Public Comment on Draft Bay Area Plan and Draft Bay Area Plan Draft Environmental Impact Report (State Clearinghouse No. 2012062029): by Robert Silvestri, 73 Surrey Ave. Mill Valley, CA 94941; May 15, 2013: GHG Emissions

This letter is submitted as public comment on the Draft Bay Area Plan and Draft Bay Area Plan Draft Environmental Impact Report (State Clearinghouse No. 2012062029) regarding GHG emissions noted in the DEIR.

INTRODUCTION

A fundamental purpose and goal of AB32, SB375, the Sustainable Communities Strategy (SCS) and Plan Bay Area is the reduction of per capita CO2 emissions / greenhouse gases (GHGs) from the use of private automobiles and light trucks by 7 percent by 2020 and by 15 percent by 2035. The Sustainable Communities Strategy requires all Metropolitan Planning Organizations (MPOs) to create transportation oriented development plans as a means of achieving those goals. In addition, SECTION 4. of SB375 states that Section 65080(b)(1)(G) of the Government Code (is amended to read) that "Prior to adopting a Sustainable Communities Strategy, the metropolitan planning organization shall quantify the reduction in greenhouse gas emissions projected to be achieved by the sustainable communities strategy and set forth the difference, if any, between the amount of that reduction and the target for the region established by the state board."

After review of the Plan Bay Area document and the Alternatives ("the Plan"), and the Draft Environmental Impact Report for the proposed Plan and the Alternatives (the "DEIR"), and in particular Part Two, Chapter 2.5 *Climate Change and Greenhouse Gas*, and Chapter 3.1, *Alternatives to the Proposed Plan*, my findings are that the DEIR fails to adequately establish reasonably proof of the

efficacy of the proposed Plan or the Alternatives in reducing per capita or overall greenhouse gas emissions (GHGs), to meet SCS goals, and therefore fails the technical requirements under CEQA. Furthermore, based on the more specific types of analysis demonstrated herein, my findings are that Plan Bay Area and the Alternatives will increase overall and per capita GHGs rather than decrease them. Please note the following comments to support this conclusion:

1 – THE CLIMATE CHANGE DATA PRESENTED IN THE DEIR IS NOT RELEVANT TO SB375 REQUIREMENTS:

The DEIR expends the first 41 of its 85 pages, and numerous pages thereafter, presenting a variety of statistics and theoretical projections about climate change, globally and locally, and its potential impacts. However, there is no requirement for the DEIR to establish whether climate change is or is not happening, or is or is not disputable. Therefore, all this data is irrelevant to the question of whether or not the Bay Area Plan and its Alternatives will reduce or increase GHGs and if so, by how much, specifically.

One needs to ask why then this data has been included. It appears that it was included to sensationalize the problem and mislead the reader to assume, by inference, that there is in fact some cause and effect between this climate change data and the proposed Plan and Alternatives, without offering any actual proof or analysis to support the proposed Plan's or Alternative's efficacy in that regard.

The DEIR's cite of EMFAC 2011 data or MTC's supplemental technical report, *Summary of Predicted Traveler Responses*, in support of its analysis is

inadequate. Neither EMFAC's data nor the MTC Report is sufficiently detailed to properly draw the correct conclusions about the efficacy of the Plan or its Alternatives. Raw data and simplistic analysis are not a substitute for thorough analytical methodologies. Furthermore, basing the DEIR on previous studies that concluded that high density, transit oriented development (TOD) reduces GHGs does not constitute proof or adequate analysis to conclude that the Plan and its Alternatives reduce GHGs. In addition, the theory that high density TOD reduces GHGs has been largely discredited by recent research and to be demonstrated to be inadequate to reach the conclusions found in the DEIR. This commentary will provide the types of analysis required to reasonably analyze all the GHG impacts of the Plan.

CONCLUSION:

As will be presented in this commentary, the DEIR fails to demonstrate that the Plan or Alternatives have beneficial impacts on either per capita or overall GHG emissions in order to comply with the requirements of SB375. Further, the DEIR fails to adequately analyze GHG impacts using specific Bay Area examples and circumstances.

2 – THE DEIR USES "STATISTICAL DATA" ON AUTO AND LIGHT TRUCK GHG EMISSIONS TOO SELECTIVELY TO REACH ITS CONCLUSIONS, WHICH ARE NOT BORNE OUT BY A MORE THOROUGH ANALYSIS:

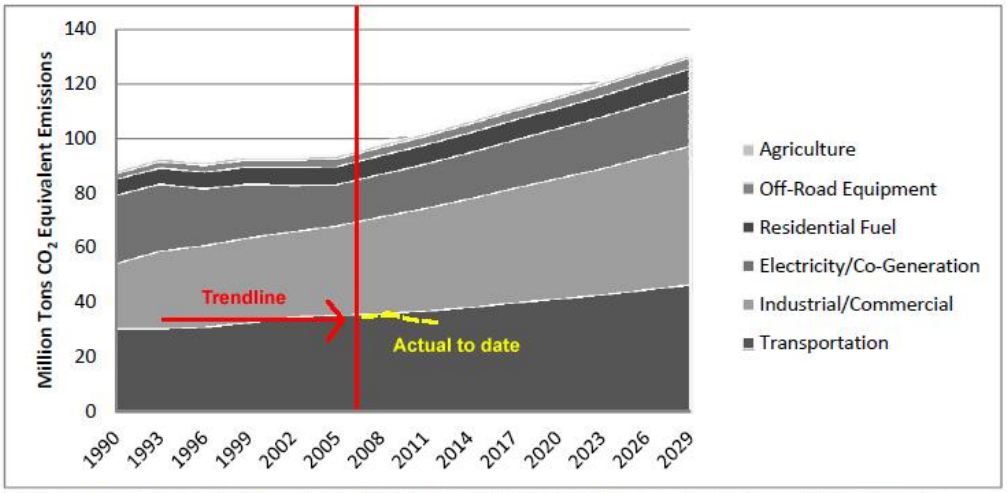
A fundamental goal of the Plan is to reduce per capita GHGs by reducing auto and light truck emissions. The DEIR argues that the Plan and Alternatives will

accomplish this. To substantiate this claim the DEIR presents projections of future GHGs from various sources, and statistical extrapolations of this assumed data to forecast future events and trends. However, the metrics and statistical "facts" that these prognostications are based upon appear to have been carefully "cherry picked" from an enormous amount of available data, both past and present. Much of the data used in the DEIR is either questionable or has been discredited by more recent research and data. Further, to merely compile statistics based on unexamined metrics to present a "bleak" picture of the future, and then to use that picture as evidence to support the Plan, does not constitute a scientific argument or proof of the Plan's efficacy or value. However, proving the efficacy and value of implementing the Plan is a requirement of the DEIR.

EXAMPLE:

On page 2.5-6 of the DEIR Figure 2.5-2 projects the rise in GHGs from various economic sectors (shown below). "Transportation" is the dark area at the bottom. These projections are extrapolated from data collected in a study that

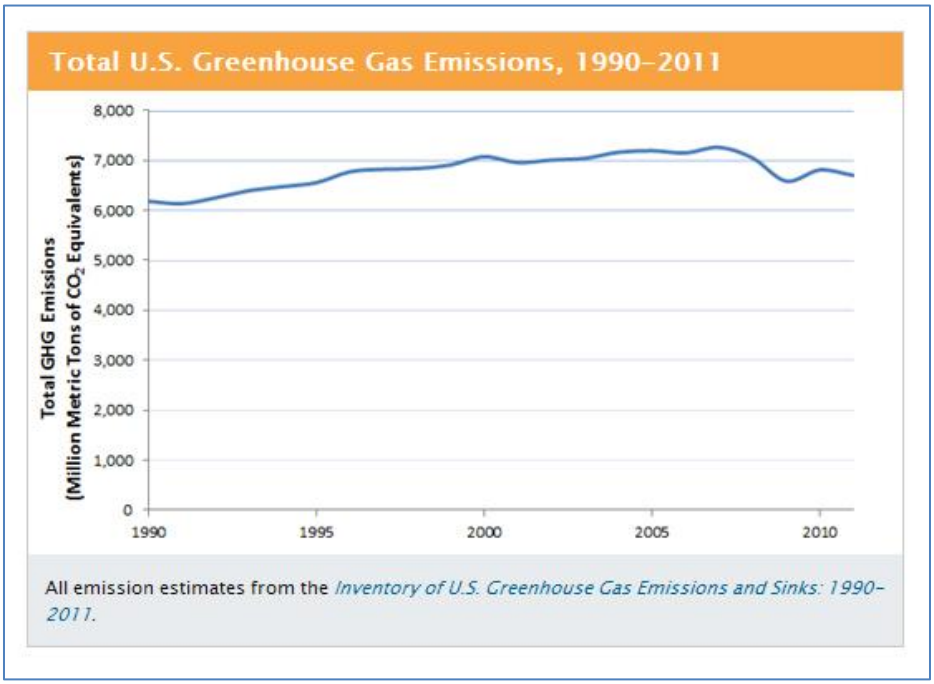
Figure 2.5-2: Bay Area Greenhouse Gas Emissions Trends by Major Source



Source: Bay Area Air Quality Management District, Source Inventory of Bay Area Greenhouse Gas Emissions, Updated 2010.

included the years up to 2005, subsequently compiled and published in 2010. However, the projections shown on this chart are both biased and irrelevant to the purposes of SB375, Plan Bay Area, and the DEIR.

The years leading up to 2005 were arguably part of the biggest growth boom in the history of this country (1993 to 2008), so any metrics generally based on that are inherently distorted. In spite of this, the DEIR future projections in Figure 2.5-2 show a straight, sloping line upwards for "transportation" from the very day of the end of the data points that the DEIR relies on. Real data from 2005 to 2013 (shown in yellow on chart) has proven this to be false. Also, data published since those used in the DEIR shows declining GHG emissions, as well, including transportation. See the chart below, published by the EPA.



As this chart clearly shows, GHG emissions began to drop significantly after the middle of 2008 and have been on a downward to sideways trend ever since. However, SB375 and the Bay Area Plan are only focused on decreasing per capita

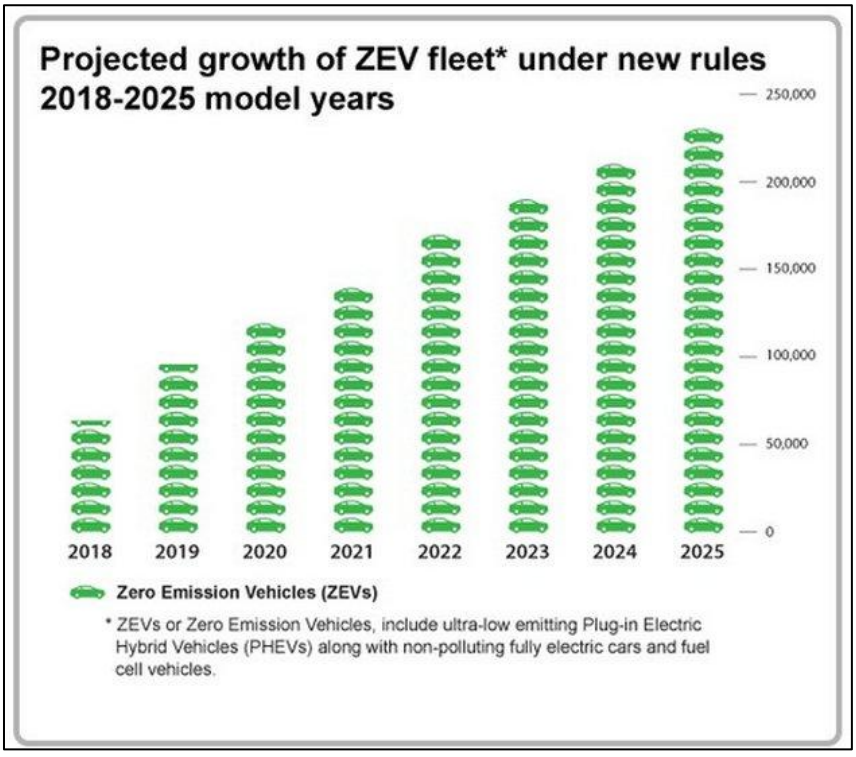
GHG emissions from personal automobiles and light trucks, not the entire "transportation" sector (e.g. trains, boats, public transit, etc.). So in order to do a proper analysis, we must look at the data more closely.

As chart 2.5-2 shows, GHG emissions associated with "transportation" have in fact been leveling off since the early 1990s (rate of increase decreasing or nonexistent) and not significantly increasing. However, when we look at just GHG emissions from autos and light trucks, we see that these have been trending down since 1990. For example, Figure 2.5-7 on page 2.5-58 of the DEIR shows "per capita car and light truck emissions" dramatically decreasing since 1990 out as far as 2050, directly contradicting the projections of Figure 2.5-2 (this doesn't even include the impacts of improved vehicle technology or the new CAFE standards). Recently published data by the EPA confirms that this flat to down trend has actually continued through 2012. So it is reasonable to ask, why the DEIR consciously choose to use outdated data (Figure 2.5-2) and not in include the positive effects of the new CAFE standards in its analysis.

The reason that GHG's from cars and light trucks have been trending downward is the result of a host of environmental laws and GHG reduction technologies beginning to have significant effect, including the effects of improved gas mileage and improved emissions technologies, as newer models enter regular use, and it is also due to the increase in fuel prices that have begun to adjust upwards to reflect true global oil pricing: increases that bring us more in line with other nations and that are not likely to ever go down again on an inflation adjusted basis.

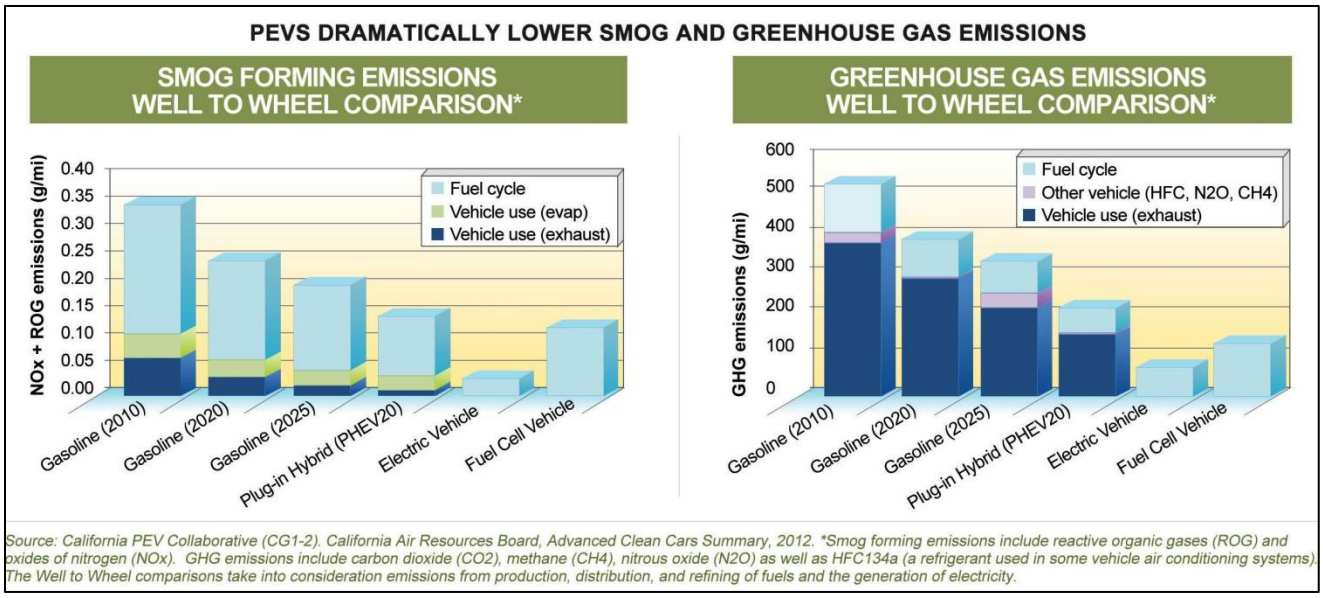
It's also important to note that Northern California and the Pacific Northwest has some of the highest new technology adoption rates and highest vehicle turnover rates of anywhere in the United States, which has been decreasing per capita GHG emissions from private auto and light truck us at a greater rate in the Bay Area than national averages. All this has sped up the manufacture, marketing and rapid public adoption of a wide variety of new types of PZEV (partial zero emissions) and ZEV (zero emission) vehicles.

This auto industry trend is now considered permanent by the auto and light truck industry, contradicting the fundamental arguments behind SB375 and Plan Bay Area's future GHG projections from autos and light trucks. The U.S. government and the EPA have recently calculated that in 2013 "up to 40 percent of new cars sold in the US will meet California's Clean Car Program standards," within the time frame contemplated by Plan Bay Area (chart below by CA EPA).



This chart shows a projected 325% increase in ZEV vehicles (autos and light trucks) sold in California between today and 2025. This fact, combined with the other factors noted above, will certainly help reduce GHG emissions from autos and light trucks in the years to come even more dramatically than shown in Figure 2.5-7. And this does not even take into account further improvements in emissions technology being brought to market every year (to meet the new 54.5 mpg CAFE Standards) that will impact the GHG output of every type of auto and light truck model sold in the coming decade.

The GHG reduction impacts of all this are quite significant because the list of PZEV and ZEV models for sale has become larger, now including at least one model by every major manufacturer and scores of model choices by leading manufacturers (e.g. Ford, General Motors, Toyota, Honda, Nissan). For reference, please note the comparative GHG emission reductions of various vehicle types shown on the chart below (courtesy of the California PEV Collaborative and the California Air Resources Board).



None of this information has been properly acknowledged or factored into the DEIR's analysis and projections. In fact the DEIR even admits, on page 2.5-43, that its emissions projections are "presented without accounting for reductions in mobile source emissions that would be expected from ongoing implementation of Pavley 1 and LCFS… from these legislative requirements," even though this omission distorts the DEIR's conclusions.

CONCLUSION:

The DEIR's omission of relevant, recent data regarding the plateauing of GHG's from autos and light trucks, and the highly questionable future projections it states, reinforce the conclusion that the DEIR did not adequately examine all available information and statistics to justify its projections. This is very important since it relates directly to the main purpose of the underlying legislation (AB32 and SB375) that drives the SCS process.

As a general comment on the Plan and its Alternatives, attempting to change human behavior and socially re-engineer society and land use based on the present design of automobiles is like trying to do that because of the design of a washer and dryer. If I proposed that, everyone would laugh. But like a washer or dryer, an automobile is just an appliance. The market understands that the most efficient use of our time, money and natural resources is to engineer a better machine (one that is fully recyclable and produces no GHGs), which it is doing and for which we need laws to continue to pressure them to do. The required technology is available to us so what actual, specific scientific evidence, research or data points does the DEIR have to support its projections of endless increases in GHG emissions from autos and light trucks, in light of compelling evidence that

the exact opposite is occurring? And what evidence does the DEIR present to prove in any way that the Plan and its Alternatives will in fact have a beneficial effect on per capita GHG emissions from cars and light trucks?

3 – A DETAILED EXAMINATION OF ACTUAL AUTO AND LIGHT TRUCK DRIVING IMPACTS OF GROWTH IN MARIN COUNTY REACH THE OPPOSITE CONCLUSIONS OF THE DEIR, AND SHOW THAT THE PLAN WILL INCREASE GHG EMISSIONS RATHER THAN REDUCE GHG EMISSIONS:

On page 2.5-41 of the DEIR, under the title "Significant Criteria" it states that "Implementation of Plan Bay Area would have a potentially significant adverse impact if the Plan would:

"Criterion 1: Fail to reduce per capita passenger vehicle and light duty truck CO2 emissions by seven percent by 2020 and by 15 percent by 2035 as compared to 2005 baseline, per SB 375.

"Criterion 2: Result in a net increase in direct and indirect GHG emissions in 2040 when compared to existing conditions."

Careful analysis of the potential impacts of the Plan in Marin County (used here as an example) on the use of autos and light trucks indicates that the Plan and the DEIR analysis fail objective tests on both of these Criteria.

In the "Method of Analysis – Greenhouse Gas Emissions" section starting on page 42 of the DEIR, states that it notes the methodology and metrics used to analyze the Plan's Alternatives and their respective GHG impacts of cars and light

trucks. However, the DEIR's analysis is superficial and inadequate, and circular, and cannot be accepted as having reached valid conclusions based only on the methods and metrics it used. Further, one cannot claim compliance with a regulation, as proof of achieving the goal of that regulation, as the DEIR attempts to do with its GHG emissions reduction outcomes.

EXAMPLE:

A detailed analysis of actual auto and light truck use in Marin County, and its potential impact of actual GHG MTCO2 reductions (annual metric tons of CO2 reduced), shows that the transportation and associated land development proposals espoused in the Plan will not result in any reduction in GHG emissions from auto and light truck usage, and in fact will increase overall GHG emissions and impacts in Marin County. Further, both charts shown on pages 2.5-44 and 2.5-45 (Figures 2.5-5 and 2.5-6), respectively, do not have anything to do with the major components of the One Bay Area Plan, which involves the development of high density, transit oriented development (TOD) to alter personal driving of autos and light trucks.

ANALYSIS:

The stated goal of SB375 is "to reduce per capita greenhouse gas emissions (GHGs) by 15 percent by 2035." Its premise is that building high density TOD with an affordable component, will decrease driving / the use of personal autos and light trucks, and therefore reduce GHG emission and thereby have a positive effect on global warming. The statistical rationale is as follows: Section 1(a) of SB375 (restated in the DEIR) states: "The transportation sector contributes over 40 percent of the greenhouse gas emissions in California. Automobiles and light

trucks alone contribute almost 30 percent. The transportation sector is the single largest contributor of greenhouse gases." This infers that SB375 and the Plan will affect 40 percent of all GHG emissions in California. This is absolutely false.

Per SB375 and the Sustainable Communities Strategy, and as acknowledged in the Plan and the DEIR, there are two basic legal requirements: (1) that "prior to adopting a Sustainable Communities Strategy (SCS), the Metropolitan Planning Organization (MPO) shall quantify the reduction in GHG emissions projected to be achieved." [SB375, Section 3 (G)] and (2) that "...the MPO shall submit a description of the methodology it intends to use to estimate the GHG emissions reduced by its Sustainable Communities Strategy." [SB375, Section 3 (I) (i)].

FALSE STATEMENTS IN THE DEIR:

Falsehood #1: "The transportation sector contributes over 40 percent of the greenhouse gas emissions in California,"

The truth is that the "40 percent" figure is a 2020 projected figure not a real measured number. The actual amount today (which itself is still estimation) is about 35 percent (Source: CA Air Resources Board: updated Oct. 2010). It seems unreasonable to base a Plan on a fabricated future guesstimate of GHG emissions to justify the Plan's need. In any case the real number, 35 percent, is also misleading because it includes emissions from airlines, trains and trams, buses, heavy construction equipment, commercial trucking and hauling, shipping, boats, ferries, etc., *none of which* are affected by any of the Plan's Alternatives.

Falsehood #2: "Automobiles and light trucks alone contribute almost 30 percent."

The truth is that if you strip out the vehicles above, not affected by the Plan, you're left with about 23 percent of GHGs that can be actually contributed by personal use of automobiles and light trucks. (Source: CA Air Resources Board: updated Oct. 2010).

Falsehood #3: "The transportation sector is the single largest contributor of greenhouse gases."

In truth, according to California EPA, energy production is the number one GHG producer in California at 41 percent. Transportation is second at 35 percent. But even that is not correct because the California Air Resources Board statistics err in saying "livestock and animal breeding" is only 3 percent, but that is just a measure of total GHG tonnage from that category, not its global warming impact or "CO2 equivalency" (MTCO2e: the true scientific method of comparison). Methane gas (the majority of GHGs from livestock and breeding) is 35 times more harmful than CO2 in its global warming impact. So "livestock and breeding" actually dwarfs energy and transportation combined.

That aside, the question is what are the correct metrics and data points to use to arrive at accurate projections for the purposes of the DEIR?

Using real data only for Marin County, as a test case, the total GHG output for Marin is estimated at 2.7 million metric tons per year. With 23 percent of that from cars and light trucks which equals 621,000 metric tons of GHG per year. (Source: Bay Area Air Quality Management District; Feb 2010 Report: Source Inventory of Bay Area Greenhouse Gas Emissions).

However, 23 percent is misleading because much of Marin's auto and light truck usage and the associated GHG emissions will not be affected by the Plan

either through public transportation improvements or high density housing, regardless of where it is built.

These kinds of driving include:

- Deliveries and pickups by car, truck and van
- Passenger vans and shuttles to private businesses and public facilities
- Workman and building contractors transportation
- Gardeners and home services
- Utility service vehicles: water, power, sewer
- City Agencies vehicles: police, fire, public works and other services
- Health and safety vehicles

This accounts for roughly 40 percent of vehicle use in Marin. That leaves 60 percent of 23 percent or 13.8 percent for personal travel. That equates to 372,600 metric tons GHG (MTCO2) per year that might conceivably be positively affected by the Plan. However, 13.8 percent is still misleading because Marin County has no significant public transportation and with its geography being what it is, there are no opportunities for the traditional mass transit solutions that work well in dense “legacy” cities in the U.S (subways, surface trams, etc.).

65 percent of the personal driving in Marin is driving to work (Source: citydata.com).

This is true regardless of where we locate housing because:

- We cannot discriminate in rentals or sales of homes based on where people work or what kind of job they have;

- No one can predict where they will have to go to find employment. People will go where the job is; and
- People don't make the decisions about where they work and where they live for the same reasons: i.e. people work where the best job opportunity is and they change that choice increasingly often. However, people choose to live where it's best for your family and lifestyle (schools, open space, amenities, etc.). There is no evidence whatsoever in any credible studies that can show that people chose where to live based on access to public transportation except in the core of urban centers like New York City, Chicago or Boston.

This analysis leaves 35 percent of 13.8 percent or 4.83 percent for other personal driving, which equates to about 30,000 metric tons of GHGs per year that might be positively affected by the Plan. However, this 4.83 percent is still misleading because most Marin County driving is not optional because it cannot be served by public transportation, and certainly not by any public transportation contemplated in the Plan, for Marin.

The types of non-optional driving include:

- Driving to lessons, soccer, schools, friends and social activities.
- Vacations, driving to the beach or mountains, or a park, etc.
- Driving to buy large things we cannot carry (paint, hardware, large grocery purchases, plants, clothing, equipment, etc.).
- People shop price not location (drive to Costco, Target, etc.).
- People have busy lives and must do multiple things in one trip.

- Because what you need is not nearby (i.e. people go to the doctor they need, wherever that is, not because he's next door).

So all in all only about 10 percent of people, who are not doing any of these things in Marin County, might be able to change their driving habits due to Plan Bay Area's scheme for high density housing near the highway 101 corridor. That leaves only 10 percent of 4.83 percent or 0.48 percent or 3,000 metric tons of GHGs per year could possibly be saved by SB375.

3,000 metric tons of GHGs per year is approximately 10^{th} of 1 percent of all of Marin County's annual GHG output (3,000 / 2,700,000). This is a statistically insignificant savings (less than 1 percent is considered a rounding error). However, it also must be noted that these are only an estimate of those emissions that "could possibly" be influenced by the Plan, not those that will be guaranteed to be saved. In fact there is nothing being proposed in the Plan that has any possibility to significantly affect any emissions in Marin County.

More troubling is that the DEIR / Plan doesn't factor in or in any way adequately consider the GHG producing outcomes of more growth and development, due to MTCO2 sequestration loss, that have to be considered in weighing the costs or benefits of the Plan.

<u>EXAMPLE:</u>

For Marin County, careful analysis suggests that the development proposed by the Plan's Alternatives 2 through 5 will actually increase GHG emissions, not lower them. Consider the following:

A typical residence produces approximately 8 metric tons of GHGs per year (estimates vary and are constantly being adjusted. This EPA estimate of 8 MTCO2 is at the high end for a national average). The 2007 – 2014 RHNA cycle called for 4,882 new homes in Marin (about 25 percent of which were built) and the 2014 – 2022 RHNA cycle calls for 2,292 homes in Marin. This includes both market rate and affordable units. Assuming a figure of 8 MTCO2e per year, using the cumulative total of 5,954 new homes, this equates to an additional 47,632 metric tons of additional GHGs per year. This would represent an increase of 1.8 percent of the total GHG production of Marin County, presently. Comparing this to the greatest potential GHG emissions savings of the Plan (3,000 MTCO2 per year) produces a net added GHGs of 44,632 MTCO2 per year, not a reduction.

With this being calculated, the natural sequestration loss of development must now also be considered.

GHG SEQUESTRATION LOSS ANALYSIS:

The average single family residential lot size in Marin is approximately .15 acres (Marin County Recorder's Office). Assuming that 20 percent of the various types of affordable units required were built at densities of 20 units per acre (the typical in-lieu required percentage) and the remainder built as single family homes, that would equate to a total loss of 774 acres of land lost (4,763 single family homes at .15 acres per home = 714 acres plus 1,191 multifamily homes at 20 units per acre = 60 acres of land lost).

The annual carbon sequestration value of one acre of typical Marin undeveloped land (grass with some trees, not forested land) is about 1.5 MTCO2e

per year. Therefore, taking 774 acres out of service equates to a negative 1,161 GHGs per year.

Adding these two together, the net added GHGs from new development plus the loss of natural GHG sequestration of land, we arrive at a net increase in GHGs of 45,793 MTCO2e per year.

CONCLUSION:

Based on the RHNA allocations proposed, Bay Area Plan would increase GHGs produced in Marin County by 45,793 MTCO2e per year, *not* reduce GHG emissions as the DEIR claims. If the methodologies used herein are applied to other parts of the Bay Area, the results would be equal or worse. Furthermore, based on the kind of analysis demonstrated here, additional high density TOD would not only not reduce per capita or overall GHG emissions from cars and light trucks, but would actually increase GHG emissions in Marin County, as the result of producing more of the kinds of required driving noted in the above analysis, in all categories. I have not even factored this into my increased GHG analysis of the Plan. Therefore the analysis presented on pages 3.1-58 through 3.1-64 are false in that actual GHG emissions will be far less than indicated.

What accurate and specific scientific evidence or data points does DEIR have to support the efficacy of its Plan Bay Area Alternatives in Marin County, with regard to actually reducing auto and light truck driving mileage and the resultant GHG emissions, when all required datasets are considered, as presented in the analysis above?

What are the impacts on the efficacy of Alternatives presented in the Plan, in achieving the goals of SB375, if all factors presented here are accurately

calculated for the entire Bay Area? This example shows that the DEIR fails to specifically analyze the real impacts of the Plan in enough detail to reach realistic conclusions and therefore the DEIR GHG emissions benefit analysis must be rejected as inadequate.

4 – GHG EMISSIONS ASSUMPTIONS USED IN THE DEIR TO CALCULATE GHG IMPACTS OR SAVINGS BY TYPES OF HOUSING UNITS ARE FLAWED

Generally, the One Bay Area Plan and the DEIR make the unexamined assumption that high density, transit oriented development, and particularly multifamily housing units, produce a lower per capita MTCO2e per annum (GHG) footprint than detached single family housing, and are therefore categorically superior. For example, on page 2.5-50, the DEIR states that "This decline (in GHG emissions to meet SB375 goals) is attributable to numerous factors, most importantly the integrated land use and transportation plan in which land use pattern focuses on growth in higher density locations near transit service." This is stated as fact but is nowhere actually proven in any conclusive way.

This assumption about the connection between high density TOD and GHG emissions reductions has been often repeated "Smart Growth gospel" for decades, and it has gone unchallenged in many "meta" studies on global climate change. Though it is considered "heresy" by much of the environmental community to even suggest otherwise, a close look at the original studies that support these assumptions, when compared with data from more recent evaluations, reveal that those studies were flawed and this assumption is simply

not true. In fact high density TOD generally has a greater, per capita, GHG emissions footprint than single family homes.

This irony is due to the fact that most of the assumptions of studies that compare high density TOD to suburban single family development are biased toward a predetermined conclusion. The DEIR's unexamined acceptance of previous studies results in its faulty conclusions.

Most of us want to believe that scientific studies are "scientific." However, like medical studies that one day "prove" something is good for us to eat then prove that it's bad for us the next day science is unfortunately, by and large, the result of the goals of those funding the studies and the fundamental principal of "garbage in, garbage out." And in fairness, as scientific knowledge has advanced, older studies have proven to be inadequate due to faulty assumptions.

In the 1970's "sprawl" was an easy target for disdain for a new breed of young environmentalists who had grown up in suburbs, gone to good colleges and moved to cities where the available 24/7 access to activities better suited their lifestyle. In some ways the early environmental movement was a general attack on "white bread" suburbia and all its perceived false values and conspicuous consumption.

However, as much as urban centers are marvelously good economic environments and great social environments for certain demographic groups, urban development, as it exists today and as we still build it today, has yet to produce good environmental solutions. And when rated on a human health scale, urbanism also scores very poorly in human health metrics, per capita, for disease and disorders of all kinds. GHG's and air pollution in general are included in the

possible reasons for that. With very few exceptions, we don't find "disease clusters" in rural or suburban areas unless a specific toxic pollutant is present, as we do with urban environments.

The DEIR consultants do not appear to have actually gone back to original sources or brought a skeptical eye to the datasets they employed to justify their conclusions and projections. Consider the following:

ANALYSIS:

There are five reasons why the assumptions that high density development produces lower GHG emissions on a per capita basis are false.

These are as follows:

1. The Definition of a "Unit" of Housing;
2. Common Areas and GHG Per Unit Calculations;
3. Urbanism's "Heat Island" and "Cold Sink" Effects;
4. Urbanism's GHG "Externalities;"
5. The Effects of Local GHG Sequestration.

Introductory Comments:

Many of the studies have been developed to analyze and compare the GHG output of various housing densities and living configurations. Those undertaken in the 1970's and early 1980's, particularly, were overly simplistic and led to seemingly obvious but statistically incorrect conclusions. The resultant "urban legend" about the beneficial relationship between GHG's and urbanism has become dogma. However, this conclusion is flawed.

As with all "science," one has to ask who did the study, who paid for the study, and towards what end. During the early decades of the environmental movement there was great urgency to create the EPA, pass clean air and water legislation, endangered species laws, and address variety of other issues. Climate changing GHGs were not on the radar but the environmental report card of the nation was worse than it is today. Many studies tried to show how bad things were in order to attract media and funding. They extrapolated trends that have not come true (mostly because of the legislation that was passed as a result). The five factors I've noted above are among the things that have taken decades to look at more carefully, and they have produced surprising results.

<u>The Definition of a "Unit" of Housing: functional unit vs. living unit:</u> There are two definitions of a habitable unit. A "functional" unit means a unit that can support an average family with all those amenities that are generally considered minimum standards for habitability. It does not factor in unit size, construction method, and so on. A "living unit" includes all the requirements of a functional unit but it is adjusted for square footage size (i.e. per person per square foot of living space) and sometimes for construction type. However, many earlier studies through the 1990's did not differentiate between these two definitions.

If one uses the functional unit definition to arrive at a per capita GHG calculation, it's no surprise that high density units (which on average are smaller than single family homes) have lower energy usage and correspondingly lower GHG emissions per capita. However, as noted in *Comparing High and Low Residential Density: Life-Cycle Analysis of Energy Use and Greenhouse Gas*

Emissions. J. Urban Plan. Dev., 132(1), 10–21. By Norman, J., MacLean, H., and Kennedy, C. (2006): "When the functional unit is changed to a per unit of living space basis the (beneficial) factor decreases to 1.0–1.5." A factor of 1.0 indicates no advantage either way (and this is before the other considerations noted below).

Conclusion: When trying to compare the GHG output of different Plan Alternatives that include both high density and low density single family, the use of the correct definition is relevant, and in the case of all of the suburban areas in the Bay Area (e.g. Marin County) it becomes extremely relevant. The Plan does not state which definitions it is relying on in the studies used to develop the DEIR.

Common Areas and GHG per Unit Calculations: Up until recently, very few studies correctly factored in the "pro rata share" that each unit needs to include for common spaces in a multifamily, high density building. These would include the GHG burden to heat, light, cool and otherwise make habitable common spaces such as elevators, lobbies, community rooms, laundry areas, storage areas, swimming pools and recreational areas, hallways, and all other commonly shared areas. The DEIR does not reference any studies that factor in this common area GHG burden for multifamily development, or express it in a per capita basis.

Conclusion: It is not arguable that correctly factoring in typical high density common areas reduces the advantages that high density development has over detached single family development when calculating GHG emissions equivalents on a per capita basis. This would have differing impacts on the outcomes of the Plan in different parts of the Bay Area: e.g. it would be very significant in

calculating GHG emissions per capita in San Francisco, San Jose and Oakland, but less so in Marin, Sonoma and Napa. How does the DEIR justify its assumptions and GHG reduction conclusions since this type of analysis was not performed for the entire Plan Bay Area?

Urbanism's "Heat Island" and "Cold Sink" Effects: Recent studies have begun to find that dense urban cores / high density developments that have so much concrete, steel, stone and other temperature variant materials have a negative effect on energy consumption and GHG emissions. Heating and cooling effects, such as the "head island" effect (once an urban environment gets hot, it takes more and more MTCO2e to cool it down) and the "cold sink" effect (once an urban environment gets cold, it takes more and more MTCO2e to heat it up) must now be considered for any analysis to be accurate (Note: According to the U.S. Energy Department, building operations are the biggest energy user, using 40 percent of the nation's energy). More development produces more MTCO2e.

For example, according to a recent study done by the Lawrence Berkeley National Laboratory's Heat Island Group, about these phenomena in the city of Los Angeles, they estimated that because of the heat island effect "the demand for electric power rises nearly 2% [more] for every degree Fahrenheit the daily maximum temperature rises." The DEIR even acknowledges the effects of heat islands (page 25-21) but fails to apply its effects to its findings.

Conclusion: Correctly factoring in the heat island and cold sink effects would negatively alter the DEIR's analysis of the projected GHG emissions outcomes of the Plan. The DEIR does not acknowledge this required analysis in arriving at its conclusions.

In Marin, for example, where over 65 percent of the County is dedicated open space, there is a natural balance of development and natural topography that acts to eliminate the heat island and cold sink effects and offer a moderate climate throughout the year. This has beneficial effects on heating and cooling energy demands and GHG emissions. How can the DEIR justify its assumptions and GHG reduction conclusions when this type of analysis has not been performed for the Plan and its Alternatives?

Urbanism's GHG "Externalities:" Proper analysis of GHG emissions externalities, or "exogenous" impacts and costs, has rarely been factored into any GHG calculation algorithms, in any studies, even those conducted by the EPA and CA EPA. The principle of external GHG impacts is simple. Everything that is required to service the habitability of development in any setting has external and largely unaccounted for "costs" that need to be factored into any per capita GHG emissions claims. Some of these would include the GHG loads required to provide fuel and energy, water, food, services such as garbage and sewage removal and treatment, and the unique demands of geographic location and micro-climates.

Example:

New York City recycles / repurposes less than 10 percent of its "trash." Marin County recycles / repurposes almost 80 percent of its waste. Marin ships it remaining trash to local landfills, at a minimum distance. NYC's trash travels thousands of miles, on average, to be dumped in landfills in the Western United States, or sorted in the South before being shipped to landfills overseas,

sometimes as far as Asia. All of this has a GHG emissions cost that is not included in per capita energy consumption / GHG emissions metrics in studies or the DEIR.

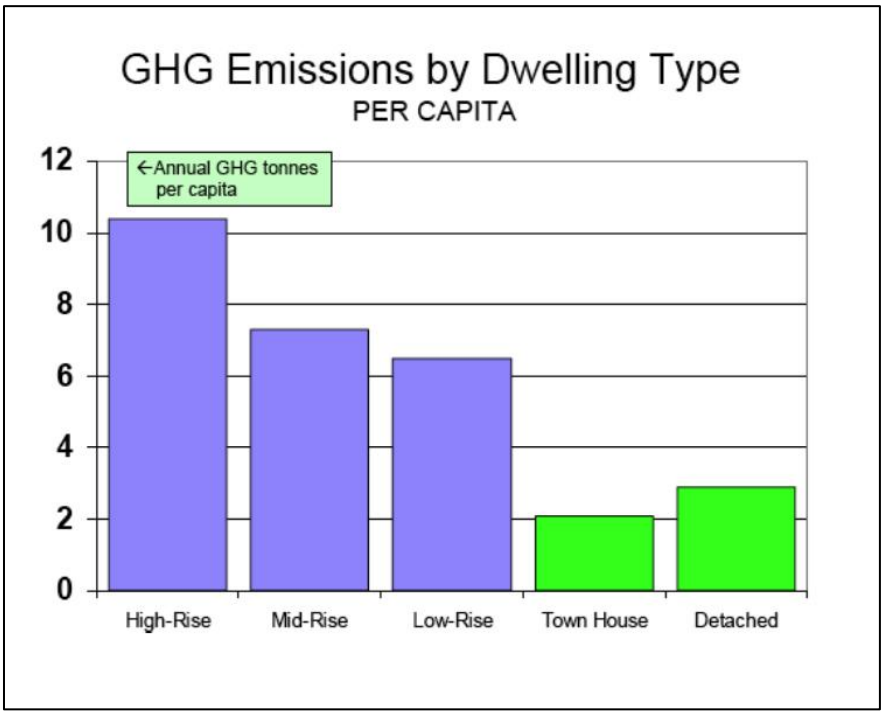
This same principle applies to all the other categories. Power and water to major metropolitan areas takes significant energy to transport and transmission loss boosting requirements for power and water evaporation both have measurable GHG emissions burdens that must be expressed in per capita metrics, but rarely are in studies, and are certainly not factored into the DEIR. Even food transportation has a quantifiable GHG cost that is significantly higher in urban environments than it is in places like Marin, where much of our food is locally grown.

In addition, a recent study, *Greenhouse Gas Emissions Along the Urban-Rural Gradient*, by Clinton J. Andrews, published in the Journal of Environmental Planning and Management, Vol. 51, Issue 6, 2008, notes that "Reflecting their central regional roles, municipalities… have higher per-capita emissions because they host both residential and commercial buildings. Buildings in urban areas typically contribute more emissions than personal transportation" outweighing any advantages that might exist.

A study conducted by the Australian Conservation Foundation, *Housing Form in Australia and its Impacts on Greenhouse Gas Emissions* (Oct. 2007), which did attempt to factor in all of the categories of variables (living unit definition, inclusion of common areas, the heat island and cold sink effects, the type and amount of driving and vehicle trips taken, and the GHG externalities), concluded that "reducing GHG emissions is not so simple as to be achieved through the urban consolidation agenda. Indeed, there is considerable evidence to the

586 contrary." This study concludes that the Plan's transportation oriented
587 development (TOD) approach is flawed.

588 GHG *per capita* emission estimates from the recently published Australian
589 Conservation Foundation Consumption Atlas, indicates virtually the opposite of
590 generally held perceptions. The data shows that "lower density areas, which rely
591 more on automobiles, tend to produce less in GHG emissions than the high
592 density, more public transport dependent areas that are favored by urban
593 consolidation policies." Their comparative findings about residential building
594 types, resulting from this kind of comprehensive GHG per capita emissions
595 analysis is even more eye-opening (see chart below).



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597 This research concludes that "low rise" high density development, the kind
598 that is envisioned by the Plan for Marin and many other parts of the Bay Area,
599 produces 2.5 times the GHG emissions of single family home development and 3

times the GHG emissions of attached, single family townhouse development. High rise development produces 5 times the GHG emissions impacts of single family town homes. Even if these results were wrong by half they would still show a decided advantage to low density, suburban development.

Conclusion: The "facts" and metrics that form the basis of the DEIR's conclusions about the Plan, that heavily favor high density TOD, are seriously flawed and misleading compared to any analysis that factors in all of the GHG emissions impacts of different types of factors noted herein. How can the DEIR justify its assumptions and GHG reduction conclusions in light of this information and without performing this kind of rigorous analysis in the DEIR?

The Effects of Local GHG Sequestration: The final piece of data analysis that is required to accurately assess the true GHG emissions impacts of various land use scenarios, and the Plan's Alternatives, on a per capita basis for the entire Bay Area Region, is the calculation of what portion of GHG's produced are sequestered locally and what portion is unaccountably "exported" to neighboring counties or regions.

This is relevant inquiry because all of the Plan Alternatives, except Alternative 1; *No Project*, will influence land use patterns and increase density, impacting the local MTCO2e sequestration potential of the existing ecosystems. This analysis is also relevant since the entire premise of the Plan and the DEIR is that the reduction of autos and light trucks is directly tied to transportation, land use and development patterns (i.e. their claim that high density urban development near public transportation produces superior GHG emissions

reductions when compared to low density, suburban development). However, here is no evidence that local MTCO2e sequestration has been considered in the DEIR when making claims about reducing GHG emissions from autos and light trucks.

Furthermore, I have been unable to find a single study that combines the four other factors noted above with potential local sequestration MTCO2e variants that effect actual GHG impacts of various transportation oriented land use and development density scenarios. Yet, this data is vital to making sound planning and land use decisions and it weighs on the questionable efficacy of the Plan as described and analyzed in the DEIR.

Analysis:

Local Sequestration of Auto and Light Truck Emissions Compared in Urban and Suburban Locations (San Francisco and Marin County):

Automobile ownership in San Francisco County is presently 658 cars / light trucks per 1,000 people, or .66 per person. Auto ownership in Marin County is presently 756 cars / light trucks per 1,000, or .77 per person.

The population of San Francisco is 812,826 people. This equates to a total of 536,465 vehicles in San Francisco. The population of Marin County is 255, 031. This equates to a total of 196,734 vehicles in Marin County. These totals generally match DMV registration records.

According to the EPA, the average American car puts out 5.2 MTCO2 (metric tons of CO2) per year. As noted above, local auto sales figures would suggest that the Bay Area Region has a significantly lower average due to our early adoption of

PZEV and ZEV vehicles. However, for the sake of this analysis I will use the worse-case scenario national averages.

Using the EPA figure, this equates to:

- San Francisco County produces 2,789,618 MTCO2 per year in GHG's from auto and light truck usage,
- Marin County produces 1,023,022 MTCO2 per year in GHG's from auto and light truck usage.

According to the latest U.S. Census, San Francisco County, a dense urban development area has a total of 329,700 occupied housing units, of which 62,653 are single family detached homes and 267,047 are multifamily units (19 percent and 81 percent, respectively).

Marin County, a rural and suburban, low density development area has a total of 100,650 housing units of which 63,656 are single family detached homes and 39,994 are multifamily units (63 percent and 37 percent, respectively).

On this per housing unit basis then, when comparing the GHG emissions from the use of autos and light trucks of San Francisco (high density urban development) and Marin County (low density rural and suburban development):

- San Francisco produces an average of 8.46 MTCO2 per housing unit per year in auto GHG emissions;
- Marin County produces an average of 10.16 MTCO2 per housing unit per year in auto GHG emissions.

Using this overly simplistic analysis based on only this one measure, one might conclude, as the DEIR apparently concludes, that dense urban development is superior to rural or suburban development with regard to auto and light truck emissions. However, that kind of analysis is inadequate to reach that conclusion.

PLEASE NOTE: Keep in mind that this part of the analysis is strictly breaking out auto and light truck GHG emissions when compared to housing unit counts and not factoring in all the other considerations presented above regarding the effects and impacts of unit sizes, definition of what a unit is, accounting for common areas in multifamily high density buildings, heat island and cold sink effects, or GHG "externalities" that are exported to other regions, and the negative correlation between type of unit and GHG per capita emissions (greater density equals higher GHG emissions per capita).

However, continuing to use this simple measurement metric, we must now apply the impacts of local MTCO2 sequestration to properly compare the overall GHG impacts of urban environments to rural / suburban environments.

Local Sequestration Calculations:

San Francisco City/County covers 231.09 square miles or 147,898 acres of land. Of that approximately 10 percent is dedicated open space (mostly the land covered by Golden Gate Park, the Presidio and coastal areas and golf courses). The remainder is urban (90 percent).

Marin County covers 828 square miles or 529,920 acres of land. Of that approximately 65 percent is permanently dedicated open space and 15 percent is agricultural / recreational rural land. The remainder is approximately 5 percent fully developed land and 15 percent suburban.

The MTCO2 sequestration equivalencies for different types of land use are as follows (Sources: U.S. EPA Calculator, CA EPA, and CA Air Resources Board, which differ):

- Forest and open vegetated land: more than 10 years old:
    - 2.5 MTCO2 per year per acre.
- Agricultural / Recreational grassland:
    - 1.5 MTCO2 per acre.
- Suburban land with a 40 percent lot coverage maximum:
    - 1.0 MTCO2 per year per acre
- Fully developed urban landscape: minimal vegetation
    - 0.2 MTCO2 per year per acre

Comparing San Francisco County to Marin County:

<u>San Francisco:</u>

90 percent urban developed land: 133,108 acres at 0.2 per acre equals sequestration of 26,622 MTCO2e per year.

10 percent forest and open vegetated land: 14,790 acres at 2.5 per acre equals sequestration of 36,975 MTCO2e per year.

TOTAL San Francisco local sequestration equals 63,597MTCO2e per year.

<u>Marin County:</u>

65 percent forest / open land: 344,448 acres at 2.5 per acre equals sequestration of 861,120 MTCO2e per year.

15 percent is agricultural / recreational rural land: 79,488 acres at 1.5 per acre equals sequestration of 119,232 MTCO2e per year.

15 percent suburban land: 79,488 acres at 1.0 per acre equals sequestration of 79,488 MTCO2e per year.

5 percent urban developed land: 26,495 acres at 0.2 per acre equals sequestration equal 5,299 MTCO2e per year

TOTAL Marin local sequestration equals 1,065,139 MTCO2e per year.

Conclusion:

Based on this analysis, Marin County, a rural / suburban development area that produces more GHG's per auto and light truck than San Francisco, locally sequesters more than 100 percent of its locally generated auto and light truck MTCO2 emissions per year, whereas San Francisco only sequesters about 1.1 percent of its locally generated auto and light truck MTCO2 emissions per year.

This simple analysis resoundingly demonstrates that the entire premise of Plan Bay Area, the conclusions of the DEIR and the underlying premise of SB375 are completely false in asserting that high density, transit oriented development categorically results in a reduction of MTCO2e emissions for personal autos and light trucks.

Plan Bay Area's premise only works if you ignore all the GHG's and pollutants that are "exported" from urban regions to others. And this correct analytical method indicates that the denser a place becomes the worse the balance of GHG emissions and local sequestration gets. When you now factor in the other negatives of high density building types, noted above, the effects of increasing density is decidedly negative for overall GHG emissions per capita.

What scientific evidence or data points does DEIR have to support the efficacy of its Plan Bay Area Alternatives, with regard to actually reducing auto

and light truck driving mileage and the resultant GHG emissions, when all required datasets noted above are considered? What are the impacts on the efficacy of the Alternatives presented in the Plan, in achieving the goals of SB375, if the loss of land and the associated MTCO2e sequestration is accurately calculated? How does the DEIR account for the GHG's that it is exporting from the Bay Area to other regions due to lack of local sequestration?

FINAL CONCLUSIONS OF ITEM #4:

The various facts presented in these analysis and the resultant conclusions provide evidence, without doubt, that when all factors are considered (the impacts of unit sizes, definition of what a unit is, accounting for common areas in multifamily high density buildings, heat island and cold sink effects, unaccounted for GHG "externalities" exported to other regions, and local GHG sequestration) a suburban, single family home development, as it is found in Marin, Sonoma, Napa and other parts of the Bay Area Region is superior in reducing GHG emission on an overall basis and on a per capita basis than dense urban, TOD development found in San Francisco, Oakland and San Jose.

The Plan and the resultant DEIR does not acknowledge or in any way address or account for this data and findings presented here. What accurate and specific scientific evidence or data points then do the DEIR consultants have to support the efficacy of its Plan Bay Area Alternatives, with regard to actually reducing auto and light truck driving mileage and the resultant GHG emissions, if all required datasets are considered, as presented in the analysis above? How does the DEIR justify the lack of the kind of comprehensive analysis, noted herein,

in arriving at its GHG emissions savings conclusions that it uses to justify Plan Bay Area?

FINAL COMMENTS:

The Bay Area Plan DEIR is without sufficient statistical or scientific basis to justify its conclusions and projections. In fact in reviewing the entire DEIR there does not appear to actually be any detailed analysis or analytical methodology provided for any of its assumptions about the relationship between TOD and GHG emissions it claims. The Alternatives described in the DEIR (aside from Alternative #) will be more economically destabilizing for small cities, are financially irresponsible in that they encourage the expenditure of large sums of taxpayer fund for no discernible benefits, and they will, overall, be environmentally harmful rather than beneficial as claimed.

Building more and more housing, of any type, and other kinds of development, without jobs growth first, leads to "unsustainable" communities and potential bankruptcy for small cities (e.g. Vallejo, Modesto and San Bernadino). The building methods available to us today, even with token gestures like LEED certification, do not even begin to justify the belief that more TOD development is good for the environment. The truth is that development, TOD or otherwise, particularly in counties like Marin, Sonoma and Napa, only sets in motion an endless feedback loop the drives even more development to accommodate support services and our consumption driven economy, and ever more auto and light truck use and, more importantly, more shipping, trucking and other more impactful transportation demands as a result.

The basic assumptions of the Plan are fundamentally flawed and contradict the laws of supply and demand, free markets and how cities grow and survive. Most troubling is that in the end, after all the costs and burdens that the One Bay Area Plan are tallied, combined with the burdens of the HCD RHNA allocation process will impose on our communities, the Plan will not result in providing what we really need: more high quality jobs and more quality, affordable housing choices for those most in need.

Examination of the Plan Bay Area Plan DEIR shows that this report fails to satisfy the requirements of SB375 and the technical requirements of the DEIR under CEQA because it fails to prove that any of the Alternatives will actually achieve the goal of reducing per capita or overall GHG emission from the use of autos and light trucks.

The DEIR analysis makes the common error of mistaking correlation with causation. It substitutes unscientific observations and unqualified statistics for proper scientific inquiry or demonstrable facts to arrive at what appear to be predetermined conclusions that are insupportable and inaccurate.

The DEIR attempts to persuade readers by inference and through anecdotal evidence rather than by doing the kind of specific and direct analysis as I've presented above. And in fact the burden of proof is on those who drafted the DEIR to show why the analysis I've presented was not undertaken. The DEIR offers a "take our word for it" approach but offers no detailed calculations or formulas, of any actual proof whatsoever to prove the Plan's efficacy in meeting the goals of SB375. Its statistical data relies on studies done by its partners (MTC, BAAMQ, etc.), whose objectivity and motivations must be questioned. It seems

questionable that with the breadth of studies and scientific knowledge available today to anyone wishing to do serious research, that the DEIR would choose to rely so heavily on statistical data developed by the very organizations (MTC, ABAG) who created the Plan that the DEIR is supposed to be objectively vetting. And considering how much irrelevant information has been included in the DEIR, a more cynical view would be that the DEIR is trying to "paper over" the situation and throw so much material at the reader (in excess of 1,300 pages) that the reader gives up accepts its conclusions, unchallenged.

Based on the evidence and kinds of analysis presented herein, the DEIR has failed to fulfill the technical requirements under CEQA, and the Plan and its Alternatives has failed to comply with the requirements and goals of AB32, SB375 and the SCS in reducing per capita or overall GHG emission. The analysis I've presented demonstrates that the Plan and its Alternatives will increase per capita and overall GHGs rather than decrease per capita and overall GHGs, so the DEIR is both incorrect and misleading in its conclusions, and inadequate under the requirements of CEQA Guidelines.