APPENDIXES A - I

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APPENDIX A

PORT AUTHORITY OF NEW YORK AND NEW JERSEY

POTENTIAL HURRICANE HAZARDS

AND

FACILITY VULNERABILITY

PATH TUNNELS

CRITICAL ELEVATIONS (NGVD)

Exchange Place Station	7.0 ft.
Morton Street Shaft	7.3 ft.
Hoboken Station	7.4 ft.
Washington Street Shaft	7.6 ft.
World Trade Center (Ramp D)	8.1 ft.
15th Street Shaft	9.6 ft.
Railroad Avenue Shaft	9.7 ft.
Grove Street Station	9.8 ft.
Pavonia Avenue	10.0 ft.
World Trade Center Concourse	12.6 ft.

POTENTIAL HURRICANE SURGE

Category 1	10.9 ft.
Category 2	17.7 ft.
Category 3	23.3 ft.
Category 4	28.2 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	0.3 hours	—
Category 2	1.2 hours	—
Category 3	1.7 hours	—
Category 4	2.0 hours	—

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

PATH SUB-STATIONS (power)

CRITICAL ELEVATIONS (NGVD)

#4 @ Exchange Place	6.0 ft.
#8 @ Kearny NJ	6.0 ft.
#9 @ Harrison NJ	7.0 ft.
#7 @ Broadway & Hallerick	7.0 ft.
#2-2A @ Washington Street	7.9 ft.
#3 @ World Trade Center	10.0 ft.

POTENTIAL HURRICANE SURGE

	Exchange Place	Kearny/ Harrison
Category 1	10.6 ft.	6.8 ft.
Category 2	16.4 ft.	9.0 ft.
Category 3	24.3 ft.	11.8 ft.
Category 4	28.6 ft.	14.4 ft

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	0.5 hours	2.0 hours
Category 2	1.5 hours	3.0 hours
Category 3	2.0 hours	3.5 hours
Category 4	2.3 hours	4.5 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

LINCOLN TUNNEL

CRITICAL ELEVATIONS (NGVD)

New Jersey Vent Shaft	10.6 ft.
New York 3rd Tube Vent Shaft	10.6 ft.
New York River Vent Shaft	11.6 ft.
New York Land Vent Shaft	19.6 ft.
New York Top-of-Ramp	22.6 ft.
New Jersey Top-of-Ramp	27.6 ft.

POTENTIAL HURRICANE SURGE

Category 1	7.5 ft.
Category 2	17.2 ft.
Category 3	20.5 ft.
Category 4	30.8 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	—
Category 2	0.5 hours	—
Category 3	1.0 hours	—
Category 4	1.2 hours	—

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

HOLLAND TUNNEL

CRITICAL ELEVATIONS (NGVD)

New Jersey Land Vent Shaft	7.6 ft.
New Jersey Top-of-Ramp	7.6 ft.
New York River Vent Shaft	8.6 ft.
New York Land Vent Shaft	8.6 ft.
New York Top-of-Ramp	9.5 ft.
New Jersey River Vent Shaft	10.6 ft.

POTENTIAL HURRICANE SURGE

Category 1	10.9 ft.
Category 2	17.7 ft.
Category 3	23.3 ft.
Category 4	28.2 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	0.2 hours	—
Category 2	1.0 hours	—
Category 3	1.6 hours	—
Category 4	1.9 hours	—

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

GEORGE WASHINGTON BRIDGE

CRITICAL ELEVATIONS (NGVD)

Center Span	213.0 ft.
Lowest Approach	200.0+ ft.

POTENTIAL HURRICANE SURGE

Category 1	
Category 2	
Category 3	
Category 4	(No hurricane surge hazard)

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	3.0 hours
Category 2	—	5.0 hours
Category 3	—	6.0 hours
Category 4	—	7.0 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size.

GEOTHALS BRIDGE

CRITICAL ELEVATIONS (NGVD)

Center Span	140.0 ft.
Staten Island Expressway Approach	15.0 ft.

POTENTIAL HURRICANE SURGE

Category 1	8.8 ft.
Category 2	10.7 ft.
Category 3	14.4 ft.
Category 4	17.7 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	3.0 hours
Category 2	—	5.0 hours
Category 3	—	6.0 hours
Category 4	0.2 hours	7.0 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

BAYONNE BRIDGE

CRITICAL ELEVATIONS (NGVD)

Center Span	150.0 ft.
John F. Kennedy Ave.	20.0 ft.

POTENTIAL HURRICANE SURGE

Category 1	9.8 ft.
Category 2	14.5 ft.
Category 3	19.8 ft.
Category 4	27.5 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	3.0 hours
Category 2	—	5.0 hours
Category 3	—	6.0 hours
Category 4	0.4 hours	7.0 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

OUTER BRIDGE

CRITICAL ELEVATIONS (NGVD)

Center Span	145.0 ft.
Lowest Approach	50.0+ ft.

POTENTIAL HURRICANE SURGE

Category 1	
Category 2	
Category 3	
Category 4	(No hurricane surge hazard)

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	3.0 hours
Category 2	—	5.0 hours
Category 3	—	6.0 hours
Category 4	—	7.0 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

JOHN F. KENNEDY INTERNATIONAL AIRPORT

CRITICAL ELEVATIONS (NGVD)

Lowest Point on Runway	11.7 ft.

POTENTIAL HURRICANE SURGE

Category 1	6.6 ft.
Category 2	15.6 ft.
Category 3	24.5 ft.
Category 4	31.2 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	2.0 hours
Category 2	0.3 hours	3.0 hours
Category 3	0.8 hours	3.5 hours
Category 4	1.2 hours	4.5 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size.

TETERBORO AIRPORT

CRITICAL ELEVATIONS (NGVD)

Lowest Point on Runway	5.0 ft

POTENTIAL HURRICANE SURGE

Category 1	5.0 ft.
Category 2	6.0 ft.
Category 3	7.5 ft.
Category 4	10.5 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	2.0 hours
Category 2	0.1 hours	3.0 hours
Category 3	0.3 hours	3.5 hours
Category 4	1.0 hours	4.5 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

LAGUARDIA AIRPORT

CRITICAL ELEVATIONS (NGVD)

Lowest Point on Runway	6.8 ft

POTENTIAL HURRICANE SURGE

Category 1	6.4 ft.
Category 2	11.2 ft.
Category 3	15.7 ft.
Category 4	20.8 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	2.0 hours
Category 2	0.5 hours	3.0 hours
Category 3	1.3 hours	3.5 hours
Category 4	2.0 hours	4.5 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

NEWARK INTERNATIONAL AIRPORT

CRITICAL ELEVATIONS (NGVD)

Lowest Point on Runway	10.3 ft

POTENTIAL HURRICANE SURGE

Category 1	8.4 ft.
Category 2	10.3 ft.
Category 3	13.6 ft.
Category 4	17.2 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	2.0 hours
Category 2	@ peak	3.0 hours
Category 3	0.3 hours	3.5 hours
Category 4	0.5 hours	4.5 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

PORT NEWARK AND ELIZABETH

CRITICAL ELEVATIONS (NGVD)

Facility Low Point	9.6 ft.

POTENTIAL HURRICANE SURGE

Category 1	8.4 ft.
Category 2	10.3 ft.
Category 3	13.6 ft.
Category 4	17.2 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	2.0 hours
Category 2	0.1 hours	3.0 hours
Category 3	0.3 hours	3.5 hours
Category 4	0.5 hours	4.5 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size.

HOWLAND HOOK TERMINAL

CRITICAL ELEVATIONS (NGVD)

Facility Low Point	9.9 ft.

POTENTIAL HURRICANE SURGE

Category 1	8.8 ft.
Category 2	10.7 ft.
Category 3	14.4 ft.
Category 4	17.7 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	2.0 hours
Category 2	@ peak	3.0 hours
Category 3	0.3 hours	3.5 hours
Category 4	0.5 hours	4.5 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size.

PIER 40

CRITICAL ELEVATIONS (NGVD)

Facility Low Point	8.9 ft.

POTENTIAL HURRICANE SURGE

Category 1	10.9 ft.
Category 2	17.7 ft.
Category 3	23.3 ft.
Category 4	28.2 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	0.1 hours	2.0 hours
Category 2	0.8 hours	3.0 hours
Category 3	1.2 hours	3.5 hours
Category 4	1.5 hours	4.5 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size.

RED HOOK MARINE TERMINAL

CRITICAL ELEVATIONS (NGVD)

Facility Low Point	9.8 ft.

POTENTIAL HURRICANE SURGE

Category 1	10.5 ft.
Category 2	16.6 ft.
Category 3	24.0 ft.
Category 4	28.7 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	0.1 hours	2.0 hours
Category 2	0.5 hours	3.0 hours
Category 3	1.2 hours	3.5 hours
Category 4	1.4 hours	4.5 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size.

PASSENGER SHIP TERMINAL

CRITICAL ELEVATIONS (NGVD)

Facility Low Point	8.9 ft.

POTENTIAL HURRICANE SURGE

Category 1	7.4 ft.
Category 2	17.5 ft.
Category 3	22.6 ft.
Category 4	28.9 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	2.0 hours
Category 2	0.8 hours	3.0 hours
Category 3	1.3 hours	3.5 hours
Category 4	1.5 hours	4.5 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size.

AUTO-MARINE TERMINAL

CRITICAL ELEVATIONS (NGVD)

Facility Low Point	9.5 ft.

POTENTIAL HURRICANE SURGE

Category 1	10.1 ft.
Category 2	15.6 ft.
Category 3	21.8 ft.
Category 4	26.8 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	0.1 hours	2.0 hours
Category 2	0.5 hours	3.0 hours
Category 3	1.2 hours	3.5 hours
Category 4	1.4 hours	4.5 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size.

APPENDIX B

MTA BRIDGES AND TUNNELS
(TRIBOROUGH BRIDGE AND TUNNEL AUTHORITY)

POTENTIAL HURRICANE HAZARDS

AND

FACILITY VULNERABILITY

BROOKLYN-BATTERY TUNNEL

CRITICAL ELEVATIONS (NGVD)

Manhattan West Street Entrance	8.6 ft.
Manhattan Battery Entrance	8.6 ft.
Brooklyn Plaza at Hamilton Avenue	11.6 ft.
Governor's Island Blower Bldg. Floor	12.6 ft.
Manhattan Blower Bldg. Floor	13.6 ft.
Brooklyn Blower Bldg. Floor	14.6 ft.

POTENTIAL HURRICANE SURGE

Category 1	10.5 ft.
Category 2	16.6 ft.
Category 3	24.0 ft.
Category 4	28.7 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	0.2 hours	—
Category 2	0.8 hours	—
Category 3	1.4 hours	—
Category 4	1.7 hours	—

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

TRIBOROUGH BRIDGE

CRITICAL ELEVATIONS (NGVD)

Center Span	145.6 ft.
E. 125th/2nd Avenue Approach	15.0 ft.

POTENTIAL HURRICANE SURGE

Category 1	8.4 ft.
Category 2	12.7 ft.
Category 3	16.4 ft.
Category 4	20.4 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	3.0 hours
Category 2	—	5.0 hours
Category 3	0.1 hours	6.0 hours
Category 4	0.4 hours	7.0 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

BRONX–WHITESTONE BRIDGE

CRITICAL ELEVATIONS (NGVD)

Center Span	138.6 ft.
Hutchinson River Pkwy. Approach	12.0 ft.

POTENTIAL HURRICANE SURGE

Category 1	6.5 ft.
Category 2	11.3 ft.
Category 3	16.6 ft.
Category 4	22.2 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	3.0 hours
Category 2	—	5.0 hours
Category 3	0.3 hours	6.0 hours
Category 4	0.8 hours	7.0 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

HENRY HUDSON PARKWAY BRIDGE

CRITICAL ELEVATIONS (NGVD)

Center Span	145.6 ft.
Lowest Approach	100.0+ ft.

POTENTIAL HURRICANE SURGE

Category 1	6.1 ft.
Category 2	13.0 ft.
Category 3	14.8 ft.
Category 4	24.6 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	3.0 hours
Category 2	—	5.0 hours
Category 3	—	6.0 hours
Category 4	—	7.0 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

MARINE PARKWAY BRIDGE

CRITICAL ELEVATIONS (NGVD)

Center Span	57.6 ft.
Beach Channel Drive Approach	8.0 ft.

POTENTIAL HURRICANE SURGE

Category 1	7.0 ft.
Category 2	14.4 ft.
Category 3	20.6 ft.
Category 4	27.2 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	2.0 hours
Category 2	0.9 hours	3.0 hours
Category 3	1.4 hours	3.5 hours
Category 4	1.8 hours	4.5 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

THROGS NECK BRIDGE

CRITICAL ELEVATIONS (NGVD)

Center Span	145.6 ft.
Throgs Neck Expwy. Approach	10.0 ft.

POTENTIAL HURRICANE SURGE

Category 1	6.5 ft.
Category 2	11.3 ft.
Category 3	16.6 ft.
Category 4	22.2 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	3.0 hours
Category 2	0.1 hours	5.0 hours
Category 3	0.5 hours	6.0 hours
Category 4	1.1 hours	7.0 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

VERRAZANO–NARROWS BRIDGE

CRITICAL ELEVATIONS (NGVD)

Center Span	230.6 ft.
Shore Parkway Approach	8.0 ft.

POTENTIAL HURRICANE SURGE

Category 1	7.9 ft.
Category 2	15.4 ft.
Category 3	21.1 ft.
Category 4	26.0 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	3.0 hours
Category 2	0.9 hours	5.0 hours
Category 3	1.4 hours	6.0 hours
Category 4	1.8 hours	7.0 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

CROSS BAY PARKWAY BRIDGE

CRITICAL ELEVATIONS (NGVD)

Center Span	57.6 ft.
Cross Bay Blvd. Approach	8.0 ft.

POTENTIAL HURRICANE SURGE

Category 1	6.3 ft.
Category 2	13.7 ft.
Category 3	21.4 ft.
Category 4	27.5 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	2.0 hours
Category 2	0.9 hours	3.0 hours
Category 3	1.4 hours	3.5 hours
Category 4	1.8 hours	4.5 hours

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

QUEENS MIDTOWN TUNNEL

CRITICAL ELEVATIONS (NGVD)

Queens Plaza at Borden Avenue	10.6 ft.
Queens Blower Bldg. Floor	12.6 ft.
Manhattan Plaza at 36th Street	14.6 ft.
Manhattan Blower Bldg. Floor	22.6 ft.

POTENTIAL HURRICANE SURGE

Category 1	9.6 ft.
Category 2	14.4 ft.
Category 3	21.0 ft.
Category 4	23.6 ft.

TIME HAZARDS COULD OCCUR (HOURS BEFORE CLOSEST APPROACH OF EYE)

	SURGE FLOODING*	SUSTAINED TROPICAL STORM WINDS*
Category 1	—	—
Category 2	0.5 hours	—
Category 3	1.0 hours	—
Category 4	1.2 hours	—

* Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

APPENDIX C

NEW YORK CITY TRANSIT AUTHORITY (SUBWAYS)

POTENTIAL HURRICANE HAZARDS

AND

FACILITY VULNERABILITY

WORLD TRADE CENTER

Critical Locations

Entrance Ramp D-West Street	8.1 feet
World Trade Center Concourse	12.6 feet

Potential Hurricane Surge (above NGVD)

Category 1	10.6 feet
Category 2	16.4 feet
Category 3	24.3 feet
Category 4	28.6 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	0.3 hours
Category 2	0.9 hours
Category 3	1.4 hours
Category 4	1.8 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

CRANBERRY STREET TUNNEL (A& C Lines)

Critical Locations

Front Street at Fulton Street Fan Plant	7.0 feet
Furman Street at Cranberry Street Fan Plant	12.8 feet

Potential Hurricane Surge (above NGVD)

Category 1	10.2 feet
Category 2	16.0 feet
Category 3	25.1 feet
Category 4	31.3 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	0.3 hours
Category 2	1.1 hours
Category 3	1.7 hours
Category 4	2.0 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

14TH STREET TUNNEL (L Line)

Critical Locations

14th Street at Avenue D Fan Plant	7.2 feet
N. 7th Street (Brooklyn) Fan Plant	9.0 feet

Potential Hurricane Surge (above NGVD)

Category 1	9.7 feet
Category 2	14.7 feet
Category 3	22.0 feet
Category 4	24.9 feet

Time Hazards Could Occur
(hours before closest approach of eye)

	Surge Flooding *
Category 1	0.2 hours
Category 2	1.0 hours
Category 3	1.6 hours
Category 4	1.8 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

NEWTOWN CREEK TUNNEL (G Line)

Critical Locations

Vernon Blvd. at 54th Avenue Fan Plant	8.1 feet

Potential Hurricane Surge (above NGVD)

Category 1	9.7 feet
Category 2	14.7 feet
Category 3	22.0 feet
Category 4	24.9 feet

Time Hazards Could Occur
(hours before closest approach of eye)

	Surge Flooding *
Category 1	0.2 hours
Category 2	0.8 hours
Category 3	1.2 hours
Category 4	1.5 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

LEXINGTON AVENUE TUNNEL (4, 5 & 6 LINES)

Critical Locations

135th Street at Park Avenue, Bronx Fan Plant 9.9 feet
131st Street at Harlem River Drive Fan Plant 11.2 feet

Potential Hurricane Surge (above NGVD)

Category 1	8.4 feet
Category 2	12.7 feet
Category 3	16.4 feet
Category 4	20.4 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	–
Category 2	0.3 hours
Category 3	0.6 hours
Category 4	1.0 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

STEINWAY TUNNEL (7 Line)

Critical Locations

Steinway Street Fan Plant/50th Street Vent 11.0 feet

Potential Hurricane Surge (above NGVD)

Category 1	9.2 feet
Category 2	14.1 feet
Category 3	17.4 feet
Category 4	22.3 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	–
Category 2	0.3 hours
Category 3	0.6 hours
Category 4	1.0 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

MONTAGUE STREET TUNNEL (M, N & R Lines)

Critical Locations

Broad Street Fan Plant	7.5 feet
Whitehall Station	9.1 feet
South Street Fan Plant	11.6 feet
Furman Street Fan Plant	12.5 feet

Potential Hurricane Surge (above NGVD)

Category 1	10.5 feet
Category 2	16.6 feet
Category 3	24.0 feet
Category 4	28.7 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	0.3 hours
Category 2	1.0 hours
Category 3	1.6 hours
Category 4	1.8 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

HARLEM RIVER TUNNEL (2 Line)

Critical Locations

Harlem River Drive Vent Shaft	10.0 feet (est.)

Potential Hurricane Surge (above NGVD)

Category 1	8.4 feet
Category 2	12.7 feet
Category 3	16.4 feet
Category 4	20.4 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	–
Category 2	0.3 hours
Category 3	0.6 hours
Category 4	1.0 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

53RD STREET TUNNEL (E & F Lines)

Critical Locations

44th Drive (Nott Avenue) Fan Plant 10.0 feet

Potential Hurricane Surge (above NGVD)

Category 1	9.2 feet
Category 2	14.1 feet
Category 3	17.4 feet
Category 4	22.3 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	–
Category 2	0.4 hours
Category 3	0.7 hours
Category 4	1.2 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

63RD STREET TUNNEL (B & Q Lines)

Critical Locations

Vernon Blvd. at 41st Avenue (Queensbridge) Fan Plant 12.7 feet

Potential Hurricane Surge (above NGVD)

Category 1	9.2 feet
Category 2	14.1 feet
Category 3	17.4 feet
Category 4	22.3 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	–
Category 2	0.1 hours
Category 3	0.3 hours
Category 4	0.8 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

RUTGERS STREET TUNNEL (F Line)

Critical Locations

Rutgers Street at South Street Fan Plant	10.6 feet
Jay Street at Plymouth Street Fan Plant	12.1 feet

Potential Hurricane Surge (above NGVD)

Category 1	10.2 feet
Category 2	16.0 feet
Category 3	25.1 feet
Category 4	31.3 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	–
Category 2	0.4 hours
Category 3	1.0 hours
Category 4	1.3 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

YANKEE STADIUM TUNNEL (C & D Lines)

Critical Locations

155th Street at 8th Avenue Fan Plant	12.8 feet

Potential Hurricane Surge (above NGVD)

Category 1	8.4 feet
Category 2	12.7 feet
Category 3	16.4 feet
Category 4	20.4 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	–
Category 2	–
Category 3	0.3 hours
Category 4	0.7 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

CLARK STREET TUNNEL (2 & 3 LINES)

Critical Locations

Old Slip at Front Street Fan Plant	9.1 feet
Furman Street at Clark Street Fan Plant	10.7 feet

Potential Hurricane Surge (above NGVD)

Category 1	10.5 feet
Category 2	16.6 feet
Category 3	24.0 feet
Category 4	28.7 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	0.2 hours
Category 2	0.8 hours
Category 3	1.3 hours
Category 4	1.5 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

SOUTH FERRY (1 & 9 LINES)

Critical Locations

IRT Station Entrance	9.1 feet

Potential Hurricane Surge (above NGVD)

Category 1	10.5 feet
Category 2	16.6 feet
Category 3	24.0 feet
Category 4	28.7 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	0.2 hours
Category 2	0.8 hours
Category 3	1.3 hours
Category 4	1.5 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

JORALEMON STREET TUNNEL
(4 & 5 Lines)

Critical Locations

State Street (Battery Park) Fan Plant/Grate 9.8 feet

Potential Hurricane Surge (above NGVD)

Category 1	10.5 feet
Category 2	16.6 feet
Category 3	24.0 feet
Category 4	28.7 feet

Time Hazards Could Occur
(hours before closest approach of eye)

	Surge Flooding *
Category 1	at closest approach
Category 2	0.5 hours
Category 3	1.1 hours
Category 4	1.3 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

APPENDIX D

LONG ISLAND RAIL ROAD

POTENTIAL HURRICANE HAZARDS

AND

FACILITY VULNERABILITY

PENN STATION - NORTH (HUDSON) RIVER TUNNEL

Critical Locations

West Side Storage Yard Berm	10.0 feet
Weehawken Shaft	12.3 feet

Potential Hurricane Surge (above NGVD)

Category 1	7.5 feet
Category 2	17.2 feet
Category 3	20.5 feet
Category 4	30.8 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	–
Category 2	0.5 hours
Category 3	1.0 hours
Category 4	1.2 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

LONG BEACH BRANCH

Critical Locations

Oceanside	6.2 feet

Potential Hurricane Surge (above NGVD)

Category 1	7.3 feet
Category 2	16.2 feet
Category 3	21.9 feet
Category 4	26.9 feet

Time Hazards Could Occur
(hours before closest approach of eye)

	Surge Flooding *
Category 1	0.1 hours
Category 2	1.3 hours
Category 3	1.8 hours
Category 4	2.2 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

EAST RIVER TUNNEL (shared with AMTRAK)

Critical Locations

Long Island Shaft	9.0 feet
1st Avenue Shaft	14.5 feet

Potential Hurricane Surge (above NGVD)

Category 1	9.2 feet
Category 2	14.1 feet
Category 3	17.4 feet
Category 4	22.3 feet

Time Hazards Could Occur
(hours before closest approach of eye)

	Surge Flooding *
Category 1	–
Category 2	0.6 hours
Category 3	0.9 hours
Category 4	1.3 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

FAR ROCKAWAY BRANCH

Critical Locations

Far Rockway	9.2 feet
Valley Stream	11.4 feet

Potential Hurricane Surge (above NGVD)

Category 1	8.1 feet
Category 2	15.4 feet
Category 3	20.5 feet
Category 4	26.2 feet

Time Hazards Could Occur
(hours before closest approach of eye)

	Surge Flooding *
Category 1	–
Category 2	0.8 hours
Category 3	1.3 hours
Category 4	1.5 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

PORT WASHINGTON BRANCH

Critical Locations

Flushing	9.2 feet

Potential Hurricane Surge (above NGVD)

Category 1	6.6 feet
Category 2	11.6 feet
Category 3	16.2 feet
Category 4	20.9 feet

Time Hazards Could Occur
(hours before closest approach of eye)

	Surge Flooding *
Category 1	–
Category 2	0.2 hours
Category 3	0.8 hours
Category 4	1.3 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

APPENDIX E

NEW JERSEY TRANSIT
(RAIL LINES)

POTENTIAL HURRICANE HAZARDS

AND

FACILITY VULNERABILITY

PASCACK VALLEY LINE

Critical Locations

Union Avenue at East Rutherford (track)
Track between East Rutherford and
I-80 (switch circuit euipment)

Potential Hurricane Surge (above NGVD)

Category 1	8.2 feet
Category 2	9.1 feet
Category 3	10.2 feet
Category 4	13.9 feet

Riverine Flooding Potential

No Issues Identified

BERGEN COUNTY LINE

Critical Locations

Hackensack River location at Secaucus (signal cases)
Pascack Junction at Rutherford (signal cases)

Potential Hurricane Surge (above NGVD)

Category 1	8.5 feet
Category 2	10.0 feet
Category 3	13.4 feet
Category 4	15.9 feet

Riverine Flooding Potential

No Issues Identified

MAIN LINE

Critical Locations

Valley Brook Road at Lyndhurst (track)
Passaic River Crossing (bridge and track)

Potential Hurricane Surge (above NGVD)

Category 1	8.2 feet
Category 2	9.1 feet
Category 3	10.2 feet
Category 4	13.9 feet

Riverine Flooding Potential

Track at Passaic River Crossing could be flooded by 500 year flood event – bridge could be flooded by 50 year flood event –
no hurricane surge problems anticipated here

MORRISTOWN AND ESSEX LINE

Critical Locations

Meadowlands segment (track and equipment)

Potential Hurricane Surge (above NGVD)

Category 1	9.8 feet
Category 2	11.9 feet
Category 3	14.6 feet
Category 4	17.2 feet

Riverine Flooding Potential

No Issues Identified

HOBOKEN TERMINAL AND BERGEN TUNNEL

Critical Locations
Hoboken Terminal
Bergen Tunnel

Potential Hurricane Surge (above NGVD)

Category 1	13.5 feet
Category 2	19.0 feet
Category 3	26.4 feet
Category 4	31.4 feet

Riverine Flooding Potential
No Issues Identified

BOONTON LINE

Critical Locations
Hackensack River Crossing at Kearney

Potential Hurricane Surge (above NGVD)

Category 1	9.9 feet
Category 2	11.1 feet
Category 3	12.7 feet
Category 4	16.8 feet

Riverine Flooding Potential
No Issues Identified

BOONTON LINE

Critical Locations

Passaic River Crossing at Little Falls Township
Pompton River Crossing at Wayne Township

Potential Hurricane Surge (above NGVD)

Category 1	–
Category 2	–
Category 3	–
Category 4	–

Riverine Flooding Potential

Bridge at Passaic River Crossing could be flooded by 500 year Flood event – bridge at Pompton River Crossing could be flooded by 100 year flood event

NORTH JERSEY COAST LINE

Critical Locations

Raritan River Crossing at Perth Ambay
Morgan area at Sayreville (electrical equipment)
Chessquake Creek Crossing at Sayreville

Potential Hurricane Surge (above NGVD)

Category 1	11.4 feet
Category 2	18.4 feet
Category 3	24.6 feet
Category 4	28.0 feet

Riverine Flooding Potential

No Issues Identified

NORTH JERSEY COAST LINE

Critical Locations

Oceanport Creek area (track and swing bridge switches)

Potential Hurricane Surge (above NGVD)

Category 1	5.1 feet
Category 2	7.2 feet
Category 3	15.1 feet
Category 4	20.7 feet

Riverine Flooding Potential

No Issues Identified

NEW JERSEY TRANSIT RAIL LINES - FLOOD DATA

Line*	Mile Post	Map Symb.	Location	County	Municipality	December 92 Flood Damage Report	EQUIPMENT ELEVATIONS**		FLOOD DATA TIDAL/RIVERINE***			
							TRACK	BRIDGE	Cat. 1	Cat. 2	Cat. 3	Cat. 4
PV	7.6-12.4	PV-1	Length of track	Bergen	Several	Switch circuit equipment submerged			8.2	9.1	10.2	13.9
PV	8.2	PV-2	Union Avenue	Bergen	East Rutherford	Track flooded/ crossing under water			8.2	9.1	10.2	13.9
BC	5.6	BC-1	Hackensack River	Bergen	Secaucus East Rutherford	Water in signal case			8.5	10.0	13.4	15.9
BC	7.6	BC-2	Pascack Junction	Bergen	Rutherford E. Rutherford	Signal cases under water (non-tidal ?)			8.2	9.1	10.2	13.9
ML	5.8	ML-1	Valley Brook Road	Bergen	Lyndhurst	Track flooded			8.2	9.1	10.2	13.9
										50 Yr.	100 Yr.	500 Yr.
ML	17.34	ML-2	Passaic River	Passaic	Paterson Hawthorne		47'	41'		42'	44'	50'
									Cat. 1	Cat. 2	Cat. 3	Cat. 4
ME	2.0-3.8	ME-1	Meadowlands	Hudson	Harrison	Track washout; damage to equipment due to high water.			9.8	11.9	14.6	17.2
RV			No flood damages reported on Raritan Valley Line from Dec. 92 Northeaster									
			Hoboken Terminal	Hudson	Hoboken	Extensive and varied flood damage			13.5	19.0	26.4	31.4
	1.0		Bergen Tunnel	Hudson	Jersey City Hoboken	Cable grounded in tunnel			13.5	19.0	26.4	31.4
BO	2.6-4.2	BO-1		Hudson	Kearny	Track washed out			9.9	11.1	12.7	16.8
BO	4.2	BO-2	Hackensack River Drawbridge	Hudson	Kearny	Track flooded			9.9	11.1	12.7	16.8
BO	4.2-5.4	BO-3		Hudson	Kearny	Track washed out				9.9	10.4	15.1
										50 Yr.	100 Yr.	500 Yr.
BO	19.43	BO-4	Passaic River	Passaic	Little Falls Twp. Wayne Twp.							
BO	21.86	BO-5	Pompton River	Passaic	Wayne Twp. Lincoln Park Bor.		173' 175'	170.5' 170'		167' 169'	169.5' 170'	172' 173.5'
									Cat. 1	Cat. 2	Cat. 3	Cat. 4
NJC	.40-.70	NJC-1	Raritan River Crossing	Middlesex	Perth Amoby South Amboy	Track washouts; drawbridge, signal & other electrical equipment damaged by flooding and by sand barge.			11.1	17.2	20.2	28.0
NJC	1.9	NJC-2	Morgan area	Middlesex	Sayreville	High tidal waters covering electrical equipment			11.4	18.4	24.6	28.0
NJC	2.6-3.0	NJC-3	Chessquake Creek Crossing	Middlesex	Sayreville Old Bridge Twp.	Track washout; damage to signal, traction and other electrical equipment; navigation lights submerged.			11.1	17.8	23.7	27.0
NJC	20.0	NJC-4	Oceanport Creek	Monmouth	Oceanport	Track washout; swing bridge switches fully covered by water.			5.1	7.2	15.1	20.7

*** Line Abrevations**

PV Pascack Valley Line
BC Bergen County Line
ML Main Line
ME Morristown and Essex Line
RV Raritan Valley Line
BO Boonton Line
NJC North Jersey Coast Line

**** Equipment Elevations**

Track and underside bridge elevations listed were obtained from FEMA Flood Insurance Study stream profiles.

***** Flood Data**

SLOSH Model worst case surge elevations are listed for locations subject to tidal flooding.
Flood Insurance Study flood elevations are listed for locations subjected to fluvial flooding.

APPENDIX F

METRO - NORTH

POTENTIAL HURRICANE HAZARDS

AND

FACILITY VULNERABILITY

GRAND CENTRAL TERMINAL

Critical Locations

IRT SteinwayTube Queens Vent (7 line) 11.0 feet

Potential Hurricane Surge (above NGVD)

Category 1	9.2 feet
Category 2	14.1 feet
Category 3	17.4 feet
Category 4	22.3 feet

Time Hazards Could Occur
(hours before closest approach of eye)

	Surge Flooding *
Category 1	–
Category 2	0.3 hours
Category 3	0.6 hours
Category 4	1.0 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

NEW HAVEN LINE

Critical Locations

Bruce Brook at Town of Stratford 22.0 feet

Potential Hurricane Surge (above NGVD)

Category 1 & 2	12.5 feet
Category 3	16.5 feet
Category 4	19.0 feet

Other Flood Parameters

10 Year Flood Frequency	22.0 feet
50 Year Flood Frequency	22.2 feet
100 Year Flood Frequency	22.4 feet
500 Year Flood Frequency	22.8 feet

NEW HAVEN LINE

Critical Locations

Sasco Creek at Town of Westport 12.5 feet

Potential Hurricane Surge (above NGVD)

Category 1 & 2	11.5 feet
Category 3	15.0 feet
Category 4	18.5 feet

Other Flood Parameters

10 Year Flood Frequency	8.8 feet
50 Year Flood Frequency	10.3 feet
100 Year Flood Frequency	11.0 feet
500 Year Flood Frequency	12.4 feet

NEW HAVEN LINE

Critical Locations

Sherwood Millpond at Town of Westport 9.8 feet

Potential Hurricane Surge (above NGVD)

Category 1 & 2	11.5 feet
Category 3	15.0 feet
Category 4	18.5 feet

Other Flood Parameters

10 Year Flood Frequency	9.1 feet
50 Year Flood Frequency	10.6 feet
100 Year Flood Frequency	11.2 feet
500 Year Flood Frequency	not available

HUDSON LINE

Critical Locations

Spuyten Duyvil 7.7 feet

Potential Hurricane Surge (above NGVD)

Category 1	6.1 feet
Category 2	13.0 feet
Category 3	14.8 feet
Category 4	24.6 feet

Time Hazards Could Occur
(hours before closest approach of eye)

	Surge Flooding *
Category 1	–
Category 2	0.6 hours
Category 3	1.0 hours
Category 4	1.5 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

NEW HAVEN LINE

Critical Locations

Rooster River at Town of Fairfield 17.0 feet

Potential Hurricane Surge (above NGVD)

Category 1 & 2	12.0 feet
Category 3	15.5 feet
Category 4	18.5 feet

Other Flood Parameters

10 Year Flood Frequency	10.0 feet
50 Year Flood Frequency	13.5 feet
100 Year Flood Frequency	14.5 feet
500 Year Flood Frequency	18.0 feet

FLOOD VULNERABILITY FACT SHEET
METRO NORTH RAILWAY
FAIRFIELD COUNTY, CONNECTICUT

Map Key Number	Community	Location	Estimated Elevation	Surge Elev. Cat. 1&2	Surge Elev. Cat. 3	Surge Elev. Cat. 4	10-year freq. flood	50-year freq. flood	100-year freq. flood	500-year freq. flood
1	Stratford-Bridgeport TL	Bruce Brook	22.0' Note 1	12.5'	16.5'	19.0'	22.0'	22.2'	22.4'	22.8'
2	Bridgeport-Fairfield TL	Rooster River	17.0' Note 2	12.0'	15.5'	18.5'	10.0'	13.5'	14.5'	18.0'
3	Fairfield	Crasmere Brook	9.6' Note 3	12.0'	15.5'	18.5'	8.6'	10.3'	11.0'	12.2'
4	Fairfield-Westport TL	Sasco Creek	12.5' Note 4	11.5'	15.0'	18.5'	8.8'	10.3'	11.0'	12.4'
5	Westport	Sherwood Mill Pond	11.6' Note 4	11.5'	15.0'	18.5'	9.0'	10.5'	11.2'	N/A
6	Westport	Sherwood Mill Pond	9.8' Note 4	11.5'	15.0'	18.5'	9.1'	10.6'	11.2'	N/A

(ELEVATIONS REFERENCED TO NGVD, 1929)

NOTES:

[1] Determined from Plate 01P (Flood Profile of Bruce Brook), FEMA's FIS for the Town of Stratford, April 16, 1990.

[2] Determined from Plate 19P (Flood Profile of Rooster River), FEMA's FIS for the City of Bridgeport, September 6, 1989.

[3] Determined from Plate 10P (Flood Profile of Grasmere Brook), FEMA's FIS for the City of Fairfield, August 19, 1986.

[4] Determined from Construction Drawings, CT Department of Transportation.

APPENDIX G

AMTRAK

POTENTIAL HURRICANE HAZARDS

AND

FACILITY VULNERABILITY

PENN STATION - NORTH (HUDSON) RIVER TUNNEL

Critical Locations

West Side Storage Yard Berm	10.0 feet
Weehawken Shaft	12.3 feet

Potential Hurricane Surge (above NGVD)

Category 1	7.5 feet
Category 2	17.2 feet
Category 3	20.5 feet
Category 4	30.8 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	–
Category 2	0.5 hours
Category 3	1.0 hours
Category 4	1.2 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

EAST RIVER TUNNEL

Critical Locations

Long Island Shaft	9.0 feet
1st Avenue Shaft	14.5 feet

Potential Hurricane Surge (above NGVD)

Category 1	9.2 feet
Category 2	14.1 feet
Category 3	17.4 feet
Category 4	22.3 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	–
Category 2	0.6 hours
Category 3	0.9 hours
Category 4	1.3 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

APPENDIX H

NEW JERSEY HIGHWAYS

POTENTIAL HURRICANE HAZARDS

AND

FACILITY VULNERABILITY

U.S. HIGHWAY 1

Critical Locations

Milepost 41.8 in Union County at Linden at Peach Orchard Brook — 11.0 feet

Potential Hurricane Surge (above NGVD)

Category 1	12.0 feet
Category 2	13.7 feet
Category 3	17.3 feet
Category 4	21.0 feet

U.S. HIGHWAY 1

Critical Locations

Milepost 38.9 in Union County at Rahway at intersection with Lawrence Street — 9.4 feet

Potential Hurricane Surge (above NGVD)

Category 1	--
Category 2	--
Category 3	16.4 feet
Category 4	21.8 feet

INTERSTATE 280

Critical Locations

Milepost 17.65 in Hudson County at Kearney at ramp to EB Turnpike (east alignment) — 7.0 feet

Potential Hurricane Surge (above NGVD)

Category 1	9.8 feet
Category 2	11.9 feet
Category 3	14.6 feet
Category 4	17.2 feet

NEW JERSEY ROUTE 27

Critical Locations

Milepost 28.4 in Union County at Rahway at Central Ave. near Robinson Br. — 13.9 feet

Potential Hurricane Surge (above NGVD)

Category 1	10.6 feet
Category 2	12.5 feet
Category 3	15.1 feet
Category 4	17.1 feet

U.S. HIGHWAY 1

Critical Locations

Milepost 46.25 in Union County at Elizabeth just over line in Newark — 9.6 feet

Potential Hurricane Surge (above NGVD)

Category 1	11.3 feet
Category 2	13.2 feet
Category 3	16.5 feet
Category 4	20.3 feet

NEW JERSEY ROUTE 35

Critical Locations

Milepost 57.9 in Middlesex County at Woodbridge at Union County Line — 15.2 feet

Potential Hurricane Surge (above NGVD)

Category 1	--
Category 2	--
Category 3	16.4 feet
Category 4	21.8 feet

U.S. HIGHWAY 1 AND 9

Critical Locations

Milepost 2.1 in Hudson County at Jersey City near Communitarian Avenue	2.0 feet

Potential Hurricane Surge (above NGVD)

Category 1	9.8 feet
Category 2	11.9 feet
Category 3	14.6 feet
Category 4	17.2 feet

NEW JERSEY ROUTE 7

Critical Locations

Milepost 2.2 in Hudson County at Kearney under Turnpike Eastern Alignment	5.3 feet
Milepost 3.65 in Hudson County at Kearney over Saw Mill Creek	6.0 feet

Potential Hurricane Surge (above NGVD)

Category 1	--
Category 2	9.9 feet
Category 3	10.4 feet
Category 4	15.1 feet

NEW JERSEY ROUTE 17

Critical Locations

Milepost 4.95 in Bergen County at East Rutherford Borough	3.9 feet
Milepost 8.2 in Bergen County at Hasbrouck Heights South of Williams Ave.	8.0 feet

Potential Hurricane Surge (above NGVD)

Category 1	8.2 feet
Category 2	9.1 feet
Category 3	10.2 feet
Category 4	13.9 feet

NEW JERSEY ROUTE 3

Critical Locations

Milepost 9.25 in Hudson County at Secaucus	8.0 feet

Potential Hurricane Surge (above NGVD)

Category 1	8.2 feet
Category 2	9.1 feet
Category 3	10.2 feet
Category 4	13.8 feet

NEW JERSEY ROUTE 169

Critical Locations

Milepost 2.15 in Hudson County at Bayonne at East 21st Street	10.1 feet

Potential Hurricane Surge (above NGVD)

Category 1	11.7 feet
Category 2	13.3 feet
Category 3	16.7 feet
Category 4	21.9 feet

INTERSTATE 95

Critical Locations

Milepost 74.8 at Teaneck Township in Bergen County at Overpeck Creek	5.8 feet
Milepost 74.15 at Teaneck Township in Bergen County under Port Lee/ Degraw Ave. Overpass	6.9 feet
Milepost 73.2 at Ridgefield Park Township in Bergen County South of Teaneck Twp. line	9.3 feet

Potential Hurricane Surge (above NGVD)

Category 1	8.2 feet
Category 2	9.1 feet
Category 3	10.2 feet
Category 4	13.9 feet

NEW JERSEY ROUTE 4

Critical Locations

Milepost 8.5 in Bergen County at Englewood City at Overpeck Creek — 11.0 feet

Potential Hurricane Surge (above NGVD)

Category 1	8.2 feet
Category 2	9.1 feet
Category 3	10.2 feet
Category 4	13.9 feet

U.S. HIGHWAY 1 AND 9

Critical Locations

Milepost 58.05 in Hudson County at N. Bergen Township at 42nd Street — 8.0 feet

Potential Hurricane Surge (above NGVD)

Category 1	8.4 feet
Category 2	9.8 feet
Category 3	11.1 feet
Category 4	14.8 feet

NEW JERSEY ROUTE 120

Critical Locations

Milepost 1.0 in Bergen County at East Rutherford Borough opposite race track — 8.2 feet

Potential Hurricane Surge (above NGVD)

Category 1	8.2 feet
Category 2	9.1 feet
Category 3	10.2 feet
Category 4	13.9 feet

U.S. HIGHWAY 46

Critical Locations

Milepost 69.9 in Bergen County at Little Ferry Borough West of Route 124 — 5.6 feet

Potential Hurricane Surge (above NGVD)

Category 1	8.2 feet
Category 2	9.1 feet
Category 3	10.2 feet
Category 4	13.9 feet

NEW JERSEY ROUTE 21

Critical Locations

Milepost .95 in Essex County at Newark at Vanderpool — 8.3 feet

Potential Hurricane Surge (above NGVD)

Category 1	--
Category 2	--
Category 3	14.9 feet
Category 4	18.7 feet

U.S. HIGHWAY 1 AND 9

Critical Locations

Milepost 47.35 in Essex County at Newark under Haynes Avenue Overpass — 6.8 feet

Potential Hurricane Surge (above NGVD)

Category 1	11.0 feet
Category 2	12.2 feet
Category 3	14.8 feet
Category 4	18.3 feet

Tidal Flooding Highway Locations in New Jersey

BERGEN COUNTY

Municipality	Road/Route	Mile Post	Road Elevation	SLOSH Surge Elevations Cat. 1	Cat. 2	Cat. 3	Cat. 4
Rutherford B.	NJ 3	6.3	14.4	8.2	9.1	10.2	13.8
Rutherford B.	NJ 3	6.6	8.0	"	"	"	"
East Rutherford B.	NJ 3	7.25	8.2	"	"	"	"
East Rutherford B.	NJ 3	7.4	10.0	"	"	"	"
East Rutherford B.	NJ 3	7.6	8.0	"	"	"	"
East Rutherford B.	NJ 3	8.0	15.0	"	"	"	"
River Edge B.	NJ 4	5.2	15.0	"	"	"	"
Englewood City	NJ 4	8.5	11.0	"	"	"	"
Rutherford B.	NJ 17	4.75	5.0	"	"	"	"
East Rutherford B.	NJ 17	4.95	3.9	"	"	"	"
East Rutherford	NJ 17	5.45	5.0	"	"	"	"
East Rutherford	NJ 17	5.8	11.0	"	"	"	"
Carlstadt B.	NJ 17	5.9	8.0	"	"	"	"
Carlstadt B.	NJ 17	6.25	9.0	"	"	"	"
Hasbrouck Hts.	NJ 17	7.2	8.6	"	"	"	"
Hasbrouck Hts.	NJ 17	7.45	9.5	"	"	"	"
Hasbrouck Hts.	NJ 17	7.65	8.0	"	"	"	"
Hasbrouck Hts.	NJ 17	8.2	8.0	"	"	"	"
Hasbrouck Hts.	NJ 17	8.85	21.0	"	"	"	"
Little Ferry B.	US 46	69.4	8.0	"	"	"	"
Little Ferry B.	US 46	69.9	5.6	"	"	"	"
Little Ferry B.	US 46	70.05	9.0	"	"	"	"
Ridgefield Park	US 46	70.7	13.5	"	"	"	"
Ridgefield Park	US 46	70.85	9.0	"	"	"	"
Ridgefield Park	US 46	71.2	14.0	"	"	"	"
TeterB B.	Interstate 80	65.85	10.7	"	"	"	"
South Hackensack	Interstate 80	66.2	10.5	"	"	"	"
South Hackensack	Interstate 80	66.4	13.8	"	"	"	"
Hackensack City	Interstate 80	66.55	11.0	"	"	"	"
Teaneck T.	Interstate 80	67-68		"	"	"	"
There are several low spots in the vicinity of the Interstates 80/95 intersection (Including on/off ramps). Chronic flooding problems noted by NJDOT appear to be rainfall induced.							
Teaneck T.	Interstate 95	73-74		8.2	9.1	10.2	13.8
Ridgefield Park T.	Interstate 95	72.5	11.2	"	"	"	"
Ridgefield Park T.	Interstate 95	73.2	9.3	"	"	"	"
Teaneck T.	Interstate 95	74.15	6.9	"	"	"	"
Teaneck T.	Interstate 95	74.8	5.8	"	"	"	"
East Rutherford B.	NJ 120	0.3	17.0	"	"	"	"
East Rutherford B.	NJ 120	1.0	8.2	"	"	"	"
East Rutherford B.	NJ 120	2.1	13.1	"	"	"	"

Tidal Flooding Highway Locations in New Jersey

ESSEX COUNTY

Municipality	Road/Route	Mile Post	Road Elevation	SLOSH Surge Elevations Cat. 1	Cat. 2	Cat. 3	Cat. 4
Newark	US 1/9	46.3	9.6	-	-	15	19
Newark	US 1/9	47.75	12.0	"	"	"	"
Newark	US 1/9	46.95	12.0	"	"	"	"
Newark	US 1/9	47.35	6.8	"	"	"	"
Newark	US 1/9	47.55	9.5	"	"	"	"
Newark	US 1/9	47.75	18.0	"	"	"	"
Newark	US 1/9	47.85	8.7	"	"	"	"
Newark	US 1/9	47.9	25.0	"	"	"	"
Newark	US 1/9	48.1	8.0	"	"	"	"
Newark	US1/9 (Truck)	51.25	13.0	"	"	"	"
Newark	US1/9 (Truck)	51.55	13.0	"	"	"	"
Newark	NJ 21	0.9	9.1	9.9	11.9	14.6	17.6
Newark	NJ 21	0.95	8.3	"	"	"	"
Newark	NJ 21	1.1	10.5	"	"	"	"
Newark	NJ 21	1.7	12.7	"	"	"	"
Newark	NJ 21	2.2	15.8	"	"	"	"
Newark	NJ 21	2.7	22.0	"	"	"	"
Newark	NJ 21	3.3	13.5	"	"	"	"
Newark	NJ 21	3.5	12.0	"	"	"	"
Newark	NJ 21	4.3	16.0	"	"	"	"
Newark	NJ 21	5.2	17.4	"	"	"	"
Newark	NJ 21	5.55	11.0	"	"	"	"
Newark	NJ 21	5.75	20.0	"	"	"	"
Belleville	NJ 21	5.95	15.0	"	"	"	"
Belleville	NJ 21	6.1	7.5	"	"	"	"
Belleville	NJ 21	6.3	32.0	"	"	"	"
Belleville	NJ 21	6.8	15.0	"	"	"	"
Belleville	NJ 21	7.2	10.0	"	"	"	"
Belleville	NJ 21	8.0	12.1	"	"	"	"
Nutley	NJ 21	8.4	11.8	"	"	"	"
Nutley	NJ 21	9.0	18.0	*See Passaic River non-tidal flood*			
	NJ 21			*elevations as NJ 21 goes upstream.*			
Newark	US 22	58.6	11.0	-	-	14.9	18.7
Newark	US 22	59.2	12.0	"	"	"	"
Newark	US 22	60.2	10.3	"	"	"	"
Newark	I - 78	57.2	14.0	9.9	11.9	14.6	17.6
Newark	I - 78	57.4	12.0	"	"	"	"
Newark	I - 78	57.95	11.8	"	"	"	"
Newark	I - 78	58.45	11.5	"	"	"	"

MIDDLESEX COUNTY

Municipality	Road/Route	Mile Post	Road Elevation	SLOSH Surge Elevations Cat. 1	Cat. 2	Cat. 3	Cat. 4
Woodbridge T.	US1/9	38.2	21.9	-	-	16.4	22.3
Woodbridge T.	NJ 35	54.1	21.5	11.1	17.8	20.4	26.2
Woodbridge T.	NJ 35	54.2	26.6	"	"	"	"
Woodbridge T.	NJ 35	54.3	16.2	"	"	"	"
Woodbridge T.	NJ 35	55.2	25.0	"	"	"	"
Woodbridge T.	NJ 35	57.9	15.1	-	-	16.4	22.3
Woodbridge T.	NJ 27	27.0	15.2	"	"	"	"
Woodbridge T.	NJ 27	27.1	19.1	"	"	"	"
Woodbridge T.	NJ 27	27.2	21.2	"	"	"	"

Tidal Flooding Highway Locations in New Jersey

HUDSON COUNTY

Municipality	Road/Route	Mile Post	Road Elevation	SLOSH Surge Elevations Cat. 1	Cat. 2	Cat. 3	Cat. 4
Jersey City	US 1/9	55.4	15.0	9.9	11.1	12.7	16.8
Jersey City	US 1/9	55.45	20.0	"	"	"	"
Jersey City	US 1/9	55.7	13.0	"	"	"	"
Jersey City	US 1/9	55.95	22.0	8.4	9.8	11.1	14.8
N. Bergen T.	US 1/9	56	15.7	"	"	"	"
N. Bergen T.	US 1/9	56.4	13.3	"	"	"	"
N. Bergen T.	US 1/9	56.7	12.1	"	"	"	"
N. Bergen T.	US 1/9	57.45	14.8	"	"	"	"
N. Bergen T.	US 1/9	57.95	8.5	8.2	9.0	10.2	13.1
N. Bergen T.	US 1/9	57.98	10.0	"	"	"	"
N. Bergen T.	US 1/9	58.05	8.0	"	"	"	"
N. Bergen T.	US 1/9	58.85	15.0	"	"	"	"
N. Bergen T.	US 1/9	59.05	10.0	"	"	"	"
Kearney	US 1/9T	1.15	12.0	-	9.9	10.2	13.1
Kearney	US 1/9T	1.45	2.0	"	"	"	"
Kearney	US 1/9T	1.6	22.0	"	"	"	"
Jersey City	US 1/9T	2	14.5	9.9	11.9	14.7	17.5
Jersey City	US 1/9T	2.1	2.0	"	"	"	"
Jersey City	US 1/9T	2.4	6.3	"	"	"	"
Jersey City	US 1/9T	2.5	7.7	"	"	"	"
Jersey City	US 1/9T	2.7	7.0	"	"	"	"
Jersey City	US 1/9T	2.85	11.6	"	"	"	"
Jersey City	US 1/9T	3.1	9.0	"	"	"	"
Jersey City	US 1/9T	3.45	10.0	"	"	"	"
Secaucus	NJ 3	8.5	14.0	8.4	9.8	11.1	14.8
Secaucus	NJ 3	9.1	14.0	"	"	"	"
Secaucus	NJ 3	9.15	10.0	"	"	"	"
Secaucus	NJ 3	9.25	8.0	"	"	"	"
Secaucus	NJ 3	9.45	10.0	"	"	"	"
Secaucus	NJ 3	9.8	9.5	"	"	"	"
Secaucus	NJ 3	10.1	9.5	"	"	"	"
Secaucus	NJ 3	10.45	11.6	"	"	"	"
Secaucus	NJ 3	10.5	13.4	"	"	"	"
Jersey City	NJ 7	0.1	20.0	9.9	11.9	14.7	17.5
Jersey City	NJ 7	0.25	11.0	"	"	"	"
Kearney	NJ 7	5	10.6	"	"	"	"
Kearney	NJ 7	2.2	5.3	"	"	"	"
Kearney	NJ 7	2.7	5.9	"	"	"	"
Kearney	NJ 7	3.65	6.0	"	"	"	"
Kearney	NJ 7	5.3	12.8	"	"	"	"
Bayonne	NJ 169	1.82	20.0	13.1	19.3	24.9	29.5
Bayonne	NJ 169	2.15	10.1	"	"	"	"
Bayonne	NJ 169	2.85	10.6	"	"	"	"
Bayonne	NJ 169	3.2	13.0	"	"	"	"
Bayonne	NJ 169	3.6	14.6	13.4	18.8	25.9	31.1
Bayonne	NJ 169	3.85	16.3	"	"	"	"
Jersey City	NJ 169	4.1	16.7	"	"	"	"
Jersey City	NJ 169	5.05	21.6	"	"	"	"
Bayonne	NJ 169	5.5	10.0	"	"	"	"
Jersey City	NJ 185	0.55	15.0	13.4	18.8	25.9	31.1
Jersey City	NJ 185	0.7	12.1	"	"	"	"

(CONTINUED)

Tidal Flooding Highway Locations in New Jersey

HUDSON COUNTY (CONTINUED)

Municipality	Road/Route	Mile Post	Road Elevation	SLOSH Surge Elevations Cat. 1	Cat. 2	Cat. 3	Cat. 4
Harrison	Interstate 280	15.4	15.0	10.6	12.5	15.1	17.1
Harrison	Interstate 280	15.6	12.0	"	"	"	"
Harrison	Interstate 280	15.75	13.8	"	"	"	"
Kearny	Interstate 280	15.9	12.0	"	"	"	"
Kearny	Interstate 280	16.45	15.5	"	"	"	"
Kearny	Interstate 280	16.55	10.4	"	"	"	"
Kearny	Interstate 280	17.05	15.7	"	"	"	"
Kearny	Interstate 280	17.1	12.7	"	"	"	"
Kearny	Interstate 280	17.65	7.0	"	"	"	"
Kearny	Interstate 280	17.85	7.0	"	"	"	"
Bayonne	NJ 440	20.55	11.3	11.1	12.2	14.8	18.3
Bayonne	NJ 440	20.8	13.0	"	"	"	"
Bayonne	NJ 440	20.9	10.8	"	"	"	"
Jersey City	NJ 440	21.1	10.5	"	"	"	"
Jersey City	NJ 440	21.3	11.1	"	"	"	"
Jersey City	NJ 440	21.9	10.2	"	"	"	"
Jersey City	NJ 440	22.15	9.4	"	"	"	"
Jersey City	NJ 440	22.55	9.7	9.9	11.9	14.7	17.5
Jersey City	NJ 440	22.65	9.8	"	"	"	"
Jersey City	NJ 440	22.9	10.0	"	"	"	"
Jersey City	NJ 440	23.15	11.0	"	"	"	"
Jersey City	NJ 440	23.3	9.0	"	"	"	"

UNION COUNTY

Municipality	Road/Route	Mile Post	Road Elevation	SLOSH Surge Elevations Cat. 1	Cat. 2	Cat. 3	Cat. 4
Rahway	US 1	38.4	13.2	-	-	16.4	21.8
Rahway	US 1	38.9	9.4	"	"	"	"
Rahway	US 1	39.2	19.0	"	"	"	"
Rahway	US 1	39.4	20.0	"	"	"	"
Rahway	US 1	39.55	17.6	"	"	"	"
Rahway	US 1	39.7	16.7	"	"	"	"
Linden	US 1	39.85	15.8	"	"	"	"
Linden	US 1	40.9	13.0	12.0	13.7	17.3	21.0
Linden	US 1	41.05	14.7	"	"	"	"
Linden	US 1	41.25	16.0	"	"	"	"
Linden	US 1	41.55	24.8	"	"	"	"
Linden	US 1	41.8	11.0	"	"	"	"
Linden	US 1	42.3	21.5	"	"	"	"
Linden	US 1	42.4	19.6	"	"	"	"
Linden	US 1	42.6	15.2	"	"	"	"
Linden	US 1	42.85	20.3	"	"	"	"
Elizabeth	US 1	43.0	26.5	"	"	"	"
Elizabeth	US 1	43.3	15.0	"	"	"	"
Elizabeth	US 1	43.4	12.6	"	"	"	"
Elizabeth	US 1	43.6	13.3	"	"	"	"
Elizabeth	US 1	43.8	15.7	"	"	"	"
Elizabeth	US 1	45.4	18.6	11.3	13.2	16.5	20.3
Elizabeth	US 1	45.5	14.0	"	"	"	"
Elizabeth	US 1	46.25	9.6	"	"	"	"
Rahway	NJ 27	27.3	14.0	-	-	16.4	22.3
Rahway	NJ 27	27.4	19.0	"	"	"	"
Rahway	NJ 27	27.5	15.6	"	"	"	"
Rahway	NJ 27	28.2	23.8	-	-	16.4	21.8
Rahway	NJ 27	28.4	13.9	-	-	16.4	21.8
Elizabeth	NJ 439	0.0	22.3	12.0	13.7	17.3	21.0
Elizabeth	NJ 439	0.15	16.6	"	"	"	"
Elizabeth	NJ 439	0.3	15.6	"	"	"	"

Metro New York Hurricane Transportation Study: Riverine Flooding Highway Locations in New Jersey

Municipality(ies) Left Side*	Right Side*	Road/Route	Mile Post	Top of Road	Bottom of Bridge	Distance (ft.) Above Mouth	Flood Elevations. 500 yr.	100 yr.	50 yr.	10 yr.
PASSAIC RIVER										
Essex Co.	*Bergen Co.*									
Belleville	N. Arlington	NJ7	5.26	15.5	11.0	44,380	15.5	11.0	9.6	7.2
Passaic Co.	*Bergen Co.*									
Nutley	Lyndhurst	Kingsland Ave.		17.8	16.8	54,100	17.0	12.3	10.6	7.5
Clifton City		NJ 21	9.0	18.0	N.A.	58,800	17.7	13.0	11.0	8.0
Clifton City		NJ 21	9.2	19.2	N.A.	59,200	17.7	13.0	11.0	8.0
Clifton City		NJ 21	9.8	19.0	N.A.	62,000	18.0	13.1	11.2	8.1
Clifton City		NJ 21	9.9	12.0	N.A.	63,000	18.1	13.1	11.2	8.2
Passaic City		NJ 21	10.9	16.0	N.A.	68,000	18.8	14.0	11.8	8.6
Passaic Co.										
Passaic	Rutherford	Union Ave.		19.5	18.0	68,000	19.0	14.0	11.8	8.8
Passaic	Rutherford	Gregory Ave./Maine Ave.		19.5	15.5	72,720	19.5	14.8	12.0	9.0
Bergen Co.										
Wallington		NJ 21	11.9	16.5	N.A.	74,800	20.2	15.8	13.0	9.4
Passaic Co.										
Passaic	Wallington	Second St.		21.5	17.5	76,050	20.5	16.0	13.2	9.6
Passaic	Wallington	West 8th St.		14.2	9.2	79,050	21.0	16.2	13.5	10.0
						82,200	*Saddle River confluence*			
Passaic	Garfield	Wall St.		13.5	12.0	83,050	21.5	17.0	14.0	10.8
Passaic	Garfield	Monroe St.		22.6	16.6	84,800	22.8	19.2	15.2	11.0
Clifton	Garfield	Ackerman Ave.		27.8	20.0	89,420	23.5	21.0	17.0	13.0
						91,800	*Dundee Dam*			
Paterson	Elmwood Park	Market St.		43.0	34.0	99,800	35.5	34.6	33.0	31.5
Paterson	Fair Lawn	Wagner Bridge/Maple Ave.		44.0	41.0	117,000	47.0	42.0	40.0	37.0
	Passaic Co.									
Paterson	Hawthorne	Lincoln Ave. - Begin NJ 20		45.5	39.0	118,150	49.0	43.0	40.5	37.6
Paterson	Paterson	Straight St.		50.5	46.5	127,100	51.0	48.0	46.0	43.0
Paterson	Paterson	Arch St.		46.0	44.0	128,800	52.5	50.0	47.5	46.0
Paterson	Paterson	Main St.		51.0	48.0	129,700	53.0	50.5	49.0	47.0
Paterson	Paterson	Mulberry St.		52.5	46.5	130,750	57.0	55.5	53.0	47.5
						133,850	*Great Falls*			
W. Paterson	Totowa	Totowa Road		127.0	124.5	141,300	131.0	128.0	126.0	122.8
W. Paterson	Totowa	Lackawanna Ave.		133.0	131.0	150,500	134.0	133.0	131.5	128.0
Little Falls T.	Totowa	NJ 23	4.5	174.0	170.0	162,980	174.5	170.0	168.5	166.5
Little Falls T.	Totowa	US 46	55.4	176.5	170.5	171,080	176.0	173.0	171.0	168.8

*** Left/right side of river facing upstream.**

Metro New York Hurricane Transportation Study: Riverine Flooding Highway Locations in New Jersey

Municipality(ies) Left Side*		Right Side*	Road/Route	Mile Post	Top of Road	Bottom of Bridge	Distance (ft.) Above Mouth	Flood Elevations. 500 yr.	100 yr.	50 yr.	10 yr.
PASSAIC RIVER (Continued)											
Essex Co.	•	*Morris co.*					*173,800*	*Pompton River confluence*			
Fairfield T.	•	Lincoln Park	Two Bridges Rd		175.0	170.0	173,950	176.0	173.0	171.0	169.0
Fairfield T.	•	Montville T.	Horseneck Rd.		173.5	171.0	219,000	176.8	173.5	172.0	170.0
Fairfield T.	•	Montville T.	US 46	51.4	181.0	172.5	234,700	177.5	174.5	173.0	171.0
Fairfield T.	•	Montville T.	Bloomfield Ave.		180.5	173.0	236,000	178.0	175.0	173.5	171.5
SADDLE RIVER											
Bergen Co.	•	*Bergen Co.*									
Garfield T.	•	Wallington T.	Midland Ave.		18.0	11.0	300	21.0	16.8	14.0	10.5
Garfield T.	•	Wallington T.	River Road		15.0	11.5	3,120	24.0	20.8	20.5	18.0
Lodi T.	•	Lodi T.	Terrace Ave.		23.2	19.0	8,180	29.0	26.8	26.2	21.2
Lodi T.	•	Lodi T.	Passaic Ave.		23.5	19.5	9,800	30.5	28.0	27.2	24.0
Lodi T.	•	Lodi T.	US 46	66.5	38.5	34.5	13,950	34.0	31.8	31.0	29.5
Lodi T.	•	Lodi T.	Outwater Lane		42.0	36.5	16,520	39.2	37.5	36.0	33.5
POMPTON RIVER											
Passaic Co.	•	*Passaic Co.*									
Lincoln Park	•	Wayne T.	US 202 (Boonton Turnpik	62.4	173.0	170.0	7,430	177.5	175.5	174.5	171.5
Pequannock T.	•	Wayne T.	Pompton Turnpike		180.8	175.8	24,380	183.0	181.5	180.8	177.8
Pequannock T.	•	Wayne T.	NJ 23	9.6	190.0	181.0	27,290	184.5	183.0	182.0	179.3
RAMAPO RIVER											
Morris Co.		*Passaic Co.*									
Pomp. Lakes T.	•	Wayne T.	Dawes Hwy		189.5	187.5	7336	192.0	189.5	188.5	187.0
Pomp. Lakes T.	•	Wayne T.	Paterson-Hamburg Tpk.		190.5	188.5	9,850	197.0	194.0	193.0	188.0
PEQUANNOCK RIVER											
Passaic Co.	•	*Passaic Co.*									
Riverdale T.	•	Pomp. Lakes T.	Riverdale Road		192.0	187.5	10,300	192.5	191.5	190.0	187.5
ROCKAWAY RIVER											
Morris Co.	•	*Morris Co.*									
Parsip. Hills T.	•	Montville T.	US 46		178.0	173.0	12,000	179.0	176.0	175.0	173.0
Parsip. Hills T.	•	Montville T.	Vail Road		177.0	174.0	20,000	181.0	179.0	178.0	175.0
WHIPPANY RIVER											
Morris Co.	•	*Morris Co.*									
Hanover T.	•	Parsip. Hills T.	Edward's Road		171.0	168.0	1,625	178.5	177.0	175.5	173.0

*** Left/right side of river facing upstream.**

Flooding Induced Traffic Disruption Locations*

NJDOT Region	County	Municipality	Road/Route	Mile Post
II	Bergen	Englewood	4	9.7
II		Lodi	17 N	10
II		E. Rutherford	17 N	4.93
II		Lodi	46	6.65
II		Lodi	80 W	63.9
II		Bogota	80 E	67.1
II		Leonia	93	1.7 - 2.6
II		Teaneck	95 S	74.1
II		Carlstadt	120 N	1.0
II	Essex	Newark	1&9 S	49.4
II		Newark	21 N	4.5
II		Verona	23 N	0.3
II		Newark	78 E	56.2 - 57.0
II		Newark	280	13.8 - 14.5
II	Hudson	Kearny	1&9t E	1.45
II		Kearny	7	3.1 - 3.6
II		E. Rutherford	17	5.2 - 5.8
II		Jersey City	440	22.1
I	Hunterdon	Readington T.	22WB	26.9
III	Middlesex	No. Brunswick T.	1 NB	22.4
III		Edison T.	1 SB	28.7 - 29
III		Woodbridge T.	1 & 9	36.7
III		So. Brunswick T.	1 SB	15.9
III		Old Bridge T.	9 NB	125.3
III		Woodbridge T.	9 SB	133.5
III		Woodbridge T.	9 NB	135.3
III		Woodbridge T.	9 NB	135.6
III		Woodbridge T.	9	135.8
III		E. Brunswick T.	18	37.1
III		E. Brunswick T.	18 EB	38.9
III		New Brunswick	18 EB	41.2
III		South Plainfield Boro.	28WB	6.0
III		Monroe T.	33	17.3
III		Old Bridge T.	35	45.3
III		Sayreville	35	50.7
III		No. Brunswick T.	91	0.7
III		Cranbury T.	130	72.7
III		Sayreville	440	Ramp GM
I	Morris	Morristown	24	0.0 - 7.4
I		Riverside Boro.	23	13.6
I		Butler Boro.	23	15.2
I		West Mitford T.	23	23.8

(CONTINUED)

*As reported by NJDOT Regional Construction & Maintenance Offices

Flooding Induced Traffic Disruption Locations*

NJDOT Region	County	Municipality	Road/Route	Mile Post
I		Dover Twp.	46	39.0 - 40.0
I		Rockaway T. & Montville Twp.	46WB	49.5
I		Morris Plains Bor. thru Denville T.	53	0.0 - 7.4
I		Harding T. to Morris Plains B.	202	39.0 - 47.0
II	Passaic	Paterson	20	3.3
II		Clifton	46	62.5 - 62.8
I	Somerset	Readington T.	22WB	28.6
I		Branchburg T.	22WB	29.9
I		Bridgewater T.	22EB @ I-287 Inter.	32.0
I		Bridgewater T.	22WB	36.8
I		North Plainfield Bor.	22WB	43.8, 45.1
I		North Plainfield Bor.	22WB	45.3
I		Watchnung Bor.	78	42.2 (Exit 41)
I		Bernardsville Bor.	202	34.3 - 34.6
I		Franklin T.	287NB	12.1
I		Bernards Twp.	287SB	28.1
II	Union	Rahway	1&9	38.6
III		Rahway	35	58.0

*As reported by NJDOT Regional Construction & Maintenance Offices

APPENDIX I

NEW YORK AND CONNECTICUT HIGHWAYS

POTENTIAL HURRICANE HAZARDS

AND

FACILITY VULNERABILITY

FDR DRIVE

Critical Elevations (NGVD)

Above 59th Street Bridge	6.0 feet

Potential Hurricane Surge

Category 1	9.2 feet
Category 2	14.1 feet
Category 3	17.4 feet
Category 4	22.3 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	0.5 hours
Category 2	1.2 hours
Category 3	1.5 hours
Category 4	2.0 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

BROOKLYN BRIDGE, WILLIAMSBURG BRIDGE

Critical Elevations (NGVD)

Center Span	133.0 feet

Potential Hurricane Surge

Category 1	–
Category 2	–
Category 3	–
Category 4	–

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *	Sustained Tropical Strom Winds*
Category 1	–	3.0 Hours
Category 2	–	5.0 Hours
Category 3	–	6.0 Hours
Category 4	–	7.0 Hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

MANHATTAN BRIDGE, QUEENSBORO BRIDGE

Critical Elevations (NGVD)

Center Span 135.0 feet

Potential Hurricane Surge

Category 1	–
Category 2	–
Category 3	–
Category 4	–

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *	Sustained Tropical Strom Winds*
Category 1	–	3.0 Hours
Category 2	–	5.0 Hours
Category 3	–	6.0 Hours
Category 4	–	7.0 Hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

FDR DRIVE

Critical Elevations (NGVD)

Vincinity of Williamsburg Bridge 6.0 feet

Potential Hurricane Surge

Category 1	9.7 feet
Category 2	14.7 feet
Category 3	22.0 feet
Category 4	24.9 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	0.5 hours
Category 2	1.3 hours
Category 3	1.8 hours
Category 4	2.2 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

WEST STREET

Critical Elevations (NGVD)

Low Point	9.0 feet

Potential Hurricane Surge

Category 1	10.6 feet
Category 2	16.4 feet
Category 3	24.3 feet
Category 4	28.6 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	0.2 hours
Category 2	0.8 hours
Category 3	1.4 hours
Category 4	1.7 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

MARINE PARKWAY BRIDGE APPROACHES

Critical Elevations (NGVD)

Beach Channel Drive Approach	8.0 feet

Potential Hurricane Surge

Category 1	7.0 feet
Category 2	14.4 feet
Category 3	20.6 feet
Category 4	27.2 feet

Time Hazards Could Occur (hours before closest approach of eye)

	Surge Flooding *
Category 1	–
Category 2	0.9 hours
Category 3	1.4 hours
Category 4	1.8 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

BATTERY PARK TUNNEL

Critical Elevations (NGVD)

Entrance Low Point	9.0 feet

Potential Hurricane Surge

Category 1	10.5 feet
Category 2	16.6 feet
Category 3	24.0 feet
Category 4	28.7 feet

Time Hazards Could Occur
(hours before closest approach of eye)

	Surge Flooding *
Category 1	0.2 hours
Category 2	0.8 hours
Category 3	1.4 hours
Category 4	1.7 hours

* assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size

GRAND CENTRAL PARKWAY/ WHITESTONE EXPRESSWAY

No Critical Facility Elevation Data Available

Potential Hurricane Surge

Category 1	6.6 feet
Category 2	11.6 feet
Category 3	16.2 feet
Category 4	20.9 feet

BRONX RIVER PARKWAY, CROSS BRONX EXPRESSWAY, HUTCHINSON RIVER PARKWAY, THROGS NECK EXPRESSWAY

No Critical Facility Elevation Data Available

Potential Hurricane Surge

Category 1	6.5 feet
Category 2	11.4 feet
Category 3	16.2 feet
Category 4	22.7 feet

HARLEM RIVER DRIVE

No Critical Facility Elevation Data Available

Potential Hurricane Surge

Category 1	8.4 feet
Category 2	12.7 feet
Category 3	16.4 feet
Category 4	20.4 feet

BELT PARKWAY/CROSS BAY BOULEVARD AT JAMAICA BAY

No Critical Facility Elevation Data Available

Potential Hurricane Surge

Category 1	6.6 feet
Category 2	15.6 feet
Category 3	24.5 feet
Category 4	31.2 feet

CROSS ISLAND PARKWAY

No Critical Facility Elevation Data Available

Potential Hurricane Surge

Category 1	6.3 feet
Category 2	11.5 feet
Category 3	18.5 feet
Category 4	25.0 feet

ARTHUR KILL ROAD

No Critical Facility Elevation Data Available

Potential Hurricane Surge

Category 1	9.9 feet
Category 2	16.0 feet
Category 3	20.0 feet
Category 4	26.2 feet

FATHER CAPODANNO BOULEVARD

No Critical Facility Elevation Data Available

Potential Hurricane Surge

Category 1	9.3 feet
Category 2	15.3 feet
Category 3	20.5 feet
Category 4	26.5 feet

BELT PARKWAY AT GRAVESEND BAY

No Critical Facility Elevation Data Available

Potential Hurricane Surge

Category 1	9.2 feet
Category 2	15.2 feet
Category 3	20.8 feet
Category 4	27.2 feet

BROOKLYN-QUEENS EXPRESSWAY NEAR BROOKLYN BRIDGE

No Critical Facility Elevation Data Available

Potential Hurricane Surge

Category 1	10.2 feet
Category 2	16.0 feet
Category 3	25.1 feet
Category 4	31.3 feet

MAJOR ARTERIAL FLOODING LOCATIONS
New York City Department of Transportation

MANHATTAN

1. F.D.R. DRIVE SOUTHBOUND JACKSON STREET
2. F.D.R. DRIVE SOUTHBOUND CHERRY STREET
3. F.D.R. DRIVE NORTHBOUND GRAND AVE - HOUSTON ST.
4. F.D.R. DRIVE BOTH DIRECTIONS 23 ST. - 25 ST.
5. F.D.R. DRIVE NORTHBOUND 63 ST. - 70 ST.
6. F.D.R. DRIVE BOTH DIRECTIONS 106 ST.
7. F.D.R. DRIVE BOTH DIRECTIONS 118 ST. - 120 ST.
8. HARLEM RIVER DRIVE NORTHBOUND 125 ST.
9. HARLEM RIVER DRIVE BOTH DIRECTIONS 145 ST.-155 ST.
10. HARLEM RIVER DRIVE BOTH DIRECTIONS 175 ST. - 190 ST.
11. HENRY HUDSON PARKWAY SOUTHBOUND 79 ST.
12. HENRY HUDSON PARKWAY SOUTHBOUND 95 ST.
13. HENRY HUDSON PARKWAY NORTHBOUND 96 ST. - 125 ST.
14. HENRY HUDSON PARKWAY NORTHBOUND 180 ST.

BROOKLYN

1. BELT PARKWAY BOTH DIRECTIONS 79 ST. - HOWARD BEACH
2. BELT PARKWAY WESTBOUND 95 STREET
3. BELT PARKWAY AT PLUM BEACH (EASTBOUND)
4. BELT PARKWAY EASTBOUND LEFT LANE ROCKAWAY PARKWAY - PENNSYLVANIA AVENUE
5. BELT PARKWAY WESTBOUND LEFT LANE 17 AVENUE
6. BROOKLYN QUEENS EXPRESSWAY EASTBOUND BROOKLYN BRIDGE
7. BROOKLYN QUEENS EXPRESSWAY EASTBOUND RAPLEY STREET TUNNEL
8. PROSPECT EXPRESSWAY SOUTHBOUND LEFT LANE CATON AVENUE
9. PROSPECT EXPRESSWAY NORTHBOUND LEFT LANE 4TH AVENUE

BRONX

1. BRONX RIVER PARKWAY BOTH DIRECTIONS/GUN HILL ROAD ENTRANCE
2. BRONX RIVER PARKWAY BOTH DIRECTIONS WESTCHESTER AVENUE
3. BRUCKNER EXPRESSWAY NORTHBOUND MIDDLETOWN ROAD
4. CROSS BRONX EXPRESSWAY BOTH DIRECTIONS JEROME AVENUE
5. CROSS BRONX EXPRESSWAY BOTH DIRECTIONS GRAND CONCOURSE
6. HENRY HUDSON PARKWAY SOUTHBOUND IN THE AREA OF BROADWAY
7. MOSHOLU SOUTHBOUND RIGHT LANE FROM NORTHBOUND HENRY HUDSON PARKWAY
8. HUTCHINSON RIVER PARKWAY SOUTHBOUND RIGHT LANE JUST BEFORE BRUCKNER
9. CROSS BRONX EXPRESSWAY WESTBOUND WESTCHESTER AVENUE

STATEN ISLAND

1. STATEN ISLAND EXPRESSWAY RIGHT SHOULDER BOTH DIRECTIONS HYLAN BOULEVARD
2. STATEN ISLAND EXPRESSWAY RIGHT SHOULDER EASTBOUND RICHMOND AVENUE EXIT
3. STATEN ISLAND EXPRESSWAY WESTBOUND BRADLEY AVENUE EXIT
4. STATEN ISLAND EXPRESSWAY EASTBOUND VICTORY BOULEVARD EXIT
5. STATEN ISLAND EXPRESSWAY WESTBOUND RICHMOND AVENUE EXIT
6. MARTIN LUTHER KING EXPRESSWAY NORTHBOUND FOREST AVENUE ENTRANCE
7. MARTIN LUTHER KING EXPRESSWAY BOTH DIRECTIONS WALKER STREET UNDERPASS

MAJOR ARTERIAL FLOODING LOCATIONS
(Continued)
New York City Department of Transportation

QUEENS

1. GRAND CENTRAL PARKWAY, NORTHBOUND KEW GARDENS INTERCHANGE TO LONG ISLAND EXPRESSWAY
2. CROSS ISLAND PARKWAY, SOUTHBOUND BELL-NORTHERN BOULEVARD
3. CROSS ISLAND PARKWAY NORTHBOUND-EXIT RAMPS BOTH DIRECTIONS NORTHERN BOULEVARD
4. WHITESTONE EXPRESSWAY NORTHBOUND 14 AVE.
5. LONG ISLAND EXPRESSWAY-GRAND CENTRAL PARKWAY TO VAN WYCK EXPRESSWAY
6. VAN WYCK EXPRESSWAY SOUTHBOUND-LONG ISLAND EXPRESSWAY TO JEWEL AVENUE
7. VAN WYCK EXPRESSWAY SOUTHBOUND ENTRANCE RAMPS FROM JEWEL AVENUE
8. INTERBORO PARKWAY-METROPOLITAN AVENUE TO MYRTLE AVENUE
9. LONG ISLAND EXPRESSWAY BOTH DIRECTIONS R/R/ OVERPASS TO MAURICE AVENUE
10. BROOKLYN QUEENS EXPRESSWAY EASTBOUND NORTHERN BOULEVARD
11. GRAND CENTRAL PARKWAY EASTBOUND RIGHT LANE BET. STEIWNWAY & 71 STREET
12. VAN WYCK EXPRESSWAY NORTHBOUND LIBERTY AVE

Source: NYCDOT September 28, 1993 Memo from William T. Donley (Director, Arterial Highways) to Frank N. Gallo (Assistant Commissioner) regarding Arterial Flooding Locations.

NEW YORK THRUWAY

Critical Elevations (NGVD)

Tappan Zee Bridge Center Span	150 feet

Potential Hurricane Surge

Category 1	----
Category 2	----
Category 3	----
Category 4	----

Time Hazards Could Occur (Hours Before Closest Approach of Eye)

	Surge Flooding*	Sustained Tropical Storm Winds*
Category 1	------	3.0 hours
Category 2	------	5.0 hours
Category 3	------	6.0 hours
Category 4	------	7.0 hours

*Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size.

NEW YORK STATE OFFICE OF PARKS, RECREATION, AND HISTORIC PRESERVATION

Critical Elevations (NGVD)

Meadowbrook State Parkway in Nassau County	7.3 feet

Potential Hurricane Surge

Category 1	4.7 feet
Category 2	15.4 feet
Category 3	23.8 feet
Category 4	28.0 feet

Time Hazards Could Occur (Hours Before Closest Approach of Eye)

	Surge Flooding*
Category 1	----
Category 2	1.0 hours
Category 3	1.7 hours
Category 4	2.0 hours

*Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size.

NEW YORK STATE OFFICE OF PARKS, RECREATION, AND HISTORIC PRESERVATION

Critical Elevations (NGVD)

Wantagh State Parkway in Nassau County 6.3 feet

Potential Hurricane Surge

Category 1	4.4 feet
Category 2	14.0 feet
Category 3	22.3 feet
Category 4	29.2 feet

Time Hazards Could Occur (Hours Before Closest Approach of Eye)

	Surge Flooding*
Category 1	----
Category 2	0.8 hours
Category 3	1.8 hours
Category 4	2.2 hours

*Assumes 40 mph forward speed and hypothetical SLOSH model storm parameters regarding storm intensity and size.

FLOOD VULNERABILITY FACT SHEET
INTERSTATE ROUTE 95
FAIRFIELD COUNTY, CONNECTICUT

Map Key Number	Community	Location	Estimated Elevation	Surge Elev. Cat. 1&2	Surge Elev. Cat. 3	Surge Elev. Cat. 4	10-year freq. flood	50-year freq. flood	100-year freq. flood	500-year freq. flood
1	Fairfield	Mill River	16.0' Note 1	12.0'	15.5'	18.5'	8.8'	10.3'	11.2'	18.6'
2	Westport	Sherwood Mill Pond	13.3' Note 2	11.7'	15.0'	18.5'	9.0'	10.5'	11.2'	N/A
3	Westport	Sherwood Mill Pond	17.4' Note 3	11.7'	15.0'	18.5'	9.0	10.5'	11.2'	N/A
4	Norwalk	Keelers Brook	76.0' Note 4	12.0'	15.0'	18.5'	70.0'	73.3'	77.8'	78.7'

(ELEVATIONS REFERENCED TO NGVD, 1929)

NOTES:

[1] Determined from Plate 05P (Flood Profile of Mill River), FEMA's FIS for the Town of Fairfield, August 15, 1986.

[2] Determined from Construction Drawings, CT Department of Transportation.

[3] Determined from Panel 2 (Floodway Map), FEMA's FIS for the Town of Westport, December 4, 1984.

[4] Determined from Plate 06P (Flood Profile of Keelers Brook), FEMA's FIS for the City of Norwalk, August 19, 1986.