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Re: US EPA Draft Los Angeles and Long Beach Maritime Port HIA Scoping Plan.

Su: CFASE Public Comments

The Coalition For A Safe Environment (CFASE) and Long Beach Coalition For A Safe Environment (LBCFASE) wishes to submit our public comments on the US EPA Draft Los Angeles and Long Beach Maritime Port HIA Scoping Plan.

CFASE would like to complement the US EPA and Human Impact Partners for the excellent job in preparing this first in the nation Port HIA Scoping Plan. This document is a testament that your staffs were listening to community input, taking note of important issues, took a comprehensive holistic view, reviewed previously submitted related documentation which resulted in a very thorough draft.

The Coalition would now like to submit our additional public comments to further provide insight into our experiences with the Ports and Goods Movement Industry and how we perceive their negative impacts and how we believe that they should be identified, addressed and mitigated.

We found it easier to redline and mark-up the original draft vs submitting a paragraph-by-paragraph critique. Do to our limited skills we were not able to revise the charts and ask that you incorporate our recommendations for the addition of new boxes of information. In some instances some information was applicable to more than one category and ask that where obvious please add and insert.

We added a nine health determinant "Light Pollution" as this is yet another negative impact on our communities and public health. We ask that you do an internet search to find applicable scientific studies. I have attached two relevant information documents, one an article on "Health Effects of Light Pollution" and the other the State of New Jersey Light Pollution Study Commissions Report.

I have attached a list by health subject category of public health scientific studies that we use as a reference that we have been compiling over the years; most were provided by the USC Keck School of Medicine via Andrea Hricho. Many are already contained in your reference but many are not and we would like to have them added. Of particular note is our listing of petroleum industry public health studies that no one else has.

We understand that an issue regarding putting the Ports of Los Angeles and Long Beach at a competitive disadvantage by requiring them to incorporate an HIA into their EIS/EA/EIR process and not other ports in the state or nation has arisen. We recommend that all Ports in California and the US be required by US EPA to incorporate an HIA into their EIS/EA/EIR process. We find nothing wrong for the Ports of Los Angeles and Long Beach being the first as they also the largest Port complex in the US and have the largest negative impacts on Port Communities in the nation.

Although we appreciated the extension of the public comment period we still believe that we needed an additional 2-3 weeks to finish our comments and should it be offered we would accept and submit additional comments.

Cordially,

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Coalition For A Safe Environment

Public Health Impact Studies Index

APPENDIX A:

Note:
1. Primary Public Health Studies Research Conducted By: USC Southern California Environmental Health Sciences Center - Children's Environmental Health Center
2. Petroleum Industry Public Health Studies Research Conducted By: Coalition For A Safe Environment
3. List is periodically updated by the Coalition For A Safe Environment

Appendix A-1: Respiratory and Children's Health

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New Jersey Light Pollution Study Commission's Report

Submitted April 1996 to the Governor and the Legislature

State of New Jersey
Christine Todd Whitman, Governor

TABLE OF CONTENTS

SUMMARY

As provided by law, the New Jersey Light Pollution Study Commission (LPSC) has met over the past several months, and this report is the result of these meetings. The report defines Light Pollution and makes twelve specific recommendations to ameliorate the Light Pollution problem; each recommendation is supported by one or more statements of needed action. A survey of known governmental mandates for outdoor lighting is included, as are references and a brief treatment of the basis for the recommendations.

The causes of Light Pollution are many and the effects can be glare, energy waste, light trespass (nuisance light) and sky glow.

The recommendations in this report are intended to reduce Light Pollution and its adverse effects. These recommendations will result in improved lighting conditions for safety and for reduced energy consumption, and will also serve as a means to help preserve the environment.

The twelve recommendations treat these subjects:

1. Role of IESNA guidelines
2. Luminaries for use in roadway and area lighting
3. Misdirected (misaimed) architectural and sign lighting
4. Turning off (or reducing) exterior lighting
5. Billboard lighting: aiming and approach
6. Site improvement provisions
7. Designated "dark areas"
8. Light-conserving materials and construction
9. Public awareness
10. Training of professionals
11. Ordinance guidelines for use by local municipalities
12. State exemplary lighting installations

[Most recommendations are tied to New Jersey State "action" directives.]

INTRODUCTION

Public Law 1993, Chapter 82, approved March 17, 1993, established a Light Pollution Study Commission (LPSC) to study the problem of Light Pollution, the potential for monetary savings if more appropriate and efficient types of outdoor lighting are selected, as well as other benefits that would occur if Light Pollution is lessened, and steps taken in other jurisdictions to address this issue and their potential applicability in this State, and to recommend any legislative, administrative, or other actions that may be taken to ameliorate the problem. (See Appendix A for copy of PL 1993, Chapter 82).

The LPSC consisted of thirteen members: representatives from the Departments of Commerce, Energy and Economic Development, Community Affairs, Transportation, and Environmental Protection; five members of the public - one representing the lighting industry, one an astronomer with experience in the study of Light Pollution, one representing the business community, one representing environmental organizations, and one a municipal law enforcement official; one member representing the New Jersey Section of the Illuminating Engineering Society; and three members representing the public electric utility industry - specifically Public Service Electric and Gas, Atlantic Electric, and Jersey Central Power and Light. (See Appendix B for membership listing).

The first LPSC organizational meeting was held on June 16, 1995. The LPSC defined "Light Pollution" to include misdirected light, stray light, excess reflected light, light during hours when

it is not needed, and light levels in excess of what is necessary for the task. A report, pursuant to the Act, was to be submitted within nine months of the organizational meeting date.

As noted in the summary, the causes of Light Pollution are many and the effects can be glare, energy waste, light trespass (nuisance light), and sky glow.

- Most glare can and should be prevented. Glare affects the ability of drivers to perceive objects or obstructions clearly. Particularly sensitive to this problem are elderly drivers.
- Energy is wasted when excessive levels of illuminances are used. Inefficient luminaires can spill unwanted light well outside of the intended target area.
- Light trespass may be viewed as an invasion of privacy. Most obtrusive lighting conditions can be avoided.
- Inappropriate use of outdoor lighting can deteriorate the natural nighttime environment, particularly in areas preserved for fauna and flora. In addition, sky glow reduces the ability to observe the starry night sky.

[For a further understanding of the terminology utilized in this report refer to the IESNA Lighting Handbook.]

The LPSC does, as the Legislature did, recognize Light Pollution as a problem and provides the recommendations and actions of this report to the Governor and the Legislature for their information and further consideration.

[The following recommendations and action(s) are in no priority order and are not weighted in any manner or fashion.]

RECOMMENDATIONS and ACTIONS

1. Nationally recognized lighting recommendations for illuminance levels and uniformity ratios should be followed, such as contained in the Illuminating Engineering Society of North America (IESNA) Lighting Handbook.

Action(s):

A. There should be established New Jersey site improvement standards or local ordinances which require this provision.

2. Roadway and area lighting should be designed to minimize misdirected and upward light from luminaires. The use of cutoff luminaires should be considered the first choice in design. Where the use of internal cutoff luminaires is not possible, the use of externally mounted shields to the luminaires may be substituted if feasible.

Action(s):

A. All State of New Jersey and State of New Jersey funded projects should be required to conform to this practice.

B. Utility companies, lighting installers, and others involved with lighting design should follow this recommendation.

3. Architectural and sign lighting should be designed to minimize light that does not illuminate the target area.

Action(s):

A. All State of New Jersey and State of New Jersey funded projects should be required to conform to this recommendation.
B. Planning boards should be encouraged to consider this recommendation in their site plan approval process.

4. Lighting of building exteriors should be minimized or eliminated during those hours when it is not needed. Lighting controls (such as timers, dimmers, motion sensing devices, and photosensors) should be encouraged.

Action(s):

A. The State of New Jersey should evaluate the exterior lighting needs of its facilities and, where feasible, implement this recommendation as soon as possible.
B. Establish these requirements by local ordinance or through site improvement standards.

5. Commercial billboard lighting should be aimed at the target area and installed in such a fashion that spill light is kept to a minimum.

Action(s):

A. Require by local ordinances.

6. Municipal engineers and planners and all those involved with lighting aspects should be made aware of the concerns regarding Light Pollution and how it can be addressed through lighting design.

Action(s):

A. Upon adoption of site improvement standards containing street and site lighting provisions, state training on site improvement provisions should include training material that recognizes Light Pollution concerns and how proper lighting design assists in its reduction.

7. Areas of New Jersey determined to be especially suitable for astronomical observations or which provide nocturnal benefits to flora and fauna should be considered for designation as "dark areas." *[A "dark area" is an area in which lighting is prohibited or*

limited in order to 1) address concerns regarding Light Pollution which impact the environment and 2) restore a more natural view of the starry sky.]

Action(s):

A. Within twelve months of issuance of this report the State of New Jersey should "map" the State to identify these "dark areas."
B. The State of New Jersey should consider formulating a plan to retain or, where possible, reduce lighting levels in those parts of the "dark areas" which are under control of the State. County and municipal government should be encouraged to retain or reduce existing lighting levels in "dark areas" they own.
C. The State's plan should include surveying and evaluating the lighting in all the state parks forests, fish and wildlife management areas, and other State-owned rural lands.
D. The State's plan should also contain recommendations for encouraging businesses and homeowners in the privately-owned parts of the "dark areas" to comply with the recommendations of this report.

8. The use of materials and devices, such as reflectors, should be evaluated and considered in lieu of additional lighting. *[Even so, the IESNA Lighting Handbook recommendations should be followed; see Recommendation 1.]*

Action(s):

A. The NJ Department of Transportation should continue to study and evaluate the use of such materials and devices on road surfaces, signs, etc., in lieu of additional lighting.

9. The general public should be provided information about Light Pollution and how to minimize it. This can be accomplished through general instruction in schools, manufacturers' literature, company flyers, State programs, or other mechanisms.

Action(s):

A. State agency or agencies or other governmental authorities are to develop and disseminate information regarding Light Pollution in accordance with recommendations of this report. As an example: The New Jersey State Museum should further emphasize sky glow concerns and ways to reduce Light Pollution during presentations at the planetarium and provide an educational display.

10. Training and educational opportunities should be made available to lighting professionals, contractors, installers, inspectors and others, with respect to Light Pollution.

Action(s):

A. Educational institutions should offer course material on Light Pollution.

11. Local municipalities should be provided with a set of guidelines to use as a starting point in developing standards and ordinances to reduce Light Pollution.

Action(s):

A. The State of New Jersey should fund the development (by a professional organization knowledgeable in Light Pollution concerns, such as the IESNA) of a set of such guidelines. This funding should be provided within the next twelve months.

12. The State of New Jersey should provide exemplary lighting installations ("demonstration projects") to serve as working models of good lighting practice with respect to Light Pollution concerns.

Action(s):

A. The State of New Jersey shall select one or more state or State-sponsored facilities and roadways to serve as examples of responsible area lighting, street lighting, architectural lighting, sign lighting, and billboard lighting, and shall suitably equip and light those facilities.
B. The state of New Jersey shall advertise the existence of these model installations.

BASIS FOR RECOMMENDATIONS

The LPSC reviewed recommendations contained in the IESNA Lighting Handbook relating to the use of outdoor lighting and Light Pollution, ordinances and other state, county and municipal regulatory documents relating to outdoor lighting practice, the New Jersey Department of Transportation's Lighting Design Policy (January 1996), speaker presentations, and other documents and articles relating to Light Pollution (See "References" section).

As mentioned above, a review of governmental agencies controls on outdoor lighting practice was made. Of the twenty six governing units cited, two are states (California and Maine), three are counties, and twenty one are local cities/municipalities. Over two-thirds of the locales are in Arizona, California, Maine, and Wisconsin. Over half of the government mandates cite light trespass (nuisance lighting) as a target of the mandate, with a third citing energy conservation and a third citing astronomy concerns. Nearly all of the mandates regulate the shielding of light sources, about half place some restriction on the times at which certain sources can be used, and one-third are tied to IESNA recommended illuminance levels. The survey data are summarized in Appendix C, which also includes the twenty six individual data sheets.

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M. Speaker Presentations

- John Batinsey - Eatontown Lighting Survey
- Earl Print - Philips Lighting Company
- R Zolnowski - NJ DOT's Lighting Design Policy
- Sgt. Ted J. Kammer, Jr. - NJ Crime Prevention
- Edward Zamengo - JCP&L
- J.A. Bryson - Highway Safety
- Alen Gest - Holophane Lighting

APPENDIXES

Appendix A: Public Law 1993, Chapter 82

An Act establishing a Light Pollution Study Commission.

Be it enacted by the Senate and General Assembly of the State of New Jersey:

1. The Legislature finds that excessive and misdirected outdoor lighting, "light pollution," is a consequence of not using outdoor lighting only where necessary, when necessary, and of the type most efficient and cost-effective for the task; that controlling light pollution will result in astronomical cost savings due to the decrease in energy requirements; that light pollution, particularly from improperly shielded street lights, is a serious safety hazard to motorists; that the unchecked growth of light pollution in recent years has unnecessarily deprived most residents of the beauty of the starry night sky, while also potentially having serious effects on nocturnal fauna and flora; that while the lighting of streets, businesses, and residences is desirable and necessary for security, it is not desirable or necessary to have lights shining directly and often dangerously into the eyes of motorists, or uselessly and wastefully into the air and off into space; that in several other states, large cities such as San Diego, San Jose, and Phoenix have adopted certain anti-light pollution measures with wide public support which are saving those jurisdictions millions of dollars per year; and that it is therefore appropriate to form a panel of experts to study the problem of light pollution and to advise the Legislature as to its severity, and to recommend legislative or administrative measures to alleviate the problem and to realize substantial savings of energy and money, while restoring and protecting the beauty of the night sky.
2.
    a. There is created the Light Pollution Study Commission, which shall consist of 13 members appointed as follows: the Commissioners of the Departments of Commerce, Energy and Economic Development, Community Affairs, Transportation, and Environmental Protection, or their designated representatives, who shall serve ex officio; five members of the public to be appointed by the Governor with the advice and consent of the Senate; one member representing the New Jersey Chapter of the Illuminating Engineering Society; and three members representing the public electric utility industry. Of the public members, one shall represent the lighting industry; one shall be an astronomer with experience in the study of light pollution; one shall represent the business community; one shall represent environmental organizations; and one shall be a municipal law enforcement official. Of the electric utility members, one shall represent Public Service Electric and Gas, one shall represent Atlantic Electric, and one shall represent Jersey Central Power and Light.
    b. Vacancies in the appointed membership of the commission shall be filled in the same manner as the original appointments were made.

c. Members of the commission shall serve without compensation, but shall be entitled to reimbursement for actual expenses necessarily incurred in carrying out their duties as members of the commission, within the limits of monies appropriated or otherwise made available to the commission.
d. Appointments to the commission shall be made and qualified within 60 days after the effective date of this act.

3. The Light Pollution Study Commission shall hold an organizational meeting within 30 days of the appointment and qualification of the full membership of the commission, and shall elect a chairperson from among its public members and a secretary, who need not be a member of the commission.
4. It shall be the duty of the Light Pollution Study Commission to study the problem of light pollution, the potential for monetary savings if more appropriate and efficient types of outdoor lighting are selected, as well as other benefits that would accrue if light pollution is lessened, and steps taken in other jurisdictions to address this issue and their potential applicability in this State, and to recommend any legislative, administrative, or other actions that may be taken to ameliorate the problem.
5. The Light Pollution Study Commission shall be entitled to call upon the assistance of the officers and employees of any State, county or municipal department, board, bureau, commission or agency as it may require and as may be made available to it to conduct its work, and may incur such expenses as it may deem necessary, and as may be within the limit of any funds appropriated or otherwise made available to it, to fulfill its responsibilities pursuant to this act.
6. The Light Pollution Study Commission, within nine months of its first organizational meeting, shall submit to the Governor and the Legislature a report setting forth the results of its study. Upon submittal of its report, the commission shall expire.
7. This act shall take effect immediately

Approved March 17, 1993.

Appendix B: LPSC Membership List

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Appendix C: Summary of Outdoor Lighting Mandates

STATE	CITY/ COUNTY	TYPE OF MANDATE	PURPOSE	AFFECTED LIGHTING	SPECIAL FEATURES
AZ	Flagstaff	outdoor lighting code	light pollution, light trespass, energy conserv., astronomy	outdoor	LPS promoted, lumen restrictions, time restrictions, shielding restrictions, timers required
AZ	Maricopa County	ordinance	energy conserv., astronomy	outdoor	LPS promoted, lumen restrictions, time restrictions, shielding restrictions, timers required
AZ	Tempe	ordinance	astronomy	outdoor (some incandescent exceptions)	LPS promoted, time restrictions, shielding restrictions, timers required
AZ	Tucson & Pima Counties	ordinance	energy conserv., astronomy	outdoor (some lower wattage exceptions)	LPS promoted, time restrictions, shielding restrictions, timers required, ties to IESNA
CA	(Statewide)	Act	glare control	outdoor lighting, impacting driving vision	lumen restrictions
CA	Concord	draft roadway	roadway, light	roadways	ties to IESNA

		standard	trespass		
CA	Martinez	roadway standard	roadway, light trespass		ties to IESNA
CA	Riverside	ordinance	light trespass, astronomy	outdoor	LPS promoted, lumen restrictions, time restrictions, shielding restrictions, timers required
CA	San Diego	regulations	light pollution, light trespass, astronomy	outdoor (devices above 4050 lumens)	LPS promoted, time restrictions, shielding restrictions, timers required, ties to IESNA
CA	San Diego	ordinance	astronomy	outdoor (some lower wattage exceptions)	LPS promoted, time restrictions, shielding restrictions, timers required
CA	Vista	draft ordinance	energy conserv, glare control, light trespass	outdoor (limitations unclear)	LPS promoted, time restrictions, shielding restrictions, timers required
CO	Boulder	draft ordinance	outdoor illuminance	outdoor (some lower lumen exceptions)	time restrictions, shielding restrictions
CO	Aspen	building code exterior			

		lighting			
CT	Greenwich	ordinance	light levels, light = trespass	outdoor (except roadway)	shielding restrictions
ME	(statewide)	Act	glare control, light trespass	State-funded outdoor lighting	shielding restrictions, ties to DOT and IESNA
ME	Kennebunkport	ordinance	energy conserv., glare control, light trespass, aesthetics	outdoor	shielding restriction, light source restrictions
ME	Portland	code-exterior lighting		exterior (some lower wattage exceptions)	shielding restrictions
ME	Gardner	standards	light trespass, aesthetics	outdoor non-residential	
ME	Lincoln	draft ordinance	glare control, light trespass	outdoor	
NJ	Eatontown	ordinance	light pollution, light trespass, energy conserv., glare control	outdoor (devices above 1800 lumens)	shielding restrictions, ties to IESNA
NY	Pittsford	building code		Illuminated awnings, signs, sports facilities, churches, agriculture	shielding restrictions, time restrictions, ties to IESNA
OR	Deschutes County	ordinance	light trespass, aesthetics	outdoor (devices above 1800 lumens)	shielding restrictions, time restrictions, ties to IESNA
WI	Madison	proposed ordinance	energy conserv., light trespass	outdoor (except roadway)	shielding restrictions, time restrictions, ties to IESNA
WI	Milwaukee	ordinance	light trespass	outdoor	shielding

				lighting which impinges on residential properties	restrictions
WI	Williams Bay	ordinance	astronomy	outdoor (except certain residential)	lumen restrictions, time restrictions, shielding restrictions
WI	Brookfield	ordinance		light trespass, off-street parking	shielding restrictions

LPS = Low Pressure Sodium Lamps

IESNA = Illuminating Engineering Society of North America

Missing the Dark: Health Effects of Light Pollution

Ron Chepesiuk

Citation: Chepesiuk R 2009. Missing the Dark: Health Effects of Light Pollution. Environ Health Perspect 117:A20-A27. doi:10.1289/ehp.117-a20

Online: January 2009

In 1879, Thomas Edison's incandescent light bulbs first illuminated a New York street, and the modern era of electric lighting began. Since then, the world has become awash in electric light. Powerful lamps light up streets, yards, parking lots, and billboards. Sports facilities blaze with light that is visible for tens of miles. Business and office building windows glow throughout the night. According to the Tucson, Arizona–based International Dark-Sky Association (IDA), the sky glow of Los Angeles is visible from an airplane 200 miles away. In most of the world's large urban centers, stargazing is something that happens at a planetarium. Indeed, when a 1994 earthquake knocked out the power in Los Angeles, many anxious residents called local emergency centers to report seeing a strange "giant, silvery cloud" in the dark sky. What they were really seeing—for the first time—was the Milky Way, long obliterated by the urban sky glow.

None of this is to say that electric lights are inherently bad. Artificial light has benefited society by, for instance, extending the length of the productive day, offering more time not just for working but also for recreational activities that require light. But when artificial outdoor lighting becomes inefficient, annoying, and unnecessary, it is known as light pollution. Many environmentalists, naturalists, and medical researchers consider light pollution to be one of the fastest growing and most pervasive forms of environmental pollution. And a growing body of scientific research suggests that light pollution can have lasting adverse effects on both human and wildlife health.

When does nuisance light become a health hazard? Richard Stevens, a professor and cancer epidemiologist at the University of Connecticut Health Center in Farmington, Connecticut, says light photons must hit the retina for biologic effects to occur. "However, in an environment where there is much artificial light at night—such as Manhattan or Las Vegas—there is much more opportunity for exposure of the retina to photons that might disrupt circadian rhythm," he says. "So I think it is not only 'night owls' who get those photons. Almost all of us awaken during the night for periods of time, and unless we have blackout shades there is some electric lighting coming in our windows. It is not clear how much is too much; that is an important part of the research now."

According to "The First World Atlas of the Artificial Night Sky Brightness," a report on global light pollution published in volume 328, issue 3 (2001) of the*Monthly Notices of the Royal Astronomical Society*, two-thirds of the U.S. population and more than one-half of the European population have already lost the ability to see the Milky Way with the naked eye. Moreover, 63% of the world population and 99% of the population of the European Union and the United States (excluding Alaska and Hawaii) live in areas where the night sky is brighter than the threshold for light-polluted status set by the International Astronomical Union—that is, the artificial sky brightness is greater than 10% of the natural sky brightness above 45° of elevation.

Light pollution comes in many forms, including sky glow, light trespass, glare, and over illumination. Sky glow is the bright halo that appears over urban areas at night, a product of light being scattered by water droplets or particles in the air. Light trespass occurs when unwanted artificial light from, for instance, a floodlight or streetlight spills onto an adjacent property, lighting an area that would otherwise be dark. Glare is created by light that shines horizontally. Overillumination refers to the use of artificial light well beyond what is required for a specific activity, such as keeping the lights on all night in an empty office building.

Distracted by the Light Top

The ecologic effects of artificial light have been well documented. Light pollution has been shown to affect both flora and fauna. For instance, prolonged exposure to artificial light prevents many trees from adjusting to seasonal variations, according to Winslow Briggs's chapter on plant responses in the 2006 book*Ecological Consequences of Artificial Night Lighting*. This, in turn, has implications for the wildlife that depend on trees for their natural habitat. Research on insects, turtles, birds, fish, reptiles, and other wildlife species shows that light pollution can alter behaviors, foraging areas, and breeding cycles, and not just in urban centers but in rural areas as well.

Sea turtles provide one dramatic example of how artificial light on beaches can disrupt behavior. Many species of sea turtles lay their eggs on beaches, with females returning for decades to the beaches where they were born to nest. When these beaches are brightly lit at night, females may be discouraged from nesting in them; they can also be disoriented by lights and wander onto nearby roadways, where they risk being struck by vehicles.

Moreover, sea turtle hatchlings normally navigate toward the sea by orienting away from the elevated, dark silhouette of the landward horizon, according to a study published by Michael Salmon of Florida Atlantic University and colleagues in volume 122, number 1–2 (1992) of*Behaviour*. When there are artificial bright lights on the beach, newly hatched turtles become disoriented and navigate toward the artificial light source, never finding the sea.

Jean Higgins, an environmental specialist with the Florida Wildlife Conservation Commission Imperiled Species Management Section, says disorientation also contributes to dehydration and exhaustion in hatchlings. "It's hard to say if the ones that have made it into the water aren't more susceptible to predation at this later point," she says.

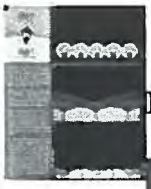
Bright electric lights can also disrupt the behavior of birds. About 200 species of birds fly their migration patterns at night over North America, and especially during inclement weather with low cloud cover, they routinely are confused during passage by brightly lit buildings, communication towers, and other structures. "Light attracts birds and disorients them," explains Michael Mesure, executive director of the Toronto-based Fatal Light Awareness Program (FLAP), which works to safeguard migratory birds in the urban environment. "It is a serious situation because many species that collide frequently are known to be in long-term decline and some are already designated officially as threatened."

Each year in New York City alone, about 10,000 migratory birds are injured or killed crashing into skyscrapers and high-rise buildings, says Glenn Phillips, executive director of the New York City Audubon Society. The estimates as to the number of birds dying from collisions across North America annually range from 98 million to close to a billion. The U.S. Fish and Wildlife Service estimates 5–50 million birds die each year from collisions with communication towers.

Turtles and birds are not the only wildlife affected by artificial nighttime lighting. Frogs have been found to inhibit their mating calls when they are exposed to excessive light at night, reducing their reproductive capacity. The feeding behavior of bats also is altered by artificial light. Researchers have blamed light pollution for declines in populations of North American moths, according to*Ecological Consequences of Artificial Night Lighting*. Almost all small rodents and carnivores, 80% of marsupials, and 20% of primates are nocturnal. "We are just now understanding the nocturnality of many creatures," says Chad Moore, Night Sky Program manager with the National Park Service. "Not protecting the night will destroy the habitat of many animals."

Figures Top

Glare, overillumination, and sky glow (which makes the sky over a city look orange, yellow, or pink) are all forms of light pollution. These photos were taken in Goodwood, Ontario, a small town about 45 minutes northeast of Toronto during and the night after the regionwide 14 August 2003 blackout. The lights inside the house in the blackout picture were created by candles and flashlights.



How Outdoor Lighting Translates into Light Pollution

Turtle hatchlings instinctively orient away from the dark silhouette of the nighttime shore. Here hatchlings have been temporarily distracted by a bright lamp. Hatchlings and mother turtles distracted by shorefront lights can wander onto nearby roadways.

Increase in Artificial Night Sky Brightness in North America

The International Agency for Research on Cancer has classified shift work as a probable human carcinogen. A study in the December 2008 issue of Sleep found that use of light exposure therapy, sunglasses, and a strict sleep schedule may help night-shift workers achieve a better-balanced circadian rhythm.

Resetting the Circadian Clock Top

The health effects of light pollution have not been as well defined for humans as for wildlife, although a compelling amount of epidemiologic evidence points to a consistent association between exposure to indoor artificial nighttime light and health problems such as breast cancer, says George Brainard, a professor of neurology at Jefferson Medical College, Thomas Jefferson University in Philadelphia. "That association does not prove that artificial light causes the problem. On the other hand, controlled laboratory studies do show that exposure to light during the night can disrupt circadian and neuroendocrine physiology, thereby accelerating tumor growth."

The 24-hour day/night cycle, known as the circadian clock, affects physiologic processes in almost all organisms. These processes include brain wave patterns, hormone production, cell regulation, and other biologic activities. Disruption of the circadian clock is linked to several medical disorders in humans, including depression, insomnia, cardiovascular disease, and cancer, says Paolo Sassone-Corsi, chairman of the Pharmacology Department at the University of California, Irvine, who has done extensive research on the circadian clock. "Studies show that the circadian cycle controls from ten to fifteen percent of our genes," he explains. "So the disruption of the circadian cycle can cause a lot of health problems."

On 14–15 September 2006 the National Institute of Environmental Health Sciences (NIEHS) sponsored a meeting that focused on how best to conduct research on possible connections between artificial lighting and human health. A report of that meeting in the September 2007 issue of*EHP*stated, "One of the defining characteristics of life in the modern world is the altered patterns of light and dark in the built environment made possible by use of electric power." The meeting report authors noted it may not be entirely coincidental that dramatic increases in the risk of breast and prostate cancers, obesity, and early-onset diabetes have mirrored the dramatic changes in the amount and pattern of artificial light generated during the night and day in modern

societies over recent decades. "The science underlying these hypotheses has a solid base," they wrote, "and is currently moving forward rapidly."

The connection between artificial light and sleep disorders is a fairly intuitive one. Difficulties with adjusting the circadian clock can lead to a number of sleep disorders, including shift-work sleep disorder, which affects people who rotate shifts or work at night, and delayed sleep–phase syndrome, in which people tend to fall asleep very late at night and have difficulty waking up in time for work, school, or social engagements.

The sleep pattern that was the norm before the invention of electric lights is no longer the norm in countries where artificial light extends the day. In the 2005 book *At Day's Close: Night in Times Past*, historian Roger Ekirch of Virginia Polytechnic Institute described how before the Industrial Age people slept in two 4-hour shifts ("first sleep" and "second sleep") separated by a late-night period of quiet wakefulness.

Thomas A. Wehr, a psychiatrist at the National Institute of Mental Health, has studied whether humans would revert back to the two-shift sleep pattern if they were not exposed to the longer photoperiod afforded by artificial lighting. In the June 1992 *Journal of Sleep Research*, Wehr reported his findings on eight healthy men, whose light/dark schedule was shifted from their customary 16 hours of light and 8 hours of dark to a schedule in which they were exposed to natural and electric light for 10 hours, then darkness for 14 hours to simulate natural durations of day and night in winter. The subjects did indeed revert to the two-shift pattern, sleeping in two sessions of about 4 hours each separated by 1–3 hours of quiet wakefulness.

Beyond Sleep Disorders Top

Alteration of the circadian clock can branch into other effects besides sleep disorders. A team of Vanderbilt University researchers considered the possibility that constant artificial light exposure in neonatal intensive care units could impair the developing circadian rhythm of premature babies. In a study published in the August 2006 issue of *Pediatric Research*, they exposed newborn mice (comparable in development to 13-week-old human fetuses) to constant artificial light for several weeks. The exposed mice were were unable to maintain a coherent circadian cycle at age 3 weeks (comparable to a full-term human neonate). Mice exposed for an additional 4 weeks were unable to establish a regular activity cycle. The researchers concluded that excessive artificial light exposure early in life might contribute to an increased risk of depression and other mood disorders in humans. Lead researcher Douglas McMahon notes, "All this is speculative at this time, but certainly the data would indicate that human infants benefit from the synchronizing effect of a normal light/dark cycle."

Since 1995, studies in such journals as *Epidemiology, Cancer Causes and Control*, the *Journal of the National Cancer Institute*, and *Aviation Space Environmental Medicine*, among others, have examined female employees working a rotating night shift and found that an elevated breast cancer risk is associated with occupational exposure to artificial light at night. Mariana Figueiro, program director at the Lighting Research Center of Rensselaer Polytechnic Institute in Troy, New York, notes that permanent shift workers may be less likely to be disrupted by night work because their circadian rhythm can readjust to the night work as long as light/dark patterns are controlled.

In a study published in the 17 October 2001 *Journal of the National Cancer Institute*, Harvard University epidemiologist Eva S. Schernhammer and colleagues from Brigham and Women's Hospital in Boston used data from the 1988 Nurses' Health Study (NHS), which surveyed 121,701 registered female nurses on a range of health issues. Schernhammer and her colleagues found an association between breast cancer and shift work that was restricted to women who had worked 30 or more years on rotating night shifts (0.5% of the study population).

In another study of the NHS cohort, Schernhammer and colleagues also found elevated breast cancer risk associated with rotating night shift work. Discussing this finding in the January 2006 issue of *Epidemiology*, they wrote that shift work was associated with only a modest increased breast cancer risk among the women studied. The researchers further wrote, however, that their study's findings "in combination with the results of earlier work, reduce the likelihood that this association is due solely to chance."

Schernhammer and her colleagues have also used their NHS cohort to investigate the connection between artificial light, night work, and colorectal cancer. In the 4 June 2003 issue of the *Journal of the National Cancer Institute*, they reported that nurses who worked night shifts at least 3 times a month for 15 years or more had a 35% increased risk of colorectal cancer. This is the first significant evidence so far linking night work and colorectal cancer, so it's too early to draw conclusions about a causal association. "There is even less evidence about colorectal cancer and the larger subject of light pollution," explains Stevens. "That does not mean there is no effect, but rather, there is not enough evidence to render a verdict at this time."

The research on the shift work/cancer relationship is not conclusive, but it was enough for the International Agency for Research on Cancer (IARC) to classify shift work as a probable human carcinogen in 2007. "The IARC didn't definitely call night shift work a carcinogen," Brainard says. "It's still too soon to go there, but there is enough evidence to raise the flag. That's why more research is still needed."

The Role of Melatonin Top

Brainard and a growing number of researchers believe that melatonin may be the key to understanding the shift work/breast cancer risk association. Melatonin, a hormone produced by the pineal gland, is secreted at night and is known for helping to regulate the body's biologic clock. Melatonin triggers a host of biologic activities, possibly including a nocturnal reduction in the body's production of estrogen. The body produces melatonin at night, and melatonin levels drop precipitously in the presence of artificial or natural light. Numerous studies suggest that decreasing nocturnal melatonin production levels increases an individual's risk of developing cancer. [For more information on melatonin, see "Benefits of Sunlight: A Bright Spot for Human Health," *EHP* 116:A160–A167 (2008).]

One groundbreaking study published in the 1 December 2005 issue of *Cancer Research* implicated melatonin deficiency in what the report authors called a rational biologic explanation for the increased breast cancer risk in female night shift workers. The study involved female volunteers whose blood was collected under three different conditions: during daylight hours, during the night after 2 hours of complete darkness, and during the night after exposure to 90 minutes of artificial light. The blood was injected into human breast tumors that were transplanted into rats. The tumors infused with melatonin-deficient blood collected after exposure to light during the night were found to grow at the same speed as those infused with daytime blood. The blood collected after exposure to darkness slowed tumor growth.

"We now know that light suppresses melatonin, but we are not saying it is the only risk factor," says first author David Blask, a research scientist at the Bassett Healthcare Research Institute in Cooperstown, New York. "But light is a risk factor that may explain [previously unexplainable phenomena]. So we need to seriously consider it."

The National Cancer Institute estimates that 1 in 8 women will be diagnosed with breast cancer at some time during her life. We can attribute only about half of all breast cancer cases to known risk factors, says Brainard. Meanwhile, he says, the breast cancer rate keeps climbing—incidence increased by more than 40% between 1973 and 1998, according to the Breast Cancer Fund—and "we need to understand what's going on as soon as possible."

Linking Light Pollution to Human Health Top

The evidence that indoor artificial light at night influences human health is fairly strong, but how does this relate to light pollution? The work in this area has just begun, but two studies in Israel have yielded some intriguing findings. Stevens was part of a study team that used satellite photos to gauge the level of nighttime artificial light in 147 communities in Israel, then overlaid the photos with a map detailing the distribution of breast cancer cases. The results showed a statistically significant correlation between outdoor artificial light at night and breast cancer, even when controlling for population density, affluence, and air pollution. Women living in neighborhoods where it was bright enough to read a book outside at midnight had a 73% higher risk of developing breast cancer than those residing in areas with the least outdoor artificial lighting. However, lung cancer risk was not affected. The findings appeared in the January 2008 issue of *Chronobiology International.*

"It may turn out that artificial light exposure at night increases risk, but not entirely by the melatonin mechanism, so we need to do more studies of 'clock' genes—nine have so far been identified—and light exposure in rodent models and humans," Stevens says. Clock genes carry the genetic instructions to produce protein products that control circadian rhythm. Research needs to be done not just on the light pollution–cancer connection but also on several other diseases that may be influenced by light and dark.

Travis Longcore, co-editor of *Ecological Consequences of Artificial Night Lighting* and a research associate professor at the University of Southern California Center for Sustainable Cities, suggests two ways outdoor light pollution may contribute to artificial light–associated health effects in humans. "From a human health perspective, it seems that we are concerned with whatever increases artificial light exposure indoors at night," he says. "The effect of outdoor lighting on indoor exposure could be either direct or indirect. In the direct impact scenario, the artificial light from outside reaches people inside at night at levels that affect production of hormones. In an indirect impact it would disturb people inside, who then turn on lights and expose themselves to more light."

"The public needs to know about the factors causing [light pollution], but research is not going at the pace it should," Blask says. Susan Golden, distinguished professor at the Center for Research on Biological Clocks of Texas A&M University in College Station, Texas, agrees. She says, "Light pollution is still way down the list of important environmental issues needing study. That's why it's so hard to get funds to research the issue."

"The policy implications of unnecessary light at night are enormous," says Stevens in reference to the health and energy ramifications [for more on the energy impact of light pollution, see "Switch On the Night: Policies for Smarter Lighting," p. A28 this issue]. "It is fully as important an issue as global warming." Moreover, he says, artificial light is a ubiquitous environmental agent. "Almost everyone in modern society uses electric light to reduce the natural daily dark period by extending light into the evening or before sunrise in the morning," he says. "On that basis, we are all exposed to electric light at night, whereas before electricity, and still in much of the developing world, people get twelve hours of dark whether they are asleep or not."

Sources believe that the meeting at the NIEHS in September 2006 was a promising beginning for moving forward on the light pollution issue. "Ten years ago, scientists thought something was there, but couldn't put a finger on it," says Leslie Reinlib, a program director at the NIEHS who helped organize the meeting. "Now we are really just at the tip of the iceberg, but we do have something that's scientific and can be measured."

The 23 participants at the NIEHS-sponsored meeting identified a research agenda for further study that included the functioning of the circadian clock, epidemiologic studies to define the artificial light exposure/disease relationship, the role of melatonin in artificial light–induced disease, and development of interventions and treatments to reduce the impact of light pollution on disease. "It was a very significant meeting," Brainard says. "It's the first time the National Institutes of Health sponsored a broad multidisciplinary look at the light-environmental question with the intent of moving to the next step."

Coalition For A Safe Environment Public Comments

Redlines Are Requested Changes, Additions And Deletions

LOS ANGELES AND LONG BEACH MARITIME PORT HIA SCOPE

WORKING DRAFT

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EXECUTIVE SUMMARY

Environmental, social, demographic, and economic conditions drive the health and well-being of communities. Factors such as housing, transportation, employment and income, noise, air quality, access to health care, access to goods and services, access to parks, and social networks have well-demonstrated and reproducible links to health outcomes such as asthma, diabetes, and cardiovascular disease. Current and future activities at the Ports of Los Angeles and Long Beach impact these factors and thus the health of residents in communities neighboring the Ports, along freight transportation corridors and warehouse distribution centers.

Health Impact Assessment

Health Impact Assessment (HIA) is a public engagement and decision-support tool that can be used to assess how environmental, social, demographic, and economic factors, and therefore health, will change as a result of planning, policy and project proposals. The sound, objective data from a HIA, and close collaboration between public health experts, affected communities, and the decision-makers on a project, lead to practical, evidence-driven recommendations that address identified health concerns to the extent possible within the limitations of the regulatory or decision-making process. HIA and the HIA process: highlight positive health contributions of a proposal; may reveal unexpected health consequences and unanticipated costs; build collaboration, consensus and buy-in; identify agencies that have jurisdiction over the source of a health concern; engage communities; focus community involvement on real health concerns and mitigations; and can have bottom line benefits for the project sponsor.

Health Impact Assessment can be used to fulfill the requirement to analyze health effects in Environmental Impact Assessment (EIA) processes. An integrated approach to conducting a comprehensive analysis of health effects would allow data collected in the EIA process to be extended to the analysis of health outcomes.

HIA and the Ports of Los Angeles and Long Beach

As the US economy has become increasingly more global, trade through the Ports of Los Angeles and Long Beach has grown. Both globalization and trade through the Ports are expected to increase. In order to meet future demand, the Ports plan to increase their capacity. Over the past decade, several port capacity-building projects have gone through the approval process, including the approval of Environmental Impact Statements/Environmental Impact Reports (EIS/EIR). It is expected that additional capacity-building projects will be proposed at the Ports over the coming years.

The Ports of Los Angeles and Long Beach have recently made concerted efforts to address health-related concerns regarding their operations and they are leading

ports across the nation in their attention to such concerns. Despite these efforts, there remain several reasons to use HIA to address health related concerns associated with port operations, such as the continued existence of health inequities in communities impacted by port operations, the benefits that the HIA process offers the Ports, and the opportunity HIA presents to collaboratively understand project benefits and develop mitigations for adverse health impacts.

In discussions with, and comment letters to, the Ports regarding recent EISs/EIRs, the Environmental Protection Agency (EPA) has asked the Ports to include Health Impact Assessment to comprehensively analyze potential health impacts and inform mitigation options. With the goals of increasing understanding of and support for the concept of conducting HIA as part of the EIS/EIR process, the EPA offered to develop a model of a HIA Scope with public input. This document reflects the results of that effort.

There is also increasing requests and support from impacted communities who are demanding that HIA's be included in all EIS/EA/EIR's.

The Los Angeles And Long Beach Maritime Port HIA Scope

This *Los Angeles And Long Beach Maritime Port HIA Scope* is intended for use as a model scope for future HIAs on proposed projects at the Ports. Once the decision to conduct a HIA on a specific project is made and project alternatives are selected for HIA analysis, the pathways, research questions, and definitions put forth in this document should be refined and narrowed to reflect the most relevant and important potential impacts of the proposed project. This process should be conducted with robust public involvement from a wide variety of stakeholders.

Specifically, this Scope contains information on the general parameters, questions, and data sources that need to be gathered to begin a HIA, including project alternatives to analyze, geographic and temporal limits of the analysis (i.e., 'defined geographies' and 'defined time period'), sensitive uses and vulnerable populations to consider, and existing population and community vulnerabilities. Questions relevant for this process: What are the demographic characteristics of the populations living and/or working in the impacted areas? What is the prevalence of relevant health issues in the impacted areas?

The Scope then contains information on each of eight health determinants: air pollution, noise, light pollution, water pollution, traffic and rail, displacement, economics, neighborhood livability, and Port revenue and funding. For each of these, the Scope provides a brief review of literature linking the determinant to health, research questions for evaluating existing conditions and potential impacts (some of which may already be answered in an EIS/EIR and some of which build on data collected for an EIS/EIR), and examples of methods and potential mitigations. Below we summarize the health impacts and give examples of the research questions for each health determinant.

Air Pollution: Port construction, operations and related activities (including trucks, trains, and ships) cause harmful air pollution. This air [pollution is in the form of PM, Criteria Pollutants, VOC's, Reefer & truck refrigeration TRU HFC's, tire rubber and brake dust. In addition to goods movement activities, ports have marine terminals which store crude oil, gas and fuels and transport them through hundreds of miles of underground pipelines which release VOC's. Petroleum industry operates oil drilling rigs which flare and release VOC's. The ports and their tenants also cause air pollution off-port tidelands property such as outdoor container fumigation facilities, container inspection facilities, truck staging areas and container storage yards. The well-documented health effects of pollution from these sources include asthma and other respiratory diseases, cardiovascular disease, lung cancer, pre-term and low-birth weight births, and premature death. Important air quality-related questions to consider in a HIA include: How will the proposed project and resulting changes in port-related activities impact these health outcomes? What is the cumulative impact of the proposed projects and all existing air pollution sources on air quality and health? What will be the immediate and long term health impacts? How will projected changes in air quality impact the number of missed days of school and work for residents and workers in the impacted areas and how will those impact income, education, and employment of residents? Many of these analyses could use data already contained in an EIS/EIR as a starting point.

Noise/Vibration: Port construction, operations and related activities (including trucks and trains), intermodal facilities, railyards, freight transportation corridors and warehouse distribution centers are major sources of environmental noise. Often overlooked is vibration and its noise. Noise is traditionally only considered and assessed in relationship to whether or not it exceeds state and federal standards, and fails to consider long term exposure to near high levels and constant non-stop noise. There is never a quiet time is some communities. As documented in the public health literature, noise exposure effects stress, hypertension, blood pressure, and heart disease, is associated with delayed learning, can cause sleep disturbance and annoyance which can impact concentration and aggression, and can impact children's learning abilities. Important noise-related questions to consider in a HIA include: How will the proposed project and resulting changes in port-related activities impact these health outcomes? How will the proposed project impact noise at noise-sensitive facilities and in residences? How will changes in noise impact school achievement and subsequent health outcomes? What is the cumulative impact of proposed projects and all existing noise sources on health?

Light Pollution: Light pollution from port, intermodal, railyard, warehouse distribution facilities and freight transportation corridors is a unique public health impact that is rarely considered. Fence-line and nearby communities never have a dark starry night.

Water Pollution: Water pollution from port activities and contaminants from storm water run off from the Ports can impact the health of people and marine wildlife. In addition, ports own hundreds of acres off port tidelands properties which have various uses such as port warehouses and truck staging areas. Port tenants own and lease properties for their activities such as truck companies, container storage yards, container fumigation facilities, chassis storage yards, chassis extension welding areas. Water pollution also comes from ship discharge, and attached sea life such as barnacles on ship hulls. Water pollution also occurs from aerial or atmospheric deposition. Documented health effects include skin irritation, stomach aches, flu, and neurological symptoms. Important water quality-related questions to consider in a HIA include: How would the proposed project impact exposure (dermal contact, ingestion) to polluted water and health impacts related to this exposure? How will the proposed project impact exposure to contaminants through consumption of fish and what are the health impacts of such exposure?

Traffic , Rail, Intermodal, Railyards: Truck and rail traffic related to port activities impact traffic safety for pedestrians, bicycles, and drivers. It is well documented that traffic volume, truck-container length, load weight, cargo and speed relate to traffic-related injuries and fatalities and that they also relate to noise (see above) and to physical activity, which greatly impacts health. Important traffic- and rail-related questions to consider in a HIA include: How will the proposed project impact pedestrian and bicyclist environmental quality? How will the predicted changes in time spent in traffic impact levels of stress and physical activity for residents and workers and what are the related health impacts including cardiovascular disease and diabetes? How will the proposed project impact traffic collisions involving pedestrians, bicyclists, or drivers and thereby impact the number of injuries and fatalities? How will the proposed project impact emergency response times? What are the externalized public health care costs? What are the externalized increased public automobile insurance costs? What are the lost days of work, school and income impacts?

Displacement: Port projects and port-related activities may lead to direct and/or indirect displacement of residents, businesses, and community resources. Ports have purchased and own hundreds of acres of off-port tidelands property in bordering communities for future Port and tenant expansion. Ports and as city departments have manipulated changes of city zoning areas to allow port uses such as container storage yards in residential areas. Residential displacement impacts employment, housing (e.g., affordability, quality, homelessness, overcrowding), commute times, and social networks. Business displacement impacts employment and access to goods and services. Displacement of community resources (e.g., parks and community centers) impacts social networks, physical activity, and other determinants of health. All of these forms of displacement have well documented health impacts including mental health (e.g., depression, fear, anger, insecurity), communicable and chronic disease and stress. Important displacement-related questions to consider in a HIA include: How will the proposed project impact the displacement of residents, businesses,

and community resources? How will any displacement impact social networks, education, housing, and access to goods and services? How will these impact academic achievement, chronic disease (e.g., heart disease, diabetes, obesity, hypertension) and communicable disease (e.g., flu, sexually transmitted infections)?

Economic Effects: The Ports and port-related activities impact jobs and the supply of goods at local, regional, and state levels. Income is one of the strongest and most consistent predictors of health and disease in the public health research literature. Ports also can limit the types of jobs, industries and career paths which can differ than what port communities may want. Ports cannot guarantee that only local residents can get the good paying port jobs. The Ports have never conducted an Off-Port Nexus Study to determine what all the externalized public incurred costs are. CARB health care costs studies have been limited in scope and did not include impacts from all air pollution types and sources. The socio-economic impacts also include the public subsidizing the costs of repairing, maintaining and replacement of freight transportation infrastructure for private big box retailers, giving private businesses financial incentives and tax breaks, diversion of public services such as police, CHP, paramedics, safety for port related accidents and activities, public ratepayers paying the majority of costs for new power plant facilities, increased public health and automobile insurance costs. Unemployment and poverty are definitively associated with poor health outcomes. Employment benefits, such as health insurance, also contribute to health outcomes. Important economic-related questions to consider in a HIA include: How will the proposed project impact the number and types of jobs offered by the Ports and at port-supporting businesses at local, regional and state levels? How will the proposed project impact unemployment in neighborhoods near the Ports? How will the proposed project impact goods and services available (including changes in cost) locally, regionally, and statewide? How will the proposed project impact job-training opportunities? How will these changes impact lifespan and chronic and communicable disease prevalence at the local, regional, and state level? When will the Ports conduct an Off-Port Community Nexus Study to determine what all co0mmunity impacts and the externalized public incurred costs?

Neighborhood livability: A livable neighborhood is one that is not burdened with real or perceived deprivation due to factors such as concentrated poverty, a lack of resources, public safety, port neighbor aesthetics, port traffic through community, port detours through community, limited social networks, physical disorder or blight, crime, and/or environmental hazards, increasing port danger and hazard footprint. The Port and port-related activities greatly impact neighborhood livability for communities near the Ports. The availability of goods and services, including health clinics, childcare, schools, community centers, parks, and food impact livability and are tied to health outcomes in the public health literature. Neighborhood-level socioeconomic status (SES), independent of individual SES, impacts health (e.g., all-cause morbidity, heart disease, cancer, mental health) through employment opportunities and social networks.

Important neighborhood livability-related questions to consider in a HIA include: How will the proposed project impact environmental hazards and perceptions of environmental hazards(eg terrorist attacks, explosions, fires, natural disasters)? How will the proposed project impact neighborhood resources and perceptions of those resources? How will the proposed project impact measures of the local economy and residents' perceptions of the local economy? How will the proposed project impact property values? How will the proposed project impact the social networks/social cohesion? How will the proposed project impact crime rates and perceptions of neighborhood safety in the impacted areas? How will these changes impact the health outcomes discussed above? Will the project impact public services?

Port Revenue and Funding: Port revenue provides funding for local, county, and state government and for community benefits, which in turn funds local programs and services, such as health clinics, emergency services, parks, and pedestrian and bicycle infrastructure. No economic study has been conducted to validate that the port contributions offset public incurred externalized costs. Availability of such programs and services impact chronic and communicable disease and rates of injury and fatality. Important Port revenue and funding-related questions to consider in a HIA include: How will the proposed project impact the share of local city, county, or state revenue paid by the Port or port-related businesses? How will the proposed project impact the proportion of tax revenues earmarked for local community benefits? How will the proposed project impact port-related fees used to mitigate existing negative impacts to local communities? How will these impact neighborhood infrastructure/projects/programs, use of such resources and health outcomes such as rates of injury and fatality, and chronic and communicable?

As described above, this *Los Angeles And Long Beach Maritime Port HIA Scope* is intended to inform stakeholders in Port project proposals about what a Health Impact Assessment could contribute to the decision-making process. The Scope details the potential health issues that such proposals may influence and specific questions that a HIA could answer. We hope it contributes to a more comprehensive understanding of the health effects related to Port activities.

INTRODUCTION

Health Impact Assessment

Many land-use and transportation decisions affect health, even ones that may not seem to be specifically about health. For example, a decision to widen roadways will have impacts on noise and air quality for adjacent residents and on the safety of pedestrians along the street; noise, air quality and pedestrian safety are related to health outcomes that include asthma, cardiovascular disease, hypertension, injury, and mortality. HIA is a public engagement and decision-support tool that can be used to assess planning and policy proposals and make recommendations to improve the health outcomes associated with those proposals.

HIA is formally defined as a combination of procedures, methods and tools that systematically assesses the potential, and sometimes unintended, effects of a proposed project, plan, or policy on the health of a population and the distribution of those effects within the population. HIA identifies appropriate actions to manage those effects. (Adapted from the IAIA, 2006)

There are five stages in a HIA process:

Screening	Determines the need and value of a HIA
Scoping	Determines all health impacts, evaluation process, methods for analysis, and a workplan
Assessment	Provides: 1) a profile & baseline of existing health conditions 2) evaluation of potential health impacts 3) strategies to eliminate & reduce identified adverse health impacts
Reporting	Includes: 1) development of the HIA report 2) communication of findings and recommendations
Monitoring	Tracks: 1) impacts on decision-making processes and the decision 2) impacts of the decision on health determinants

Environmental, social, demographic, and economic conditions drive the health and wellbeing of communities. Factors such as housing, transportation, employment and income, noise, light, air quality, access to goods and services, access to health care, access to parks, and social networks have well-demonstrated and reproducible links to health outcomes. A HIA analyzes health from a broad perspective by evaluating how a proposed project, plan, or policy affects these factors – often collectively referred to as "determinants of health" – and in turn, how impacts to these factors are likely to positively or adversely influence health.

Benefits of HIA and the HIA process

The HIA process fosters close collaboration between public health experts, affected communities, environmental justice and community based organizations and the decision-makers on a project. These stakeholders, using the information from a HIA, develop creative evidence-driven recommendations for mitigation that address identified health concerns, to the extent possible within the limitations of the regulatory or decision-making process.

- HIAs establish sound, objective data on health impacts. By using this information, potentially unexpected health consequences and unanticipated costs can be identified and thus avoided.
- HIA helps develop healthier communities by identifying design solutions that address the root causes of many prominent health problems like asthma, diabetes, and cardiovascular disease.
- The HIA process can be used to build consensus and buy-in by addressing the affected community's fears about a project directly and transparently and by providing practical solutions. The HIA could also explicitly identify trade-offs between outcomes that are important to understand and use in project planning.
- The HIA process can help build collaboration between agencies and between other stakeholders, like community groups, and those agencies. The process can also help identify which agency has jurisdiction over the source of a health concern and build support for efforts to address that issue.
- HIAs help focus community involvement on real health concerns and on feasible mitigations to those health issues.
- Health issues are typically important to community members and HIA can serve to engage community residents in decisions that impact their lives.
- HIAs give project proponents a way to recognize positive health contributions of projects on communities and to inform stakeholders about those positive contributions. It also gives businesses the information they need to distinguish themselves as smart planners and build positive working relationships with the community.
- HIAs help decision-makers by ensuring that any potential concerns about a project are identified and addressed early on.

The International Council on Mining and Metals recently published "Good Practice Guidance on Health Impact Assessment." After detailing the benefits of carrying out HIA that are similar to those listed above, the guidance then details the "business case" for conducting HIA, stating:

A proactive approach to preventing ill health and maximizing health and wellbeing, benefits can improve the financial performance of a project and parent company. Key bottom line benefits include:

- Speedier achievement of a mining and metals project's license to operate
- Lower planning and associated legal and consultancy costs
- Access to international funding
- Lower risk of disruptive protest or sabotage
- Lower risk of damage to a project and parent company's reputation
- Lower risk of future community-led liability and litigation
- Reduced absenteeism and health care costs for employees from local communities
- Improved general employee morale

HIA and Environmental Impact Assessment

The Requirement for Health Analysis in EIA

Health Impact Assessment can be used to fulfill the requirement to analyze health effects in Environmental Impact Assessment (EIA) processes, including Environmental Impact Statements (EIS) required by the National Environmental Policy Act (NEPA) and Environmental Impact Reports (EIR) required by the California Environmental Quality Act (CEQA). "Public Health Analysis Under the National Environmental Policy Act", a white paper by Wernham and Bear, describes the requirement to conduct a comprehensive health analysis under NEPA and other federal regulations (also see Appendix A, "Frequently Asked Questions about Integrating Health Impact Assessment into Environmental Impact Assessment"):

> The inclusion of a robust, systematic approach to public health is supported by NEPA, the regulations issued by the Council on Environmental Quality (CEQ), the agency in the Executive Office of the President charged with overseeing implementation of NEPA, Executive Orders 12898 and 13045, and available guidance on NEPA and environmental justice.
>
> *Congressional Intent*
>
> In using the term "human environment," Congress signaled that protection of human communities was a fundamental purpose of the legislation. In the debates leading to NEPA's enactment, Senator Henry Jackson stated: "When we speak of the environment, basically, we are talking about the relationship between man and these physical and biological and social forces that impact upon him. A public policy for the environment basically is not a public policy for those things out there. It is a policy for people."
>
> *Health in NEPA*
>
> NEPA [a six page document] mentions health a total of six times. Among NEPA's fundamental purposes is: "promote efforts which will prevent or

eliminate damage to the environment and biosphere and stimulate the health and welfare of man." NEPA § 102 [42 USC § 4321]

NEPA is intended, furthermore, to: "assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings." [42 USC § 4331]

And finally to: "attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences." [42 USC § 4331]

Health in the CEQ Regulations

Several general provisions of CEQ's NEPA regulations support the inclusion of health.

First, agencies respond to substantive public concerns in the draft EIS [40 CFR § 1503.4]. When, therefore, an agency can anticipate substantive health concerns based on scoping, it is sensible to include these issues for analysis in the DEIS.

Second, in determining whether an effect may be significant (and therefore require analysis in the EIS) one of the factors that agencies should consider is "the degree to which the effects on the human environment are likely to be highly controversial" [40 CFR § 1508.27 (b) 4]. Commonly, health often figures among the strongest concerns expressed by affected communities.

The CEQ regulations also specifically define health as one of the effects that must be considered in an EIS or an EA. In defining "effects," the regulations state that:

"Effects" includes ecological, aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative." [40 C.F.R. § 1508.8] And, the regulations instruct agencies to consider "the degree to which the proposed action affects public health or safety" in determining significance. [40 C.F.R. § 1508.27]

Health in Executive Orders

Executive Order 12898 instructs agencies to: "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 in the United States."

Similarly, Executive Order 13045 states that agencies must: "make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and ... shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."

Statements relevant to NEPA-based health analysis in Federal Guidance

CEQ guidance on implementing Executive Order 12898 contains several suggestions relevant to public health analysis, including:

• Lead agencies should involve public health agencies and clinics

• Agencies should review relevant public health data (as for any other resource)

• Agencies should consider how interrelated cultural, social, occupational, historical, or economic factors may contribute to health effects of the proposed action and alternatives.

Incorporating Health Analysis in EIA

Currently, there are three ways in which health is incorporated into an EIR/EIS: 1) as a health risk assessment for a discrete exposure; 2) as a discussion of risk factors for health (e.g., air quality, traffic flow), but the link between those risk factors and health is not often made explicitly; and 3) as a demonstration of compliance with a health-based environmental regulation, such as the Clean Air Act. These approaches do not fully address the requirement for an analysis of potential public health effects according to the format/process established by NEPA.

A more complete analysis of health effects responsive to NEPA would consider all potentially significant direct, indirect and cumulative health impacts associated with the proposed action and alternatives. The analysis would include descriptions of existing baseline heath status and determinants of health for the affected population. These elements would generally be achieved through the implementation of an integrated HIA, which would:

- Include a systematic scoping of potentially significant direct, indirect, and cumulative health impacts;
- Analyze baseline health conditions and determinants of health;
- Analyze direct and indirect health impacts of the project; and
- Analyze cumulative impacts related to health outcomes.
- Analyze proposed mitigation to achieve less than significant impacts

The steps of Health Impact Assessment (described above) parallel the steps of Environmental Impact Assessment and, therefore, the two processes can be easily integrated. By integrating HIA and EIA, redundancy in data collection and analysis is avoided, as information collected in the EIA process provides inputs into the health analysis, which carry the analyses out to health outcomes. To conduct a HIA as part of an EIR/EIS, one would:

- Scope potential direct, indirect, and cumulative health concerns in the EIR/EIS Scoping stage. HIA Scoping includes stakeholder meetings to ensure the scope is complete and uses stakeholder knowledge and experience to prioritize the health concerns to analyze.

- Assess prioritized health concerns identified during Scoping. This assessment will include:
    - new analyses (e.g., collecting existing data on health conditions and on existing determinants of health; analyzing impacts not previously analyzed as a result of the expanded Scope);
    - extensions of existing analyses (e.g., using traffic data such as vehicle trips and volume to predict impacts on traffic injuries and physical activity); and
    - developing potential mitigation measures to address significant health impacts.

  In addition, HIA assessment could include methods that involve stakeholder participation, such as community surveys and focus groups.
- Report and receive public comment on baseline health conditions and determinants of health, the analysis of health impacts, and potential mitigation measures in the Draft EIR/EIS and respond to comments to develop the Final EIR/EIS.

Increasing Capacity at the Ports of Los Angeles and Long Beach

Over the last few decades, the US economy has become increasingly integrated into the rest of the world. One result of this globalization is the increase trade with other countries, including many in the Asia/Pacific region. The Ports of Los Angeles and Long Beach (hereafter referred to as the Ports) are the busiest ports in the US, and among the top five busiest ports in the world, handling millions of shipping containers each year. Today, nearly twenty times more international trade comes through U.S. West Coast Ports than in 1970, and by the year 2020, the Ports of Los Angeles and Long Beach are expected to handle the equivalent of 36 million, 20-foot containers annually - more than twice the container volume flowing through these two ports today.[i] Forecasts for the Port of Los Angeles show that even with anticipated improvements in operational efficiency, as well as expansions and modernization, the capacity of the Port terminals by 2030 would be unable to accommodate the forecasted cargo volume.[ii]

In order to meet this demand, the Ports plan to increase the capacity of their operations. Over the past decade, a number of significant port expansion projects have been proposed and went through the approval process, including the approval of Environmental Impact Statements/Environmental Impact Reports (EIS/EIR). These include, for example, terminal expansions and improvements as well as channel deepening. It is expected that additional capacity-building projects will be proposed and undertaken at the Ports over the coming decades.

Past and Current Actions Taken by the Ports of Los Angeles and Long Beach to Address Health Issues

In the recent past, the Ports of Los Angeles and Long Beach have made concerted voluntary efforts to address health-related concerns associated with their operations. The Ports progress in reducing air emissions is demonstrating leadership for ports across the nation. Both Ports provided an extensive description of their activities around community health, further grouping these activities according to the eight major pathways described in this scoping document. The following are summary points from the full descriptions, which are included in Appendix B and C, without edits:

- The Clean Air Action Plan – The goal of this Plan is to reduce air pollution from the ports by 45% (2005 baseline year) by 2012. To date, the port of Los Angeles has cut emissions of diesel particulate matter by 19% (23% per TEU)[iii] and the Port of Long Beach has cut emissions by 21% (19% per TEU).[iv] Elements of the Clean Air Action Plan[v] include:
    - The Clean Trucks Program, which has reduced heavy duty vehicle emissions of diesel particulate matter by an estimated 80%[vi] in 2010 (from 2005 baseline).
    - Replacing a fleet of 16 switcher locomotives used at both Ports, with new cleaner, diesel engines.
    - Both Ports have several berths that provide alternate marine power, allowing ships to plug into cleaner electricity. The program goals include alternate marine power for 50% of berths by 2014 and 100% by 2020.

  The Clean Air Action Plan (http://www.cleanairactionplan.org) includes many additional measures to reduce air pollution from port operations.

The Ports have also contributed to projects aimed at improving neighborhood livability:

- The Port of Los Angeles' Wilmington and San Pedro Waterfront Projects will redevelop 526 acres of waterfront property including 68 acres of open space and 8 miles of connected bikeways and walkways.
- The Port of Long Beach provides 15,000-square-feet of facility space for the Homeless Services Center, created following the Navy Base closure. The Center provides one-stop access to resources for individuals and families experiencing homelessness within the City of Long Beach.
- The Los Angeles Harbor Department has contributed to the construction of parks and natural space for local communities including the 18-acre 22nd Street Park and the 5-acre park space at Knoll Hill.
- The Port of Long Beach has enhanced Coolidge Park, Hudson Elementary School and Perry Lindsey Academy, by planting 450 trees. The Port of Long Beach also helped create the Wrigley and 51st Greenbelts.

For a longer list of neighborhood improvement projects, see Appendix B and C.

Port and port-related business job creation represents a major benefit that the Ports of LA and Long Beach provide to local, regional, and statewide residents (see Section 6 for a discussion of the health benefits of jobs). Further, the Ports have invested in promoting education and vocational training for local residents.

- Combined, the Ports of Los Angeles and Long Beach directly employ approximately 1498 workers. According to studies commissioned by the Ports, the Port of Los Angeles supports 1.1 million jobs throughout California[vii] and the Port of Long Beach supports more than 300,000 jobs in Southern California.[viii]
- Some projects specify a minimum percentage of jobs set aside for local community members at prevailing wages. For example, the project labor agreement for the Middle Harbor Redevelopment Project requires that 30% of laborers come from the local community.
- Both Ports support a wide range of scholarships, programs and internships for local high school, community college and vocational or trade school students.

The Ports also engage with the community to provide a forum for the discussion of many issues, including the review of proposed port activities and ways the Ports can improve neighborhood livability. For additional information on these programs, see Appendix B, Port of Long Beach Programs Addressing Determinants of Health and Appendix C, Port of Los Angeles Initiatives Improving Health of the Local Community.

Although the Ports Clean Air Action Plan has incorporated a 2005 baseline year communities have only agreed that this is the first step, the 2005 air quality was still bad and unhealthy. Communities are awaiting to see the baseline year pushed back to preindustrial clean air days.

The Case for Continued Actions to Address Community Health Concerns

While the Ports have worked to address health-related concerns associated with port operations, there are three main rationale on which to base an expansion of this focus through the use of HIA: 1) continued health inequities in communities impacted by port operations; 2) benefits of the HIA process for the Ports; and 3) the possibility of collaboratively understanding project benefits and developing mitigations for adverse health impacts.

Health Inequities in Communities Impacted by Port Operations

Communities impacted by operations at the Ports, including those living near the Ports and those near the goods movement transportation corridors, intermodal facilities, railyards, warehouse distribution centers, that service the Ports, have worse health outcomes than other communities in Los Angeles County, in California, and in the United States. These data from the 2007 Los Angeles

County Health Survey, conducted by the Los Angeles County Department of Public Health, indicate communities situated in close proximity to the Ports may experience higher rates of diseases like asthma (10.6% in Long Beach vs. 7.9% in LA County) and coronary heart disease (10.3% in Long Beach vs. 7.7% in LA County), depression (17% in Long Beach vs. 13.6% in LA County), and unhealthy days (7.0 days in the last 30 days in Long Beach vs. 5.4 days in LA County). Additionally, factors that determine health outcomes, such as crime unemployment, physical inactivity, and poverty are higher in communities near the Ports. The estimates above and other sources of publicly available data illustrate the existing vulnerability of port communities and suggest port-related activities may contribute to health burdens. These data alone do not represent a comprehensive picture of community vulnerability. For example, data from neighboring communities, such as Wilmington, would be important to include and is not reflected here. The presentation of the above figures is not intended to minimize the potential impact to other communities, but is simply a reflection of a lack of readily available data at the appropriate geographic scale. While data on the prevalence of health burdens and the factors that determine health outcomes at the appropriate scale is available upon request, analysis of such data is beyond the scope of this HIA Scope.

Although it is clear that the Ports are not the only cause of these health issues, it is true that many of these issues are influenced directly or indirectly by port-related operations. In its "Methodology for Estimating Premature Deaths Associated with Long-term Exposure to Fine Airborne Particulate Matter in California" (released October 24, 2008), the California Air Resources Board reported that there are 3700 premature deaths/year directly attributable to the Ports and goods movement statewide, and approximately 120 deaths/year associated with diesel particulate matter emissions from activities at the Ports of Los Angeles and Long Beach specifically. In addition to particulate matter (PM)-related mortality, exposure to diesel PM is also associated with elevated cancer rates (mainly lung cancer), hospitalization rates, asthma exacerbation, respiratory disease, and missed workdays.

While the actions of the Ports (described above) intend to address many of the adverse health impacts from ports and goods movement activities, additional mitigations by the Ports would further reduce the existing health inequities faced by impacted communities.

The Benefits of the HIA Process for the Ports

The general benefits of HIA are described above, however, given recent history related to proposed projects at the Ports, several benefits of HIA for the Ports stand out as especially important:

- HIAs can help build consensus and collaboration and can address concerns early in the planning process. Controversy surrounding past proposals at the Ports has slowed projects down and led to litigation. Through focused and authentic engagement of stakeholders, the HIA

process has been shown to enable diverse stakeholders to find common ground and understanding. In at least one case, a HIA has helped avoid a lawsuit (in Alaska).

- HIAs can help focus community concern around real health issues. Community concerns regarding port projects range widely. The use of a health lens to focus such concerns on issues that have the greatest impact and around actionable mitigations of those issues can allow for new agreements between community and the Ports.
- HIAs can be a platform from which the Ports can raise awareness of their positive contributions to health including those related to regional jobs, contributions to the local tax base leading to enhancements in local government services, and other benefits, such as those described above. HIAs describe both positive and negative health impacts.
- The HIA process can provide an opportunity for stakeholders to work collaboratively to develop mitigations to address adverse health impacts that may not be considered as part of an EIR/EIS, and ensure that these mitigations are considered in decision-making processes. Development of feasible, research-based mitigations with stakeholders that have been involved in the HIA process (and therefore are grounded in the HIA research questions and findings) and with external subject matter experts has previously led to consensus and buy-in among stakeholders and successful implementation of health-promoting mitigations.

One critique of regulatory processes such as NEPA and CEQA is the lack of procedures to incorporate findings from environmental justice analyses into analyses conducted as part of EIR's/EIS's, and therefore a failure for environmental justice considerations to influence determinations of significant impacts and inform mitigations. The HIA process offers a mechanism to integrate environmental justice and other impact analyses, providing mitigations that address disproportionate health burdens and other inequities faced by some populations.

Environmental Protection Agency's Comments on Environmental Impact Statements for Port Projects

In response to the continued need to address community health concerns described above, since July 2008, EPA has asked the Ports to analyze potential health impacts of expansion projects by including a HIA in Port EISs/EIRs. With the goals of increasing understanding of and support for the concept of conducting HIA as part of the EIS/EIR process, the EPA offered to develop a model of a HIA Scope with public input. This document contains the results of that effort.

The Process of Developing this Scope

The process used to develop the *Los Angeles And Long Beach Maritime Port HIA Scope* adheres to standard HIA practice for scoping. Methods employed included:

- literature review
- review of public documents, including port-related EISs/EIRs
- key informant interviews
- a public stakeholder meeting (February 10, 2010 at Bannings Landing)
- public health expert review

Staff at Human Impact Partners, a non-profit with extensive HIA expertise, authored this draft of the Scope.

Intended Use of This Document and Next Steps in Conducting a HIA

This *Los Angeles And Long Beach Maritime Port HIA Scope* is intended to be a model scope for future HIAs on proposed growth and expansion projects at maritime ports. Because it is not specific to any one proposed expansion or growth project, it includes pathways and research questions, which may not be relevant for every proposed project. The pathways considered here include health effects that could occur through direct, indirect, or cumulative impacts of future port projects.

Once the decision to conduct a HIA on a specific project or set of projects has been made (HIA Screening) and project alternatives, including a 'no build' alternative, have been selected for HIA analysis, the pathways, research questions, and definitions put forth in this document should be refined and narrowed to reflect the most relevant and important potential impacts of the proposed project(s). Questions regarding the geographic and temporal scope of the potential impacts and which port-related activities (see definitions below) to include should be addressed on a project-specific basis. Similarly, after a specific project is selected, existing regulations relevant to that project would need to be researched, documented, and analyzed.

The process of refining and prioritizing pathways and research questions in this model Scope for a specific project or set of projects should be conducted with robust involvement from a wide variety of stakeholders. Prioritization criteria should be developed with those stakeholders and may include impact on existing health disparities, potential magnitude of impact, degree of concern to the community, and strength of evidence linking the pathway to the proposed action or alternatives.

This document includes a comprehensive set of potential pathways in order to account for many types of project proposals. But, because not all types of proposals can be foreseen, there may be health issues and pathways that are not part of this Scope that could be impacted by specific proposals. For this reason, while this Scope provides a framework and guide for future project-specific HIAs, it is not a substitute for the scoping phase of a HIA, which would take

into account specific features of the proposed action, and the perspectives of stakeholders in that decision.

GLOSSARY OF COMMONLY USED TERMINOLOGY IN THIS DOCUMENT

At-grade crossings

Junctions in which freight trains intersect with and have priority over roadways *(University of California, Berkeley)*

Cumulative Impacts

"Cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. *(CEQ Regulations for Implementing NEPA)*

Grade separated rail crossings

Roadway-rail grade separations divide vehicle traffic and railroad traffic by building bridges over or under railroad tracks, or rerouting train tracks over or under existing streets. *(San Bernardino Associated Governments)*

Health Disparities

Differences in the incidence, prevalence, mortality, burden of diseases and other adverse health conditions or outcomes that exist among specific population groups. Health disparities can affect populations groups based on gender, age, ethnicity, socioeconomic status, geography, sexual orientation, disability or special health care needs and occur among groups who have persistently experienced historical trauma, social disadvantage or discrimination, and systematically experience worse health or greater health risks than more advantaged social groups. (National Association of Chronic Disease Directors)

Impacted Areas

Includes areas in close proximity to the Port and to port-related activities that will be included in the HIA. The exact definition of areas that would be included in a HIA depends on both the proposal under consideration and the pathway describing the impact. For some pathways methods of determining impact areas, such as air and noise dispersion models are already established by current EIR/EIS practice, although there may still be room for improvement to account for all port-related emissions sources. For other less commonly studied pathways, such as displacement, economic effects, and neighborhood livability, geographic boundaries could be determined by factors such as the existence of data at an appropriate scale to answer the research questions and considerations of the locations and priorities of impacted communities.

Motor Vehicle Accidents (MVA)

Includes accidents involving motor vehicles with other motor vehicles, motor vehicles and pedestrians, and motor vehicles and bicyclists.

Neighborhood Resources

Key retail, services and facilities that are necessary for meeting the health needs of neighborhood residents (e.g., parks, playgrounds, retail, food outlets, banks, day care centers, community centers). Access to these resources can impact walking and biking, daily vehicle trips and miles traveled, possibilities for healthful and meaningful work, and increased interactions among neighbors and others in the community.

Port-related Activities

Includes activities involving port construction, equipment, trucks, locomotives, ships, etc. that operate at, originate from, or have a destination of the Ports and port-related businesses such as container fumigation, container inspection, chassis welding extension, transportation, and container storage. The Ports do not have jurisdiction over all port-related activities, however, the role of the Ports in the generation of these activities should be recognized. Ports also have a responsibility to notify the city planning of its and its tenants planned land uses.

Sensitive Receptors

People or institutions with people (e.g. schools) that are particularly susceptible to illness from environmental pollution, such as the elderly, very young children, people already weakened by illness (e.g., asthmatics), and persons engaged in strenuous exercise. *(University of California CEQA Handbook, 2002)*

Social Cohesion

The quality of social relationships and the existence of trust, mutual obligations and respect in communities or in the wider society that helps to protect people and their health. *World Health Organization)*

Social Networks

Social relations and links between individuals that may provide access to or may mobilize social support for health. *(World Health Organization)*

Vehicle Miles Traveled (VMT)

One vehicle traveling the distance of one mile. Total vehicle miles, thus, is the total mileage traveled by all vehicles. *(Bureau of Transportation Statistics)*

Waterways

A river, canal, or other navigable channel used as a means of travel or transport. For the purposes of this HIA Scope, waterways refer to the Los Angeles and Long Beach Harbors, as well as other rivers and channels that are used by communities in the impacted areas.

OVERARCHING SCOPING PARAMETERS

Scoping Question	Examples of Potential Scoping Alternatives
Project / decision alternatives	Proposed port expansion or change in operations Alternative projects or project with mitigations No Project
Geographic and temporal limits	Communities living within a pre-defined distance of the port Communities living within a pre-defined distance of port-related activities Current and future impacts over a pre-defined time period
Sensitive uses and vulnerable populations	Residential neighborhoods Low-income housing Senior centers or senior housing Childcare centers Schools Parks Wetlands
Population vulnerabilities	Poverty Prevalence of chronic diseases English language proficiency Educational Attainment Race/ethnic background Children population Senior population Pregnant women population Pre-existing health condition population Uninsured population Single parent population
Community vulnerabilities	Housing, land use, land loss and business conditions Existing air, water, land pollution exposure
Potential project factors leading to impacts on health	Air Pollution Noise/Vibration Light Water Pollution Vector Exposure Traffic, Rail, Intermodal Displacement Economic Effects

	Neighborhood Livability Port Revenue and Funding

BASELINE RESEARCH QUESTIONS RELEVANT TO ALL PATHWAYS

The following questions apply to all the issue-specific sections included in this HIA Scope. They are included here to avoid repetition throughout the document.

- What are the demographic characteristics of the populations living and/or working in impacted areas? Including:
  - number of people
  - age
  - race/ethnicity
  - household income
  - unemployment rate
  - occupations
  - education levels
  - poverty rate
  - children population
  - senior population
  - pregnant women
  - uninsured population
  - single parent population
- What is the prevalence of health issues in the impacted areas? For example, what is the prevalence of the following:
  - asthma and other respiratory illnesses
  - cancer
  - cardiovascular disease
  - child development
  - communicable diseases (e.g., influenza, sexually transmitted disease)
  - diabetes
  - hypertension
  - immune response
  - injury
  - mental health issues (e.g., depression, fear, anger, insecurity)
  - pre-term and low-weight birth
  - premature death (e.g., years of potential life lost – YPLL – or age of death subtracted from life expectancy; as defined by the CDC, see http://www.cdc.gov/mmwr/preview/mmwrhtml/00001773.htm)
  - stress
  - blood diseases
- What is the cost of diseases that could otherwise be avoided in the impacted areas?

- How many trips (truck and rail) originate from the Ports or have a final destination of the Ports? Including container storage yards, inspection facilities, truck storage & staging areas, chassis welding areas and truck maintenance garages.
- What are rates of physical activity among populations living in the impacted areas?
- What are the average commute times and mode splits for those who live and work in the impacted areas?
- What is the current mix of existing retail, public services, and other neighborhood resources in the impacted areas?
- What is the current status of measures of the local economy, including employment, income and access to goods and services?
- What are property values in the impacted areas and how have they been changing?
- What data exists on the actual impacts of past port projects (e.g., based on community level monitoring)?
- Access to health care (geographic and financial)?
- How much land is owned by the port off-tidelands property in the city?
- How many port and tenant activities or facilities exist or are occurring?
- Has an off-port property Community Nexus Study been conducted?
- Does proposed mitigation eliminate or reduce negative impacts to less than significant?

EXAMPLES OF DATA SOURCES

Environmental Impact Statements and Environmental Impact Reports are an important source of data and analysis needed to understand the health impacts of a proposed project. Often, HIA research extends data and analyses collected as part of an EIR/EIS.

Other data sources include:

- Public Agencies, Offices, and Departments:
    - State and local health agencies (including the Los Angeles County Department of Public Health)
    - California Air Resources Board
    - CalTrans and other transportation agencies
    - Land use agencies
    - State Highway Patrol
    - Local Fire Departments
    - Chambers of Commerce

- Department of Education
- Departments of City Planning
- Office of Economic Development
- California Employment Development Department
- City, County, State Comptrollers Offices
- City of LA and Long Beach
- Bureau of Labor Statistics
- Office of Statewide Health Planning and Development (OSHPD), hospital data and records

- Surveys and Other Databases
  - Toxic Release Inventory (TRI) data
  - U.S. Census
  - The Los Angeles County Health Survey (LACDPH)
  - California Health Interview Survey (CHIS)
  - Dunn and Bradstreet databases
  - Behavioral Risk Factor Surveillance System (BRFSS)

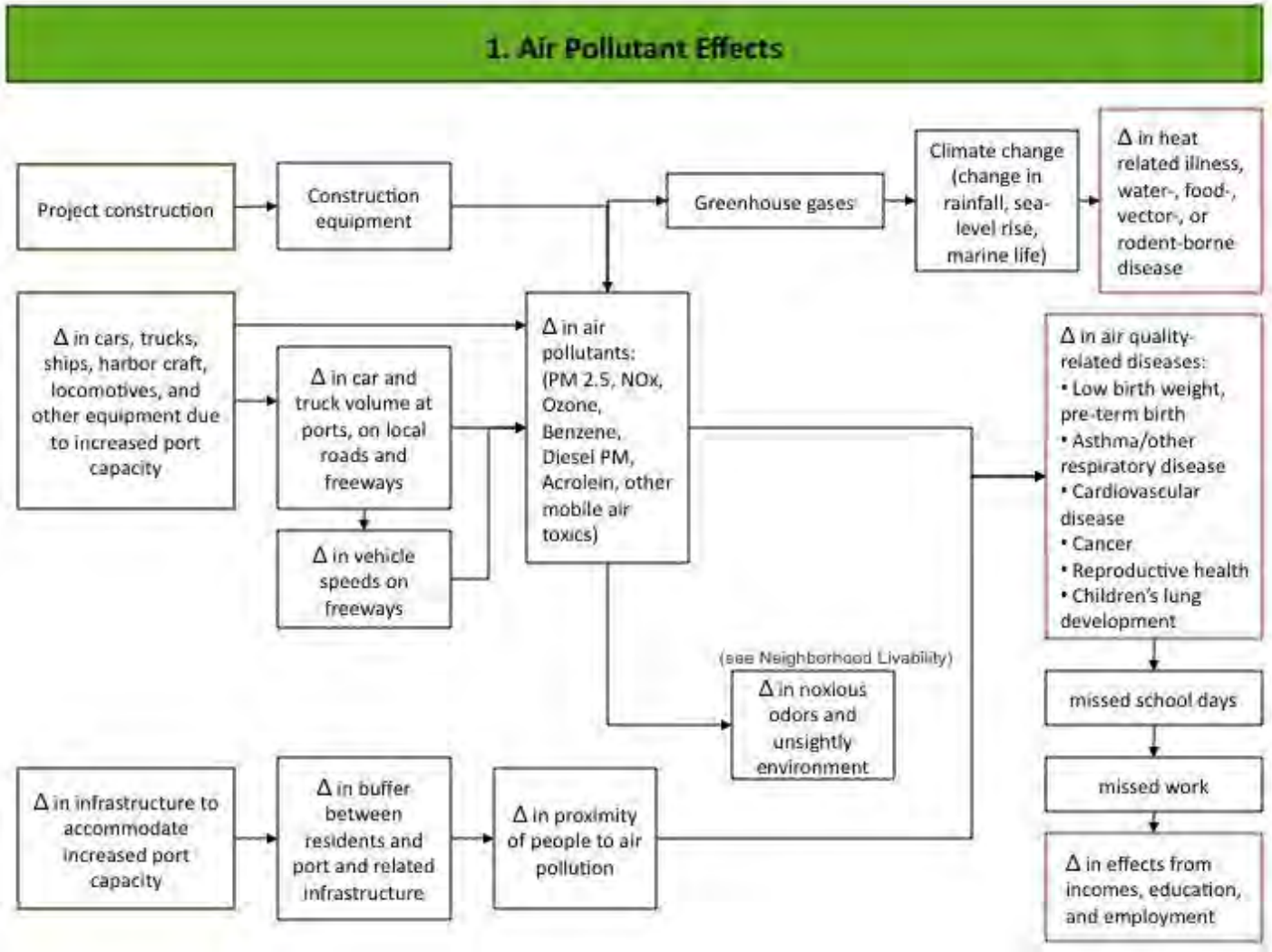
- Non-Profit Health & Research Organizations
  - American Lung Association
  - American Cancer Society
  - The Leukemia && Lymphoma Society
  - Physicians for Social Responsibility
  - UCLA School of Medicine
  - USC School of Medicine
  - Society of Concerned Scientists
  - Mayo Clinic

- Other Businesses, Organizations and Information Sources
  - Southern California Association of Governments
  - Alameda Corridor Transit Authority and San Pedro Bay Ports Economic Impact Study
  - BNSF and Union Pacific
  - Bicycle coalitions
  - School districts
  - Monitoring data and environmental documents from regulatory agencies
  - Emissions inventory
  - Port records of truck and traffic data
  - Truck counts conducted by local community organizations
  - Fitnessgram data/CA Department of Education
  - Reports by local organizations (with a youth or health focus)
  - Community surveys, focus groups, key informant interviews

- Accounts kept by local service providers, retail or neighborhood centers
- Tax Parcel records

It should be noted that some of the data that would be useful to assess baseline health conditions and health impacts is not currently available. As a result, HIAs use data available at the scale most appropriate to the issue being analyzed. For example, while cardiovascular disease rates by census block may be the most useful information, it may only be available by zip code or at the city-wide level. To the extent that is possible and useful the HIA will attempt to make comparisons with available data.

1. AIR



Add boxes to 1. AIR

A. Marine Petroleum Terminals crude oil, gas, fuels storage tanks = VOC's emissions
B. Petroleum industry oil drilling operations = Flaring & VOC's
C. Container Fumigation Facilities = methyl bromide emissions
D. Container Storage Yards = disintegrating paint, reefer HFC's
E. Trucks = PM, VOC's, HFC's, Pulverized rubber, brake dust, discarded parts

Summary of Evidence Supporting Pathway

New or expanded port operations can incrementally add to local air pollution.

- Major air pollutants from diesel engines at ports that can affect human health include particulate matter (PM), volatile organic compounds (VOCs), nitrogen oxides (NOx), and sulfur oxides (SOx).[ix]
- The health effects of pollution from ports may include asthma, other respiratory diseases, cardiovascular disease, lung cancer, and premature death.[x]

Living near roadways increases respiratory disease.

- A study of children in the Netherlands found that lung function declined with increasing truck traffic density especially for children living within 300 meters of motorways.[xi]
- Children in Erie County, New York hospitalized for asthma were 1.93 times more likely to live within 200 meters of heavily trafficked roads.[xii]
- In a study of Southern California School Children, living within 75 m of a major road was associated with an increased risk of lifetime asthma, prevalent asthma, and wheeze.[xiii]
- Vehicle miles traveled are directly proportional to air pollution and greenhouse gas emissions.[xiv]

Specific air pollutants impact human health

- Fine particulate matter (PM), oxides of nitrogen and sulfur impact human health.[xv]
- There is a 1% – 8% increased risk of mortality for every 50 ug/m3 PM10 and a 1% – 3.5% increase in mortality for every 25 ug/m3 PM2.5.[xvi]

- Average life expectancy is decreased by 1.5 years when you compare cities at the highest and lowest PM levels.[xvii]
- There is an increased risk of dying of between 0.2% – 0.6% for each increase in 10ug/m3 in O3 (smog).[xviii]
- In a Southern California study, children were followed for 5 years. Children who played three or more sports in a high ozone community showed a 3.3 times higher risk of having asthma than those who did not play sports, but still lived in a high-ozone community.[xix]
- The rate ratio of the most air-polluted cities compared to the least air-polluted cities is 1.26 times higher for mortality rates from respiratory illness.[xx]
- According to the United States Environmental Protection Agency, reducing the National Ambient Air Quality Standards for PM 2.5 by 1 mg3 from 15 to 14 would result in 1,900 fewer premature deaths, 3,700 fewer non-fatal heart attacks, and 2,000 fewer emergency room visits for asthma each year.[xxi]
- According to the California Air Resources Board, attaining California PM standards would annually prevent: - 6,500 premature deaths (3% of all deaths) - 4,000 hospital admissions for respiratory disease - 3,000 admissions for cardiovascular disease - 2,000 asthma-related ER visits - 400,000 cases of lower respiratory symptoms (such as cough) in children - 400,000 cases of upper respiratory symptoms (runny nose, itching eyes) in children - 8,000 cases of chronic bronchitis - 500,000 cases of respiratory illness (colds and flu) - 350,000 asthma attacks.[xxii]
- Health effects associated with short-term exposure to PM 2.5 include: increased hospital admission and ER visits for cardiovascular diseases and respiratory diseases, non-fatal heart attacks, premature death in people with heart and lung disease, lung function changes especially in children and people with lung diseases such as asthma.[xxiii]
- Studies have found that diesel exhaust increases cancer risks, and a 2000 California study found that diesel exhaust is responsible for 70 percent of the cancer risk from air pollution.[xxiv]
- Vehicle exhaust adversely affects lung function and is related to cardiovascular disease, cancer, mortality from diabetes and other causes, and can exacerbate chronic obstructive pulmonary disease.[xxv]

- Greenhouse gases are contributing to climate change, which may increase heat-related illness and death, health effects related to extreme weather events, health effects related to air pollution, water-borne and food-borne diseases, and vector-borne and rodent-borne disease.[xxvi] [xxvii]
- Petroleum companies operate marine terminals which import crude oil, gas and fuels in storage tanks which release VOC's, the ships storage tanks release VOC's, may operate flare units
- Petroleum companies operate oil drilling rigs (Thums Islands & On Port property) which release VOC's and may operate flare units
- Container fumigation facilities do indoor and outside fumigation using methyl bromide. Outdoor entails using a tarp like covering over the container on top of asphalt. There is significant fugitive emissions.
- Some container storage yards & other locations do welding to extend the length from the 40' chassis length to 53'
- Container storage yards have 100,000's containers which are deteriorating with pulverized paint and paint chips blowing in the air. Reefer containers rust and HFC's are released into the atmosphere.
- Air pollutants, including ozone and particulate matter, are causal factors for cardiovascular mortality and respiratory disease and illness.[xxviii]

Mitigating factors

- Pollution from existing industrial stationary and mobile sources should be considered when assessing the impact of incremental air pollution from the expansion of port activities.
- Housing conditions may mitigate exposure to air pollution by preventing outside air from making its way into indoor spaces.

Indoor air quality is also unhealthy and therefore contributes to the cumulative impacts of air pollution (e.g. indoor exposure to asthma triggers such as pests, mold, and chemicals).

Port projects may reduce some pollutant emissions relative to the expected growth in shipping without the project.

Research Questions

Baseline Questions	Impact Questions
What is the existing air quality in the impacted areas and in the region? What are the current contributions of each port-related activity to air pollution?	How will the proposed project impact port- related activities? How will the projected changes in port-related activities affect air quality in the impacted areas? How will construction activities related to the proposed project contribute to air pollution? How will the proposed project impact the port's contribution to greenhouse gasses and climate change?
What other sources of air pollution are present near the Ports and what is their contribution to air pollution in the impacted areas and the region?	What will be the cumulative impact of the proposed project and all existing air pollution sources on air quality?
What is the current vehicle volume (cars and trucks) at ports, and on local roads and freeways in the impacted areas?	How will the proposed project impact vehicle volume at the Ports and on local roads and freeways? How will the proposed project impact vehicle speed on freeways?
What is the current proximity of residents and workers to port and port-related air pollutant sources?	How will the proposed project impact the proximities of residents and workers to sources of air pollution? How will changes in proximities of residents and workers to sources of air pollution impact their exposure to air pollution?

Baseline Questions	Impact Questions
What is the current prevalence of asthma and other respiratory diseases in the impacted areas, compared to in the region and in the rest of the state?	How will projected changes in air quality impact asthma prevalence and the prevalence of other respiratory diseases in the impacted areas and region?
What is the current prevalence of cardiovascular disease in the impacted areas, compared to in the region and in the rest of the state?	How will projected changes in air quality impact prevalence of cardiovascular disease in the impacted areas and region?
What is the current cancer risk due to air pollution in the impacted areas, compared to in the region and in the rest of the state?	How will projected changes in air quality impact cancer risk in the impacted areas and region?
What is the current mortality rate associated with exposure to air pollution in the impacted areas, compared to in the region and in the rest of the state?	How will projected changes in air quality impact rates of premature death in the impacted areas and region?
What is the current number of low-birth weight babies, pre-term births, and status of other reproductive and endocrine health measures in the impacted areas compared to in the region and in the rest of the state?	How will projected changes in air quality impact the number of low-birth weight babies, pre-term births, and status of other reproductive and endocrine health measures in the impacted areas compared to in the region and in the rest of the state?
How many missed days of school are currently attributable to effects from air pollution in the impacted areas?	How will projected changes in air quality impact the number of missed days of school and work for residents and workers in the impacted areas? How will projected changes in number of missed days of school and work for residents and workers impact income, education and employment of residents and workers in the impacted areas?

ADDITIONAL BASELINE QUESTIONS

1. Have all air pollution sources been identified?
2. Have all air pollution types been identified & quantified?
3. What is the current baseline of public health problems?
4. What is the current blood disease rate?

Examples of Analysis Methods

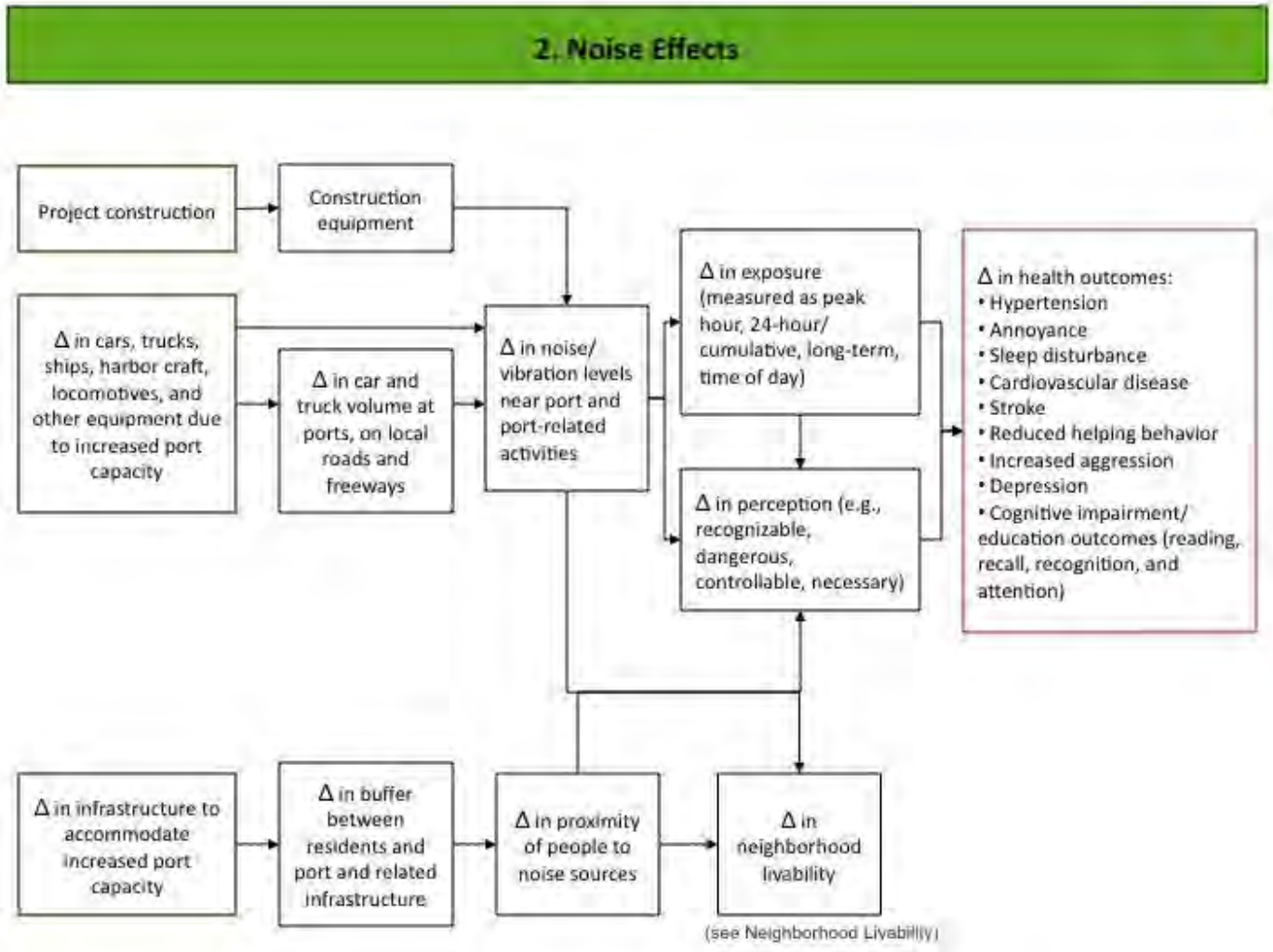
- Combined quantitative and qualitative analysis based on academic literature and past studies
- Predicted change in VMT based on research findings and current/predicted traffic data
- Emissions models (e.g., EMFAC)
- Dispersion models (e.g., AERMOD, CAL3QHC)
- EPA or CalEPA dose response functions from regulatory impact analyses
- Morbidity and mortality models (e.g. BenMAP)

Examples of Design and Mitigation Alternatives

- The Clean Air Action Plan is an example of they ways in which the Ports are setting the standard for implementation of the best available technologies to reduce air pollutant emissions (http://www.cleanairactionplan.org/reports/caap_fact_sheets.asp)
- Electrification & Zero Emissions transportation infrastructure (e.g. MagLev Train)
- Zero Emissions Freight Transportation Systems (e.g., Electric Trucks, Hydrogen Gas Fuel Cell Trucks)
- Measures to reduce air pollution exposures inside residences (e.g. ventilation system retrofits)
- Re-routing roadway freight traffic away from residential areas
- Retrofit existing housing near roadways with adequate air filtration, and ensure that new residential construction has filtration systems capable of providing safe indoor air supply

- Replacing BACT with mandatory MACT. eg. AMECS, ALECS, Vapor Recovery Systems
- Replace Flare Units with Vapor Recovery Systems
- Require all crude oil, gas and fuel storage tanks to be 100% hermetically sealed
- Require all imported dirtier crude oil to mitigated by importer and refinery
- Require all reefer containers to be evacuated of HFC's prior to long term storage of 90 days or more
- Require all trucks refrigeration units to be inspected every six months for HFC leakage
- Require all trucks to have an annual Smog Check to validate proper operation and emission levels
- Aerial (Atmospheric) Deposition Study of Land Pollution
-

2. NOISE



Add boxes to 2. NOISE

A. There are numerous off-port property noise sources. (e.g. railyards, intermodal facilities, container storage yards, fumigation facilities, gas stations, truck sales & maintenance yards

B. In addition to noise trains cause ground vibration which shakes the entire house

Summary of Evidence Supporting Pathway

Traffic and construction activity are sources of environmental noise[xxix]

- Urban noise increases 6.7 dB with 10-fold increased street traffic, with important contributors being bus and heavy truck traffic.[xxx]
- 22% of the population of the European Union are exposed to transportation noise level exceeding 65 dB during the day, which many countries consider unacceptable.[xxxi]

Noise exposure has an effect on stress, hypertension, blood pressure, and heart disease

- In a meta-analysis of 43 studies of noise exposure and heart disease, road traffic noise was associated with higher risk for myocardial infarction and ischemic heart disease than in the general population, and air traffic noise was associated with consultation with a doctor about heart problems, use of cardiovascular medications, and angina pectoralis.[xxxii]
- Men exposed to sound levels of outdoor traffic noise more than 70 dB(A) during the day were 30% more likely to have had a myocardial infarction than those whose noise exposure was not above 60 dB(A). Men who had lived at their present address for more than 10 years were 80% more likely to have had an MI.[xxxiii]
- A case-control study in West Berlin found a 32% higher odds of heart attack in men who had lived for at least 15 years on streets with 6-22 hours per day of noise levels above 70 dB(A) compared to those who lived on streets with noise measuring less than 60 dB(A).[xxxiv]
- Non habitual noise causes an increase of adrenaline. People working for 2 days under exposure to car racing noise (85-100 dB(A)) had a significant increase of adrenaline, serum MG, a decrease in erythrocytes, and total cholesterol in blood serum was increased (risk factor for heart attack).[xxxv]

Exposure to environmental noise is associated with delays in learning [xxxvi]

- Chronic road traffic could impair cognitive development in children, such as reading comprehension, speech intelligibility, memory, motivation, attention, problem-solving, and performance on standardized tests.[xxxvii]
- Noise exposure may also slow rehearsal in memory, influence processes of selectivity in memory, and choice of strategies for carrying out tasks.[xxxviii]

Long term exposure to environmental noise can cause sleep disturbances

- Reductions of noise by 6-14 dBA results in subjective and objective improvements in sleep.[xxxix]
- Noise can cause sleep disturbances.[xl]
- Sleep disturbances have been associated with a variety of health problems, such as functional impairment, medical disability, and utilization of treatment. Sleep difficulties are also associated with increased use of medical services even among those with no previous health problems.[xli]
- Exposure to night-time noise also induces secondary effects, which are measured the day following the night-time exposure, while the individual is awake. The secondary effects include reduced perceived sleep quality; increased fatigue; depressed mood or well-being; and decreased performance.[xlii]

Environmental noise is a risk for hearing impairment

- Noise-induced hearing impairment occurs predominantly in the high-frequency range of 3,000-6,000 Hz, the effect being largest at 4,000 Hz. With increasing exposure time, noise-induced hearing impairment also occurs at 2,000 Hz.[xliii]
- In a case-control study, noise-exposed persons had much greater hearing loss than their age cohorts who were relatively unexposed to noise.[xliv]

Environmental noise causes annoyance, which can impact concentration, increase aggressive behavior, and decrease helping behaviors

- Frequent annoyance was reported by 13% of subjects exposed to 24 hr > 50 dB(A) compared to 2% among those exposed to < 50 dB(A).[xlv]
- Noise may reduce helping behavior, increase aggression and reduce the processing of social cues seen as irrelevant to task performance.[xlvi]
- Living along arterial urban streets increased risk of annoyance from noise by 40%. Relative risk of annoyance from living in a high noise area in San Francisco 2.1 times compared to a low noise area.[xlvii]

- 17% of a major urban city, by scientific measurement, was deemed at risk of noise annoyance.[xlviii]

Environmental noise impacts children physically as well as their learning abilities

- In studies with dB(A) ranging from 95 - 125, elevated blood pressure levels in school-aged children is associated with living or going to school near a major chronic noise source (e.g., airport, traffic, trains).[xlix]
- Older children from quieter environments were better at discrimination tasks done under noisy conditions. Children from noisy environments learned to tune out auditory stimuli but in a nondiscriminatory way and tuned out important cues.[l]
- There is a link between chronic noise exposure and reading. One study took place at a school where planes from a nearby airport flew over a school every 6 minutes resulting in classroom decibel levels of 90 dB(A). In this study children in the noisy school had poorer reading skills than children from the quiet school.[li]

Research Questions

Baseline Questions	Impact Questions
What are the intensity and duration of noise in the impacted areas (measured as peak-hour, 24-hour/cumulative, long-term, and by time of day)? What are the current contributions of each port-related activity to noise intensity and duration?	How will projected changes in port-related activities affect noise intensity and duration in the impacted areas (measured as peak-hour, 24-hour/cumulative, long-term, and by time of day)?
What is the intensity and duration of vibration in the impacted areas?	How will projected changes affect vibration in the impacted areas?
What other sources of noise pollution exist near the Ports and what is their contribution to existing levels of noise in the impacted areas?	What will be the cumulative impact of proposed projects and all existing noise sources on noise intensity and duration at various times of day?
What are existing perceptions of noise in the impacted areas?	How will the proposed project impact perceptions of noise and vibration?
What noise-sensitive uses (i.e., schools, childcare facilities, hospitals, etc.) are located near port-related activities? Where are these located? How many people (including	How will the proposed project impact noise at these noise-sensitive facilities? How will these changes in noise impact people who use these facilities?

Baseline Questions	Impact Questions
sensitive receptors) are served by these facilities? What are existing noise levels at these sites?	
How many residences are located near port-related activities in the impacted areas? Where are these residences located? What are existing noise levels at these sites?	How will the proposed project impact noise in these residences? Will the proposed project put residences in closer proximity to noise sources? How will projected changes in noise impact people in these residences?
What are the current impacts of exposure to noise pollution on academic achievement (standardized tests, reading comprehension) for children in the impacted areas?	How will projected changes in noise affect school achievement? How will changes in school achievement affect health outcomes?
What is current prevalence of hypertension, cardiovascular disease, and stroke in the impacted areas?	How will proposed changes in noise affect the prevalence of hypertension, cardiovascular disease, and stroke?
What is current prevalence of annoyance and sleep disturbance in the impacted areas?	How will projected changes in noise affect prevalence of annoyance and sleep disturbance?
What is current prevalence of depression and aggression?	How will projected changes in noise affect prevalence of depression and aggression?
What is the current prevalence of hearing impairment?	How will projected changes in noise affect prevalence of hearing impairment?

ADDITIONAL BASELINE QUESTIONS

1. Have all noise pollution sources been identified?
2. Have all noise pollution types been identified & quantified?
3. What is the current baseline of noise duration and levels?

Examples of Analysis Methods

- Surveys or focus groups to identify noise sources, duration and levels of noise
- Modeling using FHWA traffic noise model or other noise modeling tools
- Published dose response equations and epidemiological relationships
- Creation of Community Noise Maps. Noise sources, noise radius, noise level
- Conduct noise and vibration prevention and equipment study
- Research and establish a safe indoor noise standard for residents, public schools and sensitive receptors

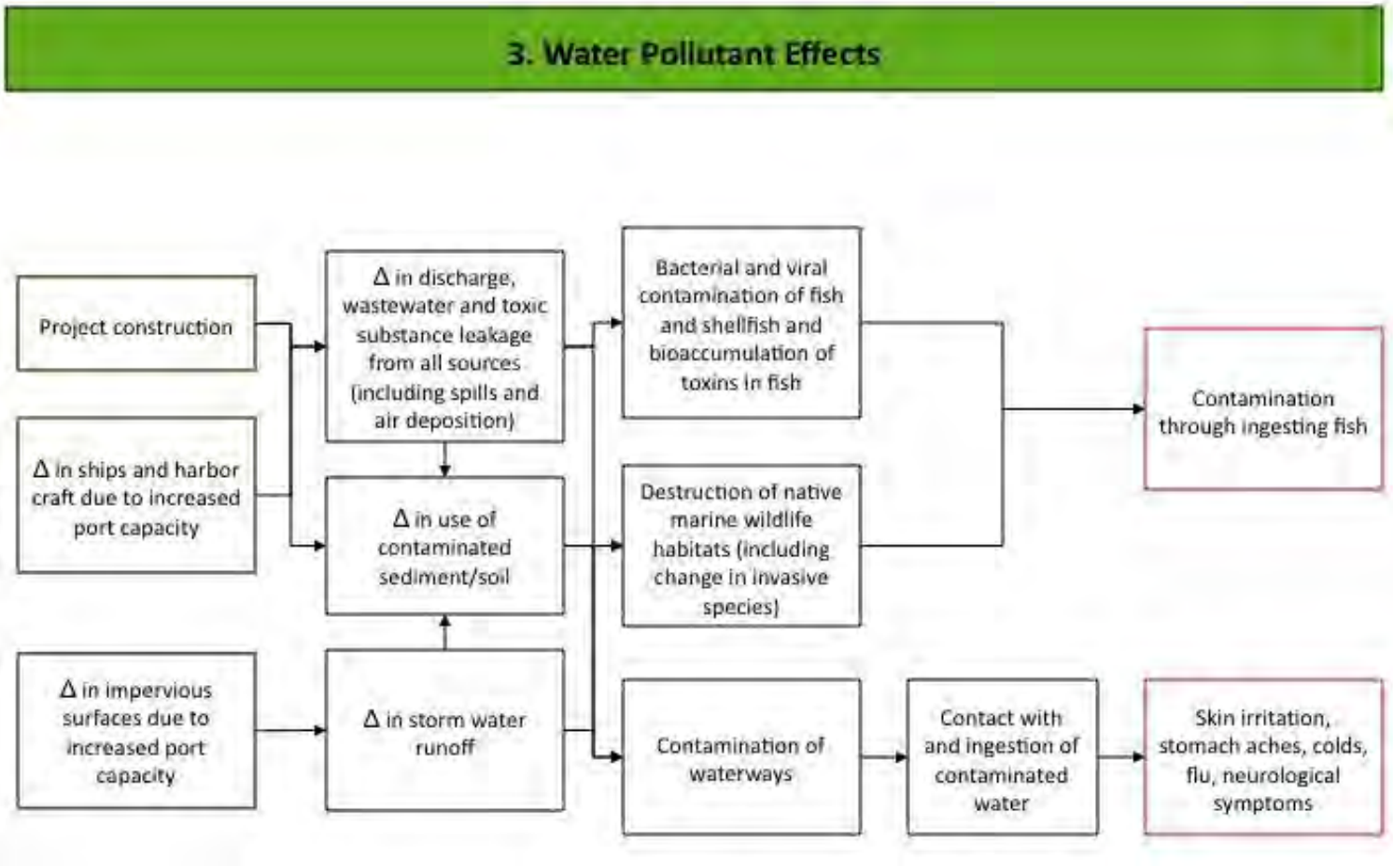
Examples of Design and Mitigation Alternatives

- Measures to reduce noise emissions (e.g., road surface treatments, rail treatments, engine design, or speed reductions)
- Measures to mitigate exposure (e.g., sound walls or residential window retrofits, timing of high-noise activities to avoid sleep hours in residential areas and school hours near schools.)
- Engineering measures to re-route or limit freight traffic in residential areas and near schools
- Install sound proofing using windows and material with an STC Rating of 80 or above
- Adopt a safe indoor noise standard for residents, public schools and sensitive receptors
- ZERO Noise & Near Noiseless transportation technologies (e.g. MagLev Train vs Locomotive Train, Electric Battery Drayage & Hydrogen Gas Fuel Cell Electric Drayage Truck vs Diesel Truck
- Replace Flare Units with Vapor Recovery Systems
- Require all crude oil, gas and fuel storage tanks to be 100% hermetically sealed
- Require all imported dirtier crude oil to mitigated by importer and refinery

3. LIGHT POLLUTION

ADD INFO LIKE OTHER CATEGORIES

4. WATER



Add boxes to 4. Water

A. Ship discharge & ship hull attachments
B. Port off-port tidelands owned properties
C. Port Tenant off-port tidelands owned properties

Summary of Evidence Supporting Pathway

Water pollution from port activities can impact the health of marine wildlife and humans[lii]

- TBT, used to prevent barnacles and other marine organisms, is linked to skin irritation, stomach aches, colds, flu, and neurological symptoms. [liii]
- Oil from bilge and other ship-related secretions is deposited in waterways and harms ecosystems and human health.[liv] [lv]
- Dredging ports to remove sediment potentially stirs up toxic substances.[lvi] [lvii]

Storm water run off pollutes waterways

- Paved surfaces contribute to flooding, habitat loss, water quality decline, and reduced diversity of aquatic life.[lviii]
- Storm runoff from urban and suburban areas contains dirt, oils from road surfaces, nutrients from fertilizers, and various toxic compounds.[lix] [lx]
- Water runoff may contain high concentrations of heavy metals, organic pollutants, fecal coliform bacteria, nutrients and total suspended solids.[lxi] [lxii]
- Automobile emissions and the wear of automobile parts and road construction materials are the primary sources of lead, zinc, copper, and iron to roadways and parking lots.[lxiii]

Contaminants from storm water runoff have been found in marine wildlife and impact human health

- Contaminants found in marine wildlife[lxiv] [lxv]
- PCBs, copper, zinc, and benzo[a]pyrene in contaminated sediments may pose a significant threat to human health via diet.[lxvi]

- Persistent organic compounds are endocrine disruptors and are associated with eggshell thinning.[lxvii]

Mitigating factors

- New technologies such as storm water management strategies.
- Establish routine inspection schedule

Research Questions

Baseline Questions	Impact Questions
What is the current water quality in waterways near the Ports? What are the current contributions of each port-related activity to water pollution (e.g., TBT, oil pollution)? (Including from water run-off from port land and spills.)	How will projected changes in port-related activities impact water quality in waterways near the Ports?
Has there been any sediment/soil contamination? If so, describe. What is the current contribution of each port-related activity to sediment/soil contamination?	How will projected changes in port-related activities impact sediment/soil contamination? Will the proposed project make use of contaminated soil? How will use of contaminated soils impact water quality in waterways near the Ports?
What other sources of water/sediment/soil pollution exist near the Ports and what is their contribution to existing levels of water pollution?	What will be the cumulative impact of the proposed project and all existing water contamination sources on water quality?
How many people utilize the local waterways for various types of recreation?	How will the proposed project impact recreational users of local waterways?
Are people currently exposed to port-related water pollution through dermal contact with or ingestion of local water sources (recreational or otherwise)? What are the health impacts of this exposure?	How would projected changes in port-related activities impact exposure (dermal, ingestion) to polluted water and health impacts related to this exposure?

Baseline Questions	Impact Questions
How much do local populations currently consume fish caught in local waterways? How much are local residents exposed to contamination as a result of consumption of fish caught in local waterways? What are the health impacts of this exposure?	How will projected changes in port-related activities impact fish caught in local waterway? How will projected changes impact exposure to contaminants through consumption of fish?

ADDITIONAL BASELINE QUESTIONS

4. Have all water pollution sources been identified?
5. Have all water pollution types been identified & quantified?
6. What is the current baseline of water quality?
7. What is the plan for aquaculture restoration?

Examples of Analysis Methods

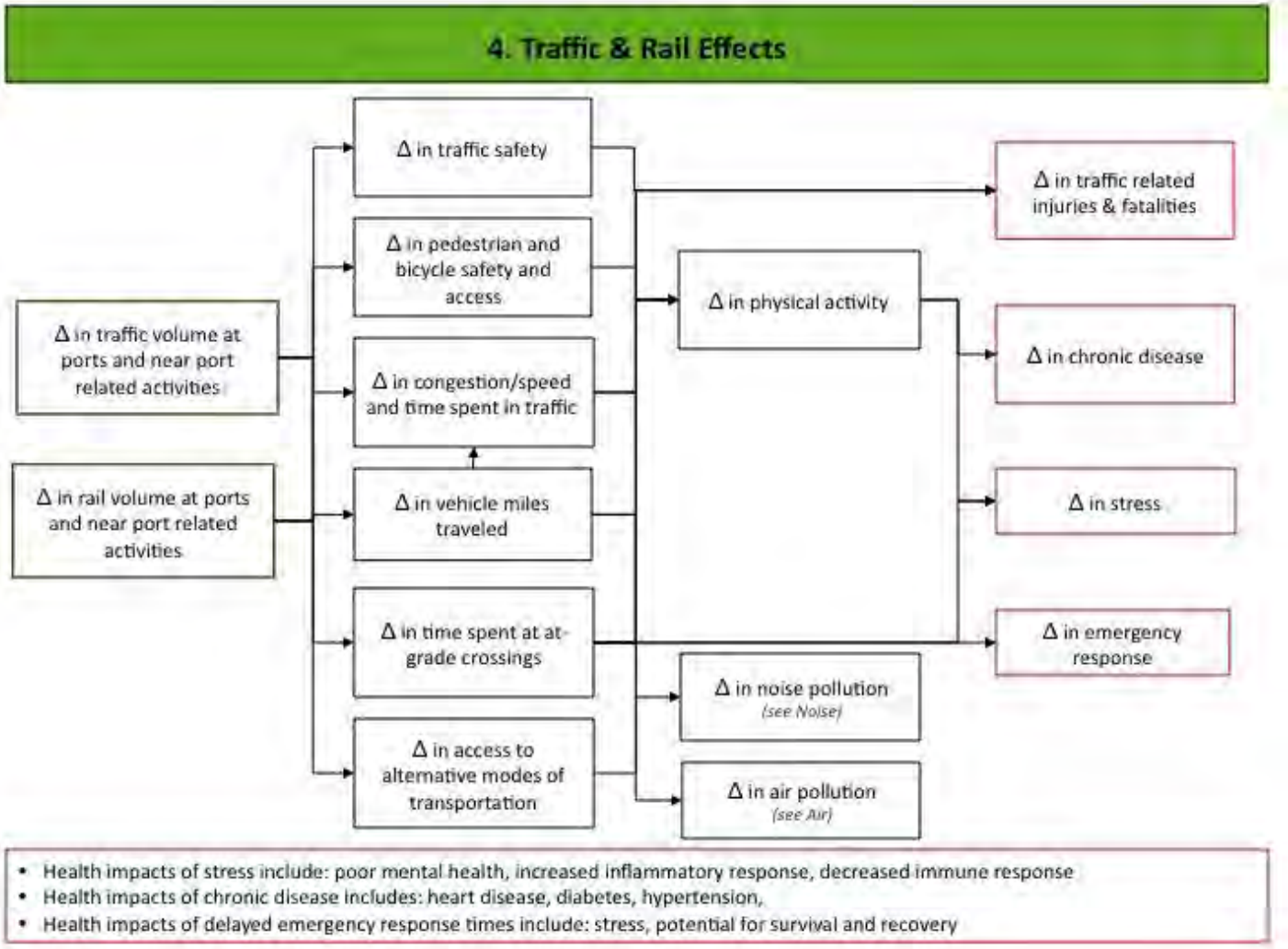
- Estimate of risk in terms of number of people - specific to the toxic substances they would come into contact with
- A simple method for estimating dermal absorption of chemicals in water: Chemosphere, VoI.19, No.12, pp 1989-2OO1, 1989 (a method for judging the health risks from dermal exposure to chemical pollutants in water)
- Aerial (Atmospheric) Deposition Study of Port and Tidelands Waters

Examples of Design and Mitigation Alternatives

- Best available technologies for preventing leaking and spills, dredging and soil remediation
- Fishing or recreational water use advisories/bans
- Building of a salt water reclamation and purification facilities
- Building and operation of a salt water fish hatchery to restock the oceans
- Remediation of Consolidated Slip

- Dock worker and subcontractor trash prevention plan
- Creation of new off-shore aquatic reefs for aquatic life restoration composed on natural materials

5. TRAFFIC, RAIL, RAILYARD, INTERMODAL, WAREHOUSE DISTRIBUTION CENTERS



Add boxes:
a. Railyards
b. Intermodal Facilities
c. Warehouse Distribution Centers
d. Truck company locations
e. Truck staging areas
f. Container storage yards
g. Chassis storage yards & welding locations

Summary of Evidence Supporting Pathway

Pedestrian safety and bicycle access

- There is a statistically significant relationship between traffic volume and the number of vehicle collisions involving a pedestrian.[lxviii] [lxix] [lxx] [lxxi]
- A neighborhood with features that make the pedestrian environment unsafe, such as high traffic volumes and speeds, narrow or degraded sidewalks, poorly connected streets, and a lack of lighting, is likely to reduce walking on residential streets.[lxxii] [lxxiii] [lxxiv]
- The risk of pedestrian injuries may discourage walking as a mode of transport, and negatively impact physical activity levels.
- California's pedestrian fatality rates are much higher than the nation's, with pedestrians accounting for more than 17% of motor vehicle deaths in California.[lxxv]

a. Hours of operation/idling
b. Standby due to accident, waiting line back-log

- The perception of collision risk prevents people from cycling. In a survey of adults in the Vancouver metropolitan area, the top deterrents were the risk of injury from car-bike collisions; the risk from motorists who don't know how to drive safely near bicycles; motorized vehicles driving faster than 50 km/hr; and streets with a lot of car, bus, and truck traffic.[lxxvi]
- Pedestrian collisions are more common in low-income areas, potentially reflecting a greater residential density, greater traffic volume, and lower automobile ownership among residents of these neighborhoods.[lxxvii]

Traffic related injury and fatalities

- Traffic crashes continue to be the greatest single cause of death and disabilities for Americans in the 1-44 years of age.[lxxviii]

- Traffic volume increases the risk of pedestrian, cyclist and motorist injury and death, with pedestrians, cyclists, and motorized two-wheeled vehicle users bearing a disproportionate share of road injury burden.[lxxix] [lxxx]
- Vehicle speed increases the risk for serious injury and death from MVA; there is also evidence that driving slower than the typical rate of speed increases risk of MVA. [lxxxi] [lxxxii] [lxxxiii] [lxxxiv] [lxxxv]

Vehicle miles traveled

- Areas with high levels of vehicle miles traveled per capita tend to have higher accident and injury rates. More time in a car means higher exposure to the perils of driving, including accidents.[lxxxvi]
- VMT and commute times correlate with obesity and have an inverse relationship to amount of physical activity.[lxxxvii] [lxxxviii] Physical activity decreases risk for obesity, diabetes, cardiovascular disease, stress, osteoporosis, and depression; and physical activity can improve mental health and longevity. [lxxxix] In a study of California counties assessing vehicle miles traveled and obesity, counties with the highest average amount of vehicle miles traveled were significantly associated with the highest average rank of obesity.[xc]

Physical activity

- The 1996 Surgeon General's report found that exercise prolongs life and prevents diabetes, high blood pressure, and colon cancer; that exercise controls weight, improves mobility in the elderly, and prevents falls; and that exercise reduces feelings of depression and anxiety and promotes psychological well-being. [xci]
- Centers for Disease Control and Prevention (CDC) recommend that adults should either engage in moderate exercise (e.g., walking briskly) for at least 30 minutes 5 days a week or in vigorous exercise (e.g., jogging) for at least 20 minutes 3 days a week.

Noise

- See Section 2: Noise Effects

Mitigating factors

- Existing concentration and distribution of traffic, including truck traffic
- Existing pedestrian safety or traffic calming measures in areas near the Ports

- Economic constraints on mobility
- Occupation
- Location of schools that local children attend

Research Questions

Baseline Questions	Impact Questions
What are the existing transportation routes in the impacted areas? (e.g. roads, public transportation routes, pedestrian and bicycle infrastructure)	How will the proposed project impact transportation routes? How will the proposed project impact the quality of the environment for pedestrians and bicyclists in the impacted areas?
What are the current volumes of traffic at ports and on roads in the impacted areas?	How will the proposed project impact traffic volumes at ports and on roads in the impacted areas? How will projected changes in traffic impact air quality and noise pollution in the impacted areas? [See Air Quality and Noise]
What are the current traffic/congestion conditions on roads in defined geographies at various times in the day and week (including speed and time spent in traffic)?	How will the proposed project impact traffic/congestion conditions at various times in the day and week? How will the proposed project impact traffic speed on roads in the impacted areas? How will the proposed project impact time that vehicles traveling in the impacted areas spend in traffic?
What is the average number of VMT for residents and workers in the impacted areas?	How will the proposed project impact the average number of VMT for residents and workers in the impacted areas?
What are the current commute times and transportation mode splits for people who live and work in the impacted areas?	How will the proposed project impact the commute times and transportation mode splits for people who live and work in the impacted areas? Will the proposed project impact access to alternative modes of transportation available within the impacted areas?
How many traffic collisions occur annually in the impacted areas? How many injuries and fatalities currently occur as a result of traffic collisions in the impacted areas?	How will the proposed project impact traffic collisions involving pedestrians, bicyclists, or drivers? How will projected changes in traffic collisions impact the number of injuries and fatalities in the impacted areas?
What is the current rail volume in the impacted areas? What is	How will the proposed project impact the volume of rail in the

Baseline Questions	Impact Questions
the average time that on-road vehicles spend at at-grade crossings in the impacted areas?	impacted areas? How will projected changes in rail volume impact the average time spent at at-grade crossings in the impacted areas?
What are current emergency response times in the impacted areas?	How will projected changes in rail volume impact emergency response times (time spent at at-grade crossings by emergency vehicles)? What are the health impacts of the predicted changes in emergency response times (stress, potential for survival and recovery)?
What are the current rates of physical activity for populations living in the impacted areas? What are the health impacts of these activity levels (e.g., cardiovascular disease, mental health, diabetes)?	How will projected changes in time spent in traffic, commute times, and mode of transportation impact rates of physical activity for these populations? What are the health impacts of projected changes in levels of physical activity (e.g., cardiovascular disease, mental health, diabetes)?

ADDITIONAL BASELINE QUESTIONS

1. Have all truck, rail, intermodal, railyard, warehouse distribution center sources and routes been identified?
2. Has a Community Goods Movement Transportation Impact Map been developed? All sources, source radius.
3.

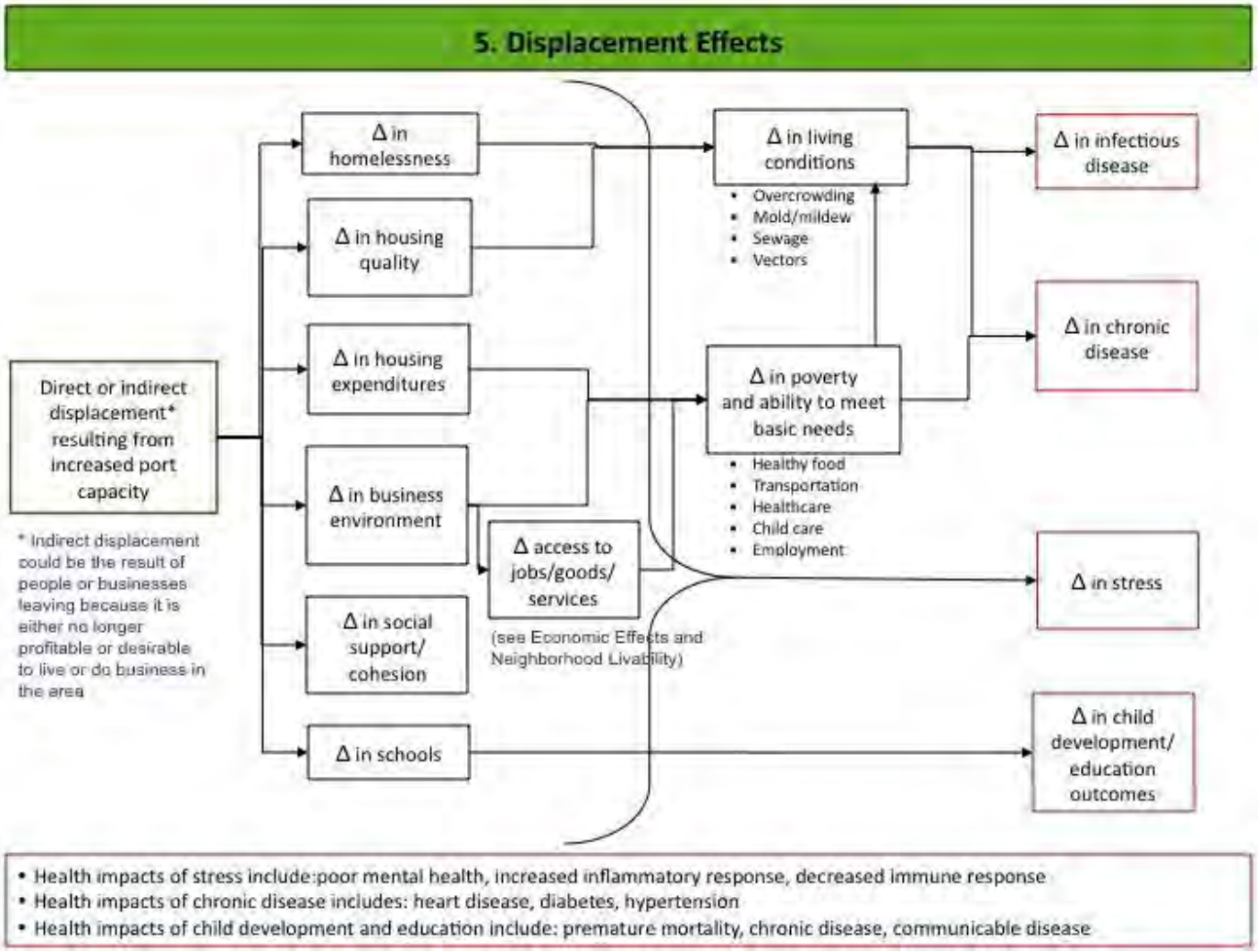
Examples of Analysis Methods

- GIS mapping
- Traffic modeling, predicted truck traffic increase based on project type
- Predicted change in VMT based on research findings and current/predicted traffic data
- FHWA methods for traffic safety analysis
- Community Ground Truthing

Examples of Design and Mitigation Alternatives

- Engineering measures to re-route, slow or limit freight traffic in residential areas
- Enhancement of pedestrian and biking infrastructure (sidewalks, traffic calming, bike routes, trails, crosswalks)
- Grade separated rail crossings
- Mandatory use of Alameda Corridor & increase usage
- Mandatory incorporation of Alternative Transportation Technologies which offer greater efficiency, velocity and throughput (e.g. Maglev Train)

6. DISPLACEMENT



Add boxes to 6. Displacement

A. Port, Tenant & Related Services companies land purchases
B. Lost community land for new low income & senior housing development
C. Lost community land for parks, recreational centers
D. Lost community land for senior centers, convalescent care centers
E. Lost community land for public schools, child care centers
F. Lost community land for wetlands restoration

Summary of Evidence Supporting Pathway

Involuntary residential displacement causes short- and long-term health effects

- Displacement can result in loss of jobs, and loss of health protective social networks.[xcii] [xciii]
- Housing stability is associated with self-rated health status such that as housing stability decreases so does self-rated health status.[xciv]
- Moving frequently is associated with higher rates of stress, mental health issues, child abuse, and neglect.[xcv]
- Displacement and relocation disrupts people's emotional bonds with places, including social ties and engagement in neighborhood activities.[xcvi]
- The long commutes of workers who are forced to move away from their jobs to more affordable suburbs encroach on quality family time and contribute to increases in greenhouse gases, both of which have health implications for future generations.[xcvii]

Displacement, and inability to afford housing can lead to homelessness

- In a study done in New York City, age-adjusted death rates were four times higher in the homeless than the general U.S. population [xcviii]
- Homelessness is linked to higher rates of mortality and increased morbidity due to respiratory infections and poor nutrition.[xcix]

Housing quality

- Substandard and deteriorating housing contributes to a variety of ailments, from respiratory disease and neurological disorders to psychological and behavioral dysfunction.[c]

- Home deterioration such as compromised climate control, growth of mold and mildew, pest or rodent infestation can lead to respiratory disease such as asthma or other allergic symptoms.[ci] [cii] [ciii]
- Research has also found that children living in dilapidated, poorly maintained inner-city housing may be at a particularly high risk for lead poisoning.[civ]
- At the community level, deterioration of housing stock results in "housing filtering", or the trend of those with lower levels of income to move into a neighborhood over time, which results in progressively poorer housing maintenance and quality.[cv] [cvi]

Housing affordability

- The inability to find affordable housing as a result of displacement may cause many families and individuals to have to less income to spend on basic necessities such as food and clothing.
- Higher rents, especially for low-income families, limit the amount that a family can spend on other life needs, such as food, clothing, medication, health care and family activities that provide exercise and emotional stability.[cvii] [cviii]
- Research has also found significant associations between unaffordable rent, and inadequate childhood nutrition and growth.[cix] [cx]

Overcrowding

- Overcrowding increases the risk of passing infectious diseases. A study in Sao Paolo, Brazil found that for every average increase of one additional dweller per bedroom in a household there was a 14% increase in tuberculosis mortality.[cxi] There can also be increased risk of ear infection in children due to overcrowding.[cxii]
- Children in low-income families exposed to one or more environmental risks such as overcrowding and noise showed an increase in urinary cortisol and epinephrine, which are biomarkers of chronic stress.[cxiii]
- Overcrowding and poor-quality housing also have a direct relationship to poor mental health, developmental delay, heart disease, and even short stature.[cxiv]
- Overcrowded housing has been associated with increased mortality rates (particularly for women), meningitis, and Helicobacter pylori bacteria that can cause stomach ailments.[cxv]

- Crowded housing conditions also contribute to poor child development and school performance, in part, because overcrowding limits the space and quiet necessary for children to do homework.[cxvi] [cxvii]
- Overcrowding can affect health indirectly by creating conditions conducive to poor sanitation, high environmental noise, and residential fires.[cxviii]

Impacts on children, and child development

- Displacement is a stressful life event and relocation can have significant impacts on health and childhood development.[cxix]
- Residential stability at childhood (moving 0-2 times by the age of 7) increases the odds that an individual will rate their health positively in midlife by 42%.[cxx]
- Increased mobility in childhood (moving 3 or more times) resulted in a 36% increased risk of developing depression and also correlated with academic delay in children, school suspensions, difficult school transitions and emotional and behavioral problems.[cxxi] [cxxii]
- Studies have also shown that for adolescents with high mobility during childhood, the odds of smoking increased 1.3 times, and risk for suicide increased 2.5 times.[cxxiii]
- Homelessness and living in temporary housing have been linked to behavioral problems and depression among children.[cxxiv]
- It is estimated that 78% of homeless children have suffered from depression, behavior problems, or severe academic delay. [cxxv]

Mitigating factors

- Housing tenure
- Existing social networks among residents living in close proximity to Ports
- Affordability of housing near ports compared to other areas of Los Angeles and Long Beach
- Current commute times from existing housing to jobs, retail, services, schools
- Compensation for displacement

Research Questions

Baseline Questions	Impact Questions

Baseline Questions	Impact Questions
What is the current population living in the impacted areas and how has this changed as a result of displacement?	How will projected changes in port-related activities impact the displacement of residents living in the impacted areas?
What industries and businesses are present in the impacted areas and how has this changed as a result of displacement?	How will projected changes in port-related activities impact the displacement of businesses in the impacted areas?
What are the priority concerns of local residents regarding potential displacement? What type of displacement has occurred in defined geographies in the past?	How will projected changes in port-related activities impact local residents concerns about displacement?
What is the nature of current social networks/support?	How would projected displacement due to the proposed project impact social networks/support?
How many schools are present in the impacted areas and what is their enrollment?	How would projected displacement impact schools or school enrollment?
What are current rates of homelessness? What is the current quality of housing in the impacted areas? What are housing expenditures in the impacted areas?	How would projected displacement impact homelessness and housing quality and expenditures?
What are current living conditions in the impacted areas (e.g., overcrowding, mold/mildew, sewage, and disease vectors)?	How would projected displacement impact living conditions in the impacted areas?
What are current poverty rates in the impacted areas? How able are current residents to meet their basic needs (food, transportation, health care, child care, and employment)?	How would projected displacement impact poverty rates in the impacted areas? How would projected displacement impact residents' abilities to meet their basic needs?
What is the current rate of infectious disease, chronic disease (heart disease, diabetes, hypertension), and stress in the impacted areas?	How would projected changes to social networks, homelessness, housing quality and expenditures, poverty, and residents abilities to meet basic needs impact infectious disease, chronic disease (heart disease, diabetes, hypertension), and stress rates in the impacted areas?
What are current child development outcomes and levels of academic achievement in the impacted areas?	How would projected changes to schools and school enrollment impact child development and education outcomes in the impacted areas?

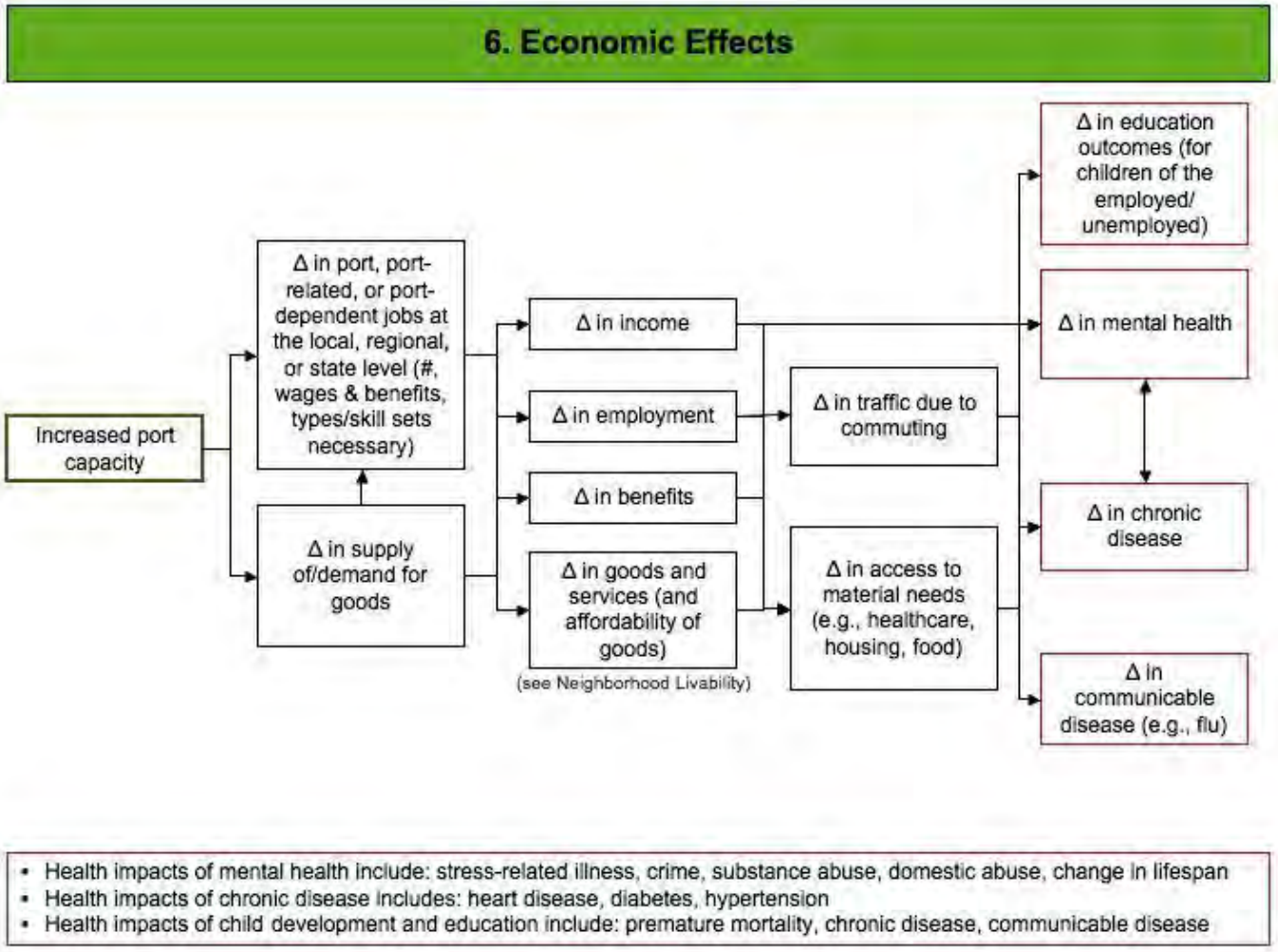
Examples of Analysis Methods

- Calculate trends in residential population and business changes and apply % changes to current demographics and expansion plans
- Compare port neighborhood trends to regional trends
- Qualitative analysis of surveys/focus groups
- Analyze investment in port area, transportation corridors, railyard and warehouse distribution center communities over time compared to other communities
- Review City of Los Angeles Wilmington and San Pedro Community Plans and CRA Plans
- Review community based organization urban development plans, sustainability studies
- Future Community Growth Needs Assessment
- Wetlands Restoration Site Studies
- Native American Historical Site, Museum, Nature Center Restoration Site Studies

Examples of Design and Mitigation Alternatives

- Buffer technologies – to shield residents from exposure to toxic substances
- Involvement/intervention by other public agencies such as Department of City Planning, Education, and Housing
- Buffer Zones, Environmental Justice Community Protection Zones
- Identification of restoration opportunities over proposed projects

7. ECONOMIC EFFECTS



Add Boxes to 7. a. Port Tsunami/Earthquake economic impact on harbor communities
b. Port danger and hazards risk impact on harbor communities

Summary of Evidence Supporting Pathway

Income is one of the strongest and most consistent predictors of health and disease in public health research literature.

- Attainment of self-sufficiency income predicts better health, improved nutrition, and lower mortality.[cxxvi]
- People with average family incomes of $15,000 to $20,000 were three times as likely to die prematurely as those with family incomes greater than $70,000.[cxxvii]
- People with lower incomes have higher risks than people with higher incomes for giving birth to low birth weight babies, for suffering injuries or violence, for getting most cancers, and for getting chronic conditions.[cxxviii]
- Prevalence of obesity and type 2 diabetes is higher among groups with the lowest levels of income and education and in the most deprived areas.[cxxix]
- A review found that lower socioeconomic status was adversely associated with psychosocial factors linked to coronary heart disease, particularly hostility and depression.[cxxx]
- Individuals who experience more frequent episodes of income loss are likely to have higher levels of depression.[cxxxi]

Unemployment and underemployment are associated with poor health outcomes.

- Men who were unemployed in several cities in Europe were 1.5 - 3.25 times more likely than those who were employed to have ischemic heart disease.[cxxxii]
- In one study, people who lost a job prior to being interviewed were 85% more likely than those not losing a job to experience worsening health status, about 90% more likely to report the onset of disability and just under 50% more likely to report the onset of high levels of depressive symptoms.[cxxxiii]
- Unemployment is associated with premature mortality cardiovascular disease, hypertension, depression, and suicide.[cxxxiv] [cxxxv]

Jobs that do not provide health insurance and guaranteed sick leave contribute to poor health outcomes.

- Annually nationwide, 18,000 premature deaths are attributable to lack of health coverage.[cxxxvi]
- The lack of sick leave benefits is associated with workers 1) coming to work sick, 2) working at lower levels of productivity, 3) risking infecting other workers, 4) experiencing longer recovery times, 5) experiencing worse health outcomes in children, and 5) utilizing higher cost health care down the line.[cxxxvii]
- Individuals without health insurance frequently forego timely health care, suffer more severe illness, and are more likely to die a premature death than their insured counterparts. Annually nationwide, 18,000 premature deaths are attributable to lack of health coverage.[cxxxviii]
- Having health insurance coverage is significantly associated with access to medical checkups.[cxxxix] [cxl]

Living in poverty is associated with many poor health outcomes.

- Poverty limits access to important health-enabling resources, including proper nutrition, good medical care, stable health insurance, and favorable housing.[cxli]
- Dropping out of school is associated with delayed employment opportunities, poverty, and poor health.[cxlii]
- Adolescents living in neighborhoods with high levels of poverty and distress tend to have lower level of scholastic achievement and a higher risk of dropping out of school.[cxliii] [cxliv]
- Poverty and lack of economic opportunity are risk factors for crime. [cxlv] [cxlvi] [cxlvii]

Mitigating factors

- Many factors influence unemployment and income, including national economic trends.

Research Questions

Baseline Questions	Impact Questions
How many and what types of jobs (including wages, benefits, types, skill sets necessary, safety hazards, leave	How will the proposed project impact the number and types of jobs offered by the Ports? How will the proposed project impact

Baseline Questions	Impact Questions
policies) do the Ports currently offer? How many and what types of jobs (including wages, benefits, types, skill sets necessary, safety hazards, leave policies) do the Ports currently provide residents neighboring the Ports?	the number and types of jobs offered by the Ports to local residents?
How many and what types of jobs (including wages, benefits, types, skill sets necessary, safety hazards, leave policies) do port-supporting businesses (e.g., trucking, container storage, warehousing, restaurants) at the local, regional and state levels currently offer? How many and what types of jobs (including wages, benefits, types, skill sets necessary, safety hazards, leave policies) do port-supporting businesses (e.g., trucking, container storage, warehousing, restaurants) provide residents neighboring the Ports?	How will the proposed project impact the number and types of jobs offered by the port-supporting businesses at the local, regional and state levels? How will the proposed project impact the number and types of jobs offered by the port-supporting businesses to local residents?
What are the demographic characteristics of the populations living near the Ports and in the region? (see Baseline Research Questions Relevant to all Sections above)	How will projected changes in employment impact these demographic characteristics?
What goods and services are available locally, regionally, and in the state as a result of the Port?	How will the proposed project impact the goods and services available (including changes in cost) locally, regionally, and in the state?
What are current job-training opportunities in the impacted areas?	How will projected changes in employment impact job-training opportunities in the impacted areas?
What is the lifespan of people living in the impacted areas and regionally?	How will projected changes in jobs and availability of goods and services impact lifespan of those living in the impacted areas?
What is the prevalence of chronic disease (e.g., diabetes, cardiovascular disease, hypertension) in the impacted areas and regionally?	How will projected changes in jobs and availability of goods and services impact chronic disease prevalence?
What is the prevalence of communicable disease (e.g., flu, STDs) and regionally?	How will projected changes in jobs and availability of goods and services impact communicable disease prevalence?

Baseline Questions	Impact Questions
What is the current educational attainment of people living in the impacted areas?	How will projected changes in jobs and availability of goods and services impact educational attainment in the impacted areas?

Examples of Analysis Methods

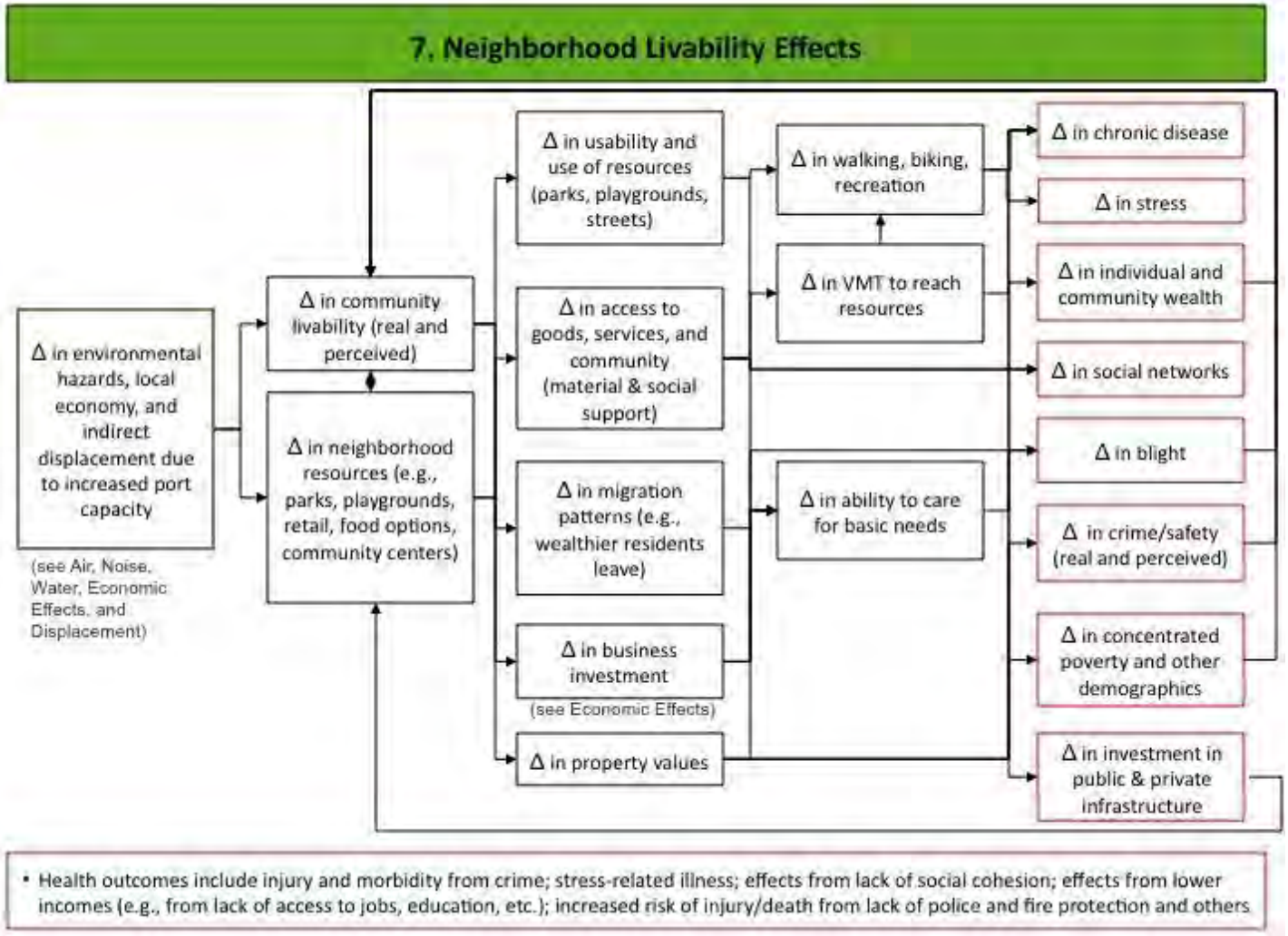
- Employment modeling
- Potential Green Technologies development & job creation opportunities
- Economic assessment of Tsunami/Earthquake-Port impacts on harbor communities

Examples of Design and Mitigation Alternatives

- Job training
- Local hiring
- Aid for local businesses
- Financial support for new green technology training ie. instructor & students
- Financial investment & incentives for emerging Green Tech Companies
  - Earmark Port tax-revenue for programs that support neighborhood resources in defined geographies
  - Community Benefits Agreements
  - Port container fees/tariffs
  - Port petroleum products pass through fees/tariffs
  - Establishment of Port Community Advisory Committees
  - Establishment of Off-Port Community Mitigation Non-Profit Organization

- Establishment of a Wetlands Restoration Advisory Committee
- Prepare ports community danger and hazards risk footprint impact protection plan
- Prepare port community disaster preparedness and evacuation impact implementation plan
- Financial investment in green alternative technologies R & D, demonstration projects and certification

8. NEIGHBORHOOD LIVABILITY



Add boxes: 8. a. Quality of life
b. No dark starry nights
c. No quiet peaceful noiseless & ground vibrationless days
d. Communities tree canopy density?

Summary of Evidence Supporting Pathway

* Conceptually, a livable neighborhood is one that is not burdened with real or perceived deprivation due to factors such as concentrated poverty, a lack of resources, limited social networks, physical disorder or blight, crime, and/or environmental hazards.

The types of goods and services that are located in a neighborhood can ultimately impact the health outcomes of local residents

- The more key public and retail services a neighborhood has, the greater the chance for residents and workers to walk or bike to access those services, increasing physical activity, social interactions, and safety through "eyes on the street."
- How much one drives is affected by traffic congestions and proximity to public transportation, work, goods and services, walking and cycling infrastructure, and parking facilities. Amount of driving has an impact on the money a family has available for other health needs, such as nutritious food and health care.
- Living in a neighborhood with a higher concentration of organizations or services for young people and adults was associated with lower levels of aggression.[cxlviii]
- In-depth interviews conducted in Baltimore revealed that employment opportunities and local businesses, were among the important perceived neighborhood factors influencing young people's experiences including violence.[cxlix]

Vehicle Miles Traveled

- Neighborhoods with diverse and mixed land uses can create closer proximity between residences, employment, and goods and services, thereby reducing vehicle trips and miles traveled and as a result, reducing air and noise pollution.[cl]
- Relying on cars to access day-to-day retail and public service needs also has adverse

consequences on health via air pollution and noise levels. Ensuring complete neighborhoods with adequate retail and public services in close proximity to residents' homes can reduce reliance on cars for every day needs.

Health Clinics

- Federally Qualified Health Centers in medically underserved areas can lower preventable hospitalization rates.[cli] Travel distance to a health care provider, and lack of transportation are well-established barriers to receiving adequate health care.[clii cliii cliv]
- Does available health care meet the communities health care needs?

Childcare

- Accessible high-quality childcare provides children with valuable opportunities for cognitive, behavioral and educational development, and results in positive physical health outcomes.[clv clvi clvii clviii]
- Are childcare centers located in pollution free and safe traffic free areas.

Schools

- Are schools located in pollution free and safe traffic free areas.
- The higher the amount of income inequality in a society (inequality between rich and poor), the higher the mortality in the lower economic segment. Lack of high school education accounts for the income inequality effect and is a powerful predictor of mortality variation among US states.[clix]
- Higher education leads to lower hostility, and hostility is linked to coronary heart disease, alcohol use, obesity, and premature mortality.[clx]
- Independent of income, education level is associated with improved health outcomes: each additional year in school is associated with increased life expectancy.[clxi]
- Research findings indicate that the physical location of schools, in particular, the distance that students travel to school, may significantly impact health outcomes.[clxii clxiii]

Recreational Facilities/Community Centers

- In 1996 the U.S. Surgeon General concluded that regular physical activity improves health. The Surgeon General's report found that exercise prolongs life and prevents diabetes, high blood pressure and colon cancer; that exercise controls weight, improves mobility in the elderly, and prevents falls; and that exercise reduces feelings of depression and

anxiety and promotes psychological well-being.[clxiv]

- One study published by the CDC, showed that creation of or enhanced access to places for physical activity led to a 25.6% increase in the percentage of people exercising on three or more days per week.[clxv] Research has also shown that access to places for physical activity combined with outreach and education can produce a 48% increase in frequency of physical activity.[clxvi]
- Access to public parks and recreational facilities has been strongly linked to reductions in crime, and in particular, to reduced juvenile delinquency.[clxvii] Recreational facilities keep at-risk youth off the streets, give them a safe environment to interact with their peers, and fill up time within which they could otherwise get into trouble.[clxviii]
- Community centers serve to enhance social cohesion among neighborhood residents. Social connection has a variety of health impacts, ranging from reducing stress, having a longer lifespan, supplying access to emotional and physical resources.[clxix]

Parks & Open Space

- People who live in close proximity to parks usually have higher levels of activity compared to those who do not.[clxx clxxi clxxii] Studies have shown that parks facilitate physically active lifestyles by providing relatively low cost choices for recreation.[clxxiii] Most (81%) users of a park live within one mile of it. People living within one mile of the park were found to be four times as likely to visit the park once per week or more.[clxxiv]
- Urban parks provide a space where people can experience a sense of community and increase neighborhood cohesion. Social networks and interaction have been linked to improvements in physical and mental health through multiple mechanisms.[clxxv] A study in Chicago found that 83% more people were involved in social activities in green spaces vs. barren spaces.[clxxvi]
- Contact with the natural world improves psychological health. Being able to escape fast-paced urban environments improves health by reducing stress and depression and improving the ability to focus, pay attention, be productive, and recover from illness.[clxxvii] One study showed that people living in a housing project near green space scored higher on the ability to manage major life issues, procrastinated less, found their issues to be less difficult and reported them to be

less severe and long-standing than those who lived in barren surroundings.[clxxviii]

- Spending time in parks can reduce irritability and impulsivity as well as promote intellectual and physical development in children and teenagers. Researchers in Chicago found that children with Attention Deficit Disorder (ADD) function better than usual after activities in green settings, and that the "greener" a child's play area, the less severe their ADD symptoms.[clxxix]
- Parks and open spaces also improve environmental quality by filtering dirty air and polluted water, and by dampening noise, thereby contributing to the general health of the area. Unpaved parks and open spaces alleviate pressures on storm water management and flood control efforts by slowing and filtering water flow and decreasing the area of impervious surfaces. Trees and green space remove pollution from the air, mitigating heat island effects in urban areas, which lower energy demands and associated emissions during warm periods. Evaporation from a single large tree can produce the cooling effect of ten room-size air conditioners operating 24 hours a day.[clxxx] In an area with 100% tree cover (such as forest groves within parks), trees can remove as much as 15% of the ozone, 14% of the sulfur dioxide, 13% of particulate matter, 8% of the nitrogen oxide, and .05% of the carbon monoxide.[clxxxi] Trees and the soil under them filter water pollution by removing polluted particulate matter from water before it reaches storm sewers, and absorbing nutrients created by human activity such as nitrogen, phosphorus and potassium, which otherwise pollute streams and lakes.[clxxxii] In addition, increased vegetation dampens sound and mitigates noise pollution.[clxxxiii]

Retail

- Having everyday retail destinations accessible by walking increases physical activity.[clxxxiv] Physical activity is associated with reductions in premature mortality; prevention of chronic diseases such as diabetes, obesity, hypertension; and improvements in psychological well-being.[clxxxv]
- A 12.2% reduction in odds of being obese was detected with increase in density, mixed use, and street connectivity within 1 km of residential area, i.e., living in a mixed use area with a variety of shops and services is a robust predictor of obesity in urban areas.[clxxxvi]

Food Retail

- The choices that people make about what they consume on a day-to-day basis are influenced by food options available.[clxxxvii]
- Research has demonstrated that the retail environment has an impact on individual health. Individuals that have to travel long distances to supermarkets and other food retail must spend more time in their cars, on the bus, or on foot in order to obtain healthy food for their households.
- For residents without access to a car, having local retail (including healthy food options) in close proximity increases accessibility.
- Low-income households often have little choice about where to purchase food. Such households often buy less expensive but more accessible food at fast food restaurants or highly processed food at corner stores. These types of foods are usually higher in calories but lower in nutritional value.[clxxxviii] Consuming these types of foods is one of the causes of higher rates of obesity for many low-income populations.[clxxxix]
- Lack of access to healthy food is one of the barriers, particularly for low-income communities, to healthy eating.
- It is well known that nutritious eating and regular physical activity aid in the prevention of chronic medical conditions, especially diabetes, cardiovascular diseases and cancers.[cxc]

Neighborhood-level socioeconomic status (SES) affects health through various social and economic community-level conditions including employment opportunities, social capital, and collective efficacy. [cxci]

- The association between neighborhood deterioration and well-being (stress and depressive symptoms) may be mediated through social contact with neighbors, trust of neighbors, and perceptions of crime. Neighborhood deterioration increases stress and depressive symptoms through decreased contact with one's neighbors and increased concerns with safety.[cxcii]
- Neighborhood disadvantage manifested its effect via lower neighborhood cohesion, which was associated with maternal depression and family dysfunction. These processes were, in turn, related to less consistent, less stimulating, and more punitive parenting behaviors, and ultimately, poorer child outcomes.[cxciii]
- Neighborhood social capital forms—social support, social leverage, informal social

control, and neighborhood organization participation—were directly associated with both positive and negative health outcomes in adults.[cxciv]

Living in a neighborhood with high levels of deprivation is known to have diverse negative health effects, independent of socioeconomic status on the individual level. [cxcv][cxcvi] [cxcvii][cxcviii][cxcix]

- After adjusting for individual-level socioeconomic status, a review found that all but two of the 25 reviewed studies reported a statistically significant association between at least one measure of neighborhood socioeconomic context and health outcomes including mortality, infant/child health, chronic diseases among adults, mental health, and health behaviors.[cc]
- Living in more deprived neighborhoods is associated with increased all cause mortality in the US and five European countries, independent of individual socioeconomic characteristics.[cci]
- Neighborhood disadvantage manifested its effect via lower neighborhood cohesion, which was associated with maternal depression and family dysfunction. These processes were, in turn, related to less consistent, less stimulating, and more punitive parenting behaviors, and ultimately, poorer child outcomes.[ccii]
- The number of community advocacy organizations servicing the community?

Residents in a disadvantaged neighborhood are more likely to engage in health risk behaviors than those living in neighborhoods of higher socioeconomic status (SES).

- Neighborhood SES was positively associated with fruit and vegetable intake.[cciii]
- An analysis of the National Health and Nutrition Examination Survey data linked with U.S. census tracts found an association between high levels of neighborhood deprivation and increased odds of health risk behaviors such as smoking, high dietary fat intake, and self-reported excessive alcohol consumption and physical inactivity, independent of socio-demographic factors, BMI, and co-morbidities.[cciv]
- Studies found direct associations between neighborhood disorder and psychological stress, neighborhood disorder and sexual risk behaviors, and neighborhood disorder and drug use.[ccv] [ccvi]
- Neighborhood disorder is positively associated with heavy drinking and this

association is largely mediated by anxiety and depression, as some residents consume alcohol to cope with feelings of anxiety and depression due to living in a disadvantaged neighborhood characterized by problems with drugs, crime, teen pregnancy, unemployment, idle youth, abandoned houses, and unresponsive police.[ccvii]

Neighborhood disadvantage and disorder increases adolescent risk behaviors that may affect their long-term health and well-being. [ccviii]

- Adolescents living in neighborhoods with high levels of poverty and distress tend to have lower level of scholastic achievement and a higher risk of dropping out of school.[ccix] [ccx]

- Neighborhood disadvantage increases youth violence and aggression through the criminogenic street milieu in extremely disadvantaged communities, which increases the chances of becoming embedded in deviant peer relationships, easy access to firearms, witnessing street violence, personal experiences with violent victimization, expectations that future victimization could result in death.[ccxi]

Neighborhood social and physical disorder adversely affects mental health, which also leads to other negative health outcomes. [ccxii] [ccxiii] [ccxiv] [ccxv]

- A disadvantaged neighborhood exposes residents to chronic stressors in the form of crime, trouble, harassment, and other potentially distressing signs of disorder and decay. The stress response occurs in the body and brain in the form of fearful anxiety and depression, dizziness, chest pains, trouble breathing, nausea, upset stomach, and weakness, leading to poor health.[ccxvi]

Neighborhood socioeconomic status (SES) affects health through access to health care, retail, and other services that impact health.

- Living in disadvantaged neighborhoods reduces the likelihood of having a usual source of care and of obtaining recommended preventive services, while it increases the likelihood of having unmet medical needs.[ccxvii] [ccxviii]

- The elderly living in disadvantaged neighborhoods with poor access to public transportation were more likely to report a decline in physical functioning, which may be due to their inability to attain needed services and engage in community participation.[ccxix]

- Key informant interviews and focus groups conducted with residents in diverse neighborhoods in Oakland, California indicated that neighborhoods of higher SES received better municipal services as well as more attention and action from municipal agencies to health and social problems that may affect the residents. Residents in such neighborhoods also tend to be better organized in collective actions to improve their neighborhoods.[ccxx]

Neighborhood Safety

- Land use patterns that encourage neighborhood interaction and a sense of community have been shown not only to reduce crime, but also create a sense of community safety and security.[ccxxi]
- Crime is associated with low social capital (often measured as connection and trust to others in the community and/or civic involvement).[ccxxii]
- Insecurity due to port terrorist threats

Mitigating factors

- Current mix of commercial land uses and zoning in communities around the Port
- Insecurity due to port train, truck & operations accidents
- Insecurity due to petroleum industry explosions, fires & accidents

Social Networks

- Social connection has a variety of health impacts, ranging from reducing stress, having a longer lifespan, to supplying access to emotional and physical resources.[ccxxiii]
- People who reported a severe lack of social support were 2.19 times more likely to report fair or poor health.[ccxxiv]
- Individuals with low levels of social support have higher mortality rates, for example from cardiovascular disease, cancer and HIV.[ccxxv] [ccxxvi] [ccxxvii]
- Social ties provide access to new health-related information and resources, enhancing people's actual control and improving their ability to solve various problems. Members of wide networks are well informed about health issues. [ccxxviii]
- Current mix of existing retail, services and other community resources in Port communities

- Current use of retail, services and other community resources by Port communities
- Perceptions of livability are impacted by many factors including real changes (e.g., property values) and belief as influenced by media and frames.
- Factors outside Port control influence income, wealth, demographics, property values, etc.

Research Questions

Baseline Questions	Impact Questions
What are the allowable land uses in the impacted areas? How are these land uses distributed throughout the impacted areas?	How will projected changes in port-related activities impact land uses and their locations? Will projected changes require changes to the current zoning in the impacted areas?
What, if any, are planned changes to zoning and development in the impacted areas according to the general plan?	Are projected changes consistent with the general plan?
What environmental hazards exist in the impacted areas? [See environmental sections above.] What is the current perception of environmental hazards among residents in the impacted areas?	How will projected changes directly and indirectly impact environmental hazards in the impacted areas? [See environmental sections above.] How will projected changes impact residents' perception of environmental hazards?
What are the neighborhood resources that currently exist in the impacted areas (e.g. parks, libraries, schools, health clinics, day care centers, community centers, post offices, banks, grocery stores etc.)? [See other sections.]	How will projected changes impact neighborhood resources? [See other sections.] How will the proposed project impact residents' perception of neighborhood resources? Will proposed port-serving infrastructure (e.g. transport facilities) require demolition or displacement of existing community-serving public or private uses? How will projected changes impact usability and use of neighborhood resources (e.g. parks, playgrounds, streets)? How will projected changes impact access to retail, public services, and community (material and social support)? How will the projected changes impact changes in migration patterns in the impacted areas (e.g.

Baseline Questions	Impact Questions
	wealthier residents leaving or coming into the neighborhood)? How will projected changes impact the ability of residents to care for basic needs (e.g. goods, services, nutrition, healthcare, housing)? How will projected changes impact individual and community wealth?
What are the levels of use (and by which populations) of the current neighborhood resources?	How will the levels of use of the current neighborhood resources change due to projected changes? Will the demographics of the users of these resources change?
What is the current status of measures of the local economy? (see Economic Effects)	How will the projected changes impact measures of the local economy and residents' perceptions of the local economy? How will projected changes impact business investment (e.g. retail and other local employers)? [See Economic Effects] How will projected changes impact investments in public and private infrastructure in the impacted areas? [See Port Revenue and Port Funding] How will projected changes impact concentrated poverty and other demographic measures?
What is the household income and ethnicity of residents in defined geographies and how has that been changing?	How will projected changes to neighborhood resources, the local economy, and concentrated poverty impact household income in defined geographies? How will projected changes to neighborhood resources, the local economy, and concentrated poverty impact the ethnic make-up of the population in defined geographies?
What are property values in the impacted areas and how have they been changing?	How will projected changes to neighborhood resources, the local economy, and concentrated poverty impact property values? How will projected changes to neighborhood resources, the local economy, and concentrated poverty impact blight in the impacted areas?
What are the rates of physical activity (e.g. walking, biking,	How will projected changes to neighborhood resources, and

Baseline Questions	Impact Questions
recreation) among populations in the impacted areas?	the local economy impact rates of physical activity in the impacted areas? How will projected changes to physical activity rates impact the prevalence of chronic diseases/conditions associated with physical activity (e.g. obesity, cardiovascular disease, diabetes, high blood pressure)?
What is the average number of VMT by residents in the impacted areas? What is the average cost to residents in the impacted areas of travel to reach necessary goods and services (e.g. gas, bus fare)?	How will projected changes to neighborhood resources impact the average number of VMT by residents in the impacted areas? How will projected changes to neighborhood resources and the local economy impact the amount of time residents spend traveling to reach necessary goods and services and jobs? How will projected changes to neighborhood resources and the local economy impact the cost of travel to reach necessary goods and services and jobs for residents in the impacted areas?
What are the current conditions of neighborhood safety in the impacted areas?	How will projected changes to neighborhood resources, the local economy, and concentrated poverty impact crime rates and perceptions of neighborhood safety in the impacted areas? How will projected changes to crime rates impact injury, morbidity and other health impacts of crime?
What is the nature of existing social networks/social cohesion in the impacted areas?	How will projected changes to the neighborhood population and resources impact the social networks/social cohesion of local communities?
What are the current levels of stress among residents living in the impacted areas?	How will projected changes impact levels of stress among residents?
What are the perceptions of neighborhood livability (environmental hazards, neighborhood resources, displacement, the local economy) in the impacted areas?	How will projected changes impact local residents' perception of neighborhood livability?

Additional Baseline Questions

Does the community want a moratorium on polluting industries growth?
Does the community want to revise and update the Community Plan?
Does the community want to revise and update the Port Master Plan"
Does the community want an Environmental Justice Protected Zone established?
Does the community want new zoning requirements and cup conditions?
Does a port waterfront community want waterfront coastal access?
Does a port waterfront community want wetlands restoration?
Does the community want zero emissions public transportation?
What is the number of dark starry nights
What is the number of quiet peaceful noiseless & ground vibrationless days
What is the communities tree canopy density?

Examples of Analysis Methods

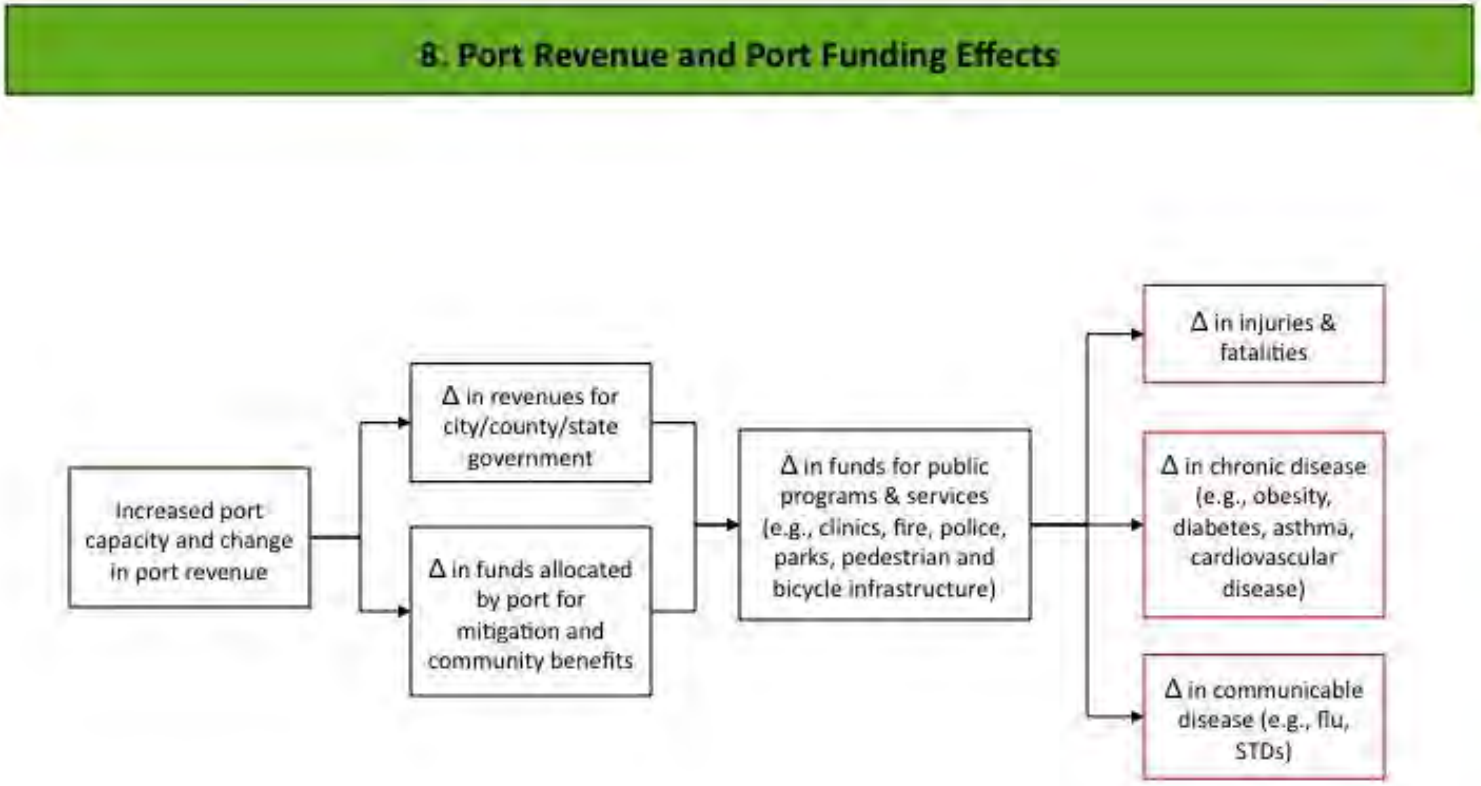
- GIS mapping
- Calculate trends in demographics (including income and wealth) as ports in LA/LB or other locations have expanded in the past; apply that % change to current demographics and expansion plans
- Compare port neighborhood trends to regional trends
- Focus groups, environmental, public health, sustainability community organizations and/or surveys
- Calculate change in property values as ports in LA/LB or other locations have expanded in the past; apply that % change to current property values and expansion plans
- Compare port neighborhood trends to regional trends
- Analyze investment in port area communities over time compared to other communities; qualitatively access implications for LA/LB communities
- Conduct Port Community Impact Nexus Study

- Port Community Waterfront Access Study
- Port Community Employment in Port & related industries studies

Examples of Design and Mitigation Alternatives

- Replacement of infrastructure (public or private) demolished or displaced because of port expansion
- Co-location of community-serving infrastructure with port serving infrastructure – greenways, parks, trails, waterfront access, etc.
- Neighborhood livability mitigation strategies are included in mitigation strategies of other sections
- Mandatory incorporation of maximum achievable pollution control technologies
- Mandatory incorporation of zero emissions public transportation and freight transportation technologies
- Incorporation of community and housing sustainability designs and technologies

9. PORT REVENUE AND PORT FUNDING



Summary of Evidence Supporting Pathway

The types of goods and services that are located in a neighborhood can ultimately impact the health outcomes of local residents

- How much one drives is affected by traffic congestions and proximity to public transportation, work, goods and services, walking and cycling infrastructure, and parking facilities. Amount of driving has an impact on the money a family has available for other health needs, such as nutritious food and health care.
- Living in a neighborhood with a higher concentration of organizations or services for young people and adults was associated with lower levels of aggression.[ccxxix]

Vehicle Miles Traveled

- Relying on cars to access public services needs also has adverse consequences on health via air pollution and noise levels. Ensuring complete neighborhoods with adequate retail and public services in close proximity to residents' homes can reduce reliance on cars for every day needs.

Health Clinics

- Federally Qualified Health Centers in medically underserved areas can lower preventable hospitalization rates.[ccxxx] Travel distance to a health care provider, and lack of transportation are well-established barriers to receiving adequate health care.[ccxxxi ccxxxii ccxxxiii]

Childcare

- Accessible high-quality childcare provides children with valuable opportunities for cognitive, behavioral and educational development, and results in positive physical health outcomes.[ccxxxiv ccxxxv ccxxxvi ccxxxvii]
- Are childcare centers located in pollution free and safe traffic free areas.

Schools

- The higher the amount of income inequality in a society (inequality between rich and poor), the higher the mortality in the lower economic segment. Lack of high school education accounts for the income inequality effect and is a powerful predictor of mortality variation among US states.[ccxxxviii]
- Higher education leads to lower hostility, and hostility is linked to coronary heart disease, alcohol use, obesity, and premature mortality.[ccxxxix]
- Are public schools located in pollution free and safe traffic free areas.

- Independent of income, education level is associated with improved health outcomes: each additional year in school is associated with increased life expectancy.[ccxl]
- Research findings indicate that the physical location of schools, in particular, the distance that students travel to school, may significantly impact health outcomes.[ccxli] [ccxlii]

Recreational Facilities/Community Centers

- In 1996 the U.S. Surgeon General concluded that regular physical activity improves health. The Surgeon General's report found that exercise prolongs life and prevents diabetes, high blood pressure and colon cancer; that exercise controls weight, improves mobility in the elderly, and prevents falls; and that exercise reduces feelings of depression and anxiety and promotes psychological well-being.[ccxliii]
- One study published by the CDC, showed that creation of or enhanced access to places for physical activity led to a 25.6% increase in the percentage of people exercising on three or more days per week.[ccxliv] Research has also shown that access to places for physical activity combined with outreach and education can produce a 48% increase in frequency of physical activity.[ccxlv]
- Access to public parks and recreational facilities has been strongly linked to reductions in crime, and in particular, to reduced juvenile delinquency.[ccxlvi] Recreational facilities keep at-risk youth off the streets, give them a safe environment to interact with their peers, and fill up time within which they could otherwise get into trouble.[ccxlvii]
- Community centers serve to enhance social cohesion among neighborhood residents. Social connection has a variety of health impacts, ranging from reducing stress, having a longer lifespan, supplying access to emotional and physical resources.[ccxlviii]

Parks & Open Space

- People who live in close proximity to parks usually have higher levels of activity compared to those who do not.[ccxlix] [ccl] [ccli] Studies have shown that parks facilitate physically active lifestyles by providing relatively low cost choices for recreation.[cclii] Most (81%) users of a park live within one mile of it. People living within one mile of the park were found to be four times as likely to visit the park once per week or more.[ccliii]
- Urban parks provide a space where people can experience a sense of community and increase neighborhood cohesion. Social networks and interaction have been linked to improvements in physical and mental health through multiple mechanisms.[ccliv] A study in Chicago found that 83% more people were

involved in social activities in green spaces vs. barren spaces.[cclv]

- Contact with the natural world improves psychological health. Being able to escape fast-paced urban environments improves health by reducing stress and depression and improving the ability to focus, pay attention, be productive, and recover from illness.[cclvi] One study showed that people living in a housing project near green space scored higher on the ability to manage major life issues, procrastinated less, found their issues to be less difficult and reported them to be less severe and long-standing than those who lived in barren surroundings.[cclvii]
- Spending time in parks can reduce irritability and impulsivity as well as promote intellectual and physical development in children and teenagers. Researchers in Chicago found that children with Attention Deficit Disorder (ADD) function better than usual after activities in green settings, and that the "greener" a child's play area, the less severe their ADD symptoms.[cclviii]
- Parks and open spaces also improve environmental quality by filtering dirty air and polluted water, and by dampening noise, thereby contributing to the general health of the area. Unpaved parks and open spaces alleviate pressures on storm water management and flood control efforts by slowing and filtering water flow and decreasing the area of impervious surfaces. Trees and green space remove pollution from the air, mitigating heat island effects in urban areas, which lower energy demands and associated emissions during warm periods. Evaporation from a single large tree can produce the cooling effect of ten room-size air conditioners operating 24 hours a day.[cclix] In an area with 100% tree cover (such as forest groves within parks), trees can remove as much as 15% of the ozone, 14% of the sulfur dioxide, 13% of particulate matter, 8% of the nitrogen oxide, and .05% of the carbon monoxide.[cclx] Trees and the soil under them filter water pollution by removing polluted particulate matter from water before it reaches storm sewers, and absorbing nutrients created by human activity such as nitrogen, phosphorus and potassium, which otherwise pollute streams and lakes.[cclxi] In addition, increased vegetation dampens sound and mitigates noise pollution.[cclxii]

Research Questions

Baseline Questions	Impact Questions
What share of local city, county, or state revenue is paid directly by the Ports? What share of local city, county, or state revenue is paid by port-related businesses?	How will the proposed project impact the share of local city, county, or state revenue paid by the port-related businesses?
What share of city/county/state port-related tax revenue is specially earmarked for local community benefit?	How will the proposed project impact the proportion of tax revenues earmarked for local community benefit?
Does the port currently pay any fees to mitigate negative impacts to local communities?	How will the proposed project impact port related fees used to mitigate existing negative impacts to local communities?
How do current tax revenues support neighborhood resources/projects/programs? How much are programs supported by these revenues used? What are the health impacts of the utilization of these programs?	How will the proposed project impact tax revenues used to support neighborhood resources/projects/programs? How will the change in tax revenues impact the projects/programs? How will use of infrastructure/projects/programs change? How will change of use impact health outcomes?
What is the current rate of injury and fatality in the impacted areas?	How will projected changes in spending on neighborhood resources/projects/programs impact current rates of injury and fatality in the impacted areas?
What are current chronic disease rates in the impacted areas?	How will projected changes in spending on neighborhood resources/projects/programs impact current chronic disease rates in the impacted areas?
What are current communicable disease rates in the impacted areas?	How will projected changes in spending on neighborhood resources/projects/programs impact current communicable disease rates in the impacted areas?

Additional Baseline Questions

What percentage of public transportation infrastructure systems costs do ports pay for their usage?
What percentage of public utilities infrastructure and services costs do ports pay for their usage?
What percentage of maximum achievable air pollution control technologies have the ports incorporate?
What percentage of zero emissions freight transportation technologies have the ports incorporated?
What percentage of alternative energy technologies have the ports incorporated?

What percentage of health care costs do the ports pay for due to their port community impacts?
What percentage of public safety costs do the ports pay for in port communities?
What is the ports danger and hazards risk footprint in port harbor communities?
What is the ports percentage of danger and hazards risk of cargo and petroleum products that pass through port harbor communities?
What are the ports and their tenants vector impacts on port communities?
Is the port and cities port community disaster preparedness and evacuation plan adequate?
Do port revenues cover the cost of their operations and mitigation requirements?
Do port board of harbor commissions have balanced port community representation?
Do city mayor port board of harbor commissioner appointments have port business experience?
Do port Joint Power Authorities have balanced port community representation?

Examples of Analysis Methods

- Prediction of change in tax revenues and the use of those revenues
- Prediction of effects from public programs
- Public Health Status Surveys
- Public Health Mitigation Effectiveness Assessment
- Cost-Benefit Analysis
- Port Community Nexus Impact Study
- Community Needs Assessment Study
- Mitigation Costs Assessment
- Conduct ports community danger and hazards risk footprint impact assessment
- Conduct port community disaster preparedness and evacuation impact assessment
- Conduct noise and vibration prevention and equipment study
- Research and establish a safe Indoor Air Quality Standard for public schools and sensitive receptors

- Research and establish a HVAC Indoor Air Quality Performance Standard

Examples of Design and Mitigation Alternatives

- Earmark Port tax-revenue for programs that support neighborhood resources in defined geographies
- Community Benefits Agreements
- Port container fees/tariffs
- Port petroleum products pass through fees/tariffs
- Establishment of Port Community Advisory Committees
- Establishment of Off-Port Community Mitigation Non-Profit Organization
- Establishment of a Wetlands Restoration Advisory Committee
- Prepare ports community danger and hazards risk footprint impact protection plan
- Prepare port community disaster preparedness and evacuation impact implementation plan
- Financial investment in green alternative technologies R & D, demonstration projects and certification

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