positively. A comfortable trip and the views were identified my most riders as the best aspects of the service, while infrequent service and the cost of the trip were the most commonly identified aspects that passengers did not like about ferry line.

The survey asked respondents to evaluate their satisfaction with the line in two different ways. First, users where asked to rate various aspects of the ferry service on a scale of 1 to 5, with 1 being very unsatisfied, 2 being unsatisfied, 3 being neutral, 4 being satisfied, and 5 being very satisfied. Riders were asked to rate their satisfaction with (1) the frequency of service, (2) reliability of service, (3) the locations of ferry terminal, (4) fare prices, (5) length of their ferry ride, and (6) the East River Ferry free shuttle bus.

Overall, user feedback was very positive regarding most of these services. 50% of respondents were either satisfied or very satisfied with the frequency of service; 83% were either satisfied or very satisfied with the reliability of service; 78% were either satisfied or very satisfied with the location of ferry terminal stops; 50% were either satisfied or very satisfied with the

SATISFACTION WITH THE EAST RIVER FERRY

<table>
<thead>
<tr>
<th>Aspect of Service</th>
<th>Very Unsatisfied</th>
<th>Unsatisfied</th>
<th>Neutral</th>
<th>Satisfied</th>
<th>Very Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of Service</td>
<td>4 7%</td>
<td>13 22%</td>
<td>12 21%</td>
<td>20 34%</td>
<td>9 16%</td>
</tr>
<tr>
<td>Reliability of Service</td>
<td>2 3%</td>
<td>1 2%</td>
<td>7 12%</td>
<td>26 45%</td>
<td>22 38%</td>
</tr>
<tr>
<td>Ferry Terminal Locations</td>
<td>1 2%</td>
<td>3 5%</td>
<td>9 16%</td>
<td>27 47%</td>
<td>11 19%</td>
</tr>
<tr>
<td>Price of the Trip</td>
<td>1 2%</td>
<td>12 21%</td>
<td>16 28%</td>
<td>9 16%</td>
<td>20 34%</td>
</tr>
<tr>
<td>Length of the Trip</td>
<td>0 0%</td>
<td>1 2%</td>
<td>5 9%</td>
<td>30 52%</td>
<td>22 38%</td>
</tr>
<tr>
<td>Shuttle Bus</td>
<td>1 2%</td>
<td>5 9%</td>
<td>23 40%</td>
<td>11 19%</td>
<td>12 21%</td>
</tr>
</tbody>
</table>
fare prices; and 90% were either satisfied or very satisfied with the length of their ferry ride. This indicates that the most favorable aspects of the ferry service for the surveyed riders was the length of their trip, the reliability of service, and the terminal locations. The majority of respondents marked a neutral view toward the free shuttle bus, likely because it only operates during commuting hours and from the E 34th street terminal, so many of the respondents did not utilize the service.

Additionally, surveyed riders were asked to identify which aspects of riding the East River Ferry they like best and which aspects they liked the least. Users were able to identify multiple answers for both of these questions. Riders identified a comfortable trip and the views as being the aspects they enjoyed most when riding the ferry. Half of the respondents also liked that the ferry line provided direct service to their destination. Fewer respondents listed the aspects they liked the least about the ferry service, many identifying that there was nothing that they disliked. 45% of respondents, however, listed infrequent service as the most negative aspect of their experience on the East River Ferry, followed by 32% that felt the price per trip is too expensive.
THE EXPANSION PLAN // FERRY TERMINAL HUBS

The ferry expansion plan offers a new strategy for ferry service in New York City through providing an interconnected ferry system along the East River. Building off of the existing East River Ferry line, it provides multi-nodal service with distinct ferry hubs. The multi-nodal service model has proven to be successful with the East River Ferry Line. Pier 11 is the most prominent hub, with all lines terminating at this terminal. E 34th Street, Long Island City North, and Fulton Street in DUMBO will also serve as ferry hubs/transfer stations, with 3 lines passing through E 34th Street and 2 lines connecting to each of the other two terminals.

This model will likely provide improved service for users who will be able to seamlessly transfer between ferry lines at these ferry hubs. Additionally, Pier 11 will allow passengers of these new lines to transfer to other privately operated ferry lines in the region, including the NY Waterway Pier 11 line, the New York Water Taxi IKEA line, and the Seastreak NY/NJ line. This will help intergrade some East River service with Hudson River service to New Jersey.

Having only one major hub, however, can be problematic. According to the results of the East River Ferry survey, Pier 11 was not the most heavily used terminal. E 34th Street, although integrated into three out of the seven NYCEDC lines, should be considered as a more prominent hub. This is especially the case with the Soundview line, which is currently planned to go from E 62nd St to Pier 11 without any intermediate stops.
EXPANSION PLAN // NORTH WILLIAMSBURG

The expanded ferry service, however, does not fully capitalize on some of the successes of the East River Ferry line. In the survey that I conducted for this study, the North Williamsburg terminal was one of the most frequented terminals by passengers. The expanded ferry lines offer no additional connections to this ferry landing. The North Williamsburg ferry landing, however, does have potential to serve as a popular transfer station or hub for ferry service. This should be considered by the NYC EDC when evaluating the new ferry service routes.

EXPANSION PLAN // ROCKAWAY SERVICE

The expanded service also includes the reinstatement of the Rockaway ferry line. This line was originally terminated due to its high costs and subsidy, which totaled $30 per passenger at a fare of $3.50. At a reduced fare, this subsidy will likely increase. Although no additional ferry landings would need to be built for this line, significantly reducing capital costs associated with this service, the substantial subsidy required to maintain service to the Rockaways makes this route unsustainable for long-term service.
The current ferry system is comprised of various private, semi-private, and public systems. With each system operated by distinct entities, ferry service in New York City is a compilation of several unique services, rather than one singular comprehensive system. This model is positive in that it allows private operators to provide service that public entities would otherwise not provide. This is particularly evident in the case of the heavily used NY Waterway Hudson River lines, which offer extensive connections between New York City and New Jersey, helping to ease congestion on other modes of transportation between the two regions.

This model, however, also creates several complications for passengers. Riders who wish to connect between lines provided by different ferry operators are required to pay both fares without any form of transfer options offered. This is a result of each service being provided by distinct operators that do not work in collaboration. Additionally, there is no complete centralized source of information on all of the ferry lines. Although the NYC DOT does provide some information on each ferry line, it is not comprehensive and does not include information on complete routes, fares, and schedules offered by each provider. Passengers who wish to use multiple ferry lines are required to consult each individual provider for this information.

Until operators of the expanded ferry service are announced by the NYC EDC, it is unknown how these disconnection between ferry services will play out on the new ferry lines, particularly if the services will be provided by different ferry operators. However, without an overarching entity providing some continuity to all of the ferry systems offered in the New York City region, it is likely that this issue will persist.

Based on the results of the East River Ferry survey, intermodal connectivity between the ferry and the other modes of public transit was identified as one of the line’s major weak points. The majority of riders walk to and from the ferry; average walking distance to and from the ferry was relatively short, between 6.3 to 6.6 blocks which indicates that riders tend to use the ferry if they are coming from or going to a location within close proximity of a ferry terminal. Only a small proportion of riders made connections to the ferry from other modes of public transit.

One of the main contributors to this lack of intermodal connectivity is likely the structure of the fare systems. The current fare for the East River ferry is $4 on weekdays, with no transfer rates offered between the ferry and other modes of public transit. Additionally, the form of payment also differs from the bus and subway, which uses metrocards, as opposed to the ticket system used aboard the ferry. These discrepancies are a result of the systems being offered by different operators.

Although the East River Ferry is operated by a private entity, it is subsidized and overseen by the NYC EDC. Additionally, the newly planned ferry lines, which will also be managed by the NYC EDC, will include fares that are on par with the current MTA NYCT fares. This places the line in a unique position, when compared to other privatized ferry lines, to maximize inter-agency participation in order to streamline service connections between the MTA NYCT and the NYC EDC’s ferry service.
There is currently no overarching entity managing all ferry service in the New York City region. With the expanded ferry service, the NYC EDC will manage several lines throughout the East River, however, there remains a lack of continuity with other privately operated ferry lines in the region. I recommend that a form of standardization be implemented for all of the ferry service in the New York City area in order to create the perception of a comprehensive and interconnected system.

Complete standardization would require a public entity to oversee all ferry service in the region and create some form of standardization of fares and transfers between systems. This would likely fall under the jurisdiction of either the Port Authority, which oversees the New York and New Jersey connections; the NYC EDC, which oversees the East River Ferry and the newly proposed ferry lines; or the NYC DOT, which operated the Staten Island Ferry and currently offers limited information on all ferry service in the region. Alternatively, a new entity can be formed to perform this function. The various distinct ferry operators would be required to cooperate and offer a standardized fare system. This would not require a uniform price, but would take the form of a uniform ticket system or e-ticket service. This would help facilitate transfers between the various lines.

A more feasible and easily implementable form of integration can be provided through the dissemination of all ferry information from single source. Again, a public entity, preferably the NYC DOT which currently offers limited information on all of the ferry lines, would be the ideal source. This would include all fare and schedule information for each line to be provided at a single source, and would ideally include route maps for each ferry line, highlighting points for transfers. This would require the entity to simply manage a website or webpage devoted to providing information on all of the ferry systems in the region. It would also require cooperation with each ferry operator to provide up-to-date information on their services to this central source, in addition to updating their own individual websites.

The current ferry system is not portrayed as a single system. Some form of standardization, whether it be more comprehensive through fare payment system, or simply through centralized information dissemination would go a long way in unifying the perception of the ferry systems. This will not only improve the passenger experience, but has the potential to increase ridership by easing
Currently, private ferry operators operate at a financial loss when they respond to ferry disaster situations. One of the greatest potential benefits of ferry service is the modes ability to be flexible and respond to unplanned events and demand. However, the lack of financial reimbursement in these situations can be a deterrent for ferry operators. I recommend that a system be put in place that allows ferry operators to seek retroactive reimbursement for their assistance in emergency situations.

In the San Francisco Bay Area, the Water Emergency Transportation Authority (WETA) is responsible for passenger ferry service as well as waterborne assistance in emergency transportation needs. They coordinate with FEMA and the state of California to receive retroactive payments for their emergency services (MW A, 2013). New York City can implement a similar system with a government agency overseeing and coordinating financial assistance to ferry lines that assist in emergency situations.

Analysis of the survey data and literature indicate a lack of integration between ferry lines and public transit. Improved integration can result in increased ridership by widening access to the ferry beyond the immediate walkable vicinity of ferry landings. This could help lessen the burden of operating subsidies provided by the NYC EDC.

Allowing for free transfers between MTA services and NYC EDC managed ferries (East River Ferry and new expanded ferry service) has several logistical issues associated with it, as both services are provided by different entities. With the newly proposed ferry lines to offer fares that are on par with the current MTA NYCT fares, fare integration between these ferry lines and MTA NYCT transit will become a more viable option. However, in order to provide fare integration a uniform fare payment system must be provided. The most feasible option for fare integration will occur once the MTA implements a smart card system. I also propose free transfers between the NYC EDC ferry lines and MTA. This can be possible if the NYC EDC managed fare payment for the ferry, as opposed to the current model used by the East River Ferry with NY Waterway managing fare revenues. It would also require cooperation between the MTA and the NYC EDC and would likely be at the expense of the ferry operator or the EDC.

Additionally, improved wayfinding between the ferry and other modes of transit can help improve integration between the systems. Currently, several bus lines run within one or two blocks of many of the ferry landings. Wayfinding signage highlighting potential transfers between the two modes can help widen access to the ferry. For example, currently the M34 bus stops directly outside of the E 34th Street ferry landings and the M15 stops one block away on First Avenue. Indicating this potential connection to user on a ferry route map will assist passengers in transferring between the two systems. It will also reduce the need for the East River Ferry shuttle bus; the shuttle bus utilizes existing bus stops and provided bus service for ferry passengers during commuting hours, connecting the E 34th Street landing to midtown Manhattan. This redundant service could be eliminated and replaced by transfers with MTA busses if proper integration
Ferry service has great historical significance in New York City. It served as the primary mode of transportation between the water-locked Manhattan and surrounding areas prior to the construction of bridges and tunnels in the late 19th century to mid-20th century. But the conditions that led to the rise of ferry services in the 19th century have changed; there is currently a multitude of public transportation options to travel between the boroughs of New York City and to New Jersey, with the exception of Staten Island. With the new ferry expansion plan to begin service in 2017, it is important that ferry service cater to new and expanding markets that lack other adequate public transportation options. Ferry ridership is shown to be heavily reliant upon proximity to the ferry landing, with most users walking to and from the ferry. This makes the location of new ferry landings one of the most important factors in determining the success of ferry lines. In order to reap the full benefits and ridership that could be obtained by ferry service, some form of standardization must be in place. Currently the ferry services of each individual operator are viewed as distinct; in order to flourish, the ferry system should be viewed as one large integrated system, with various hubs that connect services. The expansion plan already addresses some of these issues for NYC EDC managed ferry lines, however, this should be in conjunction with integration into the larger ferry and transportation network of New York City to help maximize ridership and make service sustainable for the future.
SOURCES


APPENDIX


You are being asked to participate in a survey research study regarding ferry service in New York City. The results of this study will help us better understand why ferry users choose to ride ferries and if ferry service should be expanded in the future. This survey is being conducted by Sharon Moskovits, a student at Columbia University. This survey is confidential. No one, including the researcher, will be able to associate your responses with your identity. Your participation is voluntary. You may choose not to take the survey, to stop responding at any time, or to decline any question that you do not wish to answer. This study involves no anticipated risks. You must be at least 18 years of age to participate in this study. Your completion of the survey serves as your voluntary agreement to participate in this research project and your certification that you are 18 or older. If at any time you have questions, concerns, or complaints regarding the research or your participation, you should contact the researcher, Sharon Moskovits, at sm3789@columbia.edu, or her academic advisor, David King, at dk2475@columbia.edu. If you have questions about your rights as a research participant, you should contact the Institutional Review Board (IRB) Administrator at (212) 851-7040.

1. What is your home zip code? ________________________

2. What is your age?
   - 18 – 24
   - 25 – 34
   - 35 – 44
   - 45 – 54
   - 55 - 65
   - Over 65

3. What is your gender?
   - Male
   - Female
   - Other

4. What is your approximate annual (personal) income?
   - Less than $40,000
   - $40,000 - $69,999
   - $70,000 - $99,999
   - $100,000 - $129,999
   - $130,000 - $159,999
   - $160,000 - $189,999
   - $190,000 - $219,999
   - $220,000 - $249,999
   - $250,000 - $299,999
   - $300,000 - $399,999
   - Over $300,000

5. How do you identify?
   - Caucasian (white)
   - African American
   - Hispanic
   - Other, please specify: _____________________
   - Other, please specify:

6. Where did you board this ferry?
   - East 34th Street/ Midtown
   - Hunters Point/ South Williamsburg
   - Hunters Point/ South/ Long Island City
   - Wall Street/ Pier 11
   - North 6th Street/ North Williamsburg
   - Wall Street/ Pier 11
   - Brooklyn Bridge Park/ DUMBO
   - Schaefer Landing/ South Williamsburg
   - South Street Seaport

7. Where were you coming from when you boarded this ferry?
   - Home
   - Work
   - Shopping
   - Social/Recreation
   - School
   - Other: _________________

8. What neighborhood were you coming from? (Please include the name of the neighborhood, such as Midtown East or Dumbo) ___________________________________________
9. How did you get to the ferry terminal? (Check all that apply)
   Walked, how many blocks? ______________
   Drove or rode in private vehicle
   Subway
   Bus
   Taxi or car service
   Other ride sharing service
   Bicycle
   Other (includes commuter rail, such as PATH, LIRR, Metro North, LIRR)
   Other, please specify: ____________________________

10. What type of ticket did you purchase for this trip?
    Single Ride
    All Day Pass
    Monthly
    30-Day Pass

11. Did you purchase a bicycle ticket or bicycle surcharge with your ticket?
    Yes
    No

12. Do you ever bring a bicycle with you on the ferry?
    Yes
    No

13. Do you plan on bringing a bicycle with you on the ferry in the future?
    Yes
    No

14. Please rate your experience with the East River Ferry:

15. At which stop will you be exiting the ferry?
    East 34th Street/ Midtown
    Hunters Point South/ Long Island City
    India Street/ Greenpoint
    North 6th Street/ North Williamsburg
    Schaefer Landing/ South Williamsburg
    Wall Street/ Pier 11

16. Where are you going after getting off this ferry?
   Home
   Work
   Social Recreation
   School
   Shopping
   Other:

17. What neighborhood are you going to after getting off this ferry? (Please include the name of the neighborhood, such as Midtown East or Dumbo)
   ___________________________________

18. How do you plan to reach your destination after getting off this ferry? (Check all that apply)
   Walk, how many blocks? ______________
   Drive or ride in private vehicle
   Subway
   Bus
   Taxi or car service
   Other ride sharing service
   Bicycle
   Other (includes commuter rail, such as PATH, LIRR, Metro North, LIRR)
   Other, please specify: ____________________________

19. What do you like best about the East River Ferry? (Check all that apply)
   Fast service to my destination
   On-time and on schedule
   More comfortable trip
   More productive trip
   Convenient ferry stops
   Frequency of service
   Ferry terminal locations
   Other:

20. What do you like least about the East River Ferry? (Check all that apply)
   Price per trip is too expensive
   Ferry service is too infrequent
   No free transfers with subway or bus
   Fast enough ferry stops
   Ferry stops are not convenient
   Ferry service is too infrequent
   On-time and on schedule
   Other:

21. Do you normally use the ferry to travel to work?
    Yes
    No

22. If you answered “No” to question 21, how do you normally travel to work? (Check all that apply)
    Drive/ personal vehicle
    Subway
    Bus
    Taxi or car service
    Other ride sharing service
    Bicycle
    Other (includes commuter rail, such as PATH, LIRR, Metro North, LIRR)
    Other, please specify: ____________________________

23. How much are you willing to pay for a one-way ride to or from work? (Write the maximum amount)
   (A one-way trip on the East River Ferry is $4 on weekdays and a ride on an MTA subway or city bus is $2.50)
   _________________________________________

24. On average, how many times per week do you ride the East River Ferry?
    Less than 1 month
    1 – 2 months
    3 – 6 months
    Over 2 years

25. How long have you been riding the East River Ferry since residing in your current location?
    Less than 1 month
    1 – 2 years
    1 – 6 months
    Over 2 years
    6 – 12 months

26. Do you ride the ferry all year round?
    Yes
    No

27. Which other ferry lines in the New York City region have you ridden in the past year?
    New York Waterway - Hudson River Line
    New York Water Taxi – Ikea/ Red Hook Ferry
    New York Water Taxi – Westside Commuter Ferry
    Liberty Landing Ferry
    Seastreak – New York/New Jersey Routes
    Seastreak – Rockaway Ferry Line
    Staten Island Ferry
    Other:
    __________________________________________

28. Do you ride any other ferry lines regularly?
    No
    Yes, which one? ____________________________________

Thank you for participating in this survey! Your feedback is greatly appreciated.

If you have any questions please contact:
Researcher | Sharon Moskovits | sm3789@columbia.edu
Academic Advisor | David King | dk2475@columbia.edu
Columbia University (Morningside) Institutional Review Board (IRB) | 212-851-7040

Please only answer the following questions if you ride ferries regularly (more than once per week)

24. How many times per week do you ride the East River Ferry?
    Less than 1 month
    1 – 2 months
    3 – 6 months
    Over 2 years

25. How many times per week do you ride the East River Ferry?
    Less than 1 month
    1 – 2 months
    3 – 6 months
    Over 2 years

26. Do you ride the ferry all year round?
    Yes
    No

27. Which other ferry lines in the New York City region have you ridden in the past year?
    New York Waterway - Hudson River Line
    New York Water Taxi – Ikea/ Red Hook Ferry
    New York Water Taxi – Westside Commuter Ferry
    Liberty Landing Ferry
    Seastreak – New York/New Jersey Routes
    Seastreak – Rockaway Ferry Line
    Staten Island Ferry
    Other:
    __________________________________________

28. Do you ride any other ferry lines regularly?
    No
    Yes, which one? ____________________________________