

CITY OF CONCORD

CONCORD REUSE PROJECT AREA PLAN

BOOK THREE: CLIMATE ACTION PLAN



Adopted by the Concord City Council on January 24, 2012

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Area Plan At-a-Glance

You are reading the **Concord Reuse Project Area Plan Book Three: Climate Action Plan**.

This is an overview of the three Area Plan Books that present the City's plans for the future of the former Concord Naval Weapons Station. This page shows how each document relates to the Planning Area and to the city as a whole, and indicates for what purposes readers should consult the various volumes.

2030 CONCORD GENERAL PLAN

APPLIES EXCLUSIVELY TO
THE CONCORD REUSE PROJECT AREA

APPLIES TO
THE ENTIRE CITY

APPLIES EXCLUSIVELY TO THE CONCORD REUSE PROJECT AREA			APPLIES TO THE ENTIRE CITY	
CRP-Area Plan Book One Vision + Standards Part of the 2030 General Plan	CRP-Area Plan Book Two Technical Chapters Part of the 2030 General Plan	CRP-Area Plan Book Three Climate Action Part of the 2030 General Plan	Concord 2030 General Plan	Concord Housing Element Part of the 2030 General Plan
▶ Vision for the future of the Planning Area ▶ Policies and standards for development and conservation activities ▶ Overviews of specific technical topics	Background and policies specific to the Planning Area by topic: ▶ Transportation + Circulation ▶ Conservation + Open Space ▶ Safety, Health, + Noise ▶ Community Facilities + Parks ▶ Utilities	▶ Strategies to reduce the climate impacts associated with implementation of the CRP-Area Plan. ▶ Implementation + Monitoring Program ▶ Principles, Policies, and Standards for Climate Action	▶ Long-range comprehensive plan for the City of Concord ▶ Policies to guide development and conservation ▶ Priorities for more detailed programs and plans. ▶ Minor amendments refer to the CRP-Area Plan	▶ Analysis of the City's housing stock ▶ Plans for meeting future housing needs ▶ Response to Regional Housing Needs Allocation

READER'S PURPOSE

DOCUMENTS TO CONSULT

	Area Plan Book One	Area Plan Book Two	Area Plan Book Three	General Plan	Housing Element
Obtain a general understanding of the future vision for the Planning Area.	☒	☐	☐	☐	☐
Understand the future vision for the Planning Area, and technical topics related to conservation and development in the area.	☒	☒	☒	☐	☐
Review the entire set of General Plan policies that apply to the Planning Area.	☒	☒	☒	☒	☒

Acknowledgements

City Council

Mayor Ron Leone
Vice Mayor Bill Shinn
Councilmember Tim Grayson
Councilmember Daniel Helix
Councilmember Laura Hoffmeister

Planning Commission

Chairperson Ernesto A. Avila
Vice Chair Tim McGallian
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Commissioner John Mercurio
Commissioner Carlyn Obringer

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Commissioner Lisa Alessi
Commissioner Christopher Lucas
Commissioner Wayne Schafer
Commissioner Mark Sinclair

Staff

Valerie Barone, Acting City Manager
Michael Wright, Executive Director, Local Reuse Authority
Craig Labadie, Special Counsel
Carol Johnson, Planning Manager
Ray Kuzbari, Transportation Manager
John Montag, Redevelopment and Housing Manager
Joan Carrico, Director Parks, Recreation and Open Space
Danea Gemmell, City Engineer

Table of Contents

Acknowledgements	iv
Table of Contents	v
List of Tables	vii
List of Figures	viii
1.0 Introduction to Climate Action for the Concord Reuse Project Area	1
1.1 Climate Action Plan Purpose and Organization	1
1.2 Key Terms and Concepts	2
1.3 California Climate Statutes and Implementation Guidance	3
1.4 Climate Action Plan Approach	4
1.5 Climate Action Objectives	5
1.6 Climate Action Plan Application and Legal Status	5
1.7 Using the Principles, Policies, and Standards	6
1.8 Interpretation of the Concord Reuse Project Area Plan	6
2.0 Greenhouse Gas Emissions: Existing and Future Conditions	9
2.1 Existing Conditions	9
2.2 Projecting Greenhouse Gas Emissions	9
2.3 Target GHG Emissions Level	11
2.4 Business-as-Usual Emissions Forecast	13
2.5 Area Plan Emissions Forecast	14
2.6 Creating the GHG Reduction Program Policies	16

Table of Contents

3.0	Greenhouse Gas Reduction Program	17
3.1	Summary of Greenhouse Gas Reduction Program	17
3.2	Detailed Greenhouse Gas Reduction Program	18
3.2.1	Initiative One: Sitewide Development Standards	20
3.2.2	Initiative Two: Sector-Based Principles and Policies	21
3.2.3	Initiative Three: Education and Collaboration	30
3.2.4	Initiative Four: Implementation and Monitoring	32
4.0	Implementation and Monitoring Program	35
4.1	Implementation Framework and Phasing	35
4.1.1	Program Oversight	35
4.1.2	Advancing Implementation of the GHG Reduction Program	36
4.2	Timeline of Implementation Activities	37
4.3	Monitoring and Reporting	44
	Appendix A: Documentation for GHG Emissions Forecasts	47
	Appendix B: Transportation Methodology Sources and Analysis of VMT Reduction	59
	Appendix C: Key Findings from the Evaluation of Candidate GHG Reduction Measures	63
	List of Acronyms	66
	Glossary of Terms and Abbreviations	67
	CRP Climate Action Plan Contributors	72

List of Tables

Table 2-1:	2030 Business-as-Usual Forecast of Annual GHG Emissions	13
Table 2-2:	2030 Area Plan Forecast of Annual GHG Emissions	14
Table 2-3:	2030 Annual GHG Reductions in the Area Plan Forecast	15
Table 3-1:	Summary of GHG Reduction Program	19
Table 4-1:	Monitoring Resource Use in Phase Four	45
Table A-1:	Per Capita Greenhouse Gas Emissions: Documentation of BGM Model Run for CRP Area Plan 12-23-2010	47
Table A-2:	2020 Land Use Assumption: URBEMIS Model Run for CRP Area Plan, 12-23-2010	48
Table A-3:	2030 Land Use Assumption: URBEMIS Model Run for CRP Area Plan, 12-23-2010	50
Table A-4:	2020 Mitigations: BGM Model Run for CRP Area Plan, 12-23-2010	52
Table A-5:	2030 Mitigations: BGM Model Run for CRP Area Plan, 12-23-2010	53
Table A-6:	Onsite Renewable Energy: Photovoltaics Assumptions for BGM Model Run for the CRP Area Plan, 12-23-2010	54
Table A-7:	Operational Mitigation Measures: URBEMIS Model Runs, 2020 and 2030, for CRP Area Plan, 12-23-2010	55
Table A-8:	Transit Assumptions: URBEMIS Model Run for the CRP Area Plan, 12-23-2010	57
Table B-1:	VMT Reduction Estimate	60

List of Figures

Figure 1-1:	CRP Planning Area Boundary	6
Figure 2-1:	Area Plan Diagram	10
Figure 2-2:	Annual Emissions Forecasting Approach	11
Figure 2-3:	Composition of 2030 Business-as-Usual Forecast of Annual GHG Emissions	13
Figure 2-4:	Composition of 2030 Area Plan Forecast of Annual GHG Emissions	14
Figure 2-5:	Annual 2030 Forecast Emissions: Area Plan vs. Business-as-Usual	15
Figure 3-1:	Greenhouse Gas Reduction Initiatives	17
Figure 3-2:	Street Orientation (Standard CA-1)	20
Figure 3-3:	Solar Exposure (Standard CA-2)	20
Figure 4-1:	Implementation Phase Timeline	37
Figure 4-2:	Monitoring and Reporting Timeline	44

Introduction to Climate Action for the Concord Reuse Project Area

1.1 Climate Action Plan Purpose and Organization

The purpose of Book Three is to focus on climate action as part of the vision for the former Concord Naval Weapons Station (CNWS). The three books of the Concord Reuse Project (CRP) Area Plan together establish a program of activities to limit harmful greenhouse gas (GHG) emissions created by human activity. By including a GHG Reduction Program, the Plan responds both to the requirements of state law and to mitigation measures specified in the Final Environmental Impact Report (FEIR) on the Concord Naval Weapons Station Reuse Plan.

The heart of the Climate Action Plan (CAP) is the GHG Reduction Program presented in Chapter 3. The Area Plan's standards, principles and policies call for innovations in mobility, building design, building systems, and infrastructure. Together, these will result in GHG emissions at a level consistent with the State of California's aims for battling climate change. These aims are summarized below in Section 1.3.

The GHG Reduction Program is designed specifically for the CRP area, taking into account the Area Plan's vision and standards, its transportation system, physical setting, and climate. The Greenhouse Gas Reduction Program, presented in Chapter 3, is comprised of the following four initiatives:

1. **Sitewide Development Standards:** Implementation of the Sitewide Development Standards that focus on climate action in Book One. These standards address green building and site planning features that are implemented at the District level to enhance the likelihood of success of other GHG Reduction strategies. For example, orientating streets to provide optimal exposure to the sun's rays is a Sitewide Development standard that contributes to the efficiency of rooftop solar panels and hot water systems.
2. **Sector-Based Actions for Four Principal Emissions Sources**
 - **VMT Reduction:** Strategies that reduce dependence on the single-occupant automobile by providing attractive travel options. These result in trips by foot, bicycle, transit, and carpool, in shorter average vehicle trip length, and in trip reduction attributable to management techniques such as compressed work weeks. The Area Plan emphasizes compact, mixed use development that stimulates walking, bicycling and transit use, combined with multimodal facilities, services and programs designed to reduce vehicle miles traveled while offering convenience and a high

quality of life. Standards and policies presented in Area Plan Books One and Two that contribute to VMT reduction are compiled in Chapter 3.

- **Building and Site Energy Efficiency:** Strategies to reduce energy demand, increase efficiency through passive design and encouraging active conservation, and to provide energy from renewable sources such as solar and wind power. Policies identifying energy efficiency strategies are uniquely included in the CAP.
 - **Waste Reduction:** Energy use and direct emissions associated with residential and commercial waste. Waste management policies are included in Book Two Section 5.7 and in Chapter 3 of the CAP.
 - **Water Efficiency:** Methods to lessen energy consumption associated with domestic and commercial water use, including irrigation. Water service and conservation policies as well as Recycled Water policies are included in Book Two Chapter 5 and in Chapter 3 of the CAP.
3. **Education and Collaboration:** Outreach to households and businesses in the CRP area that support the full range of climate actions, and collaboration with organizations and service providers that share responsibility for achieving the Plan's objectives.
 4. **Implementation and Monitoring.** Policies established to put the GHG Reduction Program into place and to track its success over time, while offering flexibility with regard to specific GHG reduction strategies and involving the community and key stakeholders.

The Greenhouse Gas Reduction Program identifies principles and policies associated with each of the initiatives. Some represent commitments to implementing specific policies, while others cite groups of strategies that will be used as appropriate in meeting the Climate Action Objectives presented in this chapter. In adopting the Area Plan as part of the 2030 Concord General Plan, the City is making a firm commitment to overseeing implementation of these strategies. The strategies, in combination with the results

of State-level actions such as standards for improved fuel efficiency and increased use of renewable energy sources, will enable the CRP area to meet the ambitious climate action targets expressed in the Objectives and Principles later in this chapter.

Figure 2-3 in Chapter 2 demonstrates how each of the emissions sectors contributes to meeting the target.

Accomplishing Climate Action Objectives will require an ongoing program of implementation, monitoring and reporting, as described in Chapter 4: Implementation and Monitoring Program.

Much of the work performed to prepare the Climate Action Plan is highly technical. Material documenting analysis methodologies is included in Appendix A: Documentation for GHG Emissions Forecasts. The analysis uses methodology and tools recommended by the Bay Area Air Quality Management District (BAAQMD) in its June 2010 publication, *California Environmental Quality Act (CEQA) Air Quality Guidelines*. The District's guidelines are relevant despite the fact that the Climate Action Plan is not a CEQA document, because they establish a threshold for levels of GHG emissions consistent with State aims.

1.2 Key Terms and Concepts

Climate action planning introduces vocabulary and concepts that are new to many people—even those who are familiar with local planning documents. This section presents key terms and concepts to explain how they are used in this Climate Action Plan. Additional definitions are provided in the glossary included at the back of this book.

Area sources. A category of GHG emissions sources identified by BAAQMD and used within the District's GHG model (referred to as BGM) generally including stationary, dispersed sources such as fuel combustion from space and water heating, landscape maintenance equipment, and fireplaces/stoves, evaporative emissions from architectural coatings, and consumer products. Some Area sources are not addressed by the GHG Reduction Initiatives but are reflected in the forecasts.

Business-as-usual forecast. Projection of GHG emissions assuming project activities without the imposition of GHG emission reduction requirements or incentives. For this CRP Area Plan, the business-as-usual forecast reflects the level of GHG emissions that would be associated with the Area Plan development program, circulation and transit system but without transportation demand management, green building, waste reduction and water efficiency strategies. The business-as-usual forecast reflects the benefits of the mixed use transit oriented development pattern that is contained in the Area Plan vision, and the benefits of Statewide GHG reduction measures..

Greenhouse gas (GHG). Any of several gases that produce a warming effect within the Earth's lower atmosphere by absorbing and trapping heat from the sun that would otherwise be reflected back into space. The major GHGs are carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). Less prevalent—but very powerful—greenhouse gases are hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆).

Carbon dioxide equivalent (CO₂e). A unit that enables consistent evaluation of climate impacts from different sources and gases. GHGs other than carbon dioxide are expressed as carbon dioxide equivalent units by use of multipliers based on the other gas' relative global warming potential.

Operational emissions. A category of GHG emissions identified by BAAQMD, referring to emissions produced following build-out of a project, including both area sources and transportation sources.

Per capita emissions. The level of emissions associated with Area Plan implementation, expressed as metric tons (MT) of carbon dioxide equivalent units and calculated on the basis of service population, as defined below.

Performance standard. A requirement that a measurable result be attained without specification of the methods or technologies to be used to create the result. For example, a performance standard for energy

efficiency might require that a building use 20 percent less energy than required by the California Energy Code (Title 24), without detailing the energy saving strategies to be used in building construction and operations.

Sectors. Groupings of major sources of greenhouse gas emissions.

Sequestration. The process by which vegetation, or trees in particular, take carbon out of the air and store it, thereby reducing GHG in the atmosphere

Service population. The total number of residents and workers in the CRP area at a specified time.

Strategy. An intervention to limit greenhouse gas emissions. Examples include using higher efficiency engines to burn fossil fuels more efficiently, switching from fossil fuels for electricity generation to solar energy or wind power, and establishing an aggressive standard for building insulation.

Vehicle miles travelled (VMT). The cumulative number of miles that motor vehicles travelled within a specific area over a specified period of time. (Also known as 'vehicle miles of travel') VMT is the basis for most traffic-related greenhouse gas emissions calculations.

1.3 California Climate Statutes and Implementation Guidance

The City of Concord is making GHG reduction integral to the Concord Reuse Project. In so doing, the City is responding to state-level legislative and executive action in response to the threat of climate change. Climate-related State statutes and Executive Orders that establish the context for the CAP include:

Executive Order S-3-05 (2005)

In 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05, establishing the following total statewide GHG reduction targets:

- Reduce GHG emissions to 2000 levels by 2010
- Reduce GHG emissions to 1990 levels by 2020
- Reduce GHG emissions to 80 percent below 1990 levels by 2050

Assembly Bill 32: The Global Warming Solutions Act of 2006

The Global Warming Solutions Act, Assembly Bill 32 of 2006 (AB 32), requires that California reduce its total GHG emissions to 1990 levels by 2020, consistent with Executive Order S-3-05. AB 32 requires a state-wide program of regulatory and market mechanisms to achieve quantifiable and cost-effective reductions of GHG emissions. The California Air Resources Board (CARB) is the lead agency responsible for monitoring and reducing GHG emissions.

In 2008, the ARB identified a set of actions and a timeline for implementing AB 32 following a collaborative process with other state agencies and stakeholders. The AB 32 Scoping Plan projects the GHG emissions reduction potential of each action and assigns responsibility for its implementation. These actions include, for example, strengthened green building standards and a 'cap and trade' system in which entities that emit less than a specified amount of GHG can 'sell' a credit to entities that exceed their otherwise allowable emissions.

Senate Bill 375 (2008)

California Senate Bill 375 (SB 375) supports the AB 32 emission reduction target. It requires that the State's Metropolitan Planning Organizations prepare Sustainable Community Strategies demonstrating that the future development pattern of each region—the location, type, and intensity of development—will achieve reductions in transportation-related GHG consistent with AB 32 reduction targets. These strategies must be prepared by 2013. By shaping the Area Plan to emphasize transit oriented development, walkable and bikeable environments, and a wide range of climate action strategies, the City of Concord is anticipating development features that may later be recommended as part of Sustainable Communities Strategies.

SB 97 CEQA Guidelines (2007)

California Senate Bill 97 (SB 97) (Dutton, Chapter 185, Statutes of 2007) directs the Governor's Office of Planning and Research (OPR) to develop CEQA guidelines "for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions." OPR was required to "prepare, develop, and transmit" the guidelines to the California Natural Resources Agency on or before July 1, 2009.

As directed by SB 97, the Natural Resources Agency adopted Amendments to the CEQA Guidelines for GHG emissions on December 30, 2009. On February 16, 2010, the Office of Administrative Law approved the Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The Amendments became effective on March 18, 2010.

1.4 Climate Action Plan Approach

This Climate Action Plan reflects the Area Plan's overall emphasis on community, character, and climate action. Throughout the plan are principles and policies that will distinguish the CRP area as a place with far lower climate impacts than business-as-usual development. This book compiles policies from elsewhere in the plan and adds to them with an overall set of objectives and standards, an implementation and monitoring program, and additional detail about the roles of different sectors in contributing to climate impacts and mitigations.

The approach to climate impact analysis and mitigation is based on the following key resources:

ICLEI'S Cities for Climate Protection Program

ICLEI is a membership association of local governments committed to advancing climate protection and sustainable development. ICLEI's Cities for Climate Protection program provides a replicable model for local governments committed to reducing GHG emissions while creating local community benefits. The program provides a set of tools for use

in the climate planning process. The ICLEI program is a widely accepted framework for managing the impacts of climate change and guiding the process for writing climate action plans. ICLEI tools were used in the initial stages of formulating the Climate Action Plan, understanding the sources of GHGs associated with the business-as-usual forecast, and identifying opportunities to reduce those emission levels.

Bay Area Air Quality Management District's California Environmental Quality Act Air Quality Guidelines.

These guidelines, released in June 2010, have guided preparation of this Climate Action Plan by providing both tools for analyzing emissions and establishing a useful threshold for GHG emissions. The threshold levels identified by BAAQMD as below the level that would require a finding of significant impact in a CEQA analysis are reflected in the CAP's GHG emission target. The District's GHG Model (referred to as BGM) was used to forecast GHG emissions under the business-as-usual and the Area Plan implementation scenarios.

California Air Pollution Control Officers Association (CAPCOA) Publications

The CAPCOA publication, *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures*, released in August 2010, has been used to identify sources of GHG emissions, opportunities for mitigation measures, and the potential efficacy of individual and groups of GHG reduction measures.

Independent research was conducted using additional methods and sources that are described in Section 2.6.

1.5 Climate Action Objectives

The objectives listed below and the principles listed later in this section link climate action planning with the State's goals, the vision and standards for the Concord Reuse Project area, and the City's full set of activities addressing climate and environmental protection.

The overarching goal of effective climate action is being added to the 2030 General Plan and applies to the whole city.

1. Establish the CRP Area Plan as a model for integrating greenhouse gas reduction into community planning, development and conservation consistent with California and Bay Area goals.
2. Demonstrate the ability to produce GHG emissions at or below per capita target levels of 4.6 MT CO₂e by 2020 and 2.8 MT CO₂e in 2030.
3. Achieve participation in GHG reduction activities consistent with the Area Plan by 100 percent of public and private organizations involved in development and conservation activities that impact the Planning Area.
4. Integrate the CRP Area Plan into a Concord City-wide Climate Action Plan by 2013.
5. Strive for lower GHG emissions than required by the GHG reduction target in Objective 2 in recognition of the Statewide objective of achieving an absolute reduction in emissions of GHGs.

1.6 Climate Action Plan Application and Legal Status

The CAP is part of the CRP Area Plan, and as such is part of the City of Concord General Plan. Like the other parts of the Area Plan, policies in the CAP apply exclusively to the Planning Area shown on Figure 1-1. As indicated in the Area Plan At-a-Glance at the front of this book, the reader's purpose should determine what volumes they consult, as follows:

- Readers wishing to understand the principles, policies and approach for climate action may choose to read only this book.
- Users wishing to review all policies and standards that are uniquely relevant to the CRP should consult all three books of the Area Plan.

- Those who wish to identify the complete set of General Plan policies applicable to development and conservation activities in the CRP Area should consult the three volumes of the Area Plan as well as the two volumes of the Concord 2030 General Plan.

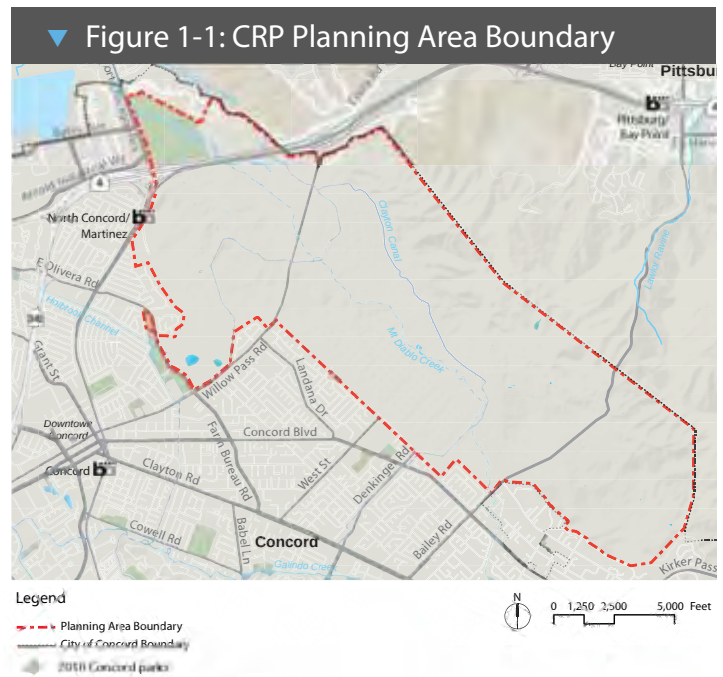
1.7 Using the Principles, Policies, and Standards

This document uses principles, policies, and standards to guide future decisions for the Concord Reuse Project area in support of the citywide goals included in the 2030 General Plan. These statements parallel the principles, and policies in the citywide 2030 Concord General Plan in the following way:

- Principles establish direction for the climate action policy framework on a particular topic.
- Policies provide more specific direction on how to achieve goals and principles by outlining actions, procedures, and techniques. The policies in Book Three are exclusively applicable to the Concord Reuse Project area.
- Standards are measurable criteria used to direct land use, site planning, building design, transportation, and other decisions related to future development and conservation activities.

As in other parts of the Concord General Plan, the principles, policies, and standards are uniquely numbered. Each principle and policy is preceded by one or more letters. For example, Principle CA-T-1 is the first principle cited in the Climate Action Plan (“CA” standing for “climate action”) and related to transportation, “T”. Similarly, Policy CA-T-1.1 is the first policy under this Principle. The policies have descriptive titles to assist the reader in navigating the document and quickly scanning the subjects covered.

Like the other parts of the Area Plan, the Climate Action Plan includes background information, explanatory material, and commentary. The purpose of this information is to explain the basis for CAP policies and to guide CAP implementation. All principles, policies, and



standards of the Area Plan will remain in effect even if background information, explanatory material or commentary becomes out of date.

1.8 Interpretation of the Concord Reuse Project Area Plan

Principles, policies, and standards in the Area Plan typically begin with an action-oriented verb expressing a directive for future decisions. The verb indicates whether a policy is mandatory or advisory.

- Policies beginning with “Require,” “Ensure,” “Mandate,” “Protect,” “Use,” and similar verbs indicate binding directives. The use of the words “shall” or “will” in a sentence likewise indicate binding directives. Conformity with such policies is necessary for proposals or actions to be determined consistent with the General Plan.
- Policies beginning with “Encourage,” “Strive,” “Support,” “Work with,” “Avoid,” “Minimize,” and similar verbs indicate more aspirational directives. While

they carry the same weight as the mandatory policies, there is a greater degree of flexibility and discretion in their application. The word “should” in a sentence can be interpreted in a similar way. Conformance with such policies or demonstration of an alternative way to meet stated principles, standards, and objectives is expected in order to achieve the aims of the General Plan.

- The use of the word “desired” in a policy indicates that implementation, while not mandatory, would promote the aims of the Area Plan.
- “May” indicates a policy that should receive consideration by project sponsors to identify opportunities to promote the aims of the Area Plan. “May” also indicates that there are multiple courses of action to achieve a given outcome.

Unless otherwise indicated in the language of specific principles, policies or standards, the responsibility for overseeing implementation rests with the City of Concord. Even where policies indicate activities related to private development, it is the City’s responsibility to ensure compliance through its regulations, review and approval processes, and operating procedures.

Where policies indicate activities related to other public agencies or special districts, it is the City’s responsibility to communicate the Plan’s intent and to work with these agencies to achieve desired results. In instances where the City’s jurisdiction is limited by state or federal law (for instance, policies applying to state universities or to the Navy), the policies should be considered by the affected agencies to the extent permitted by law, but may not be binding.

Area Plan Book Three references figures that show the intended arrangement of future uses on the site, as well as the locations of parks, roads, bikeways, and other community improvements. These figures are generalized and are subject to refinement through more detailed surveys and planning processes. Minor changes to boundaries and alignments are acceptable as long as they do not conflict with the policies and standards of the Area Plan.

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Greenhouse Gas Emissions: Existing and Future Conditions

2.1 Existing Conditions

At the time of Area Plan preparation, the CRP area contains very limited sources of GHG emissions. The North Concord / Martinez BART station, the parking lot serving the station, and roadways passing through the Planning Area are the only significant sources of GHG emissions. Implementation of the development program—either with or without Area Plan standards and policies—will substantially increase emissions compared to conditions at the time of Area Plan adoption. However, as demonstrated below, the Greenhouse Gas Reduction Program set forth in Chapter 3 will result in a development and conservation scenario that limits GHG emissions to a level that is consistent with State climate change objectives.

2.2 Projecting Greenhouse Gas Emissions

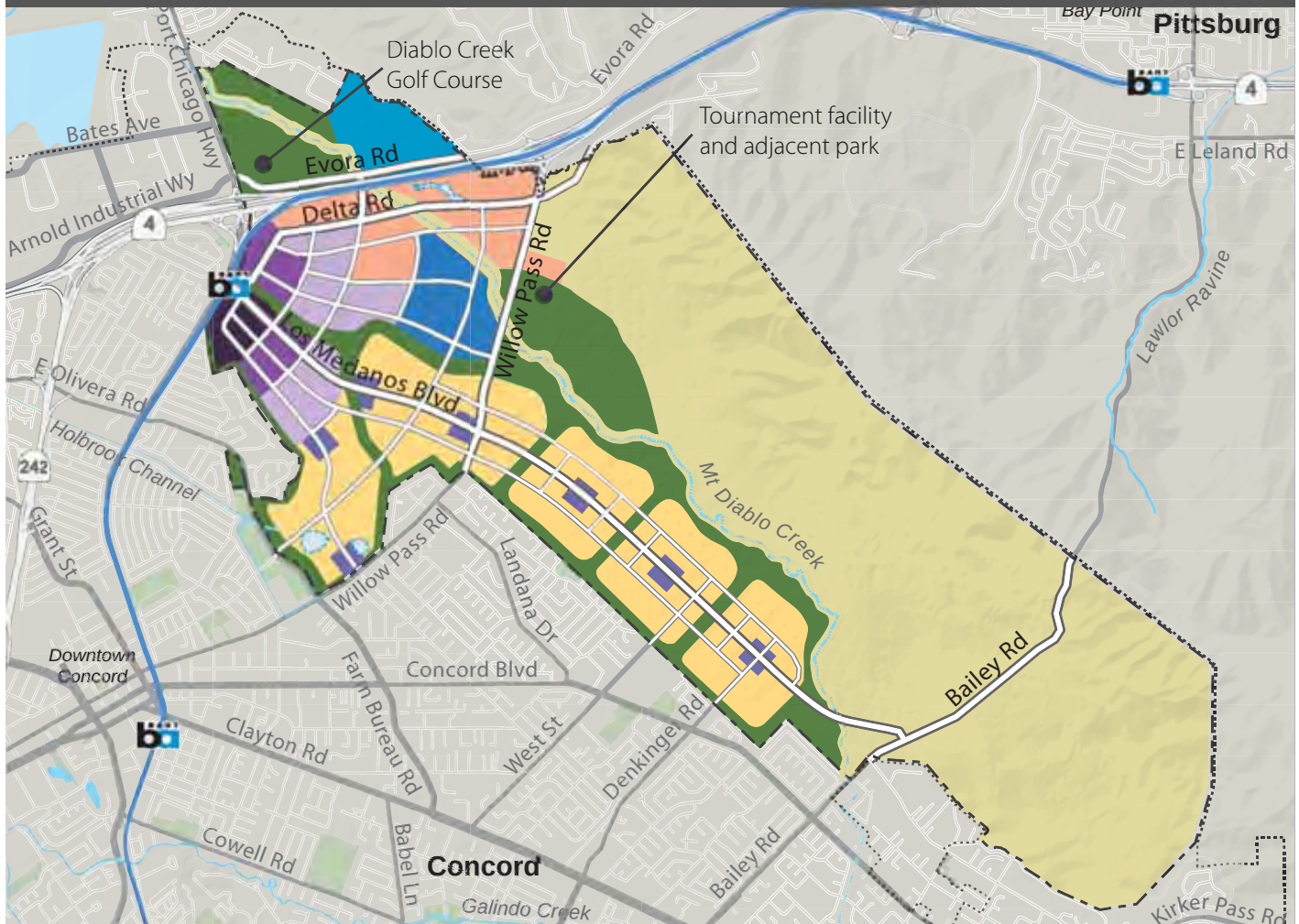
GHG emissions associated with Area Plan implementation were calculated for two scenarios. Together they create an understanding of the potential of the CRP Area Plan to set an example of a major new development opportunity that supports California's climate goals. The two scenarios are:

- The business-as-usual forecast, which estimates annual emissions associated with the implementation of the development program without measures specifically designed to reduce GHG emissions
- The Area Plan forecast, which anticipates implementation of the full Area Plan including the Climate Action Plan's Greenhouse Gas Reduction Program.

Both projections reflect the CRP Area Plan's development program and pattern as illustrated in the Area Plan Diagram (Figure 2-1) below and in Table 3-2 in Book One. (A buildout year of 2030 was assumed.) Both also assume the beneficial effects of State GHG reduction measures identified in Section 3.1.

The two scenarios were evaluated using the BAAQMD Greenhouse Gas Model (BGM) to forecast operational GHG emissions. BGM is an excel-spreadsheet-based tool that estimates operational GHG emissions from land development projects. Transportation data is imported into BGM from the URBEMIS model, while all other sources such as emissions associated with energy use, water use, and waste are calculated directly by BGM based upon the development program and typical household, business, and site resource use. Details of the modeling input are provided in Appendix A: Documentation for GHG Emissions Forecasts.

▼ Figure 2-1: Area Plan Diagram



Legend

Transit Oriented Districts



- North Concord TOD Core
- North Concord TOD Neighborhood

Neighborhoods



- Central Neighborhood
- Village Center
- Village Neighborhood

Civic and Institutional



- Campus
- First Responder Training Center

Commercial



- Commercial Flex

Conservation, Open Space and Recreation Lands



- Conservation Open Space
- Greenways, Citywide Parks, and Tournament Facilities

Not shown: Potential bike and pedestrian facilities in the Regional Park.

Primary Circulation Network



- Through Streets
- Collector Streets



0 1,250 2,500 5,000 Feet

--- Planning Area Boundary

..... City of Concord Boundary

Seasonal Wetlands (delineated as of 2010)

2010 Concord parks

Activities Included



Housing



Offices



Shopping



Schools + Public Facilities



Research + Development



Regional Auto Access



Transit, Bicycling + Walking Priority

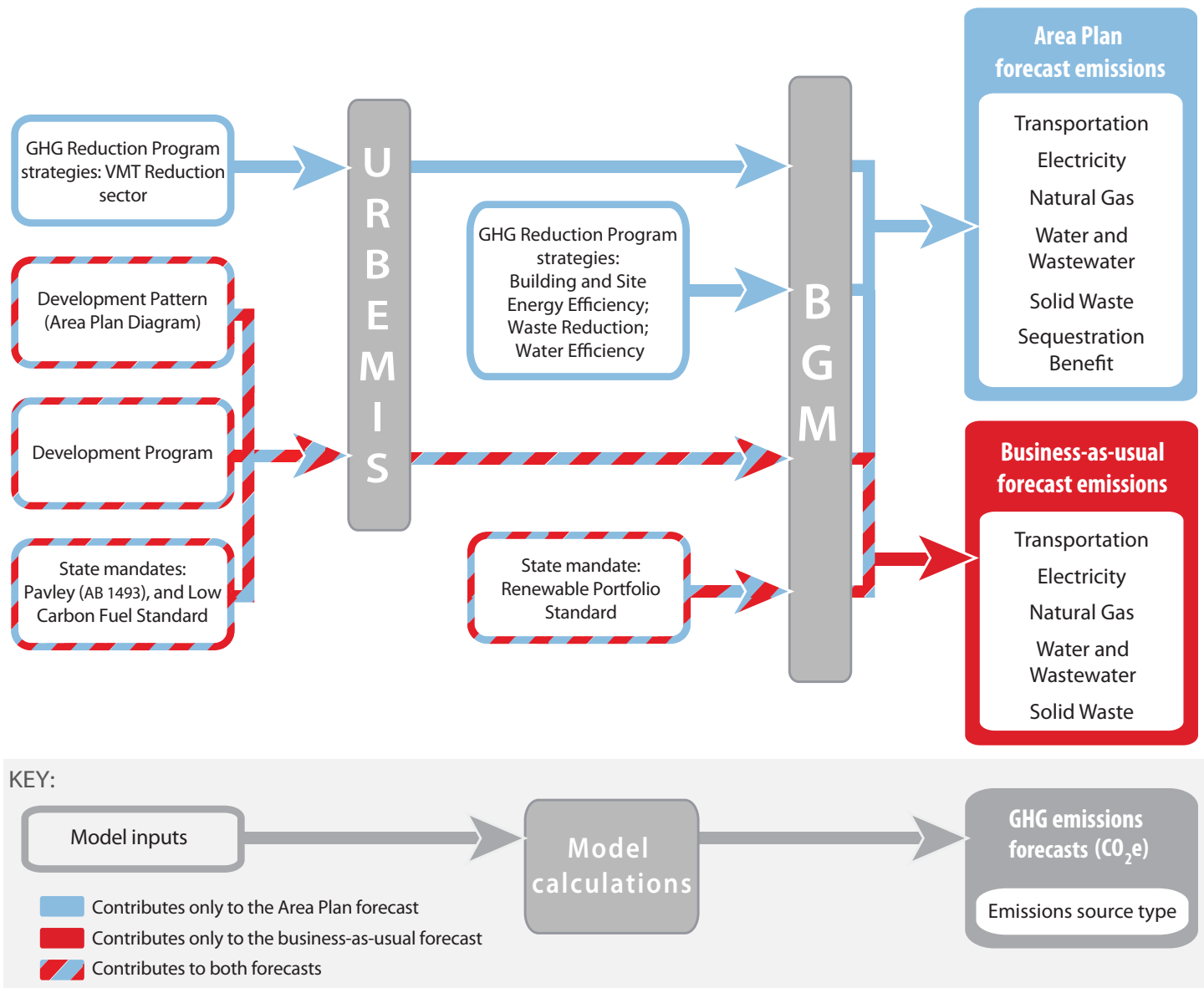


Parks and Recreation



Conservation and Species Protection

▼ Figure 2-2: Annual Emissions Forecasting Approach



2.3 Target GHG Emissions Level

The CAP establishes a target for GHG emissions that is based on the BAAQMD's Threshold of Significance for Projects other than Stationary Sources. Though the BAAQMD threshold is established specifically for CEQA analysis, it serves as a useful basis for the Area Plan analysis because it identifies the emissions level for which a project "would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions needed to move us towards climate stabilization." (*BAAQMD Adopted Air Quality Thresholds of Significance, June 2010*). The CAP's Objective 5 recognizes that attainment of a greater level of GHG reduction is a continuing aspiration.

The threshold of significance established by the Air District is 4.6 metric tons CO₂e per capita in 2020. Because buildout of the development program is not expected until 2030, the BAAQMD 2020 per capita standard was extrapolated to 2030 to create a project emissions reduction target and to analyze emissions associated with the business-as-usual and Area Plan scenarios. The 2030 target was calculated using the following steps.

Step 1: Identify the rate of reduction in statewide targets.

Statewide GHG emissions targets, which are set by Executive Order S-3-05, were compared for 2020 and 2030 to find the percent rate of reduction.

$\frac{\text{Difference in the statewide emissions targets for 2030 and 2020}}{\text{2030 statewide emissions target}}$	=	Required statewide percent reduction between 2020 and 2030
---	---	---

Calculated as:

$\frac{(9.6 \text{ metric tons CO}_2\text{e per capita} - 5.8 \text{ metric tons CO}_2\text{e per capita})}{9.6 \text{ metric tons CO}_2\text{e per capita}}$	=	40% reduction
---	---	----------------------

Step 2: Estimate the 2030 regional target per capita.

The regional (BAAQMD) target for 2020 per capita project emissions was used along with the statewide percent reduction rate (from Step 1) to estimate a 2030 regional target.

$(1 - \text{percent reduction}) \times \text{2020 regional emissions target}$	=	2030 per capita project emissions target based on BAAQMD 2020 target and Executive Order S-3-05
---	---	--

Calculated as:

$(1 - .40) \times 4.6 \text{ metric tons CO}_2\text{e}$	=	2.8 metric tons CO₂e per capita
---	---	---

Step 3: Estimate the project GHG emissions target for 2030.

The CRP Area Plan's service population, which combines its residents and working populations, was then applied to the regional per capita target to establish a 2030 project total GHG emissions target:

Per capita annual emissions target	x	Service population	=	Total project emissions target
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Calculated as:

2.8 metric tons CO₂e	x	55,834	=	156,335 metric tons CO₂e
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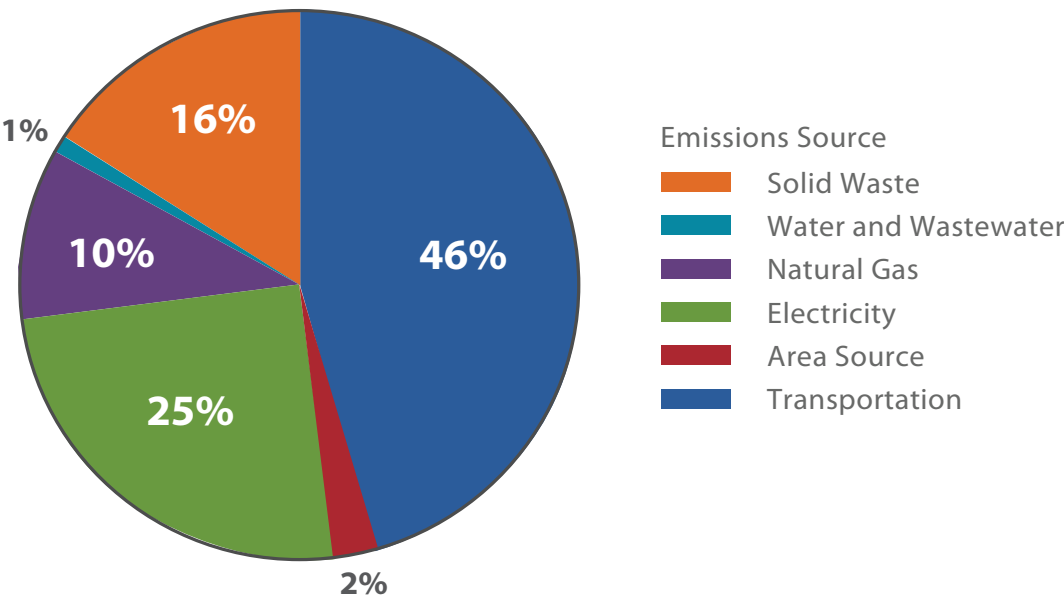
2.4 Business-as-Usual Emissions Forecast

As shown in Table 2-1, the forecasted 2030 business-as-usual emissions total of 287,099 metric tons CO₂e (5.1 MT CO₂e per capita) substantially exceeds the 2030 target of 2.8 MT CO₂e. The table shows that transportation is the single largest projected GHG source type, contributing 46 percent of all forecasted emissions. This is consistent with many other urbanized areas that do not have industrial activity. Electricity and natural gas—attributable primarily to building energy use—are also major sources of GHG emissions, contributing 25 percent and 10 percent, respectively. Solid waste contributes 16 percent, while water and waste water and area sources (such as wood burning stoves) are less important sources, contributing 1 percent and 2 percent, respectively. Figure 2-3 identifies the business-as-usual emissions by source. The business-as-usual forecast reflects the mixed-use character of the development program and pattern but does not reflect the Area Plan policies specific to climate action.

▼ Table 2-1: 2030 Business-as-Usual Forecast of Annual GHG Emissions		
Emissions Source	Business-as-Usual Forecast	
	Emissions (MT CO ₂ e)	Percent of Forecast Total
Transportation	132,332	46%
Area Sources (landscape, hearth, and stove sources)	6,395	2%
Electricity	71,678	25%
Natural Gas	28,700	10%
Water and Wastewater	2,669	1%
Solid Waste	45,326	16%
Total Project Emissions	287,099	100%
Target: 156,335		
Per Capita Project Annual Emissions	5.1	
Target: 2.8		

Source: BGM model output based on CRP Area Plan

▼ Figure 2-3: Composition of 2030 Business-as-Usual Forecast of Annual GHG Emissions



2.5 Area Plan Emissions Forecast

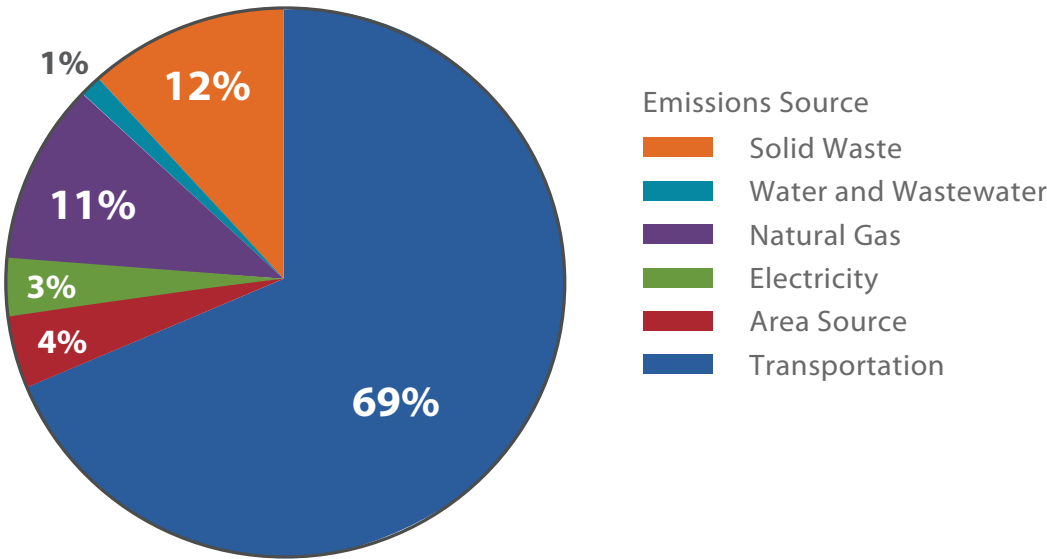
The Area Plan forecast of annual emissions in 2030 is 154,912 MT CO₂e (2.7 MT CO₂e per capita), which meets the 2030 target of 156,335 MT CO₂e (2.8 MT CO₂e per capita) as shown in Table 2-2. The Area Plan effectively emits 47 percent less GHG emissions per year than the business-as-usual forecast, which reflects the estimated climate impact of the CRP Area Plan standards and policies. Table 2-2 shows the Area Plan forecast of emissions by source, and Table 2-3 compares reductions from the business-as-usual and Area Plan forecasts by each emissions source.

Electricity alone is expected to contribute 49 percent of the total annual reduction, due to the site-wide application of photovoltaic (PV) panels and building energy requirements specifying performance above Title 24 (building code) standards. Solid waste, natural gas, and water and wastewater emissions are also projected to fall significantly, due to efficiency and reduction measures included in the Area Plan and reflected in the BGM model.

▼ Table 2-2: 2030 Area Plan Forecast of Annual GHG Emissions		
Emissions Source	Area Plan Forecast	
	Emissions (MT CO ₂ e)	Percent of Forecast Total
Transportation	104,882	69%
Area Sources (landscape, hearth, and stove sources)	6,395	4%
Electricity	4,964	3%
Natural Gas	16,554	11%
Water and Wastewater	1,611	1%
Solid Waste	17,677	12%
Total Project Emissions	151,912	100%
Target: 156,335		
Per Capita Project Annual Emissions	2.7	
Target: 2.8		

Source: BGM model output based on CRP Area Plan
Note: The model also projects the impacts of street trees (sequestration), which was found to be less than 1 percent of the total emissions forecast.

▼ Figure 2-4: Composition of 2030 Area Plan Forecast of Annual GHG Emissions



The largest contributor to emissions—transportation—is expected to fall by 27,450 MT CO₂e, approximately 20 percent of the total projected reduction in the Area Plan forecast, primarily as a result of transportation demand management measures. This more modest decline is due in part to the fact that the Plan’s mixed-use, transit-oriented development pattern is reflected in the business-as-usual emissions forecast. Appendix B: Transportation Methodology Sources and Analysis of Reduction Measures, provides additional detail on estimating the efficacy of VMT reduction measures.

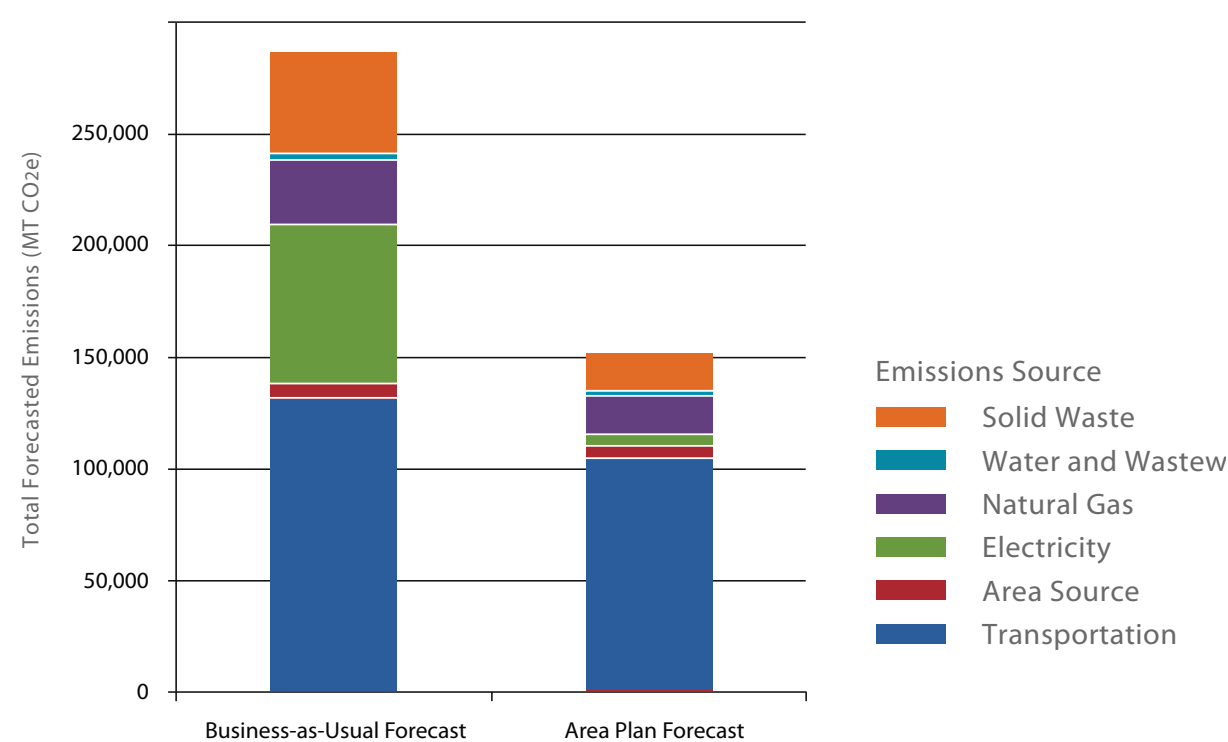
The Area Plan forecast reflects employment levels, visitor trips, and residents including student populations.

▼ Table 2-3: 2030 Annual GHG Reductions in the Area Plan Forecast

Emissions Source	Reduction in Area Plan forecast from Business-as-usual	
	Reduced Emissions (MT CO ₂ e)	Percent of Total Reduction
Transportation	27,450	20%
Area Sources (landscape, hearth, and stove sources)	0	0%
Electricity	66,714	49%
Natural Gas	12,146	9%
Water and Wastewater	1,058	1%
Solid Waste	27,649	20%
Total Reduction	135,187	100%

Source: BGM model output based on CRP Area Plan
Note: The model also projects the beneficial impacts of street trees (sequestration), which was found to be a reduction of less than 1 percent of the total annual emissions forecast.

▼ Figure 2-5: 2030 Annual Forecast Emissions: Area Plan vs. Business-as-Usual



Source: BGM model output based on CRP Area Plan

2.6 Creating the GHG Reduction Program Policies

A program of GHG reduction initiatives, described in detail in Chapter 3, provides the basis for action to achieve the emissions target, as well as key inputs for estimating GHG emissions. These principles, standards, and policies play two distinct but related roles: 1) as commitments established in the Area Plan; and 2) as inputs to the URBEMIS and BGM models. While the impact of some standards and policies can be quantified, e.g., installing rooftop photovoltaics, others indirectly support the efficacy of reduction strategies and may not be fully captured in the model.

The methodology for creating the program, and key modeling inputs, is described below:

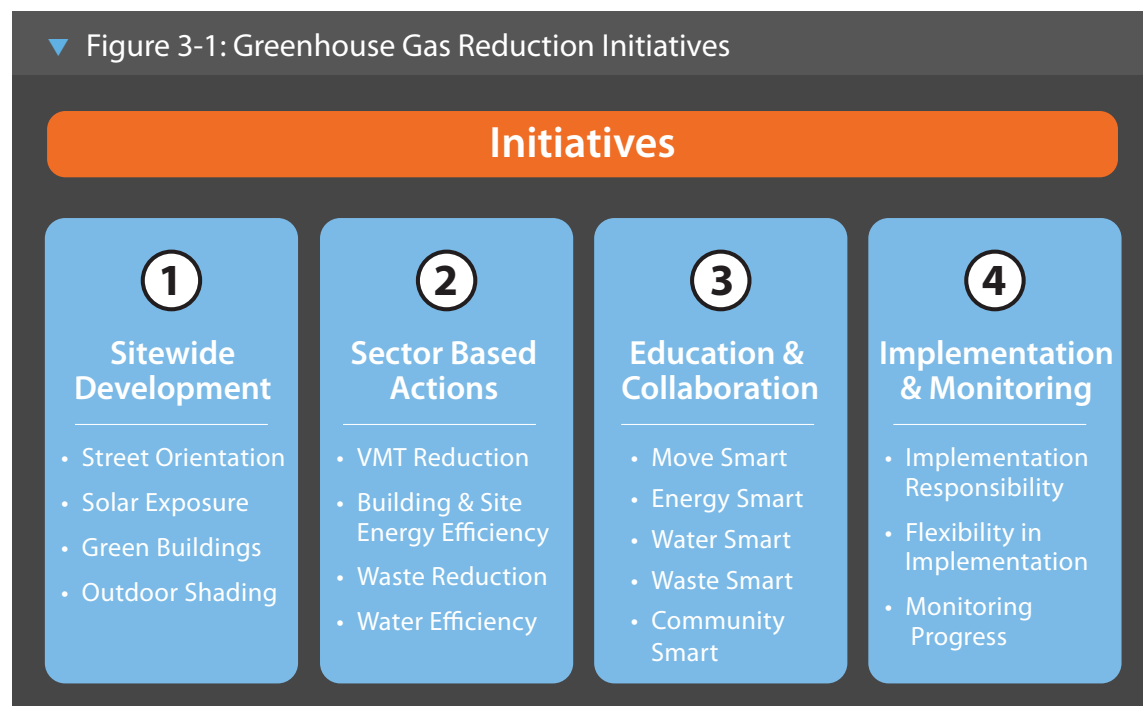
- **Context Analysis:** Assessment of site characteristics such as climate, typical energy demand, rainfall, wind, and water and waste systems. This step provided a foundation for evaluating the feasibility of GHG reduction strategies in the Planning Area, and for customizing feasible strategies to the site.
 - **Technologies and Best Practices Review:** Compilation and initial evaluation of available technologies and GHG reduction best practices, drawing on industry sources, codes, academic research, and performance in comparable projects. During the course of CAP preparation, a number of new materials were released that have confirmed initial strategy selection and estimation of reduction potential. Key among these is the August 2010 publication from the California Air Pollution Control Officers Association (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures*.
 - **Regional Guidance Review and Use of Tools:** BAAQMD CEQA Guidelines, the BGM model and the URBEMIS model have provided methodological guidance and tools.
 - **Evaluation:** Analysis of the feasibility of technologies, best practices, and policies to reduce emissions associated with implementation of the Area Plan
- development program. This included modeling of resource consumption and GHG emissions through tools including Home Energy Efficient Design (HEED) for residential buildings, eQuest for commercial buildings, and CACP for preliminary evaluation of sitewide emissions.
- Through this process, a number of effective strategies emerged. For example, roof-mounted photovoltaic cells emerged as the most efficient, cost-effective method for generating on-site renewable energy, due to the amount and angle of site solar exposure and the availability of ample low- to medium-rise residential rooftop space. Wind turbines, in contrast, were not identified as effective due to the preservation of hillsides for a regional park and the limited amount of wind in the lower elevation areas of the site.
- Key findings from the evaluation are summarized in Appendix C: Key Findings from the Evaluation of Candidate GHG Reduction Measures.
- **Standard, Principle, and Policy Development and Refinement:** Based upon evaluation findings, a set of standards, principles and policies were developed. For example, once use of photovoltaics was selected as an effective means of generating renewable energy, standards and policies were established to maximize rooftop solar access (Book One, Standard CF-15 and CF-16), and encourage installation and operation of rooftop photovoltaics (Book Three, Policy CA-E-1.6).

Greenhouse Gas Reduction Program

3.1 Summary of Greenhouse Gas Reduction Program

This GHG Reduction Program commits the City to overseeing a climate action program comprised of four initiatives as shown in Figure 3-1:

▼ Figure 3-1: Greenhouse Gas Reduction Initiatives



The program is designed to achieve the target expressed in Climate Action Objective 2: annual per capita GHG emissions below 4.6 MT CO₂e by 2020 and 2.8 MT CO₂e by 2030, consistent with both California's Global Warming Solutions Act of 2006 (AB 32) and Executive Order S-3-05. To create a practical way to implement the initiatives, the program combines specific implementation requirements with the performance-based objective for GHG emissions associated with Area Plan buildout.

Chapter 2 reports on the results of the assessment of project GHG emissions with and without GHG reduction measures. Those results demonstrate the ability to meet target emissions levels with the program specified here. Use of performance-based policies for

some sectors—in particular, for building energy efficiency—allows specific strategies to be selected closer to the time of development and occupancy. The primary reason for deferring specification of some strategies is that development of the CRP area is not expected to be initiated for several years following adoption of the Area Plan. Specifying and codifying requirements at a time closer to development is a response to the dynamic environment in which technologies, costs, and regulations are all likely to evolve before initial development applications are processed.

State and Regional Action to Reduce GHG Emissions

In addition to climate action standards and policies identified specifically for the site, the CAP recognizes the benefits of larger regional and State efforts to reduce climate emissions through State-level actions. Though not cited specifically as part of the GHG Reduction Program, which emphasizes initiatives put into place by the City of Concord, adoption of state-level mandates is reflected in both GHG emissions forecasts described in Chapter 2. These State mandates include:

- **Renewable Portfolio Standard:** The Renewable Portfolio Standard will require the renewable energy portion of the retail electricity portfolio to be 33 percent in 2020. For PG&E—the electricity provider for the CRP Planning Area—approximately 12 percent of the current portfolio qualifies as renewable under the RPS rules and thus the gain by 2020 would be approximately 21 percent.
- **Pavley (AB 1493):** AB 1493 requires improved vehicle fuel efficiency. The California Air Resources Board AB 32 Scoping Plan assigns an approximate 20 percent reduction in emissions from passenger vehicles statewide associated with its implementation.
- **Low Carbon Fuel Standard:** The Low Carbon Fuel Standard was established in 2007 by Governor Schwarzenegger’s Executive Order S-1-07, which proclaimed the transportation sector as the main source of GHG emissions in California. The executive order establishes a goal to reduce the carbon intensity of transportation fuels sold in California by a minimum of 10 percent by 2020.

The BGM model used to project GHG emissions for the CAP assumes successful implementation of each of these mandates.

Another arena for GHG reductions is through “command and control” regulations that (a) limit certain active chemicals in the atmosphere; (b) establish performance requirements for landfill gas collection and for systems that use GHGs with high global warming potential; and (c) set efficiency standards for specific equipment or processes. In general, the GHG reduction impacts of command and control regulations are not reflected in the BGM model.

3.2 Detailed Greenhouse Gas Reduction Program

This section presents the principles and policies associated with each of the CAP initiatives, as follows:

1. **Sitewide Development Standards:** Climate action-related standards from Book One that are applicable to all of the Area Plan’s Development Districts.
2. **Sector-based Actions:** Policies addressing four major categories of GHG emissions sources, including transportation, building and site energy, waste, and water. Some policies initially presented in Area Plan Books One or Two are restated here, while other policies are unique to the CAP.
3. **Education and Collaboration Policies:** Policies supporting implementation of Program Initiatives, including one for each of the sectors and one focused on collaborative efforts between the City and various local and regional organizations and agencies.

▼ Table 3-1: Summary of GHG Reduction Program

CAP Initiatives	CAP Reference	Additional Area Plan References
Sitewide Development Standards		
Street Orientation	Standard CA-1	Book One, CF-15
Solar Exposure	Standard CA-2	Book One, CF-16
Green Building	Standard CA-3	Book One, CF-17
Outdoor Shading	Standard CA-4	Book One, CF-18
Sector-Based Actions		
VMT Reduction		
Walkable Communities	Principle CA-T-1, Policies CA-T-1.1 through CA-T-1.4	Book One, Table 3-4 and Figure 3-1
Intermodal Connectivity	Principle CA-T-2, Policies CA-T-2.1 through CA-T-2.7	Book Two, Principle T-1, Policies T-1.2 through T-1.8
Emerging Technologies	Principle CA-T-3, Policies CA-T-3.1 through CA-T-3.3	Book Two, Principle T-2, Policies T-2.1 through T-2.3
Parking Management	Principle CA-T-4, Policies CA-T-4.1 through CA-T-4.7	Book Two, Principle T-3, Policies T-3.1 through T-3.7
Transportation Demand Management	Principle CA-T-5, Policies CA-T-5.1 through CA-T-5.7	Book Two, Principle T-4, Policies T-4.1 through T-4.8
Building and Site Energy		
Building and Site Energy Efficiency	Principle CA-E-1, Policies CA-E-1.1 through CA-E-1.5	Book One, CF-17. Book Two, Principle U-7.
Waste Reduction		
Reduce and divert waste	Principle CA-W-1, Policies CA-W-1.1 through CA-W-1.4	Book Two, Policies U-6.1 and U-6.2
Water Efficiency		
Use water efficiently	Principle CA-WR-1, Policies CA-WR-1.1 through CA-WR-1.7	Book Two, Policies U-2.2, U-2.5, U-4.2 through U-4.4
Education and Collaboration		
Community Education and Collaboration	Principle CA-EC-1	
Move Smart	Policy CA-EC-1.1	Book Two, Policies T-1.9 and T-4.7
Energy Smart	Policy CA-EC-1.2	
Water Smart	Policy CA-EC-1.3	
Waste Smart	Policy CA-EC-1.4	Book Two, Policy U-6.1
Community Smart	Policy CA-EC-1.5	

3.2.1 Initiative One: Sitewide Development Standards

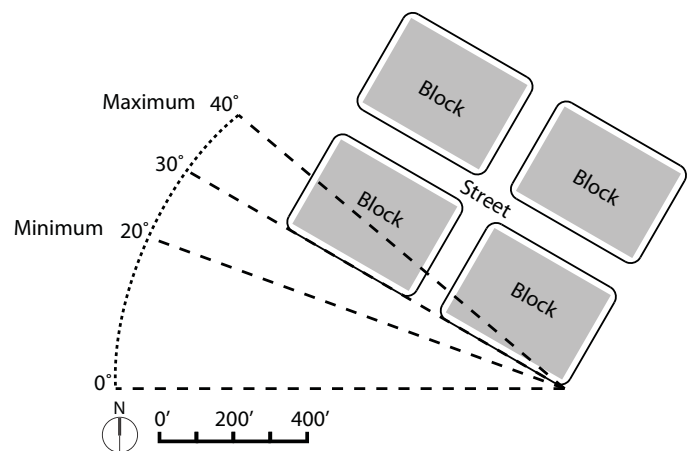
The climate action standards that comprise this initiative are included in Book One of the CRP Area Plan as Sitewide Development Standards. They are located in Book One Chapter 3: Community Framework (CF). Each standard is given a reference number within the CAP ('CA' stands for 'climate action'), while the Book One number for each of the standard is also noted (e.g., CF-15).

- **Standard CA-1: Street Orientation.** Maximize solar exposure and penetration of cool summer winds by designing the street network so that the longest face of each block is oriented between +20 and +40 degrees from due south, measured clockwise. When application of this standard would require a substantial amount of grading or would negatively impact natural hillsides, as in portions of the TOD Neighborhood, the permitted range of orientation should be slightly increased. This standard is illustrated in Figure 3-2. (Book One Standard CF-15)
- **Standard CA-2: Solar Exposure.** During detailed planning, ensure the potential of roof-mounted photovoltaic cells to generate solar energy by requiring that all south, southwest, and southeast facing rooftops receive unobstructed access to the sky at a +22 degree angle, measured counterclockwise from due south. This standard is illustrated in Figure 3-3. (Book One Standard CF-16)
- **Standard CA-3: Green Building.** Require green building methods that maximize the use of recycled materials, promote energy and water conservation, and create healthy spaces for future occupants, as demonstrated by:
 - Consistency with policies and strategies included in Book Three of the Area Plan;
 - Exceeding Title 24 energy standards by at least 30 percent for all buildings (to be interpreted as the most recently published Title 24 standards at time of submission of development application); and

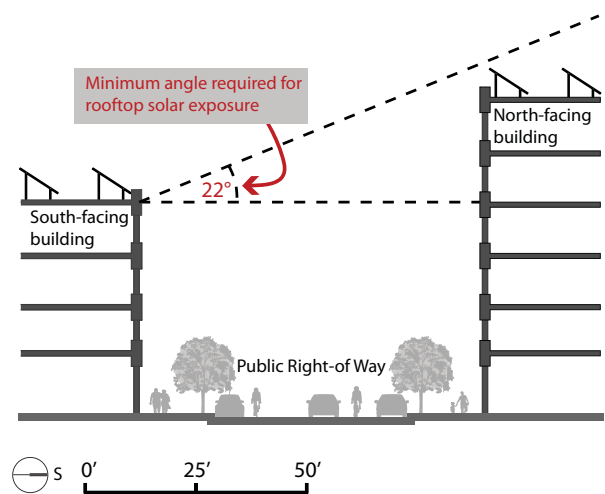
- For commercial buildings greater than 25,000 square feet, achieving LEED Gold Certification or verifying equivalent performance

- **Standard CA-4: Outdoor Shading:** All public sidewalks and parking lots shall receive at least 50 percent shade coverage when outdoor landscaping is mature. (Book One Standard CF-18)

▼ Figure 3-2: Street Orientation (Standard CA-1)



▼ Figure 3-3: Solar Exposure (Standard CA-2)



3.2.2 Initiative Two: Sector-Based Principles and Policies

The sector-based principles and policies contained in Initiative Two present the groups of strategies that will be used to reduce the GHG emissions from the site's major potential sources: transportation, building and site energy use, water use, and waste disposal. These are summarized in Table 3-1. This initiative also includes strategies for producing energy on site through renewable sources as an essential part of the overall CAP approach.

Many of the policies below are included elsewhere in the Area Plan. Where policies are re-stated from Book One or Two the number of each relevant policy or standard is identified in parentheses.

3.2.2.1 Vehicle Miles Travelled (VMT) Reduction Principles and Policies

▼ Principle CA-T-1: Walkable Communities

Implement land use strategies that result in mixed-use, walkable communities. (See Book One Table 3-4 and Figure 3-2)

► Policy CA-T-1.1: Convenience Standards

Place homes and workplaces in close proximity to daily necessities (typically ¼ mile or less) such as grocery stores and community services. (See Book One, Table 3-4.)

► Policy CA-T-1.2: Mixed-Use Development Pattern

Create business districts, mixed-use and residential neighborhoods at densities sufficient to support convenient transit service and provision of daily necessities within walking distance of homes and workplaces. (See Book One, Table 3-4.)

► Policy CA-T-1.3: Transit-Oriented Districts

Create a transit-oriented development pattern by placing higher intensity development immediately around the North Concord/Martinez BART station, with emphasis on employment-generating uses. Complement the development pattern with supportive parking, circulation network design and transit policies. (See Book One, Figure 3-1, and Table 3-4)

► Policy CA-T-1.4: Pedestrian-Oriented Design

Design small blocks, narrow streets, pedestrian crossings, and convenient access to the bicycle and off-street trail networks. (See Standards: Book One, Tables 3-4 and 3-20)

▼ Principle CA-T-2: Intermodal Connectivity

Provide a safe, attractive, accessible, and well connected transportation network that accommodates and balances the needs of pedestrians, bicyclists, transit users and motorists in the CRP area. (See Book Two, Principle T-1)

► Policy CA-T-2.1: Bicycle and Pedestrian Connections

Provide bicycle and pedestrian connections within Greenways shown on the Area Plan Diagram and in other locations where feasible to link the bicycle and pedestrian network in surrounding neighborhoods to the neighborhoods, workplaces, and commercial and recreational amenities, in the Planning Area. (See Book Two, Policy T-1.2)

► Policy CA-T-2.2: Comfortable Pedestrian Connections

In portions of development districts with significant topography, provide pedestrian connections at grades of 5% or less along public rights of way (e.g. streets and pedestrian paths) to enable comfortable access to key destinations such as the North Concord/Martinez BART station and other portions of the site. (See Book Two, Policy T-1.3)

► Policy CA-T-2.3: Safe Streets

Design public rights-of-way to help ensure personal safety through the use of techniques such as pedestrian-scale lighting, frequent ground floor windows facing sidewalks and pedestrian paths, and other techniques with demonstrated personal safety benefits. (See Book Two, Policy T-1.4)

► Policy CA-T-2.4: Bicycle and Pedestrian Safety

Provide for the safety of bicyclists and pedestrians through low-speed, properly sized streets, bike lanes, continuous sidewalks, and crosswalks; and by implementing traffic controls which reduce conflicts with motor vehicles. (See Book Two, Policy T-1.5)

► Policy CA-T-2.5: Transit Connectivity

Develop funding agreements with local transit operators, or require private operators, to provide frequent bus service between mixed-use districts, Village Centers, and commercial districts and to connect the CRP area to surrounding neighborhoods. (See Book Two, Policy T-1.6)

► Policy CA-T-2.6: Easy Transfers and Connections

Create a circulation system that provides easy connections from BART to bus and from both BART and bus to car-share, pedestrian and bicycle facilities that provide access to destinations throughout the CRP area. These connections are critical in making transit trips appealing and convenient. (See Book Two, Policy T-1.7)

► **Policy CA-T-2.7: Car- and Bike-Sharing**

Promote shared vehicles as an important part of the multi-modal transportation system. (See Book Two, Policy T-1.8)

▼ **Principle T-3: Emerging Technologies**

Use emerging technologies and services to increase transportation system efficiency. (See Book Two, Principle T-2)

► **Policy CA-T-3.1: Support Facilities for New Technologies**

Assist in providing support facilities for emerging technologies, such as alternative fueling stations. (See Book Two, Policy T-2.1)

► **Policy CA-T-3.2: Electric Vehicles**

Encourage design of streets, circulation systems, and support facilities to promote the use of electric vehicles. (See Book Two, Policy T-2.2)

► **Policy CA-T-3.3: Alternative Technology Transit Vehicles**

Support the use of transit vehicles and shared vehicles that use non-polluting technologies. (See Book Two, Policy T-2.3)

▼ **Principle T-4: Parking Management**

Develop parking strategies for the CRP Planning Area that meet the needs of residents, workers, and visitors while supporting broader goals related to GHG reduction, sustainability, design, and reduced auto dependency. (See Book Two, Principle T-3)

► **Policy CA-T-4.1: Establish Parking Maximums**

Establish minimum and maximum parking supply rates based on case studies and research of parking supply and demand in comparable transit-oriented and mixed-use developments. (See Book Two, Policy T-3.1)

► **Policy CA-T-4.2: Parking “Cash-out”**

Encourage employers who provide free parking to their employees to offer employees the option of receiving a cash payment equivalent to the out-of-pocket cost of the parking space instead of a free parking space at the worksite. (See Book Two, Policy T-3.2)

► **Policy CA-T-4.3: Parking Pricing**

Charge for all public parking, both on-street and off-street, in all development districts except Village Neighborhoods, at variable rates based upon demand on different days and times with the objective of maintaining an average 85 percent parking occupancy rate. In Village Neighborhoods, implement residential permit parking. (See Book Two, Policy T-3.3)

► **Policy CA-T-4.4: Separate Parking and Housing Cost**

Separate the price of any private parking spaces from the purchase or rental price of all residences in multi-unit buildings. (See Book Two, Policy T-3.4)

► **Policy CA-T-4.5: Provide Preferential Parking**

Provide preferential parking for car-share, carpool, and vanpool vehicles in all workplace and educational campus parking facilities. (See Book Two, Policy T-3.5)

► **Policy CA-T-4.6: Parking Benefit District**

Establish a parking benefit district, or districts, enabling a portion of the net parking revenue (on-street and off-street) collected to be spent on multi-modal transportation and circulation system improvements or programs in the CRP area. (See Book Two, Policy T-3.6)

► **Policy CA-T-4.7: Parking for Affordable and Senior Housing**

Adopt parking standards specific to affordable and senior residences that reflect the lower average car ownership of households in these restricted-occupancy housing types. (See Book Two, Policy T-3.7)

▼ **Principle CA-T.5: Transportation Demand Management**

Manage travel demand in the CRP Planning Area to reduce emissions of greenhouse gases and criteria pollutants, manage congestion and make the most efficient use of transportation infrastructure. (See Book Two, Principle T-4)

► **Policy T-CA-5.1: Transportation Management Association (TMA)**

Require commercial property owners, homeowners associations, and property management entities to financially contribute to a TMA, provided that they exceed threshold size requirements to be established in regulations implementing the Area Plan. The TMAs should coordinate and promote alternatives to single-occupant vehicle travel to residents, employers, and employees by implementing the policies of the Area Plan and sponsoring additional activities found to promote the Vision of the Area Plan. (See Book Two, Policy T-4.1)

► **Policy CA-T-5.2: Transit Passes**

Require all commercial property owners, property management entities, homeowner associations, and higher education institutions to participate in a TMA-administered transit-

pass program or provide free or reduced cost transit passes to all tenants, and residents, provided they exceed threshold size requirements to be established in regulations implementing the Area Plan. (See Book Two, Policy T-4.2)

► **Policy CA-T-5.3: Rideshare and Guaranteed Ride Home Programs**

Require commercial property owners and institutions to participate in a TMA-administered ride-matching, vanpool, and guaranteed ride home program, provided they exceed threshold size requirements to be established in regulations implementing the Area Plan. (See Book Two, Policy T-4.3)

► **Policy CA-T-5.4: Car-Sharing**

Establish an on-site car-sharing network across the Planning Area, either administered by the TMA or a commercial or non-profit provider. If feasible, car-sharing should use electric vehicles. (See Book Two, Policy T-4.4)

► **Policy CA-T-5.5: Bicycle Parking**

Establish minimum bicycle parking supply rates and design standards based on case studies, research, and best practices for bicycle parking. (See Book Two, Policy T-4.5)

► **Policy CA-T-5.6: Bicycle-Sharing**

Establish an on-site bicycle-sharing network, either administered by the TMA or a commercial or non-profit provider. (See Book Two, Policy T-4.6)

► **Policy CA-T-5.7: Telecommuting and Alternative Work Schedules**

Encourage employers of 10 or more persons to implement telecommuting (e.g., two days/week working from home) and alternative work schedules (e.g., 9/80), providing incentives as appropriate. (See Book Two, Policy T-4.7)

► **Policy CA-T-5.8: Mode Split Targets**

Implement transportation programs and policies to achieve the following mode-split targets starting in 2030, as measured during the peak hour of evening commute traffic:

- ▼ In the TOD Core and TOD Neighborhoods, less than 40 percent of all trips are to be made by single-occupant automobiles (i.e., 60 percent or more trips to be by transit, walking, bicycle, or carpool/vanpool).
- ▼ In all other Development Districts, less than 60 percent of all trips are to be made by single-occupant automobiles (i.e., 40 percent or more trips to be by transit, walking, bicycle, or carpool/vanpool).

(See Book Two, Policy T-4.8)

3.2.2.2 Building and Site Energy Efficiency Principles and Policies

▼ Principle CA-E-1: Building and Site Energy Efficiency

Minimize building and site energy use and generate on-site renewable energy in order to meet the performance standards for green building and energy efficiency established in Sitewide Standard CA-3 (Book One Standard CF-17). Specific strategies employed to meet the performance standards may evolve over time to reflect applicability, cost, and efficacy of available technologies and methods. (See also Book Two Principle U-7)

► Policy CA-E-1.1: Energy Load Reduction

Energy efficient design should be applied to minimize the amount of energy required for building and site operations. All, or a selection of, the following strategies should be among those applied to implement this policy:

- Use efficient window glazing.
- Use high efficiency roof and wall insulation.
- Use high performance roofing (e.g. cool roofing) to reduce solar load.
- Limit window to wall ratio to mitigate solar heat gain.
- Provide external shading devices on all south and west facing windows. For residential buildings, provide shutters on all south and west facing windows.
- Design windows and doors to minimize air leakage when closed.
- Minimize energy consumption of lighting by reducing effective power density.
- Use LED or equivalent lighting for all outdoor illumination.
- Install time- or motion-controlled lighting systems.
- Install efficient home appliances, consumer electronics, and information technology (IT) such as data storage and computing equipment.
- Install efficient distribution transformers.
- Install smart meters providing residents, occupants, and businesses with energy use data and demand response capability.

► Policy CA-E-1.2: Passive Heating and Cooling

Buildings should be designed to minimize the need for mechanical heating, cooling and ventilation. All, or a selection of, the following strategies should be among those applied to implement this policy:

- Make windows operable to provide natural ventilation.
- Limit building depths to allow better air flow and daylighting.
- Provide sufficient window area to facilitate natural ventilation.

► **Policy CA-E-1.3: Efficient Heating and Air Conditioning (HVAC)**

High efficiency systems should be installed to meet building heating and air conditioning demand. All, or a selection of, the following strategies should be among those applied to implement this policy:

- Use mixed-mode (mix of natural ventilation and mechanical heating and cooling), low energy HVAC (heating and air conditioning) systems.
- Install high-performance fans.
- Install efficient heat rejection equipment.
- Install water and/or airside economizers.
- Provide variable speed drives on pumps and fans serving primary air and water equipment.

► **Policy CA-E-1.4: Energy Recovery**

Heating and cooling energy expended by efficient HVAC systems should be recovered by applying energy recovery technologies (e.g. through a sensible cross-flow heat exchanger) to air and water systems.

► **Policy CA-E-1.5: Tankless Water Heaters**

Tankless or on-demand water heaters should be installed in all residential buildings.

► **Policy CA-E-1.6: Energy Generation on Buildings**

On-building renewable energy generation technologies should be installed to capture and convert local energy for building use and, when generation exceeds demand, the energy grid. All, or a selection of, the following strategies should be among those applied to implement this policy:

- Install and operate rooftop photovoltaic panels to generate electricity.
- Install and operate rooftop solar hot water heaters to generate domestic hot water.

► **Policy CA-E-1.7: Energy generation on site**

If necessary to meet CAP objectives, renewable energy generating technologies should be installed on the site to capture and convert local energy for building and site use. This should be achieved by identifying and implementing appropriate technologies such as photovoltaic panels, solar thermal electric, anaerobic digestion, and fuel cells.

3.2.2.3 Waste Reduction Principles and Policies

▼ Principle CA-W-1: Reduce and Divert Waste

Reduce waste generation and increase diversion of waste from landfill.

► Policy CA-W-1.1: Public Awareness

An education kit on waste reduction, collection, and separation should be provided to all residents and businesses upon initial occupancy.

► Policy CA-W-1.2: Source Separation

Separate waste disposal into trash, recyclable, and compostable streams. To implement this policy, the following strategies should be among those applied:

- Provide interior and exterior storage areas for recyclables and organic waste on all properties.
- Provide trash, recycling, and compost containers in public spaces. Containers must be equally easy to access.
- Collect and separate waste into three different streams: mixed organic materials, commingled recyclables (e.g. plastic, paper, cardboard, glass, aluminum), and all other waste (trash).
- Provide easily accessible locations for drop-off containers for textiles, clothing, electronic wastes, batteries and other waste not picked up during normal house hold and commercial collection.
- During demolition and construction, provide centralized locations for containers for separating construction waste. (See Book Two, Policy U-6.1.)

► Policy CA-W-1.3: Recycling

Maximize recycling of appropriate waste. To implement this policy, the following strategies should be among those applied:

- Establish a program for waste collection that maximizes material recovery.
- Evaluate feasibility of recycling construction and demolition waste. (See Book Two, Policy U-6.1.)

► Policy W-1.4: Construction and Demolition Debris Recycling

Manage and, to the extent feasible, reuse or recycle the debris generated by the demolition of storage bunkers, roads, railroad revetments, and buildings. (See Book Two, Policy U-6.2)

3.2.2.4 Water Efficiency Principles and Policies

▼ Principle CA-WR-1: Use water efficiently

Minimize building and site water consumption. (See Book Two, Principle U-2.2)

► Policy CA-WR-1.1: Fixture efficiency

Efficient fixtures (e.g. low-flush toilets, Energy Star dishwashers) should be installed in residential, commercial, institutional, and industrial buildings, as identified by established standards such as EPA Watersense and Energy Star.

► Policy CA-WR-1.2: Site efficiency

Minimize water used to landscape and irrigate outdoor areas. To implement this policy, the following strategies should be among those applied:

- Use water efficient landscape plantings, such as drought tolerant landscaping.
- Install permeable pavement, green streets, and other landscaping techniques that manage stormwater runoff and reduce heat island effects.
- Use non-potable water for irrigation and sewage conveyance (flushing) for commercial buildings and landscapes.

► Policy CA-WR-1.3: Cooling Efficiency

Minimize amount of water required to operate cooling towers in commercial buildings and evaporative residential air-conditioners. Non-chemical water treatment should be used to promote water safety and conservation.

► Policy CA-WR-1.4: Meter and Monitor

Commercial and residential buildings should be equipped with best-in-practice metering systems to increase awareness of use levels and help to identify leaks. This may include installing meters on high use systems to identify if water use is within suitable ranges.

► Policy CA-WR-1.5: Recycled Water Use

Require use of non-potable water to irrigate all public spaces and private outdoor space managed by homeowner's associations. Prohibit use of potable water for irrigation unless there are no alternative supply sources.

Use Recycled Water as the primary water supply for residential and commercial building cooling and all other applications where potable water is not essential. (See Book Two, Policy U-4.2.)

► **Policy CA-WR-1.6: Water System Design Flexibility**

Design buildings and irrigation systems to accommodate future use of recycled water if recycled water is not available at the time of construction. (See Book Two, Policy U-4.3.)

► **Policy CA-WR-1.7: Purple Pipe for Recycled Water**

Require developers to install “purple pipe” in outdoor irrigation systems throughout the Planning Area to maximize the use of recycled water. (See Book Two, Policy U-4.4.)

► **Policy CA-WR-1.8: Raw/Untreated Water Use**

Consider the feasibility of a raw/untreated water distribution system, in addition to the potable water distribution system. (See Book Two, Policy U-2.5.)

3.2.3 Initiative Three: Education and Collaboration

The education and collaboration policies below are unique to the CAP. The first four policies each support implementation of reduction strategies related to one of the sectors included in Initiative Two of the Greenhouse Gas Reduction Program. An additional policy focuses on collaboration between the City, community members, and other stakeholders.

▼ **Principle CA-EC-1: Community Education and Collaboration**

Engage community members, utility providers, and agencies in collaborative activities to increase awareness of opportunities to reduce GHG emissions.

► **Policy CA-EC-1.1: Move Smart**

Encourage behavior patterns that lead to use of forms of transportation that have lower environmental impacts and support community health. All, or a selection of, the following strategies should be among those applied to implement this policy:

- Encourage individuals to choose active, non-polluting travel options by organizing events such as ‘car-free Sunday’ on selected streets
- Provide training about eco-driving techniques that can reduce gas consumption
- Encourage businesses to provide rewards for transit riders equivalent to the value of parking validation.
- Promote bicycling, walking, and transit use through public information and education relating to facilities, services, safety, schedules, environmental benefits, and related topics. (Book Two, Policies T-1.9, T-4.7.)

► **Policy CA-EC-1.2: Energy Smart**

Promote efficient use of energy and use of renewable energy sources by individuals, households and businesses. All, or a selection of, the following strategies should be among those applied to implement this policy:

- Collaborate with community organizations to implement energy efficiency programs for all households
- Promote use of low power appliances, energy efficient bulbs, solar water heaters, switches to cut power to devices on 'stand-by' mode, and other energy saving products
- Provide information about Federal and State programs to finance private residential and commercial projects that increase energy efficiency and energy generation from renewable sources.

► Policy CA-EC-1.3: Water Smart

Promote low water use by individuals, households, and businesses. All, or a selection of, the following strategies should be among those applied to implement this policy:

- Provide training to residents and business owners about landscaping with native and drought-tolerant plants
- Increase awareness about efficient fixtures and irrigation systems to maximize water savings for homes and businesses on the site
- Provide training and resources for residents and businesses interested in rainwater harvesting and reuse
- Collaborate with the California Stormwater Quality Association to increase awareness of developers, residents, and businesses about Stormwater Best Management Practices (BMPs)

► Policy CA-EC-1.4: Waste Smart

Promote waste reduction and diversion by individuals, households, and businesses. All, or a selection of, the following strategies should be among those applied to implement this policy:

- Explore opportunities to develop a composting program on site, which will reduce the miles traveled to transport organic waste.
- Coordinate with Concord Disposal Service and other related agencies to promote recycling and composting by residents, and area businesses.
(See Book Two, Policy U-6.1.)

► Policy CA-EC-1.5: Community Smart

Encourage collaboration between the City of Concord and various local and regional organizations and agencies. All, or a selection of, the following strategies should be among those applied to implement this policy:

- Integrate climate action for the CRP Planning Area with GHG reduction activities for Concord as a whole.
- Collaborate with subregional and regional transportation planning agencies to establish an effective method for monitoring transportation-related GHG emissions.

- Collaborate with transportation planning agencies and transit operators to shift to use of non-polluting vehicles for transit, paratransit, and car-share operations.
- Use public art and interpretive displays to showcase the sustainability credentials of the community. Foster public recognition of achievements by groups and individuals.
- Develop partnerships with local educational institutions to involve students in the creation and implementation of educational campaigns in the community.
- Designate an eco-coordinator who will implement and monitor climate-related educational programs. This role would logically be combined with administration of the transportation demand management program.

3.2.4 Initiative Four: Implementation and Monitoring

The Climate Action Objectives in Section 1.5 are the basis for the implementation and monitoring program principles and policies. The implementation and monitoring program is described in Chapter 4.

▼ Principle CA-1: Implementation Responsibility

Establish clear responsibility for oversight and coordination of Climate Action Plan implementation within Concord City government.

► Policy CA-1.1: Responsibility for Oversight

Appoint the City Manager or his or her designee as the individual responsible for oversight and coordination of Climate Action Plan implementation.

► Policy CA-1.2: Climate Action Team

Convene a standing Climate Action Team to be chaired by the City Manager or his or her designee. Team members will include a designated staff member from each City Department.

► Policy CA-1.3: Director of Climate Action Program.

Establish a senior staff person, reporting directly to the City Manager, to direct the Climate Action Program. This individual may also have oversight of overall Area Plan implementation.

► Policy CA-1.4: Implementation Work Program.

Prepare and periodically update an Area Plan Implementation Work Program to guide comprehensive implementation of the Area Plan. The initial Work Program should identify the steps needed to complete Phase One preparation of all detailed planning and standards associated with CAP Implementation.

► **Policy CA-1.5: Integrated Implementation**

Whenever possible, implement and monitor the Climate Action Plan through activities and mechanisms that will simultaneously implement the full vision set forth in the 2030 General Plan for the Concord Reuse Project area and other parts of Concord.

► **Policy CA-1.6: Stakeholder Participation**

Provide opportunity for meaningful input from a wide range of stakeholders in implementation activities, including those that will establish the specific obligations assigned to Concord Reuse Project area businesses, developers and residents.

► **Policy CA-1.7: Cooperation with other Organizations**

Work with regional planning and transportation agencies (i.e., ABAG, MTC, CCA) and utility companies to support widespread implementation of GHG reduction strategies and to create systems for monitoring progress towards meeting the targets of the Climate Action Plan. Participate in regional climate action by taking part in Sustainable Communities Strategy planning activities.

▼ **Principle CA-2: Flexibility in Implementation**

Provide flexibility in the implementation of the Greenhouse Gas Reduction Program so strategies implemented will reflect best available technologies, cost considerations, and applicability of strategies to specific development proposals.

► **Policy CA-2.1: Performance Standards**

Use performance standards that balance flexibility in selection of specific strategies with commitment to reducing GHG emissions.

► **Policy CA-2.2: Sitewide Standards and Programs**

Differentiate sitewide standards and programs from project-level strategies that should be appropriate for flexible or performance-based implementation.

Site-wide standards include but are not limited to Book One Standards CF-15 through CF-18 and relate to:

- *Creation of mixed use transit oriented development with transit-supportive densities*
- *Attainment of the Plan's convenience standards*
- *Design of a multimodal circulation system*

▼ Principle CA-3: Monitoring Progress towards Climate Action

Conduct monitoring activities to determine the effects of implementing the CAP's Greenhouse Gas Reduction Program and to gauge its cumulative impact on GHG emissions over time. Revise the plan and implementing activities periodically if needed to attain the 2030 reduction target.

► Policy CA-3.1: Climate Action in the General Plan Annual Progress Report

The Planning Division should incorporate climate action monitoring reports into the City's General Plan Annual Progress Report. Annually, the Division should report on:

- Status of activities programmed in the Area Plan Implementation Work Program
- Progress in overall Area Plan Implementation based on applications received and building permits and certificates of occupancy issued
- Implementation of climate action strategies specified in the City's codes and standards and required through development agreements, conditions of approval, and CEQA mitigation requirements
- Resource use associated with transportation, energy, water and waste
- External factors significantly influencing ability to meet targets

► Policy CA-3.2: GHG Inventories

Every five years the Planning Division of the Community Development Department will prepare a GHG inventory consistent with guidelines from State and Regional agencies. The inventory will be submitted to the City Council accompanied by an assessment of whether or not climate action as implemented is likely to achieve the reduction targets of the Plan. If not, the Department will recommend modifications to the Plan as needed to attain standards.

► Policy CA-3.3: Monitoring and Reporting Coordination

The Planning Division will work actively with subregional and regional transportation planning agencies to establish an effective method for monitoring transportation-related GHG emissions.

Implementation and Monitoring Program

4.1 Implementation Framework and Phasing

This chapter provides a framework for accomplishing the Area Plan's ambitious Climate Action Objectives over the coming decades. Consistent with the principles and policies in Chapter 3, implementation activities will:

- Require participation by all public and private organizations active in Concord Reuse Project Area development and conservation activities;
- Support implementation of the Area Plan as a whole;
- Provide flexibility;
- Be monitored to gauge cumulative impact on GHG emissions over time;
- Be shaped by community and stakeholder involvement; and
- Be initiated for the Concord Reuse Project Area only, but over time be integrated with a climate action plan for all of Concord.

Climate action is integrated into the overall vision for the future of the Concord Reuse Project Area and is one of the "Key Initiatives" included in a short list of top priorities for comprehensive Area Plan implementation.

The Climate Action Principles in Section 3.6 are the basis for the implementation and monitoring program described in this chapter. The task of implementing the Area Plan will require long-term commitment and focus, due to the comprehensiveness of the Plan, the complexity of the physical, regulatory, community and economic environments, and the uncertainty inherent in a Plan with a decades-long buildout period.

4.1.1 Program Oversight

Implementation of the CAP will require action by many organizations, both governmental and private. Responsibility for oversight, coordination and monitoring rests with the City of Concord.

Implementation activities will be assigned to a number of City Departments, reflecting their missions as described below. Key roles will be played by the City Manager's office, the Community Development Department, and the Public Works Department.

Within the Community Development Department, the Planning Division has responsibility for the City's current and future planning functions, is the central point for the review and processing of all development applications, and has an established role in coordinating with other agencies. The Building Division is responsible for reviewing permit applications for compliance with all applicable state and local building codes and regulations. These include building, electrical, mechanical, plumbing, disabled accessibility, and energy efficiency codes and standards. The Building Division is responsible for review of subdivision tentative maps and accompanying documents, and for providing feedback on those documents to the Planning Division. The Division's roles include determining the requirements imposed as a condition of development. All of these functions will be essential in Climate Action Plan implementation.

The Public Works Department also has important roles in implementation of GHG reduction strategies. Activities for which the Department is responsible include traffic operations, traffic signals and street lighting, transportation planning, and stormwater management.

4.1.2 Advancing Implementation of the GHG Reduction Program

The GHG Reduction Program in Chapter 3 comprises four initiatives: Sitewide Development Standards, Sector-based Actions, and Education and Collaboration, and Implementation and Monitoring. The implementation program will advance all of the other initiatives. Two sets of efforts will structure the implementation activities. These are:

- **Long Range Planning:** Preparation and adoption of planning documents, such as Specific Plans that detail the development, open space and circulation system designs that will implement the Plan's vision and standards. Components that are particularly relevant to the ability to achieve GHG reduction targets are generally implemented at the district level. They include:
 - Creation of mixed use transit oriented development with transit-supportive densities
 - Attainment of the Plan's convenience standards

for all districts

- Establishment of a street grid oriented to provide optimal solar exposure in order to maximize the benefits of rooftop solar hot water heaters and photovoltaic cells
- Design of a circulation system with safe, continuous and convenient routes for biking, walking, and connecting to transit

Long range planning activities will generally be implemented through the development review process overseen by the Planning Division.

- **Adoption of Codes and Standards:** Adoption of established industry standards that incorporate best practices in resource efficiency, augmented as necessary to achieve the specific objectives of the Area Plan.

Codes and standards will establish requirements for building strategies referenced by the policies in the GHG Reduction Program in Chapter 3, including:

- Natural ventilation and daylighting
- Energy efficient window glazing, insulation and façade systems
- Mixed-mode heating, ventilation and air conditioning systems
- Photovoltaic panels and rooftop solar hot water heaters
- Water-efficient fixtures

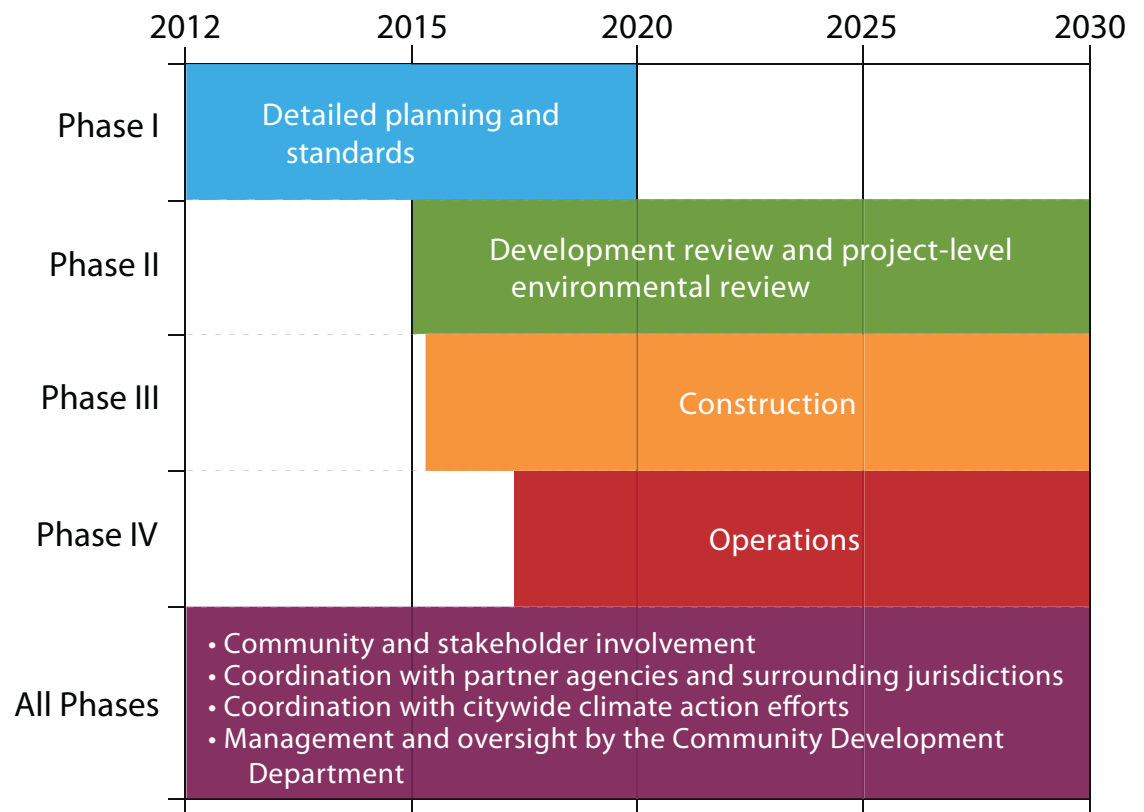
Codes and Standards may use a performance-based approach. Implementation of adopted codes and standards during construction will generally be conducted through the permitting and inspection processes overseen by the Community Development Department's Building Division.

As shown in the Implementation Timeline in Section 4.2, these activities will be programmed through an Area Plan Implementation Work Program to be prepared shortly after Area Plan adoption.

Timeline of Implementation Activities

This section presents a timeline of major CAP implementation activities organized into four program phases. The timeline is summarized in Figure 4-1. Implementation of the CAP will be concurrent with activities implementing other Area Plan policies, such as completion of a nexus study as a basis for fees to mitigate traffic impacts. Because of the uncertainty of timing of both land transfer from the Navy and submittal of development proposals, the timeline is general.

▼ Figure 4-1: Implementation Phase Timeline



Note: Phasing is likely to proceed at different rates in different parts of the Planning Area.

Anticipated Time Frame: 2012-2020

The Phase One activities identified below will be required for climate action planning to progress from the GHG Reduction Program in Chapter 3 to detailed and performance-based standards. These standards will communicate to area landowners, developers and residents how they will be required to contribute to meeting emissions reduction targets. These tasks are also essential to enable analysis of costs and funding opportunities.

Principal Activities

1. Preparation and Adoption of Detailed Plans

- **CAP Sector Focus:** Sitewide Development Standards, VMT Reduction
- **Typical Product:** Specific Plans
- **Legislative Action Anticipated:** Planning Commission and City Council
- **Lead Implementing Role:** Planning Division

2. Specification and Codification of Standards

- **CAP Initiative Focus:** Sector-Based Actions (all)
- **Typical Products:** Updated Building Code; Updated Subdivision Standards; Updated Parking Regulations
- **Legislative Action Anticipated:** Planning Commission and City Council
- **Lead Implementing Role:** Planning Division

3. Preparation of checklists and other guidance for applicants and staff reviewers

- **CAP Initiative Focus:** Sector-Based Actions
- **Typical Products:** Site plan criteria for residential and commercial developments; energy efficient design and systems checklists for residential and commercial developments
- **Legislative Action Anticipated:** None
- **Lead Implementing Role:** Permit Center

4. Inter-Agency Collaboration

- **CAP Initiative Focus:** Education and Collaboration (in support of implementation of strategies in other initiatives)
- **Typical Products:** Memoranda of Understanding or Cooperative Agreements with service providers and partners
- **Legislative Action Anticipated:** City Council as needed to approve agreements.
- **Lead Implementing Roles:** City Manager's Office, Planning Division, Public Works Department

DEVELOPMENT REVIEW AND PROJECT-LEVEL ENVIRONMENTAL REVIEW

Anticipated Time Frame: 2015-2030

Phase Two activities mark the transition from long-range planning to proposals for investment in the Concord Reuse Project Area. Development and environmental review processes will establish the legal obligations for ongoing participation in climate action by property owners, businesses, and public agencies.

Principal Activities

1. Development Review

- **Initiative Focus:** Sitewide Development Standards; Sector-Based Actions
- **Typical Products:** Development master plans; tentative and final subdivision maps, water, electrical and waste management plans for residential and commercial developments
- **Legislative Action Anticipated:** Planning Commission and City Council
- **Lead Implementing Roles:** Planning Division, Private Developers

2. CEQA Review

- **Initiative Focus:** Sector-Based Actions
- **Typical Products:** Focused Environmental Impact Report, specification of mitigation measures
- **Legislative Action Anticipated:** Planning Commission, City Council
- **Lead Implementing Role:** Planning Division Project Approvals, Environmental Document Certification

3. Development Review

- **All CAP Initiatives**
- **Typical Products:** Conditions of Development Approval; Development Agreements; Mitigation Monitoring and Reporting Programs
- **Legislative Action Anticipated:** Planning Commission, City Council
- **Lead Implementing Roles:** Planning Commission, City Attorney

PHASE III

CONSTRUCTION

Anticipated Time Frame: 2016-2030

The City's role in construction includes plan review and building inspection to insure that approved plans are being properly implemented. Many of the GHG Reduction Program's strategies require the construction of resource-efficient systems associated with individual buildings, sitewide infrastructure and landscaping.

Principal Activities

1. Plan Review

- **CAP Initiative Focus:** Sitewide Development Standards; Sector-Based Actions
- **Typical Products:** Building Permits
- **Legislative Action Anticipated:** None
- **Lead Implementing Roles:** Building Division, Public Works Department

2. Building Inspection

- **CAP Initiatives Focus:** Sitewide Development Standards; Sector-Based Actions
- **Typical Products:** Certificates of Occupancy
- **Legislative Action Anticipated:** None
- **Lead Implementing Role:** Building Division

3. Construction of public and private improvements

- **CAP Initiatives Focus:** Sitewide Development Standards; Sector-Based Actions
- **Typical Products Anticipate:** Buildings and infrastructure consistent with the Area Plan
- **Lead Implementing Role:** Private developers, Department of Public Works

PHASE IV

OPERATIONS

Anticipated Time Frame: Ongoing, Beginning 2017

Climate action will be an integral part of the future of the Concord Reuse Project area. The full spectrum of operational activities will engage individual households, neighborhoods, businesses, organizations, service providers and government agencies in an ongoing commitment to climate action. Principal activities are highlighted in this section, which focuses on processes rather than products. While individual operational activities are unlikely to require legislative actions, many activities will be reflected in the annual budget that requires City Council approval.

Principal Activities

1. Transportation Demand Management

- **Focus on CAP Initiative Sector:** VMT Reduction
- **Typical Activities:** Coordination and marketing of alternatives to single occupancy vehicle traveling, administration of ride-matching and guaranteed ride home and transit subsidy programs, leader or partner in providing shuttle services, bike and car-share, monitoring program effectiveness and reporting to City
- **Legislative Action Anticipated:** None
- **Lead Operations Role:** Transportation management associations

2. Parking Management

- **CAP Sector Focus:** VMT Reduction
- **Typical Activities:** Worksite parking management, operations of public parking structures, administration of on-street parking
- **Lead Operations Roles:** Department of Public Works, area employers

3. Provision of Transit Services

- **CAP Sector Focus:** VMT Reduction
- **Typical Activities:** BART, high-frequency bus, feeder bus and local shuttle services as described in Book One, Table 3-7
- **Lead Operations Roles:** BART, CCCTA, Transportation Management Associations

4. Educational activities (e.g. water smart and waste smart)

- **CAP Initiative Focus:** Education and Collaboration (in support of implementation of strategies in other initiatives)
- **Typical Activities:** Climate action education and outreach activities focusing on each of the sectors, targeted outreach to new residents and businesses, with maximum possible integration with citywide climate action strategies
- **Lead Operations Roles:** To be determined, Coordination by Community Development Department

5. Collaboration with service providers and partner agencies

- **CAP Initiative Focus:** Education and Collaboration (in support of implementation of strategies in other initiatives)
- **Typical Activities:** Participation in policy-level and technical advisory boards addressing climate-related issues for all resource areas, implementation of cooperative agreements to enable efficient funding and service provision
- **Lead Operations Roles:** To be determined, coordination by Community Development Department

6. Operation of resource-efficient systems

- **CAP Initiative Focus:** VMT reduction, building and site energy
- **Typical Activities:** Operations of heating, cooling, and lighting systems incorporating energy efficiency strategies
- **Lead Operations Roles:** Area businesses, City operating departments, BART, CCCTA, and utility providers

2030

7. Annual monitoring, reporting and updating of climate action plan and strategies
 - **All CAP Initiatives**
 - **Typical Activities:** Data collection regarding resource use, preparation of carbon inventories, reporting through General Plan Annual Progress Report, periodic update of Climate Action Plan and strategies
 - **Lead Operations Role:** Planning Division

FULL IMPLEMENTATION

All Phases Include

- Community and stakeholder involvement
- Coordination with partner agencies and surrounding jurisdictions
- Coordination with citywide climate action activities
- Management and oversight by the Community Development Department

Note: Phasing is likely to proceed at different rates in different parts of the Planning Areas

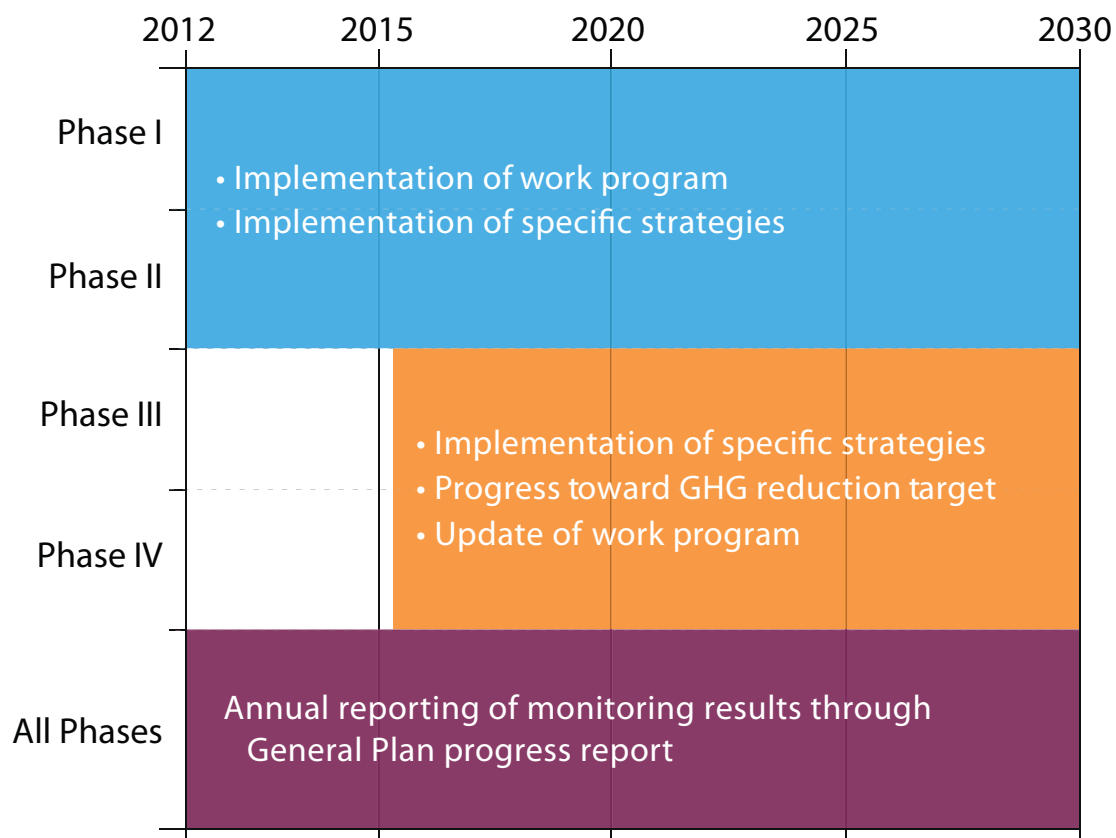
4.3 Monitoring and Reporting

Monitoring activities are divided into two categories:

1. Monitoring to assure proper implementation of the GHG Reduction Program's strategies
2. Monitoring of progress towards GHG emission targets

The timeline below identifies annual monitoring as an activity in all implementation phases. Monitoring activities will be linked to an annual reporting process integrated with the City's General Plan Annual Progress Report.

▼ Figure 4-2: Monitoring and Reporting Timeline



Monitoring progress towards emissions targets will require future carbon inventories based on collection of data relating to resource use in the Concord Reuse Project Area. As shown in Table 4-1, during Phase Four data will be collected from both service providers and planning agencies.

▼ Table 4-1: Monitoring Resource Use in Phase Four	
Data Sources	Emissions Sources Sectors
CCTA, MTC	VMT reduction
PG&E	Energy use: commercial, residential and site-wide lighting
Central Contra Costa Water District	Water use
Concord Disposal Service	Waste generation

The monitoring and reporting process will provide formal documentation of progress in two areas critical to climate action success– strategy implementation, and status of reaching emission targets. It will provide a basis for revision of strategies and standards as needed if progress is not consistent with achieving the Plan’s emissions targets.

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Documentation for GHG Emissions Forecasts

▼ Table A-1: Per Capita Greenhouse Gas Emissions: Documentation of BGM Model Run for CRP Area Plan

2020 Annual Statewide Per Capita Target (million metric tons CO ₂ e)	9.6	ARB Scoping Plan (p. 118)
2030 Annual Statewide Per Capita Target (million metric tons CO ₂ e)	5.8	ARB Scoping Plan (p. 118)
Percentage Change	40%	
Application of Percentage change to BAAQMD 2020 per capita project threshold (Calculated 2030 GHG emissions per capita project target)	2.8	
Project Total Emissions Target (million metric tons CO ₂ e)	156,335	
Total Residents - 2020	9,599	
Total Jobs - 2020	9,010	
Total Service Population - 2020	18,609	
Total 2020 Annual GHG (Mtons CO ₂ e)	48,326	BGM output
Annual 2020 project GHG emissions per capita (Mtons CO₂e)	2.6	
BAAQMD 2020 GHG per capita GHG emissions project Target (Mtons CO₂e)	4.6	BAAQMD 2020 Project Threshold
Difference	-2.00	Meets Target
Total Residents - 2030	28,800	
Total Jobs - 2030	27,034	
Total Service Population - 2030	55,834	
Total 2030 Annual GHG (million metric tons CO ₂ e)	151,912	BGM output
Annual 2030 GHG per Capita (million metric tons CO₂e)	2.7	
Calculated 2030 per capita GHG emissions project target (million metric tons CO₂e)	2.8	Adjusted from BAAQMD 2020 Project Threshold using State per capita trajectory to 2030
Difference	-0.1	Meets Target

Note: Model output from December 23, 2010

▼ Table A-2: 2020 Land Use Assumption: URBEMIS Model Run for CRP Area Plan

URBEMIS Land Use Category - 2020		Figure	Unit	Notes (results of assumptions all proportionally adjusted)
Commercial Land Uses	Regional Shopping Center	433,330	Square Feet	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	Strip Mall	225,000	Square Feet	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	Office Park	116,670	Square Feet	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	General Office Building	1,146,910	Square Feet	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	Industrial Park	116,670	Square Feet	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	(a) Total	2,038,570	Square Feet	
	(b) Area Plan Table 3-2 Total	2,038,570	Square Feet	
Residential Units	Single Family Housing	1,470	Dwell-ing Units	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	Apartments Low Rise	1,570	Dwell-ing Units	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	Apartments Mid Rise	1,060	Dwell-ing Units	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	Apartments High Rise	-	Dwell-ing Units	
	(c) Total	4,100	Dwell-ing Units	
	(d) Area Plan Table 3-2 Total	NA	Dwell-ing Units	

▼ Table A-2: 2020 Land Use Assumption: URBEMIS Model Run for CRP Area Plan (cont'd)

URBEMIS Land Use Category - 2020		Figure	Unit	Notes (results of assumptions all proportionally adjusted)
Educational Land Use	Day Care Center	14,330	Square Feet	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	Elementary School	41,670	Square Feet	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	Junior High School	26,670	Square Feet	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	High School	38,330	Square Feet	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	University/ College	3,330	Students	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	Library	9,670	Square Feet	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	Place of Worship	3,000	Square Feet	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	Total	137,000	Square Feet	
Recreational Land Use	City Park	100	Acres	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	Regional Park and Greenway	1,070	Acres	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	Hotel	70	Rooms	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
Additional Uses	Community Facilities	43,000		See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.
	First Responder Training Facility	20	Acres	See Table A-3 for 2030 details. See notes at the end of this table for assumptions relating to 2020 forecast.

Notes: 2020 buildout calculated as 33.33 percent of total buildout upon completion; Buildout assumes a 2015 start date and 2030 completion, rounded to first digit. Model output from December 23, 2010.

▼ Table A-3: 2030 Land Use Assumption: URBEMIS Model Run for CRP Area Plan

URBEMIS Land Use Category: 2030		Figure	Unit	Notes (results of assumptions all proportionally adjusted)
Commercial Land Uses	Regional Shopping Center	1,300,000	Square Feet	Assumes one Regional Shopping Center @ 1,000,000 SF and one Town Center Retail Cluster at 300,000 SF—as per Reuse Plan Program. Function of these two types of retail are similar, although different trip characteristics are likely to occur.
	Strip Mall	675,000	Square Feet	Assumes 9 "community centers" incorporating full range of local-serving retail @ 75,000 SF each. Form may be different than strip mall, but function will be the same
	Office Park	350,000	Square Feet	Based upon capacity within Commercial Flex district identified in Area Plan, taking into account Regional Shopping Center and Office Park.
	General Office Building	3,440,718	Square Feet	General Office Building based upon capacity within TOD districts, taking into account town center retail space and a share of local-serving retail. Includes residual floor space to meet Reuse Plan and Area Plan site requirements.
	Industrial Park	350,000	Square Feet	Based upon capacity within Commercial Flex district identified in the Area Plan, taking into account Regional Shopping Center and Office Park.
	(a) Total	6,115,718	Square Feet	
	(b) Area Plan Table 3-2 Total	6,115,718	Square Feet	
Residential Units	Single Family Housing	4,400	Dwelling Units	Includes both estimated detached and mix of attached and detached single family housing types in Area Plan
	Apartments Low Rise	4,700	Dwelling Units	Includes estimated attached single-unit types in Area Plan
	Apartments Mid Rise	3,172	Dwelling Units	Includes estimated multi-unit types in Area Plan, as well as residual units to reflect emphasis on transit-supportive development in Area Plan
	Apartments High Rise	-	Dwelling Units	
	(c) Total	12,272	Dwelling Units	
	(d) Area Plan Table 3-2 Total	12,272	Dwelling Units	

▼ Table A-3: 2030 Land Use Assumption: URBEMIS Model Run for CRP Area Plan (Cont'd)

URBEMIS Land Use Category: 2020		Figure	Unit	Notes (results of assumptions all proportionally adjusted)
Educational Land Use	Day Care Center	43,000	Square Feet	Based on interpretation of Reuse Plan Program in URBEMIS Run for FEIR
	Elementary School	125,000	Square Feet	Based on interpretation of Reuse Plan Program in URBEMIS Run for FEIR
	Junior High School	80,000	Square Feet	Based on interpretation of Reuse Plan Program in URBEMIS Run for FEIR
	High School	115,000	Square Feet	Based on interpretation of Reuse Plan Program in URBEMIS Run for FEIR
	University/College	10,000	Students	Based on Reuse Plan Program in URBEMIS Run for FEIR
	Library	29,000	Square Feet	Based on interpretation of Reuse Plan Program in URBEMIS Run for FEIR
	Total	402,000	Square Feet	
Recreational Land Use	City Park	292	Acres	Includes all Citywide Parks and Tournament Sports Facility in Area Plan program
	Regional Park and Greenway	3,208	Acres	Includes all Regional Open Spaces and Greenways acres in Area Plan program. These categories are merged because limited or no parking will be included in the Central Greenway and Neighborhood Frame—leading to a limited number of trips at or less than the Regional Open Spaces
	Hotel	200	Rooms	Based upon Reuse Plan Program
Additional Uses	Community Facilities	138,000	Square Feet	Based upon interpretation of Reuse Plan Program in URBEMIS Run for FEIR
	First Responder Training Facility	80	Acres	Based upon interpretation of Reuse Plan Program in URBEMIS Run for FEIR

Notes: Full buildout assumed, used for both business-as-usual and Area Plan forecasts. Model output from December 23, 2010

▼ Table A-4: 2020 Mitigations: BGM Model run for CRP Area Plan

Mitigation Category - 2020		Figure	Unit	Notes
Sequestration	Estimated LF of streets (four local streets assumed for each through and collector street)	175,982	Linear feet of streets	Based on analysis of CRP Area Plan Street Network and Block Size Standards
	Frequency of Trees (LF)	50	Feet	
	Total Trees	3,520		
Electricity and Natural Gas	On-site Renewable Energy Systems - Solar	58,877,778	Kwh/Year Generated	Based on analysis of sitewide Solar Generation Potential_ See "PV" Worksheet. Adjusted to 2020.
	Exceeds Title 24 Performance	30%	Percentage performance above Title 24	
Water and Wastewater	Drought Tolerant Landscaping	46%	Percent Reduction in outdoor water use	Includes all outdoor water use measures in CAP Reduction Program
	Low Flush Toilets	37%	Reduction in indoor water use	Includes all indoor water use measures in CAP Reduction Program
Solid Waste	Reduce Solid Waste by the Following Percentage	61%	Percent Reduction in Solid Waste	Figure based upon City of Concord Annual Report 2009. Includes all waste reduction measures in CAP Reduction Program
Tankless Water Heaters	MMBtu/year reduced	31,706		Assumes 24% reduction in Natural Gas Consumption (low end of 24-34% efficiency increase noted in CAPCOA Quantification Report 9-14-2010, p. 91). Equation: 396,360 (unmitigated) * .24 = 95,126 MMBtu. Adjusted to 2020

Note: Transportation mitigations, service population, and land use program imported from URBEMIS. Model output from December 23, 2010

▼ Table A-5: 2030 Mitigations: BGM Model run for CRP Area Plan

Mitigation Category - 2030		Figure	Unit	Notes
Sequestration	Estimated LF of streets (four local streets assumed for each through and collector street)	528,000	Linear feet of streets	Based upon analysis of CRP Area Plan Street Network and Block Size Standards
	Frequency of Trees (LF)	50	Feet	
	Total Trees	10,560		
Electricity and Natural Gas	On-site Renewable Energy Systems - Solar	176,651,000	Kwh/Year Generated	Based upon analysis of sitewide Solar Generation Potential_See "PV" Worksheet
	Exceeds Title 24 Performance	30%	Percentage performance above Title 24	Performance Standard included in Books 1 and 3
Water and Wastewater	Drought Tolerant Landscaping	46%	Percent Reduction in outdoor water use	Includes all outdoor water use measures in CAP Reduction Program
	Low Flush Toilets	37%	Reduction in indoor water use	Includes all indoor water use measures in CAP Reduction Program
Solid Waste	Reduce Solid Waste by the Following Percentage	61%	Percent Reduction in Solid Waste	Includes all waste reduction measures in CAP Reduction Program
Tankless Water Heaters	MMBtu/year reduced	95,126		Assumes 24% reduction in Natural Gas Consumption (low end of 24-34% efficiency increase noted in CAPCOA Quantification Report 9-14-2010, p. 91). Equation: 396,360 (unmitigated) * .24 = 95,126 MMBtu

Note: Transportation mitigations, service population, and land use program imported from URBEMIS. Model output from December 23, 2010

Table A-6: Onsite Renewable Energy: Photovoltaics Assumptions for BGM Model Run for the CRP Area Plan

Program	Square feet / dwelling unit	Dwelling units	Square feet	Assumed floors	Assumed rooftop area (square feet)	Percent of rooftop area appropriate for PV + SHW	Percent of appropriate area assumed to be used.	Effective percent of rooftop used for PV + SHW (assumes flat roof)	Effective area used for PV + SHW (square feet)	Total annual kilowatt-hours produced	Total annual megawatt-hours produced
Low Density Residential	2,950	1,130	3,333,500	2	1,666,750	75%	80%	60%	1,000,050	25,001,250	25,001
Low-Medium Density Residential	1,750	4,684	8,197,000	2	4,098,500	75%	80%	60%	2,459,100	61,477,500	61,478
Single Family Total											86,479
Medium Density Residential	1,200	3,330	3,996,000	3	1,332,000	75%	80%	60%	799,200	19,980,000	19,980
High Density Residential (includes TOD Residential)	900	3,128	2,815,200	4	703,800	50%	80%	40%	281,520	7,038,000	7,038
Multi-Family Total										113,496,750	27,018
Residential Total											113,497
Hotels			520,000	4	130,000	50%	80%	40%	52,000	1,300,000	1,300
Commercial-Office			3,790,718	5	758,144	35%	80%	28%	212,280	5,307,005	5,307
Commercial-Retail			1,975,000	1	1,975,000	75%	80%	60%	1,185,000	29,625,000	29,625
Industrial Park			350,000	1	350,000	75%	80%	60%	210,000	5,250,000	5,250
Commercial Total										41,482,005	41,482
Institutional			2,895,000	2	1,447,500	75%	80%	60%	868,500	21,712,500	21,713
Notes:											
Model output from December 23, 2010											
PV: Photovoltaic											
SHW: Solar hot water											
Annual kilowatt-hours per square foot of PV = 25 (per Geoff Gund, ARUP)											
Underlined = Input for BGM											
Sources:											
1. CRP Area Plan Book One Tables 3-2 and 3-3: Development Program and Neighborhood Housing Mix (Number of Units, Floorspace);											
2. CBRE Technical Memorandum "Summary of Fiscal and Financial Analyses of the Concentration and Conservation Alternative and the Clustered Villages Alternative" Exhibit D-12 (Unit Size) (12/23/2008);											
3. Assumed Commercial Floors are weighted to reflect proportional distribution of floorspace between the BART TOD and Commercial Office											
4. Cole Roberts, Arup (Rooftop Available for PV) . Geoff Gund, ARUP (Energy generation per square foot of PV)											

▼ Table A-7: Operational Mitigation Measures: URBEMIS Model Runs, 2020 and 2030, for CRP Area Plan

Mitigation Category		Figure	Unit	Notes
Vehicle Fleet Mix	Year	2020 / 2030	Year	2020 entered for 2020 run; 2030 entered for 2030 run
Mix of Uses	Number of Housing Units within 1/2 mile of radius including this project's residential housing units	12,272 (All units)	Dwelling Units	Total adjusted for 2020
Local Serving Retail	Presence of Local Serving Retail	Yes (checked)	Yes or No	
Transit Service	Daily Rail or Rapid Buses stopping within 1/2 mile of site	193	(Sum of BART stops and on-site BRT trips)	See "Transit" Worksheet; Does not include CCTA bus stops nearby or potentially within site; total adjusted for 2020
	Number of Dedicated Daily Shuttles	160	Shuttle trips	See "Transit" Worksheet; total adjusted for 2020
Bike and Pedestrian	Number of intersections per square mile	975	Intersections per square mile	Estimate of street network, based upon small block sizes required in Area Plan
	Percent of Streets with Sidewalks on Both Side	100%	Percent of streets with sidewalks on both side	Based on Area Plan standards
	Percent of Arterials/Collectors with Bike Lanes	100%	Percent of Arterials and Collectors with Bike Lanes	Based on Area Plan standards
Affordable Housing	Percent of housing units that are deed-restricted below market rate housing	15%	Percent of housing units deed-restricted below market rate housing	Based on Redevelopment Area requirements

Note: Analysis conducted in 2011 assumed 15% affordable housing. Affordable housing commitment was revised upward to 25% in 2012 and is not reflected in the URBEMIS analysis.

▼ Table A-7: Operational Mitigation Measures: URBEMIS Model Runs, 2020 and 2030, for CRP Area Plan (cont'd)

Mitigation Category		Figure	Unit	Notes
Transportation Demand Management	Daily Parking Charge	Yes (checked)	Yes or No	Based on Area Plan Book Two
	Parking Price (Applies to non-residential)	5.00	Dollars/Day	Estimate of implementation of Area Plan Book Two
	Free Transit Passes	Yes (checked)	Yes or No	Based on Area Plan Book Two
	Employee Telecommuting Program	50%	Percent of employees participating	Based on Area Plan Book Two
	Employee Telecommuting Program	2%	Average days of week telecommuting	Based on Area Plan Book Two
	Compressed Work Schedule 9/80	Yes (checked)	Yes or No	Based on Area Plan Book Two
	Compressed Work Schedule 9/80	50%	Percent of employees participating	Based on Area Plan Book Two
	Secure Bike Parking	Yes (checked)	Yes or No	Based on Area Plan Book Two
	Showers/Changing Facilities Provided	Yes (checked)	Yes or No	Based on Area Plan Book Two
	Guaranteed Ride Home Provided	Yes (checked)	Yes or No	Based on Area Plan Book Two
	Car-Sharing Services Provided	Yes (checked)	Yes or No	Based on Area Plan Book Two
	Information Provided on Transportation Alternatives	Yes (checked)	Yes or No	Based on Area Plan Book Two
	Dedicated Employee Transportation Coordinator	Yes (checked)	Yes or No	Based on Area Plan Book Two
	Carpool Matching Program	Yes (checked)	Yes or No	Based on Area Plan Book Two
	Preferential Carpool/Vanpool Parking	Yes (checked)	Yes or No	Based on Area Plan Book Two

Note: In URBEMIS, 'operational mitigations measures' include any design enhancements or components that have the effect of reducing GHG emissions. They are supported by the Greenhouse Gas Reduction Program principles, policies, and standards, as well as the Area Plan Development Program described in Books One and Two. Model Output from December 23, 2010.

▼ Table A-8: Transit Assumptions: URBEMIS Model Run for the CRP Area Plan

2030 Transit Assumptions					
	Trips/peak hour	Peak hours/day	Trips/off-peak hour	Off peak hours/day	Total trips/day
On-Site Rapid Transit Busses	8	6	4	14	104
Rail service (BART)	Based on 12-01-2010 operating schedule				89
Shuttles (2 routes)	8	6	8	14	160

2020 Transit Assumptions					
	Trips/Peak hour	Peak hours/day	Trips/off-peak hour	Off peak hours/day	Total trips/day
On-Site Rapid Transit Busses	3	2	2	5	16
Rail service (BART)	Based on 12-01-2010 operating schedule				89
Shuttles (2 routes)	3	2	3	5	21

Note: Model output from December 23, 2010.

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Transportation Methodology Sources and Analysis of VMT Reduction

Transportation Methodology Sources Consulted

Specification of the Area Plan's policies relating to VMT Reduction was based in part on a review of academic and professional literature addressing the relationship between travel behavior and the built environment. This literature also informed an initial estimation of emissions reduction related to transportation that would be achieved in the Area Plan Forecast, as described below. The sources that were consulted are listed below.

1. Brownstone, D., Golob, T.F. *The Impact of Residential Density on Vehicle Usage and Energy Consumption*. Journal of Urban Economics 2009, 65(1), 91-98.
2. Cambridge Systematics, Inc. *The Effects of Land Use and Travel Demand Management Strategies on Commuting Behavior*. U.S. Department of Transportation, Final Report. DOT-95-06. November 1994.
3. Cervero, R. and Arrington, G.B. *Effects of TOD on Housing, Parking, and Travel*. Transportation Cooperative Research Program. 2008.
4. Chatman, D. *How the Built Environment Influences Non-Work Travel: Theoretical and Empirical Essays*. PhD dissertation. University of California, Los Angeles, 2005.
5. Ewing, Reid, et. al. *Growing Cooler: The Evidence on Urban Development and Climate Change: Executive Summary*. Urban Land Institute, Washington D.C., 2008.
6. Ewing, Reid, et al. *Traffic Generated by Mixed-Use Development: A Six-Region Study Using Consistent Built Environmental Measures*. Paper presented at the 2009 Annual Meeting of the Transportation Research Board.
7. Ewing, Reid. *Travel and the Built Environment—A Meta-Analysis*. US EPA Smart Growth Office, 2008.
8. Institute of Transportation Engineers. *A Toolbox for Alleviating Traffic Congestion and Enhancing Mobility*. Washington D.C. 1997.
9. Institute of Transportation Engineers. *Recommended Practice: Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*. Washington D.C. 2010.
10. Jones & Stokes Associates. *Software User's Guide: URBEMIS2002 for Windows with Enhanced Construction Module Version 8.7 Emissions Estimation for Land Use Development Projects*. Sacramento. CA. April 2005. <http://www.urbemis.com/software/download.html>.

11. Litman, T. *Parking Management Best Practices*. American Planning Association (Planners Press) Chicago, IL, 2006
12. Lund, H.M., Cervero, R., & Wilson, R.W. *Travel Characteristics of Transit-Oriented-Development in California*. California State Polytechnic University, Pomona; University of California, Berkeley; California Department of Transportation, 2004.
13. Metropolitan Transportation Commission. *Reforming Parking Policies to Support Smart Growth, Toolbox/Handbook: Parking Best Practices & Strategies for Supporting Transit Oriented Development in the San Francisco Bay Area*. Oakland, CA. June 2007.
14. Metropolitan Transportation Commission. *Characteristics of Rail and Ferry Station Area Residents in the San Francisco Bay Area: Evidence from the 2000 Bay Area Travel Survey*. Oakland, CA. 2006. http://www.mtc.ca.gov/planning/smart_growth/stars/index.htm
15. Rodier, Carolyn. *A Review of the International Modelling Literature: Transit, Land Use, and Auto Pricing Strategies to Reduce Vehicle Miles Travelled and Greenhouse Gas Emissions*. August 1, 2008 submission to the Transportation Research Board Annual Meeting.
16. Shoup, D. *Evaluating the Effects of Parking Cash Out: Eight Case Studies*. Department of Urban Planning, UCLA, Los Angeles, CA, September, 1996.
17. Transportation Research Board Special Report 298. *Driving and the Built Environment, The Effects of Compact Development on Motorized Travel, Energy Use, and CO₂ Emissions*. Transportation Research Board, National Research Council. Washington, D.C., 2009.
18. US Environmental Protection Agency. *Parking Spaces/Community Places: Finding the Balance Through Smart Growth Solutions*. Washington DC. January 2006.
19. Washington Metropolitan Area Transit Authority. *2005 Development-Related Ridership Survey: Final Report*, March 2006.
20. Weinstein, et al. *How Far, by Which Route, and Why? A Spatial Analysis of Pedestrian Preference*. Transportation Research Board, National Research Council. Washington, D.C., 2006.

VMT Reduction Estimates

The application of the Area Plan’s VMT Reduction strategies is projected to achieve a 21 percent reduction in transportation-related GHG emissions when compared to the business-as-usual forecast. This reduction was estimated using the URBEMIS and BGM models. An alternative method was conducted earlier based on review of the literature cited above, before BGM became available. That initial analysis estimated reduction using the adopted Concord Community Reuse Plan as a baseline condition—a condition comparable to the business-as-usual forecast. The results are summarized in Table B-1 and described below. It projected a 20 percent reduction by summing the lowest end of a range of reduction estimates for strategies in five key areas. The low end of the range was judged to be an appropriate basis for projecting emissions because the VMT reduction strategies work as a bundle – their individual effects are not additive. The URBEMIS model also validates that maximum reduction impacts cannot reasonably be anticipated for each strategy, because there is a decreasing marginal impact as more strategies are implemented.

▼ Table B-1: VMT Reduction Estimate

	Reduction Range	
Strategy	Low	High
Refined Land Use Strategies	3%	5%
Connected, Multi-modal Transportation Networks	2%	4%
Managed Parking Supply	10%	20%
Transportation Demand Management Strategies	5%	15%
Total	20%*	44%

*Assumed reduction level associated with Area Plan implementation.

Land Use: 3 to 5 percent decrease in VMT compared with adopted Reuse Plan

Numerous national studies have recently found that compact, mixed-use development has “significant potential” to reduce the miles that residents drive (Ewing, 2008). These studies predict that the benefits of compact, mixed-use development will increase with time and by 2050 could generally result in a 7 to 10 percent decrease in VMT. Some of the density and mixed-use benefit of the Area Plan is already included in the business-as-usual forecast. However, the detailed convenience, use mix, and density standards required in the Area Plan would create the appropriate mix of land uses and distances at a small neighborhood scale resulting in an additional 3 to 5 percent decrease in VMT compared with the adopted Reuse Plan.

Connectivity: 2 to 4 percent decrease in VMT compared with adopted Reuse Plan

A well-connected pedestrian, bicycle, and transit network throughout the compact, mixed-use development will decrease VMT. The transportation network standards included in the Area Plan will create benefit from the careful integration of complete facilities connecting destinations on and off-site. These strategies will result in a 2 to 4 percent decrease in VMT.

Parking Management: 10 to 20 percent decrease in VMT compared with adopted Reuse Plan

The amount, location, and design of parking greatly affect the pedestrian environment and transit use. Generally, the most effective parking management strategies in reducing the demand for parking, and consequently reducing VMT, are related to the cost of parking. The policies in the Area Plan address both the cost and supply of residential and commercial or employment parking. These parking management strategies together can result in a 10 to 20 percent decrease in VMT compared to business-as-usual scenario.

Transportation Demand Management: 5 to 15 percent decrease in VMT compared with adopted Reuse Plan

Additional strategies to reduce vehicle miles traveled include providing transit pass subsidies to residents and employees, implementing rideshare programs and a guaranteed ride home program, providing a car-sharing program, and providing bicycle storage and a bike-sharing program. Like all of the transportation strategies, these strategies work best in conjunction with each other and in the context of compact, mixed-use, and connected neighborhoods. These transportation demand management strategies together can result in a 5 to 15 percent decrease in VMT.

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Key Findings from the Evaluation of Candidate GHG Reduction Measures

A key finding common to all sectors is that the strategies offer synergistic effects. Their maximum benefit will be realized when they are implemented in “bundles” rather than individually. Reflecting this is the fact that estimates of benefit in Chapter 2 are not associated with the implementation of individual strategies, but rather with sets of mutually-supportive interventions for each of the four sectors.

VMT Reduction

- a) Strategies are most effective when applied together. Strategies have a beneficial impact when implemented individually. However, they will work together and be much more effective when implemented together. For example, in a low-density community where shopping, schools, and jobs are a mile or more from housing, adding sidewalks and crosswalks alone is unlikely to result in many more walk trips. However, many people will walk in a community where there are complete sidewalks and well-placed crosswalks and the places they want to go are close to each other, reducing trip length as well as providing safe and appealing non-motorized travel options.
- b) The “4-Ds” of Smart Growth have the greatest impact on travel behavior. The often-cited “4-D’s” of “Smart Growth:” density, diversity, design, and destinations are reflected in the VMT Reduction strategies. “Density” and “diversity” refer to the Area Plan’s compact and mixed-use development approach. “Design” as defined in the research on the 4-Ds refers to circulation system connectivity as reflected by intersection density and sidewalk completeness. The “destinations” component refers to proximity to job centers, also referred to as “regional accessibility.” The Area Plan improves access to destinations by including both job centers and housing, and by providing easy access to jobs elsewhere in the region through convenient BART access. Of the four factors, regional accessibility (destinations) has the greatest influence on reducing trip making, shifting mode choice away from single occupant vehicle use, and reducing average vehicle trip length.
- c) Parking management is an important tool. The amount, location, price, and design of parking greatly affect the pedestrian environment and transit use. Generally, the most effective parking management strategies in reducing the demand for parking, and consequently reducing VMT, are related to the cost of parking. An overly-generous parking supply or a supply of free parking can reduce the effectiveness of all other strategies to reduce vehicle miles travelled.

- d) Transportation Demand Management contributes to the effectiveness of the other strategies. Strategies to maximize the use of the pedestrian, bicycle, and transit network, such as transit pass subsidies and a car-sharing program enhance the convenience and cost-effectiveness of alternative modes to the traveler, increasing their effectiveness.
- e) Benefits of land use strategies are long-term. The results of land use and transit strategies are fully realized over the course of several decades. Land use strategies implemented in the Planning Area will have increasing effectiveness over time as the site builds out and as other locations in the region increasingly reflect compact and transit-oriented development strategies.
- d) Efficiency precedes renewables. It is generally more cost-effective and environmentally sustainable to implement energy load reduction, passive systems (e.g., daylighting and natural ventilation), and efficient active mechanical and electrical systems before applying renewable energy generation such as photovoltaics. For the CRP area, the following efficiency measures are found to have greatest value:
 - Increase glazing and roof thermal resistances (Policy CA-E-1.1: Energy load reduction)
 - Increase residential building air tightness (Policy CA-E-1.1: Energy load reduction)
 - Use energy efficient consumer electronics and lighting equipment (Policy CA-E-1.1: Energy load reduction)
 - Use solar hot water to satisfy the majority of domestic hot water demand (Policy CA-E-1.6: Energy Generation on Buildings)

Building and Site Energy

- a) Planning-related sitewide strategies are essential, especially for passive systems. Parameters addressed by Book One Standards such as narrow street widths, parcel and block size, solar exposure, and street grid orientation are essential to enable key passive strategies such as daylighting, passive heating, and natural ventilation and cooling. These are difficult-to-quantify measures that are tied closely to the detailed planning activities that will follow Area Plan adoption
- b) Reducing building energy use requires redefinition of indoor comfort ranges. Significant energy reductions can be achieved by adopting a wide range of temperatures as acceptable comfort criteria. This means re-defining the default high and low thermostat temperature settings used for room heating and cooling to enable the use of natural ventilation for a greater percentage of the year.
- c) Operational regulations and automatic control systems can greatly influence energy use. Buildings designed for efficient operations can provide significant energy savings. For example, control systems can turn off mechanical systems when they are not required because natural ventilation is adequate.
- The analysis conducted for the CAP found that both energy efficiency measures and renewable energy generation will be necessary to meet emissions targets.
- e) Building density contributes to energy efficiency. As building density increases, energy consumed per square foot typically goes down. Factors that contribute to this density-related efficiency include:
 - Insulation and shading benefits of shared walls and roofs
 - Smaller residential and commercial spaces, leading to reduced HVAC and lighting energy needs
- f) Significant energy efficiency is possible, even reaching net zero energy for low-rise buildings. Net zero energy is an attainable target for low-rise buildings that have a high ratio of roof area to occupied area, such as the detached single unit buildings in the Villages and Central Neighborhoods. However, net zero energy is not currently feasible for mid- to high-rise buildings due to limited roof space for photovoltaic systems. As a result, with increased vertical density, the possibility of achieving

net zero energy on individual buildings is reduced. The GHG Reduction Program includes Sector-Based Action on Building and Site Energy Policy CA-E-1.7: Energy generation on site to recognize the possible need for renewable energy generation in the Planning Area to meet sitewide or district-wide demand using photovoltaics, wind power, fuel cells, or other technologies.

Waste

- a) Source separation is a key strategy. “Source separation” of waste into organics, recyclables, and residuals by households (including multi-unit residences) and businesses is the most cost-effective method for significantly reducing the amount of waste sent to landfills.
- b) Providing appropriate equipment and ease of access for “source separation” is critical to a successful diversion program. This includes providing “three bin” systems for households and businesses, and ensuring that dedicated space is provided in private and public spaces, both indoors and outdoors. It should be as easy to recycle and compost as it is to send waste to a landfill.
- c) Waste generation reduction and diversion is highly dependent on behavior. Waste education kits have proven successful in increasing participation in reducing waste and increasing source separation, and can be particularly successful as residents move into homes, and employees start working in new buildings. Education and Collaboration Activities in Program Initiative Three are included specifically to direct effort at the continuing behavior and operations of households and businesses in order to sustain resource-efficient behavior.
- d) Uncertain opportunity for waste-to-energy technologies. An anaerobic digester would be capable of converting the site’s organic waste into an on-site supplemental energy supply and an enclosed compost facility would be capable of processing organic waste into compost. However, these technologies were evaluated and found unlikely to be

used based on technologies available at the time of Plan adoption, due to uncertainty regarding cost, siting, feedstock quantity (organic waste that would supplement waste produced by households and businesses), and waste diversion benefit.

Water

- a) Changes in landscaping and irrigation are most cost effective. Water efficient landscaping standards—requiring native plants and the use of exclusively non-potable water—produce the greatest reductions with limited cost relative to other strategies.
- b) Appliance efficiency yields significant water and energy savings. Efficient appliance standards consistent with established industry standards such as Energy Star can significantly reduce both household water and energy use.
- c) Air conditioning efficiency can yield significant water savings. The water used by building cooling towers can be reduced indirectly through HVAC energy efficiency (i.e. the less cooling required, the less cooling towers need to run). This indirect water savings can exceed that from building fixtures and landscaping.
- d) Metering systems increase awareness and reduce leakage. Automated metering systems are most efficient when used to complement other strategies by increasing awareness of water use by residents and businesses.
- e) Limited benefits to rainwater recovery. A rainwater recovery system provides limited benefit relative to cost, especially at increased development density.

List of Acronyms

AB	Assembly Bill
ABAG	Association of Bay Area Governments
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
BGM	BAAQMD GHG Model
BMP	Best management practice
CA	Climate Action
CACP	Clean Air Climate Protection
CAP	Climate Action Plan
CAPCOA	California Air Pollution Control Officers Association
CCRP	Concord Community Reuse Plan
CCTA	Contra Costa Transportation Authority
CEQA	California Environmental Quality Act
CF	Community Framework
CNWS	Concord Naval Weapons Station
CO₂	Carbon dioxide
CO₂e	Carbon dioxide equivalent
CRP	Concord Reuse Project
EIR	Environmental Impact Report
EPA	United States Environmental Protection Agency
FEIR	Final Environmental Impact Report
GHG	Greenhouse gas
HEED	Home Energy Efficient Design
HVAC	Heating, Ventilation, and Air Conditioning
ICLEI	International Council for Local Environmental Initiatives
LED	Light-Emitting Diode
LEED	Leadership in Energy and Environmental Design
LGOP	Local Government Operations Protocol
MTC	Metropolitan Transportation Commission
PG&E	Pacific Gas and Electric
RPS	Renewable portfolio standard
TDM	Transportation demand management
TMA	Transportation management association
TOD	Transit-oriented development, Transit-oriented district
VMT	Vehicle miles travelled

Glossary of Terms

** Indicates a term defined specifically for the purposes of the Area Plan.*

Anaerobic digestion. Breaking down of organic matter in the absence of oxygen to produce a mixture of gases that are burned as fuel.

Area sources. A category of GHG emissions sources identified by BAAQMD and used within the BGM model, generally including stationary, dispersed sources such as fuel combustion from space and water heating, landscape maintenance equipment, and fireplaces/stoves, evaporative emissions from architectural coatings and consumer products.

Best-in-practice. A technique, activity, or technology which conventional wisdom regards as more effective at delivering a particular outcome than any other technique, activity, or technology when applied to a particular condition or circumstance.

Building orientation. The spatial relationship of a building (particularly its largest side) to the path of the sun, prevailing wind patterns, adjacent developments, roadway network, or other external factors. Building orientation can be changed to reduce energy demand by optimizing solar and wind exposure for daylighting, passive heating and cooling, and natural ventilation.

Business-as-usual forecast.* Projection of GHG emissions assuming the normal course of business or activities for the project before the imposition of GHG emission reduction requirements or incentives. For this CRP Area Plan, the business-as-usual forecast reflects the level of GHG emissions that would be associated with the Area Plan development program, circulation and transit system but without transportation demand management, green building, waste reduction and water efficiency strategies. The business as usual forecast reflects the benefits of the mixed use transit oriented development pattern that is contained in the Area Plan vision.

Carbon dioxide equivalent (CO₂e). A unit that enables consistent evaluation of climate impacts from different sources and gases. Individual GHGs are converted to carbon dioxide equivalent units by use of multipliers based on their relative global warming potential.

Car-sharing. A system where a fleet of cars is available for short-term use through a program of joint ownership or membership.

Cash-out parking benefits. A cash payment offered to workers as an alternative to a parking space at their workplace.

Convenience standard.* The maximum walking distance, on public sidewalks or paths, between residences, workplaces and daily necessities.

Coordinated vanpool. A commuter option offered by an employer, government agency, or non-profit organization, in which several employees ride together in a van. Coordinated vanpools contrast with those that are organized by the riders themselves.

Daily necessities.* Facilities and services that individuals are likely to use on a daily or near-daily basis, such as a high-frequency-transit stop, a dedicated bicycle lane, a shared vehicle facility, public gathering space, open space for active recreation, community services, or a grocery or convenience store.

Glossary of Terms

Daylighting. 1. (Architectural) Using natural light to illuminate building spaces.

2. (Ecological) Redirecting a buried or piped stream to be above ground. Stream daylighting is often performed to provide community amenities or ecological benefits.

Development District.* Portions of the Planning Area that are planned for development, including neighborhoods, TOD, and business districts.

Energy load. The amount of energy demanded at a given time; the instantaneous energy consumption or requirement of a building or piece of equipment. Load (kW) occurring continuously over a period of time (hours) equals energy (kWh).

Energy recovery. A process that re-utilizes heating and cooling energy expended previously.

Glazing. Glass used in the exterior of a building.

Global warming potential. The impact of a particular gas on the greenhouse effect, as compared to the impact of an equal quantity of carbon dioxide.

Green building. A building or set of building practices designed to minimize negative impacts on the environment.

Greenhouse gas (GHG). Any of several gases that produce a warming effect within the Earth's lower atmosphere by absorbing and trapping heat from the sun that would otherwise be reflected back into space. The major GHGs are carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). Less prevalent—but very powerful—greenhouse gases are hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆).

GHG inventory. A database that lists, by source, the amount of air pollutants discharged into the atmosphere of a community or entity during a given time period.

Guaranteed ride home program. An emergency service for commuters who do not commute by a personal vehicle. In the event that the normal commute mode for a participant is not possible, the program provides transportation to home from work, either on-call rides by the sponsoring agency, coupons, or reimbursement for expenses for private ride services (e.g., taxis).

Headway. The time between arrivals of a transit vehicle at a stop. Shorter headways indicate higher frequency of service.

High-frequency transit service.* Service with headways of not more than 7.5 minutes during peak periods of day.

Mixed-mode. A hybrid approach to building interior conditioning that uses both natural ventilation from operable windows and, where necessary, mechanical systems that include air distribution equipment and refrigeration equipment for cooling.

Mobile source emissions. Emissions from on-road and non-road vehicles, engines, and equipment that generate air pollution and that move, or can be moved, from place to place.

Glossary of Terms

Multi-unit housing.* Residential buildings with common entrances and shared walls between dwellings.

Natural ventilation. Air circulation into, through, and out of a building that uses external winds and internal differences in air pressure between rooms. Natural ventilation techniques can include operable windows, partition walls, louvers, and vents, among many other features.

Net zero energy. Producing as much energy on a site on an annual basis as is consumed on that site.

Open space. Any parcel or area of land or water that is essentially unimproved. Open space uses include habitat conservation, hazard mitigation, agriculture, and recreation.

Operational emissions. A category of GHG emissions identified by BAAQMD, referring to emissions produced following build-out of a project, including both area sources and transportation sources.

Operational mitigations. Any action that reduces GHG emissions. A specialized term from emissions modeling through URBEMIS, which includes any design enhancements or components that have the effect of reducing GHG emissions.

Passive systems. Building design elements that provide comfortable conditions (heating, cooling lighting, etc.) without the use of electricity or consumption of fuel.

Per capita emissions. The level of emissions associated with Area Plan implementation, expressed as metric tons (MT) of Carbon Dioxide equivalent units and calculated on the basis of service population, as defined below.

Performance standard.* A requirement that a measurable result be attained without specification of the methods or technologies to be used to create the result. For example, a performance standard for energy efficiency might require a that building use 20 percent less energy than required by the California Energy Code (Title 24), without detailing the energy saving strategies to be used in building construction and operations.

Planning Area.* The geographical extent to which the CRP Area Plan applies, shown on Figure 1-1. This area includes the land that was operated by the US Navy as the Inland Area of the Concord Naval Weapons Station as well as properties owned by the Bay Area Rapid Transit District (BART) at the North Concord /Martinez BART station, and the City of Concord (Diablo Creek Golf Course).

Purple pipe. A system of conduit designed to distribute reclaimed (non-potable) water and made purple to distinguish it from pipes distributing potable water.

Recycled water. Non-potable water which, as a result of treatment, is suitable for a direct beneficial use such as irrigation, or a controlled use that would not otherwise occur and is therefore considered a valuable resource. Also known as “recycled water”.

Renewable energy. Energy that comes from sources that do not deplete, or that replenish more quickly than they are consumed.

Glossary of Terms

Residential permit parking. A parking districts wherein local residents can park on streets near their residences through purchase of parking permits, while others are restricted to certain parking spaces or to time limits during certain times of day.

Reuse Plan.* The document adopted by the City of Concord on February 23, 2010 for the Concord Naval Weapons Station (CNWS), except for the Tidal Area of the CNWS, as required by Base Realignment and Closure (BRAC) laws. Also known as the Reuse Plan for the Concord Naval Weapons Station, or the Concord Community Reuse Plan (CCRP).

Ride-matching. A system to assist travelers in finding others with similar origins, destinations, and travel times to share a ride. Also known as “carpool matching” A ride-matching service can be limited to a specific group of people (e.g., one large employer) or open to a large group of people (e.g., the entire San Francisco Bay Area) and can be low-technology (e.g., notices on a bulletin board) or high-technology (e.g., dynamic internet software). Ride-matching can be used to establish regular and long-term arrangements (e.g., for a daily commute) or a one-time trip.

Runoff. Surface water generated by rainfall that flows over land to a watercourse or urban drainage system.

Sectors.* Groupings of major sources of greenhouse gas emissions.

Sequestration. The process by which vegetation, or trees in particular, take carbon out of the air and store it.

Service population.* The total number of residents and workers in the CRP area at a specified time.

Shared parking. A parking management technique that shares parking spaces between more than one use in order to use the space more efficiently, typically in cases where users create different periods of peak demand. Shared parking arrangements may share spaces between more than one use (such as between a restaurant and an office complex), and between members of a group (such as a limited number of spaces for a group of employees), among other arrangements.

Single-unit housing.*

Attached _: A dwelling having its own entrance and sharing one or more walls with another dwelling.

Detached _: A dwelling with no shared walls or entrances except when joined to a second unit as defined by Concord General Plan Housing Element Policy 1.3 Duplexes and Second Unit.

Smart meter. A utility meter (e.g., for electricity, gas, or water) that allows for remote reading by utilities providers using computerized digital networks.

Solar hot water. A water-heating system that uses direct exposure to the sun’s radiation to heat water, eliminating or reducing the need for conventional water heaters that use higher amounts of energy.

Source separation. Separation of waste into organics, recyclables, and residuals by households (including multi-unit residences) and businesses.

Glossary of Terms

Strategy.* An intervention to limit greenhouse gas emissions. Examples include using higher efficiency engines to use fossil fuels more efficiently, switching from fossil fuels for electricity generation to solar energy or wind power, and establishing an aggressive standard for building insulation.

Transportation demand management (TDM). Measures to improve the movement of persons and goods through more efficient utilization of transportation systems (e.g., streets and roads, free-ways, bus systems, and BART) and measures to reduce the level of single-occupant vehicle use.

Vehicle miles travelled (VMT). The cumulative number of miles that motor vehicles travelled within a specific area over a specified period of time. (Also known as 'vehicle miles of travel') VMT is the basis for most traffic-related greenhouse gas emissions calculations.

Walking distance. The distance along pedestrian circulation facilities between specified points.

CRP Climate Action Plan Contributors

Consulting Team

Technical Contributors

Aidan Hughes
Ellen Greenberg, AICP
Mark Shorett
Engin Ayaz
Steve Done
Adam Friedberg
Stephanie Glazer
Alexej Goehring
Gary Hsueh
Morgan Kanninen
Shruti Karasekar
Grant McInnes
Rowan Roderick-Jones
Cole Roberts
Kimberly Seigel
Cassie Waddell
Kirstin Weeks

Production, Graphics, and Editing

Cody Andresen
Engin Ayaz
Gary Hsueh
Morgan Kanninen
Yolanda Owens

Reviewers

City of Concord staff

Mike Wright
Ray Kuzbari
Phillip Woods