

5.9 TRANSPORTATION AND PEDESTRIAN CIRCULATION

5.9.1 Introduction

This section describes the potential transportation and pedestrian circulation impacts of the Proposed Action. The 2003 existing, 2005/2006 No Build and Build Construction conditions, 2008 No Build and Build Operational conditions, and 2025 No Build and Build Operational conditions were analyzed for pedestrian movements at all existing and proposed access points of the new South Ferry Terminal. Since no permanent changes in vehicular traffic flow are proposed nor will a significant number of vehicular trips be generated by the completed project in 2008, a traffic analysis is not warranted. In terms of pedestrian circulation, analyses were performed for subway elements including stairways, escalators, turnstiles, and high entrance/exit turnstiles (HEETs).

5.9.2 Environmental Performance Commitments

Listed below are the common EPCs related to access and circulation that will be implemented by MTA/NYCT for the South Ferry Terminal Project:

- Establishment of a project-specific pedestrian and vehicular traffic maintenance and protection plan.
- Promotion of public awareness through mechanisms such as signage; telephone hotlines; and web site updates.
- Ensuring sufficient alternate street, building, and station access during construction period.
- Regular communication with the New York City Department of Transportation (NYCDOT) and participation in its construction coordination efforts.

In addition to the above, additional project-specific measures may be developed by MTA/NYCT as the project progresses through design and construction. MTA/NYCT would also implement a Construction Environmental Protection Plan (CEPP) during construction of the South Ferry Terminal Project. The CEPP would include proactive measures to avoid or minimize environmental impacts during construction wherever possible.

5.9.3 Methodology

Detailed pedestrian analyses were conducted at the critical locations in the study area using the analytical procedures consistent with MTA/NYCT capacity guidelines. The peak 15-minute period volume is used to perform all pedestrian analyses. Level of Service (LOS) is the measure used to define how a pedestrian facility operates and how congested it is. LOS reflects the relative ease at which pedestrian movements are made and how much space is available to make them. Generally, LOS is defined from A

(lowest level of congestion) to F (highest level of congestion) for all pedestrian facilities. For subway stairways, LOS A describes operations with an unrestricted flow of pedestrians, while pedestrian flow is slightly restricted for LOS B. At LOS C, pedestrian movement is somewhat restricted with a fluid rate of speed. Walking speeds are reduced and reverse flows and cross flows are severely restricted at LOS D. For LOS E, walking speed is restricted, there is insufficient room to pass, and counter-flow movements are difficult. LOS F is characterized with severe congestion, since there is no discernable pedestrian flow due to starting and stopping and the formation of queues. Generally, pedestrian flow measurements for turnstiles and escalators at LOS A, B, C, or D are considered acceptable by MTA/NYCT, while flows measured at LOS E or F represent unacceptable operating conditions. The MTA/NYCT design guidelines for stairways and other station elements use different methodologies, which are explained in the following sections.

5.9.3.1 Stairway Analysis Methodology

The LOS for stairways was evaluated based on the Volume/SVCD (service volume between LOS C and D) capacity ratio. The breakpoint between LOS C and LOS D at a volume to capacity (v/c) ratio of 1.00 has been established by MTA/NYCT as the minimum acceptable standard for pedestrian conditions at stairways. Therefore, LOS C/D is used to determine the design capacity of the critical stairway locations in a station during each peak 15-minute period. The processing of pedestrians at LOS C/D for facilities such as stairways is adjusted to between 0 and 20 percent less based upon opposing flow volumes. This accounts for the “friction” of pedestrians traveling in both directions. In accordance with MTA/NYCT guidance, the capacity of the stairways was further reduced by 25 percent to account for peaking or surging within the 15-minute period. The LOS criteria for pedestrian stairways are defined in Table 5-3.

Table 5-3
LOS Criteria for Stairways

<u>LOS</u>	<u>Volume/SVCD Ratio</u>
A	≤ 0.45
B	> 0.45 to ≥ 0.70
C	> 0.70 to ≥ 1.00
D	> 1.00 to ≥ 1.33
E	> 1.33 to ≥ 1.67
F	> 1.67

Source: New York City Transit, 2003

5.9.3.2 Other Station Element Methodology

Escalators

The capacity of an escalator is based upon the incline speed and the size of the steps.

According to *Pedestrian Planning and Design* (Fruin 2002), an escalator with a width at the hips of 32 inches, width at the treads of 24 inches, and an incline speed of 90 feet per minute (68 steps per minute) has a maximum theoretical capacity of approximately 5,000 persons per hour. However, the nominal capacity of an escalator is actually less when unused space on each step, arrival patterns, and boarding characteristics are factored in. As a result, the nominal capacity of the same escalator, based upon a rate of one person for every other step, is 34 persons per minute. This equates to a nominal capacity of approximately 2,040 persons per hour or 510 persons per 15 minutes. In accordance with MTA/NYCT guidance, the width of the proposed South Ferry Terminal escalators was assumed to be four feet. The nominal capacity of the escalators was reduced by 25 percent to account for peaking within the 15-minute period. According to the criteria developed by MTA/NYCT, the LOS criteria have been developed based upon the 15-minute volume to capacity ratios and are summarized in Table 5-4. As indicated previously, LOS A, B, C, or D are considered acceptable by MTA/NYCT for escalators.

Turnstiles

According to the MTA/NYCT design guidelines, the theoretical capacity of a regular turnstile is 30 persons per minute for entry, 40 persons per minute for exits, and 32 persons per minute for combined entries and exits. A high entrance/exit turnstile (HEET) is a revolving gate that permits entrance flows with a Metrocard and does not restrict exit flows. The theoretical capacity of a HEET is 20 persons per minute. These LOS thresholds for turnstiles and HEETs are the same as for escalators and can be found in Table 5-4. Again, LOS A, B, C, or D is considered acceptable by MTA/NYCT for turnstiles.

Table 5-4
LOS Criteria for Escalators and Turnstiles

<u>LOS</u>	<u>Volume/Capacity Ratio</u>
A	< 0.20
B	≥ 0.20 to < 0.40
C	≥ 0.40 to < 0.60
D	≥ 0.60 to < 0.80
E	≥ 0.80 to < 1.00
F	> 1.00

Source: New York City Transit, 2003

5.9.4 Existing Conditions

Pedestrian access to the existing South Ferry Station is provided within the at-grade head house adjacent and to the north of the Whitehall Ferry Terminal entrance. The fare area (Control Area R-101) consists of a token booth, eight two-way turnstiles, and two high exit turnstiles (revolving gate restricted to exit only). A single 10-foot wide stairwell consisting of two flights of stairs (designated as P-1 A/B and P-2 A/B) connects street level with the below-grade platform. The station is comprised of one platform that serves

the first five cars of each train. During the AM peak hour, approximately 95 percent of the station entries are Staten Island Ferry passengers, and approximately 85 percent of the station exits are commuters working in the nearby business district. During the evening peak hour, Staten Island Ferry riders comprise approximately 80 percent of the station exits and office workers are approximately 80 percent of the station entries.

Within close proximity to the northeast of the South Ferry Station is the southern end of the Whitehall Street Station served by the **N** **R** subway lines. Pedestrian access to the fare control area (A-60) of the Whitehall Street Station on the west side of Whitehall Street is provided from street level in Peter Minuit Plaza via a single 10-foot wide stairwell consisting of two flights of stairs (designated as S-8 A/B and M-6 A/B). Most of the Staten Island Ferry passengers using this station are accommodated by these stairs. Additional access to this control area is provided by stairs located on the east side of Whitehall Street.

The 2003 baseline peak period pedestrian flows entering these stations were provided by MTA/NYCT based upon turnstile registration data. The MTA/NYCT Stations Operation Planning Division calculated exit flows for the peak period and assigned entry and exit flows to individual station elements. The 15-minute time interval with the highest total pedestrian volumes entering and exiting the South Ferry and Whitehall Street Stations are provided in Table 5-5 for each time period.

Table 5-5
Pedestrian Peak 15-Minute Volume Periods

Period	Peak
Weekday AM Peak	8:30 AM – 8:45 AM
Weekday PM Peak	5:15 PM – 5:30 PM

Source: New York City Transit, 2003

The analysis of the station elements was conducted at the critical locations (see Table 5-6) in the stations during the AM and PM peak periods. Each stairway element was analyzed using the methodology described in the New York City Environmental Quality Review (CEQR) Technical Manual (2002). The capacity and level of service were computed based on the peak 15-minute volumes recorded during the weekday AM and PM peak hours. The widths of the stairways were measured from wall to wall in the field. The effective widths of the stairways used in the analysis were reduced by one foot from the actual width due to handrails or similar obstructions. The widths were further reduced by a friction factor to account for pedestrians traveling in both directions.

Table 5-6 summarizes the v/c ratios and the LOS of the station elements based upon the peak 15-minute volumes for each time period and the effective widths for each stairway. Since there are no escalators or HEETs in the existing study area, no analyses were performed for these elements. The results indicate that all station elements analyzed in the South Ferry and Whitehall Street Stations currently operate at acceptable levels of service (LOS B or better) during each peak period.

However, MTA/NYCT estimates that during peak five-minute surges in the AM peak period (when ferries arrive at the Whitehall Ferry Terminal) or in the PM peak period (when a train arrives at the station), the LOS of the South Ferry Station stairs currently operate at LOS D or E. The overall 2003 pedestrian volumes within the South Ferry Station are at least 33 percent lower than pre-9/11 volumes. According to the Whitehall Ferry Terminal Environmental Assessment (FTA, 1999), the South Ferry Station stairs all operated near a v/c ratio of 1.00 during the AM and PM peak period in 1998 (a v/c ratio of 1.00 has been established by MTA/NYCT as the minimum acceptable standard for stairways). Based upon the results, these stairways operated at marginally acceptable LOS C or unacceptable LOS D for the pre-9/11 condition when the stairway flows were higher than they are today.

Table 5-6
2003 Baseline Condition – Weekday
Subway Pedestrian Analysis

ID	Location	AM Peak		PM Peak	
		Volume/ Capacity Ratio	LOS	Volume/ Capacity Ratio	LOS
South Ferry Station					
P1/P2	Platform to Street Stair	0.53	B	0.36	A
R-101	Turnstile	0.22	B	0.15	A
Whitehall Street Station					
S8/M6	Mezzanine to Street Stair	0.48	B	0.38	A

Source: Louis Berger Group, 2003

5.9.5 Potential Environmental Impacts

5.9.5.1 Analysis Year 2005/2006 (Construction)

No Build Condition

The peak construction year for the South Ferry Terminal is 2005/2006. Pedestrian flows were estimated for the future 2005/2006 conditions for the existing station elements assuming the project does not occur. According to the MTA/NYCT, background subway ridership growth for the South Ferry and Whitehall Street Stations is estimated at one percent per year, and is not expected to have returned to pre-9/11 levels by 2005/2006. The station elements, including the number of turnstiles and effective widths of the stairways used to analyze the 2003 existing conditions, remained the same for the 2005/2006 No Build Condition.

The projected volume to capacity (v/c) ratios and LOS of the turnstile and stairway locations in 2005/2006 are summarized in Table 5-7, based upon the projected 2005/2006 15-minute peak volumes for each subway element. The analysis indicates that all subway elements would operate at acceptable levels of service (LOS B or better) in the 2005/2006 No Build Condition during all peak hours analyzed.

Table 5-7
2005/2006 No Build and Build Conditions – Weekday
Subway Pedestrian Analysis

ID	Location	AM Peak		PM Peak	
		Volume/ Capacity Ratio	LOS	Volume/ Capacity Ratio	LOS
South Ferry Station					
P1/P2	Stairway to Platform	0.54	B	0.37	A
R-101	Turnstile	0.23	B	0.15	A
Whitehall Street Station					
S8/M6	Stairway to Street	0.49	B	0.39	A

Source: Louis Berger Group, 2003

Proposed Action

During the 2005/2006 peak construction year, the existing South Ferry and Whitehall Street Stations will operate as they do currently. The street-level stairs to the platform and the fare control area will remain open throughout construction. The stairs and fare control area of the Whitehall Street Station (N R) will also remain open until the main South Ferry Terminal fare control area has been completed.

The same AM and PM peak period pedestrian flow volumes and station elements used for the No Build analysis are used for the 2005/2006 Proposed Action construction analysis. The v/c ratios and the LOS of the station element locations are summarized in Table 5-7 based upon these 15-minute peak volumes. The analysis indicates that all stairways would operate at acceptable levels of service (LOS B or better) during all peak hours analyzed.

Maintenance and Protection of Traffic

Construction of the South Ferry Terminal Project would directly affect traffic on Battery Place, Greenwich Street, and State Street. Battery Place is an important east-west thoroughfare both for vehicles and buses in Lower Manhattan. Various bus lines use Battery Place to access Greenwich Street or the Brooklyn Battery Tunnel. The buses use Greenwich Street to pick up or drop off passengers during the peak hours or to park in a designated layover zone during off-peak hours.

The construction of the tunnel bellmouth and fan plant structures will take approximately eight months to complete, and will be constructed in the road bed of Battery Place and Greenwich Street. The first phase of construction, including the relocation of utilities and the installation of decking to replace the road bed, will take approximately two months. Once the decking is installed, all work would be carried out underground with minimal impact on surface traffic. Construction of the terminal under Peter Minuit Plaza would necessitate the continued use of the Plaza for construction staging purposes; it is currently used for this purpose for the Whitehall Ferry Terminal reconstruction project.

MTA/NYCT will implement a Maintenance and Protection of Traffic (MPT) Plan in coordination with NYCDOT to ensure that adequate traffic flow is maintained in the project corridor during the construction period. For Battery Place and Greenwich Street, the Plan assumes that the same numbers of existing travel lanes will remain open during construction of the bellmouth and fan plant; therefore traffic flow during construction is expected to remain at current levels of service. Construction techniques such as decking and phasing/coordinating work with other agencies would eliminate redundant operations (e.g., excavation and utility relocation) by other projects (i.e., NYSDOT's Route 9A project which includes reconstruction of Battery Place). This coordination will ensure that inconvenience to the traveling public will be kept to a minimum.

Since Greenwich Street will be kept open for buses throughout construction, alternate bus layover zones would not be necessary with the implementation of the MPT Plan. MTA/NYCT buses that normally use Peter Minuit Plaza as a turnaround/layover zone are currently being diverted due to the use of the Plaza as a construction staging area for the Whitehall Ferry Terminal reconstruction project. It is anticipated that this diversion would be extended to accommodate the South Ferry Terminal construction, including the temporary walkways that provide bus passengers with safe egress to the Whitehall Ferry Terminal and to the Lower Manhattan street network.

The Whitehall Ferry Terminal reconstruction project has implemented an MPT Plan for its construction activities. One component of this plan has been the temporary closure of the southern curb lane of State Street from Pearl Street to Whitehall Street (FTA, August 1999). This closure has temporarily restricted eastbound vehicles on State Street (a two-way street) to one lane for this two block segment. It is anticipated that a similar closure would occur for construction of the South Ferry Terminal and approach tracks as they exit Battery Park in that location. This temporary lane closure would not adversely impact traffic conditions, as only one and two block street segments would be closed as a result of the construction.

As indicated above, Peter Minuit Plaza would be under construction in 2005/2006 due to the South Ferry Terminal project. Pedestrian flow from the Staten Island Ferry through the construction and staging area in the Plaza would be maintained in a manner similar to the current scheme being used for the Whitehall Ferry Terminal reconstruction work. Pedestrian flow would also be maintained along the east sidewalk of State Street throughout the construction period. The MPT Plan will maintain pedestrian flow on the east side of State Street and the crosswalks at Battery Place and Greenwich Street.

Transit

Construction of the project's bellmouth, which includes reconstruction of a few hundred feet of existing subway tunnel, would necessitate the use of General Orders (i.e., temporary suspension of and/or modifications to train service) on the **1** **9** lines. These service interruptions would occur during nighttime hours and weekends when impacts to passengers are minimal, and would be conducted according to standard MTA/NYCT procedures.

5.9.5.2 Analysis Year 2008 (Initial Operation)

No Build Condition

Under the 2008 No Build Condition, the existing South Ferry and Whitehall Street subway station elements, including the number of turnstiles and effective widths of the stairways remain the same as those analyzed under the 2003 existing condition. The projected 15-minute peak volumes for each subway element in the South Ferry and Whitehall Street stations were increased to 2008 based upon MTA/NYCT's estimated one percent per year background subway ridership growth. The results of the 2008 No Build Condition in terms of v/c ratios and LOS for the turnstile and stairway locations are summarized in Table 5-8. The analysis indicates that all subway elements would operate at acceptable levels of service (LOS B or better) in the 2008 No Build Condition during all peak hours analyzed.

Table 5-8
2008 No Build Condition – Weekday
Subway Pedestrian Analysis

ID	Location	AM Peak		PM Peak	
		Volume/ Capacity Ratio	LOS	Volume/ Capacity Ratio	LOS
South Ferry Station					
P1/P2	Stairway to Platform	0.55	B	0.38	A
R-101	Turnstile	0.23	B	0.16	A
Whitehall Street Station					
S8/M6	Stairway to Street	0.50	B	0.40	A

Source: Louis Berger Group, 2003

Proposed Action

The South Ferry Terminal will be constructed with three fare control areas. The first (Ferry #1) will be constructed at the south end of the platform in Peter Minuit Plaza closest to the Whitehall Ferry Terminal. One new stairway set, two new escalators (one up and one down), and one elevator will be constructed between the fare control area and the street level. The fare control area is proposed to be equipped with eight turnstiles and one token booth. Access to the platform will be via one new stairway set, two new escalators (one up and one down), and one elevator.

The second fare control area (Peter Minuit #2) will be constructed at the north end of Peter Minuit Plaza, and the third (Battery Park #3) will be constructed on the west side of State Street next to Battery Park. These two fare control areas will be configured in a similar manner. A series of new stairways and one new escalator (up only) will be constructed between the fare control area and the street at each location. The fare control areas will each be equipped with four HEETs that will accept Metrocards. These control areas will be open only during peak periods of operation. Access to the platform at each location will be via a series of new stairways and one new escalator (up only).

The existing P-1 and P-2 platform to street stairs and R-101 fare control area of the existing station will be closed when construction of the new South Ferry Terminal is complete. In addition, the existing S-8 and M-6 stairs from the A-60 fare control area of the Whitehall Street Station (N R line) to the street level would also be closed as a result of the project. The Whitehall Street Station control area would be physically connected to the Ferry #1 fare control area. It is assumed that all projected users of the Whitehall Station's S-8 and M-6 stairs would divert to the new control area due to its proximity to the Whitehall Ferry Terminal.

The projected 2008 pedestrian flows at the fare control areas of the proposed South Ferry Terminal are identified in Table 5-9. It was assumed that where subway customers had a choice between stairs and an escalator, pedestrians would predominantly use the escalator until queues began to develop at LOS C. Under these conditions, pedestrians would use the stairs to avoid delays and equilibrium would be achieved between the parallel escalator and stairs.

The v/c ratios and the LOS of the stairway, escalator and turnstile locations are summarized in Table 5-10 based upon the 15-minute peak volumes, effective widths for each stairway and escalator, and the number and type of turnstile. The analysis indicates that all stairways, escalators, and turnstiles would operate at acceptable levels of service (LOS C or better) during all peak hours analyzed.

In addition to operating at acceptable levels of service for pedestrians, the proposed terminal design, in combination with the anticipated operational improvements on the 19 line, would save some customers as much as six minutes and all customers would benefit from an average of almost four minutes of time savings per trip. Total travel time savings is projected to exceed approximately 365,000 hours per year. Following are some of the functional and operational benefits expected to occur with the proposed terminal design:

- Travel times would be reduced through improved operating speeds resulting from elimination of the tight curves entering and leaving the South Ferry Terminal.
- The new terminal design would provide improved accessibility for boarding and alighting customers. By providing three entrances rather than the current single stairway, the congestion currently experience by customers entering and exiting the terminal would be reduced. The new entrance at the north end of the platform would also reduce egress times for customers who walk to destinations north of Water Street.
- The new terminal would provide full access to customers in compliance with ADA.
- The new terminal would provide enhanced intermodal connectivity to nearby transportation facilities.

**Table 5-9
2008 Build Condition – Projected Weekday
Subway Pedestrian Volumes**

Location (Fare Control Area)	AM Peak 15 Minutes	PM Peak 15 Minutes
Ferry #1		
Street Stairway	638	410
Street Escalator Up	98	266
Street Escalator Down	309	103
Total	1045	779
Platform Stairway	281	126
Platform Escalator Up	40	201
Platform Escalator Down	223	50
To N/R Whitehall Street Station	501	402
Total	1045	779
Peter Minuit #2		
Stairway (1)	7	226
Escalator Up (2)	218	13
Total	225	239
Battery Park #3		
Stairway (1)	7	84
Escalator Up (2)	69	60
Total	76	144
(1) Assumes 100% in movements		
(2) Assumes 100% out movements		

Source: NYCT/Louis Berger Group, 2003

Table 5-10
2008 Build Condition – Weekday
Subway Pedestrian Analysis

ID	Location (Fare Control Area)	AM Peak		PM Peak	
		Volume/ Capacity Ratio	LOS	Volume/ Capacity Ratio	LOS
Ferry (#1)					
M1/M2	Turnstiles	0.45	C	0.34	B
P1/P2	Platform to Mezzanine Stairs	0.29	A	0.13	A
S1/S2	Mezzanine to Street Stairs	0.66	B	0.43	A
E1	Mezzanine to Street Escalator (Down)	0.39	B	0.13	A
E2	Mezzanine to Street Escalator (Up)	0.12	A	0.34	B
E3	Platform to Mezzanine Escalator (Down)	0.28	B	0.06	A
E4	Platform to Mezzanine Escalator (Up)	0.05	A	0.26	B
Peter Minuit (#2)					
	HEET Turnstiles	0.31	B	0.33	B
P4/P3	Platform to Mezzanine Stairs	0.01	A	0.38	A
S5/S4/S3	Mezzanine to Street Stairs	0.01	A	0.38	A
E5	Platform to Mezzanine Escalator (Up)	0.28	B	0.02	A
E6	Mezzanine to Street Escalator (Up)	0.28	B	0.02	A
Battery Park (#3)					
	HEET Turnstiles	0.11	A	0.18	A
P5/P6/P7	Platform to Mezzanine Stairs	0.01	A	0.14	A
S6/S7/S8	Mezzanine to Street Stairs	0.01	A	0.14	A
E7	Platform to Mezzanine Escalator (Up)	0.09	A	0.08	A
E8	Mezzanine to Street Escalator (Up)	0.09	A	0.08	A

Source: Louis Berger Group, 2003

5.9.5.3 Analysis Year 2025 (Long-Term Operation)

No Build Condition

For the 2025 analysis year, the existing 15-minute peak volumes for each subway element in the South Ferry and Whitehall Street stations were increased based upon a 57 percent growth rate provided by MTA/NYCT. This rate takes into account the overall redevelopment of Lower Manhattan and other background developments in the vicinity of the South Ferry Station. The station elements, including the number of turnstiles and effective widths of the stairways used to analyze the 2003 existing condition, remained the same for the 2025 No Build Condition. The results of the 2025 No Build Condition in terms of v/c ratios and LOS for the turnstile and stairway locations are summarized in Table 5-11. The analysis indicates that all subway elements would operate at acceptable levels of service (LOS C or better) in the 2025 No Build Condition during all peak hours analyzed.

Table 5-11
2025 No Build Condition – Weekday
Subway Pedestrian Analysis

ID	Location	AM Peak		PM Peak	
		Volume/ Capacity Ratio	LOS	Volume/ Capacity Ratio	LOS
South Ferry Station					
P1/P2	Stairway to Platform	0.74	C	0.50	B
R-101	Turnstile	0.31	B	0.21	B
Whitehall Street Station					
S8/M6	Stairway to Street	0.67	B	0.53	B

Source: Louis Berger Group, 2003

Proposed Action

To determine the pedestrian conditions for the Proposed Action in 2025, the 2025 No Build volumes for the South Ferry and Whitehall Street Stations were reassigned to the station elements within the South Ferry Terminal. The projected 2025 pedestrian flows at the fare control areas in the South Ferry Terminal are identified in Table 5-12.

Table 5-12
2025 Build Condition – Weekday
Projected Peak Pedestrian Volumes

Location (Fare Control Area)	AM Peak 15 Minutes	PM Peak 15 Minutes
Ferry #1		
Street Stairway	954	613
Street Escalator Up	147	398
Street Escalator Down	462	154
Total	1563	1165
Platform Stairway	420	188
Platform Escalator Up	60	301
Platform Escalator Down	333	75
To N/R Whitehall Street Station	749	601
Total	1563	1165
Peter Minuit #2		
Stairway (1)	10	338
Escalator Up (2)	326	19
Total	336	357
Battery Park #3		
Stairway (1)	10	126
Escalator Up (2)	103	90
Total	114	215
(1) Assumes 100% in movements		
(2) assumes 100% out movements		

Source: NYCT/Louis Berger Group, 2003

The v/c ratios and the LOS of the stairway, escalator and turnstile locations are summarized in Table 5-13 based upon the 15-minute peak volumes, effective widths for each stairway and escalator, and the number and type of turnstile. The analysis indicates that all terminal elements (stairways, turnstiles, escalators) would operate at their respective acceptable levels of service or better during all peak hours analyzed.

Table 5-13
2025 Build Condition – Weekday
Subway Pedestrian Analysis

ID	Location (Fare Control Area)	AM Peak		PM Peak	
		Volume/ Capacity Ratio	LOS	Volume/ Capacity Ratio	LOS
Ferry (#1)					
M1/M2	Turnstiles	0.68	D	0.51	C
P1/P2	Platform to Mezzanine Stairs	0.44	A	0.20	A
S1/S2	Mezzanine to Street Stairs	0.99	C	0.64	B
E1	Mezzanine to Street Escalator (Down)	0.59	C	0.20	A
E2	Mezzanine to Street Escalator (Up)	0.19	A	0.51	C
E3	Platform to Mezzanine Escalator (Down)	0.42	C	0.09	A
E4	Platform to Mezzanine Escalator (Up)	0.08	A	0.38	B
Peter Minuit (#2)					
	HEET Turnstiles	0.47	C	0.50	C
P4/P3	Platform to Mezzanine Stairs	0.02	A	0.56	B
S5/S4/S3	Mezzanine to Street Stairs	0.02	A	0.56	B
E5	Platform to Mezzanine Escalator (Up)	0.41	C	0.02	A
E6	Mezzanine to Street Escalator (Up)	0.41	C	0.02	A
Battery Park (#3)					
	HEET Turnstiles	0.16	A	0.27	B
P5/P6/P7	Platform to Mezzanine Stairs	0.02	A	0.21	A
S6/S7/S8	Mezzanine to Street Stairs	0.02	A	0.21	A
E7	Platform to Mezzanine Escalator (Up)	0.13	A	0.11	A
E8	Mezzanine to Street Escalator (Up)	0.13	A	0.11	A

Source: Louis Berger Group, 2003