4.1 AIR QUALITY

This section analyzes the proposed Single-Use Carryout Bag Ordinance's long-term impacts on local and regional air quality. The analysis focuses on air quality impacts associated with carryout bag manufacturing facilities and the impacts associated with truck trips that deliver carryout bags in Huntington Beach. Impacts related to global climate change are addressed in Section 4.3, *Greenhouse Gas Emissions*.

4.1.1 Setting

a. Characteristics of Air Pollutants. Huntington Beach is located within the South Coast Air Basin. As a result of the climate and meteorology in the South Coast Air Basin, two types of temperature inversions (warmer air on top of colder air) are created in the area: subsidence and radiational (surface). The subsidence inversion is a regional effect created by the Pacific high in which air is heated as it is compressed when it flows from the high pressure area to the low pressure areas inland. This type of inversion generally forms at about 1,000 to 2,000 feet and can occur throughout the year, but is most evident during the summer months. Surface inversions are formed by the more rapid cooling of air near the ground during the night, especially during winter. This type of inversion is typically lower and is generally accompanied by stable air. Both types of inversions limit the dispersal of air pollutants within the regional airshed, with the more stable the air (low wind speeds, uniform temperatures), the lower the amount of pollutant dispersion. The primary air pollutant of concern during the subsidence inversions is ozone, while the greatest pollutant problems during winter inversions are carbon monoxide and nitrogen oxides. The general characteristics of ozone, carbon monoxide, nitrogen dioxide, and suspended particulates are described below.

Ozone. Ozone is produced by a photochemical reaction (triggered by sunlight) between nitrogen oxides (NO_x) and reactive organic gases (ROG). Nitrogen oxides are formed during the combustion of fuels, while reactive organic gases are formed during combustion and evaporation of organic solvents. Because ozone requires sunlight to form, it mostly occurs in concentrations considered serious between the months of April and October. Ozone is a pungent, colorless, toxic gas with direct health effects on humans including respiratory and eye irritation and possible changes in lung functions. Groups most sensitive to ozone include children, the elderly, persons with respiratory disorders, and people who exercise strenuously outdoors.

Carbon Monoxide. Carbon monoxide is a local pollutant that is found in high concentrations only near the source. The major source of carbon monoxide, a colorless, odorless, poisonous gas, is automobile traffic. Elevated concentrations, therefore, are usually only found near areas of high traffic volumes. Carbon monoxide's health effects are related to its affinity for hemoglobin in the blood. At high concentrations, carbon monoxide reduces the amount of oxygen in the blood, causing heart difficulties in people with chronic diseases, reduced lung capacity and impaired mental abilities.

Nitrogen Dioxide. Nitrogen dioxide (NO_2) is a by-product of fuel combustion, with the primary source being motor vehicles and industrial boilers and furnaces. The principal form of nitrogen oxide produced by combustion is nitric oxide (NO), but NO reacts rapidly to form

NO_2, creating the mixture of NO and NO_2 commonly called NO_x. Nitrogen dioxide is an acute irritant. A relationship between NO_2 and chronic pulmonary fibrosis may exist, and an increase in bronchitis in young children at concentrations below 0.3 parts per million (ppm) may occur. Nitrogen dioxide absorbs blue light and causes a reddish brown cast to the atmosphere and reduced visibility. It can also contribute to the formation of PM_{10} and acid rain.

Suspended Particulates. PM_{10} is particulate matter measuring no more than 10 microns in diameter, while $PM_{2.5}$ is fine particulate matter measuring no more than 2.5 microns in diameter. Suspended particulates are mostly dust particles, nitrates and sulfates. Both PM_{10} and $PM_{2.5}$ are by-products of fuel combustion and wind erosion of soil and unpaved roads, and are directly emitted into the atmosphere through these processes. Suspended particulates are also created in the atmosphere through chemical reactions. The characteristics, sources, and potential health effects associated with the small particulates (those between 2.5 and 10 microns in diameter) and fine particulates ($PM_{2.5}$) can be very different. The small particulates generally come from windblown dust and dust kicked up from mobile sources. The fine particulates are generally associated with combustion processes as well as being formed in the atmosphere as a secondary pollutant through chemical reactions. Fine particulate matter is more likely to penetrate deeply into the lungs and poses a health threat to all groups, but particularly to the elderly, children, and those with respiratory problems. More than half of the small and fine particulate matter that is inhaled into the lungs remains there. These materials can damage health by interfering with the body's mechanisms for clearing the respiratory tract or by acting as carriers of an absorbed toxic substance.

b. Current Air Quality. The South Coast Air Quality Management District monitoring station located nearest to Huntington Beach is the Costa Mesa monitoring station, located at 2850 Mesa Verde Drive East in Costa Mesa. However, only the Costa Mesa monitoring station, does not measure particulate matter (PM_{10} and $PM_{2.5}$). Therefore, data for particulate matter was taken from the next nearest monitoring station, located on Pampas Lane in Anaheim. Table 4.1-1, on the following page, indicates the number of days that each of the standards has been exceeded at these stations. As shown, the ozone concentration exceeded the state standard one day in 2010 but did not exceed the state standard in 2008 or 2009. The carbon monoxide and nitrogen dioxide concentrations did not exceed the state standard in any year between 2008 and 2010. The PM_{10} concentration exceeded state standards three times in 2008, one time in 2009 and did not exceed the state standard in 2010. The $PM_{2.5}$ concentration exceeded federal standards on five days 2008 and 2009, respectively, but did not exceed the federal standard in 2010.

c. Air Quality Management. Under state law, the SCAQMD is required to prepare a plan for air quality improvement for pollutants for which the District is in non-compliance. The SCAQMD updates the plan every three years. Each iteration of the SCAQMD's Air Quality Management Plan (AQMP) is an update of the previous plan and has a 20-year horizon. The plan was last comprehensively updated in 2007. The 2007 AQMP incorporates new scientific data and notable regulatory actions that have occurred since adoption of the 2003 AQMP. The SCAQMD adopted the 2007 AQMP on June 1, 2007. It was updated March 4, 2011 to include revisions to $PM_{2.5}$ and Ozone State Implementation Plan for the Basin. The 2007 AQMP incorporates the revisions made in 2011.

Table 4.1-1
Ambient Air Quality Data

Pollutant	2008	2009	2010
Ozone, ppm - Worst Hour	0.094	0.087	0.097
Number of days of State exceedances (>0.09 ppm)	0	0	1
Number of days of Federal exceedances (>0.12 ppm)	0	0	0
Carbon Monoxide, ppm - Worst 8 Hours	1.97	2.16	2.09
Number of days of State/Federal exceedances (>9.0 ppm)	0	0	0
Nitrogen Dioxide, ppm - Worst Hour	0.081	0.065	0.070
Number of days of State exceedances (>0.25 ppm)	0	0	0
Particulate Matter <10 microns, $\mu g/m^3$ Worst 24 Hours[b]	61.0	63.0	43.0
Number of samples of State exceedances (>50 $\mu g/m^3$)	3	1	0
Number of samples of Federal exceedances (>150 $\mu g/m^3$)	0	0	0
Particulate Matter <2.5 microns, $\mu g/m^3$ Worst 24 Hours	67.8	64.5	31.7
Number of samples of Federal exceedances (>35 $\mu g/m^3$)	5	5	0

bData collected for the Costa Mesa monitoring station
Source: CARB, 2008, 2009, & 2010 Annual Air Quality Data Summaries available at http://www.arb.ca.gov

The 2007 AQMP was prepared to ensure continued progress towards clean air and comply with state and federal requirements. This AQMP builds upon the approaches taken in the 2003 AQMP for the South Coast Air Basin for the attainment of the federal ozone air quality standard. This AQMP highlights the significant amount of reductions needed and the urgent need to identify additional strategies, especially in the area of mobile sources, to meet all federal criteria pollutant standards within the timeframes allowed under the Clean Air Act. New standards allow for a longer compliance schedule for federal fine particulates and 8-hour ozone but with more stringent PM_{10} and 1-hour ozone standards. The 2007 AQMP proposes attainment demonstration of the federal $PM_{2.5}$ standards through a more focused control of sulfur oxides (SOx), directly-emitted $PM_{2.5}$, and nitrogen oxides (NOx) supplemented with volatile organic compounds (VOC) by 2015. The 8-hour ozone control strategy builds upon the $PM_{2.5}$ strategy, augmented with additional NOx and VOC reductions to meet the standard by 2024 assuming a bump-up is obtained. Further, the 2007 AQMP aims to reduce mobile source emissions by discussing measures that would address the remaining air quality standard exceedances in the region. The 2007 AQMP is incorporated by reference and available to download at http://www.aqmd.gov/aqmp/07aqmp/index.html.

d. Air Quality and Carryout Bags. Carryout bags can affect air quality in two ways, either through emissions associated with manufacturing processes or through emissions associated with truck trips for the delivery of carryout bags to retailers. Each is summarized below.

Manufacturing Process. The manufacturing process to make carryout bags requires fuel and energy consumption, which generates air pollutant emissions. These may include particulate matter, nitrogen oxides, hydrocarbons, sulfur oxides, carbon monoxide, and odorous sulfur (Green Cities California MEA, 2010). The amount of emissions varies depending on the type and quantity of carryout bags produced. These emissions may contribute to air quality impacts related to acid rain (atmospheric acidification) or ground level ozone formation.

Although manufacturing facilities may emit air pollutant emissions in the production of carryout bags, manufacturing facilities are subject to air quality regulations, as described below in *e. Air Pollution Regulation*, which are intended to reduce the amount of emissions and the impacts related to air quality. For this EIR, the analysis is focused on the South Coast Air Basin, of which Huntington Beach is a part.

Truck Trips. Delivery trucks that transport carryout bags from manufacturers or distributors to the local retailers in Huntington Beach also contribute air emissions locally and regionally. Based on a baseline population in Huntington Beach of 191,677 persons and a statewide estimate of approximately 533 plastic bags used per person per year, retail customers in the City of Huntington Beach currently use an estimated 102,198,343 plastic bags per year. Assuming 2,080,000 plastic bags per truck load (City of Santa Monica Single-use Carryout Bag Ordinance Final EIR, January 2011), this number of plastic bags would require approximately 49 truck trips per year to deliver these carryout bags.

Diesel engines emit a complex mixture of air pollutants, composed of gaseous and solid material (ARB "Health Effects of Diesel Exhaust", 2010). The visible emissions in diesel exhaust are known as particulate matter or PM, which are very small and readily respirable. The particles have hundreds of chemicals adsorbed onto their surfaces, including many known or suspected mutagens and carcinogens. Diesel PM emissions are estimated to be responsible for about 70% of the total ambient air toxics risk. In addition to these general risks, diesel PM can also be responsible for elevated localized or near-source exposures ("hot-spots") (ARB, Health Effects of Diesel Exhaust", 2010).

Like manufacturing facilities, delivery trucks are also subject to existing regulations primarily related to diesel emissions, as described in *e. Air Pollution Regulation*. These regulations are intended to reduce emissions associated with fuel combustion and the impacts related to local and regional air quality.

Ground Level Ozone and Atmospheric Acidification. Various studies have estimated air emissions for the different carryout bags (single-use plastic, paper or reusable bags) to determine a per bag emissions rate. In order to provide metrics to determine environmental impacts associated with the proposed ordinance, reasonable assumptions based upon the best available sources of information have been established and are utilized in this EIR. Specific metrics that compare impacts on a per bag basis are available for single-use plastic, single-use paper and LDPE reusable bags. Air pollutant emissions associated with the manufacturing and transportation of one single-use paper bag result in 1.9 times the impact on atmospheric acidification as air emissions associated with one single-use plastic bag. Similarly, on a per bag basis, a reusable carryout bag that is made of LDPE plastic would result in 3 times the atmospheric acidification of a single-use plastic bag if the LDPE bag is only used only one time.

In addition, on a per bag basis, a single-use paper bag has 1.3 times the impact on ground level ozone formation of a single-use plastic bag. Finally, a reusable carryout bag that is made of LDPE plastic and only used one time would result in 1.4 times the ground level ozone formation of a single-use plastic bag (Stephen L. Joseph, 2009; Ecobilan, 2004; FRIDGE, 2002; Green Cities California MEA, 2010; City of Santa Monica Single-use Carryout Bag Ordinance Final EIR, January 2011; and, Sunnyvale Carryout Bag Ordinance Final EIR, December 2011).

The above statistics use the LDPE carryout bag as a representation of reusable bags in evaluating air quality impacts. There is no known available Life Cycle Assessment that evaluates all types of reusable bags (canvas, cotton, calico, etc.) with respect to potential air emissions. However, given the high rate of reuse of all types of reusable bags (usually at least one year, or 52 uses), the air emissions from these bags, when compared to the single-use plastic and paper carryout bags, are expected to be comparable to the LPDE bag or lower.

Table 4.1-2 lists the emissions associated contributing to ground level ozone and atmospheric acidification using the per-bag impact rates discussed above and the estimated existing plastic bags used in Huntington Beach. As shown in Table 4.1-2, the manufacturing and transportation of single-use plastic carryout bags currently used in Huntington Beach each year generates an estimated 2,351 kilograms (kg) of emissions associated with ground level ozone and 110,783 kg of emissions associated with atmospheric acidification.

Table 4.1-2
Existing Emissions from Ground Level Ozone and Atmospheric Acidification (AA) from Carryout Bags in Huntington Beach

Bag Type	# of Bags Used per Year	Ozone Emission Rate per Bag*	Ozone Emissions (kg) per 1,000 bags**	Ozone Emissions per year (kg)	AA Emission Rate per Bag*	AA Emissions (kg) per 1,000 bags***	AA Emissions per year (kg)
Single-use Plastic	102,198,343	1.0	0.023	2,350.56	1.0	1.084	110,783
			Total	**2,351**		**Total**	**110,783**

Source:
** Impact rate per bag as stated in Stephen L. Joseph, 2009; Ecobilan, 2004; FRIDGE, 2002; Green Cities California MEA, 2010; Santa Monica Single-use Carryout Bag Ordinance Final EIR, January 2011; and, Sunnyvale Carryout Bag Ordinance Final EIR, December 2011.*
*** Emissions per 1,000 bags from Ecobilan, 2004; Santa Monica Single-use Carryout Bag Ordinance Final EIR, January 2011; and, Sunnyvale Carryout Bag Ordinance Final EIR, December 2011.*
**** Emissions per 1,000 bags from FRIDGE, 2002 and Green Cities California MEA, 2010; Santa Monica Single-use Carryout Bag Ordinance Final EIR, January 2011; and, Sunnyvale Carryout Bag Ordinance Final EIR, December 2011.*

e. Air Pollution Regulation. Federal and state standards have been established for six criteria pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulates less than 10 and 2.5 microns in diameter (PM_{10} and $PM_{2.5}$ respectively), and lead (Pb). California has also set standards for sulfates, hydrogen sulfide, vinyl chloride, and

visibility-reducing particles. Table 4.1-3 lists the current federal and state standards for criteria pollutants.

Table 4.1-3
Current Federal and State Ambient Air Quality Standards

Pollutant	Federal Standard	California Standard
Ozone	0.075 ppm (8-hr avg)	0.09 ppm (1-hr avg) 0.07 ppm (8-hr avg)
Carbon Monoxide	9.0 ppm (8-hr avg) 35.0 ppm (1-hr avg)	9.0 ppm (8-hr avg) 20.0 ppm (1-hr avg)
Nitrogen Dioxide	53 ppb (annual avg) 100 ppb (1-hr avg)	0.030 ppm (annual avg) 0.18 ppm (1-hr avg)
Sulfur Dioxide	75 ppb (1-hr avg)	0.04 ppm (24-hr avg) 0.25 ppm (1-hr avg)
Lead	1.5 $\mu g/m^3$ (annual avg)	1.5 $\mu g/m^3$ (calendar qtr)
Particulate Matter (PM_{10})	150 $\mu g/m^3$ (24-hr avg)	20 $\mu g/m^3$ (annual avg) 50 $\mu g/m^3$ (24-hr avg)
Particulate Matter ($PM_{2.5}$)	15 $\mu g/m^3$ (annual avg) 35 $\mu g/m^3$ (24-hr avg)	12 $\mu g/m^3$ (annual avg)

ppm= parts per million ppb= parts per billion $\mu g/m^3$ = micrograms per cubic meter
Source: California Air Resources Board (2010), accessed online January 2012 at:
www.arb.ca.gov/research/aaqs/aaqs2.pdf

As described above, Huntington Beach is located within the South Coast Air Basin, which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The SCAQMD is required to monitor air pollutant levels to ensure that air quality standards are met and, if they are not met, to develop strategies to meet the standards. Depending on whether the standards are met or exceeded, the local air basin is classified as being in "attainment" or "non-attainment." The South Coast Air Basin is a non-attainment area for both the federal and state standards for ozone and PM_{10}. Thus, the SCAQMD is required to implement strategies that would reduce the pollutant levels to recognized acceptable standards. The Basin is in attainment for the state and federal standards for nitrogen dioxide, and for carbon monoxide. The non-attainment status is a result of several factors, the primary ones being the naturally adverse meteorological conditions that limit the dispersion and diffusion of pollutants, the limited capacity of the local air shed to eliminate pollutants from the air, and the number, type, and density of emission sources within the South Coast Air Basin.

Regulations applicable to Manufacturing Facilities.

EPA Title V Permit. Title V is a federal program designed to standardize air quality permits and the permitting process for major sources of emissions across the country. The name "Title V" comes from Title V of the 1990 federal Clean Air Act Amendments, which requires the EPA to establish a national, operating permit program. Accordingly, EPA adopted regulations [Title 40 of the Code of Federal Regulations, Chapter 1, Part 70 (Part 70)], which

require states and local permitting authorities to develop and submit federally enforceable operating permit programs for EPA approval. Title V only applies to "major sources." EPA defines a major source as a facility that emits, or has the potential to emit (PTE) any criteria pollutant or hazardous air pollutant (HAP) at levels equal to or greater than the Major Source Thresholds (MST). The MST for criteria pollutants may vary depending on the attainment status (e.g. marginal, serious, extreme) of the geographic area and the Criteria Pollutant or HAP in which the facility is located (EPA Title V Requirement, accessed March 2010). Carryout bag manufacturing facilities that emit any criteria pollutant or HAP at levels equal to or greater than the MST of the local air quality management district would need to obtain, and maintain compliance with, a Title V permit.

Local Air Quality Management District's Equipment Permits. Manufacturing facilities may also be required to obtain permits from the local air quality management district. A local air quality management district permit is a written authorization to build, install, alter, replace, or operate equipment that emits or controls the emission of air contaminants, like oxides of nitrogen (NOx), carbon monoxide (CO), fine particulate matter (PM10), oxides of sulfur (SOx), or toxics. 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. The SCAQMD, the local air quality management district serving Huntington Beach, 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. Equipment permits ensure that emission controls meet the need for the South Coast Region to make steady progress toward achieving and maintaining federal and state air quality standards (as shown in Table 4.1-3) (SCAQMD "Getting Permits", 2011). Permits also ensure proper operation of control devices, establish recordkeeping and reporting mechanisms, limit toxic emissions, and control dust or odors. In addition, the SCAQMD routinely inspects operating facilities to verify that equipment has been built and installed as required by the, and to confirm that the equipment operates in compliance with, SCAQMD rules and regulations.

Regulations applicable to Delivery Trucks.

On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation. On December 12, 2008, the ARB approved a new regulation to significantly reduce emissions from existing on-road diesel vehicles operating in California. The regulation requires affected trucks and buses to meet performance requirements between 2011 and 2023. By January 1, 2023 all vehicles must have a 2010 model year engine or equivalent. The regulation is intended to reduce emissions of diesel PM, oxides of nitrogen and other criteria pollutants (ARB "Truck and Bus Regulation, updated March 2010). All trucks making deliveries of carryout bags in California will be required to adhere to this regulation.

Diesel-Fueled Commercial Motor Vehicle Idling Limit. The purpose of this airborne toxic control measure is to reduce public exposure to diesel particulate matter and other air contaminants by limiting the idling of diesel-fueled commercial motor vehicles. The regulation applies to diesel-fueled commercial motor vehicles that operate in the State of California with gross vehicular weight ratings of greater than 10,000 pounds that are or must be licensed for operation on highways. The in-use truck requirements require operators of both in-state and out-of-state registered sleeper berth equipped trucks to manually shut down their engines when

idling more than five minutes at any location within California beginning in 2008 (ARB "Heavy-Duty Vehicle Idling Emission Reduction Program", updated March 2009). All trucks making deliveries in Huntington Beach are required to comply with the no-idling requirements.

4.1.2 Impact Analysis

a. Methodology and Significance Thresholds. The proposed Single-Use Carryout Bag Ordinance does not include any physical development or construction related activities; therefore, the analysis focuses on emissions related to carryout bag manufacturing processes and truck trips associated with delivering carryout bags to retailers in Huntington Beach. Operational emissions associated with the truck trips to deliver carryout bags to Huntington Beach retailers were calculated using the using the URBEMIS 2007 v. 9.2.4 computer program (Rimpo and Associates, 2007[1]). The estimate of operational emissions by URBEMIS includes truck trips (assumed to be heavy trucks - 33,000 to 60,000 pounds) and utilizes the trip generation rates based on the increase of truck trips associated with the proposed Ordinance.

The proposed Ordinance would create an air quality significant impact if it would:

1. *Conflict with or obstruct implementation of the applicable air quality plan*
2. *Violate any air quality standard or contribute substantially to an existing or projected air quality violation*
3. *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 (including releasing emissions which exceed quantitative thresholds for ozone precursors*
4. *Expose sensitive receptors to substantial pollutant concentrations*
5. *Create objectionable odors affecting a substantial number of people*

The Initial Study (see Appendix A) concluded that only the second and third criteria could potentially result in a significant impact, while the proposed Single-Use Carryout Bag Ordinance would result in a less than significant impact with respect to the first and fourth criteria, and would result in no impact with respect to the fifth criterion. Hence, only the second and third criteria are addressed in this section.

The SCAQMD has established the following significance thresholds for project operations within the South Coast Air Basin:

- *55 pounds per day of ROC*
- *55 pounds per day of NO_x*
- *550 pounds per day of CO*
- *150 pounds per day of SO_x*
- *150 pounds per day of PM_{10}*

[1] Please note that the California Emissions Estimator Model (CalEEMod), which is normally recommended for use by the SCAQMD, was considered for use as part of the analysis. However, because the truck trips associated with carryout bags were so few compared to larger projects normally analyzed with CalEEMod, the emissions output in CalEEMod did not yield any relevant results (all emissions were listed as 0.0 pounds per day). As stated by SCAQMD, the decision to continue using the URBEMIS model is up to the lead agency or other users (CalEEMod FAQ; www.aqmd.gov/caleemod/faq.htm). As such, the use of URBEMIS for this analysis is deemed reasonable and conservative.

- *55 pounds per day of $PM_{2.5}$*

b. Project Impacts and Mitigation Measures.

Impact AQ-1 **A shift toward reusable bags could potentially alter processing activities related to bag production, which has the potential to increase air pollutant emissions. However, the proposed Single-Use Carryout Bag Ordinance is expected to substantially reduce the number of single-use plastic carryout bags, thereby reducing the total number of bags manufactured and overall emissions associated with bag manufacture and use. Therefore, air quality impacts related to alteration of processing activities would be Class IV, *beneficial*.**

The intent of the proposed Single-Use Carryout Bag Ordinance is to reduce the amount of single-use carryout bags, and to promote the use of reusable bags by Huntington Beach retail customers. The proposed Ordinance would incrementally reduce the number of single-use plastic carryout bags that are manufactured and would incrementally increase the number of single-use paper and reusable bags manufactured compared to existing conditions.

As described in the *Setting*, emissions associated with single-use paper bag production result in 1.9 times the impact on atmospheric acidification as a single-use plastic bag. On a per bag basis, a reusable carryout bag that is made of LDPE plastic results in three times the atmospheric acidification compared to a single-use plastic bag. Reusable bags may be made of various materials other than LDPE, including cloths such as cotton or canvas. However, because LDPE reusable bags are one of the most common types of reusable bags and are of similar durability and weight (approximately 50 to 200 grams) as other types of reusable bags, this EIR utilizes the best available information regarding specific metrics on a per bag basis to disclose environmental impacts associated with the proposed Ordinance. Further, given the high rate of reuse of all types of reusable bags (usually at least one year, or 52 times), the air pollutant emissions from these bags when compared to plastic and paper carryout bags are expected to be comparable (to the LPDE bag) or lower (Santa Clara County Single-Use Carryout Bag Initial Study, October 2010). Similarly, based on a per bag basis, a single-use paper bag has 1.3 times the impact on ground level ozone formation compared to a single-use plastic bag and a reusable carryout bag that is made of LDPE plastic would result in 1.4 times the ground level ozone formation compared to a single-use plastic bag (Stephen L. Joseph, 2009; FRIDGE, 2002; and Green Cities California MEA, 2010).

A reusable bag results in greater impacts to ground level ozone formation and atmospheric acidification than a single-use plastic bag on a per bag basis; however, unlike single-use plastic bags, reusable carryout bags are intended to be used multiple times (at least 125 uses as required by the proposed Ordinance).[2] Therefore, fewer total carryout bags would need to be manufactured as a shift toward the use of reusable bags occurs. As described in Section 2.0, *Project Description*, stores making available paper carryout bags would be required to sell

[2] For the purposes of this analysis, it is assumed that reusable bags would be used once per week for a year, or 52 times, before being replaced. However, for the purposes of the Ordinance, reusable bags *can* be used as many as 125 times.

recycled paper carryout bags made from 100% recycled material with a 40% post-consumer recycled content to customers for $0.10 per bag. This mandatory charge would create a disincentive to customers to request paper bags when shopping at regulated stores and is intended to promote a shift toward the use of reusable bags by consumers in Huntington Beach. The proposed Ordinance may lead to some short-term increase in single-use paper bag use as consumers would be unable to get a free plastic bag while shopping, but may be willing to pay a charge to use paper bags.

Based on a mandatory charge of $0.10 per bag, this analysis assumes that the total volume of plastic bags currently used in Huntington Beach (102,198,343 plastic bags per year as shown in Table 2-1) would be replaced by approximately 45% paper bags and 50% reusable bags as a result of the Single-Use Carryout Bag Ordinance, as shown in Table 4.1-4. As shown therein, it is assumed that 5% of the existing single-use plastic bags used in Huntington Beach would remain in use since the Ordinance does not apply to some retailers who distribute plastic bags (e.g., restaurants) and these retailers would continue to distribute plastic bags after the Ordinance is implemented. Thus, for this analysis it is assumed that 5,109,917 plastic bags would be used in Huntington Beach after implementation of the proposed Ordinance. In addition, it is assumed that approximately 45,989,254 paper bags would replace approximately 45% of the plastic bags currently used in the City. This 1:1 replacement ratio is considered conservative, because the volume of a single-use paper carryout bag (20.48 liters) is generally equal to approximately 150% of the volume of a single-use plastic bag (14 liters), such that fewer paper bags would ultimately be needed to carry the same number of items.

Table 4.1-4
Existing Plastic Bag Replacement Assumptions

Type of Bag	Replacement Assumption	# of Bags used Per Year	Explanation
Single-use Plastic	5%	5,109,917	Because the Ordinance does not apply to all retailers, some single-use plastic bags would remain in circulation.
Single-use Paper	45%	45,989,254	Although the volume of a single-use paper carryout bag is generally 150% of the volume of a single-use plastic bag, such that fewer paper bags would be needed to carry the same number of items, it is conservatively assumed that paper would replace plastic at a 1:1 ratio.
Reusable	50%	982,676	Although a reusable bag can, by definition, be used 125 times, it is conservatively assumed that a reusable bag would be used by a customer once per week for one year, or 52 times.
	Total	**52,081,847**	

In order to estimate the number of reusable carryout bags that would replace 51,099,171 plastic bags (50% of the existing number of plastic bags used in Huntington Beach per year), it is assumed that a reusable carryout bag would be used by a customer once per week for one year (52 times). This is a conservative estimate as a reusable bag, as required by the Ordinance, must have the capability of being used 125 times (see Appendix C for complete Draft Ordinance).

Nevertheless, for this analysis, in order to replace the volume of groceries contained in the 51,099,171 single-use plastic bags that would be removed as a result of the Single-Use Carryout Bag Ordinance, an increase of approximately 982,676 reusable bags per year would be purchased by customers at retail stores. Based on the estimate of 982,676 reusable bags, each Huntington Beach resident (191,677 in 2011) would purchase around five reusable bags per year. This analysis assumes that as a result of the proposed Ordinance the existing total volume of groceries currently carried in approximately 102.2 million single-use plastic carryout bags would be carried within approximately 52 million single-use plastic, reusable and single-use paper bags.

Table 4.1-5 estimates emissions that contribute to the development of ground level ozone and atmospheric acidification that would result from implementation of the proposed Single-Use Carryout Bag Ordinance. As shown, the increased use of reusable carryout bags in the City would reduce emissions that contribute to ground level ozone by approximately 822 kg per year (a 35% decrease) and atmospheric acidification by approximately 7,310 kg per year (a 7% decrease).

Table 4.1-5
Estimated Emissions that Contribute to Ground Level Ozone and Atmospheric Acidification (AA) from Carryout Bags in Huntington Beach

Bag Type	# of Bags Used per Year*	Ozone Emission Rate per Bag**	Ozone Emissions (kg) per 1,000 bags***	Ozone Emissions per year (kg)	AA Emission Rate per Bag**	AA Emissions (kg) per 1,000 bags****	AA Emissions per year (kg)
Single-use Plastic	5,109,917	1.0	0.023	117.52	1.0	1.084	5,539.15
Single-use Paper	45,989,254	1.3	0.03	1,379.68	1.9	2.06	94,737.86
Reusable	982,676	1.4	0.032	31.45	3.0	3.252	3,195.66
			Total	**1,529**		**Total**	**103,473**
			Existing	**2,351**		**Existing**	**110,783**
			Net Change	**(822)**		**Net Change**	**(7,310)**

Source:
** Refer to Table 4.1-4.*
***Impact rate per bag as stated in Stephen L. Joseph, 2009; Ecobilan, 2004; FRIDGE, 2002; and Green Cities California MEA, 2010; Santa Monica Single-use Carryout Bag Ordinance Final EIR, January 2011.*
**** Emissions per 1,000 bags from Ecobilan, 2004; Santa Monica Single-use Carryout Bag Ordinance Final EIR, January 2011.*
***** Emissions per 1,000 bags from FRIDGE, 2002 and Green Cities California MEA, 2010; Santa Monica Single-use Carryout Bag Ordinance Final EIR, January 2011.*

As discussed in the *Setting*, air pollutant emissions from manufacturing facilities are also regulated under the Clean Air Act and would be subject to requirements by the local air quality management district (in Orange County, the SCAQMD). Either a paper bag manufacturing facility or a reusable carryout bag manufacturing facility that emits any criteria pollutant or hazardous air pollutant (HAP) at levels equal to or greater than the Major Source Thresholds (MST) of the local air quality management district would need to obtain and maintain compliance with a Title V permit. Adherence to permit requirements would ensure that a manufacturing facility would not violate any air quality standard. Manufacturing facilities would also be required to obtain equipment permits for emission sources through the local air quality management district which ensures that equipment is operated and maintained in a manner that limits air emissions in the region. Compliance with applicable regulations would ensure that manufacturing facilities would not generate emissions conflicting with or obstructing implementation of the applicable air quality plan, violate any air quality standard or contribute substantially to an existing or projected air quality violation or result in a cumulatively considerable net increase of any criteria pollutant.

As described above, the proposed Single-Use Carryout Bag Ordinance would reduce emissions associated with ozone and atmospheric acidification. Therefore, the proposed ordinance would have a beneficial impact with respect to air quality.

Mitigation Measures. Mitigation is not necessary as impacts would beneficial.

Significance After Mitigation. The impact would be beneficial without mitigation.

Impact AQ-2 Implementation of the proposed Single-Use Carryout Bag Ordinance would generate air pollutant emissions associated with an incremental increase in truck trips to deliver paper and reusable carryout bags to local retailers. However, emissions would not exceed SCAQMD operational significance thresholds. Therefore, operational air quality impacts would be Class III, *less than significant*.

Long-term emissions associated with the proposed Single-Use Carryout Bag Ordinance would include those emissions associated with truck trips to deliver carryout bags (paper and reusable) from manufacturing facilities or distributors to the local retailers in Huntington Beach. The URBEMIS computer program was used to calculate emissions for mobile emissions resulting from the number of trips generated by the proposed ordinance.

A temporary increase in single-use paper-bag use and a permanent increase in reusable bag use might lead to an increase in the frequency of truck trips needed to deliver a greater number of these bags to stores in Huntington Beach. However, any increase in truck trips related to paper and reusable bag delivery would be partially offset by the reduction in truck trips related to single-use plastic carryout bag delivery since under the proposed ordinance, plastic bags would be banned and therefore truck delivery would not be required. Nevertheless, as shown in Table 4.1-6, assuming a worst-case scenario that as a result of the proposed project the volume of existing plastic bags would be replaced by approximately 45% paper bags and 50% reusable

bags with 5% of the total plastic bags remaining in use, the net increase in truck traffic resulting from the change in bag use would be less than one truck trip per day.

Table 4.1-6
Estimated Truck Trips per Day
Following Implementation of the Proposed Single-use Carryout Bag Ordinance

Bag Type	Number of Bags per Year*	Number of Bags per Truck Load**	Truck Trips Per Year	Truck Trips per Day
Single-use Plastic	5,109,917	2,080,000	2.5	0.007
Single-use Paper	45,989,254	217,665	211	0.58
Reusable	982,676	108,862	9	0.025
		Total	**223**	**0.61**
		Existing Truck Trips for Plastic Bags (to be removed)	49	0.13
		Net New Truck Trips	**174**	**0.48**

**Based on worst case scenario estimate of 5% existing plastic bag use in Huntington Beach (approximately 102,198,343 plastic bags per year) to remain, 45% conversion of the volume of existing plastic bag use in Huntington beach to paper bags and 50% conversion to reusable bags (based on 52 uses per year).*
***City of Santa Monica Single-Use Carryout Bag Ordinance EIR (SCH #2010041004), January 2011; and City of Sunnyvale Carryout Bag Ordinance EIR (SCH#2011062032), December 2011.*

As shown in Table 4.1-6, the change in truck traffic as a result of the proposed Ordinance would be a net increase of approximately 0.48 truck trips per day. Although the reduction in single-use plastic bag deliveries would reduce truck trips compared to existing conditions, the increase in single-use paper and reusable bags would cause a negligible net increase. Mobile emissions associated with such an increase in truck traffic are summarized in Table 4.1-7.

Table 4.1-7
Operational Emissions Associated with Proposed Ordinance

Emission Source	Emissions (lbs/day)				
	ROG	NO_x	CO	PM_{10}	$PM_{2.5}$
Mobile Emissions (Truck Traffic)	0.01	0.2	0.05	0.01	0.01
Total Emissions	**0.01**	**0.12**	**0.05**	**0.01**	**0.01**
SCAQMD Thresholds	*55*	*55*	*550*	*150*	*55*
Threshold Exceeded?	***No***	***No***	***No***	***No***	***No***

Source: URBEMIS version 9.2.4 calculations for Truck Trips. See Appendix B for calculations

As indicated in Table 4.1-7, daily ROG emissions are estimated at <0.01 pounds, daily NO_X emissions are estimated at approximately 0.05 pounds, daily PM_{10} emissions would be approximately 0.01 pounds, and daily $PM_{2.5}$ emissions would be <0.01 pounds. The incremental increases in ROG, NO_X, PM_{10}, and $PM_{2.5}$ emissions associated with the proposed project would be substantially less than the SCAQMD thresholds of 55 pounds per day of ROG, NOx, or $PM_{2.5}$, 550 pounds for CO, and 150 pounds per day of PM_{10}. Because long-term emissions would not exceed SCAQMD thresholds, impacts would not be significant.

Mitigation Measures. Operational emissions associated with the increase in truck traffic as a result of the proposed Single-Use Carryout Bag Ordinance would not exceed SCAQMD thresholds. Therefore, mitigation is not required.

Significance after Mitigation. Impacts would be less than significant without mitigation.

c. Cumulative Impacts. Adopted and pending carryout bag ordinances, as described in Table 3-1 in Section 3.0, *Environmental Setting*, would continue to reduce the amount of single-use carryout bags, and promote a shift toward reusable carryout bags. Similar to the proposed Huntington Beach Ordinance, such ordinances would be expected to generally reduce the overall number of bags manufactured and associated air pollutant emissions, while existing and future manufacturing facilities would continue to be subject to federal and state air pollution regulations (see the *Setting* for discussion of applicable regulations). Similar to the proposed Huntington Beach Ordinance, other adopted and pending ordinances could incrementally change the number of truck trips associated with carryout bag delivery and associated emissions. Six other agencies in South Coast Air Basin region (County of Los Angeles, City of Long Beach, City of Manhattan Beach, City of Calabasas, City of Santa Monica, City of Malibu, and the City of Los Angeles) have either adopted or are considering such ordinances. However, based on the incremental increase in air pollutant emissions associated with the proposed Huntington Beach Ordinance (increase of ¼ pound per day or less of each criteria pollutant), the other ordinances are not expected to generate a cumulative increase in emissions that would exceed SCAQMD thresholds or adversely affect regional air quality. Therefore, cumulative air quality impacts would not be significant.