


MOUNTAIN VIEW
GREENHOUSE GAS REDUCTION PROGRAM

AUGUST 2012

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ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ABAG	Association of Bay Area Governments
ARB	California Air Resources Board
BAAQMD	Bay Area Air Quality Management District
BAWSCA	Bay Area Water Supply and Conservation Agency
BMP	best management practice
CEQA	California Environmental Quality Act
City	City of Mountain View
CO_2	carbon dioxide
DOE	Department of Energy's
EIR	Environmental Impact Report
EO	Executive Order
General Plan	City of Mountain View General Plan
GGRP	Greenhouse Gas Reduction Plan
GHG	Greenhouse gas
gpcd	gallons per capita per day
HPS	high pressure sodium
HVAC	heating, ventilation and air conditioning
IPCC	United Nations International Panel on Climate Change
LCFS	Low Carbon Fuel Standard
LED	light-emitting diode
MND	Mitigated Negative Declaration
MT CO_2e	carbon dioxide equivalent emissions
MT CO_2e/yr	carbon dioxide equivalent emissions per year
MVGBC	Mountain View Green Building Code
PACE	Property Assessed Clean Energy
PG&E	Pacific, Gas & Electric Company
PPA	Power Purchasing Agreement
PV	solar photovoltaic
RPS	Renewable Portfolio Standard
SB	Senate Bill
Scoping Plan	*Climate Change Scoping Plan*
SCVWD	Santa Clara Valley Water District
SFBAAB	San Francisco Bay Area Air Basin
SP	service population
SWH	solar water heaters
TDM	Transportation Demand Management
UWMP	Urban Water Management Plan
VMT	vehicle miles traveled

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CHAPTER I
INTRODUCTION

Greenhouse gas (GHG) emissions and resulting climate change impacts are considered a major global challenge for the 21st century. These impacts range from reducing snow pack in the Sierra Nevada affecting water supplies, to a rising sea level threatening cities along the coast and San Francisco Bay, to decreasing air quality harming public health. Both at the global and local levels, we are starting to experience shifts in climate patterns and increased frequency of extreme weather events.

Purpose

In preparing this Greenhouse Gas Reduction Program (GGRP), the City of Mountain View is contributing to efforts across California and the world to reduce GHG emissions by taking actions in its own operations and community. The GGRP is designed to implement the Mountain View General Plan and comply with Bay Area Air Quality Management District (BAAQMD) guidelines that establish an efficiency standard for GHG emissions. In so doing, the GGRP enables development streamlining opportunities for future discretionary projects.

Planning Context

A GGRP is a tool that cities across the world, including many in the Bay Area and the State of California, are using to help reduce dependency on fossil fuels and nonrenewable energy and to decrease their share of GHG emissions and contributions to global climate change.

In Mountain View, most GHG emissions come from gasoline burned in motor vehicles and energy used in buildings, with water- and waste- related emissions contributing relatively smaller proportions. Mountain View's GGRP examines each of these activities and sets forth strategies requiring future development projects to comply with prescribed mitigation measures and local residents and businesses to commit to helping the City move toward a lower-carbon future.

A GGRP does much more, though, than reduce GHG emissions. Many of the strategies included in this document will also help make Mountain View a more attractive place to live - through improved bike and pedestrian facilities, better air quality, cheaper energy and water bills, less waste, greener streets, more local amenities, and more local jobs.

Scope and Content of the Greenhouse Gas Reduction Program

The GGRP comprises five chapters: Introduction; Relationship to the General Plan and CEQA; Emissions Inventory, Projections, and Goals; GHG Reduction Strategies and Measures; and Implementation and Monitoring. Appendices A through D provide additional detail on topics covered within the program. The contents of each chapter and appendix are briefly described below:

+ **Chapter 1, Introduction,** provides a brief description of the need for GHG reduction planning in California, gives an overview of the topics covered in the GGRP, and describes state actions related to climate change.
+ **Chapter 2, Relationship to the General Plan and CEQA,** identifies how the General Plan sets a broad framework for the emission reduction strategies, measures, and actions in the GGRP, and how the GGRP is intended to implement the General Plan. This chapter also describes the GGRP's relationship to the General Plan Environmental Impact Report, and its ability to enable a CEQA tool known as "tiering" to allow consistent future discretionary development projects to skip certain steps in the traditional CEQA process.

- **Chapter 3, Emissions Inventory, Projections, and Goals,** outlines key steps taken to develop the GGRP, including establishing a 2005 baseline GHG inventory, projecting future emissions in 2020 and 2030, quantifying emissions by GHG strategy areas, and calculating statewide and federal reductions. The chapter also sets the City's communitywide GHG reduction goals for 2020 and 2030, and describes the emissions gap between projected emissions and statewide reductions, which are addressed by GGRP measures.
- **Chapter 4, Reduction Strategies and Measures,** addresses five main reduction strategies: transportation, energy, water, solid waste, and carbon sequestration. For each strategy, the program identifies the following: specific measures, actions and responsible parties for implementation, progress indicators and metrics, and estimated GHG reductions in 2020 (Assembly Bill [AB] 32 target year) and 2030 (the General Plan planning horizon).
- **Chapter 5, Implementation and Monitoring,** discusses measure implementation, program evolution, and monitoring. It also describes the relationship between the GGRP and the State and BAAQMD CEQA guidelines, and establishes criteria staff can use when determining if a proposed discretionary project is consistent with the GGRP.
- **Appendix A** provides a technical description of methods employed to prepare the 2005 emissions inventory and 2020 and 2030 projections.
- **Appendix B** describes assumptions used to determine GHG emission reductions associated with the GGRP measures.
- **Appendix C** describes how this GGRP conforms to the BAAQMD guidelines for a qualified GHG reduction plan.
- **Appendix D** presents the analysis of vehicle miles traveled and anticipated reductions associated with transportation demand management efforts.

Climate Change Science

The overwhelming consensus among scientists around the world is that climate change is a reality, with human activity its primary cause. Due largely to the combustion of fossil fuels, atmospheric concentrations of carbon dioxide (CO_2), the principal human-caused GHG, are at a level unequaled for at least the last 800,000 years. GHGs from human activities, such as burning fossil fuels for use in buildings and transportation and methane production from agricultural practices, are trapping more of the sun's heat in the earth's atmosphere and warming the earth. Over the last century, average global temperatures rose by more than 1°F, and some regions warmed by as much as 4°F, with predictions for continued temperature increases in the coming years.

Trend projections indicate that atmospheric concentrations of GHG emissions will continue to increase throughout this century. If these projections become reality, climate change will threaten our economic well-being, public health, and environment.

In its 4th assessment of climate change, the United Nations International Panel on Climate Change (IPCC) provides a comprehensive overview of the impacts

of climate change, as agreed upon by the largest global consensus scientists have ever assembled. This report describes potential global emission scenarios for the coming century. The scenarios vary from a best-case scenario characterized by low population growth, clean technologies, and low GHG emissions; to a worst-case scenario where high population and fossil-fuel dependence result in extreme levels of GHG emissions. While some degree of climate change is inevitable, most climate scientists agree that to avoid serious climate change effects, atmospheric GHG concentrations need to be stabilized as quickly as possible.

California Climate Change Actions

Mountain View's strategy for climate protection must be set within the context of the Bay Area and the State, where much of the momentum for local action in the United States originates.

California has long been a sustainability leader, as illustrated by Governor Schwarzenegger signing Executive Order (EO) S-3-05 in 2005. EO S-3-05 recognizes California's vulnerability to reduced snowpack, exacerbation of air quality problems, and potential sea-level rise due to a changing climate. To address these concerns, the governor established targets to reduce statewide GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050.

In 2006, California became the first State in the country to adopt a statewide GHG reduction target through AB 32. This law codifies the EO S-3-05 requirement to reduce statewide emissions to 1990 levels by 2020. AB 32 resulted in the 2008 adoption by the California Air Resources Board (ARB) of a *Climate Change Scoping Plan* (Scoping Plan), outlining the State's plan to achieve emission reductions through a mixture of direct regulations, alternative compliance mechanisms, different types of incentives, voluntary actions, market based mechanisms, and funding. The Scoping Plan addresses similar areas to those contained in the Mountain View GGRP, including transportation, building energy efficiency, water conservation, waste reduction, and green infrastructure.

AB 32 engendered several companion laws that can assist Mountain View to reduce communitywide GHG emissions, including:

- **AB 1493** establishing emission performance standards for motor vehicles.
- **EO-S-1-07** establishing performance standards for the carbon intensity of transportation fuels.
- **Senate Bill (SB) 107** establishing emission performance standards for electric utilities.
- **SB 7x** establishing a water use reduction target.
- **AB 811** facilitating alternative financing mechanisms for energy efficiency and renewable energy installations.

Additional descriptions of these legislative actions are provided below. At the time of GGRP preparation, the City estimated the GHG emission reductions associated with AB 1493, EO-S-1-07, the Renewable Portfolio Standard (RPS), and Medium and Heavy Duty Vehicle Efficiency (see Chapter 3 for GHG

emission reductions associated with these state programs). In the future, as the regulatory framework surrounding AB 32 grows, it may be possible to evaluate a wider range of statewide reductions.

AB 1493

AB 1493, California's mobile-source GHG emissions regulations for passenger vehicles, was signed into law in 2002. AB 1493 requires ARB to develop and adopt regulations that reduce GHG emissions from passenger vehicles, light-duty trucks, and other non-commercial vehicles for personal transportation. In 2004, ARB approved amendments to the California Code of Regulations adding GHG emissions standards to California's existing standards for motor vehicle emissions.

EO-S-1-07 – The Low Carbon Fuel Standard

EO-S-01-07 reduces the carbon intensity of California's transportation fuels by at least 10% by 2020. The Low Carbon Fuel Standard (LCFS) is a performance standard with flexible compliance mechanisms that incentivizes the development of a diverse set of clean, low-carbon transportation fuel options to reduce GHG emissions.

Renewable Portfolio Standard

SB 1078, SB 107, EO-S-14-08, and SB X1-2 have established increasingly stringent Renewable Portfolio Standard (RPS) requirements for California utilities. RPS-eligible energy sources include wind, solar, geothermal, biomass, and small-scale hydro.

- **SB 1078** required investor-owned utilities to provide at least 20% of their electricity from renewable resources by 2020.
- **SB 107** accelerated the SB 1078 timeframe to take effect in 2010.
- **EO-S-14-08** increased the RPS further to 33% by 2020. PG&E, Mountain View's electricity provider, delivered 12% of its electricity from renewable sources in 2005.
- **SB X1-2** codified the 33% RPS by 2020 requirement established by EO-S-14-08.

SB 7x

SB 7x requires the state to achieve a 20% reduction in urban per capita water use by December 31, 2020. The state is required to make incremental progress toward this goal by reducing per capita water use by at least 10% on or before December 31, 2015. SB 7x requires each urban retail water supplier to develop both long-term urban water use targets and an interim urban water use target. SB 7x also creates a framework for future planning and actions for urban and agricultural users to reduce per capita water consumption 20% by 2020.

AB 811

AB 811 helps finance the upfront costs of solar and other energy efficiency improvements that are permanent fixtures to a property. AB 811 authorizes cities and counties to establish assessment districts in order to provide loans to

property owners with long-term repayments added to their annual property tax bills. This is achieved through the creation of a financing mechanism called a Property Assessed Clean Energy (PACE) finance program.

Medium/Heavy Duty Vehicle Efficiency

Medium and heavy duty vehicle efficiency reductions in the GGRP were calculated based on the following two regulations.

- **Heavy-Duty Vehicle GHG Emission Reduction (Aerodynamic Efficiency)** regulations require existing trucks/trailers to be retrofitted with the best available technology and/or ARB-approved technology. This measure has been identified as a Discrete Early Action in the Scoping Plan, which means it must be enforceable beginning in 2010. Technologies that reduce GHG emissions and improve the fuel efficiency of trucks may include devices that reduce aerodynamic drag and rolling resistance. These requirements apply to both California-registered trucks and out-of-state registered trucks that travel to California.
- **Medium- and Heavy-Duty Vehicle Hybridization** regulations address the application of hybrid electric technology to reduce GHG emissions and improve fuel efficiency. Hybrid technology provides the greatest benefit when used in vocational applications that have significant urban, stop-and-go driving, idling, and power take-off operations in their duty cycle. Such applications include parcel delivery trucks and vans, utility trucks, garbage trucks, transit buses, and other vocational work trucks. The implementation approach for this measure is to adopt a regulation and/or incentive program that reduces the GHG emissions of these types of new trucks sold in California.

CHAPTER 2
RELATIONSHIP TO THE GENERAL PLAN + CEQA

2

This chapter establishes the relationship of the Greenhouse Gas Reduction Program (GGRP) to the City of Mountain View General Plan (General Plan) and provisions of the California Environmental Quality Act (CEQA) statue and guidelines, including the Bay Area Air Quality Management District (BAAQMD) CEQA Guidelines. The first portion of the chapter identifies how the General Plan sets a broad framework for the emission reduction strategies, measures and actions in the GGRP, and how the GGRP is intended to implement the General Plan.

One key reason the City has developed a GGRP is to enable a CEQA tool known as "tiering," which allows future development projects consistent with the General Plan that incorporate greenhouse gas (GHG) emission reduction measures described in the GGRP within their project designs to skip certain steps in the CEQA process, reducing project costs and streamlining City permit processes. This chapter describes how the GGRP meets BAAQMD's standards for a "qualified" plan for the reduction of GHGs, which in turn affords future project applicants the ability to tier from the City's GGRP and General Plan Environmental Impact Report (EIR).

Relationship to the General Plan

The GGRP implements the following goal, policy, and actions from the Mountain View General Plan Mobility Element:

- **Goal MOB-9**: Achievement of state and regional air quality and greenhouse gas emission reduction targets
  - ***Policy MOB 9.1 Greenhouse gas emissions***: Develop cost-effective strategies for reducing greenhouse gas emissions, in coordination with the Greenhouse Gas Reduction Program.
    - *Action MOB 9.1.1 Greenhouse Gas Inventory: Maintain and regularly update the City's municipal and community Greenhouse Gas Inventory to track emissions.*
    - *Action MOB 9.1.2 Greenhouse Gas Reduction Program: Regularly update the Greenhouse Gas Reduction Program to address transportation emissions reductions.*

Concepts of smart growth and climate change conscious policies and actions are prominent throughout the General Plan. The City's policy commitment to encouraging density, infill, compact community design, and development along corridors reinforces reduction strategies of the GGRP. The General Plan includes specific goals and policies that guide the City's approach to reducing GHG emissions, including reduction targets, guidelines for preparing inventories or plans, and general reduction strategies. Since GHG emissions are a cross-cutting issue addressed by many General Plan elements, the GGRP as a whole is considered an implementation measure for the General Plan. This structure allows the City to update the GGRP on an ongoing, as-needed basis to ensure that Mountain View's climate protection efforts reflect both current legislation and emerging best practices.

Relationship to the California Environmental Quality Act

The City's approach to addressing GHG emission reductions within the General Plan is parallel to the climate change planning process being followed by more than 75 other California jurisdictions. This process includes:

- Completing a baseline emissions inventory and projecting future emissions
- Identifying a community-wide reduction target
- Preparing a GGRP to identify strategies and measures to meet the reduction target
- Identifying targets and reduction strategies in the General Plan and evaluating the environmental impacts of the GGRP in the General Plan EIR
- Monitoring effectiveness of reduction measures and adapting the plan to changing conditions
- Adopting the GGRP in a public process following environmental review

This approach is consistent with State CEQA Guidelines Section 15183.5, which allows jurisdictions to analyze and mitigate the significant effects of GHGs at a programmatic level, by adopting a plan for the reduction of GHG emissions. Later, as individual projects are proposed, project-specific environmental documents may tier from and/or incorporate by reference that existing programmatic review in their cumulative impacts analysis. Project-specific environmental documents prepared for projects consistent with the General Plan and GGRP may rely on the programmatic analysis of GHGs contained in the EIR certified for the Mountain View General Plan update and GGRP. Chapter 5 provides a discussion of the criteria and process the City will use to determine if a future project is consistent with the GGRP.

A project-specific environmental document that relies on this GGRP for its cumulative impacts analysis must identify specific GGRP measures applicable to the project, and how the project incorporates the measures. If the measures are not otherwise binding and enforceable, they must be incorporated as mitigation measures applicable to the project. If substantial evidence indicates that the GHG emissions of a proposed project may be cumulatively considerable, notwithstanding the project's compliance with specific measures in this GGRP, an EIR must be prepared for the project.

Qualified Greenhouse Gas Reduction Strategy

In June 2010, BAAQMD adopted CEQA air quality thresholds of significance for use within its jurisdiction. BAAQMD has direct and indirect regulatory authority over sources of air pollution in the San Francisco Bay Area Air Basin (SFBAAB), of which the City of Mountain View is a part. The overall goal of this effort was to develop CEQA significance criteria to ensure that future development projects implement appropriate and feasible emission reduction measures to mitigate significant air quality and GHG emissions impacts.

BAAQMD has adopted a GHG threshold of 1,100 MT CO_2e per year for development projects. Projects with emissions greater than the proposed threshold would be required to mitigate to the proposed threshold level or reduce project emissions by a percentage deemed feasible by the lead agency. BAAQMD's approach is to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions. If a project would generate GHG emissions above the threshold level, it would be considered to contribute substantially to a cumulative impact and would be considered significant under CEQA.

Alternatively, a local government may prepare a qualified GHG Reduction Strategy that is consistent with AB 32 goals. BAAQMD encourages such planning efforts and recognizes that careful early planning by local agencies is invaluable to achieving the state's GHG reduction goals. If a project is consistent with an adopted qualified GHG Reduction Strategy that addresses the project's GHG emissions, it can be presumed that the project will not have significant GHG emissions under CEQA.

To meet the standards of a qualified GHG reduction plan, Mountain View's GGRP must achieve the following criteria (which parallel and elaborate upon criteria established in State CEQA Guidelines Section 15183.5[b][1]):

- Quantify GHG emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area.
- Establish a level, based on substantial evidence, below which the contribution of GHG emissions from activities covered by the plan would not be cumulatively considerable.
- Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area.
- Specify measures or a group of measures, including performance standards that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level.
- Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specific levels.
- Adopt the GHG Reduction Strategy in a public process following environmental review.

This GGRP, the City of Mountain View General Plan, and the EIR prepared and certified for the GGRP and General Plan comprise a qualified GHG Reduction Strategy. Appendix C provides a discussion regarding how the GGRP meets each individual BAAQMD qualification standard. Chapter 5 provides a discussion of the criteria and process the City will use to determine if a future project is consistent with the GGRP.

CHAPTER 3
EMISSIONS INVENTORY, PROJECTIONS + GOALS

3

This chapter examines current and projected communitywide greenhouse gas (GHG) emissions for the City of Mountain View. The chapter first examines emissions trends. It presents current annual emissions using empirical data. Next, future emissions are projected, assuming no action is taken to reduce emission levels. These future emissions are based on projected activity data and future land use data presented in the Mountain View General Plan for both the community at-large and for each of five strategy areas.

The second portion of this chapter sets a framework for communitywide GHG emission reductions. State and federal emission reduction measures are presented, along with an estimate of their projected emission reductions within the community. The GGRP's emission reduction goals are then presented. State and federal actions will provide some momentum toward reaching communitywide goals; however, additional reductions will be necessary. Finally, the quantity of reductions needed from communitywide and GHG strategy area reduction measures is discussed.

Baseline Inventory

The purpose of a baseline inventory is to provide a snapshot of communitywide GHG emissions in a given year. The City developed a baseline emissions inventory for the 2005 operational year. The inventory addresses the following emission sectors: residential and nonresidential energy use, transportation, solid waste, water use, wastewater treatment, and off-road transportation.

Communitywide Emissions

The baseline emissions inventory was prepared using energy consumption data from Pacific Gas and Electric Company (PG&E), solid waste data from landfills, and vehicle travel data from the General Plan transportation model. This empirical data was used along with emission factors to estimate Mountain View's communitywide emissions.

The baseline emissions inventory identified a communitywide emissions total of 796,987 metric tons of carbon dioxide equivalent emissions (MT CO_2e) in 2005. As shown in Figure 3.1 and Table 3.1, transportation emissions constitute more than half of Mountain View's communitywide emissions, followed by energy use, solid waste, water use and wastewater treatment, and off-road mobile sources.

Figure 3.1 – 2005 Baseline Emissions by Sector

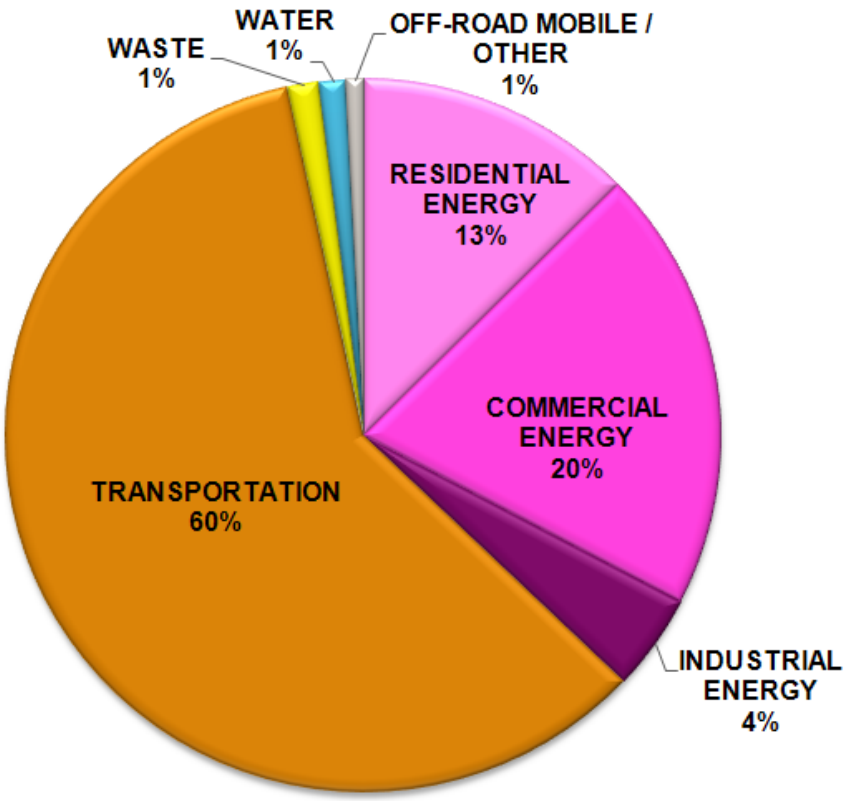


Table 3.1 – 2005 Communitywide Emissions

Emission Sector	Subsector	Emissions (MT CO_2e/year)	Communitywide Total (%)
Energy - Residential	Electricity	36,307	4.6%
	Natural Gas	64,065	8.0%
Energy – Non Residential	Electricity	108,220	13.6%
	Natural Gas	52,005	6.5%
Energy - Industrial	Electricity	4,308	0.5%
	Natural Gas	5,066	0.6%
Direct Access	Electricity	25,591	3.2%
	Subtotal	**295,562**	**37.1%**
Transportation			
	Subtotal	**474,180**	**59.5%**
Waste	Solid Waste	11,113	1.4%
	Alternate Daily Cover	70	0.0%
	Subtotal	**11,183**	**1.4%**
Water	Water Demand	4,384	0.6%
	Wastewater Treatment	5,117	0.6%
	Subtotal	**9,502**	**1.2%**
Off-Road Mobile	Construction	4,793	0.6%
	Lawn and Garden Equipment	1,767	0.2%
	Subtotal	**6,561**	**0.8%**
Total		**796,987**	**100.0%**

Note: Columns may not sum to total shown due to rounding.

GHG Strategy Areas

The City developed a GHG strategy area-specific emissions inventory for the year 2005 to gain a better understanding of where GHG emissions originate. Five strategy areas were defined based on similar land use types and access to jobs, services, and transportation (see Figure 3.2). These similarities make it possible to develop performance requirements that apply specifically to the unique conditions within each strategy area to allow closer monitoring of GHG-related characteristics (e.g., transportation patterns, energy use). The identification of GHG strategy areas in the GGRP lays the foundation for strategy area-specific measures to be included in future specific plans, such as the North Bayshore Specific Plan.

The strategy area-specific emissions inventory was derived from the communitywide emissions inventory and detailed land use data from the Mountain View General Plan. As shown in Table 3.2, the North Bayshore strategy area generated the most emissions of any individual strategy area at

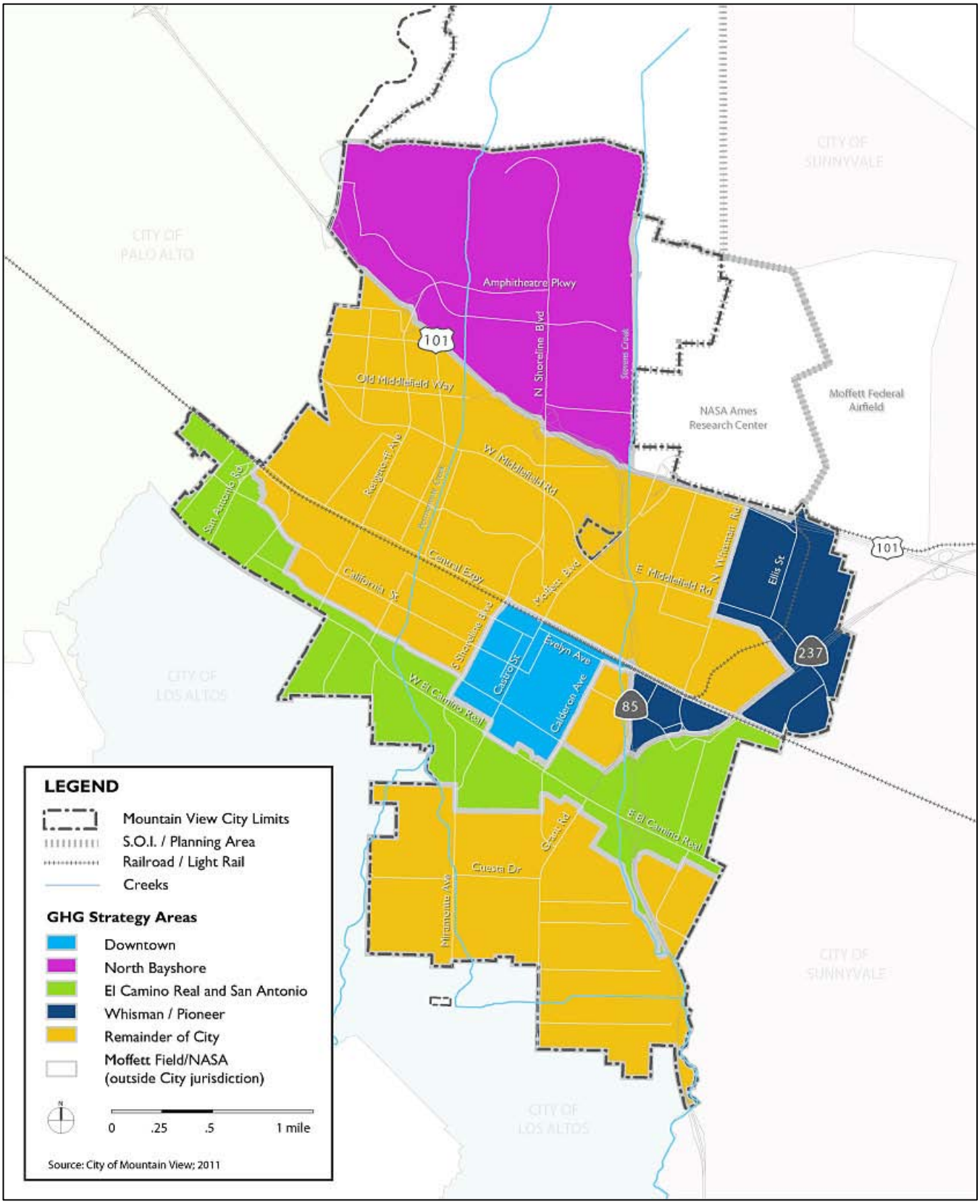


Figure 3.2 – GHG Strategy Areas

more than 18%. Areas comprising the "remainder of the City" were responsible for roughly 40% of communitywide emissions. Please refer to Appendix B for further description of inventory methods and assumptions.

Table 3.2 – 2005 Emissions by GHG Strategy Area

GHG Strategy Area	Emissions (MT CO_2e/year)	Total (%)
Downtown	58,089	7.3%
El Camino/San Antonio	138,650	17.4%
Whisman	102,802	12.9%
North Bayshore	147,440	18.5%
Remainder of the City	324,415	40.7%
Direct Access Energy Emissions (Not split-out by strategy area)	25,591	3.2%
Communitywide Total	**796,987**	**100.0%**

Land Use-Based Emission Projections

Emission projections provide insight regarding the scale of reductions needed to achieve the reduction goal. Mountain View's GHG emissions were projected for the years 2020 and 2030, assuming that historic trends describing energy and water consumption and waste generation will remain the same in the future, and that the only factor that will change is land use (see Appendix A for further description). Under this scenario, emission reductions resulting from statewide efforts and proposed emission reduction measures recommended in the GGRP would not be adopted or implemented.

Communitywide Emissions Projections

The City projected future communitywide emissions using land use data from the endorsed General Plan strategy together with use-specific emission factors. As illustrated in Figure 3.3, communitywide emissions would increase by approximately 115,627 MT CO_2e/yr (15%) between 2005 and 2020, and by approximately 204,035 MT CO_2e/yr (26%) between 2005 and 2030. The magnitude of communitywide GHG emissions increases from 2005 to 2020 and 2030 is due primarily to anticipated future population and employment growth (and related consumption activity) in Mountain View, as well as land use changes recommended in the General Plan.

Table 3.3 identifies projected communitywide emissions by sector for 2020 and 2030. In 2005, transportation sources create most communitywide emissions (58%). Energy is the next largest contributor, followed by waste, water, and off-road mobile sources (see Figure 3.4). Energy accounts for the largest proportional emissions increase for both projection years (18% increase in 2020 and 33% increase in 2030).

Figure 3.3 - Mountain View Baseline and Projected Emissions

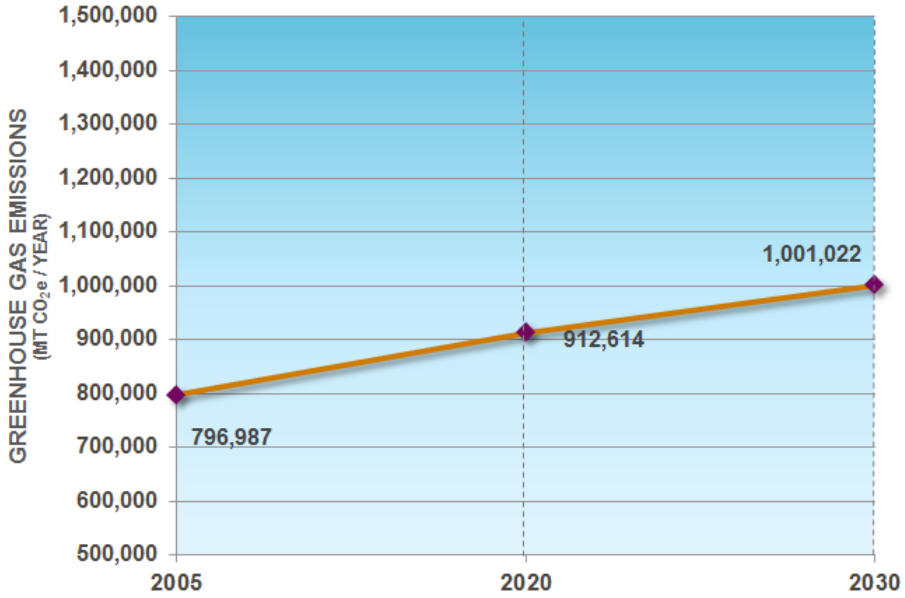
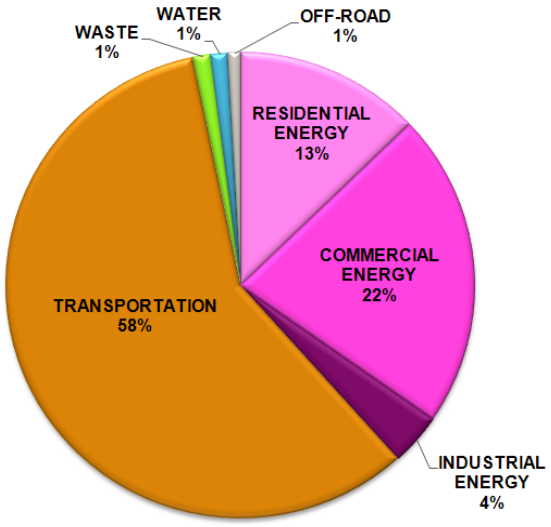
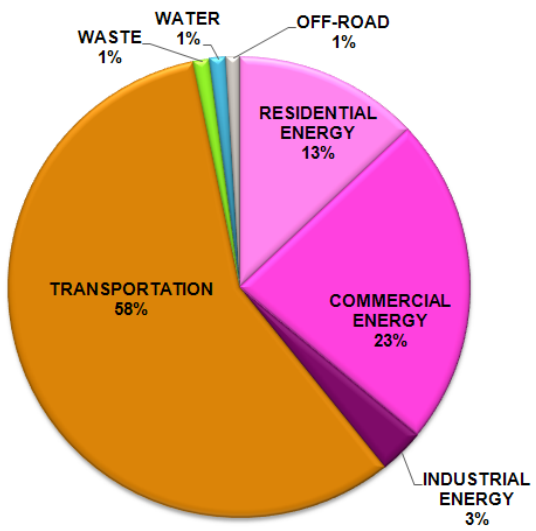


Figure 3.4 – 2020 and 2030 Communitywide Emissions



2020 Emissions by Sector



2030 Emissions by Sector

Table 3.3 – Communitywide Emissions 2005-2030

Emission Sector	2005 Emissions (MT CO_2e/yr)	2020 Emissions (MT CO_2e/yr)	Increase from 2005 (MT CO_2e/yr)	2030 Emissions (MT CO_2e/yr)	Increase from 2005 (MT CO_2e/yr)
Energy	295,562	349,663	54,101	392,715	97,153
Transportation	474,180	533,013	58,833	576,318	102,138
Waste	11,183	11,307	124	11,391	208
Water	9,502	10,577	1,075	11,362	1,860
Off-Road Mobile	6,561	8,054	1,493	9,236	2,675
Total	**796,987**	**912,614**	**115,627**	**1,001,022**	**204,035**
% Increase	**-**	**-**	**15%**	**-**	**26%**

Note: Columns may not sum to total shown due to rounding.

The GGRP references both 2020 (the AB 32 target year) and 2030 (the planning horizon for the General Plan) projections when reporting emission reduction potential of recommended measures.

Emissions Efficiency Metrics

An effective way of considering changes in emissions is to consider their relationship to Mountain View's current and future population and employment profile, as anticipated by the General Plan. The City seeks to encourage more efficient development patterns, including transit-oriented development and a mix of residential and commercial uses, even if it would result in higher mass emissions. One way to measure this efficiency is to consider mass emissions in relation to the communitywide "service population" (SP), defined as the sum of population and employment.

Without implementation of statewide reductions or GGRP measures, Mountain View's communitywide GHG efficiency level would decrease over time; improving from 6.4 MT CO2e/SP/yr in 2005 to 6.1 and 6.0 MT CO2e/SP/yr in 2020 and 2030, respectively (see Table 3.4). In other words, future population and employment growth would occur such that Mountain View residents and employees would generate less CO_2e per capita in 2030 as in 2005.

Table 3.4 – Communitywide Emissions Efficiency 2005-2030

Year	Emissions (MT CO_2e/yr)	Population	Employment	Service Population	Efficiency (MT CO_2e/SP/yr)
2005	796,987	70,629	54,071	124,700	6.4
2020	912,614	79,670	68,816	148,486	6.1
2030	1,001,022	86,331	80,818	167,149	6.0

Sources: City of Mountain View Draft General Plan, data compiled by AECOM 2011

GHG Strategy Area Emissions Projections

The City projected GHG emissions for each strategy area for the years 2020 and 2030 to better understand where communitywide emissions are created. This information will allow the City to prioritize appropriate measures for reducing communitywide emissions. The strategy area-specific emissions projections were prepared using General Plan land use data specific to each strategy area and use-based emission factors.

Without implementation of statewide reductions and GGRP reduction measures and actions, the strategy area comprising the "remainder of the City" would still generate the greatest emissions within the City in 2020 and 2030, as shown in Table 3.5. The North Bayshore strategy area would generate the most emissions among the specific strategy areas in both projection years, as well as the largest increase in emissions. The 2005-2030 emissions increase in the North Bayshore strategy area would be approximately 89,000 MT CO_2e/yr; three times greater than the next largest emissions increase of 38,000 MT CO_2e/yr in the El Camino/San Antonio strategy area.

Please refer to Appendix A for a description of the methods and information sources used to complete the emissions inventory and to project 2020 and 2030 emissions for each sector.

Table 3.5 – Emissions by GHG Strategy Area 2005-2030

GHG Strategy Area	2005 Emissions (MT CO_2e/yr)	2020 Emissions (MT CO_2e/yr)	2030 Emissions (MT CO_2e/yr)	Increase 2005-2030 (MT CO_2e/yr)
Downtown	58,089	63,271	66,915	8,826
El Camino/San Antonio	138,650	160,498	176,651	38,001
Whisman	102,802	122,694	137,792	34,990
North Bayshore	147,440	196,018	236,556	89,116
Remainder of the City	324,415	344,543	357,519	33,104
Direct Access (Not split by strategy area)	25,591	25,591	25,591	--
Communitywide Total	**796,987**	**912,614**	**1,001,022**	**204,035** **26%**

Sources: City of Mountain View Draft General Plan, data compiled by AECOM 2011

Note: Columns may not sum to total shown due to rounding.

Emission Reduction Goals

The City has made considerable effort to select practical emission reduction goals. As shown in Table 3.6, this GGRP establishes a goal to improve communitywide per- SP emissions efficiency by 15% to 20% over 2005 levels by 2020 (to 5.1 - 5.4 MT CO_2e/SP/yr) and by 30% over 2005 levels by 2030 (to 4.5 MT CO_2e/SP/yr). These goals demonstrate the City's commitment to reduce communitywide emissions. The 2020 goal exceeds plan-level efficiency requirements of Section 4.3(B) of the Bay Area Air Quality Management District (BAAQMD) California Environmental Quality Act (CEQA) Guidelines (6.6 MT CO_2e/SP/yr).

Table 3.6 – 2020 and 2030 Communitywide Emissions Efficiency Goals

Year	Goal	Efficiency Metric (MT CO_2e/SP/yr)	Communitywide Emissions at Efficiency Goal (MT CO_2e/yr)	Reductions Required from 2020 BAU levels (MT CO_2e/yr)
2020	15-20% efficiency improvement over 2005 levels	5.1 to 5.4	757,279 to 801,824	-110,790 to -155,335
2030	30% efficiency improvement over 2005 levels	4.5	752,171	-248,852

Source: City of Mountain View Draft General Plan; Data compiled by AECOM 2011

The General Plan planning horizon extends only to 2030, which makes projecting 2050 activity and emission levels highly uncertain. As a result, this GGRP does not address the steps needed to achieve reduction goals beyond 2030. However the City will regularly reevaluate its long-term emissions reduction goals to respond to future circumstances.

State and Federal Emission Reductions

To meet its reduction goals, Mountain View will consider both the effect of implementing local measures (see Chapter 4), as well as the effects of State and federal policies and regulations. Table 3.7 estimates emission reductions created by implementation of State and federal actions at the communitywide level.

The largest anticipated reductions are from State and federal fuel efficiency improvements to passenger vehicles and light-duty trucks. As residents and businesses replace older vehicles with newer ones, people will consume less fuel and generate fewer emissions per vehicle mile traveled. California's low carbon fuel standard will also reduce transportation-related emissions in the community by requiring a transition away from fossil fuels (i.e., gasoline and diesel) toward lower-carbon bio-fuels (e.g., ethanol). California law also requires utilities to obtain 33% of their electricity from renewable energy sources by 2020. In 2005, about 12% of PG&E's portfolio was from renewable sources. This increase in renewable electricity will reduce Mountain View's

communitywide energy emissions. The medium- and heavy-duty vehicle efficiency improvements program and 2008 California Energy Code (Title-24) requirements for new construction will create smaller, but still important, communitywide emission reductions.

State and federal actions that reduce communitywide emissions in Mountain View will make it easier for the community to achieve 2020 and 2030 emission reduction goals. As shown in Table 3.8, with implementation of State and federal actions, communitywide emissions would be 755,336 MT CO_2e/yr in 2020 and 795,895 MT CO_2e/year in 2030. These actions would also improve communitywide emissions efficiency to 5.1 MT CO_2e/SP/yr and 4.8 MT CO_2e/SP/yr in 2020 and 2030, respectively.

Table 3.7 – 2020 and 2030 Emission Reductions from State and Federal Actions

State or Federal Action	2020 Reduction (MT CO_2e/year)	2030 Reduction (MT CO_2e/year)
Passenger vehicle and light-duty truck fuel efficiency standards	70,711	113,882
Low carbon fuel standard	36,014	31,697
Medium- and heavy-duty vehicle efficiency improvement program	3,196	3,525
2008 CaliforniaTitle-24 standards	4,523	8,094
Renewable portfolio standard (33% by 2020)	42,834	47,930
Total	**157,278**	**205,128**

Table 3.8 – 2020 and 2030 Communitywide Emission Reduction Goals

Year/ Scenario	Emissions (MT CO_2e/yr)	Population	Employment	Service Population	Efficiency Metric (MT CO_2e/SP/yr)	Improvement over 2005 Efficiency (%)
2005 Baseline	796,987	70,629	54,071	124,700	6.4	--
2020 w/ State and federal Actions	755,336	79,670	68,816	148,486	5.1	20.3
2030 w/ State and federal Actions	795,894	86,331	80,818	167,149	4.8	25.5

Source: City of Mountain View Draft General Plan; Data compiled by AECOM 2011

Local Reductions

Both State and federal actions and local actions will play a role in achieving the communitywide emissions efficiency goal. Table 3.9 illustrates that by 2020, the City could achieve its goal of a 15% - 20% improvement over 2005 efficiency levels solely through implementation of State and federal actions. An additional reduction of approximately 43,723 MT CO_2e/yr beyond State and federal actions would be needed to achieve the 2030 goal of a 30% improvement over 2005 efficiency levels. Communitywide reduction measures and actions designed to supplement State and federal actions are presented in Chapter 4. While State and federal actions alone will allow the City to surpass its 2020 goal, the City still acknowledges the need to take local action. Starting to implement local sustainability measures now is critical to enabling the community to meet future goals.

Table 3.9 – Reductions Needed in 2020 and 2030 From Local Action

			State and Federal Measures		Additional Reductions Needed from Local Action
Year	Efficiency Goal (MT CO_2e/yr)	Resulting Communitywide Emissions	Efficiency	Resulting Communitywide Emissions	(MT CO_2e/yr)
2020	5.1 to 5.4	757,279 to 801,824	5.1	755,336	0
2030	4.5	752,171	4.8	795,894	43,723

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CHAPTER 4

REDUCTION STRATEGIES + MEASURES

4

This chapter describes measures and actions necessary to reduce communitywide greenhouse gas (GHG) emissions, and achieve the Greenhouse Gas Reduction Program (GGRP) goal of improving 2005 emissions efficiency levels 15% to 20% by 2020 and 30% by 2030. Each measure is designed to achieve quantifiable GHG reductions. To ensure proper implementation, each measure is accompanied by a description providing policy background and implementation details that articulate necessary actions; City departments and government agencies with primary action responsibility; and progress indicators timelines. The City will evaluate effectiveness of GGRP measures and actions every three years and proposed program modifications if necessary to achieve reduction goals.

Summary of Reductions

Table 4-1 summarizes GHG emission reductions anticipated from implementation of the reduction measures and actions presented in this chapter. Figure 4.1 illustrates the GHG reduction potential of the five GGRP strategies and statewide reductions.

Table 4.1: Measures and Quantified Reductions

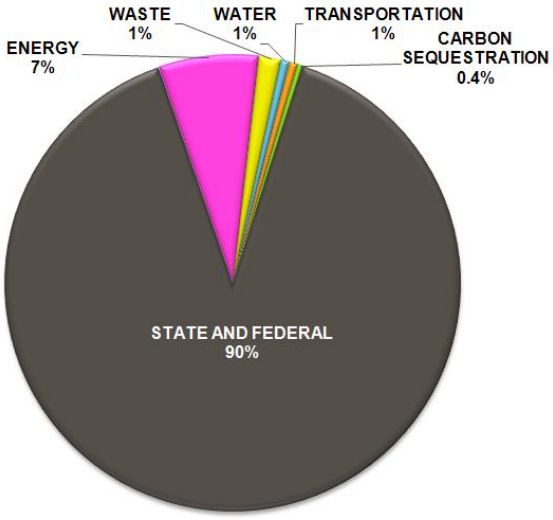
Energy Strategy		2020 (MT CO_2e/yr)	2030 (MT CO_2e/yr)
Energy Efficiency			
E-1.1	Residential Energy Efficiency Retrofit	1,004	2,640
E-1.2	Non-Residential Energy Efficiency Retrofit	1,074	2,799
E-1.3	Non-Residential Lighting Retrofit	746	4,952
E-1.4	Residential Energy Star Appliances	116	507
E-1.5	Smart Grid	873	3,849
E-1.6	Exceed State Energy Standards in New Residential Development	931	3,256
E-1.7	Exceed State Energy Standards in New Non-Residential Development	937	3,691
E-1.8	Building Shade Trees in Residential Development	17	49
Renewable Energy			
E-2.1	Residential Solar Water Heaters	1,362	4,443
E-2.2	Non-Residential Solar Water Heaters	129	456
E-2.3	Residential Solar Photovoltaic System	347	573
E-2.4	Non-Residential Solar Photovoltaic System	1,574	3,148
E-2.5	Landfill Gas-to-Energy	2,827	2,827
Municipal Building Energy			
E-3.1	Energy Efficiency in Municipal Buildings	154	154
Municipal Streetlights and Traffic Lights			
E-4.1	Energy Efficiency in Streetlights and Traffic Lights	229	229
Municipal Renewables			
E-5.1	Renewable Energy Systems on Municipal Buildings	78	73
Subtotal		**12,398**	**33,646**
Solid Waste Strategy			
SW-1.1	Implementation of a Zero-Waste Plan	2,734	6,718
Subtotal		**2,734**	**6,718**

Table 4.1: Measures and Quantified Reductions

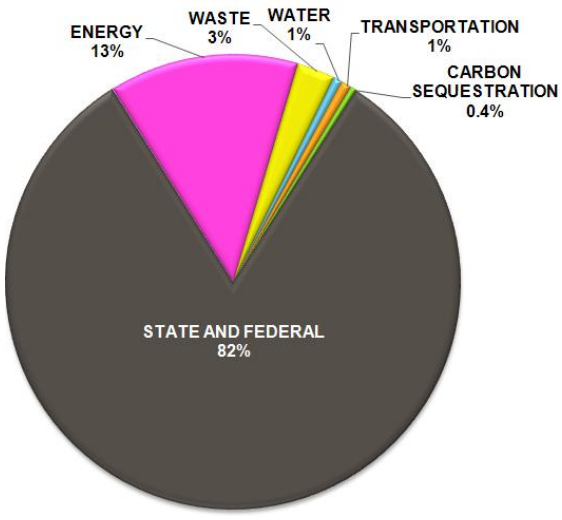
Water Strategy		2020 (MT CO_2e/yr)	2030 (MT CO_2e/yr)
W-1.1	Urban Water Management Plan Conservation Strategies	1,071	1,669
Subtotal		**1,071**	**1,669**
Transportation Strategy			
T-1.1	Transportation Demand Management	1,024	1,844
Subtotal		**1,024**	**1,844**
Carbon Sequestration Strategy			
CS – 1.1	Enhance the Urban Forest	680	2,020
Subtotal		**680**	**2,020**
SUBTOTAL GGRP MEASURES		**17,907**	**44,897**
Statewide Reductions			
Passenger vehicle and light-duty truck fuel efficiency standards		70,711	113,882
Low carbon fuel standard		36,014	31,697
Medium- and heavy-duty vehicle efficiency improvement program		3,196	3,525
2008 California Title-24 standard		4,523	8,094
Renewable portfolio standard (33% by 2020)		42,834	47,930
Subtotal		**157,278**	**205,128**
TOTAL REDUCTIONS		**175,185**	**251,025**

Note: Subtotals and totals may not appear to add correctly due to rounding.

Figure 4.1 Reduction Potential of Five Strategies and Statewide Regulations



2020 Reductions per Strategy



2030 Reductions per Strategy

Reductions Relative to 2020 Goal

The reduction measures, together with the communitywide effects of State and federal legislation in Mountain View, have potential to reduce communitywide mass emissions by 175,185 metric tons of carbon dioxide equivalent emissions per year (MT CO_2e/yr) from projected 2020 levels. Taking into account the anticipated 2020 communitywide service population (SP) of 148,486 (e.g., population plus employment), this would result in an emissions efficiency metric of 5.0 MT CO_2e/SP/yr. This metric achieves both the City's 2020 reduction goal (5.1 to 5.4 MT CO_2e/SP/yr) and the Bay Area Air Quality Management District (BAAQMD) 2020 plan-level significance threshold (6.6 MT CO_2e/SP/yr), and represents a 21.9% improvement in emissions efficiency compared to 2005 conditions.

Reductions Relative to 2030 Goal

The reduction measures, together with the communitywide effects of State and federal legislation in Mountain View, have potential to reduce communitywide mass emissions by 251,025 MT CO_2e/yr from projected 2030 levels. Taking into account the anticipated 2030 communitywide SP of 167,149, this would result in an emissions efficiency metric of 4.5 MT CO2e/SP/yr. This metric meets the City's 2030 reduction goal (4.5 MT CO_2e/SP/yr) and represents a 29.7% improvement in emissions efficiency compared to 2005 conditions.

Measure Structure

This section of the GGRP is organized by the following strategies: transportation, energy, water, solid waste, and carbon sequestration. These five strategies represent the primary ways to reduce communitywide GHG emissions in Mountain View. Each strategy section begins with an introduction to the overarching concepts that tie that particular strategy to GHG emission generation and potential reductions. This introduction is followed by the component strategies, measures, and actions that translate the City's vision into on-the-ground implementation.

Reduction Measures

Measures define the programs, policies, and projects that the City will undertake to accomplish its GHG emission reduction goals. The following paragraphs describe the format and content of the measures.

Reduction Potential

Reduction potential values are provided after each measure title, and identify the estimated annual GHG emission reductions anticipated in 2020 and 2030 in MT CO_2e/yr. All measures have a quantifiable GHG reduction potential.

Measure Description

Measure descriptions provide important background information and describe the City's rationale and policy direction. Additionally, some descriptions provide guidance that will be used in program implementation or highlight the City's actions to date that relate to a particular measure.

Actions and Progress Indicators

Action steps and progress indicators are provided in a table following each measure description. Actions identify specific steps that the City will take to implement the measure. The table also identifies responsible departments.

Progress indicators enable staff, the City Council, and the public to track implementation and monitor overall GGRP progress. Specific progress indicators are provided for both 2020 and 2030.

Five Strategies

Building on the City's tradition of environmental leadership, the GGRP sets forth a plan to reduce communitywide GHG emissions.

The strategies identified in this Chapter affect issues within the City's direct influence. Each strategy is subdivided into a series of GHG emission reduction measures. Measures were developed by (a) evaluating existing community conditions, (b) identifying emission reduction opportunities within the community, (c) reviewing best practices from other jurisdictions and organizations, and (d) incorporating State and regional laws, guidelines, and recommendations.

The five emission reduction strategies are as follows:

+ **Energy:** The Energy Strategy recommends ways to increase energy efficiency in existing buildings, enhance energy performance for new construction, and increase use of renewable energy.
+ **Waste:** The Waste Strategy increases waste diversion and recycling, reducing consumption of materials that otherwise end up in landfills.
+ **Water:** The Water Strategy promotes the efficient use and conservation of water in buildings and landscapes.
+ **Transportation:** The Transportation Strategy encourages transit, carpooling, walking, and bicycling as viable transportation modes to decrease the need to drive.
+ **Carbon Sequestration:** The Carbon Sequestration Strategy uses street trees and urban forestry to capture and store carbon emitted from other sources.

GHG Strategy Areas

As described in Chapter 3, communitywide emissions were calculated for the city as a whole as well as broken down into five GHG strategy areas: Downtown, El Camino/San Antonio, Whisman, North Bayshore, and the Remainder of the City.

GHG reduction measures may also be applied by GHG strategy area in the future, if the City defines differential performance/participation and efficiency targets for each strategy area.

Energy Strategy

The consumption of electricity for appliances, lighting and cooling, and combustion of natural gas for heating, cooking, and other processes within residential, commercial, and industrial buildings generated just over a third of Mountain View's communitywide GHG emissions in 2005. These emissions can be reduced by improving energy efficiency and increasing the amount of electricity and heat generated from renewable energy sources.

In Mountain View, approximately 80% of the housing stock was built before California's energy code, Title 24 Part 6, was implemented in the 1980s. Consequently, the building stock offers considerable opportunity for cost-effective energy efficiency retrofits to decrease the use of both electricity and natural gas. The City plans to achieve building energy efficiency improvements in both existing and new buildings through a combination of education, incentives, and regulations.

Pacific Gas and Electric (PG&E) is Mountain View's energy utility, providing both natural gas and electricity for residential, commercial, industrial, and municipal uses. PG&E generates electricity at hydroelectric, nuclear, renewable, natural gas, and coal facilities. Natural gas facilities currently provide 42% of the total electricity supply; nuclear plants provide 23%; hydroelectric operations provide 18%; renewable energy facilities including solar, geothermal, and biomass provide 14%; and coal provides 3%.

Under the provisions of SB 107, investor-owned utilities were required to generate 20% of their retail electricity using qualified renewable energy technologies by the end of 2010. In compliance with this mandate, PG&E will expand its renewable generation portfolio from 14% to at least 20%, and additional GHG-free electricity will be available to customers in Mountain View.

To increase the portion of Mountain View's energy portfolio provided from renewable sources, the City will encourage communitywide installation of rooftop solar photovoltaic and solar hot water systems, both of which are effective technologies in the sunny climate of Mountain View. The City has created a Power Purchasing Agreement (PPA) for two City buildings to increase the generation of solar energy on municipal buildings.

The total GHG emission reduction potential of the Energy Strategy is 12,398 MT CO_2e/yr in 2020 and 33,646 in 2030, or about 8% percent of total 2020 reductions and 13% of total 2030 reductions achieved by the GGRP.

E-1: Energy Efficiency

Measure E-1.1: Residential Energy Efficiency Retrofit

2020 GHG Reduction Potential: 1,004 MT CO_2e/yr
2030 GHG Reduction Potential: 2,640 MT CO_2e/yr

According to US Census data, nearly 80% of Mountain View's housing stock was constructed prior to implementation of Title 24 standards. Homes of this vintage frequently have minimal insulation, antiquated furnace systems, single-pane windows, and gaps in the building envelope. Energy efficiency improvements to residential structures can reduce energy bills for owners and reduce communitywide GHG emissions.

The City has developed a comprehensive program that encourages homeowners to voluntarily implement energy efficiency retrofits through outreach and low-cost financing. The Mountain View City Council approved the program on January 25, 2011 and initially allocated $343,000 to fund program elements. The program has an expected completion date of December 2012. By that time, the City expects to have provided:

+ 500 in-home efficiency assessments for single-family home owners/renters (250) and multi-family renters (250),
+ 1,000 household-efficiency educational packets to school children,
+ 800 free on-line assessments for high energy-using residents to identify ways to reduce energy use,
+ a pilot program to educate and provide modest rebates for 10 building owners to make energy-and water-saving upgrades, and
+ access to *Energy Upgrade California*'s educational materials and online platform that provides incentives, technical assistance, and qualified contractors for 100 homes.

By 2013, the City will consider allocating funding to expand this program The City will also promote resources such as California *Flex Your Power*, the Department of Energy's (DOE) *Weatherization Assistance Program*, and PG&E's *SmartEnergy Analyzer*™ program, all of which link residential property owners to educational and financial resources.

Action		Responsibility
A	Consider funding to continue the Residential Energy Assessment and Upgrade Program beyond the initial 2012 timeframe	PW
B	Leverage Energy Upgrade California outreach and educational materials, and PowerSaver loans when made available, to encourage energy efficiency retrofits and the use of energy efficient, low-carbon, or renewable technologies	CDD and PW
C	Support the Association of Bay Area Governments, PG&E, and other organizations' efforts to develop and implement an *Energy Upgrade California* program for residential property owners	CDD and PW

Progress Indicators	Year
+ 15% of existing single family residential units and 15% of multi-family residential units perform cost-effective energy efficiency package improvements (e.g., insulation, duct sealing, AC refrigerant recharge)	2020
+ 40% of existing single family residential units and 35% of multi-family residential units perform cost-effective energy efficiency package improvements (e.g., insulation, duct sealing, and AC refrigerant recharge)	2030

Measure E-1.2: Non-Residential Energy Efficiency Retrofit

2020 GHG Reduction Potential: 1,074 MT CO_2e/yr
2030 GHG Reduction Potential: 2,799 MT CO_2e/yr

Energy efficiency improvements to non-residential structures can reduce both energy bills and GHG emissions. The City will partner with PG&E and community organizations to conduct public education and outreach campaigns that encourage businesses to voluntarily complete energy efficiency improvements within their businesses and to take advantage of low cost energy efficiency financing programs. As part of the outreach program, the City will enhance its website by linking to information on existing energy efficiency rebates and other financial incentives, including PG&E incentives to businesses for energy efficiency improvements. The website could also contain local case studies of businesses that have completed cost effective energy efficiency improvements. Additionally, the City will partner with community non-profits to provide businesses with free energy audits and free installation of basic energy efficiency improvements. The City will provide these organizations with technical assistance to ensure that the programs effectively reach a large number of businesses in the City.

Financing is critical to the success of the energy efficiency program. The City will continue to support the development of a Property Assessed Clean Energy program to further promote energy efficiency retrofits, which would allow qualified non-residential property owners to repay the cost of energy efficiency retrofits on their property tax bill. Conventional means, such as debt financing, are also available to finance energy efficiency retrofits.

Action		Responsibility
A	Encourage the development of a non-residential Property Assessed Clean Energy financing program (AB 811) to encourage investment in energy efficiency retrofits in non-residential properties.	CDD and PW
B	Encourage small businesses to participate in PG&E programs that provide technical assistance and access to incentives for energy efficiency upgrades (e.g., refrigeration, heating, ventilation, and air conditioning, lighting)	CDD and PW

Progress Indicators		Year
+	15% of existing non-residential buildings perform cost-effective energy efficiency package improvements (e.g., ceiling insulation, cool roofs, duct sealing, Energy Management System upgrades)	2020
+	40% of existing non-residential buildings perform cost-effective energy efficiency package improvements (e.g., ceiling insulation, cool roofs, duct sealing, and Energy Management System upgrades)	2030

Measure E-1.3: Non-Residential Lighting Retrofit

2020 GHG Reduction Potential: 746 MT CO_2e/yr
2030 GHG Reduction Potential: 4,952 MT CO_2e/yr

Conventional commercial lighting, including T12 fluorescent bulbs and old exit sign lights, consume more energy than new T8 lights and light-emitting diode (LED) technologies. The City will provide outreach and technical assistance to non-residential property owners to encourage participation in PG&E's lighting upgrade program, which includes rebates for fixtures, lamps, accent/directional lighting, controls, and signage. The City will also update the Building Code to require large non-residential tenant improvements (>15,000 square feet) to exceed the Title-24 energy efficiency standards by 10%.

Action		Responsibility
A	Enforce the Building Code to require all non-residential tenant improvements larger than 15,000 square feet to improve lighting to 10% above 2008 Title-24 standards	CDD
B	Encourage small businesses to participate in PG&E programs that provide technical assistance and access to incentives for energy efficiency upgrades (e.g., lighting)	CDD

Progress Indicators	Year
+ 100% of non-residential tenant improvements over 15,000 sq feet improved to 10% above 2008 Title-24 lighting standards + 10% of non-residential buildings reduce lighting electricity demand by 10% + 5% of non-residential buildings reduce lighting electricity demand by 40% (exemplary performance) + 10% of existing businesses reduce outdoor lighting energy demand by 25%	2020
+ 100% of non-residential tenant improvements over 15,000 sq feet improved to 15% above 2008 Title-24 lighting standards + 10% of non-residential buildings reduce lighting electricity demand by 10% + 50% of non-residential buildings reduce lighting electricity demand by 40% (exemplary performance) + 50% of existing businesses reduce outdoor lighting energy demand by 25%	2030

Measure E-1.4: Residential Energy Star Appliances

2020 GHG Reduction Potential: 116 MT CO_2e/yr
2030 GHG Reduction Potential: 507 MT CO_2e/yr

The Energy Star rating is an internationally recognized standard for energy efficient consumer products. According to the EPA, devices that have an Energy Star certification, such as office equipment, home appliances, and lighting products, generally use 20% to 30% less energy than required by federal standards.

This measure is designed to encourage voluntary community participation to upgrade home appliances and electronics to Energy Star or other energy efficient models. Successful implementation of this measure relies on leveraging the *Energy Upgrade California* program materials and public platform through a public outreach campaign to increase community awareness regarding energy efficient appliance choices.

By promoting Energy Star-rated home and business appliances, the City can help to reduce GHG emissions related to the use of refrigerators, dishwashers, clothes washers, wall air conditioning units, computers, photocopiers, and other electronic devices. The City will partner with PG&E and other organizations to promote existing financial incentives and rebates for energy efficient appliance upgrades and replacements.

Action		Responsibility
A	Leverage the Energy Upgrade California platform to promote Energy Star appliances and electronics	CDD and PW
B	Collaborate with PG&E, Santa Clara Valley Water District, and other non-profit organizations to promote existing financial incentive programs to encourage voluntary replacement of inefficient appliances with new Energy Star appliances	CDD and PW
C	Develop an outreach campaign to encourage developers to install Energy Star-rated major appliances in new residential units	CDD

Progress Indicators	Year
+ 40% of existing residential units use Energy Star-rated refrigerators + 58% of existing residential units use Energy Star-rated clothes washers + 95% of existing residential units use Energy Star-rated dishwashers + 60% of new residential units install Energy Star-rated refrigerators + 60% of new residential units install Energy Star-rated clothes washers + 95% of new residential units install Energy Star-rated dishwashers	2020 and 2030

Measure E-1.5: Smart Grid

2020 GHG Reduction Potential: 873 MT CO_2e/yr
2030 GHG Reduction Potential: 3,849 MT CO_2e/yr

The smart grid is an emerging energy management system, which combines information technology with renewable energy to improve how electricity is generated, delivered, and consumed. The smart grid will reduce energy demand, improve integration of distributed energy production, and increase electricity transmission and distribution efficiency. These changes will help residents and businesses save energy, and can reduce GHG emissions associated with energy production.

The value of the smart grid does not end at the meter; its full value is realized when it extends into homes and businesses. The City and its partners will promote the use of smart appliances in homes and businesses through outreach and incentives. The City will also require smart grid-compatible major appliances (e.g., heating, ventilation, air conditioning) in new construction when technologies are available.

Action		Responsibility
A	Partner with PG&E and other community businesses to develop a community smart grid integration plan	CDD
B	Develop an outreach program that informs property owners and businesses about smart grid and smart appliance technologies	CDD
C	Update the Green Building Code to require smart grid energy management and compatible heating, ventilation, air conditioning, and lighting in new construction	CDD

Progress Indicators	Year
+ 25% of new residential units and non-residential buildings implement a smart grid retrofit, reducing electricity consumption by 6% + 5% of existing residential units and non-residential uses implement a smart grid retrofit, reducing electricity consumption by 5%	2020
+ 50% of new residential units and non-residential buildings implement a smart grid retrofit, reducing electricity consumption by 6% + 25% of existing residential units and non-residential uses implement a smart grid retrofit, reducing electricity consumption by5%	2030

Measure E-1.6: Exceed State Energy Standards in New Residential Development

2020 GHG Reduction Potential: 931 MT CO_2e/yr
2030 GHG Reduction Potential: 3,256 MT CO_2e/yr

The Mountain View Green Building Code (MVGBC) amends the State-mandated California Green Building Code (CalGreen) to include local green building standards and requirements for new development. The MVGBC applies green building requirements per building type and threshold to new construction, residential additions, and non-residential tenant improvements (addressed in Measure E-1.7 below), and includes energy efficiency standards that exceed 2008 Title-24 Building Energy Efficiency Standards. The MVGBC went into effect August 1, 2011, and stipulates that new residential projects (single-family and multi-family) must exceed Title 24 standards by 15%. The City anticipates that efficiency standards within the MVGBC would increase in the 2020-2030 timeframe based on technological improvements in building materials and techniques.

Action		Responsibility
A	Ensure compliance with City's adopted energy efficiency requirements	CDD

Progress Indicators	Year
+ 100% of new residential units (>5 units) exceed 2008 Title-24 by 15% + 100% of new residential additions (> 1,000 sf) exceed 2008 Title-24 by 10% + 100% of new residential high-rise units exceed 2008 Title-24 by 7%	2020
+ 100% of new residential units (>5 units) exceed 2008 Title-24 by 30% + 100% of new residential additions (> 1,000 sf) exceed 2008 Title-24 by 30% + 100% of new residential high-rise units 30% exceed 2008 Title-24 by 30%	2030

Measure E-1.7: Exceed State Energy Standards in New Non-Residential Development

2020 GHG Reduction Potential: 937 MT CO_2e/yr
2030 GHG Reduction Potential: 3,691 MT CO_2e/yr

The MVGBC applies green building requirements per building type and threshold to new nonresidential construction, and includes energy efficiency standards that exceed Title 24. The MVGBC went into effect August 1, 2011 and stipulates that new nonresidential projects must exceed Title 24 standards by 10%. The City anticipates that efficiency

standards within the MVGBC would increase in the 2020-2030 timeframe based on technological improvements in building materials and techniques.

Action		Responsibility
A	Ensure compliance with City's adopted energy efficiency requirements	CDD

Progress Indicators	Year
+ 100% of new nonresidential buildings exceed 2008 Title-24 by 10% + 100% of new nonresidential cold shells exceed 2008 Title-24 by 5% + 100% of new nonresidential warm shells exceed 2008 Title-24 by 8% + 100% of new hotels exceed 2008 Title-24 by 7%	2020
+ 100% of new nonresidential buildings exceed 2008 Title-24 by 30% + 100% of new nonresidential cold shells exceed 2008 Title-24 by 30% + 100% of new nonresidential warm shells exceed 2008 Title-24 by 30% + 100% of new hotels exceed 2008 Title-24 by 30%	2030

Measure E-1.8: Building Shade Trees in Residential Development

2020 GHG Reduction Potential: 17 MT CO_2e/yr
2030 GHG Reduction Potential: 49 MT CO_2e/yr

Trees can help the City achieve its GHG reduction goal by reducing building energy-related emissions. As trees mature, their canopies increase in size and provide higher levels of shade and greater levels of building cooling in hot weather. Trees with larger canopies and dense foliage provide more shade than other species. Large, deciduous species are ideal for reducing building energy as they provide shade in summer, but allow winter sunlight into buildings for passive solar gain in cooler weather. As summertime temperatures increase as a result of climate change, the building energy savings potential of the urban forest may become increasing important. The City will revise the Zoning Ordinance to require the planting of one building shade tree on a parcel to accompany each new single-family residential unit. The City will also develop an outreach and education program for property owners and neighborhood organizations to encourage planting trees in locations that maximize building shade potential.

	Action	Responsibility
A	Amend the Zoning Ordinance to require the planting of one mature building shade tree to accompany each new single-family residential unit.	CDD
B	Develop an outreach program to encourage residents to plant shade trees on private property	CDD

	Progress Indicators	Year
+	100% of new single family residential units will incorporate one building shade tree	2020 and 2030

E-2 Renewable Energy

Measure E-2.1: Residential Solar Water Heaters

2020 GHG Reduction Potential: 1,362 MT CO_2e/yr
2030 GHG Reduction Potential: 4,443 MT CO_2e/yr

Studies show that solar water heaters (SWH) can reduce energy-related GHG emissions. However, the high capital cost of water heater upgrades can pose a financial burden to building owners. The City will actively promote and facilitate the installation of SWH systems on residential buildings or for private swimming pools. The City will also create outreach programs to provide information about the benefits of solar heaters and installation and maintenance assistance to maximize community participation. The City will collaborate with PG&E and other non-profit organizations to identify various local, State, or national financing options for residents and businesses to voluntarily replace inefficient water heating systems with SWH systems. A number of financing options can reduce up-front costs, such as on-bill financing, low-interest loans, and rebates under the *California Solar Initiative*.

	Action	Responsibility
A	Develop a resident outreach program to provide information on the benefits of solar water heaters installation on residential buildings	CDD and PW
B	Collaborate with PG&E to offer low-interest loans for homeowners with swimming pools to switch to solar water heater systems	CDD and PW
C	Collaborate with PG&E and other agencies to provide information about funding sources and financial incentives to support installation and maintenance of solar water heaters, including the California Solar Initiative Thermal Program	CDD and PW
D	Remove regulatory barriers to solar water heater systems installation	CDD

Progress Indicators		Year
+	5% of residential units install solar water heater, reducing water heating energy by 70%	2020
+	15% of residential units install solar water heater, reducing water heating energy by 70%	2030

Measure E-2.2: Non-Residential Solar Water Heaters

2020 GHG Reduction Potential: 129 MT CO_2e/yr
2030 GHG Reduction Potential: 456 MT CO_2e/yr

Commercial-scale solar water heater systems are designed to provide large quantities of hot water to non-residential buildings using solar energy. A typical system includes roof- or wall-mounted solar collectors that work along with a pump, heat exchanger, and one or more large storage tanks. Solar water heater systems can reduce the amount of natural gas or electricity used to heat water in conventional systems and thereby reduces GHG emissions.

Through the *California Solar Initiative Thermal Program*, non-residential customers who install certified solar water heater systems will qualify for incentives of up to $500,000 to offset capital costs. Incentive levels will decline in four stages as the solar thermal market grows. Actual incentive payments will be determined by the thermal output of the system.

The City, in partnership with utilities and other organizations, will take an active role in promoting and facilitating the installation of solar water heater systems on non-residential and multifamily buildings in the community. The City will create an outreach program aimed at maximizing the number of businesses that invest in solar water heater systems.

Action		Responsibility
A	Create an outreach program that promotes solar water heater systems and provides information for business owners about the California Solar Initiative Thermal Program and related federal incentives	CDD and PW
B	Remove regulatory barriers to solar water heater system installation	CDD

Progress Indicators		Year
+	5% of non-residential buildings install solar water heater, reducing water heating energy by 50%	2020
+	15% of non-residential buildings install solar water heater, reducing water heating energy by 50%	2030

Measure E-2.3: Residential Solar Photovoltaic Systems

2020 GHG Reduction Potential: 347 MT CO_2e/yr
2030 GHG Reduction Potential: 573 MT CO_2e/yr

Up-front costs of solar photovoltaic systems would be a considerable burden for many homeowners and businesses. The City, in partnership with Santa Clara County, PG&E, and/or private lenders, will provide a series of cost-effective financing options to reduce this burden.

The City will evaluate various financing products that would encourage property owners to invest in solar photovoltaic systems. Options could include, but are not limited to, on-bill financing, low interest loans, energy efficient mortgages, or an energy efficient Local Improvement District. Rebates are also available through the *California Solar Initiative*.

The City will develop an outreach program that encourages property owners to install solar photovoltaic systems. The program will aim to maximize community participation in renewable energy generation. The City will partner with regional agencies to create an effective renewable energy financing program.

Action		Responsibility
A	Develop outreach and technical assistance programs to encourage the private installation of solar photovoltaic systems	CDD
B	Provide information about rebates and low-interest financing programs for residential solar photovoltaic systems on the City's website	CDD

Progress Indicators		Year
+	3% of existing residential units install 2kW systems	2020
+	8% of existing residential units install 2kW systems	2030

Measure E-2.4 Non-Residential Solar Photovoltaic Systems

2020 GHG Reduction Potential: 1,574 MT CO_2e/yr
2030 GHG Reduction Potential: 3,148 MT CO_2e/yr

Commercial and industrial rooftops and parking lots provide excellent opportunities for solar energy generation. Commercial and industrial facilities tend to have large, flat roofs that are often well-suited for solar photovoltaic. The City will work to remove or minimize regulatory and structural barriers that inhibit the installation of non-residential solar photovoltaic systems. The City will also facilitate partnerships between interested property owners and proven solar energy companies. By partnering with solar energy

companies, building owners may have photovoltaic systems installed on their roofs or parking lots at no up-front cost. To maximize participation, the City will provide outreach and technical assistance to interested property owners. The City will also continue to support the development of a Property Assessed Clean Energy program to further promote energy efficiency retrofits, which would allow qualified non-residential property owners to repay the cost of energy efficiency retrofits on their property tax bill.

Action		Responsibility
A	Analyze potential regulatory, structural, and market barriers to installing photovoltaic systems on non-residential buildings and parking lots	CDD
B	Develop outreach and technical assistance programs to encourage the installation of non-residential solar photovoltaic systems	CDD
C	Encourage the development of a non-residential Property Assessed Clean Energy financing program (AB 811) to encourage non-residential property owners to invest in renewable energy systems	CDD and PW

Progress Indicators		Year
+	500,000 square feet of solar photovoltaic panels on non-residential properties communitywide (total)	2020
+	1,000,000 square feet of solar photovoltaic panels on non-residential properties communitywide (total)	2030

Measure E-2.5: Landfill Gas to Energy

2020 GHG Reduction Potential: 2,827 MT CO_2e/yr
2030 GHG Reduction Potential: 2,827 MT CO_2e/yr

Waste disposal creates emissions when organic waste (e.g., food scraps, yard clippings, paper, wood) is buried in landfills and anaerobic digestion takes place, emitting methane as a by-product of the decomposition process. Methane from the Shoreline Landfill at Mountain View Park is captured and used to generate electricity. The City operates two 65-kilowatt micro-turbine generators capable of producing approximately one million kilowatt hours of electricity per year. The City sells the remainder of the gas to a corporate user that operates three 970-kilowatt turbines. These landfill gas-to-energy systems provide a valuable source of renewable energy and reduces the community's emissions.

Action		Responsibility
A	Continue to operate the Shoreline Landfill gas-to-energy generation systems	PW
B	Work with landfill-gas end users to evaluate potential for developing combined heat and power systems	PW

Progress Indicators	Year
+ 867,000 kilowatt hours of landfill gas to energy per year generated in the City's two 65-watt generators + Approximately 15,295,000 kilowatt hours per year generated in three privately owned 970 kilowatt generators	2020 and 2030

E-3 Municipal Building Energy

Measure E-3.1: Energy Efficiency in Municipal Buildings

2020 GHG Reduction Potential: 154 MT CO_2e/yr
2030 GHG Reduction Potential: 154 MT CO_2e/yr

Reducing municipal energy use will reduce municipal GHG emissions, save taxpayer dollars, and set an example for the successful implementation of energy-saving technology. The City has implemented the following energy efficiency actions in municipal buildings:

+ Raised summer and lowered winter building temperatures,
+ Purchased energy-efficient office equipment,
+ Installed lighting occupancy sensors in offices, conference rooms, and other common areas,
+ Conducted energy use audits of various City facilities to identify opportunities for additional energy efficiency investments,
+ Replaced 160 metal halide fixtures (250-watt) at the Mountain View Sports Pavilion and Whisman Sports Center with fluorescent hi-bay, high-output T-5 lamps,
+ Retrofitted approximately 1,700 T-12 fluorescent bulbs with T-8 fluorescent tubes and ballasts at the Police/Fire Administration Building,
+ Installed a high-efficiency chiller to serve City Hall and the Center for the Performing Arts,
+ Replaced 500-watt incandescent pool fixtures with 175-watt metal halide pool fixtures,
+ Installed power management software on the City's computer network,
+ Replaced 250-watt metal halide fixtures with hi-bay T-5 fluorescent fixtures at the Fleet Services Building,

- Replaced T-8 lighting fixtures in Civic Center stairwells with energy-saving bi-level fixtures with motion sensors,
- Replaced the antiquated lighting control system for the City Hall, Center for the Performing Arts, and Library,
- Retrofitted high pressure sodium (HPS) lamps in Pioneer Park, Centennial Plaza, and Eagle Park with induction lights, and
- Retrofitted interior, exterior, and parking lot lighting at the Community Center.

The City will continue to pursue additional opportunities to reduce energy consumption and GHG emissions.

Action		Responsibility
A	Perform cost-benefit analyses for municipal building operations and maintenance upgrades to identify Greenhouse Gas emissions reductions associated with options under consideration	PW
B	Evaluate the success of the municipal lighting system energy efficiency upgrades	PW
C	Identify other municipal buildings that would benefit from energy efficiency upgrades	PW
D	Develop a schedule for municipal building energy audits such that buildings are audited every 10 years	PW

Progress Indicators	Year
+ Reduce municipal building energy demand by 121 MWh/yr	2020
+ Reduce municipal building energy demand by 121 MWh/yr	2030

E-4 Municipal Streetlights and Traffic Lights

Measure E-4.1: Energy Efficiency in Streetlights and Traffic Lights

2020 GHG Reduction Potential: 229 MT CO_2e/yr
2030 GHG Reduction Potential: 229 MT CO_2e/yr

High pressure sodium bulbs, commonly used in streetlights, require more energy and have a shorter lifespan than new induction and/or light-emitting diode (LED) lights. The City is phasing in the conversion of all of the City's existing HPS streetlights. Phase 1 of the project will focus on the installation of induction lights along high-traffic roadways and in the City's North Bayshore Area (approximately 1,600 lights). Phase 2 of the lighting conversion project will be proposed in a future capital improvement planning process.

The City is also in the process of retrofitting 460 decorative post top HPS lights (70- and 100-watt) throughout the downtown area with a mixture of 40- and 85-watt induction lights.

The City also replaced 46 metal halide lighting fixtures (100-watt) in the Library parking garage with LED bi-level fixtures to improve lighting levels and energy efficiency, and replaced 150 HPS lights (150-watt) in the Bryant Street Parking Structure with LED bi-level fixtures. The City will implement similar changes in other municipal parking garages. In addition, the City has replaced the incandescent bulbs in traffic signals with LED bulbs, reducing energy demand by approximately 64 kilowatts per signal. The City will continue to use LED bulbs, or similar technology, in traffic signals.

Action		Responsibility
A	Identify and prioritize municipal parking garages for lighting upgrades	PW
B	Convert all streetlights to feasible high efficiency technologies (e.g., induction, light-emitting diode bulbs and light-emitting diode solar combined systems)	PW
C	Install high-efficiency lighting in all City-owned parking facilities	PW

Progress Indicators		Year
+	Reduce streetlight and traffic light energy demand by 1,000 MWh/yr	2020 and 2030

E-5: Municipal Renewables

Measure E-5.1: Renewable Energy Systems on Municipal Buildings

2020 GHG Reduction Potential: 78 MT CO_2e/yr
2030 GHG Reduction Potential: 73 MT CO_2e/yr

About one-third of communitywide emissions come from energy use. Transitioning to clean energy sources will allow Mountain View to reduce communitywide emissions. The installation of renewable energy systems on municipal buildings will show the City's leadership in the area of renewable energy generation. To that end, the City has already taken steps towards adopting solar technology.

The City has installed a 90-kilowatt photovoltaic system on the California Street parking garage to power the structure's lighting and elevator. The City will identify opportunities to install solar photovoltaic systems on other municipal garages in the future.

A Power Purchasing Agreement (PPA) is another option for transitioning to cleaner energy sources. In such an agreement, the City will agree to host a solar system owned by a private vendor and purchase the electricity from the vendor according to an agreed-upon price schedule. The vendor will fund installation and maintenance of the system and will receive payment for the power from the City as well as Federal tax

incentives. In an effort to reduce municipal GHG emissions from energy use, the City Council approved a PPA on July 5, 2011 for the design, building, installation, maintenance, and provision of electric power from solar photovoltaic systems at its Shoreline Maintenance Facility (45kW) and Shoreline Golf Links Pro Shop (91kW).

GHG reduction potential for this measure decreases between 2020 and 2030 due to normal solar photovoltaic system degradation.

Action		Responsibility
A	Conduct suitability analyses to determine potential of installing solar photovoltaic systems or other renewable energy systems on other municipal facilities	PW
B	Consider entering into other Power Purchasing Agreements, as appropriate, during the duration of the Greenhouse Gas Reduction Program	PW

Progress Indicators	Year
+ 182 MWh generated per year via PPA + 162 MWh generated per year via municipal rooftop photovoltaic systems	2020 and 2030

Solid Waste Strategy

Waste-related GHG emissions result from product consumption and disposal, and from pre-consumer commercial and industrial processes. In Mountain View, only 1% of GHG emissions are associated with solid waste generation and disposal in landfills. Waste disposal creates emissions when organic waste (e.g., food scraps, yard clippings, paper, wood) is buried in landfills and anaerobic digestion takes place, emitting methane. Additionally, extracting and processing raw materials for consumer products, distributing them to consumers, and disposing of them creates a large portion of global GHG emissions.

The City currently contracts with a private contractor to provide citywide waste and recycling collection. In addition, the City is part owner of a materials recovery facility (SMaRT Station®) that sorts curbside recyclables and recovers valuable materials from the remaining garbage. Presently, most waste reduction practices focus on diverting waste products from landfills through recycling. However, it is also important to consider programs that reduce overall waste generation, and to first consider reuse options.

The total GHG emission reduction potential of the Waste Strategy is 2,734 MT CO_2e/yr in 2020 and 6,718 MT CO2e/yr in 2030, or about 2% of the total 2020 reductions and 3% of the 2030 reductions achieved by the GGRP.

Measure SW-1.1: Implementation of Zero-Waste Plan

2020 GHG Reduction Potential: 2,734 MT CO_2e/yr
2030 GHG Reduction Potential: 6,718 MT CO_2e/yr

The City currently offers convenient residential and commercial recycling programs; recovers recyclables from garbage at the SMaRT Station®; participates in the County-

run backyard composting, public education, Green Business, and hazardous waste programs; and conducts public outreach to change public perceptions about recycling and waste, including an annual community garage sale and replacement of free spring and fall cleanup days with an "On-Call" program. These current programs enable the City to divert 70% of communitywide waste from landfills. The City will expand upon its successful programs toward implementation of a zero-waste plan with a goal to divert 90% of communitywide waste from landfills by 2020 and 100% of its waste by 2030.

When organic waste decomposes in landfills, it produces methane. Targeting food-scrap and compostable-paper diversion programs presents a key opportunity to reduce the community's landfill methane emissions. In August 2008, the City Council adopted a Construction and Demolition Ordinance requiring demolition and construction projects greater than 5,000 sq. ft. to divert a minimum of 50% of debris from the landfill. The City will continue to enforce this ordinance, and will seek to implement higher standards over time.

Action		Responsibility
A	Implement Zero-Waste Plan	PW

Progress Indicators		Year
+	90% diversion of solid waste	2020
+	100% diversion of solid waste	2030

Water Strategy

Water-related GHG emissions are mainly caused by energy used to pump, transport, heat, cool, and treat water and wastewater. Emissions associated with this energy use accounted for approximately 1% of the communitywide GHG inventory in 2005. With water supplies expected to continue declining over the coming decades, water conservation strategies have the double benefit of reducing GHG emissions and aligning demand with future water availability.

GHG emission reductions in the water sector are, in great part, driven by a state level policy, SB 7x. This policy requires a reduction in per capita water consumption by 2020 - a 20% reduction from the average water demand between 1995 and 2010.

The strategies proposed in this section represent a combination of voluntary programs and ordinances. Given the many simple, cost-effective water conservation strategies available to residents and businesses, the City is anticipating high voluntary participation to help reduce water use.

The total GHG emission reduction potential of the Water Strategy is 1,071 MT CO_2e/yr in 2020 and 1,669 MT CO_2e/yr in 2030, or less than 1% of the total reductions achieved by the GGRP in each year.

Measure W-1.1: Urban Water Management Plan Conservation Strategies

2020 GHG Reduction Potential: 1,071 MT CO_2e/yr
2030 GHG Reduction Potential: 1,669 MT CO_2e/yr

The California Water Conservation Act of 2009 requires each urban water retail supplier in California to develop a water use target for the year 2020 as part of a cooperative effort to help reduce California's statewide per capita water use by 20%. Each retailer's 2020 urban water use target must be reported in its 2010 Urban Water Management Plan (UWMP), along with its baseline daily water use and interim urban water use target for 2015. Retailers that do not meet the water use targets will not be eligible for water management grants or loans unless a viable implementation plan is approved by the funding agency.

Per the City's 2010 UWMP, Mountain View's baseline daily water use is 180 gallons per capita per day (gpcd). Following analysis of the methodologies used to calculate urban water use targets, the City adopted a 2020 urban water use target of 146 gpcd, with an interim 2015 target of 163 gpcd. To achieve the necessary reductions to meet water conservation targets, the City will continue programs that are already in place, including continued implementation of best management practices (BMPs) and enforcement of water-efficiency regulations. The City will also count savings attributed to plumbing code updates.

The City currently employs a number of BMPs to support communitywide water conservation efforts, including:

- a water conservation coordinator,
- water waste prohibitions,
- system audits, leak detection, and repair,
- metering with commodity rates and conservation pricing,
- public information and outreach program,
- education programs (e.g., landscape education classes, green garden showcase), and
- rebates for high-efficiency fixture and appliance purchase and installation.

In addition to these BMPs, the City has adopted two regulations promoting water-use efficiency:

- **Mountain View Landscaping Regulations** reduce water waste in landscaping by promoting the use of regionally-appropriate plants requiring minimal supplemental irrigation and by establishing irrigation efficiency standards. These regulations apply to new and rehabilitated landscapes of 1,000 square feet or greater.
- **Mountain View Green Building Code** requires new and renovated buildings to use water-efficient plumbing fixtures or demonstrate 20% reductions from baseline water use.

To achieve projected conservation savings, the City must continue to have sufficient support and funding for its programs. At present, Mountain View's incentive programs are funded through wholesale water rates for the Santa Clara Valley Water District

(SCVWD), while funding for outreach and educational programs is provided by the SCVWD, the City, and the Bay Area Water Supply and Conservation Agency (BAWSCA). Changes to these funding sources could alter the availability of future conservation programs.

The City has also taken several actions toward reducing municipal water consumption. The City is performing water audits of its buildings to monitor its water use and provide information on where water-use can be reduced. The City has completed thirteen building and four park irrigation audits in conjunction with the SCVWD, will continue to conduct water audits of municipal buildings and operations, and will make this information readily available to building managers and employees. The City also provides monthly water budgets for six parks, and uses weekly weather data to schedule irrigation at all City parks.

The City has installed the following water-saving equipment in various public buildings:

- solar-powered, automatic faucets (30% savings) in City Hall and Police locker rooms,
- waterless or ultra low-flow urinals (0.5 gpf, 66% savings),
- dual-flush toilets (30% savings), and
- low-flow faucet aerators.

The City is committed to continuing to reduce water demand and consumption, and will continue to replace current fixtures with water-saving fixtures throughout its facilities.

Action		Responsibility
A	Implement conservation programs identified within the 2010 Urban Water Management Plan	PW
B	Prioritize public buildings for water fixture upgrades and identify upgrades to be made	PW

Progress Indicators	Year
+ Reduce urban water use by 20% per capita below average water demand (1995-2010)	2020 and 2030

Transportation Strategy

Transportation-related emissions make up the largest component (approximately 60%) of Mountain View's 2005 emissions inventory. These emissions are determined largely by the number of vehicle miles traveled (VMT) by residents and employees. Long vehicle trips between destinations and high numbers of trips create high emissions. Successfully reducing vehicle emissions relies on reducing or shortening vehicle trips, either by making alternative modes of transportation (such as transit, bicycling, or walking) truly viable, or by increasing proximity of diverse land uses. Technological advancements in vehicle fuel efficiency and reduction of vehicle fuel carbon content at a statewide level will also reduce vehicular GHG emissions.

The Transportation Strategy relies on implementation of goals and policies in the General Plan Mobility Element, including the following:

- Minimum parking requirements
- Unbundled parking
- Public parking pricing
- Bike system improvements
- Pedestrian system improvements
- Transit system improvements
- Transit pass program
- Parking cash-out program
- Car sharing program
- Bike sharing program
- Safe routes to schools
- Carpooling
- Telecommuting and alternative work schedules
- Transportation Management Association

The total GHG reduction capacity of the Transportation Strategy is 1,024 MT CO2e/yr in 2020 and 1,844 MT CO2e/yr in 2030. This represents less than 1% of the total reductions achieved by the GGRP in each year.

Measure T-1.1: Transportation Demand Management

2020 GHG Reduction Potential: 1,024 MT CO_2e/yr
2030 GHG Reduction Potential: 1,844 MT CO_2e/yr

The General Plan Mobility Element calls for the establishment of transportation demand management (TDM) requirements for new development and significant expansion and rehabilitation projects. By 2014, the City will adopt a TDM ordinance that requires all new non-residential development, generating 50 employees or more, to reduce home-based, drive-alone peak hour commute trips. The ordinance will establish TDM performance reporting requirements, procedures, and funding mechanisms. The required TDM performance standards are listed per greenhouse gas strategy area in Table 4.2. The performance standards vary depending on the location of development within the City and the anticipated feasibility of TDM measure implementation.

At the time of project review, all subject development will submit to the City a qualified Transportation Demand Management Plan that demonstrates compliance with the required TDM performance standard. Post construction, subject businesses will be required to submit to the City an annual TDM Performance Report that identifies TDM measures implemented and the impact of the measures on their employees' drive-alone peak hour commute trips. The City anticipates that Transportation Demand Management Associations will facilitate TDM plan and report development.

Table 4.2: Mandatory Commute Trip Reductions for New Employment Generating Development

Greenhouse Gas Strategy Area	Peak Hour Drive-Alone Commute Trip Reduction
North Bayshore	13%
Whisman/Pioneer	9%
El Camino Real/San Antonio	4%
Downtown	8%
Remainder of City	3%

The City will also encourage existing businesses to implement TDM programs. Existing businesses will implement TDM measures on a voluntary basis and will not be subject to the TDM ordinance.

Action		Responsibility
A	Create a Transportation Demand Management Ordinance for Council adoption	CDD
B	Enforce compliance with Transportation Demand Management Plan and Transportation Demand Management Performance Report requirements	CDD
C	Facilitate development of Transportation Demand Management Association(s) and business community membership	CDD

Progress Indicators	Year
+ Percent reduction in peak hour drive-alone commute trips in the following GHG reduction strategy areas: - North Bayshore (13%) - Whisman/Pioneer (9%) - El Camino Real/San Antonio (4%) - Downtown (8%) - Remainder of City (3%)	2020 and 2030

Carbon Sequestration Strategy

Mountain View recognizes street trees as a valuable asset. Trees beautify neighborhoods, increase property values, reduce noise and air pollution, keep buildings cool in the summer, create privacy, and establish habitat for bird species. Importantly, the urban forest also captures and stores carbon as the trees grow. Measures in this Strategy seek to add to Mountain View's already well-established urban forest.

The total GHG emission reduction potential of the Carbon Sequestration Strategy is 680 MT CO_2e/yr in 2020 and 2,020 MT CO_2e/yr in 2030, or less than 1% of the total reductions achieved by the GGRP in each year.

Measure CS-1.1: Enhance the Urban Forest

2020 GHG Reduction Potential: 680 MT CO_2e/yr
2030 GHG Reduction Potential: 2,020 MT CO_2e/yr

Urban forests provide shade and reduce the heat island effect, which causes temperatures to increase in areas with concentrations of exposed pavement and rooftops. These higher temperatures can lead to increased air conditioner use, which increases energy consumption and can strain utility infrastructure at peak hours of the day.

The City of Mountain View received a "Gold Leaf Award" from the Western Chapter of the International Society of Arboriculture and continued recognition as a "Tree City USA" community for educational outreach, volunteerism, and urban reforestation. The City is committed to urban reforestation as a means of increasing the appeal of Mountain View as well as capturing and storing CO_2. The City has taken many steps demonstrating this commitment, including:

- An annual Arbor Day program,
- Planting 451 new trees as part of the Evelyn Avenue widening and median project, and
- Planting 3,072 new street trees citywide since 1994.

The City will continue its efforts in urban reforestation in public and private development. The City will also manage outreach programs to encourage tree planting in the community, and will seek funding to support reforestation efforts from various sources, including the Urban Forestry Program.

Action		Responsibility
A	Expand existing tree planting efforts	CDD PW CSD

Progress Indicators	Year
+ Plant 4,000 new trees	2020
+ Plant 6,000 new trees	2030

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CHAPTER 5
IMPLEMENTATION + MONITORING

5

Mountain View recognizes that reducing greenhouse gas (GHG) emissions is one of the most critical challenges facing the world today. This Greenhouse Gas Reduction Program (GGRP) implements the City's GHG reduction efforts as articulated in the General Plan. This chapter describes how the City will implement the GGRP's GHG reduction measures and actions. The chapter contains the following three sections:

- **Measure Implementation**: Describes how City staff will implement GGRP measures and their related actions and the role of the progress indicators.
- **Program Evaluation and Evolution**: Discusses the need to evaluate, update, and amend the GGRP over time, so the program remains effective and current.
- **Relationship to the California Environmental Quality Act**: Describes the relationship between the GGRP and the California Environmental Quality Act (CEQA), and establishes criteria for City staff when determining if a project is consistent with the GGRP.

Measure Implementation

Ensuring that the measures translate from policy language into on-the-ground results is critical to the success of the GGRP. To facilitate this, each measure described in Chapter 4 contains a table that identifies the specific actions the City will carry out. The table also identifies responsible departments for each action. The second section of each table provides progress indicators to enable City staff, the City Council, and the public to track measure implementation and monitor overall GGRP progress.

The tables provide both interim (2020) and final (2030) progress indicators where possible. Interim progress indicators are especially important, as they provide checkpoints to evaluate if a measure is on the right path to achieving its GHG reductions.

Upon adoption of the GGRP, the City departments identified in Chapter 4 will become responsible for implementing assigned actions. Key staff in each department will facilitate and oversee this work. In order to assess the status of City efforts, GGRP implementation meetings should take place several times a year. Some actions will require inter-departmental or inter-agency cooperation, and appropriate partnerships will need to be established. The City would also need to hire consultants to help assess progress towards measure implementation.

Program Evaluation and Evolution

The GGRP represents the City's initial attempt to create an organized, communitywide response to the threat of climate change. Staff will need to evaluate the program's performance over time and be ready to alter or amend the plan if it is not achieving its reduction goal.

Program Evaluation

Two types of performance evaluation are important: (A) evaluation of the community's overall ability to reduce GHG emissions and (B) evaluation of the performance of individual GGRP measures. Communitywide GHG emission inventories will provide the best indication of GGRP effectiveness. It will be important to reconcile actual growth in the City versus the growth projected when the GGRP was developed. Conducting these inventories periodically will enable direct comparison to the 2005 baseline inventory and will demonstrate the GGRP's ability to achieve the adopted reduction goal. The City will coordinate communitywide inventories in 2015, 2020, 2025, and 2030 to assess the level of GHG reduction goal attainment.

While communitywide inventories provide information about overall GHG reductions, it will also be important to understand the effectiveness of each measure. Evaluation of the emissions reduction capacity of individual measures will improve staff and decision makers' ability to manage and implement the GGRP. The City can reinforce successful measures and reevaluate or replace under-performing ones. Evaluating measure performance will require data regarding actual community participation rates and measurement of GHG reduction capacity.

The Community Development Department will coordinate measure evaluation on the same schedule as the communitywide inventories, and summarize the progress towards meeting the GHG reduction goal in a report that describes:

- Estimated annual GHG reductions in 2020
- Achievement of progress indicators
- Participation rates (where applicable)
- Remaining barriers to implementation

Importantly, a progress report on the GGRP action items will also be provided to decision-makers on an annual basis to help inform the General Plan Action Plan process, which assesses the specific steps the City needs to complete to help realize the vision of the General Plan. The progress report will include a cursory assessment on the progress and implementation of individual GGRP measures, including how new projects have incorporated relevant measures. The progress report will allow for gaps to be identified and corrected on a more regular basis. It also allows for additional measures to be added to the GGRP as they are implemented through the General Plan Action Plan process. Many General Plan Action Plan items with greenhouse gas reduction capacity have not yet been added to the GGRP because there is not enough information at this time to create a realistic projection.

Program Evolution

To remain relevant, the City must be prepared to adapt and transform the GGRP over time. It is likely that new information about climate change science and risk will emerge, new GHG reduction technologies and innovative municipal strategies will be developed, new financing will be available, and State and federal legislation will change. It is also possible that communitywide inventories will indicate that the community is not achieving its adopted goal. As part of the evaluations identified above, the City will assess the implications of new scientific findings and technology, explore new opportunities for GHG reduction, respond to changes in climate policy, and incorporate these changes in future updates to the GGRP to ensure an effective, efficient program.

Relationship to the California Environmental Quality Act

CEQA Guidelines, Section 15183.5 describes the requirements for a GHG reduction plan to provide tiering and streamlining benefits to future development projects. Section 15183.5(b)(1)(D) specifically states that the plan must contain measures, that if implemented on a project-by-project basis, would collectively achieve the plan's established emissions reduction target. This guidance essentially means that each future project seeking to use CEQA tiering will need to demonstrate compliance with the GGRP.

BAAQMD CEQA Guidelines

In 2005, the Bay Area Air Quality Management District (BAAQMD) adopted a resolution to initiate a Climate Protection Program, recognizing the link

between climate protection and programs to reduce air pollution in the Bay Area. In 2009, climate protection was added to the Air District's mission, identifying its commitment to pursuing GHG reduction through all District programs and initiatives.

In June 2010, the BAAQMD produced updated CEQA guidelines to implement the new State CEQA Guidelines on GHG emissions. The BAAQMD's updated guidelines included for the first time thresholds of significance related to GHG emissions from plans and projects. The approach to developing the thresholds was to identify levels for which a project would not be expected to conflict with AB 32 legislation. If a project would generate GHG emissions above the threshold level, it would be considered to contribute considerably to a cumulative impact, and would be considered significant. The threshold for GHG emissions at a plan level is either a) compliance with a qualified GHG reduction strategy, or b) 6.6 MT CO_2e/SP/yr.

This GGRP qualifies as a GHG reduction strategy as defined in the BAAQMD CEQA guidelines, as further described in Appendix D.

Project Consistency with the GGRP

The GGRP identifies both mandatory and voluntary GHG reduction measures that would apply to different types of future projects.

Mandatory Measures

For each of the following mandatory measures, the GGRP either reinforces the implementation of current codes and ordinances, or recommends changes to the City's codes and ordinances that would result in GHG reductions.

- Measure E-1.3 – Non-Residential Lighting Retrofit
- Measure E-1.6 – Exceed State Energy Standards in New Residential Development
- Measure E-1.7 – Exceed State Energy Standards in New Non-Residential Development
- Measure E-1.8 – Building Shade Trees in Residential Development
- Measure T-1.1 – Transportation Demand Management

All new projects would be required to comply with these codes and ordinances, as applicable. This would make these measures binding and enforceable, within the meaning established by State CEQA Guidelines Section 15183.5(b)(2). The proposed project would describe how each measure would be integrated into the development in its application materials and environmental documentation.

Voluntary Measures

The remaining measures are essentially voluntary, relying on assumed levels of community participation to create communitywide GHG reductions. These measures will be tracked to ensure participatory rates are reached and that the voluntary measures are being adequately applied to new and existing projects. If not, then additional, more aggressive actions will be necessary to correct any short-fall.

APPENDICES

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APPENDIX A

EMISSIONS INVENTORY AND PROJECTIONS METHODOLOGY

Appendix A

The Greenhouse Gas Reduction Program (GGRP) describes greenhouse gas (GHG) emissions for 2005 (the baseline year), 2020 (the Assembly Bill [AB] 32 target year), and 2030 (the General Plan horizon year). This appendix describes the methodology used to estimate emissions for each of these years.

Basic Summary

An effective GGRP requires an understanding of the community's emission levels in the baseline and future years. In a bottom-up inventory, emissions are calculated by multiplying activity data (e.g., electricity consumed per residential unit) by an emission factor (e.g., metric tons CO_2e per kWh of electricity). The 2005 communitywide baseline inventory was calculated using empirical activity data collected from utilities and service providers that that monitor energy consumption, water demand, and waste generation, and emissions factors from the California Climate Action Registry (CCAR) and California Energy Commission (CEC). As it is based on observed data, the baseline inventory is an accurate measure of emissions.

Because empirical activity data is not available for future years, a land use-based projection method is used to forecast communitywide emissions for the years 2020 and 2030. This method was also used to develop district-specific emissions estimates for 2005, 2020, and 2030.

2005 Baseline Inventory

As discussed in Chapter 1, the baseline emissions inventory is separated into the following emissions sectors: residential, commercial, and industrial energy consumption; transportation; solid waste disposal; water consumption and treatment, and off-road vehicles and equipment. A description of the methods used to develop each sector is provided below.

Energy Consumption

Pacific Gas and Electricity (PG&E) supplies both electricity and natural gas to Mountain View. PG&E provided data on community electricity and natural gas use in 2005. The data describes electricity and natural gas used in the residential, commercial, industrial, and direct access subsectors. Direct access encompasses energy directly purchased by consumers for uses such as server farms and electric public transportation. Electricity use was provided in kilowatt hours and natural gas consumption was provided in therms.

An electricity delivery emission factor verified by CCAR and a natural gas delivery factor verified by CCAR and CEC were used to quantify emissions associated with energy use. Electricity and natural gas data for residential, commercial, and industrial uses were multiplied by the appropriate emission factor and then converted to metric tons of carbon dioxide equivalent emissions per year (MT CO_2e/yr).

Transportation

The Transportation sector includes the operation of on-road vehicles associated with current land uses. This sector includes exhaust emissions from private vehicles, city-owned vehicles (i.e., city fleet), and public transportation vehicles.

2005 vehicle miles traveled (VMT) estimates produced for the City's General Plan update were used to complete the emissions inventory. Origin-destination based VMT by speed bin estimates were developed using the Metropolitan Transportation Commission's (MTC) travel demand model. Consistent with the recommendations of

the Senate Bill (SB) 375 Regional Targets Advisory Committee (RTAC), the following method was used to allocate VMT to the community:

- Internal to internal (II) VMT: One hundred percent of VMT from daily trips occurring entirely within Mountain View is allocated to the inventory.
- Internal to external (IX) VMT: One-half of daily trips originating within Mountain View and ending outside Mountain View are allocated to the inventory.
- External to internal (XI) VMT: One-half of daily trips originating outside of Mountain View and ending within Mountain View are allocated to the inventory.
- External-external (XX): Trips through Mountain View are not included in the inventory.

VMT-related emissions were refined using speed bin data reflecting daily and peak-hour traffic conditions. Approximately 2,429,552 daily VMT are allocated to Mountain View for 2005 conditions (Fehr and Peers 2011).

Emission estimates were developed using the California Air Resources Board's (ARB) vehicle emissions model, EMFAC2007 (ARB 2009). EMFAC2007 is an ARB-developed mobile source emission model which provides vehicle emission factors by county, speed bin, and vehicle class. EMFAC was used to develop fuel consumption, VMT, and emission estimates for gasoline and diesel vehicles by vehicle type (e.g., light-duty automobile, heavy-duty trucks). Emission factors for carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) from the ARB Local Government Operations Protocol were then used to estimate GHG emissions (ARB 2010).

Solid Waste Disposal

The most prominent source of emissions from solid waste facilities is fugitive methane released by the decomposition of organic waste over time in landfills. The scale of these emissions depends upon the size and type of the landfill and the presence of a landfill gas collection system. Other emissions included in this sector are from stationary combustion of fuels and purchased electricity used to generate power for all solid waste management facilities.

Landfill emissions and community-generated solid waste were calculated using ICLEI's CACP software, which allows the user to enter the annual solid waste and alternative daily cover tons (ICLEI 2005). Based on waste data reported to the California Integrated Waste Management Board (CIWMB) by the City, emissions were calculated from the amount of new communitywide solid waste generated in 2005. The City of Mountain View operated the Shoreline Landfill until it was officially closed in 1998. Emissions from existing waste in 2005 at the Shoreline landfill were calculated as well, but were not included within the baseline inventory, due to the fact that the majority of waste-in-place in the landfill belongs to other jurisdictions.

Water Consumption

Water consumption by the City's residents and businesses require electricity for conveyance, treatment, and distribution. Water consumption data for 2005 was obtained from the City's 2005 Urban Water Management Plan, provided in units of acre-feet per year for single-family residential, multi-family residential, commercial, industrial, and institutional land uses.

Electricity (i.e., kilowatts per million gallons) required to provide water to support communitywide residential, commercial, and industrial uses was assumed to be similar because these land uses generally require similar levels of water treatment. GHG emissions associated with water-related electricity consumption were calculated using California-wide emission factors from CCAR's *General Reporting Protocol* Version 3.1 (CCAR 2009).

Off-Road Equipment

The main source of GHG emissions within this sector is off-road equipment (e.g., heavy-duty construction equipment, lawn and garden equipment, cargo handling equipment, mining equipment). Emissions from airplane travel and rail travel are not included in this inventory.

Construction equipment emissions are based on OFFROAD 2007 estimates for Santa Clara County for the year 2005. Based on recommendations from the Bay Area Air Quality Management District (BAAQMD), the number of building permits issued by Mountain View compared to the total number issued by the County was used to allocate countywide construction equipment emissions to the City (US HUD 2010).

Lawn and garden equipment emissions were also based on OFFROAD 2007 estimates for Santa Clara County. The Association of Bay Area Governments (ABAG) provides information on the number of households in the County and City, which was used to allocate lawn and garden equipment emissions to the City (ABAG 2009).

Agriculture

While Mountain View originally began as an agricultural community, there are currently only minimal agricultural uses located in the City (City of Mountain View 2009). Former agricultural uses occur within the Moffett/Whisman Road Area on two parcels containing fallow cropland and a walnut orchard. Agricultural land accounts for only 20 acres, or approximately 0.3%, of the total land use in the community (City of Mountain View 2009). Therefore, estimates of agricultural emissions are not included in the baseline inventory.

Emissions Projections

A variety of methods can be used to forecast future year emissions. A commonly used demographic projection-based method multiplies baseline emissions by estimated future population and employment growth of a community. While this method has the advantage of being simple, it is does not accurately forecast future emissions if a community is anticipating a substantial land use transformation.

Mountain View is anticipating a transformation of industrial uses to office and retail non-residential uses and an increase in higher density multifamily residential uses during the 2030 General Plan's planning horizon. For these reasons, the City chose to use a land use-based projection method to predict emissions for 2020 and 2030. This method establishes baseline emission levels for each land use type (e.g., emissions per single-family residential unit, emissions per square foot of commercial retail use) and ties emissions growth to the 2030 General Plan's land use inventory forecast assumptions.

The City also used this method to allocate 2005 baseline emissions to individual GHG Strategy areas within the City. This data was generated to future development of district-specific GHG reduction measures.

Methodology

Tables showing the calculations used to develop the 2020 and 2030 projections are provided at the end of this appendix. Due to the complexity of the calculations, this section uses residential energy subsector as an example to demonstrate how the projections were developed. Similar methods were used to calculate emissions for the commercial/industrial energy, waste, and water sectors for both residential and non-residential buildings. Specific building intensity, calibration, and emission factors vary by building type and by sector. It should be noted that Transportation sector emissions forecasts were developed using a separate method. Transportation emission forecasts were developed using the same methods described in the inventory section above on Page A-2. The City's traffic analysis of the endorsed General Plan estimated that Mountain View will generate approximately 3,232,768 daily VMT in 2030 (Fehr and Peers 2011).

1. Land Use-Based Activity Data Model

A model of energy use, water demand, and waste and wastewater generation was created for the City of Mountain View. Activity levels were estimated using two types of data:

- Land use data (see Table A-7)
  - Existing (2005) and future year (2030) land use data describing the number and type of residential units, and the square footage and type of non-residential buildings (at communitywide or strategy area scale).
- Building intensity factors (see Table A-8)
  - Building intensity factors describe the amount of activity (e.g., energy use) expected to occur in each building (e.g., average kilowatts per hour per single-family residential unit per year). For residential uses, per-unit intensity factors are provided by residential type. For non-residential uses, per-square foot intensity factors are provided by non-residential use type. Most intensity factors are obtained from state agencies and other industry-standard sources (i.e., Commercial End Use Survey, Residential Appliance Saturation Survey, Cal Recycle). Other intensity factors were developed using local baseline year data (i.e., 2005 Urban Water Management Plan).

Activity data (e.g., energy and water use, waste generation) occurring within the community and each strategy area was modeled by multiplying the building inventory data by the intensity factors. Table A-1 provides modeled 2005 activity data for the residential energy use subsector.

Table A-1: Modeled 2005 Residential Energy Activity

Land Use		Building Intensity Factors		Activity	
Unit Type	# of Units	kWH/unit/yr	therms/unit/yr	Total kWH/yr	Total therms/yr
Single-family	7,342	7,514	554	55,167,494	4,067,648
Townhome	3,145	4,562	322	14,347,668	1,014,008
Multi-family (2-4 Units)	2,893	4,197	301	12,141,129	871,776
Multi-family (5+ Units)	17,517	3,882	196	68,001,726	3,434,788
Mobile Home	1,129	4,395	446	4,961,955	503,666
Total				**154,619,973**	**9,891,886**

Model Calibration

Because models are based on assumptions, discrepancies can exist between empirically-derived activity data and model-derived activity data. Calibration factors are used to compensate for these differences. Calibration factors were developed by comparing baseline year modeled data to baseline year empirical data. Table A-2 presents calibration factors used for the residential energy use subsector. Similar factors were developed and applied to activity data within each emission sector or subsector.

Table A-2: Calibration Factors for Residential Energy

	Total kWH/yr	Total therms/yr
2005 Empirical Activity Data	162,405,140	12,052,342
2005 Modeled Activity Data	154,619,973	9,891,886
Calibration Factor	**5.0%**	**21.8%**

2. Projecting 2030 Activity Data

To calculate 2030 activity data, the building intensity factors used in the 2005 model were multiplied by the number of units or non-residential square feet in anticipated in the endorsed 2030 General Plan land use inventory. The 2030 modeled activity data was then calibrated using the calibration factors developed in Step 2.

Table A-3 provides pre-calibrated 2005 modeled activity data for the residential energy subsector. Table A-4 provides calibrated data. While emissions were projected for this and other sectors through 2030, the *Direct Access* subsector of the energy sector was held constant. Detail describing these uses was not available; therefore, it was not possible to forecast growth accurately.

Table A-3: Modeled 2030 Residential Energy Activity

Land Use		Building Intensity Factors		Activity	
Unit Type	# of Units	kWH/unit/yr	therms/unit/yr	Total kWh/yr	Total therms/yr
Single-family	7,995	7,514	402	60,071,715	3,211,232
Townhome	3,387	4,562	353	15,451,563	1,195,528
Multi-family (2-4 Units)	3,813	4,197	347	16,005,118	1,322,760
Multi-family (5+ Units)	23,160	3,882	309	89,908,914	7,166,639
Mobile Home	1,129	4,395	382	4,961,955	431,784
Total				**186,399,266**	**13,327,943**

Table A-4: Calibrated 2030 Residential Energy Activity

	Total kWh/yr	Total therms/yr
Total	186,399,266	13,327,943
Calibration Factor	5.0%	21.8%
Calibrated 2030 Value	**195,784,530**	**16,238,858**

3. Estimating 2020 Activity Data

The process of projecting 2020 activity data was different than that used for 2005 or 2030 because no specific land use inventory data was available for 2020.

To calculate 2020 activity data, an annual growth factor was generated for each sector and subsector by calculating the rate of change of the activity data from 2005 to 2030. Then, 2020 activity data was calculated by applying this growth factor to 2005 empirical data. Table A-5 presents 2020 communitywide emissions estimates for residential energy use.

Table A-5: 2020 Communitywide Residential Energy Emissions

Emission Sector	Subsector	2005 Activity	Units	Annual Growth Factor	2020 Activity	Units
Residential Energy – 2020	Electricity	162,405,140	kWh/yr	0.75%	181,679,921	kWh/yr
	Natural Gas	12,052,342	therms/yr	1.20%	14,413,249	therms/yr

4. Calculating GHG Emissions

Emission factors were applied to each sector based on available data. For example, the electricity emission factor was based on PG&E's 2005 electricity production portfolio, which accounts for the types and amounts of energy sources (e.g., natural gas, hydroelectric, coal) used to generate electricity.

Activity data for all sectors were multiplied by emission factors and converted to MT CO_2e/yr for 2005, 2020, and 2030 at both district and communitywide levels. Table A-6 demonstrates the process used to estimate communitywide residential energy emissions for 2005, 2020, and 2030.

Table A-6: Communitywide 2005, 2020, and 2030 Residential Energy Use Emissions

Year	Subsector	Activity	Units	Emission Factor MT CO_2/kWh	Units	Emissions (MT CO_2e/yr)
2005	Electricity	162,405,140	kWh/yr	0.00022356	MT CO_2/kWh	36,307
	Natural Gas	12,052,342	therms/yr	0.00531560	MT CO_2/therm	64,065
	Subtotal					**100,372**
2020	Electricity	181,679,921	kWh/yr	0.00022356	MT CO_2/kWh	40,616
	Natural Gas	14,413,249	therms/yr	0.00531560	MT CO_2/therm	76,615
	Subtotal					**117,231**
2030	Electricity	195,784,530	kWh/yr	0.00022356	MT CO_2/kWh	43,769
	Natural Gas	16,238,859	therms/yr	0.00531560	MT CO_2/therm	86,319
	Subtotal					**130,088**

Tables A7 - A27

Tables A-7 through A-27 describe data used in the development of the emissions inventory and projections.

- Table A-7 describes the building inventory data used. Residential units and commercial /industrial square footage are provided for both existing conditions (2005) and General Plan horizon (2030).
- Table A-8 describes the building intensity factors used per subsector and their sources.
- Tables A-9 through A-11 describe the calculated activity data, the emissions factors, and the resulting communitywide emissions for each subsector. Values are provided for 2005, 2020, and 2030 respectively.
- Tables A-12 through A-23 describe the calculated activity data, the emissions factors, and the resulting emissions for each subsector at the GHG Strategy Area level. Values are provided for 2005, 2020, and 2030.
- Tables A-24 through A-27 show the calculation of the communitywide activity data using building inventory and building intensity factors for 2005 and 2030. Table A-24 describes the calculations for the energy sector. Table A-25 describes the calculations for the waste sector. Table A-26 describes the calculations for the water subsector. Table A-27 describes the calculations for the wastewater subsector.

Table A-7: 2005 and 2030 General Plan Land Use Data

Land Use Type	2005	2030
COMMERCIAL SQUARE FEET		
MIN (& 25% RE2)	288,300	747,768
HOS	724,006	1,133,073
MED	368,144	340,326
RDO	8,219,006	7,002,838
MOT	642,688	807,543
MMR	89,100	0
RES	335,130	248,294
FFD	36,314	29,552
GAS	31,099	22,418
MHR	33,500	0
MMR	17,800	0
MOR	151,492	0
RCE	114,500	124,500
RCF	49,031	18,510
RE1	1,878,149	1,409,729
RE2	683,143	2,095,445
SER	2,068,736	1,424,555
DYC	-19,364	1,455
OFF (& 50% LIN)	4,654,631	12,644,263
MOR	371,178	0
INDUSTRIAL SQUARE FEET		
IND	2,389,399	1,768,350
LIN (50%)	2,378,133	1,556,199
RESIDENTIAL UNITS		
Single-family	7,342	7,995
Townhome	3,145	3,387
Mulit-family (2-4 Units)	2,893	3,813
Multi-family (5+ Units)	17,517	23,160
Mobile Home	1,129	1,129

Table A-8: Building Intensity Factor Sources

Sector	Land Use	Intensity Factor	Unit	Source
Residential Energy Electricity	SFR (Attached)	7,514	kWH/unit/yr	CEC Residential Appliance Saturation Survey for Zone 4
	SFR (Detached)	4,562		
	MFR 2-4 Unitst	4,197		
	MFR 5+ Units	3,882		
	Mobile Home	4,395		
Residential Energy Gas	SFR (Attached)	554	therms/unit/yr	CEC Residential Appliance Saturation Survey for Zone 4 (adapted)
	SFR (Detached)	322		
	MFR (2-4 Units)	301		
	MFR (5+ Units)	196		
	Mobile Home	446		
Non-Residential Energy Electricity	MIN	44.34	kWH/sq ft/yr	CEC Commercial End Use Survey for Zone 4; and Industrial assumptions based on CALEMOD output.
	HOS	23.03		
	MED	23.03		
	RDO	23.51		
	MOT	9.33		
	MMR	9.33		
	RES	35.97		
	FFD	35.97		
	GAS	12.82		
	MHR	12.82		
	MMR	12.82		
	MOR	12.82		
	RCE	12.82		
	RCF	12.82		

Sector	Land Use	Intensity Factor	Unit	Source
Non-Residential Energy Electricity (continued)	RE1	12.82	kWH/sq ft/yr	CEC Commercial End Use Survey for Zone 4; and Industrial assumptions based on CALEMOD output.
	RE2	12.82		
	SER	12.82		
	DYC	6.65		
	OFF	17.37		
	MOR	17.37		
	New OFF	21.35		
Non-Residential Energy Gas	MIN	25.77	kBTU/sq ft/yr	CEC Commercial End Use Survey for Zone 4; and Industrial assumptions based on CALEMOD data.
	HOS	118.71		
	MED	118.71		
	RDO	26.39		
	MOT	46.95		
	MMR	46.95		
	RES	212.55		
	FFD	212.55		
	GAS	3.01		
	MHR	3.01		
	MMR	3.01		
	MOR	3.01		
	RCE	3.01		
	RCF	3.01		
	RE1	3.01		
	RE2	3.01		
	SER	3.01		
	DYC	22.71		
	OFF	9.75		
	MOR	9.75		
	New OFF	20.52		

Sector	Land Use	Intensity Factor	Unit	Source
Solid Waste	SFR (Attached)	0.62	tons/unit/yr	Based on CALEMOD data and adjusted to reflect increased waste diversion from 1999 to current year.
	SFR (Detached)	0.23		
	MFR (2-4 Units)	0.23		
	MFR (5+ Units)	0.23		
	Mobile Home	0.23		
	MIN	2.77	tons/1,000 sq ft/yr	Based on CALEMOD data and adjusted to reflect increased waste diversion from 1999 to current year.
	HOS	5.30		
	MED	5.30		
	RDO	0.46		
	MOT	0.60		
	MMR	0.60		
	RES	5.84		
	FFD	5.84		
	GAS	0.52		
	MHR	0.52		
	MMR	0.52		
	MOR	0.52		
	RCE	0.52		
	RCF	0.52		
	RE1	0.52		
	RE2	0.52		
	SER	0.52		
	DYC	0.64		
	OFF	0.46		
	MOR	0.46		
	IND & LIN	5.30		

Sector	Land Use	Intensity Factor	Unit	Source
Water	SFR (Attached)	0.102	mgals/unit/yr	Calculated from City of Mountain View 2005 Urban Water Management Plan
	SFR (Detached)	0.102		
	MFR (2-4 Units)	0.055		
	MFR (5+ Units)	0.055		
	Mobile Home	0.102		
	MIN	0.033	mgals/1,000 sq ft/yr	
	HOS	0.029		
	MED	0.029		
	RDO	0.021		
	MOT	0.031		
	MMR	0.031		
	RES	0.032		
	FFD	0.032		
	GAS	0.021		
	MHR	0.021		
	MMR	0.021		
	MOR	0.021		
	RCE	0.021		
	RCF	0.021		
	RE1	0.021		
	RE2	0.021		
	SER	0.021		
	DYC	0.010		
	OFF	0.021		
	MOR	0.021		
	IND & LIN	0.054		

Sector	Land Use	Intensity Factor	Unit	Source
Wastewater	SFR (Attached)	0.055	mgals/unit/yr	Calculated from City of Mountain View 2005 Urban Water Management Plan. Assumes 88% of indoor water consumption becomes wastewater.
	SFR (Detached)	0.055		
	MFR (2-4 Units)	0.041		
	MFR (5+ Units)	0.041		
	Mobile Home	0.055		
	MIN	0.029	mgals/1,000 sq ft/yr	
	HOS	0.025		
	MED	0.025		
	RDO	0.019		
	MOT	0.027		
	MMR	0.027		
	RES	0.028		
	FFD	0.028		
	GAS	0.019		
	MHR	0.019		
	MMR	0.019		
	MOR	0.019		
	RCE	0.019		
	RCF	0.019		
	RE1	0.019		
	RE2	0.019		
	SER	0.019		
	DYC	0.008		
	OFF	0.019		
	MOR	0.019		
	New OFF	0.047		

Table A-9: 2005 Communitywide Emission and Activity Summary

Emission Sector	Subsector	Activity	Units	Emission Factor MT CO_2/kWh	Units	Emissions (MT CO_2e/yr)	% of Communitywide Total
Energy - Residential	Electricity	162,405,140	kWh/yr	0.00022356	MT CO_2/kWh	36,307	4.6%
	Natural Gas	12,052,342	therms/yr	0.00531560	MT CO_2/therm	64,065	8.0%
Energy - Commercial	Electricity	484,081,502	kWh/yr	0.00022356	MT CO_2/kWh	108,220	13.6%
	Natural Gas	9,783,455	therms/yr	0.00531560	MT CO_2/therm	52,005	6.5%
Energy - Industrial	Electricity	19,269,742	kWh/yr	0.00022356	MT CO_2/kWh	4,308	0.5%
	Natural Gas	954,593	therms/yr	0.00530720	MT CO_2/therm	5,066	0.6%
Direct Access	Electricity	114,469,888	kWh/yr	0.00022356	MT CO_2/kWh	25,591	3.2%
Energy	**Subtotal**					**295,562**	**37.1%**
Transportation	**Subtotal**					**474,180**	**59.5%**
Waste - Residential	Solid Waste	12,585	tons/yr	0.23402673	MT CO_2/ton	2,945	0.4%
	Alt Daily Cover	57	tons/yr	0.31372503	MT CO_2/ton	18	0.0%
Waste - Commercial & Industrial	Solid Waste	36,274	tons/yr	0.22517067	MT CO_2/ton	8,168	1.0%
	Alt Daily Cover	165	tons/yr	0.31372503	MT CO_2/ton	52	0.0%
Waste	**Subtotal**					**11,183**	**1.4%**
Water - Residential	Water Demand	3,586	mgal/yr	0.96241805	MT CO_2/Mgal	3,451	0.4%
	Wastewater Treatment	2,032	mgal/yr	1.76577014	MT CO_2/Mgal	3,588	0.5%
Water - Commercial & Industrial	Water Demand	969	mgal/yr	0.96241805	MT CO_2/Mgal	933	0.1%
	Wastewater Treatment	866	mgal/yr	1.76577014	MT CO_2/Mgal	1,529	0.2%
Water	**Subtotal**					**9,502**	**1.2%**
Off-Road Mobile	Construction	83	building permits	57.75080436	MT CO_2/permit	4,793	0.6%
	Lawn/Garden Equipment	32,026	occupied units	0.05518301	MT CO_2/unit	1,767	0.2%
Off-Road Mobile	**Subtotal**					**6,561**	**0.8%**
Total						**796,987**	**100.0%**

Table A-10: 2005 and 2020 Communitywide Emission and Activity –Summary

Emission Sector	Subsector	2005 Activity	2005 Units	2005 Emissions (MT CO_2e/ yr)	Annual Growth Factor	2020 Activity	2020 Units	Emissions (MT CO_2e/yr)	% of Communitywide Total
Energy – Residential	Electricity	162,405,140	kWh/yr	36,307	0.84%	181,678,297	kWh/yr	40,616	4.5%
	Natural Gas	12,052,342	therms/yr	64,065	1.30%	14,413,237	therms/yr	76,615	8.4%
Energy - Commercial	Electricity	484,081,502	kWh/yr	108,220	1.57%	605,076,937	kWh/yr	135,271	14.8%
	Natural Gas	9,783,455	therms/yr	52,005	1.45%	12,043,688	therms/yr	64,019	7.0%
Energy – Industrial	Electricity	19,269,742	kWh/yr	4,308	-1.43%	15,521,702	kWh/yr	3,470	0.4%
	Natural Gas	954,593	therms/yr	5,066	-1.43%	768,921	therms/yr	4,081	0.4%
Direct Access	Electricity	114,469,888	kWh/yr	25,591	0.00%	114,469,888	kWh/yr	25,591	2.8%
Energy	**Subtotal**							**349,663**	**38.3%**
Transportation	Gasoline Consumption	45,540,280	gal/yr	420,888	0.85%	52,697,866	gal/yr	475,796	52.1%
	Diesel Consumption	4,958,630	gal/yr	53,292	0.44%	5,396,424	gal/yr	57,218	6.3%
Transportation	**Subtotal**							**533,013**	**57.5%**
Waste – Residential	Solid Waste	12,585	tons/yr	2,945	0.78%	13,983	tons/yr	3,272	0.4%
	Alt Daily Cover	57	tons/yr	18	0.78%	64	tons/yr	20	0.0%
Waste – Commercial & Industrial	Solid Waste	36,274	tons/yr	8,168	-0.16%	35,312	tons/yr	7,951	0.9%
	Alt Daily Cover	165	tons/yr	52	-0.16%	160	tons/yr	50	0.0%
Waste	**Subtotal**							**11,307**	**1.2%**
Water – Residential	Water Demand	3,586	mgal/yr	3,451	0.83%	4,028	mgal/yr	3,876	0.4%
	WW Treatment	2,032	mgal/yr	3,588	0.88%	2,286	mgal/yr	4,036	0.4%
Water – Commercial & Industrial	Water Demand	969	mgal/yr	933	0.72%	1,070	mgal/yr	1,029	0.1%
	WW Treatment	866	mgal/yr	1,529	0.50%	926	mgal/yr	1,635	0.2%
Water	**Subtotal**							**10,577**	**1.2%**
Off-Road Mobile	Construction	83	permits	4,793	1.46%	83	permits	5,959	0.7%
	Lawn Equipment	32,026	units	1,767	1.25%	36,313	units	2,095	0.2%
Off-Road Mobile	**Subtotal**							**8,054**	**0.9%**
Total								**912,614**	**100.0%**

Table A-11: 2030 Communitywide Emissions and Activity – Summary

Emission Sector	Subsector	Activity Data	Units	Emission Factor	Units	Emissions (MT CO_2e/year)	% of Communitywide Total
Energy - Residential	Electricity	195,784,530	kWh/yr	0.00022356	MT CO_2/kWh	43,769	4.4%
	Natural Gas	16,238,859	therm/yr	0.00531560	MT CO_2/therm	86,319	8.6%
Energy - Commercial	Electricity	702,123,991	kWh/yr	0.00022356	MT CO_2/kWh	156,965	15.7%
	Natural Gas	13,833,677	therm/yr	0.00531560	MT CO_2/therm	73,534	7.3%
Energy - Industrial	Electricity	13,437,391	kWh/yr	0.00022356	MT CO_2/kWh	3,004	0.3%
	Natural Gas	665,667	therm/yr	0.00530720	MT CO_2/therm	3,533	0.4%
Direct Access	Electricity	114,469,888	kWh/yr	0.00022356	MT CO_2/kWh	25,591	2.6%
Energy	**Subtotal**					**392,715**	**39.2%**
Transportation	**Subtotal**					**576,318**	**57.6%**
Waste - Residential	Solid Waste	15,299	tons/yr	0.23402673	MT CO_2/ton	3,510	0.4%
	Alt Daily Cover	70	tons/yr	0.31372503	MT CO_2/ton	21	0.0%
Waste - Commercial & Industrial	Solid Waste	34,878	tons/yr	0.22517067	MT CO_2/ton	7,810	0.8%
	Alt Daily Cover	158	tons/yr	0.31372503	MT CO_2/ton	49	0.0%
Waste	**Subtotal**					**11,391**	**1.1%**
Water - Residential	Water Demand	4,412	mgal/yr	0.96241805	MT CO_2/Mgal	4,189	0.4%
	Wastewater Treatment	2,532	mgal/yr	1.76577014	MT CO_2/Mgal	4,365	0.4%
Water - Commercial & Industrial	Water Demand	1,159	mgal/yr	0.96241805	MT CO_2/Mgal	1,099	0.1%
	Wastewater Treatment	981	mgal/yr	1.76577014	MT CO_2/Mgal	1,709	0.2%
Water	**Subtotal**					**11,362**	**1.1%**
Off-Road Mobile	Construction	83	building permits	83.00683662	MT CO_2/permit	6,890	0.7%
	Lawn/Garden Equipment	39,485	occupied units	0.05943771	MT CO_2/unit	2,347	0.2%
Off-Road Mobile	**Subtotal**					**9,236**	**0.9%**
Total						**1,001,022**	**100.0%**

Table A-12: 2005 Emissions by GHG Strategy Area

GHG Strategy Area	2005 Emissions (MT CO_2e/yr)
Downtown	58,089
El Camino/San Antonio	138,650
Whisman	102,802
North Bayshore	147,440
Other (remainder of City)	324,415
Direct Access (Not split by district)	25,591
Total	**796,987**

Table A-13: 2005 Downtown Emissions and Activity Summary

Emission Sector	Subsector	Activity	Units	Emission Factor ($MT CO_2/kWh$)	Units	Emissions ($MT CO_2e/yr$)	% of Area Total
Energy - Residential	Electricity	9,213,453	kWh/yr	0.00022356	MT CO_2/kWh	2,060	3.5%
	Natural Gas	679,032	therm/yr	0.00531560	MT CO_2/Mmbtu	3,609	6.2%
Energy - Commercial	Electricity	34,783,002	kWh/yr	0.00022356	MT CO_2/kWh	7,776	13.4%
	Natural Gas	1,079,600	therm/yr	0.00531560	MT CO_2/Mmbtu	5,739	9.9%
Energy - Industrial	Electricity	114,935	kWh/yr	0.00022356	MT CO_2/kWh	26	0.0%
	Natural Gas	5,694	therm/yr	0.00530720	MT CO_2/Mmbtu	30	0.1%
Energy	**Subtotal**					**19,240**	33.1%
Transportation	**Subtotal**					**37,337**	64.3%
Waste - Residential	Solid Waste	727	tons/yr	0.23402673	MT CO_2/ton	170	0.3%
	Alt Daily Cover	3	tons/yr	0.31372503	MT CO_2/ton	1	0.0%
Waste - Commercial & Industrial	Solid Waste	1,915	tons/yr	0.22517067	MT CO_2/ton	431	0.7%
	Alt Daily Cover	9	tons/yr	0.31372503	MT CO_2/ton	3	0.0%
Waste	**Subtotal**					**605**	1.0%
Water - Residential	Water Demand	131	mgal/yr	0.96241805	MT CO_2/Mgal	126	0.2%
	Wastewater Treatment	113	mgal/yr	1.76577014	MT CO_2/Mgal	199	0.3%
Water - Commercial & Industrial	Water Demand	55	mgal/yr	0.96241805	MT CO_2/Mgal	53	0.1%
	Wastewater Treatment	45	mgal/yr	1.76577014	MT CO_2/Mgal	80	0.1%
Water	**Subtotal**					**458**	0.8%
Off-Road Mobile	Construction	6	building permits	57.75080436	MT CO_2/permit	351	0.6%
	Lawn/Garden Equipment	1,773	occupied units	0.05518301	MT CO_2/unit	98	0.2%
Off-Road Mobile	**Subtotal**					**449**	0.8%
Total						**58,089**	**100.0%**

Table A-14 – 2005 El Camino/San Antonio Emissions and Activity Summary

Emission Sector	Subsector	Activity	Units	Emission Factor ($MT CO_2/kWh$)	Units	Emissions ($MT CO_2e/yr$)	% of Area Total
Energy - Residential	Electricity	32,931,000	kWh/yr	0.00022356	MT CO_2/kWh	7,362	5.3%
	Natural Gas	2,456,350	therms/yr	0.00531560	MT CO_2/Mmbtu	13,057	9.4%
Energy - Commercial	Electricity	75,704,564	kWh/yr	0.00022356	MT CO_2/kWh	16,924	12.2%
	Natural Gas	1,616,394	therms/yr	0.00531560	MT CO_2/Mmbtu	8,592	6.2%
Energy - Industrial	Electricity	256,905	kWh/yr	0.00022356	MT CO_2/kWh	57	0.0%
	Natural Gas	12,727	therms/yr	0.00530720	MT CO_2/Mmbtu	68	0.0%
Energy	**Subtotal**					**46,060**	**33.2%**
Transportation	**Subtotal**					**88,027**	**63.5%**
Waste - Residential	Solid Waste	2,457	tons/yr	0.23402673	MT CO_2/ton	575	0.4%
	Alt Daily Cover	11	tons/yr	0.31372503	MT CO_2/ton	4	0.0%
Waste - Commercial & Industrial	Solid Waste	3,397	tons/yr	0.22517067	MT CO_2/ton	765	0.6%
	Alt Daily Cover	15	tons/yr	0.31372503	MT CO_2/ton	5	0.0%
Waste	**Subtotal**					**1,348**	**1.0%**
Water - Residential	Water Demand	899	mgal/yr	0.96241805	MT CO_2/Mgal	866	0.6%
	Wastewater Treatment	428	mgal/yr	1.76577014	MT CO_2/Mgal	755	0.5%
Water - Commercial & Industrial	Water Demand	137	mgal/yr	0.96241805	MT CO_2/Mgal	132	0.1%
	Wastewater Treatment	116	mgal/yr	1.76577014	MT CO_2/Mgal	205	0.1%
Water	**Subtotal**					**1,958**	**1.4%**
Off-Road Mobile	Construction	15	building permits	57.75080436	MT CO_2/permit	880	0.6%
	Lawn/Garden Equipment	6,826	occupied units	0.05518301	MT CO_2/unit	377	0.3%
Off-Road Mobile	**Subtotal**					**1,257**	**0.9%**
Total						**138,650**	**100.0%**

Table A-15: 2005 Whisman/Pioneer Emissions and Activity Summary

Emission Sector	Subsector	Activity	Units	Emission Factor ($MT CO_2/kWh$)	Units	Emissions ($MT CO_2e/yr$)	% of Area Total
Energy - Residential	Electricity	7,892	kWh/yr	0.00022356	MT CO_2/kWh	2	0.0%
	Natural Gas	675	therms/yr	0.00531560	MT CO_2/Mmbtu	4	0.0%
Energy - Commercial	Electricity	124,022,674	kWh/yr	0.00022356	MT CO_2/kWh	27,726	27.0%
	Natural Gas	1,892,466	therms/yr	0.00531560	MT CO_2/Mmbtu	10,060	9.8%
Energy - Industrial	Electricity	6,197,265	kWh/yr	0.00022356	MT CO_2/kWh	1,385	1.3%
	Natural Gas	307,003	therms/yr	0.00530720	MT CO_2/Mmbtu	1,629	1.6%
Energy	**Subtotal**					**40,806**	**39.7%**
Transportation	**Subtotal**					**58,918**	**57.3%**
Waste - Residential	Solid Waste	1	tons/yr	0.23402673	MT CO_2/ton	0	0.0%
	Alt Daily Cover	0	tons/yr	0.31372503	MT CO_2/ton	0	0.0%
Waste - Commercial & Industrial	Solid Waste	8,828	tons/yr	0.22517067	MT CO_2/ton	1,988	1.9%
	Alt Daily Cover	40	tons/yr	0.31372503	MT CO_2/ton	13	0.0%
Waste	**Subtotal**					**2,001**	**1.9%**
Water - Residential	Water Demand	0	mgal/yr	0.96241805	MT CO_2/Mgal	0	0.0%
	Wastewater Treatment	0	mgal/yr	1.76577014	MT CO_2/Mgal	0	0.0%
Water - Commercial & Industrial	Water Demand	250	mgal/yr	0.96241805	MT CO_2/Mgal	241	0.2%
	Wastewater Treatment	224	mgal/yr	1.76577014	MT CO_2/Mgal	396	0.4%
Water	**Subtotal**					**637**	**0.6%**
Off-Road Mobile	Construction	8	building permits	57.75080436	MT CO_2/permit	440	0.4%
	Lawn and Garden Equipment	1	occupied units	0.05518301	MT CO_2/unit	0	0.0%
Off-Road Mobile	**Subtotal**					**441**	**0.4%**
Total						**102,802**	**100.0%**

Table A-16: 2005 North Bayshore Emissions and Activity Summary

Emission Sector	Subsector	Activity	Units	Emission Factor ($MT CO_2/kWh$)	Units	Emissions ($MT CO_2e/yr$)	% of Area Total
Energy - Residential	Electricity	1,645,930	kWh/yr	0.00022356	MT CO_2/kWh	368	0.2%
	Natural Gas	192,531	therm/yr	0.00531560	MT CO_2/Mmbtu	1,023	0.7%
Energy - Commercial	Electricity	156,866,807	kWh/yr	0.00022356	MT CO_2/kWh	35,069	23.8%
	Natural Gas	2,450,965	therms/yr	0.00531560	MT CO_2/Mmbtu	13,028	8.8%
Energy - Industrial	Electricity	5,568,251	kWh/yr	0.00022356	MT CO_2/kWh	1,245	0.8%
	Natural Gas	275,842	therms/yr	0.00530720	MT CO_2/Mmbtu	1,464	1.0%
Energy	**Subtotal**					**52,197**	**35.4%**
Transportation	**Subtotal**					**91,441**	**62.0%**
Waste - Residential	Solid Waste	102	tons/yr	0.23402673	MT CO_2/ton	24	0.0%
	Alt Daily Cover	0	tons/yr	0.31372503	MT CO_2/ton	0	0.0%
Waste - Commercial & Industrial	Solid Waste	8,515	tons/yr	0.22517067	MT CO_2/ton	1,917	1.3%
	Alt Daily Cover	39	tons/yr	0.31372503	MT CO_2/ton	12	0.0%
Waste	**Subtotal**					**1,953**	**1.3%**
Water - Residential	Water Demand	450	mgal/yr	0.96241805	MT CO_2/Mgal	433	0.3%
	Wastewater Treatment	27	mgal/yr	1.76577014	MT CO_2/Mgal	47	0.0%
Water - Commercial & Industrial	Water Demand	280	mgal/yr	0.96241805	MT CO_2/Mgal	270	0.2%
	Wastewater Treatment	243	mgal/yr	1.76577014	MT CO_2/Mgal	428	0.3%
Water	**Subtotal**					**1,178**	**0.8%**
Off-Road Mobile	Construction	11	building permits	57.75080436	MT CO_2/permit	651	0.4%
	Lawn/Garden Equipment	353	occupied units	0.05518301	MT CO_2/unit	19	0.0%
Off-Road Mobile	**Subtotal**					**670**	**0.5%**
Total						**147,440**	**100.0%**

Table A-17: 2005 Other Areas (Remainder of City) Emissions and Activity Summary

Emission Sector	Subsector	Activity	Units	Emission Factor (MT CO_2/kWh)	Units	Emissions (MT CO_2e/yr)	% of Area Total
Energy - Residential	Electricity	118,606,864	kWh/yr	0.00022356	MT CO_2/kWh	26,515	8.2%
	Natural Gas	8,723,753	therms/yr	0.00531560	MT CO_2/Mmbtu	46,372	14.3%
Energy - Commercial	Electricity	92,704,455	kWh/yr	0.00022356	MT CO_2/kWh	20,725	6.4%
	Natural Gas	2,744,030	therms/yr	0.00531560	MT CO_2/Mmbtu	14,586	4.5%
Energy - Industrial	Electricity	7,132,386	kWh/yr	0.00022356	MT CO_2/kWh	1,594	0.5%
	Natural Gas	353,327	therms/yr	0.00530720	MT CO_2/Mmbtu	1,875	0.6%
Energy	**Subtotal**					**111,668**	**34.4%**
Transportation	**Subtotal**					**198,457**	**61.2%**
Waste - Residential	Solid Waste	9,298	tons/yr	0.23402673	MT CO_2/ton	2,176	0.7%
	Alt Daily Cover	42	tons/yr	0.31372503	MT CO_2/ton	13	0.0%
Waste - Commercial & Industrial	Solid Waste	13,617	tons/yr	0.22517067	MT CO_2/ton	3,066	0.9%
	Alt Daily Cover	62	tons/yr	0.31372503	MT CO_2/ton	19	0.0%
Waste	**Subtotal**					**5,275**	**1.6%**
Water - Residential	Water Demand	2,106	mgal/yr	0.96241805	MT CO_2/Mgal	2,026	0.6%
	Wastewater Treatment	1,465	mgal/yr	1.76577014	MT CO_2/Mgal	2,586	0.8%
Water - Commercial & Industrial	Water Demand	246	mgal/yr	0.96241805	MT CO_2/Mgal	237	0.1%
	Wastewater Treatment	238	mgal/yr	1.76577014	MT CO_2/Mgal	421	0.1%
Water	**Subtotal**					**5,270**	**1.6%**
Off-Road Mobile	Construction	43	building permits	57.75080436	MT CO_2/permit	2,471	0.8%
	Lawn/Garden Equipment	23,073	occupied units	0.05518301	MT CO_2/unit	1,273	0.4%
Off-Road Mobile	**Subtotal**					**3,744**	**1.2%**
Total						**324,415**	**100.0%**

Table A-18: 2030 Emissions by GHG Strategy Area

GHG Strategy Area	2030 Emissions (MT CO_2e/yr)
Downtown	66,915
El Camino/San Antonio	176,651
Whisman	137,792
North Bayshore	236,556
Other (Remainder of City)	357,519
Direct Access (Not split by district)	25,591
Total	**1,001,022**

Note: Strategy areas may not sum to total shown due to rounding.

Table A-19: 2030 Downtown Emissions and Activity Summary

Emission Sector	Subsector	Activity	Units	Emission Factor ($MT CO_2/kWh$)	Units	Emissions ($MT CO_2e/yr$)	% of Area Total
Energy – Residential	Electricity	12,162,807	kWh/yr	0.00022356	MT CO_2/kWh	2,719	4.1%
	Natural Gas	998,783	therms/yr	0.00531560	MT CO_2/therm	5,309	8.1%
Energy – Commercial	Electricity	48,700,359	kWh/yr	0.00022356	MT CO_2/kWh	10,887	16.5%
	Natural Gas	1,343,223	therms/yr	0.00531560	MT CO_2/therm	7,140	10.8%
Energy – Industrial	Electricity	0	kWh/yr	0.00022356	MT CO_2/kWh	0	0.0%
	Natural Gas	0	therms/yr	0.00530720	MT CO_2/therm	0	0.0%
Energy	**Subtotal**					**26,056**	**39.5%**
Transportation	**Subtotal**					**38,945**	**58.2%**
Waste - Residential	Solid Waste	940	tons/yr	0.23402673	MT CO_2/ton	220	0.3%
	Alt Daily Cover	4	tons/yr	0.31372503	MT CO_2/ton	1	0.0%
Waste - Commercial & Industrial	Solid Waste	1,859	tons/yr	0.22517067	MT CO_2/ton	419	0.6%
	Alt Daily Cover	8	tons/yr	0.31372503	MT CO_2/ton	3	0.0%
Waste	**Subtotal**					**643**	**1.0%**
Water - Residential	Water Demand	172	mgal/yr	0.96241805	MT CO_2/Mgal	165	0.3%
	Wastewater Treatment	152	mgal/yr	1.76577014	MT CO_2/Mgal	268	0.4%
Water - Commercial & Industrial	Water Demand	63	mgal/yr	0.96241805	MT CO_2/Mgal	61	0.1%
	Wastewater Treatment	51	mgal/yr	1.76577014	MT CO_2/Mgal	90	0.1%
Water	**Subtotal**					**584**	**0.9%**
Off-Road Mobile	Construction	7	building permits	83.00683662	MT CO_2/permit	543	0.8%
	Lawn/Garden Equipment	2,432	occupied units	0.05943771	MT CO_2/unit	145	0.2%
Off-Road Mobile	**Subtotal**					**688**	**1.0%**
Total						**66,915**	**100.0%**

Table A-20: 2030 El Camino/San Antonio Emission and Activity Summary

Emission Sector	Subsector	Activity	Units	Emission Factor ($MT CO_2e/yr$)	Units	Emissions ($MT CO_2e/yr$)	% of Area Total
Energy - Residential	Electricity	49,039,110	kWh/yr	0.00022356	MT CO_2/kWh	10,963	6.3%
	Natural Gas	4,252,845	therms/yr	0.00531560	MT CO_2/therm	22,606	13.0%
Energy - Commercial	Electricity	101,129,900	kWh/yr	0.00022356	MT CO_2/kWh	22,608	13.0%
	Natural Gas	2,186,367	therms/yr	0.00531560	MT CO_2/therm	11,622	6.7%
Energy – Industrial	Electricity	256,905	kWh/yr	0.00022356	MT CO_2/kWh	57	0.0%
	Natural Gas	12,727	therms/yr	0.00530720	MT CO_2/therm	68	0.0%
Energy	**Subtotal**					**67,925**	**39.0%**
Transportation	**Subtotal**					**102,562**	**58.1%**
Waste - Residential	Solid Waste	3,599	tons/yr	0.23402673	MT CO_2/ton	842	0.5%
	Alt Daily Cover	16	tons/yr	0.31372503	MT CO_2/ton	5	0.0%
Waste - Commercial & Industrial	Solid Waste	4,700	tons/yr	0.22517067	MT CO_2/ton	1,058	0.6%
	Alt Daily Cover	21	tons/yr	0.31372503	MT CO_2/ton	7	0.0%
Waste	**Subtotal**					**1,912**	**1.1%**
Water - Residential	Water Demand	1,223	mgal/yr	0.96241805	MT CO_2/Mgal	1,177	0.7%
	Wastewater Treatment	643	mgal/yr	1.76577014	MT CO_2/Mgal	1,136	0.7%
Water - Commercial & Industrial	Water Demand	162	mgal/yr	0.96241805	MT CO_2/Mgal	156	0.1%
	Wastewater Treatment	137	mgal/yr	1.76577014	MT CO_2/Mgal	241	0.1%
Water	**Subtotal**					**2,710**	**1.6%**
Off-Road Mobile	Construction	11	building permits	83.00683662	MT CO_2/permit	917	0.5%
	Lawn/Garden Equipment	10,529	occupied units	0.05943771	MT CO_2/unit	626	0.4%
Off-Road Mobile	**Subtotal**					**1,542**	**0.9%**
Total						**176,651**	**100.0%**

Table A-21: 2030 Whisman/Pioneer Emissions and Activity Summary

Emission Sector	Subsector	Activity	Units	Emission Factor ($MT CO_2e/yr$)	Units	Emissions ($MT CO_2e/yr$)	% of Area Total
Energy - Residential	Electricity	443,412	kWh/yr	0.00022356	MT CO_2/kWh	99	0.1%
	Natural Gas	40,983	therms/yr	0.00531560	MT CO_2/therm	218	0.2%
Energy - Commercial	Electricity	168,844,683	kWh/yr	0.00022356	MT CO_2/kWh	37,746	27.8%
	Natural Gas	2,666,505	therms/yr	0.00531560	MT CO_2/therm	14,174	10.4%
Energy - Industrial	Electricity	4,316,533	kWh/yr	0.00022356	MT CO_2/kWh	965	0.7%
	Natural Gas	213,834	therms/yr	0.00530720	MT CO_2/therm	1,135	0.8%
Energy	**Subtotal**					**54,337**	**40.0%**
Transportation	**Subtotal**					**79,530**	**57.7%**
Waste - Residential	Solid Waste	30	tons/yr	0.23402673	MT CO_2/ton	7	0.0%
	Alt Daily Cover	0	tons/yr	0.31372503	MT CO_2/ton	0	0.0%
Waste - Commercial & Industrial	Solid Waste	7,371	tons/yr	0.22517067	MT CO_2/ton	1,660	1.2%
	Alt Daily Cover	33	tons/yr	0.31372503	MT CO_2/ton	11	0.0%
Waste	**Subtotal**					**1,677**	**1.2%**
Water - Residential	Water Demand	6	mgal/yr	0.96241805	MT CO_2/Mgal	6	0.0%
	Wastewater Treatment	6	mgal/yr	1.76577014	MT CO_2/Mgal	11	0.0%
Water - Commercial & Industrial	Water Demand	278	mgal/yr	0.96241805	MT CO_2/Mgal	267	0.2%
	Wastewater Treatment	233	mgal/yr	1.76577014	MT CO_2/Mgal	412	0.3%
Water	**Subtotal**					**696**	**0.5%**
Off-Road Mobile	Construction	19	building permits	83.00683662	MT CO_2/permit	1,545	1.1%
	Lawn/Garden Equipment	107	occupied units	0.05943771	MT CO_2/unit	6	0.0%
Off-Road Mobile	**Subtotal**					**1,551**	**1.1%**
Total						**137,792**	**100.0%**

Table A-22: 2030 North Bayshore Emissions and Activity Summary

Emission Sector	Subsector	Activity	Units	Emission Factor (MT CO_2e/yr)	Units	Emissions (MT CO_2e/yr)	% of Area Total
Energy - Residential	Electricity	1,245,943	kWh/yr	0.00022356	MT CO_2/kWh	279	0.1%
	Natural Gas	125,631	therm/yr	0.00531560	MT CO_2/therm	668	0.3%
Energy - Commercial	Electricity	263,015,476	kWh/yr	0.00022356	MT CO_2/kWh	58,800	24.9%
	Natural Gas	4,261,078	therm/yr	0.00531560	MT CO_2/therm	22,650	9.6%
Energy - Industrial	Electricity	3,562,603	kWh/yr	0.00022356	MT CO_2/kWh	796	0.3%
	Natural Gas	176,486	therm/yr	0.00530720	MT CO_2/therm	937	0.4%
Energy	**Subtotal**					**84,397**	**35.6%**
Transportation	**Subtotal**					**146,606**	**62.0%**
Waste - Residential	Solid Waste	397	tons/yr	0.23402673	MT CO_2/ton	23	0.0%
	Alt Daily Cover	2	tons/yr	0.31372503	MT CO_2/ton	0	0.0%
Waste - Commercial & Industrial	Solid Waste	8,131	tons/yr	0.22517067	MT CO_2/ton	1,788	0.8%
	Alt Daily Cover	37	tons/yr	0.31372503	MT CO_2/ton	11	0.0%
Waste	**Subtotal**					**1,822**	**0.8%**
Water - Residential	Water Demand	611	mgal/yr	0.96241805	MT CO_2/Mgal	531	0.2%
	Wastewater Treatment	87	mgal/yr	1.76577014	MT CO_2/Mgal	46	0.0%
Water - Commercial & Industrial	Water Demand	408	mgal/yr	0.96241805	MT CO_2/Mgal	377	0.2%
	Wastewater Treatment	327	mgal/yr	1.76577014	MT CO_2/Mgal	555	0.2%
Water	**Subtotal**					**1,509**	**0.6%**
Off-Road Mobile	Construction	30	building permits	83.00683662	MT CO_2/permit	2,470	1.0%
	Lawn/Garden Equipment	345	occupied units	0.059437710	MT CO_2/unit	21	0.0%
Off-Road Mobile	**Subtotal**					**2,491**	**1.1%**
Total						**236,556**	**100%**

Table A-23: 2030 Other Areas (Remainder of City) Emissions and Activity Summary

Emission Sector	Subsector	Activity	Units	Emission Factor (MT CO_2e/yr)	Units	Emissions (MT CO_2e/yr)	% of Area Total
Energy - Residential	Electricity	132,543,741	kWh/yr	0.00022356	MT CO_2/kWh	29,631	8.4%
	Natural Gas	10,785,205	therms/yr	0.00531560	MT CO_2/therm	57,330	16.3%
Energy - Commercial	Electricity	120,433,573	kWh/yr	0.00022356	MT CO_2/kWh	26,924	7.6%
	Natural Gas	3,426,504	therms/yr	0.00531560	MT CO_2/therm	18,214	5.2%
Energy - Industrial	Electricity	5,301,350	kWh/yr	0.00022356	MT CO_2/kWh	1,185	0.3%
	Natural Gas	262,621	therms/yr	0.00530720	MT CO_2/therm	1,394	0.4%
Energy	**Subtotal**					**134,678**	**38.2%**
Transportation	**Subtotal**					**208,676**	**58.4%**
Waste - Residential	Solid Waste	10,332	tons/yr	0.23402673	MT CO_2/ton	2,418	0.7%
	Alt Daily Cover	47	tons/yr	0.31372503	MT CO_2/ton	15	0.0%
Waste - Commercial & Industrial	Solid Waste	12,816	tons/yr	0.22517067	MT CO_2/ton	2,886	0.8%
	Alt Daily Cover	58	tons/yr	0.31372503	MT CO_2/ton	18	0.0%
Waste	**Subtotal**					**5,337**	**1.5%**
Water - Residential	Water Demand	2,400	mgal/yr	0.96241805	MT CO_2/Mgal	2,310	0.7%
	Wastewater Treatment	1,645	mgal/yr	1.76577014	MT CO_2/Mgal	2,904	0.8%
Water - Commercial & Industrial	Water Demand	249	mgal/yr	0.96241805	MT CO_2/Mgal	239	0.1%
	Wastewater Treatment	232	mgal/yr	1.76577014	MT CO_2/Mgal	410	0.1%
Water	**Subtotal**					**5,864**	**1.7%**
Off-Road Mobile	Construction	17	building permits	83.00683662	MT CO_2/permit	1,415	0.4%
	Lawn/Garden Equipment	26,071	occupied units	0.05943771	MT CO_2/unit	1,550	0.4%
Off-Road Mobile	**Subtotal**					**2,965**	**0.8%**
Total						**357,519**	**100.0%**

Table 24- City of Mountain View - Modeled Energy Consumption

COMMUNITYWIDE - COMMERCIAL	2005 Land Use	2005 Baseline Energy Consumption				2030 Land Use	2030 Baseline Energy Consumption			
	Sq Ft	kWh/sf/year	Total kWh/year	kBTU/sf/year	Total kBTU/year	Sq Ft	kWh/sf/year	Total kWh/year	kBTU/sf/year	Total kBTU/year
NewOff (and OFF)		21.35	-	20.52	-	12,644,263	21.35	269,905,771	20.52	259,433,306
All Warehouses	-	5.82	-	4.26	-	0	5.82	0	4.26	0
MIN (& 25% RE2)	288,300	44.34	12,784,136	25.77	7,430,789	747,768	44.34	33,158,366	25.77	19,273,326
HOS	724,006	23.03	16,672,563	118.71	85,949,606	1,133,073	23.03	26,092,644	118.71	134,511,562
MED	368,144	23.03	8,477,698	118.71	43,703,825	340,326	23.03	7,837,099	118.71	40,401,441
RDO	8,219,006	23.51	193,250,111	26.39	216,873,167	7,002,838	23.51	164,654,853	26.39	184,782,400
MOT	642,688	9.33	5,996,738	46.95	30,176,337	807,543	9.33	7,534,953	46.95	37,916,827
MMR	89,100	9.33	831,367	46.95	4,183,541	0	9.33	0	46.95	0
RES	335,130	35.97	12,055,625	212.55	71,231,358	248,294	35.97	8,931,876	212.55	52,774,502
FFD	36,314	35.97	1,306,323	212.55	7,718,484	29,552	35.97	1,063,074	212.55	6,281,231
GAS	31,099	12.82	398,578	3.01	93,493	22,418	12.82	287,319	3.01	67,395
MHR	33,500	12.82	429,351	3.01	100,711	0	12.82	0	3.01	0
MMR	17,800	12.82	228,133	3.01	53,512	0	12.82	0	3.01	0
MOR	151,492	12.82	1,941,587	3.01	455,430	0	12.82	0	3.01	0
RCE	114,500	12.82	1,467,482	3.01	344,221	124,500	12.82	1,595,646	3.01	374,284
RCF	49,031	12.82	628,403	3.01	147,402	18,510	12.82	237,232	3.01	55,647
RE1	1,878,149	12.82	24,071,174	3.01	5,646,271	1,409,729	12.82	18,067,698	3.01	4,238,062
RE2	683,143	12.82	8,755,454	3.01	2,053,729	2,095,445	12.82	26,856,139	3.01	6,299,529
SER	2,068,736	12.82	26,513,819	3.01	6,219,232	1,424,555	12.82	18,257,709	3.01	4,282,632
DYC	-19,364	6.65	(128,863)	22.71	(439,822)	1,455	6.65	9,683	22.71	33,048
OFF (& 50% LIN)	4,654,631	17.37	80,851,361	9.75	45,368,795	0	17.37	0	9.75	0
MOR	371,178	17.37	6,447,395	9.75	3,617,880	0	17.37	0	9.75	0
WHOLE CITY - INDUSTRIAL										
IND	2,389,399	9.03	21,576,273	27.41	65,493,427	1,768,350	9.03	15,968,201	27.41	48,470,474
50% LIN	2,378,133	9.03	21,474,541	27.41	65,184,626	1,556,199	9.03	14,052,472	27.41	42,655,401
Total Commercial	**20,736,583**		**402,978,435**		**530,927,961**	**28,050,269**		**584,490,062**		**750,725,191**
Total Industrial	**4,767,532**		**43,050,814**		**130,678,052**	**3,324,549**		**30,020,673**		**91,125,874**

	Commercial kWh	Commercial kBTU
2005 Empirical Inventory Values	484,081,502	978,345,500
Calibration Factor	20.1%	84.3%

COMMUNITYWIDE- RESIDENTIAL	2005 Land Use	2005 Baseline Energy Consumption				2030 Land Use	2030 Baseline Energy Consumption			
	Units	kWh/unit/year	Total kWh/year	therms/unit/year	Total therms/year	Units	kWh/unit/year	Total kWh/year	therms/unit/year	Total therms/year
Single Family	7,342	7,514	55,167,494	554	4,067,648	7,995	7,514	60,071,715	402	3,211,232
Townhome	3,145	4,562	14,347,668	322	1,014,008	3,387	4,562	15,451,563	353	1,195,528
2-4 Unit Apt	2,893	4,197	12,141,129	301	871,776	3,813	4,197	16,005,118	347	1,322,760
5+ Unit Apt	17,517	3,882	68,001,726	196	3,434,788	23,160	3,882	89,908,914	309	7,166,639
Mobile Home	1,129	4,395	4,961,955	446	503,666	1,129	4,395	4,961,955	382	431,784
Total	**32,026**		**154,619,973**		**9,891,886**	**39,485**		**186,399,266**		**13,327,943**

	Residential kWh	Residential kBTU
2005 Empirical Inventory Values	162,405,140	12,052,342
Calibration Factor	5.0%	21.8%

Table 25 - City of Mountain View - Modeled Solid Waste Generation

COMMUNITYWIDE- COMMERCIAL	2005 Land Use	2005 Baseline Waste Disposal		2030 Land Use	2030 Baseline Waste Disposal		
	Sq Ft	tons/sf/year	Total tons/years	Sq Ft	tons/sf/year	Total tons/years	Land Use Descriptions
All Office				12,644,263	0.00046	5,769	Small Office
MIN	288,300	0.00277	798	747,768	0.00277	2,069	*Grocery*
HOS	724,006	0.00530	3,836	1,133,073	0.00530	6,003	*Health*
MED	368,144	0.00530	1,950	340,326	0.00530	1,803	*Health*
RDO	8,219,006	0.00046	3,750	7,002,838	0.00046	3,195	*Large Office*
MOT	642,688	0.00060	385	807,543	0.00060	484	*Lodging*
MMR	89,100	0.00060	53	0	0.00060	0	*Lodging*
RES	335,130	0.00584	1,956	248,294	0.00584	1,449	*Restaurant*
FFD	36,314	0.00584	212	29,552	0.00584	173	*Restaurant*
GAS	31,099	0.00052	16	22,418	0.00052	12	*Retail*
MHR	33,500	0.00052	17	0	0.00052	0	*Retail*
MMR	17,800	0.00052	9	0	0.00052	0	*Retail*
MOR	151,492	0.00052	78	0	0.00052	0	*Retail*
RCE	114,500	0.00052	59	124,500	0.00052	64	*Retail*
RCF	49,031	0.00052	25	18,510	0.00052	10	*Retail*
RE1	1,878,149	0.00052	967	1,409,729	0.00052	726	*Retail*
RE2	683,143	0.00052	352	2,095,445	0.00052	1,079	*Retail*
SER	2,068,736	0.00052	1,066	1,424,555	0.00052	734	*Retail (75% Retail -- 25% Grocery)*
School	-19,364	0.00064	(12)	1,455	0.00064	1	*School*
OFF	4,654,631	0.00046	2,124	0	0.00046	0	*Small Office*
MOR	371,178	0.00046	169	0	0.00046	0	*Small Office*
IND & LIN	4,767,532	0.00530	25,259	3,324,549	0.00530	17,614	*Unrefrigerated Warehouse*
Total	**25,504,115**		**43,070**	**31,374,817**		**41,184**	

	Commercial tons/yr
Inventory Value	36,274
Calibration Factor	-15.8%

COMMUNITYWIDE- RESIDENTIAL	2005 Land Use	2005 Baseline Waste Disposal		2030 Land Use	2030 Baseline Waste Disposal	
	Units	tons/unit/year	Total tons/year	Units	tons/unit/year	Total tons/year
Single Family	7,342	0.62	4,538	7,995	0.62	4,942
Townhome	3,145	0.23	710	3,387	0.23	764
2-4 Unit Apt	2,893	0.23	653	3,813	0.23	861
5+ Unit Apt	17,517	0.23	3,953	23,160	0.23	5,226
Mobile Home	1,129	0.23	255	1,129	0.23	255
Total	**32,026**		**10,108**	**39,485**		**12,048**

	Residential tons/yr
Inventory Value	12,585
Calibration Factor	24.5%

Table 26 - City of Mountain View - Modeled Water Consumption

COMMUNITYWIDE- COMMERCIAL	2005 Land Use	2005 Baseline Water Consumption - **Total**		2005 Baseline Water Consumption - **Indoor**			2005 Baseline Water Consumption - **Outdoor**			2030 Land Use	2030 Baseline Water Consumption - **Total**		2030 Baseline Water Consumption - **Indoor**			2005 Baseline Water Consumption - **Outdoor**		
	Sq Ft	Mgal/Sq Ft/year	Total Mgal/year	% Indoor	Mgal/Sq Ft/year	Total Mgal/year	% Outdoor	Mgal/Sq Ft/year	Total Mgal/year	Sq Ft	Mgal/Sq Ft/year	Total Mgal/year	% Indoor	Mgal/Sq Ft/year	Total Mgal/year	% Outdoor	Mgal/Sq Ft/year	Total Mgal/year
NewOff (and OFF)	0	0.000034	0	62.0%	0.000021	0	38%	0.000013	0	12,644,263	0.000034	431	62%	0.000021	267	38%	0.000013	164
MIN	323,178	0.000034	11	97.0%	0.000033	11	3%	0.000001	0	747,768	0.000034	25	97%	0.000033	25	3%	0.000001	1
HOS	1,133,073	0.000034	38	84.0%	0.000028	32	16%	0.000005	6	1,133,073	0.000034	39	84%	0.000029	32	16%	0.000005	6
MED	362,144	0.000034	12	84.0%	0.000028	10	16%	0.000005	2	340,326	0.000034	12	84%	0.000029	10	16%	0.000005	2
Large Office	8,219,006	0.000034	277	62.0%	0.000021	172	38%	0.000013	105	7,002,838	0.000034	239	62%	0.000021	148	38%	0.000013	91
MOT	628,688	0.000034	21	90.0%	0.000030	19	10%	0.000003	2	807,543	0.000034	28	90%	0.000031	25	10%	0.000003	3
MMR	89,100	0.000034	3	90.0%	0.000030	3	10%	0.000003	0	0	0.000034	0	90%	0.000031	0	0%	0.000003	0
RES	335,130	0.000034	11	94.0%	0.000032	11	6%	0.000002	1	248,294	0.000034	8	94%	0.000032	8	6%	0.000002	1
FFD	39,636	0.000034	1	94.0%	0.000032	1	6%	0.000002	0	29,552	0.000034	1	94%	0.000032	1	6%	0.000002	0
GAS	29,880	0.000034	1	62.0%	0.000021	1	38%	0.000013	0	22,418	0.000034	1	62%	0.000021	0	38%	0.000013	0
MHR	33,500	0.000034	1	62.0%	0.000021	1	38%	0.000013	0	0	0.000034	0	62%	0.000021	0	0%	0.000013	0
MMR	17,800	0.000034	1	62.0%	0.000021	0	38%	0.000013	0	0	0.000034	0	62%	0.000021	0	0%	0.000013	0
MOR	151,492	0.000034	5	62.0%	0.000021	3	38%	0.000013	2	0	0.000034	0	62%	0.000021	0	0%	0.000013	0
RCE	114,500	0.000034	4	62.0%	0.000021	2	38%	0.000013	1	124,500	0.000034	4	62%	0.000021	3	38%	0.000013	2
RCF	49,031	0.000034	2	62.0%	0.000021	1	38%	0.000013	1	18,510	0.000034	1	62%	0.000021	0	38%	0.000013	0
RE1	1,889,309	0.000034	64	62.0%	0.000021	39	38%	0.000013	24	1,409,729	0.000034	48	62%	0.000021	30	38%	0.000013	18
RE2	787,775	0.000034	27	62.0%	0.000021	16	38%	0.000013	10	2,095,445	0.000034	71	62%	0.000021	44	38%	0.000013	27
SER	1,758,988	0.000034	59	62.0%	0.000021	37	38%	0.000013	23	1,424,555	0.000034	49	62%	0.000021	30	38%	0.000013	18
School	21,636	0.000034	1	28.0%	0.000009	0	72%	0.000024	1	1,455	0.000034	0	28%	0.000010	0	72%	0.000025	0
OFF	4,600,470	0.000034	155	62.0%	0.000021	96	38%	0.000013	59	0	0.000034	0	62%	0.000021	0	0%	0.000013	0
MOR	395,178	0.000034	13	62.0%	0.000021	8	38%	0.000013	5	0	0.000034	0	62%	0.000021	0	0%	0.000013	0
IND & LIN	4,533,407	0.000057	257	100.0%	0.000057	257	0%	0.000000	0	3,324,549	0.000054	179	100%	0.000054	179	0%	0.000000	0
Total	**25,512,920**		**964**			**721**			**243**	**31,374,817**		**1,136**			**803**			**333**
Percent of Total			*100%*			*75%*			*25%*			*100%*			*71%*			*29%*

	Commerical&Industrial Mgal/year
2005 Empirical Inventory Values	969
Calibration Factor	0.6%

COMMUNITYWIDE- RESIDENTIAL		2005 Baseline Water Consumption - **Total**		2005 Baseline Water Consumption - **Indoor**			2005 Baseline Water Consumption - **Outdoor**			2030 Land Use	2030 Baseline Water Comsuption - **Total**		2030 Baseline Water Consumption - **Indoor**			2030 Baseline Water Consumption - **Outdoor**		
	Units	Mgal/Unit/year	Total Mgal/year		Mgal/Unit/year	Total Mgal/year		Mgal/Unit/year	Total Mgal/year	Sq Ft	Mgal/Sq Ft/year	Total Mgal/year	% Indoor	Mgal/Sq Ft/year	Total Mgal/year	% Outdoor	Mgal/Sq Ft/year	Total Mgal/year
Single Family	7,411	0.101644	753	61.3%	0.062342	462	38.7%	0.039302	291	7,995	0.101644	813	61%	0.062342	498	39%	0.0393023	314
Townhome	3,138	0.101644	319	61.3%	0.062342	196	38.7%	0.039302	123	3,387	0.101644	344	61%	0.062342	211	39%	0.0393023	133
2-4 Unit Apt	2,909	0.054769	159	86.0%	0.047102	137	14.0%	0.007668	22	3,813	0.054769	209	86%	0.047102	180	14%	0.0076677	29
5+ Unit Apt	17,666	0.054769	968	86.0%	0.047102	832	14.0%	0.007668	135	23,160	0.054769	1,268	86%	0.047102	1,091	14%	0.0076677	178
Mobile Home	1,129	0.101644	115	61.3%	0.062342	70	38.7%	0.039302	44	1,129	0.101644	115	61%	0.062342	70	39%	0.0393023	44
Total	**32,253**		**2,314**			**1,697**			**617**	**39,485**		**2,749**			**2,050**			**699**
Percent of Total			*100%*			*73%*			*27%*			*100%*			*75%*			*25%*

	Residential Mgal/year
Inventory Values	2,346
Calibration Factor	1.4%

Table 27 - City of Mountain View - Modeled Wastewater Generation

COMMUNITYWIDE - COMMERCIAL	2005 Land Use	2005 Baseline Water Consumption - Indoor		Wastewater Generation to Water Consumption Ratio	2005 Baseline Wastewater Generation		2030 Land Use	2030 Baseline Water Consumption - Indoor		Wastewater Generation to Water Consumption Ratio	2030 Baseline Wastewater Generation	
	Sq Ft	MG/sf/year	Total MG/year		MG/sf/year	Total MG/year	Sq Ft	MG/sf/year	Total MG/year		MG/sf/year	Total MG/year
New OFF (and OFF)	-			88%	-	-	12,644,263	0.000021	267	88%	0.000019	235
MIN	288,300	0.000033	10	88%	0.000029	8	747,768	0.000033	25	88%	0.000029	22
HOS	724,006	0.000029	21	88%	0.000025	18	1,133,073	0.000029	32	88%	0.000025	29
MED	368,144	0.000029	11	88%	0.000025	9	340,326	0.000029	10	88%	0.000025	9
RDO	8,219,006	0.000021	174	88%	0.000019	153	7,002,838	0.000021	148	88%	0.000019	130
MOT	642,688	0.000031	20	88%	0.000027	17	807,543	0.000031	25	88%	0.000027	22
MMR	89,100	0.000031	3	88%	0.000027	2	0	0.000031	0	88%	0.000027	0
RES	335,130	0.000032	11	88%	0.000028	9	248,294	0.000032	8	88%	0.000028	7
FFD	36,314	0.000032	1	88%	0.000028	1	29,552	0.000032	1	88%	0.000028	1
GAS	31,099	0.000021	1	88%	0.000019	1	22,418	0.000021	0	88%	0.000019	0
MHR	33,500	0.000021	1	88%	0.000019	1	0	0.000021	0	88%	0.000019	0
MMR	17,800	0.000021	0	88%	0.000019	0	0	0.000021	0	88%	0.000019	0
MOR	151,492	0.000021	3	88%	0.000019	3	0	0.000021	0	88%	0.000019	0
RCE	114,500	0.000021	2	88%	0.000019	2	124,500	0.000021	3	88%	0.000019	2
RCF	49,031	0.000021	1	88%	0.000019	1	18,510	0.000021	0	88%	0.000019	0
RE1	1,878,149	0.000021	40	88%	0.000019	35	1,409,729	0.000021	30	88%	0.000019	26
RE2	683,143	0.000021	14	88%	0.000019	13	2,095,445	0.000021	44	88%	0.000019	39
SER	2,068,736	0.000021	44	88%	0.000019	38	1,424,555	0.000021	30	88%	0.000019	26
School	(19,364)	0.000010	0	88%	0.000008	(0)	1,455	0.000010	0	88%	0.000008	0
OFF	4,654,631	0.000021	98	88%	0.000019	86	0	0.000021	0	88%	0.000019	0
MOR	371,178	0.000021	8	88%	0.000019	7	0	0.000021	0	88%	0.000019	0
IND & LIN	4,767,532	0.000054	257	88%	0.000047	226	3,324,549	0.000054	179	88%	0.000047	158
Total	**25,504,115**		**718**			**631**	**31,374,817**		**803**			**706**

	Com/Ind MG
2005 Invenory Value	631
Calibration Factor	0%

COMMUNITYWIDE - RESIDENTIAL	2005 Land Use	2005 Baseline Water Consumption - Indoor		Wastewater Generation to Water Consumption Ratio	2005 Baseline Wastewater Generation		2030 Land Use	2030 Baseline Water Consumption - Indoor		Wastewater Generation to Water Consumption Ratio	2030 Baseline Wastewater Generation	
	Units	MG/unit/year	Total MG/year		MG/unit/year	Total MG/year	Units	MG/unit/year	Total MG/year		MG/unit/year	Total MG/year
Single Family	7,342	0.062342	458	88%	0.054792	402	7,995	0.062342	498	88%	0.054792	438
Townhome	3,145	0.062342	196	88%	0.054792	172	3,387	0.062342	211	88%	0.054792	186
2-4 Unit Apt	2,893	0.047102	136	88%	0.041398	120	3,813	0.047102	180	88%	0.041398	158
5+ Unit Apt	17,517	0.047102	825	88%	0.041398	725	23,160	0.047102	1,091	88%	0.041398	959
Mobile Home	1,129	0.062342	70	88%	0.054792	62	1,129	0.062342	70	88%	0.054792	62
Total	**32,026**		**1,686**			**1,481**	**39,485**		**2,050**			**1,802**

	Residential MG
2005 Inventory Values	1,481
Calibration Factor	0%

APPENDIX B

GREENHOUSE GAS REDUCTIONS

Introduction

This appendix summarizes the assumptions and parameters used to calculate greenhouse gas (GHG) emission reduction performance of Greenhouse Gas Reduction Program (GGRP) measures.

Emissions Reduction Analysis

Energy Measures

E-1.1: Residential Energy Efficiency Retrofits

Measure	Performance	Participation Rate	GHG Reduction (MT CO_2e/yr)	Sources
E-1.1: Energy Efficiency Retrofits in Existing Residential	This measure estimates the reduction in energy-related emissions (i.e., electricity and natural gas) resulting from retrofitting existing residential units. The measure includes retrofitting both single- and multi-family units and utilizes two tiers of energy efficiency retrofits. Baseline electricity and natural gas consumption levels per unit type were identified using CEC's Residential Appliance Saturation Survey data for Forecast Climate Zone 4. Energy savings estimates were based on outputs from Lawrence Berkeley Laboratory's Home energy Saver ™ building energy modeling software. The model-derived energy savings estimates were downscaled in order to be conservative in emissions reduction calculations. Mitigated energy consumption levels were calculated by subtracting the electricity and natural gas savings from baseline levels (See Table E-1.1). The City selected participation rates based on the initial cost, annual savings and simple payback of the representative residential energy efficiency retrofit packages. The lower-cost tier (including installation of programmable thermostats, gas water heater upgrades, installation of high-efficiency light bulbs) would have an initial cost approximately $600, save approximately $350 per year, and have a simple payback of 2 to 3 years. The higher-cost tier (including all lower-cost tier measures plus gas furnace upgrades, duct sealing, foundation insulation, and building envelope sealing/weatherization) would have an initial cost approximately $3,500, save approximately $400 per year, and have a simple payback of 11 years.			
	15% energy savings with lower-cost tier package	10%(2020) and 30%(2030) of existing single-family homes with lower-cost tier	1,004 MT CO_2e/yr in 2020 2,640 MT CO_2e/yr in 2030	*Baseline Energy Consumption: Residential Appliance Saturation Survey, CEC, 2010* *Energy Savings from Retrofit Packages: Home Energy Saver ™, Lawrence Berkeley Laboratory, Berkeley, CA* *Cost/Savings Estimates: Home Energy Saver ™, Lawrence Berkeley Laboratory, Berkeley, CA* *Participation Rates: City of Mountain View, 2011*
	26% energy savings with higher-cost tier package	5%(2020) and 10%(2030) of existing single-family homes with higher-cost tier		
	15% energy savings with lower-cost tier package	10%(2020) and 30%(2030)of existing multi-family homes with lower-cost tier		
	23% energy savings with higher-cost tier package	5%(2020) and 10%(2030) of existing multi-family homes with high tier		
	6% energy savings	10%(2020) and 30%(2030) of existing mobile homes		
	For 2020, the City anticipates that 10% of existing single-family units will implement a lower-cost tier energy retrofit package that achieves a 15% energy savings, and 5% of existing single-family units will			

	implement a higher-cost tier energy retrofit package that achieves a 26% energy savings. For multi-family units, the measure assumes 10% will implement a lower-cost tier energy retrofit package that achieves a 15% savings and 5% will implement a higher-cost tier energy retrofit package that achieves a 23% energy savings. Lastly, the measure also assumes that 10% of existing mobile units will be retrofitted achieving a 6% energy savings. For 2030, the measure assumes that 30% of existing single-family units will implement a lower-cost tier energy retrofit package that achieves a 15% energy savings, and 10% of existing single-family units will implement a higher-cost tier energy retrofit package that achieves a 26% energy savings. For multi-family units, the measure assumes 30% will implement a lower-cost tier energy retrofit package that achieves a 15% savings and 10% will implement a higher-cost tier energy retrofit package that achieves a 23% energy savings. The measure also assumes that 30% of existing mobile homes will be retrofitted achieving a 6% energy savings.

Table E-1.1

	Building Area		Baseline Energy Consumption		Mitigated Energy Consumption		Emissions Reductions
Land Use	Percent of Land Use	2005 Units	kWH/Sq Ft/year	kBTU/Sq Ft/year	kWH/Sq Ft/year	kBTU/Sq Ft/year	(MT CO_2e)
Single Family	10%	7,342	8836.0	561.6	8653.8	495.9	286
Townhome	10%	3,145	5762.0	326.8	5656.6	287.8	72
Single Family	5%	7,342	8836.0	561.6	8526.7	450.1	242
Townhome	5%	3,145	5762.0	326.8	5583.1	260.6	61
2-4 Unit Apartment	10%	2,893	4595.0	305.5	4521.0	273.1	54
5+ Unit Apartment	10%	17,517	5248.0	198.8	5172.6	180.5	199
2-4 Unit Apartment	2%	2,893	4595.0	305.5	4479.6	254.9	17
5+ Unit Apartment	2%	17,517	5248.0	198.8	5130.3	170.3	62
Mobile Home	10%	1,129	5917.0	452.2	5882.1	438.2	9
Total							1004

E-1.2: Non-Residential Energy Efficiency Retrofits

Measure	Performance	Participation Rate	GHG Reduction (MT CO_2e/yr)	Sources
E-1.2: Energy Efficiency Retrofits in Existing Commercial	This measure estimates the reduction in energy-related emissions (i.e., electricity and natural gas) resulting from retrofitting existing nonresidential buildings. The measure includes building retrofits at two tiers of energy efficiency. Baseline electricity and natural gas consumption levels per square foot per non-residential use type were identified using CEC's Commercial End Use Survey data for Forecast Climate Zone 4. Cost-effective energy efficiency retrofit packages were estimated using AECOM's SSIMe building energy modeling software. Mitigated energy consumption levels were calculated by subtracting the electricity and natural gas savings from baseline levels (See Table E-1.2). The City selected participation rates based on the initial cost of the representative commercial energy efficiency retrofit packages. The lower-cost tier (including heating and cooling upgrades, installation of variable frequency drive motors, installation of low flow fixtures, water boiler upgrades) would cost approximately $6 per square foot. The higher-cost tier (including all lower-cost tier measures plus lighting systems upgrades and installation of lighting control systems) would have an initial cost of approximately $10 per square foot. It was assumed that State and utility energy efficiency rebates would help offset some of the associated costs. For 2020, the measure assumes that 10% of existing non-residential buildings (excluding warehouse buildings) will implement the lower-cost tier energy retrofit package that achieves a 15% energy savings, and 5% of existing commercial buildings (excluding warehouse buildings) will implement the higher-cost tier energy retrofit package that achieves a 19% energy savings. For 2030, the measure assumes that 35% of existing non-residential buildings (excluding warehouse buildings) will implement the lower-cost tier energy retrofit package that achieves a 15% energy savings, and 10% of existing commercial buildings (excluding warehouse buildings) will implement the higher-cost tier energy retrofit package that achieves a 19% energy savings.			
	15% energy savings with lower-cost tier package	15% (2020) and 35% (2030) of existing commercial square footage with lower-cost tier	1,074 MT CO_2e/yr in 2020	*Baseline Energy Consumption: Commercial End Use Survey, CEC, 2006*
	19% energy savings with higher-cost tier package	5% (2020) and 10% (2030) of existing commercial square footage with higher-cost tier	2,799 MT CO_2e/yr in 2030	*Energy Savings from Retrofit Packages: AECOM SSIMe™ Building Energy Analysis* *Participation Rates: City of Mountain View, 2011*

Table E-1.2

Land Use	Building Area		Baseline Energy Consumption		Mitigated Energy Consumption		Emissions Reductions (MT CO_2e)
	Percent of Land Use	2005 Sq Feet	kWH/Sq Ft/year	kBTU/Sq Ft/year	kWH/Sq Ft/year	kBTU/Sq Ft/year	
All Office	10%	13,219,584	12.8	27.4	10.4	13.7	403
All Warehouse	10%	4,766,907	11.1	16.1	22.4	0.0	30
Grocery	10%	288,300	14.2	27.0	35.3	29.5	12
Health	10%	976,185	36.3	32.1	14.0	40.9	60
Lodging	10%	719,638	15.0	46.6	9.2	24.2	30
Restaurant	10%	346,322	25.9	0.2	31.6	208.3	27
Retail	10%	3,712,712	33.2	214.0	9.5	11.2	89
Sub-Total							651

Land Use	Building Area		Baseline Energy Consumption		Mitigated Energy Consumption		Emissions Reductions (MT CO_2e)
	Percent of Land Use	2005 Sq Feet	kWH/Sq Ft/year	kBTU/Sq Ft/year	kWH/Sq Ft/year	kBTU/Sq Ft/year	
All Office	5%	13,219,584	12.8	27.4	10.3	13.0	262
All Warehouse	5%	4,766,907	11.1	16.1	22.4	0.0	20
Grocery	5%	288,300	14.2	27.0	35.1	28.7	8
Health	5%	976,185	36.3	32.1	13.6	39.2	39
Lodging	5%	719,638	15.0	46.6	8.9	23.3	20
Restaurant	5%	346,322	25.9	0.2	31.2	206.5	17
Retail	5%	3,712,712	33.2	214.0	9.4	10.7	58
Sub-Total							423

Total	1074

E-1.3: Non-Residential Lighting Retrofits

Measure	Performance	Participation Rate	GHG Reduction (MT CO_2e/yr)	Sources

This measure estimates the reduction in electricity-related emissions resulting from indoor and outdoor light retrofits within commercial land uses. Baseline lighting electricity loads per square foot per non-residential use type were identified using CEC's Commercial End Use Survey data for Forecast Climate Zone 4 (See Table 1.3).

Table 1.3

Commercial Use Type	Indoor and Exterior Lighting Energy kWh/SF/Year
Grocery	8.6
Health	5.7
Lodging	3.1
Large Office	5.0
Restaurant	6.7
Retail	6.4
Small Office	5.0
Warehouse	2.7

E-1.3: Non-Residential Lighting Retrofits

The measure assumes that indoor lighting retrofits would occur at two different performance tiers as identified with the State's *Database for Energy Efficient Resources*. The first tier of efficiency improvements would reduce indoor lighting loads by approximately 10%. The second tier would reduce indoor lighting loads by approximately 40%. For exterior lighting, a single tier of efficiency improvements was assumed to reduce exterior lighting loads by 25%. For 2020, the City assumes that 10% of total community-wide nonresidential square footage would implement a lower-cost 10% indoor lighting load reduction and 5% of total community-wide nonresidential square footage would implement a higher-cost 40% indoor lighting load reduction. It was also assumed that 10% of total community-wide nonresidential square footage would implement a 25% exterior lighting load reduction. For 2030, the measure assumes that 10% of total communitywide non-residential buildings would implement a 10% indoor lighting load reduction, and 50% of total communitywide non-residential buildings would implement a 40% indoor lighting load reduction. It was also assumed that 50% of total communitywide non-residential square footage would implement a 25% exterior lighting load reduction. All non-residential uses (office, retail, warehouse, and other uses) are included in these calculations. Participation rates also reflect the assumption that State and federal light bulb efficiency standards (i.e. Energy Independence and Security Act of 2007) will assist in the implementation of this measure.

10% indoor lighting load reduction	10% (2020) and 10% (2030) of commercial square footage with lower-cost tier reduction	746 MT CO_2e/yr in 2020 4,952 MT CO_2e/yr in 2030	*Baseline Energy Consumption: Commercial End Use Survey, CEC, 2006* *Energy Savings from Retrofit Packages: CEC/CPCU Database for Energy Efficient Resources, 2005* *Participation Rates: City of Mountain View, 2011*
40% indoor lighting load reduction	5% (2020) and 50% (2030) of commercial square footage with higher-cost tier reduction		
25% exterior lighting load reduction	10% (2020) and 50% (2030) of commercial square footage with exterior load reduction		

E-1.4: Energy Efficient Appliances in Residential Uses

Measure	Performance	Participation Rate	GHG Reduction (MT CO_2e/yr)	Sources
E-1.4: Energy Efficient Appliances in Residential Uses	This measure estimates the reduction in electricity-related emissions resulting from installing energy-efficient appliances in new and existing residential units. This measure focuses on installation of energy-efficient refrigerators, clothes washers, and dishwashers. The CAPCOA report "*Quantifying Greenhouse Gas Mitigation Measures*" provides a methodology for calculating the electricity reductions associated with the installation of energy efficient refrigerators, clothes washers, and dishwashers. The City selected participation rates on the assumption that City, State and utility outreach programs will increase the market share of Energy Star appliances above current levels. Baseline market share values from a *Northwestern Energy Alliance* study indicate that approximately 33% of consumers purchase Energy Star refrigerators, 83% purchase Energy Star dishwashers, and 36% purchase Energy Star clothes washers. The study shows a strong trend of increasing Energy Star Appliance market share over the past decade. For 2020 and 2030, the City assumes that additional outreach and rebates will further increase the Energy Star appliance market share in Mountain View. For existing residential units, the measure assumes use of energy efficient refrigerators will increase by 7% to a market share of 40%, use of energy efficient clothes washers will increase by 22% to a market share of 58%, and use of energy efficient dishwashers will increase by 12% to a market share of 95%. The City assumes that 60% of new residential units will install energy efficient refrigerators, 60% will install energy efficient clothes washers, and 95% will install energy efficient dishwashers.			
	Install Energy Star appliances in new and existing residential units	New Residential: 60% refrigerators, 60% clothes washers, 95% dishwashers Existing Residential: 7% increase in refrigerators, 22% increase in clothes washers, 12% increase in dishwashers	116 MT CO_2e/yr in 2020 507 MT CO_2e/yr in 2030	Quantification Methodology: *Energy Efficient Appliance Reduction: CAPCOA. 2010 (August). Quantifying Greenhouse Gas Mitigation Measures. Available: <http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>.* Participation Rates: *Energy Star Consumer Products Market Progress Report: Northwestern Energy Alliance, report #E06-156, 2006*

E-1.5: Smart Grid

Measure	Performance	Participation Rate	GHG Reduction (MT CO_2e/yr)	Sources
E-1.5: Smart Grid	This measure estimates the reduction in electricity-related emissions resulting from integration of Smart Grid for new and existing residential and commercial land uses. Literature indicates that integration of Smart Grid technologies reduces electricity use by more than 5% in existing residential and commercial buildings and 6% in new residential and commercial buildings. For 2020, the measure assumes that 25% of all new residential and commercial buildings and 5% of existing residential and commercial buildings will integrate Smart Grid technologies. For 2030, the measure assumes that 50% of all new residential and commercial buildings and 25% of existing residential and commercial buildings will integrate Smart Grid technologies.			
	6% electricity savings in new residential and commercial buildings 5% electricity savings in existing residential and commercial buildings	25% (2020) and 50% (2030) of new residential and commercial buildings 5% (2020) and 25% (2030) of existing residential and commercial buildings	873 MT CO_2e/yr in 2020 3,849 MT CO_2e/yr in 2030	Smart Grid Reduction: *SMART 2020: Enabling the low carbon economy in the information age, The Climate Group on behalf of the Globale Sustainability Initiative (GeSI)* *Estimating the Benefits of the GridWise Initiative Phase I Report Walter S. Baer, Brent Fulton, Sergej Mahnovski TR-160-PNNL, May 2004 Prepared for the Pacific Northwest National Laboratory* Participation Rates: *Pacific Northwest National Laboratory , Estimating the Benefits of the GridWise Initiative Phase I Report Walter S. Baer, Brent Fulton, Sergej Mahnovski TR-160-PNNL, May 2004* *City of Mountain View, 2011*

E-1.6: Exceed State Energy Standards in New Residential Development

Measure	Performance	Participation Rate	GHG Reduction (MT CO_2e/yr)	Sources
E-1.6: Exceed State Energy Standards in New Residential Development	The CAPCOA report "*Quantifying Greenhouse Gas Mitigation Measures*" provides a methodology for calculating the reduction in energy-related emissions (i.e., electricity and natural gas) resulting from increased energy efficiency in new residential construction. The methodology calculates the reduction in residential electricity and natural gas consumption for each percent increase over baseline (2008) Title 24 standards per residential building type and climate zone. Projections of new residential development were developed for the 2030 General Plan update and provided the building inventory used within this measures. Baseline electricity and natural gas consumption levels per residential unit type were identified using CEC's Residential Appliance Saturation Survey data for Forecast Climate Zone 4. Mitigated levels of electricity and natural gas consumption levels per unit type were calculated using the CAPCOA methodology. The measure assumes that all new single-family and multi-family dwelling units built prior to 2020 will exceed Title 24 energy standards by at least 15%. The measure assumes that residential buildings built between 2020 and 2030 will exceed Title 24 energy standards by at least 30%.			
	Construction Prior to 2020: Achieve a level energy efficiency 15% above 2008 Title 24 Standards Construction 2020 to 2030: Achieve a level energy efficiency 30% above 2008 Title 24 Standards	100% of new single-family and multi-family units	931 MT CO_2e/yr in 2020 3,256 MT CO_2e/yr in 2030	*Building Inventory: City of Mountain View, 2011* *Baseline Energy Consumption: Residential Appliance Saturation Survey, CEC, 2010* *Reduction Over Title 24: CAPCOA. 2010 (August). Quantifying Greenhouse Gas Mitigation Measures. Available: <http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>.*

E-1.7: Exceed State Energy Standards in New Non-Residential Development

Measure	Performance	Participation Rate	GHG Reduction (MT CO_2e/yr)	Sources
E-1.7: Exceed State Energy Standards in New Non-Residential Development	The same CAPCOA methodology described above can be used to calculate the reduction in energy-related emissions (i.e., electricity and natural gas) resulting from increased energy efficiency in new nonresidential construction. Projections of new nonresidential development were developed for the 2030 General Plan update and provided the building inventory used within this measure. Baseline electricity and natural gas consumption levels per residential unit type were identified using CEC's Commercial End Use Survey data for Forecast Climate Zone 4. Mitigated levels of electricity and natural gas consumption levels per unit type were calculated using the CAPCOA methodology. The measure assumes that all new nonresidential development built prior to 2020 will exceed Title 24 energy standards by at least 10%. The measure assumes that nonresidential buildings built between 2020 and 2030 will exceed Title 24 energy standards by at least 30%.			
	Construction Prior to 2020: Achieve a level energy efficiency 10% above 2008 Title 24 Standards Construction 2020 to 2030: Achieve a level energy efficiency 25% above 2008 Title 24 Standards	100% of new commercial buildings	937 MT CO_2e/yr in 2020 3,691 MT CO_2e/yr in 2030	*Building Inventory: City of Mountain View, 2011* *Baseline Energy Consumption: Commercial End Use Survey, CEC, 2006* *Reduction Over Title 24: CAPCOA. 2010 (August). Quantifying Greenhouse Gas Mitigation Measures. Available: <http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>.*

E-1.8: Building Shade Trees in Residential Development

Measure	Performance	Participation Rate	GHG Reduction (MT CO_2e/yr)	Sources
E-1.8: Building Shade Trees in Residential Development	This measure is based on estimates of the energy savings associated with building shade trees planted next to single-family residential units. Building energy savings were calculated using outputs from the Center for Urban Forest Research (CUFR) Tree Carbon Calculator. The measure assumes shade trees will be planted on the southwest side of buildings within 20 feet of the structure. The measure assumes that a variety of locally-common landscape tree species will be utilized. Tree age (and thus size) is factored into the measure and related to the assumed rate of development. Total single-family development is assumed to be distributed evenly per year between 2011 and 2030. The City will adopt an ordinance calling for the planting of 1 building shade tree at every new single-family units (were feasible). For purposes of the calculation the measure assumes 1 tree will be planted in 100% of new single-family units.			
	1 shade tree per new single-family home		17 MT CO_2e/yr in 2020 49 MT CO_2e/yr in 2030	*Building Energy Savings: The Center for Urban Forest Research (CUFR) Tree Carbon Calculator.* *Participation Rates: City of Mountain View, 2011*

E-2.1: Residential Solar Hot Water Heaters

Measure	Performance	Participation Rate	GHG Reduction (MT CO_2e/yr)	Sources
E-2.1: Residential Solar Hot Water Heaters	This measure estimates the reduction in natural gas-related emissions resulting from installation of solar hot water heaters in residential units. Baseline water heating-related natural gas consumption levels per residential unit type were identified using CEC's Residential Appliance Saturation Survey data for Forecast Climate Zone 4. In addition, CEC data identifies the energy savings potential of solar hot water heater for specific climates in California.			

Table E-2.1

Residential Type	Units	Hot water heater energy per unit (therms/year)	Solar Water Heater Effectiveness	Energy Savings per unit (therms/year)	Participation Rate (% of units)	Total Savings (therms/year)
Single-Family	7,727	211	70%	147.90	5%	57,140
Townhome	3,288	205	70%	143.35	5%	23,567
Apt 2-4 Unit	3,495	202	70%	141.07	5%	24,651
Apt 5+ Unit	21,200	198	70%	138.80	5%	147,126
Mobile Home	1,129	209	70%	146.38	5%	8,263
Total						**260,748**

The measure assumes that 70% of water heating natural gas can be reduced through the use of solar hot water heaters. For 2020, the measure assumes that 5% of total residential units will install solar hot water heaters to meet their hot water demands. For 2030, the measure assumes that 20% of total residential units will install solar hot water heaters to meet their hot water demands. Care should be taken to avoid double-counting between a solar hot water heater installed to help new residential units achieve the building code-mandated energy efficiency performance and solar hot water heaters installed in excess of that requirement. This measure assumes that an additional 5% of units in 2020 and 20% in 2030 will install solar hot water heaters.

70% reduction in water heating natural gas consumption	5% (2020) and 20% (2030) of residential units	1,362 MT CO_2e/yr in 2020 4,443 MT CO_2e/yr in 2030	*Baseline Hot Water Natural Gas Consumption: Residential Appliance Saturation Survey, CEC, 2010* *Solar Fraction: Solar Water Heating CEC 2013 Title 24 Pre-rulemaking Workshop, California Energy Commission, June 9, 2011*

E-2.2: Non-Residential Solar Hot Water Heaters

Measure	Performance	Participation Rate	GHG Reduction (MT CO_2e/yr)	Sources

E-2.2: Commercial Solar Hot Water Heaters

This measure estimates the reduction in natural gas-related emissions resulting from installation of solar hot water heaters in nonresidential buildings. Baseline water heating-related natural gas consumption levels per nonresidential use type were identified using CEC's Commercial End Use Survey data for Forecast Climate Zone 4. In addition, CEC data identifies the energy savings potential of solar hot water heater for specific climates in California.

Table E-2.2

Commercial Use Type	Square Footage	Water Heater Energy kBTU/SF/Year	Solar Water Heater Effectiveness	Energy Savings kBTU/SF/Year	Participation Rate % of SF	Total Savings kBTU/year
All Office	17,022,481	3.2	50%	1.61	5%	1,368,982
Grocery	309,486	4.5	50%	2.27	5%	35,153
Health	1,307,089	17.3	50%	8.67	5%	566,512
Large Office	771,161	6.9	50%	3.47	5%	133,865
Restaurant	312,061	29.95	50%	14.97	5%	233,619
Retail	5,300,519	1.91	50%	0.96	5%	253,735
Warehouse	3,840,228	17.59	50%	8.80	5%	1,688,814
Total						**4,280,679**

The measure assumes that 50% of water heating natural gas in nonresidential uses can be reduced through the use of solar hot water heaters. For 2020, the City assumes that 5% of total nonresidential water heating demand will be met through solar hot water heaters. For 2030, the measure assumes that 15% of total nonresidential water heating demand will be met through solar hot water heaters to. Care should be taken to avoid double-counting between a solar hot water heater installed to help new non residential buildings achieve the building code-mandated energy efficiency performance and solar hot water heaters installed in excess of that requirement. This measure assumes that an additional 5% in 2020 and 15% in 2030 of commercial water heating will be met through solar hot water heaters.

Measure	Performance	Participation Rate	GHG Reduction (MT CO_2e/yr)	Sources
	50% reduction in water heating natural gas consumption	5% (2020) and 15% (2030) of commercial hot water heating demand	129 MT CO_2e/yr in 2020 456 MT CO_2e/yr in 2030	*Baseline Hot Water Natural Gas Consumption: Commercial End Use Survey, CEC, 2006* *Solar Fraction: Solar Water Heating CEC 2013 Title 24 Pre-rulemaking Workshop, California Energy Commission, June 9, 2011*

E-2.3: Residential Photovoltaic Systems

Measure	Performance	Participation Rate	GHG Reduction (MT CO_2e/yr)	Sources
E-2.3: Residential Photovoltaic Systems	This measure estimates the reduction in electricity-related emissions resulting from installation of grid connected photovoltaic (PV) systems in residential uses. The measure uses National Renewable Energy Laboratory solar insolation data specific to Mountain View's geographic location and climate (5.30 kW/m²/day). The measure also assumes an average of PV system efficiency of 10%. For 2020, it was assumed that approximately 730 single-family and town-home units would install 2-kilowatt grid connected PV systems. For 2030, it was assumed that approximately 1,700 single-family and town-home units would install 2-kilowatt grid connected PV systems. **Table E-2.3** Photovoltaic System Size per Unit (kW): 2 Percentage of SFR Units: 0.05 Number of SFR Units in 2020: 434 Generation Potential (kwh/sf/year): 18 Electricity Generated (kwh/year): 1,561,838			
	PV system efficiency of 10%	434single-family units install 2-kilowatt PV systems in 2020 1,707 single-family units install 2-kilowatt PV systems in 2030	347 MT CO_2e/yr in 2020 573 MT CO_2e/yr in 2030	*Solar Insolation: National Renewable Energy Laboratory Renewable Resource Data Center, 2011* *Participation Rates: City of Mountain View, 2011*

E-2.4: Non-Residential Photovoltaic Systems

Measure	Performance	Participation Rate	GHG Reduction (MT CO_2e/yr)	Sources
E-2.4: Non-Residential Photovoltaic Systems	This measure estimates the reduction in electricity-related emissions resulting from installation of grid connected photovoltaic (PV) systems in multi-family residential units and non-residential uses. The measure utilized National Renewable Energy Laboratory solar insolation data specific to Mountain View's geographic location and climate (5.30 kW/m²/day). The measure also assumes an average of PV system efficiency of 10%. For 2020, it was assumed that multi-family and commercial buildings would cumulatively install 500,000 square feet of PV panels. For 2030, it was assumed that multi-family and commercial buildings would cumulatively install 1,000,000 square feet of PV panels. **Table E-2.4** Photovoltaic System Size (MW): 5.0 Area (Sq Ft): 500,000 Generation Potential (kWh/SF/Year): 18 Electricity Generated (kWh/Year): 9,000,000			
	PV system efficiency of 10%	500,000 (2020) 1,000,000 (2030) square feet of PV panels	1,574 MT CO_2e/yr in 2020 3,148 MT CO_2e/yr in 2030	*Solar Insolation: National Renewable Energy Laboratory Renewable Resource Data Center, 2011* *Participation Rates: City of Mountain View, 2011*

E-2.5: Landfill Gas-to-Energy

Measure	Performance	Participation Rate	GHG Reduction (MT CO_2e/yr)	Sources
E-2.5: Landfill Gas-to-Energy	This measure estimates the reduction in electricity-related emissions resulting from the use of landfill gas (i.e., methane) to generate electricity. Combustion of landfill gas is considered biogenic and energy obtained from its combustion would avoid emissions associated with electricity production at utility generation facilities. The City is installing two 65 kilowatt replacement microturbines capable of a producing approximately 867,000 kilowatt hours of electricity per year. The microturbines are anticipated to be in operation in mid-2012. The City sells the remainder of the landfill gas to a corporate user that owns three 970-kilowatt turbines. This measure assumes that the corporate user operates two of the turbines 90% of the time, generating approximately 15,295,000 kilowatt hours of electricity per year. To calculate the associated reduction in GHG emissions, this amount of electricity was multiplied by the appropriate PG&E emission factor.			
	Estimated net electricity generation of 16,162,000 kWh/year		2,827 MT CO_2e/yr in 2020 2,827 MT CO_2e/yr in 2030	*Methane Production Potential: City Of Mountain View, 2011* *Energy Production Potential: City Of Mountain View, 2011* *Displaced Electricity Emission Factors: CCAR derived PG&E data*

E-3.1: Energy Efficiency in Municipal Buildings

Measure	Performance	Participation Rate	GHG Reduction (MT CO_2e/yr)	Sources
E-3.1: Photovoltaic Systems on Municipal Buildings	The City has implemented a wide array of energy efficiency improvements within municipal buildings and facilities. City audits have identified electricity savings of approximately 680,471 kWh per year. To calculate the associated reduction in GHG emissions, this amount of electricity was multiplied by the appropriate PG&E emission factor.			
	Energy savings of 680,471 kWh/year kWh/year		154 MT CO_2e/yr in 2020 154 MT CO_2e/yr in 2030	*Energy Savings: City Of Mountain View, 2011* *Displaced Electricity Emission Factors: CCAR derived PG&E data*

E-4.1: Energy Efficiency in Streetlights and Traffic Signals

Measure	Performance	Participation Rate	GHG Reduction (MT CO_2e/yr)	Sources
E-4.1: Photovoltaic Systems on Municipal Buildings	The City has retrofitted existing streetlights and traffic signals with energy saving bulb technologies. City audits have identified electricity savings of approximately one million kWh per year. To calculate the associated reduction in GHG emissions, this amount of electricity was multiplied by the appropriate PG&E emission factor.			
	Electricity savings of 1,010,898 kWh/year		229 MT CO_2e/yr in 2020 229 MT CO_2e/yr in 2030	*Energy Savings: City Of Mountain View, 2011* *Displaced Electricity Emission Factors: CCAR derived PG&E data*

E-5.1: Renewable Energy Systems on Municipal Buildings				
Measure	**Performance**	**Participation Rate**	**GHG Reduction (MT CO_2e/yr)**	**Sources**
E-5.1: Photovoltaic Systems on Municipal Buildings	The City has installed approximately 225 kilowatts of PV generation systems on municipal buildings directly or through power purchase agreements. These systems generate approximately 344,000 kWh per year. To calculate the associated reduction in GHG emissions, this amount of electricity was multiplied by the appropriate PG&E emission factor. The decrease from 2020 to 2030 is a result of system degradation, assumed to occur at a rate of 0.5% per year.			
	225 kilowatts of PV systems on municipal buildings	344,000 kWh/year	78 MT CO_2e/yr in 2020 73 MT CO_2e/yr in 2030	*Energy Production Potential: City Of Mountain View, 2011* *Displaced Electricity Emission Factors: CCAR derived PG&E data*

Transportation Measure

T-1.1: Transportation Demand Management			
Measure		**GHG Reduction (MT CO_2e/yr)**	**Sources**
T-1.1: Transportation Demand Management	The GHG reduction potential of the transportation demand management (TDM) measure was calculated using traffic model outputs created to support the City of Mountain View General Plan update. The traffic model estimated the amount of vehicle miles traveled (VMT) under a business-as-usual 2030 Endorsed General Plan without Transportation Demand Management Measures (TDM) scenario and a 2030 Endorsed General Plan with TDM (incorporates transportation demand management measures recommended within the General Plan update). Fuel consumption for each scenario was calculated by applying fleet fuel efficiency factors for each five mile-per -hour speed bin to the VMT data outputs. Fuel consumption was converted to metric tons of carbon dioxide equivalent emissions per year (MT CO_2e/yr). 2020 values were obtained by interpolating between existing condition values and 2030 values. GHG reductions attributed to the reduction in community VMT amount to approximately 971 MT CO2e/yr in 2020 and 1,854 MT CO2e/yr in 2030.		
		1,024 MT CO_2e/yr in 2020 1,844 MT CO_2e/yr in 2030	*VMT Reductions*: Fehr & Peers Associates, 2011

TABLE T-1.1

Scenario	Community Vehicle Miles Travel (Miles/Year)	EMFAC Fuel Consumption (Gallons/Year)	GHG Emissions (MT CO_2e/Yr)
2030 GP without TDM	1,121,770,496	55,866,563 5,582,180	576,318
2030 GP with TDM	1,118,181,854	55,687,841 5,564,322	574,475
2020 GP without TDM	1,019,574,419	51,481,294 5,323,864	533,013
2020 GP with TDM	1,017,680,278	51,382,415 5,313,639	531,989
Difference Between: 2030 GP w/o TDM – GP w/ TDM	3,588,642	4,385,270 258,315	1,844
Difference Between: 2020 GP w/o TDM – GP w/ TDM	1,894,141	4,305,427 250,683	1,024

Waste Measure

WS-1: Zero-Waste Plan Implementation				
Measure	**Performance**	**Participation Rate**	**GHG Reduction (MT CO_2e/yr)**	**Sources**
WS-1.1: Establish 90% waste reduction interim target for 2020.	An inventory of the community's organic waste was created using Cal Recycle waste volume and characterization data. Using the first-order decay methodology from the 2006 IPCC guidelines, fugitive methane emissions from the organic landfill waste were calculated for base-case and mitigated scenarios. This measure assumes 90% of all waste will be diverted from landfills for 2020 and 100% of all waste will be diverted from landfills for 2030. This measure would apply to GHG emissions associated with new waste generated and would not apply to waste in place disposed prior to CAP implementation.			
	90% waste diversion rate by 2020 100% waste diversion rate by 2030		2,734 MT CO_2e/yr in 2020 6,718 MT CO_2e/yr in 2030	*CalRecycle Waste Characterization Data, 2011* *IPCC, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5 Chapter 3.*

Table WS-1.1A

Assumptions of Total Waste Disposed in Landfill per Sector per Year 2013 - 2020 (US Tons)								
Year	Total Waste	All Commercial	Commercial	Self-Haul	All Residential	SFR	MFR	Self-Haul
0 (2013)	49,000	26,014	19,323	6,691	22,986	13,791	6,896	2,299
1 (2014)	49,357	26,204	19,464	6,740	23,153	13,892	6,946	2,315
2 (2015)	49,717	26,395	19,606	6,789	23,322	13,993	6,997	2,332
3 (2016)	50,080	26,588	19,749	6,839	23,492	14,095	7,048	2,349
4 (2017)	50,445	26,782	19,893	6,889	23,664	14,198	7,099	2,366
5 (2018)	50,813	26,977	20,038	6,939	23,836	14,302	7,151	2,384
6 (2019)	51,184	27,174	20,184	6,990	24,010	14,406	7,203	2,401
7 (2020)	51,557	27,372	20,331	7,041	24,185	14,511	7,256	2,419

Table WS-1.1B

Baseline Mass of Degradable Organic Carbon disposed in Year t (DDOCmdt) – Commercial Waste															
Year	Newspaper	Office Paper	Corrugated Boxes	Coated Paper	Food	Grass	Leaves	Branches	Lumber	Textiles	Diapers	Construction /Demolition	Medical Waste	Sludge /Manure	Total
0 (2013)	19.0	148.1	275.7	151.3	354.4	14.9	58.2	56.1	416.6	139.8	73.6	31.0	0.0	0.0	1,738.8
1 (2014)	19.1	149.2	277.7	152.4	357.0	15.0	58.7	56.5	419.7	140.8	74.1	31.2	0.0	0.0	1,751.5
2 (2015)	19.3	150.2	279.7	153.6	359.6	15.1	59.1	56.9	422.7	141.8	74.7	31.4	0.0	0.0	1,764.2
3 (2016)	19.4	151.3	281.8	154.7	362.2	15.2	59.5	57.4	425.8	142.9	75.2	31.6	0.0	0.0	1,777.1
4 (2017)	19.6	152.4	283.8	155.8	364.9	15.3	60.0	57.8	428.9	143.9	75.8	31.9	0.0	0.0	1,790.1
5 (2018)	19.7	153.6	285.9	156.9	367.5	15.4	60.4	58.2	432.0	145.0	76.3	32.1	0.0	0.0	1,803.1
6 (2019)	19.8	154.7	288.0	158.1	370.2	15.6	60.8	58.6	435.2	146.0	76.9	32.3	0.0	0.0	1,816.3
7 (2020)	20.0	155.8	290.1	159.2	372.9	15.7	61.3	59.1	438.4	147.1	77.5	32.6	0.0	0.0	1,829.5
Baseline Mass of Degradable Organic Carbon disposed in Year t (DDOCmdt) – Residential Waste															
Year	Newspaper	Office Paper	Corrugated Boxes	Coated Paper	Food	Grass	Leaves	Branches	Lumber	Textiles	Diapers	Construction /Demolition	Medical Waste	Sludge /Manure	Total
0 (2013)	39.8	142.6	114.8	181.7	613.4	23.6	57.3	24.1	177.3	167.7	196.1	14.4	0.0	0.6	1,753.5
1 (2014)	40.1	143.7	115.7	183.0	617.9	23.8	57.7	24.2	178.6	168.9	197.6	14.5	0.0	0.6	1,766.3
2 (2015)	40.4	144.7	116.5	184.4	622.4	24.0	58.1	24.4	179.9	170.1	199.0	14.6	0.0	0.6	1,779.2
3 (2016)	40.7	145.8	117.4	185.7	626.9	24.2	58.6	24.6	181.2	171.4	200.5	14.7	0.0	0.6	1,792.2
4 (2017)	41.0	146.8	118.2	187.1	631.5	24.3	59.0	24.8	182.6	172.6	201.9	14.8	0.0	0.6	1,805.2
5 (2018)	41.3	147.9	119.1	188.4	636.1	24.5	59.4	25.0	183.9	173.9	203.4	14.9	0.0	0.6	1,818.4
6 (2019)	41.6	149.0	119.9	189.8	640.7	24.7	59.9	25.1	185.2	175.2	204.9	15.0	0.0	0.7	1,831.7
7 (2020)	41.9	150.1	120.8	191.2	645.4	24.9	60.3	25.3	186.6	176.4	206.4	15.2	0.0	0.7	1,845.0

Table WS-1.1C

Baseline Decay and Methane Generation – From Commercial Waste 2013-2020				
Year	DDOCmd$_t$ disposed (Mg)	DDOCma$_t$ accumulated (Mg)	DDOCm decomp$_t$ decomposed (Mg)	CH_4 Generated (Mg CH_4/Year)
0 (2013)	1,739	1738.8	0.0	0.0
1 (2014)	1,751	3425.4	64.8	43.2
2 (2015)	1,764	5061.9	127.7	85.1
3 (2016)	1,777	6650.3	188.7	125.8
4 (2017)	1,790	8192.4	248.0	165.3
5 (2018)	1,803	9690.0	305.5	203.6
6 (2019)	1,816	11145.0	361.3	240.9
7 (2020)	1,830	12558.9	415.6	277.0
Baseline Decay and Methane Generation – From Residential Waste 2013-2020				
Year	DDOCmd$_t$ disposed (Mg)	DDOCma$_t$ accumulated (Mg)	DDOCm decomp$_t$ decomposed (Mg)	CH_4 Generated (Mg CH_4/Year)
0 (2013)	1,754	1,754	0	0
1 (2014)	1,766	3,454	65	44
2 (2015)	1,779	5,105	129	86
3 (2016)	1,792	6,707	190	127
4 (2017)	1,805	8,262	250	167
5 (2018)	1,818	9,772	308	205
6 (2019)	1,832	11,239	364	243
7 (2020)	1,845	12,665	419	279

Table WS-1.1D

Baseline Methane Generation in Year 2020										
Waste Type	Total Methane Generated (MT CH4/yr)	Total Methane Oxidized (MT CH4/yr)	Total Methane NOT Oxidized (MT CH4/yr)	Total Methane Recovered by MRS (MT CH4/yr)	Total Recovered Methane Emissions Destroyed by MRS (MT CH4/yr)	Total Recovered Methane Emissions Destroyed by MRS (MT CO2e/yr)	Total Recovered Methane Emissions NOT Destroyed by MRS (MT CH4/yr)	Total Methane NOT Recovered by MRS (MT CH4/yr)	Total Fugitive Methane Emissions (MT CH4/yr)	Total Fugitive Methane Emissions (MT CO2e/yr)
Commercial Waste										
Newspaper	3.0	0.30	2.72	2.04	2.00	46.06	0.04	0.68	0.72	16.61
Office Paper	23.6	2.36	21.23	15.93	15.61	358.96	0.32	5.31	5.63	129.42
Corrugated Boxes	43.9	4.39	39.54	29.65	29.06	668.36	0.59	9.88	10.48	240.97
Coated Paper	24.1	2.41	21.70	16.28	15.95	366.88	0.33	5.43	5.75	132.28
Food	56.5	5.65	50.82	38.12	37.35	859.12	0.76	12.71	13.47	309.75
Grass	2.4	0.24	2.14	1.60	1.57	36.10	0.03	0.53	0.57	13.02
Leaves	9.3	0.93	8.35	6.26	6.14	141.17	0.13	2.09	2.21	50.90
Branches	8.9	0.89	8.05	6.04	5.92	136.05	0.12	2.01	2.13	49.05
Lumber	66.4	6.64	59.74	44.81	43.91	1,009.97	0.90	14.94	15.83	364.14
Textiles	22.3	2.23	20.05	15.03	14.73	338.87	0.30	5.01	5.31	122.18
Diapers	11.7	1.17	10.56	7.92	7.76	178.45	0.16	2.64	2.80	64.34
Construction/Demolition	4.9	0.49	4.44	3.33	3.26	75.05	0.07	1.11	1.18	27.06
Medical Waste	0.0	-	-	-	-	-	-	-	-	-
Sludge/Manure	0.0	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Commercial Subtotal	**277.0**	**27.70**	**249.34**	**187.00**	**183.26**	**4,215.06**	**3.74**	**62.33**	**66.07**	**1,520**
Residential Waste										
Newspaper	6.3	0.6	5.7	4.3	4.2	96.5	0.1	1.4	1.5	34.8
Office Paper	22.7	2.3	20.5	15.3	15.0	345.7	0.3	5.1	5.4	124.6
Corrugated Boxes	18.3	1.8	16.5	12.3	12.1	278.4	0.2	4.1	4.4	100.4
Coated Paper	28.9	2.9	26.1	19.5	19.2	440.5	0.4	6.5	6.9	158.8
Food	97.7	9.8	88.0	66.0	64.6	1,486.9	1.3	22.0	23.3	536.1
Grass	3.8	0.4	3.4	2.5	2.5	57.3	0.1	0.8	0.9	20.7
Leaves	9.1	0.9	8.2	6.2	6.0	138.9	0.1	2.1	2.2	50.1
Branches	3.8	0.4	3.5	2.6	2.5	58.3	0.1	0.9	0.9	21.0
Lumber	28.3	2.8	25.4	19.1	18.7	429.9	0.4	6.4	6.7	155.0
Textiles	26.7	2.7	24.0	18.0	17.7	406.5	0.4	6.0	6.4	146.6
Diapers	31.2	3.1	28.1	21.1	20.7	475.4	0.4	7.0	7.5	171.4
Construction/Demolition	2.3	0.2	2.1	1.5	1.5	34.9	0.0	0.5	0.5	12.6
Medical Waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sludge/Manure	0.1	0.0	0.1	0.1	0.1	1.5	0.0	0.0	0.0	0.5
Residential Subtotal	**279.4**	**27.9**	**251.5**	**188.6**	**184.8**	**4,250.8**	**3.8**	**62.9**	**66.6**	**1,533**
Total	**556.4**	**55.6**	**500.8**	**375.6**	**368.1**	**8,465.9**	**7.5**	**125.2**	**132.7**	**3,052**

Table WS-1.1E

Impact of Organic Waste Diversion Programs of Solid Waste Emissions		
Baseline Fugitive Mehtane Emissions ($MT CO_2e/yr$)	**Effective Organic Waste Reduction (% Reduction)**	**Mitigated Fugitive Methane Emissions* ($MT CO_2e/yr$)**
3,038	90%	2,734
* Assumes implementation of organic waste diversion from 2013-2020.		

Water Measure

WR-1.1: Urban Water Management Plan Conservation Strategies

Measure	Performance	GHG Reduction ($MT CO_2e/yr$)	Sources
WR-1.1: Urban Water Management Plan Conservation Strategies	To estimate GHG reductions associated with implementation of the City's proposed water conservation strategies, water demand data for 2005, 2020, and 2030 from the City's Urban Water Management Plan were used to establish base-case and future year estimates under business-as-usual-and mitigated scenarios. Annual water savings were calculated by subtracting the mitigated scenario demand from the base-case scenario demand in both 2020 and 2030. The annual water savings were translated into GHG reductions by applying water-energy intensity factors (kWh/million gallons/year) and California-wide electricity-generation emissions factors (MT CO_2e/kWh/year). Separate water-energy intensity factors were applied to indoor and outdoor portions of water savings. The ratio of indoor water to outdoor water was based on Bay Area region-specific assumptions for residential uses (EBMUD) and LA region-specific assumptions for commercial and industrial uses (LADWP). LADWP data was used as it was best available data at the time of preparation.		

Table WR-1.1A

Urban Water Management Plan Scenario	2020	2030
Scenario A (Base-Case)	15,159	16,733
Scenario D (Plumbing Codes & Conservation)	13,686	14,557
Water Savings (Acre Feet/Year)	1,473	2,176

Table WR-1.1B

GHG Emission Reductions (indoor water)							
KWh/million gallons/year	KWh/acre-ft/year	acre-ft/year	Total KWh	MWh	Region	Emission Factor (lb CO_2e/MWh)	Emission Reduction (MT CO_2e/Year)
5,411	1763	867	1,529,026	1,529	CALI	633.982	**440**
GHG Emission Reductions (outdoor water)							
KWh/million gallons/year	KWh/acre-ft/year	acre-ft/year	Total KWh	MWh	Region	Emission Factor (lb CO_2e/MWh)	Emission Reduction (MT CO_2e/Year)
11,111	3620	606	2,193,129	2,193	CALI	633.982	**631**
TOTAL		**1,473**	**3,722,155**	**3,722**			**1,070**

Annual Water Savings in 2020 1,473 Acre Feet Annual Water Savings in 2030 2,176 Acre Feet	1,071 MT CO_2e/yr in 2020 1,669 MT CO_2e/yr in 2030	Urban Water Management Plan, City of Mountain View, 2011 Refining Estimates of Water-Related Energy Use in California. Navigant Consulting, Inc. 2006. Indoor/Outdoor Split (Residential): Water Supply Management Program 2040 Plan. East Bay Municipal Utility, 2009 Indoor/Outdoor Split (Commercial): Urban Water Management Plan. Los Angeles Department of Water & Power, 2010.

Carbon Sequestration Measure

C-1: Carbon Sequestration				
Measure	**Performance**	**Participation Rate**	**GHG Reduction (MT CO_2e/yr)**	**Sources**
C-1.1: Enhance the Urban Forest	This measure is based on extrapolating the carbon potential of a typical tree planting palette. The City's goal is that 4,000 net trees will be planted by public and private development by 2020 and 6,000 net trees by 2030. Carbon sequestration rates specific to the species and age of the planted trees were collected from the Center for Urban Forest Research (CUFR) Tree Carbon Calculator and used to calculate the annual sequestration potential of the trees from 2005 to 2020 and 2005 to 2030. For purposes of the calculation it was assumed that an equal number of trees will be planted each year between 2005 and 2020 and 2020 and 2030.			
	N/A	4,000 additional trees planted (net of tree planting and tree removal) by 2020 6,000 additional trees planted (net of tree planting and tree removal) by 2030	680 MT CO2e/yr in 2020 2,020 MT CO2e/yr in 2030	The Center for Urban Forest Research (CUFR) Tree Carbon Calculator.

APPENDIX C

BAY AREA AIR QUALITY MANAGEMENT DISTRICT QUALIFICATION STANDARDS

Introduction

In June 2010, the Bay Area Air Quality Management District adopted California Environmental Quality Act (CEQA) air quality thresholds of significance for use within its jurisdiction. BAAQMD has direct and indirect regulatory authority over sources of air pollution in the San Francisco Bay Area Air Basin (SFBAAB), of which a portion of Solano County is a part. The overall goal of this effort was to develop CEQA significance criteria that ensure that future development implements appropriate and feasible emission reduction measures to mitigate significant air quality and climate change impacts.

If a long-range plan includes goals, policies, performance standards, and implementation measures achieving greenhouse gas (GHG) emission reductions that can be shown to meet and/or exceed Assembly Bill (AB) 32 mandates, as outlined in Section 4.3 of the June 2010 BAAQMD CEQA Guidelines, subsequent projects consistent with the plan could be relieved of performing GHG analysis as part of their CEQA compliance. This approach is consistent with the State CEQA Guidelines, Section 15183.5

The Threshold of Significance for operational-related GHG impacts of plans employs either a GHG efficiency-based metric of 6.6 metric tons of carbon dioxide equivalent emissions per service population per year (MT CO2e/SP/yr), or a GHG Reduction Strategy option. Unlike other plan-level thresholds, the GHG efficiency threshold may only be applied to general plans.

Qualification Criteria

The City of Mountain View GGRP fulfills the following requirements of a BAAQMD-qualified GHG Reduction Strategy:

(A) Quantify GHG emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area.

The Mountain View GGRP includes an emissions inventory that quantifies an existing baseline level of emissions for 2005 and projected GHG emissions from forecast scenarios for 2020 and 2035 (See Chapter 3, Emissions Inventory, Projections, and Goals). The baseline year is based on the existing 2005 development pattern. Projected GHG emissions are based on anticipated growth through 2020 and 2035 as proposed within the General Plan.

Furthermore:

- The baseline inventory includes one complete calendar year of data for 2005. CO_2 is inventoried for the residential, commercial, industrial, transportation, waste and water sectors. CH_4 and N_2O emissions are also accounted for, where feasible.
- Projected emissions are directly related to the land uses proposed on the General Plan Land Use Diagram (See Appendix A, Emissions Inventory and Projections Methodology).

(B) Establish a level, based on substantial evidence, below which the contribution of GHG emissions from activities covered by the plan would not be cumulatively considerable.

The Mountain View GGRP establishes a goal to improve communitywide per- SP emissions efficiency by 15% -to 20% over 2005 levels by 2020 (to 5.1 - 5.4 MT CO_2e/SP/yr), and by 30% over 2005 levels by 2030 (to 4.5 MT CO_2e/SP/yr). The 2020 goal exceeds BAAQMD's plan-level efficiency threshold (6.6 MT CO2e/SP/yr), and the 2035 goal places the City on a trajectory to meet EO S-3-05 reduction goals. These goals will be adopted by resolution, as a component of the GGRP.

(C) Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area.

The Mountain View GGRP identifies and analyzes GHG reductions from local and state policies and regulations that may be planned or adopted but not implemented to understand the amount of reductions needed to achieve GHG reduction goals. Specifically, the GGRP identifies and analyzes the effects of statewide GHG emission reductions related to implementation of passenger vehicle and light-duty truck fuel efficiency standards, low carbon fuel standards, medium- and heavy-duty vehicle efficiency improvement programs, 2008 Title-24 standards, and California's renewable portfolio standard (33% by 2020) (See Chapter 3, Emissions Inventory, Projections, and Goals).

(D) Specify measures or a group of measures, including performance standards that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level.

The Mountain View GGRP includes the following mandatory and enforceable measures that reinforce the implementation of current codes and ordinances, or recommend changes to the City's codes and ordinances that would result in GHG reductions:

- Measure E-1.3 – Non-Residential Lighting Retrofit
- Measure E-1.6 – Exceed State Energy Standards in New Residential Development
- Measure E-1.7 – Exceed State Energy Standards in New Non-Residential Development
- Measure E-1.8 – Building Shade Trees in Residential Development
- Measure T-1.1 – Transportation Demand Management

All new projects would be required to comply with these codes and ordinances, as applicable. This would make these measures binding and enforceable on new projects, within the meaning established by State CEQA Guidelines Section 15183.5(b)(2). The proposed project would describe how each measure would be integrated into the development in its application materials and environmental documentation.

The GGRP includes quantification of expected GHG emission reductions from each measure where substantial evidence is available (See Chapter 4, Reduction Strategies and Measures), including disclosure of calculation methods and assumptions (See Appendix B, Greenhouse Gas Reductions). Quantification reflects annual GHG reductions and demonstrates how the GHG reduction goal will be met.

In 2020, the reduction measures, together with the communitywide effects of State and federal legislation in Mountain View, have potential to reduce communitywide mass emissions by 175,185 metric tons of carbon dioxide equivalent emissions per year (MT CO_2e/yr) from projected levels. Taking into account the anticipated 2020 communitywide SP of 148,486 this would result in an emissions efficiency metric of 5.0 MT CO_2e/SP/yr. This metric achieves both the City's 2020 reduction goal (5.1 to 5.4 MT CO_2e/SP/yr) and the Bay Area Air Quality Management District (BAAQMD) 2020 plan-level significance threshold (6.6 MT CO_2e/SP/yr), and represents a 21.9% improvement in emissions efficiency compared to 2005 conditions.

In 2030, the reduction measures, together with the communitywide effects of State and federal legislation in Mountain View, have potential to reduce communitywide mass emissions by 251,025 MT CO_2e/yr from projected levels. Taking into account the anticipated 2030 communitywide SP of 167,149 this would result in an emissions efficiency metric of 4.5 MT CO_2e/SP/yr. This metric meets the City's 2030 reduction goal

(4.5 MT CO_2e/SP/yr), puts the City on a trajectory to meet EO S-3-05 goals, and represents a 29.7% improvement in emissions efficiency compared to 2005 conditions.

(E) Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specific levels.

The City of Mountain View will monitor results that are achieved by the various GGRP measures and actions. Monitoring results is a critical step in verifying that the measures and actions are achieving the anticipated GHG emission reductions.

To ensure that new development projects are incorporating all applicable measures contained within the GGRP, the GGRP includes an implementation chapter (See Chapter 5, Implementation and Monitoring). The following BAAQMD implementation requirements are addressed within the GGRP:

- Identification of which measures apply to different types of new development projects, discerning between voluntary and mandatory measures (See Chapter 5, Implementation and Monitoring).
- Mechanism for reviewing and determining if all applicable mandatory measures are being adequately applied to new development projects (See Chapter 5, Implementation and Monitoring)
- Identification of implementation steps and parties responsible for ensuring implementation of each action (See Chapter 4, Reduction Strategies and Measures).
- Schedule of implementation identifying near-term and longer-term implementation steps (See Chapter 4, Reduction Strategies and Measures).
- Procedures for monitoring and updating the GHG inventory and reduction measures in 2015, 2020, 2025, and 2030 (See Chapter 5, Implementation and Monitoring).

(F) Adopt the GHG Reduction Strategy in a public process following environmental review.

The GGRP is a component of the project description for the City of Mountain View General Plan Update Environmental Impact Report (EIR). The EIR documents the potential environmental effects of implementing the GGRP, and will be certified through a public review process, as required by CEQA.

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APPENDIX D

TRANSPORTATION PERFORMANCE INDICATORS

FEHR PEERS

MEMORANDUM

Date: June 1, 2012

To: Stephanie Williams, and Martin Alkire, City of Mountain View
Judith Malamut and Amy Paulsen, LSA Associates, Inc.

From: Daniel Rubins, P.E. and Robert Eckols, P.E.

Subject: City of Mountain View General Plan Update: Transportation Performance Indicators with North Bayshore Alternative

SJ08-1077

This memorandum summarizes the results of an evaluation of recent land use changes in North Bayshore area of the Draft 2030 General Plan using the same transportation performance indicators developed to evaluate the proposed land use options in the environmental impact report. The evaluation considers a reduction in the land uses within North Bayshore and the resulting effects of the changes in density and diversity in the North Bayshore area on the City of Mountain View travel patterns and transportation system.

This analysis recognizes the programmatic nature of the project and therefore uses the systemwide performance indicators developed using the City of Mountain View's Travel Demand Forecasting Model. The model was used to estimate a number of transportation measures including:

- Roadway mobility: Daily vehicle hours of travel (VHT) and VHT per service population.
- Roadway productivity: Daily vehicle trips (VT), daily VT per service population, daily vehicle miles of travel (VMT) and VMT per service population.
- Roadway system preservation: Roadway and freeway segment operations, and adjacent jurisdiction summary.

One of the key performance indicators is vehicle miles traveled (VMT) that is used to both evaluate citywide travel and as an input to the greenhouse gas analysis.

The results are presented in the following sections:

- Description of **Scenarios Evaluated**
- Summary of **Technical Approach** to estimate performance measures
- Summary of **Performance Indicators** results

SCENARIOS EVALUATED

The following five land use scenarios were evaluated:

Scenario 1: *Existing Conditions (2009)* – Existing daily roadway segment volumes obtained from counts. Citywide daily VMT and adjacent jurisdiction analysis obtained using the base year (2009) travel demand forecasting model assuming the existing land use and roadway system.

Scenario 2: *Existing Plus Draft General Plan Conditions (2009)* – Existing Plus Draft General Plan (and GGRP, while not explicitly mentioned in the title of this scenario, implementation of the GGRP is included as part of the proposed project) daily roadway segment volumes, citywide daily VMT and adjacent jurisdiction analysis based on the changes in the Draft General Plan land use, assuming that the existing roadway system remains unchanged and the GGRP is implemented. No growth was assumed for any other land uses within other jurisdictions (e.g., Moffett Federal Airfield and NASA Ames Research Center) other than the City of Mountain View.

Scenario 3: *Existing Plus Draft General Plan with North Bayshore Alternative Conditions (2009)* – Same as Scenario 3, except 1,111 fewer residential dwelling units and 500,000 fewer square feet of office space in North Bayshore.

Scenario 4: *Draft General Plan Conditions (2030)* – Year 2030 cumulative daily roadway segment volumes, citywide daily VMT and adjacent jurisdiction analysis based on Draft General Plan land use and GGRP implementation for Mountain View and the Association of Bay Area Governments (ABAG) land use projections for

adjacent jurisdictions and planned and funded transportation system improvements in the *Valley Transportation Plan (VTP) 2030*.[1]

Scenario 5: *Draft General Plan Conditions with North Bayshore Alternative Conditions (2030)* – Same as Scenario 4, except 1,111 fewer residential dwelling units and 500,000 fewer square feet of office space in North Bayshore.

TECHNICAL APPROACH

A description of the City of Mountain View Travel Demand Forecasting Model, trip adjustments for land use strategies, trip adjustments for transportation demand management (TDM) strategies, measurement of vehicle miles traveled method, and motor vehicle level of service analysis methods are discussed in the Transportation and Circulation section of the *City of Mountain View Draft 2030 General Plan and Greenhouse Gas Reduction Program Draft Environmental Impact Report* (LSA Associates, November 2011). Below is a summary of the service population and trip adjustments used in this analysis.

SERVICE POPULATION

To be consistent with the Regional Targets Advisory Committee (RTAC) recommendation to the California Transportation Commission (CTC), VMT per service population (residents + employment) was used to compare various land use and roadway network scenarios for the Draft General Plan and the evaluation of the North Bayshore Alternative. This measurement accounts for the fact that, while there is absolute growth in VMT due to increases in population and employment, the VMT per service population can be reduced. **Table 1** shows the service population for the City of Mountain View for the five scenarios.

[1] Valley Transportation Authority, 2005. *Valley Transportation Plan 2030.* February.

TABLE 1
CITY OF MOUNTAIN VIEW OCCUPIED LAND USE SUMMARY

Land Use	Year 2009 Scenarios			Year 2030 Scenarios	
	Existing	Existing plus Draft 2030 General Plan		Draft 2030 General Plan	
		without North Bayshore Alternative	with North Bayshore Alternative	without North Bayshore Alternative	with North Bayshore Alternative
Employees[1]	60,460	82,230	80,820	82,230	80,820
Residential Population	73,860	88,570	86,330	88,570	86,330
Service Population	134,320	170,800	167,150	170,800	167,150

Notes:
1. Employees based on occupied non-residential square footage.
2. Rounded to nearest 10 employees or residents.
3. Land use summary does not include NASA AMES research center.
4. Service Population within Mountain View = residents + employees

Source: City of Mountain View, *Background Data and Documentation General Plan Land Use Projection 2008-2030,* January 2011, and City of Mountain View for North Bayshore land use alternative, May 2012.

DS TRIP REDUCTIONS

The Ds scores are developed for 1/3 mile grid cells using the ArcGIS software geoprocessing tools and the traffic analysis zone (TAZ) land use data from the City's model. The full process used to develop the Ds scores is described in the technical memorandum entitled, *4D Enhancement User's Guide* (Fehr & Peers, June 2011). **Figures 1A** and **1B** illustrate the magnitude of change in the density variable between Existing Conditions and Draft 2030 General Plan Conditions (2009 or 2030), and Existing Conditions and Draft 2030 General Plan Conditions with North Bayshore Alternative Conditions (2009 or 2030). As the legend indicates, the percent change in the density "D" is shown by color gradations. **Figures 2A** and **2B** illustrate the magnitude of change in the diversity variable.

An overview comparison of **Figures 1A** to **1B** and **2A** to **2B** reveals:

- The most pronounced 4D effects related to density occur in the North Bayshore, Whisman/Pioneer and San Antonio areas of the city under the Draft 2030 General Plan. In North Bayshore, the density increase is less under the Draft 2030 General Plan with North Bayshore Alternative.

- Similar to density, the greatest increase in the diversity occurs in the North Bayshore, and Whisman/Pioneer areas of the city under the Draft 2030 General Plan. With the North Bayshore Alternative land use diversity decreases as more employment land uses are added to North Bayshore without increasing residential land uses within North Bayshore or approximately a half-mile south of US 101.
- Residential areas of the city, North Bayshore, and Whisman/Pioneer see a reduction in the diversity score because the density of housing or jobs is increased without a proportional change in the mix of jobs to housing. This reduction in diversity is most noticeable under the Draft 2030 General Plan with North Bayshore Alternative.

By quantifying changes in the 4Ds, the adjustment process adjusts the number of vehicle trips based on a set of elasticities that relate changes in vehicle trips to changes in the 4D inputs. The vehicle trip adjustments are presented in **Figures 3A** and **3B**. In most cases, the vehicle trip reduction of a given TAZ is less than 5 percent. In North Bayshore, the reduced diversity score has a greater affect than the increase in density; therefore, there is an increase in vehicle trips prior to applying additional transportation demand management strategies. While the D's reductions are relatively modest, they do not indicate a lack of 4D effectiveness in Mountain View. In fact, the City is already experiencing many of the benefits attributable to the Ds factors, and the Draft 2030 General Plan furthers that trend. Within Mountain View, people may make significantly different transportation choices when they travel to districts with a greater density and diversity of land uses. The beneficial relationship between Mountain View's existing 4D qualities and policy-based trip reduction strategies, as discussed below, is significant.

TRANSPORTATION DEMAND MANAGEMENT (TDM) REDUCTIONS

Although not a part of the 4D equations, Fehr & Peers has embedded into the model script the ability to make daily and peak hour TDM adjustments for commute (e.g., home-based work) and non-commute trips (e.g., home-based shopping, non-home based, etc.). These reductions are taken after the 4D reductions and include floor and ceiling limits based on empirical data to avoid overstating the trip reductions. The existing and future TDM commute trip reductions (e.g., the home-based-work trip purpose) identified by Nelson\Nygaard by geographic area of the city were applied as follows:

- Vehicle trips were extracted by trip purpose (e.g., home-based work, home-based shop, non-home based, etc.) for each geographic area of the City identified in **Figure 4**.
- The commute trip reductions were applied to existing and net new home-based drive alone trips. Net new trips are the additional trips beyond the existing trips.
- Aggregate reductions of home-based work trips (e.g., existing plus net new trips) were calculated for each geographic area of the city as presented in **Table 2**.

TABLE 2
CITY OF MOUNTAIN VIEW TDM TRIP REDUCTION SUMMARY

Geographic Area	Time Period	Year 2009 Scenarios			Year 2030 Scenarios	
		Existing	Existing plus Draft 2030 General Plan		Draft 2030 General Plan	
			without North Bayshore Alternative	with North Bayshore Alternative	without North Bayshore Alternative	with North Bayshore Alternative
North Bayshore	Daily Peak Hour	0.0% 0.0%	3.5% 12.6%		3.5% 12.7%	
Whisman / Pioneer	Daily Peak Hour	0.0% 0.0%	2.6% 9.3%		2.5% 8.9%	
El Camino Real / San Antonio	Daily Peak Hour	0.0% 0.0%	1.1% 3.9%		1.1% 3.8%	
Downtown	Daily Peak Hour	0.0% 0.0%	2.2% 7.8%		2.1% 7.7%	
Remainder of City	Daily Peak Hour	0.0% 0.0%	0.8% 3.0%		0.8% 3.0%	

Notes:
Home-based work drive-alone trip reductions percentages shown for each area of the City. Trip reduction percentages would be lower after accounting for other trip purposes.
Source: Fehr & Peers, May 2012.

SUMMARY OF PERFORMANCE INDICATORS

As presented in **Tables 3A**, **3B** and **4**, nine (9) performance indicators were developed to evaluate the five study scenarios. The vehicle miles traveled per service population, daily roadway and freeway segment level of service, and adjacent jurisdiction analysis were used to identify impacts in the environmental document. Existing Conditions are provided as a point of reference. As stated previously, these indicators evaluate roadway performance including mobility, productivity and system preservation. **Tables 3A** and **3B** indicate the change from Existing Conditions and the change between the without and with North Bayshore Alternative scenarios under Year 2009 and Year 2030 Conditions. The results are discussed below by indicator:

- **Roadway Mobility (Indicators 1 and 2)**: Due to the anticipated growth within Mountain View and the region as a whole

    - There are absolute increases in daily vehicle hours traveled (VHT) for each scenario.

    - The North Bayshore Alternative has slightly less daily VHT than the without North Bayshore Alternative.

    - On a VHT per service population basis the Draft General Plan with North Bayshore Alternative Conditions is greater than the without North Bayshore Alternative under either the 2009 or 2030 scenarios.

- **Roadway Productivity (Indicators 3 to 6)**: Similar to daily citywide vehicle hours of travel, the absolute number of daily citywide vehicle trips (VT) and vehicle miles traveled (VMT) increases between the Existing Conditions and each scenario. The North Bayshore Alternative has slightly less absolute daily VT and VMT than the without North Bayshore Alternative under the 2009 or 2030 scenarios.

  On a per service population basis, VT and VMT are greater for the Draft 2030 General Plan with North Bayshore Alternative Conditions than without the North Bayshore alternative, under the 2009 or 2030 scenarios. While the VT per service population decreases between existing and the 2009 or 2030 scenarios, the VMT per service population increases. This indicates that trip lengths are longer without or with the

North Bayshore Alternative under 2009 or 2030 scenarios as compared to today. This increase in average trip length is due to the greater rate of increase in jobs than population within the City of Mountain View from Existing Conditions. Specifically, the jobs-to-population ratio in the City remains high (approximately 1.0) compared to the Santa Clara County average ratio (0.45), which represents a "balanced" mix of jobs-to-population.

As shown in **Table 4** and **Figure 5,** the VMT distribution by speed bin is similar for both the Draft 2030 General Plan scenarios under 2009 and 2030 conditions, respectively. VMT by speed is a useful performance measure, since the amount of travel and conditions under which the travel occurs directly relate to how much fuel vehicles burn.[2] To be consistent with the Regional Targets Advisory Committee (RTAC) recommendation to the California Transportation Commission (CTC), VMT per service population is used to compare various land use and roadway network scenarios for the environmental analysis. This measurement accounts for the fact that, while there is absolute growth in VMT, the rate of VMT per service population can be reduced. In other words, using VMT per service population is a simple performance measure that accounts for different land use growth rates between the without and with North Bayshore Alternative scenarios.

- **Roadway Preservation (Indicators 7 to 9)**: Existing Conditions and Year 2009 scenarios of the Draft 2030 General Plan without and with the North Bayshore Alternative have a similar percent of local roadway segments operating at Level of Service E or F. Similarly, the 2030 scenarios have a similar percent of local roadway segments with a Level of Service E or F under 2030 scenarios. Most LOS E and F roadway segments are sub-regional roadways such as El Camino Real near State Route 85 freeway.

  Compared to the without North Bayshore Alternative, the with North Bayshore Alternative under the 2009 or 2030 scenarios have similar volumes on the nearby freeways and fewer daily vehicles in and out of North Bayshore. The land use changes in the North Bayshore Alternative changes trip patterns and travel behavior, which

[2] Conditions influencing the amount of fuel consumed per VMT include the speed of travel, congestion stops and starts, length of trip, layover between trips, and the vehicle type and fuel economy.

changes the daily roadway forecasts on major roadways in Mountain View. The daily roadway and freeway segment volumes and levels of service are presented in attached **Tables A1** and **A2** and **Figures 6A** and **6E**.

Operations of roadway segments in adjacent jurisdiction outside the City of Mountain View boundaries were reviewed for the five scenarios. **Tables A3** and **A6** attached, summarize these results. Vehicular traffic on roadway segments within several jurisdictions is projected to increase under each scenario as compared to Existing Conditions.

TABLE 3A
CITY OF MOUNTAIN VIEW GENERAL PLAN UPDATE:
CITYWIDE TRANSPORTATION PERFORMANCE INDICATORS

Indicator	Measure[1,2]	Year 2009 Scenarios			Comparison	
		Existing (Scenario 1)	Existing Plus Draft 2030 General Plan			
			without North Bayshore Alternative (Scenario 2)	with North Bayshore Alternative (Scenario 3)	Scenario 3 to Scenario 1	Scenario 3 to Scenario 2
Roadway Mobility	1. Daily vehicle hours traveled (VHT)	140,010	174,490	173,560	↑	↓
	2. Daily VHT per service population	1.04	1.02	1.04	=	↑
Roadway Productivity	3. Daily vehicle trips (VT)	457,330	541,360	537,880	↑	↓
	4. Daily VT per service population	3.40	3.17	3.22	↓	↑
	5. Daily vehicle miles traveled (VMT)[3]	2,452,696	2,993,630	2,978,213	↑	↓
	6. Daily VMT per service population	18.26	17.53	17.82	↓	↑
Roadway System Preservation	7. Percent of local roadway segments with LOS E or F	2%	2%	2%	=	=
	8. Roadway LOS	See attached **Table A1** and **A2** and **Figures 6A** to **6D**				
	9. Adjacent Impact Summary	See attached **Tables A3** and **A6**				

Notes:
1. VHT = vehicle hours traveled; VT = vehicle trips; VMT = vehicle miles traveled
2. Citywide VHT, VT, and VMT based on select zone analysis using one-half external trip approach (II, 0.5*IX, and 0.5*XI).
3. Daily VMT by speed bin presented in **Table 4** and **Figure 5**.

Source: Fehr & Peers, May 2012.

TABLE 3B
CITY OF MOUNTAIN VIEW GENERAL PLAN UPDATE:
CITYWIDE TRANSPORTATION PERFORMANCE INDICATORS

Indicator	Measure[1,2]	Year 2009 Scenario	Year 2030 Scenarios		Comparison	
			Existing Plus Draft 2030 General Plan			
		Existing (Scenario 1)	without North Bayshore Alternative (Scenario 4)	with North Bayshore Alternative Scenario 5)	Scenario 5 to Scenario 1	Scenario 5 to Scenario 4
Roadway Mobility	1. Daily vehicle hours traveled (VHT)	140,010	464,770	463,580	↑	↓
	2. Daily VHT per service population	1.04	2.72	2.77	↑	↑
Roadway Productivity	3. Daily vehicle trips (VT)	457,330	527,810	524,240	↑	↓
	4. Daily VT per service population	3.40	3.09	3.14	↓	↑
	5. Daily vehicle miles traveled (VMT)[3]	2,452,696	3,247,067	3,232,768	↑	↓
	6. Daily VMT per service population	18.26	19.01	19.34	↑	↑
Roadway System Preservation	7. Percent of local roadway segments with LOS E or F	2%	21%	21%	=	=
	8. Roadway LOS	See attached **Table A1** and **A2** and **Figures 6A** to **6D**				
	9. Adjacent Impact Summary	See attached **Tables A3** and **A6**				

Notes:
1. VHT = vehicle hours traveled; VT = vehicle trips; VMT = vehicle miles traveled
2. Citywide VHT, VT, and VMT based on select zone analysis using one-half external trip approach (II, 0.5*IX, and 0.5*XI).
3. Daily VMT by speed bin presented in **Table 4** and **Figure 5**.

Source: Fehr & Peers, May 2012.

TABLE 4
CITY OF MOUNTAIN VIEW GENERAL PLAN UPDATE:
PERFORMANCE INDICATOR 5 – VMT DISTRIBUTION BY SPEED BIN

Actual Speed Bin (mph)	Year 2009 Scenarios						Year 2030 Scenarios			
	Existing		Existing plus Draft 2030 General Plan				Draft 2030 General Plan			
			without North Bayshore Alternative		with North Bayshore Alternative		without North Bayshore Alternative		with North Bayshore Alterative	
	VMT	Percent	VMT	Percent	VMT	Percent	VMT	Percent	VMT	Percent
0.0 to 7.49	117,556	4.79%	152,241	5.09%	151,233	5.08%	616,332	18.98%	613,268	18.97%
7.5 to 12.49	88,568	3.61%	110,561	3.69%	107,753	3.62%	360,302	11.10%	350,672	10.85%
12.5 to 17.49	71,031	2.90%	93,361	3.12%	100,393	3.37%	310,043	9.55%	310,148	9.59%
17.5 to 22.49	185,763	7.57%	231,022	7.72%	230,111	7.73%	354,540	10.92%	361,844	11.19%
22.5 to 27.49	468,446	19.10%	580,504	19.39%	568,055	19.07%	561,188	17.28%	539,186	16.68%
27.5 to 32.49	581,637	23.71%	739,633	24.71%	719,361	24.15%	627,678	19.33%	645,119	19.96%
32.5 to 37.49	305,040	12.44%	345,319	11.54%	369,924	12.42%	169,730	5.23%	167,428	5.18%
37.5 to 42.49	225,260	9.18%	267,556	8.94%	266,361	8.94%	68,007	2.09%	60,231	1.86%
42.5 to 47.49	157,482	6.42%	188,176	6.29%	178,623	6.00%	54,567	1.68%	59,316	1.83%
47.5 to 52.49	95,308	3.89%	101,321	3.38%	101,353	3.40%	47,088	1.45%	47,360	1.47%
52.5 to 57.49	77,549	3.16%	102,059	3.41%	104,200	3.50%	39,094	1.20%	39,291	1.22%
57.5 to 62.49	59,885	2.44%	59,296	1.98%	58,318	1.96%	25,772	0.79%	26,316	0.81%
62.5 to 67.49	19,169	0.78%	22,581	0.75%	22,528	0.76%	12,726	0.39%	12,589	0.39%
67.5 to 200	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total	**2,452,696**	**100.00%**	**2,993,630**	**100.00%**	**2,978,213**	**100.00%**	**3,247,067**	**100.00%**	**3,232,768**	**100.00%**

Note:
VMT = vehicle miles traveled; mph = miles per hour
Source: Fehr & Peers, May 2012.

Attachments

TABLE A1
DAILY ROADWAY SEGMENT VOLUME AND LEVEL OF SERVICE SUMMARY

Roadway Segment[1]	Existing Roadway Type/ Future Roadway Type	Year 2009 Scenarios						Year 2030 Scenarios			
		Existing		Existing plus Draft 2030 General Plan				Draft 2030 General Plan			
				without North Bayshore Alternative		with North Bayshore Alternative		without North Bayshore Alternative		with North Bayshore Alternative	
		Daily Volume[2]	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]
1. Amphitheatre Pkwy. between Charleston Rd. and NB US 101 Ramps	4-Lane Divided Arterial	14,700	C	34,200	D	32,300	D	39,100	D	38,700	D
2. California St. between Escuela Ave. and Shoreline Blvd.	4-Lane Undivided Arterial	11,400	C	15,800	C	16,300	C	**38,500**	**F**	**37,300**	**F**
3. Castro St. between Evelyn Ave. and California St.	2-Lane Undivided Arterial	9,000	C	10,800	C	10,200	C	16,500	D	14,300	D
4. Central Expy. between San Antonio Rd. and Rengstorff Ave.*	4-Lane Divided Arterial	26,000	D	26,500	D	26,500	D	34,800	D	34,900	D
5. Central Expy. between Rengstorff Ave. and Shoreline Blvd.*	4-Lane Divided Arterial	25,600	D	27,700	D	27,700	D	35,400	D	35,900	D
6. Central Expy. between Shoreline Blvd. and Moffett Blvd.*	4-Lane Divided Arterial	28,100	D	29,000	D	28,900	D	30,000	D	30,300	D
7. Central Expy. between SR 85 and Whisman Ave.*	6-Lane Divided Arterial	28,300	C	34,900	D	33,900	D	59,400	D	59,500	D
8. Central Expy. between Bernardo Ave. and Middlefield Rd.*	4-Lane Divided Arterial	25,500	D	31,200	D	30,800	D	42,000	D	41,600	D

TABLE A1
DAILY ROADWAY SEGMENT VOLUME AND LEVEL OF SERVICE SUMMARY

Roadway Segment[1]	Existing Roadway Type/ Future Roadway Type	Year 2009 Scenarios						Year 2030 Scenarios			
		Existing		Existing plus Draft 2030 General Plan				Draft 2030 General Plan			
				without North Bayshore Alternative		with North Bayshore Alternative		without North Bayshore Alternative		with North Bayshore Alternative	
		Daily Volume[2]	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]
9. Charleston Rd. between San Antonio Rd. and Rengstorff Ave.	4-Lane Divided Arterial	20,700	C	22,000	C	21,900	C	28,600	D	30,400	D
10. Cuesta Dr. between Miramonte Ave. and Grant Rd.	4-Lane Divided Arterial	16,300	C	16,400	C	16,300	C	33,900	D	34,700	D
11. Dana St. between Calderon Ave. and Pioneer Wy.	2-Lane Divided Arterial	6,200	C	8,200	C	8,000	C	17,900	D	18,000	D
12. El Camino Real between Los Altos Ave. and San Antonio Rd.*	6-Lane Divided Arterial	38,800	D	41,500	D	42,000	D	60,000	D	59,700	D
13. El Camino Real between Showers Dr. and Rengstorff Ave.*	6-Lane Divided Arterial	38,200	D	40,600	D	41,300	D	56,200	D	54,600	D
14. El Camino Real between El Monte Ave. and Shoreline Blvd.*	6-Lane Divided Arterial	47,800	D	49,100	D	49,100	D	60,600	D	61,300	D
15. El Camino Real between Phyllis Ave. and Castro St.*	6-Lane Divided Arterial	51,900	D	53,500	D	54,000	D	61,700	D	62,500	D
16. El Camino Real between Grant Rd. and SB SR 85 Ramps*	6-Lane Divided Arterial	51,200	D	54,900	D	54,900	D	**69,800**	**F**	**69,300**	**F**

TABLE A1
DAILY ROADWAY SEGMENT VOLUME AND LEVEL OF SERVICE SUMMARY

Roadway Segment[1]	Existing Roadway Type/ Future Roadway Type	Year 2009 Scenarios						Year 2030 Scenarios			
		Existing		Existing plus Draft 2030 General Plan				Draft 2030 General Plan			
				without North Bayshore Alternative		with North Bayshore Alternative		without North Bayshore Alternative		with North Bayshore Alternative	
		Daily Volume[2]	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]
17. El Camino Real between NB SR 85 Ramps and Sylvan Ave.*	6-Lane Divided Arterial	53,600	D	56,900	D	56,600	D	**66,500**	**E**	**66,400**	**E**
18. Ellis St. between SB US 101 Ramps and Middlefield Rd.	4-Lane Divided Arterial	9,000	C	14,300	C	13,500	C	29,900	D	27,400	D
19. El Monte Ave. between El Camino Real and Springer Rd.	4-Lane Undivided Arterial	16,500	C	17,100	C	17,200	C	27,100	D	27,800	D
20. Evelyn Ave. between Calderon Ave. and SB SR 85 Ramp	4-Lane Undivided Arterial	12,600	C	13,900	C	15,000	C	28,000	D	27,500	D
21. Evelyn Ave. between SR 237 and Bernardo Ave.	4-Lane Divided Arterial	13,300	C	15,100	C	15,000	C	42,200	D	40,900	D
22. Grant Rd. between Phyllis Avenue and Cuesta Dr.	4-Lane Divided Arterial	37,200	D	38,600	D	38,500	D	**43,400**	**E**	**43,300**	**E**
23. Grant Rd. between Cuesta Dr. and Covington Rd.	4-Lane Divided Arterial	23,100	D	24,100	D	24,100	D	30,100	D	28,900	D
24. Middlefield Rd. between San Antonio Rd. and Old Middlefield Wy.	4-Lane Undivided Arterial	17,300	C	17,300	C	17,400	C	18,500	C	18,300	C
25. Middlefield Rd. between Old Middlefield Wy. and Independence Ave.	4-Lane Divided Arterial	6,200	C	8,300	C	7,500	C	11,600	C	12,100	C

TABLE A1
DAILY ROADWAY SEGMENT VOLUME AND LEVEL OF SERVICE SUMMARY

Roadway Segment[1]	Existing Roadway Type/ Future Roadway Type	Year 2009 Scenarios						Year 2030 Scenarios			
		Existing		Existing plus Draft 2030 General Plan				Draft 2030 General Plan			
				without North Bayshore Alternative		with North Bayshore Alternative		without North Bayshore Alternative		with North Bayshore Alternative	
		Daily Volume[2]	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]
26. Middlefield Rd. between Sierra Vista Ave. and Terra Bella Ave.	4-Lane Divided Arterial	11,300	C	12,500	C	12,300	C	24,200	D	22,600	C
27. Middlefield Rd. betweenShoreline Blvd. and Moffett Blvd.	4-Lane Divided Arterial	13,700	C	15,300	C	15,200	C	22,600	C	22,700	C
28. Middlefield Rd. between Moffett Blvd. and Tyrella Ave.	4-Lane Divided Arterial	13,200	C	13,200	C	13,400	C	18,400	C	18,300	C
29. Middlefield Rd. between Ellis St. and SR 237	4-Lane Divided Arterial	14,300	C	14,800	C	15,100	C	17,000	C	17,000	C
30. Miramonte Ave. between El Camino Real and Cuesta Dr.	4-Lane Undivided Arterial	13,400	C	14,100	C	14,100	C	**39,100**	**F**	**38,800**	**F**
31. Miramonte Ave. between Cuesta Dr. and Covington Rd.	4-Lane Undivided Arterial	9,700	C	10,500	C	10,500	C	20,700	C	20,600	C
32. Moffett Blvd. between SB US 101 Ramps and NB SR 85 Ramp	4-Lane Divided Arterial	15,200	C	17,300	C	18,400	C	20,400	C	23,800	D
33. Moffett Blvd. between Middlefield Rd. and Central Ave.	4-Lane Undivided Arterial	13,500	C	14,900	C	14,700	C	25,900	D	26,200	D
34. Old Middlefield Wy. between Rengstorff Ave. and SB US 101 Ramps	4-Lane Divided Arterial	16,900	C	16,900	C	16,800	C	18,800	C	18,800	C

TABLE A1
DAILY ROADWAY SEGMENT VOLUME AND LEVEL OF SERVICE SUMMARY

Roadway Segment[1]	Existing Roadway Type/ Future Roadway Type	Year 2009 Scenarios						Year 2030 Scenarios			
		Existing		Existing plus Draft 2030 General Plan				Draft 2030 General Plan			
				without North Bayshore Alternative		with North Bayshore Alternative		without North Bayshore Alternative		with North Bayshore Alternative	
		Daily Volume[2]	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]
35. Rengstorff Ave. between SB US 101 Ramps and Old Middlefield Wy.	4-Lane Undivided Arterial	18,100	C	24,400	D	22,600	D	**36,100**	**F**	**36,400**	**F**
36. Rengstorff Ave. between Montecito Ave. and Central Expy.	4-Lane Undivided Arterial	18,300	C	23,200	D	22,500	D	**34,800**	**F**	**37,100**	**F**
37. Rengstorff Ave. between Central Expy. and California St.	4-Lane Undivided Arterial	18,800	C	21,800	D	21,900	D	**40,400**	**F**	**40,800**	**F**
38. San Antonio Rd. between Bayshore Pkwy. and NB US 101 Ramps* (Palo Alto)	2-Lane Undivided Arterial	10,800	C	15,400	D	14,500	D	17,900	D	18,100	D
39. San Antonio Rd. between SB US 101 Ramps and Charleston Rd.* (Palo Alto)	3-Lane Arterial (2 in one direction)	**35,600**	**F**	**39,200**	**F**	**39,200**	**F**	**48,700**	**F**	**48,700**	**F**
40. San Antonio Rd. between San Antonio Cir. and California St.*	6-Lane Divided Arterial	40,500	D	43,000	D	43,200	D	**66,400**	**E**	**66,000**	**E**
41. San Antonio Rd. between El Camino Real and Paso Robles Ave.* (Los Altos)	4-Lane Divided Arterial	24,900	D	26,700	D	26,600	D	35,300	D	37,100	D

TABLE A1
DAILY ROADWAY SEGMENT VOLUME AND LEVEL OF SERVICE SUMMARY

Roadway Segment[1]	Existing Roadway Type/ Future Roadway Type	Year 2009 Scenarios						Year 2030 Scenarios			
		Existing		Existing plus Draft 2030 General Plan				Draft 2030 General Plan			
				without North Bayshore Alternative		with North Bayshore Alternative		without North Bayshore Alternative		with North Bayshore Alternative	
		Daily Volume[2]	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]
42. Shoreline Blvd. between Charleston Rd. and NB US 101 Ramps	4-Lane Divided Arterial	30,000	D	34,500	D	34,400	D	37,400	D	37,300	D
43. Shoreline Blvd. between SB US 101 Ramps and Middlefield Rd.	4-Lane Divided Arterial	25,000	D	26,200	D	25,300	D	40,700	D	38,100	D
44. Shoreline Blvd. between Montecito Ave. and Central Expy.	4-Lane Divided Arterial	26,800	D	27,800	D	27,500	D	**48,800**	**F**	**48,100**	**F**
45. Shoreline Blvd. between Central Expy. and California St.	6-Lane Divided Arterial	23,300	C	23,500	C	24,700	C	53,400	D	48,500	D
46. Springer Rd. between El Monte Ave. and Cuesta Dr.	2-Lane Collector	7,400	C	8,000	C	8,000	C	12,200	D	11,600	D
47. Whisman Rd. between Middlefield Rd. and Central Expy.	4-Lane Undivided Arterial	7,300	C	9,000	C	8,700	C	24,900	D	23,500	D
Number of Roadway Segments with LOS E or F		**1 (2%)**		**1 (2%)**		**1 (2%)**		**11 (23%)**		**11 (23%)**	

Notes:

1. Major roadways nearest the count location
2. Average Daily Traffic (ADT) volume based on traffic counts collected in February and March 2009.
3. LOS – Level of Service

Bold text indicates a segment that exceeds the City of Mountain View LOS D standard for local streets and LOS E standard for streets within the Downtown and San Antonio Center areas and CMP facilities (e.g., Central Expressway, El Camino Real) under the 1992 General Plan Circulation Element. Local streets in Palo Alto and Los Altos have a LOS D standard too.

* Denotes Congestion Management Program (CMP) facility.

Source: Highway Capacity Manual, Transportation Research Board, 2000 and Fehr & Peers, May 2012.

TABLE A2
DAILY FREEWAY SEGMENT VOLUME AND LEVEL OF SERVICE SUMMARY

Freeway Segment[1]		Existing Roadway Type/ Future Roadway Type[2]	Year 2009 Scenarios						Year 2030 Scenarios			
			Existing		Existing plus Draft 2030 General Plan				Draft 2030 General Plan			
					without North Bayshore Alternative		with North Bayshore Alternative		without North Bayshore Alternative		with North Bayshore Alternative	
			Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]
NB SR 85*	Fremont Ave. to El Camino Real	3-Lane Freeway	**57,500**	**D**	**58,800**	**D**	**58,800**	**D**	**64,000**	**D**	**63,900**	**D**
	SR 237 to Evelyn Ave.	3-Lane Freeway	39,000	C	41,300	C	41,200	C	46,100	C	46,000	C
	Evelyn Ave. to Moffett Blvd.	3-Lane Freeway	37,500	C	40,700	C	40,400	C	**53,800**	**D**	**52,700**	C
SB SR 85*	Moffett Blvd. to Evelyn Ave.	3-Lane Freeway	37,500	C	41,300	C	41,300	C	**61,900**	**D**	**60,800**	D
	Evelyn Ave. to SR 237	3-Lane Freeway	39,000	C	40,600	C	40,900	C	**54,300**	**D**	**54,100**	D
	El Camino Real to Fremont Ave.	3-Lane Freeway	**57,500**	**D**	**58,300**	**D**	**58,200**	**D**	**64,700**	**D**	**64,400**	**D**
NB US 101*	SR 237 to Ellis St.	4-Lane Freeway	**79,000**	**D**	**80,600**	**D**	**80,200**	**D**	**97,700**	**F**	**98,100**	**F**
	Ellis St. to Moffett Blvd.	4-Lane Freeway	**78,000**	**D**	**79,700**	**D**	**79,600**	**D**	**92,200**	**E**	**92,400**	**E**
	SR 85 to Old Middlefield Rd.	4-Lane Freeway	**113,500**	**F**	**115,600**	**F**	**115,700**	**F**	**141,800**	**F**	**141,800**	**F**
	Old Middlefield Rd. to Rengstorff Ave.	4-Lane Freeway	**105,000**	**F**	**107,600**	**F**	**107,500**	**F**	**132,800**	**F**	**132,400**	**F**
	Rengstorff Ave. to San Antonio Rd.	4-Lane Freeway	**97,000**	**E**	**97,000**	**E**	**97,500**	**E**	**120,200**	**F**	**119,500**	**F**

TABLE A2
DAILY FREEWAY SEGMENT VOLUME AND LEVEL OF SERVICE SUMMARY

Freeway Segment[1]		Existing Roadway Type/ Future Roadway Type[2]	Year 2009 Scenarios						Year 2030 Scenarios			
			Existing		Existing plus Draft 2030 General Plan				Draft 2030 General Plan			
					without North Bayshore Alternative		with North Bayshore Alternative		without North Bayshore Alternative		with North Bayshore Alternative	
			Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]
SB US 101*	San Antonio Rd. to Rengstorff Ave.	4-Lane Freeway	**97,000**	**E**	**97,000**	**E**	**97,500**	**E**	**123,000**	**F**	**121,500**	**F**
	Rengstorff Ave. to Old Middlefield Rd.	4-Lane Freeway	**105,000**	**F**	**106,100**	**F**	**105,900**	**F**	**135,000**	**F**	**134,600**	**F**
	Old Middlefield Rd. to SR 85	4-Lane Freeway	**113,500**	**F**	**114,400**	**F**	**114,800**	**F**	**144,500**	**F**	**143,800**	**F**
	Moffett Blvd. to Ellis St.	4-Lane Freeway	**78,000**	**D**	**78,400**	**D**	**78,500**	**D**	**101,200**	**F**	**100,200**	**F**
	Ellis St. to SR 237	4-Lane Freeway	**79,000**	**D**	**80,400**	**D**	**80,500**	**D**	**111,000**	**F**	**110,200**	**F**
EB SR 237*	El Camino Real to SR 85	2-Lane Freeway	22,500	B	22,500	B	23,000	B	24,900	C	24,500	C
	Sylvan Wy. to Middlefield Rd./ Maude Ave.	2-Lane Freeway/ 3-Lane Freeway	**37,000**	**D**	**37,600**	**D**	**37,600**	**D**	**55,600**	**D**	**55,900**	**D**
	Middlefield Rd./ Maude Ave. to US 101	2-Lane Freeway/ 3-Lane Freeway	**37,500**	**D**	**37,600**	**D**	**37,800**	**D**	**57,200**	**D**	**57,500**	**D**
WB SR 237*	US 101 to Middlefield Rd./Maude Ave.	2-Lane Freeway/ 3-Lane Freeway	**37,500**	**D**	**38,300**	**D**	**38,400**	**D**	**53,200**	**D**	**53,700**	**D**
	Middlefield Rd./ Maude Ave. to Sylvan Way	2-Lane Freeway/ 3-Lane Freeway	**37,000**	**D**	**37,200**	**D**	**37,300**	**D**	42,700	C	43,500	C
	SR 85 to El Camino Real	2-Lane Freeway	22,500	B	22,500	B	22,500	B	24,500	C	24,300	C

TABLE A2
DAILY FREEWAY SEGMENT VOLUME AND LEVEL OF SERVICE SUMMARY

Freeway Segment[1]	Existing Roadway Type/ Future Roadway Type[2]	Year 2009 Scenarios						Year 2030 Scenarios			
		Existing		Existing plus Draft 2030 General Plan				Draft 2030 General Plan			
				without North Bayshore Alternative		with North Bayshore Alternative		without North Bayshore Alternative		with North Bayshore Alternative	
		Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]	Daily Volume	LOS[3]
Number of Freeway Segments with LOS E or F		**6 (27%)**		**6 (27%)**		**6 (27%)**		**10 (45%)**		**10 (45%)**	

Notes:

1. Major roadways nearest the count location
2. The number of lanes of a freeway segment includes high occupancy vehicle (HOV) lanes but excludes auxiliary lanes.
3. LOS – Level of Service

Bold text indicates a segment that exceeds the Caltrans standard (C/D cusp) or VTA CMP standard (LOS E).

* Denotes Congestion Management Program (CMP) facility.

Source: *Highway Capacity Manual*, Transportation Research Board, 2000 and Fehr & Peers, May 2012.

TABLE A3
AM PEAK HOUR ADJACENT JURISDICTION IMPACTS SUMMARY

City	Year 2009 Scenarios									Comparison – Percent of Impacted Lane Miles	
	Existing (Scenario 1)			Existing plus Draft 2030 General Plan							
				without North Bayshore Alternative (Scenario 2)			with North Bayshore Alternative (Scenario 3)				
	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Scenario 3 to Scenario 1	Scenario 3 to Scenario 2
Major Arterial and Collector Roadways											
Campbell	0.0	0.0	0.0%	0.0	0.0	0.0%	0	0	0.0%	=	=
Cupertino	0.0	0.0	0.0%	0.0	0.0	0.0%	0.8	0	0.0%	=	=
Gilroy	0.0	0.0	0.0%	0.0	0.0	0.0%	0.4	0	0.0%	=	=
Los Altos	0.0	0.0	0.0%	0.0	0.0	0.0%	0	0	0.0%	=	=
Los Altos Hills	0.0	0.0	0.0%	0.0	0.0	0.0%	0	0	0.0%	=	=
Los Gatos	0.0	0.0	0.0%	0.0	0.0	0.0%	0	0	0.0%	=	=
Milpitas	38.7	0.0	0.0%	36.2	0.0	0.0%	34.9	0	0.0%	=	=
Monte Sereno	0.0	0.0	0.0%	0.0	0.0	0.0%	0	0	0.0%	=	=
Morgan Hill	3.1	0.0	0.0%	3.1	0.0	0.0%	2.1	0	0.0%	=	=
Palo Alto	4.4	3.3	74.3%	5.6	3.1	**56.1%**	3.9	3.1	**79.5%**	↑	↑
San Jose	24.5	0.0	0.0%	24.6	0.0	0.0%	25.7	0	0.0%	=	=

TABLE A3
AM PEAK HOUR ADJACENT JURISDICTION IMPACTS SUMMARY

City	Year 2009 Scenarios									Comparison – Percent of Impacted Lane Miles	
	Existing (Scenario 1)			Existing plus Draft 2030 General Plan							
				without North Bayshore Alternative (Scenario 2)			with North Bayshore Alternative (Scenario 3)				
	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Scenario 3 to Scenario 1	Scenario 3 to Scenario 2
Santa Clara	1.0	0.0	0.0%	0.6	0.0	0.0%	1.6	0.8	**46.7%**	↑	↑
Saratoga	0.9	0.0	0.0%	1.2	0.0	0.0%	1.2	0	0.0%	=	=
Sunnyvale	1.1	0.7	62.9%	1.4	1.0	**71.3%**	1.7	1.5	**87.4%**	↑	↑
Freeways, State Highways, and Expressways											
Caltrans Facilities[3]	295.4	37.0	12.5%	305.6	50.0	16.4%	307.4	50	16.3%	↑	↓
Expressways[4]	17.7	0.0	0.0%	22.1	0.5	2.1%	25.2	2.4	9.5%	↑	↑

Notes:

1. Lane miles of less than 0.5 were rounded to 0.
2. Impacted lane miles are where Mountain View traffic is greater than or equal to 10 percent of the roadway volume. For evaluating significant impacts, if impacted lane miles attributable to the City are less than 0.5, impacts are considered *less-than-significant*. Mountain View traffic based on select zone analysis using one-half external trip approach (II, 0.5*IX, and 0.5*XI).
3. Includes all Caltrans facilities (freeways and state highways) within Santa Clara County but outside of the Mountain View city limits.
4. Includes all expressway facilities within Santa Clara County but outside of the Mountain View city limits.

Significant impacts are identified in **bold** text.
Source: Fehr & Peers, May 2012.

TABLE A4
AM PEAK HOUR ADJACENT JURISDICTION IMPACTS SUMMARY

City	Year 2009Scenario			Year 2030 Scenarios						Comparison – Percent of Impacted Lane Miles	
	Existing (Scenario 1)			Existing plus Draft 2030 General Plan							
				without North Bayshore Alternative (Scenario 2)			with North Bayshore Alternative (Scenario 3)				
	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Scenario 5 to Scenario 1	Scenario 5 to Scenario 4
Major Arterial and Collector Roadways											
Campbell	0.0	0.0	0.0%	4.7	0.0	0.0%	4.5	0	0.0%	=	=
Cupertino	0.0	0.0	0.0%	8.4	0.0	0.0%	6.8	0	0.0%	=	=
Gilroy	0.0	0.0	0.0%	1.3	0.0	0.0%	1.0	0	0.0%	=	=
Los Altos	0.0	0.0	0.0%	5.4	2.6	**48.6%**	4.9	2.7	**55.1%**	↑	↑
Los Altos Hills	0.0	0.0	0.0%	7.2	0.0	0.0%	7.2	0	0.0%	=	=
Los Gatos	0.0	0.0	0.0%	4.1	0.0	0.0%	4.2	0	0.0%	=	=
Milpitas	38.7	0.0	0.0%	93.8	0.0	0.0%	93.1	0	0.0%	=	=
Monte Sereno	0.0	0.0	0.0%	0.0	0.0	0.0%	0.3	0	0.0%	=	=
Morgan Hill	3.1	0.0	0.0%	4.5	0.0	0.0%	3.0	0	0.0%	=	=
Palo Alto	4.4	3.3	74.3%	27.9	7.7	**27.6%**	30.3	5.4	18.0%	↓	↓

TABLE A4
AM PEAK HOUR ADJACENT JURISDICTION IMPACTS SUMMARY

City	Year 2009Scenario			Year 2030 Scenarios						Comparison – Percent of Impacted Lane Miles	
	Existing (Scenario 1)			Existing plus Draft 2030 General Plan							
				without North Bayshore Alternative (Scenario 2)			with North Bayshore Alternative (Scenario 3)				
	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Scenario 5 to Scenario 1	Scenario 5 to Scenario 4
San Jose	24.5	0.0	0.0%	216.5	0.0	0.0%	226.8	0	0.0%	=	=
Santa Clara	1.0	0.0	0.0%	21.1	0.0	0.0%	22.2	0.5	2.4%	↑	↑
Saratoga	0.9	0.0	0.0%	8.3	0.0	0.0%	6.9	0	0.0%	=	=
Sunnyvale	1.1	0.7	62.9%	13.4	5.4	**40.0%**	12.8	7.4	**57.8%**	↓	↑
Freeways, State Highways, and Expressways											
Caltrans Facilities[3]	295.4	37.0	12.5%	630.8	28.8	4.6%	625.1	31.7	5.1%	↓	↑
Expressways[4]	17.7	0.0	0.0%	96.8	4.6	4.8%	97.8	3.1	3.2%	↑	↓

Notes:

1. Lane miles of less than 0.5 were rounded to 0.
2. Impacted lane miles are where Mountain View traffic is greater than or equal to 10 percent of the roadway volume. For evaluating significant impacts, if impacted lane miles attributable to the City are less than 0.5, impacts are considered less-than-significant. Mountain View traffic based on select zone analysis using one-half external trip approach (II, 0.5*IX, and 0.5*XI).
3. Includes all Caltrans facilities (freeways and state highways) within Santa Clara County but outside of the Mountain View city limits.
4. Includes all expressway facilities within Santa Clara County but outside of the Mountain View city limits.

Significant impacts are identified in **bold** text.
Source: Fehr & Peers, May 2012.

TABLE A5
PM PEAK HOUR ADJACENT JURISDICTION IMPACTS SUMMARY

City	Year 2009 Scenarios									Comparison – Percent of Impacted Lane Miles	
	Existing (Scenario 1)			Existing plus Draft 2030 General Plan							
				without North Bayshore Alternative (Scenario 2)			with North Bayshore Alternative (Scenario 3)				
	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Scenario 3 to Scenario 1	Scenario 3 to Scenario 2
Major Arterial and Collector Roadways											
Campbell	1.1	0.0	0.0%	1.1	0.0	0.0%	1.1	0	0.0%	=	=
Cupertino	0.0	0.0	0.0%	0.0	0.0	0.0%	0	0	0.0%	=	=
Gilroy	0.0	0.0	0.0%	0.0	0.0	0.0%	0	0	0.0%	=	=
Los Altos	0.0	0.0	0.0%	0.0	0.0	0.0%	0	0	0.0%	=	=
Los Altos Hills	0.0	0.0	0.0%	0.0	0.0	0.0%	0.4	0	0.0%	=	=
Los Gatos	0.0	0.0	0.0%	0.0	0.0	0.0%	0	0	0.0%	=	=
Milpitas	23.1	0.0	0.0%	21.6	0.0	0.0%	21.9	0	0.0%	=	=
Monte Sereno	0.0	0.0	0.0%	0.0	0.0	0.0%	0	0	0.0%	=	=
Morgan Hill	0.0	0.0	0.0%	0.0	0.0	0.0%	0	0	0.0%	=	=
Palo Alto	1.7	0.0	0.0%	1.7	1.2	**70.0%**	1.8	1.2	**65.1%**	↑	↓
San Jose	10.7	0.0	0.0%	10.6	0.0	0.0%	9.3	0	0.0%	=	=

TABLE A5
PM PEAK HOUR ADJACENT JURISDICTION IMPACTS SUMMARY

City	Year 2009 Scenarios									Comparison – Percent of Impacted Lane Miles	
	Existing (Scenario 1)			Existing plus Draft 2030 General Plan							
				without North Bayshore Alternative (Scenario 2)			with North Bayshore Alternative (Scenario 3)				
	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Scenario 3 to Scenario 1	Scenario 3 to Scenario 2
Santa Clara	0.0	0.0	0.0%	0.0	0.0	0.0%	0	0	0.0%	=	=
Saratoga	1.0	0.0	0.0%	1.0	0.0	0.0%	1.0	0	0.0%	=	=
Sunnyvale	0.0	0.0	0.0%	0.0	0.0	0.0%	0.4	0	0.0%	=	=
Freeways, State Highways, and Expressways											
Caltrans Facilities[3]	220.8	40.7	18.4%	229.2	51.8	22.6%	229.0	51.6	22.5%	↑	↓
Expressways[4]	10.7	0.0	0.0%	9.8	0.0	0.0%	12.4	0.9	7.7%	↑	↑

Notes:

1. Lane miles of less than 0.5 were rounded to 0.
2. Impacted lane miles are where Mountain View traffic is greater than or equal to 10 percent of the roadway volume. For evaluating significant impacts, if impacted lane miles attributable to the City are less than 0.5, impacts are considered less-than-significant. Mountain View traffic based on select zone analysis using one-half external trip approach (II, 0.5*IX, and 0.5*XI).
3. Includes all Caltrans facilities (freeways and state highways) within Santa Clara County but outside of the Mountain View city limits.
4. Includes all expressway facilities within Santa Clara County but outside of the Mountain View city limits.

Significant impacts are identified in **bold** text.
Source: Fehr & Peers, May 2012.

TABLE A6
PM PEAK HOUR ADJACENT JURISDICTION IMPACTS SUMMARY

City	Year 2009Scenario			Year 2030 Scenarios						Comparison – Percent of Impacted Lane Miles	
	Existing (Scenario 1)			Existing plus Draft 2030 General Plan							
				without North Bayshore Alternative (Scenario 2)			with North Bayshore Alternative (Scenario 3)				
	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Scenario 5 to Scenario 1	Scenario 5 to Scenario 4
Major Arterial and Collector Roadways											
Campbell	0.0	0.0	0.0%	3.3	0.0	0.0%	3.3	0	0.0%	=	=
Cupertino	0.0	0.0	0.0%	2.1	0.0	0.0%	2.0	0	0.0%	=	=
Gilroy	0.0	0.0	0.0%	0.0	0.0	0.0%	0	0	0.0%	=	=
Los Altos	0.0	0.0	0.0%	1.3	0.7	**56.2%**	1.1	0.7	**69.8%**	↑	↑
Los Altos Hills	0.0	0.0	0.0%	3.6	0.0	0.0%	3.6	0.6	18.1%	↑	↑
Los Gatos	0.0	0.0	0.0%	0.6	0.0	0.0%	0.6	0	0.0%	=	=
Milpitas	38.7	0.0	0.0%	72.2	0.0	0.0%	76.7	0	0.0%	=	=
Monte Sereno	0.0	0.0	0.0%	0.0	0.0	0.0%	0	0	0.0%	=	=
Morgan Hill	3.1	0.0	0.0%	1.6	0.0	0.0%	1.6	0	0.0%	=	=
Palo Alto	4.4	3.3	74.3%	18.4	5.8	**31.3%**	17.3	6.0	**34.6%**	↓	↑

TABLE A6
PM PEAK HOUR ADJACENT JURISDICTION IMPACTS SUMMARY

City	Year 2009Scenario			Year 2030 Scenarios						Comparison – Percent of Impacted Lane Miles	
	Existing (Scenario 1)			Existing plus Draft 2030 General Plan							
				without North Bayshore Alternative (Scenario 2)			with North Bayshore Alternative (Scenario 3)				
	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Total Lane Miles with Deficient V/C Ratio[1]	Impacted Lane Miles[1,2]	Percent of Impacted Lane Miles	Scenario 5 to Scenario 1	Scenario 5 to Scenario 4
San Jose	24.5	0.0	0.0%	94.1	0.0	0.0%	93.8	0	0.0%	=	=
Santa Clara	1.0	0.0	0.0%	9.2	0.0	0.0%	8.8	0	0.0%	=	=
Saratoga	0.9	0.0	0.0%	3.5	0.0	0.0%	3.5	0	0.0%	=	=
Sunnyvale	1.1	0.7	62.9%	4.3	0.5	11.8%	4.0	0.5	12.7%	↓	↑
Freeways, State Highways, and Expressways											
Caltrans Facilities[3]	295.4	37.0	12.5%	549.1	29.3	5.3%	547.4	27.1	5.0%	↓	↓
Expressways[4]	17.7	0.0	0.0%	54.9	2.5	4.6%	56.4	2.9	5.1%	↑	↑

Notes:

1. Lane miles of less than 0.5 were rounded to 0.
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3. Includes all Caltrans facilities (freeways and state highways) within Santa Clara County but outside of the Mountain View city limits.
4. Includes all expressway facilities within Santa Clara County but outside of the Mountain View city limits.

Significant impacts are identified in **bold** text.
Source: Fehr & Peers, May 2012.

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