Appendix C:
Methodology Reports

Appendix C contains methodologies and impact thresholds for several environmental categories that are profiled in the EA. These methodologies are consistent with federal, state and local guidelines for the undertaking of *any* publicly funded project and, it should be noted, these methodologies are not new and do not specifically apply to this EA.

While specific port improvement projects that may be proposed in the future are not currently known, it is possible that future project sponsors will need to consider these impact methodologies at the time of the project.

Comprehensive Port Improvement Plan Environmental Assessment (CPIP EA)

TRAFFIC AND TRANSPORTATION METHODOLOGY REPORT

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1.0 INTRODUCTION

The purpose of this methodology report is to define current procedures, assumptions, and data sources applicable to the assessment of traffic and transportation impacts of proposed projects, including assessment of potential traffic and transportation impacts attributable to the future port and associated transportation improvement projects. However, at such time as the traffic and transportation impact assessment is to be undertaken for a given proposed project, the lead agency(ies), project sponsor, and environmental consultant should review then-current guidance to determine what is most applicable and appropriate for the proposed project.

The traffic and transportation impact assessment will address local and regional roadway and rail effects, as follows:

- Detailed arterial segment analyses and/or intersection analyses in the immediate vicinity of the each of the port sites under study;
- General assessment of changes in speeds and vehicular traffic volumes on key segments of the regional highway system in both New York and New Jersey;
- Regional assessment of rail operations to identify potential operations-related constraints; and
- Assessment of the potential impact of enhanced rail service that may be proposed with any given project alternative on vehicular traffic operations at a representative set of grade crossings on mainline segments.

2.0 STUDY AREA DEFINITION

Study areas will be defined and traffic analysis locations selected after identification of the CPIP alternatives, including both port and associated transportation elements, for the port sites under study:

- The existing facilities at Port Newark/Elizabeth, Howland Hook (Staten Island), Global/NEAT (Bayonne), and Red Hook (Brooklyn); and
- Potential new port facilities in South Brooklyn and at The Peninsula at Bayonne Harbor.

The traffic/transportation analyses will address 50 to 60 intersections or arterial roadway (either roadway mainline sections, ramps or weave sections) and 15 to 20 regional highway segments. Initial recommendation of analysis locations, to be refined followed identification of the CPIP alternatives, is listed in Table 1.

For assessment of potential project-related rail system impacts, study areas and analysis locations will be identified after the extent and specific locations of proposed rail improvements are identified.

TABLE 1
TRAFFIC/TRANSPORTATION ANALYSIS LOCATIONS

Port Facilities	Analysis Locations
Port Newark/Elizabeth, New Jersey	• Port Street / Terminal Street intersection and ramps (2) • Port Street @ Doremus Avenue • Corbin Street @ Tyler Street • Brewster Road @ Port Street • North Avenue @ Kapkowski Road • North Avenue @ Earhart Drive • North Avenue @ Dowd Avenue • Routes US-1&9 @ North Avenue • NJ Turnpike Interchange 13A (3 roadway sections) • NJ Turnpike Interchange 14 (3 roadway sections)
Port Jersey/Bayonne, New Jersey	• Avenue E @ East 53rd Street (NJ Turnpike Interchange 14A) • Route NJ-440 @ Pulaski Street • Port Jersey Boulevard @ Pulaski Street • Avenue E @ MOTBY Access Road • Route NJ-440 @ Port Terminal Road • Route NJ-440 @ East 46th Street • NJ Turnpike Interchange 14A (2 ramps) • Port Jersey Boulevard merge sections (2)
Howland Hook, Staten Island, New York	• Goethals Road @ Western Avenue • Goethals Road @ Forest Avenue • Gulf Avenue @ Forest Avenue • Forest Avenue @ South Avenue • Goethals Road North @ South Avenue • Staten Island Expressway ramps to/from Gulf Avenue (2) • Staten Island Expressway ramps to/from Forest Avenue (2)
Red Hook, Brooklyn, New York	• Van Brunt Street @ Union Street • Columbia Street @ Congress Street • Hamilton Avenue @ Columbia Street • Columbia Street @ Union Street • Columbia Street / Hamilton Avenue @ Coles Street • Brooklyn-Queens Expressway Interchange 27 (2 ramp sections) • Gowanus/BQE Interchange 26 (up to 4 ramp/weave sections)
South Brooklyn, New York	• 2nd Avenue @ 29th Street • 2nd Avenue @ 33rd Street • 2nd Avenue @ 36th Street • 2nd Avenue @ 39th Street • 3rd Avenue @ 29th Street • 3rd Avenue @ 33rd Street • 3rd Avenue @ 36th Street • 3rd Avenue @ 39th Street • 3rd Avenue @ 65th Street • Gowanus Expressway / 39th Street partial interchange (2 ramps or mainline segments) • Gowanus Expressway / Shore Parkway interchange (up to 4 ramps and/or mainline segments)

TABLE 1
TRAFFIC/TRANSPORTATION ANALYSIS LOCATIONS

Port Facilities	Analysis Locations
Representative Grade Crossings	• 69th Street crossing, North Bergen (CSX / NYS&W) • Hook Road (Route 502) crossing, Harrington Park (CSX River Line) • Inman Avenue crossing, Edison (NJSAA Lehigh Line) • Beekman Lane crossing, Hillsborough (NS Lehigh Line) • Belle Meade–Blawenberg Road (Route 601) crossing, Montgomery Twp. (CSX West Trenton Line) • Main Street crossing, Ramsey (NJ TRANSIT Main Line / NS Southern Tier Line)
Regional Roadway Links	• I-78 west of I-287 • I-78 between I-95 and Interchange 14A (Bayonne) • I-80 west of I-287 • I-80 between NJ-17 and New Jersey Turnpike (I-95) • I-95 south of Interchange 11 (I-287) • I-95 between Interchange 14 and Interchange 15 • I-95 at George Washington Bridge • I-278 at Goethals Bridge • I-278 at Verrazano Narrows Bridge • I-278 (Gowanus Expressway) between Shore Parkway and Brooklyn-Battery Tunnel • I-280 between New Jersey Turnpike (I-95) and East Orange • I-287 between I-78 and I-80 • I-287/87 at Tappan Zee Bridge • I-495 (Long Island Expressway) between I-278 and I-678 • I-678 (Van Wyck Expressway) between I-495 and JFK Airport • US-1&9 between Elizabeth and Port Newark • Holland Tunnel • Lincoln Tunnel • NJ-17 between NJ-3 and I-80 • NY-440 at Outerbridge Crossing

3.0 TRAFFIC IMPACT ASSESSMENT METHODOLOGY

A. Data Collection

Existing traffic volume count data will be identified for intersections and roadway segments in the vicinity of the port sites. The CPIP Plan Consultant has collected data at many of these locations to verify and calibrate results from the NJDOT Statewide Truck Model, and this information will be used, wherever applicable for the CPIP EIS evaluations. For grade crossings and intersection locations where recent volume data are not available, manual vehicle classification/turning movement counts will be conducted during morning, afternoon, and evening peak periods on a midweek day (Tuesday through Thursday). Automatic traffic recorder (ATR) counts will be conducted for a one-week period at key locations, to identify any potential variations in traffic volumes through the course of a week.

Physical inventories of each location will be conducted to determine roadway geometry, e.g., number of lanes, lane widths, distances to nearest intersection, and signal operations. Signal timing parameters will be obtained from the appropriate agencies (municipality, county, or state) that are responsible for maintaining traffic signals at any given location.

Existing travel speed data will be collected along the major arterials for each of the air quality receptor locations at the various port sites.

All data for the regional roadway links that will be required for the regional impact analysis will be derived from the CPIP Plan Consultant's application of the NJDOT Truck Model.

B. Analysis Years

Standard EIS methodology includes analyses of "Existing" and "Future No-Action" conditions, the latter describing future conditions absent the proposed project and defining the future baseline against which project alternatives are evaluated to determine potential project-related impacts. Future No-Action analysis years are defined coincident with the proposed project's principal construction period, if the project includes significant new infrastructure, and its first year of operation and/or its design year.

Because the CPIP alternatives will comprise multi-phased port and associated transportation improvements that would likely be implemented over several decades, it is anticipated that more than one future analysis year will need to be defined for assessment of the Future No-Action condition and of potential traffic/transportation impacts resulting with project alternatives. Detailed, quantitative impact assessments will be conducted of nearer-term port and/or associated transportation improvements (i.e., those that would be implemented by 2025). Later-phased improvements will be assessed qualitatively, in terms of likely trends and patterns, recognizing the uncertainties inherent in projecting conditions for more distant horizon years.

C. Analysis Methodology

Intersections and grade crossings that are isolated and not influenced by adjacent intersections or a roadway "system" will be analyzed using the latest version of the Transportation Research Board's *Highway Capacity Manual* (HCM, 2000). The Highway Capacity Manual methodology provides measures of effectiveness in terms of average delay, 95th-percentile queue length, volume to capacity (v/c) ratio, and level of service.

Some of the intersections and many of the at-grade rail crossings are adjacent to major signalized intersections, while a few are part of a complex signalized roadway network. At these critical locations,

signalized intersection roadway networks will be analyzed as a "system" rather than as individual locations, by using a special software analysis tool such as CORSIM (*Cor*ridor *Sim*ulation). CORSIM is a microscopic and stochastic computer software program that simulates individual vehicular behavior. The program "mimics" the real world condition and produces detailed traffic performance measures such as average delay, queue length, travel time, percentage of stops, fuel consumption and emission by vehicle type, speed, etc.

At grade crossings, it is important to determine the minimum preemption time for the traffic signal, which is dependent on various parameters such as minimum warning time, equipment response time, buffer time, queue clearance, pedestrian clearance, etc. The Millennium Edition of the *Manual on Uniform Traffic Control Devices* (MUTCD) suggests that a queuing study should be performed when at-grade rail crossings are located within 1,000 feet of a signalized intersection. The analysis is based on the traffic volume for the approach crossing the tracks, nearby traffic signal timing, the number of lanes on the approach, characteristics of the vehicles using the approach, and operational characteristics of the railroad. The assessment of railroad grade crossings will be based on standards documented in the following sources:

- Guidance on Traffic Control Devices at Highway-Rail Grade Crossings (November 2002), a joint publication of USDOT, FHWA and Highway/Rail Grade Crossing Technical Working Group; and
- Traffic Signal Operations Near Highway-Rail Grade Crossings (National Cooperative Highway Research Program Synthesis of Highway Practice 271, Transportation Research Board, 1999).

Intersection and grade crossing levels-of-service are defined in terms of average vehicle control delay. Control delay is the portion of the total delay attributed to traffic control devices, such as traffic signals or a stop signs, and includes the amount of travel time lost due to initial deceleration, queue move-up time, stopped time, and final acceleration time. Delay levels for signalized intersections are as follows:

- Level-of-Service (LOS) A describes operations with very low delay – i.e., less than 10.0 seconds per vehicle. This occurs when signal progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all.
- LOS B describes operations with delay in the range of 10.1 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. Again, most vehicles do not stop at the intersection.
- LOS C describes operations with delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. The number of vehicles stopping is significant, although many still pass through the intersection without stopping.
- LOS D describes operations with delay in the range of 35.1 to 55.0 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity (v/c) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines.
- LOS E describes operations with delay in the range of 55.1 to 80.0 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume-to-capacity ratios.
- LOS F describes operations with delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume-to-capacity ratios with cycle failures. Poor progression and long cycle lengths may also be contributing to such delays. Often, vehicles do not pass through the intersection in one signal cycle.

The level-of-service criteria for an unsignalized intersection differ from those of a signalized intersection because of the expectation that signalized intersections encounter more traffic and, therefore, greater delays. The thresholds for the levels-of-service of unsignalized intersections are as follows:

Level of Service	Control Delay per Vehicle (sec./veh.)
A	0 to 10
B	10+ to 15
C	15+ to 25
D	25+ to 35
E	35+ to 50
F	greater than 50

Based on the *HCM 2000* procedures for highway and arterial analyses, levels-of-service for merge and diverge influence areas are defined in terms of density of passenger cars per mile per lane for all cases of stable operation LOS A through E. For the case where the total flow from the merge area exceeds the capacity of the downstream freeway segment, no density is determined and the situation is represented as LOS F. Levels of service for weaving segments are based on the *HCM 2000* procedures and are determined by the density of passenger cars per mile per lane. Although there are both weaving and non-weaving vehicles within a weaving segment, a single level of service is used to describe operations within the weaving segment.

For the future No-Action alternative, changes in background traffic volumes will be identified by one of the following methods: 1) projected volumes identified in the NJDOT Truck Model; or 2) annual background growth factors obtained from appropriate state, county, or municipal agencies for the roadways in question, based on future population and employment projections for each analysis year. All programmed and committed projects that would be implemented by the future analysis year(s) would be included in the future No-Action baseline.

Each of the project alternatives will be analyzed using the site-generated traffic volumes provided by the CPIP Plan Consultant for each of the port sites under study. Future cargo modal splits, which will also be provided by the CPIP Plan Consultant, will serve as the basis for the site-generated traffic impact assessment, described below, and the regional rail system assessment, described in Section 4.0 of this Methodology Report.

The temporal distribution and geographic origins/destinations of additional port-related truck traffic will either be generated by the NJDOT Truck Model and provided by the CPIP Plan Consultant, or will be estimated using data from other recent studies for the Port of New York and New Jersey. Future employee trips at each site will be based on projected employment levels and professional judgment about current travel patterns for similar employers in the area of each port site. All traffic volumes identified for each alternative will be added to the appropriate future No-Action baseline to determine future traffic volumes with each project alternative.

The “representative” grade crossings identified in Table 1 will be analyzed for each alternative that proposes an increase in port-related rail volume substantial enough to affect traffic operations at grade crossings in the New York/New Jersey region. The projected future length and frequency of freight trains will be a key factor in this analysis.

Changes in vehicular traffic volumes between existing and future No-Action conditions will be identified for the regional roadway links identified in Table 1, along with any reductions in travel speeds identified

in the NJDOT Truck Model runs. For each alternative, impacts on the regional roadways will be identified for any roadway segment in which the port-related truck traffic is expected to increase by an increment of 5 percent or more above the appropriate No-Action alternative. For the regional roadway assessment, these impacts will be measured in terms of changes in travel speeds and daily traffic volumes (vehicle-miles traveled, or VMT).

D. Traffic Impact Criteria

While a uniform analytical methodology will be used to assess traffic and transportation impacts in the NY/NJ region, regulatory bodies in New York and New Jersey have different criteria for evaluating these impacts. According to generally accepted practice, levels-of-service A, B, and C reflect the existence of delays within an acceptable-to-tolerable range; LOS D and E suggest delays increasing to often unacceptable or breakdown conditions; and LOS F indicates severe levels of congestion for both signalized and unsignalized intersections. For the analysis locations identified in New York City, the methodology identified in the *City Environmental Quality Review (CEQR) Manual* (2001) will be used to identify significant traffic impacts. The CEQR criteria for identifying significant impacts are as follows:

- Increases in approach delays of five seconds or more in LOS D;
- Increases of four seconds or more in LOS E;
- Increases of three seconds or more in LOS F; or for delay increases of one second within LOS F when the No-Action condition is above 120 seconds of delay; and
- Any deterioration from acceptable levels A, B, or C in the future No-Action condition to marginally acceptable mid-LOS D or worse with a project alternative.

The New Jersey port sites under study are located in different municipalities, i.e., Newark, Elizabeth, Bayonne, and Jersey City, each of which has its own generic criteria for identifying and mitigating traffic impacts. However, as these criteria generally do not vary substantially, the analyses for the CPIP EIS will use a set of uniform criteria for all of the analysis locations in New Jersey. While the New Jersey traffic impact standards are somewhat less stringent than the CEQR criteria, they are based on similar measurements of delay within the levels of service identified by the HCM 2000 methodology. These criteria, which have been used for a number of recent environmental impact studies in northern New Jersey that incorporated multiple municipal jurisdictions, are as follows:

- LOS A, B, C or D with the No-Action condition changes to LOS E or F with an increase in the average vehicle delay of 10 or more seconds with a project alternative;
- LOS E with the No-Action condition changes to LOS F with an increase in the average vehicle delay of 10 or more seconds with a project alternative;
- LOS E with the No-Action condition remains at LOS E with an increase in the average vehicle delay of 10 or more seconds with a project alternative;
- LOS F with the No-Action condition remains at LOS F with an increase in the average vehicle delay of 10 or more seconds with a project alternative.

Significant traffic impacts will be identified based on the criteria described above, as well as measures required to mitigate these impacts. In general, the traffic/transportation component of the EIS is required to identify mitigation measures that would “restore” a significant traffic impact back to the future No-Action condition, i.e., back to traffic conditions that would prevail without the proposed project.

The detailed results of the analyses will be documented in a Technical Traffic Appendix to the EIS. These results will also be summarized and depicted in a format suitable for public presentation purposes,

including mapping and graphical elements identifying areas of significant traffic impacts and the level of mitigation that can be achieved (fully or partially mitigated, or unmitigatable) at each location.

4.0 RAIL SYSTEM ASSESSMENT METHODOLOGY

A. Estimated Rail Capacity

The modal splits provided by the CPIP Plan Consultant (see Section 3.C) for each project alternative and port site will be studied in detail to determine if the rail network in the northeastern United States has sufficient capacity to accommodate the projected rail cargo volumes on the various main lines and secondary routes in northern New Jersey. Most of the railroad network within a 25-mile radius of the Port District lies within the North Jersey Shared Assets Area (NJSAA), but the bottlenecks that will dictate the rail system's capacity could be some distance from the Port District, potentially in neighboring states along routes that are owned by one of the two Class I rail carriers in the region (Norfolk Southern and CSX).

The capacity of a rail line is influenced by a number of factors, including the number of tracks, the track condition and signal system, the level of activity at sidings and yards, and operating characteristics (size, speed, etc.) of the trains using the line. For each of the major routes identified in this study, figures for theoretical and practical line capacity will be estimated, based on industry standards and anecdotal information provided by rail operators.

The assessment of the region's rail capacity will serve as the basis for the evaluation of potential project-related rail impacts. If the evaluation indicates that there is insufficient rail system capacity to accommodate future port-related cargo movement via rail, even with consideration of rail improvements proposed as an element of a given project alternative, it is possible that the future mode splits would need to be adjusted to reflect a higher share for other modes (including trucks). (Any such adjustments in future cargo mode splits would be used for the traffic impact assessment described in Section 3.)

1. Major Rail Routes

The North Jersey region is served by a number of main lines and secondary routes that are currently used to access the Port District. These routes will be the focus of the rail capacity assessment for the CPIP EIS.

- The **River Line** from South Kearny to Selkirk, New York is owned by CSX, and is a major route for rail traffic to/from points west of Albany, NY.
- The **Lehigh Line** from Oak Island Yard in Newark to Port Reading Junction in Bound Brook is the major freight route to the west. As part of the North Jersey Shared Assets Area, it is used by both CSX and Norfolk Southern (NS) to access the port district from points south and west. NS owns the Lehigh Line west of Bound Brook, and uses this route as its primary means of access to the region. Of particular concern along the Lehigh line is the segment used by passenger trains on New Jersey Transit's Raritan Valley Line between Cranford and Amtrak's Northeast Corridor Line in Newark.
- The **West Trenton Line** is CSX's main route to the region from the south. It runs south and west from Port Reading Junction.
- Norfolk Southern's **Southern Tier Line** runs from Croxton Yard in Secaucus through Passaic and Bergen Counties to the north. This route is somewhat constrained by passenger service that is operated by New Jersey Transit and Metro-North Railroad as far west as Port Jervis, New York.

- The **New York, Susquehanna & Western** (NYSW) is a regional railroad that operates as a subsidiary of both CSX and NS. The railroad's main line runs from North Bergen to the north and west through Bergen, Passaic and Sussex Counties, then connects to the Southern Tier Line for points west via a trackage rights agreement with NS.
- The **Chemical Coast Line** is a secondary route that runs through the industrial areas alongside the New Jersey Turnpike in Middlesex and Union Counties. The **Port Reading Secondary** connects the Lehigh Line in Bound Brook and the Chemical Coast Line in Port Reading. These routes function in combination as an alternative route to the port district from the west, and are accessible to both NS and CSX as part of the North Jersey Shared Assets Area. The Chemical Coast Line is expected to serve as the primary means of rail access to Howland Hook in Staten Island.
- The **Passaic and Harsimus Line**, part of the NJSAA, is a short alignment from the west end of Oak Island Yard in Newark to South Kearny Yard. It provides a continuous route through the region from the Lehigh Line in the south to the River Line in the north.
- The **National Docks Branch** is a "back door" route through Jersey City, between Oak Island Yard in Newark and Croxton Yard in Secaucus via a bridge over Newark Bay and a tunnel under the main ridge in eastern Hudson County.

These freight lines are the primary routes in the Port District's vicinity; bottlenecks identified outside northern New Jersey will likely be downstream of one of these lines. There are also connecting tracks between these lines that may represent bottlenecks within the Port District itself.

While the CPIP EIS will examine rail operations for a variety of different types of rail cargo, one important consideration for port-related rail operations is that most of the routes listed above are cleared for full doublestack "high cube" container movements (20'-2"). The National Docks Branch is the lone exception – it has a "restricted" doublestack clearance of 19'-1" that permits the movement of "high cube" containers stacked in combination with "standard" containers.

2. Train Control Systems

One of the key considerations in identifying the capacity of a rail line is the type of signal system that is used to control train movements on the line. The type of control (CTC, DCS, Running Track, etc.) for each of the major routes in the region, as well as for segments downstream of the major regional routes that connect to points outside the region, will be identified.

3. Train Volumes

Current levels of utilization for the major freight routes in the region will be identified, based on train schedules for the Class I railroads as well as operating schedules for local and yard trains in the Shared Assets Area. Future No-Action "baseline" service or infrastructure enhancements that would affect projected train volumes, absent the proposed project, will be identified by the CPIP Plan Consultant and confirmed by the CPIP EIS Consultant with input from outside agencies. These changes could include expansion of NJ Transit service, development of rail-intensive land uses (e.g., a municipal waste transfer station in Tremley Point), etc.

Project alternatives that would be expected to generate a substantial volume of rail traffic in the future analysis years will be identified using projected mode splits provided by the CPIP Plan Consultant. Geographic origin/destination information for future rail traffic will be obtained for each alternative from the CPIP Plan Consultant, and will serve as the basis for the estimate of the number and size of additional port-related trains projected to use each rail line in each future analysis year.

B. Impact Assessment

The evaluation of rail system-related impacts in the Port will rely on existing NS, CSX, and NYSW freight train schedules and an outline of Conrail switching and transfer operations in the Port (or, in railroad terms, the NJSAA). These data were compiled in the *North Jersey Shared Assets Area Rail Freight Capacity Analysis Study* (August 2001), some of which were incorporated in the CPIP Plan Consultant's rail analysis[1]. The information will be updated and used as the baseline operating pattern to which future rail traffic increases will be added. The NJSAA Study, and the CPIP Plan rail capacity report, provide guidelines regarding measures of rail capacity. Data documented in the CPIP Plan rail capacity report – supplemented, as needed, by railroad track charts and timetables covering the Northeast -- will serve as the basis for describing existing infrastructure in terms of number of tracks, train control systems, maximum speeds, and, in turn, identifying weak points in the system that could become capacity constraints as traffic increases. Planned rail infrastructure improvements will be taken into account in this assessment of existing conditions.

Potential "downstream" impacts throughout the Northeast region will be evaluated using the CPIP Plan's initial evaluation of capacity, under the scenario reflecting ongoing and proposed infrastructure enhancements, as a starting point. Increased train traffic resulting from Port growth, added to existing volumes, will represent projected future line density. That future density will be evaluated in terms of the facilities available to handle it, including any proposed rail improvements associated with CPIP port improvement alternatives, both within and beyond the Port area. The initial capacity analysis (i.e., in the CPIP Plan rail capacity report), projected volumes, and CPIP-recommended rail improvements, along with data and input from the carriers, will be compared with theoretical and practical measures of capacity that are generally used to identify potential capacity shortfalls.

[1] *Task E Technical Memorandum (Draft #1), Market Demand and Port Capacity, Volume 4: Current and Planned Capacity of Regional Transportation Network – RAIL* (Sir William Halcrow & Partners, Inc., May 2003).

Comprehensive Port Improvement Plan Environmental Assessment (CPIP EA)

AIR QUALITY METHODOLOGY REPORT

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1.0 INTRODUCTION

The purpose of this methodology protocol is to outline current procedures and assumptions applicable to the assessment of air quality impacts from proposed projects, including assessment of the potential air quality impacts attributable to the future port and associated transportation improvement projects. However, at such time as the air quality impact assessment is to be undertaken for a given proposed project, the lead agency(ies), project sponsor, and environmental consultant should review then-current air quality guidance to determine what is most applicable and appropriate for the proposed project.

Analyses will be conducted to estimate the following:

- Pollutant levels near heavily traveled roadways and congested intersections that may be affected by the project alternatives under existing and future No-Action conditions;
- Potential impacts associated with project-generated increases in traffic volumes or changes in traffic patterns near heavily congested roadways, interchanges, intersections, at-grade rail crossings, and heavily utilized parking facilities, where the maximum total pollutant concentrations or incremental increases resulting from the alternatives would be likely to occur and where people would likely be present;
- Potential impacts associated with increases or changes in port operations that may affect pollutant levels at sensitive land uses surrounding each major port facility. Emissions from moving trucks and other diesel-fueled equipment (e.g., forklifts, tractors, etc.), ships and locomotives, combustion equipment, and maintenance facilities will be considered;
- Changes in vehicular emissions that could be generated in the New York and New Jersey portions of the study area under each of the project alternatives, and whether these changes conform to the requirements of each State Implementation Plan (SIP); and
- Potential impacts associated with the construction phase of the project alternatives.

2.0 REGULATORY SETTING AND COMPLIANCE WITH STANDARDS

The federal Clean Air Act (CAA) defines non-attainment areas as geographic regions that have been designated as not meeting one or more of the National Ambient Air Quality Standards (NAAQS). The CAA requires that a State Implementation Plan (SIP) be prepared for each non-attainment area, and a maintenance plan be prepared for each former non-attainment area that subsequently demonstrated compliance with the standards. The SIP is a state's plan on ways it will meet the NAAQS under the deadlines established by the CAA. EPA's Transportation Conformity Rule requires SIP conformity determinations on transportation plans, programs, and projects before they are approved or adopted. Conformity is defined as conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. In addition, Federal activities may not cause or contribute to new violations of air quality standards, exacerbate existing violations, or interfere with timely attainment or required interim emissions reductions towards attainment.

The final conformity rule also establishes the process by which the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and local metropolitan planning organizations determine conformance of highway and transit projects.

The project area in New Jersey falls within areas that are designated as non-attainment for the 1-hour and 8-hour ozone standard and the annual fine particulate matter ($PM_{2.5}$) standard and maintenance for carbon monoxide (CO).

The project area in New York is designated as non-attainment for the 1-hour ozone standard and the $PM_{2.5}$ annual standard and maintenance for CO. Manhattan (which may be affected by project-generated truck traffic) is also classified as non-attainment for particulate matter smaller than 10 microns (PM_{10}).

3.0 POLLUTANTS OF CONCERN

The following air pollutants have been identified by the U.S. Environmental Protection Agency (EPA) as being of concern nationwide: carbon monoxide (CO), hydrocarbons (HC), nitrogen dioxides (NO_2), photochemical oxidants (predominantly ozone (O_3)), lead (Pb), sulfur dioxide (SO_2), and particulate matter smaller than 10 microns (PM_{10}) and 2.5 microns ($PM_{2.5}$) in diameter. In the New York/New Jersey region, ambient concentrations of CO, HC, and photochemical oxidants are predominantly influenced by motor vehicle activity. Nitrogen oxides (NO_x) are emitted from both mobile and stationary sources. Emissions of sulfur oxides (SO_x) are associated mainly with stationary sources; and emissions of particulate matter are associated with stationary sources, and to a lesser extent, mobile sources and fugitive dust. Lead emissions, which historically were principally influenced by motor vehicle activity, have been substantially reduced due to the elimination of lead from gasoline. In addition, carbon dioxide (CO_2) is one of the compounds that contribute to climate change by trapping heat within Earth's atmosphere.

These pollutants will be considered in this analysis as follows:

- CO, PM_{10} and $PM_{2.5}$ for the localized (microscale) mobile source analyses;
- CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$ for the localized stationary source analysis of on-site port operations; and
- CO, CO_2, and ozone precursors (i.e., NO_x and HCs) for the regional (mesoscale) analysis.

4.0 STANDARDS AND GUIDELINES

Existing and future CO, NO_2, SO_2, and PM_{10} pollutant levels will be compared with established National Ambient Air Quality Standards (NAAQS) and, where applicable, the New York City Department of Environmental Protection's (NYCDEP) *de minimis* criteria for CO and NYCDEP's and NYSDOT's Significant Threshold Values (STV) for $PM_{2.5}$ and PM_{10} and with one another to determine impacts of the project alternatives. [It is likely that in the future, existing and future estimated $PM_{2.5}$ levels will also be compared with NAAQS, but the methodology necessary to conduct this analysis has not yet been developed.]

5.0 RECEPTORS

The locations at which pollutant concentrations are estimated are known as "receptors." Receptors that will be considered in this analysis include those that are located on public property, sidewalks, and open spaces that are available to the general public on a more or less continuous basis. Ground-level receptors will be placed at a height of 6.0 feet above sidewalk elevation. The exact number of receptors considered near each analysis site will be determined based on the configuration and complexity of the site.

The following types of receptor sites will be employed:

- For estimating air quality levels near congested roadways, receptors will be located near the midpoint of the adjacent sidewalks, in accordance with EPA mobile source modeling guidelines; and
- For estimating levels near the port facilities, both ground-level and elevated receptors (i.e., operable windows, air intake ducts, etc.) on nearby buildings will be considered. Two sets of receptors will be considered. The first will be a set of grid receptors that start at the site's boundary and extend out in all directions in 25-meter increments up to a distance of 150 meters. The second set will include actual sensitive land uses (i.e., schools, hospitals, playgrounds, etc.) located around the site.

6.0 MOBILE SOURCE ANALYSIS

A. Intersection Analysis Sites

Analysis sites will include critical heavily congested roadways, interchanges, intersections, at-grade rail crossings, and heavily utilized parking facilities that may be affected by the proposed project alternatives. Sites will be selected for analysis as follows:

- Traffic data (volumes, levels of service, etc.) at the major intersections affected by the proposed project will be reviewed and those locations that will be subject to a screening-level analysis will be selected. The selection of these screening level sites will be based on criteria applicable at the time of the analysis. Current site selection criteria include EPA's Guideline for Modeling CO from Roadway Intersections (EPA-454/R-92-005), and NYSDOT's Environmental Procedures Manual and Project Level Particulate Matter Analysis (dated September 2004).

  Intersections that have level of service (LOS) designations of D, E or F, or will change to D, E or F as a result of a given project alternative will likely be considered for detailed modeling. In addition to the CO site-selection criteria, the percentages of heavy-duty diesel vehicles at these locations will also be considered.

- Each of the screened sites will be ranked by LOS, volumes, and distances to sensitive land uses to determine those locations most likely to have elevated pollutant levels. This analysis will estimate the potential of the proposed project alternatives to result in significant impacts on air quality levels near these sites, based on projected build and no-build levels of service and surrounding land uses. Intersection locations will be ranked by LOS and overall approach volume and air quality sites will be selected for detailed CO analysis; and
- The CO analysis sites will be further screened to select sites that have a high percentage of truck traffic for detailed PM_{10} and $PM_{2.5}$ analysis.

B. CO, VOC, and NO_x Vehicular Emission Factors

Emission factors will be estimated using the latest version of EPA's emission factor algorithm, which is currently MOBILE 6.2.03. This version includes the effects of new vehicle standards, and covers model years 1952 to 2051.

For the analysis sites located in the New York portion of the study area, the modeling input provided by the NYSDEC will be applied. For analysis sites located in the New Jersey portion of the study area, the most current NJDEP input will be used. Factors such as engine operating parameters, vehicular age-distribution rates, inspection/maintenance (I/M) and anti-tampering program (ATP) credits, low emission vehicle (LEV) program, and meteorological conditions will be subject to approval by NYCDEP, NYSDEC and NJDEP corresponding to each portion of the study area.

C. PM_{10} and $PM_{2.5}$ Vehicular Emission Factors

PM_{10} and $PM_{2.5}$ emission factors will be estimated using the latest version of EPA's emission factor algorithm (currently MOBILE 6.2.03). Exhaust, brake, and tire wear emissions from moving vehicles will be estimated for all vehicle types; idle emissions, however, will be estimated only for heavy-duty diesel trucks and buses, because this information is estimated only for these vehicles. (PM idle emissions from other vehicle types are considered trivial and are not currently available from EPA.)

Emissions of fugitive dust will be estimated using the latest EPA-approved emission factors, which are currently estimated using EPA's AP-42 equation for paved roads. This formula uses empirical data for fugitive dust and has recently been adjusted by the EPA to discount the contribution from exhaust and brake and tire wear emissions. Emissions from fugitive dust are dependent on vehicle weight and the surface silt loading. The following silt loading factors will likely be used:

- 0.16 for collector roadways with more than 5,000 vehicles per day (vpd);
- 0.10 for principal and minor arterials with more than 5,000 vpd;
- 0.4 for roadways with fewer than 5,000 vpd; and
- 0.015 for expressways.

An average vehicle fleet weight of 6,000 pounds will likely be used for most of the mobile source analyses; this weight may be changed at locations with very high or low truck percentages.

D. Vehicle Classification Data

Vehicle classification data required to determine composite emission factors will likely be based on traffic survey data for the following categories: light duty gasoline vehicles (LDGVs), SUVs, light-duty trucks, heavy-duty trucks, and buses. Light-duty gasoline trucks will be divided into four groups (LDGT1 through LDGT4), based on local registration data.

Vehicle classification data required to determine composite emission factors will be based on traffic survey data and include percentages of LDGVs, SUVs, light-duty trucks, heavy-duty trucks, and buses. Currently, SUVs are classified as light-duty gasoline trucks and 75 percent of SUV emissions are considered as LDGT1&2, while the remaining 25 percent will be LDGT3&4; light-duty gasoline trucks are divided into four groups (LDGT1 thru LDGT4) based on local registration data.

For analysis sites located in New York, the split between heavy-duty gasoline vehicles (HDGVs) and heavy-duty diesel vehicles (HDDVs) will likely be based on NYSDEC's registration for MOBILE 6 for each appropriate analysis year. For analysis sites located in New Jersey, the split between heavy-duty gasoline vehicles (HDGVs) and heavy-duty diesel vehicles (HDDVs) will likely be developed using MOBILE6 and NJDEP's forecast for vehicle classification and registration data.

All buses will be analyzed as heavy-duty diesel vehicles (HDDVs).

E. Traffic Data

Traffic data, including volumes, free-flow speeds, and intersection capacities, will be developed as described in the Appendix C, Traffic and Transportation Methodology Report.

F. Analysis Years and Analysis periods

Pollutant estimates will be made for existing conditions at the time of analysis, the project's short-term planning horizon, and its long-term planning horizon. Future year analyses will be conducted with and without the project alternatives. Weekday AM and PM peak time periods will be evaluated.

G. Dispersion Modeling

Modeling will be conducted using the latest versions of EPA-recommended mobile source dispersion models, which currently are:

- CAL3QHC, with worst-case meteorological data and the use of persistence factors, to estimate one-hour and eight-hour CO concentrations;
- CAL3QHCR, with five years of actual meteorological data from Newark Airport or La Guardia Airport, as appropriate, to estimate peak 24-hour and annual average PM_{10} concentrations, and peak project-generated 24-hour and annual average $PM_{2.5}$ impacts;

The analyses will follow EPA's Intersection Modeling Guidelines for modeling methodology. All major roadway segments (links) within approximately 1,000 feet from each analysis site (i.e., congested intersection) will be considered. To avoid double-counting queued vehicles at intersections downstream of an analysis site, CAL3QHC-estimated queues will be truncated at the end of each roadway link.

H. Meteorological Conditions

For the CAL3QHC CO microscale analyses, the following set of reasonable worst case meteorological conditions will likely be utilized to estimate peak one-hour concentrations:

- Wind Speed: 1 m/s
- Stability Class: D
- Mixing Height: 1,000 Meters
- Wind Angles: 5 degree increments from 0 to 360
- Surface Roughness Factor: 108 cm

For the CAL3QHCR PM_{10} and $PM_{2.5}$ microscale analyses, a set of five consecutive years of recent meteorological data from Newark Airport or La Guardia Airport will be used.

I. Persistence Factor

Following current EPA guidelines, eight-hour CO concentrations will be obtained by multiplying the highest peak-hour CO concentration by the EPA-recommended default persistence factor for urban area of 0.7 for analysis sites in New Jersey. At analysis locations in New York, persistence factors developed by NYCDEP and NYSDOT will be used. These factors accounts for the fact that over eight hours (as distinct from a single hour), vehicle volumes will fluctuate downwards from the peak, vehicle speeds may vary, and meteorological conditions including wind speed and wind direction will vary as compared to the very conservative assumptions used for the single hour.

Twenty-four hour and annual PM_{10} and $PM_{2.5}$ concentrations will be estimated directly using five years of meteorological data.

J. Pollutant Background Levels

In estimating the total pollutant concentrations with and without the proposed project alternatives, it is necessary to include background levels for the study area. Background levels are the component of total concentrations not accounted for through the microscale modeling analysis. Applicable pollutant background concentrations will be added to the modeling results to obtain total pollutant concentrations at each receptor site for each analysis year. The background values used in the analysis will be determined in consultation with NYCDEP and NJDEP for the New York and New Jersey sites, respectively.

K. Results of the Mobile Source Analysis

The 8-hour CO level, and 24-hour and annual PM_{10} levels estimated using the methodologies described above will be added to appropriate background levels, and the resulting total pollutant concentrations will be compared with NAAQS standards to determine whether any of the project alternatives have the potential to cause or exacerbate an exceedance of an air quality standard. Project-generated changes in $PM_{2.5}$ and PM_{10} levels will be compared with Significant Threshold Values (STV) developed by NYCDEP and NYSDOT. [As previously stated, it is likely that in the near future total $PM_{2.5}$ concentrations will have to be estimated for comparison with the NAAQS.]

7.0 STATIONARY SOURCE ANALYSIS OF PORT OPERATIONS

Atmospheric dispersion analyses will be conducted to estimate pollutant levels at sensitive land uses surrounding each major port facility. The most appropriate EPA-approved atmospheric dispersion model will be used for this analysis. Currently, the model of choice would be EPA's Industrial Source Complex Air Quality Dispersion Model (ISCST3), but it may be replaced in the near future by AERMOD.

The following types of emission sources will be considered:

- Moving trucks and combustion equipment (e.g., loaders, forklifts, tractors, etc.) will likely be considered as line sources located along the internal roadway system of each facility. It will likely be assumed that all moving vehicles will be traveling at 5 mph while on site.
- Exhaust emissions from ships and locomotives idling at or near the port sites, on-site combustion equipment, and maintenance facilities will be considered as point sources.
- Exhaust emissions from tugboats operating within or near the ports will likely be considered as area sources. The sizes of these areas will be determined based on the existing and/or anticipated operational characteristics of each port facility.
- Major parking areas will likely be considered as area sources.

Electrically powered on-site equipment will not be considered in the dispersion analysis.

The concentrations of each pollutant will likely be estimated by modeling all of the sources of that pollutant from each facility. It will be conservatively assumed that pollutants will be released from all sources simultaneously. That is, all of the identified emission sources (point, line/ volume and area sources) within each facility will be included in one modeling run. Separate analyses will be conducted to estimate short-term (1-hour, 3-hour, 8-hour, and 24-hour) pollutant levels and long-term (annual average) pollutant levels. Short-term estimates will be based on peak 1-hour activity levels at each facility; long-term estimates will be based on annual average activity levels at each site.

PM_{10}, $PM_{2.5}$, NO_2, CO, and SO_2 will be considered for this analysis. Concentrations of total hydrocarbons (HC) will also likely be estimated so that air toxic analyses can be performed, as described below.

In order to evaluate the short-term and annual impacts of non-carcinogenic toxic air pollutants, states have established short-term guideline concentrations (SGCs) and annual guideline concentrations (AGCs) for exposure limits. These are maximum allowable 1-hour and annual guideline concentrations, respectively, that are considered acceptable concentrations below which there should be no adverse effects on the health of the general public.

Based on SGCs and AGCs, EPA has developed methodologies that can currently be used to estimate the potential impacts of air toxic pollutants from multiple emission sources. EPA's "Hazard Index Approach" will likely be used to estimate the potential impacts of non-carcinogenic pollutants. The combined ratio of estimated pollutant concentrations divided by the respective SGCs or AGCs value for each of the toxic pollutants released from the diesel-fueled equipment will be compared to the value of 1 to determine whether significant air quality impacts would be predicted to occur.

For carcinogenic pollutants released from the diesel equipment, unit risk factors based on toxicity of pollutants will be used. EPA currently does not consider an overall incremental cancer risk from a proposed action of less the one-in-one million to be significant. Using these factors, the potential cancer risk associated with each carcinogenic pollutant, as well as the total cancer risk of the releases of all of the carcinogenic toxic pollutants combined, will be estimated. The total incremental cancer risk of all of the carcinogenic toxic pollutants combined will be compared to a value of one-in-one million to determine whether significant air quality impacts would be predicted to occur due to these pollutant releases.

New York State Department of Environmental Conservation's (NYSDEC) Air-Guide 1 dispersion model, which includes the toxicities of each of the diesel pollutants and can be used to cumulatively estimate the potential risks associated with multiple pollutants, will likely be used for this analysis.

A. Pollutant Emission Rates

Following current modeling guidelines, emissions from the various sources associated with this project will be estimated as follows:

- Estimated hourly emission rates of each pollutant from all of the sources within each site will be summed to compute the total hourly emission rate by pollutant, reflecting the contribution of all types of emission sources within the site.
- NO_x, PM_{10} and $PM_{2.5}$, and CO emission factors for moving vehicles (i.e., exhaust, brakes, and tires) and queuing vehicles will be estimated using the latest version of EPA's emission factor algorithm (currently MOBILE 6.2.03) as described in Mobile Source section.
- Fugitive dust emission factors from moving vehicles will be estimated as described, above, in Section 5.0 Mobile Source Analysis.
- NO_x, CO, PM_{10}, and $PM_{2.5}$ emission factors for on-site moving vehicles (grams/vehicle-mile) will be multiplied by the distance that an average vehicle would travel within the site and by the number of on-site operating vehicles during each analysis period.
- Emission rates of NO_x, CO, PM_{10} and $PM_{2.5}$ from on-site diesel engines will be estimated using the latest version of EPA's NONROAD Emission Model. $PM_{2.5}$ emission factors for combustion equipment will be assumed to be between 92-97 percent of the estimated PM_{10} emission factors for each type of equipment.
- Current sources for emission factors for ships and tugboats will be obtained from EPA's "Analysis of Commercial Marine Vessel Emissions and Fuel Consumption Data; updated data sources that may become available would be consulted in the future.

- Current sources for emission factors for locomotives will be obtained from EPA's "Locomotive Emission Standards, Regulatory Support Document;" updated data sources that may become available would be consulted in the future.
- The effects using Ultra-Low Sulfur Diesel fuel after 2012 will be incorporated into the estimation of total emission factors for locomotives and marine vessels.

The following assumptions relating to source (stack) parameters will be applied:

- All engines will be operating at 70 percent of maximum engine horsepower during normal operations under both peak hour and annual average conditions;
- All engines will be operating at 20 percent of maximum engine horsepower while idling under annual average conditions;
- A diesel fuel sulfur content of 5,000 ppm will be assumed for all on-site operating stationary equipment. (This value will likely be lower in the future. For example, should ultra-low sulfur fuel be required for the heavy duty combustion equipment, a sulfur content of 30 ppm will be assumed.);
- For trucks and operating equipment, the following exhaust stack parameters will be assumed: height = 10 feet, inside diameter = 5 inches, and exit velocity = 60 ft/sec; and
- A temperature of 350°F (450°K) will be assumed for all diesel engine exhausts.

B. Dispersion Modeling

Two analysis scenarios will be developed for each port site – one for estimating potential short-term (1-hour, 3-hour, 8-hour, and 24-hour) impacts and one for estimating potential annual impacts. The short-term scenario will assume that every on-site diesel engine will be operating for the full analysis period under peak-period operating conditions. The annual scenario will be based on the estimated number of hours of operation of each piece of equipment on an annual basis, assuming that each facility will operate an average of one shift per day for 250 days per year.

Atmospheric dispersion analyses will be conducted using the ISC model to estimate pollutant levels at sensitive land uses surrounding each port. An appropriate set of point and area emission source parameters associated with each operation for each pollutant will be developed for the dispersion analysis. Each piece of operating equipment, as well as each truck, will be considered as a single point source and modeled using the point source algorithm incorporated in the ISC3 (or AERMOD) model. On-site mobile sources will be considered as line sources and modeled using a line source algorithm incorporated.

The concentrations of each pollutant will be estimated by modeling all of the sources of that pollutant from on-site operations at each port. It will be conservatively assumed that pollutants will be released from all sources simultaneously. That is, all of the identified emission sources within a site will be assumed to be operating during the same time periods and included in one modeling run.

The estimated short-term and annual pollutant impacts of the criteria pollutants will be added to appropriate background levels, and total pollutant concentrations will be compared with NAAQS standards to determine whether any activities have the potential to cause or exacerbate an exceedance of an air quality standard.

C. Results of the Stationary Source Analysis

Pollutant levels estimated using the methodologies described above will be added to appropriate background levels specific to each port site, and the resulting total pollutant concentrations will be

compared with NAAQS standards to determine whether any of the project alternatives have the potential to cause or exacerbate an exceedance of an air quality standard. Project-generated changes in $PM_{2.5}$ levels will also currently be compared with Significant Threshold Values (STV).

8.0 CHANGES IN REGIONAL EMISSIONS RATES (MESOSCALE ANALYSIS)

A regional (mesoscale) emissions analysis will compare transportation-related emissions (CO, CO2, NO_x, VOCs, and PM_{10}) generated in both the New York and New Jersey portions of study area with each project alternative for the future analysis years.

The mesoscale analysis will be conducted for the same study area as defined for the regional transportation analysis. Traffic data for the analysis will be obtained from output of the New Jersey Department of Transportation Truck Model.

A. Construction-Phase Analysis

Should a construction phase analysis be undertaken in the near future, it will likely be conducted using methodologies and assumptions similar to those recently completed for the World Trade Center Memorial and Redevelopment GEIS; the Fulton Street Transit Center FEIS; the No. 7 Subway Extension Hudson Yards Rezoning and Redevelopment FGEIS; and the Access to the Region's Core DEIS.

The analysis will include an estimation of emissions generated by diesel-powered construction equipment and dust generating activities, an air quality dispersion modeling impact analysis at a number of major construction areas, and an evaluation of emission control measures that may be necessary to mitigate potential air quality impacts.

The following tasks will likely be conducted:

- Evaluation of construction schedules, levels and duration of construction activities, and a determination of the parameters that will be used to select areas with the greatest potential for construction-phase air quality impacts.
- Estimation of emissions generated by the construction activities (demolition, excavation, tunnel spoil and rock removal, concrete and steel construction) at the main construction areas during the years of peak construction activity - including emissions from fugitive dust and exhaust from diesel-powered equipment and trucks. The following pollutants will be considered: PM_{10}, $PM_{2.5}$, NO2, and CO. Emission factors for moving and idling on-road vehicles will be developed using the latest available emission factors for trucks and on-site diesel engines.
- Selection for analysis of a number of analysis areas and the critical time intervals associates based on the emission generation potential of the anticipated construction activities and the location of nearby sensitive land uses.
- Selection of mobile analysis sites based on the routes that will be used by the construction vehicles and changes in levels of service that will result from the additional construction-related trucks.
- Dispersion modeling, likely using either EPA's ISCST3 of AERMOD dispersion model, at selected construction areas.
- Dispersion modeling, using likely using either EPA's CAL3QHC or CAL3QHCR mobile source dispersion model, at the intersections with the greatest potential for being affected by construction

activities near each area. It may be assumed that one intersection will be evaluated near each of the selected construction areas.

- A comparison of the cumulative (on-site and off-site) modeling results to the applicable NAAQS for all applicable pollutants, and NYCDEP's and NYSDOT's STVs for $PM_{2.5}$. The PM2.5 analysis will be conducted following methodologies developed by the NYCDEP.
- Identification and quantification of the effectiveness of possible mitigation measures that could be undertaken to minimize construction phase impacts (e.g., diesel equipment retrofit technologies, cleaner fuels and fugitive dust controls), if such impacts result in exceedances of any NAAQS and/or NYCDEP's and NYSDOT's STVs. Dispersion modeling may be conducted that will incorporate the effects of the selected mitigation measures at the areas with potentially significant impacts. Measures designed to reduce the potential impacts from construction-related dust, the operation of construction-related equipment, and fugitive dust from exposed soil will be addressed.

9.0 DETERMINE COMPLIANCE WITH EPA'S FINAL CONFORMITY RULE

A determination, with the appropriate supporting material, will be made as to the project's compliance with EPA's Final Conformity Rule. The supporting material will include the results of the analyses of the project's effects on regional emissions and localized pollutant concentrations, and whether these results will comply with the requirements of both the New York and New Jersey State Implementation Plans (SIPs).

Comprehensive Port Improvement Plan Environmental Assessment (CPIP EA)

NOISE AND VIBRATION METHODOLOGY REPORT

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1.0 INTRODUCTION

The purpose of this methodology report is to define current procedures, assumptions and data sources applicable to the assessment of noise and vibration impacts from proposed projects, including assessment of potential noise and vibration impacts attributable to the future port and associated transportation projects. However, at such time as the noise and vibration impact assessment is to be undertaken for a given proposed project, the lead agency(ies), project sponsor, and environmental consultant should review then-current guidance to determine what is most applicable and appropriate for the proposed project.

Analyses will be conducted to estimate the following:

- On-site noise from 24-hour operations of the terminal and its effects on the adjacent sensitive receptors.
- Construction phase noise impacts at sensitive receptors:
  - Noise generated by type of construction activity and equipment
  - Routing of construction–related traffic through sensitive areas.
- Mitigation of construction and operations noise impact in order to satisfy the requirements of applicable criteria.

Noise from terminals can be a source of annoyance to neighbors and can disturb wildlife.

Container terminals are regarded as noisy environments as the containers are made of steel and a large proportion of the containers are empty, resulting in un-deadened noise. Noise sources include impact sounds made during the handling process and safety beepers from reversing mobile plant or traversing cranes. The diesel engines of container handling mobile equipment are also a significant source of noise. Large numbers of refrigerated containers are stored on the terminal, and these require refrigeration compressor units to keep the temperature at the required level. At some terminals the refrigerated containers are stored in high stacks that can cause the compressor noise to be heard from a long distance.

The noise level at auto terminals is similar to normal street levels.

General cargo is diverse, ranging through timber and steel products, and the noise level will depend on the type of cargo being handled. However, the noise levels are generally less than those at container terminals.

Dry bulk terminals also handle a diverse range of products. In some cases there may be intermittent noise from loading equipment scraping product from concrete slabs and general background noise of conveyors and machinery.

Liquid bulk terminals generally have low noise levels.

2.0 STUDY AREA DEFINITION

A. Port Facilities

From an inspection of aerial photographs, land use maps and site visits the nearest sensitive receptors to the proposed port facility will be identified. If sensitive receptors do not exist within 1,500 feet, the facility will be screened from further analysis and a qualitative discussion of the screening results will be

provided. If sensitive receptors exist within 1,500 feet, a detailed stationary noise source analysis will be performed.

B. Roadway Noise

Land uses that may be affected by port-related traffic noise in noise-sensitive areas (residences, businesses, schools, churches, hospitals, parks, recreation areas, etc.) will be located and identified.

C. Rail Noise and Vibration Impacts

Sensitive land uses within 750 feet will be located and identified.

3.0 NOISE STANDARDS AND CRITERIA

The following Federal, State, and local noise and ground-borne vibration standards and guidelines are applicable to the construction and operation of the CPIP project.

A. Guidelines for Noise from Operations

1. Federal Guidelines and Standards

a. Federal Transit Administration (FTA) Guidelines

The FTA guidelines are contained in the FTA Manual titled "Transit Noise and Vibration Impact Assessment" – DOT – T – 95 – 16. These guidelines are widely applied for the evaluation of noise and vibration levels resulting from transit projects, and for the assessment of impacts that could result from these projects. The FTA's noise analysis methodology determines the operational noise impacts that result from transit projects based on peak hour $L_{eq\ (1)}$ and 24-hour L_{dn} noise levels, depending on the land use category of the affected areas near transit projects (Table 1).

TABLE 1
FTA GUIDELINES FOR LAND USE CATEGORIES AND METRICS FOR TRANSIT NOISE

Land Use Category	Noise Metric (dBA)	Description of Land Use Category
1	Outdoor $L_{eq}(h)$*	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land used as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use.
2	Outdoor L_{dn}	Residences and buildings where people normally sleep. This category includes homes, hospitals and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor $L_{eq}(h)$*	Institutional land uses with primary daytime and evening use. This category includes schools, libraries, and churches where it is important to avoid interference with such activities as speech, meditation and concentration on reading material.

* *L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity*

The FTA has developed criteria for environmental impacts from ground-borne vibration and ground-borne noise based on maximum level for a single event. The impact criteria are defined in the FTA guidance manual and are presented in Table 2.

TABLE 2
FTA GROUNDBORNE VIBRATION AND NOISE IMPACT CRITERIA
(VIBRATION LEVELS EXPRESSED IN VDB RE 1 MICRO INCH/SEC AND NOISE LEVELS IN DBA)

Land Use Category	Vibration Velocity Impact Levels for Frequent [1] Events	Vibration Velocity Impact Levels for Infrequent[2] Events	Noise Impact Levels for Frequent[1] Events	Noise Impact Levels for Infrequent[2] Events
Category 1: Buildings where low ambient vibration is essential for interior operations	65 VdB[3]	65 VdB[3]	-[4]	-[4]
Category 2: Residences and Buildings where people normally sleep	72 VdB	80 VdB	35 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use	75 VdB	83 VdB	40 dBA	48 dBA

Notes:
1 "Frequent Events" is defined as more than 70 vibrations per day. Most rapid transit projects fall into this category.
2 "Infrequent Events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.
3 This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.
4 Vibration-sensitive equipment is not sensitive to ground-borne noise.

b. Surface Transportation Board

The STB regulations specify that noise analysis be conducted if the project will result in either: (A) an increase in rail traffic of at least 100 percent (measured in gross ton miles annually) or an increase of at least eight trains a day on any segment of rail line affected by the proposal, or (b) An increase in rail yard activity of at least 100 percent (measured by carload activity). If any of the identified thresholds are surpassed, determine whether the proposed action will cause: (i) an incremental increase in noise levels of three decibels L_{dn} or more; or (ii) an increase to a noise level of 65 decibels L_{dn} or greater. If so, sensitive receptors (e.g., schools, libraries, hospitals, residences, retirement communities, and nursing homes) in the project area should be identified, and noise increase for these receptors should be quantified.

c. Federal Railroad Administration

In response to a legislative mandate, the FRA has issued an *Interim Final Rule* for the Use of Locomotive Horns at Highway-Rail Crossings. The rule requires that locomotive horns be sounded as a warning to highway users at public highway-rail crossings. In accordance with a legislative requirement, the rule will not take effect until one year following the date of its publication on December 18, 2003. Until December 18, 2004, the sounding of the locomotive horns at crossings will remain subject to applicable State and local laws. The rule also provides an opportunity, not previously available, for thousands of localities nationwide to mitigate the effects of train horn noise by establishing new "quiet zones." The rule also details actions communities with pre-existing "whistle bans" can take to preserve accustomed quiet.

d. Federal Highway Administration (FHWA) Standards

The FHWA noise criteria are contained in 23 CFR 772 "Procedures for Abatement of Highway Traffic and Construction Noise". The FHWA regulations apply to traffic noise from highway projects. These criteria have two components: "absolute" noise criteria and "relative" noise criteria. The absolute criteria are called Noise Abatement Criteria (NAC) and they depend on task interference due to noise interruption of various activities involving speech. The NAC vary by land use (Table 3). The second type of criteria is relative to existing noise levels whereby substantial impacts occur when predicted traffic noise levels increase by more than a prescribed limit (6dBA for New York State DOT and 10dBA for New Jersey State DOT) above existing noise levels.

TABLE 3
FEDERAL HIGHWAY ADMINISTRATION
NOISE ABATEMENT CRITERIA

Activity Category	L_{eq} for Noisiest Traffic Hour	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purposes.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	52 (Interior)	Residences, motels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: Highway Traffic Noise in the United States, USDOT, FHWA, April 1986.

2. State Guidelines and Standards

a. New York State Department of Transportation (NYSDOT) Standards

NYSDOT has adopted the FHWA noise criteria for use on projects subject to their jurisdiction. According to NYSDOT criteria, traffic noise impacts occur under either of the following two conditions: (1) predicted future traffic noise levels approach within one decibel or exceed the FHWA NAC and /or (2) when future predicted noise levels exceed the existing noise levels by six or more decibels. If traffic noise impacts are identified, noise abatement measures must be examined for all areas where traffic noise impacts are determined to occur. This examination should consider the effectiveness, feasibility, reasonableness, and cost of such measures.

b. New York State Department of Environmental Conservation (NYSDEC) Guidance

Facility operations in close proximity to other land uses can produce sound that creates significant noise impacts for proximal sound receptors. NYSDEC guidance ("Assessing and Mitigating Noise Impacts" DEP-00-1) provides directions for evaluating sound levels and characteristics (such as pitch and duration) generated from proposed or existing facilities. Regulatory authority for assessing and controlling noise effects are contained in both SEQR and specific Department program regulations (Article 8 of Environment Conservation Law (ECL) Section 3-0301(1) (i), 6NYCRR Part 617 (SEQR Act), Solid waste regulations at 6 NYCRR subdivision 360-1.14(p), 6 NYCRR Parts 450 through 454). The policy guidance document states that increases from 0-3 dBA should have no appreciable effect on receptors, increases of 3-6 dBA may have the potential for adverse impact only in cases where the most sensitive receptors are present, and increases of more than 6 dBA may require a closer analysis of impact potential depending on existing noise level and character of surrounding land use and receptors. In terms of threshold values the addition of any noise source in a non-industrial setting should not raise the ambient noise level above a maximum of 65 dBA. Ambient noise level in industrial or commercial areas may exceed 65 dBA with a high end of approximately 79 dBA (EPA 550/9-79-100, November 1979). Projects that exceed these guidance levels should explore the feasibility of implementing mitigation.

c. New Jersey Department of Transportation (NJDOT) Standards

NJDOT has adopted the FHWA noise criteria for use on projects under their jurisdiction. According to NJDOT criteria, impacts occur with either of the following conditions: (1) predicted future traffic noise levels approach within one dBA or exceed the FHWA NAC and /or (2) when predicted future noise levels substantially exceed the existing levels by ten or more decibels.

d. New Jersey Department of Environmental Protection (NJDEP)

The NJDEP does not have a Noise Control Program. The NJDEP promulgated noise regulations to control noise from stationary commercial and industrial sources in 1974, pursuant to the Noise Control Act of 1971, 13:1G-1 *et seq*. These regulations establish noise level standards at residential property lines of 50 dBA during the nighttime (10:00 PM to 7:00 AM) and 65 dBA during the daytime and at non-residential property lines of 65 dBA during both daytime and nighttime.

3. City Standards and Criteria

a. New York City Noise Code

The New York City Noise Code contains ambient noise quality criteria and standards based on existing land use zoning designations (Table 4). Conformance with the noise levels contained in the Code is determined by considering the noise level emitted directly from stationary source activities within the boundary of the project. Construction activities and noise sources outside the boundaries of the project are not included within the provisions of the Code.

TABLE 4
AMBIENT NOISE QUALITY ZONES (NEW YORK CITY NOISE CODE)

Ambient noise quality zone	Daytime standards (7 AM – 10 PM)	Nighttime standards (10 PM – 7 AM)
Noise quality zone N-1 (Low density residential R_L; land-use zones R-1 to R-3)	Leq = 60 dB(A) measured for any one hour	Leq = 50 dB(A) measured for any one hour
Noise quality zone N-2 (High density residential R_H; land-use zones R-4 to R-10)	Leq = 65 dB(A) measured for any one hour	Leq = 55 dB(A) measured for any one hour
Noise quality zone N-3 (All commercial and manufacturing land-use zones)	Leq = 70 dB(A) measured for any one hour	Leq = 70 dB(A) measured for any one hour

b. New York City CEQR Thresholds

The *CEQR Technical Manual* uses the following criteria to determine whether a proposed project would result in a significant adverse noise impact. The impact assessment compares the proposed project's build condition $L_{eq\ (1)}$ noise levels to those calculated for the No-Action condition, for receptors potentially affected by the project. If the No-Action noise level is 60 dBA $L_{eq\ (1)}$ or less and the analysis period is not a nighttime period, the threshold for a significant impact would be an increase of at least 5 dBA. If the No-Action noise level is equal to or greater than 62 dBA $L_{eq\ (1)}$ or if the analysis period is a nighttime period (defined in the CEQR Standards as being between 10 PM and 7 AM) the incremental significant impact threshold would be 3 dBA $_{Leq(1).}$ If the No-Action level is 61dBA $L_{eq\ (1)}$ the maximum incremental increase would be 4 dBA, since an increase higher than this would result in a noise level higher than the 65 dBA $_{Leq(1)}$ threshold.

c. New York City DEP's External Noise Exposure Guidelines

The *CEQR Technical Manual* contains noise exposure guidelines for use in New York City environmental impact review. The standards for vehicular, train, and aircraft environs are listed on Table 5. Noise exposure is classified into four main categories: "acceptable," "marginally acceptable," "marginally unacceptable," and "clearly unacceptable." The standards for aircraft and train noise differ from those for traffic noise due to the intrusive nature of these noise sources.

TABLE 5
CEQR NOISE EXPOSURE GUIDELINES FOR USE IN CITY ENVIRONMENTAL IMPACT REVIEW[1]

Receptor Type	Time Period	Acceptable General External Exposure	Airport[3] Environs	Marginally Acceptable General External Exposure	Airport[3] Environs	Marginally Unacceptable General External Exposure	Airport[3] Environs	Clearly Unacceptable General External Exposure	Airport[3] Environs
1. Outdoor area requiring serenity and quiet [2]		L_{10} less or equal 55 dBA							
2. Hospital, nursing home		L_{10} less or equal55 dBA	L_{dn} less than or equal to 60 dBA	55<L_{10} but less or equal 65 dBA	L_{dn} less than or equal to 65 dBA	65<L_{10} but less or equal80 dBA	(I)L_{dn} less than or equal to 70 dBA (II) L_{dn} less than or equal to 75 dBA	L_{10}> 80 dBA	L_{dn} >75 dBA
3. Residence, residential hotel or motel	7AM to 11 PM	L_{10} Less or equal 65 dBA		65<L_{10} but less or equal 70 dBA		70<L_{10} but less or equal 80 dBA		L_{10}> 80 dBA	
	11PM to 7AM	L_{10} Less or equal 55 dBA		55<L_{10} but less or equal 70 dBA		70<L_{10} but less or equal 80 dBA		L_{10}> 80 dBA	
4. School. museum, library, court, house of worship or transient hotel or motel, public meeting room, auditorium, out-patient public health facility		Same as Residential Day (7AM-11PM)		Same as Residential Day (7AM-11PM)		Same as Residential Day (7AM-11PM)		Same as Residential Day (7AM-11PM)	
5. Commercial or office		Same as Residential Day (7AM-11PM)		Same as Residential Day (7AM-11PM)		Same as Residential Day (7AM-11PM)		Same as Residential Day (7AM-11PM)	
6. Industrial, public areas only [4]	Note [4]	Note [4]		Note [4]		Note [4]		Note [4]	

Source: New York Department of Environmental Protection (adopted policy 1983).

Notes:

(i) In addition, any new activity shall not increase the ambient noise level by 3 dBA or more: (ii) CEPO-CEQR Noise Standards for train noise are similar to the above aircraft noise standards: the noise category for train noise is found by taking the L_{dn} value for such train noise to be an L_{dn} (L_{dn} contour) value (see table on the following page).

1 Measurements and projections of noise exposures are to be made at appropriate heights above site boundaries as given by ANSI Standards: all values are for the worst hour in the time period.

2 Tracts of land where serenity and quiet are extraordinarily important and serve an important public need and where the preservation of these qualities is essential for the area to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks or open spaces dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet. Examples are grounds for ambulatory hospital patients and patients and requiring special qualities of serenity and quiet. Examples are grounds for ambulatory hospital patients and patients and residents of sanitariums and old-age homes.

3 One may use the FAA-approved L_{dn} contours supplied by the Port Authority, or the noise contours may be computed from the federally approved INM Computer Model using data supplied by the Port Authority of New York and New Jersey.

4 External Noise Exposure standards for industrial areas of sounds produced by industrial operations other than operating motor vehicles or other transportation facilities are spelled out in the New York City Zoning Resolution, Sections 42-20 and 42-21. The referenced standards apply to M1, M2, and M3 manufacturing districts and to adjoining residence districts (performance standards are octave band standards).

5 For purposes of satisfying FHWA traffic noise assessment requirements which are based on L_{eq} (1 hour), the following approximate relation between L_{eq} and L10 may be used: $L_{eq} = L_{10}$-3

d. New Jersey Cities Standards and Criteria

New Jersey cities Elizabeth, Newark, Jersey City and Bayonne use the state's model noise ordinance. See New Jersey Model Noise Ordinance under Construction Noise and Vibration.

B. Guidelines for Noise from Construction

The project construction could result in high noise levels and occasional high ground-borne vibration and ground borne noise levels in nearby areas. Construction-related activities at the ground level could generate air borne noise and ground borne vibration during heavy construction. Noise and vibration could also result from the operation of delivery vehicles traveling to and from the construction site, often through sensitive areas. Major sources of noise and vibration during ground level construction are pile drivers, rock drills and blasting. Temporary noise impacts could occur in the local area during project construction, as a consequence of a variety of construction activities, including clearing and grubbing, excavation, blasting, pile driving, and other site preparation and construction work.

Roadway or transit way construction would involve excavation employing heavy construction equipment. Such construction techniques and machinery operation will result in propagation of vibration through the ground and this has the potential to result in detectable vibration and /or radiated ground-borne noise within nearby buildings.

Construction noise sources include both stationary (e.g., compressors, pile drivers, power tools, etc.) and mobile (e.g., trucks, bulldozers, etc.) sources. The impact of these sources depends on their noise emissions levels and the number, location, and duration of their use during the construction period. Noise levels in the vicinity of the construction site could increase over existing levels. This increase will vary depending on the existing environment. In environments dominated by high levels of road traffic noise, the construction noise should generally be limited to an increase of no more than 5 dBA

For offices, commercial and residential properties the potential for radiated noise within the buildings is usually of greater concern than the perceptible ground vibration level. However, for buildings with vibration-sensitive areas or equipment, such as hospitals, doctor’s offices, etc., the potential for construction vibration affecting the operation of these buildings is a serious issue.

No standardized criteria exist for assessing construction noise impact. Therefore, project-specific criteria should be developed. To facilitate this process, various sources or guidance documents are discussed below.

The following Federal, State and local construction noise regulations and standards are relevant to the CPIP project.

1. Federal Guidelines and Standards

a. FTA Guidelines

The FTA manual *Transit Noise and Vibration Impact Assessment* recognizes that while it is not the purpose of the manual to specify standardized criteria for defining construction noise impact, it does propose guidelines for assessment. Chapter 12 of the FTA guidance manual recommends that:

> *Project construction noise criteria should take into account the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use.*

The FTA manual recommends that, for a detailed assessment, the construction noise level be predicted in terms of 8-hour L_{eq} and 30-day averaged L_{dn}. Potential impacts are identified where the predicted construction level exceeds the criteria in Table 6. These are trigger levels above which there may be adverse community reaction.

TABLE 6
FTA GUIDELINES FOR CONSTRUCTION NOISE, DB RE 2X 10^{-5} PA

Land Use	$dBL_{Aeq, 8 hour}$		$dBL_{Aeq, 30 day}$
	Day	Night	30-day Average
Residential	80	70	75(a)
Commercial	85	85	80(b)
Industrial	90	90	85(b)

a) In urban areas where existing noise level exceeds L_{dn} 65 dB, noise (L_{dn}) from construction activities should not exceed existing + 10 dBA.
b) 24-hour L_{eq}, not L_{dn}.

b. Environmental Protection Agency Noise Emission Levels

The United States Environmental Protection Agency (EPA) has established standards (U.S. EPA, 1971. NTID 301, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances") for a number of types of construction equipment, including emission standards for pile drivers, compressors, graders, bulldozers, pavers, pumps, boring machines, generators, pavement breakers, and a broad range of construction-related heavy trucks (Table 7).

TABLE 7
CONSTRUCTION EQUIPMENT NOISE LEVELS AT 50 FEET
(CONFORMANCE WITH EPA NOISE EMISSION LEVELS)

Equipment	Typical Noise Level (dBA) 50 feet from Source
Air Compressor	81
Backhoe	80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane Derrick	88
Crane Mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	89
Jackhammer	88
Loader	85
Paver	89
Pile Driver (Impact)	101
Pile Driver (Sonic)	96

TABLE 7
CONSTRUCTION EQUIPMENT NOISE LEVELS AT 50 FEET
(CONFORMANCE WITH EPA NOISE EMISSION LEVELS)

Equipment	Typical Noise Level (dBA) 50 feet from Source
Pneumatic Tool	85
Pump	76
Rock Drill	90
Roller	98
Saw	74
Scarifier	76
Scraper	89
Shovel	82
Spike Driver	77
Tie Cutter	84
Tie Handler	80
Tie Inserter	85
Truck	88

Source: Table from FHWA Prediction Method, Chapter 12.2.3, and FTA Publication No. DOT-T-95-16, Noise and Vibration During Construction, based on an EPA Report, measured data from railroad construction equipment taken during the Northeast Corridor Improvement Project, and other measured data.

2. New Jersey Model Noise Ordinance

a. Maximum Permissible Sound Levels

(A) No person shall cause, suffer, allow, or permit the operation of any source of sound on any source property listed in II.(A) above[1] in such a manner as to create a sound level that equals or exceeds the sound level limits set forth in Tables 8 and 9 when measured at or within the real property line of any of the receiving properties listed in Tables 8 and 9, except as specified in (B) below.

(B) When measuring total sound or residual sound within a multi-use property, or within a residential unit when the property line between it and the source property is a common wall, all exterior doors and windows shall be closed and the measurements shall be taken in the center of the room most affected by the noise. Residual sound shall be measured in accordance with N.J.A.C. 7:29-2.9(b)2. When measuring total sound or residual sound, all sound sources within the dwelling unit must be shut off (e.g., television, stereo). Measurements shall not be taken in areas which receive only casual use such as hallways, closets and bathrooms.

(C) Indoor measurements shall only be taken if the sound source is on or within the same property as the receiving property, as in the case of a multi-use property (e.g., sound generated within a commercial unit of a multi-use property building and received within a residential unit of the same building) or multi-dwelling unit building. In addition, indoor measurements shall be taken if the property line between the receiving property and the source property is a common wall, such as in a multi-dwelling unit building. The allowable sound level standards for indoors are as shown in Tables 8 and 9.

[1] Industrial facilities; commercial facilities; public service facilities; community service facilities; residential properties; multi-use properties; public and private right-of-ways; public spaces; and multi-dwelling unit buildings.

(D) Impulsive Sound {Note: either one of the following must be adopted.}

1. Impulsive sound shall not equal or exceed 80 decibels at all times.

OR

2. Between 7:00 AM and 10:00 PM, impulsive sound shall not equal or exceed 80 decibels. Between 10:00 PM and 7:00 AM, impulsive sound which occurs less than four times in any hour shall not equal or exceed 80 decibels. Impulsive sound which repeats four or more times in any hour shall be measured as impulsive sound and shall meet the requirements as shown in Table 8.

TABLE 8
MAXIMUM PERMISSIBLE A-WEIGHTED SOUND LEVELS

1. No person shall cause, suffer, allow, or permit the operation of any source of sound on any source property listed in II.(A) above[1] in such a manner as to create a sound level that equals or exceeds the sound levels listed below.

(A) Outdoors			
	Residential property, or residential portion of a multi-use property		**Commercial facility, public service facility, non-residential portion of a multi-use property, or community service facility**
Receiving Property Category	**7 AM-10 PM**	**10 PM-7 AM**	**24 hours**
Maximum A-Weighted sound level standard, dB	65	50	65
(B) Indoors			
	Residential property, or residential portion of a multi-use property		**Commercial facility,* or non-residential portion of a multi-use property**
Receiving Property Category	**7 AM-10 PM**	**10 PM-7 AM**	**24 hours**
Maximum A-Weighted sound level standard, dB	55	50	55

* *In those instances when a commercial facility shares a common wall/ceiling/floor with another commercial facility that is producing the sound.*

TABLE 9
MAXIMUM PERMISSIBLE OCTAVE BAND SOUND PRESSURE LEVELS IN DECIBELS

1. No person shall cause, suffer, allow, or permit the operation of any source of sound on any source property listed in II.(A) above[1] in such a manner as to create a sound pressure level that equals or exceeds the sound levels listed below in one or more octave bands.

2. When octave measurements are made, the sound from the source must be constant in level and character. If octave band sound pressure level variations exceed plus or minus 2 dB in the bands containing the principal source frequencies, discontinue the measurement.

Receiving Property Category	Residential property, or residential portion of a multi-use property OUTDOORS		Residential property, or residential portion of a multi-use property INDOORS		Commercial facility, public service facility, non-residential portion of a multi-use property, or community service facility OUTDOORS	Commercial facility,* or non-residential portion of a multi-use property INDOORS
Octave Band Center Frequency, Hz.	Octave Band Sound Pressure Level, dB		Octave Band Sound Pressure Level, dB		Octave Band Sound Pressure Level, dB	Octave Band Sound Pressure Level, dB
	7 AM - 10 PM	10 PM - 7 AM	7 AM - 10 PM	10 PM - 7 AM	24 hours	24 hours
31.5	96	86	86	76	96	86
63	82	71	72	61	82	72
125	74	61	64	51	74	64
250	67	53	57	43	67	57
500	63	48	53	38	63	53
1,000	60	45	50	35	60	50
2,000	57	42	47	32	57	47
4,000	55	40	45	30	55	45
8,000	53	38	43	28	53	43

* *In those instances when a commercial facility shares a common wall/ceiling/floor with another commercial facility that is producing the sound.*

Restricted Uses and Activities

(A)
1. Except as provided in (B) below, the provisions of this ordinance shall not apply to the exceptions listed at N.J.A.C. 7:29-1.4.
2. Construction and demolition activities are exempt from the sound level limits set forth in Tables 8 and 9, except as provided for in (B) below.

(B) {Note: This section is optional; any numbered paragraph may be adopted in its entirety.} Notwithstanding the provisions of Tables 8 and 9, the following standards shall apply to the activities or sources of sound set forth below:

1. Non-commercial or non-industrial power tools and landscaping and yard maintenance equipment shall not be operated between the hours of 8:00 PM and 8:00 AM, unless such activities can meet the applicable limits set forth in Tables 8 and 9. All motorized equipment used in these activities shall be operated with a muffler. At all other times, the limits set forth in Tables 8 and 9 do not apply to non-commercial or non-industrial power tools and landscaping and yard maintenance equipment;

2. Commercial or industrial power tools and landscaping and yard maintenance equipment, excluding emergency work, shall not be operated on a residential property or within 250 feet of a residential property line when operated on commercial or industrial property, between the hours of 6:00 PM and 7:00 AM on weekdays, or between the hours of 6:00 PM and 9:00 AM on weekends or federal holidays, unless such activities can meet the limits set forth in Tables 8 and 9. In addition, commercial or industrial power tools and landscaping and yard maintenance equipment, excluding emergency work, utilized on commercial or industrial property shall meet the limits set forth in Tables 8 and 9 between the hours of 10 PM and 7 AM. All motorized equipment used in these activities shall be operated with a muffler. At all other times, the limits set forth in Tables 8 and 9 do not apply to commercial or industrial power tools and landscaping and yard maintenance equipment;

3. Construction and demolition activity, excluding emergency work, shall not be performed between the hours of 6:00 PM and 7:00 AM on weekdays, or between the hours of 6:00 PM and 9:00 AM on weekends and federal holidays, unless such activities can meet the limits set forth in Tables 8 and 9. All motorized equipment used in construction and demolition activity shall be operated with a muffler. At all other times, the limits set forth in Tables 8 and 9 do not apply to construction and demolition activities;

4. Motorized snow blowers, snow throwers, and lawn equipment with attached snow plows shall be operated at all times with a muffler;

Construction and demolition activity, excluding emergency work, shall not be performed between the hours of 6:00 PM and 7:00 AM on weekdays, or between the hours of 6:00 PM and 9:00 AM on weekends and federal holidays, unless such activities can meet the limits set forth in Tables 8 and 9. All motorized equipment used in construction and demolition activity shall be operated with a muffler. At all other times, the limits set forth in Tables 8 and 9 do not apply to construction and demolition activities.

3. Local Standards for Marine Terminals

The following local standards are applicable to Marine Terminals in New York City, and in cities in New Jersey.

New York City Noise Code and CEQR Standards for construction and operations phases should apply to South Brooklyn Marine Terminal, Red Hook Container Terminal, Brooklyn Marine Terminal, and Staten Island's Howland Hook Terminal.

New Jersey State Model Ordinance requirements for construction and operation phases should apply to Port Newark Marine Terminal, Port Elizabeth Marine Terminal, Port Jersey (Global Marine and Auto Marine) Terminal, and the Pennsylvania at Bayonne Harbor (formerly Military Ocean Terminal at Bayonne (MOTBY).

4. New York City Standards

Construction noise is regulated by New York City Noise Control Code (Title 24, Environmental Protection and Utilities, Chapter 2, Noise Control), and by New York City Noise Control Standards.

Section 24-224 of the New York City Noise Control Code limits construction activities to weekdays between the hours of 7:00 AM and 6:00 PM, although variances may be granted "in the case of urgent necessity in the interest of public safety." The Noise Control Code also establishes noise emission limitations on air compressors, paving breakers and heavy trucks. The provisions contained in the Noise Control Code are enforced by the New York City Department of Environmental Protection Bureau of Air Resources, Division of Noise Abatement.

- Section 24-224 (a) Construction activities.

  Except as otherwise provided in this section, no person shall engage in or permit any person to be engaged in construction activities in any zone other than on weekdays between the hours of 7 AM and 6 PM.

  N.B. Section 24-224 (b) states that 'in the case of urgent necessity in the interest of public safety, [an NYC agency] may issue a variance for an initial period of up to three days.

  In addition, Section 24-250 (e), which covers tunneling, states that construction permits can be granted for periods of up to sixty days.

- Section 24-225 Construction devices.

  Except as provided in subchapter five of this code, no person shall operate or use or cause to operate a construction device in such a way as to create an unreasonable noise.

- Section 24-226 Containers and construction material.

  No person shall handle or transport or cause to be handled or transported in any public place, any container or any construction material in such a way as to create an unnecessary noise.

- Section 24-236 (c) Air compressors.

  No person shall operate an air compressor which when operated produces a maximum sound level exceeding 75 dB(A) (for sizes 350 cfm or less) or 80 dB(A) (for sizes greater than 350 cfm), when measured at a distance of one meter from the air compressor.

- Section 24-240 Emergency signal devices.

  No person shall operate an emergency signal device which creates a sound level exceeding 90 dB(A) when measured at a distance of 50 feet from the vehicle.

- Section 24-241 (b) Paving breakers.

  No person shall operate a paving breaker which when operated produces a maximum sound level exceeding 95 dB(A), when measured at a distance of one meter from the paving breaker.

Sub-chapter 6 states criteria for maximum allowable ambient noise levels, both for daytime (7am to 10pm) and nighttime (10pm to 7am), which are in Table 10. While these criteria apply to the external ambient noise, not construction noise, they are included here for reference.

TABLE 10
AMBIENT NOISE QUALITY ZONES (NEW YORK CITY NOISE CODE)

Ambient noise quality zone	Daytime standards (7 AM – 10 PM)	Nighttime standards (10 PM – 7 AM)
Noise quality zone N-1 (Low density residential R_L; land-use zones R-1 to R-3)	L_{eq} = 60 dB(A) measured for any one hour	L_{eq} = 50 dB(A) measured for any one hour
Noise quality zone N-2 (High density residential R_H; land-use zones R-4 to R-10)	L_{eq} = 65 dB(A) measured for any one hour	L_{eq} = 55 dB(A) measured for any one hour
Noise quality zone N-3 (All commercial and manufacturing land-use zones)	L_{eq} = 70 dB(A) measured for any one hour	L_{eq} = 70 dB(A) measured for any one hour

The criteria are divided into allowable noise levels for low and high density residential, commercial and manufacturing land use. For high-residential areas the maximum allowable ambient is 55 dB(A) for nighttime and 65 dB(A) for daytime, measured for any one hour period (Table 10).

Ambient noise quality zone N-1 shall consist of low density residential areas; N-2 shall consist of higher density residential areas; and N-3 shall consist of all commercial and industrial areas.

All noise measurements shall be made at the property line of the impacted site. When instruments cannot be placed at the property line, the measurements shall be made as close thereto as reasonable. However, noise measurements shall not be made at a distance less than 25 feet from the edge of the noise source.

The ambient noise quality criteria and standards above are not presently adjusted for particular noise sources having pure tones or impulsive noise characteristics, such as jet engine whine and pile drivers, respectively.

5. New York City Transit Standard Contractual Specification

The general noise control clauses in NYCT's contractual specifications for construction state that construction noise levels, at the closest point adjacent to the construction site in normal use by the public, shall not exceed 90 dB(A).

In addition, construction noise level, as measured at the street line of the structure adjacent to the site, should not exceed the limits set out in Table 11. For residential properties the construction noise level should not exceed 75 dB(A) during the daytime or 60 dB(A) at nighttime and weekends. The document does not specify with what metric the noise levels should be measured i.e. LA_{max}, LA_{eq}, and LA90. etc.

TABLE 11
NEW YORK CITY TRANSIT GENERAL SPECIFICATION CLAUSES FOR NOISE CONTROL, dB RE $2x10^{-5}$ PA

	Daytime Standards (7 AM – 11 PM) dBA	**Nighttime Standards (11 PM – 7 AM) dBA**
Residential	75	60
Business/commercial structures	85	85
Factory/commercial structures	90	90

6. Construction Airborne Noise Criteria Used on Other Recent Projects in New York

For the First Avenue Steam Tunnel project, on East 36th Street, the contractual permit specified the following noise requirements:

- Sound levels due to construction activities, should not exceed the following limits (in terms of L_{ea}(30min) – when measured at the property line):
  - Business / commercial structures.....80 dB(A)
  - Residential [Daytime 7 AM – 6 PM].....75 dB(A)
  - Residential [Evening 6 PM – 11 PM].....65 dB(A)
  - Residential [Nighttime 11 PM – 7 AM].....60 dB(A)
- Noise produced by the detonation of explosives shall not exceed 95 dB(A) at any residential building, when measured using a sound level meter with a slow time-response.

4.0 NOISE AND VIBRATION IMPACTS ANALYSIS METHODOLOGY

A. Port Facilities

Noise and vibration impact analysis may need to be performed for the construction and operations phases of the container terminals, depending on details of future proposed projects and associated noise-generating activities. If necessary, the analysis will address the following noise issues:

- On-site noise from 24-hour operations of the terminal and its effects on the adjacent sensitive receptors.
- Construction phase noise impacts at sensitive receptors:
  - Noise generated by type of construction activity and equipment
  - Routing of construction–related traffic through sensitive areas.
- Mitigation of construction and operations noise impact in order to satisfy the requirements of applicable criteria.

The noise analysis will assess potential mobile and stationary source noise impacts at sensitive receptors near the port facilities. Procedures and methodologies including those provided in the *CEQR Technical Manual*, and other local, state, and federal guidelines will serve as the basis for the noise analysis.

The following tasks will be performed:

- From an inspection of aerial photographs, land use maps, and site visits, the nearest sensitive receptors to the proposed port facility will be identified. Ambient noise and vibration monitoring will be performed at representative sites to establish baseline conditions in accordance with the following:
  - All noise levels will be reported in units of dB(A).
  - Units of dB(C) will be reported if maximum instantaneous octave bands are monitored at industrial stationary equipment (per NYC Zoning Resolution).
  - A Type I or II meter (conforming to ANSI S1.4-1983) with a windscreen (measures overall sound levels) will be used. A wind screen is a porous sphere placed atop a microphone to reduce the effects of wind-generated noise on the microphone diaphragm.
  - A Type I or II meter with a windscreen (measures octave bands) will be used if an octave band analysis is necessary for consistency with NYC Zoning Resolution performance standards and New Jersey Ordinance..
  - Slow meter response will be selected.
  - Metrics of: L_{eq} (hourly) 10th, 50th and 90th percentile noise levels (L_{10}, L_{50}, L_{90}), and hourly minimum and maximum noise levels (L_{min}, and L_{max}) will be recorded (at a minimum).
  - The meter will be calibrated before each monitoring event. Microphone placement will be approximately five feet or greater above the ground and at a minimum of three to four feet from the nearest reflective surface.
  - Prior to monitoring, the wind speed and temperature data will be researched for the period during the short-term monitoring events. Noise monitoring will not occur during periods in which the wind speed is greater than 15 mph (per CEQR) or when the intervening ground is wet due to rain or covered with snow.
  - Where necessary, twenty-four (24) hour noise-monitoring events will be performed occur at the property line of the nearest sensitive receptor.
  - Twenty (20) minute noise monitoring events will be performed at the nearest sensitive receptor during expected peak Facility noise impact hour.
  - The location of sensitive receptors will be field verified.

  If sensitive receptors do not exist within 1500 feet, the Port Facility will be screened from further analysis and a qualitative discussion will be provided of the screening results. If sensitive receptors exist within 1,500 feet a detailed stationary noise source analysis will be performed following the procedures detailed below. Where nearby residents are potentially affected by the port activity, all noise sources will be listed and areas where noisy activity could be expected to occur as a result of the proposal will be described.

- Number and types of on-site stationary and mobile equipment, their noise levels, usage factors, and approximate location on the proposed port facility will be obtained.
- Ground-vibration levels that residents within proximity to the Port might experience during the operation and construction phases will be indicated and baseline vibration levels will be measured.
- Applicable federal (FTA for vibration), state, and local (New York City and cities in New Jersey for noise) criteria for acceptability of stationary source noise and vibration levels at the receptor sites depending on the category of their land use will be used in noise and vibration impact assessment.
- The future noise levels from on-site equipment will be predicted at the adjacent sensitive receptors during 24 hours of terminal operation. Container terminal on-site equipment typically includes

specific penetrating noise sources, including warning sirens on cranes and straddle carriers, ship's horn sounded on departure and train crossing horns and warning bells. General plant noise sources include refrigerated container units, cranes and straddle carriers, ship's generators, trucks, and trains. To predict future noise levels it is necessary to determine the dominant noise sources within the container terminal. A number of noise measurements will be made close to the noise sources or information will be gathered from reliable sources in order to develop a data base.

- Noise impacts from terminal operations will be determined by comparing the future operations phase noise levels with the applicable federal, state, and local noise impact criteria.
- If impacts are identified, appropriate noise mitigation will be recommended during the operations phase to satisfy the requirements of applicable noise criteria.
- Construction methods and types of construction equipment used at the proposed site and time periods for operation will be obtained. Equipment noise levels will be collected from published information, equipment suppliers or construction contractors. Noise from construction activity and equipment will be predicted. Principal focus will be on pile driving, dredging operations, and noise from other dominant noise sources. The propagation of high levels of noise generated by heavy construction activity has the potential to create impacts at the adjacent sensitive receptor sites. Construction equipment noise levels and their reduction as they propagate to the adjacent sensitive receptors will be determined. Noise levels that can be expected within the twelve hour periods of 7 AM to 7 PM and 7 PM to 7 AM during the construction phase will be estimated. Construction noise impacts will be assessed following standard procedures and by applying local, state and federal criteria.
- If impacts are identified, effective mitigation will be discussed and mitigation methods will be recommended. Recommendations for construction noise and vibration control will be based on federal, state, and local guidelines. Noise specifications for construction equipment would be laid down in contracts for construction work in accordance with EPA and local standards for the environment. Occasional measurements of noise levels in the external environment should be made to monitor noise. Records of complaints should be kept.

B. Roadway Noise Impacts

1. Determine Existing Traffic Noise Condition

- Locate and identify land uses that may be affected by port-related traffic noise. Identification of noise sensitive areas (residences, businesses, schools, parks, etc.), including information on the number and types of activities which may be affected, should include developed lands and undeveloped lands for which development is planned, designed, and programmed.
- Perform ambient noise and vibration measurements with a calibrated Type I or Type II Sound Level Meter conforming to ANSI 1.4-1983 Standard at sensitive properties such as residences, schools, churches, hospitals, parks, and recreation areas to determine existing noise levels. The noise monitoring procedures will follow those detailed under Port Facilities.
- Model existing noise conditions using FHWA's Traffic Noise Model (TNM) 2.1 to determine existing noise levels at all potentially affected land uses.

2. Determine Future Conditions

- Model future noise levels for the no-build and build conditions using FHWA's TNM 2.1.
- Noise Impact Assessment: Determine the extent of noise impact (in decibels) at each sensitive area noise impact based on FHWA's, NYSDOT's, and NJDOT's guideline and procedures. This includes a comparison of the predicted noise levels with both the FHWA noise abatement criteria and the existing noise levels. (Traffic noise impacts occur when the predicted traffic noise levels approach or exceed the noise abatement criteria or when they substantially exceed the existing noise levels.)
- For road traffic noise impact analysis and abatement FHWA's "Highway Traffic Noise Analysis and Abatement Policy and Guidance" and FHWA procedures contained in 27 CFR 772 will be followed. For predicting future traffic noise levels the FHWA Traffic Noise Model version 2.1 will be followed by both New York and New Jersey as both the states have adopted the Federal Highway procedure and policies with minor variations. For example, the definition of "substantial increase over existing noise level" is an increase of 6 dBA over the existing noise level for New York and 10 dBA over the existing noise level for New Jersey.
- Investigate potential for roadway improvement-related construction noise impacts.

3. Noise Abatement

- Noise Abatement for construction and operations phases: Noise mitigation will be evaluated in all land uses where impacts are predicted to occur. Noise abatement measures which have been considered for each area potentially subjected to impacts and those measures that are reasonable and feasible and that would "likely" be incorporated into the proposed project would be considered. Estimated costs, decibel reductions and height and length of barriers will be shown for recommended abatement. Feasibility and cost effectiveness of noise mitigation will be determined based on NYSDOT criteria for road traffic noise related to terminals in New York and NJDOT criteria for road traffic noise related to terminals in New Jersey. New York City Noise Code and CEQR Standards for construction and operations phases would apply to South Brooklyn Marine Terminal, Red Hook Container Terminal, Brooklyn Marine Terminal, and Staten Island's Howland Hook Terminal. New Jersey State Model Ordinance requirements for construction would apply to Port Newark Marine Terminal, Port Elizabeth Marine Terminal, Port Jersey (Global Marine and Auto Marine) Terminal, and the Pennsylvania at Bayonne Harbor (formerly MOTBY).
- Noise impacts for which no prudent solutions are reasonably available will be discussed, including the reasons why they are not reasonable.

C. Rail Noise and Vibration Impacts

1. Determine Existing Conditions

- Land uses within 750 feet will be identified in accordance with FTA's noise screening procedure as described in FTA's "Transit Noise and Vibration Impact Assessment." If no sensitive land uses are found within the screening distance monitoring will not be required.
- If sensitive land uses are found within the screening distance, that could be potentially affected by rail noise and vibration, such land uses will be identified for detailed analysis.
- Existing noise and vibration measurements will be performed at the identified sensitive properties which may include residences, schools, churches, hospitals, parks, and recreation areas. The noise monitoring procedures will follow those detailed under Port Facilities. Vibration monitoring is not required unless the receptors are within 100 feet. FTA procedures will be followed if vibration monitoring is required.

2. Determine Future Conditions

- Noise and vibration impacts will be determined using FTA's model.
- Level of noise impact will be determined in accordance with FTA's procedures (No Impact, Impact, or Severe Impact). Vibration impacts will be assessed following FTA procedures. New York City CEQR noise standards also will apply for terminals in New York state.

3. Noise Abatement

- Noise and vibration mitigation will be evaluated in all areas where impacts are predicted to occur.
- Feasibility and reasonableness of noise and vibration mitigation will be determined based on the FTA criteria.

5.0 REFERENCES

- Federal Highway Administration Traffic Noise Model 2.1
- New York State Department of Transportation Noise Abatement Policy
- Federal Transit Administration Transit Noise and Vibration Impact Assessment, April 1995
- 23 CFR 772 Procedures for Abatement of Highway Traffic Noise and Construction Noise.
- 29 CFR 1910.95

Comprehensive Port Improvement Plan Environmental Assessment (CPIP EA)

NATURAL RESOURCES METHODOLOGY REPORT

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1.0 INTRODUCTION

The purpose of this methodology report is to define current procedures, assumptions, and data sources applicable to the assessment of impacts to natural resources from a proposed project, including assessment of the potential impacts to natural resources attributable to the future port and associated transportation improvement projects. However, at such time as the natural resources impact assessment is to be undertaken for a given proposed project, the lead agency(ies), project sponsor, and environmental consultant should review then-current guidance to determine what is most applicable and appropriate for the proposed project.

The natural resources assessment will address direct and indirect effects on aquatic and terrestrial species and their habitats, including:

- Freshwater and tidal wetlands including littoral zones, coastal shoals, bars and flats, intertidal, coastal and high marshes and formerly connected wetlands;
- Terrestrial habitats and biota; and
- Built resources that serve as habitat or function in place of the natural environment.

(Water resources, including surface and groundwater, floodplains and stormwater drainage systems are addressed in the Water Quality Methodology Report.)

Significant, sensitive habitats and protected species should be provided the special evaluations and interagency coordination prescribed by federal, state and municipal regulations governing such resources. As applicable, assessment methodologies are based upon available guidance, including the *City of New York City Environmental Quality Review (*CEQR*) Technical Manual* (2001) and regulations and guidance from state and federal agencies.

2.0 STUDY AREA

The study area will be defined and sampling locations selected when the likely build date and proposed port and associated transportation project is defined. Study areas will encompass those upland and aquatic habitats likely to be subject to impacts from construction and operation of a proposed port and associated transportation improvement project.

The CPIP Plan is predicated upon deepening federal navigation channels to 50 feet and, consequently, deepening of some berthing areas to similar depths to accommodate deep draft vessels. Impacts associated with deepening the federal channels were addressed previously in the *Harbor Navigation Study Final Environmental Impact Statement* (USACE, 1999). Only dredging activities required to achieve adequate depths at berthing sites not considered previously would be addressed.

3.0 NATURAL RESOURCES IMPACT ASSESSMENT METHODOLOGY

A. Determining the Extent of the Natural Resources Assessment

Natural resource assessments are to be undertaken for projects that are proposed at or near a site with a natural resource and where the action may impact that resource. Sites that are substantially devoid of

natural resources, do not support protected species, and do not have subsurface conditions that may affect the function or value of a natural resource should not be subjected to a natural resource assessment. However, the lack of natural resources should be documented.

B. Analysis Years

Standard EIS methodology includes analyses of "existing" and "future No-Action" conditions, the latter describing future conditions absent the proposed project and defining the future baseline against which project alternatives are evaluated to determine potential project-related impacts. Future No-Action analysis years are defined coincident with the proposed project's principal construction period, if the project includes significant new infrastructure, and its first year of operation and/or its design year.

C. Data Collection and Assessment

The value of natural resources and supporting habitats present in the study areas (and likely to be present in the future No-Action condition) should be documented. The interaction of these resources with the construction and operation of a proposed port improvement project should be analyzed to determine the extent of impact. The level of detail in data and the effort expended in analysis should be equivalent to the extent of likely potential impacts and the level of detail available regarding the proposed project.

Natural resources are dynamic, undergoing natural changes and succession. Some areas of the harbor are losing ecosystem functions and values, while others may be gaining functions and showing improvements over historic conditions. Actions that are likely to cause significant impacts at a point so distant in the future that existing conditions may not accurately reflect the level of impact to be expected should be identified and an appropriate time schedule for analysis of likely impacts recommended.

Initial evaluations of likely impacts should be made using available data and reconnaissance surveys. Where the potential for significant impact is high and likely in the near future, more extensive analysis should be undertaken.

1. Available Literature and Data

A vast array of published and unpublished data sources is available to assist in the characterization of both site-specific and regional natural resources. A good summary of biological data and publications is provided in an annotated bibliography prepared by the U.S. Army Corps of Engineers (USACE) New York District (1998).

EISs prepared by the USACE and others, for projects in New York Harbor and by entities with projects proposed for the waterfront, should be evaluated. Databases developed by the Hudson River Foundation, the Interstate Sanitation Commission, NYC Department of Environmental Protection (NYCDEP), state breeding bird and herpetological atlases, and others, as applicable, should be reviewed to identify available data for study areas.

Some portions of the study area and adjacent areas have been the subject of natural resource surveys conducted in support of other EISs and research studies. The USACE, U.S. National Marine Fishery Service (NMFS), and the City of New York have sampled sites throughout the Harbor, collecting data on fish, benthos, and water quality, in support of various civil works projects. These databases extend over many years and are being supplemented with additional sampling. The information provided by these extensive and long-term data provide a regional context for assessing impacts to the aquatic species using the Harbor.

Some data are also available in the near vicinity of specific port sites, most notably data in the vicinity of Howland Hook collected at Old Place Creek and Bridge Creek. Surveys of fish, benthos and water quality have been conducted in support of Port Authority projects at Howland Hook and related to the *Staten Island Bridges Program – Modernization and Capacity Enhancement Project EIS* (USCG, 1997). Avifauna surveys have been conducted in support of the Harbor Herons Project.

2. Protected Species and Special Habitats

State and federal laws designate species that are rare or threatened with extinction as protected. Certain habitats that support protected species are also identified and protected. Data on the locations of historic sightings of protected species and known habitats are maintained by the resource agencies charged with protecting the species. Letters requesting file reviews for protected species and biotic communities should be submitted to the U.S. Fish and Wildlife Service (USFWS) and the New York and New Jersey State Natural Heritage Programs. Letters should include a diagram of the study area shown on a U.S. Geological Survey (USGS) topographic map. The NMFS should be consulted for information on protected species that may use the waters surrounding a port site.

If federally protected species or habitat critical to a species survival are present, a formal consultation process is required under Section 7 of the Endangered Species Act. Both state and federal resource agencies may require collection of additional data to more definitively assess impacts to the species and its habitats.

State, federal and New York City governments have recognized that certain areas provide significant benefits for natural resources and require that potential impacts to these areas be documented and evaluated. Although there are many significant habitats within the Harbor region, few are in proximity to the port sites.

The New York Department of State designates the area adjacent to Howland Hook as a Significant Coastal Fish and Wildlife Habitat. The USFWS has designated the northwest portion of Staten Island as a Significant Habitat Complex known as the Arthur Kill Complex (USFWS, 2004). The area includes three island heronries (Prall's Island, Shooter's Island and Isle of Meadows) located in the Arthur Kill/Kill van Kull waterway. The complex includes associated tributaries and wetlands along the waterway. Foraging areas found surrounding these heronries are included in the Arthur Kill Complex. Goethal's Bridge Pond, a 50-acre shallow, brackish pond surrounded by common reed included in the Arthur Kill Complex is adjacent to Howland Hook.

Under the authority of Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), NMFS has identified Essential Fish Habitat (EFH) for some species and life stages of fish in the waters surrounding the port sites (NMFS, 2004). Information is available in a recent EFH Assessment and an Enhancement Program developed by the USACE for the channels leading to existing port sites (USACE, 2004).

3. Reconnaissance Surveys

Reconnaissance surveys should document existing conditions and characterize available natural habitats and biota. The study area for a proposed project should be visited by a qualified ecologist, wetland specialist and/or wildlife biologist, as appropriate to the habitat. Major resources and habitat types should be documented along with their condition and likely functions. Field logs and site-visit data sheets should be prepared for the study area and supported by photo-documentation and site diagrams of existing conditions. Data from the reconnaissance surveys should be evaluated to determine the value of natural resources and the need for additional data, in the near term or in the future. The relationship among resources in the study area and the larger, surrounding region should also be evaluated to determine if

regional data should be collected. For example, the extent to which a study area supports avian species using the Atlantic Migratory Bird Flyway should be determined.

4. Impact Analysis

Information from the field reconnaissance and literature evaluation should be used to determine whether additional field surveys are needed to characterize potential impacts to natural resources and supporting habitats. The appropriate time for additional surveys should be determined dependent upon when impacts are likely to occur and what the resource to be affected is. Sites with seasonal use for foraging during migration, nesting or other reproductive functions should be sampled when fauna are likely to be present. The size of the area to be surveyed should be focused upon the location and extent of potential disturbance.

To the extent possible, field and analytical procedures that are equivalent to those used to develop existing databases should be used to analyze effects. This will provide continuity with these databases over time and facilitate regional perspective and assessment of cumulative impacts. If areas subject to impacts have not been sampled previously, standard procedures such as those described in the *CEQR Technical Manual* or other state and federal guidance documents should be employed. Prior to conducting surveys, field and analytical methods, locations of sampling sites, and frequency of sampling should be discussed with appropriate natural resource agencies.

Habitat should be characterized using evaluation procedures appropriate for the urban environments that are characteristic of the port sites and associated transportation corridors. Upland habitats should be subjected to ecological community analysis and methodological vegetation mapping using standard accepted procedures. Descriptions of ecological communities should generally follow the New York Natural Heritage Program's document, "Ecological Communities of New York State" (Edinger et al., 2002). Wetland areas should be delineated using the appropriate technique (i.e., USACE's 1987 and 1989 manuals used by New York and New Jersey, respectively, or as updated in the future; see Section D below, for specific information on criteria and analysis of wetlands). Areas adjacent to wetlands and aquatic zones also support a variety of ecological functions. The functions that these areas serve, e.g., wildlife habitat, water filtration, groundwater recharge, flood control, erosion control, recreation, etc., should also be documented.

If habitats have functions and values that are suitable to support biota, species likely to be using the area should be described and their presence documented. Animals using areas that are subject to impacts should be surveyed using appropriate sampling techniques. Fish and wildlife, including herptiles, birds and mammals that are likely to be subject to impacts should be sampled. Protected or commercially important invertebrate species should be sampled if they are listed by resource agencies or identified during site visits. Areas used seasonally for specific life history functions (e.g., nesting, breeding, feeding, etc.) should be sampled when fauna are likely to be present. To the extent appropriate to the level of potential impact, survey methods should be consistent with those presently being employed or used in the recent past. Comparability in sampling and analysis methods will ensure the value of the historical databases of natural resources in the Harbor that have been developed by the USACE, USFWS, and the State and City natural resource agencies.

Data analysis should involve comparison of future conditions with a proposed project and future No-Action conditions. Future No-Action conditions should include activities that are programmed and committed for implementation by the year that the proposed project will be in place. The Future No-Action conditions should also include the likely outcome of environmentally beneficial projects that will occur or that are currently in progress, such as the Hudson-Raritan Estuary Restoration Program and the closure of Fresh Kills Landfill.

Assessment of impacts resulting from proposed port and associated transportation projects should address direct and indirect effects associated with construction and operation of the port facilities, effects on the functioning of the resource, and the changing context in which the resource functions. The context in which the resource is changed, as well as the severity of the impact, should be evaluated. This process involves three components:

- Evaluation of the significance of the resource impact in terms of the amount of the resource found in the overall project area;
- Evaluation of the significance of the resource impact in terms of the other resource impacts of the proposed project, i.e., the cumulative impacts, and any synergies among impacts; and
- Evaluation of the significance of the resource impact in terms of the No-Action condition, recognizing the changing context of the Port of New York and New Jersey.

D. Impact Criteria

For all project locations in New York City, the recommendations made in the *CEQR Technical Manual* (2001) should be used to identify significant impacts. CEQR recommendations for identifying significant impacts are as follow:

- An action that renders a water resource unfit for one or more classified uses;
- An action that adversely affects a significant, sensitive or protected resource;
- An action that diminishes habitat for a protected species or species of concern;
- An action that results in the loss of a protected plant species;
- An action that results in the loss or decrease of a scarce resource;
- An action that impacts a resource's ability to provide valuable ecosystem functions; and
- An action that contributes to a cumulative loss of habitat or ecological functions.

While a uniform analytical methodology should be used to assess impacts to natural resources in the region, regulatory bodies in New York and New Jersey and the USACE have different criteria for evaluating and regulating these impacts, particularly with respect to wetlands and shallow water habitats.

1. Wetlands and Navigable Waters Criteria

The USACE regulates dredge and fill in waters of the United States, including wetlands, under Section 404 of the Federal Clean Water Act (33 USC 1344, administered by the US Environmental Protection Agency (USEPA)). Activities are regulated through Nationwide, Regional General, or Individual Permits. Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) requires a permit to construct any structure in navigable waters of the United States. Actions must not obstruct navigation, have a significant adverse effect on the aquatic environment, or violate water quality criteria. Permits are issued using a "no net loss" approach. Wetlands are depicted on National Wetland Inventory (NWI) Maps; however, all areas likely to be subject to impacts must be field-delineated and the delineation must be verified by the USACE. Delineations are generally valid for three years. Impacts must be avoided and minimized to the extent possible, and unavoidable impacts must be compensated with approved mitigation. Compensatory mitigation should be designed to replace potentially lost functions and values. Mitigation is usually required for fill in navigable waters, regardless of whether a "wetland" is present or not.

New York State regulates activities including dredge and fill under its Tidal Wetlands Act and its Protection of Waters Act. New York State maps its wetlands by type. Its jurisdiction includes the intertidal zone from mean high water to mean low water, and the littoral zone from mean low water to minus 6 feet. The Protection of Waters program extends New York State Department of Environmental Conservation (NYSDEC) jurisdiction to "navigable waters" in compliance with the federal Clean Water

Act. USACE also regulates these waters of the United States. New York State generally requires a 3-to-1 or greater ratio for mitigation.

In New Jersey, activities in intertidal and subtidal shallows (i.e., all submerged areas from the spring high water line to 4 feet below mean low water) are regulated under the Coastal Zone Management Rules. However, for its coastal waters, New Jersey has joint jurisdiction with the USACE, and projects involving tidally influenced waters or wetlands within 1,000 feet of tidal waters require both USACE and New Jersey Department of Environmental Protection (NJDEP) permits. Thus, activities in navigable waters are regulated. New Jersey regulations require a 1-to-1 replacement ratio for creation of wetlands and a 2-to-1 replacement ratio for enhanced wetlands.

E. Mitigation

Evaluation of a proposed project must consider the following five degrees of effect and mitigation: first, seek to avoid wetlands; second, seek to minimize impacts; then restore after temporary impacts; reduce impacts; and compensate for impacts.

Where significant impacts on natural resources are identified, mitigation measures must be developed. In compliance with City, State and federal regulations, compensatory mitigation should be used as a last resort.

Certain mitigation measures have been developed by City, State and/or federal agencies and are applied throughout the Harbor region in permit conditions. The most notable of these are construction "windows" for in-water work in the Harbor Estuary, restrictions on types of construction equipment and their deployment, and limitations on discharges from construction zones. These conditions are widely accepted ways to avoid, minimize, or reduce impacts.

Specific mitigation measures for unavoidable impacts resulting from future proposed port projects should be developed with appropriate City, State and federal agencies. Measures to create, restore or acquire habitats should be coordinated with ongoing restoration and mitigation projects to assure that habitat functions and values are maximized and sustainable through the duration of the CPIP planning horizon.

Detailed guidance on the analyses, performance standards, site selection, habitat characterization procedures, financial assurance requirements, monitoring, maintenance, and adaptive management plans for Compensatory mitigation in the USACE New York District is detailed in the District's Special Public Notice, dated January 10, 2005. Mitigation plans should be developed in coordination with federal, State and City resource agencies to assure that the plan meets the requirements of all involved agencies.

The detailed results of the analyses should be documented, including mapping and graphical elements identifying areas of significant impacts and the level of mitigation that can be achieved (fully or partially mitigated, or unmitigatable) at each affected location.

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Comprehensive Port Improvement Plan Environmental Assessment (CPIP EA)

WATER QUALITY METHODOLOGY REPORT

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1.0 INTRODUCTION

The purpose of this methodology report is to define current procedures, assumptions, and data sources applicable to the assessment of water quality impacts from proposed projects and identification of methods that can be used to avoid, minimize, and, if necessary, mitigate for such impacts. This methodology is applicable to assessment of the potential impacts attributable to the future port and associated transportation improvements that may be proposed. However, at such time as the water quality impact assessment is to be undertaken for a given proposed project, the lead agency(ies), project sponsor, and environmental consultant should review then-current guidance to determine what is most applicable and appropriate for the proposed project.

The water quality assessment addresses issues related to surface water bodies, tidal wetlands (as defined by the Federal government, as well as the States of New York and New Jersey), and other water systems, such as drainage and stormwater management systems. As applicable, assessment methodologies described in this report are based on available guidance and regulations, including:

- Federal
  - Section 404(b)(1) Guidelines of the Clean Water Act of 1972 (33 USC 1344)
  - Section 401 Water Quality Certification
- New Jersey
  - New Jersey Administrative Code (N.J.A.C.) 7:8, 7:14, and 7:15
  - New Jersey Stormwater Best Management Practices Manual
  - New Jersey Tier A Municipal Stormwater Guidance Document
- New York State
  - Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations (6 NYCRR Part 703)
- New York City
  - City of New York Environmental Quality Review Technical Manual – Chapter I. Natural Resources

2.0 STUDY AREA

Study areas are defined after the likely build dates and project alternatives, including both port and associated transportation elements, are known. Study areas encompass upland areas likely to be subject to impacts from construction and operation of port alternatives and associated transportation improvements, as well as aquatic areas, including wetlands, that may be affected by activities in upland areas. All study areas, at a minimum, include properties within a specified distance from the site(s) under evaluation, as required in the guidance and regulation documents listed above.

The CPIP Plan is predicated upon deepening federal navigation channels to 50 feet and, consequently, deepening of some berthing areas to similar depths to accommodate deep draft vessels. Impacts associated with deepening the federal channels have been addressed previously (USACE *Harbor Navigation Study Final Environmental Impact Statement*, 1999). Only dredging activities required to achieve adequate depths at berthing sites not considered previously would be addressed in future environmental reviews for future proposed port projects.

3.0 WATER QUALITY ASSESSMENT METHODOLOGY

A. Determination of the Extent of Water Quality Assessment

Surface water bodies in the Port of New York and New Jersey (PONYNJ) consist of harbors (Upper Bay, New York Harbor), bays (Newark Bay), and tidal straits (Arthur Kill). The shorelines of the various water bodies have been modified substantially but the waters are used for shipping, waterborne commerce, water-related recreation, and habitat for finfish and benthos. Activities or actions that would impair water quality related to these functions would fall within the purview of any water quality assessment.

Groundwater is not used for potable water at or adjacent to the port sites. Groundwater may be a source of water for wetlands and/or surface water bodies. It may provide geotechnical functions (load bearing) and prevent salt water intrusion of aquifers. Activities or actions that would impair water quality related to these functions fall within the purview of any water quality assessment.

Wetlands, whether tidal or freshwater, serve a variety of functions, including water filtration. (Impacts to wetlands are addressed in the Natural Resources Methodology Report.)

Other components of water resources are stormwater and the natural or built systems that convey it to receiving bodies of open water or wetlands. Although stormwater and associated systems do not support ecosystems, they influence the physical and chemical conditions of the receiving water bodies.

B. Analysis Years

Standard EIS methodology includes analyses of “existing” and “future No-Action” conditions, the latter describing future conditions absent the proposed project and defining the future baseline against which project alternatives are evaluated to determine potential project-related impacts. Future No-Action analysis years are defined coincident with the proposed project’s principal construction period, if the project includes significant new infrastructure, and its first year of operation and/or its design year.

Assessment procedures and methodologies to be used for projects proposed for a given port site should be developed in consultation with the natural resource agencies having jurisdiction and regulatory authority and should be based on the types of construction and operations activities anticipated.

C. Data Collection and Assessment

Water quality at port sites and adjacent areas are documented to provide a baseline against which impacts of potential actions can be assessed. The level of detail in data collected and the effort expended in each study area should be equivalent to the extent of the potential impact and the level of detail that is available regarding the proposed project.

Long-term trends for port sites in Upper New York Bay and the Arthur Kill can be determined from the New York City Department of Environmental Protection’s (NYCDEP) Annual New York Harbor Water Quality Report. The report is based on surveys conducted each year from May to September, a time that coincides with the greatest impairments to water quality. The data provide a conservative view of water quality in the Harbor. The report, published since 1909, addresses four primary parameters (dissolved oxygen, fecal coliform, chlorophyll a, and secchi depth) to provide an overall picture of aquatic health in the Harbor. Additional parameters (e.g., nitrogen, temperature) are also measured to provide a comprehensive examination of the Harbor’s water quality.

Data on water quality for New Jersey waters (i.e., Newark Bay) are collected by the State's Ambient Surface Water Monitoring Network and the Ambient Groundwater Monitoring Network. These data are available electronically on the U.S. Geological Survey (USGS) National Water Information System Website, the U.S. Environmental Protection Agency's (USEPA) STORET data on-line site, and in USGS Annual Reports entitled *Water Resources Data-New Jersey*. Conventional water quality parameters that are measured and reported include dissolved oxygen, pH, total phosphorous, total suspended solids, total dissolved solids, sulfate, temperature, chloride, and nitrate. Data requirements and assessment methodologies are specified in the New Jersey Department of Environmental Protection (NJDEP) draft publication entitled *Integrated Water Quality Monitoring and Assessment Methods*.

If site-specific data are not available and the proposed project may cause an impact to ground or surface water quality, data on the existing condition of the receiving water body are to be collected. Field sampling and analysis methodologies are stipulated in USEPA 821/C-99-004 *USEPA Methods and Guidance for Analysis of Water*, a compilation of testing methods approved by the USEPA. USEPA testing methodologies are also found at Title 40 (Protection of the Environment) of the *Code of Federal Regulations*.

Data documenting existing conditions are compared to water quality criteria and to likely future conditions with and without the proposed project. The likelihood and severity of a potential impact should define the level of analysis required to adequately evaluate the impact. Where impacts would be small and unlikely to violate water quality criteria, a simple comparison of expected levels may be sufficient. If impacts are likely to occur and the extent is difficult to predict, various water quality models may be needed to predict and quantify impacts. The appropriate model is determined by the potential impact.

Water quality modeling, i.e., the analysis of conventional and toxic constituents in water bodies, is used to predict the extent of an impact. Hydrological models, linked with hydrodynamic models, can be used to simulate the physical attributes of water surface elevation, velocity, and circulation to analyze the effect of physical changes, such as dredging or filling, on salinity distributions as well as other water quality constituents. Hydrodynamic models are used as the transport simulator of natural water systems for the overall purpose of water quality modeling to simulate time-variable responses to point and non-point source loadings. Land-side models of the watershed are used to analyze the changes in stormwater runoff attributable to changes in land use such as the development of roads, parking lots and other impervious surfaces. The stormwater flows and associated pollutant concentrations calculated by these models are then used as input to the receiving water models.

Time variable, waste assimilative capacity models can be used to analyze the impact of temporal events, e.g., treated wastewater releases during particular tidal stages or stormwater discharges during storm events. Such models can be used to assess the impact of a proposed project on water quality. Waterways that are on the list of impaired waters (i.e., 303(d) list), which is published every two years by New York and New Jersey, and reviewed by USEPA, are not in compliance with the water quality standards and thereby designated for a Total Maximum Daily Load (TMDL) program. Proposed projects that are in the watershed of a 303(d) listed-waterway should be analyzed in the context of the TMDL to determine the wasteload allocation (point source) and/or load allocation (non-point source) that result from the TMDL. These allocations set the limits on the allowable pollutant loading for a proposed project. Projects within watersheds that are not on the states' 303(d) lists should also be assessed for their impact on water quality by modeling the receiving water. Existing conditions which are in compliance with water quality standards form the "baseline" for comparing the projected impacts of a proposed project. The comparative assessment includes the analysis of water quality for compliance with the water quality standards to ascertain whether a proposed project will cause impairment and thereby necessitate a TMDL.

Another possibility is that a project is located in a watershed where a TMDL was completed. If a proposed discharge would result in the TMDL of a constituent of concern being exceeded as the result of a discharge, mitigation should be considered in order to reduce the discharge to a level allowed by the TMDL. Concerns about the fate of contaminants in waterways can be modeled using fate and transport models combined with sediment transport models if necessary, to determine water quality impacts related to dredging projects or from construction of structures in the waterway.

The modeling approach for a water quality assessment is developed to focus on the mechanisms by which the project would potentially change the physical, chemical or biological characteristics of the waterway. Land-side modeling may entail a simplified approach based on land use, such as WinSLAMM, or a more mechanistically detailed model such as the Stormwater Management Model (SWMM). The presence of stratification attributable to tidal effects in the waterway would warrant a vertically segmented or multi-layered model; lateral variation in conjunction with stratification would warrant a full three-dimensional (3-D) hydrodynamic model. Water quality models that are linked with hydrodynamic models, such as EFDC, ECOM3D, RMA-10/RMA-11 and MIKE, are candidate generic models that may be applied to assess projects requiring 3-D modeling. The availability of a calibrated and verified model for the waterway of interest should be investigated through discussions with the NYSDEC, NJDEP and USEPA Region 2. The design conditions, specified in terms of the rainfall, river flows and tides, for modeling potential project impacts should be developed in a consistent manner with any TMDL modeling.

Measures to avoid, minimize, and mitigate impacts start with a review of any municipal and/or regional stormwater control plans for port sites and of any other water quality control or protection measures in place for the area to determine if a proposed project (discharge) would be in compliance with the plan. If discharges are in compliance with control plans, then constituent loads will not exceed water quality standards or TMDLs. Hence, there is no impact. The water quality standards set by each state are discussed below.

D. Impact Criteria

The NJDEP and the New York State Department of Environmental Conservation (NYSDEC) have each established classification systems for the best intended uses of surface waters in the project area (Surface Water Quality Standards, NJAC 7:9B; Water Quality Regulations, 6 NYCRR parts 700-705). These classifications are based on the extent to which these surface waters will attain the Clean Water Act goals of aquatic life support and swimmability, and the designated uses outlined by each State. Designated uses are generally based on a set of numeric and narrative water quality criteria. The swimmability goal means having all possible surface waters of sufficient quality to allow for primary-contact recreation. The aquatic life support goal means having all possible waters of sufficient quality to support healthy and reproducing aquatic biota.

For Upper New York Bay, the NJDEP and NYSDEC classifications are SE-2 (saline, estuarine waters) and I (fishing), respectively. These waters are suitable for fishing and secondary contact recreation. The northern portion of the Arthur Kill is classified as SE-3 (NJDEP) and SD (NYSDEC). SE-3 waters are suitable for maintenance and migration of fish populations and secondary contact recreation. Class SD waters are suitable for fish survival. Class SD waters are characterized as waters not primarily used for recreational purposes, shellfish culture, or the development of fish life and, due to natural or manmade conditions, cannot meet the requirements of these uses. Newark Bay, under jurisdiction of the NJDEP, is also classified as SE-3.

The NYSDEC has established water quality standards, guidance values, or groundwater effluent limitations for all forms of substances that may impair water quality. Narrative water quality standards for specific water classes are found in 6 NYCRR Part 703.2 and consist of the following water quality

parameters: 1) taste-, color- and odor-producing toxic and other deleterious substances, 2) turbidity, 3) suspended, colloidal and settleable solids, 4) oil and floating substances, 5) garbage, cinders, ashes, oils, sludge, and other refuse, 6) phosphorus and nitrogen, 7) radioactivity, and 8) thermal discharges. Standards for specific classes are found at 6 NYCRR Part 703.3 *et seq*.

The NJDEP has also established water quality standards. The standards for surface water are found at N.J.A.C. 7:9B and specify the criteria necessary to protect the waters in the State. The criteria applicable to different use classifications are numerical estimates of constituent concentrations, including toxic pollutants, protective of the uses. Narrative criteria describe conditions to be maintained, attained, or avoided and standards for specific classes and constituents are provided.

The standards for groundwater are found at N.J.A.C. 7:9-6. Groundwater at the port site areas is designated as Class II, which is defined as groundwater with uses other than potable water supply. As with surface water standards, the criteria are numerical values assigned to each constituent, and narrative criteria describe conditions to maintain, attain, or avoid and standards for specific constituents.

In addition to the state agencies, the Interstate Environmental Commission (IEC), a tri-state regulatory agency, also sets standards for tidal water bodies. The goal of the IEC, in addition to preventing water pollution, is to increase the extent of areas in the tri-state region (New York, New Jersey, Connecticut) that are suitable and available for swimming and shellfishing.

Projects that are likely to violate water quality standards and criteria during their construction, including dredging, or their operation, cannot be permitted.

E. Mitigation

Effective protection of water quality during construction of proposed port improvement projects, including dredging, is enforced through permit conditions that stipulate dredging measures to isolate resuspended sediments and work windows that restrict construction to time periods that would result in the least environmental impact. These conditions are designed to protect habitats and are described in the Natural Resources Methodology.

Effective protection of water quality during port operations can be achieved through the use of various Best Management Practices (BMPs), which can involve both structural and nonstructural stormwater management techniques to lower or minimize potential impacts resulting from development or redevelopment of port sites.

Foremost among non-structural BMPs for protection of water quality is the protection of areas that provide water quality benefits (e.g., wetlands) and areas that are susceptible to erosion and runoff. Hence, alternatives that do not involve fill options and that do not change runoff conditions or the quality of runoff should be given preference.

Other non-structural BMPs that can be used to protect water quality are limited in their application at existing port sites. In developing port sites (e.g., Bayonne), the minimization of land disturbance and planning of the facility to avoid concentration of flows should be given major consideration.

Structural measures to protect water quality should start with preventing pollutants from becoming part of stormwater runoff. Preventing floatables (trash and debris) from entering waterways can be achieved by regular trash collection and installation of litter fences.

Measures to store, infiltrate, and protect runoff close to its source are also structural water quality protection measures. Such measures may be dispersed throughout a site. Localized infiltration systems in suitable areas, drywells, and bioretention systems are examples of measures that can be implemented.

Site design features to prevent and/or contain spills and other accumulations of pollutants can be included in new developments or retrofitted to existing facilities. Such features include, but are not limited to, berms, oil/grit separators, secondary containments, and walls/roofs/overhangs. Berms are constructed to contain fuel or chemical spills or to divert stormwater from areas where it may come in contact with materials that would adversely affect its quality. Similarly, walls/roofs are used to prevent or minimize contact between stormwater and materials (stored or in use) that may impair water quality. Oil/grit separators or other treatment devices are used to contain spills and to treat stormwater that has come in contact with spills or other materials.

Comprehensive Port Improvement Plan Environmental Assessment (CPIP EA)

HAZARDOUS AND REGULATED MATERIALS METHODOLOGY REPORT

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1.0 INTRODUCTION

The purpose of this methodology report is to define current procedures, assumptions, and data sources applicable to the assessment of impacts related to hazardous and regulated materials and wastes that may be attributable to a proposed project, including future port and associated transportation improvement projects. The hazardous and regulated materials and waste assessment will address the potential presence of contaminated materials, the types of contaminants that may be present, and the potential for both human and environmental exposure to contaminants. The assessment will address the potential on- and off-site impacts, including the potential for migration and exposure off-site. However, at such time as the hazardous waste impact assessment is to be undertaken for a given proposed project, the lead agency(ies), project sponsor, and environmental consultant should review then-current guidance to determine what is most applicable and appropriate for the proposed project.

As applicable, assessment methodologies are based upon available guidance and regulations including:

A. New York City

- City of New York, City Environmental Quality Review (CEQR) Technical Manual – Chapter J. Hazardous Materials, 2001, and Hazardous Materials Appendices.
- Chapter 24, Title 15 of the Rules of the City of New York Governing Placement and Removal of an (E) Designation on a tax lot.

B. New Jersey

- Attachment to Executive Order No. 215 of 1989 – Guidelines for the Preparation of an Environmental Impact Statement/Environmental Assessment.
- New Jersey Technical Requirements for Site Remediation, N.J.A.C. 7:26E, readoption December 2002 and Amendments, July 2004; also known as the "Tech Rules."

C. New York State

- Draft DER-10 Technical Guidance for Site Investigation and Remediation, NYSDEC, December 2002.
- Draft Brownfield Cleanup Program Guide, NYSDEC, May 2004.
- SPOTS Memo #14: Site Assessments at Bulk Storage Facilities, NYSDEC, August 1, 1994.
- STARS 1 – Petroleum-Contaminated Soil Guidance Policy, NYSDEC, August 1992.

D. Federal

- Final Consensus Draft Regulation: Part 312–Standards for Conducting All Appropriate Inquiries (To be codified in Federal regulation, late 2004).[1]

E. Industry Standard

- American Society for Testing and Materials (ASTM) Practice E1527-00 for Phase I Environmental Site Assessments (2000) and Practice E-1903 for Phase II Environmental Site Assessments.

[1] This document is not a proposed or final rule. The reader is instructed to use the final rule at such time that one is promulgated.

2.0 STUDY AREA

The study area will be defined and sampling locations selected when the likely build date and future port and associated transportation project is defined. Study areas will encompass those upland areas likely to be subject to impacts from construction and operation of the proposed project. Aquatic areas, including wetlands, that may be affected by migration of contaminants, or in which contaminants may be present, will be considered part of the study area. All study areas, at a minimum, will include properties within a specified distance from the site(s) under evaluation as required in the guidance and regulations documents listed above.

3.0 HAZARDOUS AND REGULATED MATERIALS AND WASTE ASSESSMENT METHODOLOGY

A. Determining the Extent of Hazardous and Regulated Materials and Waste Assessment

Hazardous and regulated materials and waste assessments will be undertaken for proposed projects that will involve actions or activities in port areas where the presence or likely presence of any hazardous substance or petroleum product exists. These types of assessments are usually mandatory, as described below.

Pursuant to CEQR, certain types of industrial, manufacturing and commercial facilities (as listed in Hazardous Materials Appendix 1 of the *CEQR Technical Manual*) require assessment for hazardous materials. This list includes a category labeled "shipping waterfront." Additionally, for tax lots subject to an (E) designation on the New York City Zoning Maps, a Phase II Environmental Site Assessment (ESA) is required before any building permit can be issued. If contamination is discovered, a Remediation Plan and remedial action of some type are required to satisfy the (E) designation.

In New Jersey, for "industrial establishments," as defined by the Industrial Site Recovery Act (ISRA), N.J.S.A. 13:1K and N.J.A.C. 7:26B, when certain transactions concerning a facility are conducted, or for any site in the Voluntary Cleanup Program, a Preliminary Assessment is required, usually followed by a Site Investigation, Remedial Investigation and ultimately a Remedial Action. Executive Order No. 215 guidelines specify that an assessment "include the status of any hazardous substances or waste remediation activities triggered by ISRA, the Underground Storage of Hazardous Substances Act or any other State or federal regulations" and that a description of existing conditions include "the presence of any hazardous substances or waste" and "the presence of any underground storage tanks or structures."

For all commercial/industrial property types, to obtain an innocent landowner defense, a Phase I ESA must be conducted pursuant to ASTM Practice E1527-00 standards. The Phase I ESA is generally considered to be the industry standard and is used for various types of property transactions and development activities nationwide. The Federal draft All Appropriate Inquiry Rule was written to provide additional defenses including bona fide prospective purchaser (for those intentionally purchasing contaminated properties) and contiguous property owner. This Federal regulation will set forth standards for assessment of the potential for site contamination.

B. Analysis Year

Standard EIS methodology includes analysis of "existing" and future "No-Action" conditions, the latter describing future conditions absent the proposed project and defining the future baseline against which

project alternatives are evaluated to determine potential project-related impacts. Future No-Action analysis years are defined coincident with the proposed project's principal construction period, if the project includes significant new infrastructure, and its first year of operation and/or its design year.

C. Data Collection and Assessment

One or more of the following types of assessments will be performed to evaluate the potential for hazardous materials or wastes at the site of a proposed port and/or associated transportation improvement project, and the potential impacts of these materials or wastes:

- Phase I Environmental Site Assessment;
- All Appropriate Inquiry Assessment (future Federal standards);
- Preliminary Screening Assessment (some NYC (E) designated sites);
- Preliminary Assessment (for projects in New Jersey);
- Phase II Environmental Site Assessment;
- Site Investigation (for projects in New Jersey);
- Remedial Investigation ;
- Remediation Plan, Remedial Action Work Plan; and
- Remedial Action or Mitigation.

D. Determining if a Hazardous and Regulated Materials and Waste Assessment is Appropriate

Potential impacts related to hazardous and regulated materials and wastes may occur when elevated levels (i.e., above regulatory guidance values or standards) of such materials exist on or adjacent to a site and the proposed action would create pathways for exposure to humans or the environment or if an action could introduce such materials and increase the potential for human and/or environmental exposure.

As the presence of elevated levels of hazardous and regulated materials or wastes is difficult to ascertain, as is the extent of contamination, an assessment of hazardous and regulated materials and waste is appropriate unless the proposed action would not create a public health concern or introduce new contaminants to the environment. Some of the different types of hazardous and regulated materials and waste assessments are described below.

1. Preliminary Screening Assessment

A Preliminary Screening Assessment is often prepared if certain past or current conditions are associated with a project in New York City. These conditions include the presence of incinerators, underground or aboveground storage tanks, active solid waste landfills, permitted hazardous waste management facilities, inactive hazardous waste facilities, suspected hazardous waste sites, hazardous substance spill locations, areas known to contain fill material, petroleum spill locations, or any past use identified in the *CEQR Technical Manual* Appendix. This assessment consists of visual and historic documentation of the site(s).

2. Phase I Environmental Site Assessment

A Phase I Environmental Site Assessment (ESA) is a qualitative evaluation of environmental conditions at a site based on a review of available information, site observations, and interviews. The Phase I ESA is considered to be the industry standard for initial assessments of properties throughout the United States and is the first step in a hazardous materials assessment pursuant to CEQR. The assessment does not include invasive sampling or testing. The objective is to identify *recognized environmental conditions,* which include the presence or likely presence of any hazardous substance or petroleum products on a site under conditions that indicate an existing release, past release, or a material threat of release, as defined in the American Society of Testing and Materials (ASTM) Practice E-1527-00. The Phase I ESA may

include preliminary evaluations of other potential environmental conditions not required by ASTM protocol, such as lead-based paint and asbestos-containing material.

This information is obtained through a review of historical maps, regulatory agency databases, government records review, reconnaissance of the site and adjoining sites, and interviews with persons familiar with the property history and usage. Historical sources for Phase I ESAs include Sanborn Fire Insurance Maps, city and county directories, records maintained by local and state agencies, available reports relating to contamination at a site, U.S. Geological Survey topographic maps, site photographs (aerial and ground level), and title deed searches to determine chain of ownership.

Regulatory agency databases that would be reviewed as part of a Phase I ESA include:

- Federal Databases
  - Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) list and CERCLIS-NFRAP (No Further Remedial Action Planned)
  - Emergency Response Notification System (ERNS) records
  - Facility Index Tracking System (FINDS)
  - Hazardous Materials Information Reporting System (HMIRS)
  - Material Licensing Tracking System (MLTS)
  - National Priority List (NPL), Delisted NPL, and NPL Liens
  - Polychlorinated Biphenyl (PCB) Activity Database System (PADS)
  - Resource Conservation and Recovery Act (RCRA) Administrative Action Tracking System (RAATS)
  - RCRA Hazardous Waste Generators and Transporters list
  - Records of Decision (ROD)
  - RCRA hazardous waste Treatment, Storage, and Disposal facilities (TSD) and Corrective Actions (CORRACTS) lists
  - Toxic Release Inventory (TRI) Sites list
  - Toxic Substances Control Act (TSCA)

- New York State Databases
  - Chemical and Petroleum Bulk Storage (CBS and PBS) Facilities lists (underground and above-ground storage tanks)
  - Coal Gas Sites
  - Inactive Hazardous Waste Disposal Sites list
  - Hazardous Substance Waste Disposal Site Inventory
  - Leaking Underground Storage Tanks (LUST) database
  - Major Oil Storage Facilities (MOSF) list
  - Solid Waste Management Facilities
  - Hazardous Materials Spills database

- New York City Databases
  - Department of Environmental Protection (DEP) Emergency Response Incidents
  - DEP Spill Law Notices of Violation
  - Fire Department of New York (FDNY) Registered Storage Tanks

- New Jersey Databases
  - Chromate Chemical Production Waste Sites (CHROME)
  - Coal Gas Sites
  - Deed Notice Sites
  - Groundwater Contamination Areas
  - Known Contaminated Sites (KCS) list
  - New Jersey Major Facilities (NJ Major Facilities)

- New Jersey Pollutant Discharge Elimination System (NJPDES) Sites
- New Jersey Releases (NJ Release)
- New Jersey Spills (NJ Spills)
- Publicly Funded Cleanups Site Status Report (New Jersey PF)
- Regulated UST Contamination Sites
- Solid Waste Facility Directory
- Underground Storage Tank Sites

ASTM Practice E 1527-00 specifies the radial distances from each site for which individual database searches are performed.

The site reconnaissance should include the following elements: current use of buildings (if present) including type of heating system, water and sanitary connections, presence of vent pipes and fill caps associated with petroleum or chemical storage tanks, electrical transformers, areas of fill, potential asbestos-containing materials and lead-based paints, and chemical storage and handling.

3. Preliminary Assessment

A Preliminary Assessment is required for sites subject to ISRA or for sites in the Voluntary Cleanup Program in New Jersey. The Preliminary Assessment is somewhat similar to a Phase I ESA. A complete site history must be provided covering the period from the time the site was naturally vegetated to the present. Sources of historic information are similar to those used in preparation of a Phase I ESA but also include Industrial Directory searches, information on NJDEP's Geographic Information System, a comprehensive list of all environmental permits issued to the site, and a list of all enforcement actions. Identification of non-indigenous fill material is also required. This information, along with a site visit, is used to create a list of Areas of Concern (AOCs) at a site. Each AOC must be addressed in one of two ways: 1) there is sufficient existing information to determine that no further action is required relative to an AOC (e.g., the area was previously sampled and no contamination was found); or 2) further investigation and/or invasive sampling will follow. The required format and content of a Preliminary Assessment report is detailed in the Technical Requirements for Site Remediation, N.J.A.C. 7:26E.

4. Phase II ESA/Site Investigation

A Phase II ESA or Site Investigation would be performed, as appropriate, for sites at which the initial screenings (e.g., a Phase I ESA or Preliminary Assessment) revealed a situation that requires confirmation of the potential presence of hazardous materials or wastes. ASTM Practice E 1903-97 is a standard guide that can be used as a framework to develop the required scope of work for the assessment activities for New York City sites. For projects in New Jersey, State regulations require that the procedures detailed in the Technical Requirements for Site Remediation (N.J.A.C. 7:26E) be followed for all Site Investigations.

A work plan or sampling protocol for a Phase II ESA contains three major elements:

- Survey and Analytical Plan: types of surveys to be undertaken, the rationale for the approach, sampling locations, and investigative, sampling, and laboratory methods;
- Health and Safety Plan: protection of workers and adjacent community; and
- Quality Assurance and Quality Control Plan: sample acquisition, handling, and analysis.

In the Survey and Analytical Plan, two categories of surveys are defined. First-stage surveys are used to locate areas of concentrations of contaminants that would be the focus of more detailed surveys. First-stage surveys could include geophysical techniques (e.g., ground penetrating radar, magnetometers, shallow seismic reflection/refraction, ground conductivity/resistivity), soil-gas surveys using various

techniques (e.g., gas chromatography, photo- and flame-ionization detectors, combustible gas meters) of the vadose zone, shallow soil probes, subsurface excavations, and surface soil and waste samples.

Detailed surveys include direct push soil and groundwater probe investigations to collect samples at discrete depths, as well as soil boring and monitoring well installations using split spoon or hydro-punch drill rigs. In addition, if buildings are present, construction materials and/or contents can be collected using appropriate techniques, such as wipe samples, bulk samples, air samples, coring samples, or field measurements.

Typical parameters of concern in soil or water samples include categories of materials such as volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), heavy metals, polychlorinated biphenyls (PCBs), pesticides, herbicides, and dioxins. Specific compounds within each group can be found in the U.S. Environmental Protection Agency Contract Laboratory Program Target Compound List for organics and Target Analyte List for inorganics, or the Priority Pollutant List from the Clean Water Act.

The Health and Safety Plan provides the basis for conducting surface and subsurface assessments in a manner that ensures adequate community and worker health and safety. Requirements for minimizing exposure to hazardous materials and wastes and the methods for monitoring potential exposure of workers and the community must be fully defined in the plan.

The purpose of the Quality Assurance and Quality Control Plan is to ensure that sample integrity is maintained during collection and transport and that the laboratory adheres to predetermined, proper analytical procedures and protocols. The plan should describe sampling methods and techniques, laboratory and field instrumentation calibration and maintenance procedures, decontamination procedures, chain of custody procedures, sample preservation procedures, analytical procedures, personnel requirements, and any other factors necessary for successfully collecting, transporting, and analyzing hazardous material or waste samples.

The results of the Phase II ESA or Site Investigation are compiled in a final report that presents the methodologies used, the data that were collected, an interpretation of the data, and recommendations based on comparison to standards or guidance values for the media analyzed (e.g., soil, groundwater). The applicable standards or guidance values to which the results of the Phase II ESA or Site Investigation sample analyses are compared are listed below:

a. New York

- **For Soils**: Technical and Administrative Guidance Memorandum (TAGM) No. 4046 – Determination of Soil Cleanup Objectives and Cleanup Levels, New York State Department of Environmental Conservation (NYSDEC), January 24, 1994.
- **For Sediment**: Technical Guidance for Screening Contaminated Sediments, NYSDEC, January 25, 1999.
- **For Surface Water and Groundwater**: Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations, 6 NYCRR Part 703, last Amended August 1999. Standards and Guidance values can also be found in Technical and Operational Guidance Series (TOGS) No. 1.1.1., NYSDEC, June 1998, Errata Sheet, January 1999, and Addendum April 2000.

b. New Jersey

- **For Soils**: Draft Soil Remediation Standards, July 19, 2004 (not promulgated); Soil Cleanup Criteria, May 12, 1999, from Cleanup Standards for Contaminated Sites, N.J.A.C. 7:26D.

- **For Sediment**: Sediment Screening Values from Guidance For Sediment Quality Evaluations, New Jersey Department of Environmental Protection (NJDEP), November 1998.
- **For Surface Water**: Surface Water Quality Standards, N.J.A.C. 7:9B, last Amended November 3, 2003.
- **For Groundwater**: Ground Water Quality Standards, N.J.A.C. 7:9-6, January 7, 1993.

5. Remedial Investigation

A Remedial Investigation is a continuation of the Phase II ESA or Site Investigation (if contamination is discovered) where the objective is to define the extent of contamination both horizontally and vertically. Sampling of impacted media usually continues until the extent of contamination is delineated to unrestricted use standards. The Remedial Investigation may involve sampling off-site. The result is a report with data that define boundaries between contaminated and uncontaminated media, that enables the evaluation of remedial alternatives, and provides the basis for development of a Remedial Action Plan.

6. Remediation Plan/Remedial Action Work Plan

The Remediation Plan includes an assessment of potential remedial techniques and technologies that may be used to achieve removal/cleanup of contamination, reduction in contaminant levels, or elimination of exposure pathways on a site in New York City. In New Jersey, the assessment of a remedial action is performed in the Remedial Action Selection report. The Remediation Plan/Remedial Action Work Plan document details the steps to be taken to achieve compliance with applicable regulations and to reduce or eliminate human health and environmental exposure to site contaminants. (The types of remedial actions that may be evaluated or proposed in the work plan document are discussed further in Section F. "Mitigation."

The manner in which samples of environmental media (e.g., soil, groundwater) are obtained as part of the assessment phases described above is also prescribed in guidance documents and in regulation. Improper sample collection, handling, transport, cross-contamination, and other mistakes in the field can severely compromise an investigation and render the data useless. The proper procedures for the collection and analysis of samples, the installation and development of monitoring wells, and other activities relative to field work can be found in guidance documents such as: TAGM #4015, Policy Regarding Alteration of Groundwater Samples Collected for Metals Analysis, NYSDEC, September 30, 1988; and Field Sampling Procedures Manual, NJDEP, May 1992.

E. Impact Criteria

The type(s) of hazardous materials and wastes, their locations on the site, the proposed use(s) of the site, and the potential for exposure to site contaminants determine the potential for significant impacts. To determine if a significant adverse impact would result, the potential for human and environmental exposure must be evaluated. Human exposure relates to those who might be on-site at present and future times, as well as to those who might be off-site.

If there is no potential for exposure, either environmental or human, then it is unlikely that the potential for a significant impact exists. If there is potential for either environmental or human exposure, then there is potential for a significant impact.

Decisions about significant adverse impacts must be made on a site-specific, action-specific basis that includes consideration of all available information concerning the site and potential uses. The presence of contaminants in groundwater, for example, would not have a significant adverse impact unless there is a definable route of exposure through drinking water or volatilization of contaminants into buildings or

structures as a result of an existing condition of the proposed project. Moreover, if a proposed project, e.g., conversion of an auto terminal to a container terminal, would not increase the extent of groundwater contamination, facilitate contaminant mobility, or involve dewatering as part of construction, then there is no potential for significant adverse impact.

F. Mitigation

A mitigation activity involves action(s) to eliminate, reduce, or control adverse effects. With respect to hazardous materials and wastes, mitigation involves specific measures to protect worker and public health and safety, as well as the management of such materials and wastes prior to, during, and subsequent to construction activities to prevent significant impacts that might arise based on their presence. Such measures include those that ensure that materials and wastes that remain in place would be isolated in a manner that would prevent any subsequent impacts during the operational phase of the proposed project.

Mitigation measures are based on the results of the prior studies, including the Phase II ESA or Site Investigation, Remedial Investigation, and selection of a remedial action. The report includes a summary of the investigation activities, a delineation of contaminants of concern and of potential exposure pathways, an assessment of the potential for significant exposure, and an assessment of mitigation opportunities, including proposed remediation measures.

Typically, the determination of the best course of action for mitigation activities is one that is based on a risk assessment of the potential significant impacts. A risk-based determination weighs land use (current and future) and the proposed project against the potential exposure pathways for the known contaminants of concern to develop any necessary remediation plan, including any risks and impacts that may arise from implementation of the plan. Short-term and long-term risks associated with the implementation of a remedial action plan must be assessed.

Techniques for mitigation activities typically fall within one of three categories: containment, removal, or treatment. Containment, the process of enclosing or covering hazardous materials or wastes to minimize or prevent potential receptors from having direct contact with contaminants, is the simplest and, usually, least expensive mitigation measure. Subsurface contaminants may be contained by capping (i.e., placement of an impermeable surface) the site to prevent surface water infiltration and minimize off-site migration of contaminants. Prevention of lateral migration may involve techniques such as slurry walls or soil grouting. It is not uncommon for the proposed project itself to be used as a cap. Impervious surfaces such as buildings, asphalt and concrete can mitigate exposure to site contaminants. Where vapors are of concern, vapor barriers can be installed when building foundations are constructed.

What are referred to as “institutional and engineering controls” fall under the category of containment. An institutional control is a type of documented restriction that limits uses, activities, and contact with contaminated media on a site. Examples of institutional controls include land use restrictions, deed notices, and Classification Exception Areas (New Jersey). Engineering controls are physical barriers that prevent contact with or migration of site contaminants. Examples of engineering controls range from simple means, such as fencing off a site, to more extensive mechanisms such as caps, leachate collection systems, and groundwater pumping systems.

A second set of mitigation techniques involves removal of contaminated material and subsequent transport to an approved disposal site, e.g. landfill. Materials removed from a site may be treated and returned to the site for re-use or disposed of in other ways, some even beneficial. The transport and disposal of contaminated materials is regulated by various federal and state agencies. The two most common removal scenarios are excavation of contaminated soil followed by replacement with clean fill material and removal of free-phase product (most often petroleum) from the groundwater table.

The nature of the removal (type of equipment and techniques) and transport is determined by the volume of the material to be removed, the physical (liquid, gas, solid) and chemical (ignitability, corrosivity, etc.) characteristics of the material, and the physical characteristics of the site. The removal plan will provide for monitoring and protection of workers and the surrounding environment as the work is accomplished.

A third set of mitigation techniques involves treatment technologies of various types. Cost of mitigation and the nature and volume of contaminated material determine the potential for use of any particular treatment technology. The location at which treatment occurs may be in- or ex-situ, on- or off-site.

Separation of contaminants from the containing media may be accomplished by procedures such as soil vapor extraction (SVE), air stripping, soil flushing, air sparging/SVE, and in-situ biodegradation. Solidification is used to change the physical and handling characteristics of the contaminated material, whereas incineration is used to break down contaminated media to raw materials. Monitored natural attenuation (MNA) involves a variety of naturally occurring processes (physical, chemical, and biological) that are used in-situ for the purpose of altering physical and chemical characteristics of contaminated materials without human intervention. MNA is used mostly when there is no potential for environmental or human exposure to the contaminated material or waste.

Comprehensive Port Improvement Plan Environmental Assessment (CPIP EA)

OPEN SPACE METHODOLOGY REPORT

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1.0 INTRODUCTION

The purpose of this methodology report is to define current procedures, assumptions, and data sources applicable to the assessment of project impacts on open space and parkland resources, including assessment of potential impacts of future port or associated transportation improvements on open space and parkland resources near the port sites. However, at such time as the open space impact assessment is to be undertaken for a given proposed project, the lead agency(ies), project sponsor, and environmental consultant should review then-current guidance to determine what is most applicable and appropriate for the proposed project.

Open space resources are publicly owned properties that are publicly accessible and designated for passive or active recreation, or set aside for the protection and/or enhancement of the natural environment. Typical open spaces are parks, playgrounds, ball fields, public plazas and cemeteries that provide seating. Direct effects to open space resources result primarily from the physical alteration of open space, while indirect effects may comprise changes in the utilization or quality of the open space resource.

The guidance on open space impact assessment provided in this methodology report may be applied to any of the port sites and vicinities for which port and/or associated transportation improvements may be proposed in the future. The guidance regarding impact assessment for parklands and open space are provided separately for application to port sites in New York City (Howland Hook, Red Hook, South Brooklyn) and New Jersey (Port Newark, Port Elizabeth, Port Jersey, Bayonne). As some future projects may require federal approval and/or have federal funding, federal guidance regarding parklands/open space and related impact assessment and consultation requirements are also provided.

2.0 PROJECT SITES IN NEW YORK CITY

A. Background

The New York *City Environmental Quality Review (CEQR) Technical Manual* (2001) provides guidance for analysis of open space (Section 3.D. Open Space). The guidance requires that an analysis be conducted to determine whether an action would have either a direct impact resulting in the elimination or alteration of open space or an indirect impact resulting from overtaxing available open space. According to the *CEQR Technical Manual*, an initial quantitative open space assessment may be useful to determine if a detailed open space analysis is necessary, or whether the open space assessment can be targeted to a particular user group. This initial assessment comprises calculation of the existing open space ratio by determining the existing residential and non-residential populations and the total open space in an appropriate study area. That ratio is then compared to the open space ratio in the future with the proposed action. If the change in the open space ratio would approach or exceed 5 percent, or if the study area would have a low open space ratio, indicating a shortfall of open spaces, a detailed analysis is warranted.

B. Study Area Definition

As set forth in the *CEQR Technical Manual*, workers typically use passive open spaces within approximately ¼ mile of their workplace (i.e., walking distance). Therefore, the "nonresidential" open space study area would include all census tracts that have 50 percent of their area located within a ¼-mile radius of the port site or associated transportation network for which a project is proposed.

Residents are more likely to travel farther to reach parks and recreational facilities, and they use both passive and active open spaces. Residents will typically walk up to ½ mile for recreational spaces. Therefore, the open space study area would include all census tracts that have 50 percent of their area located within a ½ mile of the project site.

C. Analysis Methodology

The adequacy of open space in the study area is quantitatively assessed using a ratio of useable open space acreage to the study area population; this is referred to as the open space ratio. The following decreases in the open space ratio are considered to warrant a more detailed analysis of the study area's open space resources:

- 1.5 acres per 1,000 residents; or
- 0.15 acres of passive open space per 1,000 non-residential users.

According to the *CEQR Technical Manual*, more detailed analysis of open space effects on residents is considered unnecessary if the open space ratio decreases by less than 1 percent.

The *CEQR Technical Manual* also presents the detailed open space assessment methodology in Chapter 3, Section D. It is based on analysis of the study area population considered by age group with details about the amount and quality of specific types of open space for particular age groups. The detailed assessment focuses on where shortfalls in open space currently exist and where shortfalls would result from the action, and to identify what measures would be necessary to mitigate the potential impact.

As the *CEQR Technical Manual* is periodically updated, lead agencies, project sponsors and environmental consultants undertaking environmental reviews of future proposed port or associated transportation projects should confirm that they are applying the then-current guidance.

3.0 PROJECT SITES IN NEW JERSEY

A. Background

Neither the State of New Jersey nor the municipalities of Newark, Jersey City, Elizabeth, and Bayonne have promulgated specific impact criteria for impacts related to parkland and open space. Without State- or municipality-legislated requirements, the impact assessment methodology described below focuses on inventorying existing parkland/open space resources, determining project-related changes within the project study area, and concluding whether the project-related changes would result in significant change to open space inventory.[1]

B. Study Area Definition

Study areas are recommended to be defined as the area within a ½-mile radius of each port where improvements are proposed or within a ½-mile radius of where associated transportation improvements are proposed.

[1] If the proposed project requires federal approval and/or funding, federal requirements for protection of publicly owned parkland/open space, for agency consultation, and for impact assessment should be reviewed to determine their applicability. Federal requirements are summarized in this Report in Section 4.0, below.

C. Analysis Methodology

A survey of existing land uses should be conducted to compile an inventory of open space and parkland resources within the project study area. Based on the proposed port or associated transportation improvement, any adverse impact to parkland/open space should be determined, focused on the following potential changes:

- Acquisition of a parkland or open space in part or in its entirety for non-parkland or non-open space use;
- Creation of new uses, which would generate significant new demand for parkland or open space resources; and
- Construction of new facilities within the study area, which would impede access to the identified parkland and open space resources.

If any of the above impacts are likely to result with implementation and/or operation of the proposed project, measures to mitigate the impacts should be developed.

4.0 FEDERAL REQUIREMENTS

A. Background

Section 4(f) of the Department of Transportation Act of 1996, as amended (49 USC 303), states that the U.S. Department of Transportation may not approve the use of land from a significant publicly owned public park, recreation area (or wildlife or wildfowl refuge or any significant historic site) unless a determination is made that:

- There is no feasible and prudent alternative to the use of land from the property; and
- The action includes all possible planning to minimize harm to the property resulting from such use.

All analyses of feasibility, prudent alternatives, and planning to minimize harm, including development of mitigation measures, should be determined in coordination with the agency owning or administering the Section 4(f) resource.

B. Study Area Definition

The study area for the purposes of a Section 4(f) analysis is recommended as within ¼ mile of any proposed port or associated transportation improvement. If the local analysis determines that one of the following resources is within the ¼-mile study area, a detailed Section 4(f) analysis should be conducted:

- Any significant publicly owned land designated as parkland, recreation area, or wildlife and waterfowl refuge; or
- Any land from an historic site of national, state or local significance.

NOTE: One thing to consider is that it is conceivable, although highly unlikely, that a constructive use (e.g., noise, air quality, vibration, visual intrusion, etc.) of a Section 4(f) resource may occur outside of the ¼-mile study area.

C. Analysis Methodology

Impacts on Section 4(f) resources are categorized as impacts involving a “use” or “constructive use” of such resources. A Section 4(f) “use,” as defined in 23 CFR 771.135(p), occurs when land is permanently

incorporated into a transportation facility, or there is a temporary occupancy of land that results in substantial impacts. A Section 4(f) "constructive use" occurs when the proposed transportation project would not incorporate land from the resource, but the project's proximity impacts would be such that the activities, features, or attributes that qualify the resource for protection under Section 4(f) are substantially impaired.

The following questions should be considered to determine if potential impacts on Section 4(f) resources may be associated with implementation of a proposed project:

- Is there a need to acquire and/or use land from a Section 4(f) resource;
- Would projected noise, vibration levels, or other proximity impacts associated with the construction, operation, and/or maintenance of the project substantially affect a Section 4(f) resource;
- Would an improvement introduce a visual intrusion substantially affecting a Section 4(f) resource; and
- Would an improvement result in potential restriction on access to a Section 4(f) resource?

If any use or constructive use of designated Section 4(f) resources is determined to be likely with implementation and/or operation of the proposed project, the following analyses and evaluation must be conducted, either as a separate section of a NEPA document or as a stand-alone document:

- Description of the proposed project;
- Purpose and need for the project;
- Alternatives considered;
- Description of Section 4(f) resources;
- Effects of project alternatives on Section 4(f) resources;
- Avoidance alternatives (i.e., alternatives that would avoid the permanent use of Section 4(f) resources);
- Analysis of net harm to Section 4(f) resource and measures to minimize harm, such as on- or off-site measures that may include creating new open space, improving existing open space, and/or the acquisition of replacement parkland of equal or greater size and value; and
- Coordination and consultation with pertinent agencies and consulting parties (i.e., local or other organizational stakeholders with interest in the resource).

If sufficient analysis demonstrates that a particular alternative is not feasible and prudent, the analysis or consideration of that alternative will come to an end. The feasible and prudent alternative that results in the least net harm must be selected.

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CULTURAL RESOURCES METHODOLOGY REPORT

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1.0 INTRODUCTION

The purpose of this methodology report is to outline the current, standard approach for conducting impact assessments and consultation processes related to cultural resources that may be affected by a proposed project, including future port or associated transportation projects that may be proposed for any of the seven port sites considered in the CPIP (Howland Hook, Red Hook, South Brooklyn, Port Newark, Port Elizabeth, Port Jersey, Bayonne). However, at such time as the cultural resource impact assessment is to be undertaken for a given proposed project, the lead agency(ies), project sponsor, and environmental consultant should review then-current guidance to determine what is most applicable and appropriate for the proposed project.

Cultural resources include both archeological and historic resources. In addition to requirements of the National Environmental Policy Act (NEPA) of 1969 that potential impacts to cultural resources be considered, potential effects must also be considered in conformance with Section 4(f) of the United States Department of Transportation Act of 1966 and Section 106 of the National Historic Preservation Act of 1966. This methodology report outlines the approaches applicable to assessment of potential impacts to historic and archeological resources pursuant to these Federal requirements.

Any future study of cultural resource sensitivity and assessment of potential project-related impacts should address the following principal questions:

- What is the potential for a port and/or associated transportation project site to be archaeologically sensitive or to contain significant archeological or historic resources?
- What is the likelihood that any archaeological resources have survived subsurface disturbances associated with previous construction and development on the site?
- What is the potential impact of port and/or associated transportation improvements on identified archeological and historic resources?

2.0 SECTION 4(f) REVIEW AND DOCUMENTATION

A. Regulatory Context

Section 4(f) of the Department of Transportation Act of 1996, as amended (49 USC 303), states that the U.S. Department of Transportation may not approve the use of any significant historic site (or land from a significant publicly owned public park, recreation area, or wildlife or wildfowl refuge) unless a determination is made that:

- There is no feasible and prudent alternative to the use of the property; and
- The action includes all possible planning to minimize harm to the property resulting from such use.

All analyses of feasibility, prudent alternatives, and planning to minimize harm, including development of mitigation measures, should be determined in coordination with the agency owning or administering the Section 4(f) resource.

B. Study Area Definition

The study area (or Area of Potential Effect) for the purposes of a Section 4(f) analysis is recommended as within ¼ mile of any proposed port or associated transportation improvement project, although this should be refined depending on the local setting and conditions of the area within which a future project is

proposed. If the local analysis determines that one of the following resources is within the defined study area, a detailed Section 4(f) analysis should be conducted:

- Any significant publicly owned land designated as parkland, recreation area, wildlife or waterfowl refuge; or
- Any land from an historic site of national, state or local significance.

For CPIP-associated improvements that will be proposed in the future, any properties within the project-specific Area of Potential Effect that are now less than 50 years of age should be evaluated in the future for potential National Register eligibility.

NOTE: One thing to consider is that it is conceivable, although highly unlikely, that a constructive use (e.g., noise, air quality, vibration, visual intrusion, etc.) of a Section 4(f) resource may occur outside of the defined study area, so a good faith effort should be made to identify all potentially affected Section 4(f) resources.

C. Inventory and Identification of Section 4(f) Resources

For purposes of Section 4(f), an historic site is significant only if it is on or eligible for the National Register of Historic Places, unless the Federal Highway Administration (FHWA) determines that the application of Section 4(f) is otherwise appropriate. Pursuant to the National Historic Preservation Act (NHPA), the New York and New Jersey Department's of Transportation will consult with the New York and New Jersey SHPOs and, if appropriate, with local officials to determine whether an historic site is on or eligible for the National Register. If an historic site is determined not to be on or eligible for the National Register, but an official (such as the Mayor, President of the local historic society, etc.) formally provides information to indicate that the historic site is of local significance, FHWA <u>may</u> determine that it is appropriate to apply Section 4(f) in that case.

D. Methodology for Section 4(f) Analysis

Impacts on Section 4(f) resources are categorized as impacts involving a "use" or "constructive use" of such resources. A Section 4(f) "use," as defined in 23 CFR 771.135(p), occurs when land is permanently incorporated into a transportation facility, or there is a temporary occupancy of land that results in substantial impacts. A Section 4(f) "constructive use" occurs when the proposed transportation project would not incorporate land from the resource, but the project's proximity impacts would be such that the activities, features, or attributes that qualify the resource for protection under Section 4(f) are substantially impaired.

The following questions should be considered to determine if potential impacts on Section 4(f) resources may be associated with implementation of a proposed project:

- Is there a need to acquire and/or use land from a Section 4(f) resource;
- Would projected noise, vibration levels or other proximity impacts, associated with the construction, operation, and/or maintenance of the project substantially affect a Section (4f) resource;
- Would an improvement introduce a visual intrusion substantially affecting a Section 4(f) resource; and
- Would an improvement result in potential restriction on access to a Section 4(f) resource?

If any use or constructive use of designated Section 4(f) resources is determined to be likely with implementation and/or operation of the proposed project, the following analyses and evaluation must be conducted, either as a separate section of a NEPA document or as a stand-alone document::

- Description of the proposed project;
- Purpose and need for the project;
- Alternatives considered;
- Description of Section 4(f) resources;
- Effects of project alternatives on Section 4(f) resources;
- Avoidance alternatives (i.e., alternatives that would avoid the permanent use of Section 4(f) resources);
- Analysis of net harm to Section 4(f) resource and measures to minimize harm; and
- Coordination and consultation with pertinent agencies and consulting parties (i.e., local or other organizational stakeholders with interest in the resource).

If sufficient analysis demonstrates that a particular alternative is not feasible and prudent, the analysis or consideration of that alternative will come to an end. The feasible and prudent alternative that results in the least net harm must be selected.

3.0 Section 106 Consultation

A. Regulatory Context

Section 106 of the National Historic Preservation Act (NHPA) of 1966 requires that federal agencies take into account the effects of their undertakings on historic properties. This process, commonly referred to as the Section 106 process, provides for review of any federally licensed, financed, or assisted undertaking. The agencies should consider potential impacts on any district, site, building, structure, or object that is included in, or eligible for inclusion in, the National Register of Historic Places. It further requires that the Advisory Council on Historic Preservation (ACHP) be given an opportunity to comment on the proposed undertaking. A project is considered to have an adverse effect on a historic property if it would change the quality of cultural characteristics that render the resource eligible for listing on the National Register of Historic Places.

B. Methodology for Section 106 Consultation

The typical steps comprising Section 106 consultation include:

- Transmittal of a Project Initiation Letter to the pertinent SHPO(s), describing the proposed project, the project purpose and need, a draft delineation of the APE for SHPO review and approval, and identification of consulting parties (i.e., owner or administrator of the resource, and local or other organizational stakeholders with interest in the resource) for SHPO review and approval;

- Development and transmittal to the SHPO of an inventory of historic resources that are National Historic Sites or Landmarks; listed on the State and/or National Registers of Historic Places; have been determined eligible or have SHPO opinions of eligibility; for resources in the City of New York, have been designated as landmarks by the New York City Landmarks Preservation Commission; or that are potentially eligible for listing on the State and/or National Registers.

- Development and transmittal to the SHPO of an Effects Assessment, documenting whether the proposed project would pose an adverse effect on any of the historic resources identified in the Historic Architectural Resources Background Study (HARBS); and

- If an adverse effect is identified, development and execution of a Memorandum of Agreement or a Programmatic Agreement among the lead agency, the SHPO, and the Advisory Council on Historic Preservation, detailing required mitigation for the adverse effect and future consultation requirements during later project development phases.

The task of identifying historic resources in the APE begins with a review of existing studies and findings previously conducted regarding historic resources in the APE. This includes review of National Register files, determinations of eligibility, SHPO opinions, existing surveys, case reports, environmental impact statements, and other documents available at the SHPO. This is followed by verification in the field, research of local archives, and a review of historic literature and photographs.

Historic research in the APE should be conducted to provide an overview of the development history and context for discussion of specific historic resources. Primary and secondary literature sources, historic maps, and photographs should be reviewed.

Cultural resource surveys should be conducted in areas not previously surveyed to determine the presence of historic resources of significance that may be affected by the proposed project. National Register eligibility criteria should then be applied to these resources.

Once a determination has been made that a proposed project would have an effect on a historic resource, the criteria for an adverse effect must be applied to determine the extent of the effect. The criterion by which an adverse effect determination is made is defined in 36 CFR 800.9, Subsection (b), as follows:

> "An undertaking is considered to have an adverse effect when the effect on an historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties include, but are not limited to:
>
> - physical destruction, damage, or alteration of all or part of the property;
> - isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register;
> - introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
> - neglect of a property resulting in its deterioration of destruction; and
> - transfer, lease or sale of the property."

The SHPO, the lead agency(ies) for an EIS of a future proposed project, and the project sponsor agency may agree that efforts can be taken to avoid having an adverse effect on historic properties. If such an agreement has been reached, a "no adverse effect" determination can be made by the SHPO. If an adverse effect that must be mitigated is identified, the mitigation measures must be outlined in either a Memorandum of Agreement or a Programmatic Agreement, which, when executed, fulfills the agencies' Section 106 responsibilities. If adverse effects cannot be minimized through mitigation measures and all feasible and prudent alternatives have been exhausted, the SHPO and the Advisory Council will provide consultation on how to resolve an adverse effect.

4.0 DOCUMENTARY STUDY OF ARCHEOLOGICAL SENSITIVITY

A. Introduction

As part of the review of a proposed project's potential effects on cultural resources, a comprehensive documentary research study, often called a Phase 1A Study, should be designed and conducted to identify any known or potential archeological resources within a proposed project's Area of Potential Effect (APE). The APE is the area of a project site (i.e., footprint of a port or associated transportation improvement project and potential areas of disturbance) where direct project effect, i.e., ground-disturbing activities, would occur. Indirect project effects can occur when the project causes changes in the character or use of historic properties (i.e., visual or noise effects). A primary objective of the study is to evaluate the sensitivity of these areas for the presence of archeological resources.

The Phase IA Study should identify potential archaeological resources through literature, archival, and cartographic sources, and identify the potential for any resources to remain undisturbed in the context of any prior disturbance that may have occurred and affected the survival of any such resources. Potential project-related effects should be assessed and recommendations for any further archaeological investigations, including subsurface testing, additional documentary research, and mitigation measures should be provided, as appropriate.

B. Methodology for Phase IA Archaeological Study

The initial stage of the archaeological research should be a review of the site, structure, and report files maintained by:

- New York and New Jersey State Historic Preservation Offices (SHPO);
- New York and New Jersey State Museums;
- New York City Landmarks Preservation Commission;
- New York and New Jersey State Libraries;
- local archeological societies; and
- other repositories, as appropriate.

Copies of all information relating to a proposed project should be compiled and used as reference material for drafting the background research section of the Phase IA report.

Archeological site maps and files should be studied in order to identify historic and precontact sites located within the study area. Site locations should be marked on appropriate topographic quadrangles using a geographic information system (GIS). The New York and New Jersey SHPO building/structure and State/National Register files should also be examined for information pertaining to structures, sites, and bridges within the study area. The NY and NJ SHPO report files should be researched to identify previous cultural resource and other surveys conducted within and near the study area for the proposed project.

C. Background Research

The second phase of documentary research should entail assembling environmental and historical data regarding the project area, including land use and prior disturbance. Environmental data include general information on soils, drainage, vegetation, and geology. Historic documentation consists of a review of historic maps and texts, photographic files and information that may be available from the research facilities listed above, as well as others such as local libraries, municipal archives, and Port Authority of

New York and New Jersey file documents. Photographs and digital copies of pertinent maps and other data should be obtained, if available, for inclusion in the report.

D. Site Visit

Following the background research portion of the project, a reconnaissance survey of the study area should be conducted to observe current environmental conditions. Notations about field observances should be made on maps, including areas of disturbance, excessive slope or wetness, bedrock outcropping, etc. Representative photographs of the various portions of the study area should also be recorded. If necessary, permission for study staff to enter the properties during the site visits may need to be obtained via the project sponsor or lead agency for the EIS.

E. Report Preparation

A draft report summarizing the results of the literature review, site visits and archeological assessments should be prepared. The report should include the following sections:

- Abstract;
- Project summary, including a discussion of research goals and methodology;
- Existing environmental factors;
- Brief precontact and historic contexts;
- Summary of reported resources in the immediate vicinity of the study area;
- Discussion of previous disturbances and existing site conditions in the study area and how this relates to archeological sensitivity;
- Discussion of potential archeological resources in the study area and the potential impact of the proposed project on those resources; and
- Recommendations concerning the need or lack of need, for subsurface investigations of the site to determine the presence or absence or significant archaeological resources, and possible mitigation measures, if necessary.

Information not included in the body of the report should be presented in appropriate appendices, such as a list of sources, current and historic maps, informative photographs and figures, and applicable tables.

The results of the Phase IA research should be submitted by the federal and/or state agencies involved with the permitting and/or funding of the proposed project to the New York and New Jersey SHPOs. These agencies will decide whether any of the identified areas warrant further research. Such research could consist of Phase IB and/or II in-depth research and field investigations.

5.0 STATE AND LOCAL REVIEWS

For future port and associated transportation improvement projects proposed at one of the Port's New York (i.e., Howland Hook, Red Hook/North Brooklyn, South Brooklyn) or New Jersey facilities (e.g., Port Newark, Port Elizabeth, Port Jersey, The Peninsula at Bayonne Harbor), the required environmental review, including assessment of potential impacts to cultural resources, may be pursuant to State and/or local regulations and guidance. For New York and New Jersey projects that are subject to State reviews, the governing regulations are as contained in the New York State Environmental Quality Review Act (SEQRA) and New Jersey Executive Order 215, respectively. While neither of these explicitly addresses the requirements, procedures, or methodology for assessment of potential impacts to cultural resources, general practice comprises identification of resources, assessment of impacts, and development of mitigation through data recovery, avoidance and/or restriction of project activities. For projects in New York, consultation is required with the New York State Historic Preservation Office (NYSHPO) within

the New York Office of Parks, Recreation, and Historic Preservation (NYS OPRHP). For projects in New Jersey, consultation is conducted with the New Jersey Historic Preservation Office (NJHPO) within the New Jersey Department of Environmental Protection (NJDEP). Consultation with these agencies is conducted regarding identification of known resources, assessment of potential impacts, and development of appropriate mitigation to minimize adverse effect.

For proposed projects at one of the Port's New York facilities, the City Environmental Quality Review (CEQR) requirements (*City Environmental Quality Review Technical Manual*, Chapter 3.F) may also apply. While the guidance conforms largely to Federal requirements for identification of cultural resources and assessment of impacts, it recognizes the New York City Landmarks Preservation Commission (NYCLPC) as the City agency with expertise and resources pertinent to cultural resource investigations, and requires consultation with NYCLPC, notably for designing of mitigation measures when significant impacts would occur to resources.

Comprehensive Port Improvement Plan Environmental Assessment (CPIP EA)

ENVIRONMENTAL JUSTICE METHODOLOGY REPORT

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1.0 INTRODUCTION

Issued on February 11, 1994, Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, is based on Title VI of the Civil Rights Act of 1964. The purpose of the Executive Order, is to prevent disproportionately high and adverse environmental, economic, social, or health impacts resulting from federal actions on minority and/or low-income populations. The order requires that impacts on minority and/or low-income populations be taken into account when preparing environmental and socioeconomic analyses of projects or programs that are proposed, funded, or licensed by federal agencies.

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no minority and/or low-income population should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.

Environmental justice impact assessment guidance is currently provided by federal, New York State and New Jersey State, and local agencies, with the United States Department of Transportation (USDOT)/Federal Highway Administration (FHWA) offering perhaps the greatest degree of guidance. This methodology report describes the background, principles, and general approaches of various agencies' guidance for assessing potential environmental justice impacts of future port and associated transportation improvement projects that may be proposed. <u>However, at such time as the environmental justice impact assessment is to be undertaken for a given proposed project, the lead agency(ies), project sponsor, and environmental consultant should review then-current environmental justice guidance to determine what is most applicable and appropriate for the proposed project</u>.

2.0 FEDERAL

A. United States Department of Transportation

The USDOT issued its *Order on Environmental Justice to Address Environmental Justice in Minority Populations and Low-Income Populations* (USDOT Order 5610.2)[1] and FHWA issued its *Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*.[2] For case studies, see USDOT's web site.[3]

USDOT Order 5610.2 focuses on whether a proposed action or plan would cause disproportionately high and adverse effects on minority populations and/or low-income populations, and whether these populations would receive or be denied project-related benefits. A framework of analysis is required to be defined to determine whether a proposed action or plan would differentially affect different populations. Environmental justice determinations are based on project-related effects and not on population size and, consistent with the USDOT Order, disproportionately high and adverse impacts should be mitigated where possible, if not totally avoided.

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1 *US Department of Transportation Order on Environmental Justice* (http://www.fhwa.dot.gov/environment/ejustice/dot_ord.htm)

2 FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (http://www.fhwa.dot.gov/legsregs/directives/orders/6640_23.htm)

3 USDOT's Environmental Justice web site/brochure, *An Overview of Transportation and Environmental Justice* (http://www.fhwa.dot.gov/environment/ejustice/case/index.htm)

Environmental justice embodies three fundamental principles:

- Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and/or low-income populations;
- Ensure the full and fair participation by all potentially affected communities in the decision-making process; and
- Prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and/or low-income populations.

According to USDOT, environmental justice should be considered and addressed in all National Environmental Policy Act (NEPA) decision-making and appropriately documented in Environmental Impact Statements (EIS), Environmental Assessments (EA), Categorical Exclusions (CE), and/or Records of Decision (ROD). The Executive Order and the accompanying Presidential Memorandum call for specific actions in NEPA-related activities, including:

- Analyzing environmental effects, including human health, economic, and social effects on minority populations and/or low-income populations when such analysis is required by NEPA;
- Ensuring that mitigation measures analyzed or discussed in EAs, EISs, and RODs, whenever feasible, address disproportionately high and adverse environmental effects or proposed actions on minority populations and/or low-income populations; and
- Providing opportunities for community input in the NEPA process, including identifying potential effects and mitigation measures in consultation with affected communities and improving accessibility to public meetings, official documents, and notices to affected communities.

FHWA's environmental justice guidelines describe a community impact assessment as a process to evaluate the effects of a transportation action on a community and its quality of life. The information in the assessment is intended to be used to mold a project, and to provide documentation of the current and anticipated social and economic environment of a geographic area with and without the proposed project or action. The assessment process comprises the following steps: (1) define the project, study, and planning area; (2) develop a community profile; (3) analyze impacts; (4) identify solutions; (5) use public involvement; and (6) document findings. These steps are elaborated upon in FHWA's *Community Impact Assessment: A Quick Reference for Transportation*, and its companion document, *Community Impact Mitigation: Case Studies* (1998).

The FHWA's environmental justice policies advise that the following analytical tools be used:

- Most current version of Census Transportation Planning Package (CTPP) to report travel flows between home and workplace to cross-tabulate travel patterns;
- American Community Survey (ACS) for up-to-date statistical picture for annually planning and evaluating public programs.

Executive Order 12898 and USDOT Order 5610.2 refer exclusively to "populations," while the White House distribution memo refers to both "communities" and "populations." The USDOT Order defines each "population" as: (1) any readily identifiable group of minority persons or low-income persons who live in geographic proximity; or (2) geographically dispersed persons, such as migrant workers or Native Americans. Therefore, depending on the context and circumstances, the environmental justice assessment for a proposed project must consider both definitions in its identification of the potentially affected group to ascertain whether it could cause a disproportionately high and adverse effect on a minority and/or low-income population even if there are no clearly delineated neighborhoods or communities within which such populations are concentrated.

B. United States Environmental Protection Agency

USEPA Region 2 Interim Environmental Justice Policy (2000) addresses the requirements of Executive Order 12898 and presents a methodology to identify environmental justice communities. The Interim Policy includes the Region's Environmental Justice Policy Statement and its guidance with respect to permitting, enforcement, community involvement, and the Superfund program.

USEPA mainly uses its environmental justice tools for permitting reviews and NEPA analysis of USEPA-funded infrastructure grant projects. The tools, which are listed below, facilitate an analysis of environmental justice considerations. Although the USEPA's environmental justice analyses are focused principally on permitting and grant projects, Region 2 recommends the analysis methodology be used in all environmental justice analyses in the beginning of a project's environmental review to facilitate proactive coordination with the community (ies) in question.

EPA guidance provides a methodology for identifying the communities of concern (COC), evaluating whether they are minority and/or low-income communities, and assessing whether their environmental burdens are disproportionately high and adverse. In general, at the conclusion of an environmental justice analysis, a decision document should be generated, including the following:

- Boundaries of the COC and rationale for its selection;
- Identification of the statistical reference area used;
- Analysis results for each factor: minority, low-income, and environmental burden;
- Comparison of the results for each factor between the COC and the reference area;
- Any additional factors that were considered; and
- Conclusion of the analysis, incorporating all three factors (minority population, low-income population, environmental burden).

USEPA stipulates the mapping of minority and/or low-income communities that reside within and proximal to a proposed project. The guidance recommends that the analyst identify low-income populations by annual statistical poverty thresholds from the Bureau of the Census' current population reports (Series P-60 on Income and Poverty), as well as consider state and regional low-income and poverty definitions, as appropriate.

The following six steps comprise the USEPA's procedure to identify potential and actual environmental justice communities:

- Delineate the boundaries of the COC and conduct, as appropriate, a preliminary environmental burden analysis;
- Compare the demographics of the community to an appropriate statistical reference;
- Determine whether the community is minority and/or low-income;
- Develop a comprehensive environmental load profile (ELP) for any community that is minority and/or low-income;
- Assess whether the burden is disproportionately high and adverse; and
- Summarize and report the results.

USEPA currently utilizes the following tools to determine ambient air quality conditions for use in environmental justice analysis:[4]

- Demographic Tool - captures most recent Census data relating to Census block information and compares it (in cluster analyses) to state-wide levels via two categories: minority and/or low-income;
- Environmental Load Profile Tool - analyzes whether there is an increased risk from:
  - Toxic Release Inventory (TRI) and the transportation or collection of toxic materials and their specific risks;
  - National Air Toxics Assessment (NATA), which looks at the 33 worst air toxic chemicals and designates buffers around their facilities; and
  - Facility Density Indicator, which looks at the number of USEPA-regulated facilities that exist within an area, as well as around the area.

At such time as environmental justice analyses are conducted for future port and associated transportation improvement projects, analysis tools that may have been newly developed and been made publicly available should be reviewed to determine their utility for the environmental justice analysis.

C. United States Army Corps of Engineers

According to the United States Army Corps of Engineers (USACE) Civil Planning Department, the agency does not have a specific environmental justice policy. NEPA guidelines stipulate a general discussion of environmental justice but do not specify the process; the USACE typically includes discussion of environmental justice in sections addressing social well-being or community impacts (see, for example, Oakland Harbor Navigation Improvement (-50 Foot) Project FEIS,[5] May 1998).

3.0 STATE OF NEW YORK

While environmental justice assessment is a federal requirement, some state agencies have established guidance for state-level reviews, such as the New York State Department of Environmental Conservation's (NYSDEC) CP-29: Environmental Justice and Permitting Policy.[6]

While there is no required environmental justice methodology for a State Environmental Quality Review Act (SEQRA) EIS, NYSDEC's environmental justice guidance for permitting addresses whether a proposed action or plan would cause disproportionately high and adverse effects on minority populations and/or low-income populations, and seeks to ensure meaningful public participation. Additionally, the permitting process requires evaluation of existing environmental burdens.

A preliminary screening process is conducted to:

- Identify a proposed project's study area;
- Identify the potential adverse environmental impacts and area that would be affected; and
- Determine whether any potential adverse environmental impacts would be likely to affect a potential environmental justice population.

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[4] According to USEPA Region 2, FHWA's environmental justice analysis methodology is the recommended methodology; however, USEPA's tools are useful to proactively talk about the area in an environmental justice context. According to FHWA's guidelines, the analyses for low-income and minority communities should not be consolidated.

[5] *Oakland Harbor Navigation Improvement (-50 Foot) Project* (http://www.50ftdredge.com)

[6] http://www.dec.state.ny.us/website/ej/ejpolicy.html

If any of the communities are within the affected areas of significant adverse environmental impact, a determination is made regarding whether and to what extent these communities would be disproportionately affected, compared to effects experienced by the population of the greater geographic area within which the affected area is located. The study area is then determined based on the analyses conducted for the other impact assessments included in an EIS, combining all of the study areas into one.

4.0 STATE OF NEW JERSEY

In February 2004, then-Governor McGreevey signed an executive order calling for the New Jersey Department of Environmental Protection (NJDEP) and the New Jersey Department of Transportation (NJDOT) to develop a coordinated strategy for reducing the public's exposure to fine particulate pollution. NJDEP was also required to use environmental and public health data to identify existing and proposed industrial and commercial facilities in communities of color and low-income neighborhoods that should be targeted for more aggressive compliance, enforcement, remediation, and permitting strategies to reduce residents' exposure to toxics and other pollution.

According to NJDEP's Office of Permit Coordination and Environmental Review, environmental justice has been a consideration with permits, not EISs, in New Jersey. Executive Order 215 (1989), which requires environmental review when major construction is funded and/or initiated by state agencies, includes an environmental justice component in the social and economic section but does not provide methodological guidance.[7]

[7] Section III.E.3, "Discuss how environmental justice was considered during the environmental decision-making process. If an environmental justice analysis was done, provide information regarding the status and/or findings of the analysis."

Comprehensive Port Improvement Plan Environmental Assessment (CPIP EA)

ENVIRONMENTAL SCREENING METHODOLOGY REPORT

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1.0 INTRODUCTION

The purpose of this methodology report is to outline an approach for conducting environmental screening of future port improvement and associated transportation improvement projects that may be proposed for sites within the Port of New York and New Jersey. The purpose of the environmental screening will be to objectively and even-handedly compare potential project alternatives and, thereby, select those that would best satisfy the purpose and need for the Comprehensive Port Improvement Plan (CPIP) and the related goals and objectives. The screening will serve to identify each alternative's environmental advantages and disadvantages, relative to other alternatives, and to highlight potential tradeoffs inherent in selecting one alternative over others.

This document describes the screening criteria and associated evaluation measures that have been defined for future environmental screening evaluations of proposed port improvement and associated transportation improvement projects. At such time as projects may be proposed and environmental reviews are initiated, the criteria and evaluation measures defined in this report should be reviewed in the context of then-current environmental and related regulations and refined, if and as necessary, to appropriately reflect applicable environmental law and practice.

The results of any future screening evaluations should be short lists of alternatives that are reasonable and feasible and, compared to other potential alternatives, would best conform to the CPIP. Short-listed alternatives for a proposed project will then be evaluated in detail, based on their complexity, in a categorical exclusion, environmental assessment, or in a draft environmental impact statement (DEIS), pursuant to federal (National Environmental Policy Act [NEPA]), state (New York State Environmental Quality Review Act [SEQRA]; New Jersey Executive Order 215), and/or local (New York City Environmental Quality Review [CEQR]) regulations, and other statutes that may be applicable to the given proposed project.

As the screening criteria have been defined to reflect the CPIP goals and objectives and, thereby, lead to selection of project alternatives that are consistent with the stated goals and objectives, the CPIP goals and objectives are provided below. The environmental screening criteria and associated evaluation measures are provided in Section 3.0.

2.0 CPIP GOALS AND OBJECTIVES

The CPIP project's goals and objectives reflect the stated purpose of and need for a comprehensive plan for the future phased development of the Port of New York and New Jersey. Four of the project goals address the overarching purpose of maintaining the Port's economic viability in balance with the enhancement and sustainability of the land- and water-side environments within which the Port operates. The remaining three goals collectively address the need for a plan that is implementable and has regional public and institutional support. More specific objectives were defined for each of these goals to guide project planning and provide the basis for evaluating project alternatives that may be proposed in the future for any of the port sites. The CPIP goals and objectives are as follow:

GOAL 1: Identify the port improvements necessary to maintain the status of the Port of New York & New Jersey as the preeminent port on the U.S. Atlantic Coast.

Objectives:

- Review and update projections (if necessary) of maritime market demand from past studies.
- Using past studies and new work, develop phased-in container and non-container improvement programs for existing and future maritime terminals.
- Identify the costs and economic benefits associated with the proposed improvements, each as stand alone, and as an aggregate plan which results in the greatest public and private benefit.
- Identify upland transportation-related improvements directly related to proposed terminal improvements.
- Identify environmental impacts from port development to be addressed in CPIP Plan and CPIP EA.
- Identify funding sources (federal, state, public/private partnerships) that could be used to finance the improvement initiatives.
- Thoroughly investigate technologies that increase terminal throughput capacity on existing port acreage.
- Identify coastal and inland sites that can be developed for port usage, avoiding or minimizing requirements to fill waters or wetlands. (Identify a "least-fill" port development strategy.)

GOAL 2: Link the CPIP to existing regional planning efforts.

Objectives:

- Identify relevant planning efforts that complement the strategic vision of CPIP.
- Develop CPIP so as to integrate the plan with existing regional planning efforts.
- Work closely with public agencies and officials to ensure implementation of port program is well-synchronized with other public policy goals.

GOAL 3: Develop the CPIP consistent with the enhancement of the environmental quality of the estuary.

Objectives:

- Investigate innovative best management practices for reduction of non-point sources of water pollutants.
- Support attainment of sediment, water and habitat quality to sustain a diversity of living resources.
- Identify and protect significant habitats, including wetlands and uplands, and compensate for unavoidable impacts.
- Support the vision of the NY/NJ Harbor Comprehensive Conservation and Management Plan (CCMP) to "establish and maintain healthy and productive harbor bight ecosystem with full beneficial uses."
- Avoid wetland impacts to the maximum extent practicable.
- Where wetland impacts are unavoidable, create wetlands and special aquatic site mitigation to increase the overall value of existing ecosystems.
- Where creation is not feasible, require enhancement, which will lead to an overall improvement of the aquatic ecosystem.

GOAL 4: Link development with efforts to improve environmental quality.

Objectives:

- Reduce or minimize potential future increases in regional vehicle miles of travel (VMT) and mobile source emissions from port improvement-related activities.
- Achieve Air Quality Conformity with Regional and State Implementation Plans.
- Promote rail/truck/barge mode split that will support reduced port-related VMTs and improve air quality.
- Promote mass transit to port-related work facilities.
- Implement pollution prevention measures as feasible.
- Facilitate coordination between relevant regulatory and response agencies for improved data collection.

GOAL 5: Adopt "Green Port" planning criteria to guide development options.

Objectives:

- Research existing examples of "Green Port" developments that have occurred domestically and abroad.
- To the maximum extent practicable, develop plans in consideration of environmental improvement opportunities.
- Apply Green Port concepts during CPIP plan development.
- Reuse previously developed sites (brownfields), and reclaim disturbed sites where appropriate.
- Enhance waterfront public access in conformance with State Coastal Zone Management and local plans.
- Promote and encourage the use of new technologies for alternative fuels, energy efficiency and renewable energy in port facilities and operations.
- Plan in accordance with federal and state Sustainable Development Initiatives.

GOAL 6: Create more certainty in the federal, state, and local permit review process to create needed port expansion capability.

Objectives:

- Work with environmental regulators and environmental non-governmental organizations to identify appropriate mitigation options.
- Coordinate CPIP Plan and CPIP EA with existing regulatory processes (e.g., Coastal Zone Management, Clean Water Act Regulations), such that permits can be obtained on a least-time basis.

GOAL 7: Maximize public participation to ensure that port development projects achieve regional consensus.

Objectives:

- Create a meaningful public outreach program that maximizes input from the local community, elected officials, labor, and business interests.

- Convene frequent stakeholder meetings to update groups on CPIP's status.
- Promote environmental education and stewardship.
- Ensure consideration of environmental justice issues.
- Use "hands-on" planning approaches (e.g., workshops, field trips) whenever appropriate to explain port and transportation issues and gain consensus.

3.0 ENVIRONMENTAL SCREENING METHODOLOGY AND CRITERIA

For future proposed port improvement or associated transportation improvement projects that are of sufficient scale and/or have the potential to result in significant environmental impact(s) requiring formal environmental review, pursuant to applicable regulation(s), potentially reasonable and feasible alternatives to the proposal must be identified. Such alternatives may be characterized as "preliminary," i.e., not yet subjected to any screening or other environmental review. Preliminary alternatives for a given port site or transportation facility may represent different project sizes and/or configurations, infrastructure, operations, or even sites.

The screening evaluation methodology proposed for application to future port or associated transportation improvement projects comprises two tiers of screening:

1) *Initial screening of preliminary alternatives*: qualitative and independent review of each preliminary alternative to eliminate those that would clearly contradict the CPIP goals and objectives and, therefore, would have little likelihood of satisfying the CPIP purpose and need; and
2) *Comparative screening of intermediate alternatives*: qualitative and quantitative evaluation of alternatives surviving the initial screening to compare each alternative's relative advantages and shortcomings, and to highlight trade-offs or lost opportunities that would be inherent in selecting one alternative over others.

Results of the initial screening should be displayed in a single matrix of project goals against preliminary alternatives, with a checkmark noted in the matrix cell for any alternative that would clearly contradict a given goal, as further defined by its related objectives. The assessment should be conducted conservatively to avoid premature elimination of alternatives for which goal-related evaluation is uncertain, i.e., only in instances in which it is clear that a preliminary alternative contradicts a particular CPIP goal should the alternative be judged fundamentally deficient and eliminated from further consideration. In such cases, the rationale for judging a given alternative's deficiency related to a given goal should be documented.

Results of the comparative screening should be displayed in two matrices: 1) the first providing the qualitative or quantitative assessment results (i.e., actual data or information), for each screening criterion and its associated evaluation measures; and 2) the second presenting each alternative's relative performance against the subset of evaluation measures that best serve to differentiate among alternatives. Various means of displaying alternatives' relative performance in the second matrix may be designed by study participants for future screening exercises. One method that may be considered uses pie charts that depict the best- to worst-performing among the competing alternatives, relative to the selected evaluation measures (i.e., a fully filled-in circle would represent the alternative with the best performance for a given evaluation measure, an empty circle would, conversely, represent the alternative with the worst performance for the same evaluation measure, and all other alternatives' circles would be filled in to represent their performance proportionally to the best and worst performing ones). The second matrix

will serve to facilitate decision-making about which alternatives have the greatest potential environmental benefits and least adverse effects, relative to others, and thereby warrant advancement to the subsequent, detailed phase of the proposed project's environmental review process.

Each of the two steps of the proposed screening process is described below.

A. First-Tier Screening of Preliminary Alternatives

Preliminary alternatives for a proposed project may be identified from various sources, which typically include a proposed project's sponsor and study team, other studies, agency and public input, and political discourse. While pertinent and potentially useful alternatives are generally identified via such sources, some suggested alternatives may not be directly pertinent to the CPIP purpose and need and related goals and objectives. It is prudent to initially assess each preliminary alternative's relevance to the defined CPIP goals to 1) eliminate any preliminary alternative that clearly contradicts any CPIP goal;[1] and 2) maximize a study's time- and cost-efficiencies by focusing on alternatives that have some likelihood of achieving the CPIP purpose and fulfilling the related goals.

Each preliminary alternative should be assessed to ascertain whether it would contradict or preclude achievement of the project goals. However, as the CPIP goals are broadly stated, the assessment should consider each preliminary alternative in light of the specific objectives defined for each goal. Based on this, future study team members should determine whether any preliminary alternative should be eliminated from further consideration (i.e., not be advanced to the second tier of screening).

The threshold for advancing a preliminary alternative from the initial to the comparative screen may differ from one proposed project to another, in terms of how many goals – as measured by their underlying objectives – an alternative must be consistent with in order to warrant further consideration. Future study participants should establish such thresholds through consensus among lead agencies for the proposed project's required environmental review, project sponsors, and, if appropriate, agency and/or public input.

B. Second-Tier Comparative Screening of Intermediate Alternatives

Table 1 presents comparative environmental screening criteria and associated evaluation measures that may be applied to alternatives for future port and associated transportation improvement projects, and identifies the specific CPIP goal(s) to which each criterion is related. Each criterion and its associated evaluation measures is also briefly described, to provide the rationale for their inclusion. As noted above, the evaluation measures should be reviewed at the time that future environmental screenings are undertaken for future proposed projects to confirm that the measures are still pertinent and appropriate or to refine the measures so they accurately reflect environmental regulations that are in force at the time.

1. Acquisition or Displacement of Property

In support of the port being a good neighbor to its host community, this screening criterion seeks to avoid disruption of those host communities. Direct displacement is the "involuntary displacement of residents or businesses from the site of (or a site directly affected by) a proposed action" (*New York City CEQR Technical Manual*, p. 3B-2). Substantial displacement of existing residential or commercial land uses may affect community stability and result in alteration of a host community's character. Minimizing the number of properties acquired, and the number of uses displaced, would likely help maintain existing community development patterns.

[1] An alternative that contradicts a CPIP goal and would, therefore, be unable to satisfy the CPIP purpose and need, may nonetheless have merit for consideration for another project or purpose.

TABLE 1
ENVIRONMENTAL SCREENING CRITERIA AND EVALUATION MEASURES

Environmental Category	Environmental Criteria for Screening of Port Improvement Options	Evaluation Measure(s) for Criterion	Related Goal(s)
Acquisition or Displacement of Property	An alternative should minimize the number and extent of potential property acquisitions required for project implementation.	• Number and types of properties to be acquired, or existing uses to be displaced, in part or entirety.	1
Brownfields	An alternative should use or support the reclamation of brownfield sites for expansion of existing facilities or development of new facilities, including both port-related and warehouse/distribution centers.	• Number and acreage of existing brownfield properties to be used and improved.	1, 5
Historic Resources	An alternative should avoid taking or constructive use of landmarked or eligible historic resources.	• Number, status and significance of affected resources. • Number and status of other resources within 400 feet of site.	1
Parkland	An alternative should avoid permanent taking of public parkland or recreation area.	• Number and acreage of public parkland or recreation area to be permanently taken.	1
Public Waterfront Access	An alternative should not preclude existing public access and should seek to enhance safe public access to waterfront resources.	• Number of existing waterfront access points on or near site that would be compromised. • Number of new waterfront access points provided.	1, 5, 6
Threatened and Endangered Species and Significant Habitats	An alternative should avoid permanent taking of protected habitat of a known state or federally designated threatened or endangered species.	• Acreage of permanent habitat taking. • Number and status of identified protected species using habitat to be taken.	1, 3, 4, 5
Water Resources	An alternative should minimize adverse impacts to water resources, and should incorporate Best Management Practices for reduction on non-point sources of water pollution.	• Increase in pollutant loads, measured by quantity of Total Suspended Solids (TSS) and Dissolved Oxygen (DO).	1, 3
Navigation	An alternative should avoid construction of any physical barriers to navigable waterways.	• Number and degree (minor, moderate, major) of physical barriers to be constructed, by navigable waterway.	1, 2

TABLE 1 (CONTINUED)
ENVIRONMENTAL SCREENING CRITERIA AND EVALUATION MEASURES

Environmental Category	Environmental Criteria for Screening of Port Improvement Options	Evaluation Measure(s) for Criterion	Related Goal(s)
Wetlands	An alternative should avoid the permanent taking of designated freshwater or tidal wetlands.	• Acreage of wetlands permanently taken. • Type/value of wetlands permanently taken. • Degree of fragmentation of wetland system (minor, moderate, major).	1, 3
Hazardous Wastes and Substances	An alternative should minimize the disturbance of sites with known hazardous substances.	• Number and acreage of sites potentially disturbed, by listing and status.	1, 5
Traffic	An alternative should not result in a significant degradation of traffic/transportation conditions.	• Estimated increase in site-generated traffic volumes (24 hours): a) 0%-5%; b) 5%-20%; c) 20%-50%; d) 50%+ • Estimated increase in site-generated traffic volumes (peak hour of adjacent roadway network): a) 0%-5%; b) 5%-10%; c) 10%-25%; d) 25%+ • Estimated change in truck share of traffic on nearby regional (interstate) roadway links: a) increase; b) decrease; c) no change • Is the option expected to generate additional truck traffic on roadway links not intended to accommodate heavy vehicles (Y/N)?	1, 4

TABLE 1 (CONTINUED)
ENVIRONMENTAL SCREENING CRITERIA AND EVALUATION MEASURES

Environmental Category	Environmental Criteria for Screening of Port Improvement Options	Evaluation Measure(s) for Criterion	Related Goal(s)
Air Quality	An alternative should or minimize degradation of local and regional air quality due to mobile or stationary sources of development or port operation	*Micro-Scale Off-Site* • For projects in New York City, estimated additional trucks and total additional vehicles per hour and level-of-service (LOS) changes to D, E, or F. • For projects in New Jersey, forecast LOS changes from D to E or E to F. *Micro-Scale On-Site* • Estimate of emissions generated by diesel-fueled operations at the port facility, compared to NAAQS and, in New York City, to STVs. *Mesoscale* • Estimated increase in nitrogen oxide or hydrocarbon emissions and $PM_{2.5}$ emissions, compared to impact thresholds. • Estimated increases or decreases of pollutant emissions.	1, 4
Noise	An alternative should minimize impacts to noise-sensitive receptors from stationary and mobile sources.	• Stationary: number of noise-sensitive receptors within 1,500 feet of site. • Mobile: forecasted increase in volume of passenger car equivalents (PCEs) at noise-sensitive receptors during the noise peak hour (i.e., noisiest traffic hour).	1
Planning Policies	An option should be consistent with approved local planning policies.	• Number and nature of policies with which option is or is not consistent.	2, 5, 6

TABLE 1 (CONTINUED)
ENVIRONMENTAL SCREENING CRITERIA AND EVALUATION MEASURES

Environmental Category	Environmental Criteria for Screening of Port Improvement Options	Evaluation Measure(s) for Criterion	Related Goal(s)
Regulatory Complexity	An alternative should be capable of being implemented without requiring an extraordinary approval or permitting process.	• Number of required approvals/permits and consequent degree of permitting complexity (minor, moderate, major).	2, 4, 6
Greenport Principles	An alternative should promote the use of diesel emission control technologies including alternative fuels, modified engine designs, and pollution control devices. An alternative should support the restoration of New York Harbor by precluding overboard, at-sea discharges.	• Proposed use/implementation of: - alternate fuels: synthetic diesel fuel or water-in-diesel emulsions (yes/no). - modified engine designs that permit use of exhaust gas recirculation (EGR), dimethyl Ether, or natural gas (yes/no). - pollution control devices: lean NOx catalysts or selective catalytic reduction (SCR) devices (yes/no). • Provision of port refuse disposal/recycling facilities to support in-port disposal/recycling of ship's and port-generated refuse (yes/no).	1, 5
Construction Impacts	An alternative should minimize the duration and severity of off-site construction impacts.	• Extent of off-site construction (none, minor, moderate, major). • Duration of construction period (months).	1
Environmental Justice	An alternative should not result in disproportionately high or adverse impacts to low-income and/or minority populations.	• Category and degree (none, minor, moderate, major) of disproportionately high and adverse effects, by EJ category (low-income, minority classification) and size of EJ population.	1, 7

Alternatives that would pose the least number of property acquisitions or displacements would be preferred over those requiring larger numbers of either impact to host communities (i.e., alternatives resulting in no such impacts would be ranked highest, with lower rankings for each additional property acquisition or displacement). The number of necessary property acquisitions and/or displacements and the specific uses so affected should be documented for each alternative.

2. Brownfields

A brownfield is a site characterized by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Reuse of brownfields is beneficial to a community. Contaminated properties are cleaned up during the redevelopment process; local municipalities are able to realize property tax revenues from the property once again; and vacant, "green" land that may otherwise have been developed can remain undeveloped. Utilization of brownfields for port improvements would reintroduce underutilized and/or abandoned properties to beneficial use, generate additional property tax revenues, and reduce pressure to develop open space and greenfields. Incorporation of this measure into the environmental screening represents support for local host communities and protection of overall environmental conditions.

Alternatives that propose reuse of one or more brownfield sites for implementation of a port or associated transportation improvement would be preferred to those that would not include such reclamation. The number and contaminant characterization of brownfield site(s) to be reused should be documented for each alternative.

3. Historic Resources

The permanent use of land from any historic site for the implementation of an alternative would be considered a major adverse effect. Alternatives should seek to avoid the permanent taking of historic properties or districts listed on the National, New Jersey or New York Registers, or determined eligible for such listing; National Historic Landmarks; and New York City Landmarks and Historic Districts or those listed by local municipalities in New Jersey.

Section 106 of the National Historic Preservation Act of 1966, as amended, requires that federal agencies identify and evaluate cultural resources and consider the impact of undertakings they fund, license, permit, or assist with on historic properties eligible for inclusion in the National Register of Historic Places. Section 106 also requires conduct of a consultation process with the pertinent State Historic Preservation Office(s) and the Advisory Council on Historic Preservation regarding identification of potentially affected historic resources; determination of adverse effects, if any; and development of appropriate mitigation and execution of a programmatic agreement, as necessary.

Section 4(f) of the United States Department of Transportation Act of 1966 (23 U.S.C. 138) prohibits the use of historic resources of national, state or local significance for a federally funded transportation project, unless it can be demonstrated that there are no feasible and prudent alternatives that avoid the use of Section 4(f) resources, and that the project includes all possible planning to minimize adverse impacts to the identified Section 4(f) resource(s).

Alternatives that avoid taking of historic resources would be preferred to those that would require the permanent taking of one or more resources, in part or in their entirety. The number, significance and identities of any historic resource(s) potentially affected by an alternative should be documented.

4. Parkland

The permanent taking of public parkland or publicly accessible open space is an adverse effect on a community's recreational and aesthetic resources, potentially reducing residents' quality of life. While

local municipalities' perspectives on preservation of open space may depend upon the density and character of land use in a given port site's vicinity, and the availability and quality of open space in the municipality, the port sites' host communities are all urban and without an overabundance of open space for locals' use.

In addition to the direct impact of parkland taking on a community, taking of public parkland for a proposed port or associated transportation improvement project may also impose significant hurdles to project implementation, potentially requiring federal, state, and/or local approvals ranging from rigorous review and approval processes to alienation procedures requiring state–level legislative action.

Section 4(f) of the United States Department of Transportation Act of 1966 (23 U.S.C. 138) prohibits the use of public parkland and public recreation areas for a transportation project requiring federal approval or using federal funds, unless it can be demonstrated that there are no feasible and prudent alternatives that would avoid the use of the Section 4(f) resource in question, and that the project includes all possible planning to minimize adverse impacts to the Section 4(f) resource.

Alternatives that avoid permanent taking of public parkland or publicly accessible open space would be preferred to those requiring such taking. The number of parkland or open space resources and related acreage required to be taken should be documented for each alternative.

5. Public Waterfront Access

The New Jersey Administrative Code [N.J.A.C.] Coastal Zone Management Rules [7:7E-8.11 Public Access to the Waterfront] defines public access as "…the ability of all members of the community at large to pass physically and visually to, from and along…waterfronts" and requires that coastal developments, including developed waterfront areas, provide "…permanent perpendicular and linear access to the waterfront to the maximum extent possible." Similarly, N.J.A.C. 7:7E-7.9 [Port Use Rule] requires expanded ports to "…provide for maximum open space and physical and visual access to the waterfront provided that this access does not interfere with port operations or endanger public health and safety."

Policy Nos. 19 and 20 of the New York State Coastal Zone Management Program [NYCZMP] require that the state "[p]rotect, maintain, and increase the level and types of access to public water–related recreation resources and facilities" and that it allow "[a]ccess to the publicly owned foreshore and…water's edge…in a manner compatible with adjoining uses."

Policy No. 8 of the New York City Waterfront Revitalization Plan [NYCWRP] requires the City to "[p]rovide public access to and along New York City's coastal waters." New York's "…waterfront zoning regulations do not require public access in connection with industrial development…" but note that opportunities for access along working waterfronts often exist. Policy No. 9 of the NYCWRP requiring the City to "[p]rotect scenic resources that contribute to…visual quality…" could be interpreted as requiring visual access to the waterfront.

Although federal laws or regulations do not require public waterfront access, the coastal zone management plans for New Jersey and New York and for New York City are an outgrowth of the Coastal Zone Management Act of 1972. This act requires that federal agencies undertaking work in the coastal zone and applicants for federal permits for work in the coastal zone comply with a state's coastal zone management program after it has been approved by the Secretary of Commerce. Hence, there is an indirect requirement for federal actions to provide public waterfront access.

Alternatives should be reviewed to determine if any existing public waterfront access at a given port site would be maintained or compromised, and whether any new points of waterfront access would be

provided. Alternatives that maintain existing and/or propose provision of new public waterfront access would be preferred to those that either would compromise existing access and/or would provide no new access opportunities. The number of existing access points maintained or lost, and the number of new access points that would be provided should be documented for each alternative.

6. Threatened and Endangered Species/Significant Habitats

Harm to a protected species or to critical habitat (or significant portion thereof) necessary for the survival/propagation of an endangered or threatened species, as defined in the Endangered Species Act of 1973 (Public Law 93-205), is an adverse effect. If federally protected species may be adversely affected by a federal action, the effects on that species must be evaluated via a Section 7 consultation process.

Endangered species are those determined to be currently in danger of extinction; threatened species include those not currently in such danger, but likely to become so in the foreseeable future. Rare species are those listed as either endangered or threatened, or are of special concern on the New York and New Jersey endangered species lists. These lists include federally listed species that may be found within the given State. Significant habitat at both the state and federal levels refers to areas/ecosystems used by a protected species during any life stage or for any critical activity (e.g., spawning, nesting, feeding).

The presence or absence of threatened or endangered species and associated habitats within the vicinity of a port site for which a project is proposed should be determined in consultation with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). At the state level, this information should be obtained through requests for reviews of state Natural Heritage Program databases placed with the New York State Department of Environmental Conservation (NYSDEC), Division of Fish, Wildlife & Marine Resources, New York Natural Heritage Program and the New Jersey Department of Environmental Protection (NJDEP), Division of Parks and Forestry, Office of Natural Lands Management, Natural Heritage Program.

The New York State Department of State, Division of Coastal Resources also maintains a database and series of maps that identify significant coastal fish and wildlife habitats. A review of these data for habitats in the areas surrounding the port facility for which a project is proposed should be conducted to determine if any will be adversely affected by a proposed project.

Impacts to listed species or their habitat require documentation of site characteristics. The *NYC CEQR Technical Manual* provides guidance on the basic elements necessary for assessment of impacts to listed species and their habitats. These include the value of the habitat, habitat support systems, and interaction among project alternatives, habitat, and habitat support systems. The manual provides methodologies for data collection and analysis, as well as lists of effects, which should be used to establish the level of impact and how it should be addressed.

Project alternatives that would not result in impacts to listed species or their habitat should be given preference, followed by those that would allow impacts to be minimized, and, lastly, by those that would cause but mitigate impacts. Alternatives that would result in impacts that affect only previously affected areas would be ranked higher than those whose impacts would relate to previously unaffected areas.

7. Water Resources

Permanent impacts to established water quality standards/classifications and dedicated uses and/or obstruction of or encroachment on navigable waterways would be considered an adverse effect from a proposed project. Alternatives should be reviewed to determine their potential to increase pollutant loads that would be discharged to local water bodies, thereby affecting water quality and designated uses of a

regulated adjoining water course (New York and New Jersey regulated programs of Section 402 of the Clean Water Act).

Water quality classifications and designated uses of regulated waterbodies in the vicinity of the proposed project's alternatives should be identified through a review of New York and New Jersey maps and existing data from local studies.

8. Navigation

Alternatives should be evaluated for their potential to obstruct or encroach upon a navigable waterway. At the federal level, this is regulated under Section 10 of the Rivers and Harbors Act; by N.J.A.C 7:13 in New Jersey; and by Article 15 of the Environmental Conservation Law (ECL) in New York.

State and federal maps and regulations pertaining to navigable waters should be reviewed for information (e.g., channel width, depth) on the navigable waterways located at and near the port site for a project is proposed. The degree to which a navigable waterway would likely be affected by a project alternative should be qualitatively assessed, as having no effect, or minor, moderate, or major effect.

9. Wetlands

The presence or absence of both state and federally regulated freshwater and tidal wetlands within the immediate vicinity of a port site for which a project is proposed should be determined through a review of available maps and data. At the federal level, USFWS National Wetland Inventory (NWI) Maps are the primary source of these data, supplemented by U.S. Geological Survey (USGS) topographic maps and National Oceanic and Atmospheric Administration (NOAA) navigation charts. Maps depicting tidal and freshwater wetlands from the NYSDEC and NJDEP should be reviewed to identify all state-regulated wetlands located within and adjacent to the port facility for which a project is proposed to estimate the type and degree of likely adverse effect that a project alternative may impose.

The permanent taking (i.e., filling) of federal wetlands is an adverse effect. Such a taking would impose a legal requirement pursuant to Section 404 of the Federal Water Pollution Control Act of 1972 (33 U.S.C. 1344), which provides the U. S. Army Corps of Engineers (USACE) with the permitting authority to determine the effects of proposed discharge of dredge or fill material in the waters of the United States, including those which, like wetlands, are listed as special aquatic sites under Section 404(b)(1) guidelines (40 CFR 230.3). Executive Order 11990, enacted in 1977, directs all federal agencies to minimize adverse effects on wetlands, protect wetland resources, and undertake or allow construction in wetland areas only when there are no practicable alternatives.

Permits would also be required from NYSDEC (ECL Articles 24 and 25) and NJDEP (N.J.S.A. 13:9 A and B) for the taking of any state-regulated wetlands. Therefore, alternatives that minimize impacts to wetlands would be deemed preferable. In addition, impacts to wetlands require mitigation for the loss of wetland functions and values. Mitigation options that would be implemented on site and would provide the same functions and values as those lost due to the proposed project would be deemed preferable to those that would occur off site and would provide different functions and values from those lost.

In evaluating potential wetland impacts, the acreage of identified freshwater and tidal wetlands that would be directly taken as a result of an alternative should be estimated by wetland class. Wetland data and mapping should be gathered from the USFWS, NYSDEC, and NJDEP. Both tidal and freshwater wetlands should be identified using NWI maps, NYSDEC tidal and freshwater wetland maps, and NJDEP freshwater and coastal wetland map. Acreage that would potentially be taken by an alternative should be estimated and determinations made as to whether the takings would be critical to high-value wetland systems.

Generally, an alternative that would affect greater areas of higher value wetlands within a continuous (i.e., unfragmented) wetlands system is considered to be less desirable than an alternative that would affect a lower quality, fragmented wetland system. The nature and degree of likely disturbance (e.g., ditching, isolation, change in hydrologic regime), presence and extent of invasive vegetation, and any documented contamination will also be considered in assessing the value of wetland systems. The relative value of the wetland will also be considered in assessing if the wetland is "replaceable" (can the functions and values be replicated through a mitigation program) or if there are characteristics that cannot be replaced in the same watershed.

The potential for positive effects on both tidal and freshwater wetlands exists. Depending on the option, the restoration or reestablishment of wetland acreage, value and/or function might result, other than that required as compensatory mitigation. All opportunities for this type of restoration and enhancement should be considered.

10. Hazardous Wastes and Substances

A substance or waste is judged to be a hazard by virtue of having the potential to cause human illness or injury based on the nature of the material or its inherent toxicity. Hazardous waste is defined as a by-product of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Hazardous wastes, as defined in the Resource Conservation and Recovery Act (RCRA), possess at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or are defined as hazardous by virtue of being listed as such by the USEPA.

Materials considered to be hazardous are noted in RCRA, as well as in the Toxic Substances Control Act (TSCA), the Clean Air Act (CAA), and the Clean Water Act (CWA). Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the USEPA has the authority to designate other elements, compounds, mixtures, or solutions as hazardous substances that are excluded by definition under RCRA.

Data from various sources should be reviewed to identify any known presence of hazardous waste or hazardous substances at a given port site for which a port improvement project is proposed. Primary sources of information are regulatory databases (federal and state), such as CERCLA, RCRA, State Hazardous Waste Sites (SHWS), and Leaking Underground Storage Tanks (LUST). Searches of these and other databases should be undertaken within search distances established by ASTM Practice E1527-00 for conducting environmental site assessments to determine the presence of contaminants.

Alternatives that do not pose disturbance of property with known on-site hazardous wastes or substances would be ranked higher than those for which contaminant disturbance and consequent cleanup would be involved. The type and likely extent of contamination should be documented for each alternative.

11. Traffic

The screening of alternatives for consideration of traffic effects should be based on projected vehicular traffic volumes estimated for each alternative, using the NJDOT Truck Model (truck traffic) and through projected port facility employment levels and operating plans (auto traffic), or using travel demand forecasting tools available at the time a future proposed project undergoes environmental review and as recommended by the pertinent federal, state, and/or local transportation agency(ies). Although traffic volume changes in and of themselves do not indicate "degradation" of the roadway network, they can be used in the screening process to estimate orders-of-magnitude of potential changes in roadway operating conditions.

Potential traffic impacts of alternatives should be evaluated with consideration of four pertinent factors: 1) the total anticipated increase in traffic, 2) temporal distribution of this increase, 3) percentage of increased truck traffic, and 4) increase of truck traffic on local roads. The evaluation measures are as follows:

- The projected increase in site-generated traffic volume during a 24-hour period should be estimated and ranked. Alternatives should be ranked based on the following scale for increased traffic volumes, with lower percentage changes preferable to higher ones:
  - 0%-5%
  - 5%-20%
  - 20%-50%
  - 50%+
- The projected increase in site-generated traffic volume during the peak hour of the adjacent roadway network should be estimated and ranked. Alternatives should be ranked based on the following scale for increased traffic volumes, with lower percentage changes preferable to higher ones:
  - 0%-5%
  - 5%-10%
  - 10%-25%
  - 25%+
- The estimated change in truck share of traffic on nearby regional (interstate) roadway links, with decreases preferable to no change or to increases:
  - increase
  - decrease
  - no change
- Is the option expected to generate additional truck traffic on roadway links not intended to accommodate heavy vehicles (Y/N)? Alternatives not generating additional truck traffic on non-truck routes would be preferable to those that would impose additional truck volumes on routes not intended for such traffic.

12. Air Quality

a. Air Quality Standards

Air quality is regulated at the federal level under the Clean Air Act (CAA), which authorizes the USEPA to set National Ambient Air Quality Standards (NAAQS) for air pollutants of nationwide concern. It also requires each state to submit a State Improvement Plan (SIP) detailing its strategies for attaining the standards.

NAAQS have been established for the following air pollutants that are applicable to future proposed projects: carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$), and sulfur dioxide (SO_2). "Primary" standards have been established to protect the public health; "secondary" standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare.

b. Regulatory Setting

The CAA defines non-attainment areas as geographic regions that have been designated as not meeting one or more of the NAAQS. Air quality maintenance areas are regions that have recently attained compliance with the NAAQS. All of the New York-New Jersey Metropolitan Area is currently (i.e., in 2005) designated as being a non-attainment area for ozone and $PM_{2.5}$, and Manhattan is designated as a non-attainment area for PM_{10}. Both the New York and New Jersey portions of the Port District were re-designated from a non-attainment area to a maintenance area for CO, after demonstrating compliance with the CO standards. The area is in attainment for all of the other regulated pollutants.

A State Implementation Plan (SIP) is a given state's plan on how it will meet the NAAQS under the deadlines established by the CAA. In addition, USEPA's Final Conformity Rule requires that federal agencies, prior to approving or funding a regionally significant project, must demonstrate compliance with the requirements of this rule. In order to make this demonstration, the impact on air quality of a proposed project that will be located in a non-attainment and/or maintenance area must be studied to determine whether the selected alternative will conform to the purpose of the SIP, which is the attainment of the NAAQS. Procedures specified in USEPA's "Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Funded, Developed or Approved Under Title 23 U.S.C or the Federal Transit Laws" (40 CFR Parts 51 and 93), have to be used to make this determination.

Conformity to a SIP is defined as conformity to a plan's purpose of eliminating or reducing the severity and number or violations of the NAAQS and achieving expeditious attainment of the standards.

c. Local Impact Thresholds

In addition to the NAAQS, under New York City's Environmental Quality Review (CEQR) guidelines, the following incremental impact criteria, known as "de minimis" criteria, have been established to measure the impact significance of estimated increments:

i. CO Increments

- An increase of 0.5 ppm or more for the 8-hour period, when baseline concentrations are above 8.0 ppm; or
- An increase of one-half the difference between the baseline and the standard concentration (9 ppm) for the 8-hour period when baseline concentrations are below 8 ppm.

Project-related impacts less than these values are not considered to be significant. Actions which exceed these thresholds would require an examination of potential measures to reduce or eliminate such potential significant adverse impacts.

ii. $PM_{2.5}$ Significant Threshold Values (STVs)

- Predicted incremental impacts of $PM_{2.5}$ greater than 5 µg/m3 averaged over a 24-hour (daily) period at a discrete location of public access, either at ground or elevated levels (microscale analysis);
- Predicted incremental ground-level impacts of $PM_{2.5}$ greater than 0.1 µg/m3 on an annual average neighborhood-scale basis.

Actions that would result in incremental impacts greater than these STVs have the potential to cause significant adverse impacts by exacerbating existing exceedances of the annual $PM_{2.5}$ standard or increasing 24-hour $PM_{2.5}$ contributions. Actions that exceed these thresholds would require an examination of potential measures to reduce or eliminate such potential significant adverse impacts.

d. Analyses Required

Following the requirements of this Conformity Rule, two types of analyses – local and regional – are necessary to make the necessary conformity compliance determination:

- A local (microscale) analysis for CO and particulate matter (PM_{10} and $PM_{2.5}$) to determine whether the project would cause or exacerbate a violation of an air quality standard;
- A local (microscale) analysis for projects located in New York City to determine whether the project would cause an exceedance of the CO and/or $PM_{2.5}$ impact thresholds; and

- A regional (mesoscale) analysis for CO, O_3 precursors (hydrocarbons and nitrogen oxides), and particulate matter (PM_{10} and $PM_{2.5}$) to determine whether the project would impede the area from expeditiously attaining air quality standards.

Screening analyses for air quality impacts from proposed port and/or associated transportation improvement alternatives are divided into three categories: 1) microscale (local) off-site, 2) microscale (local) on-site, and 3) mesoscale (regional). For each project alternative, determinations about each category of potential impacts would be made based on the measures presented below. Alternatives with the least air quality impacts would be considered to support the CPIP's goals and objectives, compared to alternatives with greater impacts.

e. <u>Local (Microscale) Off-Site Screening</u>

- In New York City, determinations should be made as to whether 21 trucks per hour in each direction (i.e., 21 inbound and 21 outbound) or 100 total vehicles (automobiles and trucks) would be added to intersections near the proposed project site. Potential impacts at locations that are projected to have smaller increases in vehicles would not be considered to be significant. For sites generating more than 21 trucks or 100 total vehicles per hour, potential impacts at intersections with a change in traffic level of service (LOS) to LOS D, LOS E, or worse, or with a greater than 5 percent increase in volumes for already congested locations would be considered to be potentially significant. (Existing and forecast LOS should be obtained from the study's traffic consultants or project sponsor.)
- In New Jersey, determinations should be made as to whether project-related traffic increases would adversely affect the LOS on nearby congested roadways (e.g., a change of LOS from D to E or E to F). Potential impacts at locations that are not projected to adversely affect congested roadways would not be considered to be significant while potential impacts at locations that are projected to adversely affect congested roadways would be considered to be significant. (Existing and forecast LOS should be obtained from the study's traffic consultants or project sponsor.)

f. <u>Local (Microscale) On-Site Screening</u>

Using either USEPA's SCREEN model or ISC model (in the screening mode), or the then-current and approved model at the time of a future project's environmental review, the air quality impacts of the emissions generated by the diesel-fueled operations at the given port facility should be estimated. If projected pollutant concentrations are below (i.e., comply with) the appropriate NAAQS, and project impacts are less than the appropriate CO increments and $PM_{2.5}$ STVs (in New York City), project impacts would not be considered significant. If projected concentration and/or impacts are greater than these values, potential impacts would be considered potentially significant.

g. <u>Regional (Mesoscale) Screening</u>

- Any alternative that would increase nitrogen oxide or hydrocarbon emissions by more than the General Conformity Rule's impact thresholds (e.g., currently 50 tons per year of hydrocarbons and 100 tons per year of nitrogen dioxide) in this non-attainment area, which is in an ozone transport region, would be considered to have the potential to cause a significant air quality impact.
- Any alternative that would increase $PM_{2.5}$ emissions in New York State by more than 15 tons per year (according to NYS Department of Environmental Conservation Commissioners Policy -- CP-33) would be considered to have the potential to cause a significant air quality impact.
- Alternatives should be ranked based on estimated increases or decreases of pollutant emissions.

13. Noise

Noise is commonly defined as unwanted sound (e.g., in *NYC CEQR Technical Manual*). An alternative that would produce operations- or traffic-related noise levels above applicable government standards and thresholds would be considered to have an adverse effect on neighboring land uses and occupants, as well as on project site occupants and workers. Often, noise-producing stationary equipment and mobile sources of noise can be controlled by the use of noise abatement technologies that would lessen the adverse effect on receptors. Receptors are noise-sensitive locations where people (and/or wildlife) would be affected if noise levels rise above defined levels, and typically include residences, schools, houses of worship, parks and recreation areas.

The Federal Highway Administration (FHWA) has noise standards for mobile sources (vehicular traffic), as mandated by 23 U.S.C. 109 (i). Highway projects must conform to these standards. The FHWA standards consist of maximum decibel levels compared to "activity categories" including parks and open space, outdoor recreational areas, and residential land uses.

The State of New Jersey has Noise Control Regulations (N.J.A.C. 7:29) that define operational performance standards as the maximum allowable sound pressure levels for specific sound frequencies. The maximum allowable levels vary based upon the time of day during which the noise occurs and the nature of the property use receiving the noise. The New Jersey Noise Control Act (N.J.S.A. 13:1G-1 et seq.) provides counties and local municipalities the authority to adopt a local noise control ordinance if such ordinance is more stringent than the performance standards contained in N.J.A.C. 7:29.

The State of New York does not have similar state-mandated noise control regulations. Rather, noise ordinances are established at the local level. The City of New York regulates noise levels through its Zoning Ordinance and CEQR. In addition to the performance standards in the Zoning Ordinance, the New York City Department of Environmental Protection (NYCDEP) has established Noise Exposure Guidelines based on combined frequency sound pressure levels that differentiate between acceptable nighttime and daytime levels.

Noise-sensitive receptors within 400 feet of a port site or transportation facility for which an improvement project is proposed should be identified via field reconnaissance and/or review of recent aerial photography. Alternatives that would potentially affect noise-sensitive receptors would be considered less favorably than those with no nearby receptor sites. The number and type of noise-sensitive receptors that would potentially be affected should be documented for each alternative.

14. Planning Policies

Regional and local public policy initiatives should be reviewed to determine whether a proposed project's alternatives are consistent with or contrary to such policies. The potential development of the port should be advanced in conformity with existing planning efforts, to ensure port sites support their host communities as well as support the environmental initiatives in progress throughout the region. Alternatives that would likely support all or the greatest number of such policies that are applicable to a given port's host community or environment should be considered preferable to alternatives that would be inconsistent with such policies. Table 2 presents the list of related planning initiatives that should be reviewed to determine each alternative's consistency with such policies, relative to other project alternatives.

TABLE 2
RELATED PLANNING INITIATIVES

Name of Planning Initiative	Study Area/ Relevant Facilities	Generalized Goals and Objectives of Initiative
Comprehensive Port Improvement Plan	Port of New York and New Jersey	Identify and recommend port and associated transportation improvements that would result in future development of the Port in a manner that balances economic viability and environmental sustainability while advancing restoration of the Harbor and its environment.
New York-New Jersey Harbor Estuary Program Final Comprehensive Conservation and Management Plan, 1996	NY/NJ Harbor	Ensure the continued economic viability of the Port to support safe and efficient waterborne commerce without adversely impacting the ecosystem.
Brownfield Economic Redevelopment: Preparing Modern Inter-modal Freight Infrastructure to Support Brownfield Redevelopment, 2003	Northern New Jersey including all New Jersey Ports	Promote brownfields redevelopment for port-related infrastructure within the Port District.
The New Waterfront Revitalization Program, 1999	New York City ports: Howland Hook, Red Hook and Sunset Park	Promote water-dependent and industrial uses in Significant Maritime and Industrial Areas.
Plan for the Staten Island Waterfront	Howland Hook	Protect, enhance and facilitate water dependent maritime industries in the port area.
Plan for the Brooklyn Waterfront	Red Hook and South Brooklyn Marine Terminals	Protect, enhance and facilitate water dependent maritime industries in the port area.
Comprehensive Restoration Implementation Plan (CRIP)	NY/NJ Harbor	Provide structure and guidance for the continued success of current and future restoration projects in the NY/NJ Harbor.

15. Regulatory Complexity

In addition to environmental review, future proposed port and associated transportation projects may require other reviews and will need to obtain approval by federal, state, and/or local agencies and authorities.

Goal 6 of the CPIP seeks greater certainty in review processes, thereby facilitating implementation of any needed port or associated transportation improvement projects. Therefore, it will be important to identify the degree of complexity (i.e., uncertainty) that is likely to be involved in obtaining any necessary permits for each alternative for a future proposed project.

Regulatory complexity can be viewed as being of different degrees: minor, moderate, and major. Each can be defined in terms of the types of permits required; the extent of agency review and consultation required, including public comment; the need for mitigation to obtain authorization; and the potential that additional studies would be required to address issues and concerns. These factors strongly influence temporal and, therefore, monetary considerations related to implementing a project.

Minor complexity involves activities that would have little or no adverse environmental impact. Typically, they would be authorized by nationwide (federal) or general (state) permits that would require minimal or no review by agencies. Activities that would fall under this category would, in many cases, not undergo public review or multi-agency consultation. Any mitigation that might be required would be minor. The time frame for obtaining permits would likely be several weeks to a few months.

Moderate complexity would involve activities that are expected to have adverse impacts but also provide benefits that outweigh the detriments. Such activities require a higher level of scrutiny by permitting agencies, would involve consultations with resource agencies, and public review. Mitigation or additional studies might be required but most or all issues would have been addressed in environmental documents or in the course of pre-application consultations. The time frame for such permitting would probably be several months to a year.

Major complexity would involve activities that are expected to have major adverse impacts that would require mitigation, as well as additional studies, and still might not have a high degree of expectation that the necessary permit(s) would be issued; for example, resource agencies might have strong objections and block, or at least delay, permit issuance. The timeframe for such permits, if eventually issued, would be two or more years.

Alternatives that would likely be acceptable with minimal review and analysis by regulatory agencies, i.e., those of minor complexity, would be preferable and rank higher than alternatives with moderate or major regulatory complexity. The complexity of the permitting and approval process for an alternative is an indicator of the environmental impact potentially associated with the alternative. Alternatives that require an extensive and extended approval process (e.g., Environment Assessments or EIS documents, additional studies) would require additional investment of time and money, as well as be less uncertain of receiving approval for implementation.

16. Greenport Principles

Greenport principles have been established to provide port operators and owners cost-effective management practices and technologies to avoid, prevent, minimize, mitigate or remediate environmental impacts associated with port development and operations. The principles provide methods for incorporating environmental stewardship to go beyond the standard of minimizing impacts and, instead, to result in improvements to the natural and social environments in which a port is located.

Many of the objectives recommended by greenport principles are incorporated into typical screening criteria (e.g., avoidance/minimization of impacts to air quality and water quality, utilization of brownfields, enhanced waterfront access, avoidance of protected species' habitats). Inclusion of additional greenport objectives beyond those typically addressed during early project development will bring focus to port improvement alternatives that exceed legislated requirements and result in ports that are better neighbors to their host communities and the surrounding natural environment.

The following specific measures related to greenport principles have been defined for consideration during comparative screening analyses of port improvement alternatives:

a. <u>Diesel Emission Control Technologies</u>

According to USEPA estimates, non-road diesel engines currently account for about 44 percent of total diesel particulate matter (PM) emissions and about 12 percent of total nitrogen oxides (NOx) emissions from mobile sources nationwide. These proportions are even higher in some urban areas. Since much of the diesel power equipment used in port facilities has higher emissions than equivalent diesel engines for highway use (due to the lack of emission controls until 1996, and the fact that diesel fuel used for non-

road equipment has a much higher sulfur content than roadway fuel), the reduction of these emissions has the potential to improve ambient air quality in the New York/New Jersey region, as well as air quality benefits to workers on and properties and activities adjacent to port facilities.

USEPA is currently proposing a comprehensive national program to reduce emissions from non-road diesel engines by treating engine controls and reduced sulfur fuel as a system to gain the greatest emission reductions. The proposed Tier 4 emission standards for non-road engines would apply to diesel engines used in most kinds of construction, agricultural, and industrial equipment. The Tier 4 standards are proposed to be phased in between 2008 and 2014, reducing PM and NOx emissions by up to 90 percent. They also include a reduction of sulfur content in non-road diesel from approximately 2,500 parts per million (ppm) today to 500 ppm by 2007, and 15 ppm by 2010.

Since the stricter new emission standards will only apply to new engines and diesel engines have a long useful life (25 years and more), several port facilities in the U.S. are implementing different types of emission control technologies to achieve emission reductions before the proposed regulations would require them. Currently, diesel emission control technologies can be grouped into three main categories: fuel modifications; engine design/fuel modifications; and after-treatment/add-on pollution control devices. Utilization of any of these practices or technologies, as further described below, as part of a port improvement alternative would be considered a project benefit, compared to alternatives (including No Action) that do not include such applications.

Fuel Modifications. Diesel fuel properties that influence NOx emissions include sulfur content, which can interfere with NOx control devices; cetane number, which when increased can decrease NOx; and aromatics, which when reduced can reduce NOx. Current fuels that have an effect toward NOx and PM reduction include:

- Synthetic diesel fuel made from natural gas or coal, synthetic diesel fuel results in lower emissions since it contains no-sulfur, higher cetane numbers, and lower aromatics. Test demonstration projects have shown NOx reductions in the range of 12-28 percent.
- Water-in-diesel emulsion, a mixture of diesel fuel, water, and an additive to maintain the emulsified mixture's stability and avoid water droplets from coming in contact with engine parts. As water atomizes and converts into steam, it lowers engine temperature, reducing NOx and PM formation. Test demonstration projects have achieved 10-30 percent NOx reductions and 10-50 percent PM reductions. Clean fuels can be used without engine modification. One type, PuriNOx, has been certified by USEPA to reduce the emissions of NOx and PM up to 20 and 58 percent, respectively.

Engine Design Modifications. Exhaust gas recirculation (EGR) to the air intake lowers oxygen concentration due to dilution. As a consequence, EGT lowers NOx formation.

- Dimethyl Ether, which requires engine modification, is a non-toxic and environmentally benign gas at standard pressure. It reduces emissions due to higher cetane number but, since its density is higher than conventional fuels, it requires modifications to the fuel injection system to provide greater flow rates. Test demonstrations have resulted in NOx reductions of 40 to 70 percent.
- Compressed Natural Gas (CNG), which requires engine modification, is widely used in light-duty vehicles and heavy-duty, natural-gas engines are currently being developed.

After Treatment/Add-On Pollution Control Devices: Lean NOx catalysts reduce NOx, despite oxygen-rich exhaust. As unburned hydrocarbons travel through small molecular cages inside, the catalyst enters into oxidation, reducing oxygen resulting in lower NOx formation. Several control devices have been installed in medium- and large-size diesel engines for trucks and marine vessels.

Selective catalytic reduction (SCR) requires Urea (also called carbamide), which when injected into the gas stream of a diesel engine generates ammonia, reacts with NOx. SCRs typically reduce NOx by 70 to 90 percent.

b. In-Port Disposal/Recycling Facilities

Annex V to the International Convention for the Prevention of Pollution from Ships (MARPOL Protocol of 1973/78; 79 national signatories, including the United States) restricts the locations and types of materials permitted to be discharged by vessels at sea and in port. The Marine Plastics Pollution Research and Control Act (MPPRCA; promulgated in 1988) is the U.S. federal law which implements Annex V in all U.S. waters. MPPRCA prohibits the disposal of any plastic from any vessel in the U.S. Exclusive Economic Zone (i.e., waters up to 200 miles offshore) and other types of garbage within 3 miles of shore. Disposal at sea is within the law for solid waste generated by vessels. Reduction of waste volumes disposed of at sea could improve global environmental conditions; providing facilities for in-port disposal of solid waste would provide an alternative to at-sea dumping. In-port disposal facilities should have sufficient capacity to accommodate a port site's vessel traffic and be located close to the docks. Identification of the types of refuse materials that are most likely to be brought to port sites, based on shipping activities, would aide in the selection of appropriate methods for waste-handling methods. Waste generated by on-site port operations should also be accommodated.

Alternatives that incorporate disposal/recycling mechanisms for on-ship and/or port-generated waste would be considered preferable, providing a project-related environmental benefit, compared to alternatives that do not include such accommodations. Further benefit would be realized if the disposal/recycling program were proposed to be extended to the port's host community. The type of disposal/recycling accommodation should be documented for any alternative that proposes it.

17. Construction Impacts

Construction activities can cause short-term but significant impacts, which could disrupt port sites' host communities. While on-site construction impacts are typically considered more acceptable, construction period activities that result in off-site impacts are less tolerable.

Construction impacts are analyzed as a subset of specific technical analyses performed for overall project impacts. According to the *CEQR Technical Manual*, construction impacts are typically analyzed, at a minimum, for traffic, air quality, and noise conditions.

For a screening-level analysis, the duration of the construction period, notably focused on activities that generate additional traffic, pollutant emissions, and/or noise, is the principal determinant of the severity of any anticipated impacts. A qualitative determination of the severity of construction impacts (categorized as none, minor, moderate, and major) should be completed for each impact category appropriate for each project alternative. The number, severity, and duration of potential construction impacts should be documented, and alternatives with fewer and less severe impacts would be considered preferable to those with more severe impacts of longer duration.

18. Environmental Justice

Federal Executive Order 12898 (February 11, 1994) states that "each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." The U.S. Department of Transportation (USDOT) subsequently provided further guidance in DOT Order 5610.2. The Executive Order and subsequent actions on environmental justice (EJ) are based, in part, on Title VI of the Civil Rights Act of 1964.

For purposes of environmental justice, USDOT defines "minority" as persons identifying themselves as Hispanic or Latino; Black or African-American; American Indian and Alaskan Native; Asian; or Native Hawaiian and other Pacific Islander. "Low-income" is defined as persons with household income at or below the federally defined poverty threshold.

The U.S. Council on Environmental Quality's (CEQ) "CEQ Environmental Justice Guidance Under the National Environmental Policy Act" (1998) defines "disproportionately high" effects as those that 1) affect a population that is more than 50 percent minority and/or low-income, or 2) affect a minority and/or low-income population that represents a proportion meaningfully greater than the average minority and/or low-income population for an appropriate geographic reference area.

Data from the decennial U.S. Census current at the time of the environmental screening should be used to identify whether a minority and/or low-income population(s), i.e., an EJ community, is present within 1 mile of a proposed port or transportation improvement alternative. If EJ communities are present, the type(s) and degree(s) of potential impacts (as identified via the other screening criteria and their related environmental evaluation measures) that would likely affect the EJ population(s) should be identified and compared to the type(s) and degree(s) of potential impacts to non-EJ communities within the study area to determine if a disproportionate, adverse impact(s) would result on the EJ community. Alternatives that would not pose disproportionately high and adverse impacts to EJ communities, compared to non-EJ communities, would be preferred.