



View looking southeast at Manhattan skyline
from Pier "C" Park

TABLE OF CONTENTS

LIST OF ACRONYMS	LA-1	
GLOSSARY/DEFINITIONS	G-1	
EXECUTIVE SUMMARY.....	ES-1	
1.0 INTRODUCTION.....	1-1	
1.1 Project Location And Topography.....	1-2	
1.2 Project Background.....	1-5	
1.3 Coastal Flooding	1-7	
1.4 Systemic Inland Flooding	1-11	
1.5 Project Authorization And Regulatory Framework	1-12	
1.6 Funding	1-13	
2.0 PURPOSE AND NEED.....	2-1	
2.1 Purpose.....	2-1	
2.2 Need	2-1	
2.3 Goals and Objectives.....	2-3	
3.0 CONCEPT AND ALTERNATIVE DEVELOPMENT	3-1	
3.1 Concept Development	3-2	
3.2 Description of Concepts.....	3-10	
3.3 Concept Screening.....	3-20	
3.4 Concept Evaluation.....	3-20	
3.5 Concept Refinement.....	3-24	
3.6 Three Build Alternatives	3-26	
3.7 No Action Alternative.....	3-37	
4.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES	4-1	
4.1 Natural Resources	4-4	
4.1.1 Methodology	4-4	
4.1.2 Affected Environment	4-6	
4.1.3 Environmental Consequences	4-27	
4.2 Cultural Resources	4-51	
4.2.1 Methodology	4-54	
4.2.2 Existing Conditions	4-56	
4.2.3 Potential Effects on Cultural Resources	4-79	
4.3 Noise.....	4-93	

4.3.1 Methodology	4-93	4.9.3 Environmental Consequences.....	4-206	system.....	ES-9
4.3.2 Affected Environment.....	4-95	4.10 Summary of the Environmental Consequences	4-215	Figure ES.10 ROW Site depicting tanks.....	ES-9
4.3.3 Environmental Consequences.....	4-96	5.0 CUMULATIVE IMPACTS.....	5-1	Figure ES.11 ROW Site depicting tanks.....	ES-9
4.3.4 Mitigation Measures and BMPs under Alternatives 1, 2, and 3.....	4-102	5.1 Methodology.....	5-1	Figure ES.12 NJ TRANSIT Site Schematic.....	ES-10
4.4 Vibration.....	4-104	5.2 Existing Conditions	5-4	Figure ES.13 Block 10 Site, Underground tanks and urban amenities...ES-10	
4.4.1 Construction-Related Vibration Assessment Methodology	4-104	5.3 Past, Present, Reasonably Foreseeable Future Projects	5-7	Figure ES.14 Alternative 1.....	ES-12
4.4.2 Environmental Consequences.....	4-106	5.4 Potential Cumulative Impacts.....	5-11	Figure ES.15 Alternative 1 - Resist alignment features.....	ES-13
4.4.3 Mitigation Measures and BMPs in Alternatives 1, 2, and 3.....	4-110	5.5 Mitigation	5-17	Figure ES.16 Alternative 2 - Resist alignment features.....	ES-13
4.5 Visual and Aesthetic Resources.....	4-113	6.0 ALTERNATIVES ANALYSIS.....	6-1	Figure ES.17 Alternative 2.....	ES-14
4.5.1 Methodology- Waterfront Visual Impact Assessment.....	4-113	6.1 Development of Impact Criteria.....	6-1	Figure 1.1 Comprehensive Stormwater Management Schematic	1-1
4.5.2 Affected Environment.....	4-114	6.2 Summary of Findings, Impacts, and Benefits	6-7	Figure 1.2 Project Location Map.....	1-2
4.5.3 Environmental Consequences.....	4-117	6.3 Preferred Alternative	6-14	Figure 1.3 Flood Zone Schematic.....	1-2
4.5.4 Aesthetic Considerations.....	4-120	7.0 CONSULTATION AND COORDINATION.....	7-1	Figure 1.4 Study Area Map	1-3
4.6 Air Quality.....	4-127	7.1 Consultation and Coordination Framework	7-1	Figure 1.5 Preliminary FIRM Flood Zone Map.....	1-5
4.6.1 Methodology	4-128	7.2 Agency and Stakeholder Groups	7-3	Figure 1.6 Study Area Inundation during Superstorm Sandy.....	1-6
4.6.2 Affected Environment.....	4-129	7.3 Community Involvement.....	7-4	Figure 1.7 Combined Sewer Schematic.....	1-7
4.6.3 Environmental Consequences.....	4-130	7.4 Agency Coordination Meetings	7-10	Figure 1.8 Topography / NHSA Sewershed / Flooding Hot Spots Map	1-9
4.6.4 Greenhouse Gas Assessment	4-132	7.5 Individual Stakeholder Meetings	7-11	Figure 2.1 Critical Infrastructure	2-2
4.7 Hazardous Materials	4-134	7.6 Ongoing Agency Outreach	7-12	Figure 3.1 Rebuild by Design competition idea board	3-2
4.7.1 Methodology	4-134	LIST OF FIGURES		Figure 3.2 Toolkit Components – Types of Resist and DSD Features.....	3-3
4.7.2 Affected Environment.....	4-136	Figure ES.1 Study Area Map	ES-2	Figure 3.3 Toolkit Components – Resist.....	3-4
4.7.3 Environmental Consequences.....	4-140	Figure ES.2 Rebuild By Design competition idea board.....	..ES-3	Figure 3.4 Toolkit Components – DSD.....	3-5
4.8 Socioeconomics and Land Use	4-149	Figure ES.3 Roadmap to Preferred Alternative.....	ES-5	Figure 3.5 Toolkit Component Schematic.....	3-6
4.8.1 Methodology	4-149	Figure ES.4 Alternative 3 - Resist alignment features.....	ES-6	Figure 3.6 Screening Criteria Schematic.....	3-7
4.8.2 Affected Environment.....	4-151	Figure ES.5 Alternative 3 - Resist alignment features	ES-6	Figure 3.7 All Concepts "Subway" Map.....	3-9
4.8.3 Environmental Consequences.....	4-181	Figure ES.6 Rendering of gate in open position, 14th Street and Wash- ington Street.....	ES-7	Figure 3.8 Concept A - Resist Structure Lincoln Harbor Light Rail Station.....	3-10
4.9 Transportation and Infrastructure	4-199	Figure ES.7 Rendering of urban amenities within the alleyway	ES-7	Figure 3.9 Concept A – South to Garden Street.....	3-10
4.9.1 Methodology	4-199	Figure ES.8 Preferred Alternative	ES-8	Figure 3.10 Concept A - Option 1 along Observer Highway, within Rail Yard.....	3-10
4.9.2 Affected Environment.....	4-199	Figure ES.9 BASF Site depicting tanks and typical "High Level" Storm sewer system.....	ES-9	Figure 3.11 Concept A - Option 2 along Observer Highway	3-10
		Figure 3.12 DSD - Small ROW Tank	3-10		

Figure 3.13 Concept A.....	3-11	Figure 3.43 Resist Structure along 15th St. and Washington St.....	3-30	Figure 4.18 Modeled Increase in Flood Depths – Alternative 2	4-38
Figure 3.14 Concept B – Seawall along Waterfront in front of Hudson Tea Building.....	3-12	Figure 3.44 Cove Park, southwest corner of Weehawken Cove	3-30	Figure 4.19 Floodplain Impacts Map – Alternative 3	4-39
Figure 3.15 Concept B – Sinatra Drive North	3-12	Figure 3.45 Alternative 2	3-31	Figure 4.20 Modeled Increase in Flood Depths – Alternative 3	4-40
Figure 3.16 Concept B - Deployable Wall along 1st Street.....	3-12	Figure 3.46 Potential amenities along Washington Street.....	3-32	Figure 4.21 Impacted Wetlands	4-44
Figure 3.17 Concept B - Alignment along Observer Highway.....	3-12	Figure 3.47 Options 1 & 2 along Hoboken Terminal Yard.....	3-32	Figure 4.22 Upland Vegetation Impacts – Alternative 1	4-46
Figure 3.18 Concept B	3-13	Figure 3.48 Alternative 2 urban amenities along NJ TRANSIT railroad embankment.....	3-32	Figure 4.23 Upland Vegetation Impacts – Alternative 2	4-47
Figure 3.19 Concept C - In-water revetment.....	3-14	Figure 3.49 Alternative 2 alignment along HBLR tracks.....	3-32	Figure 4.24 Upland Vegetation Impacts – Alternative 3	4-48
Figure 3.20 Concept C - Sinatra Drive North.....	3-14	Figure 3.50 High Level Storm Sewer System, northern portion	3-33	Figure 4.25 Archaeological APE	4-52
Figure 3.21 Concept C – Frank Sinatra Drive.....	3-14	Figure 3.51 High Level Storm Sewer System, southern portion	3-34	Figure 4.26 Historic Architectural APE.....	4-53
Figure 3.22 Concept C – Hoboken Terminal.....	3-14	Figure 3.52 Alternative 3 along the alleyway to Washington St.....	3-35	Figure 4.27 Plan and Profile of Sewer in Ferry St from Hudson Street to Jefferson St - Whittemore 1940.....	4-55
Figure 3.23 Concept C	3-15	Figure 3.53 Urban amenities within the alleyway.....	3-35	Figure 4.28 Detail of brick sewer in Newark St from Park Ave to Harrison St, Whittemore 1940.....	4-55
Figure 3.24 Concept D – Harbor Blvd.	3-16	Figure 3.54 Urban amenities within the alleyway.....	3-35	Figure 4.29 Detail of Adams St. sewer Between 13th & 17th St., Whittemore 1940.....	4-55
Figure 3.25 Concept D – Sinatra Drive North.....	3-16	Figure 3.55 Alternative 3 urban amenities.....	3-35	Figure 4.30 Small ROW tank location schematic	4-56
Figure 3.26 Concept D - Sinatra Drive South	3-16	Figure 3.56 Alternative 3	3-36	Figure 4.31 Segments of the Archaeological APE	4-60
Figure 3.27 Concept D – South of Hoboken Terminal	3-16	Figure 4.1 Study Area	4-2	Figure 4.32 Reproduction of Bailey and Ward, City of Hoboken, 1881.....	4-61
Figure 3.28 Concept D.....	3-17	Figure 4.2 Natural Ecosystems Analysis Area Map.....	4-5	Figure 4.33 Map of the city and county of New York, Burr 1832; Red Arrow points to Paterson Planck Road.....	4-63
Figure 3.29 Concept E – Resist Structure Lincoln Harbor Light Rail Station	3-18	Figure 4.3 Geology Map	4-7	Figure 4.34 Plank Road Hoboken Meadows toll Plank Walk, 4th and Willow Avenue to foot of hill Between 7th and 8th Streets, circa 1890.....	4-63
Figure 3.30 Concept E – Option 1 along Hudson Street.....	3-18	Figure 4.4 Soils Map	4-8	Figure 4.35 Topographical Map of Hoboken, Speilmann and Brush 1880.....	4-64
Figure 3.31 Concept E – Option 2 along Shipyard Lane	3-18	Figure 4.5 Sole Source Aquifer Map	4-10	Figure 4.36. Waterfont Development, Hopkins, 1909.....	4-66
Figure 3.32 Concept E – Observer Highway and Washington Street.....	3-18	Figure 4.6 Groundwater Observation Well Location Map	4-11	Figure 4.37 Image of Tietjen and Lang circa 1942.....	4-66
Figure 3.33 Concept E	3-19	Figure 4.7 U.S. Coastal Survey, 1844.....	4-12	Figure 4.38 Artist depiction of expanding industry in city of Hoboken, Hughes and Bailey, 1904.....	4-67
Figure 3.34 Potential Lincoln Harbor Ferry Stop.....	3-26	Figure 4.8 Map showing conveyances on Hudson River.....	4-12	Figure 4.39 Historic Illustration of Crib Wall with Concrete Filling, North German Lloyd Co., Hoboken, NJ., 1917.....	4-68
Figure 3.35 Cove Park	3-26	Figure 4.9 Tideland Claim Map.....	4-22	Figure 4.40 Known Historic Properties.....	4-72
Figure 3.36 Potential Amenities at Cove Park.....	3-26	Figure 4.10 Delineated Wetlands Map	4-24		
Figure 3.37 Alternative 1	3-27	Figure 4.11 Soils Impact Map – Alternative 1	4-28		
Figure 3.38 Maxwell Place Park, bermed terraced area	3-28	Figure 4.12 Soils Impact Map – Alternative 2	4-29		
Figure 3.39 Tool Kit Amenities.....	3-28	Figure 4.13 Soils Impact Map – Alternative 3	4-30		
Figure 3.40 ROW Site – typical small tank.....	3-28	Figure 4.14 Bulkhead Replacement – Alternative 1	4-33		
Figure 3.41 BASF – Underground Storage Tanks.....	3-29	Figure 4.15 Modeled Increase in Flood Depths – Alternative 1	4-35		
Figure 3.42 Block 10 Site –Underground Storage Tanks.....	3-29	Figure 4.16 Floodplain Impacts Map – Alternative 1	4-36		
		Figure 4.17 Floodplain Impacts Map – Alternative 2	4-37		

Figure 4.41 Area of Archaeological Potential to be Affected by the Project – Alternative 1.....	4-81	Figure 4.60 Visual depiction of Resist feature and urban amenities along Washington Street.....	4-124	Figure 4.82 Population Age 75 and Over (Block Groups) – Alternative 2	4-166
Figure 4.42 Area of Archaeological Potential to be Affected by the Project – Alternative 2.....	4-83	Figure 4.61 Visual depiction of Resist feature in the alleyway, Bloomfield Street in the background.....	4-125	Figure 4.83 Population Age 75 and Over (Block Groups) – Alternative 3	4-167
Figure 4.43 Area of Archaeological Potential to be Affected by the Project – Alternative 3.....	4-85	Figure 4.62 Visual depiction of Resist feature in the alleyway, Washington Street in the background.....	4-125	Figure 4.84 Land Use	4-168
Figure 4.44 Potential Effects on Known Historic Properties - Alternative 1....	4-87	Figure 4.63 Hazardous Waste Analysis Area.....	4-135	Figure 4.85 Zoning Map	4-169
Figure 4.45 Potential Effects on Known Historic Properties - Alternative 2....	4-89	Figure 4.64 Recognized Environmental Conditions.....	4-137	Figure 4.86 Redevelopment and Rehabilitation Areas.....	4-171
Figure 4.46 Potential Effects on Known Historic Properties - Alternative 3....	4-91	Figure 4.65 Recognized Environmental Conditions – Alternative 1	4-141	Figure 4.87 Open Space.....	4-176
Figure 4.47 Background Noise Monitoring Location	4-97	Figure 4.66 Recognized Environmental Conditions – Alternative 2	4-144	Figure 4.88 Critical Infrastructure.....	4-178
Figure 4.48 Existing Outdoor Noise Classification	4-98	Figure 4.67 Recognized Environmental Conditions – Alternative 3	4-145	Figure 4.89 Potential Construction Easements - Alternative 1.....	4-182
Figure 4.49 Structural Damage- Impact Pile Driving – Alternative 1	4-108	Figure 4.68 Demographic Analysis Area.....	4-150	Figure 4.90 Potential Construction Easements - Alternative 2.....	4-183
Figure 4.50 Structural Damage- Impact Pile Driving – Alternative 2	4-109	Figure 4.69 Minority (Block Groups) – Alternative 1.....	4-153	Figure 4.91 Potential Construction Easements - Alternative 3.....	4-185
Figure 4.51 Structural Damage- Impact Pile Driving – Alternative 3	4-111	Figure 4.70 Minority (Block Groups) – Alternative 2.....	4-154	Figure 4.92 Transportation Map	4-200
Figure 4.52 Key Map of Visual Photographs.....	4-114	Figure 4.71 Minority (Block Groups) – Alternative 3.....	4-155	Figure 4.93 Transportation Map; Map Source: Imagery © 2017 Google, Map data.....	4-201
Figure 4.53 Viewpoint 1: Rendering Number 1, Lincoln Harbor, Weehawken	4-117	Figure 4.72 Hispanic or Latino (Block Groups) – Alternative 1	4-156	Figure 4.94 Hoboken Northern Ingress/Egress LOS (PM Peak); Map Source: Imagery © 2017 Google, Map data.....	4-201
Figure 4.54 Viewpoint 2: Rendering Number 2, 1600 Park Avenue, Hoboken.....	4-118	Figure 4.73 Hispanic or Latino (Block Groups) – Alternative 2	4-157	Figure 4.95 Observer Highway at Washington Street LOS (PM peak); Map Source: Imagery © 2017 Google, Map data.....	4-201
Figure 4.55 Viewpoint 3: Rendering Number 3, Tea Building Park, Hoboken.....	4-118	Figure 4.74 Hispanic or Latino (Block Groups) – Alternative 3	4-158	Figure 4.96 Observer Highway at Washington Street LOS (PM peak); Imagery © 2017 Google, Map data.....	4-202
Figure 4.56 Viewpoint 4: Rendering Number 4, Shipyard Park, Hoboken.....	4-119	Figure 4.75 Households below the Poverty Level (Census Tracts) – Alternative 1	4-159	Figure 4.97 Hoboken Area Bike Network; Imagery © 2017 Google, Map data.....	4-202
Figure 4.57 Viewpoint 5: Rendering Number 5, Sinatra Drive, between 2nd Street and 3rd Street, Hoboken.....	4-119	Figure 4.76 Households below the Poverty Level (Census Tracts) – Alternative 2	4-160	Figure 4.98 Bikeshare Stations.....	4-202
Figure 4.58 Visual depiction of Resist feature along HBLR, southwest portion of Study Area.....	4-123	Figure 4.77 Households below the Poverty Level (Census Tracts) – Alternative 3	4-161	Figure 4.99 Bus Routes with Bus Stops; GTFS NJ TRANSIT GIS.....	4-203
Figure 4.59 Visual depiction of Resist feature on south side of Hudson Tea Building.....	4-123	Figure 4.78 Families with Related Children under the Age of 18 below the Poverty Level (Census Tracts) - Alternative 1.....	4-162	Figure 4.100 Hoboken "Hop" Shuttle Service Network; City of Hoboken, NJ TRANSIT, PANYNJ.....	4-203
		Figure 4.79 Families with Related Children under the Age of 18 below the Poverty Level (Census Tracts) - Alternative 2.....	4-163	Figure 4.101 Hoboken Senior Shuttle Network; City of Hoboken.....	4-203
		Figure 4.80 Families with Related Children under the Age of 18 below the Poverty Level (Census Tracts) - Alternative 3.....	4-164	Figure 4.102 HBLR System; Source: NJ TRANSIT.....	4-203
		Figure 4.81 Population Age 75 and Over (Block Groups) – Alternative 1	4-165	Figure 4.103 Study Area Ferry Locations; Imagery © 2017 Google, Map data.....	4-204
				Figure 4.104 Sanitary and Storm Sewer Map.....	4-205

Figure 4.105 Southern Emergency Access; Imagery © 2017 Google, Map data.....	4-208	Table 3.3 Alternative 1 Construction Costs.....	3-30	Table 4.21 Emergency Generator Noise Levels during Daytime Testing at Nearest Sensitive Receiver Property Line	4-100
Figure 4.106 Northern Emergency Access; Imagery © 2017 Google, Map data.....	4-208	Table 3.4 Alternative 2 Construction Costs.....	3-35	Table 4.22 Alternative 2, Options 1 and 2 Construction-Related Weekday Daytime Noise Impacts.....	4-101
Figure 4.107 NJ TRANSIT Hoboken Bus Routes; NJ TRANSIT.....	4-209	Table 3.5 Alternative 3 Construction Costs.....	3-37	Table 4.23 Alternative 3, Options 1 and 2 Construction-Related Weekday Daytime Noise Impacts.....	4-102
Figure 5.1 Cumulative Impacts Study Area	5-3	Table 4.1 Soil Types Mapped within the Study Area	4-9	Table 4.24 FTA and Swiss Standard SN 640 312a Construction Vibration Damage Criteria	4-104
Figure 5.2 BASF Site - Design Concepts	5-12	Table 4.2 Surface Water Quality Assessment Reporting Year 2012 Lower Hudson River Estuary HUC NJ02030101170030-01 (USEPA, 2015)	4-13	Table 4.25 FTA Construction Vibration Annoyance Criteria.....	4-105
Figure 5.3 Block 10 - Design Concepts	5-12	Table 4.3 Water Quality Causes of Impairment Reporting Year 2012 Lower Hudson River Estuary HUC NJ02030101170030-01	4-14	Table 4.26 FTA Construction Vibration Annoyance Criteria for Special Buildings	4-105
Figure 6.1 Alternative 1	6-8	Table 4.4 Life Stages of Fish Species of Interest to NMFS, which may be found in the Natural Ecosystems Analysis Area.....	4-18	Table 4.27 Potential Structural Damage Assessment Results – Minimum Distance to Potential Structural Damage.....	4-107
Figure 6.2 Alternative 1 – Coastal Flood Risk Reduction	6-9	Table 4.5 Summary of Tideland Map Reviews	4-21	Table 4.28 United States Environmental Protection Agency National Ambient Air Quality Standards	4-127
Figure 6.3 Alternative 1 – South Waterfront Amenities	6-9	Table 4.6 Floodplain Impacts for Alternative 1, Options 1 and 2.....	4-35	Table 4.29 Project-Related De Minimis Air Pollutant Thresholds.....	4-127
Figure 6.4 Alternative 2.....	6-10	Table 4.7 Properties Impacted by Modeled Increase in Flood Depths Under Alternative 1	4-35	Table 4.30 Construction Equipment Categories.....	4-128
Figure 6.5 Alternative 2 – Coastal Flood Risk Reduction	6-11	Table 4.8 Floodplain Impacts for Alternative 2, Options 1 and 2.....	4-38	Table 4.31 Predicted Emissions Compared to De Minimis Thresholds – Alternative 1, Option 1 / Option 2 (tons/year).....	4-130
Figure 6.6 Alternative 2 – Inland Resist Barrier at 15th Street and Garden Street	6-11	Table 4.9 Properties Impacted by Modeled Increase in Flood Depths Under Alternative 2.....	4-38	Table 4.32 Predicted 2022 Emergency Generator Emissions Compared to De Minimis Thresholds (tons/year).....	4-130
Figure 6.7 Alternative 3.....	6-12	Table 4.10 Floodplain Impacts for Alternative 3, Options 1 and 2.....	4-40	Table 4.33 Predicted Emissions Compared to De Minimis Thresholds – Alternative 2, Option 1 / Option 2 (tons/year).....	4-131
Figure 6.8 Alternative 3 – Coastal Flood Risk Reduction	6-13	Table 4.11 Properties Impacted by Modeled Increase in Flood Depths Under Alternative 3	4-40	Table 4.34 Predicted Emissions Compared to De Minimis Thresholds – Alternative 3, Option 1 / Option 2 (tons/year).....	4-131
Figure 6.9 Alternative 3 - Inland Resist Barrier along Garden Street, from 15th Street to the alleyway.....	6-13	Table 4.12 Previously Identified Archaeological Sites within One-Mile of the Study Area	4-57	Table 4.35 CO2e Emission Estimates.....	4-132
Figure 6.10 Conceptual Rolling Gate Closing at 15th Street and Garden Street	6-14	Table 4.13 Assessment of Archaeological Sensitivity	4-58	Table 4.36 Summary of Potential Environmental Conditions	4-138
Figure 7.1 Design Zones	7-8	Table 4.14 Summary of Anticipated Effects on Known Historic Properties.....	4-69	Table 4.37 Aboveground Storage Tanks within the Acceptable Separation Distance.....	4-140
LIST OF TABLES		Table 4.15 New Jersey Administrative Code 7:29.....	4-93	Table 4.38 RECs within the Limits of Disturbance for Alternatives 1, 2, and 3.....	4-142
Table ES.1 Alternative 3 Construction Costs	ES-11	Table 4.16 FHWA Noise Abatement Criteria.....	4-94	Table 4.39 Population Characteristics in the Demographic Analysis Area.....	4-151
Table ES.2 Alternative 1 Construction Costs.....	ES-13	Table 4.17 Construction Scenarios	4-95		
Table ES.3 Alternative 2 Construction Costs.....	ES-13	Table 4.18 Outdoor Ldn Noise Descriptions	4-96		
Table ES.4 Comparative Summary of Environmental Consequences on the Environment by Alternative.....	ES-16	Table 4.19 Weekday and Weekend Ldn Calculations	4-99		
Table ES.5 Summary of Mitigation Measures of On-Going Activities....	ES-21	Table 4.20 Alternative 1, Options 1 and 2 Construction-Related Weekday Daytime Noise Impacts.....	4-99		
Table ES.6 Preferred Alternative Permitting Requirements.....	ES-26				
Table 3.1 Public and Agency Coordination Groups.....	3-2				
Table 3.2 Concept Screening Matrix	3-20				

Table 4.40	Average Sales Price for a Home	4-177
Table 4.41	Potential Construction easements - Alternative 1.....	4-181
Table 4.42	Potential Construction easements - Alternative 2.....	4-184
Table 4.43	Potential Construction easements - Alternative 3.....	4-184
Table 4.44	Summary of Businesses Impacted by Build Alternatives	4-188
Table 4.45	Comparative Summary of Environmental Consequences on the Human Environment by Alternative	4-216
Table 5.1	Present and Reasonably Foreseeable Future Projects	5-4
Table 5.2	Summary of Cumulative Impacts.....	5-10
Table 6.1	Alternatives Analysis Matrix	6-2
Table 7.1	List of Community Meetings.....	7-5
Table 7.2	List of Executive Steering Committee Working Group Meetings	7-10
Table 7.3	Individual Stakeholder Meetings	7-11
Table 7.4	Preferred Alternative Permitting	7-12

LIST OF PHOTOGRAPHS

Photograph ES.1	Aerial view of northern portion of Study Area.....	ES-4
Photograph ES.2	Wildlife along the Hudson River.....	ES-18
Photograph ES.3	Vibratory hammer - typical pile driving activity.....	ES-18
Photograph ES.4	Hoboken sewer monitoring with brick riser manhole.....	ES-19
Photograph ES.5	Typical urban archaeological excavation.....	ES-19
Photograph ES.6	Community Meeting at multipurpose center.....	ES-25
Photograph 1.1	Flooding after Superstorm Sandy near Hoboken Terminal.....	1-4
Photograph 1.2	Flooding after Superstorm Sandy - ShopRite near 10th and Madison Street.....	1-4
Photograph 1.3	Flooding after Superstorm Sandy - Willow Avenue near Observer Highway.....	1-4
Photograph 1.4	Flooding after Superstorm Sandy - Emergency Vehicle Submerged	1-4

Photograph 1.5	Flooding after Superstorm Sandy at 5th Street.....	1-8
Photograph 1.6	Flooding after Superstorm Sandy within the Study Area.....	1-8
Photograph 1.7	Flooding after Superstorm Sandy within the Study Area	1-8
Photograph 1.8	Flooding after Superstorm Sandy within the Study Area	1-8
Photograph 1.9	Flooding after Superstorm Sandy - Intersection of Observ- er Highway and Monroe Street.....	1-10
Photograph 1.10	Flooding after Superstorm Sandy within the Study Area...	1-10
Photograph 1.11	Flooding after Superstorm Sandy within the Study Area...	1-10
Photograph 1.12	Flooding after Superstorm Sandy within the Study Area...	1-10
Photograph 1.13	Stormwater outfall – normal conditions.....	1-11
Photograph 1.14	Stormwater outfall at Sinatra Drive and 3rd Street.....	1-11
Photograph 1.15	Combined Sewer (CSO) outfall at Weehawken Cove in closed position.....	1-11
Photograph 1.16	Hoboken H-5 Wet Weather Pump Station on 11th Street, online October 2016.....	1-13
Photograph 2.1	Flooding from Rainfall Event May 31, 2015.....	2-3
Photograph 2.2	Typical Stormwater outfall, note water level stain at top of pipe.....	2-3
Photograph 2.3	View of Northwest Hoboken, circa 1880	2-3
Photograph 3.1	December 10, 2015 Public Meeting.....	3-21
Photograph 3.2	Hoboken Terminal, wood-crib bulkhead	3-25
Photograph 4.1	American Shad	4-17
Photograph 4.2	Blueback Herring	4-19
Photograph 4.3	Shortnose Sturgeon.....	4-19
Photograph 4.4	Atlantic Sturgeon.....	4-19
Photograph 4.5	View facing west of Wetland C; located in Area #2.....	4-23
Photograph 4.6	View facing west of Wetland D; located in Area #7.....	4-23
Photograph 4.7	Field reconnaissance for potential DSD location	4-56
Photograph 4.8	Exposed Wood Sewer, RGA 2015.....	4-65
Photograph 4.9	501 Adams Street (Public School No. 3) (Map ID No.1).....	4-71
Photograph 4.10	Church of the Holy Innocents (Map ID No. 2).....	4-71
Photograph 4.11	Church of Our Lady of Grace (Map ID No. 3).....	4-73
Photograph 4.12	Engine Company #2 Firehouse (Map ID No. 4).....	4-73
Photograph 4.13	Engine Company #3, Truck #2 Firehouse (Map ID No. 5)....	4-73
Photograph 4.14	Erie Lackawanna Terminal (Map ID No. 6).....	4-74
Photograph 4.15	Ferguson Brothers Manufacturing Company (Map ID No. 7).....	4-74
Photograph 4.16	Hoboken Historic District (Map ID No. 8).....	4-74
Photograph 4.17	Hoboken Land and Improvement Company Building (Map ID No. 9).....	4-74
Photograph 4.18	Hoboken –North Hudson YMCA (Map ID No. 10).....	4-75
Photograph 4.19	Keuffel and Esser Manufacturing Complex (Map ID No. 11).....	4-75
Photograph 4.20	Machine Shop (Bethlehem Steel Corp. Shipyard (Map ID No. 12).....	4-75
Photograph 4.21	Old Main Delaware, Lackawanna and Western Railroad Historic District (Map ID No. 13).....	4-76
Photograph 4.22	Public School No. 7 (Map ID No. 14).....	4-76
Photograph 4.23	Stevens Historic District (Map ID No. 15).....	4-76
Photograph 4.24	Hudson and Manhattan Railroad Transit System (PATH) (Map ID No. 16).....	4-77
Photograph 4.25	Grove Street Bridge (NJ TRANSIT Morristown Line MP 0.66) (Map ID No. 17).....	4-77
Photograph 4.26	Holbrook Manufacturing Company (Map ID No. 18).....	4-77
Photograph 4.27	North (Hudson) River Tunnels (Map ID No. 19).....	4-77
Photograph 4.28	Pennsylvania Railroad New York to Philadelphia Historic District (Map ID No. 20).....	4-78
Photograph 4.29	R. Neumann & Co. Factory Complex (Map ID No. 21).....	4-78
Photograph 4.30	509 Madison Street (Map ID No. 22).....	4-78

Photograph 4.31 Factory Terminal Loft Buildings (Standard Brands & Lipton Tea Plant) (Map ID No. 23).....	4-78
Photograph 4.32 Hoboken High School (Map ID No. 24).....	4-79
Photograph 4.33 Christopher Columbus Gardens (Map ID No. 25).....	4-79
Photograph 4.34 John Schmalz's Sons Model Bakery (Map ID No. 26)....	4-79
Photograph 4.35 R.B. Davis Company Manufacturing Complex (Map ID No. 27).....	4-79
Photograph 4.36 Field Reconnaissance, August 2016	4-114
Photograph 4.37 Viewpoint 1: Looing East at Lincoln Harbor, Weehawken.....	4-115
Photograph 4.38 Viewpoint 2: Looking East from 1600 Park Avenue, Hoboken.....	4-115
Photograph 4.39 Viewpoint 3: Looking Northeast from Tea Building Park, Hoboken.....	4-116
Photograph 4.40 Viewpoint 4: Looking East from Shipyard Park Waterfront, Hoboken	4-116
Photograph 4.41 Viewpoint 5: Looking East on Sinatra Drive, Hoboken	4-116
Photograph 4.42 Looking southwest on Washington Street from the Hud- son Tea Building.....	4-121
Photograph 4.43 Looking south on Washington Street and 14th Street.....	4-121
Photograph 4.44 Looking northeast on corner of Observer Highway and Washington Street.....	4-122
Photograph 4.45 Looking southwest along Observer Highway.....	4-122
Photograph 4.46 View of Hoboken Rail Yard from HBLR.....	4-198
Photograph 4.47 View of Hoboken Terminal.....	4-198
Photograph 5.1 View of Hoboken from New York City	5-2
Photograph 5.2 Recreation along the Hudson River	5-6
Photograph 5.3 Wildlife along the Hudson River.....	5-6
Photograph 5.4 View of Hoboken Meadows looking Southeast circa 1897...	5-7
Photograph 5.5 View Looking West at Long Slip Canal.....	5-13

Photograph 6.1 Typical Rolling Gate.....	6-14
Photograph 7.1 CAG Meeting at the Multi-Service Center.....	7-2
Photograph 7.2 CAG Meeting at the Multi-Service Center.....	7-2
Photograph 7.3 CAG Meeting at the Multi-Service Center.....	7-6
Photograph 7.4 CAG Meeting at the Multi-Service Center.....	7-6
Photograph 7.5 CAG Meeting at the Multi-Service Center.....	7-7
Photograph 7.6 CAG Meeting at the Multi-Service Center.....	7-7

LIST OF PREPARERS **LP-1**

LIST OF REFERENCES **LR-1**

LIST OF APPENDICES

- Appendix A CAG/Community Meeting Summaries and Memos
- Appendix B Agency Outreach
- Appendix C Public Comments
- Appendix D Handouts
- Appendix E Distribution List
- Appendix F Lower Hudson River Sandy Resiliency Projects
- Appendix G Programmatic Agreement
- Appendix H Record of Decision

LIST OF ATTACHMENTS

- Attachment 1 Scoping Document
- Attachment 2 Traffic Study Technical Memorandum
- Attachment 3 Noise and Vibration Technical Environmental Study
- Attachment 4 Air Quality Technical Environmental Study
- Attachment 5 Cultural Resources Technical Environmental Study
- Attachment 6 Hazardous Waste Screening Technical Environmental Study
- Attachment 7 Natural Ecosystems Technical Environmental Study
- Attachment 8 Socioeconomic, Land Use and Environmental Justice
Technical Environmental Study
- Attachment 9 BASF Environmental Assessment