D R A F T E N V I R O N M E N T A L I M P A C T R E P O R T

CITY OF SAN DIEGO
SINGLE USE PLASTIC REDUCTION ORDINANCE

SCH NO: 2020120099

Prepared for:

City of San Diego
Planning Department
9485 Aero Drive, MS 413
San Diego, California 92123

Prepared By:

AECOM Project No. 27652080.00300
Consultant Assistance:

AECOM
401 West A Street
San Diego, California 92101

December 2021

The City of SAN DIEGO

Planning Department
Environmental Policy & Public Spaces
Planning Division

DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT

SCH No. 2020120099

SUBJECT: **Single Use Plastic Reduction Ordinance**

Applicant: City of San Diego Planning Department

DRAFT DOCUMENT – December 10, 2021:

PROJECT DESCRIPTION:

The City is proposing an ordinance that would amend the San Diego Municipal Code (SDMC) to restrict the use of polystyrene products throughout the City. The proposed ordinance includes a ban of the distribution of egg cartons, food service ware, or food trays that are made, in whole or in part, from polystyrene foam. Items that are made, in whole or in part, from polystyrene foam that is not wholly encapsulated or encased within a non-polystyrene foam material (e.g., coolers, ice chests, or similar containers; pool or beach toys; or dock floats, mooring buoys, or anchor or navigation markers) will also be banned from distribution. Products that are made, in whole or in part, from polystyrene foam will be banned from distribution in or at facilities within the City. The proposed ordinance will allow the distribution of prepared food that is packaged in food service ware or that uses food trays made, in whole or in part, from polystyrene foam, if the prepared food is packaged outside of the City and is provided to the consumer as originally packaged. The proposed ordinance would limit the distribution of food service ware products such as, utensils and straws, for takeout orders of prepared food, and will only allow the provision of utensils upon the request of the person ordering the prepared food.

The ordinance will also include a process for obtaining a waiver of the provisions regarding food service ware and food trays if the applicant or City official seeking the waiver demonstrates that adherence to the ordinance would result in the following: 1) a feasibility-based hardship; 2) a financial hardship; and/or 3) a violation of a contractual requirement.

PROJECT LOCATION:

The City of San Diego is located within San Diego County in the southwestern corner of California. The City is generally bounded by the Cities of Del Mar and Escondido to the north; the Cities of La Mesa, Santee, and El Cajon to the east; the Cities of Chula Vista, National City, and Imperial Beach to the south; and the Pacific Ocean to the west, encompassing an area of approximately 372 square miles.

ENVIRONMENTAL DETERMINATION:

The purpose of this document is to inform decision-makers, agencies, and the public of the significant environmental effects that could result if the project is approved and implemented, identify possible ways to minimize the significant effects, and describe a reasonable range of alternatives to the project.

Based on the analysis conducted for the project described above, the City of San Diego has prepared the following Draft PEIR in accordance with CEQA. The analysis conducted identified that the proposed project could result in significant and unavoidable impacts in the area of **Greenhouse Gas Emissions (GHG Emissions).** All other impacts analyzed in this Draft PEIR were found to be less than significant.

This document has been prepared by the City of San Diego's Planning Department and is based on the City's independent analysis and determinations made pursuant to Section 21082.1 of the California Environmental Quality Act (CEQA) and Section 128.0103(a) and (b) of the San Diego Municipal Code.

RESULTS OF PUBLIC REVIEW:

( ) No comments were received during the public input period.

( ) Comments were received but did not address the accuracy or completeness of the draft environmental document. No response is necessary and the letters are incorporated herein.

( ) Comments addressing the accuracy or completeness of the draft environmental document were received during the public input period. The letters and responses are incorporated herein.

Heidi Vonblum, Deputy Director
Planning Department

December 10, 2021
Date of Draft Report

Date of Final Report

Analyst: Rebecca Malone, AICP, Planning Department

PUBLIC REVIEW DISTRIBUTION:

The following agencies, organizations, and individuals received a copy or notice of the Draft PEIR and were invited to comment on its accuracy and sufficiency. Copies of the Draft PEIR and any technical appendices may be reviewed in the office of the Planning Department or purchased for the cost of reproduction.

Federal Government
U.S. Environmental Protection Agency (19)

State of California
CalRecycle (35)
California Environmental Protection Agency (37A)
Department of Toxic Substances Control (39)
Regional Water Quality Control Board (44)
Water Resources (45)
State Clearing House (46A)
California Coastal Commission (47)

County of San Diego
Planning and Land Use (68)
Water Authority (73)
Department of Environmental Health (75)

City of San Diego
Office of the Mayor (91)
Councilmember LaCava, District 1
Councilmember Campbell, District 2
Council President Pro Tem Whitburn, District 3
Councilmember Montgomery Steppe, District 4
Councilmember von Wilpert, District 5
Councilmember Cate, District 6
Councilmember Campillo, District 7
Councilmember Moreno, District 8
Council President Elo-Rivera, District 9

City Attorney's Office
Corrine Neuffer, Chief Deputy City Attorney
Noah Brazier, Deputy City Attorney
Nicole Denow, Deputy City Attorney

Environmental Services Department
Jennifer Ott, Recycling Specialist

Planning Department
Mike Hansen, Director
Tom Tomlinson, Assistant Director
Heidi Vonblum, Deputy Director
Rebecca Malone, AICP, Program Manager
Elena Pascual, Senior Planner
Tara Ash-Reynolds, Assistant Planner

Library Department
Library Department-Gov. Documents (81)

Other Governments
City of Chula Vista (94)
City of Coronado (95)
City of Del Mar (96)
City of El Cajon (97)
City of Escondido (98)
City of Imperial Beach (99)
City of La Mesa (100)
City of Lemon Grove (101)
City of National City (102)
City of Poway (103)
City of Santee (104)
City of Solana Beach (105)
San Diego Association of Governments (108)
San Diego Unified Port District (109)

Community Planning Groups
Community Planning Committee (194)
Balboa Park Committee (226A)
Black Mountain Ranch-Subarea I (226C)
Otay Mesa-Nestor Planning Committee (228)
Otay Mesa Planning Committee (235)
Barrio Logan Planning Group (240)
Downtown Community Planning Council (243)
Clairemont Mesa Planning Committee (248)
Greater Golden Hill Planning Committee (259)
Serra Mesa Planning Committee (263A)
Kearney Mesa Community Planning Group (265)
Linda Vista Community Planning Committee (267)
La Jolla Community Planning Association (275)
City Heights Area Planning Committee (287)
Kensington-Talmadge Planning Committee (290)
Normal Heights Community Planning Committee (291)
Eastern Area Planning Committee (302)
Midway/Pacific Highway Community Planning Group (307)
Mira Mesa Community Planning Committee (310)
Mission Beach Precise Planning Board (325)
Mission Valley Planning Group (331)
Navajo Community Planners, Inc. (336)
Carmel Valley Community Planning Board (350)
Del Mar Mesa Community Planning Board (361)
North Park Planning Committee (363)
Ocean Beach Planning Board (367)
Old Town Community Planning Board (368)
Pacific Beach Community Planning Committee (375)
Pacific Highlands Ranch-Subarea III (377A)
Rancho Peñasquitos Planning Board (380)
Peninsula Community Planning Board (390)
Rancho Bernardo Community Planning Board (400)
Sabre Springs Community Planning Group (406B)
San Pasqual-Lake Hodges Planning Group (426)
San Ysidro Planning and Development Group (433)

Scripps Miramar Ranch Planning Group (437)
Miramar Ranch North Planning Committee (439)
Skyline Paradise Hills Planning Committee (443)
Torrey Hills Community Planning Board (444A)
Southeastern San Diego Planning Committee (449)
Encanto Neighborhoods Community Planning Group (449A)
College Area Community Planning Board (456)
Tierrasanta Community Council (462)
Torrey Highlands – Subarea IV (467)
Torrey Pines Community Planning Board (469)
University City Community Planning Group (480)
Uptown Planners (498)

Town and Community Councils
Town Council Presidents Association (197)
Barrio Station, Inc. (241)
Downtown Community Council (243)
Harborview Community Council (245)
Clairemont Town Council (257)
Serra Mesa Community Council (264)
La Jolla Town Council (273)
Rolando Community Council (288)
Oak Park Community Council (298)
Darnell Community Council (306)
Mission Beach Town Council (326)
San Carlos Area Council (338)
Carmel Mountain Ranch Community Council (344)
Pacific Beach Town Council (374)
Rancho Peñasquitos Town Council (383)
Rancho Bernardo Community Council, Inc. (398)
San Dieguito Planning Group (412)
United Border Community Town Council (434)
Murphy Canyon Community Council (463)
Mission Valley Community Council (328C)
Ocean Beach Town Council, Inc. (367A)

Native American
Native American Heritage Commission
Kuumeyaay Cultural Heritage Preservation (223)
Kuumeyaay Cultural Repatriation Committee (225)
Barona Group of Capitan Grande Band of Mission Indians (225A)
Campo Band of Mission Indians (225B)
Ewiiaapaayp Band of Mission Indians (225C)
Inaja Band of Mission Indians (225D)
Jamul Indian Village (225E)
La Posta Band of Mission Indians (225F)
Manzanita Band of Mission Indians (225G)
Sycuan Band of Mission Indians (225H)
Viejas Group of Capitan Grande Band of Mission Indians (225I)
Mesa Grande Band of Mission Indians (225J)
San Pasqual Band of Mission Indians (225K)
Ipai Nation of Santa Ysabel (225L)
La Jolla Band of Mission Indians (225M)
Pala Band of Mission Indians (225N)

Pauma Band of Mission Indians (225O)
Pechanga Band of Mission Indians (225P)
Rincon Band of Luiseno Indians (225Q)
San Luis Rey Band of Luiseno Indians (225R)
Los Coyotes Band of Mission Indians (225S)

Other Interested Agencies, Organizations and Individuals
Daily Transcript (135)
San Diego Chamber of Commerce (157)
Environmental Health Coalition (169)
San Diego Coastkeeper, Matt O'Malley (173)
Endangered Habitat League (182)
Citizens Coordinate for Century 3 (189)
League of Women Voters (192)
National City Chamber of Commerce (200)
Carmen Lucas (206)
South Coastal Information Center (210)
Ron Chrisman (215)
Frank Brown - Inter-Tribal Cultural Resource Council (216)
Jim Peugh (167A)
Clint Linton (215B)
Haydar Bolunmez
Daniel Brunton
Brian Macdonald
Friars Village HOA
Sierra Club SD
Terry Grill
Heather Buonomo
Daniel Brunton
Rubi Baricuatro
Brady Bradshaw
Brian Macdonald
Alexandra Ferron
Mitch Silverstein
Laura Minna-Choe
Bill Mattos

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LIST OF ACRONYMS AND ABBREVIATIONS

˚C	degrees Centigrade
AB	Assembly Bill
AFPA	American Forest and Paper Association
ARB	California Air Resources Board
Attainment Plan	Final Ozone Attainment Plan
BAAQMD	Bay Area Air Quality Management District
BPI	Biodegradable Products Institute
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEPA	California Environmental Protection Agency
CalRecycle	California Department of Resources Recycling and Recovery
CAP 2000	Compliance Assurance Program
CAP	Climate Action Plan
CAT	Climate Action Team
CCAA	California Clean Air Act
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CH_4	methane
Checklist	Climate Action Plan Consistency Checklist
City	City of San Diego
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CUK	coated unbleached kraft
diesel PM	particulate exhaust emissions from diesel-fueled engines
EIR	Environmental Impact Report
EMFAC2021	EMission FACtor model, version 2021
EPS	expanded polystyrene
GHG	greenhouse gas
GVWR	Gross Vehicle Weight Rating
GWP	global warming potential

HC	hydrocarbons
HDPE	High Density Polyethylene
HFC	hydrofluorocarbon
IPCC	Intergovernmental Panel on Climate Change
IS	Initial Study
LCD	liquid-crystal-display
LCFS	low carbon fuel standard
LDPE	low-density polyethylene
LFG	landfill gas
MMT	million metric tons
MT	metric tons
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NF_3	nitrogen trifluoride
NHTSA	National Highway Traffic Safety Administration
NO	nitric oxide
NO_2	nitrogen dioxide
NOP	Notice of Preparation
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
OEHHA	Office of Environmental Health Hazard Assessment
OPR	Governor's Office of Planning and Research
PE	polyethylene
PET	polyethylene terephthalate
PFAS	Per- and polyfluoroalkyl substances
PFC	perfluorocarbon
PLA	polylactic acid
PM	particulate matter
PM_{10}	PM equal to or less than 10 micrometers in diameter
$PM_{2.5}$	PM equal to or less than 2.5 micrometers in diameter
PPB	parts per billion
PPM	parts per million

PRC	Public Resources Code
RAQS	Regional Air Quality Strategy
Reporting Rule	Final Mandatory Greenhouse Gas Reporting Rule
ROG	reactive organic gas
RPS	Renewables Portfolio Standard
SAFE	Safer Affordable Fuel Efficient
SANDAG	San Diego Association of Governments
SB	Senate Bill
SBS	solid bleached sulfate
Scoping Plan	Climate Change Scoping Plan: A Framework for Change
SDAB	San Diego Air Basin
SDAPCD	San Diego Air Pollution Control District
SCAQMD	South Coast Air Quality Management District
SF_6	sulfur hexafluoride
SIP	State Implementation Plan
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO_2	sulfur dioxide
SO_X	sulfur oxides
TAC	toxic air contaminant
TCM	Transportation Control Measure
U.S.	United States
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WARM	USEPA's Waste Reduction Model
XPS	extruded polystyrene

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EXECUTIVE SUMMARY

THE PROJECT

The City of San Diego (or City) is proposing an ordinance that would amend the San Diego Municipal Code to restrict the use of polystyrene products throughout the City. The proposed ordinance includes restrictions on the distribution of egg cartons, food service ware, and food trays that are made, in whole or in part, from polystyrene foam. Items that are made, in whole or in part, from polystyrene foam that are not wholly encapsulated or encased within a non-polystyrene foam material (e.g., coolers, ice chests, or similar containers; pool or beach toys; or dock floats, mooring buoys, or anchor or navigation markers) would also be restricted. Products that are made, in whole or in part, from polystyrene foam would be restricted in or at facilities within the City. The proposed ordinance would allow the distribution of prepared food that is packaged in food service ware or that uses food trays made, in whole or in part, from polystyrene foam, if the prepared food is packaged outside of the City and is provided to the consumer as originally packaged. The proposed ordinance would limit the distribution of food service ware products, such as utensils, including straws, for takeout orders of prepared food, and would only allow the provision of utensils upon the request of the person ordering the prepared food.

The proposed ordinance would also include a process for obtaining a waiver of the provisions regarding food service ware and food trays if the applicant or City official seeking the waiver demonstrates that adherence to the ordinance would result in the following: (1) a feasibility-based hardship; (2) a financial hardship; and/or (3) a violation of a contractual requirement.

PROJECT OBJECTIVES

The purpose of the proposed ordinance is to regulate the use of polystyrene products to reduce waste, encourage source reduction, prevent litter in the environment, protect public health, and promote environmentally sustainable practices in the City. The proposed ordinance would result in a reduction of polystyrene food and beverage containers; however, the ordinance may or may not result in a decline in overall consumption of disposable food and beverage containers. Replacement products are anticipated to be a mix of plastic and fiber products that do not break apart as easily as expanded polystyrene foam material. The objectives for the City of San Diego Single Use Plastic Reduction Ordinance include:

- Reducing the consumption of polystyrene, a difficult-to-manage material;

- Encouraging the use of more easily recyclable products, consistent with California's waste reduction hierarchy;
- Providing an enforceable ordinance within the San Diego Municipal Code; and
- Reducing litter and the associated adverse impacts to storm water facilities, aesthetics, and the environment.

PROJECT LOCATION AND SURROUNDING USES

The proposed ordinance would apply throughout the City, which encompasses approximately 372 square miles; from San Pasqual in the northern part of the City to the Pacific Ocean on the west; and the International Border with Mexico on the south. To the east, the City borders unincorporated portions of the county, the city of Santee, the city of La Mesa, and the city of Lemon Grove. To the north, the City is bordered by the city of Del Mar, and the city of Solana Beach. Inland to the north, the City is bordered by unincorporated portions of the county, the city of Escondido, and the city of Poway. The southern portion of the City is bordered by the cities of Chula Vista, National City, Imperial Beach, and Coronado, and unincorporated portions of the county.

ENVIRONMENTAL IMPACTS

This Environmental Impact Report (EIR) has been prepared to analyze the potentially significant environmental impacts associated with adoption and implementation of the Single Use Plastic Reduction Ordinance. The Initial Study (IS) Checklist prepared for this proposed ordinance/proposed project indicates that potential impacts would be limited to air quality and greenhouse gases (GHGs); thus, the EIR is focused on those two topics. The analysis contained in this EIR determined less than significant effects would occur regarding air quality and, based on a no net increase threshold for the proposed ordinance, significant effects would occur regarding GHG emissions. Because the origin of the raw materials purchased is not known, manufacturing information for those raw materials is also not known, and specific suppliers are variable; the calculation of life cycle emissions would be speculative and is not warranted or appropriate for the proposed ordinance. Table S-1 summarizes the potential environmental impacts associated with the adoption and implementation of the proposed ordinance.

Table S-1
Summary of Potential Environmental Impacts

Environmental Impact	Mitigation Measures	Level of Impact after Mitigation
Air Quality - This proposed ordinance would result in a net increase in criteria air pollutant emissions. The analysis conservatively assumed that all polystyrene alternative products (e.g., paper and plastic) would be disposed of at the local landfills instead of recycled and/or composted. Furthermore, the proposed project assumes that all new truck trips would travel the farthest distance between the distributor and the local retailers. The analysis concluded that emissions associated with the net increase in truck trips for delivery and disposal of the replacement products would increase but would not exceed the recommended thresholds of significance.	Impact would be less than significant and no mitigation is required.	Impact would be less than significant and no mitigation is required.
Greenhouse Gas (GHG) Emissions - Using the same conservative analysis as used for the air quality analysis, the proposed ordinance would result in a net increase of 1,269 metric tons (MT) of carbon dioxide equivalent (CO_2e) as a result of a change from polystyrene containers to recyclable plastic containers. The net calculated increase in emissions with implementation of the proposed ordinance is estimated to be 105 MT CO_2e per year. As the City has not adopted a GHG threshold for policy projects, a no net increase threshold was applied for the proposed project. Therefore, the potential net increase in GHG emissions associated with implementation of the proposed ordinance would be considered significant.	Impact would be significant.	Impact would be significant and unmitigable.

ALTERNATIVES TO THE PROJECT

The alternatives considered and compared to the proposed project in the EIR include:

Alternative 1: "No Project"
Alternative 2: Enforceable Materials Specifications
Alternative 3: Enforceable Materials Specifications and Fee Requirements

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Alternative 1, the "No Project" Alternative would continue the existing use of polystyrene in the City and no Single Use Plastic Reduction Ordinance would be enacted. The "No Project" Alternative would not achieve any of the project objectives and is not environmentally superior to the proposed project.

Alternative 2 would provide enforceable materials specifications for the alternatives to polystyrene that would result in similar impacts as the proposed project and would achieve all project objectives, including providing better implementation and enforcement. This alternative provides City approved criteria requiring the alternative products to be easily recyclable materials that are commonly acceptable in local recycling programs (not including polystyrene). The approved criteria requiring that the acceptable alternatives are recyclable provide enhanced and enforceable materials compliance in comparison to the proposed project, and could potentially result in a reduction of toxins in the environment from baseline conditions. Therefore, Alternative 2 is considered environmentally superior to the proposed project.

Alternative 3 would provide enforceable materials specifications and also include fee requirements to specifically reduce the consumption of any type of single use cups. This alternative includes the same City approved criteria of alternative products to polystyrene identified for Alternative 2, which provides enhanced compliance and enforceability associated with this alternative in comparison to the proposed project and could potentially result in a reduction of toxins in the environment from baseline conditions. In addition, Alternative 3 would expand the proposed requirements of the ordinance to include a $0.25 fee charged by establishments for any type of disposable cups provided. The intent of the fee is to discourage food vendors and consumers from choosing single use products, thus reducing waste and improving water quality (caused by litter of single use products). This correlates to a reduction in the number of truck trips associated with single use cup distribution and transporting the used waste product to the landfills, which would result in associated reductions to air quality and GHG emissions relative to the proposed project, Alternative 2, and potentially the current baseline condition. Alternative 3 would also achieve all the project's objectives. Therefore, Alternative 3 would be the environmentally superior alternative to the proposed project and Alternative 2.

AREAS OF CONTROVERSY

The City previously considered the enactment of the Single Use Plastic Reduction Ordinance and prepared a California Environmental Quality Act (CEQA) exemption. The process for approval of the proposed ordinance was challenged in court indicating that it had potentially unanalyzed impacts. The resulting settlement agreement specified the preparation of an EIR.

The project's Notice of Preparation (NOP) was distributed on December 4, 2020 for a 30-day public review and comment period, and a public scoping meeting was held on December 16, 2020. The NOP, IS Checklist, and comment letters received on the NOP

are provided as Appendix A to this EIR. Issues of controversy that were raised during the NOP scoping period include concerns related to aesthetics, air quality, cultural arts, environmental justice, greenhouse gases, hydrology and water quality, recreation, solid waste and litter, and alternatives; as well as life-cycle analyses for air quality, biological resources, energy, forestry resources, greenhouse gasses, and hydrology and water quality. The California Resources Agency found that life-cycle analyses were not warranted for project-specific CEQA analysis in most situations, for a variety of reasons, including lack of control over some sources and the possibility of double-counting emissions (see Final Statement of Reasons for Regulatory Action, December 2009). Because the origin of the raw materials purchased is not known, manufacturing information for those raw materials is also not known, and specific suppliers are variable, calculation of life cycle emissions would be speculative. Thus, a life-cycle analysis is not warranted or appropriate for this project (CNRA 2009).

SECTION 1 INTRODUCTION

1.1 PURPOSE OF THE EIR

This Environmental Impact Report (EIR) has been prepared to evaluate the environmental effects of the adoption and implementation of the City of San Diego (or City) Single Use Plastic Reduction Ordinance regulating the use of polystyrene in the City. The proposed ordinance constitutes a project for the purposes of the California Environmental Quality Act (CEQA) and the State CEQA Guidelines.

According to Section 15121(a) of the Guidelines for Implementation of the California Environmental Quality Act, an EIR "is an informational document that would inform public agencies, decision makers, and the public generally of the significant environmental effects of a project on the environment, identify possible ways to minimize the significant effects, and describe alternatives to the project."

This EIR is an informational document to be used by decision makers, public agencies, and the general public. It is not a policy document of the City. The EIR would be used by the City in assessing the impacts of the proposed project prior to approving and acting on the proposed project.

1.2 LEGAL REQUIREMENTS AND ENVIRONMENTAL PROCESS

This EIR has been prepared in accordance with CEQA (Public Resources Code Section 21000 et seq.) and the CEQA Guidelines (California Code of Regulations, Title 14, Section 15000 et seq.). The City is the lead agency for this EIR, as defined in CEQA Section 21067.

1.2.1 Notice of Preparation

Pursuant to CEQA and the CEQA Guidelines, a Notice of Preparation (NOP) for this EIR was issued by the City on December 4, 2020, in accordance with the requirements of the CEQA Guidelines Sections 15082(a) and 15375. The NOP indicated that an EIR was being prepared and invited comments on the proposed project and scope of the EIR from the public and public agencies. A total of three written comments were received during the NOP period, including from one native American tribe (Rincon Band of Luiseño Indians), one company, and one individual. The NOP and the comment letters received in response to the NOP are included in Appendix A of this EIR. Comments received during the scoping process have been taken into consideration during the preparation of this EIR. A list of the issues noted during the scoping process is

provided in Areas of Controversy discussed in the Executive Summary section of this EIR.

1.2.2 Intended Uses of the EIR

This EIR would be used by the City to provide information necessary for environmental review of discretionary actions and approvals for the proposed ordinance. These actions include:

Lead Agency

City of San Diego

- Certification of the Final Environmental Impact Report
- Adoption of the City of San Diego Single Use Plastic Reduction Ordinance

Other Public Agencies

No approval from any other public agency is required.

SECTION 2 PROJECT DESCRIPTION

2.1 PROJECT BACKGROUND

2.1.1 Polystyrene

Polystyrene is a synthetic aromatic hydrocarbon polymer. In chemical terms, polystyrene is a long chain hydrocarbon wherein alternating carbon centers are attached to phenyl groups, which are a derivative of benzene. Polystyrene's chemical formula is C_8H_8; it contains the elements carbon and hydrogen. General-purpose polystyrene is clear, hard, and brittle. It is a poor barrier to oxygen and water vapor and has a relatively low melting point. Polystyrene is one of the most widely used plastics, with millions of tons produced per year. Depending on the manufacturing process used, polystyrene can be transparent or it can be colored. It is an easily ignited, flammable material. It is in a solid state at room temperature but flows if heated above about 100 degrees Centigrade (ºC). It becomes rigid again when cooled. This temperature behavior is exploited for extrusion and also for molding and vacuum forming because it can be cast into molds with fine detail.

Polystyrene is made through the distillation of hydrocarbon fuels into lighter groups, which are then combined with catalysts to create plastic. In general, polystyrene is inexpensive and readily available, and it glues, sands, cuts, and paints relatively easily (Creative Mechanisms 2015). There are three major types of polystyrene: polystyrene foam, polystyrene plastic, and polystyrene film (Creative Mechanisms 2015). Polystyrene foam is generally found in one of two forms, expanded polystyrene (EPS) foam and extruded polystyrene (XPS) foam. Polystyrene food and beverage containers and packing peanuts are generally made from EPS foam, while XPS foam is a higher-density foam, which is typically used in applications like architectural building models (Creative Mechanisms 2015). Polystyrene plastic is generally rigid and can be used for a variety of applications, including compact disc cases. With respect to food and beverage containers, rigid polystyrene plastic may be used for food containers such as yogurt containers or “Solo” brand-type cups. Polystyrene film on the other hand is generally vacuum-formed and used in packaging applications. For consumers, polystyrene food and beverage containers offer an odorless, lightweight, insulated, sturdy package, but they are intended for one use before disposal. Polystyrene is one of the most widely used forms of plastic in consumer goods and Californians alone use approximately 165,000 tons each year for packaging and food service purposes; however, only 0.2 percent of polystyrene food packaging is recycled (Gardner and Lee 2008; Clean Water Action California 2009). Additionally, according to a study conducted by the California Department of Resources Recycling and Recovery

(CalRecycle) in 2004, 377,580 tons of polystyrene were produced in California (Clean Water Action California 2009). In addition, the national average of polystyrene use ranges from 1.8 to 7 pounds per person per year (The Resin Review 2012).

Polystyrene was discovered in 1839 by Eduard Simon from Berlin. He distilled an oily substance from the resin of the tree *Liquidambar orientalis* and named it styrol. Since the initial discovery, several scientists and inventors worked with it, using various manufacturing processes. In the 1930s, the company I. G. Farben began manufacturing polystyrene as a replacement for die-cast zinc in many applications. Otis Ray McIntire (1918–1996), an employee of Dow Chemical, rediscovered a manufacturing process first patented by Swedish inventor Carl Munters. Dow bought the rights to Munters's method and in 1944 patented the process and its product, which Dow named Styrofoam.

Polystyrene foams are produced using blowing agents that form bubbles and expand the foam. In EPS foam, the blowing agents are usually flammable hydrocarbons such as pentane. XPS is usually made with hydrofluorocarbons, which have global warming potentials of approximately 1,000 to 1,300 times that of carbon dioxide, according to United States Environmental Protection Agency (USEPA) data. Although polystyrene is generally considered safe for food packaging, styrene oligomers in polystyrene containers used for food packaging have been found in some studies to migrate into the food. The safety of microwaving food in polystyrene has not been well studied.

2.1.2 Littering

The City spends millions of dollars each year on prevention, cleanup, and other activities to reduce litter (City of San Diego 2013). For example, the City provides litter bins and bin collection on public streets in commercial areas with retailers that provide large quantities of single use items to their customers. The City also has a Code Compliance section that gives citations for illegal dumping and littering. The City provides community cleanups in all City Council Districts, and the City provides public education about waste reduction at community meetings and events. The goal of the education program is to reduce the amount of waste generated in the first place, recycle the waste that does get generated, and prevent litter before it enters the environment.

Littered polystyrene food packaging clogs storm drains and pollutes the coastal environment, which results in millions of dollars in cleanup costs (Clean Water Action California 2009). Once littered, polystyrene entangles in brush, collects along roadways, blows into storm drains, and washes up on beaches. It breaks apart and is

carried downstream into waterways, impacting the environment, including wildlife. EPS foam crumbles and can be difficult to collect. It is often a more visible source of litter compared to other littered materials. In addition to impacts on wildlife, littering impacts recreational areas and the quality of life for residents. One study of beach debris surveyed 43 sites along the Orange County coast. It found that EPS foam was the second most abundant form of beach debris (Clean Water Action California 2009). Additionally, the "Two Rivers" study in Los Angeles found that over 1.6 billion pieces of plastic foam were headed to the ocean from the rivers, over a three-day period during surveys in 2004–2005. Likewise, the study determined that 71 percent of the 2.3 billion plastic items in the survey were foam items and made up 11 percent of the overall weight of plastic pollution collected during the surveys (Moore et al. 2011). In 2017, the Surfrider Foundation's San Diego Chapter removed 20,883 pieces of polystyrene foam from City beaches (Surfrider Foundation San Diego County 2019).

2.1.3 Source Reduction

One of the more challenging aspects of solid waste management is determining which approach to managing waste has the least amount of impacts on the environment. The California Public Resources Code, Section 41780 et seq. specifies that "source reduction," also known as waste prevention, is the most preferable approach to solid waste management because recycling, which is typically preferable to disposal in landfills, is often associated with greenhouse gas (GHG) production from transportation and remanufacture. Using USEPA's Waste Reduction Model (WARM) to track GHGs associated with different management strategies shows that source reduction results in fewer impacts than any other approach (USEPA 2020). Both source reduction and recycling are considered "diversion" from landfills, and both help reduce impacts associated with products made from "virgin" (un-recycled) materials.

California has established a state goal, found in Section 41780 et seq. of the Public Resources Code, of diverting 75 percent of the material being disposed of in landfills by 2020. However, local governments are not evaluated on whether they recycle more, but rather on whether they dispose of less. Therefore, reducing waste is the overall goal.

Consistent with state law and environmental priorities, the most environmentally beneficial way of reducing waste is not to generate it. Examples of "source reduction" include using reusable coffee cups instead of disposable or recyclable cups and buying products with less packaging. While recycling keeps materials from being wasted in landfills, some recycling processes are associated with long trip distances and

polluting remanufacturing processes. While recycling is preferable to the use of virgin materials, source reduction is preferable to recycling.

There are many ways of accomplishing source reduction, including "right sizing"—for example, avoiding buying more of a product than can be used. "Think before you purchase" is an important campaign that reduces not only impacts associated with disposal but also reduces the impacts that come before disposal that are associated with the raw materials production, manufacture, and transportation of a product before it is consumed.

Reusable food and beverage containers are often the source reduction method most closely associated with shifts away from single use products. Reusable food containers can be made from plastic, metal (such as stainless steel), or glass. These containers differ from the single use containers in their longevity as they are meant to withstand many uses. Although still developing and expanding, there are options for reusable food containers that are available today, such as GO Box, which is a subscription-based program launched in downtown Portland, Oregon, that allows members to pick up a meal in a reusable, returnable container and once their meal is complete, return it to a specialized drop box to be commercially washed and reused by the next patron. This program has proved successful in Portland so far with more than 80 food vendors, 3,000 subscribers, and 100,000 containers saved since the program launched (GO Box 2017). The primary hurdle associated with reusable food and beverage containers is compliance with the Health Department rules that prohibit food vendors from serving food in a customer's personal containers or containers that have otherwise not been sanitized professionally. The main exception to this is establishments that primarily serve beverages, such as coffee shops where customers may be able to reuse a container from home and may even get a discount. Likewise, individuals may bring their own take-away container from home for leftovers at a restaurant. The production stages in reusable food and beverage container lifecycles depend on the materials used. Once used, these containers are reused until worn out through washing or regular use, and then typically disposed either in the landfill or recycling facility (if recyclable).

2.1.4 Composting

Multiple types of single use "biodegradable" food and beverage containers are sold, but most of these products are not actually readily composted. "Biodegradable" food and beverage containers are made from a variety of different materials including corn, sugarcane, potatoes, soybeans, grass, cellulose, and wood. In general, plastics derived from plants and food by-products such as corn, soybeans, and sugar are considered

bioplastic. The most common is polylactic acid (PLA), which is made from fermented plant starch (generally corn). PLA may break down within three months under some specialized composting processes, but PLAs cannot be processed by even large-scale composting operations, such as the aerated static pile system used by the City at its Miramar Greenery, a food and yard waste composting operation. PLAs take even longer (ranging from 100 to 1,000 years) to break down in a landfill. However, PLA can be formed into pellets, then melted and molded into various products, which is similar to the recycling process for plastics.

Paper food and beverage containers are also seldom actually biodegradable. These products are generally constructed from paperboard, which is made from wood pulp. Specifically, bleached paperboard or solid bleached sulfate (SBS), which may be used for food packaging, is a paperboard grade that is produced from a combination of at least 80 percent virgin bleached wood pulp (American Forest and Paper Association [AFPA] 2014). The SBS is generally coated with a thin layer of kaolin clay to improve its printing surface. Food and beverage containers are also often coated with polyethylene (PE) resin to increase strength for packaging wet food. Coated unbleached kraft (CUK) paperboard, which may also be used for food packaging, is generally produced from a mixture containing at least 80 percent virgin unbleached, natural wood pulp (AFPA 2014). Similar to SBS, the paperboard is generally coated with a thin layer of kaolin clay to improve its printing surface, and food and beverage containers are also often coated with PE resin to increase strength for packaging wet food. Paper containers are often used for hot or cold drinks, soup bowls, and plates, as well as clamshell boxes and trays. Paper containers that are coated with compostable plastics cannot be composted in the City's Miramar Greenery. "Biodegradable/compostable" food and beverage containers are generally a similar size and weight as non-biodegradable food and beverage containers but are more expensive and only biodegrade if sent to specialized commercial composting facilities, and no such facility occurs in the San Diego region. Additionally, there is growing concern over human health impacts from poly-fluoroalkyl substances (PFAS) contained in many compostable food service ware items. The Biodegradable Products Institute (BPI) in 2019 began limiting the allowable fluorine content in compostable food service ware they certify. The reason for this is that PFAS contaminates the compost made from those products (BioCycle 2018).

Under American Society for Testing and Materials standards, polystyrene is regarded as not biodegradable. Polystyrene is relatively chemically inert. While it is waterproof, and resistant to breakdown by many acids and bases, it dissolves quickly when exposed to certain solvents such as acetone. Waste polystyrene takes hundreds of years to biodegrade and is resistant to photo-oxidation. However, certain organisms

can degrade it, albeit very slowly. For example, mealworms, the larvae of the darkling beetle *Tenebrio molitor*, can digest it. However, most organisms cannot and may mistake it for food. Polystyrene foam blows in the wind and floats on water, due to its low specific gravity, where it can be ingested by birds, fish, and other organisms. It is accumulating as a form of litter in the outside environment, particularly along shores and waterways, especially in its foam form.

2.1.5 Recycling

Recyclable plastic food and beverage containers are typically clear and durable, made from polyethylene terephthalate (PET) or other recyclable plastics such as polyethylene (HDPE), and intended for one use prior to being recycled. In general, plastic manufacturing procedures are generally consistent depending on the type of recyclable plastics. PET is the most commonly recycled plastic. PET pellets are generated through the combination of ethylene glycol and terephthalic acid (Petra 2015). Once pelletized, the PET is heated to a liquid that is molded into a specific shape, such as food and beverage containers. When PET is molded into specific shapes and held at high temperatures, it crystallizes and becomes opaque and less flexible, and is often used for food storage (Petra 2015). Prior to recycling plastic food and beverage containers, they should be rinsed or wiped clean to remove food residue. Because all recyclables are transported together, there is a risk for contamination, especially with food residue being transferred to potentially clean, recyclable materials, such as paper. Although it is recognized that there are various types of recyclable plastics, for the purposes of this analysis, any form of recyclable plastic container is referred to simply as "recyclable-plastic."

Polystyrene is not accepted in most curbside collection recycling programs due to the low market value and the requirement to have a clean, separated stream that undergoes an initial compaction process. After compaction, waste polystyrene can be shipped and used as a feedstock of recycled plastic pellets, which are used for insulation sheets and other materials such as clothes hangers, park benches, flower pots, toys, rulers, stapler bodies, seedling containers, picture frames, architectural molding, and metal casting operations. Polystyrene can be combined with cement to be used as an insulating amendment in the making of concrete foundations and walls.

2.1.6 Incineration

Polystyrene can be accepted as a feedstock for renewable energy production where waste materials are incinerated at high temperatures with plenty of air. Under these conditions, incineration produces water, carbon dioxide (CO_2), and possibly small

amounts of residual halogen-compounds from flame-retardants. However, high heat is required for this level of degradation. When polystyrene is burned at the typical range of many incinerators, 800–900°C, a more complex mixture of polycyclic aromatic hydrocarbons is produced, including alkyl benzenes and benzoperylene. Alkyl benzenes and benzoperylene are chemicals produced during an incineration process and can enter the atmosphere. No incineration facilities are present in the San Diego region.

2.1.7 Polystyrene Use in San Diego

This analysis uses California Department of Finance population data for the City, per capita production rates of polystyrene, and the average weight of the different types of polystyrene containers. This analysis applies a rate of 4.4 pounds of polystyrene per person per year, which is halfway between the national average (which ranges from 1.8 to 7 pounds per person per year). The population of San Diego, in 2019, was estimated at 1,425,976 using the Quick Facts Website (Quick Facts 2019). This EIR assumes that the number of City residents that patronize retailers outside the City is comparable to customers of City retailers who reside outside of San Diego (i.e., visitors who live outside San Diego but travel to shop or eat within the City) because the density of the surrounding areas is very similar. Using these data, it is estimated that approximately 6,270,000 pounds of polystyrene service ware containers are used per year in San Diego.

2.1.8 Efforts to Reduce Polystyrene

Many California communities regulate the use of polystyrene. Approximately 100 adopted ordinances in California restrict the use of polystyrene, as listed in Table 2-1.

Table 2-1
Polystyrene Ordinances in California

Adoption Date	Jurisdiction (City unless County specified)	Description
2008	Alameda	EPS ban, requirement that all takeout food packaging be compostable.
2015	Alameda County	Polystyrene ban for all disposable food service items, with a requirement for recyclable or biodegradable replacements.
2008	Albany	EPS ban, requirement that all takeout food packaging be compostable or recyclable.
2005	Aliso Viejo	Government facility EPS ban. Ordinance #2004-060
2015	Arcata	Ban of distribution and sale of polystyrene food packaging products.

Adoption Date	Jurisdiction (City unless County specified)	Description
2016	Arroyo Grande	EPS ban for both distribution and sale, with a requirement that all disposable food containers be biodegradable, compostable, or recyclable.
2017	Avalon	Ban on the distribution of EPS food containers for prepared foods.
2012	Belmont	EPS ban (San Mateo County ordinance).
1988	Berkeley	EPS ban, requirement that 50% of takeout food packaging be recyclable or compostable. Title 11.58 and 11.60 of Municipal Code.
2014	Brisbane	Polystyrene food packaging ban.
2011	Burlingame	The City of Burlingame passed an ordinance referencing San Mateo County's ordinance on May 16, 2011.
2008	Calabasas	EPS ban, requirement that all takeout food packaging be recyclable or compostable.
2014	Campbell	EPS food ware ban, adopted in December of 2014, effective June 1, 2015.
2012	Capitola	Prohibit the sale of EPS products (expansion of 2009 requirement that all disposable takeout food packaging be compostable) .
1989	Carmel	EPS ban, requirement that 50% of takeout food packaging be recyclable, compostable, or reusable.
2017	Carpinteria	Ban on non-recyclable plastic food takeout containers, including EPS. Chapter 8.5 of Municipal Code.
2013	Colma	Ban on polystyrene-based food service ware for prepared foods.
2018	Concord	Ban on all polystyrene foam food and beverage service ware.
2020	Contra Costa County	Ban on all polystyrene foam food and beverage service ware.
2020	Costa Mesa	Prohibits use or purchase of EPS food service products at city facilities & city sponsored events.
2017	Culver City	Ban on distribution or sale of EPS food containers, and includes a provision that requires food providers to ask customers before providing disposable utensils.
2014	Cupertino	Food vendors prohibited from using EPS food takeout containers.
2012	Daly City	Ban on polystyrene-based food service ware for prepared foods. Effective September 12, 2012.
2012	Dana Point	Ban on EPS food containers. Effective 6 months after adoption date.
2017	Davis	Ban on polystyrene food containers, requirement that all takeout food packaging be recyclable or compostable.
2019	Del Mar	Bans distribution of polystyrene food ware. Additional prohibition of polystyrene packing materials.
2010	Del Ray Oaks	EPS ban, requirement that all takeout food packaging be recyclable or compostable. Municipal Code 8.30.
2014	El Cerrito	EPS food ware ban, requirement that food packaging be recyclable, compostable, or reusable.
2008	Emeryville	EPS ban, requirement that all takeout food packaging be recyclable or compostable.
2016	Encinitas	In November 2016, City Council banned all disposable food service ware made from EPS for all food providers and city facilities.
1993	Fairfax	EPS ban for all restaurants and food retail vendors. Title 8.16.030 of Municipal Code.
2015	Fort Bragg	EPS food ware ban adopted in September 2014.

Adoption Date	Jurisdiction (City unless County specified)	Description
2012	Foster City	Polystyrene ban for restaurants and food vendors, adopted October 17, 2011.
2011	Fremont	EPS ban for food vendors, requirement that all takeout food packaging be recyclable or compostable. Section 8.40.860 of Municipal Code.
2015	Gonzales	EPS ban for food vendors, requirement that all takeout food packaging be recyclable or compostable.
2015	Greenfield	EPS ban for food vendors, requirement that all takeout food packaging be recyclable or compostable.
2018	Grover Beach	Ban on the sale and distribution of any EPS products.
2011	Half Moon Bay	Half Moon Bay passed an ordinance, referencing San Mateo County's polystyrene food container ban, on May 17, 2011.
2011	Hayward	EPS ban for restaurant vendors, requirement that takeout food packaging be recyclable or compostable.
2008	Hercules	EPS ban. Sec.5-3109, Title 5, Chapter 3 of Municipal Code.
2012	Hermosa Beach	Polystyrene container ban.
2005	Huntington Beach	Government facility EPS ban.
2018	Imperial Beach	Ban on non-recyclable plastic food takeout containers, including EPS. Including a ban on EPS packaging materials.
2015	Lafayette	CFC processed polystyrene ban, 50% of food containers must be recyclable or returnable (75% by 2020).
2008	Laguna Beach	Polystyrene ban, requirement that all plastic takeout food packaging be recyclable. Bans the retail sale of foam or other nonrecyclable plastic disposable food ware. Title 7.05 of Municipal Code.
2008	Laguna Hills	Government facility EPS ban.
2004	Laguna Woods	Government facility EPS ban.
2010	Livermore	Food vendors are required to use recyclable or compostable takeout food packaging.
2018	Long Beach	Covers restaurants and requires plastic utensils and straws upon request.
2014	Los Altos	Starting July 4, 2014, the distribution and sale of EPS foam food containers and ice chests are prohibited.
2012	Los Altos Hills	Ban on EPS and non-recyclable plastic food containers.
2008	Los Angeles	Government facility EPS ban. Chapter IV, Article 13 of Municipal Code.
2008	Los Angeles County	Government facility EPS ban.
2014	Los Gatos	Ban on EPS food containers and coolers.
2005	Malibu	Ban on both sale and distribution of any food packaging, containers, and food service ware made from EPS and that is neither compostable nor recyclable. Includes a ban on the retail sale of packing materials, coolers, pool/beach toys, buoys, and other items made from EPS. Title 9.24 of Municipal Code.
2013	Manhattan Beach	In 2013, Manhattan Beach adopted a polystyrene food packaging ban, updating its 1988 ban on CFC processed polystyrene. In 2014, it was amended to include ALL other non-recyclable disposables and

Adoption Date	Jurisdiction (City unless County specified)	Description
		polystyrene coolers. This makes for one of the strongest bans in the nation.
2010	Marin County	EPS food container ban.
2011	Marina	EPS food container ban. Requires the use of recyclable or compostable takeout food packaging unless alternatives are unavailable.
2014	Martinez	Ban on CFC processed polystyrene food takeout containers. Full compliance effective January 15, 2015..
2014	Mendocino County	EPS food container ban adopted July 22, 2014.
2012	Menlo Park	Adopted San Mateo County's ordinance by reference in August of 2012.
2009	Mill Valley	Food vendors and city facilities are prohibited from using EPS foam food containers.
2008	Millbrae	Polystyrene ban, requirement that all plastic takeout food packaging be recyclable or compostable.
2017	Milpitas	EPS food service ware ban.
2009	Monterey	EPS ban, requirement that all takeout food packaging be recyclable or compostable.
2010	Monterey County	EPS ban. Title 10, Chapter 10.42 of Municipal Code.
2017	Monrovia	Prohibits the use or purchase of EPS food service products at city facilities.
2014	Morgan Hill	An EPS ban in restaurants and other food facilities was adopted on October 2, 2013.
2016	Morro Bay	EPS ban for both distribution and sale, with a requirement that all disposable food containers be biodegradable, compostable, or recyclable.
2014	Mountain View	A ban on EPS food packaging products for retail sale or distribution in food facilities was adopted on March 25, 2014.
2008	Newport Beach	EPS ban. Title 6, Section 5 of Municipal Code.
2013	Novato	Expanded polystyrene ban.
2007	Oakland	EPS ban, requirement that all takeout food packaging be compostable. Businesses that generate a large portion of litter must pay a litter fee. Title 8.07 Municipal Code.
2014	Ojai	EPS ban for all stores and vendors was passed on January 28, 2014.
2005	Orange County	Government facility EPS ban, including cities of Aliso Viejo, Huntington Beach, Laguna Hills, Laguna Woods, San Clemente, and San Juan Capistrano, and the Santa Margarita Water District.
2008	Pacific Grove	EPS ban, requirement that all takeout food packaging be recyclable or compostable. Title 11, Chapter 11.99 of Municipal Code.
2010	Pacifica	EPS ban. Effective January 1, 2010.
2010	Palo Alto	EPS ban. Chapter 5.30 of Municipal Code. In November 2015, the ordinance was expanded so that retailers can no longer sell or distribute polystyrene foam of any sort. Effective March 1, 2016.
2017	Pasadena	Polystyrene ban for all food providers, retail, and government facilities/sponsored events.

Adoption Date	Jurisdiction (City unless County specified)	Description
2020	Petaluma	Prohibits EPS disposable food ware and the sale of EPS coolers and packing materials.
2016	Pismo Beach	EPS disposable food container ban, as well as a ban on the sale of any EPS products.
1993	Pittsburg	CFC processed polystyrene ban. Title 8.06.210 of Municipal Code.
2013	Pleasanton	Ban on polystyrene food takeout containers with a requirement for food takeout containers to be recyclable or compostable.
2012	Portola Valley	Polystyrene ban (San Mateo County ordinance).
2007	Rancho Cucamonga	Resolution banning polystyrene food service products at city facilities and city sponsored events.
2020	Redondo Beach	Ban on the disposable EPS food service ware as well as the retail sale of EPS coolers.
2013	Redwood City	Polystyrene ban (San Mateo County ordinance).
2014	Richmond	Polystyrene ban (2010) for takeout food packaging in restaurants was expanded to prohibit retail sale of polystyrene products on July 16, 2013.
2011	Salinas	On August 16, 2011, an EPS ban on takeout containers was passed.
2012	San Bruno	Restaurant use of polystyrene disposable food service items, requirement that all packaging be recyclable or compostable.
2011	Salinas	On August 16, 2011, an EPS ban on takeout containers was passed.
2018	San Anselmo	Bans EPS food ware and retail sale of EPS ice chests and coolers.
2010	San Bruno	Polystyrene ban, requirement that all plastic takeout food packaging be recyclable or compostable.
2012	San Carlos	Adopted the San Mateo County ordinance by reference. Chapter 8.27 of Municipal Code.
2011	San Clemente	Government facility EPS ban in 2004. Council passed a citywide ban in 2011.
2019	San Diego	Bans the use and distribution within city limits of products like egg cartons, food containers, coolers, ice chests, pool or beach toys, mooring buoys, and navigation markers made fully or partially of polystyrene foam.
2007/2016	San Francisco	EPS ban, requirement that all takeout food packaging be recyclable or compostable. On July 19, 2016, the Board of Supervisors expanded the ban to include the sale of non-recyclable non-compostable polystyrene food service ware, egg cartons, meat trays, and packing materials, as well as coolers, pool or beach toys, and floats or buoys that are not encapsulated in a more durable material. San Francisco has the most comprehensive ban in the nation. Effective January 1, 2017.
2014	San Jose	An EPS ban in all food establishments was adopted in 2013. Prior to that, the city had a government facility EPS ban for special events.
2004	San Juan Capistrano	Government facility EPS ban.
2012	San Leandro	EPS food container ban, adopted October 2011.
2015	San Luis Obispo	EPS food container ban. Includes ban on retail sale of foam products.

Adoption Date	Jurisdiction (City unless County specified)	Description
2021	San Luis Obispo County	EPS food container ban. Includes ban on retail sale of foam products.
2013	San Mateo	Polystyrene food packaging ban based on the San Mateo County model.
2008/2011	San Mateo County	Polystyrene food packaging ban based on the San Mateo County model.
2014	San Pablo	Ban on polystyrene food service ware and requires all disposable food service ware to be recyclable or compostable. Effective April 1, 2015.
2013	San Rafael	City Council adopted foamed polystyrene container ban in October 2012.
2019	Santa Barbara	Ban on EPS food service ware and requires all disposable food service ware to be recyclable or compostable. Prohibits any retailer from selling or otherwise providing any EPS product that is not wholly encapsulated.
2015	Santa Clara	Ban on polystyrene food service ware. National chain restaurants were phased in September 1, 2014, and all other restaurants were phased in on January 1, 2015.
2013	Santa Clara County	The Santa Clara County Board of Supervisors adopted an EPS takeout container ban for the unincorporated county on June 5, 2012.
2012	Santa Cruz	Ban on sale of all foam polystyrene products. Prior to 2012, the city banned the distribution of EPS food containers, with a requirement that the food packaging be recyclable or compostable.
2008/2012	Santa Cruz County	EPS ban, requirement that all takeout food packaging be recyclable or compostable. Title 5, Section 46 of Municipal Code. The ban was expanded to prohibit the sale of all EPS products in stores on April 17, 2012.
2007	Santa Monica	Ban on all polystyrene AND most other non-recyclable plastic disposable food service containers. This makes for one of the strongest bans in the nation.
2008	Sausalito	Food vendors and city facilities and events are prohibited from using EPS foam food containers.
2009	Scotts Valley	EPS ban, requirement that all takeout food packaging be recyclable or compostable.
2010	Seaside	Polystyrene ban with requirement that all plastic takeout food packaging be recyclable or compostable.
2015	Solana Beach	Ban on polystyrene and non-recyclable plastic disposable food service containers as well as ban on EPS packing materials.
1989	Sonoma	Government facility EPS ban. Chapter 7.30 of the Municipal Code.
1989	Sonoma County	Government facility EPS ban. Title 19, Section 19-6.1 of Municipal Code.
2018	South Lake Tahoe	Ban on sale and distribution. Plastic cutlery and straws only upon request.
2017	South Pasadena	In November 2016, City Council banned all disposable food service ware made from Expanded Polystyrene for all food providers, retail sales, and city facilities.
2008	South San Francisco	Polystyrene ban. Chapter 8.60 of Municipal Code.
2013	Sunnyvale	EPS container ban in restaurants (effective Earth Day 2014) and ban on EPS food packaging products for retail sale (effective Earth Day 2015).
2015	Ukiah	EPS food ware ban adopted in November of 2014.

Adoption Date	Jurisdiction (City unless County specified)	Description
2016	Union City	Ban on polystyrene disposable food ware and requires all disposable food ware to be recyclable or compostable. Effective January 1, 2017.
2004	Ventura County	Government facility EPS ban.
2021	Ventura	Bans EPS food ware starting July 1, 2021.
2014	Walnut Creek	Polystyrene food packaging ban.
2009/2014	Watsonville	EPS ban, requirement that all takeout food packaging be recyclable or compostable. Title 6, Chapter 6 of Municipal Code. First adopted in 2009. Amended in 2014 to include a ban on retail sales of EPS products.
1990	West Hollywood	Polystyrene ban for restaurants and food vendors.
1989	Yountville	EPS food container ban.

CFC = chlorofluorocarbon; EPS = expanded polystyrene
Source: Californians Against Waste 2015

2.2 PROJECT OBJECTIVES

The purpose of the proposed ordinance is to regulate the use of polystyrene products to reduce waste, encourage source reduction, prevent litter in the environment, protect public health, reduce contamination from polystyrene in other solid waste recycling processes, and promote environmentally sustainable practices in the City. The proposed ordinance would result in a reduction of polystyrene food and beverage containers; however, the ordinance may or may not result in a decline in overall consumption of disposable food and beverage containers. Replacement products are anticipated to be a mix of plastic and fiber products that do not break apart as easily as EPS foam material. The City's objectives for the Single Use Plastic Reduction Ordinance include:

- Reducing the consumption of polystyrene, a difficult-to-manage material;
- Encouraging the use of more easily recyclable products, consistent with California's waste reduction hierarchy;
- Providing the City an enforceable ordinance within the San Diego Municipal Code; and
- Reducing litter and the associated adverse impacts to storm water facilities, aesthetics, and the environment.

2.3 PROJECT HISTORY

The City previously considered this ordinance and processed a CEQA exemption. The process for approval of the CEQA exemption was challenged in court regarding the adequacy of evidence provided and the potential for unanalyzed impacts. The resulting settlement agreement specified the preparation of an EIR for the proposed ordinance. An IS Checklist was prepared as part of the NOP process, which indicated that the proposed project might have potentially significant Air Quality and GHG impacts. This EIR has been prepared to analyze these potential impacts.

For decades, the City has proactively addressed waste reduction control with planning documents including the City Council approved "Recycling and Waste Reduction Plan" in 1988, the "Source Reduction and Recycling Element" in 1992, updated in 1994 and annually thereafter, and, the "Zero Waste Plan" unanimously approved by City Council in July 2015 (City of San Diego 2015). The proposed ordinance would assist the City to further meet their waste reduction goals in line with the City's Zero Waste Plan and State mandates.

2.4 OUTREACH

The City has provided outreach including the publication of a web page, located at www.sandiego.gov/environmental-services/recycling/pf-ban, with general information about polystyrene, the proposed ordinance, and polystyrene alternatives; emails to an interested parties list of more than 500 recipients; mailing to over 8,500 potentially-impacted businesses in San Diego; and media interviews resulting in several print and television stories on the proposed ordinance.

An NOP for this EIR was distributed by the City on December 4, 2020, for a 30-day public review and comment period, and a public scoping meeting was held on December 16, 2020. A total of three written comments were received during the NOP period, including from one native American tribe (Rincon Band of Luiseño Indians), one company, and one individual.

2.5 THE PROJECT

The City is proposing an ordinance that would amend the San Diego Municipal Code to restrict the use of polystyrene products throughout the City. The proposed ordinance includes restrictions on the distribution of egg cartons, food service ware[1],

[1] Food service ware means containers, bowls, plates, trays, cups, lids, and other similar items that are designed for one-time use for prepared food, including containers for takeout food or leftovers. Food service ware does not include polystyrene foam coolers and ice chests.

and food trays that are made, in whole or in part, from polystyrene foam. Items that are made, in whole or in part, from polystyrene foam that is not wholly encapsulated or encased within a non-polystyrene foam material (e.g., coolers, ice chests, or similar containers; pool or beach toys; or dock floats, mooring buoys, or anchor or navigation markers) would also be removed from distribution. Products that are made, in whole or in part, from polystyrene foam would be removed from distribution in or at facilities within the City. The proposed ordinance would allow the distribution of prepared food that is packaged in food service ware or that uses food trays made, in whole or in part, from polystyrene foam, if the prepared food is packaged outside of the City and is provided to the consumer as originally packaged. The proposed ordinance would limit the distribution of food service ware products such as, utensils (including straws), for takeout orders of prepared food and would only allow the provision of disposable utensils upon the request of the person ordering the prepared food.

The ordinance would also include a process for obtaining a waiver of the provisions regarding food service ware and food trays if the applicant or City official seeking the waiver demonstrates that adherence to the ordinance would result in the following: 1) a feasibility-based hardship; 2) a financial hardship; and/or 3) a violation of a contractual requirement.

The Single Use Plastic Reduction Ordinance would specify the following:

> *No person may distribute egg cartons, food service ware, or food trays made, in whole or in part, from polystyrene foam. No person may distribute the following items made, in whole or in part, from polystyrene foam that is not wholly encapsulated or encased within a non-polystyrene foam material: coolers, ice chests, or similar containers; pool or beach toys; or dock floats, mooring buoys, or anchor or navigation markers. No person shall use the products prohibited from distribution in or at City facilities.*
>
> *It shall not be a violation of the ordinance to distribute prepared food packaged in food service ware or use food trays made, in whole or in part, from polystyrene foam, if the prepared food is packaged outside the City and is provided to the consumer as originally packaged.*
>
> *A food vendor may only distribute utensils for takeout orders of prepared food upon the request of the person ordering the prepared food. A food vendor may only distribute straws, as defined as a utensil, upon request of the person ordering the prepared food.*
>
> *The Environmental Services Department Director shall, within 30 days after certification of the EIR for this ordinance, publish on the City's website and distribute*

to interested parties who have requested notice, information regarding acceptable alternative food service ware and food tray products that are not prohibited. The person using a product as food service ware or a food tray will have the burden of establishing that the product complies with this ordinance. The Director shall maintain and update the published information as may be appropriate.

An applicant may seek a waiver or a renewal of a waiver of the restrictions of this ordinance in accordance with this section by submitting a written application on a form approved by the Director. Applications for renewals must be submitted no later than 60 days prior to the expiration of the previous waiver. The Director may require the applicant to submit additional information or documentation before making a determination regarding the waiver. The Director may waive the provisions regarding food service ware and food trays in accordance with the following:

- *Feasibility-based hardship. The applicant seeking the waiver must demonstrate to the Director's satisfaction that no reasonably feasible alternative exists to a specific non-compliant material.*
- *Financial hardship. An individual or an entity may seek a financial hardship waiver. The applicant seeking the waiver must demonstrate to the Director's satisfaction that the following criteria are met: The applicant has a gross income of less than $500,000 on the applicant's annual federal income tax filing for the most recent tax year; (however, a waiver sought on behalf of an entity must be based on the entity's income), and with respect to each specific non-compliant product, there is no suitable and reasonably affordable alternative product available.*
- *Contractual requirement. The applicant seeking a waiver based on an existing contractual requirement must demonstrate to the Director's satisfaction that a contract to purchase a non-compliant material was entered into within one year prior to certification of this CEQA document, in which case the Director may waive the requirements for one year.*

The Director may grant feasibility-based or financial hardship waivers in whole or in part, with or without conditions, for up to 24 months if the applicant or City official seeking the waiver has demonstrated to the Director's satisfaction that strict application of the specific requirement would create a continued feasibility-based or financial hardship pursuant to San Diego Municipal Code Section 66.0906(d)(1) or (2) or there are special circumstances or conditions that are peculiar to the applicant and these circumstances or conditions are not the result of any act of the applicant's after February 23, 2019, and the waiver is the minimum relief necessary to address the

> *special circumstances or conditions. The Director shall base his or her determination on the most current information available. The Director may grant renewals for up to 24 months, based on the same criteria. Subsequent renewals for up to 24 months, based on the same criteria, may be applied for and granted. The Director's determination regarding a waiver shall be final and shall not be subject to appeal.*
>
> *The Director shall issue a written warning to any person he or she determines is violating this Division as a first offense. If, after issuing a written warning of violation, the person continues to violate the same provision of this Division, the City may impose the other enforcement remedies set forth in San Diego Municipal Code Chapter 1.*

The proposed ordinance is anticipated to result in the replacement of expanded polystyrene, with a mix of recyclable, compostable, and reusable products. Both plastic and paper replacement products are generally heavier than polystyrene. While each individual item is generally a lightweight item, when considering the transport of many thousands of single use products, small increases in weight could have associated, indirect and/or cumulative impacts. For this analysis, it is conservatively assumed that all existing polystyrene food and beverage containers (approximately 6,270,000 pounds) would be replaced by a similarly sized container or product that is composed of either approved plastic or paper products (City of San Jose 2013). To estimate the potential increase in weight, the data from Franklin Associates life cycle study of foam polystyrene was used (Franklin Associates 2011). According to the Franklin study, a polystyrene 32-ounce cold cup weighs 8.8 grams, whereas a low-density polyethylene (LDPE)-coated paperboard cup weighs 19.8 grams. Similarly, a polystyrene sandwich-sized clamshell weighs 4.8 grams, a paperboard clamshell weighs 10.2 grams, and a solid polylactic acid (biomass-derived alternative) clamshell weighs 23.3 grams. GoCeramic Cup compared a paper cup and a plastic cup that weighed the same amount (GoCeramic Cup 2018), but plastic alternatives vary widely in weight. Paper and plastic alternatives to polystyrene in these studies range from 1.0 to three times as heavy, with 2.4 times representing a rough, conservative estimate of the weight of paper alternative, and 2.5 times being a rough, conservative estimate of weight of the plastic alternative. The actual shift in composition between plastic and paper food containers may be different, may change over time, and could vary from year to year. Because plastic alternative materials weigh approximately 2.5 times more than polystyrene (and paper alternatives weigh less than plastic materials [2.4 times more than polystyrene]), for the purposes of providing a worst-case analysis, this EIR assumes a 100 percent shift from polystyrene to plastic replacement products; which would result in an increase of 9,405,000 pounds (4,266 tons) of material per year.

For the purpose of this analysis, it is assumed that all polystyrene is EPS foam because there are no reasonable other polystyrene (rigid or film) metrics for use. Additionally, this is a conservative approach because the basis of the analysis is in part weight-based and EPS foam is generally lighter than rigid polystyrene. Although EPS foam is not necessarily lighter than EPS film, EPS film is likely not widely used by food service providers in the City. Instead, it would be more likely that polystyrene film would be found on pre-packaged food items.

2.6 ENVIRONMENTAL SETTING

The City is the largest (geographically and by population) of the 18 cities within San Diego County. It is located approximately 120 miles south of Los Angeles and adjacent to the border with Mexico. With an estimated population of more than 1.4 million, San Diego is the eighth-largest city in the United States and second-largest in California. The proposed ordinance would apply Citywide, approximately 372 square miles, stretching from San Pasqual to the north, the Pacific Ocean to the west, and the International Border with Mexico to the south (see Figure 2-1). To the east the City borders unincorporated portions of the county, the City of Santee, the City of La Mesa, and the City of Lemon Grove. Other adjoining jurisdictions include Solana Beach, Del Mar, Escondido, Poway, Coronado, National City, Chula Vista, and Imperial Beach.

The national average of polystyrene use ranges from 1.8 to 7 pounds per person per year. A waste characterization analysis completed in 2010 by the Cities of Mountain View and Sunnyvale determined the per capita disposal rate of polystyrene materials to be 6.4 pounds per person per year, which is comparable with New York City's 2015 polystyrene disposal rate estimated to be 6.0 pounds per person per year. In 1999, approximately 300,000 tons of EPS foam was landfilled in California, which represents approximately 0.8 percent of total waste and translates to a total disposal cost of $30 million per year (Equinox Project 2017). Although the weight-based percentage is small, EPS foam is light, so it represents a larger percentage of the total waste stream by volume. Although the technology to recycle polystyrene exists, EPS foam food containers are rarely recycled because the items are not clean enough for recyclable processing and/or the recycled material is not profitable enough to sell to waste traders. Likewise, polystyrene is non-biodegradable.

Polystyrene food and beverage containers are odorless, lightweight, insulated, sturdy packages, but are intended for one-time use before disposal. Californians use approximately 165,000 tons of polystyrene each year for packaging and food service purposes; however, only 0.2 percent is recycled (Gardner and Lee 2008).

Littered polystyrene food packaging clogs storm drains and pollutes beaches, which results in millions of dollars in cleanup costs (Clean Water Action 2009). Because of polystyrene's longevity and inability to biodegrade, once littered, polystyrene entangles in brush, collects along roadways, blows into storm drains, and washes up on beaches. It breaks apart and is carried downstream into waterways, impacting the environment, including wildlife. EPS foam crumbles and can be difficult to collect. It is often a more visible source of litter compared to other littered materials. In addition to impacts on wildlife, littering impacts recreational areas and the quality of life for residents. One study of beach debris surveyed 43 sites along the Orange County coast. It found that EPS foam was the second most abundant form of beach debris (Clean Water Action 2009). Additionally, the "Two Rivers" study in Los Angeles found that over 1.6 billion pieces of plastic foam were headed to the ocean over a three-day period during surveys in 2004 and 2005. Likewise, the study determined that 71 percent of the 2.3 billion plastic items in the survey were foam items that made up 11 percent of the overall weight of plastic pollution collected during the surveys (Moore et al. 2011). Locally, in 2017, the Surfrider Foundation's San Diego Chapter removed 20,883 pieces of polystyrene foam from City beaches (Surfrider Foundation 2019). Beach cleanups are conducted by San Diego Coast Keeper on a regular basis and, in 2016, approximately 11 percent of trash collected was polystyrene (Gladson 2018). Furthermore, the amount of polystyrene material in the City that is recovered for recycling is approximately 15 tons out of 66,000 tons of curbside recyclables; approximately 1,600 tons of polystyrene material collected for recycling goes into the landfill every year because it is contaminated (Hoffman 2019).

Figure 2-1
Project Assessment Area (from SanGIS)

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SECTION 3 ENVIRONMENTAL IMPACT ANALYSIS

This section of the EIR examines the potential environmental effects of the proposed project for the specific issue areas that were identified through the IS Checklist and NOP process as having the potential for a significant impact. The IS Checklist narrowed the scope of issue areas to be considered to two issue areas: Air Quality and GHG Impacts. Thresholds that were found to have less than significant impacts as identified in the IS Checklist (Appendix A) are not included in this analysis section. This section focuses only on analysis of the thresholds identified as "Potentially Significant" in the IS Checklist; all other thresholds are discussed in Section 4, Effects Found Not to Be Significant.

The following aspects of air quality and GHG impacts are considered:

- Environmental Setting, which describes the existing environmental conditions as they exist before the commencement of the project to provide a baseline for comparing "before the project" and "after the project" environmental conditions.
- Regulatory Framework, which describes the current regulatory requirements pertaining to the project.
- Impact Criteria, which define and list specific criteria that were identified through a review of the City's CEQA Guidelines and Significance Thresholds and NOP process as having the potential for a significant impact.
- Environmental Impact Analysis, which presents evidence, based to the extent possible on scientific and factual data, of the cause and effect relationship between the project and potential changes in the environment. The magnitude, duration, extent, frequency, range, or other parameters of a potential impact support conclusions about the significance. Direct effects and reasonably foreseeable indirect effects are considered. If, after thorough investigation, a particular impact is too speculative for evaluation, that conclusion is noted (CEQA Guidelines Section 15145).
- Mitigation Measures, which include measures that may be needed to reduce or avoid the potentially significant impact identified in the EIR analysis. Standard existing regulations, requirements, and procedures applicable to the project are considered a part of the existing regulatory environment.
- Level of Impact after Mitigation, which indicates what effect would remain after application of mitigation measures, if any, and whether the remaining effect is considered significant. When impacts, even with the inclusion of

mitigation measures, cannot be mitigated to a level considered less than significant, they are identified as "unavoidable significant impacts."

3.1 AIR QUALITY

This section describes the regulatory framework, provides an overview of existing conditions related to air quality, and evaluates the potential air quality impacts associated with implementation of the proposed ordinance.

3.1.1 Environmental Setting

Air quality is defined by the concentration of pollutants in relation to their impact on human health (USEPA 2015). Concentrations of air pollutants are determined by the rate and location of pollutant emissions released by pollution sources, and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, and sunlight (Pénard-Morand and Annesi-Maesano 2004). Therefore, ambient air quality conditions within the local air basin are influenced by such natural factors as topography, meteorology, and climate, in addition to the amount of air pollutant emissions released by existing air pollutant sources.

Climate, topography, and meteorology influence regional and local ambient air quality. Southern California is characterized as a semiarid climate, although it contains three distinct zones of rainfall that coincide with the coast, mountain, and desert. The proposed ordinance would be implemented within the City, which is within the San Diego Air Basin (SDAB). The SDAB is a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean to the west and high mountain ranges to the east. The topography in the SDAB region varies greatly, from beaches on the west, to mountains and then desert to the east.

The climate of the SDAB is characterized by warm, dry summers and mild winters. One of the main determinants of its climatology is a semi-permanent high-pressure area in the eastern Pacific Ocean. This high-pressure cell maintains clear skies for much of the year. When the Pacific High moves southward during the winter, this pattern changes, and low-pressure storms are brought into the region, causing widespread precipitation. During fall, the region often experiences dry, warm easterly winds, locally referred to as Santa Ana winds, which raise temperatures and lower humidity, often to less than 20 percent.

A common atmospheric condition known as a temperature inversion affects air quality in the SDAB. During an inversion, air temperatures get warmer rather than cooler with increasing height. Inversion layers are important for local air quality, because they inhibit the dispersion of pollutants and result in a temporary degradation of air quality. The pollution potential of an area is largely dependent

on a combination of winds, atmospheric stability, solar radiation, and terrain. The combination of low wind speeds and low-level inversions produces the greatest concentration of air pollutants. On days without inversions, or on days of winds averaging over 15 miles per hour, the atmospheric pollution potential is greatly reduced.

3.1.1.1 Criteria Air Pollutants

Individual air pollutants at certain concentrations may adversely affect human or animal health, reduce visibility, damage property, and reduce the productivity or vigor of crops and natural vegetation. Six air pollutants have been identified by USEPA and the California Air Resources Board (ARB) as being of concern both on a nationwide and statewide level: ozone; carbon monoxide (CO); nitrogen dioxide (NO_2); sulfur dioxide (SO_2); lead; and particulate matter (PM), which is subdivided into two classes based on particle size: PM equal to or less than 10 micrometers in diameter (PM_{10}) and PM equal to or less than 2.5 micrometers in diameter ($PM_{2.5}$). Because the air quality standards for these air pollutants are regulated using human health and environmentally based criteria, they are commonly referred to as "criteria air pollutants." The discussion below defines each criteria pollutant, identifies major sources, and describes health effects associated with exposure.

Ozone. Ozone is the principal component of smog and is formed in the atmosphere through a series of reactions involving reactive organic gases (ROGs) or volatile organic compounds (VOCs) and nitrogen oxides (NO_X) in the presence of sunlight. ROGs/VOCs and NO_X are called precursors of ozone. NO_X includes various combinations of nitrogen and oxygen, including nitric oxide (NO), NO_2, and others. Significant ozone concentrations are usually produced only in the summer, when atmospheric inversions are greatest and temperatures are high. ROGs/VOCs and NO_X emissions are considered critical in ozone formation.

Individuals exercising outdoors, children, and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered the most susceptible sub-groups for ozone effects. Short-term exposure (lasting for a few hours) to ozone can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. In recent years, a correlation between elevated ambient ozone levels and increases in daily hospital admission rates, as well as mortality, has also been reported. An increased risk for asthma has been found in children who participate in sports and live in communities with high ozone levels.

Carbon Monoxide. CO is a colorless and odorless gas that, in the urban environment, is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. Relatively high concentrations are typically found near crowded intersections and along heavily used roadways carrying slow-moving traffic. Even under the most severe meteorological and traffic conditions, high concentrations of CO are limited to locations within a relatively short distance (300 to 600 feet) of heavily traveled roadways. Vehicle traffic emissions can cause localized CO impacts, and severe vehicle congestion at major signalized intersections can generate elevated CO levels, called "hot spots," which can be hazardous to human receptors adjacent to the intersections. Individuals with a deficient blood supply to the heart are the most susceptible to the adverse effects of CO exposure. The effects observed include earlier onset of chest pain with exercise, and electrocardiograph changes indicative of decreased oxygen supply to the heart. Inhaled CO has no direct toxic effect on the lungs but exerts its effect on tissues by interfering with oxygen transport. Hence, conditions with an increased demand for oxygen supply can be adversely affected by exposure to CO. Individuals most at risk include fetuses, patients with diseases involving heart and blood vessels, and patients with chronic hypoxemia (oxygen deficiency) as seen at high altitudes.

Nitrogen Dioxide. NO_2 is a product of combustion and is generated in vehicles and in stationary sources, such as power plants and boilers. It is also formed when ozone reacts with NO in the atmosphere. As noted above, NO_2 is part of the NO_X family and is a principal contributor to ozone and smog generation. Population-based studies suggest that an increase in acute respiratory illness, including infections and respiratory symptoms in children, is associated with long-term exposure to NO_2 at levels found in homes with gas stoves, which are higher than ambient levels found in Southern California. Airway contraction and increased resistance to air flow are observed after short-term exposure to NO_2 in healthy subjects. Larger decreases in lung functions are observed in individuals with asthma or chronic obstructive pulmonary disease (e.g., chronic bronchitis, emphysema) than in healthy individuals, indicating a greater susceptibility of these sub-groups.

Sulfur Dioxide. SO_2 is a combustion product, with the primary source being power plants and heavy industries that use coal or oil as fuel. SO_2 is also a product of diesel engine combustion. SO_2 in the atmosphere contributes to the formation of acid rain. SO_2 can irritate lung tissue and increase the risk of acute and chronic respiratory disease. In asthmatics, increased resistance to air flow and a reduction in breathing capacity leading to severe breathing difficulties are observed after acute exposure to SO_2. In contrast, healthy individuals do not exhibit similar acute

responses even after exposure to higher concentrations of SO_2. Some population-based studies indicate that the mortality and morbidity effects associated with fine particles show a similar association with ambient SO_2 levels. In these studies, efforts to separate the effects of SO_2 from those of fine particles have not been successful. It is not clear whether the two pollutants act synergistically, or one pollutant alone is the predominant factor.

Lead. Lead is a highly toxic metal that may cause a range of human health effects. Fetuses, infants, and children are more sensitive than others to the adverse effects of lead exposure. Exposure to low levels of lead can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotient. In adults, increased lead levels are associated with increased blood pressure. Lead poisoning can cause anemia, lethargy, seizures, and death, although it appears that there are no direct effects of lead on the respiratory system. Previously, the lead used in gasoline anti-knock additives represented a major source of lead emissions to the atmosphere from mobile and industrial sources. USEPA began working to reduce lead emissions soon after its inception, issuing the first reduction standards in 1973. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. USEPA banned the use of leaded gasoline in highway vehicles in December 1995. As a result of USEPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector and levels of lead in the air decreased dramatically.

Particulate Matter. PM is a complex mixture of extremely small particles that consists of dry solid fragments, solid cores with liquid coatings, and small liquid droplets. PM is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, soot, and soil or dust particles. Natural sources of PM include windblown dust and ocean spray. The size of PM is directly linked to the potential for causing health problems. USEPA is concerned about particles that are 10 micrometers in diameter or smaller, because these particles generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. Health studies have shown a significant association between exposure to PM and premature death. Other important effects include aggravation of respiratory and cardiovascular disease, lung disease, decreased lung function, asthma attacks, and certain cardiovascular problems, such as heart attacks and irregular heartbeat (USEPA 2016). Individuals particularly sensitive to fine particle exposure include older adults, people with heart and lung disease, and children. A consistent correlation between elevated PM levels and an increase in mortality

rates, respiratory infections, number and severity of asthma attacks, and the number of hospital admissions has been observed in different parts of the United States and various areas around the world. In recent years, some studies have reported an association between long-term exposure to air pollution dominated by fine particles and increased mortality, reduction in life-span, and an increased mortality from lung cancer. USEPA groups PM into two categories, which are described below.

PM_{10}. PM_{10} includes both fine and coarse dust particles; the fine particles are $PM_{2.5}$. Coarse particles, such as those found near roadways and dust-producing industries, are larger than 2.5 micrometers and smaller than 10 micrometers in diameter. Sources of coarse particles include crushing or grinding operations and dust from paved or unpaved roads. Control of PM_{10} is primarily achieved through the control of dust at construction and industrial sites, the cleaning of paved roads, and the wetting or paving of frequently used unpaved roads.

$PM_{2.5}$. Fine particles, such as those found in smoke and haze, are $PM_{2.5}$. Sources of fine particles include all types of combustion activities (motor vehicles, power plants, wood burning, etc.) and certain industrial processes. $PM_{2.5}$ is also formed through reactions of gases, such as SO_2 and NO_X, in the atmosphere. $PM_{2.5}$ is the major cause of reduced visibility (haze) in California.

3.1.1.2 Ambient Air Quality Standards

Health-based air quality standards have been established for these criteria pollutants by USEPA at the national level and by ARB at the state level. These standards were established to protect the public with a margin of safety from adverse health impacts due to exposure to air pollution. California has also established standards for sulfates, visibility-reducing particles, hydrogen sulfide, and vinyl chloride. Table 3.1-1 presents the National Ambient Air Quality Standards (NAAQS) and the California Ambient Air Quality Standards (CAAQS).

3.1.1.3 Toxic Air Contaminants

In addition to criteria pollutants, both federal and state air quality regulations also focus on toxic air contaminants (TACs). TACs can be separated into carcinogens and noncarcinogens based on the nature of the effects associated with exposure to the pollutant. For regulatory purposes, carcinogens are assumed to have no safe threshold below which health impacts would not occur. Any exposure to a carcinogen poses some risk of contracting cancer. Noncarcinogens differ in that there is generally assumed to be a safe level of exposure below which no negative

health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis.

Table 3.1-1
National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a] Concentration[c]	National Standards[b] Primary[c,d]	National Standards[b] Secondary[c,e]
Ozone[l]	1 hour	0.09 ppm (180 µg/m³)	–	Same as primary standard
Ozone[l]	8 hours	0.070 ppm (137 µg/m³)	0.070 ppm (137 µg/m³)	Same as primary standard
Respirable particulate matter (PM_{10})[f]	24 hours	50 µg/m³	150 µg/m³	Same as primary standard
Respirable particulate matter (PM_{10})[f]	Annual arithmetic mean	20 µg/m³	–	Same as primary standard
Fine particulate matter ($PM_{2.5}$)[f]	24 hours	–	35 µg/m³	Same as primary standard
Fine particulate matter ($PM_{2.5}$)[f]	Annual arithmetic mean	12 µg/m³	12 µg/m³	15 µg/m
Carbon monoxide (CO)	8 hours	9.0 ppm (10 mg/m³)	9 ppm (10 mg/m³)	None
Carbon monoxide (CO)	1 hour	20 ppm (23 mg/m³)	35 ppm (40 mg/m³)	None
Carbon monoxide (CO)	8 hours (Lake Tahoe)	6 ppm (7 mg/m³)	–	–
Nitrogen dioxide (NO_2)[g]	Annual arithmetic mean	0.030 ppm (57 µg/m³)	0.053 ppm (100 µg/m³)	Same as primary standard
Nitrogen dioxide (NO_2)[g]	1 hour	0.18 ppm (339 µg/m³)	100 ppb (188 µg/m³)	None
Sulfur dioxide (SO_2)[h]	Annual arithmetic mean	–	0.030 ppm (for certain areas)[h]	–
Sulfur dioxide (SO_2)[h]	24 hours	0.04 ppm (105 µg/m³)	0.14 ppm (for certain areas)[h]	–
Sulfur dioxide (SO_2)[h]	3 hours	—	–	0.5 ppm (1,300 µg/m³)
Sulfur dioxide (SO_2)[h]	1 hour	0.25 ppm (655 µg/m³)	75 ppb (196 µg/m³)	–
Lead[i,j]	30-day average	1.5 µg/m³	–	–
Lead[i,j]	Calendar quarter	–	1.5 µg/m³ (for certain areas)[j]	Same as primary standard
Lead[i,j]	Rolling 3-month average	–	0.15 µg/m³	Same as primary standard
Visibility-reducing particles[k]	8 hours	See footnote j	No national standards	No national standards
Sulfates	24 hours	25 µg/m³	No national standards	No national standards
Hydrogen sulfide	1 hour	0.03 ppm (42 µg/m³)	No national standards	No national standards
Vinyl chloride[i]	24 hours	0.01 ppm (26 µg/m³)	No national standards	No national standards

Notes: – = not applicable, mg/m³ = milligrams per cubic meter; ppb = parts per billion; ppm = parts per million; µg/m³ = micrograms per cubic meter

[a] California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility-reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³

is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standards.

[c] Concentration expressed first in the units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25 degrees Celsius and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and reference pressure of 760 torr; (ppm) in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[e] National Secondary Standards: The levels of air quality necessary to protect public welfare from any known or anticipated adverse effects of a pollutant.

[f] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m^3, as was the annual secondary standard of 15 µg/m^3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

[g] To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. California standards are in units of ppm. To directly compare the national 1-hour standard to the California standards the units can be converted from 100 ppb to 0.100 ppm.

[h] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved. To directly compare the 1-hour national standard to the California standard, the units can be converted to ppm. In this case, the national standard of 75 ppb is identical of 0.075 ppm.

[i] ARB has identified lead and vinyl chloride as toxic air contaminants with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[j] The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standards are approved.

[k] In 1989, ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and the "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

[l] On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

Source: ARB 2016

TACs may be emitted by stationary, area, or mobile sources. Common stationary sources of TAC emissions include gasoline stations, dry cleaners, and diesel backup generators, which are subject to local air district permit requirements. The other, often more significant, sources of TAC emissions are motor vehicles on freeways, high-volume roadways, or other areas with high numbers of diesel vehicles, such as distribution centers. Off-road mobile sources are also major contributors of TAC emissions and include construction equipment, ships, and trains.

Particulate exhaust emissions from diesel-fueled engines (diesel PM) were identified as a TAC by ARB in 1998. Federal and state efforts to reduce diesel PM emissions have focused on the use of improved fuels, adding particulate filters to engines, and requiring the production of new-technology engines that emit fewer exhaust particulates.

Diesel engines tend to produce a much higher ratio of fine particulates than other types of internal combustion engines. The fine particles that make up diesel PM tend to penetrate deep into the lungs and the rough surfaces of these particles

makes it easy for them to bind with other toxins within the exhaust, thus increasing the hazards of particle inhalation. Long-term exposure to diesel PM is known to lead to chronic, serious health problems including cardiovascular disease, cardiopulmonary disease, and lung cancer.

The nearest monitoring stations to the City for which the San Diego Air Pollution Control District (SDAPCD) samples for TACs are the El Cajon and Chula Vista monitoring stations. Excluding diesel PM, data from these stations indicate that the background cancer risk in 2018 due to TACs was 356 in one million in Chula Vista and 389 in one million in El Cajon. There is no current methodology for directly measuring diesel PM. However, ARB estimates the excess cancer risk from diesel PM in California in 2014 as 460 in a million (SDAPCD 2019).

3.1.1.4 Existing Air Quality

The SDAPCD is responsible for enforcing the rules and regulations protecting air quality in the SDAB. Ambient air pollutant concentrations in the SDAB are measured at air quality monitoring stations operated by ARB and the SDAPCD. The SDAPCD operates nine monitoring sites throughout SDAB that collect criteria pollutant data (SDAPCD 2020a). Table 3.1-2 summarizes the exceedances of standards and the highest recorded concentrations for each criteria pollutant in the SDAB. These concentrations represent the existing, or baseline conditions, for the project area, based on the most recent information that is available.

As shown in Table 3.1-2, ambient air concentrations of NO_2 and CO did not exceed the NAAQS or CAAQS between 2017 and 2019. The 1-hour and 8-hour ozone concentrations were exceeded each year. PM_{10} concentrations exceeded the CAAQS each year and only exceeded the NAAQS one day in 2019. $PM_{2.5}$ concentrations exceeded the NAAQS in 2017 and 2018. Table 3.1-3 shows the attainment designations for the SDAB.

Table 3.1-2
Ambient Air Quality Summary for San Diego Air Basin[a]

Pollutant Standards	2017	2018	2019
Ozone State max 1-hour concentration (ppm)	0.109	0.102	0.110
Ozone National maximum 8-hour concentration (ppm)	0.095	0.082	0.084
Ozone State maximum 8-hour concentration (ppm)	0.095	0.082	0.084
Number of Days Ozone Standard Exceeded CAAQS 1-hour (>0.09 ppm)	13	3	2

Number of Days Ozone Standard Exceeded CAAQS 8-hour (>0.070 ppm)/NAAQS 8-hour (>0.070 ppm)	57/54	25/23	21/19
Carbon Monoxide (CO) [b] Maximum 8-hour concentration (ppm)	1.5	1.4	2.5
Carbon Monoxide (CO) [b] Maximum 1-hour concentration (ppm)	2.0	1.9	4.1
Number of Days **CO** Standard Exceeded CAAQS 8-hour (>9 ppm)/NAAQS 8-hour (>9 ppm)	0	0	0
Nitrogen Dioxide (NO_2) State maximum 1-hour concentration (ppb)	74	55	86
NO_2 Annual Average (ppb)	16	15	14
Number of Days **NO_2** Standard Exceeded NAAQS 1-hour (>100 ppb)	0	0	0
Number of Days **NO_2** Standard Exceeded CAAQS 1-hour (>0.18 ppm)	0	0	0
Particulate Matter (PM_{10}) National maximum 24-hour concentration (⊠g/m³)	68.0	55.0	199.0
PM_{10} State maximum 24-hour concentration (⊠g/m³)	69.0	55.0	199.8
PM_{10} State annual average concentration (⊠g/m³)	26.9	26.2	31.4
Measured Number of Days **PM_{10}** Standard Exceeded NAAQS 24-hour (>150 ⊠g/m³)	0	0	1
Measured Number of Days **PM_{10}** Standard Exceeded CAAQS 24-hour (>50 ⊠g/m³)	4	3	8
Particulate Matter ($PM_{2.5}$) National maximum 24-hour concentration (⊠g/m³)	42.7	41.9	23.8
$PM_{2.5}$ State maximum 24-hour concentration (⊠g/m³)	42.7	50.8	34.3
$PM_{2.5}$ National annual average concentration (⊠g/m³)	9.6	10.0	8.6
$PM_{2.5}$ State annual average concentration (⊠g/m³)	9.6	10.5	*
Measured Number of Days Standard Exceeded NAAQS 24-hour (>35 ⊠g/m³)	1	1	0

Notes: µg/m³ = micrograms per cubic meter; ARB = California Air Resources Board; CAAQS = California Ambient Air Quality Standards; NAAQS = National Ambient Air Quality Standards; ppb = parts per billion; ppm = parts per million; SDAB = San Diego Air Basin; SDAPCD = San Diego Air Pollution Control District

[a] Data primarily compiled for the ARB iADAM: Air Quality Data Statistics, summarized by air basin for the SDAB for years 2017–2019, unless otherwise noted (see footnote b).

[b] Data obtained from the SDAPCD 5-Year Air Quality Monitoring Network Assessment, Table 6.0: CO Concentrations for San Diego (SDAPCD 2020b).

*Insufficient data to determine the value.

Source: ARB 2020a

Table 3.1-3
San Diego Air Basin Attainment Designations

Pollutant	State	Federal
Ozone (1-hour)	Nonattainment	Attainment*
Ozone (8-hour)	Nonattainment	Nonattainment
Carbon Monoxide	Attainment	Unclassified/Attainment
Nitrogen Dioxide	Unclassified/Attainment	Unclassified/Attainment
Sulfur Dioxide	Unclassified/Attainment	Unclassified/Attainment
PM_{10}	Nonattainment	Unclassified
$PM_{2.5}$	Nonattainment	Unclassified/Attainment
Sulfates	Attainment	N/A
Hydrogen Sulfide	Unclassified	N/A
Visibility Reducing Particles	Unclassified	N/A
Lead	Attainment	Unclassified/Attainment

Notes:
N/A = not applicable; no standard. PM_{10} = particulate matter equal to or less than 10 micrometers in diameter; $PM_{2.5}$ = particulate matter equal to or less than 2.5 micrometers in diameter
* The federal ozone (1-hour) standard of 12 parts per million was in effect from 1979 through June 15, 2005. The revoked standard is referenced here because this benchmark is addressed in State Implementation Plans.
Source: SDAPCD 2020c.

As shown in Table 3.1-3, the SDAB currently attains or is designated as "unclassified" under the NAAQS for all criteria air pollutants except ozone (1-hour) and (8-hour) and meets or is designated as "unclassified" under the CAAQS for all criteria air pollutants except ozone (1-hour) and (8-hour), PM_{10}, and $PM_{2.5}$.

3.1.1.5 Sensitive Receptors

Some members of the population are especially sensitive to air pollutant emissions and should be given special consideration when evaluating air quality impacts from projects. The City's CEQA Significance Determination Thresholds defines a sensitive receptor as a person who is more susceptible to health effects due to exposure to an air contaminant relative to the population at large (City of San Diego 2016). Sensitive receptors include children, the elderly, people with preexisting respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise. Air quality regulators typically define sensitive receptor locations to be schools, hospitals, resident care facilities, day-care centers, or other facilities that may house individuals who are particularly susceptible to health effects that would be adversely impacted by changes in air quality.

Residential areas are also considered sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to pollutants present. Recreational land uses are considered moderately sensitive to air pollution. Exercise places a high demand on respiratory functions, which can be impaired by air pollution even though exposure periods during exercise are generally short. In addition, noticeable air pollution can detract from the enjoyment of recreation. Industrial and commercial areas are considered the least sensitive to air pollution because exposure periods are relatively short and intermittent as the majority of the workers tend to stay indoors most of the time.

3.1.1.6 Existing Air Pollutant Emissions Associated with Polystyrene Use

Polystyrene has the potential to contribute to the generation of criteria air pollutants through emissions associated with the manufacturing process, truck trips delivering containers to retailers, and as a result of disposal at the end of life. This analysis estimates that an average of 4.4 pounds of polystyrene per person per year is used, given that the national average ranges from 1.8 to 7 pounds per person per year (The Resin Review, 2012 Edition)[2]. The population of the City in 2019 was estimated at 1,425,976 (Quick Facts 2019). This analysis assumes that the number of City residents that patronize retailers outside the City is comparable to customers of City retailers who reside outside of San Diego (i.e., visitors who live outside San Diego but travel to shop or eat within the City), as the density of the surrounding areas is similar to the City. Using these data, it is estimated that approximately 6,270,000 pounds of polystyrene service ware containers are used per year in San Diego.

Manufacturing Process. Polystyrene is the fourth largest thermoplastic by production volume. It is used in applications in the following major markets (listed in order of consumption): packaging, consumer/institutional goods, electrical/electronic goods, building/construction, furniture, industrial/machinery, and transportation (USEPA 1991). CEQA analyses typically do not use consumption-based or life-cycle scopes of analysis for calculating emissions, because many emissions estimated in such analyses are outside of local

[2] For the purpose of this analysis, it is assumed that all polystyrene is EPS foam because there are no other reasonable polystyrene (rigid or film) data available. This is a conservative approach because the basis of the analysis is in part weight-based and EPS foam is generally lighter than rigid polystyrene. Although EPS foam is not necessarily lighter than EPS film, EPS film is likely not widely used by food service providers in the City. Instead, it would be more likely that polystyrene film would be found on pre-packaged food items.

jurisdictional control or substantial jurisdictional influence[3]. In addition, because the manufacturing process can vary by manufacturing plants, grade of product, emission control devices, and location, manufacturing emissions are also not included in the impact analysis because this information is not known, and the proposed ordinance does not propose any change to any manufacturing process.

Delivery to Local Retailers. Delivery trucks that transport food and beverage containers from manufacturers or distributors to local retailers generate criteria air pollutants, including ROGs/VOCs, NOx, SOx, CO, PM_{10}, and $PM_{2.5}$. Assuming that food and beverage containers are transported via a standard 53-foot diesel delivery truck, which has a maximum load capacity of approximately 48,000 pounds, approximately 131 annual truck trips (roundtrips) are currently needed to deliver the approximately 6.27 million pounds of polystyrene service ware containers used per year in San Diego. This analysis assumes that each delivery truck trip would be approximately 93 miles based on the distance between the city of Encinitas (location of a local distributor)[4] to the southeastern edge of the air district boundary (ARB 2020b). The analysis utilized the EMission FACtor model, version 2021 (EMFAC2021) data for a standard delivery truck in San Diego County in 2021. EMFAC2021 is the latest update to the EMFAC model, a model that ARB uses to assess emissions from on-road motor vehicles including cars, trucks, and buses in California, and to support ARB's planning and policy development. This newest model reflects ARB's current understanding of statewide and regional vehicle activities (ARB 2021). The annual and daily emissions estimates associated with the existing truck trips to deliver polystyrene products to local retailers are shown in Table 3.1-4. Additional details are provided in Appendix B.

Table 3.1-4
Existing Mobile Source Emissions Associated with Polystyrene Delivery Truck Trips

Description	ROGs	NO_x	CO	SO_x	PM_{10}[2]	$PM_{2.5}$[2]
Annual Emissions (tons/year)[1]	<0.01	0.06	<0.01	<0.01	0.09	0.02
Daily Emissions (lbs/day)[1]	0.01	0.44	0.04	<0.01	0.66	0.17

[3] Life cycle emissions include indirect emissions associated with materials manufacture. However, these indirect emissions involve numerous parties, each of which is responsible for emissions of their particular activity. The California Resources Agency found that life-cycle analyses were not warranted for project-specific CEQA analysis in most situations, for a variety of reasons, including lack of control over some sources and the possibility of double-counting emissions (see Final Statement of Reasons for Regulatory Action, December 2009). Because the origin of the raw materials purchased is not known and manufacturing information for those raw materials is also not known, calculation of life cycle emissions would be speculative. A life-cycle analysis is not warranted (CNRA 2009).

[4] Jarrett Industries – distributor, Encinitas; Flexy Foam & Packaging – manufacturer, San Diego; KB Foam, Inc – manufacturer, San Diego.

Notes: CO = carbon monoxide; lbs/day = pounds per day; NO_X = oxides of nitrogen; PM_{10} = particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = particulate matter less than 2.5 micrometers in diameter; ROGs = reactive organic gases; SO_X = sulfur oxides.
[1] Emissions estimated using EMFAC2021 for the San Diego County fleet mix for a standard delivery truck.
[2] PM emissions include paved road dust emissions associated with travel on paved roads.

Disposal to Landfills. Solid waste collection vehicles that transport food and beverage containers to the landfill once disposed also generate criteria air pollutants, including ROGs/VOCs, NOx, SOx, CO, PM_{10}, and $PM_{2.5}$. Assuming that all containers are landfilled and transported via a standard solid waste collection vehicle with an estimated weight capacity of 28,000 pounds, approximately 224 annual truck trips (roundtrips) are currently needed to dispose the approximately 6.27 million pounds of polystyrene service ware containers used per year in the City[5]. The analysis assumes that each collection vehicle would travel approximately 19 miles based on the weighted average distance between the City and the Miramar Landfill, Otay Landfill, and Sycamore Landfill and 2020 CalRecycle data (Jurisdiction Disposal and Beneficial Reuse by Destination). Based on the 2013 study of the History of Waste Management in the City of San Diego, the County of San Diego developed a network of landfills, which, by 1990, included a large landfill in the northern part of the county (San Marcos), one in the east (Sycamore, located in the City of San Diego, adjacent to Santee), and another in the south (Otay). This network, together with the City's Miramar Landfill in the center of the City's population, allows for relatively short collection routes (City of San Diego 2013). The annual and daily emissions estimates associated with transport to the landfill are shown in Table 3.1-5. The analysis assumes the solid waste collection vehicle fleet mix is 55 percent diesel-fueled and 45 percent natural gas-powered per EMFAC2021 data for San Diego County in 2021. Additional details are provided in Appendix B.

Table 3.1-5
Existing Mobile Source Emissions Associated with Polystyrene Transport to Landfills

Description	ROGs	NO_x	CO	SO_x	PM_{10}[2]	$PM_{2.5}$[2]
Annual Emissions (tons/year)[1]	<0.01	0.08	0.07	<0.01	0.02	<0.01
Daily Emissions (lbs/day)[1]	0.01	0.52	0.47	<0.01	0.12	0.03

[5] Truck trip estimates for the delivery and disposal of polystyrene are based on the anticipated truck capacity for a standard 53-foot delivery truck (48,000 pounds) and the truck capacity for a solid waste collection vehicle (28,000 pounds), respectively; thus, it is assumed that more trucks would be required to dispose of the 6.27 million pounds of polystyrene than the number of trucks required to deliver the polystyrene.

Notes: CO = carbon monoxide; lbs/day = pounds per day; NO_X = oxides of nitrogen; PM_{10} = particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = particulate matter less than 2.5 micrometers in diameter; ROGs = reactive organic gases; SO_X = sulfur oxides.
[1] Emissions estimated using EMFAC2021 for the San Diego County fleet mix for solid waste collection vehicles.
[2] PM emissions include paved road dust emissions associated with travel on paved roads.

3.1.2 Air Quality Regulatory Framework

Air quality in the SDAB is regulated by USEPA, ARB, and the SDAPCD. Each of these agencies develops rules, regulations, or policies, and/or goals to attain the directives imposed through legislation. Although USEPA regulation may not be superseded, both state and local regulations may be more stringent.

3.1.2.1 Federal

Clean Air Act. USEPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970 and amended in 1977 and 1990. The CAA requires USEPA to establish the NAAQS. The CAA identifies two types of NAAQS. Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Because the NAAQS for these air pollutants are regulated using human health and environmentally based criteria, they are commonly referred to as "criteria air pollutants" (USEPA 2018). The NAAQS are summarized in Table 3.1-1.

The CAA (and its subsequent amendments) requires each state to prepare an air quality control plan referred to as the State Implementation Plan (SIP). The CAA Amendments dictate that states containing areas violating the NAAQS revise their SIPs to include extra control measures to reduce air pollution. The SIP includes strategies and control measures to attain the NAAQS by deadlines established by the CAA. The SIP is periodically modified to reflect the latest emissions inventories, plans, rules, and regulations of air basins as reported by the agencies with jurisdiction over them. USEPA has the responsibility to review all SIPs to determine whether they conform to the requirements of the CAA.

In the CAA, Congress established a requirement that every region of the country must have New Source Review and Title V permitting programs in place that satisfy the CAA's minimum standards. The basic concept is that Congress established certain minimum requirements that need to be in place in every region

throughout the county, and then looked to states (often through local or regional agencies such as the Air District) to adopt their own programs that meet or exceed these federal minimum requirements. USEPA's New Source Review permitting program protects air quality when factories (such as manufacturing facilities), industrial boilers, and power plants are newly built or modified. Title V of the CAA requires major sources of air pollutants, and certain other sources, to obtain an operating permit, operate in compliance with that permit, and certify at least annually their compliance with permit requirements (USEPA 2021). Examples of facilities that are subject to these requirements include major and minor source facilities, including but not limited to, manufacturing facilities and municipal solid waste landfills.

Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources. USEPA also has certain regulations for on-road vehicles and engines, including passenger vehicles, commercial trucks and buses, and motorcycles (USEPA 2017). In 2001, USEPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources. This rule was issued under the authority in Section 202 of the CAA. Passenger cars and trucks are regulated by USEPA under "light-duty" vehicle programs. USEPA regulates passenger vehicles to reduce the amount of harmful emissions. There are regulations for multiple aspects of passenger vehicles, including standards for exhaust and evaporative emissions; control of hazardous air pollutants and air toxics; National Low Emission Vehicle Program; CAP 2000 (Compliance Assurance Program); onboard refueling vapor recovery; and inspection and maintenance.

3.1.2.2 State

California Clean Air Act. ARB is also responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA was adopted in 1988 and requires ARB to establish the CAAQS. In most cases, CAAQS are more stringent than NAAQS. The CAAQS are summarized in Table 3.1-1.

Other ARB responsibilities include, but are not limited to, overseeing local air district compliance with state and federal laws; approving local air quality plans; submitting SIPs to USEPA; monitoring air quality; determining and updating area designations and maps; and setting emission standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels. ARB maintains air quality monitoring stations throughout the state in conjunction with local air districts. Data collected at these stations are used by ARB to classify air

basins as being in attainment or nonattainment with respect to each pollutant and to monitor progress in attaining air quality standards.

California Health and Safety Code Section 40914. The CCAA requires that each area exceeding the CAAQS for ozone, CO, SO_2, and NO_2 develop a plan aimed at achieving those standards. California Health and Safety Code Section 40914 requires air districts to design a plan that achieves an annual reduction in district-wide emissions of 5 percent or more, averaged every consecutive 3-year period. To satisfy this requirement, local air districts develop and implement air pollution reduction measures, which are described in their air quality attainment plans, and outline strategies for achieving the CAAQS for any criteria pollutants for which the region is classified as nonattainment.

In-Use Off-Road Diesel Vehicle Regulation, On-Road Light-Duty Certification, and California Reformulated Gasoline Program. ARB has established emission standards for vehicles sold in California and for various types of equipment. California gasoline specifications are governed by both state and federal agencies. During the past decade, federal and state agencies have imposed numerous requirements on the production and sale of gasoline in California. ARB has also adopted control measures for diesel PM and more stringent emissions standards for various on-road mobile sources of emissions, including transit buses and off-road diesel equipment (e.g., tractors, generators).

Truck and Bus Regulation (13 California Code of Regulations [CCR] 2025). The Truck and Bus regulation affects individuals, private companies, and federal agencies that own diesel vehicles with a Gross Vehicle Weight Rating (GVWR) greater than 14,000 pounds that operate in California. Heavier trucks and buses with a GVWR greater than 26,000 pounds must comply with a schedule by engine model year or owners can report to show compliance with more flexible options. All heavier vehicles with 1996 or newer model year engines should have a PM filter. Vehicles with 1995 model year and older engines should have been replaced by January 1, 2015. By January 1, 2023, all trucks and buses must have 2010 model year engines with few exceptions.

Tanner Air Toxics Act and the Air Toxics Hot Spots Information and Assessment Act. TACs in California are regulated primarily through the Tanner Air Toxics Act (Chapter 1047, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act (Chapter 1252, Statutes of 1987). Assembly Bill (AB) 1807 sets forth a formal procedure for ARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before ARB can designate a

substance as a TAC. The Air Toxics Hot Spots Information and Assessment Act requires that TAC emissions from stationary sources be quantified and compiled into an inventory according to criteria and guidelines developed by ARB, and if directed to do so by the local air district, a health risk assessment must be prepared to determine the potential health impacts of such emissions.

ARB adopted a Diesel Risk Reduction Plan, which recommends control measures to achieve a diesel PM reduction of 85 percent by 2020 from year 2000 levels. Recent regulations and programs include the low-sulfur diesel fuel requirement and more stringent emission standards for heavy-duty diesel trucks and off-road in-use diesel equipment. As emissions are reduced, it is expected that the risks associated with exposure to the emissions would also be reduced.

Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. This Airborne Toxic Control Measure is set forth in Title 13, California Code of Regulations, Section 2485, and requires, among other things, that drivers of diesel-fueled commercial motor vehicles with GVWR greater than 10,000 pounds, including buses and sleeper berth equipped trucks, not idle the vehicle's primary diesel engine longer than five minutes at any location.

3.1.2.3 Local

In San Diego County, the SDAPCD is the agency responsible for the administration of federal and state air quality laws, regulations, and policies. State and local government projects, as well as projects proposed by the private sector, are subject to requirements of the local air district, if the sources are regulated by the SDAPCD. SDAPCD regulates most air pollutant sources, except for motor vehicles, marine vessels, aircraft, and agricultural equipment, which are regulated by ARB or USEPA. Included in the SDAPCD's tasks are monitoring of air pollution, preparation of the SIP for the SDAB, and promulgation and enforcement of rules and regulations.

The SIP includes strategies and tactics to be used to attain the federal ozone standard in the county. The SIP elements are taken from the Regional Air Quality Strategy (RAQS), which the SDAPCD prepares. The 1991/1992 RAQS was adopted on March 27, 1992 and includes Transportation Control Measures (TCMs) for the air quality plan prepared by the San Diego Association of Governments (SANDAG). The required triennial updates of the RAQS and corresponding TCMs were adopted in 1995, 1998, 2001, 2004, 2009, and 2016. On October 14, 2020, the Final Ozone Attainment Plan (Attainment Plan) for San Diego County was approved by the SDAPCD, demonstrating how the region would further reduce air pollutant

emissions in order to attain the current NAAQS for ozone in the future. This Attainment Plan was submitted to ARB for their approval and, if approved, would then be submitted to USEPA as a revision to the California SIP for attaining the ozone standards. The rules and regulations include procedures and requirements to control the emission of pollutants and to prevent adverse impacts.

San Diego Air Pollution Control District Equipment Permits. As previously mentioned, the SDAPCD is the agency principally responsible for air pollution control in the region. As part of the promulgation and enforcement of rules and regulations, the SDAPCD requires permits for a variety of facilities and operations.

The SDAPCD requires operators that plan to build, install, alter, replace, or operate any equipment that emits or controls the emission of air contaminants to apply for, obtain, and maintain equipment permits. The SDAPCD routinely inspects operating facilities to verify that equipment has been built and installed as required and to confirm that the equipment operates in compliance with SDAPCD rules and regulations.

Air Toxics "Hot Spots" Information and Assessment Act. As described previously, the Air Toxics "Hot Spots" Information and Assessment Act requires stationary sources of air pollutants to report the types and quantities of certain substances routinely released into the air. Emissions of interest are actual emissions that result from the typical operation of a facility or are predictable, including but not limited to, continuous and intermittent releases from process fluctuations and equipment maintenance. The goals of the "Hot Spots" Act are to collect emissions data, identify facilities having localized impacts, determine facility-wide health risks, notify the community of high risk facilities in their vicinity, and have the owners of facilities reduce significant risks to below the level of significance. The SDAPCD implements this program by reviewing the data submitted by facilities, determining what actions facilities must undertake, and ensuring those facilities fully comply with the requirements of the "Hot Spots" Act. Approximately 3,000 facilities within the San Diego County region are required to comply with the "Hot Spots" Act (SDAPCD 2019). The SDAPCD implements the "Hot Spots" Act through its "Hot Spots" Program, consistent with California's Emissions Inventory and Criteria Guideline Regulation, according to the following process: emission inventory reports, health risk assessments, public notification, and risk reduction audits and plans.

3.1.3 Impact Criteria

Air quality thresholds that were found to have less than significant impacts as identified in the IS Checklist (Appendix A) are not included in this analysis section. This section focuses only on analysis of the thresholds identified as "Potentially Significant" in the IS.

The proposed project would have a significant impact related to air quality if it would:

- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.

The proposed ordinance would not involve any physical development that would result in construction-related emissions. The City's CEQA Significance Determination Thresholds (July 2016) provide guidance on significance thresholds for operational air quality impacts. A significant impact related to air quality would occur if the proposed project would generate regional emissions that exceed the screening level thresholds presented in Table 3.1-6.

Table 3.1-6
Regional Pollutant Emissions Screening Level Standards of Significance

Unit of Measure	ROGs/VOCs[1]	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$[2]
Pounds per day	137	250	550	250	100	67
Tons per year	15	40	100	40	15	10

Notes: CO = carbon monoxide; NO_X = oxides of nitrogen; PM_{10} = particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = particulate matter less than 2.5 micrometers in diameter; ROGs = reactive organic gases; SO_X = sulfur oxides; VOCs = volatile organic compounds.

[1] VOC standards not included in San Diego Air Pollution Control District (SDAPCD) Rule 20.2 (New Source Review). Threshold based on levels per the South Coast Air Quality Management District (SCAQMD) and the Monterey Bay Air Pollution Control District, which have a similar federal and state attainment status as San Diego, consistent with the City of San Diego Significance Determination Thresholds.

[2] Standard for $PM_{2.5}$ from SDAPCD Rule 20.2 (New Source Review, Non-Major Stationary Sources)

Source: City of San Diego 2016

The City's screening level thresholds are based on SDAPCD Regulation II, Rule 20.2, Air Quality Impact Analysis Trigger Levels for new or modified stationary

sources. Although these trigger levels do not generally apply to general land development projects, these levels may be used to evaluate the increased emissions from projects and to demonstrate that a project's emissions would not result in a significant impact to regional air quality and impede attainment of air quality standards for the region. Because regional air quality standards have been established for these criteria pollutants to protect the public with a margin of safety from adverse health impacts due to exposure to air pollution, these trigger levels can also be used to assess project emissions and inform an assessment of a project's impacts to regional air quality and health risks under CEQA.

3.1.4 Environmental Impact Analysis

As described in Section 3.1.3, the proposed ordinance would not involve any physical development that would result in construction-related emissions. However, implementation of the proposed ordinance would increase the use of alternative products (e.g., paper and plastic products) proportional with the reduction in use of polystyrene products, which could result in an increase in the weight of products used by the public. Both plastic and paper replacement products are generally heavier than polystyrene. As described in Section 2, Project Description, the actual shifts or split in composition between plastic and paper food containers in a jurisdiction may vary from year to year and change over time. Shifts may be influenced by changes in price, product availability, and as new products enter the market. The Cities of San Jose, Palo Alto, and Seattle anticipate a predominant shift to recyclable plastic for disposable food containers and assumed that the alternative plastic and paper food containers would be 85 percent plastic and 15 percent paper (City of San Jose 2013). Based on the waste composition of all blue bin recycling materials in the City in March 2021, plastic and paper materials made up approximately 3 and 46 percent of the total waste, respectively. Because the actual split in composition between plastic and paper food containers is not known and can vary over time, the analysis conservatively assumed that all replacement products would be plastic because plastic is heavier than paper. If 100 percent of the existing polystyrene use became plastic alternative products, a net increase of approximately 9,405,000 pounds (4,703 tons) of material could occur within the City from implementation of the proposed ordinance.

The use of the replacement products (paper and plastic products) has the potential to contribute to the generation of criteria air pollutants through emissions associated with the manufacturing process, truck trips delivering containers to retailers, and as a result of disposal at the end of life.

Manufacturing. Similar to polystyrene, the manufacturing process and emissions associated with the manufacture of the paper and plastic replacement products can vary based on the manufacturing plant and origin of the raw materials anywhere around the world. However, calculation and analysis of emissions associated with materials manufacture, which are within the life-cycle of the product, is not warranted for the proposed ordinance as the calculation of emissions would be speculative, beyond the influence of the City (as the City does not control where establishments purchase their products), and unrelated to the substance of the proposed ordinance. Furthermore, manufacturing facilities would continue to be routinely inspected by the SDAPCD to verify that equipment operates in compliance with SDAPCD rules and regulations.

Delivery to Local Retailers. As described in Section 3.1.1.6, delivery trucks that transport food and beverage containers from manufacturers or distributors to local retailers generate criteria air pollutants, including ROGs/VOCs, NOx, SOx, CO, PM_{10}, and $PM_{2.5}$. Assuming that food and beverage containers are transported via a standard 53-foot diesel delivery truck, which has a maximum load capacity of approximately 48,000 pounds, approximately 327 annual truck trips (roundtrips) would be required to deliver the approximately 15.7 million pounds of plastic replacement products. This would result in an annual net increase of approximately 196 truck trips to deliver the replacement products. The analysis conservatively assumes that all replacement products would be plastic (heavier material than paper) and that each delivery truck trip would be approximately 93 miles based on the distance between the city of Encinitas (location of a local distributor)[6] to the edge of the air district boundary. This is a conservative assumption as it is more likely that the majority of the delivery truck trips travel shorter distances within the City. Tables 3.1-7 and 3.1-8 show the increase in annual and daily emissions, respectively, associated with implementation of the proposed ordinance. Additional details are provided in Appendix B.

[6] Jarrett Industries – distributor, Encinitas; Flexy Foam & Packaging – manufacturer, San Diego; KB Foam, Inc – manufacturer, San Diego.

Table 3.1-7
Net Increase in Annual Emissions Associated with Implementation of the Proposed Ordinance (tons/year)

Description	ROGs	NO_x	CO	SO_x	PM_{10}[3]	$PM_{2.5}$[3]
Proposed Ordinance: Delivery to Local Retailers[1]	<0.01	0.14	0.01	0.00	0.21	0.05
Proposed Ordinance: Disposal/Transportation to the Landfill [2]	<0.01	0.20	0.18	0.00	0.05	0.01
Total Emissions	0.01	0.35	0.20	0.00	0.26	0.07
Existing Emissions (Polystyrene)	<0.01	0.14	0.08	0.00	0.10	0.03
Net Increase in Emissions	<0.01	0.21	0.12	0.00	0.16	0.04
City of San Diego Thresholds/SDACPD Air Quality Impact Analysis (AQIA) Thresholds	15	40	100	40	15	10
Exceeds Thresholds?	No	No	No	No	No	No

Notes: CO = carbon monoxide; NO_X = oxides of nitrogen; PM_{10} = particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = particulate matter less than 2.5 micrometers in diameter; ROGs = reactive organic gases; SDAPCD=San Diego Air Pollution Control District; SO_X = sulfur oxides.

[1] Emissions estimated using EMFAC2021 for the San Diego County fleet mix for a standard delivery truck.

[2] Emissions estimated using EMFAC2021 for the San Diego County fleet mix for solid waste collection vehicles.

[3] PM emissions include paved road dust emissions associated with travel on paved roads.

Table 3.1-8
Net Increase in Daily Emissions Associated with Implementation of the Proposed Ordinance (pounds/day)

Description	ROGs	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Proposed Ordinance: Delivery to Local Retailers Emissions	0.02	1.11	0.09	0.01	1.65	0.42
Proposed Ordinance: Disposal/Transportation to the Landfill	0.01	1.29	1.19	<0.01	0.30	0.08
Total Emissions	0.04	2.41	1.28	0.01	1.95	0.50
Existing Emissions (Polystyrene)	0.01	0.96	0.51	<0.01	0.78	0.20
Net Increase in Emissions	0.02	1.44	0.77	0.01	1.17	0.30
City of San Diego Thresholds/SDACPD Air Quality Impact Analysis (AQIA)Thresholds	137	250	550	250	100	67
Exceeds Thresholds?	No	No	No	No	No	No

Notes: CO = carbon monoxide; NO_X = oxides of nitrogen; PM_{10} = particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = particulate matter less than 2.5 micrometers in diameter; ROGs = reactive organic gases; SDACPD = San Diego Air Pollution Control District; SO_X = sulfur oxides

Disposal to Landfills or Recycling Facilities. As described in Section 3.1.1.6, solid waste collection vehicles that transport food and beverage containers to the landfill or recycling facility once disposed also generate criteria air pollutants, including ROGs/VOCs, NOx, SOx, CO, PM_{10}, and $PM_{2.5}$. Assuming that all polystyrene replacement containers are landfilled or recycled and transported via a standard solid waste collection vehicle with an estimated weight capacity of 28,000 pounds, it would result in approximately 560 annual truck trips (roundtrips) that would be required to dispose the replacement products with implementation of the proposed ordinance. This results in a net increase of an approximately 336 annual truck trips (roundtrips) beyond existing conditions. The analysis assumed that each collection vehicle would travel approximately 19 miles based on the weighted average distance between the City and the Miramar Landfill, Otay Landfill, and Sycamore Landfill. The average distance between the City and the network of landfills is longer than the average distance between the City and the surrounding recycling facilities, which is approximately 10 miles[7]. Therefore, assuming that all replacement products are landfilled is a conservative analysis as it is anticipated that implementation of the proposed ordinance would result in a shift in consumer behavior and the recycling and/or composting rate of the alternatives would be significantly higher than for polystyrene; thus making recycling paper and plastic more accessible and easier for consumers. Thus, it is more likely that implementation of the proposed ordinance would result in shorter trips to the surrounding recycling facilities than to the landfills. The analysis also assumed the solid waste collection vehicle fleet mix is 55 percent diesel-fueled and 45 percent natural gas-powered per EMFAC2021 data for San Diego County in 2021.

Tables 3.1-7 and 3.1-8 show the increase in annual and daily emissions, respectively, associated with implementation of the proposed ordinance requiring delivery/disposal of alternative products.

The estimates of the future truck trips associated with implementation of the proposed ordinance and existing polystyrene use assume that all containers are delivered in separate dedicated truck loads. However, containers may be delivered to retailers and to landfills as part of larger mixed loads scheduled for delivery regardless of the replacement product type and there may not be an actual net increase in truck traffic from the change in food and beverage products. Nonetheless, as shown in Tables 3.1-7 and 3.1-8, the emissions associated with the net increase in truck trips for delivery and disposal of the replacement products

[7] There are three recycling facilities within San Diego County: EDCO Recycling [6700 Federal Boulevard. Lemon Grove, CA 91945]; Allan Company [6733 Consolidated Way, San Diego, CA 92121]; and IMS Recycling Services, Inc. [2740 Boston Avenue, San Diego, CA 92113] (City of San Diego 2008).

would not exceed the City's thresholds of significance. These thresholds are designed to identify those projects that would result in significant levels of air pollution and to assist the region in attaining the applicable state and federal ambient air quality standards. Projects that would not exceed the thresholds of significance would not contribute a considerable amount of criteria air pollutant emissions to the region's emissions profile and would not impede attainment and maintenance of ambient air quality standards. Therefore, implementation of the proposed ordinance would not be cumulatively considerable. This impact would be less than significant.

3.1.5 Mitigation Measures

Impacts related to air quality would be less than significant. No mitigation measures are required.

3.1.6 Level of Impact after Mitigation

No significant impacts were identified; therefore, no mitigation measures are required.

3.2 GREENHOUSE GAS EMISSIONS

This section assesses the GHG emissions that would be generated by implementation of the proposed ordinance. GHG emissions have the potential to adversely affect the environment because such emissions contribute, on a cumulative basis, to global climate change. This section provides a background discussion of climate change, provides a discussion of existing sources of GHG emissions, describes the regulatory framework, and evaluates the potential GHG impacts associated with implementation of the proposed ordinance.

3.2.1 Environmental Setting

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. A portion of the solar radiation that enters the earth's atmosphere is absorbed by the earth's surface, and a smaller portion of this radiation is reflected back toward space. This infrared radiation (i.e., thermal heat) is absorbed by GHGs within the earth's atmosphere. As a result, infrared radiation released from the earth that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the "greenhouse effect," is responsible for maintaining a habitable climate on the earth.

GHGs are present in the atmosphere naturally, are released by natural and anthropogenic sources, and are formed from secondary reactions taking place in the atmosphere. Natural sources of GHGs include the respiration of humans, animals, and plants; decomposition of organic matter; and evaporation from the oceans. Anthropogenic sources include the combustion of fossil fuels, waste treatment, and agricultural processes. The following are GHGs that are widely accepted as the principal contributors to human-induced global climate change:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur hexafluoride (SF_6)
- Nitrogen trifluoride (NF_3)

Emissions of CO_2 are byproducts of fossil fuel combustion. CH_4 is the main component of natural gas and is associated with agricultural practices and landfills. N_2O is a colorless GHG that results from industrial processes, vehicle

emissions, and agricultural practices. HFCs are synthetic chemicals used as a substitute for chlorofluorocarbons in automobile air conditioners and refrigerants. PFCs are produced as a byproduct of various industrial processes associated with aluminum production and the manufacturing of semiconductors. SF_6 is an inorganic, odorless, colorless, nontoxic, nonflammable GHG used for insulation in electric power transmission and distribution equipment, and in semiconductor manufacturing. NF_3 is used in the electronics industry during the manufacturing of consumer items, including photovoltaic solar panels and liquid-crystal-display (i.e., LCD) television screens.

Global warming potential (GWP) is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to CO_2. The GWP of a GHG is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time (i.e., lifetime) that the gas remains in the atmosphere ("atmospheric lifetime"). The reference gas for GWP is CO_2; therefore, CO_2 has a GWP of 1. The other main GHGs that have been attributed to human activity include CH_4, which has a GWP of 28, and N_2O, which has a GWP of 265 (USEPA 2020). For example, one ton of CH_4 has the same contribution to the greenhouse effect as approximately 28 tons of CO_2. GHGs with lower emissions rates than CO_2 may still contribute to climate change because they are more effective at absorbing outgoing infrared radiation than CO_2 (i.e., high GWP). The concept of CO_2-equivalents (CO_2e) is used to account for the different GWP potentials of GHGs to absorb infrared radiation.

Although the exact lifetime of any particular GHG molecule is dependent on multiple variables, it is understood by scientists who study atmospheric chemistry that more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. GHG emissions related to human activities have been determined as "extremely likely" to be responsible (indicating 95 percent certainty) for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's atmosphere and oceans, with corresponding effects on global circulation patterns and climate (ARB 2014). The quantity of GHGs that it takes to ultimately result in climate change is not precisely known; however, no single project is expected to measurably contribute to a noticeable incremental change in the global average temperature, or to a global, local, or micro climate.

3.2.1.1 Effects of Climate Change

Globally, climate change has the potential to affect environmental resources through potential impacts related to future air temperatures and precipitation (rain/hail/snow) patterns. Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate (IPCC 2018). According to the Indicators of Climate Change in California 2018 Report, potential impacts of climate change in California may include loss of snowpack (which serves as water storage), sea level rise, extreme heat events, more wildfires, and drought conditions (OEHHA 2018). Below is a summary of some of the most important and far-reaching potential effects that could occur in California as a result of climate change.

Sea Level Rise. Mean sea levels along the California coast show year-to-year variability, peaking during El Niño years (when the waters of the eastern Pacific Ocean are warmer). Over the long term, mean sea levels—the average height of the ocean relative to land—have been rising. Mean sea level has increased by 180 millimeters (seven inches since 1900 in San Francisco, and by about 150 millimeters (six inches) since 1924 in La Jolla (OEHHA 2018). Sea level rise may be a product of climate change through two main processes: expansion of sea water as the oceans warm and melting of ice over land. A rise in sea levels could result in coastal flooding and erosion and could jeopardize California's water supply due to saltwater intrusion.

Air Quality. Higher temperatures are conducive to air pollution formation, and therefore temperature increases could worsen air quality. Climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore its indirect effects, are uncertain. If higher temperatures are accompanied by drier conditions, the potential for large wildfires could increase, which, in turn, would further worsen air quality. Additionally, severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout California (USEPA 2016a).

Water Supply. Warming temperatures and changing precipitation patterns have altered California's "physical systems"—the ocean, lakes, rivers and snowpack—

upon which the state depends. Winter snowpack and spring snowmelt runoff from the Sierra Nevada and southern Cascade Mountains provide approximately one-third of the state's annual water supply. The fraction of snowmelt runoff reaching the Sacramento River between April and July has decreased by about 9 percent since 1906. This reduction is influenced by earlier spring warming and more winter precipitation falling as rain. With less spring runoff, less water is available during summer months to meet the state's domestic and agricultural water demands. These reductions also affect the generation of hydroelectricity, impair cold-water habitat for certain fishes, and stress forest vegetation. The latter has consequences for wildfire risk and long-term forest health (OEHHA 2018).

Agriculture. California has a $50 billion agricultural industry that produces over a third of the country's vegetables and two-thirds of the country's fruits and nuts (CDFA 2020). If temperatures rise and drier conditions prevail, water demand could increase; crop-yield could be threatened by a less reliable water supply and drought conditions; and greater air pollution could render plants more susceptible to pest and disease outbreaks (USEPA 2016a).

Ecosystems and Wildlife. Climate change and the potential resulting temperature increases, changes in weather patterns, and soil moisture changes could have four major impacts on plants and animals: (1) timing of ecological events; (2) geographic range; (3) species' composition within communities; and (4) ecosystem processes, such as carbon cycling and storage (Pew Center on Global Climate Change 2004).

3.2.1.2 Global Greenhouse Gas Concentrations

Data describing atmospheric GHG concentrations over the past 800,000 years show that concentrations of CO_2 have increased since pre-industrial times, from an annual average of 280 parts per million (ppm) in the late 1700s to 401 ppm as measured at Mauna Loa in 2015 (a 43 percent increase). This increase is due to human activities and these activities have warmed the world by about 1°C since pre-industrial times (USEPA 2016a; IPCC 2018). Temperature increase due to global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate. The impacts of climate change are being felt in every inhabited continent and in the oceans. However, impacts are not spread uniformly across the globe, and different parts of the world experience impacts differently. Any increase in global warming is projected to affect human health, with primarily negative consequences. Limiting warming to 1.5°C rather than 2°C would reduce challenging impacts on ecosystems, human health, and well-being (IPCC 2018).

3.2.1.3 Greenhouse Gas Emissions Inventories

California

In 2018, emissions from GHG emitting activities statewide were 425 million metric tons (MMT) of CO_2e (ARB 2020a). The 2018 emissions are 0.8 MMT CO_2e higher than 2017 levels and 6 MMT CO_2e below the 2020 GHG Limit of 431 MMT CO_2e. The major source of GHG in California is transportation, contributing approximately 40 percent of the state's total GHG emissions. Electricity generation is the second largest source, contributing approximately 15 percent of California's GHG emissions, with industrial sources of GHG, dominated by the general fuel use, producing most of the remaining emissions (ARB 2020a).

City of San Diego

The total GHG emissions from the City in 2018 were approximately 9.8 MMT CO_2e. Overall changes in emissions were primarily driven by two sectors: natural gas and water use. The major source of GHG in the City is on-road transportation, contributing approximately 55 percent of the total GHG emissions. Electricity generation is the second largest source, contributing approximately 22 percent of the total. In 2018, natural gas emissions decreased by 12 percent. Less rain in 2017 and 2018 meant the City imported more water, which led to a 19 percent increase in emissions in the water category. Overall, GHG emissions have decreased by 24 percent since 2010 (City of San Diego 2019).

3.2.1.4 Greenhouse Gas Emissions from Polystyrene

Polystyrene has the potential to contribute to the generation of criteria air pollutants through emissions associated with the manufacturing process, truck trips delivering containers to retailers, and as a result of disposal at the end of life. It is estimated that approximately 6,270,000 pounds of polystyrene service ware containers are used per year in the City.

Manufacturing Process. GHG emissions differ depending on the manufacturing process and material type. For polystyrene, manufacturing starts with petroleum and/or natural gas, and consumes energy that generates GHG emissions. Energy consumption varies depending on whether the process is from virgin materials, or from recycled feedstocks. As described in Section 3.1, Air Quality, CEQA analyses typically do not use consumption-based or life-cycle scopes of analysis for calculating emissions because many emissions estimated in such analyses are

outside of local jurisdictional control or substantial jurisdictional influence[8]. In addition, because the manufacturing process for both polystyrene and polystyrene replacements can vary by manufacturing plants, grade of product, origin of the raw materials, emission control devices, and location, manufacturing emissions are also not included in this analysis because not enough information is available to quantify baseline emissions or manufacturing-related emissions following implementation of the proposed ordinance.

Delivery to Local Retailers. Delivery trucks that transport food and beverage containers from manufacturers or distributors to local retailers generate GHG emissions, including CO_2, CH_4, and N_2O. Using the same methodology as described in Section 3.1, Air Quality, it is estimated that approximately 131 annual truck trips (roundtrips) are currently needed to deliver the approximately 6.27 million pounds of polystyrene service ware containers used per year in San Diego. GHG emissions were estimated utilizing emission factors of CO_2, CH_4, and N_2O for a standard delivery truck from the ARB EMFAC2021 database for San Diego County. As shown in Table 3.2-1, it is estimated that the delivery of polystyrene products to local retailers currently generates approximately 42 metric tons (MT) CO_2e per year. Additional details are provided in Appendix B.

Table 3.2-1
Existing Mobile Source Emissions Associated with Polystyrene Delivery and Disposal

Description/Source	GHG Emissions (MT CO_2e/year)
Delivery to Local Retailers	42
Disposal/Transportation to the Landfill	28
Total Existing Emissions	70

Notes: MT CO_2e = metric tons carbon dioxide equivalent

Disposal to Landfills. Because plastics do not contain biodegradable carbon, they do not generate CH_4 and are not considered to store any carbon when landfilled. The only emissions associated with landfilling plastics are from transportation to the landfill and moving waste in the landfill (USEPA 2016c). Solid waste collection vehicles that transport food and beverage containers to the landfill once disposed

[8] Life cycle emissions include indirect emissions associated with materials manufacture. However, these indirect emissions involve numerous parties, each of which is responsible for emissions of their particular activity. The California Resources Agency found that life-cycle analyses were not warranted for project-specific CEQA analysis in most situations, for a variety of reasons, including lack of control over some sources and the possibility of double-counting emissions (see Final Statement of Reasons for Regulatory Action, December 2009). Because the origin of the raw materials purchased is not known and manufacturing information for those raw materials is also not known, calculation of life cycle emissions would be speculative. A life-cycle analysis is not warranted (CNRA 2009).

generate GHG emissions, including CO_2, CH_4, and N_2O. Using the same methodology described in Section 3.1, Air Quality, it is estimated that approximately 224 annual truck trips (roundtrips) are currently needed to dispose the approximately 6.27 million pounds of polystyrene service ware containers used per year in San Diego. GHG emissions were estimated assuming the solid waste collection vehicle fleet mix is 55 percent diesel-fueled and 45 percent natural gas-powered per EMFAC2021 data for San Diego County in 2021. As shown in Table 3.2-1, GHG emissions associated with the transport of all containers to local landfills are approximately 28 MT CO_2e. Additional details are provided in Appendix B.

3.2.2 Greenhouse Gas Emissions and Climate Change Regulatory Framework

USEPA is the federal agency responsible for implementing the CAA. The Supreme Court of the United States ruled on April 2, 2007, that CO_2 is an air pollutant as defined under the CAA, and that USEPA has the authority to regulate emissions of GHGs. ARB is the agency responsible for coordination and oversight of state and local air pollution control programs, including GHG emissions in California. ARB also acknowledges that local governments have broad influence and, in some cases, exclusive jurisdiction over activities that contribute to significant direct and indirect GHG emissions through their planning and permitting processes, local ordinances, outreach and education efforts, and municipal operations.

3.2.2.1 Federal

Greenhouse Gas Findings under the Federal Clean Air Act. On December 7, 2009, USEPA signed two distinct findings regarding GHGs under Section 202(a) of the CAA:

- Endangerment Finding: The Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations.
- Cause or Contribute Finding: The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.

Although these findings did not themselves impose any requirements on industries or other entities, this action was a prerequisite to finalizing USEPA's

Proposed Rulemaking to Establish Light Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards s (USEPA 2009). On May 7, 2010, the final *Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards* were published in the Federal Register (USEPA 2010). Phase 1 of the emissions standards required model year 2012 through 2016 vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile, which is equivalent to 35.5 miles per gallon if the automobile industry were to meet this CO_2 level solely through fuel economy improvements.

On August 28, 2012, the U.S. Department of Transportation (USDOT) and USEPA issued a joint Final Rulemaking requiring additional federal GHG and fuel economy standards for Phase 2 of the emissions standards for model year 2017 through 2025 passenger cars and light-duty trucks. The standards would require these vehicles to meet an estimated combined average emissions level of 163 grams of CO_2 per mile in model year 2025, which is equivalent to 54.5 miles per gallon if the improvements were made solely through fuel efficiency. However, on April 2, 2018, USEPA issued a Mid-term Evaluation Final Determination, which finds that the model year 2022 through 2025 emissions standards are not appropriate and should be revised. This Mid-term Evaluation is not a final agency action; rather, this determination led to the making of the Safer Affordable Fuel Efficient Vehicle Rule (USEPA 2018a).

In addition to the standards for light-duty vehicles, USDOT and USEPA adopted complementary standards to reduce GHG emissions and improve the fuel efficiency of heavy-duty trucks and buses on September 15, 2011. The Phase 1 standards together form a comprehensive heavy-duty national program for all on-road vehicles rated at a gross vehicle weight at or above 8,500 pounds for model years 2014 through 2018. The standards phased in with increasing stringency in each model year from 2014 through 2018. The USEPA standards adopted for 2018 represent an average per-vehicle reduction in GHG emissions of 17 percent for diesel vehicles and 12 percent for gasoline vehicles (USEPA 2011). Building on the success of the Phase 1 standards, USEPA and the National Highway Traffic Safety Administration (NHTSA) finalized Phase 2 standards for medium- and heavy-duty vehicles through model year 2027. The Phase 2 standards are expected to lower CO_2 emissions by approximately 1.1 billion MT (USEPA 2016b).

Safer Affordable Fuel Efficient Vehicles Rule. In September 2019, the NHTSA and USEPA published the Safer Affordable Fuel Efficient (SAFE) Vehicles Rule Part One: One National Program. The SAFE Part One Rule revokes California's authority and vehicle waiver to set its own emissions standards and set zero-emission vehicle

mandates in California for passenger cars and light trucks and establish new standards, covering model years 2021 through 2026. In April 2020, USEPA and NHTSA issued the second part of the proposed SAFE Vehicles Rule. This final rule became effective on June 29, 2020. The Final SAFE Rule relaxed the federal GHG emissions and fuel economy standards to increase in stringency at only about 1.5 percent per year from model year 2020 levels over model years 2021–2026. The previously established emission standards and related "augural" fuel economy standards would have achieved about 4 percent per year improvements through model year 2025 (ARB 2020b). During the period the federal action is in effect, ARB would administer the affected portions of its program on a voluntary basis. On April 26, 2021, USEPA formally signaled its intent to return California's authority to set its own stricter standards for light-duty cars and trucks and is currently seeking public input on its reconsideration of the SAFE Vehicles Rule for the purposes of rescinding the action (USEPA 2021a).

Mandatory Greenhouse Gas Reporting Rule. On September 22, 2009, USEPA published the Final Mandatory Greenhouse Gas Reporting Rule (Reporting Rule) in the Federal Register. The Reporting Rule requires reporting of GHG data and other relevant information from fossil fuel and industrial GHG suppliers, vehicle and engine manufacturers, and all facilities that would emit 25,000 MT or more of CO_2e per year. Facility owners are required to submit an annual report with detailed calculations of facility GHG emissions on March 31 for emissions from the previous calendar year. The Reporting Rule also mandates recordkeeping and administrative requirements to enable USEPA to verify the annual GHG emissions reports.

3.2.2.2 State

Executive Order S-3-05. Executive Order S-3-05 set the following GHG emission reduction targets: by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels. It calls for the Secretary of the California EPA (CalEPA) to be responsible for coordination of state agencies and progress reporting. In response to the executive order, the Secretary of the CalEPA created the Climate Action Team (CAT). CAT members work to coordinate statewide efforts to implement global warming emission reduction programs and California's Climate Adaptation Strategy. The CAT is composed of 14 agencies and is divided into 11 subgroups to assist ARB with their scoping plan.

Assembly Bill (AB) 32. In 2006, California passed the California Global Warming Solutions Act of 2006 (AB 32; California Health and Safety Code Division 25.5,

Sections 38500, et seq.). AB 32 further details and puts into law the mid-term GHG reduction target established in Executive Order S-3-05: reduce GHG emissions to 1990 levels by 2020. AB 32 also identifies ARB as the state agency responsible for the design and implementation of emissions limits, regulations, and other measures to meet the target. AB 32 also established several programs to achieve GHG emission reductions, including the Low Carbon Fuel Standard, Mandatory GHG Emissions Reporting, and the Cap-and-Trade program. As detailed in Section 3.2.1.3, statewide GHG emissions in 2018 were 6 MMT CO_2e below the 2020 GHG Limit of 431 MMT CO_2e.

Mandatory GHG Emissions Reporting. The regulation for the Mandatory Reporting of Greenhouse Gas Emissions is applicable to electricity generators, industrial facilities, fuel suppliers, and electricity importers. ARB implements and oversees a third-party verification program to support mandatory GHG reporting.

Executive Order S-1-07, the Low Carbon Fuel Standard. Executive Order S-1-07, which was signed by then California governor Arnold Schwarzenegger in 2007, proclaims that the transportation sector is the main source of GHG emissions in California, at more than 40 percent of statewide emissions. Executive Order S-1-07 establishes a goal that the carbon intensity of transportation fuels sold in California should be reduced by a minimum of 10 percent by 2020. ARB adopted the low carbon fuel standard (LCFS) on April 23, 2009. In November 2015, the Office of Administrative Law approved re-adoption of the LCFS.

Executive Order S-13-08. This order directed the California Natural Resources Agency to coordinate with 10 state agencies, multiple scientists, a consulting team, and stakeholders to develop the 2009 California Climate Adaptation Strategy. This Strategy describes the vulnerability of California to climate change impacts and outlines possible solutions that can promote resiliency. Adaptation in this context refers to preparation for the impacts of climate change and adjustments in natural or human systems.

Senate Bill (SB) 97. SB 97 required the Governor's Office of Planning and Research (OPR) to develop recommended amendments to the CEQA Guidelines for addressing GHG emissions. The amendments became effective on March 18, 2010.

In response to SB 97, the California Natural Resources Agency adopted amendments to the State CEQA Guidelines that require evaluation of GHG emissions or the effects of GHG emissions. The amendments, in CEQA Guidelines Section 15064.4, provided that:

(a) The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in Section 15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate, or estimate the amount of greenhouse gas emissions resulting from a project.

(b) A lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:

(1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;

(2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project;

(3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions.

The amendments also added CEQA Guidelines Section 15126.4(c), Mitigation Measures Related to Greenhouse Gas Emissions, which require lead agencies to consider feasible means, supported by substantial evidence and subject to monitoring or reporting, of mitigating the significant effects of GHG emissions. Potential measures to mitigate the significant effects of GHG emissions are identified, including those outlined in Appendix F, Energy Conservation, of the State CEQA Guidelines.

The amendments also added to CEQA Guidelines Section 15183.5 provide standards for tiering and streamlining analysis of GHG emissions, including provisions for adoption of and reliance on GHG reduction plans.

Executive Order B-30-15. In April 2015, Governor Edmund Brown issued an executive order establishing a statewide GHG reduction goal of 40 percent below 1990 levels by 2030. The emission reduction target acts as an interim goal between the AB 32 goal (i.e., achieve 1990 emission levels by 2020) and Governor Brown's Executive Order S-03-05 goal of reducing statewide emissions 80 percent below 1990 levels by 2050. In addition, the executive order aligns California's 2030 GHG

reduction goal with the European Union's reduction target (i.e., 40 percent below 1990 levels by 2030) that was adopted in October 2014.

SB 32. In 2016, the California State Legislature adopted SB 32 and its companion bill AB 197, and both were signed by Governor Brown (Office of Governor Edmund G. Brown Jr. 2016). SB 32 establishes a new climate pollution reduction target of 40 percent below 1990 levels by 2030.

ARB Climate Change Scoping Plans. In December 2008, ARB adopted its *Climate Change Scoping Plan: A Framework for Change* (Scoping Plan), which contains the main strategies California would implement to achieve the required GHG reductions required by AB 32 (ARB 2008). The Scoping Plan also includes ARB-recommended GHG reductions for each emissions sector of California's GHG inventory. ARB further acknowledges that decisions about how land is used would have large impacts on the GHG emissions that would result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emissions sectors.

ARB is required to update the Scoping Plan at least once every five years to evaluate progress and develop future inventories that may guide this process. ARB approved *First Update to the Climate Change Scoping Plan: Building on the Framework* in June 2014 (ARB 2014). The Scoping Plan update includes a status of the 2008 Scoping Plan measures and other federal, state, and local efforts to reduce GHG emissions in California, and potential actions to further reduce GHG emissions by 2020.

In November 2017, ARB released the 2017 Climate Change Scoping Plan, which establishes a framework of action for California to reduce statewide emissions by 40 percent by 2030, compared to 1990 levels (ARB 2017a). The 2017 Scoping Plan builds upon the framework established by the 2008 Scoping Plan and the 2014 Scoping Plan Update, while also identifying new, technologically feasible and cost-effective strategies to ensure that California meets its GHG reduction targets.

SB 350. California's Renewables Portfolio Standard (RPS) was established in 2002 under SB 1078 and accelerated in 2006 under SB 107, by requiring that 20 percent of electricity retail sales be served by renewable energy sources by 2010. Subsequent recommendations in California energy policy reports advocated a goal of 33 percent by 2020, and on November 17, 2008, then Governor Arnold Schwarzenegger signed Executive Order S-14-08 requiring retail sellers of electricity to serve 33 percent of their load with renewable energy by 2020. In April 2011, SB X1-2 codified Executive Order S-14-08, setting the new RPS targets at 20 percent by the end of 2013, 25 percent by the end of 2016, and 33 percent by the

end of 2020 for all electricity retailers. In October 2015, Governor Edmund Brown signed SB 350, which extended the RPS target by requiring retail sellers to procure 50 percent of their electricity from renewable energy resources by 2030. This was followed by SB 100 in 2018, which further increased the RPS target to 60 percent by 2030 along with the requirement that all of the state's electricity come from carbon-free resources by 2045.

3.2.2.3 Local

City of San Diego Climate Action Plan (CAP). The City adopted a CAP in December 2015 (City of San Diego 2015a). The City's CAP quantifies GHG emissions; establishes reduction targets for 2020 and 2035; identifies strategies and measures to reduce GHG levels; and provides guidance for monitoring progress on an annual basis. The City estimates GHG emissions of approximately 14.1 MMT CO_2e in 2020 and 16.7 MMT CO_2e in 2035 under the business as usual scenario. To achieve its proportional share of GHG reduction, the City would need to reduce GHG emissions to approximately 11.0 MMT CO_2e in 2020 and 6.5 MMT CO_2e in 2035 (City of San Diego 2015a). The City CAP identifies a comprehensive set of goals and actions, including ordinances, policies, resolutions, programs, and incentives, that the City can use to reduce GHG emissions. The City's CAP includes strategies and actions that encourage (1) water and energy efficient buildings, (2) clean and renewable energy, (3) bicycling, walking, transit, and land use, (4) zero waste (gas and waste management), and (5) climate resiliency. In conjunction with the City's CAP, the City adopted the Climate Action Plan Consistency Checklist (Checklist) in July 2016. The Checklist contains measures that are required to be implemented on a project-by-project basis to ensure that the specified emission targets in the City's CAP are achieved. The CAP includes a commitment to update the plan in 2020 and the City of San Diego Climate Action Plan Update, Our Climate Our Future is currently being drafted (City of San Diego 2021).

3.2.3 Impact Criteria

The proposed project would have a significant impact related to GHG emissions if it would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; and/or
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

As stated in the CEQA Guidelines, these questions are "intended to encourage thoughtful assessment of impacts and do not necessarily represent thresholds of significance" (Title 14, Division 6, Chapter 3 Guidelines for Implementation of the CEQA, Appendix G, VII Greenhouse Gas Emissions). The CEQA Guidelines encourage but do not require lead agencies to adopt thresholds of significance (CEQA Guidelines Section 15064.7). When developing these thresholds, and consistent with the December 2018 CEQA and Climate Change Advisory published by the California Office of Planning and Research (OPR 2018), the Guidelines allow lead agencies to develop their own significance threshold and/or to consider thresholds of significance adopted or recommended by other public agencies, or recommended by experts, provided that the thresholds are supported by substantial evidence. Individual lead agencies may also undertake a case-by-case approach for the use of significance thresholds for projects consistent with available guidance and current CEQA practice (OPR 2018).

As described in Section 3.2.2.3, the City adopted the Checklist applicable to land use development projects that includes measures that are required to be implemented on a project-by-project basis to ensure that the specified emissions targets identified in the CAP are achieved. Implementation of these measures would ensure that new development is consistent with the CAP's assumptions for relevant CAP strategies toward achieving the identified GHG reduction targets. However, the Checklist is not applicable to regulations, such as the proposed ordinance; and the City has not adopted a significance threshold applicable to the proposed project (City of San Diego 2016). For reference and informational purposes only, this analysis also reviewed guidelines used by other public agencies throughout the state. The South Coast Air Quality Management District (SCAQMD) and Bay Area Air Quality Management District (BAAQMD) have adopted a significance threshold of 10,000 MT CO_2e per year for industrial (stationary source) projects (SCAQMD 2008; BAAQMD 2017). The 10,000 MT CO_2e thresholds were developed with the intention to ensure at least 90 percent of new GHG emissions would be reviewed and assessed for mitigation, thereby contributing to the GHG emissions reduction goals of AB 32. The Sacramento Metropolitan Air Quality Management District (SMAQMD) has also adopted an annual threshold of 1,100 MT CO_2e for the construction phase of land use development projects and 10,000 MT CO_2e for stationary source operational emissions (SMAQMD 2021). The thresholds set by the SMAQMD were developed considering the AB 32 and SB 32 reduction goals.

However, in the absence of an applicable significance threshold for this type of project, the City considers any net increase in GHG emissions to be potentially

significant. It is not the intent of this CEQA document to cause the adoption of this net zero threshold as a limit for other projects, but rather conservatively analyze the proposed ordinance's emissions in absence of an applicable adopted threshold. In addition, this analysis also qualitatively evaluated the implementation of the proposed ordinance as it relates to the strategies of the City's CAP and ARB's 2017 Climate Change Scoping Plan.

3.2.4 Environmental Impact Analysis

3.2.4.1 GHG Emissions

As described in Section 3.1.3, the proposed ordinance would not involve any physical development that would result in construction-related emissions. However, implementation of the proposed ordinance would increase the use of polystyrene alternatives. It is anticipated that the proposed ordinance could result in an increase in the weight of products used by the public as both plastic and paper replacement products are generally heavier than polystyrene. As described in Section 2, Table 2-2, Project Description, if 100 percent of the existing polystyrene use became plastic alternative products, an increase of approximately 9,405,000 pounds (4,703 tons) of material could occur within the City. However, it is more likely that some of the alternative products would be plastic and some would be paper. Thus, it is anticipated that the actual increase in weight of material as a result of the proposed ordinance would be less than this conservative estimate.

The use of the replacement products (paper and plastic products) has the potential to contribute to the generation of GHG emissions associated with the manufacturing process, truck trips delivering containers to retailers, and as a result of disposal at the end of life.

Manufacturing. Similar to polystyrene, the manufacturing process and emissions associated with the manufacture of the paper and plastic replacement products can vary based on the manufacturing plant and origin of the raw materials. Calculation of emissions associated with materials manufacture, which are within the life-cycle of the product, is not warranted for this proposed ordinance because such calculation of emissions would be speculative.

Delivery to Local Retailers. As described in Section 3.2.1.4, delivery trucks that transport food and beverage containers from manufacturers or distributors to local retailers generate GHG emissions, including CO_2, CH_4, and N_2O. Using the same methodology as described in Section 3.1, Air Quality, it is estimated that approximately 327 annual truck trips (roundtrips) would be required to deliver the

approximately 15.7 million pounds of plastic replacement products. This would result in an annual net increase of approximately 196 truck trips (roundtrips) to deliver the replacement products. GHG emissions were estimated utilizing emission factors of CO_2, CH_4, and N_2O for a standard delivery truck from the ARB EMFAC2021 database for San Diego County. As shown in Table 3.2-3, it is estimated that the delivery of replacement products to local retailers would generate approximately 105 MT CO_2e per year. Additional details are provided in Appendix B.

Disposal to Landfills or Recycling Facilities. As described in Section 3.2.1.4, transportation of the replacement products to the landfill or recycling facility would also generate GHG emissions, including CO_2, CH_4, and N_2O. In addition, while plastics do not contain biodegradable carbon and they do not generate CH_4 when landfilled, when paper products are landfilled, anaerobic bacteria slowly degrade the materials, producing CH_4 and CO_2 over time (USEPA 2016c). Therefore, this analysis estimated GHG emissions associated with the transport of plastic and paper replacement products to the landfill and decomposition of the paper products.

Transportation to the Landfill or Recycling Facilities. Solid waste collection vehicles that transport food and beverage containers to the landfill or recycling facility once disposed also generate GHG emissions, including CO_2, CH_4, and N_2O. Assuming that all containers are landfilled or recycled and transported via a standard solid waste collection vehicle with an estimated weight capacity of 28,000 pounds, it would result in approximately 560 annual truck trips (roundtrips) that would be required to dispose the replacement products with implementation of the proposed ordinance. This would result in an annual net increase of approximately 336 truck trips (roundtrips) to dispose of the replacement products. As described previously, assuming that all replacement products are landfilled is a conservative analysis as it is anticipated that implementation of the proposed ordinance would result in a shift in the types of products used, and the recycling and/or composting rate of the replacement products would be significantly higher than for polystyrene. This would primarily occur because most curbside recycling programs do not accept polystyrene materials; thus, making recycling paper and plastic more accessible and easier for consumers. The average distance between the City and the network of landfills (19 miles) is longer than the average distance between the City and the surrounding recycling facilities, which is approximately 10 miles.[9] Thus, it is more

[9] There are three recycling facilities within San Diego County: EDCO Recycling [6700 Federal Boulevard, Lemon Grove, CA 91945]; Allan Company [6733 Consolidated Way, San Diego, CA 92121]; and IMS Recycling Services, Inc. [2740 Boston Avenue, San Diego, CA 92113] (City of San Diego 2008).

likely that implementation of the proposed ordinance would result in shorter trips to the surrounding recycling facilities than to the landfills. As shown in Table 3.2-3, it is estimated that the transportation of the replacement products to landfills would generate approximately 69 MT CO_2e per year.

Landfilling of Paper Products. While the analysis in this EIR assumes a worst-case scenario that all replacement products would be plastic (because it is heavier than paper and would require more truck trips), for the purposes of landfilling emissions this discussion uses a conservative assumption that all replacement products would be paper because plastics do not contain biodegradable carbon and they do not generate CH_4 when landfilled; therefore, using all paper products provides a worst-case assumption regarding landfill emissions. Because the actual shifts or split in composition between plastic and paper food containers in a jurisdiction may vary from year to year and change over time, for the purposes of estimating emissions from the landfilling of paper alternative products, the landfilling analysis assumed a conservative scenario in which all replacement products would be paper. As described previously, as paper products decompose, emissions of CO_2 and CH_4 are produced over time. However, it is more likely that the paper products are recycled or composted. By weight, more paper is recovered for recycling from municipal solid waste streams than glass, plastic, steel, and aluminum combined (USEPA 2018b). According to USEPA, the overall recycling rate for paper and paperboard packaging in the United States was 80.9 percent in 2018 (USEPA 2021b). Recycling paper reduces the amount of wood harvested from forests, reduces GHG emissions from the combustion of fossil fuels in manufacturing and transportation, and avoids future methane emissions that would have occurred if the paper had been landfilled. It is challenging to relate these life-cycle reductions to the sector-based, annual perspective of inventories because these reductions often occur across a number of different sectors and over a varying or uncertain amount of time (USEPA 2016d). Therefore, emissions associated with end-of-life management are considered life-cycle emissions and are not required in CEQA analyses.

In addition, because paper is derived from sustainably harvested sources of wood in the United States, CO_2 emissions are not counted, as they are biogenic and would be produced through natural decomposition in forests. This is also consistent with CEQA guidance developed by agencies throughout the state, including the BAAQMD, which states that biogenic CO_2 emissions should not be included in the quantification of GHG emissions for a project (BAAQMD 2017) and GHG quantification and reporting protocols such as the Greenhouse Gas Protocol, which recommend that biogenic CO_2 emissions are not included in the standard scopes

of GHG emissions (Greenhouse Gas Protocol 2020). CH_4 emissions, however, are included in WARM's emission factors, because the CH_4 is emitted as a result of placing the paper in a landfill, making the CH_4 a human-caused (i.e., anthropogenic) source of GHG emissions. In addition to CO_2 and CH_4 emissions, some of the carbon in landfilled paper remains stored in the landfill because paper products are not completely decomposed by anaerobic bacteria. This stored carbon constitutes a sink (i.e., negative emissions) in the net emission factor calculation. The WARM methodology also accounts for the avoided CO_2 emissions from energy recovery. There are three categories of landfills modeled in WARM: (1) landfills that do not recover landfill gas (LFG), (2) landfills that collect the LFG and flare it without energy recovery, and (3) landfills that collect LFG and recover energy by combusting it to generate electricity. WARM calculates emission factors for each of these three landfill types and uses the national average mix of collection systems installed at landfills in the United States to calculate a national average emission factor that accounts for the extent to which CH_4 is not captured, is flared without energy recovery, or is combusted onsite for energy recovery. Avoided CO_2 emissions from energy recovery are calculated based on the non-baseload GHG emissions intensity of U.S. electricity generation, because it is non-baseload power plants that would adjust to changes in the supply of electricity from energy recovery at landfills (USEPA 2016c). Table 3.2-2 demonstrates the landfilling emissions factors for paper products. For the purposes of this analysis, it was assumed that the paper food and beverage containers would be most similar to the corrugated containers category in WARM. Corrugated containers are boxes made from containerboard (liner and corrugating medium) used in packaging applications. As the WARM methodology states, the corrugated containers category was used to proxy tissue paper and towels, paper plates and cups, other non-packaging paper, and corrugated boxes (USEPA 2016c).

Table 3.2-2
Landfilling Emission Factors for Corrugated Containers (Paper Products)

Source	GHG Emission Factors[1] (MT CO_2e/Short Ton of Material)
Landfill CH_4 [2]	1.05
Avoided CO_2 Emissions from Energy Recovery [3]	-0.11
Landfill Carbon Storage [3]	-0.72
Net Emissions (Post-Consumer)	0.22

Notes:
CH_4 = methane; CO_2 = carbon dioxide; GHG = greenhouse gas; MT CO_2e = metric tons carbon dioxide equivalent; USEPA = United States Environmental Protection Agency; WARM = United States Environmental Protection Agency's Waste Reduction Model
[1] Emission Factors from USEPA GHG Emission Factors used in the WARM tool (February 2016) Exhibit 3-26 (USEPA 2016c)

[2] The emission factors for landfill CH_4 presented in this table are based on national-average rates of landfill gas capture and energy recovery.
[3] Negative values denote GHG emission reductions or carbon storage.

Assuming that all replacement products would be paper and that all paper products are landfilled, it is estimated that the anticipated 15 million pounds of paper waste with implementation of the proposed ordinance would generate approximately 1,655 MT CO_2e during degradation and landfilling. However, as described previously, as paper products decompose over a longer period, these emissions would be generated over a long period of time. In addition, this methodology provides a worst-case scenario as it assumes that all paper products are landfilled. It is more likely that the paper products are recycled or composted. Recycling paper reduces the amount of wood harvested from forests, reduces GHG emissions from the combustion of fossil fuels in manufacturing and transportation, and avoids future methane emissions that would have occurred if the paper had been landfilled. It is challenging to relate these life-cycle reductions to the sector-based, annual perspective of inventories because these reductions often occur across a number of different sectors and over a varying or uncertain amount of time (USEPA 2016d). Therefore, emissions associated with end-of-life management are considered life-cycle emissions and are not required in CEQA analyses.

As shown in Table 3.2-3, assuming a maximum impact scenario from transportation sources (delivery and disposal), the proposed ordinance would result in an annual net increase of approximately 105 MT CO_2e as a result of a change from polystyrene containers to recyclable plastic containers. This presents a conservative estimate of the net increase in emissions because plastic is heavier than paper, and because the shift from polystyrene would likely result in a composition of both plastic and paper products. Further, the estimates of the future truck trips associated with implementation of the proposed ordinance as well as the estimate of truck trips currently associated with existing polystyrene use assume that all containers are delivered in separate, dedicated truck loads. However, containers may be delivered to retailers and to landfills as part of larger mixed loads scheduled for delivery regardless of the replacement product type; thus, there may not be an actual net increase in truck traffic from the replacement products. Because the proposed ordinance is assumed as a part of this analysis to result in a net increase in emissions (see calculations in Section 3.1.4), and because for the purpose of this project, the City considers a net increase in emissions to represent a potentially significant impact, implementation of the proposed ordinance would result in a cumulatively considerable impact.

Table 3.2-3
Net Increase in Emissions Associated with Implementation of the Proposed Ordinance

Description	GHG Emissions ($MT CO_2e$)
Proposed Ordinance: Delivery to Local Retailers [1]	106
Proposed Ordinance: Disposal/Transport to the Landfill [2]	69
Total Emissions	176
Existing Emissions (Polystyrene)	70
Net Increase in Emissions	105

Notes: MT CO_2e = metric tons carbon dioxide equivalent
Totals may not add due to rounding.
[1] Emissions estimated using EMFAC2021 for the San Diego County fleet mix for a standard delivery truck.
[2] Emissions estimated using EMFAC2021 for the San Diego County fleet mix for solid waste collection vehicles.

3.2.4.2 GHG Plan, Policy, or Regulation Conflicts

The City's CAP references the City's Zero Waste Plan as one of its strategies (City of San Diego 2015a, 2015b). The Zero Waste Plan identifies support for local, state, and federal producer responsibility policies and laws targeting plastics and packaging materials and promoting reuse policies, which are consistent with the proposed ordinance. Additionally, consistent with the Zero Waste Plan, a transition to more recyclable and/or compostable options is necessary. Promoting recyclability and recycled content in consumer products is a primary motivation for the proposed ordinance enactment and is expected to facilitate plan achievement. A significant proportion of the plastic and paper alternatives (estimated, consistent with the Zero Waste Plan projections, to be approximately 75 percent) is anticipated to be recycled or composted. Attainment of the recycling target would not be possible with continued use of polystyrene due to its limited recycling options. Because the City's CAP Action 4.1 includes enactment of the City's Zero Waste Plan, the proposed ordinance would assist with compliance with the City's CAP and State solid waste management goals. Further, the City's Conservation Element of its General Plan includes a significant component on GHG reduction for reducing waste (page CE-9), reducing potential for polluted runoff (page CE-23), and improving and maintaining urban runoff quality (page CE24), all of which would be accomplished with implementation of the proposed ordinance (City of San Diego 2008).

Additionally, the ARB's 2017 Climate Change Scoping Plan includes a goal to maximize recycling and diversion from landfills. As described in the 2017 Scoping Plan, Californians dispose about 30 million tons of solid waste in landfills each year. To further reduce landfilled solid waste, the Legislature adopted AB 341 to achieve more significant waste reductions by setting a goal that 75 percent of solid waste generated be reduced, recycled, or composted by 2020. To help reduce GHG emissions by 40 percent below 1990 levels by 2030 and meet California's waste reduction goals, California's waste management sector strives to achieve in-state processing and management of waste generated in California. ARB acknowledges that, in order to achieve this goal, collaboration is needed among residents and producers to reduce the volume of waste generated overall and capitalize on technology and social changes that might enable waste reduction. The 2017 Climate Change Scoping Plan also states (ARB 2017a):

> "Packaging comprises approximately eight million tons of waste landfilled in California annually, or about one quarter of the State's total disposal stream. To reduce the climate change footprint of packaging, the State is promoting the inclusion of source reduction principles in packaging and product design; fostering recycling and recyclability as a front end design parameter for packaging and products that cannot be reduced; and encouraging recycling markets and market development for recycled-content product and packaging."

The proposed ordinance would enable a transition to more recyclable and/or compostable options for food and beverage containers. CalRecycle is also continuing to work with stakeholder organizations and industry to explore complementary voluntary activities that have the potential to significantly decrease packaging disposal in California (ARB 2017a). As described previously, consistent with the goals of the 2017 Scoping Plan, the proposed ordinance would promote recyclability and recycled content in consumer products. Further, the delivery trucks and solid waste collection vehicles that would transport the replacement products would continue to be subject to ARB's emission reduction programs, including but not limited to, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling, ARB Truck and Bus Regulation (ARB 2011), and Solid Waste Collection Vehicle Regulation (ARB 2007). Further, landfill activities would continue to implement the Landfill Methane Control Measure, which requires municipal solid waste landfills to reduce methane and other air pollutant emissions through emissions monitoring and through capturing fugitive methane (ARB 2010).

Therefore, while implementation of the proposed ordinance would result in a net increase in GHG emissions associated with the transport and disposal of the polystyrene replacement products, these mobile source emissions would continue to decrease with implementation of laws and regulations at the statewide level. While paper products have the potential to result in GHG emissions during degradation and landfilling, it is more likely that the paper products are recycled or composted. As described previously, by weight, more paper is recovered for recycling from municipal solid waste streams than glass, plastic, steel, and aluminum combined (USEPA 2018b). The recycling of paper products reduces the amount of wood harvested from forests, reduces GHG emissions from the combustion of fossil fuels in manufacturing and transportation, and avoids future methane emissions that would have occurred if the paper had been landfilled. Implementation of the proposed ordinance would result in higher recycling rates due to the accessibility of the City's curbside recycling program for plastic and paper alternatives and consumers' existing familiarity with that recycling program, and enable a transition to more recyclable and/or compostable options for food and beverage containers, consistent with the broader goals toward reducing GHG emissions locally within the City and statewide. Therefore, because the proposed ordinance is consistent with and would promote the objectives of relevant GHG-related plans, policies, and laws, implementation of the proposed ordinance would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. This impact would be less than significant.

3.2.5 Mitigation Measures

As described in Section 3.2.4, the proposed ordinance would result in a net increase of approximately 105 MT CO_2e per year. This EIR evaluated potential mitigation measure options to address the net increase in GHG emissions; however, the potential mitigation measures are regarded as infeasible, as detailed below.

The net increase in GHG emissions associated with implementation of the proposed ordinance is attributed to the potential increase in truck trips for delivery and disposal of the replacement products, due to the heavier weight of plastic and paper products compared to polystyrene. Achieving the emissions reductions needed to achieve a net zero threshold for this project would require a multi-pronged approach that includes policy decisions at the federal and state level to require zero-emission delivery and solid waste collection vehicles.

ARB has a variety of programs aimed at zero-emission technology in the transportation sector, including but not limited to, the Advanced Clean Truck Regulation. The Advanced Clean Truck Regulation is part of a holistic approach to accelerate a large-scale transition to zero-emission medium- and heavy-duty vehicles through manufacturer sales requirements and reporting requirements by fleet size. While implementation of improved technologies for zero-emission vehicles could theoretically reduce GHG emissions associated with the proposed ordinance; this approach would be infeasible as much of this implementation is beyond the jurisdiction of the City. For example, the delivery trucks that would deliver the replacement products would not be City-owned vehicles, and the City does not control the vendors selected for these activities. Since requiring novel technological improvements for the delivery truck fleets would not be entirely within the City's jurisdiction, this potential mitigation measure is regarded as infeasible. Furthermore, while the City has jurisdiction over the solid waste collection vehicles owned by the City and the vehicles it requires under the City's Franchise Agreements for Solid Waste Management Services, the City's CAP Strategy 2 (Clean and Renewable Energy) involves converting existing diesel municipal solid waste collection trucks to compressed natural gas or other alternative low emission fuels. The CAP includes a target of 100 percent conversion from diesel fuel used by municipal solid waste collection trucks to compressed natural gas or other alternative low emission fuels by 2035. The City's Collections division converted 86 out of 131 vehicles from diesel to compressed natural gas in fiscal year 2020, averaging about 20 vehicles per year and franchisees are also required to start converting trucks to alternative fuels vehicles (City of San Diego 2020). As such, the City has already implemented a program toward reducing emissions associated with disposal-related truck trips from the City fleet and franchises. Currently it is not feasible for the City to pursue additional reductions beyond the CAP program. However, with implementation of ongoing and future statewide regulations and programs, and the City's CAP goals, mobile source emissions associated with the proposed ordinance will decrease over time.

Consistent with CEQA Guidelines Section 15126.4(c)(3), this analysis also considered off-site measures, including offsets that are not otherwise required, to mitigate the project's emissions. As detailed in Section 3.2.4, the annual net increase of 105 MT CO_2e associated with the proposed ordinance is based on a maximum impact scenario that assumes all products are plastic due to the heavier weight of plastic than paper, when in actuality, the shift from polystyrene would likely result in both plastic and paper replacement products. In addition, the estimates of the future truck trips associated with implementation of the proposed ordinance and existing polystyrene use assume that all containers are delivered or

disposed in separate dedicated truck loads. However, containers may be delivered to retailers and to landfills as part of larger mixed loads scheduled for delivery regardless of the replacement product type and there may not be an actual net increase in truck traffic from the change in replacement product materials. As described in Section 2, Project Description, the actual shifts or split in composition between plastic and paper food containers in a jurisdiction may vary from year to year and change over time. Shifts may be influenced by changes in price, product availability, and as new products enter the market. Because the actual split in composition between plastic and paper food containers is not known and can vary over time, on an annual basis, the actual annual GHG emissions associated with implementation of the proposed ordinance will also vary. Therefore, the necessary off-site measures, such as offsets, required to achieve net zero emissions on a yearly basis would not be feasible to accurately estimate in future years. The City would not be able to feasibly require any sort of permit or records for the purchase and delivery of replacement products to understand the actual product type breakdown and inform the ongoing net emissions change analysis on an annual basis. Similarly, the City would also not be able to feasibly require retailers to log their truck trips specifically for the purpose of delivering containers. On the contrary, it is more environmentally and economically beneficial to combine deliveries of products and materials; thus, the logistics of replacement product deliveries would not be feasible to accurately report and monitor. Therefore, offsite measures, including the purchase of offsets, would not be realistic or capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors (CEQA Guidelines Section 15364). Therefore, potential mitigation measures are regarded as infeasible.

3.2.6 Level of Impact after Mitigation

As described in Section 3.2.5, there are no feasible mitigation measures available to reduce this impact. Therefore, this impact is cumulatively considerable, and significant and unavoidable.

SECTION 4 EFFECTS FOUND NOT TO BE SIGNIFICANT

4.1 VISUAL IMPACTS, AESTHETICS

The project does not propose any construction, alteration of landform, or other modification to the land. Any consideration of visual impacts at the location of manufacture would be purely speculative (because the origin of the raw materials purchased is unknown, the manufacturing information for those raw materials is also unknown) and therefore is not included. The proposed ordinance is intended to reduce litter, which would reduce existing visual blight due to the presence of litter in natural and urban settings. Polystyrene contributes to litter conditions more than other materials as it is a highly visible litter material, breaks apart and transports through air and waterways easily, and does not biodegrade.

4.2 AGRICULTURE AND FOREST RESOURCES

The project does not propose any development or alterations to agricultural and forest resources. No new development or change of land use is anticipated that could directly affect agricultural and forest resources or cause the indirect conversion of agricultural lands or operations, or forest land and timberlands. Any consideration of impacts to agricultural and forest resources would be purely speculative and therefore is not included.

4.3 AIR QUALITY

No construction is proposed and thus would not result in construction equipment-related pollutant emissions. The project would not conflict with or obstruct implementation of the applicable air quality plan. Air quality impacts that may reach beyond the local air basin are addressed in the GHG analysis. GHG impacts are a uniquely global issue. Production of raw materials for manufacture, transportation, use, and recycling or disposal of products may have GHG impacts. As noted previously in Section 3.1 and throughout this EIR, a calculation of life cycle air emissions would be speculative and is not required for CEQA. The SDAPCD regulates projects and facilities that could have an impact on local air quality. Where those impacts are more global and regional, they may be considered as part of the emissions resulting in GHGs. The manufacturing process to make food and beverage containers requires fuel and energy consumption, which generates air pollutant emissions. These may include particulate matter (PM_{10} and $PM_{2.5}$), NO_x, hydrocarbons (HC), SO_x, CO, and odorous sulfur. The level of emissions varies depending on the type and quantity of containers produced. While there are no specific data for emissions per container type, World

Centric Eco-profiles (2013) provides energy use associated with the manufacturing process for each container based on data from PlasticsEurope, Environmental Paper Network, and NatureWorks (World Centric 2013). Manufacturing of polystyrene containers requires more energy per pound than manufacturing of paper or plastic containers. Thus, despite the increased weight of food and beverage containers as a result of the proposed ordinance, the proposed ordinance would reduce energy use compared to existing conditions. Thus, there would not be a substantial increase, and potentially a beneficial decrease would occur in criteria pollutant emissions associated with manufacturing of containers using polystyrene substitutes.

Further, manufacturing facilities are subject to air quality regulations that are intended to reduce emissions sufficiently to avoid violations of air quality standards, including the federal CAA, and would be required to obtain permits such as the USEPA Title V Permit and/or a local air quality management district permit. A local air permit from the SDAPCD is a written authorization to build, install, alter, replace, or operate equipment that emits or controls the emission of air contaminants such as NO_x, CO, PM_{10}, $PM_{2.5}$, or SO_x, Permits ensure that emission controls meet the need for the local region to make steady progress toward achieving and maintaining federal and state air quality standards. Permits also ensure proper operation of control devices, establish record keeping and reporting mechanisms, limit toxic emissions, and control dust or odors. In addition, the SDAPCD routinely inspects operating facilities to verify that equipment operates in compliance with SDAPCD rules and regulations. Thus, while the proposed ordinance may alter emissions associated with manufacturing facilities of food and beverage containers, the facilities would be subject to federal, state, regional, and local air regulations, and therefore any related change in emissions from the substitute products manufactured in California and locally in San Diego would be emissions that have been permitted in compliance with these regulations and would potentially be lower than existing emissions due to the reduction of energy use as indicated above.

4.4 BIOLOGICAL RESOURCES

The project does not include any development and no alterations to habitats are proposed. Any consideration of impacts to habitat in the location of any potential, future manufacturing facilities would be purely speculative, and therefore is not included. The proposed ordinance is intended to reduce litter, which would be considered a highly beneficial effect in the protection and health of sensitive habitats and wildlife (Derraik 2002).

4.5 CULTURAL RESOURCES

The project does not include any development and no ground disturbance or other potential alterations to cultural resources would result. Any consideration of impacts to cultural resources at the location of any potential, future material manufacturing facilities would be purely speculative, and therefore is not included. The proposed ordinance is intended to provide regulations to reduce litter and does not propose any construction or development, or include or cause actions that would disturb native soils with the potential to contain unknown cultural resources. Thus, the project would not result in significant impacts to cultural resources.

4.6 ENERGY

The project does not propose any construction or development. Manufacturing of polystyrene containers requires more energy per pound than manufacturing of paper or plastic containers. Thus, despite the increased weight of food and beverage containers as a result of the proposed ordinance, the proposed ordinance would reduce energy use compared to existing conditions. Therefore, the project would not result in wasteful, inefficient, or unnecessary consumption of energy resources. In addition, the project would not conflict with any state or local plan for renewable energy or energy efficiency.

4.7 GEOLOGY, SOILS

The project does not include any development and there would be no ground disturbance or other construction activity that could increase risk to life or property due to geologic instability or other geologic hazards. Any consideration of geological or soil impacts at the location of any potential, future material manufacturing facilities would be purely speculative, and therefore is not included.

4.8 HAZARDS AND HAZARDOUS MATERIALS

Polystyrene is not a hazardous material and can be disposed of in a landfill or, in some cases, recycled, and it does not require handling as a hazardous material. The same is true for the common replacement products. Polystyrene can release hazardous materials when heated (EcoWare 2014). While this is not the intended use of the products, the removal of these products from food and beverage consumers would minimize potential for accidental release of hazardous materials from heating. No hazards associated with the use of polystyrene products, above and beyond the baseline conditions, are anticipated. The replacement of polystyrene products with

paper or plastic alternatives would not create a new or increased public risk or environmental hazard due to release of or exposure to hazardous materials.

Because polystyrene products and the alternative products are not considered hazardous materials, the transportation or handling of these products does not pose a hazard. Furthermore, polystyrene and the alternative products can be disposed of in a landfill, or in some cases recycled. No transportation-related hazards or hazardous material disposal impacts are anticipated.

4.9 HYDROLOGY AND WATER QUALITY

The proposed ordinance would not involve physical development regulated by water quality standards or require the development of additional waste discharge requirements. The proposed ordinance would result in a reduction in polystyrene products and is anticipated to result in an increase in the manufacture and use of plastic and paper substitute materials. There are currently fiber and plastic containers manufactured in California and nationally and internationally. In discussing the expected effect of the proposed ordinance, this EIR assumes polystyrene food service ware products would be replaced with plastic service ware products, providing a worst-case scenario.

The wastes discharged from plastic manufacturing into surface waters are subject to state discharge regulations and are regulated under the Clean Water Act. These discharge guidelines limit the amounts of sulfides, ammonia, suspended solids and other compounds that may be present in the wastewater (Hazardous Substance Centers/South & Southwest Outreach Program 2003). When plastics are manufactured from recycled plastic, the impacts associated with virgin materials mining are avoided. Paper manufacture in the United States is regulated under the National Pollution Discharge Elimination System (NPDES) under the Industrial Discharge Program (USEPA 1990). Any manufacturing facility, including plastic and paper manufacturers, must comply with the applicable regulations at the point of release. While one of the objectives and goals of the project is to reduce waste, the waste discharged from the transition to alternative products resulting from the proposed ordinance is anticipated to be the same or slightly reduced compared to baseline conditions, as the public is accustomed to using single use products and it takes time and education to produce a shift to reusables. Based on a study conducted for the City of San Francisco, a change in the availability of polystyrene foam food ware for single use disposal containers showed a shift in the material composition, but not the amount of street litter (City of San Jose 2013). Therefore, the proposed ordinance would not result in impacts.

The proposed ordinance would target litter reduction, but even if there is no substantial change in the number, volume, or weight of litter items or trash in waterways, the changed nature of the litter may be beneficial. Polystyrene easily breaks down into smaller particles yet does not decompose, and then more easily blows around yet cannot be captured in screening devices or other maintenance methods, and it is more difficult to control than alternative products. If paper materials do end up reaching waterways, they are more likely to naturally biodegrade. The breakage of plastic alternatives into small, harmful pieces would be similar to that of polystyrene, but slower because polystyrene generally breaks into pieces sooner than other hard, non-foam plastic resin products. Such a shift would not interfere with implementation of local or regional plans or programs including NPDES municipal storm water permits designed to protect beneficial uses and improve water quality. The proposed Single Use Plastic Reduction Ordinance would not violate water quality standards, waste discharge requirements, or otherwise substantially degrade water quality. Therefore, the project would not be anticipated to have any significant impacts.

Water use associated with product manufacture, such as water use associated with concrete used for most project development, is beyond the scope of CEQA analysis. In this case, the proposed ordinance proposes no manufacture of products, and therefore entails no water consumption. Crude oil extraction and refining for plastic/polystyrene manufacture is more strongly associated with groundwater use and contamination compared to the production of raw materials for paper manufacture. Because the specific manufacturing facilities that would be involved are not known, a precise comparison is not possible, but overall it is anticipated that the potential for ground water depletion would be similar with and without the proposed ordinance, and potentially less.

Furthermore, the proposed shift in littered materials from polystyrene to paper or plastics would be easier to control, as they do not break down into small non-decomposable particles like polystyrene, and therefore would reduce potential impacts to drainage systems and flooding from baseline conditions.

4.10 LAND USE, PLANNING

The project does not include any development, no land uses would be modified, and no land use conflicts would be created; therefore, no planning documents intended to guide development are pertinent. Any consideration of land use or planning impacts at the location of any potential, future manufacturing facilities would be purely speculative, and therefore is not included.

4.11 MINERAL RESOURCES

The project does not propose any development or manufacture operations, and therefore would not impact mineral resources or their availability. Any consideration of mineral resource impacts at the location of any potential, future manufacturing facilities would be purely speculative, and therefore is not included.

4.12 NOISE

San Diego Municipal Code Section 59.5.0401 regulates noise by land use and time of day. The project is a Citywide ordinance that would regulate polystyrene use; no change to land use or noise generating construction or operation is proposed. Therefore, the project would normally be considered not to have any impact. However, polystyrene products are part of the commerce that occurs within the City and thus are included in the existing traffic, which generates noise. Currently, approximately 131 annual truck trips (roundtrips) are needed to deliver the approximately 6.27 million pounds of polystyrene service ware containers used per year in San Diego. Based on the potential change in consumption, the additional weight associated with alternative products could result in an annual net increase of up to 196 truck trips per year; however, these trips would not be confined to any one area. The addition of 196 truck trips (roundtrips) throughout the San Diego region transportation network over the course of a year is nominal within the existing traffic volumes. Thus, the resulting noise, vibration, or ground-borne noise due to this minor amount of truck trips within the existing traffic conditions would be imperceptible and the project would have no noise impacts.

4.13 POPULATION, HOUSING

The project does not propose any development, and therefore, would not create a demand for housing and would not be growth inducing. Any consideration of population or housing impacts at the location of any potential, future manufacturing facilities would be purely speculative, and therefore is not included.

4.14 PUBLIC SERVICES (OTHER THAN SOLID WASTE, WATER, AND SEWER)

The project does not include any development, and no impacts to police, fire/life safety, libraries, schools, or other City services would occur. Any consideration of service impacts at the location of any potential, future material manufacturing facilities would be purely speculative, and therefore is not included.

4.15 RECREATION

The project does not include any development and no impacts to recreational resources would occur. Any consideration of impacts to recreational assets at the location of any potential, future manufacturing facilities would be purely speculative, and therefore is not included.

4.16 TRANSPORTATION/ TRAFFIC

The City participates in the SANDAG Regional Transportation Plan and Congestion Management Plan. The City's General Plan Mobility Element is part of SANDAG's long-range mobility plan. The four components of the plan are Land Use, Demand Management, Systems Development, and Systems Management. The impact of the proposed ordinance on transportation and SANDAG's Demand Management component of its long-range mobility plan is discussed below.

Assuming that food and beverage containers are transported via a standard 53-foot delivery truck, which has a maximum load capacity of approximately 48,000 pounds approximately 131 annual truck trips (an average of about 0.36 trips per day) are needed under existing conditions to deliver the approximately 6,270,000 pounds (or 4,438 tons) of polystyrene used per year in San Diego. Since the actual percentage of plastic verses paper replacement products is unknown, for purposes of this analysis, plastic was assumed to replace all of the existing polystyrene food ware products as it weighs more than the paper replacement products. Given the additional weight associated with the replacement products, a net increase of approximately 196 truck trips would be needed per year to deliver approximately 15.7 million pounds of plastic products. In addition, assuming that all polystyrene replacement containers are landfilled and transported via a standard solid waste collection vehicle with an estimated weight capacity of 48,000 pounds, a net increase of approximately 336 annual truck trips (roundtrips) are needed beyond existing conditions to dispose of the replacement products. The combined net increase in truck trips per year is approximately 532 trips compared to existing conditions. Assuming delivery of products would occur five days a week and disposal services would occur six days per week, the project would result in a net increase of approximately two truck trips daily; this increase would be negligible and would not conflict with any established programs, plans, ordinances, or policies addressing the circulation system. Therefore, the project would have a less than significant impact on implementation of existing City or SANDAG programs, plans, or policies pertaining to the City's circulation system.

Furthermore, Section 15064.3 of the CEQA Guidelines allows each lead agency to determine its own methodology to evaluate a project's vehicle miles traveled. This particular project requires a unique methodology because there is no specific land use generating the truck trips. Instead, the trips would merely be existing trips, but with different materials on them, and potentially, if every trip had maximized loads, resulting in an increase in up to two trucks per day of actual vehicles somewhere within the City. Therefore, impacts associated with the potential increase in truck trips is less than significant. The project does not include any development. No construction is proposed, and no impacts associated with City transportation plans, ordinances, or policies would occur. A larger-scale discussion of GHGs from traffic related to product transport and disposal is addressed in Section 3.1, Air Quality, and Section 3.2, Greenhouse Gas Emissions.

4.17 TRIBAL CULTURAL RESOURCES

The project does not include any development, ground disturbance, alteration of landforms, or other modifications to the land, and no impacts to tribal cultural resources would occur. Any consideration of impacts to tribal cultural resources at the location of any potential, future manufacturing facilities would be purely speculative, and therefore is not included. The proposed ordinance is expected to reduce litter as polystyrene contributes to litter conditions more than other replacement materials as it is a highly visible litter material, breaks apart and transports through air and waterways easily, and doesn't biodegrade. Therefore, the project may have a beneficial effect in terms of reduced litter at tribal cultural resource sites.

4.18 UTILITIES

Wastewater: No development producing new sources of wastewater is proposed. The proposed restrictions on the use of polystyrene food and beverage containers and a shift to other types of single use food-ware used in the City would not result in substantial additional water use or wastewater generation. Polystyrene may require washing to be recyclable, and alternative reusable products may require washing, which would generate wastewater. Plastic and paper alternatives that could be recycled should be rinsed by residents before placing in recycling bins, similar as to what is expected for polystyrene products. Studies from the European plastics industry (PlasticsEurope, Association of Plastics Manufacturers) show that the production of plastic resins ranges in water use from 3,378 grams of water per kilogram of HDPE to 4,828 grams of water per kilogram of PET (PlasticsEurope 2008a, 2008b). According to the same source, the production of one kilogram of polystyrene resin requires approximately 9,175 to 10,279 grams (20.22 to 22.6 pounds) of water

(PlasticsEurope 2008a, 2008b). Based on the results of these European life cycle inventories, production of substitute plastic products uses approximately 33 to 53 percent less water than production of polystyrene. This analysis assumes similar procedures are conducted in manufacturing facilities throughout the world. Thus, the proposed ordinance would result in a net decrease of water use. In addition, a net reduction would occur in wastewater generation.

Water Supply: The replacement of polystyrene food and beverage containers with alternative containers would not substantially affect local water use, supply, or treatment. Water use for potential manufacturing of replacement materials inside or outside of the City would be drawn from managed water resources and may involve water recycling or alternative mechanisms to minimize water consumption. Any further consideration of water supply requirements at the location of any potential, future manufacturing facilities would be purely speculative and therefore is not included.

Storm Water: The project would involve no modifications to landform or runoff, and it would have no impact on storm water. Litter issues associated with the project are anticipated to be the same as, or less than, the baseline condition. Litter can be carried to the storm drain system through a variety of pathways, including movement through curbs and gutters, wind, or illegal dumping. Littered trash can form large accumulations in storm water systems that can impact water quality and flood control. The proposed ordinance would result in a reduction of polystyrene food and beverage containers; however, the proposed ordinance may not result in a decline in overall consumption of disposable food and beverage containers or reduce the overall litter rates. Even if the volume of litter on the streets does not change, replacement containers are anticipated to be a combination of plastic and fiber products, which, when littered, do not break apart as easily as EPS foam material. There are a variety of characteristics of replacement products that could impact how much of the replacement materials enter the storm water system and to what degree they may clog the system. Although plastic replacement containers would be lighter than fiber replacement containers, they are less likely to break apart than EPS foam products and it is anticipated that the replacement containers, even if littered, would be less likely to become airborne, either off of a waste hauling truck, out of someone's vehicle, or on the street. Additionally, the alternative containers that are littered may be more likely to be collected during routine maintenance or by screens/trash racks than the small pieces of EPS foam that have broken apart. Therefore, even if the replacement containers are disposed of inappropriately, they are equally or less likely to reach waterways. Replacing polystyrene with alternatives would not increase the

volume or weight of littered trash in the storm water system or interfere with implementation of applicable regional plans or programs.

Solid Waste Management: Pursuant to California Public Resources Code Section 40051 and the City's Zero Waste Plan, the first priority in waste management is to reduce the amount of waste generated, also called "source reduction." Reducing waste and reusing items, are the primary goals because this option generally has the least associated impacts. The second priority in the waste management hierarchy is recycling or composting, although this type of management generally has greater impacts than does source reduction. For the proposed project, the baseline condition involves single use polystyrene. Polystyrene can often be recycled, but polystyrene recycling rates are low, the economics are challenging, washing (and hence water use) is sometimes necessary, and the recycling process is not without impacts. Any alternative products generally have equal or lesser impacts, some being reusable, some compostable, some recyclable, with similar and often lesser impacts compared to the existing condition. The project is anticipated to have no adverse solid waste impacts.

Contamination of polystyrene in with other more recyclable plastics can be a problem for solid waste managers. Separating the polystyrene is a challenge for existing materials recovery facility machinery, as it easily breaks into small pieces and is often contaminated, and the value of the recovered materials is typically less than the cost of the separation and compaction required to manage the polystyrene. The proposed ordinance would reduce this problem. It would result in a shift in the composition of waste from food and beverage containers. The primary replacement options that are currently available include containers made from plastic (recyclable and compostable/ biodegradable) and paper. Within the City, plastic and paper food and beverage containers are recycled at a higher rate than polystyrene products. A sample of materials collected in the City's residential recycling blue bins shows approximately 0.09% polystyrene is being collected in the blue bins (including contaminated polystyrene), whereas paper and plastic make up the bulk of the blue bin recyclable materials (City of San Diego 2021). The replacement of polystyrene with more recyclable options would be consistent with the primary goals of AB 939 and AB 341, which aim to reduce the sources of landfill waste and increase diversion via recycling, composting, and source reduction. Further, the proposed ordinance would not increase the overall volume of solid waste compared to existing conditions because it is anticipated that the same number and size of food and beverage containers would result from the proposed ordinance as occurs under the existing conditions. Therefore, the proposed ordinance is considered to have a positive impact on local solid waste management.

4.19 WILDFIRE

The project does not include any development or modifications to the land, and no impacts to wildfire would occur. Any consideration of impacts to wildfire at the location of any potential, future manufacturing facilities would be purely speculative, and therefore is not included.

SECTION 5 ALTERNATIVES TO THE PROJECT

The following discussion considers alternatives to the City's Single Use Plastic Reduction Ordinance project. The CEQA Guidelines state that an EIR need not consider every conceivable alternative to the project [Section 15126.6(a)], or an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative [Section 15126.6(f)(3)]. The Guidelines require that a range of alternatives be addressed "governed by 'a rule of reason' that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice." The discussion of alternatives must focus on alternatives that are potentially feasible and capable of achieving major project objectives while avoiding or substantially lessening any significant environmental effects of the project [CEQA Guidelines Section 15126.6(f)].

The purpose of the proposed ordinance is to regulate the use of polystyrene products to reduce waste, encourage source reduction, prevent litter in the environment, protect public health, and promote environmentally sustainable practices in the City. The proposed ordinance would result in a reduction of polystyrene food and beverage containers; however, the proposed ordinance may or may not result in a decline in overall consumption of disposable food and beverage containers. Replacement products are anticipated to be a mix of plastic and fiber products that do not break apart as easily as EPS foam material. The City's objectives for the Single Use Plastic Reduction Ordinance include:

- Reduce the consumption of polystyrene, a difficult to manage material;
- Encourage the use of more easily recyclable products, consistent with State requirements to prioritize waste reduction;
- Provide the City an enforceable ordinance within the San Diego Municipal Code; and
- Reduce litter and the associated adverse impacts to storm water facilities, aesthetics, and the environment.

The IS Checklist determined that the proposed project would have no significant impacts with regard to every issue area except potentially Air Quality and Greenhouse Gases. As outlined in the analysis sections in Section 3, the proposed project was found to create a slight net increase in air quality and GHG emissions that would result in a less than significant impact related to Air Quality and a significant impact related to GHG. The discussion of the project alternatives focuses on the alternatives that could reduce air quality and GHG impacts.

5.1 ALTERNATIVES CONSIDERED BUT REJECTED

CEQA Guidelines Section 15126.6(c) recommends that an EIR identify alternatives that were considered for analysis but rejected as infeasible and briefly explain the reasons for their rejection. According to CEQA, among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: i) failure to meet most of the basic project objectives, ii) infeasibility, or iii) inability to avoid significant environmental impacts. The following alternatives were rejected from further analysis consistent with Section 15126.6(c) of the CEQA Guidelines.

5.1.1 Zero Waste Takeout Program

A zero waste takeout program for the City would require consumers to purchase approved reusable containers from restaurants within the City. The consumer would order a zero waste takeout container directly from the restaurant, and the restaurant would exchange the consumer brought container for a new one that has been pre-cleaned and sanitized. The consumer would take their takeout order food home in the re-usable, pre-cleaned, sanitized container. When done with the meal, the consumer would rinse the container with water to remove food particles and would bring the rinsed used container to a restaurant when ordering future takeout orders. This alternative would meet the project objectives; however, the cost of the reusable containers is high at approximately $25 per container. The cost may be a deterrent for the public and the restaurants, would not be readily or uniformly accepted by the public, and would be costly and difficult to implement. This would also be impractical for consumers that are not local to the City, such as tourists or travelers passing through an area. Therefore, this alternative is not considered economically feasible.

5.1.1.1 Install Full Stormwater Treatment Capture Systems Throughout the City of San Diego

This alternative would entail the City upgrading existing stormwater treatment systems to provide full capture stormwater treatment capture systems that have been shown to capture polystyrene litter. This alternative would necessitate the replacement of stormwater treatment capture systems throughout the City, which would result in potential construction related impacts associated with air quality, biological resources, GHGs, noise, cultural resources, and water quality. Furthermore, this alternative would result in a large expense to the City to purchase new stormwater treatment capture systems for the entire City and for the construction work associated with the replacement of the existing stormwater treatment systems. Furthermore, this alternative is not in-line with the State or the City's solid waste reduction goals

and would not meet most of the project objectives other than reducing litter in stormwater. Therefore, this alternative was rejected from further analysis.

5.2 ALTERNATIVES CARRIED FORWARD FOR CONSIDERATION

The alternatives considered and compared to the project in the EIR are:

Alternative 1: No Project Alternative
Alternative 2: Enforceable Materials Specifications
Alternative 3: Enforceable Materials Specifications and Fee Requirements

5.2.1 Alternative 1: No Project

Alternative 1: No Project, required to be evaluated in the EIR, considers "existing conditions…as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services" [CEQA Guidelines Section 15126.6(e)(2)].

The proposed ordinance was found to have a slight net increase in air quality and GHG emissions. No significant impacts were identified for air quality; however, the project was determined to result in significant unavoidable GHG impacts as there is no adopted GHG threshold for policy-related projects. The No Project alternative would not have potential negative effects because it is the definition of baseline conditions. While this alternative would not increase air quality or GHG emissions, it would not be consistent with ARB's 2017 Climate Change Scoping Plan's goal to maximize recycling diversion from landfills. In addition, the No Project alternative would also fail to provide the potential desired outcomes associated with the proposed project and the other alternatives, such as reduced litter and waste reduction, fewer harmful effects on the surface water and the costal environment.

Under the No Project alternative, no Single Use Plastic Reduction Ordinance would be enacted (and the proposed ordinance would be removed from the City's Municipal Code), and the existing use of polystyrene in the City would remain unchanged. Impacts associated with polystyrene would remain at current levels, increasing proportionately with increases in the City's population. The City's objectives for the project would not be achieved with the No Project alternative.

5.2.2 Alternative 2: Enforceable Materials Specifications

Alternative 2: Enforceable Materials Specifications would add to the proposed ordinance the City's ability to enforce the use of acceptable alternative material types. This alternative would ensure that the replacement products to polystyrene are commonly acceptable materials in local recycling streams (excluding expanded polystyrene), thereby strengthening the clarity of the prohibited material type and reducing the potential impact of replacement materials that may need to be landfilled or may contaminate the recycling stream. This alternative would increase the fulfillment of the objective of encouraging the use of more easily recyclable products and providing an enforceable ordinance.

Alternative 2: Enforceable Materials Specifications would result in similar air quality and GHG emissions as the proposed project, as the addition of clarifying language would not alter the volume of polystyrene replacement product used at a magnitude to cause a notable change from the analysis presented in the IS Checklist and this EIR. However, this alternative would provide criteria that the acceptable alternative products are recyclable (not including polystyrene), as opposed to non-recyclable alternatives (which would be landfilled), which is in line with the EPA's waste reduction hierarchy. Additionally, this alternative would provide acceptable alternatives that do not include toxins (i.e., prohibiting products that include toxins such as PFAS—a group of man-made chemicals in single use service ware); thereby reducing the amount of toxins in the local landfills and environment. The increased ability to enforce the proposed ordinance with the addition of language proposed in this alternative achieves the City's objective to provide an enforceable ordinance to a greater degree than the proposed project. This alternative would achieve all project objectives and may provide improvement over existing baseline environmental conditions associated with environmental health and safety and water quality.

5.2.3 Alternative 3: Enforceable Materials Specifications and Fee Requirements

Alternative 3: Enforceable Materials Specifications and Fee Requirements would ensure that the replacement products to polystyrene are commonly acceptable materials in local recycling streams (excluding expanded polystyrene), by providing the same criteria of acceptable alternative products that are recyclable (as opposed polystyrene or non-recyclable alternatives), as well as providing the acceptable alternatives that do not include toxins (i.e., prohibiting products that include toxins such as PFAS); thereby reducing the amount of toxins in the local landfills and streams. In addition, Alternative 3 would expand the requirements of the proposed

ordinance to include a $0.25 fee on establishments for each use of any type of disposable cups. The intent of the fee is to discourage food vendors and consumers from choosing single use products, thus reducing waste and improving water quality (caused by litter of single use products). Adding a fee would likely require a notification process and could result in less public acceptance of the program due to the clear and obvious cost to the consumer.

Similar to Alternative 2, Alternative 3: Enforceable Materials Specifications and Fee Requirements would provide enforceable criteria of acceptable recyclable (not including polystyrene) and non-toxin alternative products; thereby reducing the amount of toxins in the local landfills and streams. The intent of the $0.25 fee is to discourage consumers from choosing single use products thus reducing waste and improving water quality (from litter of single use products). This alternative would reduce consumer demand for single use products as reusable drink containers would be more frequently used; and therefore, reduce the number of truck trips needed to transport products to establishments and the associated waste products to landfills. The lower number of truck trips would result in a reduction in air quality and GHG emissions relative to those resulting from the proposed project. Therefore, this alternative would reduce potential environmental impacts in comparison to the proposed project and would achieve all project objectives. However, there is a possibility that if establishments found the ordinance overly burdensome, compliance and enforcement could become challenging. Therefore, this alternative may be less able to satisfy the project objective regarding enforceability.

A comparison of the project alternatives is provided in Table 5-1 below.

Table 5-1
Comparison of Alternatives

Alternative	Air Quality	GHG Emissions	Project Objectives
Project	Less Than Significant	Significant	Achieves
Alternative 1: No Project	▲ Less Than Significant	▲ Less Than Significant	Does not achieve
Alternative 2: Enforceable Materials Specifications	▼ Less Than Significant	▼ Significant	Achieves
Alternative 3: Enforceable Materials Specifications and Fee Requirements	▼ Less Than Significant	▼ Less Than Significant	Achieves

GHG = greenhouse gas
Key:

Impacts are Reduced = ▼
Impacts are Greater = ▲

5.3 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

According to State CEQA Guidelines Section 15126.6(e)(2), a lead agency is to identify the "environmentally superior alternative" and in cases where the "No Project" Alternative is the environmentally superior alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives.

As discussed in Section 4.1, the No Project alternative is the continuation of the current baseline condition and would not result in an increase in air quality or GHG emissions. However, this alternative would continue to allow polystyrene single use products that easily break down into small particles that do not decompose. The No Project alternative would not meet the project objectives and would also fail to provide the potential desired outcomes associated with the project and the other alternatives, such as waste reduction and reduced litter and pollution in surface water, as well as compliance with ARB's 2017 Climate Change Scoping Plan.

Alternative 2: Enforceable Materials Specifications would provide the City a mechanism to enforce the types of products that are acceptable (which include products that do not contain toxins known to be found in some single use products), and therefore would result in improvement over existing baseline environmental conditions associated with water quality. However, it would have similar air quality and GHG emissions as the proposed project.

Alternative 3: Enforceable Materials Specifications and Fee Requirements would reduce the consumption of any type of single use cups. This correlates to a reduction in the number of truck trips associated with single use cup distribution and transporting the waste product to the landfills, which would result in associated reductions to air quality and GHG emissions relative to the proposed project, Alternative 2, and potentially the current baseline condition. Therefore, Alternative 3 would be the environmentally superior alternative.

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SECTION 6 SIGNIFICANT ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED IF THE PROJECT IS IMPLEMENTED

This section of the EIR summarizes an analysis of the potential for the project to result in significant environmental effects that cannot be avoided. Consistent with the requirements of Section 15126.2(c) of the State CEQA Guidelines, significant impacts, including those that can be mitigated but not reduced to the level below significance, are described in this section of the EIR. Where there are impacts that cannot be alleviated without imposing an alternative design, the impacts' implications and reasons why the project is being proposed, notwithstanding its effects, are also described. In addition, State CEQA Guidelines Section 15093(a) allows the decision-making agency to determine if the benefits of a project outweigh the unavoidable adverse environmental impacts if it prepares and adopts a "Statement of Overriding Considerations" setting forth the specific reasons for making such a judgement.

As discussed in Section 3, Environmental Impact Analysis, the proposed project is expected to result in less than significant impacts related to air quality and significant and unmitigable impacts associated with GHG emissions. As discussed in Section 3.2, Greenhouse Gas Emissions, the project would result in an annual net increase of approximately 105 MT CO_2e as a result of a change from polystyrene containers to recyclable plastic containers. In the absence of an adopted significance threshold for this type of project, the City determined the appropriate threshold for the proposed project would be a net zero threshold to evaluate the proposed project's GHG emissions; therefore, the project would generate GHG emissions that would be significant and unavoidable (refer to Section 3.2.2). However, as discussed in Section 3.2, the GHG emissions are conservatively assessed as a worst-case scenario assuming all replacement products would be plastic products, whereas the actual mix of replacement products would consist of both paper and plastic. Potential impacts associated with all other environmental issue areas were determined to be less than significant through the IS Checklist (Appendix A) and are discussed in Section 4, Effects Found Not to Be Significant, of this EIR.

SECTION SIX Significant Environmental Effects Which Cannot be avoided if the Project is Implemented

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SECTION 7 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

Public Resources Code Section 2100(b)(2) requires that an EIR include a discussion of significant irreversible environmental changes that would result from implementation of a project. Section 15126.2(d) of the State CEQA Guidelines describes an irreversible environmental change as follows:

> Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.

In addition, Public Resources Code Section 21100(b)(3) requires that lead agencies consider "measures to reduce the wasteful, inefficient, and unnecessary consumption of energy." Appendix F of the CEQA Guidelines further states, "Potentially significant energy implications of a project shall be considered in an EIR to the extent relevant and applicable to the project."

The proposed ordinance would preclude the City and persons in the City from distributing specified polystyrene products. The objective of the proposed ordinance is to reduce adverse environmental impacts related to polystyrene and promote educational opportunities regarding waste reduction. Implementation of the proposed ordinance would not result in any changes in the existing land uses or new physical development within the City. Therefore, the proposed ordinance would not alter or cause irreversible physical alterations to existing land uses.

The proposed ordinance is anticipated to result in the replacement of polystyrene foam material for prepared food distribution, coolers/ice chests, pool/beach toys; or dock floats/mooring buoys/navigation markers, or similar items, with alternative products. As discussed in Section 3, Environmental Impact Analysis, it is conservatively assumed that all existing polystyrene food and beverage containers (approximately 6,270,000 pounds) would be replaced by a similarly sized container or product composed of either approved plastic or paper products. Both plastic and paper replacement products are generally heavier than polystyrene. While each

individual item is generally a lightweight item, when considering the transport of many thousands of single use products, small increases in weight would result in a net increase of approximately 196 truck trips (roundtrips) annually for distribution to establishments and approximately 336 truck trips (roundtrips) annually for transport to a local landfill, for the same quantity of products. The increase in fossil fuels would be irreversible. The proposed ordinance does not propose changes to any land uses or development of any land use types. The proposed ordinance would be consistent with applicable plans, policies, and regulations related to reducing GHG emissions, including ARB's scoping plan and the City's CAP, and would result in beneficial environmental effects, such as potentially reducing the amount of litter washing into the ocean, as well as increasing the use of materials that are more easily recyclable and therefore diverting waste from landfills. As analyzed in this EIR, while there is a net increase in emissions associated with mobile sources, mobile source emissions are anticipated to be reduced over time and the benefit of implementation of the proposed ordinance would outweigh the increase in emissions due to the overall consistency with statewide and local plans for waste reduction.

SECTION 8 GROWTH-INDUCING EFFECTS

CEQA Guidelines Section 15162.2(e) requires a discussion of "…ways in which the project could foster economic or population growth…in the surrounding environment," including the project's potential to remove obstacles to population growth. For example, the extension of infrastructure may encourage or facilitate other activities that could induce growth, and the types of projects that provide housing and infrastructure to support additional growth are typically considered to result in growth inducing effects.

The intent of the proposed ordinance is to significantly reduce the amount of litter in the City attributable to polystyrene and its associated adverse environmental impacts and increase use of recyclable materials. Implementation of the proposed ordinance to reduce polystyrene would not result in any changes in the existing land uses or density or new physical development such as homes or businesses that would directly or indirectly induce substantial economic or population growth within the City. The project requires no expansion or extension of infrastructure that could facilitate population growth. The project also would not create a substantial new work force demand that could encourage local population growth. While there are no known manufacturing facilities for polystyrene or its replacements in the City, jobs related to the proposed ordinance, if any, could be filled by the City's existing labor force; therefore, the project would not affect long-term local or regional employment patterns (Federal Reserve Bank 2020).

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SECTION 9 CUMULATIVE IMPACTS

Per CEQA Guidelines Section 15065(a)(3), "Cumulatively considerable means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects." Impacts are significant if:

1. The combined impact of the project and other projects is significant (14 California Code of Regulations Section 15130(a)(2)), and
2. The project's incremental effect is cumulatively considerable (14 California Code of Regulations Section 15130(a)).

In many cases, the impact of an individual project may not be significant, but its cumulative impact may be significant when combined with those impacts from other related projects. CEQA Guidelines Section 15355 defines cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." CEQA Guidelines Section 15130(b) states that "the discussion [of cumulative impacts] need not provide as great detail as is provided for the effects attributable to the project alone." Section 15130(b) further states that a cumulative impacts discussion "should be guided by standards of practicality and reasonableness."

Cumulative impacts can occur from the interactive effects of a single project. For example, the combination of noise and dust generated during construction activities can be additive and can have a greater impact than either noise or dust alone. However, substantial cumulative impacts more often result from the combined effect of past, present, and future projects located in proximity to a proposed project. Thus, it is important for a cumulative impacts analysis to be viewed over time and in conjunction with other related past, present, and reasonably foreseeable future projects, the impacts of which might compound or interrelate with those of the project under review.

As provided by Section 15130(b) of the CEQA Guidelines, the following elements are necessary in an adequate discussion of cumulative impacts:

1) Either:

   (A) a list of past, present, and reasonably anticipated future projects producing related or cumulative impacts, including those projects outside the control of the agency; or

(B) a summary of projections contained in an adopted general plan or related planning document that is designed to evaluate regional or area wide conditions. Any such planning document shall be referenced and made available to the public at a location specified by the lead agency.

2) When utilizing a list, factors to consider when determining whether to include a related project should include the nature of each environmental resource being examined, the location of the project and its type.

3) Lead agencies should define the geographic scope of the area affected by the cumulative effect and provide a reasonable explanation for the geographic limitation used.

4) A summary of the expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available.

5) A reasonable analysis of the cumulative impacts of the relevant projects. An EIR shall examine reasonable options for mitigating or avoiding any significant cumulative effects of the proposed projects.

For the analysis of cumulative impacts associated with the Single Use Plastic Reduction Ordinance, the subject area primarily includes the City; however, in addition, single use plastic bag and Single Use Plastic Reduction Ordinances elsewhere in California are considered. As listed in Table 2-1, more than 100 jurisdictions throughout the state of California have passed ordinances regulating polystyrene use.

Most of these ordinances were enacted citing CEQA Guidelines Section 15307 and/or 15308, an exemption for actions taken for the protection of the environment, and they did not identify any potential impacts.

A complete list of past, present, and probable future projects throughout the City's entire jurisdictional area that could have impacts would require a consideration of every project, and would be both impossibly lengthy, unreasonable, and also speculative due to the broad nature of the proposed ordinance. However, consistent with Section 15130(b)(1)(B) of the CEQA Guidelines, the growth projections as provided in SANDAG's 2050 Regional Growth Forecast (SANDAG 2010), and the potential cumulative impacts associated with this future population growth can be factored into the cumulative impact discussion. The Regional Growth Forecast provides estimates and forecasts of employment, population, and housing for the period between 2008 and 2050. The growth forecast is completed in two stages. During the first stage, SANDAG produces a forecast for the entire San Diego region based on existing

demographic and economic trends. During the second stage, SANDAG develops a subregional forecast by working with local jurisdictions to understand existing land use plans. The Regional Growth Forecast's growth projections show 1,333,617 people in the City in 2008, and 1,947,184 in 2050, for a 46 percent projected increase (SANDAG 2010).

9.1 AIR QUALITY

If a project involves development that is greater than that anticipated in the local plan and SANDAG's growth projections, the project might be in conflict with the SIP and RAQS and may contribute to a potentially significant cumulative impact on air quality. The project does not involve any development; thus, it would be consistent with the existing zoning and General Plan land use designations, which incorporate SANDAG's growth forecast. Additionally, the project would not include a residential component that would increase local population growth, nor would the project provide additional water supplies that would result in growth-inducing effects. The project would not increase employment, nor would it cause impacts associated with increased employment.

If project emissions were to exceed applicable regional thresholds for any nonattainment pollutant, then the project could have the potential to result in a cumulatively considerable net increase in these pollutants and thus could have a significant impact on the ambient air quality. However, as explained in Section 3.1, Air Quality, the project would not exceed the City's significance thresholds for criteria pollutants: VOCs, NOx, CO, SOx, PM_{10}, or $PM_{2.5}$.

Adopted and pending ordinances across the state would continue to reduce the amount of single use polystyrene products. Similar to the proposed ordinance, other ordinances would be expected to generally reduce the overall number of polystyrene products produced and, due to the increased weight of the products, would also increase the number of truck trips to distribute replacement products to establishments and dispose of replacement products in landfills.

The project would not be growth inducing and thus would not alter SANDAG's growth forecast, estimated project emissions are below regional thresholds, and other comparable projects would not be expected to have significant impacts. As shown in Table 3.1-8, the emissions associated with the net increase in truck trips for delivery and disposal of the replacement products would not exceed the recommended thresholds of significance. The thresholds are designed to identify projects that would result in significant levels of air pollution and to assist the region in attaining the applicable state and federal ambient air quality standards. Projects that would not

exceed the thresholds of significance would not contribute a considerable amount of criteria air pollutant emissions to the region's emissions profile and would not impede attainment and maintenance of ambient air quality standards. Therefore, implementation of the proposed ordinance would not be cumulatively considerable. Impacts would be less than significant.

9.2 GREENHOUSE GAS EMISSIONS

Because of the broad global nature of GHG emissions, it is not feasible to analyze GHG emissions solely on an individual, project-level basis. Given the nature of environmental consequences from GHG emissions and global climate change, CEQA requires that lead agencies evaluate the cumulative impacts of GHGs, even relatively small additions, on a global basis. As discussed and analyzed in Section 3.2, Greenhouse Gas Emissions, the project's GHG emissions were evaluated to determine whether they would have a significant cumulative impact on the environment. The project would result in an annual net increase of approximately 105 MT CO_2e as a result of a change from polystyrene containers to more easily recyclable containers. In the absence of an applicable adopted significance threshold for this type of project, the City applied a net zero threshold to evaluate the proposed project's GHG emissions; therefore, the project would generate GHG emissions that would be significant and unavoidable (refer to Section 3.2.2).

The City's CAP provides standards that are intended to reach rigorous GHG reduction targets, while taking SANDAG's 46 percent population increase projection into account. The CAP incorporates the City's Zero Waste Plan as one of its five strategies for GHG emissions reduction. The project is specifically addressed in the Zero Waste Plan and thus is consistent with the Zero Waste Plan and the CAP. Adopted and pending ordinances of approximately 100 other jurisdictions within California would continue to reduce the amount of polystyrene used and promote an educational opportunity and potential shift toward source reduction.

The project would be consistent with the City's Zero Waste Plan, CAP, and the 2017 Scoping Plan goals and strategies to reduce landfilled solid waste, enable a transition to more recyclable and/or compostable options for food and beverage containers, and be consistent with the broader goals toward reducing GHG emissions locally within the City and statewide from the solid waste sector. However, due to the weight of the replacement products, mobile source emissions associated with the delivery and disposal of the replacement products would potentially result in a net increase in GHG emissions. While implementation of the proposed ordinance would result in a net increase in GHG emissions associated with the transport and disposal of the

polystyrene replacement products, these mobile source emissions would continue to decrease with implementation of laws and regulations at the statewide level. Furthermore, the actual shifts or split in composition of the replacement products in a jurisdiction may vary from year to year and change over time. Shifts may be influenced by changes in price, product availability, and as new products enter the market. The GHG analysis provided in Section 3.2 is a cumulative impact analysis. Because there is no City approved GHG threshold for policy-level projects, and because the actual split in composition between plastic and paper food containers is not known and can vary over time, the analysis conservatively determined that the project would result in a significant and unavoidable cumulatively considerable impact.

SECTION 10 PREPARERS OF THE EIR

Lead Agency: City of San Diego Planning Department

Heidi Vonblum, Deputy Director
Rebecca Malone, Program Manager
Elena Pascual, Senior Planner
Sureena Basra, Associate Planner
Tara Ash-Reynolds, Assistant Planner

City of San Diego Environmental Services Department

Lisa Wood, Principal Planner
Jennifer Ott, Recycling Specialist

Consultant to Lead Agency, AECOM

Kara Friedman, Project Director
Elizabeth Doalson, Project Manager
Matthew Gerken, Senior Environmental Planner/Air Quality Scientist
Paola Pena, Air Quality Scientist
Mary Nooristani, Environmental Planner
Therese Tempereau, Technical Editor
Marisa Fabrigas, Word Processor

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SECTION 11 REFERENCES; INDIVIDUALS & AGENCIES CONSULTED

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APPENDIX A Notice of Preparation and Initial Study Checklist