APPENDIX G

Cordova Hills Greenhouse Gas Reduction Plan

Cordova Hills

GREENHOUSE GAS PLAN

MAY 2011

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SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

Larry Greene
AIR POLLUTION CONTROL OFFICER

June 2, 2011

Ms. Lauren Hocker
Sacramento County
Department of Environmental Review and Assessment
827 7th Street, 2nd Floor
Sacramento, CA 95814

Subject: Cordova Hills Greenhouse Gas Mitigation Plan- determination of technical adequacy
SAC200600987

Dear Ms. Hocker:

SMAQMD has reviewed the May 2011 Cordova Hills Greenhouse Gas Mitigation Plan (GHG Plan, version received June 1, 2011) as well as its accompanying technical analysis. The GHG Plan narrative sufficiently describes the commitments which will allow Cordova Hills to meet the greenhouse gas CEQA threshold expectations that the County currently requires of the project. In addition, SMAQMD finds the GHG Plan technical analysis suitable for CEQA purposes. SMAQMD wishes to thank the County, and particularly the proponent, for their close consultation with SMAQMD throughout the development of the Plan.

SMAQMD would like to note that the County released revised greenhouse gas CEQA thresholds in mid-April 2011. Because this GHG Plan was developed over a long period of time, the County has allowed the proponent to use the previous thresholds. We would like to point out that the project would not meet the new thresholds, nor does it meet three thresholds currently required individually (instead, the project meets a threshold that combines all three into one). These facts are clearly and satisfactorily disclosed in the GHG Plan narrative.

In order for the Cordova Hills development to achieve the actual reductions committed to in this GHG Plan, each measure and policy must be codified in one or more of the following documents: development agreement, master plan, mitigation and monitoring report, urban services plan, financing plan, etc. Successful implementation will be verified by site visits and lead agency consultation. If any measure becomes obsolete or are no longer applicable, please contact us for assistance in identifying replacements.

Again, we thank the County and proponent for working so closely with us. Please do not hesitate to contact me if you have any questions or comments.

Sincerely,

RDuBose

Rachel DuBose
Air Quality Planner/Analyst
Sacramento Metropolitan Air Quality Management District (SMAQMD)

C: Mark Hanson, SBM Corp
Cathy Baranger, William Hezmalhalch Architects, Inc.
Larry Robinson, Sacramento Metropolitan Air Quality Management District (SMAQMD)
Jeane Berry, Sacramento Metropolitan Air Quality Management District (SMAQMD)

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ACRONYM LIST

AB 32 – Global Warming Solutions Act of 2006

AQMP - Air Quality Mitigation Plan

BAU - Business As Usual

CACP – Clean Air and Climate Protection Software

CAPCOA - California Air Pollution Control Officers Association

CCAP - Center for Clean Air Policy

CARB – California Air Resources Board

CCAR – California Climate Action Registry

CAMX – Western Electricity Coordinating Council's California egrid subregion

CEC – California Energy Commission

CH - Cordova Hills

CH_4 – Methane

CO_2 – Carbon Dioxide

CO_2e – CO_2 equivalent

CHCSD - Cordova Hills Community Service District

EMFAC - EMission FActor computer model for estimating on-road mobile emissions

GHG – Greenhouse Gas

GWP – Global Warming Potential

ICLEI – Local Governments for Sustainability

ITE -Institute of Transportation Engineers

IPCC – Intergovernmental Panel on Climate Change

Kft^2 – 1,000 square feet

Kg – Kilograms

KWH – Kilowatt-hour

Lbs – Pounds

LCFS – Low Carbon Fuel Standards

LEED – Leadership in Energy and Environmental Design

LED – Light Emitting Diode

LID - Low Impact Development

MPG - Miles Per Gallon

MT – Metric Ton

MWh – Megawatt Hour

N_2O – Nitrous Oxide

OAG - Office of the Attorney General

PV – Photovoltaic

SACOG – Sacramento Area Council of Government

SAR – Second Assessment Report from IPCC

SCFs – Speed Correction Factors

SMUD – Sacramento Municipal Utility District

SMAQMD – Sacramento Metropolitan Air Quality Management District

SPA – Special Plan Area

SPFs - Speed Correction Factors

TDM - Transportation Demand Management

TMA - Transportation Management Association

URBEMIS – Air emissions software model

USGBC – US Green Building Council

VMT – Vehicle Miles Traveled

WUCOLS – Water Use Classifications of Landscape Species

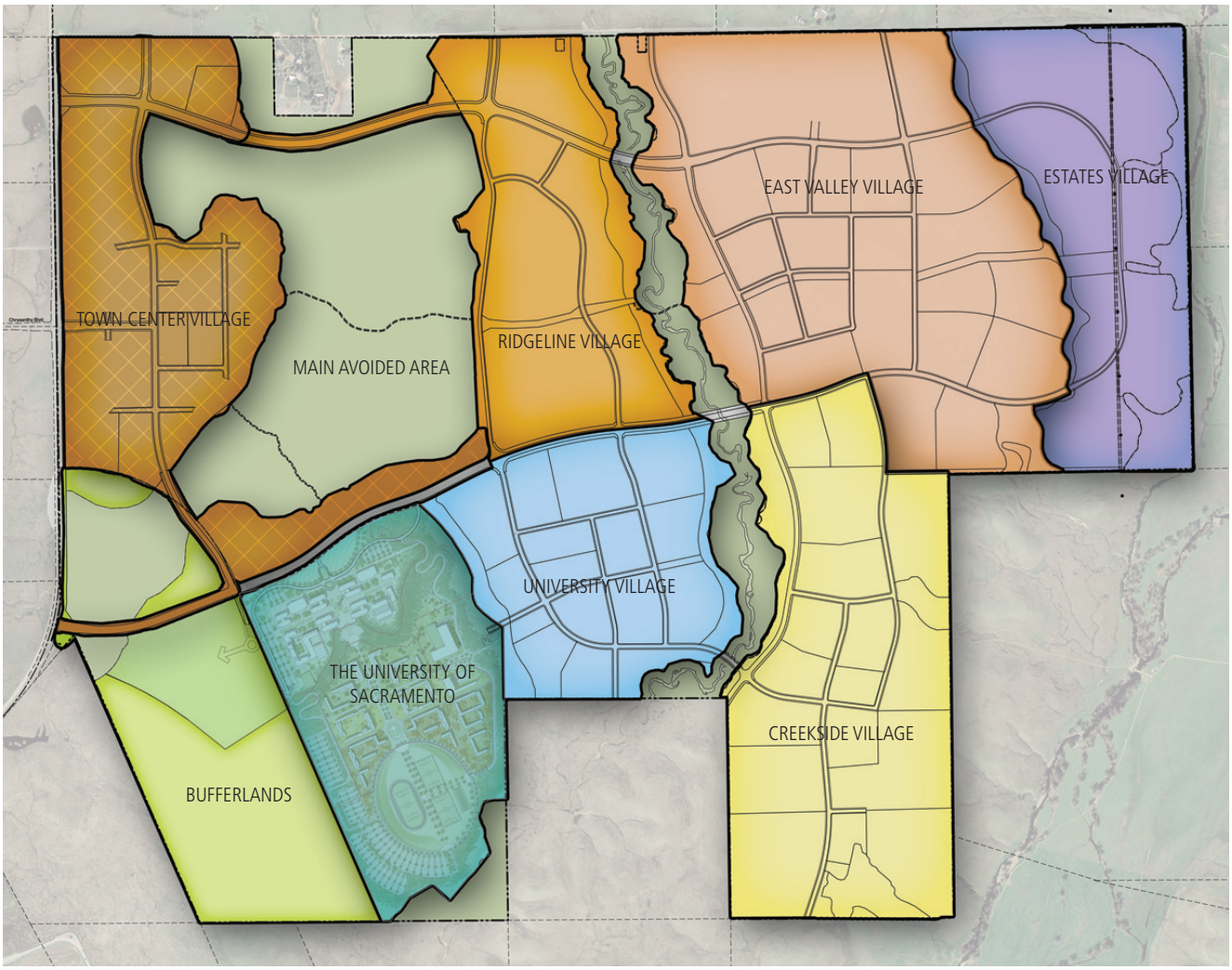


Figure 1: Cordova Hills Villages Concept Map (Figure 3.1 of Cordova Hills Master Plan)

EXECUTIVE SUMMARY

Purpose

California's Global Warming Solutions Act of 2006, Assembly Bill 32 (AB 32) requires the state to reduce greenhouse gas (GHG) emissions to 1990 levels from business-as-usual (BAU) emission levels projected for 2020. AB 32 requires the Air Resources Board (ARB) to prepare a Scoping Plan that outlines the main State strategies for meeting the 2020 deadline. The Scoping Plan includes a number of recommendations that will be studied and implemented over the next several years. In the meantime, the County of Sacramento has established three GHG emission thresholds for development in the following sectors:

- Residential
- Commercial/Industrial
- Transportation

This GHG Plan describes the measures that will be implemented under the County of Sacramento's requirements to reduce Cordova Hills GHG emissions below the established threshold.

Since this report is filled with acronyms, an Acronym List is found on page 9 in the front of this document.

Project Description

Cordova Hills is located in eastern Sacramento County and includes a wide variety of residential, retail, office, recreation, institutional, hospital/ medical facilities, and educational uses. Except for areas where no urban uses are permitted (in the Bufferlands and the floodplain along Carson Creek) the entire project is located within the county of Sacramento Urban Services Boundary (USB).

The Cordova Hills development will be made up of six distinct Villages, the University of Sacramento campus, and the bufferlands. Each Village will include a mix of housing types, and where appropriate, retail and service centers, parks, and schools. Each Village is defined by natural features that convey a distinct character as well as access to open space. See Figure 1: Cordova Hills Villages Map.

The Cordova Hills Special Plan Area (SPA) Master Plan ordinance is the regulatory document for Cordova Hills. The Cordova Hills SPA Master Plan ordinance establishes a development framework for land use, affordable housing, resource protection, circulation, utilities and services, implementation, and design. The County of Sacramento will adopt and administer the Master Plan SPA ordinance. This GHG plan will also be included as part of the Draft Environmental Impact Report (DEIR) for Cordova Hills and all GHG reduction measures listed in this document will be included in the Mitigation Monitoring and Reporting Plan (MMRP) for Cordova Hills.

Summary GHG Emissions

This Master Plan has been analyzed for its annual GHG emissions with the summary achievements described below. This GHG plan will be included as part of the Draft Environmental Impact Report (DEIR) for Cordova Hills and all GHG reduction measures listed in this document will be included in the Mitigation Monitoring and Reporting Plan (MMRP) for Cordova Hills.

In the Residential Sector under BAU, Cordova Hills will generate 1.50 MT per capita of GHG. By requiring several GHG reduction measures including constructing all units 20% above Title 24 (2008) and requiring a minimum of 20% renewable energy generation out of the overall residential usage, Cordova Hills will achieve 1.18 metric tons (MT) per capita below the threshold target of 1.3 annual MT of CO_2e emissions.

In the Commercial/Industrial Sector, under BAU, Cordova Hills will generate Carbon Dioxide Equivalent (CO_2e) emissions of 6.32 annual MT per kft^2, less than Sacramento County's GHG emissions target of 8.08 annual MT of CO_2e per kft^2. By requiring all buildings to be constructed 20% better than Title 24 (2008), Cordova Hills will achieve 5.75 MT. The 5.75 annual MT per kft^2 equates to 0.62 MT per capita.

In the Transportation Sector under BAU, Cordova Hills will emit 8.01 annual MT of CO_2e emissions compared to the target emissions threshold of 4.56 annual MT. With GHG committed reduction strategies, Cordova Hills will generate 4.02 MT per capita, less than the threshold target of 4.56 annual MT of CO_2e emissions.

With all the committed strategies in the Cordova Hills GHG Plan, the project will achieve a cumulative annual emission of 147,386 MT or 5.80 MT per capita, well under the overall target of 6.86 annual MT of CO_2e per capita. This reduction represents a 43.04% reduction over BAU. See Table 1: Overall Summary Per Capita.

Table 1: Overall Summary Per Capita

Sector	Target CO_2e MT Per Capita	MT CO_2e Per Capita under BAU	Total Annual MT CO_2e under BAU	Achievement CO_2e MT Per Capita	Total Annual CO_2e MT CO_2e
Residential	1.30	1.50	38,017.62	1.18	30,100.40
Commercial/ Industrial	1.00	0.68	17,187.39	0.62	15,634.37
Transportation	4.56	8.01	203,550.61	4.02	102,181.95
Tree Credit				0.02	531.00
Total	6.86	10.18	258,755.62	5.80	147,385.71

This overall summary does not include the additional GHG reduction measures related to reduction in water use and waste generation as shown on Tables 20 and 21.

BACKGROUND

This Greenhouse Gas (GHG) Plan describes the measures that will minimize GHG emissions created by the Cordova Hills development. This narrative provides context to the calculations of various potential GHG impacts and the effects of planned measures to minimize those impacts. The impacts are gauged against a baseline condition that would occur in a typical development of similar size and character in Sacramento County.

As part of the General Plan update (April 2009), the County of Sacramento prepared a draft Environmental Impact Report (EIR) that addressed climate change and created thresholds for development with regard to emissions of GHGs. GHGs are atmospheric gases that act as global insulators by reflecting visible light and infrared radiation back to earth. Some GHGs, such as water vapor, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (NO_2) occur naturally and are emitted to the atmosphere through natural processes. Although these gases occur naturally, human activities have altered their atmospheric concentrations.

To address concerns about climate change, Sacramento County joined the California Climate Action Registry (CCAR) and Local Governments for Sustainability (ICLEI). CCAR has developed protocol standards for reporting GHG emissions. ICLEI has created Climate Protection Model (CACP) software that provides a simple, standardized way of monitoring, measuring, and reporting performance towards reducing the amount of GHGs. These protocols estimate GHGs on an annual basis.

In addition, the Sacramento Metropolitan Air Quality Management District (SMAQMD) has developed protocols for developing operational Air Quality Mitigation Plans (AQMPs) for the Sacramento air basin and has requested that both their protocol and the protocol in the California Air Pollution Control Officers Association's (CAPCOA's) Quantifying Greenhouse Gas Mitigation Measures be utilized in this GHG Plan.

The amount of greenhouse gases that an individual, entity or product directly or indirectly emits is referred to as its carbon footprint. Because CO_2 is the most prominent GHG in the atmosphere, it is commonly used as the metric for measuring GHG emissions. Other GHG emissions, such as CH_4 or NO_2, are typically converted to "equivalent CO_2, or "CO_2e". This is useful for standardizing and comparing emissions from different sources and across sectors.

To convert GHG emissions to CO_2e, each type of emission is multiplied by its global warming potential (GWP) value to get its associated CO_2e value. Below are the GWP values that the Intergovernmental Panel on Climate Change (IPCC) developed in 1996 in its Second Assessment Report (SAR). The California Climate Registry uses the IPCC protocols.

Table 2: Global Warming Potential (GWP) of GHGs

GHG	GWP (SAR, 1996)
CO_2	1
CH_4	21
NO_2	310

AB 32 requires that California GHG emissions be reduced to 1990 levels by the year 2020. The 1990 level is estimated in the AB 32 Scoping Plan to be 15% below existing (2005) emissions. Future (2020) GHG emission thresholds were developed to ensure new development is compliant with the General Plan goals.

The CACP software was used to estimate existing unincorporated Sacramento County emissions. The year 2005 was chosen as a baseline for data inputs. The CACP model divides the GHG emissions among a number of sectors. All the sectors

analyzed are shown on Table 3: Cordova Hills Target Reductions; however, most sectors do not include a threshold. The Residential, Commercial/Industrial, and Transportation Sectors are directly related to development and each have an established threshold. Wastewater and Waste Sectors will be addressed by the activities of the Sacramento Regional County Sanitation District. Agriculture, Airport, and High GWP GHGs are not within the jurisdiction of Sacramento County and must be reduced through State and Federal actions. The County has no ability to affect water service within the densely developed areas.

Except for construction equipment, the County does not have a means to regulate emissions of off-road vehicle uses. On a per project basis, development projects will be required to reduce emissions from construction equipment. The amount is based on the size of the site and the number and type of equipment used.

Future project emissions were then estimated using the same CACP software. The County emission baseline is approximately 6,555,802 MT of CO_2e. Refer to Table 3: Cordova Hills Target Reductions.

Cordova Hills GHG Thresholds

In May 2009, as part of the General Plan EIR update, 2020 annual target thresholds were proposed. A per capita threshold was proposed for the residential and transportation sectors, while for the commercial/industrial sector the threshold is per 1,000 square feet (Kft^2). These thresholds reflected the housing projections and projection of commercial and industrial square footage provided by the Sacramento Area Council of Governments.

These thresholds can vary overtime depending upon development projections, changes in data/calculations, and emissions. As a result, Sacramento County's guidelines for these thresholds clarify the timing at which a project must adhere to thresholds. The County guidelines state if a project's Notice of Preparation (NOP) is released prior to new thresholds being established, then the project may adhere to the thresholds that exist at the time of its NOP.

The Cordova Hills NOP was released at the time the County had originally proposed thresholds in its General Plan Update. The Cordova Hills project did meet the County thresholds that were being considered in the Update at the time of the Cordova Hills NOP was issued.

During the preparation of the Draft EIR for the Cordova Hills project, the County further revised its consideration of greenhouse gas emission thresholds due to continuing refinements to calculation methodologies and the increasing availability of more accurate data. As a result, the County is now considering the use of new thresholds. Consequently, in the Draft EIR for the Cordova Hills project the County has analyzed the impacts of the Cordova Hills project based on both the original thresholds as well as based on the potentially new thresholds.

The new thresholds that may be adopted by the County include:

- Residential: 1.33 MT per capita
- Commercial/Industrial: 7.87 MT per Kft^2 (or 1.00 MT per capita)
- Transportation: 2.64 MT per capita

The Cordova Hills project has made its best effort in incorporating all feasible mitigation measures. Nonetheless, while the project did meet the original thresholds, the project would fail to meet the County's new proposed transportation threshold. Cordova Hills does meet the new proposed residential and commercial thresholds. Because the project's emissions of greenhouse gases exceed the latest proposed transportation threshold, the project cannot meet the overall threshold.

Table 3: Cordova Hills Target Reductions
per the County of Sacramento General Plan Update (April 13, 2009).

Sector	Annual CO_2e (MT) 2005 Baseline Inventory[1]	Percent of Total	Total Annual Minimum Reduction CO_2e (MT)[2]	2020 Annual Target CO_2e (MT)[3,4]	Annual CO_2e Thresholds (MT)	Total Persons Base on Project Population[10]	Commercial Target Per Capita
Residential	1,033,142	15.8%	155,373	877,769	1.3 per capita	658,368	
Commercial/ Industrial[5]	793,163	12.1%	118,988	674,175	8.08 per kft^2 1.0 per capita		1.0
Wastewater Treatment	54,391	0.8%	7,867	46,524	[6]		
Transportation	3,610,937	55.1%	541,837	3,069,100	4.56 per capita	658,368	
Waste	201,399	3.1%	30,484	170,915	[6]		
Agriculture	197,132	3.0%	29,501	167,631	[7]		
High GWP GHGs	228,768	3.5%	34,418	194,350	[8]		
Off-road Vehicle Use	236,466	3.6%	35,401	201,065	[9]		
Airport	200,404	3.1%	30,484	169,920	[7]		
Total	6,555,802	100.0%	983,370	5,572,432			

Notes:

[1] Baseline year emissions from the Greenhouse Gas Emissions Inventory for Sacramento County Inventory June 2009 prepared by ICF Jones and Stokes.

[2] Population, commercial square footage, and industrial square footage date forecasts for the 2020 year provided by SACOG.

[3] Table assumes that total County 2005 emissions must be reduced by 15% consistent with the AB 32 Scoping Plan.

[4] The Total Annual Minimum Reduction is based on the proportion that each sector contributes to emissions (e.g. Commercial/Industrial emissions are 12.1% of the total 2005 emissions, so that sector is also responsible for 12.1% of the total minimum reduction required: 12.1% x 983,370 = 118,988).

[5] Combines Commercial and Industrial and Industrial Specific from the 6-2009 GHG Emissions Inventory.

[6] Wastewater and Waste emissions will be reduced through government activities and implementation of the AB 32 Scoping Plan, not through development thresholds.

[7] Agriculture and Airport emissions are not within the jurisdiction of the County, and must be reduced through State and Federal actions.

[8] High GWP gases are not directly related to development (they come primarily from refrigerants), and must be reduced by State and Federal actions.

[9] Off-Road Vehicle Use includes construction equipment, rail, recreational watercraft and land craft, and other such combustion vehicles. Except for construction equipment, the County does not have jurisdiction over these uses. Development projects will be required to reduce emissions from construction equipment, but that will need to be determined on a per-project basis, depending on the size of the site and the number and type of equipment that will be used.

[10] Projected population from Lauren Hocker, Environmental Analyst, Department of Environmental Review and Assessment, County of Sacramento from e-mail dated 4/6/2011

GHG EMISSIONS

For each sector (Residential, Commercial/ Industrial, and Transportation) a business as usual (BAU) baseline annual emission is identified using established protocols. Assumptions and formulas are then described for electricity and natural gas use and vehicle miles traveled (VMTs) impacts. Then GHG reduction strategies were determined to reduce the GHG emissions to meet the target per capita amount.

Residential Sector

Public sector data (2009) from California Energy Commission (CEC) for both electricity and gas usage was utilized to determine the annual MT of CO_2e emitted per capita. The protocol for determining BAU emissions was from CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures.*

Residential Electricity GHG Emissions

The annual household electricity use data from the *California Energy Demand 2010-2020 Staff Report (CEC)* dated 2009 using 2009 numbers as suggested by SMAQMD's *CEQA Guide* dated December 2009 was used to determine the Cordova Hills electricity use (4,621 GWh by 534,072 households).

The formulas for converting annual total kWH to MT of CO_2e were provided by CCAR. The following formulas were used:

Total CO_2 Emissions (MT) = Electricity Use (kWH)/1,000 (MWh) x Electricity Emission Factor (lbs CO_2/kWH)/2,204.62 lbs/metric ton

Total CH_4 Emissions (MT) = Electricity Use (kWH)/1,000 (MWh) x Electricity Emission Factor (lbs CH_4/kWH)/2,204.62 lbs/metric ton

Total N_2O Emissions (MT) = Electricity Use (kWH)/1,000 (MWh) x Electricity Emission Factor (lbs N_2O/kWH)/2,204.62 lbs/metric ton

MT of CO_2e = (MT of CO_2 x 1) + (CH_4 x 21) + (N_2O x 310)

Table 4: Electricity Emission Factors lists the emission factors that were used in the equations.

Table 4: Electricity Emission Factors

Gas	Factor
CO_2	555.26 pounds per megawatt hours (lbs/MWh)[1]
CH_4	0.0302 pounds per megawatt hours (lbs/MWh)[2]
N_2O	0.0081 pounds per megawatt hours (lbs/MWh)[2]

[1] *Quantifying Greenhouse Gas Mitigation Measures* Appendix E, Table E-1: Carbon Intensity (CAPCOA)

[2] *California Climate Action Registry General Reporting Protocol* Version 3.1, Table C2 Carbon Dioxide, Methane and Nitrous Oxide Electricity Emission Factors by eGRID Subregion

Table 5a: Residential Electricity GHG BAU Emissions Projections describes the initial calculations that were performed. These calculations were then reduced due to improvement in the Building Code from 2001 to 2008 for homes with Central Air Conditioning as shown in Table 5b: Baseline Electricity Projections. The total BAU annual MT of CO_2e generated by electricity is 18,827.

Table 5a: Residential Electricity GHG Emissions Projections

Projections	Annual Household Electricity Use (kWh)[1]	Total No of Units	Total Annual Electricity use (MWh)	Annual MT CO_2 Emissions	Annual MT CH_4 Emissions	Annual MT N_20	Total Annual MT of CO_2e
SFD	8,652	5,342	46,219	11,641	0.63	0.17	11,707
MF	8,652	2,658	22,997	5,792	0.32	0.08	5,825
Dorm	8,652	1,010	8,739	2,201	0.12	0.03	2,213
Total		9,010	77,955	19,634	1.07	0.29	19,745

[1] California Energy Demand 2010-2020 Staff Revised Forecast December 2010 using 2009 numbers (Form 1.1 - SMUD Planning Area and Form 2.2 SMUD Planning Area)

Table 5b - Baseline Electricity Projections (Includes Reductions for Title 24 Improvement from 2001 to 2008 for Homes with Central A/C)

Residential Electricity Reductions[1]	Total No of Units	Housing Type %	Total Annual MT of CO_2e [2]	Reduction 2001 to 2005[3]	Reduction 2005 to 2008[3]	GHG Emissions Reduction %	Total Annual MT of CO_2e Reduced	Baseline Total Annual MT of CO_2e
SF (detached)	4,299	80%	9,421	19.80%	22.70%	4.49%	423.44	8,997.62
SF (Townhome)	1,043	20%	2,286	24.30%	19.70%	4.79%	109.42	2,176.27
		100%						
MF (non-townhome)	1,891	71%	4,144	24.30%	19.70%	4.79%	198.38	3,945.66
MF (Townhome)	767	29%	1,681	24.30%	19.70%	4.79%	80.46	1,600.38
		100%						
MF (Dorm)	1,010	100%	2,213	24.30%	19.70%	4.79%	105.96	2,107.41
Total	9,010		19,745				917.66	18,827.34

[1] The total single family and multifamily housing numbers had to be adjusted to account for the number of estimated townhomes since the reduction is in Table BE-1.2 had different reductions between single family, detached, townhome and multifamily

[2] From Table 5a Residential Electricity GHG Emissions Projections above

[3] *Quantifying Greenhouse Gas Mitigation Measures*, Table D-2 Reduction in Title 24 Regulated End Use for Residential Buildings (CAPCOA)

GREENHOUSE GAS PLAN

Since all the homes in Cordova Hills will be constructed at 20% above the 2008 Title 24 Standards, additional reductions can be taken using the protocol from CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures* (Refer to Table 6a: CO_2e Reduction for Improvement over 2008 Title 24 Requirements - Electricity). In addition there are also reductions for an Energy Star dishwasher and an Energy Star ceiling fan in each home (these percentages are based on the climate zone). Refer to Table 6b: GHG Reduction for Energy Efficient Appliances.

Quantifying Greenhouse Gas Mitigation Measures has specific protocol for combining strategies so that emissions are not double counted. Effectiveness levels for multiple strategies within a subcategory should be multiplied to determine a combined effectiveness level up to a maximum level. Since the combination of mitigation measures and independence of mitigation measures are both complicated the following formula should be taken:

GHG emission reduction for the category = 1- [(1-A) x (1-B) x (1-C)]

Where:

A, B and C are individual mitigation measure reduction percentages for the strategies to be combined in a given category. Refer to Table 6c: Combining Electricity Reductions for the Mitigated Total Annual MT of CO_2e emitted by residential electricity use.

Finally, Cordova Hills will provide at least 20% of the overall residential energy from a renewable source such as one or more of the following sources: rooftop solar, solar farm, methane district energy plant, enrollment in a green energy program, or another renewable energy source. Refer to Table 7: Alternative Energy Credit.

The renewable electricity emission savings analysis was calculated by multiplying the total estimated residential electricity usage (from Table 5b: Baseline Electricity Projections) by 20%.

Table 6a: CO_2e Reduction for Improvement over 2008 Title 24 Requirements - Electricity

Housing Type[1]	Reduction[2]	% Commitment Over Title 24	% reduction in GHG Emissions (A)
SF (detached)	0.14%	20	2.80%
SF (Townhome)	0.11%	20	2020%
MF (non-townhome)	0.15%	20	3.00%
MF (Townhome)	0.11%	20	2.20%
MF (Dorm)	0.15%	20	3.00%

[1] The total single family and multifamily housing numbers were adjusted to account for the number of estimated townhomes since the reduction is in Table BE-1.2 had different reductions between single family, detached, townhome and multifamily

[2] *Quantifying Greenhouse Gas Mitigation Measures*, Table BE-1.2 Residential Reduction for 1% Improvement over 2008 Title 24 (CAPCOA)

Table 6b: Electricity CO_2e Reduction for Energy Efficient Appliances

Housing Type	Energy Star Dishwasher % Reduction[2] (B)	% Commit-ment	Energy Star Ceiling Fan % Reduction[2] (C)	% Commit-ment
SF (Detached)	0.13%	100.00%	0.61%	100.00%
SF (Townhome)	0.13%	100.00%	0.96%	100.00%
MF (non-townhome)	0.11%	100.00%	1.12%	100.00%
MF (Townhome)	0.13%	100.00%	0.96%	100.00%
MF (Dorm)	0.00%	0.00%	1.12%	100.00%

[1] From Table 5b - Baseline Electricity

[2] *Quantifying Greenhouse Gas Mitigation Measures*, Table BE-4.2 Residential Reduction for ENERGY STAR Appliances (CAPCOA)

Table 6c: Combining Electricity Reductions (Includes Title 24 and Energy Star Appliance Reductions from Tables 6a & 6b[1])

Housing Type	Total % Reduction within Electricity Category	Reduced Annual MT of CO_2e for electricity	Mitigated Total Annual MT of CO_2e
SF (detached)	3.52%	316.58	8,681.04
SF (Townhome)	3.26%	71.05	2,105.22
MF (non-townhome)	4.19%	165.40	3,780.26
MF (Townhome)	3.26%	52.25	1,548.13
MF (Dorm)	4.09%	86.12	2,021.29
Total		691.4	18,135.94

[1] Formula 1-[(1-A)x(1-B)x(1-C)]1 from page 57-58 of *Quantifying Greenhouse Gas Mitigation Measures* (CAPCOA)

Table 7: Alternative Energy Credit

Housing Type	20% of Electricity Use Saved[1]	Annual MT CO_2 Emissions Saved[3]	Annual MT CH_4 Emissions Saved[3]	Annual MT N_20 Emissions Saved[3]	Total Annual MT of CO_2e Saved
SF Projections	9,243.80	2,328.16	0.127	0.034	2341.35
MF Projections	4,599.40	1,158.41	0.063	0.017	1164.98
Dorm Projections	1,747.70	440.18	0.0239	0.006	442.67
Total		3,926.76	0.214	0.057	3,949.00

[1] 20% of Electricity Use from Table 5b

[2] *Quantifying Greenhouse Gas Mitigation Measures* Appendix E, Table E-1: Carbon Intensity (CAPCOA)

[3] Conversion factor pounds to MT: 2,204.62 California Climate Action Registry General Reporting Protocol Version 3.1 January 2009, Step 3 page 35

Residential Natural Gas GHG Emissions

The natural gas per capita usage was obtained from the *Greenhouse Gas Emissions Inventory for Sacramento County* dated June 2009 by dividing the total natural gas usage for the unincorporated Sacramento County of 80,910,929 therms (Table B-3 on page B-4) by the unincorporated Sacramento County population of 561,625 (Table B-1 on page B-1) for a per capita usage of 144 therms.

The following formulas for converting annual total kgs/MMBtu to MT of CO_2e provided by CCAR were used:

Total CO_2 Emissions (MT) = Natural Gas Use (kgs CO_2/MMBtu) x Natural Gas Emission Factor (kgs CO_2/MMBtu x 0.001 MT/kg

Total CH_4 Emissions (MT) = Natural Gas Use (kgs CH_4/MMBtu) x Natural Gas Emission Factor (kgs $CH_{4/}$MMBtu) x 0.001 MT/kg

Total N_2O Emissions (MT) = Natural Gas Use (kgs N_2O/MMBtu) x Natural Gas Emission Factor (kgs N_2O/kWH) x 0.001 MT/kg

MT of CO_2e = (MT of CO_2 x 1) + (CH_4 x 21) + (N_2O x 310)

Table 8: Natural Gas Emission Factors lists the CCAR natural gas emission factors that were used to perform the equations. Table 9: Baseline Gas Usage demonstrates the per capita emissions of 0.77 annual MT of emissions from natural gas.

These calculations were then reduced due to improvements in the Building Code from 2001 to 2008 for homes with gas water heaters as shown in Table 10: CO_2e Reduction for Improvement over Title 24 - Gas. Since all the homes in Cordova Hills will be constructed at 20% above the 2008 Title 24 Standards, additional reductions can be taken using protocols from CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures.* Note that improvements in Title 24 standards affect both GHG emissions for electricity and natural gas.

Table 8: Natural Gas Emission Factors

Gas	Factor
CO_2	0.0546 kilograms per cubit feet (kgs/ft^3)[1]
CH_4	0.005 kilograms per million British Thermal Unit (kgs/MMBtu)[2]
N_2O	0.0001 kilograms per million British Thermal Unit (kgs/MMBtu)[2]

1. *California Climate Action Registry General Reporting Protocol* Version 3.1 January 2009, Table C.7 Carbon Dioxide Emission Factors for Stationary Combustion

2. *California Climate Action Registry General Reporting Protocol* Version 3.1 January 2009, Table C.8 Methane and Nitrous Oxide Emission Factors for Stationary Combustion by Fuel Type

Total Residential GHG Emissions

Total combined electricity and natural gas emissions for the residential uses can be found in Table 11: Summary Residential Electricity and Natural Gas Emissions. The per capita MT of CO_2e was multiplied by the total population to determine the total MT of CO_2e emissions.

Table 9: Baseline Gas Usage

	Unincorporated County 2009 Residential Usage Therms[1]	Unincorporated County Population 2009[2]	Per Capita Usage Therms	Annual MMBtus Per Capita	MT CO_2 Per Capita	MT CH_4 Per Capita	MT N_2O Per Capita	Per Capita Annual MT of CO_2e
Natural Gas Demand	80,910,929	561,625	144	14.41	0.76	7.20329E-05	1.44066E-06	0.77

[1] Natural Gas usage from Greenhouse Gas Emissions Inventory for Sacramento County June 2009 Table B-3 on page B-4

[2] Population from Greenhouse Gas emissions Inventory for Sacramento County June 2009 Table B-1 on page B-1

Table 10: CO_2e Reduction for Improvement over Title 24 - Gas

	Total Units	Per Capita	Pop.	Total Annual MT of CO_2e [2]	Reduction from 2001 to 2005[3]	Reduction from 2005 to 2008[3]	Total Annual Reduction MT of CO_2e	Mitigated Total Annual MT of CO_2e	Reduction for Each 1% Over Title 24 Stds[3]	% Commitment Over Title 24 Stds	% reduction in GHG Emissions	Total Annual MT of CO_2e Reduced	Mitigated Annual MT of CO_2e
SF (detached)	4,299	2.71	11,650	8,928	6.70%	10.00%	59.82	8,869	0.91%	20	18.2%	1,614	7,314.37
SF (Townhome)	1,043	2.71	2,827	2,166	15.70%	7.00%	23.81	2,142	0.89%	20	17.8%	381	1,784.83
MF (non-town-home)	1,891	2.54	4,803	3,681	15.70%	7.00%	40.45	3,641	0.89%	20	17.8%	648	3,032.98
MF (Townhome)	767	2.54	1,948	1,493	15.70%	7.00%	16.41	1,477	0.89%	20	17.8%	262	1,230.19
MF (Dorm)	1,010		4,040	3,096	15.70%	7.00%	34.03	3,062	0.89%	20	17.8%	545	2.551.09
Total	9,010			19,365			174.52	19,190				3,451	15,913.45

[1] The total single family and multifamily housing numbers had to be adjusted to account for the number of estimated townhomes since the reduction is in Table BE-1.2 had different reductions between single family, detached, townhome and multifamily

[2] From Table 9 Baseline Gas Usage above

[3] Quantifying Greenhouse Gas Mitigation Measures, Table BE-1.2 Residential Reduction for 1% Improvement over 2008 Title 24 (CAPCOA)

Table 11: Summary Residential Electricity and Natural Gas Emissions

Total Residential Emissions	Total Annual MT of CO_2e BAU	Total Annual MT of CO_2e with Reductions
Electricity	18,827.34	14,186.94
Gas	19,190.28	15,913.45
Total	38,017.62	30,100.4
Per Capita	1.50	1.18

Commercial/Industrial Sector

Commercial/Industrial Electricity GHG Emissions

The annual kWH use per square foot for nonresidential uses was determined from CEC's *California Energy Demand 2009-2020 Staff Revised Forecast* dated December 2009 using 2009 numbers. All commercial and industrial spaces were assumed to be occupied; therefore, the final CO_2e estimates shown on Table 12: Commercial/Industrial Electrical BAU Emissions Projections are very conservative. See Table 26: Project Employment Totals and Commercial Use Square Footage for the estimated total square footage of the commercial and industrial uses in the plan.

The same formulas used for converting annual kWH and MMBtus to MT of CO_2e in the Residential Sector were used for the Commercial/Industrial Sector.

Table 12: Commercial/Industrial Electrical BAU Emissions Projections[1]

Building Type	Annual kWH/s.f.	Area (s.f.)	Annual MWh[3]	Annual CO_2 Lbs/MT	Annual CH_4 Lbs/ MT	Annual N_20 Lbs/MT	Annual MT CO_2e	Per Ksf[2] Annual MT of Co_2e	Per Capita Annual MT
Non-residential	16.67	2,719,919	44,948	11,320	0.62	0.17	11,385	4.19	0.45

[1] California Energy Demand 2009-2020 Staff Revised Forecast December 2009 using 2009 numbers 4280 MkWH and 259 MMSF

[2] Does not assume any vacancy

Commercial/Industrial Natural Gas Emissions

To determine the natural gas emissions, the total gas consumption for Sacramento County was obtained from the CEC Energy Consumption Data Management System website for 2009. The SMUD Planning Area commercial floor space was obtained from the CEC staff demographic assumptions found in the *California Energy Demand 2010-2010 Adopted Forecast Staff* Form 2.2 SMUD Planning Area on page 185. Table 13: Commercial/Industrial Natural Gas BAU Emissions Projections demonstrates the annual MT of CO_2e per 1,000 square feet is 2.13.

Table 13: Commercial/Industrial Natural Gas BAU Emissions Projections

	County 2009 Non-residential Usage Mtherms[1]	County Commercial sf[2]	Annual MBtus/ ksf[2]	MT CO_2/ Ksf[2]	MT CH_4/ ksf[2]	MT N_2O/ ksf[2]	Annual MT of CO_2e/ksf	Per Capita Annual MT
Natural Gas Community Use	103,867,442	259,000,000	40.10	2.13	0.0002	0.0000	2.13	0.23

[1] Gas Consumption - Sacramento - Nonresidential 2009 (CEC website http://ecdms.energy.ca.gov/gasbycounty.aspx)
[2] Does not assume any vacancy

Since all buildings will be constructed 20% above 2008 Title 24 standards, a reduction can be taken using the protocol from CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures* Table BE-1.1 Non-residential Reduction for 1% improvement over 2008 Title 24. Refer to Table 14a: Reduction for Improvement over Title 24 - Gas and Electric.

Table 14a - Gas CO_2e Reduction for Improvement over 2008 Title 24 - Gas and Electric

	Reduction[1]	% Commit-ment over Title 24 Stds	% reduction in GHG Emissions	GHG MT Emissions Credit
Electric	0.31%	20	6.20%	705.86
Gas	0.73%	20	14.60%	847.16

[1] *Quantifying Greenhouse Gas Mitigation Measures,* Table BE-1.1 Non-Residential Reduction for 1% Improvement over 2008 Title 24 (CAPCOA) assuming the All Commercial category

Total Commercial/Industrial Emissions

The electricity and natural gas were added together to get a total emissions per 1,000 square feet for the Commercial/Industrial Sector. Total combined electricity and natural gas emissions for the Non-Residential sector can be found in Table 14b: Summary Non-residential Projections.

Table 14b: Summary Non-residential Projections

	Annual MT CO_2e	Per Ksf[2] Annual MT of CO_2e	Per Capita Annual MT
Electricity	10,679.04	3.93	0.42
Natural Gas	4,955.33	1.82	0.19
Total	15,634.37	5.75	0.62

Transportation Sector

To determine the BAU transportation emissions for the Cordova Hills Project, the Institute of Transportation Engineers (ITE rates) trip generation rates were inputted into the URBEMIS (2007) model (refer to Table 15: BAU Transportation Emissions). The output from the URBEMIS model listed 1,098.819 daily VMTs generating 202,959 MT of CO_2 annually. To determine the CO_2e, the total daily VMTs were multiplied by 320 to allow for differences in traffic levels and levels of service for transit during weekdays and holidays (source: SACOG's DEIR for the Metropolitan Transportation Plan for 2035). The annual VMTs were then multiplied by emissions factors from the *California Climate Action Registry General Reporting Protocol* Table C.4 for all vehicle model years (0.0048 g/mile for N_20 and 0.0051 g/mile for CH_4). These numbers was then converted to MTs and multiplied by the GWP factors and added to the URBEMIS generated CO_2 emissions. The total BAU emissions are 203,550 MT of CO_2e or 8.01 MT of CO_2e per capita.

The County of Sacramento contracted with DKS to perform a traffic impact study for the Cordova Hills Project. As part of the background work for the Traffic Impact Study, DKS produced the detail data found in Table 16: Project Daily Vehicle Trip Rates and Daily VMT Rates for Cordova Hills.

Again to convert the daily VMTs to annual VMTs, the daily VMT was multiplied by 320 to allow for differences in traffic levels and levels of service for transit during weekdays and holidays.

In order to determine the annual VMTs for the year 2020 which is the year the per capita emissions target is based on, these VMT estimates were updated using a simple progression from the year 2035 to the year 2020. The current project's VMTs were subtracted from the 2035 VMTs and then divided by 27 to determine the annual average VMT. This number was then multiplied by 12 and added to project's total VMTs for the year 2020.

Table 15: BAU Transportation Emissions

	ITE Trip Generation Rate[1]	Daily VMTs
SF (Per Unit)	9.57	436,922.15
MF (Per Unit)	6.65	151,235.65
Retail (Per Employee)	21.47	78,108.80
Other (Per Employee)	3.32	79,384.50
K-12 (Per Student)	1.54	52,998.55
University (Per Student)	7.77	300,169.71
Total Daily VMTs[2]		1,098,819.36
Annual VMTs[3]		351,622,195
Annual MT CO_2[2]		202,959.25
Annual MT NO_2[4]		1.69
Annual MT CH_4[4]		1.76
Total Annual MT		203,550.61
MT Per Capita		8.01

[1] From Britt Fugitt (DKS Associates) email correspondence March 14, 2011

[2] URBEMIS Model output

[3] Multiplied daily trips by 320 to allow for differences in traffic levels and levels of service for transit during weekdays and holidays

[4] NO_2 and CH_4 emission factors from *California Climate Action Registry General Reporting Protocol* Table C.4

The total VMTs for each type of land use are also used to apportion GHG emission mitigation measure benefits for the applicable land use. For example, a mitigation measure that affects residential VMT would only apply to the VMTs related to residential.

CARB has developed an on-road inventory of mobile source emissions for motor vehicles for the last 25 years. A mathematical model has been developed to produce estimates of the emissions of motor vehicles based on the following formula:

Emissions = Number of Sources x Activity x Emission Rate

Table 16: Project Daily Vehicle Trip Rates and Daily VMT Rates

Land Use	Project Units	Daily Vehicle Trip Rates[1]		Daily Vehicle Miles Traveled Rates[2]		Daily Vehicle Trips		Daily VMTs		Estimated VMTs in 2020	% of Total Trips
		Existing + Project	2035 + Project	Existing + Project	2035 + Project	Existing + Project	2035 + Project	Existing + Project	2035 + Project		
SF Units	5,340	7.2	6.9	73.7	54.1	38,270	36,981	393,518	289,126	347,122	37.78%
MF Units	2,660	4.9	4.8	49	35.4	13,112	12,759	130,425	94,171	114,312	12.44%
										461,434	50.23%
Retail Employees	1,897	13.1	13.7	121.2	88.1	24,871	26,066	230,007	167,056	202,029	
Other Employees	2,166	3	3.3	38	31.7	6,568	7,072	82,365	68,564	76,231	
										278,260	30.29%
K-12 Students	7,140	1.3	1.3	11.5	9.7	9,199	9,343	82,268	68,924	76,337	8.31%
Subtotal						92,021	92,221	918,584	687,841	102,698	11.18%
University Students	6,000	1.5	1.5	18.6	15.3	8,756	8,818	111,629	91,534	457,295	49.77%
Total						100,777	101,039	1,030,212	779,375	918,729	100.00%

[1] Vehicle trip rates reflect internalization reduction. For trips internal to the Cordova Hills Project, half the trip is attributed to the origin and half to the destination.

[2]VMT rates reflect internalization reduction. For trips internal to the Cordova Hills Project, half the VMT is attributed to the origin and half to the destination.

Source: DKS Associates, March 2011

EMFAC (short for EMission FACtor) is a FORTRAN computer model capable of estimating forecasted inventories for calendar years up to 2040 for 1965 and newer vehicles powered by either gasoline, diesel or electricity. Emissions are estimated for each vehicle class within each calendar year, for twenty-four hourly periods, for each month of the year. These emissions consider the ambient temperature, relative humidity, altitude and speed of the vehicle. The results include the gram per mile emission rates.

Speed has a significant effect on exhaust emission rates. The on-road emission inventory uses Speed Correction Factors (SCFs) to adjust the basic emission rates. In general, the SCFs are "U" shaped for passenger cares with higher emissions at both low and high extremes of speed. VMTs are reported in thirteen "bins" of five miles per hour, ranging from five to 70 miles per hour. The speed distributions are specific to the time of day: morning, midday afternoon and evening. The number of trips taken by a vehicle each day is also included in the model because a vehicle's emissions are elevated during starts. Short trips like shuffling vehicles in a driveway or moving from one parking spot to another in a strip mall are also included. In addition, evaporative hydrocarbons are emitted both when cars are being driven and when they are inactive. How long a vehicle sits also affects the magnitude of subsequent starts. For these reasons, the on-road inventory maintains a "Time-off" profile for each vehicle.

Refer to Table 17: Cordova Hills VMTs and CO_2 Emissions Per Speed Bin for 2020. The EMFAC grams/mile emissions estimate based on VMTs was provided by ICF Jones and Stokes. The formulas for converting total VMTs to MT of CO_2e were provided by CCAR. The following formulas were used:

Total Emissions (MT) = Emission Factor by Vehicle and Fuel Type (g/mi) x Annual Mileage x 0.000001 MT/g

Total CO_2 Emissions (MT) = Fuel use (gallons) x CO_2 Emission Factor (g CO_2 g/mile) x 0.0001 kg

Total CH_4 Emissions (MT) = Fuel use (gallons) x Fuel Emission Factor (CH_4 g/mile) x 0.0001 kg

Total N_2O Emissions (MT) = Fuel Use (gallons) x Fuel Emission Factor (N_2O g/mile) x 0.0001 kg

MT of CO_2e = (MT of CO_2 x 1) + (CH_4 x 21) + (N_2O x 310)

The same emission factors for N_2O and CH_4 were used for the 2020 project. The total annual MT of CO_2e is 121,500 or 4.78 MT CO_2e per capita.

In addition, CARB has also adopted Low Carbon Fuel Standards (LCFS) that set carbon reduction standards affecting the types of fuels that can be sold in California, particularly renewable fuels. These standards will reduce the GHG emissions even if total fuel consumption is not reduced. No protocol for estimating the impact of these standards has been established as of yet. Therefore, the projected transportation emissions are very conservative.

Transportation Reduction Strategies

CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures* provides protocols for transportation-related emission reduction measures. Since the DKS Traffic Impact Study assumed the following emission reduction strategies in their study, and to ensure no double counting occurs, these strategies cannot be included in the protocol to further reduce transportation emissions.

- Increased density
- Location efficiency
- Increased diversity of urban & suburban developments
- Increased destination accessibility
- Increase transit accessibility
- Orientation of project toward non-auto corridors
- Location of project near bike path/bike lanes
- Neighborhood site enhancements (interconnection of street network, sidewalks and traffic calming)
- NEV network
- Parking reductions
- Expansion of transit network
- Increase in Transit Services Frequency/Speed
- Improvement of traffic flow

The individual transportation-related emission reduction measures that have been utilized can be found in Table 18: Applicable Transportation Mitigation Measures. Since mitigation measures are implemented together with other measures, when more and more measures are implemented to mitigate a particular source of emissions, the benefit of each additional measure diminishes. Therefore, the interaction between the various categories of transportation-related mitigation measures is complex and sometimes counter-intuitive. Combining these mitigation measures can have a substantive impact on the quantification of the associated emission reductions. In order to safeguard the accuracy and reliability of the methods, while maintaining their ease of use, maximum reductions have been specified by subcategory in Table 19: Summary of Transportation Related Reduction Measures. Maximum reduction values also reflect the highest reduction levels justified by the literature. Table 19 indicates the maximum reductions for individual measures permitted under the CAPCOA protocol.

Table 17: Cordova Hills VMTs and CO_2 Emissions Per Speed Bin

		Regional - 5 mph Bin 2008[1]		Regional - 5 mph Bin 2035[1]		Daily VMTs Calculated Adjustment to 2020[2]		Convert to Annual VMTs[3]		Project Only Annual VMTS 2020 (1,000) [4]	EMFAC 2020 Estimated CO_2	
Period	Speed Bin Value	2008 No Build (1,000)	Existing Project (1,000)	2035 No Build (1,000)	2035 Project (1,000)	No Build 2020 (1,000)	No Build + Project 2020 (1,000)	No Build 2020 (1,000)	No Build + Project 2020 (1,000)		Grams/ Mile[5]	Annual MT CO_2
VMT All Day	1 - 5	23	24	78	77	47	47	15,330	15,260	(69)	1197.284	(84)
	6 - 10	161	191	263	276	207	228	66,121	73,191	7,070	912.596	6,452
	11 - 15	335	364	648	667	474	498	151,776	159,422	7,645	722.237	5,522
	16 - 20	6,861	6,957	10,827	10,917	8,624	8,717	2,759,595	2,789,521	29,926	593.965	17,775
	21 - 25	2,436	2,539	3,599	3,684	2,953	3,047	944,850	975,319	30,469	510.353	15,550
	26 - 30	3,062	3,257	5,381	5,501	4,092	4,254	1,309,578	1,361,321	51,743	454.064	23,494
	31 - 35	6,123	6,281	10,408	10,489	8,027	8,151	2,568,752	2,608,461	39,709	417.746	16,588
	36 - 40	6,58	6,861	13,013	13,198	9,442	9,678	3,021,430	3,096,857	75,427	397.044	29,948
	41 - 45	6,087	6,014	8,285	8,474	7,064	7,108	2,260,496	2,274,431	13,936	389.651	5,430
	46 - 50	3,437	3,595	6,211	6,182	4,670	4,745	1,494,333	1,518,364	24,031	394.833	9,488
	51 - 55	5,818	5,857	7,817	7,649	6,706	6,653	2,146,040	2,129,038	(17,002)	413.281	(7,027)
	56 - 60	11,057	11,041	13,809	13,860	12,280	12,294	3,929,699	3,934,056	4,358	447.252	1,949
	61 - 65	2,235	2,196	1,765	1,752	2,026	1,999	648,322	639,741	(8,580)	501.044	(4,299)
	66 - 70	1,762	1,765	2,135	2,135	1,928	1,929	616,938	617,483	545	509.055	277
	Total	55,983	56,943	84,240	84,862	68,541	69,351	21,933,260	22,192,466	259,206		121,064

[1] Source: DKS Associates 2011 Updated Air Quality Traffic Reports GHG_VMT_5mph_Spd_2008 and 2035 using regional numbers

[2] Took 2035 and divided by 27 and multiplied by 12 to get annual change and added 2008 number to convent to 2020

[2] Multiplied daily trips by 320 to allow for differences in traffic levels and levels of service for transit during weekdays and holidays. (Source: DEIR Metropolitan Transportation Plan for 2035, Sacramento Area Council of Governments Chapter 9-Energy and Global Climate Change, page 14 (http://www.sacog.org/mtp/2035/eir/Chapter%209%20-%20Energy%20and%20Climate%20Change/Chapter%209%20-%20Energy%20and%20Global%20Climate%20Change.pdf)

[4] Subtracted No build from No Build + Project 2020

[5] The background data was extracted from EMFAC by ICF Jones and Stokes (Laura Yoon).

As shown, the transportation measures that can be utilized to reduced GHGs has been limited to only 15.9%. Therefore, a conservative estimate of the total annual MT of CO_2e emissions has been projected to be 102,181.95 or 4.02 per capita. If the measures were not limited, the reduction would be 27.23% leading to a 3.48 MT of CO2e per capita. It is important to note that these limits on mitigation measures reduce the options available to reduce emissions for the Cordova Hills project.

Table 18: Applicable Transportation Mitigation Measures

Measure #	Measure Name	Description	Formula	Cordova Hills Calculation	Emission Reduction %
Land Use					
LUT - 9	Improved Design of Development	Enhancement of walkability and connectivity measured in number of intersection per square mile	%VMT Reduction = Number of intersections per square mile Increase vs. a typical ITE suburban development [36] (Not to exceed 500%) x Elasticity of VMT with respect to % of intersections [.12] (max 30%)	Cordova Hills will have a minimum of 140 vehicular or pedestrian intersections per square miles as provided on page 50. %VMT Reduction =(((100-36)/36)*.12)	21.33%
Neighborhood/Site Enhancement					
SDT - 2	Provide Traffic Calming Measures	Provide pedestrian access network to link all areas of development	In a suburban context with pedestrian accommodations within project site and connecting off site a VMT reduction of .025 to 2% is permitted	Cordova Hills is designed around the pedestrian and links to all sites. At least 50% of streets and intersections include the CAPCOA specified improvements (marked crosswalks, curb extensions, median islands, on-street parking, and planter strips with street trees). See Circulation description on pages 49-56.	0.5%
Parking Policy/Pricing					
	Measures either not applicable or included in the DKS Traffic Impact Study				
Commute Trip Reduction					
TRT - 1	Voluntary Commute Trip Reduction Programs	A multi-strategy program that encompasses a combination of measures	%VMT Reduction = 5.4% (suburban center) x% employees eligible	100% of residents and employees will be eligible to participate in the commute trip reduction programs (refer to page 60).	5.4%
Transit System Improvements					
	Measures either not applicable or included in the DKS Traffic Impact Study				
Road Pricing Management					
	Measures either not applicable or included in the DKS Traffic Impact Study				
Vehicle Related Measures					
	Measures are not applicable				

Table 19: Summary of Transportation Related Reduction Measures

Reduction Measure		Achievement (from Table 18)	Maximum Permitted Reduction	Applied	Total Annual MT CO_2e	Annual MT CO_2e per Capita
LUT	Land Use/ Location[1]	21.33%	10%	10%		
SDT	Neighborhood/ Site Enhancement	0.50%[4]	12.7%	0.05%		
PDT	Parking Policy/ Pricing[2]	N/A	20%	N/A		
TST	Transit System Improvements	0.00%	10%	0.00%		
Subtotal		22.33%	15%	10.5%		
TRT	Commute Trip Reduction - work[3]	5.40%[4]	15%	5.4%		
	Commute Trip Reduction - School	0.00%	65%	0%		
Maximum Reduction		27.73%[4]	20%	15.9%		
GHG Emissions from Table 17		121,064	x (1-15.9%)	84.1%	102,181.95	4.02

[1] Suburban Center

[2] Parking strategies should be implemented in one of two combinations (limited off-street supply ratios plus residential permit parking and priced on-street parking (to limit spillover), or Unbundle parking plus residential permit parking and priced on-street parking (to limit spillover)

[3] Maximum of 25% reduction in work-related VMT is assumed equivalent to a 15% reduction in overall project VMT for the purpose of the global maximum; this can be adjusted for project-specific land use mixes

[4] Many of the permitted measures were already included in the DKS traffic study assumptions

Water

While GHG emissions related to water use are not a threshold that this GHG plan is required to identify, water-related energy use is an important consideration. Water consumes 19 percent of California's electricity, 30 percent of its natural gas, and 88 billion gallons of diesel fuel every year. Commercial water-related energy use represents 30 percent of the electricity and 6 percent of the natural gas use. Industrial water-related energy use represents 22 percent of the electricity and 45 percent of the natural gas. The Residential Sector accounts for 48 percent of both the electricity consumption associated with urban water use.

Residential water uses include personal hygiene (shower, bath, sink), dish and clothes washing, toilets, landscape irrigation, chilled water and ice in refrigerators, and swimming pools and spas water use. Energy related to residential water use includes water treatment (filtering and softening), heating (natural gas or electric water heaters), hot water circulation loops, cooling (icemakers and chilled water systems for HVAC and chilled drinking water), circulation (spa pumps, as one example).

Commercial and industrial water uses include all those found in residences, plus hundreds more. Some of the more energy-intensive applications related to commercial or industrial water use include high-rise supplemental pressurization to serve upper floors, steam ovens and tables, car and truck washes, process hot water and steam, process chilling, equipment cooling (x-ray machines, for example), and cooling towers. In the Commercial Sector, the major water-related end uses that use electricity are cooling and water heating. Cooling towers for air conditioning are large water users. In the Industrial Sector, water-related energy use is very dependent upon specific processes. No single industrial category stands out as a major user of electricity or natural gas. Water heating and process heating are the largest users of natural gas.

In general, urban water use in California is more energy intensive than agricultural water use. This is because every urban water system requires energy for water and wastewater treatment, both of which are not generally required for agriculture. The vast majority of urban water systems also require energy for distribution. Water use in Northern California uses significantly less energy than water use in Southern California because water is not transported as far from its source.

The Sacramento County Water Agency will be the wholesaler and retailer for Cordova Hills. According to CAPCOA's *Quantifying Greenhouse Gas Measures*, August 2010, water reduction measures do not include the carbon intensity of the local utility since the water is transported from outside the utility's service area.

Table 20: Water Measures lists the measures that will be used in Cordova Hills but are not used to meet the required County of Sacramento thresholds.

Solid Waste

While reduction of GHG from solid waste is not a threshold that is required to the County to be included in the GHG plan, where possible the Cordova Hills project will reduce emissions from Solid waste. Emissions from solid waste include two sources: emissions from all wastes generated by the project and from "waste-in-place" for waste currently located in landfills. Reducing the amount of waste through careful reducing recycling and reusing of materials is the most appropriate way to reduce emissions from solid waste. Table 21: Solid Waste Measures lists the measures that will be used within Cordova Hills.

Table 20: Water Measures

Measure Number	Measure Name	Measure Description
OAG 14	Water-efficient landscapes	All landscape will be selected from the Cordova Hills Master Plant Palette which includes the Plant Factor (PF) from the California Department of Water Resources Water Use Classifications of Landscape Species (WUCOLS). At a minimum, 40% of the vegetation will have a Low PF, 40% will have a Moderate PF, and 20% will have a High PF. This could reduce the GHGs related to water by up to 13%.
OAG 15	Water-efficient irrigation	Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls. This could reduce the GHGs related to water by up to 6.1%.
OAG 16	Reclaimed water	Use reclaimed water for landscape irrigation serviced by the CHCSD (including streetscapes, large developments landscapes, and parks but not including single family developments). Install the infrastructure to deliver and use reclaimed water when available at the regional facility. This could reduce the GHGs related to water by up to 12%.
OAG 17	Water efficient fixtures	All residences will meet the 2010 CGBSC Voluntary Standards or equivalent for toilet, showerhead, bathroom and kitchen faucets and provide an Energy Star residential standard dishwasher. All non-residential uses will meet the 2010 CGBSC Voluntary Standards for toilet, urinal, showerhead, bathroom and kitchen faucets, Energy Star top-loading clothes washer (except for restaurants). This could reduce the GHGs related to water by up to 27.6%.
CAPCOA WUW- 5	Reduce Turf in Landscapes and Lawns	Limit turf to the greatest extent feasible.

Table 21: Solid Waste Measures

Measure Number	Measure Name	Measure Description
OAG 24	Recycle Construction Waste	Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).
OAG 25	Easy Access to Recycle Areas	Provide interior and exterior storage areas for recyclables and green waste and adequate recycling containers located in public areas.
CH 5	Composting	Partner with the Solid Waste Authority (SWA) to utilize their new composting facility to be located 1 mile north of Cordova Hills.
CH 6	Green Landscape Waste	All properties shall collect and submit all green waste to a recycling program.
CH 12	Proximity to Aggregate Resources	There is an existing Teichert quarry just to the north of Cordova Hills that was recently approved for expansion of its quarry operation. This will reduce the VMT for any off-site hauling of aggregate.

Tree Planting Credit

The planting of trees at Cordova Hills provides positive impacts on CO_2 emissions for both direct carbon dioxide sequestration and the cooling and heating energy savings from the climatic effects that shade, solar energy reflection, and transpiration have on energy use. A conservative estimate of 15,000 trees are assumed to be planted at Cordova Hills. This number was derived by assuming 4 trees will be planted for every 50 linear feet of street (1 tree on each side within the right-of-way and 1 tree on each side in the setback).

CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures* protocol was used to generate the data found in Table 22: CO_2 Credit for Planting of Trees. The formula for GHG emission credit for trees is follows:

Growing period for all trees [20 years] x the default annual CO_2 accumulation per tree [.0354] x number of trees [15,000]/Total Emissions. This number was then divided by 20 to obtain the annual credit for the planting of 15,000 trees.

Table 22: CO_2 Credit for Planting of Trees

GHG Emission Reduction MT CO_2/20 year	10,620
CHG Emission Reduction MT CO_2/1 year	531
% Reduction of Total GHG BAU Emissions	0.21%
% Reduction of Total GHG Mitigated Emissions	0.32%
Per Capita Reduction	0.02

GHG PLAN SUMMARY

In summary this Master Plan has been analyzed for its annual GHG emissions with the summary achievements described below.

In the Residential Sector under BAU, Cordova Hills will generate 1.50 MT per capita of GHG. By requiring several GHG reduction measures including constructing all units 20% above Title 24 (2008) and requiring a minimum of 20% renewable energy generation out of the overall residential usage, Cordova Hills will achieve 1.18 metric tons (MT) per capita below the threshold target of 1.3 annual MT of CO_2e emissions.

In the Commercial/Industrial Sector, under BAU, Cordova Hills will generate Carbon Dioxide Equivalent (CO_2e) emissions of 6.32 annual MT per kft^2, less than Sacramento County's GHG emissions target of 8.08 annual MT of CO_2e per kft^2. By requiring all buildings to be constructed 20% better than Title 24 (2008), Cordova Hills will achieve 5.75 MT. The 5.75 annual MT per kft^2 equates to 0.62 MT per capita.

In the Transportation Sector under BAU, Cordova Hills will emit 8.01 annual MT of CO_2e emissions compared to the target emissions threshold of 4.56 annual MT. With GHG committed reduction strategies, Cordova Hills will generate 4.02 MT per capita, less than the threshold target of 4.56 annual MT of CO_2e emissions.

With all the committed strategies in the Cordova Hills GHG Plan, the project will achieve a cumulative annual emission of 147,386 MT or 5.80 MT per capita, well under the overall target of 6.86 annual MT of CO_2e per capita. This reduction represents a 43.04% reduction over BAU. See Table 23: Overall Summary Per Capita.

Table 23: Overall Summary Per Capita

Sector	Target CO_2e MT Per Capita	MT CO_2e Per Capita under BAU	Total Annual MT CO_2e under BAU	Achievement CO_2e MT Per Capita	Total Annual CO_2e MT CO_2e
Residential	1.30	1.50	38,017.62	1.18	30,100.40
Commercial/ Industrial	1.00	0.68	17,187.39	0.62	15,634.37
Transportation	4.56	8.01	203,550.61	4.02	102,181.95
Tree Credit				0.02	531.00
Total	6.86	10.18	258,755.62	5.80	147,385.71

This overall summary does not include the additional GHG reduction measures related to reduction in water use and waste generation as shown on Tables 20 and 21.

CORDOVA HILLS EMISSION REDUCTION PLAN JUSTIFICATION

The proposed Cordova Hills project is located in eastern Sacramento County. Except for areas where no urban uses are permitted (in the Bufferlands and the floodplain along Carson Creek) the entire project is located within the county of Sacramento Urban Services Boundary (USB). This community will consist of estate, low, medium, and high density residential homes that gradually transition from the rural edge along the project's eastern foothills to the proposed regional retail centers along the existing Grant Line Road and potential future Grant Line Regional Connector Road. The project will also include a variety of regional and community retail centers, office uses, hospital/medical facilities, and a vast network of trails and public uses.

Villages

Cordova Hills will be made up of six distinct Villages, the University of Sacramento campus, and the bufferlands area. Each Village will include a mix of residential types, and where appropriate, retail and services centers, parks, and schools. The Villages are defined by natural features that convey a distinct character and open space accessibility. See Figure 1: Cordova Hills Villages Map.

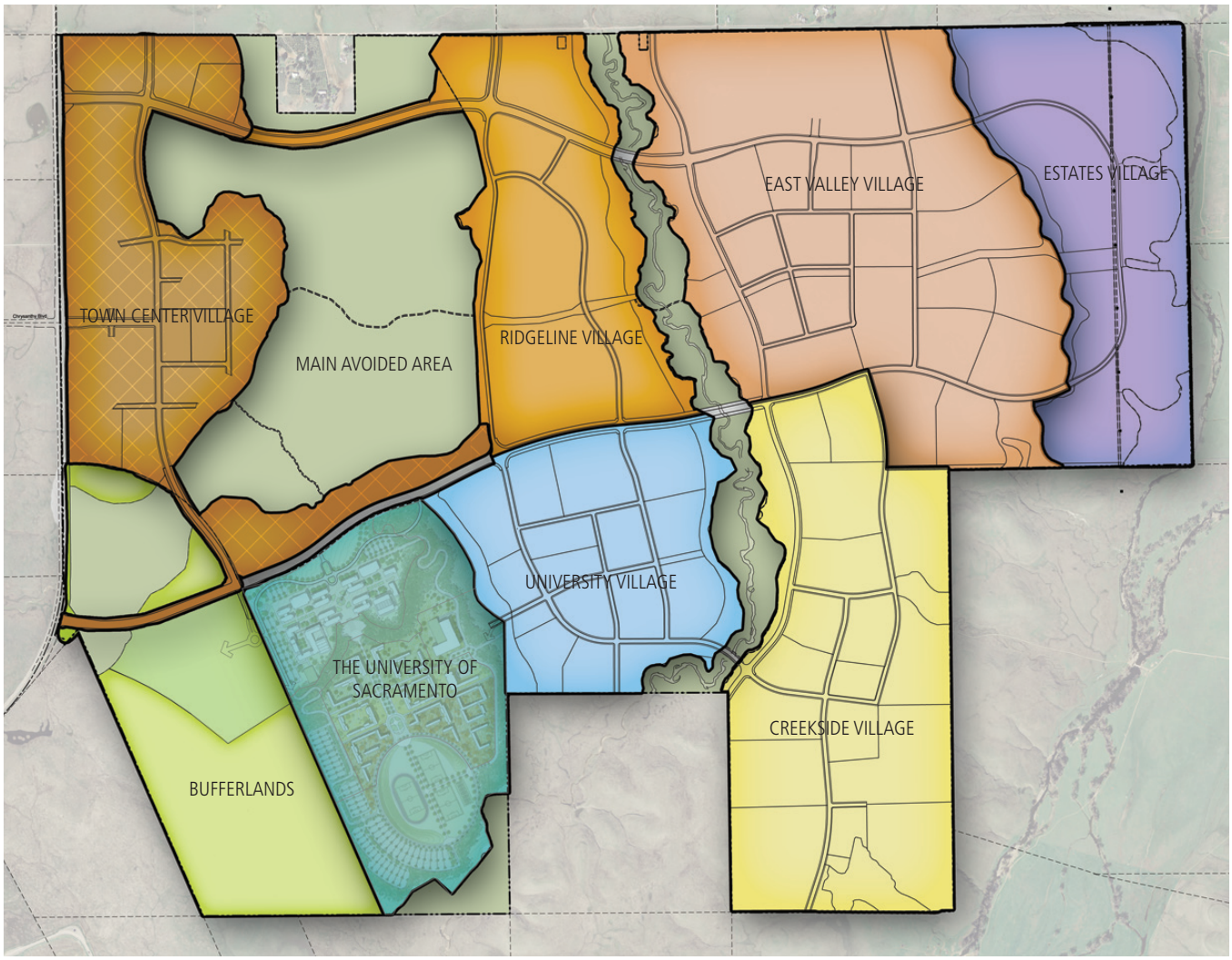


Figure 2: Cordova Hills Villages Map (Figure 3.1 of Cordova Hills Master Plan)

Residential

The project proposes low density residential on lot sizes ranging between 5,000 and 20,000 square feet and medium density residential on lot sizes between 2,000 and 4,999 square feet. High density residential zoning will include attached condominiums and multi-family dwelling units. Residential development will consist of a mix of one- and two-story single family homes, condominiums, townhomes, live-work units, and other types of multi-family units. See Table 24: Master Plan - Residential Units for housing information.

The proposed project includes housing for a residential population of approximately 25,519 residents, based on a maximum of 8,000 residential units and the University population discussed on page 42. The residential population is based on SACOG's latest projections of 2.71 persons per household for single family units and 2.54 persons per household for multifamily units. See Table 25: Cordova Hills Population Estimates.

Table 24: Master Plan - Residential Units

Village	HDR 2 30 - 40 DU/AC	HDR 1 23 - 30 DU/AC	RD-20 20 DU/AC	MDR 7 - 15 DU/AC	LDR 4 - 7 DU/ AC	ER 1 - 7 DU/AC	Flex Commercial	Total Units
Town Center	150	400	150	760	290	0	0	1,750
Ridgeline	0	200	0	485	260	0	50	995
University Village	0	620	205	530	80	0	40	1,475
East Valley	0	200	230	725	520	0	65	1,740
Creekside	0	200	303	610	425	2	0	1,540
Estates	0	0	0	0	355	145	0	500
TOTALS	150	1,620	888	3,110	1,930	147	155	8,000

Table 25: Cordova Hills Population Estimates

Land Use Zone	Total Units	Population Per HH[1] (SACOG)	Population Estimate
HDR-2 30 - 40	150	2.54	381
HDR-1 23 - 30	1,620	2.54	4,115
RD-20 15 - 23	888	2.71	2,406
MDR 7 - 15	3,110	2.71	8,428
LDR 4 - 7	1,930	2.71	5,230
ER 1 - 7	147	2.71	398
FC Flex Commercial	155	2.71	420
Total	8,000		21,379
University Population			4,040
Total Cordova Hills Population			25,419

[1] SACOG estimates 2.54 persons per unit for rental unit and 2.71 persons per unit for owner occupied

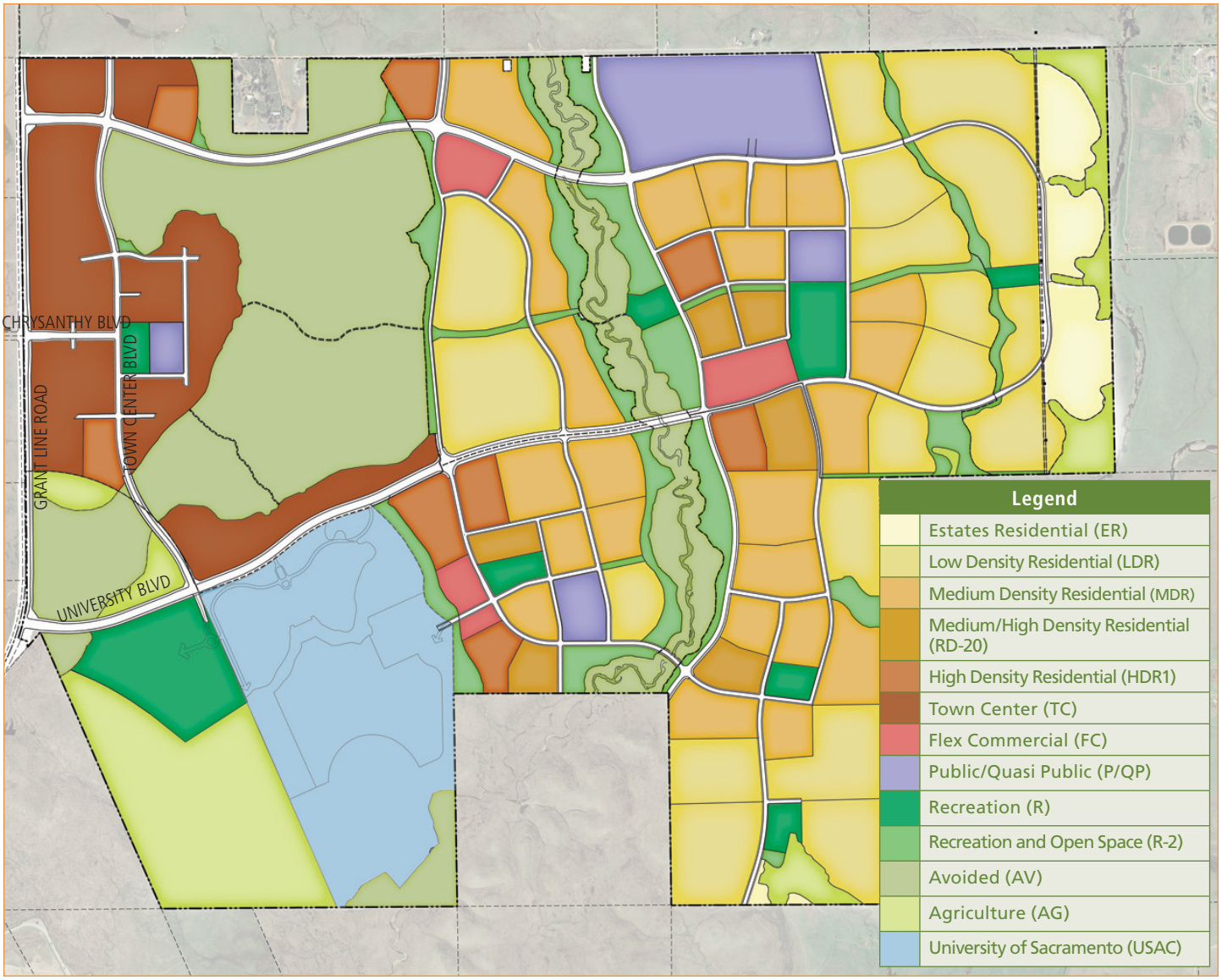


Figure 3: Cordova Hills Illustrative Land Use Plan (Figure 3.5 of Cordova Hills Master Plan)

Neighborhoods

Neighborhoods are the vital "building blocks" of the community and are predominantly residential, comprised of a wide range of single-family homes (attached and detached), and may also include multi-family dwelling units. Neighborhoods typically are broken up by builder parcels, allowing for a mix of housing types in each neighborhood. Neighborhoods will typically exhibit the following features and characteristics:

- Diversity in housing choices in lot and home sizes, design, diversity in housing products, cost and lifestyles is important to the social fabric and economic viability of the neighborhoods.
- Each cluster of neighborhoods will include a neighborhood center that is a "place" for neighbors to gather (e.g., school, park, community center, neighborhood commercial services, and eating establishments).
- Neighborhoods will be compact and walkable in design, scaled at 3 to 10 acres. The residential population of the neighborhood will be approximately 75-250 residents. The small scale of neighborhoods allows residents to walk almost anywhere in the neighborhood.
- Neighborhoods will be generally developed on a modified grid/curvilinear (fused grid) pedestrian friendly street system with short blocks for ease of mobility. Major streets will not bisect neighborhoods, thereby eliminating cross traffic conflicts. However, neighborhood streets do establish a hierarchy of larger to smaller streets that helps residents and visitors understand where they are in any given neighborhood.
- Cul-de-sacs will be linked to open spaces and/or other neighborhoods providing additional incentives for residents to walk rather than drive to the neighborhood center and/or other amenities.

Street Grid System Flatter and Higher Density Areas

Fused Grid System for areas with Topography and Lower Density

Non-residential Uses

Separation of work and home life has been a dominant theme in urban development for generations. As a result, long distance commutes between suburban residential tracts and distant work centers have become a common lifestyle for many. The need and desire to provide alternatives is apparent in the high cost of commuting in terms of time and dollars for the individual, but also the air quality, congestion, and high infrastructure cost for the entire community. Cordova Hills will enhance opportunities for living and working within the community by including office, research and development sites, and entertainment and retail sites within the plan, including a major University that will provide a substantial number of jobs, and by providing land use regulations that permit live/work residential use in many locations.

In addition, state of the art wiring technologies, such as fiber optics or conduit for the fiber, will be installed throughout the community to facilitate telecommuting. Community intranet will be established and funded through a Community Association.

Table 26: Project Employment Totals demonstrates the total number of employees projected to be employed at Cordova Hills.

Table 26: Project Employment Totals and Commercial/Industrial Use Square Footage

Employment Type	Employees
Retail	1,897
Office	1,129
Elementary Schools	180
High School/ Middle School	245
FRO Zone	329
Live Work Units	682
CHCSD:	50
University Total Employment	2,036
Total Estimated Employment	6,548
Commercial/Industrial Use	**Total Square Footage**
Cordova Hills Development	1,349,419
University (non-dorms)	930,500
Estimated K-12 Schools	440,000
Total Estimated Square Footage	2,719,919

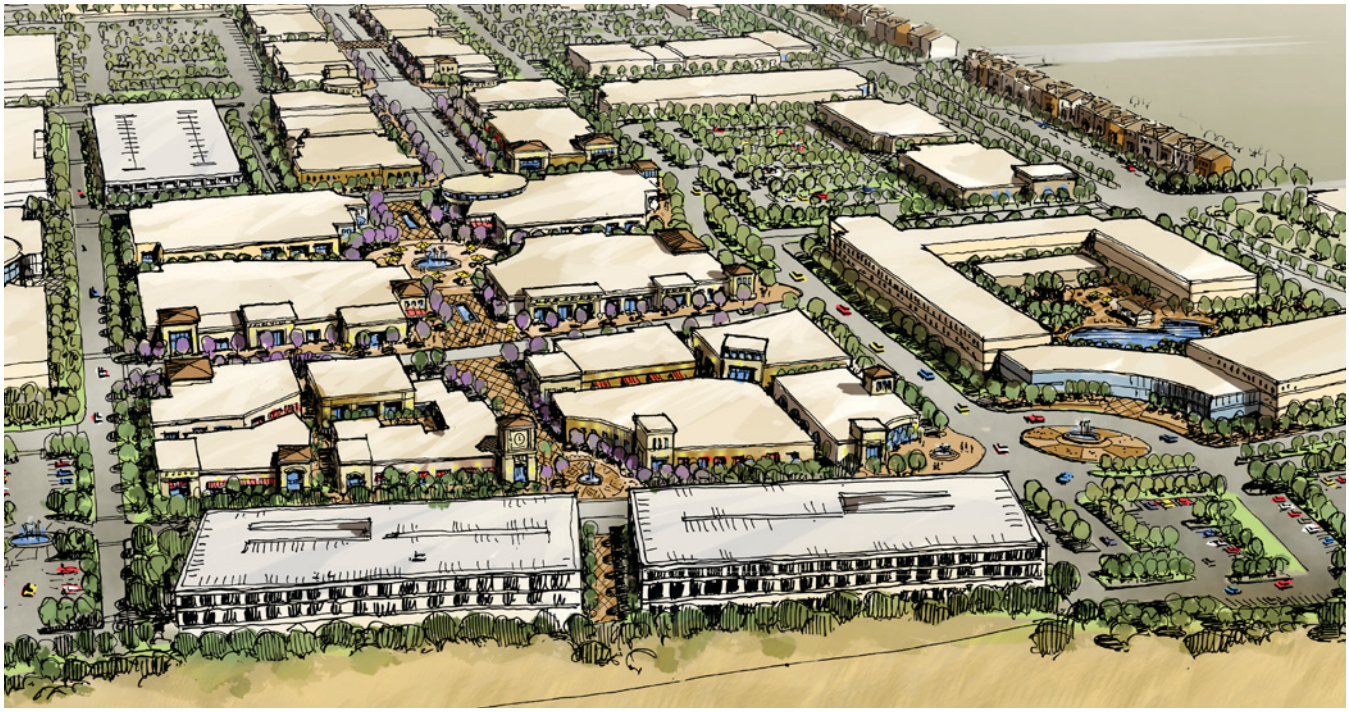
Town Center

The Cordova Hills Town Center Village is envisioned as a diversified Village with retail, residential, entertainment, and employment opportunities. The Town Center location adjacent to Grant Line Road is ideal for a regional hub for employment, shopping, entertainment and connection to a variety of transportation modes ranging from high capacity public transit to local pedestrian and bike trails.

The Town Center will contain a large array of retail types, including retail of various sizes, restaurants, movie theatres, book stores, home supply stores, electronic stores, and other types of similar retail, but will do so in a condensed, main street setting. The Town Center will include some high density residential uses above the first floor retail. Offices will also be provided within the Town Center Village.

The project includes almost 1.3 million square feet of commercial and office uses. The majority of the commercial uses will be located in the Town Center District.

The Town Center also provides a major transit hub on the proposed Capital Southwest Connector through the east side of Sacramento County. A transit hub along this corridor will provide opportunities for a true multi-modal station that will be able to accommodate regional transit, local bus service, the local transit system, a regional bike route, and park and ride facilities, as well as local streets and an extensive bike and pedestrian trail network.



Town Center Concept

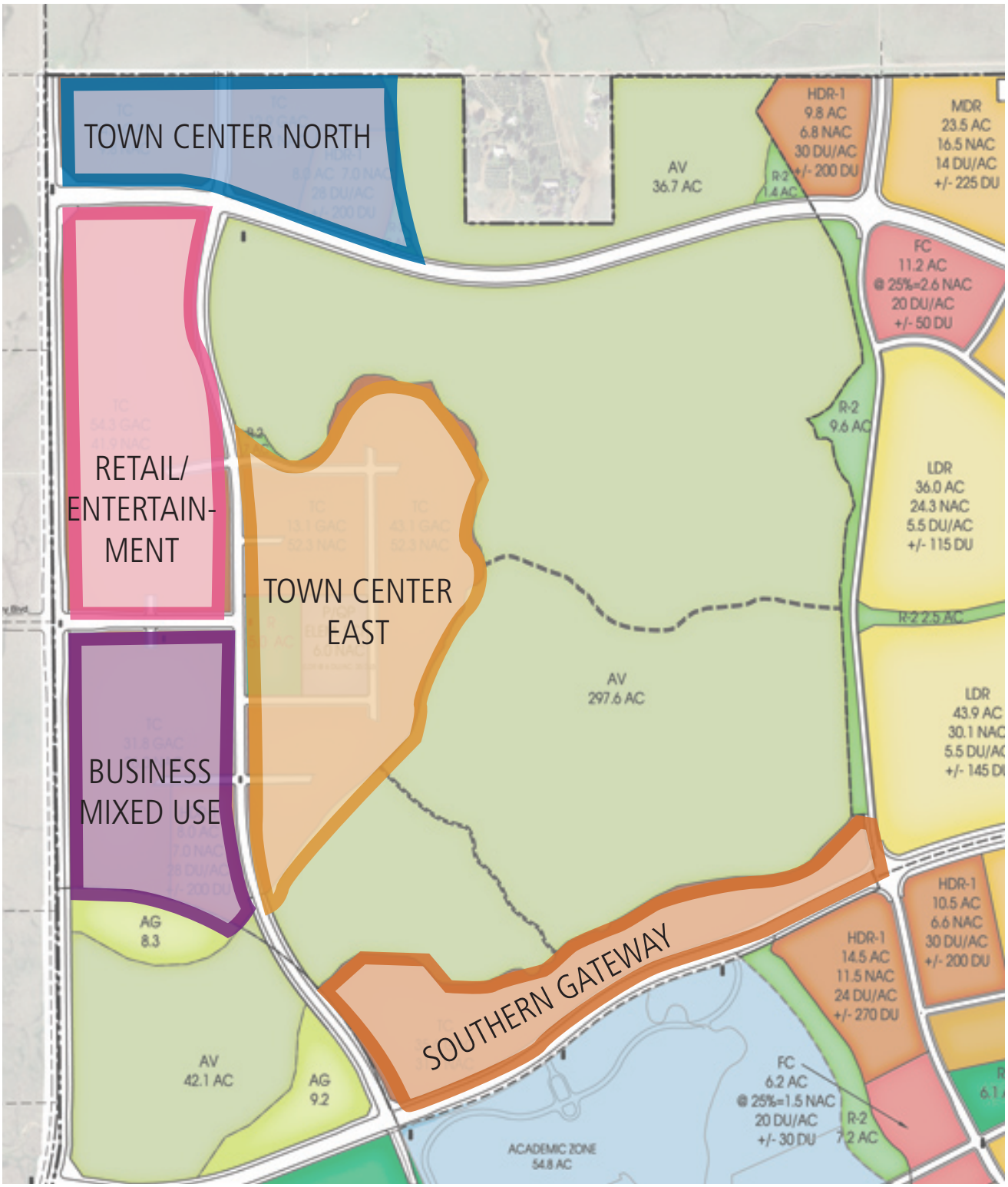


Figure 4: Town Center Districts (Figure 4.4 of Cordova Hills Master Plan)

University of Sacramento

Cordova Hills will also include a unique +/-246-acre private University campus, situated, in the prominent highlands along the project's southwestern boundary. This new University campus will include an internationally recognized 4-year higher educational institution, athletic facilities, student and facility housing, and the potential inclusion of site specific ecological and interpretive facilities to maximize the University's proximity to the site's diverse landscape. All University Buildings will be LEED certified or certified in an equivalent program.

The University of Sacramento will ultimately serve 4,300 undergraduate students and 1,700 graduate students for a total of 6,000 students. The University seeks to be primarily a residential campus, requiring most of the students to live on the campus itself.

The University also desires to have housing on campus for some of the faculty, since faculty from outside the region and from the University's global network of schools will come to Sacramento from time to time to instruct and participate in the educational process at the University of Sacramento. The University estimates that approximately 4,040 students will reside on the campus. See Table 27: University of Sacramento Residents.

To reduce parking needs and foster a greater sense of community among new students, freshman will be prohibited from keeping cars on campus. The sale of parking permits for the remaining undergraduate students (to a maximum of 33%) will further reduce the parking requirements for the University students who reside adjacent to the campus.

Table 27: University of Sacramento Residents

	Students	Residents	Assumptions
Undergraduates	4,300	3,870	Assumes 90% live on campus
Graduates	1,700	170	Assumes 10% live on campus
Total Residents	6,000	4,040	

Table 28: University of Sacramento Statistics

Academic/Administrative Facilities Square Feet	930,500
Residential Square (Dorms) Square Feet	939,500
Total Square Feet	1,870,000

The University will develop a shared vehicle program, like ZipCar, which removes 15 personal cars from the road. At a rate of 1 vehicle per 87 parking spaces, at the 30-year final phase, a fleet of 30 ZipCars would reduce the campus parking requirement by 450 spaces. The ZipCar program may be utilized by the entire Cordova Hills community.

Time restricted parking passes will also be implemented to reduce parking by 933 spaces.

Ultimately, the University will include approximately 1,870,000 square feet of facilities, of which approximately half or 939,500 square feet will be residential uses and the remaining 930,500 square feet will be academic or administrative facilities. See Table 28: University of Sacramento Statistics.

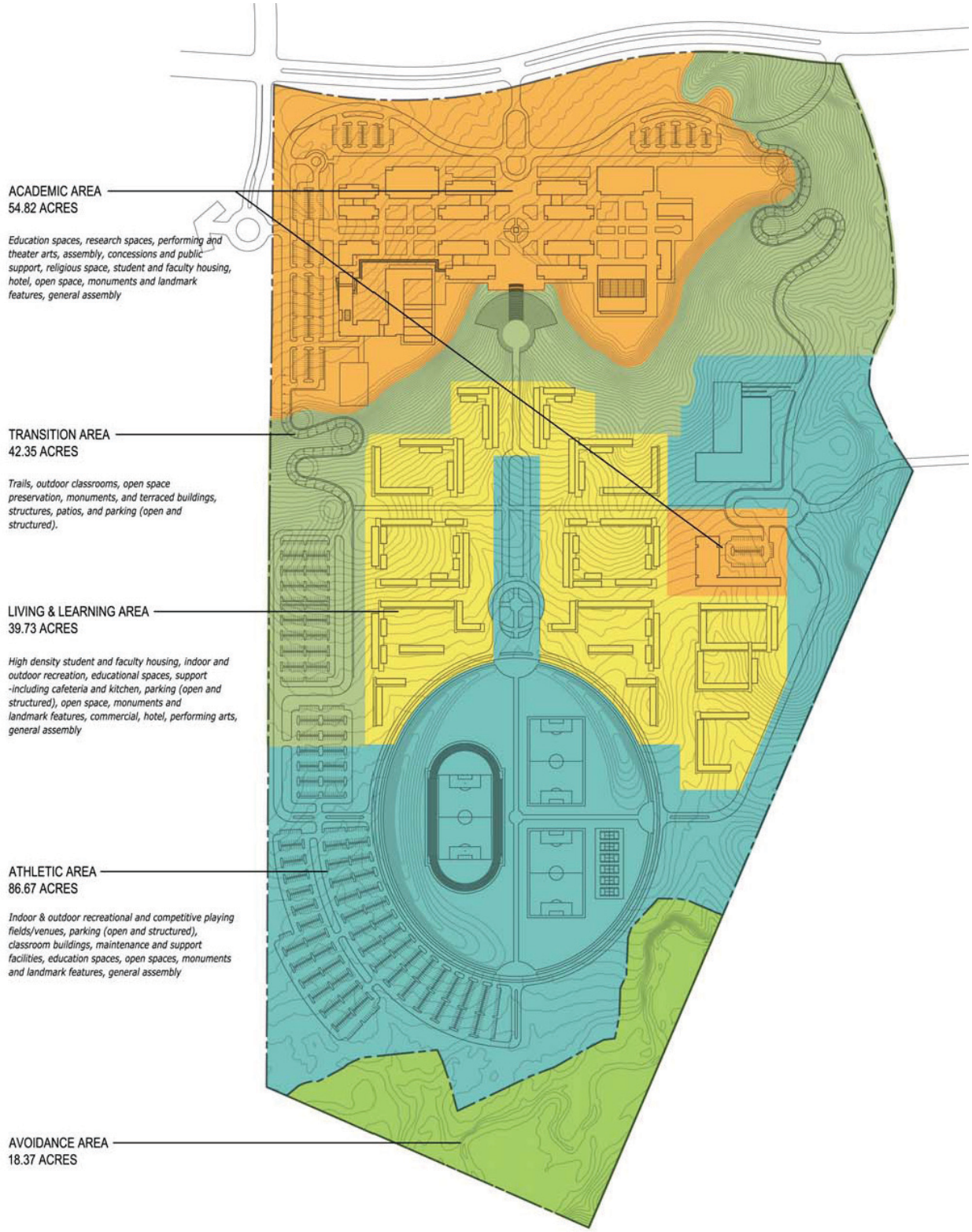


Figure 5: University of Sacramento Land Plan (Figure 5.1 of Cordova Hills Master Plan)

Parks & Open Space

The developed portions of Cordova Hills will be interwoven with extensive open space features, both protected avoidance areas and readily accessible natural features. A large wetland avoidance area adjacent to the Town Center, and a large wetland and drainage corridor in the center of the community provide extensive open space areas that will be landmark features. The eastern edge of the community abuts permanent agricultural open space and an established floodplain. This adjacent open space allows for regional connections to hiking and biking trails.

Approximately one-third of the Cordova Hills land area will remain in open space, including parks, natural open space, avoidance areas, storm water detention basins, and trail corridors. Walking and bicycling trails are planned within the area's natural open spaces, which will connect to the regional trail system. Neighborhood schools, parks, and community centers and other public amenities will all be integrated into the overall trail network.

Pedestrian Connectivity

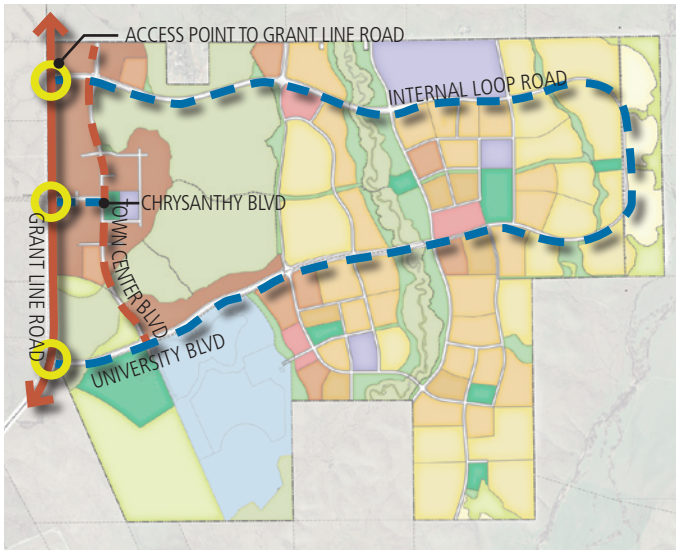
Circulation

Through careful design of the community, the transportation system and the dwellings, it will be possible for individuals to significantly reduce the "carbon footprint" in their daily lives compared to similar lifestyles in more conventional communities.

Three primary access points from Grant Line Road to Cordova Hills are proposed. The primary access to the Cordova Hills Town Center on Grant Line Road will be the easterly extension of Chrysanthy Road across Grant Line Road. This will be the community's front door into the Town Center. Two other access points off of Grant Line Road, one each north and south of Chrysanthy Road, will provide additional distribution of access to serve the community to the east.

The extension of the two arterial access points eastward into the project will form an internal loop system to service the University of Sacramento and University Village, Creekside, The Estates, East Valley, and Ridgeline Villages. The internal roadway network for Cordova Hills generally avoids steep slopes and creek crossings to mitigate environmental impacts and site development costs.

These three access points into the project will be 4 lanes and will eventually decrease to 2 lanes at the eastern side of the project.



Cordova Hills Access Points and Transportation Network
(Figure 3.4 of Cordova Hills Master Plan)

One of the key features of the plan is the opportunity to combine several forms of circulation that will provide significant alternatives to conventional vehicle use for common, every day travel. The Cordova Hills community will be served by a multi-level, multi-modal transportation system.

The Town Center conceptually located at the intersection of Chrysanthy Boulevard and Grant Line Road would include a multi-modal transit hub that links the internal circulation system to the regional transit system. Links between the public transportation system and the regional transportation would include an extension of Cordova Hills transit system along Chrysanthy Boulevard, west to its intersection with Rancho Cordova Parkway and also to Highway 50.

A park and ride facility will be located within the buffer area as part of a joint-use facility with the Sports Park. The park and ride will be utilized primarily for Cordova Hills commuters during the business hours of the week. During the evenings and weekends it will primarily be used for Sports Park events and overflow parking for University events.

Well-planned road and trail networks will efficiently handle vehicular traffic, and will emphasize walkability and connectivity. All homes are planned to be not more than 1/4 mile from a trail, school, park, recreation facility, or other open space. The community pedestrian network, consisting of approximately 75.4 miles of Class I trails (off-street), off-street paseos, and Class II bike lanes. Approximately 42.3 miles will consist of off-street community Class I trails and paseos. Cordova Hills can become a critical link in completing a comprehensive regional bike trail that ultimately connects the three rivers in Sacramento County, the Sacramento, the American, and the Cosumnes.

The Town Center and western third of the project will include a grid street network due to the flat

topography and high density of land uses planned in the area. The terrain to the east limits the opportunity for a traditional grid street network.

Cordova Hills will include a hierarchy of street types including a Town Center Boulevard, four-lane arterials, two-lane Community Boulevards, two-lane Neighborhood Collectors, residential streets with detached and attached sidewalks, and rural streets. However, the backbone streets are in a grid formation, but the neighborhood streets may not be due to the topography.

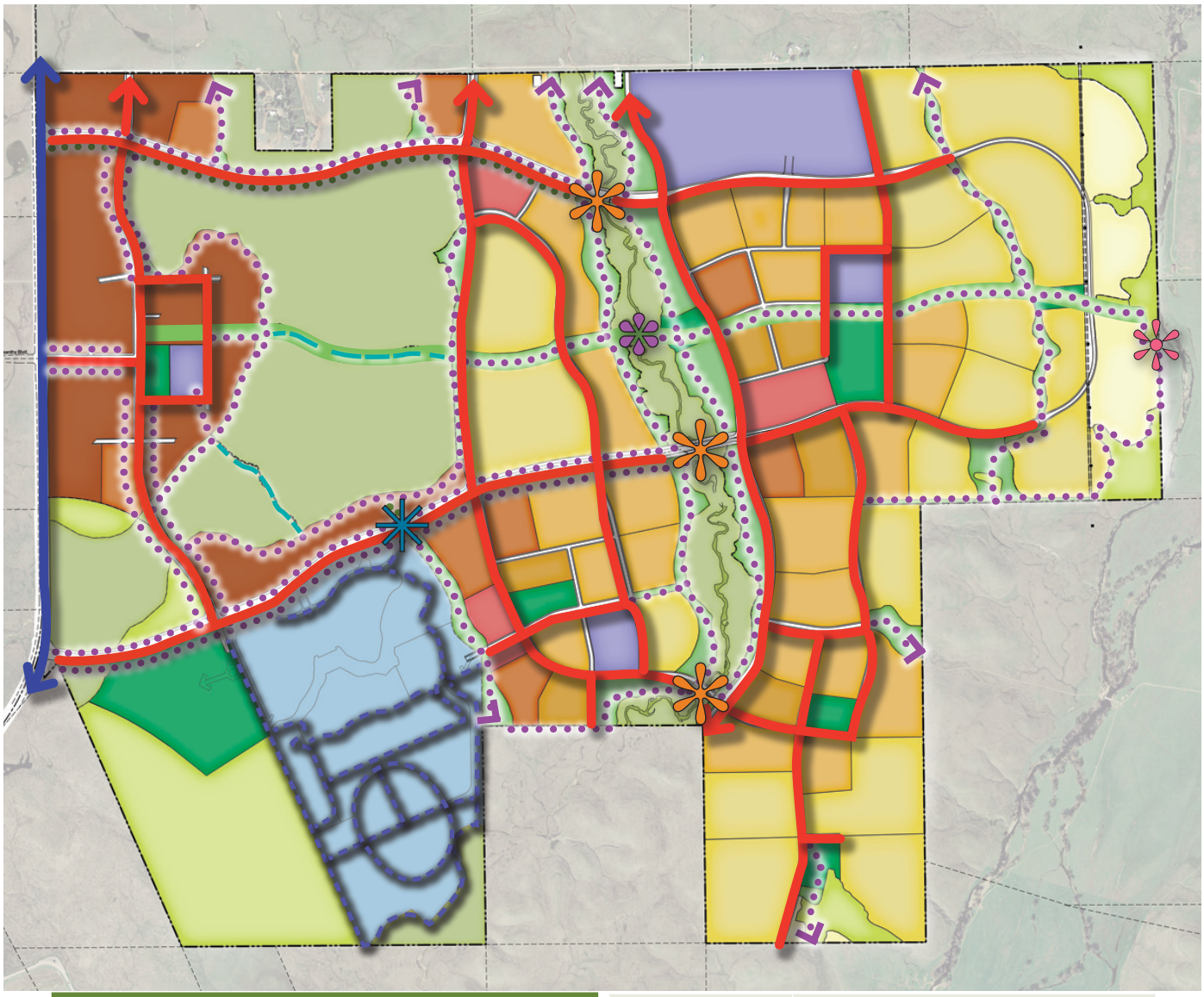
Cordova Hills is intended to have a high degree of connectivity. Connectivity is a measurement of the vehicular, pedestrian and bicycle connections and directness of the road or trail. A well-connected network will have many short links, numerous intersections and few dead-ends; the more intersections, the greater the connectivity. The connectivity index for Cordova Hills neighborhoods is 140 intersections per square mile except where topography precludes connections and in the Estate Village as provided in section 6.5.7 Connectivity of the Cordova Hills Master Plan. This criteria is based on USGBC's LEED for Neighborhood Development requirements. Figure 6: Connectivity Example provides the ideal image of a well-connected neighborhood.

Figure 6: Connectivity Example

Pedestrian and bike circulation is an important amenity at Cordova Hills and it is essential that the routes to destinations be safe, comfortable and convenient. The pedestrian and bike network is comprised of the following components:

- Bike lanes along major street network
- Formal sidewalks adjacent to all streets except ones located in the Estate Village
- Multi-use trails in non-formal landscaped open space. Typically these have a 10' paved section with 2' dg shoulders
- Multi-use trails along streets in formal landscaping areas. Typically these have a 10' paved section without shoulders
- Pedestrian/Bike Paseos in small open space corridors that connect the backbone multi-use trails and the neighborhoods
- A pedestrian bridge, a conceptual pedestrian underpass and three vehicular bridges with a trail underpass

The backbone pedestrian and bike trail network is illustrated in Figure 7: Trails Plan depicts these components except for the approximate 20 miles of paseos, whose location will be determined at the time of the small lot tentative maps.



Legend	
	Proposed Regional Trail (by others)
	Class II Bicycle Lane (On-Street) (Approx. 27.6 miles)
	Off Street 10' Multi-use Trails (Approximately 22.3 Miles)
	10' Multi-use Trails Through Main Avoided Area (On Grade) (Approx. .75 miles)
	University Trails (Approx. 4.8 miles)

	East/West Community Trail
	Pedestrian/Bicycle Bridge
	Pedestrian Underpass
	Potential Future Connection to Existing Off-Site Trails
	Vehicular Bridge with Trail Underpass

Figure 7: Trails Plan (Figure 6.10 of Cordova Hills Master Plan)

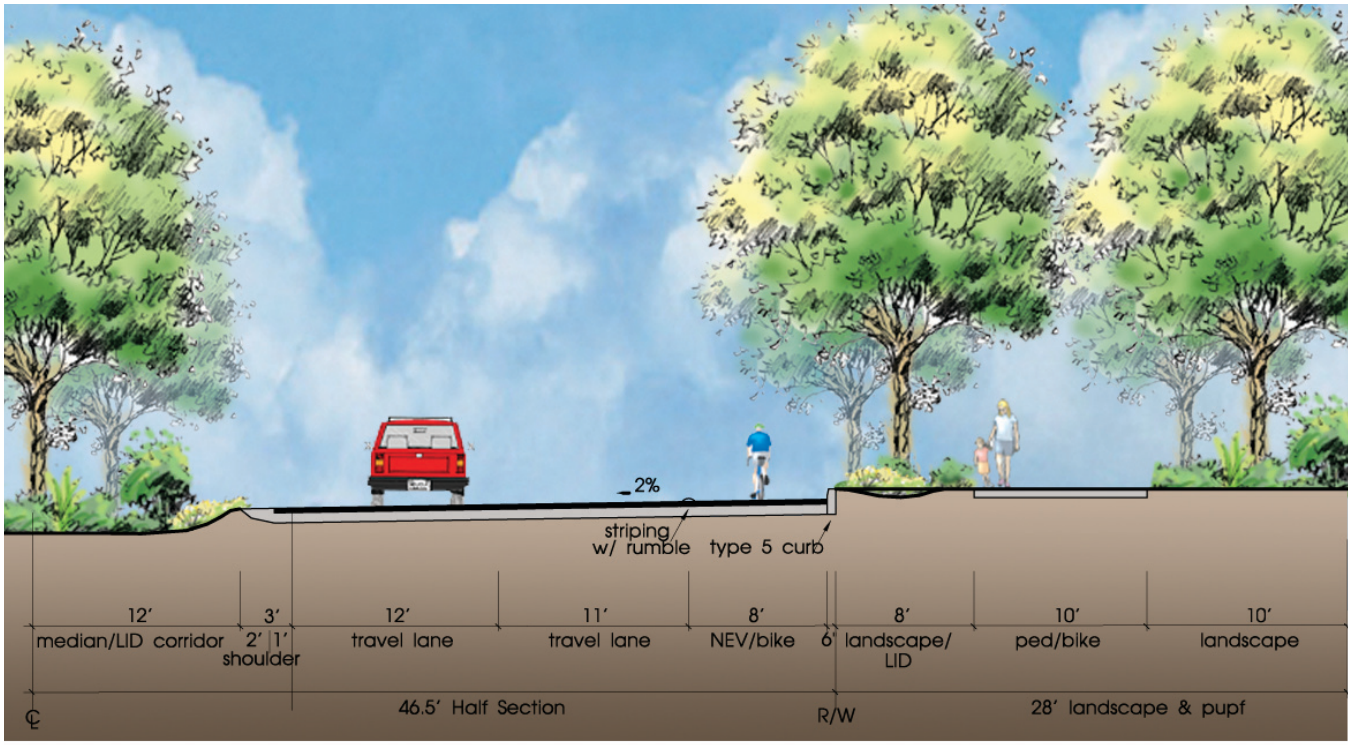
The community pedestrian and bike network will consist of formal sidewalks along streets in various widths and configurations, a Class I bike trail system, Class II bike, a pedestrian trail system in and adjacent to open space areas, and paseos integrated into residential neighborhoods. The edges of open space areas are directly accessible at the perimeter of the wetland avoidance areas.

The circulation system is designed to provide safe, convenient, and reasonably direct pedestrian routes from neighborhoods to the primary destinations within the community, including shopping and entertainment centers, schools, parks, and Village centers. By providing convenient alternatives to driving, it is intended that residents will opt for walking or bicycling rather than using a vehicle for a portion of their daily trips.

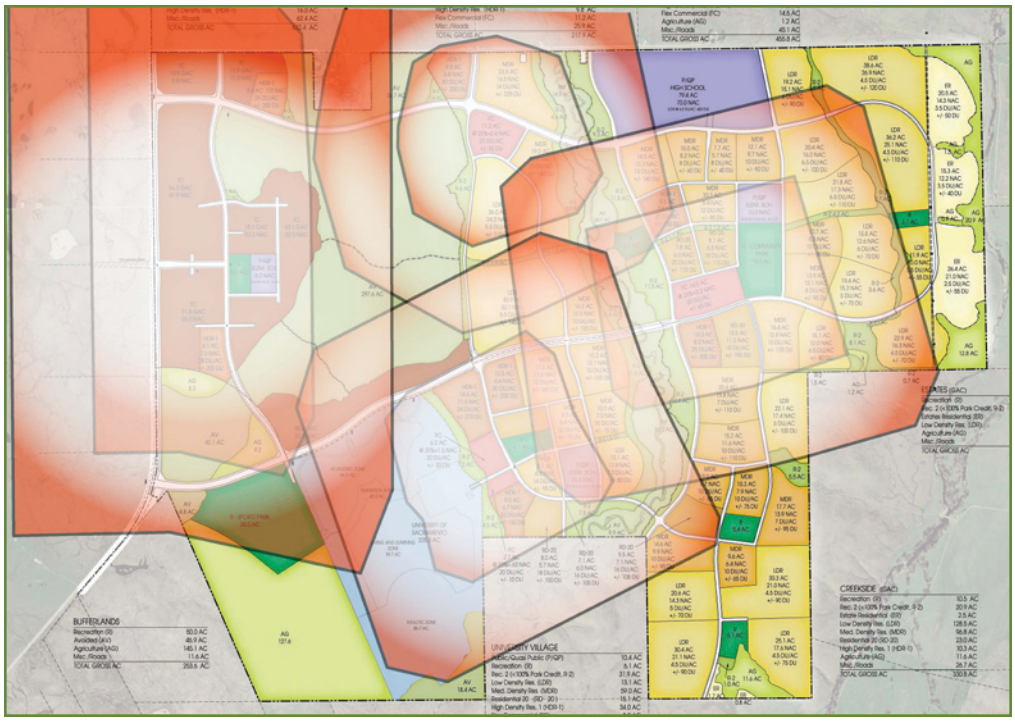
These primary destinations are located within 1/4-mile walking distance reducing the internal vehicular trips generated by the project. Figure 8a-d: Proximity to Retail/Entertainment, Transit, Parks and Open Space and Schools show the amenities with 1/4-mile walking distance.

Paseos include a variety of small pedestrian and bike trails not located adjacent to street that connect to parks, schools, and commercial areas. Paseos shall include pedestrian and bike trails at least 6 feet wide and hard-surfaced. Landscaping can be formal or informal and may include turf, planting areas, and trees.

Typically, community walls and fences will not be required along major streets. However, where a wall or fence is required along an arterial street, access through the wall will be provided by a pedestrian walkway connection between an interior street and the arterial street sidewalk.



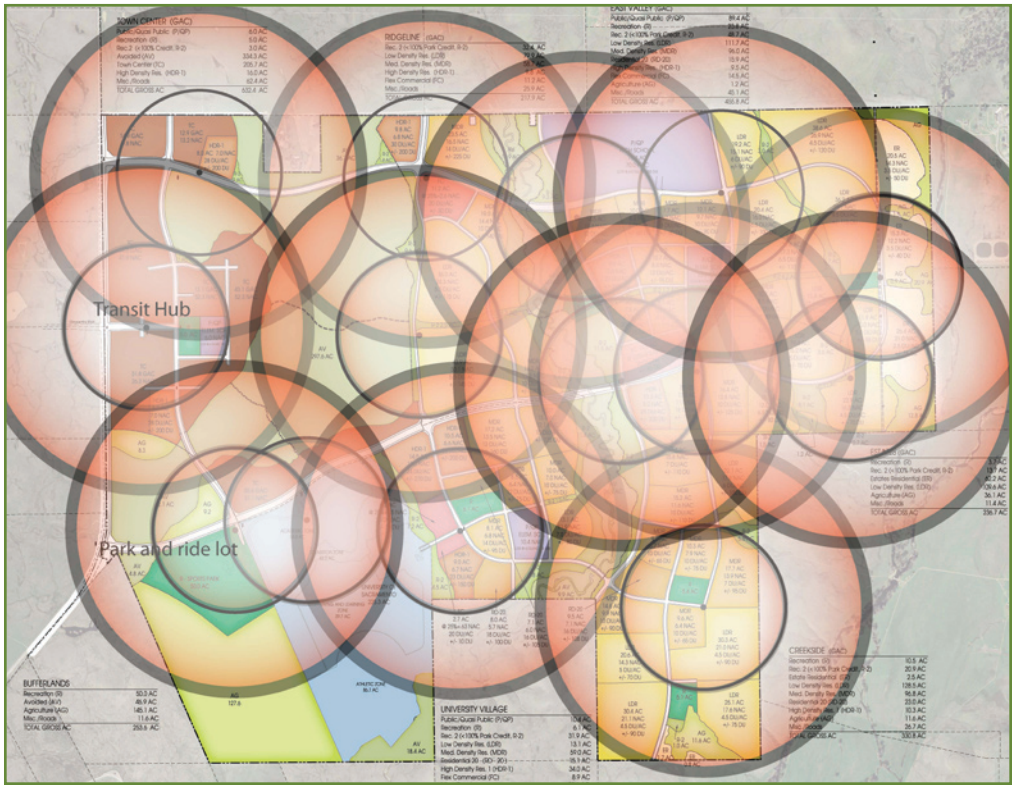
Typical pedestrian trail and bike cross section



AREAS WITHIN 1/4 MILE AND 1/2 MILE WALK TO RETAIL AND ENTERTAINMENT

NOTE: 84% OF HOMES ARE WITHIN A 1/2 MILE OF RETAIL AND ENTERTAINMENT

Figure 8a: Proximity to Retail / Entertainment (Figure 6.9a of the Cordova Hills Master Plan)_

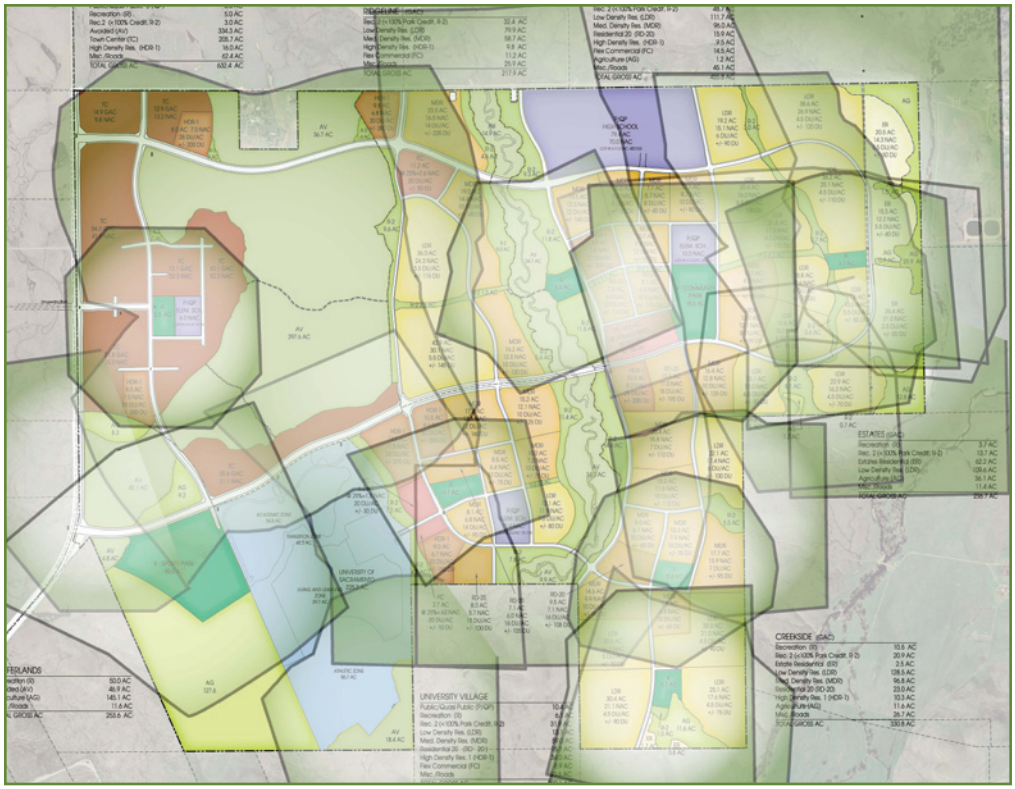


AREAS WITHIN 1/4 MILE AND 1/2 MILE WALK TO INTERNAL SHUTTLE ROUTE STOPS

*THESE CONCEPTUAL LOCATIONS WILL BE REFINE WITH DETAILED TRANSIT PLANNING

NOTE: 94% OF HOMES ARE WITHIN A 1/2 MILE OF THE INTERNAL TRANSIT ROUTE

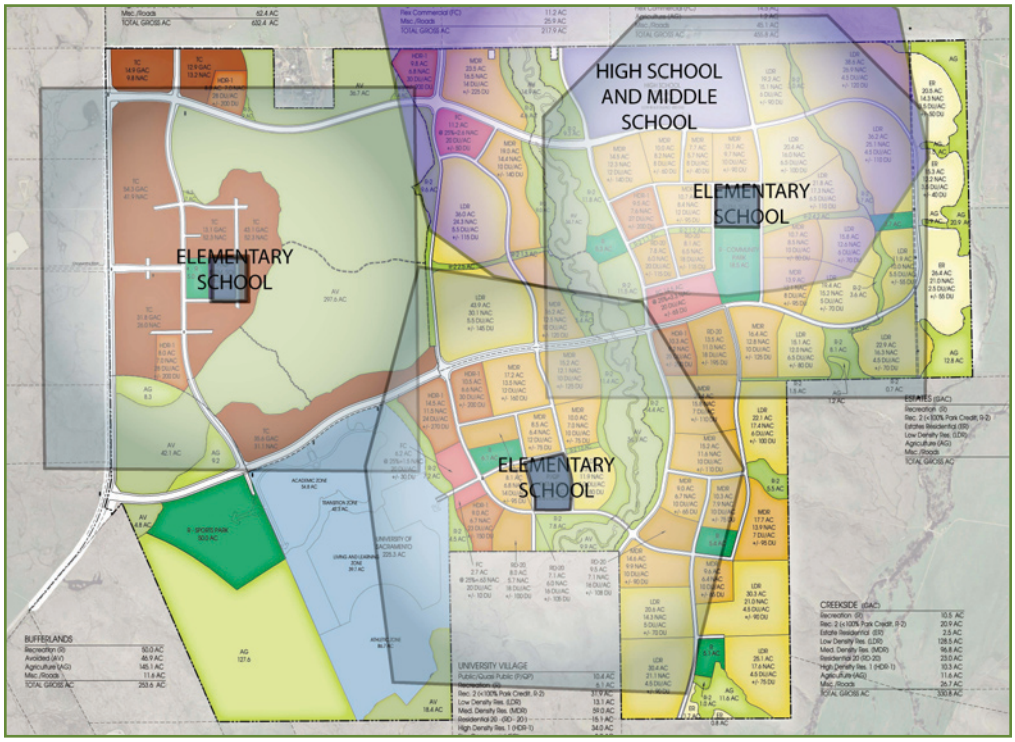
Figure 8b: Proximity to Transit (Figure 6.9b of the Cordova Hills Master Plan)



AREAS WITHIN 1/4 MILE WALK TO PARK, OPEN SPACE AND TRAILS

NOTE: 100% OF HOMES ARE WITHIN A 1/4 MILE OF PARKS, OPEN SPACE, AND TRAILS

Figure 8c: Proximity to Parks and Open Space (Figure 6.9c of the Cordova Hills Master Plan)



AREAS WITHIN 1/2 MILE WALK TO SCHOOL

NOTE: 87% OF HOMES ARE WITHIN A 1/2 MILE OF A SCHOOL

Figure 8d: Proximity to Schools (Figure 6.9d of the Cordova Hills Master Plan)

Access to sidewalks along an arterial or collector street from the interior neighborhoods will be provided at intervals of not less than approximately one thousand feet and at an average of eight hundred feet. Access will typically be provided at the intersection of a residential street with the collector.

At least 90% of all cul-de-sacs will include paseo connection to promote bicycle and pedestrian access except in the Village Estates and where topography prevents the connection.

All development will be designed to minimize barriers to pedestrian access and interconnectivity. Passages shall be provided through physical barriers such as walls, berms, landscaping and slopes between residential and non-residential uses that would impede bicycle or pedestrian circulation. All development will be required to connect to the planned bicycle routes.

Barriers to pedestrian access between neighborhoods shall be minimized. All community pedestrian paths and bikeways will connect to the commercial and mixed-use areas within Cordova Hills. In all cases, commercial uses shall provide a walkway from the adjacent parking area and from the bikeway to the primary façade of the main building.

Collector and residential streets will include traffic calming devices to slow traffic and discourage "cut-through," non-resident traffic in neighborhoods. Some of these measures provide shorter crossing distances at intersections, thereby enhancing the pedestrian experience and encouraging people to walk for many routine daily errands and recreation.

Traffic circles and roundabouts may be located at selected intersections of arterial, collector, and primary residential streets and may include multi-lane designs. Bulb-outs and lane width restrictions may be used at residential street intersections to slow traffic within neighborhoods. Other measures, such as speed bumps, humps and tables may also be used.

All traffic signals will allow future synchronization when traffic counts warrant. Traffic signalization can reduce vehicle emissions and fuel consumption. According to CACP, studies have shown that fuel use can be reduced by 8.6 percent due to synchronization.

Typical Traffic Circle

Typical Traffic Bulb

At least 75% of the streets (with the exception of alleys and streets within the Estate neighborhood because of topography and its rural nature) within the project have sidewalks on both sides. All sidewalks internal and adjacent to project site are minimum of five feet wide. At least 75% of all sidewalks feature vertical curbs unless they are adjacent to a bioswale or for minor residential neighborhood streets. Pedestrian facilities and improvements such as grade separation, wider sidewalks, and traffic calming are implemented wherever feasible to minimize pedestrian barriers. All site entrances provide pedestrian access. Facilities comply with the California Department of Transportation "Pedestrian and Bicycle Facilities in California" technical reference document.

The neighborhood streets may include rolled curbs that are more sustainable in that they use approximately 5% less concrete for the curb plus provide the option for bioswales along the street. Rolled curbs also allow additional reduction in the use of concrete for the thickness of the driveway apron where it crosses the curbs. Rolled curbs will reduce the number of driveways (approximately 10-15%) that will be demolished in developments that require a vertical curb to be constructed prior to driveway placement. Finally, the rolled curb is less prone to construction vehicle damage during home construction after the streets are constructed, since construction vehicles will often drive over the curbs.

Streetscape design will include unique, low impact development (LID) drainage features within the street section while incorporating low, dry-stacked boulder walls to support larger plant material.

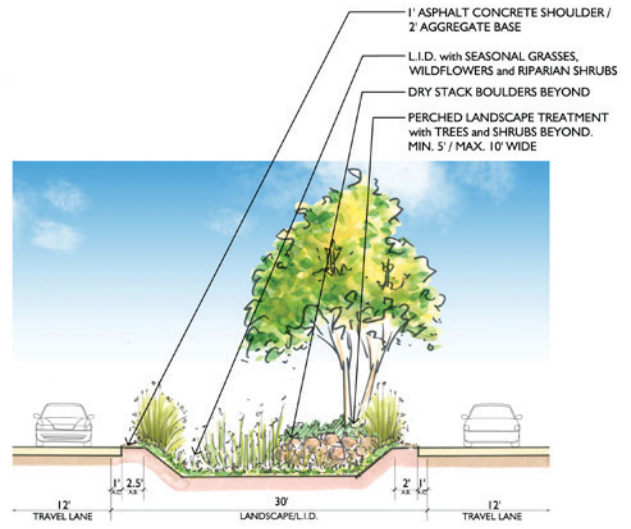
Parking lots shall be shaded to cover a percentage of the total parking area with tree canopies within 15 years or by other means as shown on Table 29: Parking Lot Shading.

Table 29: Parking Lot Shading

Parking Spaces Required	% of Total Parking
5-24 spaces	40% minimum
25-49 spaces	50% minimum
50+	60% minimum

Typical Rolled Curb

Typical Rolled Curb at a Bioswale



Typical LID streetscape

Transit System

A transit system (as required in Section 6.12 of the Cordova Hills Master Plan) will be provided that circulates Cordova Hills and feeds into Sacramento Regional Transit system. The Cordova Hills system would be operated by a service operator under contract with the CHCSD.

Internal Transit System

Initially, the internal services may include a range of rideshare initiatives, paratransit, alternative mode promotional activities and may involve only an external shuttle to the LRT station at Mather Field Road. As population increases and as travel becomes more concentrated within the Cordova Hills, local fixed route service will be implemented.

The internal transit systems service would consist of a loop route connecting the Town Center Village with the medium to high density residential development villages. Refer to Figure 9: Internal Transit Route. The route would begin at the planned transit center located on the north side of the future extension of Chrysanthy Boulevard. From Chrysanthy Boulevard, the route would continue south along Town Center Boulevard toward the park-and ride-lot and then head east onto University Boulevard running past high and medium density residential, then south into University Village, then head into Creekside Village, then head north where it would connect with North Access Loop, and finally back to the transit center. Buses would run in both directions on the loop. The distance of this route is approximately 6.1 miles. Bus/van stops along the route will be spaced at ¼ to ½

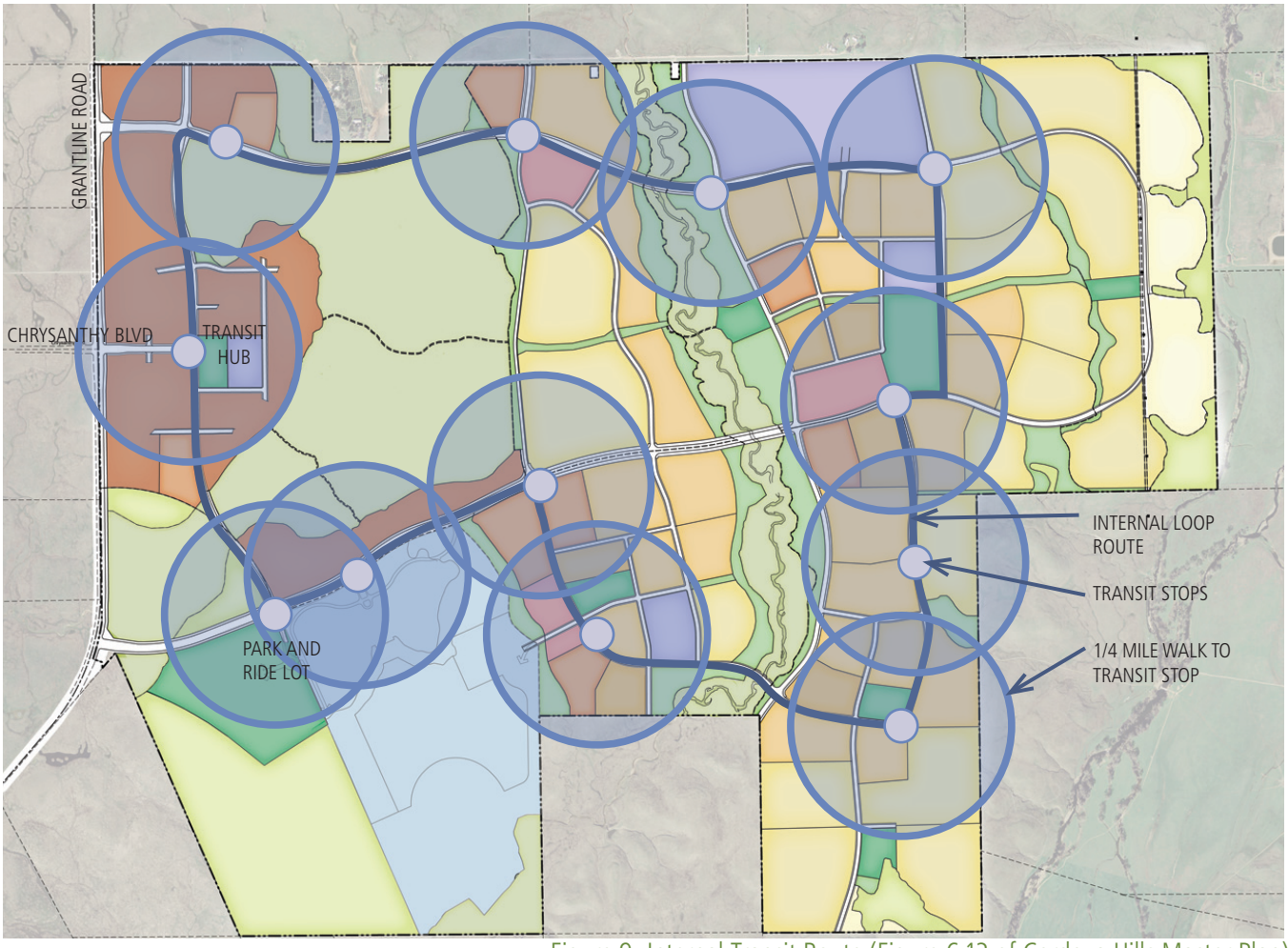


Figure 9: Internal Transit Route (Figure 6.13 of Cordova Hills Master Plan)

mile intervals and at all major cross streets. Each bus/van stop would have a covered shelter and benches.

The internal transit headways are proposed to be 15 minutes during peak hours and 30 minutes during all other times of the day. Walk access distances should not be much more than ¼ mile at maximum. Transfers should be minimized and the service will operate such that "timed transfers" are possible when they are necessary.

The operating characteristics for the internal route are shown in Table 30: Proposed Service and Operating Characteristics for the Internal Transit. Cycle time refers to the time needed for a bus or a van to complete a one-direction run on the loop. The assumed average run time is 10 mph including stops. Actual run times will depend on the number of passengers boarding and alighting at each stop. Planning time includes cycle time plus a buffer for breaks, etc. rounded up to the next headway. The planning time divided by the target headway and multiplied by the number of directions operated on the loop (two-way), gives the number of buses or vans required.

External Transit System

Initially, Cordova Hills will be located approximately 7 miles from the nearest fixed route, regularly scheduled transit service. An external transit service between the Cordova Hills Transit Center and the Mather Field Road Station on the Gold Line light rail line will provide a linkage between those services and Cordova Hills. As Rancho Cordova and the surrounding areas develop and transit service is extended out towards Cordova Hills, the need for transit will change and potentially diminish. The establishment of Grant Line Road as the Southeast Connector may bring high speed, high quality transit service literally to the front door step of the Cordova Hills community. The external transit operating characteristics are shown in Table 31: Proposed Service & Operating Characteristics for the External Transit.

Most customers that will be using this service will be peak period commuters. Therefore, during non-peak hours the headways could be up to 60 minutes. People using this service during non-peak hours are likely to be "lifeline" customers versus elective riders. The non-peak period headway could be reduced when there is more of a demand from local residents.

The service should deliver passengers directly to the major employer or the transit station where they will be transferring to other services. The off-site service should be scheduled so that "timed transfers" are possible at the major transit stations.

Table 30: Proposed Service & Operating Characteristics for the Internal Transit System

Hours of Operation	6 AM - 9 PM
Days of Operation	Everyday
Peak Frequency	15 minutes
Off Peak Frequency	30 minutes
Percent of Residents within ¼ Mile	75%
Average Speed (Including Stops)	10 miles per hour
Distance (miles)	6.1
Cycle time (Minutes)	37
Planning time (Minutes)	45
Target Headway (Minutes)	15
Vehicles Required	6
Dowling 2010	

Table 31: Proposed Service & Operating Characteristics for the External Transit System

Hours of Operation	6 AM - 7 PM
Days of Operation	Weekdays
Peak Frequency	15 minutes
Off Peak Frequency	60 minutes
Scheduling	Timed transfers with LRT & RT service at Mather Field Road Station
Average Speed (Including Stops)	30 miles per hour
Distance (miles)	17.3
Cycle time (Minutes)	35
Planning time (Minutes	45
Target Headway (Minutes)	15
Vehicles Required	3
Dowling 2010	

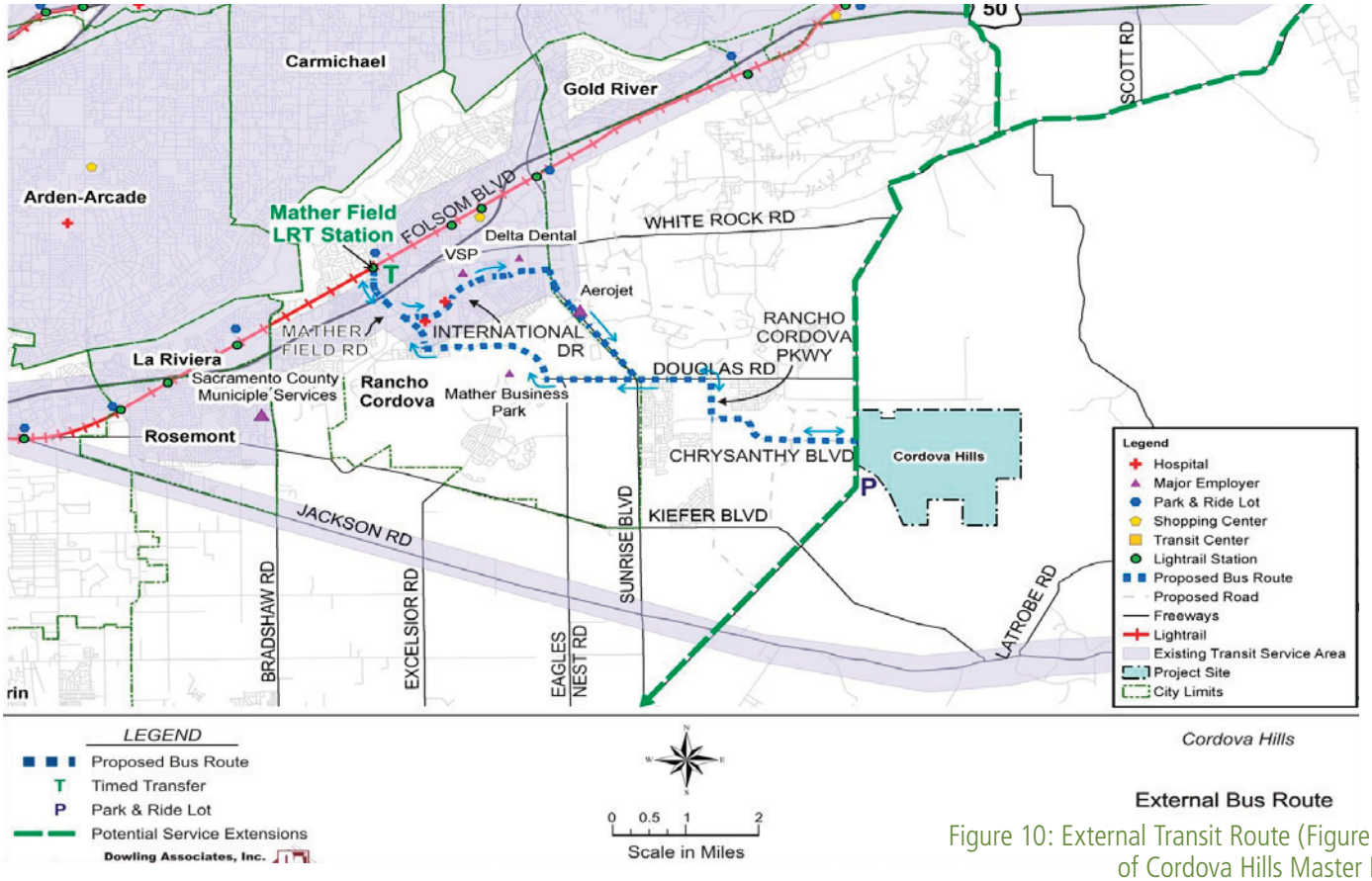


Figure 10: External Transit Route (Figure 6.14 of Cordova Hills Master Plan)

Speed is crucial for longer distance transit services such as recommended between Cordova Hills and the Mather Field Road LRT station. Thus it is recommended that a target speed for the service of 30 mph be set, including intermediate stops.

One route for external service is recommended and the service is designed for residents and employees of Cordova Hills. In general the bus route would take residents between Cordova Hills, major employment areas, and the Mather Field light rail station. The route would depart the planned transit center located on Chrysanthy Boulevard, head west on Chrysanthy Boulevard, north on Rancho Cordova Parkway, west on Douglas Road, northwest on Mather Boulevard, north on Whitehead Street where it becomes Mather Field Road, and final stop at the Mather Field light rail station. This would be a "timed transfer" such that the bus schedule would be in coordination with the Gold Line light rail schedule. On the return trip the route would continue from the Mather Field light rail station and head south on Mather Field Road, east on International Drive, south on Sunrise Boulevard, east on Douglas Road, south on Rancho Cordova Parkway, and then east on Chrysanthy Boulevard. The distance of this route is approximately 17.3 miles. Refer to Figure 10: External Transit Route.

This route would operate similar to a Bus Rapid Transit (BRT) route. There would be limited stops with approximately only three or four stops in addition to the stop at the Mather Field light rail station.

The assumed average run time of 30 mph includes stops. Actual run times will depend on the number of passengers boarding and alighting at each stop. Planning time includes cycle time plus a buffer for breaks, etc. rounded up to the next headway. The planning time divided by the target headway, gives the number of buses or vans required.

The external route ridership was based on the number of employees that would leave Cordova Hills for work. Based on the 2000 SACOG Household Travel Survey, there are 1.23 workers per household. Cordova Hills will have approximately 8,000 dwelling units which would equate to 9,840 workers within Cordova Hills. Based on our trip generation estimate, 78% of trips would be external trips. This would mean that approximately 78% or 7,700 workers would travel outside of Cordova Hills to work. The most recent journey to work data states that 3% of Sacramento County workers use transit to get to work. Also each day a worker would make two trips on transit; 1 trip from home to work and 1 trip from work to home. This would mean that the total daily transit trips are 460 trips.

Cordova Hills Community Service District (CHCSD)

Management of many of the amenities provided in Cordova Hills will be by a "Super District" or CHCSD. The CHCSD will require membership by all property owners and include property assessments and/or other special taxes. The type of amenities owned and managed by the CHCSD will include:

- Multi-use trails/paseos
- Sidewalks outside of ROWs
- Lighting in parks and along trails
- Transit stops, shelters and transit maintenance
- Ride-sharing facilities
- TMA services (see below)
- Open space management
- Neighborhood and linear parks
- Community pools
- Recreation programs
- Extension programs (gardening)
- Community gardens
- Farmer's markets
- Wildfire prevention management
- Community facilities management
- Streetscape maintenance
- Graffiti abatement

Transportation Management Association (TMA) Services

The CHCSD will include public-private partnerships of area businesses and the University to create an institutional framework for to provide TMA services. This will allow small employers to provide commute trip reductions services comparable to those offered by large companies. All commercial properties in Cordova Hills will be required to participate in the Cordova Hills TMA. The CHCSD may also participate in another geographically broader TMAs to reduce overall VMTs. The CHCSD will provide the following TMA services to the businesses:

- Commute Trip Reduction
- Commuter Financial Incentives
- Flextime Support
- Guaranteed Ride Home Services

The TMA services will also be provided to as the residents through the CHCSD These additional services for both residents and businesses may include:

- Marketing and promotion
- Parking management
- Rideshare matching and vanpool coordination
- Shared parking coordination
- Transit services
- Special event transport management
- Telework support
- Transit improvements
- Transportation access guides
- Wayfinding and multi-modal navigation tools

A big part of the TMA services to be provided is the promotion of the internal transit system and the

transit center that will be located on the north side of the future extension of Chrysanthy Boulevard. Promotion will consist of making residents, employees, students, and visitors to Cordova Hills aware of the transit services available at the transit center. This information may be provided through the CHCSD website, flyers distributed to employers and the University, mailers to residents, and kiosks located in the transit center, the University, and surrounding commercial center. There will be parking within the transit center that is co-located in the commercial area that is designed to be pedestrian friendly. The transit center will accommodate all modes of transportation such as public and private transit operators, bicyclists, and taxis, etc.

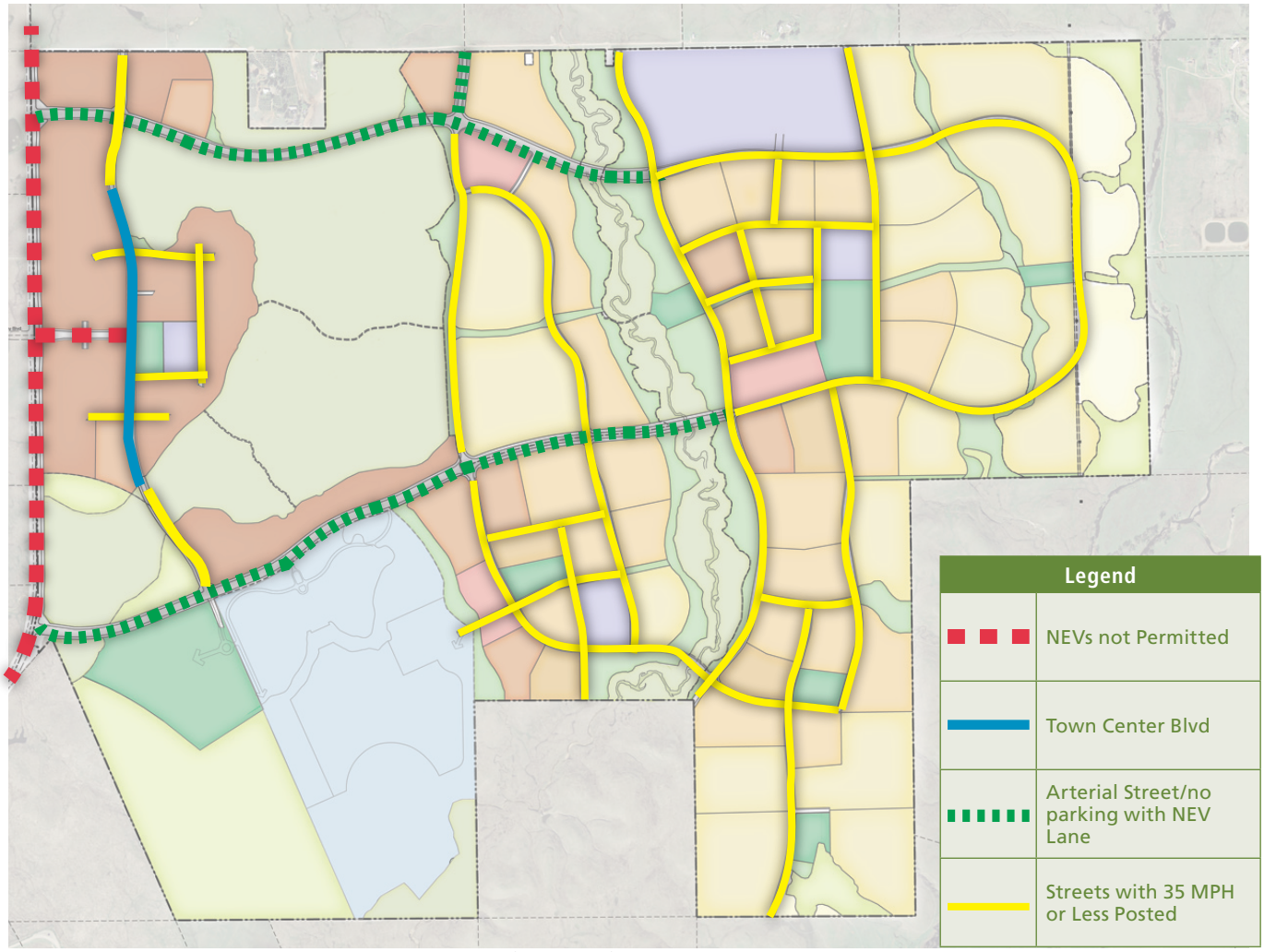
Neighborhood Electric Vehicles (NEVs)

As the cost of operating conventional automobiles continues to rise, Cordova Hills residents may seek alternative vehicles with lower operating costs. The alternative vehicles currently available are relatively slower and have less range than conventional automobiles. The alternative vehicles are compatible with cars on low speed residential streets, but would not be safe when mixed with higher speed or heavier traffic on collector or arterial roadways. The vehicles would, therefore, operate on streets posted at speeds of 35 mph or less or have a dedicated lane when speed limits are above 35 mph.

The local street system in Cordova Hills is designed to accommodate both NEV vehicles and conventional cars. Refer to Figure 11: Master NEV Routing Plan. The routes of local residential streets are relatively direct and provide good connectivity from residences to community facilities and commercial areas. Where residential or collector streets intersect with arterial streets, connectivity will be accommodated so that a NEVs can be driven from one neighborhood to another.

Research by the Green Car Institute has provided some useful information about NEV usage. The potential consumer market in California for NEVs is in the range of 12-18 percent of new light-duty vehicle purchases. 90% of NEV trips would otherwise be auto trips, with the remaining being walking (7%) and bicycle (3%) trips. Households with NEVs replaced 64.7% of their internal combustion engine vehicle trips with NEV trips. Averaging the user habits of all NEV users in California, the average trip length is about 0.48 miles and the average annual NEV mileage is about 1,258 miles/year.

NEV trips are internal trips that for various reasons (length, weather conditions, cargo needs, etc.) that would not be made via bicycle or pedestrian modes and would instead be made by auto. Short range trips equate with cold start engines that are the most significant factor in automobile generated air pollution and green house gas emissions. Therefore, substantial reductions in short range trips have a disproportionate benefit on air pollution. Any trips made by NEVs within Cordova Hills will reduce the total number of vehicle miles traveled generated in the community. However, because the length of trips within the community would be relatively short, the total vehicle miles traveled would be proportionately less.



NOTE: NEV'S ARE IS ALLOWED ON ALL MINOR RESIDENTIAL STREETS (NOT SHOWN)

Figure 11: Master NEV Routing Plan (Figure 6.7 of Cordova Hills Master Plan)

Using the Green Car Institute research results, if 15% of the households in Cordova Hills have NEVs there would be a total of 1,200 NEVs within the project. With an assumed average annual mileage of 1,200 miles/NEV, the total reduction in automobile vehicle miles travelled due to NEVs would be about 1,440,000 VMT annually, or 5,760 VMT per day (assuming use for 250 days annually).

Electric Vehicles

According to the December 2000 CEC Commission Report titled California Energy Demand 2010-2020 Adopted Forecast, the use of light duty electric vehicles will increase. Refer to Table 32: Projected Electric Vehicles in SMUD's Territory.

It is assumed that 75% of recharging would take place during off-peak hours (10 p.m. – 6 a.m.) having little impact on peak loads. This change in future vehicle types will reduce the impact of GHG emissions from VMTs generated by the project. To support the use of electric vehicles, each garage will be provided with a 240V outlet that can be accessed either in or outside the garage for charging. A 240V outlet will take approximately 8 hours to recharge the vehicle.

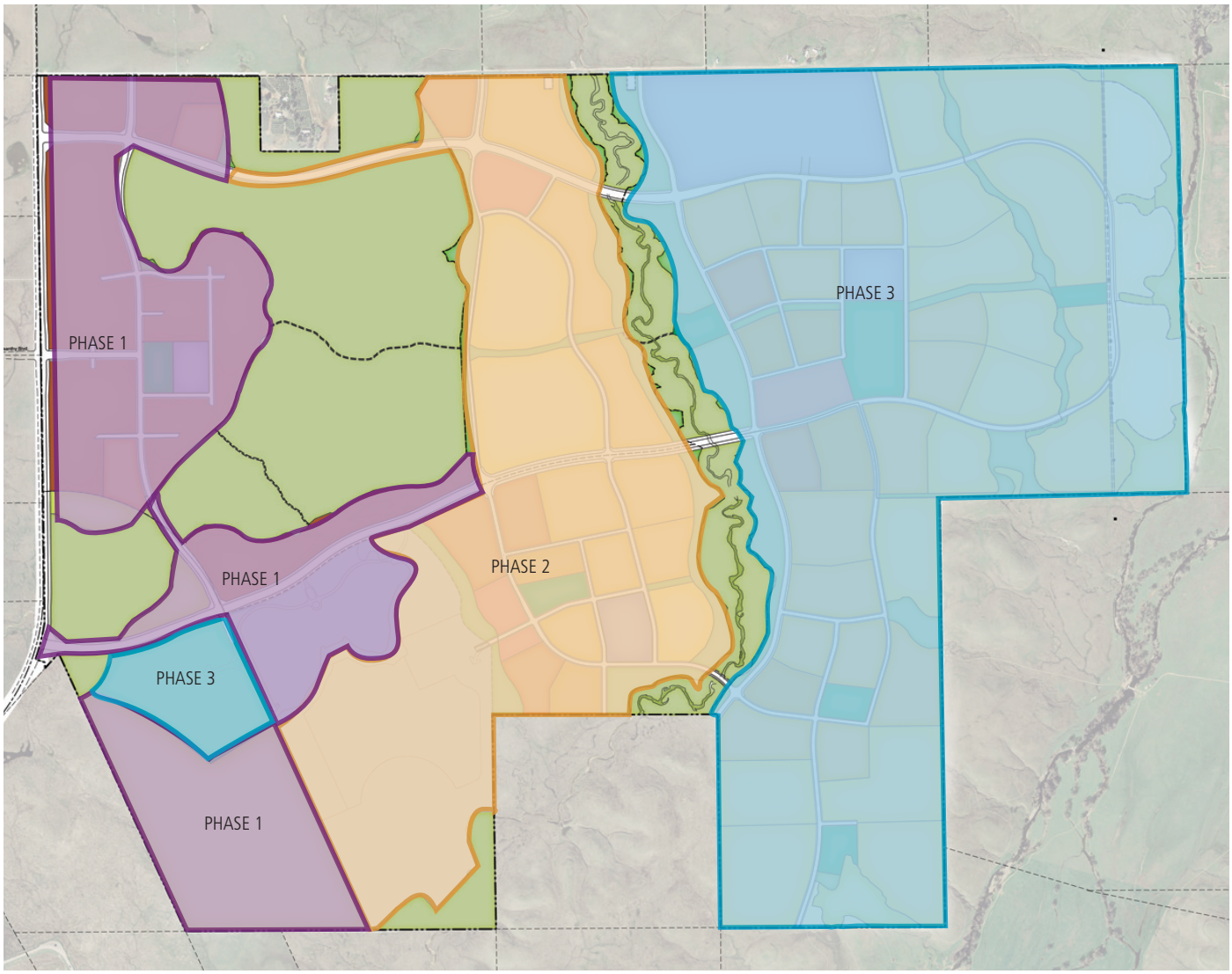


Figure 12: Phasing Plan (Figure 9.1 of Cordova Hills Master Plan)

Table 32: Projected Electric Vehicles in SMUD's Territory[1]

Year	No. Vehicles
2009	89
2012	3,993
2015	23,596
2018	43,145
2030	56,111

[1] California Energy Demand 2010-2020 Adopted Forecast

PHASING

Phasing and construction of Cordova Hills is anticipated to begin along Grant Line Road along with the University of Sacramento. The project will then build-out in an easterly direction as shown on Figure 12, Phasing Plan. However, market conditions and infrastructure phasing may dictate alternative build-out scenarios. For traffic modeling purposes, Sacramento County is assuming a 30-year buildout. Therefore the assumptions that have been made related to VMTs are very conservative.

GREENHOUSE GAS PLAN

The University is also anticipated to have a 30-year build-out. The initial phase would include construction of the Welcome Center, Student Union and Recreation Center, Administration Center, General Academic Buildings, and Arts and Sciences Building. Phase Two would add Professional Program buildings, including Arts and Sciences, Performing Arts, Chapel, and housing. Phase Three would include additional Professional Program Buildings, including the Main Lecture Hall, Arts and Sciences, Executive Training Center and Physical Plant and additional Housing.

The final phase would include new construction of Medial/Nursing, Engineering, Business Education and Law Buildings and Housing.

Table 33: University Final Phase Built Area by Use Type provides a breakdown of gross built area for Phase 1, and the final phase, and an option for a sub-phase to include Athletic/Recreation, Faculties and Library Buildings.

Table 33: University Final-Built Area by Use Type

Phase Final- Built Area			
	PROGRAM	GROSS AREA	
PHASE ONE	General Academic	54,000	gross sf
	Administration & Support	20,000	gross sf
	Cafeteria & Student Union	60,000	gross sf
	Undergraduate Housing	111,000	gross sf
	SUBTOTAL	***245,000***	***gross sf***
OPTION	Welcome Center	23,000	gross sf
	Campus Hotel	56,000	gross sf
	Academic & P1 Library	20,000	gross sf
	SUBTOTAL	***99,000***	***gross sf***
PHASE FINAL	Theater & Arts		
	Main Chapel		
	Athletic/Recreation		
	Library		
	College of Business		
	College of Engineering		
	College of Law		
	Main Lecture Hall		
	College of Education		
	College of Arts & Sciences		
	College of Medicine & Nursing		
	Facilities & Maintenance		
	Main Cafeteria		
	Student Union Center		
	Undergraduate Housing		
	Graduate Housing		
	Faculty & Staff Housing		
	Stadium		
	On-Campus Retail, Lodging, Conference Center		
	SUBTOTAL	***1,526,000***	***gross sf***
	TOTAL	**1,870,000**	**gross sf**

Appendix

ADDITIONAL GHG REDUCTION STRATEGIES

This section includes a number of additional measures to reduce GHGs for Cordova Hills. They have been organized by type of measure. The first group of measures in each category came from SMAQMD's *Recommended Guidance for Land Use Emission Reductions* (version 2.5 updated on January 12, 2010). The proposed SMAQMD measures utilizes the SMAQMD numbering system for ease of implementation. The majority of the SMAQMD measures have been quantified and correlated with the Traffic Study. The Office of the Attorney General (OAG) developed the second group of measures which were included in the *Cordova Hills Air Quality Impact Report* approved by SMAQMD.

These measures utilize SMAQMD's method of calculating a project's total GHG impacts and demonstrate that the project will be at or below the County threshold standards. Point values have been identified for each measure that will reduce the projected GHG emissions by the same percentage value as the point. The point values from the transportation related reduction measures have been adjusted to reflect the percentage of VMTs associated with the particular land use the measure applies to. For example, a measure that only applies to commercial/industrial uses will be multiplied by 30.29% because 30.29% of the VMTs are from the commercial/Industrial uses; measures only related to the University will be multiplied by 11.18% because 11.18% of the VMTs are from the University uses. Refer to Table 16: Project Daily Vehicle Trip Rates and Daily VMT Rates on page 25.

This method of calculating the GHG reductions leads to a 22.45% reduction (generally related to transportation impacts) compared to the 15.9% reduction utilizing CAPCOA's method of calculating GHG reductions.

The GHG reduction strategies have organized in the following tables on the next several pages:

- Table A-1: Bicycle/Pedestrian/Transit Measures
- Table A-2: Parking Measures
- Table A-3: Site Design/Mixed-Use Measures
- Table A-4: Building Component Measures
- Table A-5: Miscellaneous Measures

Table A-1: Bicycle/Pedestrian/Transit Measures

Measure #	Title	Use	Description	Mitigation Points
SMAQMD 1	Bike parking	C,M	Each non-residential project shall provide short-term facilities @ 1 bike rack space/20 vehicle spaces within 50' of primary entrances, and long-term facilities to include one of the following: a bicycle locker, a locked room with facilities with access limited to bicyclists, or a rack in location that is staffed or monitored by video surveillance during operating hours.	*Scaled nonresidential* 0.363
SMAQMD 4	Proximity to bike path/bike lanes	R,C,M	The entire project is located within 1/2 mile of Class I or Class II bike lanes or pedestrian trails. The facilities will be developed as part of a phased project. See Figure 7: Trails Plan on page 47.	0.625
SMAQMD 5	Pedestrian network	R,C,M	The Circulation Section of the SPA designates the street cross sections that require and locate the pedestrian sidewalks and trails. Trails will connect with planned external streets. The project entails over 55.4 miles of pedestrian/bicycle trails connecting the community. See Figure 7: Trails Plan on page 47. In addition, there are approximately 20 miles of paseos that will be determined at the time of small lot tentative maps.	*Scaled at least 75% of streets meet requirements* 0.75
SMAQMD 6	Pedestrian barriers minimized	R,C,M	The SPA requires that pedestrian barriers be minimized for each project. See Figure 7: Trails Plan on page 47 and Figures 8a through 8d Proximity maps on pages 49 and 50.	1.0
SMAQMD 9	Traffic calming	R,C,M	All sidewalks are 5' wide, skewed intersections have been avoided, intersections include one of the following: marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, raised intersections, median islands, tight corner radii, roundabouts or mini-circles. Streets feature on-street parking, planter strips with street trees, chicanes/chokers. Rolled curbs will used to allow implementation of LID strategies and in residential neighborhoods.	0.5
SMAQMD 33	Transportation Management Association (TMA) membership	R,C,M	A permanent TMA membership and funding to be provided by Community Facilities District or County Service District or other non-revocable funding mechanism. The TMA will include both commercial and residential properties. Refer to page 56 for more information.	5.0
SMAQMD 99 (OAG 43)	Transit System	R,C,M	Provide a community transit service to public transit. Headways are proposed to be 15 minutes during peak hours and 30 minutes during all other times of the day. 94% of all homes will be within 1/2 mile of a transit stop (see Figure 8b: Proximity to Transit). Transfers would be minimized and the service would operate such that "timed transfers" are possible when they are necessary. Refer to pages 53-56 for detailed description of the Transit System.	0.7
SMAQMD 99 (OAG 42)	Transportation Center	R,C,M	Build or fund a transportation center where various public transportation modes intersect in the Town Center and provide a Park and ride facility in the Buffer Area.	0.88
Total Bicycle/ Pedestrian/ Transit Measures				2.9

Table A-2: Parking Measures

Measure #	Title	Use	Description	Mitigation Points
SMAQMD 12	Parking reduction beyond code	R,C,M	The University will prohibit freshman students from keeping cars on campus. Housing in University Village will require students walk to the campus. Parking for employees will be time restricted. Trip reductions shall be computed in the same manner as above. Maximum achievable trip reduction is 12%. See page 42 for more information	*Scaled University only* 1.34
SMAQMD 13	Pedestrian pathway through parking	R,C,M	Each development will provide a parking lot design that includes clearly marked and shaded pedestrian trailways between transit facilities and building entrances as required in Section 6.11.2.2 of the Master Plan. See page 51.	*Scaled nonresidential* 0.249
SMAQMD 99	Shared Parking Strategy	M	The plan limits parking for all new development to no more than minimum required by code. Up to 50% of all parking generated may be accommodated through a shared parking strategy.	*Scaled nonresidential* 1.34
SMAQMD 99	Shared Vehicle Program	M	Provide up to 30 shared vehicles (ZipCars) located on the University Campus to reduce parking requirements for up to 450 vehicles. See page 42 for more information.	*Scaled nonresidential* 1.34
Total Parking Measures				2.93

Table A-3: Site Design Measures

Measure #	Title	Use	Description	Mitigation Points
SMAQMD 17	Orientation toward planned transit, bikeway, or pedestrian corridor	R,C,M	Setback distance between project and existing or planned uses; between project building and planned or existing sidewalks are minimized. Buildings are oriented towards existing or planned street frontage. Primary entrances to building are located along planned or existing public street frontage. Project provides bicycle access to all planned bicycle corridors. See Figure 7: Trails Plan on page 47 and Table A-6: Comparison Between Cordova Hills Standards and the Sacramento County Code in the Appendix.	0.25
SMAQMD 18	Residential density	R	The overall net density of Cordova Hills is 10.4 units/acre.	*Scaled residential* 0.42
SMAQMD 20	Neighborhood electric vehicle access	R,C,M	NEVs are permitted on all streets with speed limits <35 mph. If speed limits are >35 mph then there will be a dedicated lane. Allowing NEVs on all streets within Cordova Hills will be required in the SPA/ ordinance.	1.5
SMAQMD 23	Suburban mixed-use	R,C,M	Have at least three of the following on site and/or off-site within ¼ mile: Residential Development, Retail Development, Park, Open Space, or Office	3.0
Total Site Design Measures				5.25

Table A-4: Building Component Measures

Measure #	Title	Use	Description	Mitigation Points
SMAQMD 28	On-site renewable energy system	R,C,M	Project provides at least 20% of the residential electricity usage from renewable energy system(s)	2.0
SMAQMD 99	Exceed title 24	R,C,M	Project exceeds the currently adopted Title 24 requirements by 20% and Use Energy Efficient Appliances	1.0
Total Building Component Measures				3.0
Note these measures were included in the residential base calculations and included here for comparison with the AQMP				

Table A-5: Miscellaneous Measures

Measure #	Title	Use	Description	Mitigation Points
SMAQMD 99	LEDs	R,C,M	Install light emitting diodes (LEDs) for traffic, street, and other outdoor lighting. Provide traffic lights, street lights and water and wastewater pumps to achieve a 15% annual energy reduction below an estimated baseline energy use for this infrastructure.	1.0
SMAQMD 99	Limit Outdoor Lighting	R,C,M	Limit the hours of operation of privately owned outdoor lighting by the following: 50% of the external luminaires must have fixture-integrated lighting controls that use motion sensors to reduce light levels by at least 50% after 15 minutes, and all shared areas have automatic controls that turn off exterior lighting not required, and define light zones with specific uplight and light trespass requirements.	0.5
Total Building Component Measures				1.5
Grand Total				22.45

GLOSSARY

(From *California Climate Action Registry General Reporting Protocol* Version 3.1 January 2009)

CACP – Clean Air and Climate Protection Software

CACP is a software program that calculates and tracks emissions and reductions of GHG developed by ICLEI.

CCAP - Center for Clean Air Policy

An independent, nonprofit think tank for climate and air quality policy at the local, U.S. national and international levels. Headquartered in Washington, D.C., CCAP helps policy-makers around the world develop, promote, and implement innovative, market-based solutions to major climate, air quality, and energy problems that balance both environmental and economic interests.

CCAR – California Climate Action Registry

The CCAR is a program of the Climate Action Reserve and serves as a voluntary GHG registry to protect and promote early actions to reduce GHG emissions by organizations. The CCAR provides leadership on climate change by developing and promoting credible, accurate, and consistent GHG reporting standards and tools for organizations to measure, monitor, third-party verify, and reduce their GHG emissions consistently across industry sectors and geographical borders.

CH_4 - Methane

One of the three primary GHGs, consisting of a single carbon atom and four hydrogen atoms, possessing a GWP of 21, and produced through the anaerobic decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

CO_2 - Carbon Dioxide

The most common of the three primary GHGs, consisting of a single carbon atom and two oxygen atoms, and providing the reference point for the GWP of other gases. (Thus, the GWP of CO_2 is equal to one.)

CO_2e - CO_2 equivalent

A measure for comparing carbon dioxide with other GHGs, which generally have a higher global warming potential (GWP), based on the amount of those other gases multiplied by the appropriate GWP factor. CO_2e is calculated by multiplying the MT of gas by the appropriate GWP.

EMFAC 2007

A emission modeling tool for the quantification of GHGs from on-road sources (vehicles).

GHGs - Greenhouse Gases

GHGs are the three gases measured for this report, carbon dioxide (CO_2), nitrous oxide (N_2O) and methane (CH_4).

GWP – Global Warming Potential

A measure of how much a given mass of a GHG is estimated to contribute to global warming. It is a relative scale that compares the gas to the same mass of CO_2 whose GWP is 1. THE GWP depends on the following factors:

- The absorption of infrared radiation
- The spectral location of its absorbing wavelengths
- The atmospheric lifetime

ICLEI - Local Governments for Sustainability

ICLEI is an international association founded in 1990 consisting of national, regional, and local government organizations that have made a commitment to sustainable development. Over 1107 cities, towns, counties, and their associations worldwide are members of ICLEI. ICLEI provides technical consulting, training, and information services to its members.

Metric Ton (MT)

Common international measurement for the quantity of GHG emissions, equivalent to about 2,204.6 pounds or 1.1 short tons.

N_2O – Nitrous Oxide

One of the three primary GHGs, consisting of two nitrogen atoms and a single oxygen atom, possessing a GWP of 310, and typically generated as a result of soil cultivation practices, particularly the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning.

Short Ton

A short ton is a common measurement in the U.S. and equivalent to 2,000 pounds or about 0.907 MT.

URBEMIS Model

A software model designed to estimate air emissions from land use development projects.

ZipCars

A self-service, on-demand car sharing program, reducing the need for ownership of a car

CODE COMPARISON

Table A-6: Comparison Between Cordova Hills Standards and the Sacramento County Code

Use Type	Single Family					Multi-family			Non-Residential					
	County Code	CH	CH	CH	CH	County Code	CH	CH	County Code				CH	CH
Minimum requirements in feet unless stated otherwise	SF	ER	LDR	MDR	RD-20	MF	HDR	TC	Businesses in R-zones	BP	CO	SC, LC, GC, AC and TC	Town Center	Village Commercial
Lot Area	n/a	5,000	4,000	2,800	2,400	na/	n/a	n/a	6,000	n/a	n/a	n/a	n/a	n/a
Lot Width	n/a	50	45	45	25		n/a	n/a	60	60	60	no min	no min	no min
Lot Depth	n/a	100	90	80	65		n/a	n/a	100	n/a	n/	n/a	n/	n/a
Front Yard Setback	24	25	20	18	18	31	n/a	n/a	31	31	56	56	0	10
Front Yard Setback to Garage Door	30	25	20	18	18		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Side Yard Setback (One side)	5, > 3 story -15	5	5	5	5	31, may allow 20	5	0	20	n/a	n/a	n/a	n/a	n/a
Side Yard Setback Adjacent to Residential	n/a	n/a	n/a	n/a	n/a	greater than 1 story, 100 feet	n/a			20	25	25	n/a	n/a
Side Yard Setback Adjacent to Street	12.5	10	10	5	5		10	10		31	56	56	0	10
Side Yard Setback (Both Sides Together)	10	10	10	10	10		10	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Rear Yard Setback	lots>125 - 25 lots< 125 - 20% of depth and at least 15	20	20	12	12		12	0	25	n/a	n/a	n/a	0	0
Rear Yard Setback Adjacent to Residential	n/a	n/a	n/a	n/a	n/a		na/	n/a		25	25	25	n/a	n/a
Buildilng Separation						1-story - 10 2-story - 15 3-story - 20							per UBC	per UBC
Open Space	n/a					25%							n/a	n/a
Maximum Building Height Adjacent to Residential	n/a	n/a	n/a	n/a	n/a		n/a	n/a		24, may allow 40	24, may allow 40	24, may allow 40	n/a	n/a
Maximum Building Height	30 - 2 stories may be increased to 40 2.5-3 stories	2 stories or 35’	2 stories or 35’	2 stories or 35’	2 stories or 35’	40 - 3 stories	3 stories or 36’	5 stories	24 -1 story; may allow 40				5 stories	5 stories
Maximum # of Attached Dwellings adj to residential	n/a					8								

APPENDIX H

SHPO Concurrence Letter

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
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October 2011, 2012 In Reply Refer To: COE120703A

Lisa M. Gibson
Senior Project Manager, California Delta Branch
Department of the Army
U.S. Army Engineer District, Sacramento
1325 J Street
Sacramento, CA 95814

Re: Section 106 Consultation for Cordova Hills Project

Dear Ms. Gibson:

Pursuant to 36 CFR Part 800 (as amended 8-05-04) regulations implementing Section 106 of the National Historic Preservation Act, the Army Corps of Engineers (COE), is seeking my comments on its determination of the Area of Potential Effects (APE), historic property identification efforts, determination of eligibility for National Register of Historic Places (NRHP), and finding of effects that the proposed undertaking will have on historic properties.

The proposed project will issue to Cordova Hills Ownership Group (Applicant) a Section 404 of the Clean Water Act Permit allowing development of a large-scale, mixed-use, planned community on 2,688 acres in Sacramento County. Construction activities associated with project implementation would consist of grading, installation of utilities, paving, and construction of structures, and related infrastructure throughout the project. The horizontal APE consists of the entire 2,688 acre project area; the depth of the vertical APE will extend to no further than about ten feet below the natural ground surface to allow for installation of utilities and infrastructure and the construction of buildings.

A sacred land file search was completed by the Native American Heritage Commission (NAHC); no sacred lands were identified. Further consultation with local Native American Tribal members identified no concerns regarding the project.

The following documents were submitted as evidence of your efforts to identify historic properties in the project Area of Potential Effects (APE):

- *Cultural Resources Survey Report Cordova Hills (ECORP Consulting, September, 2007).*
- *Cultural Resources Survey Report Solitu Property (ECORP Consulting, November, 2007).*
- *Cultural Resources Survey Report Grant Line Mesa (ECORP Consulting, May, 2008).*
- *Cultural Resources Survey Report Cordova Hills (ECORP Consulting, 2007).*

A total of five cultural resources were identified within the APE by records search and pedestrian survey. The following sites were evaluated and determined to be ineligible for listing on the NRHP: CA-SAC-334, CA-SAC-1032H, CA-SAC-1033H, CA-SAC-1034H, and CA-SAC-1045H.

After reviewing your letter and supporting documentation, I have the following comments:

1. Pursuant to 36 CFR Part 800.4(c)(1), I agree with your determination that the following sites: CA-SAC-334, CA-SAC-1032H, CA-SAC-1033H, CA-SAC-1034H, and CA-SAC-1045H do not meet the criteria for listing on the NRHP.

2. Due to the possibility of unanticipated discovery during this project, I recommend an archaeological monitor be present during all ground disturbing activities.

3. I concur that there will be no historic properties affected by this undertaking, pursuant to 36 CFR 800.4(d).

Be advised that under certain circumstances, such as unanticipated discovery or a change in project description, the COE may have additional future responsibilities for this undertaking under 36 CFR Part 800. Thank you for seeking my comments and for considering historic properties in planning your project. If you require further information, please contact Brendon Greenaway of my staff at phone 916-445-7036 or email bgreenaway@parks.ca.gov.

Sincerely,

Susan K Stratton for

Jenan Saunders
Acting State Historic Preservation Officer