Concept Paper for the Freight Handbook

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Document Availability

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Comments

We welcome written comments sent to: freight@arb.ca.gov. Please provide any written comments on this Concept Paper by February 28, 2020.

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INTRODUCTION

To support public review, discussion, and feedback, this Concept Paper shares the California Air Resources Board (CARB or Board) staff's preliminary thoughts for the Freight Handbook. CARB is developing a Freight Handbook as an informational resource for community advocates, local decision makers, port terminals, railyard intermodal facilities, freight transportation corridor planners and freight facility developers, owners, and operators. The document will frame efforts to address air pollution impacts as "practices" which may apply to the siting, design, construction, and operation of freight facilities to minimize health impacts on nearby communities.

In recognition that specific communities in California are heavily impacted by air pollution, the California Legislature passed Assembly Bill 617 (AB 617) to reduce emissions directly from sources contributing to cumulative exposure burdens within and directly surrounding such communities. To implement AB 617, CARB established the Community Air Protection Program. In September 2018, the Board selected a set of initial communities to create Community Emissions Reduction Plans (CERPs), and will annually consider the selection of additional impacted communities. Freight facilities are one of the primary areas of concern in a number of communities currently developing CERPs. New actions proposed by these communities include increased engagement with local land use and transportation agencies to help minimize impacts from freight activities. Many of the actions and ideas summarized in this Concept Paper build off and support these AB 617 activities.

Prior to engaging in the AB 617 process, CARB initiated additional work on freight activities, through increased reviews of California Environmental Quality Act (CEQA) documents for proposed facilities, creation of the Sustainable Freight: Pathways to Zero and Near-Zero Emissions (April 2015) document, and development of the multi-agency California Sustainable Freight Action Plan (July 2016). Also, CARB staff have met frequently with residents and advocates for communities impacted by air pollution from freight operations and heard a consistent request for guidance that identifies possible local actions that could minimize freight facility emissions and related community exposure to air pollution.

Governor Brown's 2017 Executive Order B-32-15 is the first to direct the state of California to transition to zero emissions freight technology.

Governor Newsom's 2019 Executive Order N-19-19 furthered the State's commitment to transition towards a healthier, sustainable, and more inclusive economy. This includes addressing direct tailpipe emissions from diesel equipment and vehicles through strong public investments. California has prioritized billions of dollars in annual transportation spending for the construction, operation, and maintenance of infrastructure to help reverse the trend of increased fuel consumption and decrease vehicle miles traveled. The State also continues its effort to accelerate zero-emission vehicle sales through incentive programs, grants, and regulatory actions.

This Concept Paper supports the relevant freight-related actions proposed by communities developing CERPs through the Community Air Protection Program, ideas we've heard from communities, the recommendations we've included in our CEQA

comment letters on proposed freight facilities, and other existing resources. This Concept Paper is intended to aid and encourage public participation to help shape the Freight Handbook. CARB staff will continue to collaborate with communities,agencies, industry and other stakeholders through a public process, and will integrate public feedback into the creation a Freight Handbook that will provide a detailed discussion of the concepts introduced in this Concept Paper. This will include framing how practices may apply in a given scenario and the roles that local government, freight facility developers, owners, and operators, and the public have in land use planning and development review processes.

CARB is seeking robust engagement from community, public, and private industry participants. We encourage you to share your thoughts and expertise in this effort. In addition to any comments you would like to provide, CARB staff can greatly benefit from focused comments that:

- Suggest other land use scenarios that should be highlighted;
- Identify implementation challenges for practices listed in Tables 5 and 6;
- Propose other practices that can be undertaken to support the goals of the Freight Handbook;
- Clearly identify the specific issues on which you are commenting and provide a citation;
- Explain why you agree or disagree with a proposed practice. Where you disagree, please suggest an alternative and consider potential trade-offs as well as opposing views;
- Describe your assumptions and support assertions with factual information by providing technical data, or specific examples, where possible.

CONCEPTS FOR THE FREIGHT HANDBOOK

I. Context for Action

This Concept Paper introduces preliminary thoughts for a Freight Handbook. This Concept Paper serves as a starting point for local, regional, and State discussions about freight facility siting, design, construction, and operational decisions that can minimize and/or eliminate near-source exposure to air pollution from new, existing, and expanding freight facilities, and promote clean, healthy air for existing and future Californians and its millions of annual visitors. CARB's intent is to encourage land use planners and local officials, community advocates, and freight facility developers, owners, and operators to integrate emission and greenhouse gas reduction, prevention, elimination practices, mitigation and information about freight facilities into local plans and ordinances, facility-based decisions, and community advocacy.

California's freight transport system is vital to our State economy. California is the nation's largest gateway for international trade and domestic commerce, with an interconnected system of ports, railroads, highways, and roads that allow freight from around the world to move throughout the State and nation. This system is responsible for approximately one-third of the State's economic production, with jobs from freight-dependent industries accounting for over $700 billion in revenue and over 5 million jobs. California's vast transportation system connects the estimated nearly 40 million residents and supports a vibrant economy with nearly $3 trillion in annual gross domestic product. The trucks, chassis, gensets/TRU's and cargo handling equipment (CHE) that congregate at freight and off-site supporting freight facilities such as container storage yards, chassis storage yards and container fumigation facilities are essential components of the statewide freight system which transports and delivers food, household products, electronics, vehicles, toys, and medicines to the consumer market, both in California and the country. Traditional routes of moving freight face increasing competition from across the globe, and California's system must anticipate and stay ahead of these changes. As California's freight transport system continues to grow under pressure to serve our growing population and satisfy dynamic market demands, other locations in the United States and across the world are competing for this economic activity.

Although the freight system plays an important role in everyday life, communities near freight facilities are burdened by air pollution—specifically toxic air contaminants like diesel particulate matter in the form of exhaust—from the construction and operational activities at freight facilities. Where freight movement increases from new and existing facilities over time, communities may experience increased exposure to higher emissions of toxic and criteria air pollutants. Increased exposure to these emissions have public health implications such as increased risk of premature death, lung cancer, heart and lung diseases, and asthma. Increased exposure also increases public health care costs and premature death. The CARB study ….. estimated that the freight transportation cost California $ 2 billion annually. Increased greenhouse gasses can impact and damage our strong California agriculture.

To achieve its air quality, climate, efficiency and economic competitiveness goals,

California must transition to a more efficient, zero-emission transportation system for both passenger and freight movement. This is a complex and challenging undertaking. Meeting the State's goals will require the combined efforts of public and

private stakeholders taking action and investing resources across a wide range of sectors that include: energy and fuels, advanced technology, housing and land use, infrastructure, health, the environment, and the economy. Industries operating in California have already made substantial investments in cleaner diesel fuels, vehicles and equipment, reducing diesel particulate matter and other pollutants. California is currently the US leader in zero emission freight transportation technologies, emission capture and treatment technologies and clean hydrogen fuel cell power technologies. Progress is being made in many of these sectors in the form of State regulation, policy and funding, local actions, private innovation, investments supporting communities and exploring new technologies, and more.

The Concept Paper for the Freight Handbook will initiate a new dialogue to identify a set of practices that can be implemented to support flexibility, efficiency, and business practices through policies and programs that support the economy, while working with industry to mitigate the environmental and health inequities certain communities experience due to emissions from freight activities.

A. Roles and Responsibilities

A more efficient, zero and near-zero emission modern freight system will demand not only new vehicles, equipment, and fuels, but also new transportation infrastructure, communications, and industry operating practices. California will need workers trained to build, maintain, and operate this advanced equipment and communications systems. To help fund these efforts, California's logistics industry must remain profitable in the face of increasing competition from other North American seaports and supply chains. The ability to readily adapt to changing trends and expand operations is key to improving the competitiveness of the system. Community acceptance of industry expansion often depends on the prospects for new local jobs, clean air, and safe operations.

The transition to this modern freight system relies on public and private funds invested in infrastructure projects, vehicle and equipment purchases, technological applications, and system management approaches. It also requires the new regulatory and incentive programs underway to spur zero-emission and other clean technology development and deployment. To ensure effective implementation of these actions, many groups must come together to successfully achieve the needs of California's communities from public health, economic, and environmental standpoints.

Local governments that make land use decisions related to freight facilities are on the forefront of the transition to zero-emission operations. They must carefully consider a range of sometimes competing priorities for economic development and jobs, the critical need for affordable housing and infill development, public health, and quality of life for community residents. The owners and operators of new or expanded freight facilities play key roles in leading this transition and are positioned to make cost-effective investments in infrastructure while designing and building projects. Community residents and their advocates need a greater voice in freight facility siting, design, construction, and operation choices so the end result supports or enhances

their environment, safety, and opportunities for employment.

B. Need to Accelerate Air Quality Progress

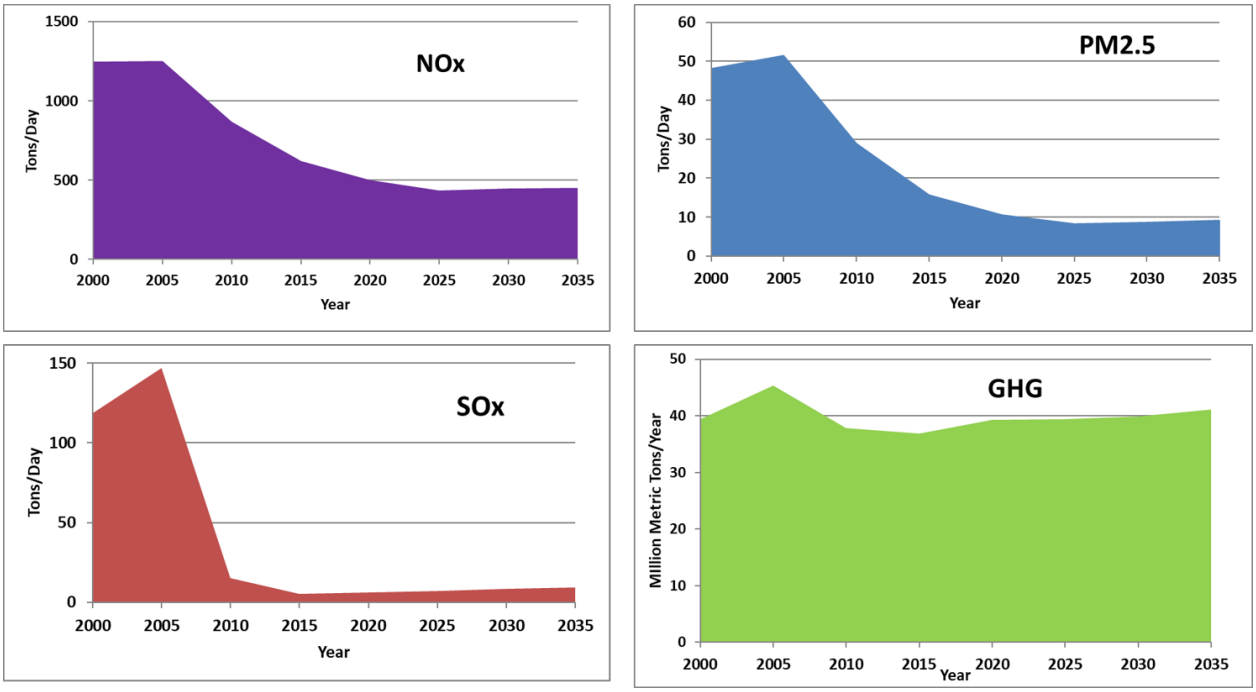
To control and reduce emissions, CARB gathers and analyzes data for updating its mobile source emissions inventories.[1] The inventories assess population, activities, and emissions from mobile sources operating in and around the State. Periodically, these inventories are updated to support the latest air quality plans and regulations. CARB compiles emissions data for on- and off-road mobile sources including off-shore emissions to prepare a statewide freight inventory.

The emissions from the heavy equipment that transports freight in California contributes to elevated ambient levels of criteria pollutants such as fine particulate matter and ozone, as well as localized health impacts near freight facilities. Freight transport accounts for about half of toxic diesel particulate matter (diesel PM) and emissions of nitrogen oxides that form ozone and fine particulate matter in the atmosphere, and six percent of the greenhouse gas emissions in California. These numbers include emissions from trucks, ships, locomotives, aircraft (cargo portion), harbor craft, and all types of equipment used to move freight across the State.

Figure 1 summarizes freight emissions statewide from CARB 2000 inventories projected to 2035. As illustrated in the graphs, CARB strategies for reducing criteria pollutants and greenhouse gas emissions have been effective. However, the State must continue to implement programs and develop new strategies to achieve its air quality goals.

[1] CARB. See, Mobile Source Emissions Inventory.

Figure 1. Freight Emission Inventory Statewide for 2000 and 2035



Source: CARB

Together with our local, regional, and state government partners, we have accelerated extensive changes towards cleaner technologies across the State. Truck owners, ocean carriers, terminal operators, and railroads have made substantial investments to transition their diesel freight equipment to cleaner models, while refineries retooled to produce cleaner diesel fuels. We are seeing the real-world benefits of those investments resulting in measurably cleaner air in communities near seaports and rail yards over the last decade. For example, these combined actions have cut toxic diesel PM at the State's largest seaports by more than 80 percent over the last decade.

However, California must accelerate implementation of air quality programs for the protection of public health. The State must continue to develop policies and make investments in technologies that result in greater emission reductions, elimination of emissions and emission capture and treatment technologies to achieve its air quality and public health goals. To that end, California is pursuing both incentive and regulatory approaches to reduce the high near-source cancer risk from freight facilities to community members, increase the sustainability of the freight system to meet targets in the State Implementation Plan, and reshape the freight system to achieve our long-term climate goals.

This need is especially acute in specific communities that are exposed to high cumulative levels of air pollution. To reduce this burden, and in response to Assembly Bill 617 (C. Garcia, Chapter 136, Statutes of 2017), CARB established the Community Air Protection Program. Through this program, the Board annually considers for selection impacted communities to collaborate with to develop and implement new locally-focused Community Emissions Reduction Plans (CERPs). Freight facilities are

One of the primary areas of concern in a number of communities currently developing CERPs due to their substantial toxic and criteria air pollution emissions. CARB staff have already begun working closely with local air districts, community groups, community members, environmental organizations, and regulated industries to identify emission reduction practices for freight facilities and supporting freight services such as container, container fumigation and chassis storage yards within the affected communities.

1. Near-Source Health Risks

Despite substantial progress over the last decade, the ongoing use of diesel-fueled trucks and cargo handling equipment continue to impact communities near major freight facilities. The diesel-fueled equipment operating in and around freight facilities is the most significant source of diesel PM, a toxic air contaminant that can substantially increase the risk of developing cancer and other health problems such as increased respiratory illnesses, risk of heart disease, and premature death. Exposure to diesel PM is a health hazard to people of all ages, but particularly to children whose lungs are still developing and the elderly, who may have other serious health problems. The diesel PM emissions from freight facilities impact communities located adjacent to those operations, as well as people living and working miles away.

In the last decade, advances in science have shown that early-life exposures to air toxics contribute to an increased lifetime risk of developing cancer, decreased lung development or other adverse health effects, compared to exposures that occur in adulthood. This research has shown that children and infants are more sensitive to the harmful effects of exposure to air toxics, like those emitted from freight equipment, than we previously understood.

In March 2015, the California Office of Environmental Health Hazard Assessment released an update to its recommended methodology for conducting health risk assessments in California. The methodology addresses this greater sensitivity and incorporates the most recent data on childhood and adult exposure to air toxics. Health risk assessments conducted by or available to CARB staff show the potential for elevated exposures to diesel PM in communities near freight facilities.

2. More Protective Air Quality Standards

Current control programs are reducing emissions, but the State Implementation Plans required by federal law to demonstrate our path to attain ozone and fine particle ambient air quality standards compel significant additional emission reductions, emissions elimination and emission capture and treatment technologies in the South Coast and San Joaquin Valley. At the same time, these two regions, and the San Francisco Bay Area, are experiencing tremendous growth in warehousing and distribution facilities due to e-commerce. The growth in the development of these facilities may increase air pollution from construction and their day-to-day operational activities.

3. Ambitious Climate Change Targets

New efforts in response to climate change are ramping up the pressure for further progress in the 2030 and 2050 timeframes to reduce greenhouse gases and short-lived climate pollutants, like black carbon from diesel-fueled equipment. California has set aggressive targets for reducing greenhouse gas emissions by 40 percent below 1990 levels by 2030, and then 80 percent below 1990 levels by 2050. California also committed to achieve zero-carbon electricity by 2045. Without action, greenhouse gases from the freight sector are projected to grow, driven by increases from freight movement. To curb emissions, the freight industry should accelerate efforts to integrate zero-emission, renewable energy technologies into facility operations to cut petroleum use.

C. State Vision for Sustainable Freight

In 2016, six State agencies, departments, and offices developed the California Sustainable Freight Action Plan. The plan identified State policies, programs, and investments to ensure progress toward a sustainable freight system.

Vision for a Sustainable Freight Transport System

Utilize a partnership of federal, State, regional, local, community, and industry stakeholders to move freight in California on a modern, safe, integrated, and resilient system that continues to support California's economy, jobs, and healthy, livable communities. Transporting freight reliably and efficiently by zero-emission equipment everywhere feasible, and near-zero emission equipment powered by clean, low-carbon renewable fuels everywhere else.

As part of that work, the State is dedicating considerable resources to modernize the freight transport system with a priority to integrate zero and near-zero emission technologies. These and other technologies have the potential to greatly reduce impacts from freight activities on nearby communities and regional air quality, as well as climate change. The benefits of reducing diesel PM emissions and near-source exposure, protecting public health, and achieving systematic reductions in climate pollution cannot be overstated.

II. How the Freight Handbook Can Inform Land Use Planning and Development Decisions

The Freight Handbook will describe new polices, programs and practices that reduce criteria and toxic pollutants and specially diesel PM emissions and near-source exposure, nitrogen oxides, greenhouses gases, and black carbon. We identified potential practices for inclusion in this Concept Paper because they have the potential to increase community participation and minimize community air pollution impacts from freight facilities.

III. Addressing Three Land Use Scenarios for Freight Facilities

This section provides an overview of staff's approach to frame the Freight Handbook. For each of the three land use scenarios, we identify potential practices that local government, freight facility developers, owners, and operators could implement with greater community involvement.

The scenarios are:

A. New and expanding freight facilities near existing residences, schools, child care, health care facilities, public parks, recreational facilities, libraries, senior citizen residence facilities and other sensitive receptors.

B. Existing freight facilities near existing residences, schools, child care, health care facilities, public parks, recreational facilities, senior citizen residence facilities, libraries and other sensitive receptors.

C. New residences, schools, child care, health care facilities, public parks, recreational facilities, senior citizen residence facilities, libraries and other sensitive receptors near existing freight facilities.

A. New and Expanding Freight Facilities near Existing Residences, Schools, Health Care Facilities, and Other Sensitive Receptors

D. In response to changing market demands, new freight facilities and supporting freight service facilities such as container, container fumigation and chassis storage yards are being built and many existing freight facilities are expanding physical footprints or increasing operational activities, particularly in the warehousing and distribution center sector. As more freight facilities are built, air pollutant emissions may increase from construction and operational activities over the baseline conditions on a development site. The Freight Handbook will describe practices that can minimize air pollutant emissions and community exposure. Table 1 summarizes some key potential practices for siting new or expanded freight facilities near existing residences, school, child care, health care facilities, public parks, recreational facilities, senior citizen residence facilities, libraries and other sensitive receptors.

Table 1. Potential Practices for Siting New or Expanded Freight Facilities near Existing Residences, Schools, Health Care Facilities, and Other Sensitive Receptors

1. Mandatory operation of zero-emission trucks and equipment.
2. Mandatory contractor, subcontractor and vendor use of zero-emission trucks and equipment.
3. Provide a "transition zone" between new or expanded freight facility and existing residences, schools, child care, health care facilities, public parks, recreational facilities, senior citizen residence facilities, libraries and other sensitive receptors.
4. Identify and implement exposure reduction and/or elimination approaches (air filters, trees, and walls)
5. Develop and implement designated truck and rail routes and public safety programs.
6. Establishment of a mandatory Buffer Zone distance.

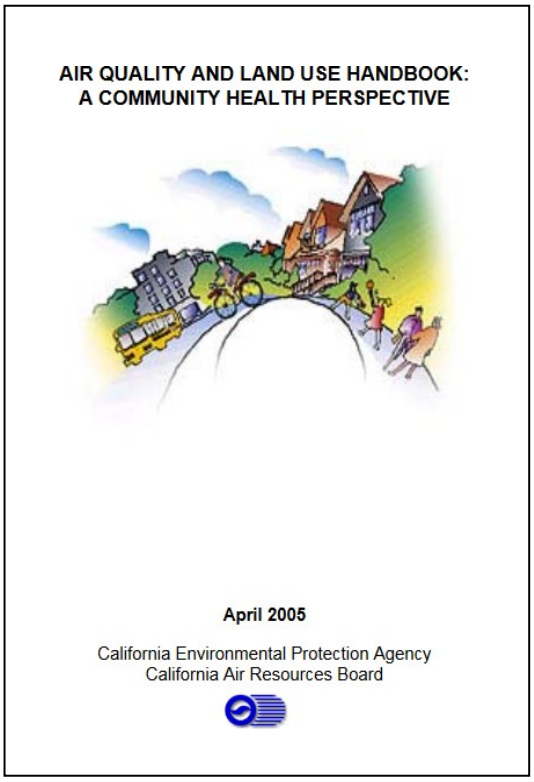
Staff is also identifying potential practices for local governments to consider when preparing or updating land use documents and zoning codes. These include planning documents and ordinances that identify impacted areas and zoning that supports practices that new and expanding freight facility projects can implement. For example, city of Los Angeles CUGU.

Practices for freight facility developers could include use of the lowest emitting construction equipment, routing truck hauling and delivery activities away from neighbors, and locating on-site operations to minimize the air pollution, safety, and nuisance impacts on neighbors. Once built, freight facility owners and operators can utilize zero-emission trucks, cargo handling equipment and portable power equipment on-site. Where zero-emission operations are not yet feasible, owners and operators can use and allow on site near-zero emission technologies utilizing renewable energy, with a plan for transitioning to zero in the future. Owners and operators can also install vegetated barriers, contribute to funding programs for installing and maintaining adequate air filtration in public schools and on buildings that house sensitive receptors, designate truck delivery routes, and appropriately locate truck access points and loading areas. Example: the Port of Los Angeles TraPac Container Terminal Expansion Project Settlement MOU which included a $6 million mitigation fund to install air filters in all public elementary schools in Wilmington and San Pedro.

Potential community advocacy practices include engagement in land use planning and development review processes, monitoring facility activities, community emergency preparedness plans and reporting any concerns. This may include attending community workshops, public events and hearings, and monitoring implementation efforts.

1. Preliminary Distances for Establishing Transition Zones

As described in prior CARB documents, studies show that public exposure to air pollution can be substantially elevated near freight facilities with diesel-fueled vehicles and equipment. And that same pollution decreases sharply with distance from the source because of how particles move and deposit on surfaces. For that reason, CARB will continue to encourage space that separates new or expanded freight facilities served by diesel and other combustion vehicles and equipment from sensitive receptors.



CARB's 2005 Air Quality and Land Use Handbook discussed siting new sensitive receptors a minimum distance away from existing air pollution sources of all types. This Concept Paper discusses siting new or expanded freight facilities away from existing residences, schools, health care facilities, and other sensitive receptors.

In this Concept Paper, we refer to this space as a "buffer zone" to separate land use zones for new or expanded freight facilities away from sensitive land uses such as residences, schools, child care, health care facilities, public parks, recreational facilities, senior citizen residence facilities, libraries and other sensitive receptors.

Buffer zones are important because increasing the distance between an emission source and sensitive receptor is a particularly effective means of protecting vulnerable people (children, the elderly, and medically compromised individuals) from exposure to air pollution from freight facilities. Buffer zones might contain green space, or revenue-producing uses like commercial office buildings or retail. The key is to find uses that would naturally limit the duration of time that people are exposed to air pollution from the nearby freight facility. Example: city of Los Angeles Clean Up Green Up (CUGU) Ordinance.

We plan to identify minimum Buffer zone distances for new and expanded freight facilities to protect the health of communities near these facilities. Through a collaborative public process, CARB will work with community advocates, local decision makers, and freight facility owners, operators, and developers to design and evaluate the technical analysis needed to determine appropriate distances. We encourage you to share your thoughts and expertise in this effort.

Buffer zone recommendations in the Freight Handbook will be intended to provide Best Practices guidance to local land use decision makers regarding zoning, permitting,

and project approval actions for new or expanded freight facilities. They should not be used as a substitute for site-specific assessments of emissions, health impacts, traffic congestions, public safety and emergency preparedness for proposed freight facilities, including those analyses required or recommended as part of federal or State environmental review processes. Additionally, they should not be used as an indicator of a safe level of exposure to emissions from freight facilities, as health risks may exist beyond distances identified.

Freight facilities are often strategically placed in response to the logistic chain or purpose they serve; therefore, each freight facility often has its own activity profile and configuration. Community exposure to diesel PM can vary depending on the proximity to, freight transportation corridor type and the geographic location of, a freight facility.

Regardless of the size of a new freight facility or its operational characteristics, we strongly recommend that new freight facilities be designed and built for eventual full zero-emission operation. Multiple types and models of zero-emission or near Zero-emission operation freight vehicles and equipment are available today. Many others are in development or demonstration phases. To support the goal of a zero-emission freight system, CARB is pursuing an ambitious agenda to require vehicles, equipment, and facilities to make the transition to zero-emission options. Building a new freight facility with cooler white roofs, no black asphalt parking lots, LED lighting and renewable energy infrastructure to power this equipment is more cost effective and less disruptive to operations than retrofitting a facility later.

Even if a new or expanded freight facility is sited consistent with an identified Buffer zone, the facility should still reduce its air pollutant emissions, assess all cumulative impacts and mitigate impacts to the maximum extent possible. This is critical to continue California's progress to reduce local air toxics emissions and near-source exposure, achieving and maintaining regional air quality goals, and combatting climate change.

Lastly, a facility would be subject to local ordinances that address other potential impacts such as noise, vibration, facility rail spurs, entrances and exits to residential areas and sensitive receptors, light pollution, and water pollution. The local agency would review a proposed freight facility to ensure compliance with applicable standards, rules, and regulations including adequate distances to avoid or reduce an impact.

2. Proposed Approach for Determining Buffer Zone Distances

The best practices to be provided in the Freight Handbook are intended to reduce air pollution and greenhouse gases at freight facilities. But the transition zone concept specifically focuses on the proximity of new diesel vehicles, cargo handling equipment and diesel emergency backup power to people, and the associated near-source cancer risks to community members. This section discusses the data and an approach that could be used to develop the distances for the transition zones.

The Buffer zone distances for new or expanded freight facilities with diesel vehicles, cargo handling equipment and diesel emergency backup power would be based on both technical analysis, impact assessments, mitigation measures and discussions within a collaborative public process. The intent of the analysis would be to evaluate the general diesel PM-related exposure trends for freight facilities based on current practices and pollution control technology. The public discussions would help inform the selection of distances, based on a review of the technical analysis. The technical analysis and discussion would not be intended to identify a distance that should be interpreted to correspond to a safe level of exposure to diesel PM. For all facility types using diesel equipment that we have previously evaluated, the analysis shows that excess cancer risk remains unless zero-emission technology is used. This is important because there is currently no safe level identified for exposure to diesel exhaust.

A freight facility with zero on-site emissions does not present the same issues with near-source cancer risk or other localized health impacts to sensitive receptors as a facility with combustion-related air pollution. However, we are aware that there may be concerns from residents about other factors (e.g. traffic congestion, public safety, blight-trash/graffiti magnet, rain/mud run-off, noise, vibration, odor, glare, etc.) associated with freight operations that support a transition zone even around a zero-emission facility. Here, we suggest 500 feet from existing residences, schools, health care facilities, or other sensitive receptors as a potential distance.

We do not propose 2,500 feet is appropriate distance for a zero-emission freight facility in every instance. Rather, we suggest 2,500 feet in order to avoid implying zero-emission facilities would not result in any potential impact. We are seeking input to determine an appropriate transition zone for freight facilities with zero on-site emissions.

Table 2 serves to illustrate how CARB staff proposes to display minimum transition zone distances for new and expanded freight facilities. The top value of each range (X and Y) will be the minimum transition zone distance for freight facilities with diesel vehicles and equipment on site, while the 2,500 foot transition zone assumes zero on-site emissions.

Table 2. Illustration of Transition Zone Distances Around New or Expanded Freight Facilities

Facility Type	Preliminary Distance from Facility
Warehouse/ Distribution Centers > [TBD] square feet	2,500 feet to X
Cold Storage Warehouses	2,500 feet to Y

Source: CARB

a. Analytical Approach

An analytical approach could focus on evaluating dispersion modeling results from published Health Risk Assessment (HRA studies and Health Impact Assessments (HIA), Public Health Surveys or modeling of a representative facility and the associated cancer risk estimates[2]. Through a collaborative public process, we could identify representative facility characteristics or a representative study for a high-activity freight facility that includes all diesel vehicles and equipment typically operating at that freight facility. This approach would provide the most appropriate and health-protective analysis for this purpose.

The projected ground-level concentrations of diesel PM and other toxic chemical components in the downwind direction for each selected freight facility study could be extracted, with adjustments if needed based on emission changes, and updated estimates of the associated potential excess cancer risks would be generated.

b. Emissions, Exposure, and Cancer Risk

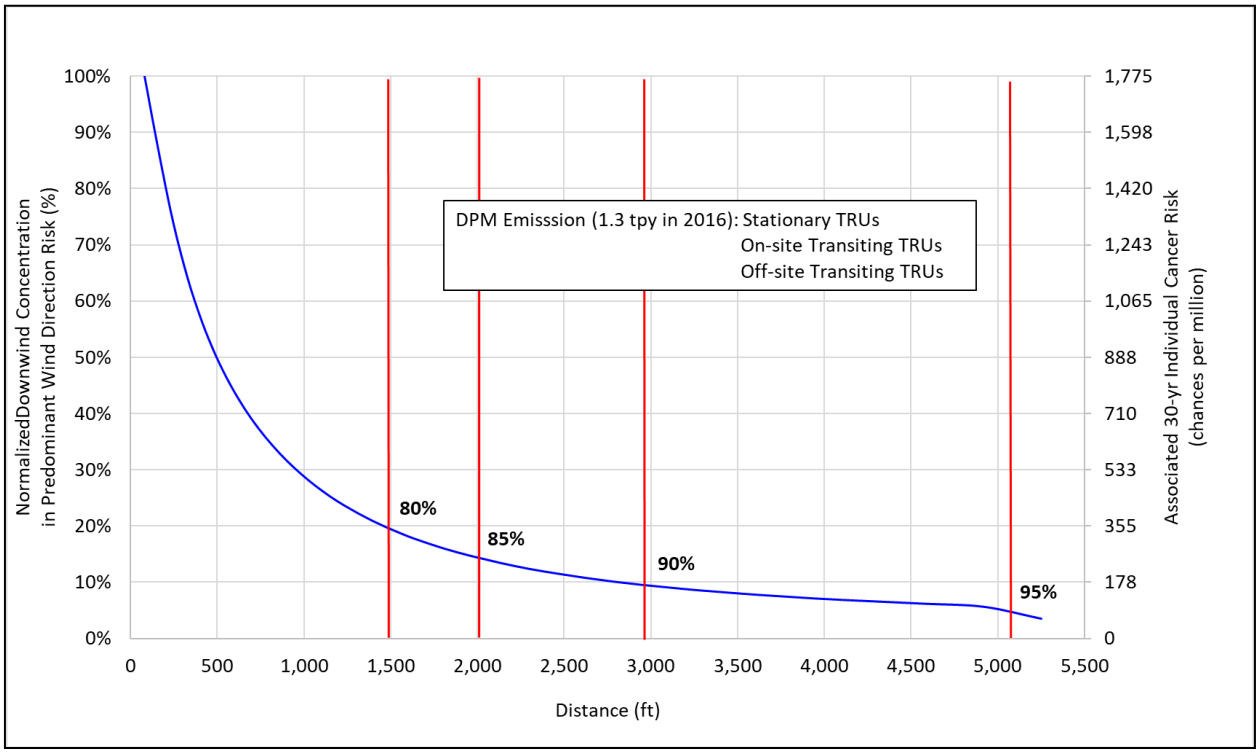
Generally, emissions from a facility depend on the emission level of the equipment, and the number and activity level of the equipment. Since existing studies focus on facility operations and emissions from different years, the facility emissions from different HRAs, HIA's, Public Health Surveys could be updated to the same reference year, without changing the original activity levels to develop a consistent baseline for a transition zone. We could also assume that the physical location of emission sources would not change from the original analyses. The intent of such an analysis would be to provide a series of reference points that illustrate the relationship between cancer risks, air pollutant concentrations, and distance.

The result of such an analysis would be a series of graphs that would include reference points where the diesel PM and other toxic chemical components concentration and cancer risk decrease, compared to the highest near-source risk level to community members (i.e. the "maximum exposed individual").

For example, Figure 2 illustrates a preliminary analysis of normalized diesel PM concentrations for a high-activity cold-storage warehouse. The red lines in the graph represent the distances downwind from the highest off-site risk value where the diesel PM concentration (left axis) and the associated cancer risks (right axis) are reduced by 80, 85, 90, and 95 percent.

[2] Using the Office of Environmental Health Hazard Assessment (OEHHA) *Air Toxics Hotspots Program Guidance Manual for Preparation of Health Risk Assessments* (OEHHA Guidance)

Figure 2. Normalized Downwind Diesel PM Concentration and Associated 30-Year Cancer Risk by Distance



c. Factors in Identifying Distances

To identify a health-protective distance for the transition zones, CARB staff could provide modeling expertise and scientific judgement, and would work with stakeholders to consider the most relevant factors. Since CARB's 2005 Air Quality and Land Use Handbook recommended distances based on reducing exposure and cancer risk by 80 percent, we could start with that approach. However, in most cases an 80 percent reduction in cancer risk would still result in high residual cancer risks for most facility types, based on the latest health science and health risk assessments in development applications CARB has reviewed. Staff therefore suggests examining, at minimum, the distances needed to achieve an 85, 90, and 95 percent reduction in concentration and cancer risk. Staff may also recommend and public comment that a facility expansion project or new facility project must be 100% zero emissions to have zero public health and environmental impact to be approved.

In discussions and further analysis, CARB proposes that all of these factors should be considered to develop reasonable transition zone distances for local land use planners to consider when making zoning and project approval decisions for new and expanded freight facilities. We expect and welcome public feedback on these concepts.

B. Existing Freight Facilities near Existing Residences, Schools, Health Care Facilities, and Other Sensitive Receptors

In many communities, existing freight facilities are located in proximity to existing residencies, schools, health care facilities, and other sensitive receptors. To address health impacts related to emissions from freight facilities, a collective effort among State, regional, and local officials is needed. Table 3 summarizes some of CARB's activities to support efforts that reduce air quality impacts from freight facilities. CARB and air districts continue working to reduce air pollution through regulations and permitting while local agencies primarily address truck routing and parking issues. Together, the combination of actions can minimize air pollution and reduce negative health impacts from existing freight facilities.

Table 3. CARB Activities Supporting California's Efforts to Reduce Impacts from Existing Freight Facilities Near Existing Residences, Schools, Health Care Facilities, and Other Sensitive Receptors

1. Strengthen CARB statewide regulations for new and in-use diesel-fueled equipment, plus charging/fueling infrastructure at freight facilities
2. Petition the federal government for stricter emission standards
3. Use incentives to demonstrate and deploy zero-emission technology and install freight infrastructure, with a focus on communities near freight facilities
4. Mandate that all existing vehicles, CHE and portable power equipment must be replaced with zero emissions within 5 years.
5. Mandate that all new vehicles, CHE and portable power equipment purchased must be zero emissions.
6. Support air district Indirect Source Review rules at freight facilities
7. Encourage cities to develop/enforce local truck routing, idling limits, and parking requirements away from residential areas and sensitive receptors.
8. Encourage Caltrans, other government agencies, and industry stakeholders to expand safe and clean truck parking, and reduce truck idling.

Existing and new CARB regulations in development will further reduce air pollution from trucks and equipment. CARB staff plans to propose regulations that strengthen regulations for new and in-use diesel equipment, zero and near-zero emission equipment and charging/fueling infrastructure at freight facilities. CARB currently provides incentives to support demonstration projects that deploy zero-emission technologies, with a focus on communities near freight facilities.

We also advocate with other agencies at all levels for stricter national and international emission standards, zero-emission requirements, new air district rules for freight facilities, and methods to reduce truck impacts. Local governments can designate truck routes and restrict parking near sensitive land uses. Local air districts continue to develop methods for quantifying emissions, new rules to control emissions, and offer an array of financial incentives. State agencies continue to implement and update the

California Sustainable Freight Action Plan, with commitments from Caltrans, the Energy Commission, CARB, and others to develop regulations, funding opportunities, and demonstration projects targeted at improving the statewide freight system.

C. New Residences, Schools, Health Care Facilities, and Other Sensitive Receptors near Existing Freight Facilities

The State recognizes the critical need for affordable housing, infill development, and greenhouse gas reductions. The Freight Handbook will describe best practices that could be implemented through land use policies and permitting to support development while minimizing pollution. Table 4 lists some examples of positive steps that development projects placing sensitive receptors near existing freight facilities can take.

Table 4. Potential Practices for New Residences, Schools, Health Care Facilities, and Other Sensitive Receptors Near Existing Freight Facilities

1. Health impact disclosures to prospective occupants within transition zone
2. Exposure reduction strategies (air filters, trees, and walls)
3. Developer installation and replacement of air filtration devices through covenants, conditions, and restrictions recorded against the developed property to ensure existing and future owners comply with air filtration requirements throughout the life of the structure
4. Initiate a public process to address and implement truck routing, idling, parking and safety programs
5. Developer establishes a Mitigation Fund to support existing freight facilities purchase of zero emissions vehicles, CHE, portable power equipment.
6. Developer establishes a Mitigation Fund to support existing freight facilities light pollution, noise and vibration community, residential, public school, child care center and sensitive receptor impact mitigation.

Development proposals can incorporate strategies to reduce exposure like maintaining vegetated walls, sound proofing, lower light poles, light reflectors and barriers between the project site and freight facilities. New freight projects can be designed to minimize community exposure to diesel exhaust along truck routes. Developers must disclose the potential health and environmental impacts to prospective occupants within transition zones, install and maintain air filters, and contribute to local investments that reduce, eliminate, capture and treat emissions from nearby freight facilities.

Freight facility owners and operators can collaborate with local agencies and communities, community organizations on ways to minimize air pollution, light pollution, traffic congestion, noise, vibration, blight-trash/graffiti magnet and rain/mud run-off from existing operations. This may include upgrading diesel or other combustion equipment to zero emissions or emissions capture and treatment technologies and providing operational data to inform land use decisions. Community residents can participate in land use planning and development review processes. To strengthen that participation, community members may wish to organize and engage local officials through advisory committees on solutions to address neighborhood

concerns.

IV. Summary of Potential Practices

In the Freight Handbook, CARB staff will describe practices that may apply to one or more of the three land use scenarios. This Concept Paper introduces our approaches in several categories: broad-based, priority project-specific, and additional practices and mitigation. Tables 5 and 6 summarize the potential practices for implementing

entities: local government and air districts; freight facility developers, owners, and operators; and the public.

A. Broad-Based Practices

Local governments can address air pollution, light pollution, traffic congestion, noise, vibration, blight-trash/graffiti magnet and rain/mud run-off from freight facilities on a project-by- project basis and through a broader planning approach. The Freight Handbook will discuss broad-based practices that we are developing from a review of land use documents, ordinances, and conditions of approval as well as relevant land use planning policies and local implementation programs. Example: the Los Angeles Green Up Clean Up EJ Zone Ordinance. Broad-based practices aim to help local governments address air pollution through land use documents. The Freight Handbook will encourage local officials to collaborate with air districts and community-based organizations on the development of land use policies, incentive and funding programs.

B. Priority Project-Specific Practices

CARB has established a variety of programs, regulations, incentives, and policies designed to support the State's transformation toward a more sustainable freight system. These include a range of actions to minimize the community health impacts from freight facilities. The Freight Handbook will identify project-specific practices that local governments and freight facility developers, owners, and operators can implement. Community members and organizations are encouraged to provide early input to ensure goals are set that meet community expectations, monitor implementation and report any ongoing concerns.

C. Additional Practices and Mitigation

Freight facilities can deploy additional practices that accelerate the transition to zero-emission operations, reduce the exposure of communities to air pollution, light pollution, traffic congestion, noise, vibration and blight-trash/graffiti magnet and minimize emissions from their activity and workforce commuting. Potential practices and mitigation include: vegetative walls, sound proofing, rain/mud run-off and other solid barriers, air filtration devices, development programs, and lease agreements.

D. Resources for Development of Potential Practices

CARB staff routinely review and comment on environmental analyses prepared for individual freight facility projects pursuant to CEQA. Comments generally focus on the need for accurate characterization of a project's air pollutant emissions, appropriate modeling assumptions and results, health risk analysis, health impact assessments, public health surveys and mitigation to reduce air quality impacts. We post these comment letters on our website and encourage local governments, freight facility developers and owners, and the public to periodically check for updates to influence project design or mitigation.[3]

[3] California Air Resources Board, California Environmental Quality Act Comment Letters on Freight Facility Projects.

We drew from these letters, staff technology assessments and regulatory requirements, public comments at prior community meetings, and more than 50 documents prepared by other government agencies and advocacy organizations to identify potential practices, as summarized in this Concept Paper and being considered for the Freight Handbook. Many of the identified practices describe existing local government practices while others encourage collaboration between local agencies, freight facilities owners and operators, and the public. Land use planning and decision-making is a complex process. While the authority to regulate land use is primarily vested in local governments, air districts account for, and depend upon, local land use decisions when preparing air quality planning documents and conducting rule-making processes. For that reason, local governments and air districts should consider the identified practices when updating and implementing their planning efforts.

Table 5 presents a list of potential practices to minimize community health impacts from freight facilities. We are sharing this list to signal the range of practices we are considering for inclusion in the Freight Handbook. A refined list of potential practices specific to warehouses, distribution centers, cold-storage facilities, container storage yards, chassis/genset/TRU storage yards and container fumigation facilities is summarized in Table 6. We are seeking input on the general substance of all potential practices as well as what level the Freight Handbook should describe practices and appropriate methods to implement a practice.

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Table 5. Summary of Potential Practices to Minimize Community Health Impacts from Freight Facilities

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
BROAD-BASED			
Local Freight Committee	Convene a local freight committee comprised of community members and freight representatives to solicit input on land use policies that provide a framework for assessing air quality impacts and addressing community exposure from freight facility projects.	Facility or industry representatives participate on a local freight committee to incorporate community suggestions, gather or provide information, and consider feedback to inform the siting and design of freight facility projects before submitting permit applications.	Form or participate in a freight committee, to help organize and advocate for changes to planning processes and permitting of freight facility projects.
Economic Development Coalition	Establish a coalition of community members, industry stakeholders, and local economic development entities to identify approaches to providing economic and public health benefits to communities near freight facilities.	Facility or industry representatives participate in the coalition to provide operations information and inform cost effectiveness discussions supporting an efficient and strategic deployment of cleaner freight vehicles and equipment.	Building off existing community air protection efforts, participate in the coalition and identify community-specific priorities that determine the balance of economic and public health considerations.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Land Use Policies	Develop land use policies for addressing and minimizing community exposure to air pollution from increased development of freight-related projects when updating land use planning documents.	Design freight facility projects that are consistent with land use policies intended for addressing community exposure prior to submitting permit applications.	Participate in local processes to update land use documents by advocating and proposing land use policies.
Local Ordinances	Update ordinances (i.e., site design standards and operational standards in zoning ordinances) and associated permitting conditions consistent with updated ordinance standards that require freight projects to achieve zero-emission operations. Establish a new Community EJ Protective Zone Ordinance.	Integrate zero-emission and emissions capture and treatment technologies (freight train, ships, barges, port lift bridges) technologies to the maximum extent feasible and incorporate project design features that minimize community exposure prior to submitting permit applications.	Engage local agencies during the development of ordinances and permitting conditions.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Rezone and Remove Nonconforming Uses	Update or adopt an ordinance to phase out freight facilities or operations in close proximity to sensitive receptors when updating the General Plan and zoning code.	Phase out freight facility operations adjacent to sensitive receptors or phase out older equipment and, where possible, avoid siting new and expanding freight facilities in proximity to sensitive receptors.	Advocate and support local officials in adopting or updating ordinances that restrict or phase out freight operations in areas of the community impacted by existing freight facilities.
Improvement and Financing Districts	Create improvement and/or financing districts to generate revenue for infrastructure that supports zero-emission technologies at freight facilities.	Collaborate with local agencies to identify financing needs for supporting needed infrastructure improvements at freight facilities; commit to investments that achieve zero-emission operations.	Participate in processes to form financing districts that link investments in fully zero-emission operations and emission capture and treatment technologies with benefits to the community.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Development Programs and Agreements	Require freight and supporting facilities (container storage yards, chassis/genset/TRU storage yards and container fumigation facilities) facilities to establish or contribute towards publically administered Development Programs that help fund projects for reducing community exposure to air pollution from freight.	Negotiate with local agencies and community organizations to establish or contribute towards publically administered development programs that reduce community exposure to air pollution.	Participate in processes to establish or administer development programs in support of activities that fund appropriate projects that reduce community air pollutant light pollution, traffic congestion, noise, vibration and blight-trash/graffiti magnet exposure.
Cumulative Analysis Criteria	Establish screening criteria to evaluate a freight facility's contribution to a cumulatively considerable air quality impact including but not limited to identifying impacted areas, adopting local thresholds of significance, and developing standardized modeling parameters.	Consider a freight facility's surrounding air quality conditions to inform siting decisions and implementing all feasible practices for reducing air pollution and community exposure before submitting permit applications.	Advocate for planning agencies to collaborate with air districts and county departments of public health and sustainability when developing cumulative thresholds, impact significance criteria, and mitigation to address cumulative impacts from freight facilities.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
PRIORITY PROJECT-SPECIFIC			
Health Protective Siting	Zone freight activities with consideration of avoiding health impacts to sensitive receptors when updating the General Plan and zoning code.	Prioritize development at properties with adequate distances from sensitive receptors and design projects to minimize community exposure.	Inform zoning and permitting decisions to ensure adequate distances are provided for protecting nearby sensitive receptors. Advocate for planning agencies to collaborate with air districts and county departments of public health and sustainability.
Zero-Emission Technology	Adopt or update site design and operational standards, consistent with updated standards and associated conditions of approval, that require freight facility projects to operate fully with zero-emissions everywhere feasible, and near-zero emission equipment powered by renewable energy everywhere else.	Commit to fully operate with zero-emissions and invest in infrastructure to support zero-emission equipment everywhere feasible, and near-zero emission equipment powered by renewable energy everywhere else, when designing or updating a freight facility.	Inform local processes to develop conditions of approval, monitor implementation and report any ongoing concerns.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Zero-Emission Infrastructure	Adopt or update site design and operational standards, consistent with updated ordinance standards, and associated conditions of approval to require infrastructure for freight projects that support full zero-emission operation at the facility.	Commit to investments in zero-emission technologies and infrastructure for all facility operations and service providers, and coordinate with utility companies to provide zero-emission infrastructure when developing site design.	Advocate for land use decisions that help expedite the development of the zero-emission charging/furling infrastructure in California.
Clean Heavy-Duty Truck Parking	Establish a heavy-duty truck parking program that provides clean, safe, and affordable truck parking with support for zero-emission technologies.	Reserve land for clean heavy-duty truck parking and install zero-emission infrastructure to eliminate truck and TRU emissions while parked.	Inform land use decisions to identify heavy-duty truck parking, monitor implementation and report any ongoing concerns.
Truck Routing	Designate all truck routes, within community input, that service freight facilities to avoid sensitive receptors when updating land use planning documents and permitting conditions.	Inform local agencies and community members to design truck routes to serve freight facility needs and minimize exposure to air pollution.	Inform land use decisions to designate truck routes, and monitor implementation and report any ongoing concerns.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Residential Project Design	Update or adopt ordinances that require site design and operational standards and associated conditions of approval for buildings with sensitive receptors located downwind of freight facilities to require practices that reduce sensitive receptors' exposure to the freight facility's emissions when permitting new development.	Coordinate with local agencies to identify financial tools that accelerate or support investments in zero-emission technology.	Support land use decisions that ensure local agencies consider all applicable practices and permitting conditions that will result in reductions in exposure.
Freight Facility Design	Update or adopt ordinances that require site design and operational standards and associated conditions of approval that require site design features for reducing air pollution and minimizing community exposure during development review.	Design freight facility access points and operational activities to minimize community exposure prior to submitting permit applications.	Support land use decision processes that ensure local agencies consider all applicable practices and permitting conditions that will support reductions in exposure to local communities.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
ADDITIONAL PRACTICES AND MITIGATION			
Vegetation and Other Barriers	Establish a program that requires freight facility owners to maintain vegetated walls or other appropriate barriers that separate facility operations from sensitive receptors when permitting freight facilities.	Dedicate land and resources to construct and maintain vegetated barriers or other appropriate tools to cut exposure when designing freight facilities.	Support land use decisions that ensure local agencies require freight facilities to construct and maintain vegetated walls or other barriers, where appropriate.
Air Filtration Devices	Partner with regional planning agencies and air districts to develop a program for installing and maintaining high-efficiency air filtration devices in existing and new sensitive receptors in proximity to freight facilities.	Support programs to install and maintain high efficiency air filters in existing buildings with sensitive receptors in proximity of freight facilities.	Collaborate with residential property owners and management organizations to promote the deployment, maintenance, and repair of air filtration systems through covenants, conditions, and restrictions.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Implement Required Clean Technology Early	Collaborate with CARB or the local air district on local actions to accelerate implementation of cleaner technologies required by State or district regulation at new freight facilities.	Commit to fund and develop a schedule for early compliance with CARB or district regulations.	Monitor implementation of clean technology programs and report any ongoing concerns.
Rate Structures	Adopt or update conditions of approval that require a rate structure that incentivizes freight facilities to contract with trucking, rail, and marine companies that utilize the lowest emitting transport technologies.	Implement a rate structure and charge more for access by higher emitting trucks, locomotives, or other equipment, and include a fee rate for zero-emission technologies.	Support the development and adoption of rate structures that support the accelerated deployment of zero-emission equipment.
Community Benefit Agreements	Support or administer community benefit agreements to address air quality impacts from freight facility projects and community exposure to air pollution. Support non-profit foundations that specialize in community mitigation programs. Example: The Port of Los Angeles created Harbor Community Benefit	Establish or support community benefit agreements to implement practices that provide air pollutant reductions at facilities and provide local benefits to impacted communities.	Negotiate with local agencies and developers to establish and implement community benefit agreements that address community air pollutant exposure from freight activities; monitor implementation and report any ongoing concerns.

	Foundation.		
Emission Capture and Treatment	Adopt or update site design and operational standards, consistent with updated standards and associated conditions of approval, that require freight facility projects to incorporate Emission Capture and Treatment technologies as an alternative when zero emissions technologies are not available. Example: ALECS-Advanced Locomotive Emissions Control System and AMECS-Advanced Maritime Emissions Control System.	Commit to fully operate with and invest-in Emission Capture and Treatment technologies when zero emissions technologies are not available.	Inform local processes to develop conditions of approval, monitor implementation and report any ongoing concerns.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Lease Agreements	Adopt or update conditions of approval for permitting that require freight facilities to use the cleanest commercially available technologies.	Include contractual language in lease agreements that requires zero-emission technologies everywhere feasible, and near-zero emission equipment powered by renewable energy everywhere else.	Advocate for the development of freight facility agreements that incorporate commitments for deployment of clean technologies.
Advanced Technologies	Require freight facilities to conduct periodic reviews of operations to identify opportunities to upgrade or phase out older equipment, as part of Development Agreements.	Conduct periodic reviews and commit to purchase, or require tenants to utilize zero-emission technologies or near zero-emission technologies if zero is not yet feasible.	Monitor implementation and report any ongoing concerns.
Mitigation Monitoring Reporting Program	Develop mitigation monitoring and reporting programs (MMPRs) to require periodic data and operational information to demonstrate compliance. Support non-profit foundations that specialize in community mitigation programs. Example: The Port of Los Angeles created Harbor Community Benefit	Post MMRPs and supporting documentation for public review with periodic updates that describe efforts to implement applicable practices.	Participate in development of MMPRs, follow implementation and report any ongoing concerns.

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Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Public Contracting	Include requirements in public contracting document (i.e., Request for Proposals and Request for Qualifications) to specify that bidders implement practices that reduce air quality impacts and address community exposure to air pollution.	Submit proposals that meet or exceed the minimum set criteria for bidders to implement practices that reduce air quality impacts and address community exposure to air pollution.	Monitor implementation and report any ongoing concerns.
Employee Commuting	Establish or update program guidelines with sufficient resources to support alternative commute modes for freight facilities with more than 50 employees.	Commit to fund transit pass subsidies and support incentive programs for other forms of commuting; provide travel data to inform future program updates.	Participate in commuter programs, monitor implementation, and report any ongoing concerns.

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CONCEPTS FOR WAREHOUSE FACILITIES

The Freight Handbook will include practices for the siting, design, construction, and operations of warehouse facilities. Warehouses and other facilities (distribution centers, cold storage, etc., referred to collectively as "warehouse facilities") operate under similar conditions with primarily combustion-powered vehicles and equipment. As of 2019, most freight vehicles and equipment at warehouses run on diesel fuel.

In many communities, warehouse facilities are sited near existing transportation networks to access regional markets. Siting new warehouse facilities within or in close proximity to a neighborhood can compound air quality impacts from other air pollutant sources such as high-volume roadways and existing freight facilities nearby.

We are developing warehouse practices to serve as an informational resource to help communities, decision-makers, and warehouse facility developers, owners, and operators identify and implement practices to minimize community exposure to air pollution from these facilities. As described in CEQA comment letters, CARB staff continues to support building these facilities to achieve full zero-emission operation, implementing zero-emission technologies everywhere feasible, and near-zero emission equipment powered by renewable energy everywhere else.

Table 6 lists potential practices at warehouse facilities. The potential practices below compliment or expand upon potential practices listed in Table 5. As discussed above, local governments and air districts should consider these potential practices when permitting projects and when updating and implementing planning efforts. We are seeking input on the substance of potential practices as well as what level CARB should describe practices and appropriate methods to implement practices for warehouse facilities.

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Table 6. Summary of Potential Practices at Warehouses and Distribution Centers

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
PLANNING, REVIEW, AND PERMITTING			
Update Zoning	Review and update, or adopt, a zoning ordinance (site design and operational standards) to ensure warehousing activities are permitted in areas based on health risks from the warehouse's operational air pollution emissions, an appropriate distance from sensitive receptors.	Identify development opportunities that allow facility operations, or design facility projects, at appropriate distances; utilize air dispersion modeling, as necessary, to estimate exposure risk and inform design-level decisions prior to identifying air pollutant mitigation.	Engage local agencies and participate in review and updates to zoning ordinances for minimizing community exposure to air pollutant emissions.
Zero-Emission Operations and Emission Capture and Treatment technologies as an alternative when zero emissions technologies are not available. : Land Use Policies and Standard Permitting Conditions of Approval	During permit review process, and through standard permitting conditions, to require freight facilities fully operate with zero-emissions equipment everywhere feasible and Emission Capture and Treatment technologies as an alternative when zero emissions technologies are not available. , and near-zero emission equipment powered by	Design projects to integrate zero-emission technologies to the extent feasible prior to submitting permit applications; commit to contractual obligations that fully require tenants to zero-emission equipment Emission Capture and Treatment technologies as an alternative when zero emissions technologies are not available. operations everywhere feasible, and near- zero emission equipment powered	Support local agencies' adoption of land use policies and standard permitting conditions that will result in the deployment of cleaner technologies.

	renewable energy everywhere else.	by renewable energy everywhere else.	

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Zero-Emission and Emission Capture and Treatment technologies as an alternative when zero emissions technologies are not available Infrastructure: Land Use Policies and Standard Permitting Conditions of Approval	Adopt or update ordinances that require site design and operational standard permitting conditions to provide needed infrastructure for zero-emission and Emission Capture and Treatment technologies as an alternative when zero emissions technologies are not available operation.	Commit to investments in zero-emission infrastructure at the project-design stage; deploy zero-emission and Emission Capture and Treatment technologies as an alternative when zero emissions technologies are not available. technologies and incorporate contractual language requiring tenants to utilize zero-emission technologies to the maximum extent possible.	Review and provide input into project designs and monitor implementation and report any ongoing concerns.
Zero-Emission and Emission Capture and Treatment technologies as an alternative when zero emissions technologies are not available Infrastructure: Investment Plan	Update or adopt permit conditions that require facility developers and owners to establish an investment plan supporting zero-emission and Emission Capture and Treatment technologies as an alternative when zero emissions technologies are not available. infrastructure.	Establish an investment plan and adopt a timeline for making investments in zero-emission and Emission Capture and Treatment technologies as an alternative when zero emissions technologies are not available technologies; and anticipate emerging technologies becoming commercially available.	Review and assess project designs, monitor implementation and report any ongoing concerns.

Regulatory Compliance, Idling Limits and Dock Electrification	Help enforce mobile and off-road source regulations to limit unnecessary idling, and electrify loading docks serviced by trucks with transport refrigeration units (TRU) or auxiliary power units (APU).	Commit to implementing zero-emission technologies and incorporate contractual language to require tenants demonstrate compliance with mobile and off-road source regulations, limit unnecessary idling, and electrify loading docks servicing trucks with TRUs or APUs.	Review project proposals, and monitor implementation and report any ongoing concerns.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Development Programs and Agreements	Require owners and operators to contribute or establish Development Agreements that fund projects for reducing community exposure to air pollution from freight.	Negotiate with local agencies and community organizations to establish or contribute towards publically administered development programs that reduces community exposure to air pollution.	Participate in processes to establish and administer development programs that fund projects that result in a reduction in community air pollutant exposure.
ZERO EMISSION TECHNOLOGY			
Zero and Near-Zero Emission Technologies for All Project Phases	Condition permit approval of warehouse proposals to integrate zero-emission technologies during construction and operational phases everywhere feasible, and near-zero emission equipment powered by renewable energy everywhere else.	Incorporate zero-emission and Emission Capture and Treatment technologies as an alternative when zero emissions technologies are not available technologies into business decisions, financial planning, and contractual language for construction phases, operational activities, and tenant lease agreements.	Collaborate with freight facility developers and owners, monitor implementation, and report any ongoing concerns.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Upgrade On-site Service Equipment	As a permitting condition, require all on-site service equipment (cargo handling, yard hostlers, forklifts, pallet jacks, etc.) to fully operate with zero-emissions, where possible.	Install necessary infrastructure to support zero-emission technologies and contractually obligate tenants to deploy commercially available zero-emission technologies to the maximum extent possible.	Monitor implementation, and report any ongoing concerns.
Intermodal Facility Transport Activities	Organize a committee to collaborate with warehousing facilities owners and operators to maximize cargo transport efficiency of cargo handling, and long-haul truck activities	Integrate operation systems using cleanest available technologies; coordinate management systems to maximize operational efficiency for minimizing unnecessary idling of all diesel engines.	Monitor implementation and report any ongoing concerns.
Fueling Infrastructure for Zero-Emission Operations	Condition permit approval of warehouse facilities to install fueling infrastructure (electric charging and hydrogen fueling stations) for maximizing on-site zero-emission operations.	Incorporate fueling infrastructure to support zero-emission operations into project to the maximum extent possible; coordinate construction plans and activities with utility providers prior to submitting permitting applications.	Monitor implementation and report any ongoing concerns.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
On-Site Renewable Energy Generation	Encourage through adoption of general plan policies and goals or through conditioning permit approval of warehouse facilities to incorporate renewable energy resources into project designs or exceed applicable green building standards for warehouses.	Incorporate on-site renewable energy production—solar, wind, ocean wave etc.—into project design; coordinate with utility providers prior to submitting permitting applications and integrate necessary infrastructure.	Advocate for local governments to develop requirements and incentives for the usage of renewable energy at facilities.
On-Site Microgrid Energy Storage	Coordinate integration of on-site microgrid energy deployment between facilities and utility providers.	Integrate microgrids into project designs to help reduce electricity costs, distribute on-site energy demand across, and increase storage capacities.	Monitor implementation and report any ongoing concerns.
On-Site Energy Storage	Review permitting practices for opportunities to streamline review processes to encourage on-site energy storage solutions for supporting fully zero-emission operations.	Integrate renewable energy storage to ensure adequate storage capacities, including surplus margins, to provide alternative emergency backup power.	Advocate for local governments to develop efficient permitting processes that allow for deployment of energy storage systems.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
WAREHOUSE FACILITY DESIGN			
Establish Truck Routes	Design routing programs in the General Plan to address congestion, provide adequate truck parking capacity, and account for delivery schedules to avoid peak commute periods with a goal of directing trucks around sensitive receptors.	Inform local agencies and community members to establish truck route programs that service facility needs while prioritizing routes that minimize community exposure to air pollution.	Monitor truck activities, collaborate with freight facility owners, and report any ongoing concerns.
Provide Truck Parking	Condition permit approval of warehouse facilities to provide adequate space for truck parking, staging, and loading activities with incentivizes for zero-emission delivery vehicles.	Collaborate with local agencies and utility providers to provide necessary infrastructure for supporting zero-emission delivery vehicles.	Monitor truck activities, collaborate with freight facility owners, and report any ongoing concerns.
Adequate Truck Route Signage	Condition permit approval of warehouse facilities in coordination with Caltrans to install adequate wayfinding strategies along truck routes from highways to facility parking areas.	Provide trainings to inform employee and tenants on proper truck routing and parking programs.	Monitor truck activities, collaborate with freight facility owners, and report any ongoing concerns.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Provide Multimodal Commuter Pathways	Condition permit approval of warehouse projects to provide or promote alternative transportation modes for reducing vehicular commuter dependence.	Integrate multimodal design into and around facility access points with the existing transportation infrastructure including connections to existing and planned pedestrian and bicycle pathways.	Review and assess project proposals, monitor implementation, and report any ongoing concerns.
Funding for Freight Transport Infrastructure	Apply and match Federal, State, and local funding sources to support freight transport infrastructure that improves freight facility connectivity and maximizing operational efficiency.	Maximize public funding opportunities to improve facility operations through siting, access, and connectivity to established freight transport corridors.	Advocate for project proposals maximizing public investments in freight transportation planning efforts that improve freight efficiency.
Building Codes for Zero-Emission Charging Stations	Update local codes to require infrastructure for electrification or fueling stations, or adopt State building code for medium and heavy-duty zero-emission infrastructure, as available.	Design or modify facilities to integrate charging station infrastructure; coordinate with utility providers to maximize on-site potential for supporting zero-emission vehicles.	Monitor implementation and report any ongoing concerns.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Design Guidelines for Minimizing Community Exposure	Update or adopt site design standards to locate entrance gates, loading docks, staging areas, and parking facilities away from sensitive receptors.	Incorporate design features that demonstrably reduce a community's exposure from loading, staging, and parking activities.	Monitor implementation and report any ongoing concerns.
Vegetative and Other Solid Barriers	Update or adopt site design standards to promote vegetative or other solid barriers for reducing community exposure to air pollution from nearby roadway and on-site activities.	Identify potential air pollutant sources on-site and access routes that may impact nearby communities for informing the location of vegetative or solid barriers, with appropriate design parameters to reduce particulate matter.	Monitor implementation and report any ongoing concerns.
Design Features to Maximize On-Site Truck Maneuvering Efficiency	Review or adopt site design standards to encourage facility designs that maximize efficiency of on-site trucking and loading activities including: turning radii, simultaneous container loading and unloading, and connectivity to site access and roadways.	Design facilities to maximize available space for trucking and loading activities including: turning radii, simultaneous container loading and unloading, and connectivity to site access and roadways.	Monitor implementation and report any ongoing concerns.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Multimodal Facility Design	Reduce air quality impacts associated with multimodal facility projects by maximizing transiting efficiencies between transport modes for distributing containers and truck trailers.	Integrate access and loading operations into existing intermodal freight systems for maximizing capacities and operational efficiency.	Monitor implementation and report any ongoing concerns.
WAREHOUSE FACILITY CONSTRUCTION			
Construction Emissions Minimization Plan	Update or adopt an ordinance to establish minimum criteria for construction emissions minimization plans that apply to projects in impacted communities. Establishment of a zero emission technologies clearing house.	Coordinate with local agencies to identify projects in impacted areas and incorporate plan criteria into contractual language for minimizing emissions from all construction-related activities to the extent feasible. Requirement to identify zero emission technologies that can be incorporated into project.	Monitor implementation and report any ongoing concerns.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Electrify Low Kilowatt Equipment	Update or adopt ordinances that require site design and operational standards and associated permit conditions to require electrifying all off-road equipment with a power rating below 19 kilowatts (e.g., plate compactors, pressure washers, etc.) wherever possible.	Integrate needed electrical infrastructure and hookups into construction planning; include contractual language that requires all contractors to electrify low kilowatt equipment wherever possible.	Monitor implementation and report any ongoing concerns.
Accelerate Regulatory Compliance	Encourage or condition permit approvals of warehouse proposals to maximize commercially available clean-engine technologies for heavy-duty trucks servicing the site.	Include contractual language that requires all contractors to utilize commercially available clean-engine technologies for heavy-duty trucks everywhere possible.	Monitor implementation and report any ongoing concerns.
Minimize Engine Idling	Update or adopt ordinances that require site design and operational standards and associated permit conditions to minimize diesel engine idling for no more than two minutes.	Inform contractors servicing the site of diesel engine idling limits by posting signage at access points, monitoring delivery activities, and training employees to maximize equipment efficiency.	Monitor implementation and report any ongoing concerns.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Utilize Generators Utilizing Renewable Fuels	Enforce permit conditions that require generators utilizing renewable fuels to be used, where electrification is infeasible.	Electrify equipment to the maximum extent feasible with connections to the power grid, utilize renewable fuels everywhere else.	Monitor implementation and report any ongoing concerns.
WAREHOUSE FACILITY OPERATIONS			
Minimize Refrigerants	Condition permit approval of warehouse proposals that include cold storage facilities to use low Global Warming Potential (GWP) refrigerants.	Use low GWP refrigerants at cold storage facilities. (e.g. <150 GWP, ammonia, CO_2, Hydrocarbons).	Support proposals that use low GWP refrigerants at cold storage facilities; and monitor implementation.
Minimum Green Building Standards	Update or adopt design guidelines that require facility operations to exceed standard green building criteria for reducing on-site air pollution and nearby community exposure.	Incorporate green building features that demonstrably address on-site air pollution source or minimize nearby community exposure through design and modified operational activities.	Support proposals for applicable green building features, monitor implementation, and report any ongoing concerns.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Truck Service Efficiency	Support facility owners and operators to integrate new technologies for improving efficiency of trucking activities to minimize queuing and in-terminal waiting periods.	Coordinate techniques and methods to improve truck delivery and loading activities using available software packages; train service providers on methods to group, streamline, or otherwise maximize facility efficiency during heavy delivery periods.	Collaborate with facility owners and operators to implement technologies, monitor implementation, and report any ongoing concerns.
Container Yard Management Efficiency	Support facility owners and operators to incorporate technologies for operational activities or on-site practices that improve equipment management practices and increase goods movement efficiency. Establishment of a zero emission technologies clearing house.	Coordinate yard management techniques and methods using available software packages to virtualize container loading areas for improving on-site exchanges between import and export activities. Requirement to identify zero emission technologies that can be incorporated into facility.	Monitor implementation and report any ongoing concerns.

Coordinate Neighboring Purchasing and Deliveries	Support facility logistics for minimizing duplicative supply deliveries to minimize daily truck visits.	Coordinate supply needs and delivery service contacts with neighboring facilities to maximize supply receiving and shipping activities.	Monitor implementation and report any ongoing concerns.

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Freight Traffic Information Systems	Collaborate with public agencies to develop and implement a "push" freight traffic information system through a public platform for data sharing that improves logistics planning and truck delivery scheduling.	Support development and implementation of a "push" freight traffic information system by providing trucks servicing a facility with real-time traffic data.	Monitor implementation and report any ongoing concerns.
FINANCING, GRANTS, AND INCENTIVES			
Grants for Zero-Emission Infrastructure and Equipment, Emissions Capture and Treatment Technologies Renewable Fuels, and Efficiency	Utilize grants for zero-emission vehicles and equipment, emissions capture and treatment technologies, renewable fuel production, charging, and hydrogen fueling infrastructure, and efficiency improvement technologies. Consider container tariff/ fees, bulk cargo tariff/fees	Maximize investments to integrate and deploy zero-emission vehicles and equipment, emissions capture and treatment technologies, produce and store renewable fuels, provide charging and fueling infrastructure, and implement efficiency improvements.	Monitor implementation and report any ongoing concerns.

	and air pollution, light pollution, traffic congestion, noise, vibration and blight-trash/graffiti magnet community mitigation fees.		

Practice	Local Governments and Air Districts	Warehouse Developers, Owners, or Operators	Public
Funding for Zero-Emission Technology	Support and fund zero-emission TRU and APU technology to modernize existing facilities and support integrating with proposals for new facilities.	Maximize investments in zero-emission technologies and incorporate contractual language for tenants and service providers to deploy vehicles with TRUs or APUs capable of integrating with electrified loading docks.	Monitor implementation and report any ongoing concerns.
Joint Public and Private Investment Opportunities	Identify local opportunity areas to support clean-technology investments through Property and Business Improvement Districts (PBID) or Enhanced Infrastructure Financing Districts (EFID).	Collaborate with local agencies to establish and support PBIDs or EIFDs; coordinate with neighboring facilities to maximize investments in business opportunities that support fully zero-emission operations.	Support local agencies and facility owners and operators to establish PBIDs and EIFDs for financing fully zero-emission operations; monitor implementation and report any ongoing concerns.
Projects to Demonstrate Emerging Technologies	Support funding opportunities for demonstrating zero-emission and emissions capture and treatment technologies for existing and new freight facilities.	Maximize investment opportunities and implement zero-emission and emissions capture and treatment demonstration projects in all applicable facility operations.	Support local agency and facility owners and operators to identify opportunities; monitor implementation and report any ongoing concerns.

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LIST OF RESOURCE DOCUMENTS

CARB staff reviewed an extensive selection of resource documents to inform development of the Concept Paper for the Freight Handbook and identify practices for the siting, design, construction, and operation of freight facilities to minimize the resulting air pollution impacts on nearby communities. Some of these documents are listed below. In addition to these documents, this Concept Paper reflects public input CARB gathered through developing and implementing state-level programs related to freight. CARB has also considered the feedback received from local workshops to develop community monitoring and emission reduction plans, the Pathways to Zero and Near-Zero Emissions document, and the Sustainable Freight Action Plan, as well as updated information posted on State and local agency websites.

- Bay Area Air Quality Management District (BAAQMD). *California Environmental Quality Act Air Quality Guidelines* (2017).
- BAAQMD. *Improving Air Quality & Health in Bay Area Communities: Community Air Risk Evaluation Program Retrospect & Path Forward* [2004 - 2013] (2014).
- BAAQMD. *Planning Healthy Places: A Guidebook for Addressing Local Sources of Air Pollutants in Community Planning* (2016).
- BAAQMD. *Regulation 11, Rule 18: Reduction of Risk from Air Toxic Emissions at Existing Facilities* (2017).
- Bay Conservation and Development Commission, Metropolitan Transportation Commission (MTC). *San Francisco Bay Area Seaport Plan* (2017).
- CARB. *Air Quality and Land Use Handbook: A Community Health Perspective* (2005).
- CARB. *Let's Clear the Air: A Public Participation Guide to Air Quality Decision Making in California* (2005).
- CARB. *Sustainable Freight: Pathways to Zero and Near-Zero Emissions* (2015).
- CARB. *Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways* (2017).
- California Department of Transportation (Caltrans). *California Freight Mobility Plan* (2014).
- Caltrans. *Mitigating Freight Impacts on Nearby Communities – Preliminary Investigation* (2015).
- Caltrans, CARB, *et. al*. *California Sustainable Freight Action Plan* (2016).
- California Air Pollution Control Officers Association. *Health Risk Assessments for Proposed Land Use Projects* (2009).
- California Governor's Office of Planning and Research (Cal OPR). *State of California General Plan Guidelines* (2017).
- Cal OPR. *The Planner's Guide to Specific Plans* (2001).
- City of Oakland. *West Oakland Truck Management Plan* (2018).
- City of Riverside. *Good Neighbor Guidelines for Siting New and/or Modified Warehouse Distribution Facilities* (2008).

- Biggs, D., Stansbery, S., and Nance, M. American Planning Association. *100 Great Community Engagement Ideas* (2018).
- Environmental Defense Fund. *Green Freight Handbook* (2014).
- Institute for Local Government. *Effective Public Engagement through Strategic Communication* (2015).
- Institute for Local Government. *What is Public Engagement and Why Should I Do It?* (2016).
- Los Angeles County Metropolitan Transportation Authority, Caltrans. *Healthy Communities and Healthy Economy* (2009).
- MTC, Bay Area Goods Movement Collaborative. *Community Collaborative for Sustainable Freight* (2014).
- MTC. *San Francisco Bay Area Goods Movement Plan* (2016).
- MTC, *et. al. Freight Emissions Reduction Action Plan* [for Plan Bay Area 2040] Final Supplemental Report (2017).
- MTC, *et. al. Plan Bay Area 2040, Draft Environmental Impact Report* (SCH# 2016052041) (2017).
- National Center for Sustainable Transportation. *Freight Efficiency Whitepapers* (2016).
- Natural Resources Defense Council. *Clean Cargo: A Guide to Reducing Diesel Air Pollution from the Freight Industry in Your Community* (2012).
- Natural Resources Defense Council. *Defend Your Air* (2012).
- PolicyLink. *The Sustainable Communities Initiative: The Community Engagement Guide for Sustainable Communities* (2012).
- Port of Long Beach. "Air Quality Programs" (website 2018).
- Port of Long Beach. *Port Master Plan, Update 1990* (As amended, 2005).
- Ports of Long Beach and Los Angeles. *San Pedro Bay Ports Clean Air Action Plan* (2017).
- Port of Los Angeles. *Port Master Plan* (2018).
- Port of Oakland. *Growth With Care: Port of Oakland Strategic Business Plan* 2018-2022 (2018).
- San Diego Unified Port District. *Port Master Plan* (2017).
- San Diego Association of Governments. *2050 Regional Transportation Plan/Sustainable Communities Strategy*, Draft Environmental Impact Report (SCH# 2010041061) (2011).
- San Diego Unified Port District. *Port Master Plan* (2017).
- San Joaquin Council of Governments. *2018 Regional Transportation Plan/Sustainable Communities Strategy*, Draft Environmental Impact Report (SCH# 2017032042) (2018).
- San Joaquin Valley Unified Air Pollution Control District (SJVAPCD). *Guidance for Assessing and Mitigating Air Quality Impacts* (2015).
- SJVAPCD. *Guidance for Assessing and Mitigating Air Quality Impacts* (2015).
- SJVAPCD. *Rule 3180: Administrative Fees for Indirect Source Review* (Adopted 2005, as amended 2018).

- SJVAPCD. *Rule 9150: Indirect Source Review* (Adopted 2005, as amended 2017).
- Transportation Research Board, National Cooperative Freight Research Program. *Guidebook for Understanding Goods Movement* (2012).
- Southern California Association of Governments (SCAG). *2016-2040 Regional Transportation Plan/Sustainable Communities Strategy*, Draft Environmental Impact Report (SCH# 2015031035) (2015).
- SCAG. *Industrial Warehousing in the SCAG Region* (2018).
- South Coast Air Quality Management District (SCAQMD). *Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning* (2005).
- SCAQMD. *Model Air Quality Element* (Reviewed, 2019).
- SCAQMD. *Rule 1402: Control of Toxic Air Contaminants from Existing Sources* (Adopted 1994, as amended 2016).
- Transportation Research Board, National Cooperative Highway Research Program. *Guide to Deploying Clean Truck Freight Strategies* (2017).
- Transportation Research Board, National Cooperative Freight Research Program. *Issues Identified and Lessons Learned from NCFRP 24 - Smart Growth and Urban Goods Movement* (2013).
- Transportation Research Board, National Cooperative Freight Research Program. *Background Research Material for Freight Facility Location Selection: A Guide for Public Officials* (2011).
- United States Department of Transportation, Federal Highway Administration. *Freight and Air Quality Handbook* (2012).
- United Sates Environmental Protection Agency, SmartWay. *Vision 2020: A New Era of Freight Sustainability* (2015).
- West Oakland Environmental Indicators Project. *Clearing the Air: Reducing Diesel Pollution in West Oakland* (2003).
- Western Riverside Council of Governments. *Transportation Uniform Mitigation Fee Program* (2019).