PLACEWORKS

MEMORANDUM

DATE February 10, 2022

TO Jonathan Moore, City of Salinas Community Development Department, Senior Planner

FROM Tammy L. Seale, PlaceWorks, Climate Action and Resilience Associate Principal
Eli Krispi, PlaceWorks, Climate Action and Resilience Senior Associate
Renata Langis, PlaceWorks, Project Planner

SUBJECT Draft Community GHG Inventory – Summary of Results

1. Introduction

PlaceWorks is working with the City of Salinas (City) to prepare a Climate Action Plan (CAP), which is a plan to assess and reduce greenhouse gas (GHG) emissions and improve community resilience to changing conditions associated with climate change in the community. The CAP is concurrent with the City's General Plan update. The General Plan is the City's guiding document for future growth, government operations, and City decisions through 2050. The plan includes updates that comply with state law, including housing, environmental justice, community health, climate adaptation, and mobility.

As part of the CAP, PlaceWorks has been updating the City's community-wide GHG inventories. A community-wide GHG inventory identifies GHG emissions that result from activities of residents, employees, and other community members occurring within the community. Examples include residents driving cars, homes using water, and businesses using electricity. Determining the annual level of GHG emissions will help Salinas establish an attainable goal for reducing the community's emissions year over year, building on work that has been a community priority for over a decade. Knowing which activities release these GHG emissions allows the City to develop policies and programs that facilitate a decrease in emissions for each activity.

The City must consider the GHG emissions caused by activities attributed to the community, including GHG emissions generated both inside and outside their jurisdictional boundaries. GHG emissions are generated by various activities that are largely commonplace in daily life. Some daily activities release GHG emissions in the location of the activity, such as gases released anytime a car is driven. On the other hand, some activities cause GHG emissions to be released elsewhere, such as someone using electricity to power their home, which generates GHG emissions in the location of the power plant that supplies the power and not in the home itself.

Prior to the CAP project, the Association of Monterey Bay Area Governments (AMBAG) prepared community-wide GHG inventories for Salinas for the calendar years 2005, 2010, 2015, 2017, 2018, and 2019. PlaceWorks revised the existing community-wide GHG inventories for 2005 and 2019 to use consistent and current methods and data sources. The 2005 inventory creates an updated baseline for establishing targets, while the 2019 inventory is the most recent indication of how emissions have changed since the baseline.

This memo presents the draft results of the updated 2005 and 2019 Salinas community-wide GHG inventories and a discussion of the methods used to prepare and update the GHG inventories (Section 2) and selected results from the community-wide GHG inventory (Section 3). The updated draft GHG inventory results show that between 2005 and 2019, there was a 21-percent drop in community-wide GHG emissions. The three sectors responsible for much of this decrease are the water and wastewater, nonresidential energy, and residential energy sectors.

2. Methods

A series of guidance documents, called protocols, provide recommendations on how to adequately assess GHG emissions. The project team updated GHG inventories consistent with the guidance in widely adopted, standard protocol documents. These protocols provide guidance on what activities will be evaluated in the GHG inventories and how emissions from those activities will be measured. Using standard methods also allows for an easy comparison of GHG emission levels across multiple years and communities.

- The community-wide GHG inventory uses the United States Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (U.S. Community Protocol), which was first developed in 2012 and updated most recently in 2019. The California Governor's Office of Planning and Research encourages cities and counties in California to follow the U.S. Community Protocol for community-wide GHG emissions.
- The Global Protocol for Community-Scale Greenhouse Gas Inventories (Global Protocol) was first developed in 2014 and is intended for use in preparing international community-scale GHG inventories. It is largely consistent with the U.S. Community Protocol, although it contains additional guidance and resources to support a wider range of activities that may be found in other countries. The project team has used the Global Protocol to assess GHG emissions from sources that are not covered in the U.S. Community Protocol.

GHG inventories are estimates of GHG emissions based on these standard methods and verified datasets. While they are not direct measurements of GHG emissions, the use of the standard methods identified in the protocol, in combination with accurate data from appropriate sources, allows GHG inventories to provide reliable estimates of local emission levels.

UNITS OF MEASUREMENT

GHG inventories assess emissions in a unit called carbon dioxide equivalent (CO_2e), which is a combined unit of all GHGs analyzed in the inventory. As different GHGs have different effects on the processes that drive climate change, CO_2e is a weighted unit that reflects the relative potency of the different GHGs. These inventories report amounts of GHGs in metric tons of CO_2e ($MTCO_2e$), equal to 1,000 kilograms or approximately 2,205 pounds.

EMISSION FACTORS

The project team calculated most of the GHG emissions using data on GHG-generating activities in combination with emission factors. An emissions factor describes how many $MTCO_2e$ are released per unit of an activity. For instance, an emissions factor for electricity describes the $MTCO_2e$ produced per kilowatt-hour (kWh) of electricity used, or an emission factor for on-road transportation describes the $MTCO_2e$ produced per mile of driving.

Table 1 shows the emissions factors for 2005 and 2019. Some sectors, including agriculture and off-road emissions, are calculated using formulas or models and do not have specific emission factors.

Table 1: 2005 and 2019 Emissions Factors

SECTOR	UNIT	2005	2019	SOURCE
PG&E electricity	$MTCO_2e$/ kWh	0.000224	0.000002	PG&E
3CE electricity	$MTCO_2e$/ kWh	-	0.000005	3CE
Natural gas	$MTCO_2e$/Per therm	0.005319	0.005319	U.S. Community Protocol
On-road transportation (light- and medium-duty vehicles)	$MTCO_2e$/Per mile	0.000419	0.000358	California Air Resources Board
On-road transportation (heavy-duty vehicles)	$MTCO_2e$/Per mile	0.001305	0.001204	California Air Resources Board
On-road transportation (total)	$MTCO_2e$/Per mile	0.000499	0.000428	California Air Resources Board
Solid waste (municipal solid waste)	$MTCO_2e$/Per ton	0.276044	0.286103	AMBAG

3. Community-Wide GHG Inventory

The community-wide GHG inventory assessed GHG emissions from the following seven categories of activities, known as sectors.

- Transportation includes GHG emissions created by driving on-road vehicles, including passenger and freight vehicles.
- Energy includes GHG emissions attributed to the use of electricity and natural gas in residential and nonresidential buildings.
- Solid waste includes the GHG emissions released from trash collected in the City of Salinas.
- Off-road equipment includes GHG emissions from equipment that does not provide on-road transportation, such as tractors for construction or equipment used for landscape maintenance.
- Agriculture includes GHG emissions from fertilizer use for crop cultivation.
- Water and wastewater accounts for the electricity used to transport every gallon of water or wastewater to residents and businesses, as well as direct emissions resulting from the processing of wastewater material.
- Land use and sequestration includes GHG emissions absorbed and stored in trees and soils on locally controlled lands as part of healthy ecosystems and released into the atmosphere from development of previously undeveloped land.

The proportion of each sector's contribution to annual GHG emissions is largely consistent between the years 2005 and 2019, as shown in Table 2.

Table 2: Proportions of Annual GHG Emissions by Sector

Sector	2005 $MTCO_2E$	2005 Proportion of Total	2019 $MTCO_2E$	2019 Proportion of Total
Transportation	388,430	51%	390,550	65%
Residential energy	129,510	17%	79,780	13%
Nonresidential energy	181,440	24%	64,780	11%
Solid waste	42,490	6%	46,890	8%
Off-road equipment	10,270	1%	16,260	3%
Water and wastewater	10,010	1%	4,130	1%
Agriculture	1,650	0.2%	1,550	0.3%
Land use and sequestration	-3,880	-0.5%	-4,040	-0.7%
Total Annual $MTCO_2e$	**759,920**	**100%**	**599,900**	**100%**

The transportation sector has remained the largest source of GHG emissions in Salinas, increasing from 51 percent in 2005 to 65 percent of community-wide emissions in 2019. This is not because transportation emissions increased substantially from 2005 to 2019, but rather that emissions declined in most other sectors, causing transportation to make up a larger part of Salinas' overall emissions.

The transportation sector is followed by the residential and nonresidential energy sectors as the second- and third-largest sources of GHG emissions. While non-residential energy was the second-highest emitting sector in 2005, it falls below residential energy as the third highest in 2019. The share of residential energy emissions decreased from 17 percent in 2005 to 13 percent in 2019. The nonresidential energy sector's share of GHG emissions decreased more than any other sector in Salinas, decreasing from 24 percent in 2005 to 11 percent in 2019, a decrease of 13 percent.

Solid waste is the fourth-largest source of GHG emissions in Salinas, increasing from 6 percent of community-wide emissions in 2005 to 8 percent in 2019. Water and wastewater and off-road equipment are the next-largest sources of GHG emissions in Salinas. Off-road equipment increased from 1 percent of community-wide emissions in 2005 to 3 percent in 2019. Water and wastewater remained constant at approximately 1 percent between 2005 and 2019.

Agriculture is the smallest sources of GHG emissions in Salinas. The share of agricultural emissions remained relatively constant between 2005 and 2019.

Land use and sequestration was a net sink, offsetting some of the community-wide emissions associated with other activities. This sector remained fairly constant between 2005 and 2019.

As shown in **Table 3**, Salinas' community-wide GHG emissions decreased by approximately 21 percent between the years 2005 and 2019.

Table 3: Percentage Change Between 2005 and 2019 by Sector

Sector	2005	2019	Percentage Change 2005 to 2019
Transportation	388,430	390,550	1%
Residential energy	129,510	79,780	-38%
Nonresidential energy	181,440	64,780	-64%
Solid waste	42,490	46,890	10%
Off-road equipment	10,270	16,260	58%
Water and Wastewater	10,010	4,130	-59%
Agriculture	1,650	1,550	-6%
Land use and sequestration	-3,880	-4,040	4%
Total Annual $MTCO_2e$	**759,920**	**599,900**	**-21%**

All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

The three sectors that experienced the largest decrease in annual GHG emissions are water and wastewater, nonresidential energy, and residential energy, which reduced by 64, 64, and 38 percent, respectively, between 2005 and 2019. This is primarily due to the introduction of Central Coast Community Energy (3CE) service in March 2018. 3CE is the default electricity provider for Salinas, although customers may choose to continue to receive electricity from PG&E. PG&E continues to provide the infrastructure and services for transmission and distribution of all electricity in the community, including the electricity supplied by 3CE.

3CE supplies electricity to most customers in Salinas, and in 2019, used renewable and carbon-free sources of electricity. As a result of cleaner electricity use from 3CE and PG&E, GHG emissions associated with electricity use have declined substantially. Due to the availability of cleaner sources of energy being used to power homes and businesses, and process and treat water and wastewater, these three sectors achieved the greatest reduction in GHG emissions. Improvements in energy efficiency have reduced the amount of electricity and natural gas use in Salinas despite a growing population, which has also contributed to reduce energy-related GHG emissions. The agriculture sector also experienced a decline in emissions by 6 percent between 2005 and 2019.

The transportation sector's GHG emissions remained fairly constant (increasing by 1 percent) despite a significant increase in vehicle miles traveled (VMT), primarily because of the increase of vehicle fuel efficiency and increased adoption of electric vehicles.

In addition to transportation, two other sectors experienced an increase in GHG emissions: solid waste and off-road equipment. GHG emissions from solid waste increased by 10 percent, potentially due to the growing population. Off-road equipment GHG emissions increased by 58 percent due at least in part to an increase in construction activity and a growing population.

GHG emissions associated with land use and sequestration remained relatively constant, as the rate of development of previously undeveloped land in Salinas has not changed much during this period.

4. Updates to the 2005 and 2019 Inventories

As mentioned previously, PlaceWorks updated Salinas' existing inventories to be consistent with current guidance and best practices. Because of these changes, the inventory results presented in this memo will be different than results that have been shown previously. Apart from the water and transportation sectors, these changes are relatively minor.

The dramatic increase in emissions associated with water and wastewater use in these revised inventories as compared to the original AMBAG results is due to a more complete analysis of activities and emissions for this sector. The water and wastewater sector includes two types of GHG emissions: indirect and direct emissions. Indirect emissions are GHG emissions associated with electricity use for the supply, conveyance, distribution, and treatment of potable water and wastewater. Direct emissions are GHG emissions associated with biological processes that occur naturally through the treatment process. The original 2005 and 2019 GHG inventories assessed a smaller scope of activities, including a limited selection of emissions from anaerobic digester gas and direct emissions of nitrous oxide associated with effluent emissions and wastewater treatment emissions. The update to the 2005 and 2019 GHG inventories included an assessment of all activities and emissions for the sector, including indirect water and wastewater use in addition to the emissions from anaerobic digester gas, effluent, and wastewater treatment process emissions. This change in method for quantifying the wastewater emissions explains the 2,844-percent and 665-percent increase in emissions for this sector in the updated 2005 and 2019 GHG inventories, respectively.

The large change in transportation-related emissions is due to a change in the method of quantifying emissions from VMT. The original GHG inventories prepared by AMBAG used a method called the "boundary model." This model accounts for emissions from all travel miles that occurred within the geographic area, in this case, the city limits of Salinas. The boundary model does not account for travel miles outside of the area, even if the origin or destination of the trip was in Salinas. Although it does not account for travel demand, the original GHG inventories include a portion of "pass-through" or partial trips, which are those that do not begin or end in Salinas, but pass through the community, primarily on Highway 101. By contrast, the updated 2005 and 2019 GHG inventories use the "origin-destination" model, which accounts for travel demand by reporting all trips in which both the origin and destination are within the geographic area, as well as trips that have only an origin or destination within the area. The latter, known as transboundary trips, are quantified by allocating 50 percent of travel miles to the city where the trip began or ended. Due to the more comprehensive scope of the origin-destination model, which accounts for travel demand into and outside of the city limits, the emissions associated with VMT are much higher in the updated GHG inventories. This change in method for quantifying vehicle emissions explains the 81-percent increase and 114-percent increase in emissions for the transportation sector in the updated 2005 and 2019 GHG inventories, respectively, relative to the original inventory from AMBAG.

Using the new methods of calculating community-wide emissions, total emissions increased by 34 percent in the updated inventory results for 2005 and 60 percent in the updated inventory results for 2019. Table 4 and Table 5 show how the baseline 2005 inventory and the 2019 inventory have been updated.

Table 4: Updates to 2005 Baseline Inventory

Sector	Original Inventory Results	Updated Inventory Results	Percentage Change
Transportation	214,950	388,430	81%
Residential energy	129,510	129,510	0%
Nonresidential energy	181,440	181,440	0%
Solid waste	42,490	42,490	0%
Off-road equipment	—	10,270	—
Water and wastewater	340	10,010	2,844%
Agriculture	—	1,650	—
Land use and sequestration	—	-3,880	—
Total Annual $MTCO_2e$	**568,730**	**759,920**	**34%**

All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Table 5: Updates to 2019 Inventory

Sector	Original Inventory Results	Updated Inventory Results	Percentage Change
Transportation	182,780	390,550	114%
Residential energy	80,390	79,780	-1%
Nonresidential energy	64,790	64780	0%
Solid waste	46,890	46,890	0%
Off-road equipment	—	16,260	—
Water and wastewater	540	4,130	665%
Agriculture	—	1,550	—
Land use and sequestration	—	-4,040	—
Total Annual $MTCO_2e$	**375,390**	**599,900**	**60%**

All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

SECTOR DETAILS

Transportation

Salinas' community members drove approximately 790,567,900 vehicle miles in 2005, increasing to 913,465,360 vehicle miles in 2019. The VMT in 2005 resulted in approximately 388,430 $MTCO_2e$, which increased to roughly 390,550 $MTCO_2e$ in 2019. Although vehicle miles increased by 16 percent between 2005 and 2019, total emissions only increased by 1 percent due to increasingly fuel-efficient vehicles, along with a wider adoption of electric vehicles. The method used to calculate VMT for the transportation sector of the CAP, and the results of this process, are consistent with those of the General Plan update. **Table 6** provides a breakdown of the activity data and emissions for on-road transportation by each individual year included in the updated community inventory.

Table 6: Transportation Activity Data and GHG Emissions, 2005-2019

Sector	2005	2019	Percentage Change 2005 to 2019
Activity Data (kWh)			
Light-duty vehicles	726,020,690	838,759,380	16%
Heavy-duty vehicles	64,547,210	74,705,980	16%
Total Annual VMT	**797,567,900**	**913,465,360**	**16%**
GHG Emissions ($MTCO_2e$)			
Light-duty vehicles	304,210	300,630	-1%
Heavy-duty vehicles	84,220	89,920	7%
Total Emissions ($MTCO_2e$)	**388,430**	**390,550**	**1%**

All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Residential Electricity

Salinas' GHG emissions from residential electricity totaled approximately 640 $MTCO_2e$ in 2019, compared to 42,380 $MTCO_2e$ in 2005, a decline of 98 percent. While residential electricity use declined approximately 35 percent over this period due to increases in energy efficiency, much of the decline in emissions is due to electricity coming from cleaner sources. This trend accelerated after the wide-scale adoption of 3CE, which in 2019, supplied electricity entirely from renewable and other carbon-free sources. **Table 7** provides a breakdown of the activity data and GHG emissions for residential electricity by each individual year included in the updated community inventory.

Table 7: Residential Electricity GHG Emissions 2005–2019 by Subsector

Sector	2005	2019	Percentage Change 2005 to 2019
Activity Data (kWh)			
Residential electricity PG&E	189,553,740	8,224,140	-96%
Residential electricity 3CE	—	114,369,510	—
Total activity (kWh)	**189,553,740**	**122,593,650**	**-35%**
GHG Emissions ($MTCO_2e$)			
Residential electricity PG&E	42,380	20	-100%
Residential electricity 3CE	—	620	
Total emissions ($MTCO_2e$)	**42,380**	**640**	**-98%**

All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Residential Natural Gas

GHG emissions from residential natural gas use totaled approximately 79,760 $MTCO_2e$ in 2019, compared to approximately 87,130 $MTCO_2e$ in 2005, a decrease of 8 percent. This decrease in natural gas GHG emissions is largely due to improvements in energy efficiency of natural gas appliances and potential changes in heating demand, such as shifts in weather patterns that reduce demand for home heating. **Table 8** provides a breakdown of the activity data and GHG emissions for residential natural gas by year in the updated community-wide GHG inventory.

Table 8: Residential Natural Gas GHG Emissions 2005–2019

Sector	2005	2019	Percentage Change 2005 to 2019
Activity Data (therms)			
Residential Natural Gas	16,381,410	14,995,480	-8%
GHG Emissions ($MTCO_2e$)			
Residential Natural Gas	87,130	79,760	-8%

All numbers are rounded to the nearest 10.

Nonresidential Electricity

Salinas' GHG emissions from nonresidential electricity, including GHG emissions from direct access electricity, totaled 2,640 $MTCO_2e$ in 2019, compared to approximately 114,440 $MTCO_2e$ in 2005, a decline of 98 percent. Despite a slight increase in activity in this sector, the dramatic decline in GHG emissions is largely due to electricity coming from cleaner sources. As mentioned previously, this trend accelerated when 3CE started to supply electricity in Salinas, which provides electricity from renewable and carbon-free sources. Table 9 provides a breakdown of the activity data and emissions for nonresidential electricity by each year included in the updated community-wide inventory.

Table 9: Nonresidential Electricity GHG Emissions 2005–2019 by Subsector

Sector	2005	2019	Percentage Change 2005 to 2019
Activity Data (kWh)			
Nonresidential electricity PG&E	436,825,510	5,554,670	-99%
Nonresidential electricity 3CE	-	484,679,020	-
Direct access electricity	50,846,040	0	-100%
Total activity (kWh)	487,671,550	490,233,690	**1%**
GHG Emissions ($MTCO_2e$)			
Nonresidential electricity PG&E	97,670	10	-100%
Nonresidential electricity 3CE	-	2,630	
Direct access electricity	16,770	0	-100%
Total emissions ($MTCO_2e$)	**114,440**	**2,640**	**-98%**

All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Nonresidential Natural Gas

Nonresidential natural gas GHG emissions totaled approximately 62,140 $MTCO_2e$ in 2019, compared to approximately 67,000 $MTCO_2e$ in 2005, a decrease of 7 percent. This decrease in natural gas GHG emissions may be due to changes in weather conditions (affecting the need for natural gas heating), and general improvements in energy efficiency. Conversions from natural gas to electric appliances may also contribute to reduced natural gas emissions. Table 10 provides a breakdown of the activity data and emissions for nonresidential natural gas by each individual year included in the updated community inventory.

Table 10: Nonresidential Natural Gas Emissions 2005–2019

Sector	2005	2019	Percentage Change 2005 to 2019
Activity Data (therms)			
Residential Natural Gas	12,597,420	11,687,610	-7%
GHG Emissions ($MTCO_2e$)			
Residential Natural Gas	67,000	62,140	-7%

All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Solid Waste

Salinas' community-wide GHG emissions associated with municipal solid waste (MSW) thrown away by community members increased by 10 percent between 2005 and 2019, from 42,490 $MTCO_2e$ in 2005 to 46,890 $MTCO_2e$ by 2019. This increase in emissions, which is greater than the rate of increase in the volume of solid waste, is potentially the result of an increase in population during the time period. **Table 11** presents specific solid waste data for each year.

Table 11: Solid Waste GHG Emissions 2005–2019

Sector	2005	2019	Percentage Change 2005 to 2019
Activity Data (tons)			
MSW	153,930	163,880	6%
GHG Emissions ($MTCO_2e$)			
MSW	42,490	46,890	10%

All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Off-Road Equipment

Emissions from off-road equipment in Salinas increased approximately 58 percent between 2005 and 2019, from 10,270 $MTCO_2e$ in 2005 to 16,260 $MTCO_2e$ in 2019, based on data available from the California Air Resources Board. **Table 12** shows the change in GHG emissions for each year. As shown, the off-road equipment that has increased the most significantly is transport refrigeration units (TRUs), followed by agricultural equipment, and construction and mining equipment, which rose by 755, 650, and 172 percent, respectively. Growth in construction and mining equipment emissions may be attributed to an increase in construction activities and employment, while increases in agricultural and TRU emissions may be attributed to an increase or practice changes in agricultural production and commercial activity growth, respectively. Light commercial emissions rose by 12 percent, lawn and garden equipment emissions rose by 9 percent, and portable equipment emissions rose by 7 percent. These increases are largely attributed to increases in population that Salinas experienced in this time frame.

Conversely, industrial equipment emissions decreased by 4 percent between 2005 and 2019. This decrease may be due to more fuel-efficient equipment becoming available in combination with changing equipment needs.

Table 12: Off-Road Transportation GHG Emissions 2005–2019 by Subsector

Off-Road Equipment	2005	2019	Percentage Change 2005 to 2019
Agricultural	20	150	650%
Construction and mining	2,750	7,490	172%
Industrial	2,510	2,420	-4%
Lawn and garden	640	700	9%
Light commercial	1,690	1,890	12%
Pleasure craft	1,690	1,760	4%
Portable equipment	730	780	7%
Recreational	130	130	0%
Transport Refrigeration Units	110	940	755%
Total Off-Road Equipment	**10,270**	**16,260**	58%

All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Water and Wastewater

GHG emissions from Salinas' water and wastewater consumption decreased from 10,010 $MTCO_2e$ in 2005 to 4,130 $MTCO_2e$ in 2019. Emissions associated with both indirect water and indirect wastewater (i.e., the electricity needed to move and process water and wastewater) decreased by 99 percent. GHG emissions released from direct wastewater grew slightly by 10 percent, likely due to population increase. Although the activity data in **Table 13** does not show a dramatic decrease in the gallons of water used, the GHG emissions for these subsectors decreased due to the use of renewable and carbon-free electricity sourced from 3CE. As a result, the overall GHG emissions released from electricity used to pump the water and wastewater decreased dramatically, by 59 percent between 2005 and 2019.

Table 13: Water and Wastewater GHG Emissions 2005–2019 by Subsector

Sector	2005	2019	Percentage Change 2005 to 2019
Activity Data (gallons)			
Indirect water	20,054,150	17,325,140	-14%
Indirect wastewater	8,155,560	7,108,930	-13%
Water and Wastewater Total	**28,209,710**	**24,434,070**	**-13%**
GHG Emissions ($MTCO_2e$)			
Indirect water	4,480	40	-99%
Indirect wastewater	1,820	20	-99%
Direct wastewater	3,710	4,070	10%
Water and Wastewater Total	**10,010**	**4,130**	**-59%**

All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Agriculture

PlaceWorks assessed GHG emissions from agriculture by calculating the nitrous oxide emissions associated with fertilizer use for all types of agricultural production in Salinas, including field, vegetable crops, fruit, and nut crops. As shown in **Table 14**, GHG emissions in this sector decreased from 1,650 $MTCO_2e$ in 2005 to 1,550 in 2019, a decrease of 6 percent during this time period. The decrease is attributed to a decrease in agricultural production, reflected in the proportional decline in acres of crop production between 2005 and 2019.

Table 14: Fertilizer Use 2005–2019

Sector	2005	2019	Percentage Change 2005 to 2019
Activity Data (acres)			
Acres of Fertilized Crops	3,360	3,170	-6%
GHG Emissions ($MTCO_2e$)			
Acres of Fertilized Crops	1,650	1,550	-6%

All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Land Use and Sequestration

GHG emissions from land use and sequestration can be either positive or negative. Natural lands and street trees absorb carbon, storing it in biomass, such as wood, plants, and soil. As a result, when natural land is preserved or when more street trees are planted, emissions from this sector are negative because GHGs are being removed from the atmosphere. However, developing natural lands or converting them to a different form (for example, replacing forests with crop land) or removing street trees causes carbon to be released, creating GHG emissions.

This sector includes emission sources and sinks from two types of activities: (1) emissions caused by permanently removing vegetation from natural lands or farmlands as a part of development (emissions source), and (2) sequestration of GHG emissions in street trees in urbanized areas (emissions sink). As shown in **Table 15**, the development of agricultural land resulted in the release of almost 3,000 $MTCO_2e$ in both 2005 and 2019. These emissions are calculated based on development of agricultural land that occurred during a 20-year period. Our methodology assumes that all developed agricultural land was converted into urban land uses, and no street trees were removed on those urban lands. The street trees associated with citywide urban land absorbed a total of about -6,890 $MTCO_2e$ and -7,070 $MTCO_2e$ in 2005 and 2019, respectively, offsetting some of the emissions caused by urban development and other activities. As a result, the net impact of land use change, when accounting for urban street trees, is a carbon sink. Emissions from this sector total -3,880 $MTCO_2e$ in 2005 and -4,040 $MTCO_2e$ in 2019.

Table 15: Land Use Change and Street Tree Biomass 2005–2019

SECTOR	2005	2019	PERCENTAGE CHANGE 2005 TO 2019
Activity Data (acres)			
Land use change*	2,900	2,980	3%
Street tree biomass	890	910	2%
GHG Emissions ($MTCO_2e$)			
Land use change*	3,010	3,030	1%
Street tree biomass	-6,890	-7,070	3%
Total emissions ($MTCO_2e$)	**-3,880**	**-4,040**	**4%**

*Conversion of agricultural to urban land

All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

5. Next Steps

Following City review of these draft GHG inventory results and any revisions that may be needed, PlaceWorks will prepare forecasts of future community-wide GHG emissions, consistent with General Plan buildout projections, and will assess the GHG reduction benefits from existing and planned state, regional, and local activities GHG emissions. The results of the GHG inventory, forecast, and benefits of existing and planned activities will help inform new policies to reduce community-wide GHG emissions.