San Bernardino Valley Audubon Society

VIA Email and USPS

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Community and Economic Development Department
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April 5, 2013

Re: Comments on the Draft Environmental Impact Report for the World Logistics Center Project, State Clearinghouse No. 2012021045

Dear Mr. Gross,

These comments are submitted on behalf of the Center for Biological Diversity, and San Bernardino Valley Audubon Society (collectively "Conservation Groups") on the World Logistics Center Project ("Project"), located south of Interstate 60 on the eastern edge of Moreno Valley. The Project would be the largest master-planned warehouse development in U.S. history, totaling approximately 41.6 million square feet on 2,710 acres. The Project would result in significant impacts to air quality contributing tons of criteria pollutants into an area currently designated as non-attainment under the Clean Air Act, poses a significant impact to climate change, and threatens the adjacent San Jacinto Wildlife Area.

The Environmental Impact Report ("EIR") fails to adequately describe the Project and the environmental setting, including the creation of a fictional "CDFW Conservation Buffer Area", which effectively removes over 1000 acres from the San Jacinto Wildlife Area ("SJWA") and core reserve lands under the Western Riverside County Multiple Species Habitat Conservation Plan ("MSHCP"). The EIR also fails to analyze a range of environmental impacts, mitigation measures, and alternatives. At a minimum, the EIR must be revised and recirculated to remedy these deficiencies. However, because of the permanent and irreconcilable conflicts with public health and environmental protection the project should be denied.

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The Center for Biological Diversity is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center for Biological Diversity has over 500,000 members and e-activists throughout California and the western United States, including residents of western Riverside County. The Center has worked for many years to protect imperiled plants and wildlife, open space, air and water quality, and overall quality of life for people in the Inland Empire.

The San Bernardino Valley Audubon Society ("SBVAS") is a local chapter of the National Audubon Society, a 501(c)3 corporation. The SBVAS chapter area covers almost all of Riverside and San Bernardino Counties and includes the project area. It has about 2,000 members, about half of whom live in Riverside County. Part of our chapter's mission is to preserve habitat in our area, not just for birds, but for other wildlife, and to maintain the quality of life in the Inland Empire.

I. THE EIR FAILS TO PROVIDE AN ADEQUATE DESCRIPTION OF THE PROJECT AND ITS IMPACTS

The EIR for the Project fails to provide the public with a thorough, properly defined, and finite description of the Project and its environmental impacts. CEQA requires that an EIR analyze the whole of the Project including associated off site impacts and impacts that are further distant in the future. *See* CEQA Guidelines, §§ 15126 (impact from all phases of the project), 15358(a) (direct and indirect impacts). These requirements help ensure that the public and decision makers are reviewing and deciding on the Project know the full scope of the project and its impacts. EIRs that fail to provide these requirements undermine CEQA's fundamental requirement of public disclosure. An accurate, stable and finite project description is the *sine qua non* of an informative and legally sufficient EIR. *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185 (an enigmatic or unstable project description impedes public input); *See also San Joaquin Raptor/Wildlife Reserve Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 730. Unfortunately, the EIR contains an incomplete project description and analysis that fails to provide the public and decision makers with the necessary information in order to analyze impacts and mitigation measures.

The EIR fails to analyze the whole of the project by, among other things, failing to adequately disclose and analyze off-site improvements and the impacts of future developments and plot plans to be implemented after approval of the EIR. Off-site improvements are not adequately disclosed, analyzed, or mitigated. The EIR discusses approximately 104 acres of off-site improvements required as part of the Project. (DEIR at 1-5). These improvements include the following: debris Basins easterly of Gilman Springs Road; water reservoirs and access roads located northeast, north, and west of the project site; SR-60 interchange improvements; and roadway, water, sewer, drainage, and utility improvements extending north and west from the project. (DEIR at 3-19, 3-25). However, the exact locations, impacts, and mitigation for these off site improvements is not disclosed or analyzed. Where the EIR does contain analysis, it is perfunctory and defers any substantive analysis to a later date.

The EIR contains many failures to analyze and mitigate offsite impacts. Offsite improvements could potentially impact jurisditional wetlands and should be analyzed. (DEIR at 4.4-59). Studies for the DEIR recognize that offsite improvements east of Redlands Boulevard may potentially impact drainage features likely considered jurisdictional by regulatory agencies. (DEIR App. E at 125). However, analysis of these impacts is deferred until another date and deprives the public and decision makers of a full and complete analysis of the project or its impacts. Even though these impacts are considered potentially significant, no analysis occurs.

The EIR fails to analyze the impacts to cultural, paleontological, and geotechnical off site impacts. The EIR defers analysis of these impacts to future studies when cultural resource assessments, paleontological resource assessments, or geotechnical constraints assessments "will be conducted." (DEIR at 1-16 through 1-19). The EIR further fails to adequately disclose and analyze the significant off-site traffic improvements that would be required and their subsequent impacts. A Project of this scale would have tremendous off site improvements resulting in a broad range of impacts. The EIR's failure to fully disclose and mitigate those impacts violates CEQA.

The EIR's attempt to address off site impacts by employing a nebulous and narrow "off site analysis zone" doesn't cure these impacts. (DEIR at 3-25, 7-27). Many of the off site impacts extend geographically beyond the off site analysis zone and the analysis itself is only focused on impacts to biological resources. So any impacts beyond the geographic scope of the off site analysis zone are not analyzed or disclosed and any non- biological resource impacts are not analyzed whatsoever. Even if the scope of the analysis covered all of the geographic and resource categories the vague and ill defined nature of the analysis does not allow for a focused site specific analysis.

The EIR figure 4.4.1 shows that the 1,000 foot "off-site analysis zone" is drawn not around the 2710 acre Specific Plan area, but around a misleading "CDFW Conservation Buffer Area" that is actually the SJWA itself. This map shows that the biological, jurisdictional, and MSHCP analysis in the EIR and Appendix were done with the wrong assumptions as to the project site and its boundaries. The erroneous "CDFW Conservation Buffer Area" must be removed from the EIR and all the biological analysis redone.

The EIR fails to disclose and analyze the project's impacts from the specific plan and instead improperly defers analysis of impacts to a later approval of plot plans. The EIR proposes a specific plan to allow for the development of 41.4 million square feet of logistics warehousing, up to 200,000 square feet of light logistics uses, and a site for logistics support uses. (DEIR at 7-28). However, the detail regarding the nature, scope, and impacts of that specific plan and the project itself are deferred until later plot plans are proposed. For example, the EIR fails to disclose and analyze impacts to waterways, state or federal jurisdictional waterways, or watercourses. (*See e.g*. DEIR at 4.4-60; DEIR App.E. at 126). Instead of conducting an analysis now the EIR asserts that site specific jurisdictional delineation will occur later when future development will submit grading and drainage studies. (DEIR at 1-38, 4.4-76). The EIR's failure to depict a stable and complete project and its impacts also leads to a failure to analyze impacts on specific resources as described more thoroughly in Section II below.

The EIR asserts that this deferral is proper because the jurisdictional delineation is programmatic in nature. (DEIR at 4.4-76). The EIR cannot improperly mask site specific impacts for a specific plan when the impacts should be analyzed at the phase when the whole project is approved, not at a later date when the impacts will be improperly piecemealed to mask the true impacts. The EIR cannot hide behind its own failure to seek out information. CEQA's requires that a lead agency must "use its best efforts to find out and disclose all that it reasonably can" Guidelines §§ 15144.

The EIR fails to disclose and analyze the nature, scope and impacts of the tentative parcel map. The EIR discloses that a tentative parcel map is being processed to subdivide 1,539 acres of the project site owned by the project applicant. (*E.g*. DEIR at 7-28.) The EIR further alleges that the parcel map is "for financing purposes only" and would "confer no development rights to the property." (*E.g*. DEIR at 7-28.) Despite numerous references to the same tentative parcel map there is no further discussion of the location, parcel size, layout, or elaboration of what "for financing purposes" actually means. Furthermore there are no provisions for limiting the development rights to the property that is the subject of the parcel map. The EIR's wholesale failure to provide a good faith analysis of what the tentative parcel map constitutes, the potential impacts of that tentative parcel map approval, and mitigation measures to assure that the parcel map approval confers no development rights runs contrary to CEQA.

II. THE EIR FAILS TO ADEQUATELY ANALYZE AND MITIGATE IMPACTS TO BIOLOGICAL RESOURCES

The DEIR fails in providing the level of analysis mandated by CEQA because it fails to address numerous aspects of how the project will affect wildlife, as well as providing a thorough analysis of the project's impacts to sensitive species and ecological communities. The Project is also adjacent to several regionally important wildlife preserves including the San Jacinto Wildlife Area ("SJWA"), the San Jacinto/Lake Perris Core Reserve for the Stephens' Kangaroo Rat Habitat Conservation Plan, and Proposed Core 3 and Existing Core H under the Western Riverside County Multiple Species Habitat Conservation Plan. These areas contain a range of rare, sensitive, threatened, and endangered species that must be fully analyzed in the DEIR. (Morton 2008; CNDDB 2013 El Casco; CNDDB 2013 Lakeview; CNDDB 2013 Perris; CNDDB 2013 Sunnymead). The EIR must fully analyze the direct and indirect impacts of the project on biological resources on the project site as well as neighboring areas.

CEQA requires that an EIR adequately describe the environment in the area that will be affected by the project. An EIR must include a description of the physical environmental conditions in the vicinity of the project at the time the environmental analysis is commenced with special emphasis placed on environmental resources that are rare or unique to that region and would be affected by the project. Guidelines § 15125 (a), (c). An "inadequate consideration and documentation" in an EIR "of existing environmental conditions renders it impossible for the FEIR to accurately assess the impacts the project will have on wildlife and wildlife habitat or to determine appropriate mitigation measures for those impacts." *San Joaquin Raptor/Wildlife*

Rescue Center v. County of Stanislaus, 27 Cal. App. 4th 713, 722 (internal citation omitted). Unfortunately the EIR fails this requirement.

A. THE EIR FAILS TO ADEQUATELY ANALYZE RIPARIAN/RIVERINE FEATURES AND JURISDICTIONAL WATERWAYS

The EIR fails to provide an adequate analysis of the significant riparian and jurisdictional areas on the Project site and in the Project vicinity. As noted in Attachment A these remaining and limited wetland and riparian areas are of crucial importance to ecological resources in California. The Project will impact onsite riparian/riverine and jurisdictional areas by increasing non-point source pollution and contamination, altering hydrology, destroying sensitive habitat, and increasing road effects. The EIR fails to properly describe and analyze the total riparian and jurisditional areas, including a proper jurisdictional delineation under the Clean Water Act §§ 401, 403, Porter Cologne Act (California Water Code § 13000 et seq.), and California Fish and Game Code §§ 1600, 1603.

One of the EIR's major flaws is the inconsistent and improper description of impacted riparian/riverine resources, the project environment, and the impacts of the project itself. The EIR claims that there are no areas that are subject to the jurisdiction of the U.S. Army Corps of Engineers, or the California Regional Water Quality Control Board. (DEIR at 1-13, 4.4-59, 4.4-76). However, the EIR's own studies contradict this assertion and acknowledge that Drainage Feature 12 "was determined to be jurisdictional waters of the U.S. under Section 404 and 401" of the Clean Water Act. (DEIR App. E at 124-125). The EIR must fully disclose and analyze the impacts to this jurisdictional waterway and discuss the potential alternatives and mitigation measures for this impact prior to project approval.

The failure of the EIR to properly disclose and analyze the impacts to riparian/riverine features prohibits the Project's compliance with the Western Riverside County MSHCP (WRCMSHCP, but herein after "MSHCP"). The MSHCP requires a specific analysis for riparian/riverine resources. (MSHCP Section 6.1.2). The MSHCP defines riparian/riverine areas as lands which contain habitat dominated by plants which occur close to or which depend upon soil moisture from a nearby fresh water source, or areas with fresh water flow during all or a portion of the year. (MSHCP Section 6.1.2). The biological studies for the Project recognize that riparian/riverine features occur in drainage features 7, 8, 9, and 14. (DEIR App. E at 124, 134-135, 137). Because the Project will impact these resources a Determination of Biologically Equivalent or Superior Preservation ("DBESP") is required. (MSHCP Section 6.1.2). A DBESP analysis requires, at a minimum, a determination of whether avoidance is feasible, minimization measures for indirect impacts, mitigation that would fully offset any impacts, and a determination that mitigation proposed is biologically equivalent or superior. (MSHCP Section 6.1.2).

The EIR fails to conduct the analysis of riparian/riverine features and DBESP analysis required by the MSHCP. Instead, the EIR defers a full analysis of the Project's impacts on riparian/riverine features and a DBESP analysis until the future. (DEIR App. E. at 120, 124, 134-135, 137). Several drainage features, including drainage features 7, 8, 9, and 14, may be

subject to the jurisdiction of the California Department of Fish and Wildlife, but site specific jurisdictional delineations, evaluations of impacts, and proposed mitigation measures are deferred. (DEIR at 4.4-76, 1-14, and 1-15). This runs contrary to the requirements of CEQA and the MSHCP regarding the proper timeframe for environmental review and disclosure of a Project's impacts. (MBA 2008; MBA 2009). There is no provision for public input and review when the DBESP is improperly deferred, and the EIR attempts to segment the whole of the project review by improperly avoiding analysis and disclosure of the project being approved.

The protection of riparian/riverine resources is also required by the City of Moreno Valley General Plan. General Plan Policy 7.4.3 requires that projects "[p]reserve natural drainage courses in their natural state and the natural hydrology, unless the protection of life and property necessitate improvement as concrete channels." (DEIR at 4.4-60). The EIR acknowledges that 14 drainages or basins occur but defers analysis to determine whether the project is consistent with this policy. (DEIR at 4.4-60; DEIR App. E at 126). The EIR cannot ignore local policies regarding the proper protection of natural resources.

The DEIR also fails to adequately disclose and analyze the riparian and riverine features. The DEIR claims that Drainage feature 14 contains "no native riparian habitat." (DEIR at 4.4-59). However, this is again contradicted by the biological surveys for the project, which indicated that the native habitat of "southern willow scrub" dominated Drainage feature 14 and provides habitat for least Bell's vireo, and southwestern willow flycatcher. (DEIR App. E at 54, 120). Attempts to dismiss the riparian areas in the text of the EIR by asserting that it does not provide suitable habitat for riparian/riverine planning species, when the studies for the EIR acknowledge that the area contains habitat that could be used by native wildlife runs contrary to CEQA. The EIR's incomplete and inconsistent analysis renders the EIR invalid.

B. THE EIR FAILS TO ADEQUATELY MINIMIZE AND MITIGATE THE IMPACTS OF LIGHT POLLUTION

The DEIR's conclusion that additional mitigation measures may be necessary for the impacts of light pollution on wildlife is inadequate. (DEIR at 4.4-67). This is insufficient to meet CEQA's requirement of fully disclosing impacts. Pub. Res. Code §§ 21061; 21005(a). CEQA Guidelines mandate that relevant information be presented so that agencies and the public are fully informed as to the ramifications of a project. *See e.g.* Pub. Res. Code § 21005(a). Here, the DEIR fails to adequately analyze and mitigate the impacts to wildlife from light pollution on and adjacent to the Project.

Light pollution is a major problem that can significantly confuse migratory birds and otherwise disturb and disrupt wildlife foraging and breeding. (CNN, "Light Pollution Threatens National Park," 1999). Light pollution can seriously threaten the continual survival of numerous species; "[t]he cumulative effects of behavioral changes induced by artificial night lighting on competition and predation have the potential to disrupt key ecosystem functions" (Longcore and Rich, 2004). Light pollution is not to be taken lightly in the DEIR, and should be afforded a weighty and detailed analysis.

Many bird species fly at night, and have evolved to navigate their migration paths in the dark, aided by star and moon light, which is of course blocked by artificial light sources. (American Bird Conservancy, 2008). Further, birds can be attracted to lit structures, including streetlights, and can become disoriented as a result. (American Bird Conservancy, 2008). Disorientation often results in collisions with the lit structures themselves or with other birds, leading to injury and death. (American Bird Conservancy 2008). More than 100 millions birds are affected by collisions each year in North America, and this includes many endangered species. (Deda, et al). Many such catastrophes have been documented, the worst incidents involving hundreds of birds killed at one building in a single night. (American Bird Conservancy, 2008). Bird species can also become "entrapped" within lighted areas, refusing to move for the night, and thus increasing their risk of predation. (Longcore and Rich, 2004).

Another aspect of light pollution that the DEIR does not address is that some species, including certain birds and reptiles, have begun to utilize artificial lights, such as streetlights to forage underneath for food. (Longcore and Rich, 2004). However, this can increase their risk of predation, as well as increase these species dependence on these human structures. (Longcore and Rich, 2004). The EIR should also analyze the potential for night lighting to impact SKR populations both on and off the Project site. SKR often forages and moves around at night. Natural and artificial lighting impacts kangaroo rats because it inhibits their nocturnal foraging and makes them more susceptible to the chance of predation. (COSEWIC 2006). The EIR must discuss the extent that the proposed lighting will reduce SKR habitat adjacent to the project because of predation or avoidance. Therefore, the presence of street lights within the VOL could actually attract some species into the development, prompting problematic interactions between these species and humans or their pets.

Plant species are also impacted by light pollution. Plants measure and react to night length, and duration of darkness can manipulate how frequently plants pollinate or flower, how they prepare for dormancy during winter, and even how much photosynthesizing they do. (Deda, et. al). Trees are similarly affected, for instance, an abundance of light pollution can keep a tree from losing its leaves at the correct time. (Deda, et. al). This also impacts animals that depend on these trees for habitat; for instance, birds are prevented from nesting in trees as a result of surrounding light pollution. (Deda, et. al).

Furthermore, light pollution need not be highly extensive to have a major impact on nearby plants and wildlife. For instance, one study found that desert rodents reduced foraging activity when exposed to the light of a single camp lantern. (Longcore and Rich, 2004). As well, light pollution has far reaching effects; a study of national parks found that artificial lights over *100 miles away* could still affect national parks and their wildlife. (CNN, "Light Pollution Threatens National Park," 1999). Given this 100 miles perimeter, the buffer of mere acres established in the DEIR is nowhere near sufficient to protect species from light pollution.

The DEIR needs to fully disclose these risks; only then can the likely effectiveness of proposed mitigation measures be evaluated when compared to the severity of the risk. Given the impact that light pollution has on wildlife species, particularly migratory birds such as the many species that utilize the SJWA as habitat, the proposed mitigation measures are inadequate to

protect against this harm. This is especially true in light of evidence showing that light pollution can be felt as far as 100 miles away.

The relatively miniscule buffer the DEIR provides here to protect against light pollution is insufficient. Indeed, the DEIR recognizes that the mitigation measures would not fully mitigate the Project's significant cumulative impacts to biological resources from light pollution, (DEIR at 4.4-67), but fails to adequately propose or analyze additional mitigation measures to address that significant impact. CEQA requires that agencies "mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so." Pub. Res. Code § 21002.1(b). The EIR fails to meet this mandate.

C. THE EIR FAILS TO ADEQUATELY ANALYZE AND MITIGATE AIR POLLUTION

The DEIR's analysis of the impacts of air pollution on biological resources and proposed mitigation is inadequate. (DEIR at 4.4-67 to 4.4-71). This data provided insufficient to meet CEQA's requirement of fully disclosing impacts. Pub. Res. Code §§ 21061; 21005(a). The DEIR recognizes some of the numerous impacts to wildlife that can occur from air pollution. (DEIR at 4.4-67 to 4.4-71). Reduced breeding performance of birds in the area close to air pollution due to the direct impacts of pollution on avian species as well as indirect effects due to reductions in prey. (Eeva 1996; Eeva). Air pollution also contributes increased toxicity and fertility problems due to smaller, lighter and thinner-shelled eggs. (Global Times 2011). Biomarkers of air pollution demonstrate connections between other physiological problems such as impaired bone structure. (Eeva 2000). Air pollution also leads to inheritable genetic mutations in wildlife. (Somers 2002). However, it fails to properly analyze the risks posed to wildlife, and in particular sensitive wildlife in adjacent areas.

As described in more detail below the DEIR cannot rely on the mitigation measures proposed in the MSHCP to address these impacts. Furthermore, by fabricating a "buffer" that is actually a wildlife area with sensitive resources the EIR improperly minimizes the Project's impacts and engages in a failure to adequately disclose the nature of the existing environment, which prohibits an adequate analysis and mitigation of the Project's impacts.

D. THE EIR FAILS TO ADEQUATELY MINIMIZE AND MITIGATE THE IMPACTS TO THE WESTERN BURROWING OWL

The Western Burrowing Owl (*Athene cunicularia hypugaea*) is considered to be a Bird of Conservation Concern by the U.S. Fish and Wildlife Service (USFWS). Burrowing Owls are listed as a Species of Concern in California. California's remaining burrowing owls are threatened primarily by habitat loss to urban development, persecution of ground squirrels, and intensive agricultural practices. The state-approved practice of evicting owls from development sites is accelerating local extinction of owls from rapidly urbanizing areas. Other factors contributing to the decline of owls statewide include destruction of burrows through disking and grading, impacts of pesticides, increased predation by nonnative or feral species, habitat

fragmentation, and other human-caused mortality from vehicle strikes, electrified fences, collisions with wind turbines, shooting, and vandalism of nesting sites.

The number of breeding owl colonies located in study areas in California has declined by nearly 60 percent from the 1980s to the early 1990s, and the statewide number of owls is currently thought to be declining at about 8 percent per year due to urban development. Breeding burrowing owls have been extirpated from almost one-quarter of their former geographic range in California over the past two decades. (CBD 2003). Surveys in California in 1986-91 found population decreases of 23-52% in the number of breeding groups and 12- 27% in the number of breeding pairs of owls. (DeSante et al. 1997). In southwestern California studies demonstrating overall decline of the burrowing owl populations also predict extirpation of burrowing owls from southwestern California. (Kidd 2007).

The EIR fails to adequately account for the Project threats to local and regional populations of the burrowing owl, or adequately mitigate for the loss of burrowing owl populations. Burrowing owls were found on the Project site. (DEIR at 4.4-29; DEIR App. E at 119). The mitigation measures of avoiding burrowing owls when they are present will not mitigate the decline in population and loss of habitat that the project contributes to. Considering the magnitude of threats, and ongoing population decline in the Project area the Project poses a substantial threat to the Burrowing Owl.

E. THE EIR'S PROPOSED MITIGATION MEASURES ARE INADEQUATE TO MITIGATE THE PROJECT'S IMPACTS

The EIR relies upon the MSHCP for mitigation of both direct and cumulative biological impacts related to this project. However, the EIR fails to disclose the uncertainty regarding the implementation of mitigation measures contemplated in the MSHCP to provide for the mitigation of potentially significant impacts to biological resources relied upon in the MSHCP and EIR. The failure to require binding and effective mitigation, disclose the uncertainties associated with mitigation, and analyze the provision of other sources of mitigation and the environmental impacts of those mitigation measures violates CEQA.

In order to address several issues related to the cost, revenue sources, and plan benefits associated with the MSHCP the Western Riverside County Regional Conservation Authority contracted with the RAND Corporation to provide an independent and objective analysis. (RAND 2008). Entitled "Balancing Environment and Development: Costs, Revenues, and Benefits of the Western Riverside County Multiple Species Habitat Conservation Plan" the study revealed some troubling issues related to the ability of projected revenue to acquire lands relied upon by the MSHCP for mitigation and the ability of the MSHCP to achieve the reserve strategy relied upon by the US Fish and Wildlife Service in their Biological Opinion and CEQA analysis.

First, the RAND study revealed that the operating cost "exceeds the original forecast in MSHCP planning documents by $345 million (increasing from $937 million to $1,282 million)." (RAND 2008 at xxvi). This was due primarily to the failure to integrate costs into the original estimate. (RAND 2008 at xxvi). Second, the expected revenue sources do not correlate to the

strategy for acquiring land outlined in the MSHCP, and the RAND study did not conclude that "existing local revenue streams will be sufficient to finance the local share of reserve assembly and operation costs." (RAND 2008 at xxvii). Notwithstanding these revenue shortages the RAND study further concluded that the "individual acreage goals cannot all be met using the USFWS CRD [conceptual reserve design]." (RAND 2008 at xxx). In other words, the reserve design relied upon by the US Fish and Wildlife Service and California Department of Fish and Wildlife in determining that biological impacts would be mitigated below a level of significance cannot be achieved. The EIR's failure to disclose, analyze, and plan for the failure of the MSHCP to mitigate impacts does not meet CEQA's information mandate on disclosure to the decision makers and the public or the substantive mandate to adopt all feasible mitigation measures for potentially significant impacts.

The DEIR cannot simply rely entirely on the MSHCP because there are areas of significant environmental and public concern that the MSHCP simply does not, and was not meant to, address. This includes the potentially significant impacts from direct deaths to special status species from vehicles. The impacts of vehicular deaths to species such as the Stephen's Kangaroo Rat or burrowing owl for instance, are nowhere discussed in the DEIR or any supporting document. This is cause for concern as the identified impacts to species such as the burrowing owls from collisions with vehicles is documented within the MSHCP, and this project will significantly increase the amount of traffic in the area. (MSHCP, Volume 2 – Threats to Species). Undoubtedly, there will be vehicular caused death as a result of the project.

Additionally, the DEIR presents no information regarding impacts to covered species from pesticide use associated with the project. Pesticide use is currently harming many of the species covered in the MSHCP. (See generally, MSHCP §5.2.1) That the DEIR does not address these issues violates both the MSHCP and CEQA.

The DEIR cannot simply conclude that it complies with the MSHCP, and that even if the project does comply with the MSHCP, this compliance is enough to ensure that the long-term survival of special-status species will be ensured for the project. Instead, the DEIR needs to provide detailed analysis as to how it specifically complies with all of the MSHCP's requirements. Further, it must insure that even with MSHCP compliance, and that the project still will not result in significant impacts to biological resources and protected species.

The EIR improperly treats the state owned property within the San Jacinto Wildlife Area as a buffer to mitigate the Project's impacts. As the biological studies for the DEIR note, "this land cannot be used as MSHCP compensation for the proposed development…" (DEIR App. E at 101). However, the EIR improperly treats the state owned property within the San Jacinto Wildlife Area as a buffer. The biological studies call for a 400 foot setback within the Project site. (DEIR App. E at 134). However, the DEIR itself calls for only a 250 foot "clear zone" that will still permit project specific impacts related to water detention basins and project landscaping. (DEIR at 4.4-71). The EIR would not create a 400 foot buffer for those project impacts, but allow them up to the edge of the SJWA. The project attempts to fabricate a 400 foot setback by adding 150 foot building setback, which could include parking lots, fences, lighting, or other urban development, to the 250 foot clear zone. (DEIR at 4.4-71). The EIR's

attempt to limit the setback and require the SJWA to provide the buffer outlined as mitigation measures in studies for the EIR runs contrary to CEQA's requirement that the EIR adopt all feasible mitigation measures.

III. THE EIR FAILS TO ADEQUATELY ANALYZE AND MITIGATE IMPACTS TO GREENHOUSE GASES AND GLOBAL CLIMATE CHANGE

The CEQA Guidelines require the lead agency to "make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project." Guidelines § 15064.4(a). Under CEQA, an EIR must reflect a good faith effort at full disclosure, including "detail sufficient to enable those who did not participate in its preparation to understand and to consider meaningfully the issues raised by the proposed project." *Laurel Heights Improvement Assn. v. Regents of the University of California* (1988) 47 Cal.3d 376,. at 405; CEQA Guidelines § 15151. Its purpose is to give government agencies and the public the information needed to make informed decisions, thus "protect[ing] not only the environment but also informed self-government." *Laurel Heights I*, 47 Cal.3d at 392. The EIR fails to adhere to the standards of a good faith analysis to provide informed self government.

A. THE EIR FAILS TO ANALYZE CONFLICTS WITH APPLICABLE GREENHOUSE GAS REDUCTION PLANS

The EIR fails to adequately disclose and analyze conflicts with regional greenhouse gas reduction plans. CEQA requires that EIRs address the Project's potential to "[c]onflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases." CEQA Guidelines Appendix G, § VII(b). The studies supporting the EIR admit that the Project would be inconsistent with plans, policies, and regulations related to GHG reductions and result in a significant impact climate change impact. (DEIR App. D at 2, 234). However, the EIR tries to mask this significant impact and inconsistency with applicable plans by stating that the "proposed project is consistent with federal and state GHG reduction strategies, the CARB Scoping Plan, the City's General Plan, and the City's Climate Action Strategy." (DEIR at 1-20, DEIR at 4.7-43). The EIR's internal inconsistency and the failure to properly disclose significant impacts is contrary to CEQA.

The EIR specifically fails to adhere to several applicable greenhouse gas reduction plans. For example, the Project fails to comply with the City of Moreno Valley Climate Action Strategy and City of Moreno Valley General Plan policies related to the reduction of greenhouse gas emissions and air quality impacts. (*See e.g.* DEIR at 4.7-24, 4.7-25). The EIR admits that the Project is not consistent with local climate action strategy R2-E5 regarding New Construction Commercial Energy Efficiency Requirements that Require energy efficient design for all new commercial buildings to be 10% beyond the current Title 24 standards. (DEIR at 4.7-42). The EIR also asserts that it is consistent with vehicle miles traveled reduction strategies related to encouraging the development of transit priority projects along high quality transit corridors identified in the Southern California Association of Goverments ("SCAG") Sustainable Communities Plan, to allow a reduction in vehicle miles traveled. (DEIR at 4.7-42). However,

the Project is not a transit priority project, not along a high quality transit corridor identified by SCAG, and does not reduce vehicle miles traveled. The EIR's 50 mile average for long haul trucks, which actually undercounts mileage, hardly qualifies for a reduction in vehicle miles traveled.

The EIR also incorrectly asserts that it is consistent with the Renewable Portfolio Standard of achieving a 33% renewable energy in California and California's Million Solar Roofs Initiative without requiring any renewable energy to be developed onsite or any requirements for renewable energy to be used for the construction or operation of the Project. The EIR also claims that it is consistent with a Sustainable Communities Strategy when no Sustainable Communities Strategy has been adopted for Riverside County and it fails to apply many of the strategies proposed by SCAG because it asserts they are not applicable to the Project. (DEIR at 4.7-22). Finally, there is no quantitative or logical analysis of how the Project's massive contribution to greenhouse gases could be consistent with the ambitious greenhouse gas reduction standards outlined in Executive Order S-3-05. (DEIR at 4.7-44).

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The quantitative data provided by the EIR demonstrates that the sheer volume of emissions provided by the Project prohibit the compliance with greenhouse gas reduction strategies. A simple comparison of Table 4.7.B, which provides the Moreno Valley greenhouse gas reduction targets with Table 4.7.I, which provides the Project greenhouse gas emissions illustrates the Project's significant impacts to local greenhouse gas reduction plans.

4.7.1.4 Greenhouse Gas Inventories

The City of Moreno Valley estimated greenhouse gas emissions for the community for 2007 and 2010 and projected emissions for 2020 are shown in Table 4.7.B, which shows the reduced 2020 emissions are below the reduction target.

Table 4.7.B: City of Moreno Valley Projected Greenhouse Gas Emissions

Source Category	Moreno Valley Greenhouse Gas Emissions ($MTCO_2e$ per year)			
	2007	2010	BAU 2020	Reduced 2020
Transportation	517,098	513,581	788,267	421,561
Energy	287,261	277,230	356,192	251,372
Area	69,390	69,437	84,665	73,046
Water and Wastewater	21,595	16,831	20,216	14,158
Solid Waste	44,294	43,633	49,203	38,000
Total	**939,638**	**920,712**	**1,298,543**	**798,137**
Reduction Target	—	—	**798,693**	**798,693**

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalents BAU = business as usual
Source: Table 9, City of Moreno Valley Greenhouse Gas Analysis, 2012., MBA 2013

Table 4.7.B demonstrates that the total city greenhouse gas reduction targets total 798,693 metric tons of carbon dioxide equivalents per year in 2020.

Table 4.7.I: Project Operational GHG Emissions (Year by Year with Mitigation)

Source	Emissions with Mitigation and Project Design Features ($MTCO_2e$/year)								
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Vehicles	10,638	21,784	28,283	39,632	52,154	57,836	61,228	65,730	66,329
Trucks	51,111	107,099	141,204	199,737	269,134	304,600	328,592	358,109	366,971
Electricity	14,513	30,387	40,428	58,208	79,917	91,993	101,491	110,174	112,888
Natural gas	177	371	494	711	976	1,124	1,240	1,346	1,379
Water	299	626	833	1,199	1,646	1,895	2,090	2,269	2,325
Waste	12,812	26,826	35,690	51,385	70,550	81,211	89,595	97,261	99,657
Refrigerants	182	380	506	728	1,000	1,151	1,269	1,378	1,412
Construction	37,927	31,634	26,947	94,510	41,743	34,665	26,818	26,818	14,471
Sequestration	-14	-30	-40	-57	-79	-90	-100	-108	-111
Total	**127,645**	**219,077**	**274,345**	**446,053**	**517,041**	**574,385**	**612,223**	**662,977**	**665,321**
Threshold	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Significant?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Reduction summary: local vehicles = 3 percent; waste = 35 percent
Source: Michael Brandman Associates 2013.

Table 4.7.I discloses that the 2020 greenhouse gas emissions attributed to the Project are 612,223 metric tons of carbon dioxide equivalents per year in 2020.

The Project's greenhouse gas emissions are 76% of the City's projected 2020 GHG emissions. The EIR must analyze how the Project would impact the ability of the City of Moreno Valley to achieve their greenhouse gas reduction targets. The EIR cannot hide behind the failure to seek out information regarding the emissions methodologies used by the City in

making this determination and whether the project was included in the City's greenhouse gas inventory. A lead agency must "find out and disclose all that it reasonably can". Guidelines § 15144.

B. THE EIR FAILS TO ANALYZE THE PROJECT'S FULL GREENHOUSE GAS IMPACTS

The EIR also fails to account for the total greenhouse gas emissions from the Project by omitting sources of energy used by the Project, improperly curtailing the vehicle miles traveled and scope of the traffic analysis, and omitting the analysis of global warming pollutants such as black carbon. CEQA requires that an EIR analyze the whole of the Project including associated off site impacts and impacts that are further distant in the future. *See* CEQA Guidelines, §§ 15126 (impact from all phases of the project), 15358(a) (direct and indirect impacts). The EIR's failure to address the full range of greenhouse gas impacts renders it invalid.

The EIR must fully disclose and analyze all of the energy used by the project, the pollution resulting from that use and the impacts resulting from that use. The EIR states that over 39 million square feet of industrial facilities will use no natural gas whatsoever. (DEIR at 4.16-36). This attempt to improperly omit energy usage runs contrary to CEQA's project description requirements that energy use by fuel type and end use be provided. CEQA Guidelines Appendix F. The EIR's attempt to omit energy uses from analysis, improperly minimize energy and greenhouse gas impacts, and distort the project description runs contrary to CEQA and analysis of natural gas usage by warehouse facilities. (E Source 2007, East LA College 2009, Center for Energy and Climate Solutions 2012).

The EIR improperly minimizes the trip length for vehicle emissions, which omits necessary components of the project's impacts and fails to adequately disclose and analyze the Project's impacts. The Project objective is to "[p]rovide a major logistics center to accommodate the ever-expanding trade volumes at the Ports of Los Angeles and Long Beach." (DEIR at 3-73). Port related long haul trips are 79 miles. (DEIR at App. D at 120, Table 20). However, the "[t]rip length used in regional analysis for long-haul trips 50." (DEIR at App. D at 120, Table 20). The EIR engages in this misleading minimization of impacts by stating that only a small percentage of the trips will be associated with port related traffic. (DEIR at App. D at 120, Table 20). This omits a large number of vehicle miles and their associated air quality impacts for the major project objective of accommodating port related traffic.

The EIR also undercounts other long haul routes by setting arbitrarily short distances to regional locations. For example, the EIR sets an arbitrarily short destination for long haul trips of the San Diego County line to the south, the Banning pass to the east, and the Cajon pass to the northeast. (DEIR at App. D at 120, Table 20). The EIR also improperly undercounts local travel by claiming that "the local vehicles travel between 9.6 and 15.4 miles per trip." (DEIR at 4.7-30). These estimates disregard the actual proximity of nearby cities serving the Project. The distance to Riverside is 18 miles; Beaumont is 10 miles, Perris is 21 miles on the freeway, and San Bernardino is 24 miles on the freeway. The EIR also masks full emissions projections by reducing the number of overall trips and truck trips for the facility. Improperly minimizing

vehicle miles undercounts numerous Project impacts including greenhouse gas emissions, traffic, and air quality. Importantly, the EIR fails to account for impacts air quality impacts within the Salton Sea Air Basin, Mojave Desert Air District, and the San Diego County Air Basin violating CEQA's requirements that an EIR must analyze whether the Project "[v]iolates any air quality standard or contributes substantially to an existing or projected air quality violation." CEQA Guidelines App. G § III(b).

The EIR must also conduct an analysis and quantification of the greenhouse gas emissions associated with water use related to the project. In order to mitigate the PM pollution from the Project during construction the contractors are required to dampen the graded and exposed material to reduce dust that worsens the existing air quality violations. The Project itself will use water related to landscaping, bathroom and kitchen uses, and cleaning. Transport of water throughout the state is extremely energy intensive. The water sector is the largest consumer of energy in California, estimated to account for 19 percent of total electricity and 32 percent of total natural gas consumed in the state. (CEC 2005). In the present case energy will be used to transport water needed for the project via pumps, to move water to southern California from the San Francisco Delta and Colorado River, and tanker trucks to transport and spray water on the project area.

The EIR also fails to account for the emissions associated with manufacturing and transport of building materials, and operational goods for the project. For example, construction of 41 million square feet of development will take thousands of cubic yards of construction material including concrete. Cement and concrete manufacture is extremely energy intensive producing a large amount of greenhouse gas emissions. The manufacture of concrete accounts for roughly 3% of California's greenhouse gas emissions. (Masanet 2005). In order to determine ways to reduce greenhouse gas emissions from concrete the Lawrence Berkeley National Laboratory and others have developed methods for analyzing the lifecycle emissions of concrete manufacture. (Manaset 2005, Flower 2007). The EIR also fails to account for the emissions associated with the transportation of goods to the ports that the Project is supposed to serve. (DEIR at 4.7-43).

These numbers must be integrated into the greenhouse gas emissions significance determination in order to perform the good faith analysis required under CEQA. CEQA requires that "an agency must use its best efforts to find out and disclose all that it reasonably can" (Guidelines § 15144), that an EIR must make "good faith effort at full disclosure" (Guidelines § 15151), and that an impact may only be deemed speculative "after thorough investigation." (Guidelines § 15145). The EIR cannot prematurely determine that the information is speculative if it does not attempt to compile and analyze the information. (DEIR at 4.7-43). By refusing to include necessary information on Project emissions in the EIR, the City violated the most basic and fundamental requirements of CEQA. *Protect the Historic Amador Waterways*, 116 Cal. App. 4th at 1106 (EIR invalid as a matter of law where "it omits material necessary to informed decision-making and informed public participation.").

C. AS PART OF ITS INVENTORY OF GLOBAL WARMING POLLUTION, THE EIR MUST ALSO ANALYZE BLACK CARBON EMISSIONS RESULTING FROM THE PROJECT

As part of its analysis of global warming impacts, the EIR must also address black carbon, an important short-lived pollutant that contributes to global and regional warming. Black carbon is produced by incomplete combustion and is the black component of soot. Although combustion produces a mixture of black carbon and organic carbon, the proportion of black carbon produced by burning fossil fuels, such as diesel, is much greater than that produced by burning biomass.

Black carbon heats the atmosphere through a variety of mechanisms. First, it is highly efficient at absorbing solar radiation and in turn heating the surrounding atmosphere. Second, atmospheric black carbon absorbs reflected radiation from the surface. Third, when black carbon lands on snow and ice, it reduces the reflectivity of the white surface which causes increased atmospheric warming as well as accelerates the rate of snow and ice melt. Fourth, it evaporates low clouds. Notably, black carbon is often complexed with other aerosols such as sulfates, which greatly increases its heating potential. (Ramanathan & Carmichael 2008; Jacobson 2001).

Due to black carbon's short atmospheric life span and high global warming potential, decreasing black carbon emissions offers an opportunity to mitigate the effects of global warming trends in the short term. (Ramanathan & Carmichael 2008). Black carbon is considered a 'short-lived pollutant' (SLP) because it remains in the atmosphere for only about a week in contrast to carbon dioxide, which remains in the atmosphere for over 100 years. Furthermore, the global warming potential of black carbon is approximately 760 times greater than that of carbon dioxide over 100 years (Reddy & Boucher 2007) and approximately 2200 times greater over 20 years. (Bond & Sun 2005). It is estimated that black carbon is the second greatest contributor to global warming behind carbon dioxide. (Ramanathan & Carmichael 2008).

Unlike traditional greenhouse gases, which become relatively uniformly distributed and mixed throughout the Earth's atmosphere, black carbon exerts a regional influence. The impacts of black carbon on a regional level include both atmospheric heating, as discussed above, and hydrological changes. Hydrological changes occur due to alterations in cloud formation and heat gradients. (Ramanathan & Carmichael 2008). For instance, aerosol pollution has been linked to decreases in the summer monsoon season in tropical areas as well as the drought in the Sahel region of Africa. (Ramanathan & Carmichael 2008). California is an area of particular concern because of the drought-fire cycle. The more drought conditions prevail, the more forest fires burn, and the forest fires in turn emit massive quantities of black and organic carbon. The release of these aerosols intensifies the drought effect.

Another impact of black carbon is accelerated snowmelt; for instance, black carbon is likely contributing to the retreat of Himalayan glaciers and the resulting water shortage in areas of Asia. (Id.). When black carbon settles on snow, it makes the snow darker so that it absorbs more solar radiation. This directly leads to snow melt. In addition, local atmospheric heating

due to black carbon increases the melting rate. These same effects may well be operating on the Sierra Nevada, which would reduce water availability throughout California at crucial times of the year. These localized impacts could also be contributing to a decreased snow pack and earlier snow melt for the San Gabriel, San Bernardino, and San Jacinto mountains.

Black carbon is also detrimental to human health. Black carbon has been linked to a variety of circulatory diseases. One study found an increased mortality rate was correlated with exposure to black carbon. (Maynard 2007). The same is true for heart attacks. (Tonne 2007). Another study found that residential black carbon exposure was associated with increased rates of infant mortality due to pneumonia, increased chronic bronchitis, and increased blood pressure. (Schwartz 2007).

In developed countries, diesel burning is the main source of black carbon. Diesel emissions include a number of compounds such as sulfur oxides, nitrogen oxides, hydrocarbons, carbon monoxide, and particulate matter. Diesel particulate matter is approximately 75% elemental carbon. The proposed project will require the use of diesel-powered heavy duty trucks, construction equipment, and warehouse equipment. Thus, it is crucial that black carbon be addressed as part of the environmental review for the Project.

(1) ANALYZING PARTICULATE MATTER IS INSUFFICIENT TO ADDRESS BLACK CARBON

Particulate matter (PM) refers to the particles that make up atmospheric aerosols. The primary constituents of PM are sulfates, nitrates, and carbon compounds. Sulfates and nitrates form in the atmosphere from the chemical reaction of sulfur and nitrogen dioxides. These may often be present as ammonium sulfate or nitrate salts. Carbon compounds may be directly emitted, e.g. black carbon emitted from combustion, or may form in the atmosphere from other organic vapors, e.g. oxidation of volatile organic compounds.

Because PM can be reduced through mitigation of other constituents of PM than black carbon, it is essential that black carbon emission reduction strategies be considered independently from PM reductions. The proportions of the constituents of PM vary over time and by location According to a recent series of surveys conducted at various U.S. cities under the EPA's "Supersite" program, black carbon was often only about 10% of total measured $PM_{2.5}$.[1]

In contrast to total $PM_{2.5}$, diesel PM is composed largely of black carbon. Nonetheless, some diesel PM reduction strategies do not affect black carbon. For instance, diesel oxidation catalysts can reduce diesel PM emissions as a whole by approximately 20 to 40%, yet they do not decrease black carbon emissions. (Walker 2004). In addition, while low-sulfur fuel will reduce sulfate emissions, in and of itself low-sulfur fuel will not reduce black carbon. Low-sulfur fuel is important because it *allows* for better technology to reduce black carbon. (*See, e.g.* 69 Fed. Reg. 38957, 38995 (June 29, 2004)). Yet those reductions can only occur once the technology has been implemented.

1 For an overview of the program and initial results see http://www.epa.gov/ttn/amtic/supersites.html

(2) METHODS ARE AVAILABLE TO SPECIFICALLY QUANTIFY BLACK CARBON EMISSIONS FROM THE PROJECT

Like greenhouse gases, black carbon emissions from various types of engines and activities can be estimated through numerical calculations. (Bond 2004). Thus, there is no reason why black carbon can reasonably be omitted from these estimates.

The estimated black carbon emissions from the project can be inventoried similarly to other greenhouse gas emissions:

- Estimate the mass of diesel fuel consumed by each type of diesel engine, e.g. ship, machinery, truck, construction equipment, and locomotive.
- Calculate a black carbon emission factor (EF) using reference values available in the literature. For instance, an equation for "EF_{BC}" from various types of diesel engines that takes into account 4 different factors.[2]
- Multiply the emission factor times the mass of diesel (in kilograms) used for each engine type. This will provide the grams of black carbon emitted by that engine type.
- Sum all black carbon emissions from each engine category to obtain total black carbon emissions from the project.

After obtaining the total black carbon emissions from the project, the relative global warming impact of the emissions can be compared to other global warming pollutants. Carbon dioxide-equivalent values can be obtained by multiplying total black carbon emissions (in kilograms) from the project by the global warming potential (GWP) for black carbon. Although there is some variation in estimated GWP values, representative black carbon GWP values are: 760 over 100 years[3] or 2200 over 20 years (Bond & Sun 2005).

The EIR fails to analyze the impacts of black carbon emissions during both the construction and operation phase of the project. The Project will result in a large increase in diesel exhaust from the existing conditions, which is a major source of black carbon. The Project will require the cut and fill of approximately 42 million cubic yards of earth material that will require thousands of hours of operation of heavy duty construction equipment. Nowhere in the EIR is any quantified analysis performed to determine how these significant impacts could be avoided, reduced, or mitigated.

It is incumbent on the City "disclose all it can" about project impacts and educate itself on methodologies that are available to measure project emissions. *Berkeley Keep Jets Over the Bay Comm. v. Board of Port Comm'rs ("Berkeley Jets")*, 91 Cal. App. 4th 1344, 1370 (2001). Without a complete inventory, the EIR cannot adequately inform the public and decision-makers about the Project's impacts. Similarly, without a complete inventory and analysis of greenhouse

2 See Bond et al. 2004 at 4 and Table 7.
3 The combined global average direct (480) and indirect (281) GWP for black carbon as reported in Reddy & Boucher (2007).

gas emissions that will result from the project, there is simply no way that the EIR can then adequately discuss avoidance and mitigation measures to reduce those impacts.

D. THE EIR MUST ANALYZE AND ADOPT ALL FEASIBLE MITIGATION MEASURES TO REDUCE THE PROJECT'S GREENHOUSE GAS EMISSIONS

In addition to thoroughly evaluating project alternatives, because it is clear that the project's greenhouse gas emissions will cumulatively contribute to global warming, "the EIR must propose and describe mitigation measures that will minimize the significant environmental effects that the EIR has identified." *Napa Citizens for Honest Gov't v. Napa County Bd. of Supervisors*, 91 Cal.App.4th 342, 360 (2001). CEQA requires that agencies "mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so." Pub. Res. Code § 21002.1(b). CEQA specifically requires lead agencies to "consider feasible means, supported by substantial evidence and subject to monitoring or reporting, of mitigating the significant effects of greenhouse gas emissions." Guidelines § 15126.4 (c). Mitigation of a project's significant impacts is one of the "most important" functions of CEQA. *Sierra Club v. Gilroy City Council*, 222 Cal.App.3d 30, 41 (1990). Therefore, it is the "policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures which will avoid or substantially lessen the significant environmental effects of such projects." Pub. Res. Code § 21002.

There are any number of feasible measures that can be incorporated to reduce vehicle miles traveled, energy use, waste, water consumption and other sources of emissions. The California Air Pollution Control Officer's Association (CAPCOA) White Paper on CEQA and Climate Change identifies existing and potential mitigation measures that could be applied to projects during the CEQA process to reduce a project's GHG emissions. (CAPCOA 2008 at Appendix B). The California Office of the Attorney General also has developed a list of reduction mechanisms to be incorporated through the CEQA process. (California Office of the Attorney General 2010). These resources provide a rich and varied array of mitigation measures to be incorporated in both the programmatic and project level. These mitigation measures are included at Attachment B and must be analyzed to determine whether they are feasible in reducing the Project's significant greenhouse gas impacts. The EIR includes a paltry list of mitigation measures that fails to meet CEQA's substantive requirement to adopt all feasible mitigation. (DEIR at 1-54, DEIR App. D at 2-8).

When the EIR does discuss substantive mitigation measures to reduce greenhouse gases through project design it fails to demonstrate why feasible mitigation measures are not adopted. CEQA requires the adoption of all feasible mitigation measures to reduce significant impacts like climate change or there is substantial evidence as to why the mitigation measures are infeasible. Pub. Res. Code § 21081(a)(3). The specific plan allows for the future installation of solar photovoltaic panels (i.e., buildings will be "solar ready") or other alternative energy systems on the roof of each warehouse building to offset the energy demands of the building, up to full roof coverage. (DEIR at 4.16-36, 4.16-38). Unfortunately, the EIR fails to include the installation of solar photovoltaic panels in the first instance. California's programs like the Million Solar Roof

Initiative and Renewable Portfolio Standard provide applicable plans to encourage on-site renewable energy in the Project. With a range of federal and state incentives and financing options the EIR must adopt the feasible mitigation of on site renewable energy for the Project.

Importantly, mitigation measures must be "fully enforceable through permit conditions, agreements, or other measures" so "that feasible mitigation measures will actually be implemented as a condition of development." *Federation of Hillside & Canyon Ass'ns v. City of Los Angeles*, 83 Cal.App.4th 1252, 1261 (2000). The EIR fails to analyze and adopt LEED certification standards for the Project. The EIR instead claims that "the project intends to achieve applicable elements of certification from the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED), and encourages LEED Certification." (DEIR at 4.16-38). However, these type of non-binding mitigation measures fails to meet CEQA's standards of full enforceability and fails to provide any analysis or demonstration that LEED is not feasible

The studies supporting the EIR also discuss other feasible mitigation measures that should be adopted. The greenhouse gas analysis proposes "onsite alternative fueling infrastructure (electric charging stations and/or natural gas fueling), which will help facilitate the use of these low-emitting trucks" and "a site for the sale of food, fuel, and convenience items to minimize the need for trucks to travel off-project to purchase these goods and services." (DEIR App. D at 5). However, the EIR itself doesn't propose these feasible mitigation measures. The greenhouse gas analysis also fails to ensure that the mitigation measures would be fully enforceable and only requires their adoption "as appropriate." (DEIR App. D at 5).

A lead agency may only "disclaim[] responsibility to mitigate environmental effects . . . when the other agency said to have responsibility has *exclusive* responsibility" to mitigate that impact. *City of Marina v. Bd. of Trustees* (2006) 39 Cal.4th 341, 366; *Citizens for Quality Growth v. City of Mount Shasta* (1988) 198 Cal.App.3d 433, 442, fn. 8 (city cannot avoid responsibility to mitigate project impacts by pointing to potential action of another agency). Unfortunately, the EIR engages in this type of deceptive analysis in asserting that the "emissions from vehicle exhaust are controlled by the State and Federal governments and are outside the control of the City…. The proposed project is required to comply with existing State and Federal regulations..." (DEIR at 4.7-44). The City cannot absolve of responsibility to adopt other feasible mitigation measures simply because another agency could potentially mitigate similar impacts.

After all measures have been implemented to reduce emissions in the first instance, remaining emissions that cannot be eliminated may be mitigated through offsets. Preference should be given to offset mitigation measures in that are in close proximity to the project. (SCAQMD 2008). In other words project applicants should prioritize first on mitigation onsite, then on mitigation in the neighborhood or air district, next in state, then finally out of state. (SQAQMD 2008). Care should be taken to ensure that offsets purchased are real (additional), permanent, and verified, and all aspects of the offsets should be discussed in the EIR. As demonstrated by the Office of the Attorney General and SCAQMD offsets are a feasible CEQA

mitigation measures[4] once all feasible mitigation measures have been adopted to reduce the Project's carbon footprint and produce energy using renewable sources. (SCAQMD 2008).

IV. THE EIR FAILS TO ANALYZE HOW GLOBAL WARMING WILL COMPOUND PROJECT IMPACTS OVER THE PROJECT'S LIFETIME

The EIR fails to address how the projected effects of global warming will exacerbate the impacts of the Project. CEQA requires that an EIR "analyze any significant environmental effects the project might cause by bringing development and people into the affected area." Guidelines § 15126.2(a). In recent guidance to local governments on the analysis of global warming in a general plan update, the Attorney General noted that "[l]ead agencies should disclose any areas governed by the general plan that may be particularly affected by global warming, e.g., coastal areas that may be subject to increased erosion, sea level rise, or flooding….General plan policies should reflect these risks and minimize hazards for current and future development." (Cal. Attorney General 2009 at 6). This guidance applies with equal force to developments like the Project.

A. The EIR Must Analyze Global Warming's Affects on Air Quality in Determining Project Air Quality Impacts

The rise in temperatures resulting from global warming will create a more conducive environment for air pollution formation (Cayan 2007). This will intensify the adverse effects the proposed project will already have on air quality in the project area and threaten residents' health (Cayan 2007). The air quality analysis must disclose how the increased temperatures in the project area will exacerbate the already severe air quality conditions.

Californians experience the worst air quality in the nation, with annual health and economic impacts estimated in at 8,800 deaths (3,000–15,000 probable range) and $71 billion ($36–$136 billion) per year (Cayan 2006). Ozone and particulate matter (PM) are the pollutants of greatest concern (maximum levels are about double California's air quality standards) and the current control programs for motor vehicles and industrial sources cost about $10 billion per year. In light of these underlying conditions it is critical that the air quality analysis be rigorous. The DEIR is required to properly analyze the Projects' direct, indirect, and cumulative contribution to deteriorating air quality.

Riverside County in particular, has some of the worst air quality in the nation, even when compared to other highly urban, populated counties in California. Riverside County is ranked as one of the "Dirtiest/Worst Counties" in the US for almost all criteria pollutants under the Clean Air Act. (Criteria Air Pollutant Report; American Lung Association 2005; American Lung Association 2008). Because of this, project proponents have a unique and heavy burden not to

4 The California Attorney General's Office has adopted CEQA settlements calling for the auditing, reduction, and offsetting of greenhouse gas emissions related with a Project demonstrating that offsets are a feasible way to reduce a Project's negative environmental effects on global warming. See http://ag.ca.gov/newsalerts/release.php?id=1466&category=global%20warming See generally http://oag.ca.gov/environment/ceqa/measures

add to this already significant health and public safety threat. Given the severe status of air quality in the project area the contribution of global warming to increased ozone formation will only worsen this severe problem; it must be fully analyzed and mitigated.

B. The EIR Must Analyze Global Warming's Affect on Water Supply in Determining Project Water Supply Impacts

Significantly for the state, as well as the project area, is global warming's impact on water supply. The IPCC specifically identified the American West as vulnerable, warning, "Projected warming in the western mountains by the mid-21st century is very likely to cause large decreases in snowpack, earlier snow melt, more winter rain events, increased peak winter flows and flooding, and reduced summer flows" (IPCC 2007). Recently, researches found that an increase in atmospheric greenhouse gases has contributed to a "coming crisis in water supply for the western United States" (Barnett 2008). Using several climate models and comparing the results, the researches found that "warmer temperatures accompany" decreases in snow pack and precipitation and the timing of runoff, impacting river flow and water levels (Barnett 2008). These researchers concluded with high confidence that up to 60 percent of the "climate related trends of river flow, winter air temperature and snow pack between 1950-1999" are human-induced (Barnett 2008). This, the researchers wrote, is "not good news for those living in the western United States" (Barnett 2008).

The California Center on Climate Change has also recognized the problem global warming presents to the state's water supply and predicts that if greenhouse gas emissions continue under the business-as-usual scenario, this snowpack could decline up to 70-90 percent, affecting winter recreation, water supply and natural ecosystems (Cayan 2007). Global warming will affect snowpack and precipitation levels, and California will face significant impacts, as its ecosystems depend upon relatively constant precipitation levels and water resources are already under strain (Cayan 2007). The decrease in snowpack in the Sierra Nevada will lead to a decrease in California's already "over-stretched" water supplies (Cayan 2007). It could also potentially reduce hydropower and lead to the loss of winter recreation (Cayan 2007). All of this means "major changes" in water management and allocation will have to be made (Cayan 2007). Thus, global warming may directly affect the ability to supply clean, affordable water to the residents, or change how the project will utilize water, and it may also impact other activities outside the project area, such as agriculture.

Scientists indicate that climate change will also exacerbate the problem of flooding by increasing the frequency and magnitude of large storms, which in turn will cause an increase in the size and frequency of flood events (NRDC 2007). The increasing cost of flood damages and potential loss of life will put more pressure on water managers to provide greater flood protection (NRDC 2007). At the same time, changing climate conditions (decreased snowpack, earlier runoff, larger peak events, etc.) will make predicting and maximizing water supply more difficult (NRDC 2007). These changes in hazard risk and water supply availability must be considered during environmental review.

Water quality, in addition to water quantity and timing, will also be impacted. Changes in precipitation, flow, and temperature associated with climate change will likely exacerbate water quality problems (NRDC 2007). Changes in precipitation affect water quantity, flow rates, and flow timing (Gleick 2000). Shifting weather patterns are also jeopardizing water quality and quantity in many countries, where groundwater systems are overdrawn (Epstein 2005). Decreased flows can exacerbate the effect of temperature increases, raise the concentration of pollutants, increase residence time of pollutants, and heighten salinity levels in arid regions (Schindler 1997).

C. The EIR Must Analyze Global Warming's Affects on Biological Resources in Determining Project Impacts

Climate change is having a major adverse impact on numerous plant and animal species. (Cameron and Scheel, 2001). Climate change impacts species by altering the climatic conditions that species need to survive or use a particular location as habitat, including particular temperature, type of food, water levels and water abundance, or weather conditions. (Schwartz, et. al., 2006). This causes massive migration shifts, with species seeking out other areas featuring their needed climatic conditions. (Schwartz, et. al., 2006). However, such migration shifts are not simple. For many species, their habitat is already so limited that there is no other location they can practically relocate to. As well, major impediments such as urban areas can keep species from reaching other habitats. Species migration can also cause increased food and habitat competition as more species attempt to forage, hunt, or breed, in smaller areas. Migration also has the potential to cause many of the issues commonly associated with invasive species.

For many species of course, migration just is not possible and, as their habitats quickly change, they will be unable to adapt in time, and will become extinct. Extinction as a direct result of climate change is an imminent possibility for numerous species. (Cameron and Scheel, 2001).

The threat of climate change induced species extinction is found to be highest in species with a small current distribution, (Schwartz, et. al. 2006), such as the SKR. This makes sense given that the reason that these species have small habitats in the first place is that they are "habitat specialists," meaning they can only survive in a very specific set of climatic/habitat conditions. (Schwartz, et al., 2006).

The DEIR should have disclosed this threat to species, and discussed the potentiality of the project contributing to the massive problem. The lead agency must include such an analysis in their subsequent EIR. The EIR must use its best efforts to find out and disclose all it reasonably can about the impacts of climate change on the environment and—most importantly—use that information to form an educated opinion about how to plan and adapt for the impacts of climate change.

Such an analysis is particularly important to include given that the DEIR has already concluded that the project will have a significant contribution to climate change. Because the project will have a significant impact to climate change, the project will also have a significant

contribution to the various secondary effects resulting from climate change, including massive migration shifts and species extinction. Further, it is irrelevant that species that are currently receiving the most attention for being at risk of extinction, such as the pika or the polar bear, are not located anywhere near the project site. Climate change is not localized in its effects so that any GHG emissions will cumulatively contribute to climate change induced species extinction.

Further, we are just beginning to understand how climate change is impacting species. Little information exists as to how climate change is impacting species that currently exist within the vicinity of the project site such as the burrowing owl or the SKR. However, what data we do have indicates that these species may as well be feeling the effects of climate change. Here, the EIR has not conducted an adequate inquiry into what the potential impacts from climate change to species such as the burrowing owl may be.

V. THE EIR FAILS TO ADEQUATELY ANALYZE AND MITIGATE IMPACTS FROM ENERGY USE AND ASSOCIATED FACILITIES

The EIR fails to adequately disclose, analyze, and mitigate the Project's related energy use and facilities including the impacts outlined in Appendix F of the CEQA Guidelines. Among other requirements, Appendix F requires an EIR to analyze the "effects of the project on local and regional energy supplies and on requirements for additional capacity" and the "effects of the project on peak and base period demands for electricity and other forms of energy." Unfortunately the EIR fails to conduct an adequate analysis of the project on local and regional energy supplies; instead it includes vague references to facility upgrades that may be required. (DEIR at 4.16-37, 4.16-38). The EIR similarly fails to analyze the effects of the Project on peak and base electrical demands. The EIR defers analysis of the effects until an undefined later date and will rely on local stations "as long as capacity is still available at that station." (DEIR at 4.16-37).

The EIR claims to analyze whether the "proposed WLC project require the construction of new electrical and/or natural gas facilities or expansion of existing facilities, the construction of which would cause significant environmental effects." (DEIR at 4.16-36). However, the EIR simply lists potential electrical upgrades that may be required but doesn't analyze any impacts of those new facilities. (DEIR at 4.16-37, 4.16-38). The failure to analyze all of the necessary components of the project improperly downplays the Project's impacts and fails to provide a stable description of the Project itself. The EIR also engages in an inconsistent analysis of whether the Moreno Valley Electric Utility or Southern California Edison will provide the necessary electrical upgrades for the Project, which fails to provide the public and decision makers with a stable and consistent project description. (DEIR at 3.51, DEIR at 4.16-37). Similarly the EIR's analysis provides a shifting and variable description of whether on-site solar energy would be integrated into the Project.

VI. THE EIR FAILS TO ADEQUATELY ANALYZE A REASONABLE RANGE OF ALTERNATIVES

The EIR fails to consider a meaningful analysis of reasonable alternatives to the Project in order to lessen or avoid the Project's significant impacts. CEQA mandates that significant environmental damage be avoided or substantially lessened where feasible. Pub. Res. Code § 21002; Guidelines §§ 15002(a)(3), 15021(a)(2), 15126(d). A rigorous analysis of reasonable alternatives to the project must be provided to comply with this strict mandate. "Without meaningful analysis of alternatives in the EIR, neither courts nor the public can fulfill their proper roles in the CEQA process." *Laurel Heights Improvement Ass'n v. Regents of University of California*, 47 Cal.3d 376, 404 (1988). Moreover, "[a] potential alternative should not be excluded from consideration merely because it 'would impede to some degree the attainment of the project objectives, or would be more costly" even when that alternative includes Project development on an alternative site. *Save Round Valley Alliance v. County of Inyo*, 157 Cal. App. 4th 1437, 1456-57 (2007) (quotations omitted).

As discussed in comments on the NOP the EIR must consider a reasonable range of alternatives including the feasibility of rail service to the project and a site served by rail. Unfortunately the EIR fails to conduct that analysis. The EIR also conducts a faulty alternative site analysis claiming that the only feasible alternative site would include "a contiguous 2,635-acre site for 41 million square feet." (DEIR at 6-38). This improperly narrow project objective fails to permit the EIR to conduct an analysis of a reasonable range of alternatives.

VII. THE EIR MUST BE RECIRCULATED FOR PUBLIC REVIEW AND COMMENT

A lead agency must re-circulate an EIR for further public comment under any of four circumstances:

> (1) When the new information shows a new, substantial environmental impact resulting either from the project or from a mitigation measure;
> (2) When the new information shows a substantial increase in the severity of an environmental impact, except that recirculation would not be required if mitigation that reduces the impact to insignificance is adopted;
> (3) When the new information shows a feasible alternative or mitigation measure that clearly would lessen the environmental impacts of a project and the project proponent declines to adopt the mitigation measure; or
> (4) When the draft EIR was "so fundamentally and basically inadequate and conclusory in nature" that public comment on the draft EIR was essentially meaningless.

CEQA Guidelines §15088.5.

Based on the comments above, it is clear that the EIR must be re-drafted and re-circulated. Conditions (1) and (2) above will be met by meaningful and adequate discussion of the project itself and the project's impacts to biological resources and greenhouse gases. Failure

to address these impacts is inadequate and requires further analysis and recirculation. The combined effect of these omissions makes it clear that the fourth condition has also been met.

CONCLUSION

Thank you for your attention to these comments. We look forward to working with the County to assure that the EIR conforms to the requirements of CEQA to assure that all significant impacts to the environment are fully analyzed, mitigated or avoided. Should you have any questions feel free to contact Jonathan Evans at the contact information listed above.

The Center for Biological Diversity, and San Bernardino Valley Audubon Society wish to be placed on the mailing list for all future notices regarding this project. Please mail all notices to CBD at the address listed above (via email at jevans@biologicaldiversity.org); and San Bernardino Valley Audubon Society at drewf3@verizon.net and P. O. Box 10973, San Bernardino, California 92423-0973.

Best regards,

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Attachment A

Ecological Value of Riparian Areas and Wetlands

Riparian areas support a disproportionate share of the State's biodiversity and preservation of these vegetation communities is critical to the survival of rare, sensitive, threatened and endangered plants and wildlife. CDFG 2003.

> Over 225 species of birds, mammals, reptiles, and amphibians depend upon California's riparian habitats (Knopf et al. 1988, Saab et al. 1995, Dobkin et al. 1998). In addition, these beautiful examples of California's biodiversity can help reduce flood flows and flood damage, improve groundwater recharge, prevent damaging chemicals and other compounds from reaching open water, and reduce wind and erosion on adjacent lands. . . Unfortunately, human activities have destroyed or fragmented most of this valuable habitat over the past 150 years. No one has documented how much riparian habitat existed in California before 1850. However, a 1984 study estimated that riparian vegetation in the Central Valley and desert regions represented from two to five percent of the pre-1850 amount… Because they are both biologically rich and severely degraded, riparian areas have been identified as the most critical habitat for conserving neotropical migrant birds.

CDFG 2003. (emphasis added).

Wetlands and riparian habitats are truly among the rarest and most sensitive ecosystem types in California. These areas are critical for biodiversity, harboring high concentrations of threatened, endangered, and sensitive species. Krueper (1992) estimates that wetland and riparian habitat occupies less than 1% of the total land area in the western U.S., yet is critical for up to 80% of terrestrial vertebrate species. Riparian habitats are relatively rare in the California deserts, but extensively degraded. As noted above, more than 90% of the State's riparian areas and wetlands have already been lost, but while there are fewer acres of riparian habitat than other plant communities, riparian areas sustain a disproportionately high number of aquatic and terrestrial wildlife species (Faber et al. 1989). Riparian communities in the arid areas of the State are typically surrounded by far drier environments, and the water and riparian vegetation that they provide are vitally important to many species (Krueper 1992).

Terrestrial vertebrates in the State rely heavily on riparian habitats for various life stages, as noted above, the California Department of Fish and Game estimates that over 225 species of birds, mammals, reptiles, and amphibians depend upon California's riparian habitats. A recent study found that there are approximately 173 terrestrial vertebrates in the eastern United States alone that require riparian habitats for some lifehistory function (26 mammals, 27 birds, 50 reptiles, and 70 Amphibians) (Crawford 2007).

Direct and Indirect Impacts to Wetlands and Riparian Areas

Nonpoint source pollution from activities such as urban runoff, agriculture, and habitat modification are considered the primary source of pollutants to waters of the US (USEPA 2002). Many wetlands that persist are significantly degraded through contamination by pollution from urban and agricultural runoff (Dahl 2006).

It is important to recognize that the destruction and modification of riparian and wetland habitat can have broad indirect effects within a watershed and analyze the impacts of those impacts.

> Artificial flow regulation with local or upstream dams and diversions, as well as channel alteration and containment with levees and channelization, can alter plant communities at watershed scales (Ohmart 1994, Hunter et al. 1999). Transportation departments may channelize or re-direct sheet flow to manage rainfall events, altering hydrologic input to desert wash habitats (The Nature Conservancy 2001). Vegetation, and therefore vegetation-dependent wildlife, can be dramatically affected by distant upstream water management practices (Ohmart 1994), so that restoration efforts at specific sites may depend ultimately on the cooperation of partners managing water in the wider landscape.

(CalPIF, The Draft Desert Bird Conservation Plan, 2006).

Specific types of development can have broad ranging effects. Roads are responsible for a suite of indirect effects that impact species dynamics, soil characteristics, water flow regimes, and vegetation cover (Bashore et al. 1985; Reijnen et al. 1996, Forman et al. 2003). The degree of indirect effect varies in relation to the distance from a road, extending to what is known as the "road effect zone" or the outer limit of significant ecological effect (Forman et al. 1997; Forman and Deblinger 1998, 1999). Forman and Deblinger (2000) found that the effects of all nine ecological factors studied extended more than 100 m from the road, with some extending outwards of 1 km of the road. The road-effect zone was asymmetric, had convoluted boundaries and a few long fingers and averaged approximately 600m in width.

Indirect effects often have such broad implications because the "road effect zone," or the outer limit of a significant ecological effect, extends much further than the actual road, route or trail (Forman 2000). Forman et al. (2003) state all roads not only have a physical footprint, but also a "virtual footprint" surrounding their actual location. This virtual footprint includes the "accumulated effect over time and space of all of the activities that roads induce or allow, as well as all of the ecological effects of those activities (Forman et al. 2003)." It is estimated that 19% of the land surface in the U.S. is directly affected by roads, while in total, 22% of the U.S may be ecologically altered by the road network (Forman 2000).

Mitigation for Impacts to Wetlands and Riparian Areas

To protect stream amphibians and other wildlife dependent on riparian areas and wetlands, land managers and policy makers must consider conserving more than aquatic

resources alone (Crawford 2007). Developing core terrestrial habitat estimates and buffer zone widths for wildlife populations is a critical first step in the conservation of many semiaquatic organisms and protecting biodiversity (Crawford 2007). Typically when buffer zones are determined to mitigate edge effects, they are based on criteria that protect aquatic resources alone and do not consider impacts to wildlife, semiaquatic species, and other terrestrial resources (Semlitsch & Bodie 1998; Semlitsch & Jensen 2001). For example, in Oregon, the minimum buffer strip required to protect water resources is 6.1 m, although a minimum buffer of 20 m is needed to protect certain salamander species (Vesely & McComb 2002).

Maintaining appropriate, fully protected buffer strips between streams and upland soil-disturbing activities is critical to sustaining aquatic and riparian ecosystems (Erman et al. 1996). Most of the current literature about estimating appropriate widths of riparian buffer strips takes into account the complexity of landscapes. Research conducted as part of the Sierra Nevada Ecosystem Project (Erman et al. 1996) provided guidance for designating riparian buffers that incorporate steepness of surrounding slopes and erodability of soils: this research concluded that if the average slope were 25 percent, the buffer width should be 524 feet on either side of the stream, and if the slope were 50 percent, the buffer should be 672 feet.

Riparian forests have been found to reduce delivery of nonpoint-source pollution to streams and lakes in many types of watersheds (Vellidis et al. 2002, 2003a; Lowrance et al. 1983, 1984a, 1984b, 1985a, 1985b, 1997). Riparian forest ecosystems are excellent nutrient and herbicide sinks that reduce the pollutant discharge from surrounding agroecosystems (Peterjohn and Correll 1984). For example, studies from coastal plain agricultural watersheds reveal that riparian forest ecosystems are excellent nutrient sinks and buffer the discharge from surrounding agroecosystems (Lowrance 1984a). Riparian buffers are especially important on small streams where intense interaction between terrestrial and aquatic ecosystems occurs (Vellidis et al., 2003b), because first- and second-order streams comprise nearly three-quarters of the total stream length in the US (Leopold et al., 1964).

Attachment B

Greenhouse Gas Mitigation Measures

Table 16
Mitigation Measure Summary

Mitigation Measure	Applicable Project/Source Type[1]	Effective	Feasible (Yes/No)			Secondary Effects (Yes/No)	Agency/Organization/Other[6]	Description/Comments
		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
Transportation								
Bicycle/Pedestrian/Transit Measures								
MM T-1: Bike Parking	LD (C, M), I, SP, TP, AQP, RR, P/Mobile	1%-5%/High: CCAP presents combined % reductions for a range of mitigation measures (Dierkers et al. 2007). SMAQMD allocates combined reductions among individual measures (e.g., 2.5% reduction for all bicycle-related measures and one-quarter of 2.5% for each individual measure) (TIAX 2005, EDAW 2006, SMAQMD 2007). VTPI presents % reductions for showers and combined measures in the TDM encyclopedia (VTPI	Yes: Lockers ($1,200-$2,950, $700/bike on average), Racks ($70-$2,000, $70/bike on average).	Yes (Caltrans 2005, Dierkers et al. 2007, VTPI 2007)	Yes (Caltrans 2005, Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs	Caltrans, Portland Bicycle Master Plan (City of Portland 1998), CCAP Transportation Emissions Guidebook (Dierkers et al. 2007), SMAQMD Recommended Guidance for Land Use Emission Reductions (SMAQMD 2007), VTPI, CA air quality management and control districts, and cities/counties.	Nonresidential projects provide plentiful short- and long-term bicycle parking facilities to meet peak season maximum demand (e.g., one bike rack space per 20 vehicle/employee parking spaces.
MM T-2: End of Trip Facilities	LD (C, M), I, SP, TP, AQP, RR, P/Mobile		Yes	Yes (Caltrans 2005, Dierkers et al. 2007, VTPI 2007)	Yes (Caltrans 2005, Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs		Nonresidential projects provide "end-of-trip" facilities including showers, lockers, and changing space (e.g., four clothes lockers and one shower provided for every 80 employee parking spaces, separate facilities for each gender for projects with 160 or more employee parking spaces).
MM T-3: Bike-Parking at Multi-	LD (R, M), SP, AQP, RR,		Yes: Lockers ($1,200-	Yes (Caltrans 2005,	Yes (Caltrans	Adverse: No Beneficial:		Long-term bicycle parking is provided at apartment

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
Unit Residential	P/Mobile	2007). JSA bases estimates on CCAP information (JSA 2004).	$2,950, $700/bike on average), Racks ($70-$2,000, $70/bike on average).	Dierkers et al. 2007, VTPI 2007)	2005, Dierkers et al. 2007, VTPI 2007)	CAPs, TACs		complexes or condominiums without garages (e.g., one long-term bicycle parking space for each unit without a garage). Long-term facilities shall consist of one of the following: a bicycle locker, a locked room with standard racks and access limited to bicyclists only, or a standard rack in a location that is staffed and/or monitored by video surveillance 24 hours per day.
MM T-4: Proximity to Bike Path/Bike Lanes	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile		Yes	Yes (Caltrans 2005, Dierkers et al. 2007, VTPI 2007)	Yes (Caltrans 2005, Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs		Entire project is located within one-half mile of an existing/planned Class I or Class II bike lane and project design includes a comparable network that connects the project uses to the existing offsite facility. Project design includes a designated bicycle route connecting all units, on-site bicycle parking facilities, offsite bicycle facilities, site entrances, and primary building entrances to existing Class I or Class II bike lane(s) within one-half mile. Bicycle route connects to all streets contiguous with project site. Bicycle route has minimum conflicts with automobile parking and circulation

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								facilities. All streets internal to the project wider than 75 feet have Class II bicycle lanes on both sides.

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MM T-5: Pedestrian Network	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	1%-10%/High: CCAP presents combined % reductions for a range of mitigation measures (Dierkers et al. 2007). SMAQMD allocates 1% for each individual measure (TIAX 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs	CCAP Transportation Emissions Guidebook (Dierkers et al. 2007), SMAQMD Recommended Guidance for Land Use Emission Reductions (SMAQMD 2007), VTPI, CA air quality management and control districts, and cities/counties.	The project provides a pedestrian access network that internally links all uses and connects to all existing/planned external streets and pedestrian facilities contiguous with the project site. Project design includes a designated pedestrian route interconnecting all internal uses, site entrances, primary building entrances, public facilities, and adjacent uses to existing external pedestrian facilities and streets. Route has minimal conflict with parking and automobile circulation facilities. Streets (with the exception of alleys) within the project have sidewalks on both sides. All sidewalks internal and adjacent to project site are minimum of five feet wide. All sidewalks feature vertical curbs. 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.
MM T-6: Pedestrian	LD (R, C, M), I, SP, TP,		Yes	Yes (Dierkers et al. 2007,	Yes (Dierkers et	Adverse: No Beneficial:		Site design and building placement minimize barriers to

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Barriers Minimized	AQP, RR, P/Mobile			VTPI 2007)	al. 2007, VTPI 2007)	CAPs, TACs		pedestrian access and interconnectivity. Physical barriers such as walls, berms, landscaping, and slopes between residential and nonresidential uses that impede bicycle or pedestrian circulation are eliminated.
MM T-7: Bus Shelter for Existing/Planned Transit Service	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	1%-2%/High: CCAP presents these % reductions (Dierkers et al., 2007). SMAQMD assigns from .25%-1%, depending on headway frequency (TIAX 2005, EDAW 2006, SMAQMD 2007).	Yes: $15,000-$70,000.	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs	CCAP Transportation Emissions Guidebook (Dierkers et al. 2007), SMAQMD Recommended Guidance for Land Use Emission Reductions (SMAQMD 2007), VTPI, City of Calgary (City of Calgary 2004), CA air quality management and control districts, and cities/counties.	Bus or streetcar service provides headways of one hour or less for stops within one-quarter mile; project provides safe and convenient bicycle/pedestrian access to transit stop(s) and provides essential transit stop improvements (i.e., shelters, route information, benches, and lighting).

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
MM T-8: Traffic Calming	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	1%-10%/High: CCAP presents combined % reductions for a range of mitigation measures (Dierkers et al. 2007). SMAQMD allocates .25%-1.0% for each individual measure depending on percent of intersections and streets with improvements (TIAX 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs	CCAP Transportation Emissions Guidebook (Dierkers et al. 2007), SMAQMD Recommended Guidance for Land Use Emission Reductions (SMAQMD 2007), VTPI, CA air quality management and control districts, and cities/counties.	Project design includes pedestrian/bicycle safety and traffic calming measures in excess of jurisdiction requirements. Roadways are designed to reduce motor vehicle speeds and encourage pedestrian and bicycle trips by featuring traffic calming features. All sidewalks internal and adjacent to project site are minimum of five feet wide. All sidewalks feature vertical curbs. Roadways that converge internally within the project are routed in such a way as to avoid "skewed intersections;" which are intersections that meet at acute, rather than right, angles. Intersections internal and adjacent to the project feature one or more of the following pedestrian safety/traffic calming design techniques: marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, raised intersections, median islands, tight corner radii, and roundabouts or mini-circles. Streets internal and adjacent to the project feature pedestrian safety/traffic calming measures such as on-street parking, planter strips with street trees,

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								and chicanes/chokers (variations in road width to discourage high-speed travel).
Parking Measures								
MM T-9: Paid Parking (Parking Cash Out)	LD (C, M), I, SP, TP, AQP, RR, P/Mobile	1%-30%/High: CCAP presents a range of 15%-30% reduction for parking programs (Dierkers et al. 2007). SMAQMD presents a range of 1.0%-7.2%, depending on cost/day and distance to transit (TIAX 2005, EDAW 2006, SMAQMD 2007). Shoupe presents a 21% reduction [$5/day for commuters to downtown LA, with elasticity of -0.18 (e.g., if price increases 10%, then solo driving goes down by 1.8% more)] (Shoupe 2005). Urban Transit Institute	Yes: Vary by location and project size.	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs	CCAP Transportation Emissions Guidebook (Dierkers et al. 2007), SMAQMD Recommended Guidance for Land Use Emission Reductions (SMAQMD 2007), VTPI, CA air quality management and control districts, and cities/counties.	Project provides employee and/or customer paid parking system. Project must have a permanent and enforceable method of maintaining user fees for all parking facilities. The facility may not provide customer or employee validations. Daily charge for parking must be equal to or greater than the cost of a transit day/monthly pass plus 20%.

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
		presents a range of 1%-10% reduction in trips to central city sites, and 2%-4% in suburban sites (VTPI 2007).						
MM T-10: Minimum Parking	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	1%-30%/High: CCAP presents a range of 15%-30% reduction for parking programs (Dierkers et al. 2007). SMAQMD presents a maximum of 6% (Nelson/Nygaard Consulting Associates, 2005, TIAX 2005, EDAW 2006).	Yes	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007), Note that in certain areas of the state, the minimum parking required by code is greater than the peak period parking demand for most land uses. Simply meeting minimum code requirements in these areas would not result in an emissions reduction.	Adverse: No Beneficial: CAPs, TACs	CCAP Transportation Emissions Guidebook (Dierkers et al. 2007), SMAQMD Recommended Guidance for Land Use Emission Reductions (SMAQMD 2007), VTPI, Governor's Office of Smart Growth (Annapolis, Maryland) (Zimbler), CA air quality management and control districts, and cities/counties.	Provide minimum amount of parking required. Once land uses are determined, the trip reduction factor associated with this measure can be determined by utilizing the ITE parking generation publication. The reduction in trips can be computed as shown below by the ratio of the difference of minimum parking required by code and ITE peak parking demand to ITE peak parking demand for the land uses multiplied by 50%. Percent Trip Reduction = 50 * [(min parking required by code – ITE peak parking demand)/ (ITE peak parking demand)]

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MM T-11: Parking Reduction Beyond Code/Shared Parking	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	1%-30%/High: CCAP presents a range of 15%-30% reduction for parking programs (Dierkers et al. 2007). SMAQMD presents a maximum of 12% (Nelson/Nygaard, 2005, TIAX 2005, EDAW 2006).	Yes	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs		Provide parking reduction less than code. This measure can be readily implemented through a shared parking strategy, wherein parking is utilized jointly among different land uses, buildings, and facilities in an area that experience peak parking needs at different times of day and day of the week.
MM T-12: Pedestrian Pathway Through Parking	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	1%-4%/Moderate: CCAP presents combined % reductions for a range of mitigation measures (Dierkers et al. 2007). SMAQMD allocates 0.5% reduction for this measure (TIAX 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs		Provide a parking lot design that includes clearly marked and shaded pedestrian pathways between transit facilities and building entrances.

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MM T-13: Off - Street Parking	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	1%-4%/Moderate: CCAP presents combined % reductions for a range of mitigation measures (Dierkers et al. 2007). SMAQMD allocates a range of 0.1%-1.5% for this measure (TIAX 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs		Parking facilities are not adjacent to street frontage.
MM T-14: Parking Area Tree Cover	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	Annual net CO_2 reduction of 3.1 kg/m^2 canopy cover/Moderate (McPherson 2001).	Yes: $19 per new tree for CA, cost varies for maintenance, removal and replacement (McPherson 2001).	Yes	Yes	Adverse: VOCs Beneficial: CAPs, TACs	AG, State of CA Department of Justice (Goldberg 2007) and cities/counties (e.g., parking lot ordinances in Sacramento, Davis, and Los Angeles, CA).	Provide parking lot areas with 50% tree cover within 10 years of construction, in particular low emitting, low maintenance, native drought resistant trees. Reduces urban heat island effect and requirement for air conditioning, effective when combined with other measures (e.g., electrical maintenance equipment and reflective paving material).
MM T-15: Valet Bicycle Parking	LD (C, M), SP, AQP, TP, RR, P/Mobile	NA/Low	Yes	Yes	Yes: Raley Field (Sacramento, CA)	Adverse: No Beneficial: CAPs, TACs	Raley Field (Sacramento, CA).	Provide spaces for the operation of valet bicycle parking at community event "centers" such as amphitheaters, theaters, and stadiums.
MM T-16: Garage Bicycle Storage	LD (R, M), SP, AQP, TP, RR, P/Mobile	NA/Low	Yes: Less than $200/multiple bike rack.	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	City of Fairview, OR	Provide storage space in one-car garages for bicycles and bicycle trailers.

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MM T-17: Preferential Parking for EVs/CNG Vehicles	LD (C, M), I, SP, TP, AQP, RR, P/Mobile	NA/Low	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	USGBC, CA air quality management and control districts and cities/counties (e.g., BAAQMD).	Provide preferential parking space locations for EVs/CNG vehicles.
MM T-18: Reduced/No Parking Fee for EVs/CNG Vehicles	LD (C, M), I, SP, TP, AQP, RR, P/Mobile	NA/Low	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	Hotels (e.g., Argonaut in San Francisco, CA)	Provide a reduced/no parking fee for EVs/CNG vehicles.

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Miscellaneous Measure								
MM T-19: TMA Membership	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	1%-28%/High: CCAP presents a range of 3%-25% for TDMs with complementary transit and land use measures (Dierkers et al. 2007). VTPI presents a range of 6%-7% in the TDM encyclopedia (VTPI 2007). URBEMIS offers a 2%-10% range in reductions for a TDM that has 5 elements that are pedestrian and transit friendly and 1%-5% for 3 elements. SMAQMD presents a reduction of 5% (TIAX 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Include permanent TMA membership and funding requirement. Funding to be provided by Community Facilities District or County Service Area or other nonrevocable funding mechanism. TDMs have been shown to reduce employee vehicle trips up to 28% with the largest reductions achieved through parking pricing and transit passes. The impact depends on the travel alternatives.
MM T-20: ULEV	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	NA/Low	Yes: Higher than corresponding gasoline models.	Yes	Yes: Fueling stations might not be readily available depending on location. More than 900 E85 fueling	Adverse: No Beneficial: CAPs, TACs	DGS, CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Use of and/or provide ULEV that are 50% cleaner than average new model cars (e.g., natural gas, ethanol, electric).

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
					stations in the U.S., 5 in CA. Vehicles available in select regions only			
MM T-21: Flex Fuel Vehicles	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	5466.97 lb GHG/year/Low (DOE Fuel Economy)	Yes: E85 costs less than gasoline per gallon, but results in lower fuel economy.	Yes	Yes: More than 900 E85 fueling stations in the U.S., 5 in CA. Vehicles available in select regions only	Adverse: Yes Issues with the energy intensive ethanol production process (e.g., wastewater treatment requirements). Beneficial: CAPs, TACs	DGS, CA air quality management and control districts and cities/counties (e.g., SJVAPCD).	Use of and/or provide vehicles that utilize gasoline/ethanol blends (e.g., E85).
Design								
Commercial & Residential Building Design Measures								
MM D-1: Office/Mixed Use Density	LD (C, M), SP, TP, AQP, RR, P/Mobile	0.05%-2%/Moderate: This range is from SMAQMD, depending	Yes	Yes (VTPI 2007)	Yes (VTPI 2007)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties	Project provides high density office or mixed-use proximate to transit. Project must provide

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		on FAR and headway frequencies (Nelson/Nygaard Consulting Associates 2005, EDAW 2006, SMAQMD 2007).					(e.g., SMAQMD).	safe and convenient pedestrian and bicycle access to all transit stops within one-quarter mile.
MM D-2: Orientation to Existing/Planned Transit, Bikeway, or Pedestrian Corridor	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	0.4%-1%/Moderate: CCAP attributes a 0.5% reduction per 1% improvement in transit frequency (Dierkers et al. 2007). SMAQMD presents a range of 0.25%-5% (JSA 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (Dierkers et al. 2007)	Yes (Dierkers et al. 2007)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project is oriented towards existing transit, bicycle, or pedestrian corridor. Setback distance between project and existing or planned adjacent uses is minimized or nonexistent. Setback distance between different buildings on project site is minimized. Setbacks between project buildings and planned or existing sidewalks are minimized. Buildings are oriented towards existing or planned street frontage. Primary entrances to buildings are located along planned or existing public street frontage. Project provides bicycle access to any planned bicycle corridor(s). Project provides pedestrian access to any planned pedestrian corridor(s).
MM D-3: Services Operational	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	0.5%-5%/Moderate	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project provides on-site shops and services for employees.

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MM D-4: Residential Density (Employ Sufficient Density for New Residential Development to Support the Use of Public Transit)	LD (R, M), SP, TP, AQP, RR, P/Mobile	1%-40%/High: #7, EPA presents a range of 32%-40% (EPA 2006). SMAQMD presents a range of 1%-12% depending on density and headway frequencies (Nelson/Nygaard Consulting Associates 2005, JSA 2005, EDAW 2006, SMAQMD 2007). Nelson/Nygaard presents a trip reduction formula: Trip Reduction = 0.6*(1-(19749*((4.814+ households per residential acre)/(4.814+7.14))^-06.39)/25914).	Yes	Yes (VTPI 2007, Holtzclaw 2007)	Yes (VTPI 2007, Holtzclaw 2007)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project provides high-density residential development. Transit facilities must be within one-quarter mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within one-quarter mile of project border.
MM D-5: Street Grid	LD (R, C, M), I, SP, TP, AQP, RR,	1%/Moderate: SMAQMD presents this % reduction (JSA	Yes	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007,	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties	Multiple and direct street routing (grid style). This measure only applies to projects

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	P/Mobile	2005, EDAW 2006, SMAQMD 2007).			VTPI 2007)		(e.g., SMAQMD).	with an internal CF >/= 0.80, and average of one-quarter mile or less between external connections along perimeter of project. [CF= # of intersections / (# of cul-de-sacs + intersections)]. Cul-de-sacs with bicycle/pedestrian through access may be considered "complete intersections" when calculating the project's internal connectivity factor. External connections are bike/pedestrian pathways and access points, or streets with safe and convenient bicycle and pedestrian access that connect the project to adjacent streets, sidewalks, and uses. If project site is adjacent to undeveloped land; streets, pathways, access points, and right-of-ways that provide for future access to adjacent uses may count for up to 50% of the external connections. Block perimeter (the sum of the measurement of the length of all block sides) is limited to no more than 1,350 feet. Streets internal to the project should connect to streets external to the project whenever possible.

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MM D-6: NEV Access	LD (R, C, M), SP, TP, AQP, RR, P/Mobile	0.5%-1.5%/Low: SMAQMD presents this % reduction (EDAW 2006, SMAQMD 2007).	Yes	Yes (Litman 1999, Sperling 1994)	Yes (Litman 1999, Sperling 1994)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Make physical development consistent with requirements for neighborhood electric vehicles. Current studies show that for most trips, NEVs do not replace gas-fueled vehicles as the primary vehicle.
MM D-7: Affordable Housing Component	LD (R, M), SP, TP, AQP, RR, P/Mobile	0.4%-6%/Moderate: SMAQMD presents this % reduction (Nelson/Nygaard Consulting Associates 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Residential development projects of five or more dwelling units provide a deed-restricted low-income housing component on-site (or as defined in the code). Developers who pay into In-Lieu Fee Programs are not considered eligible to receive credit for this measure. The award of emission reduction credit shall be based only on the proportion of affordable housing developed on-site because in-lieu programs simply induce a net increase in development. Percentage reduction shall be calculated according to the following formula:

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
								% reduction = % units deed-restricted below market rate housing * 0.04
MM D-8: Recharging Area	LD (R, M), SP, TP, AQP, RR, P/Mobile	NA/Low	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs		Provide residential buildings with a "utility" room or space for recharging batteries, whether for use in a car, electric lawnmower, other electric landscaping equipment, or even batteries for small items such as flashlights.
Mixed-Use Development Measures								
MM D-9: Urban Mixed-Use	LD (M), SP, TP, AQP, RR, P/Mobile	3%-9%/Moderate: SMAQMD presents this % reduction (TIAX 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (EPA 2006)	Yes (EPA 2006)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Development of projects predominantly characterized by properties on which various uses, such as office, commercial, institutional, and residential, are combined in a single building or on a single site in an integrated development project with functional interrelationships and a coherent physical design.
MM D-10: Suburban Mixed-Use	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	3%/Moderate: SMAQMD presents this % reduction (TIAX 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (EPA 2006)	Yes (EPA 2006)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Have at least three of the following on site and/or offsite within one-quarter mile: Residential Development, Retail Development, Park, Open Space, or Office.
MM D-11: Other Mixed-Use	LD (R, M), SP, TP, AQP, RR, P/Mobile	1%/Moderate: SMAQMD presents this % reduction (TIAX 2005, EDAW	Yes	Yes (EPA 2006)	Yes (EPA 2006)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	All residential units are within one-quarter mile of parks, schools or other civic uses.

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		2006, SMAQMD 2007).						
MM D-12: Infill Development	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	3%-30%/High: Infill development reduces vehicle trips and VMT by 3% and 20%, respectively (Fehr & Peers 2007). CCAP identifies a site level VMT reduction range of 20%-30% (Dierkers et al. 2007).	Yes	Yes (Dierkers et al. 2007)	Yes (Dierkers et al. 2007)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project site is on a vacant infill site, redevelopment area, or brownfield or greyfield lot that is highly accessible to regional destinations, where the destinations rating of the development site (measured as the weighted average travel time to all other regional destinations) is improved by 100% when compared to an alternate greenfield site.
Miscellaneous Measures								
MM D-13: Electric Lawnmower	LD (R, M), SP, AQP, RR, P/Area	1%/Low: SMAQMD presents this % reduction (EDAW 2006, SMAQMD 2007).	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Provide a complimentary electric lawnmower to each residential buyer.

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MM D-14: Enhanced Recycling/Waste Reduction, Reuse, Composting	LD (R, C, M), I, SP, AQP, RR, P/Stationary & Area	NA/Low	Yes	Yes	Yes: Association with social awareness.	Adverse: No Beneficial: CAPs, TACs	CIWMB	Provide infrastructure/education that promotes the avoidance of products with excessive packaging, recycle, buying of refills, separating of food and yard waste for composting, and using rechargeable batteries.
MM D-15: LEED Certification	LD (R, C, M), I, SP, AQP, RR, P/Stationary & Area	NA/Moderate	Yes: Receive tax rebates, incentives (e.g., EDAW San Diego office interior remodel cost $1,700,000 for 32,500 square feet) (USGBC 2007)	Yes	Yes: More than 700 buildings of different certifications in CA (USGBC 2007).	Adverse: No Beneficial: CAPs, TACs	USGBC, CA air quality management and control districts and cities/counties (e.g., BAAQMD).	LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.
MM D-16: Retro-Commissioning	LD (C, M), I, SP, AQP, RR, P/Stationary & Area	8%-10% reduction in energy usage/Moderate: (Mills et al. 2004)	Yes: Average $0.28/square feet, varies with building size (Haasl and Sharp 1999).	Yes	Yes: 27 projects underway in CA, 21 more to be completed in 2007, mostly state buildings owned by DGS (DGS 2007).	Adverse: No Beneficial: CAPs, TACs	DGS, CA air quality management and control districts and cities/counties (e.g., BAAQMD).	The process ensures that all building systems perform interactively according to the contract documents, the design intent and the owner's operational needs to optimize energy performance.
MM D-17 Landscaping	LD (R, C, M), I, SP, AQP, RR,	NA/Low	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	Alliance for the Chesapeake Bay, EPA Green Landscaping	Project shall use drought resistant native trees, trees with low emissions and high carbon

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	P/Stationary & Area						Resources	sequestration potential. Evergreen trees on the north and west sides afford the best protection from the setting summer sun and cold winter winds. Additional considerations include the use of deciduous trees on the south side of the house that will admit summer sun; evergreen plantings on the north side will slow cold winter winds; constructing a natural planted channel to funnel summer cooling breezes into the house. Neighborhood CCR's not requiring that front and side yards of single family homes be planted with turf grass. Vegetable gardens, bunch grass, and low-water landscaping shall also be permitted, or even encouraged.
MM D-18: Local Farmers' Market	LD (M), SP/Mobile, Stationary, &	NA/Low	Yes	Yes	Yes: Associated with social	Adverse: No Beneficial: CAPs, TACs	Cities/counties (e.g., Davis, Sacramento)	Project shall dedicate space in a centralized, accessible location for a weekly farmers' market.

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	Area				choice and public awareness.			
MM D-19: Community Gardens	LD (M), SP/Mobile, Stationary, & Area	NA/Low	Yes	Yes	Yes: Associated with social choice and public awareness.	Adverse: No Beneficial: CAPs, TACs	Cities/counties (e.g., Davis)	Project shall dedicate space for community gardens.
Energy Efficiency/Building Component								
MM E-1: High-Efficiency Pumps	LD (R, C, M), SP, AQP, RR, P/Stationary & Area	NA/Low	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., BAAQMD).	Project shall use high-efficiency pumps.
MM E-2: Wood Burning Fireplaces/Stoves	LD (R, M), SP, AQP, RR, P/Stationary & Area	NA/Low: EDAW 2006	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project does not feature fireplaces or wood burning stoves.
MM E-3: Natural Gas Stove	LD (R, M), SP, AQP, RR, P/Stationary & Area	NA/Low: EDAW 2006	Yes: Cost of stove—$350 (gas) and $360 (electric) same brand, total yearly cost of $42.17 as opposed to $56.65 for electric (Saving Electricity 2006).	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project features only natural gas or electric stoves in residences.

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MM E-4: Energy Star Roof	LD (R, C, M), I, SP, AQP, RR, P/Stationary & Area	0.5%-1%/Low: SMAQMD presents this % reduction (EDAW 2006, SMAQMD 2007).	Yes	Yes	Yes: 866 Energy Star labeled buildings in California (Energy Star 2007)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project installs Energy Star labeled roof materials.
MM E-5: On-site Renewable Energy System	LD (R, C, M), I, SP, AQP, RR, P/Stationary & Area	1%-3%/Moderate: SMAQMD presents this % reduction (USGBC 2002 and 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (USGBC 2002 and 2005)	Yes (USGBC 2002 and 2005)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project provides onsite renewable energy system(s). Nonpolluting and renewable energy potential includes solar, wind, geothermal, low-impact hydro, biomass and bio-gas strategies. When applying these strategies, projects may take advantage of net metering with the local utility.

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MM E-6: Exceed Title 24	LD (R, C, M), I, GSP, AQP, RR, P/Stationary & Area	1%/Moderate: SMAQMD presents this % reduction (EDAW 2006, SMAQMD 2007).	Yes	Yes (PG&E 2002, SMUD 2006)	Yes (PG&E 2002, SMUD 2006)	Adverse: No Beneficial: CAPs, TACs	PG&E, SMUD, CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project exceeds title 24 requirements by 20%.
MM E-7: Solar Orientation	LD (R, C, M), I, SP, AQP, RR, P/Stationary & Area	0.5%/Low: SMAQMD presents this % reduction (EDAW 2006, SMAQMD 2007).	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project orients 75% or more of homes and/or buildings to face either north or south (within 30° of N/S). Building design includes roof overhangs that are sufficient to block the high summer sun, but not the lower winter sun, from penetrating south facing windows. Trees, other landscaping features and other buildings are sited in such a way as to maximize shade in the summer and maximize solar access to walls and windows in the winter.
MM E-8: Nonroof Surfaces	LD (R, C, M), I, GSP, AQP, RR, P/Stationary & Area	1.0%/Low: SMAQMD presents this % reduction (EDAW 2006, SMAQMD 2007).	Yes	Yes (USGBC 2002 and 2005)	Yes (USGBC 2002 and 2005)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Provide shade (within 5 years) and/or use light-colored/high-albedo materials (reflectance of at least 0.3) and/or open grid pavement for at least 30% of the site's nonroof impervious surfaces, including parking lots, walkways, plazas, etc.; OR place a minimum of 50% of parking spaces underground or covered by structured parking; OR use an open-grid pavement system (less than 50% impervious) for a minimum of

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								50% of the parking lot area. The mitigation measure reduces heat islands (thermal gradient differences between developed and undeveloped areas to minimize impact on microclimate and human and wildlife habitats. This measure requires the use of patented or copyright protected methodologies created by the ASTM. The SRI is a measure of the constructed surface's ability to reflect solar heat, as shown by a small rise in temperature. It is defined so that a standard black (reflectance 0.05, emittance 0.90) is "0" and a standard white (reflectance 0.80, emittance 0.90) is 100. To calculate SRI for a given material, obtain the reflectance value and emittance value for the material. SRI is calculated according to ASTM E 1980-01. Reflectance is measured

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								according to ASTM E 903, ASTM E 1918, or ASTM C 1549. Emittance is measured according to ASTM E 408 or ASTM C 1371. Default values for some materials will be available in the LEED-NC v2.2 Reference Guide.
MM E-9: Low-Energy Cooling	LD (C, M), I, SP, AQP, RR, P/Stationary & Area	1%-10%/Low: EDAW presents this percent reduction range (EDAW 2006).	Yes	Yes (USGBC 2002 and 2005)	Yes (USGBC 2002 and 2005)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project optimizes building's thermal distribution by separating ventilation and thermal conditioning systems.
MM E-10: Green Roof	LD (R, C, M), I, SP, AQP, RR, P/Stationary & Area	1.0%/Moderate: SMAQMD presents this % reduction (EDAW 2006, SMAQMD 2007).	Yes	Yes (USGBC 2002 and 2005)	Yes (USGBC 2002 and 2005)	Adverse: Increased Water Consumption Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Install a vegetated roof that covers at least 50% of roof area. The reduction assumes that a vegetated roof is installed on a least 50% of the roof area or that a combination high albedo and vegetated roof surface is installed that meets the following standard: (Area of SRI Roof/0.75)+(Area of vegetated roof/0.5) >= Total Roof Area. Water consumption reduction measures shall be considered in the design of the green roof.
MM E-11: EV Charging Facilities	LD (C, M), SP, AQP, RR, P/Stationary & Area	NA/Low	Yes: $500-$5000/ vehicle site (PG&E 1999)	Yes	Yes: 381 facilities in CA (Clean Air Maps 2007).	Adverse: No Beneficial: CAPs, TACs	DOE, EERE, CA air quality management and control districts and cities/counties (e.g., BAAQMD).	Project installs EV charging facilities.
MM E-12:	LD (R, C, M),	NA/Low: Increasing	Yes: Light	Yes	Yes: Apply	Adverse: No		Project provides light-colored

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Light-Colored Paving	I, SP, AQP, RR, P/Stationary & Area	the albedo of 1,250 km of pavement by 0.25 would save cooling energy worth $15M per year.	colored aggregates and white cement are more expensive than gray cement. Certain blended cements are very light in color and may reflect similarly to white cement at an equivalent cost to normal gray cement.		natural sand or gravel colored single surface treatments to asphalt (EOE 2007).	Beneficial: CAPs, TACs		paving (e.g., increased albedo pavement).
MM E-13: Cool Roofs	LD (R, C, M), I, SP, AQP, RR, P/Stationary & Area	NA/Low	Yes: 0.75–1.5/square feet coating (EPA 2007a)	Yes	Yes: Over 90% of the roofs in the United States are dark colored	Adverse: No Beneficial: CAPs, TACs	CEC	Project provides cool roofs. Highly reflective, highly emissive roofing materials that stay 50-60°F cooler than a normal roof under a hot summer sun. CA's Cool Savings

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					(EPA 2007a).			Program provided rebates to building owners for installing roofing materials with high solar reflectance and thermal emittance. The highest rebate went to roofs on air conditioned buildings, while buildings with rooftop ducts and other nonresidential buildings were eligible for slightly less. The program aimed to reduce peak summer electricity demand and was administered by the CEC.
MM E-14: Solar Water Heaters	LD (R, M), SP, AQP, RR, P/Stationary & Area	20%–70% reduction in cooling energy needs/Moderate	Yes: $1675/20 square feet, requires a 50 gallon tank, annual operating cost of $176 (DOE 2007).	Yes	Yes: Based on solar orientation, building codes, zoning ordinances.	Adverse: No Beneficial: CAPs, TACs	Europe	Project provides solar water heaters.
MM E-15: Electric Yard Equipment Compatibility	LD (R, M), SP, AQP, RR, P/Stationary & Area	NA/Low	Yes: $75–$250/outlet from existing circuit (Cost Helper 2007).	Yes	Yes	Adverse: No Beneficial: CAPs, TACs		Project provides electrical outlets at building exterior areas.
MM E-16: Energy Efficient Appliance Standards	LD (R, C, M), SP, AQP, RR, P/Stationary & Area	NA/Low	Yes: Varies for each appliance—higher capital costs, lower operating costs (Energy	Yes	Yes: Major retail stores.	Adverse: No Beneficial: CAPs, TACs		Project uses energy efficient appliances (e.g., Energy Star).

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			Star 2007).					
MM E-17: Green Building Materials	LD (R, C, M), SP, AQP, RR, P/Stationary & Area	NA/Low: 25-30% more efficient on average.	Yes	Yes: BEES software allows users to balance the environmental and economic performance of building products; developed by NIST (NIST 2007).	Yes	Adverse: No Beneficial: CAPs, TACs		Project uses materials which are resource efficient, recycled, with long life cycles and manufactured in an environmentally friendly way.
MM E-18: Shading Mechanisms	LD (R, C, M), I, SP, AQP, RR, P/Stationary, & Area	NA/Low: Up to $450 annual energy savings (Energy Star 2007).	Yes: Higher capital costs, lower operating and maintenance costs (Energy Star 2007).	Yes	Yes: Major retail stores.	Adverse: No Beneficial: CAPs, TACs		Install energy-reducing shading mechanisms for windows, porch, patio and walkway overhangs.

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MM E-19: Ceiling/Whole-House Fans	LD (R, C, M), I, SP, AQP, RR, P/Stationary, & Area	NA/Low: 50% more efficient than conventional fans (Energy Star 2007).	Yes: $45-$200/fan, installation extra (Lowe's 2007).	Yes	Yes: Major retail stores.	Adverse: No Beneficial: CAPs, TACs		Install energy-reducing ceiling/whole-house fans.
MM E-20: Programmable Thermostats	LD (R, C, M), I, SP, AQP, RR, P/Stationary, & Area	NA/Low: $100 annual savings in energy costs (Energy Star 2007).	Yes: $60/LCD display and 4 settings for typical residential use (Lowe's 2007).	Yes	Yes: Major retail stores.	Adverse: Yes, Mercury Beneficial: CAPs, TACs		Install energy-reducing programmable thermostats that automatically adjust temperature settings.
MM E-21: Passive Heating and Cooling Systems	LD (R, C, M), I, SP, AQP, RR, P/Stationary, & Area	NA/Low	Yes: $800 (wall heaters) to $4,000+ (central systems)	Yes	Yes	Adverse: No Beneficial: CAPs, TACs		Install energy-reducing passive heating and cooling systems (e.g., insulation and ventilation).
MM E-22: Day Lighting Systems	LD (R, C, M), I, SP, AQP, RR, P/Stationary, & Area	NA/Low	Yes: $1,300 to $1,500 depending upon the kind of roof (Barrier 1995), installation extra.	Yes	Yes: Work well only for space near the roof of the building, little benefit in multi-floor buildings.	Adverse: No Beneficial: CAPs, TACs		Install energy-reducing day lighting systems (e.g., skylights, light shelves and interior transom windows).
MM E-23: Low-Water Use Appliances	LD (R, C, M), I, SP, AQP, RR, P/Stationary, & Area	NA/Low: Avoided water agency cost for using water-efficient kitchen pre-rinse spray valves of $65.18 per acre-foot.	Yes: Can return their cost through reduction in water consumption,	Yes	Yes	Adverse: No Beneficial: CAPs, TACs		Require the installation of low-water use appliances.

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			pumping, and treatment.					
MM E-24: Goods Transport by Rail	LD (C, M), I, SP, AQP, RR, P/Mobile	NA/Moderate	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	ARB Goods Movement Plan (ARB 2007)	Provide a spur at nonresidential projects to use nearby rail for goods movement.
Social Awareness/Education								
MM S-1: GHG Emissions Reductions Education	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile, Stationary, & Mobile	NA/Low	Yes	Yes	Yes: Similar programs currently exist in CA.	Adverse: No Beneficial: CAPs, TACs		Provide local governments, businesses, and residents with guidance/protocols/information on how to reduce GHG emissions (e.g., energy saving, food miles).
MM S-2: School Curriculum	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile, Stationary, & Mobile	NA/Low	Yes	Yes	Yes: Similar programs currently exist in CA.	Adverse: No Beneficial: CAPs, TACs		Include how to reduce GHG emissions (e.g., energy saving, food miles) in the school curriculum.
Construction								
MM C-1: ARB-Certified Diesel Construction Equipment	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	NA/Low	Yes: Oxidation Catalysts, $1,000-	Yes	Yes	Adverse: Yes, NO_x Beneficial: CAPs, TACs	AG, EPA, ARB, and CA air quality management and pollution control districts.	Use ARB-certified diesel construction equipment. Increases CO_2 emissions when trapped CO and carbon particles

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			$2,000. DPF, $5000-$10,000; installation extra (EPA 2007b).					are oxidized (Catalyst Products 2007, ETC 2007).
MM C-2: Alternative Fuel Construction Equipment	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	NA/Low	Yes	Yes	Yes	Adverse: Yes, THC, NO_x Beneficial: CO, PM, SO_x	AG, EPA, ARB, and CA air quality management and pollution control districts.	Use alternative fuel types for construction equipment. At the tailpipe biodiesel emits 10% more CO_2 than petroleum diesel. Overall lifecycle emissions of CO_2 from 100% biodiesel are 78% lower than those of petroleum diesel (NREL 1998, EPA 2007b).
MM C-3: Local Building Materials	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	NA/Low	Yes	Yes	Yes: Depends on location of building material manufacture sites.	Adverse: No Beneficial: CAPs, TACs		Use locally made building materials for construction of the project and associated infrastructure.
MM C-4: Recycle Demolished Construction Material	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	NA/Low	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs		Recycle/Reuse demolished construction material. Use locally made building materials for construction of the project and associated infrastructure.

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Miscellaneous								
MM M-1: Off-Site Mitigation Fee Program	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile & Area	NA/Moderate-High: Though there is currently no program in place, the potential for real and quantifiable reductions of GHG emissions could be high if a defensible fee program were designed.	Yes	Yes	No: Program does not exist in CA, but similar programs currently exist (e.g., Carl Moyer Program, SJVAPCD Rule 9510, SMAQMD Off-Site Construction Mitigation Fee Program).	Adverse: No Beneficial: CAPs, TACs		Provide/Pay into an off-site mitigation fee program, which focuses primarily on reducing emissions from existing development and buildings through retro-fit (e.g., increased insulation).
MM M-2: Offset Purchase	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile, Stationary, & Area	NA/Low	Yes	Yes	No: ARB has not adopted official program, but similar programs	No		Provide/purchase offsets for additional emissions by acquiring carbon credits or engaging in other market "cap and trade" systems.

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					currently exist.			
Regional Transportation Plan Measures								
MM RTP-1: Dedicate High Occupancy Vehicle (HOV) lanes prior to adding capacity to existing highways.	RTP		Yes	Yes	Yes	Adverse: possible local CO Beneficial: regional CAPs, TACs	Caltrans, local government	Evaluate the trip reduction (and GHG reduction) potential of adding HOV lanes prior to adding standard lanes.
MM RTP-2: Implement toll/user fee programs prior to adding capacity to existing highways.	RTP		Yes	Yes	Yes	Adverse: possible local CO. Beneficial: regional CAPs, TACs	Caltrans	Evaluate price elasticity and associated trip reduction (and GHG reduction) potential with adding or increasing tolls prior to adding capacity to existing highways.

Note:
[1] Where LD (R, C, M) =Land Development (Residential, Commercial, Mixed-Use), I=Industrial, GP=General Plan, SP=Specific Plan, TP=Transportation Plans, AQP=Air Quality Plans, RR=Rules/Regulations, and P=Policy. It is important to note that listed project types may not be directly specific to the mitigation measure (e.g., TP, AQP, RR, and P) as such could apply to a variety of source types, especially RR and P.
[2] This score system entails ratings of high, moderate, and low that refer to the level of the measure to provide a substantive, reasonably certain (e.g., documented emission reductions with proven technologies), and long-term reduction of GHG emissions.
[3] Refers to whether the measure would provide a cost-effective reduction of GHG emissions based on available documentation.
[4] Refers to whether the measure is based on currently, readily available technology based on available documentation.
[5] Refers to whether the measure could be implemented without extraordinary effort based on available documentation.
[6] List is not meant to be all inclusive.
Source: Data complied by EDAW in 2007

Under the California Environmental Quality Act (CEQA), local agencies have a very important role to play in California's fight against global warming – one of the most serious environmental effects facing the State today. Local agencies can lead by example in undertaking their own projects, insuring that sustainability is considered at the earliest stages. Moreover, they can help shape private development. Where a project as proposed will have significant global warming related effects, local agencies can require feasible changes or alternatives, and impose enforceable, verifiable, feasible mitigation to substantially lessen those effects. By the sum of their actions and decisions, local agencies will help to move the State away from "business as usual" and toward a low-carbon future.

Included in this document are various measures that may reduce the global warming related impacts at the individual project level. (For more information on actions that local governments can take at the program and general plan level, please visit the Attorney General's webpage, "CEQA, Global Warming, and General Plans" at http://ag.ca.gov/globalwarming/ceqa/generalplans.php.)

As appropriate, the measures can be included as design features of a project, required as changes to the project, or imposed as mitigation (whether undertaken directly by the project proponent or funded by mitigation fees). The measures set forth in this package are examples; the list is not intended to be exhaustive. Moreover, the measures cited may not be appropriate for every project. The decision of whether to approve a project – as proposed or with required changes or mitigation – is for the local agency, exercising its informed judgment in compliance with the law and balancing a variety of public objectives.

Mitigation Measures by Category

Energy Efficiency

Incorporate green building practices and design elements.	The California Department of Housing and Community Development's Green Building & Sustainability Resources handbook provides extensive links to green building resources. The handbook is available at http://www.hcd.ca.gov/hpd/green_build.pdf. The American Institute of Architects (AIA) has compiled fifty readily available strategies for reducing fossil fuel use in buildings by fifty percent. AIA "50 to 50" plan is presented in both guidebook and wiki format at http://wiki.aia.org/Wiki%20Pages/Home.aspx.

Meet recognized green building and energy efficiency benchmarks.	For example, an ENERGY STAR-qualified building uses less energy, is less expensive to operate, and causes fewer greenhouse gas emissions than comparable, conventional buildings. http://www.energystar.gov/index.cfm?c=business.bus_index. California has over 1600 ENERGY STAR-qualified school, commercial and industrial buildings. View U.S. EPA's list of Energy Star non-residential buildings at http://www.energystar.gov/index.cfm?fuseaction=labeled_buildings.locator. Los Angeles and San Francisco top the list of U.S. cities with the most ENERGY STAR non-residential buildings. http://www.energystar.gov/ia/business/downloads/2008_Top_25_cities_chart.pdf. Qualified ENERGY STAR homes must surpass the state's Title 24 energy efficiency building code by at least 15%. Los Angeles, Sacramento, San Diego, and San Francisco-Oakland are among the top 20 markets for ENERGY STAR homes nationwide. http://www.energystar.gov/ia/new_homes/mil_homes/top_20_markets.html. Builders of ENERGY STAR homes can be more competitive in a tight market by providing a higher quality, more desirable product. See http://www.energystar.gov/ia/partners/manuf_res/Horton.pdf. There are a variety of private and non-profit green building certification programs in use in the U.S. See U.S. EPA's Green Building / Frequently Asked Questions website, http://www.epa.gov/greenbuilding/pubs/faqs.htm. Public-Private Partnership for Advancing Housing Technology maintains a list of national and state Green Building Certification Programs for housing. See http://www.pathnet.org/sp.asp?id=20978. These include the national Leadership in Energy and Environmental Design (LEED) program, and, at the state level, Build it Green's GreenPoint Rated system and the California Green Builder program. Other organizations may provide other relevant benchmarks.
Install energy efficient lighting (e.g., light emitting diodes (LEDs)), heating and cooling systems, appliances, equipment, and control systems.	Information about ENERGY STAR-certified products in over 60 categories is available at http://www.energystar.gov/index.cfm?fuseaction=find_a_product. The California Energy Commission maintains a database of all appliances meeting either federal efficiency standards or, where there are no federal efficiency standards, California's appliance efficiency standards. See http://www.appliances.energy.ca.gov/. The Electronic Product Environmental Assessment Tool (EPEAT) ranks computer products based on a set of environmental criteria, including energy efficiency. See http://www.epeat.net/AboutEPEAT.aspx. The nonprofit American Council for an Energy Efficient Economy maintains an Online Guide to Energy Efficient Commercial Equipment, available at http://www.aceee.org/ogeece/ch1_index.htm. Utilities offer many incentives for efficient appliances, lighting, heating and cooling. To search for available residential and commercial incentives, visit Flex Your Power's website at http://www.fypower.org/.

Use passive solar design, e.g., orient buildings and incorporate landscaping to maximize passive solar heating during cool seasons, minimize solar heat gain during hot seasons, and enhance natural ventilation. Design buildings to take advantage of sunlight.	See U.S. Department of Energy, Passive Solar Design (website) http://www.energysavers.gov/your_home/designing_remodeling/index.cfm/mytopic=10250. See also California Energy Commission, Consumer Energy Center, Passive Solar Design (website) http://www.consumerenergycenter.org/home/construction/solardesign/index.html. Lawrence Berkeley National Laboratories' Building Technologies Department is working to develop innovative building construction and design techniques. Information and publications on energy efficient buildings, including lighting, windows, and daylighting strategies, are available at the Department's website at http://btech.lbl.gov.
Install light colored "cool" roofs and cool pavements.	A white or light colored roof can reduce surface temperatures by up to 100 degrees Fahrenheit, which also reduces the heat transferred into the building below. This can reduce the building's cooling costs, save energy and reduce associated greenhouse gas emissions, and extend the life of the roof. Cool roofs can also reduce the temperature of surrounding areas, which can improve local air quality. See California Energy Commission, Consumer Energy Center, Cool Roofs (webpage) at http://www.consumerenergycenter.org/coolroof/. See also Lawrence Berkeley National Laboratories, Heat Island Group (webpage) at http://eetd.lbl.gov/HeatIsland/.
Install efficient lighting, (including LEDs) for traffic, street and other outdoor lighting.	LED lighting is substantially more energy efficient than conventional lighting and can save money. See http://www.energy.ca.gov/efficiency/partnership/case_studies/TechAsstCity.pdf (noting that installing LED traffic signals saved the City of Westlake about $34,000 per year). As of 2005, only about a quarter of California's cities and counties were using 100% LEDs in traffic signals. See California Energy Commission (CEC), Light Emitting Diode Traffic Signal Survey (2005) at p. 15, available at http://www.energy.ca.gov/2005publications/CEC 400 2005 003/CEC 400 2005 003.PDF. The California Energy Commission's Energy Partnership Program can help local governments take advantage of energy saving technology, including, but not limited to, LED traffic signals. See http://www.energy.ca.gov/efficiency/partnership/.
Reduce unnecessary outdoor lighting.	See California Energy Commission, Reduction of Outdoor Lighting (webpage) at http://www.energy.ca.gov/efficiency/lighting/outdoor_reduction.html.

Use automatic covers, efficient pumps and motors, and solar heating for pools and spas.	During the summer, a traditional backyard California pool can use enough energy to power an entire home for three months. Efficiency measures can substantially reduce this waste of energy and money. See California Energy Commission, Consumer Energy Center, Pools and Spas (webpage) at http://www.consumerenergycenter.org/home/outside/pools_spas.html. See also Sacramento Municipal Utilities District, Pool and Spa Efficiency Program (webpage) at http://www.smud.org/en/residential/saving-energy/Pages/poolspa.aspx.
Provide education on energy efficiency to residents, customers and/or tenants.	Many cities and counties provide energy efficiency education. See, for example, the City of Stockton's Energy Efficiency website at http://www.stocktongov.com/energysaving/index.cfm. See also "Green County San Bernardino," http://www.greencountysb.com at pp. 4-6. Businesses and development projects may also provide education. For example, a homeowners' association (HOA) could provide information to residents on energy-efficient mortgages and energy saving measures. See The Villas of Calvera Hills, Easy Energy Saving Tips to Help Save Electricity at http://www.thevillashoa.org/green/energy/. An HOA might also consider providing energy audits to its residents on a regular basis.

Renewable Energy and Energy Storage

Meet "reach" goals for building energy efficiency and renewable energy use.	A "zero net energy" building combines building energy efficiency and renewable energy generation so that, on an annual basis, any purchases of electricity or natural gas are offset by clean, renewable energy generation, either on-site or nearby. Both the California Energy Commission (CEC) and the California Public Utilities Commission (CPUC) have stated that residential buildings should be zero net energy by 2020, and commercial buildings by 2030. See CEC, 2009 Integrated Energy Policy Report (Dec. 2009) at p. 226, available at http://www.energy.ca.gov/2009publications/CEC-100-2009-003/CEC-100-2009-003-CMF.PDF; CPUC, Long Term Energy Efficiency Strategic Plan (Sept. 2008), available at http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/eesp/.
Install solar, wind, and geothermal power systems and solar hot water heaters.	The California Public Utilities Commission (CPUC) approved the California Solar Initiative on January 12, 2006. The initiative creates a $3.3 billion, ten-year program to install solar panels on one million roofs in the State. Visit the one-stop GoSolar website at http://www.gosolarcalifornia.org/. As mitigation, a developer could, for example, agree to participate in the New Solar Homes program. See http://www.gosolarcalifornia.org/builders/index.html. The CPUC is in the process of establishing a program to provide solar water heating incentives under the California Solar Initiative. For more information, visit the CPUC's website at http://www.cpuc.ca.gov/puc/energy/solar/swh.htm. To search for available residential and commercial renewable energy incentives, visit Flex Your Power's website at http://www.fypower.org/.

Install solar panels on unused roof and ground space and over carports and parking areas.	In 2008 Southern California Edison (SCE) launched the nation's largest installation of photovoltaic power generation modules. The utility plans to cover 65 million square feet of unused commercial rooftops with 250 megawatts of solar technology – generating enough energy to meet the needs of approximately 162,000 homes. Learn more about SCE's Solar Rooftop Program at http://www.sce.com/solarleadership/solar-rooftop-program/general-faq.htm. In 2009, Walmart announced its commitment to expand the company's solar power program in California. The company plans to add solar panels on 10 to 20 additional Walmart facilities in the near term. These new systems will be in addition to the 18 solar arrays currently installed at Walmart facilities in California. See http://walmartstores.com/FactsNews/NewsRoom/9091.aspx. Alameda County has installed two solar tracking carports, each generating 250 kilowatts. By 2005, the County had installed eight photovoltaic systems totaling over 2.3 megawatts. The County is able to meet 6 percent of its electricity needs through solar power. See http://www.acgov.org/gsa/Alameda%20County%20-%20Solar%20Case%20Study.pdf. In 2007, California State University, Fresno installed at 1.1-megawatt photovoltaic (PV)-paneled parking installation. The University expects to save more than $13 million in avoided utility costs over the project's 30-year lifespan. http://www.fresnostatenews.com/2007/11/solarwrapup2.htm.
Where solar systems cannot feasibly be incorporated into the project at the outset, build "solar ready" structures.	U.S. Department of Energy, A Homebuilder's Guide to Going Solar (brochure) (2008), available at http://www.eere.energy.gov/solar/pdfs/43076.pdf.
Incorporate wind and solar energy systems into agricultural projects where appropriate.	Wind energy can be a valuable crop for farmers and ranchers. Wind turbines can generate energy to be used on-site, reducing electricity bills, or they can yield lease revenues (as much as $4000 per turbine per year). Wind turbines generally are compatible with rural land uses, since crops can be grown and livestock can be grazed up to the base of the turbine. See National Renewable Energy Laboratory, Wind Powering America Fact Sheet Series, Wind Energy Benefits, available at http://www.nrel.gov/docs/fy05osti/37602.pdf. Solar PV is not just for urban rooftops. For example, the Scott Brothers' dairy in San Jacinto, California, has installed a 55-kilowatt solar array on its commodity barn, with plans to do more in the coming years. See http://www.dairyherd.com/directories.asp?pgID=724&ed_id=8409 (additional California examples are included in article.)

Include energy storage where appropriate to optimize renewable energy generation systems and avoid peak energy use.	See National Renewable Energy Laboratory, Energy Storage Basics (webpage) at http://www.nrel.gov/learning/eds_energy_storage.html. California Energy Storage Alliance (webpage) at http://storagealliance.org/about.html. Storage is not just for large, utility scale projects, but can be part of smaller industrial, commercial and residential projects. For example, Ice Storage Air Conditioning (ISAC) systems, designed for residential and nonresidential buildings, produce ice at night and use it during peak periods for cooling. See California Energy Commission, Staff Report, Ice Storage Air Conditioners, Compliance Options Application (May 2006), available at http://www.energy.ca.gov/2006publications/CEC-400-2006-006/CEC-400-2006-006-SF.PDF.
Use on-site generated biogas, including methane, in appropriate applications.	At the Hilarides Dairy in Lindsay, California, an anaerobic-lagoon digester processes the run-off of nearly 10,000 cows, generating 226,000 cubic feet of biogas per day and enough fuel to run two heavy duty trucks. This has reduced the dairy's diesel consumption by 650 gallons a day, saving the dairy money and improving local air quality. See http://www.arb.ca.gov/newsrel/nr021109b.htm; see also Public Interest Energy Research Program, Dairy Power Production Program, Dairy Methane Digester System, 90-Day Evaluation Report, Eden Vale Dairy (Dec. 2006) at http://www.energy.ca.gov/2006publications/CEC 500 2006 083/CEC 500 2006 083.PDF. Landfill gas is a current and potential source of substantial energy in California. See Tom Frankiewicz, Program Manager, U.S. EPA Landfill Methane Outreach Program, Landfill Gas Energy Potential in California, available at http://www.energy.ca.gov/2009_energypolicy/documents/2009-04-21_workshop/presentations/05-SCS_Engineers_Presentation.pdf. There are many current and emerging technologies for converting landfill methane that would otherwise be released as a greenhouse gas into clean energy. See California Integrated Waste Management Board, Emerging Technologies, Landfill Gas-to-Energy (webpage) at http://www.ciwmb.ca.gov/LEACentral/TechServices/EmergingTech/default.htm.

Use combined heat and power (CHP) in appropriate applications.	Many commercial, industrial, and campus-type facilities (such as hospitals, universities and prisons) use fuel to produce steam and heat for their own operations and processes. Unless captured, much of this heat is wasted. CHP captures waste heat and re-uses it, e.g., for residential or commercial space heating or to generate electricity. See U.S. EPA, Catalog of CHP Technologies at http://www.epa.gov/chp/documents/catalog_of_%20chp_tech_entire.pdf and California Energy Commission, Distributed Energy Resource Guide, Combined Heat and Power (webpage) at http://www.energy.ca.gov/distgen/equipment/chp/chp.html. The average efficiency of fossil-fueled power plants in the United States is 33 percent. By using waste heat recovery technology, CHP systems typically achieve total system efficiencies of 60 to 80 percent. CHP can also substantially reduce emissions of carbon dioxide. http://www.epa.gov/chp/basic/efficiency.html. Currently, CHP in California has a capacity of over 9 million kilowatts. See list of California CHP facilities at http://www.eea-inc.com/chpdata/States/CA.html. The Waste Heat and Carbon Emissions Reduction Act (Assembly Bill 1613 (2007), amended by Assembly Bill 2791 (2008)) is designed to encourage the development of new CHP systems in California with a generating capacity of not more than 20 megawatts. Among other things, the Act requires the California Public Utilities Commission to establish (1) a standard tariff allowing CHP generators to sell electricity for delivery to the grid and (2) a "pay as you save" pilot program requiring electricity corporations to finance the installation of qualifying CHP systems by nonprofit and government entities. For more information, see http://www.energy.ca.gov/wasteheat/.

Water Conservation and Efficiency

Incorporate water-reducing features into building and landscape design.	According to the California Energy Commission, water-related energy use – which includes conveyance, storage, treatment, distribution, wastewater collection, treatment, and discharge – consumes about 19 percent of the State's electricity, 30 percent of its natural gas, and 88 billion gallons of diesel fuel every year. See http://www.energy.ca.gov/2007publications/CEC 999 2007 008/CEC 999 2007 008.PDF. Reducing water use and improving water efficiency can help reduce energy use and greenhouse gas emissions.
Create water-efficient landscapes.	The California Department of Water Resources' updated Model Water Efficient Landscape Ordinance (Sept. 2009) is available at http://www.water.ca.gov/wateruseefficiency/landscapeordinance/technical.cfm. A landscape can be designed from the beginning to use little or no water, and to generate little or no waste. See California Integrated Waste Management Board, Xeriscaping (webpage) at http://www.ciwmb.ca.gov/organics/Xeriscaping/.

Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls and use water-efficient irrigation methods.	U.S. Department of Energy, Best Management Practice: Water-Efficient Irrigation (webpage) at http://www1.eere.energy.gov/femp/program/waterefficiency_bmp5.html. California Department of Water Resources, Landscape Water Use Efficiency (webpage) at http://www.water.ca.gov/wateruseefficiency/landscape/. Pacific Institute, More with Less: Agricultural Water Conservation and Efficiency in California (2008), available at http://www.pacinst.org/reports/more_with_less_delta/index.htm.
Make effective use of graywater. (Graywater is untreated household waste water from bathtubs, showers, bathroom wash basins, and water from clothes washing machines. Graywater to be used for landscape irrigation.)	California Building Standards Commission, 2008 California Green Building Standards Code, Section 604, pp. 31-32, available at http://www.documents.dgs.ca.gov/bsc/2009/part11_2008_calgreen_code.pdf. California Department of Water Resources, Dual Plumbing Code (webpage) at http://www.water.ca.gov/recycling/DualPlumbingCode/. See also Ahwahnee Water Principles, Principle 6, at http://www.lgc.org/ahwahnee/h2o_principles.html. The Ahwahnee Water Principles have been adopted by City of Willits, Town of Windsor, Menlo Park, Morgan Hill, Palo Alto, Petaluma, Port Hueneme, Richmond, Rohnert Park, Rolling Hills Estates, San Luis Obispo, Santa Paula, Santa Rosa, City of Sunnyvale, City of Ukiah, Ventura, Marin County, Marin Municipal Water District, and Ventura County.
Implement low-impact development practices that maintain the existing hydrology of the site to manage storm water and protect the environment.	Retaining storm water runoff on-site can drastically reduce the need for energy-intensive imported water at the site. See U.S. EPA, Low Impact Development (webpage) at http://www.epa.gov/nps/lid/. Office of Environmental Health Hazard Assessment and the California Water and Land Use Partnership, Low Impact Development at http://www.coastal.ca.gov/nps/lid-factsheet.pdf.
Devise a comprehensive water conservation strategy appropriate for the project and location.	The strategy may include many of the specific items listed above, plus other innovative measures that are appropriate to the specific project.
Design buildings to be water-efficient. Install water-efficient fixtures and appliances.	Department of General Services, Best Practices Manual, Water-Efficient Fixtures and Appliances (website) at http://www.green.ca.gov/EPP/building/SaveH2O.htm. Many ENERGY STAR products have achieved their certification because of water efficiency. See California Energy Commission's database, available at http://www.appliances.energy.ca.gov/.

Offset water demand from new projects so that there is no net increase in water use.	For example, the City of Lompoc has a policy requiring new development to offset new water demand with savings from existing water users. See http://www.cityoflompoc.com/utilities/pdf/2005_uwmp_final.pdf at p. 29.
Provide education about water conservation and available programs and incentives.	See, for example, the City of Santa Cruz, Water Conservation Office at http://www.ci.santa-cruz.ca.us/index.aspx?page=395; Santa Clara Valley Water District, Water Conservation at http://www.valleywater.org/conservation/index.shtm; and Metropolitan Water District and the Family of Southern California Water Agencies, Be Water Wise at http://www.bewaterwise.com. Private projects may provide or fund similar education.

Solid Waste Measures

Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).	Construction and demolition materials account for almost 22 percent of the waste stream in California. Reusing and recycling these materials not only conserves natural resources and energy, but can also save money. For a list of best practices and other resources, see California Integrated Waste Management Board, Construction and Demolition Debris Recycling (webpage) at http://www.ciwmb.ca.gov/condemo/.
Integrate reuse and recycling into residential industrial, institutional and commercial projects.	Tips on developing a successful recycling program, and opportunities for cost-effective recycling, are available on the California Integrated Waste Management Board's Zero Waste California website. See http://zerowaste.ca.gov/. The Institute for Local Government's Waste Reduction & Recycling webpage contains examples of "best practices" for reducing greenhouse gas emissions, organized around waste reduction and recycling goals and additional examples and resources. See http://www.ca-ilg.org/wastereduction.
Provide easy and convenient recycling opportunities for residents, the public, and tenant businesses.	Tips on developing a successful recycling program, and opportunities for cost effective recycling, are available on the California Integrated Waste Management Board's Zero Waste California website. See http://zerowaste.ca.gov/.
Provide education and publicity about reducing waste and available recycling services.	Many cities and counties provide information on waste reduction and recycling. See, for example, the Butte County Guide to Recycling at http://www.recyclebutte.net. The California Integrated Waste Management Board's website contains numerous publications on recycling and waste reduction that may be helpful in devising an education project. See http://www.ciwmb.ca.gov/Publications/default.asp?cat=13. Private projects may also provide waste and recycling education directly, or fund education.

Land Use Measures

Ensure consistency with "smart growth" principles – mixed-use, infill, and higher density projects that provide alternatives to individual vehicle travel and promote the efficient delivery of services and goods.	U.S. EPA maintains an extensive Smart Growth webpage with links to examples, literature and technical assistance, and financial resources. See http://www.epa.gov/smartgrowth/index.htm. The National Oceanic and Atmospheric Administration's webpage provides smart growth recommendations for communities located near water. See Coastal & Waterfront Smart Growth (webpage) at http://coastalsmartgrowth.noaa.gov/. The webpage includes case studies from California. The California Energy Commission has recognized the important role that land use can play in meeting our greenhouse gas and energy efficiency goals. The agency's website, Smart Growth & Land Use Planning, contains useful information and links to relevant studies, reports, and other resources. See http://www.energy.ca.gov/landuse/. The Metropolitan Transportation Commission's webpage, Smart Growth / Transportation for Livable Communities, includes resources that may be useful to communities in the San Francisco Bay Area and beyond. See http://www.mtc.ca.gov/planning/smart_growth/. The Sacramento Area Council of Governments (SACOG) has published examples of smart growth in action in its region. See Examples from the Sacramento Region of the Seven Principles of Smart Growth / Better Ways to Grow, available at http://www.sacog.org/regionalfunding/betterways.pdf.
Meet recognized "smart growth" benchmarks.	For example, the LEED for Neighborhood Development (LEED-ND) rating system integrates the principles of smart growth, urbanism and green building into the first national system for neighborhood design. LEED-ND is a collaboration among the U.S. Green Building Council, Congress for the New Urbanism, and the Natural Resources Defense Council. For more information, see http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148.
Educate the public about the many benefits of well-designed, higher density development.	See, for example, U.S. EPA, Growing Smarter, Living Healthier: A Guide to Smart Growth and Active Aging (webpage), discussing how compact, walkable communities can provide benefits to seniors. See http://www.epa.gov/aging/bhc/guide/index.html. U.S. EPA, Environmental Benefits of Smart Growth (webpage) at http://www.epa.gov/dced/topics/eb.htm (noting local air and water quality improvements). Centers for Disease Control and Prevention (CDC), Designing and Building Healthy Places (webpage), at http://www.cdc.gov/healthyplaces/. The CDC's website discusses the links between walkable communities and public health and includes numerous links to educational materials. California Department of Housing and Community Development, Myths and Facts About Affordable and High Density Housing (2002), available at http://www.hcd.ca.gov/hpd/mythsnfacts.pdf.

Incorporate public transit into the project's design.	Federal Transit Administration, Transit-Oriented Development (TOD) (webpage) at http://www.fta.dot.gov/planning/planning_environment_6932.html (describing the benefits of TOD as "social, environmental, and fiscal.") California Department of Transportation (Caltrans), Statewide Transit-Oriented Development Study: Factors for Success in California (2002), available at http://transitorienteddevelopment.dot.ca.gov/miscellaneous/StatewideTOD.htm Caltrans, California Transit-Oriented Development Searchable Database (includes detailed information on numerous TODs), available at http://transitorienteddevelopment.dot.ca.gov/miscellaneous/NewHome.jsp. California Department of Housing and Community Development, Transit Oriented Development (TOD) Resources (Aug. 2009), available at http://www.hcd.ca.gov/hpd/tod.pdf.
Preserve and create open space and parks. Preserve existing trees, and plant replacement trees at a set ratio.	U.S. EPA, Smart Growth and Open Space Conservation (webpage) at http://www.epa.gov/dced/openspace.htm.
Develop "brownfields" and other underused or defunct properties near existing public transportation and jobs.	U.S. EPA, Smart Growth and Brownfields (webpage) at http://www.epa.gov/dced/brownfields.htm. For example, as set forth in the Local Government Commission's case study, the Town of Hercules, California reclaimed a 426-acre brownfield site, transforming it into a transit-friendly, walkable neighborhood. See http://www.lgc.org/freepub/docs/community_design/fact_sheets/er_case_studies.pdf. For financial resources that can assist in brownfield development, see Center for Creative Land Recycling, Financial Resources for California Brownfields (July 2008), available at http://www.cclr.org/media/publications/8-Financial_Resources_2008.pdf.
Include pedestrian and bicycle facilities within projects and ensure that existing non-motorized routes are maintained and enhanced.	See U.S. Department of Transportation, Federal Highway Administration, Bicycle and Pedestrian Program (webpage) at http://www.fhwa.dot.gov/environment/bikeped/. Caltrans, Pedestrian and Bicycle Facilities in California / A Technical Reference and Technology Transfer Synthesis for Caltrans Planners and Engineers (July 2005), available at http://www.dot.ca.gov/hq/traffops/survey/pedestrian/TR_MAY0405.pdf. This reference includes standard and innovative practices for pedestrian facilities and traffic calming.

Transportation and Motor Vehicles

Meet an identified transportation-related benchmark.	A logical benchmark might be related to vehicles miles traveled (VMT), e.g., average VMT per capita, per household, or per employee. As the California Energy Commission has noted, VMT by California residents increased "a rate of more than 3 percent a year between 1975 and 2004, markedly faster than the population growth rate over the same period, which was less than 2 percent. This increase in VMT correlates to an increase in petroleum use and GHG production and has led to the transportation sector being responsible for 41 percent of the state's GHG emissions in 2004." CEC, The Role of Land Use in Meeting California's Energy and Climate Change Goals (Aug. 2007) at p. 9, available at http://www.energy.ca.gov/2007publications/CEC-600-2007-008/CEC-600-2007-008-SF.PDF. Even with regulations designed to increase vehicle efficiency and lower the carbon content of fuel, "reduced VMT growth will be required to meet GHG reductions goals." *Id.* at p. 18.
Adopt a comprehensive parking policy that discourages private vehicle use and encourages the use of alternative transportation.	For example, reduce parking for private vehicles while increasing options for alternative transportation; eliminate minimum parking requirements for new buildings; "unbundle" parking (require that parking is paid for separately and is not included in rent for residential or commercial space); and set appropriate pricing for parking. See U.S. EPA, Parking Spaces / Community Places, Finding the Balance Through Smart Growth Solutions (Jan. 2006), available at http://www.epa.gov/dced/pdf/EPAParkingSpaces06.pdf. Reforming Parking Policies to Support Smart Growth, Metropolitan Transportation Commission (June 2007) at http://www.mtc.ca.gov/planning/smart_growth/parking_seminar/Toolbox_Handbook.pdf. See also the City of Ventura's Downtown Parking and Mobility Plan, available at http://www.cityofventura.net/community_development/resources/mobility_parking_plan.pdf, and Ventura's Downtown Parking Management Program, available at http://www.ci.ventura.ca.us/depts/comm_dev/downtownplan/chapters.asp.
Build or fund a major transit stop within or near the development.	"'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods." (Pub. Res. Code, § 21064.3.) Transit Oriented Development (TOD) is a moderate to higher density development located within an easy walk of a major transit stop. http://transitorienteddevelopment.dot.ca.gov/miscellaneous/NewWhatisTOD.htm. By building or funding a major transit stop, an otherwise ordinary development can become a TOD.

Provide public transit incentives such as free or low-cost monthly transit passes to employees, or free ride areas to residents and customers.	See U.S. Department of Transportation and U.S. EPA, Commuter Choice Primer / An Employer's Guide to Implementing Effective Commuter Choice Programs, available at http://www.its.dot.gov/JPODOCS/REPTS_PR/13669.html. The Emery Go Round shuttle is a private transportation service funded by commercial property owners in the citywide transportation business improvement district. The shuttle links a local shopping district to a Bay Area Rapid Transit stop. See http://www.emerygoround.com/. Seattle, Washington maintains a public transportation "ride free" zone in its downtown from 6:00 a.m. to 7:00 p.m. daily. See http://transit.metrokc.gov/tops/accessible/paccessible_map.html#fare.
Promote "least polluting" ways to connect people and goods to their destinations.	Promoting "least polluting" methods of moving people and goods is part of a larger, integrated "sustainable streets" strategy now being explored at U.C. Davis's Sustainable Transportation Center. Resources and links are available at the Center's website, http://stc.ucdavis.edu/outreach/ssp.php.
Incorporate bicycle lanes, routes and facilities into street systems, new subdivisions, and large developments.	Bicycling can have a profound impact on transportation choices and air pollution reduction. The City of Davis has the highest rate of bicycling in the nation. Among its 64,000 residents, 17 percent travel to work by bicycle and 41 percent consider the bicycle their primary mode of transportation. See Air Resources Board, Bicycle Awareness Program, Bicycle Fact Sheet, available at http://www.arb.ca.gov/planning/tsaq/bicycle/factsht.htm. For recommendations on best practices, see the many resources listed at the U.S. Department of Transportation, Federal Highway Administration's Bicycle and Pedestrian website at http://www.fhwa.dot.gov/environment/bikeped/publications.htm. See also Caltrans Division of Research and Innovation, Designing Highway Facilities To Encourage Walking, Biking and Transit (Preliminary Investigation) (March 2009), available at http://www.dot.ca.gov/research/researchreports/preliminary_investigations/docs/pi-design_for_walking_%20biking_and_transit%20final.pdf.
Require amenities for non-motorized transportation, such as secure and convenient bicycle parking.	According to local and national surveys of potential bicycle commuters, secure bicycle parking and workplace changing facilities are important complements to safe and convenient routes of travel. See Air Resources Board, Bicycle Awareness Program, Bicycle Fact Sheet, available at http://www.arb.ca.gov/planning/tsaq/bicycle/factsht.htm.

Ensure that the project enhances, and does not disrupt or create barriers to, non-motorized transportation.	See, e.g., U.S. EPA's list of transit-related "smart growth" publications at http://www.epa.gov/dced/publications.htm#air, including Pedestrian and Transit-Friendly Design: A Primer for Smart Growth (1999), available at www.epa.gov/dced/pdf/ptfd_primer.pdf. See also Toolkit for Improving Walkability in Alameda County, available at http://www.acta2002.com/ped toolkit/ped_toolkit_print.pdf. Pursuant to the California Complete Streets Act of 2008 (AB 1358, Gov. Code, §§ 65040.2 and 65302), commencing January 1, 2011, upon any substantive revision of the circulation element of the general plan, a city or county will be required to modify the circulation element to plan for a balanced, multimodal transportation network that meets the needs of all users.
Connect parks and open space through shared pedestrian/bike paths and trails to encourage walking and bicycling. Create bicycle lanes and walking paths directed to the location of schools, parks and other destination points.	Walk Score ranks the "walkability" of neighborhoods in the largest 40 U.S. cities, including seven California cities. Scores are based on the distance to nearby amenities. Explore Walk Score at http://www.walkscore.com/. In many markets, homes in walkable neighborhoods are worth more than similar properties where walking is more difficult. See Hoak, *Walk appeal / Homes in walkable neighborhoods sell for more: study*, Wall Street Journal (Aug. 18, 2009), available at http://www.marketwatch.com/story/homes-in-walkable-neighborhoods-sell-for-more-2009-08-18. By creating walkable neighborhoods with more transportation choices, Californians could save $31 million and cut greenhouse gas emissions by 34 percent, according to a study released by Transform, a coalition of unions and nonprofits. See Windfall for All / How Connected, Convenient Neighborhoods Can Protect Our Climate and Safeguard California's Economy (Nov. 2009), available at http://transformca.org/windfall-for-all#download-report.
Work with the school districts to improve pedestrian and bike access to schools and to restore or expand school bus service using lower-emitting vehicles.	In some communities, twenty to twenty-five percent of morning traffic is due to parents driving their children to school. Increased traffic congestion around schools in turn prompts even more parents to drive their children to school. Programs to create safe routes to schools can break this harmful cycle. See California Department of Public Health, Safe Routes to School (webpage) and associated links at http://www.cdph.ca.gov/HealthInfo/injviosaf/Pages/SafeRoutestoSchool.aspx. See also U.S. EPA, Smart Growth and Schools (webpage), available at http://www.epa.gov/dced/schools.htm. California Center for Physical Activity, California Walk to School (website) at http://www.cawalktoschool.com Regular school bus service (using lower-emitting buses) for children who cannot bike or walk to school could substantially reduce private vehicle congestion and air pollution around schools. See Air Resources Board, Lower Emissions School Bus Program (webpage) at http://www.arb.ca.gov/msprog/schoolbus/schoolbus.htm.

Institute teleconferencing, telecommute and/or flexible work hour programs to reduce unnecessary employee transportation.	There are numerous sites on the web with resources for employers seeking to establish telework or flexible work programs. These include U.S. EPA's Mobility Management Strategies: Commuter Programs website at http://www.epa.gov/otaq/stateresources/rellinks/mms_commprograms.htm; and Telework, the federal government's telework website, at http://www.telework.gov/. Through a continuing FlexWork Implementation Program, the Traffic Solutions division of the Santa Barbara County Association of Governments sponsors flexwork consulting, training and implementation services to a limited number of Santa Barbara County organizations that want to create or expand flexwork programs for the benefit of their organizations, employees and the community. See http://www.flexworksb.com/read_more_about_the_fSBp.html. Other local government entities provide similar services.
Provide information on alternative transportation options for consumers, residents, tenants and employees to reduce transportation-related emissions.	Many types of projects may provide opportunities for delivering more tailored transportation information. For example, a homeowner's association could provide information on its website, or an employer might create a Transportation Coordinator position as part of a larger Employee Commute Reduction Program. See, e.g., South Coast Air Quality Management District, Transportation Coordinator training, at http://www.aqmd.gov/trans/traing.html.
Educate consumers, residents, tenants and the public about options for reducing motor vehicle-related greenhouse gas emissions. Include information on trip reduction; trip linking; vehicle performance and efficiency (e.g., keeping tires inflated); and low or zero-emission vehicles.	See, for example U.S. EPA, SmartWay Transport Partnership: Innovative Carrier Strategies (webpage) at http://www.epa.gov/smartway/transport/what-smartway/carrier-strategies.htm. This webpage includes recommendations for actions that truck and rail fleets can take to make ground freight more efficient and cleaner. The Air Resources Board's Drive Clean website is a resource for car buyers to find clean and efficient vehicles. The web site is designed to educate Californians that pollution levels range greatly between vehicles. See http://www.driveclean.ca.gov/. The Oregon Department of Transportation and other public and private partners launched the Drive Less/Save More campaign. The comprehensive website contains fact sheets and educational materials to help people drive more efficiently. See http://www.drivelesssavemore.com/.
Purchase, or create incentives for purchasing, low or zero-emission vehicles.	See Air Resources Board, Low-Emission Vehicle Program (webpage) at http://www.arb.ca.gov/msprog/levprog/levprog.htm. Air Resource Board, Zero Emission Vehicle Program (webpage) at http://www.arb.ca.gov/msprog/zevprog/zevprog.htm. All new cars sold in California are now required to display an Environmental Performance (EP) Label, which scores a vehicle's global warming and smog emissions from 1 (dirtiest) to 10 (cleanest). To search and compare vehicle EP Labels, visit www.DriveClean.ca.gov.

Create a ride sharing program. Promote existing ride sharing programs e.g., by designating a certain percentage of parking spaces for ride sharing vehicles, designating adequate passenger loading and unloading for ride sharing vehicles, and providing a web site or message board for coordinating rides.	For example, the 511 Regional Rideshare Program is operated by the Metropolitan Transportation Commission (MTC) and is funded by grants from the Federal Highway Administration, U.S. Department of Transportation, the Metropolitan Transportation Commission, the Bay Area Air Quality Management District and county congestion management agencies. For more information, see http://rideshare.511.org/. As another example, San Bernardino Associated Governments works directly with large and small employers, as well as providing support to commuters who wish to share rides or use alternative forms of transportation. See http://www.sanbag.ca.gov/commuter/rideshare.html. Valleyrides.com is a ridesharing resource available to anyone commuting to and from Fresno and Tulare Counties and surrounding communities. See http://www.valleyrides.com/. There are many other similar websites throughout the state.
Create or accommodate car sharing programs, e.g., provide parking spaces for car share vehicles at convenient locations accessible by public transportation.	There are many existing car sharing companies in California. These include City CarShare (San Francisco Bay Area), see http://www.citycarshare.org/; and Zipcar, see http://www.zipcar.com/. Car sharing programs are being successfully used on many California campuses.
Provide a vanpool for employees.	Many local Transportation Management Agencies can assist in forming vanpools. See, for example, Sacramento Transportation Management Association, Check out Vanpooling (webpage) at http://www.sacramento-tma.org/vanpool.html.
Create local "light vehicle" networks, such as neighborhood electric vehicle systems.	See California Energy Commission, Consumer Energy Center, Urban Options - Neighborhood Electric Vehicles (NEVs) (webpage) at http://www.consumerenergycenter.org/transportation/urban_options/nev.html. The City of Lincoln has an innovative NEV program. See http://www.lincolnev.com/index.html.
Enforce and follow limits idling time for commercial vehicles, including delivery and construction vehicles.	Under existing law, diesel-fueled motor vehicles with a gross vehicle weight rating greater than 10,000 pounds are prohibited from idling for more than 5 minutes at any location. The minimum penalty for an idling violation is now $300 per violation. See http://www.arb.ca.gov/enf/complaints/idling_cv.htm.
Provide the necessary facilities and infrastructure to encourage the use of low or zero-emission vehicles.	For a list of existing alternative fuel stations in California, visit http://www.cleancarmaps.com/. See, e.g., Baker, *Charging-station network built along 101*, S.F. Chron. (9/23/09), available at http://articles.sfgate.com/2009-09-23/news/17207424_1_recharging-solar-array-tesla-motors.

Agriculture and Forestry (additional strategies noted above)

Require best management practices in agriculture and animal operations to reduce emissions, conserve energy and water, and utilize alternative energy sources, including biogas, wind and solar.	Air Resources Board (ARB), Economic Sectors Portal, Agriculture (webpage) at http://www.arb.ca.gov/cc/ghgsectors/ghgsectors.htm. ARB's webpage includes information on emissions from manure management, nitrogen fertilizer, agricultural offroad equipment, and agricultural engines. "A full 90% of an agricultural business' electricity bill is likely associated with water use. In addition, the 8 million acres in California devoted to crops consume 80% of the total water pumped in the state." See Flex Your Power, Agricultural Sector (webpage) at http://www.fypower.org/agri/. Flex Your Power, Best Practice Guide / Food and Beverage Growers and Processors, available at http://www.fypower.org/bpg/index.html?b=food_and_bev. Antle et al., Pew Center on Global Climate Change, Agriculture's Role in Greenhouse Gas Mitigation (2006), available at http://www.pewclimate.org/docUploads/Agriculture's%20Role%20in%20GHG%20Mitigation.pdf.
Preserve forested areas, agricultural lands, wildlife habitat and corridors, wetlands, watersheds, groundwater recharge areas and other open space that provide carbon sequestration benefits.	"There are three general means by which agricultural and forestry practices can reduce greenhouse gases: (1) avoiding emissions by maintaining existing carbon storage in trees and soils; (2) increasing carbon storage by, e.g., tree planting, conversion from conventional to conservation tillage practices on agricultural lands; (3) substituting bio-based fuels and products for fossil fuels, such as coal and oil, and energy-intensive products that generate greater quantities of CO2 when used." U.S. EPA, Carbon Sequestration in Agriculture and Forestry, Frequently Asked Questions (webpage) at http://www.epa.gov/sequestration/faq.html. Air Resources Board, Economic Sectors Portal, Forestry (webpage) at http://www.arb.ca.gov/cc/ghgsectors/ghgsectors.htm.
Protect existing trees and encourage the planting of new trees. Adopt a tree protection and replacement ordinance.	Tree preservation and planting is not just for rural areas of the state; suburban and urban forests can also serve as carbon sinks. See Cal Fire, Urban and Community Forestry (webpage) at http://www.fire.ca.gov/resource_mgt/resource_mgt_urbanforestry.php.

Off-Site Mitigation

If, after analyzing and requiring all reasonable and feasible on-site mitigation measures for avoiding or reducing greenhouse gas-related impacts, the lead agency determines that additional mitigation is required, the agency may consider additional off-site mitigation. The project proponent could, for example, fund off-site mitigation projects that will reduce carbon emissions, conduct an audit of its other existing operations and agree to retrofit, or purchase verifiable carbon "credits" from another entity that will undertake mitigation.

The topic of off-site mitigation can be complicated. A full discussion is outside the scope of this summary document. Issues that the lead agency should consider include:

- The location of the off-site mitigation. (If the off-site mitigation is far from the project, any additional, non-climate related co-benefits of the mitigation may be lost to the local community.)

- Whether the emissions reductions from off-site mitigation can be quantified and verified. (The California Registry has developed a number of protocols for calculating, reporting and verifying greenhouse gas emissions. Currently, industry-specific protocols are available for the cement sector, power/utility sector, forest sector and local government operations. For more information, visit the California Registry's website at http://www.climateregistry.org/.)

- Whether the mitigation ratio should be greater than 1:1 to reflect any uncertainty about the effectiveness of the off-site mitigation.

Offsite mitigation measures that could be funded through mitigation fees include, but are not limited to, the following:

- Energy efficiency audits of existing buildings.

- Energy efficiency upgrades to existing buildings not otherwise required by law, including heating, ventilation, air conditioning, lighting, water heating equipment, insulation and weatherization (perhaps targeted to specific communities, such as low-income or senior residents).

- Programs to encourage the purchase and use of energy efficient vehicles, appliances, equipment and lighting.

- Programs that create incentives to replace or retire polluting vehicles and engines.

- Programs to expand the use of renewable energy and energy storage.

- Preservation and/or enhancement of existing natural areas (e.g., forested areas, agricultural lands, wildlife habitat and corridors, wetlands, watersheds, and groundwater recharge areas) that provide carbon sequestration benefits.

- Improvement and expansion of public transit and low- and zero-carbon transportation alternatives.