18 September 2009

To: Thomas Rogers, Menlo Park Planning Commission

Cc: Menlo Park EQC
Menlo Park City Council

Re: Menlo Gateway Project.

Dear Mr. Rogers:

Thank you for all your assistance in providing information about the 900,000+ ft^2 development proposed by Bohannon Development in the existing light-industrial area to the bayside of US101 and adjacent to Marsh Road. The following summarizes my comments on the project as its current plans declare. The view taken is that this must be considered only as a many-decades project, whose viability and appropriateness must be assessed realistically in relation to unfolding global climate issues and local economic realities, now and decades into the future. It should also be viewed as a means to show that Menlo Park and the developer both understand and attend to the very serious environmental situation we all now face. In other words, the developer should fully cooperate with Menlo Park to require and implement the most environmentally effective design, so to set an example of competence and concern for all to see.

I: Solar-Electric The plans indicate possible solar-electric **(PV) panels** installed over certain areas atop the proposed parking and other structures. Unfortunately, the drawings suggest use of current flat-panel products. Such products are currently at best 15% efficient (see Appendix) in converting solar flux (insolation) into usable electricity. Film-based products are far less efficient. The remaining 85% or more of unutilized insolation is converted to infrared (thermal) radiation – this is why the cells appear dark. And that conversion directly worsens the effects of greenhouse gasses (GHGs), because they absorb infrared radiation preferentially. This then worsens global warming and climate change to an extent greater than any utility emissions mitigation achieved by the PV power generated. For technical details, refer to publications by the Heat Island Group and the California Energy Commission, such as the 1st "Cool Roofs…" presentation in…

http://www.energy.ca.gov/commissioners/rosenfeld_docs/index.html

particularly beginning with computations beginning on p10. This will also be referred to in Section III.

The project should be directed to include only concentrating PV systems, some of which also produce hot water, particularly useful for structures such as the proposed

hotels and businesses. The net efficiency target should be set above 30%, for any solar installations at Menlo Gateway. Otherwise, there is no overall environmental benefit. Examples of efficient PV systems are provided by Solyndra and Skyline Solar, both in the bay area. I have no relation to either.

II: It's unclear from the DEIR the extent to which positive use of daylight is made for **natural illumination** of all interior spaces – it should be required, especially within designated office/R&D structures. **Natural ventilation** should also be specified for such spaces, as well as for individual hotel rooms. This can be coordinated with current HVAC systems. The new NASA building (Sustainability Base) under construction at Ames Research Center should be consulted for good natural illumination & ventilation practices – a consultation with the relevant architects should be required (see Appendix).

And, the development should be required to use electro-chromic glazing in all sklylights and in all SE-to-SW-facing windows. Standard High-E glazing is acceptable on other exposures. The electro-chromic glazing can be controlled thermostatically, by integration with the basic HVAC system. The benefit to HVAC energy consumption is very large.

III: All roofs and all paving should be required to be designed for **maximum visible-light reflectivity** (albedo). For roofs, this can simply be achieved via CA AB32 Cool Roofs requirements. For paving, including the top parking floors of all parking structures, this can be accomplished with white-sanded concrete. Where ground-level parking and driving lanes are laid, specialized concrete or macadam with high albedo can be selected. The reasoning behind this is conveyed in the CEC reports referred to in section I and in the reports by the Heat-Island Group working with Lawrence-Berkeley Labs, as in…

http://tinyurl.com/3el8u5

The calculations make clear that roofing & paving together offer as much or more GHG mitigation as do all internal structural energy-saving methods. Albedo of human structures is so important simply because about 3% of land is covered by them – see the CEC reference, the above URL and table on next page.

CO_2-equivalent effects of roof & pavement albedo increases in cooling the globe…

	Solar Reflectivity Increase	CO_2 Offset by 100 m^2 (~120 sq yards)	CO_2 Offset Globally
White Roof	0.40	10 tons (~2 cars)	
Average Roof	0.25	6.3 tons	**24 Gt**
Cool Pavement	0.15	4 tons	20 Gt
Total Potential	--	--	**44 Gt**
Value of 44 Gt CO_2 at $25/t ~ $1 Trillion 100 gallons Gasoline/year => ~1 ton CO_2 **Global CO_2 emissions in 2009 ~24Gt** **(Akbari, Menon, Rosenfeld. *Climatic Change*, 2008)**			

The table indicates that simply improving existing roof/pavement reflectivity modestly is more than equal in effect to eliminating more than two cars per home.

IV: All ground-level paving should be shaded. The development should be required to plant sufficient foliage and/or install sufficient concentrating solar collectors that parking lanes and areas around all structures will be 80% shaded from direct sunlight throughout the day, within 8 years of project start (see Appendices III & IV). This requirement complements and does not obviate requirement III. For reference, note the very poor degree of pavement shading now at the project site -- beginning of the Appendix.

This requirement is related to the real future of the site, given that a 3ft sea-level rise is quite certain within 50 years (see BCDC.org). The species of trees/shrubs planted, must be selected for some resistance to salt water intrusion below the site at root levels. A requirement for consultation with UC Davis and other arboreal experts should be made, before species selection begins.

V: If **hot-water solar-collection systems** are installed, they must be required to be **sized to meet daily needs** of all structures when fully occupied, but no larger. This requirement mates with use of any efficient, concentrating solar PV systems, because the requirement is to maintain overall site albedo at the highest level possible. Unused solar-heated water creates a storage problem and an infrared-radiation problem, just as do dark roofs/paving.

VI: A 'gray water' system should be required that will meet as much of the needs of required landscaping as possible, as each structure on the site is occupied.

VII: The specified **health facility** should be required to operate no friction or air-loaded (fan) machines. All such machines that are of treadmill, 'exercycle' or other device types that use rotational loading of users' muscles should use **electrical loading**. The power output of these machines should be required to enter or supplant the facility's electrical grid connection, just as any solar-electric systems do. Electrically-loaded exercise machines are currently in use and available. Note that a trained athlete can sustain ½ hp of physical output for many minutes. This amounts to over 300 Watts. A busy exercise facility can easily generate all its needed power.

VIII: All construction fuel and other energy usage should be recorded to count in the overall environmental mitigation budget for the project. The CEC should be consulted to determine how best to accomplish an accurate measure of overall energy consumption and so the degree of subsequent mitigation to be required of the site beyond the considerations above, and those commented on by others.

IX: The DEIR should be reviewed and **a new estimate of occupancy rates for all structures/business-purposes on the site should be required**. The current economic state is forecast to change slowly, particularly in Silicon Valley, where hundreds of thousands remain unemployed. There is no indication that this project will have a high occupancy rate for business tenants, given the glut of existing space throughout the Valley. Similarly for the proposed hotel. Final approval of part or all of the project should be contingent on obtaining an up-to-date occupancy estimate from competent sources.

X: The seriousness of climate change has been apparent for decades to scientists, and was forecast over 100 years ago by S. Arrhenius, the father of industrial chemistry. Finally, hopefully enough lay and governmental individuals around the world understand the dire threat and the need for wise, robust action. The Menlo Gateway site is precariously close to flooding well within its lifetime. There is no reason Menlo Park, California and US citizens should be called upon in the future to cover any losses incurred by the project simply due to its developer's desire to have it exist at this site at this dangerous time in history. Therefore, Menlo Park should require the posting of a bond and/or the establishment of a trust fund by the developer that is sufficiently serviced, yearly, so that even if the site were to be flooded by the maximum sea-level forecast to 2100, 3-50 feet, only the site owners and their insurers would be financially

impacted. The yearly size of such a reserve can be established with a panel of disinterested financial experts. Their selection should be made in concert with ABAG and other relevant agencies, and be complete before any structure is complete or occupied.

The last requirement may seem expensive, but the concept of developing such projects for profit in such at-risk locations must be tempered by reality. Other states and municipalities have already done this, often decades ago.

Sincerely,

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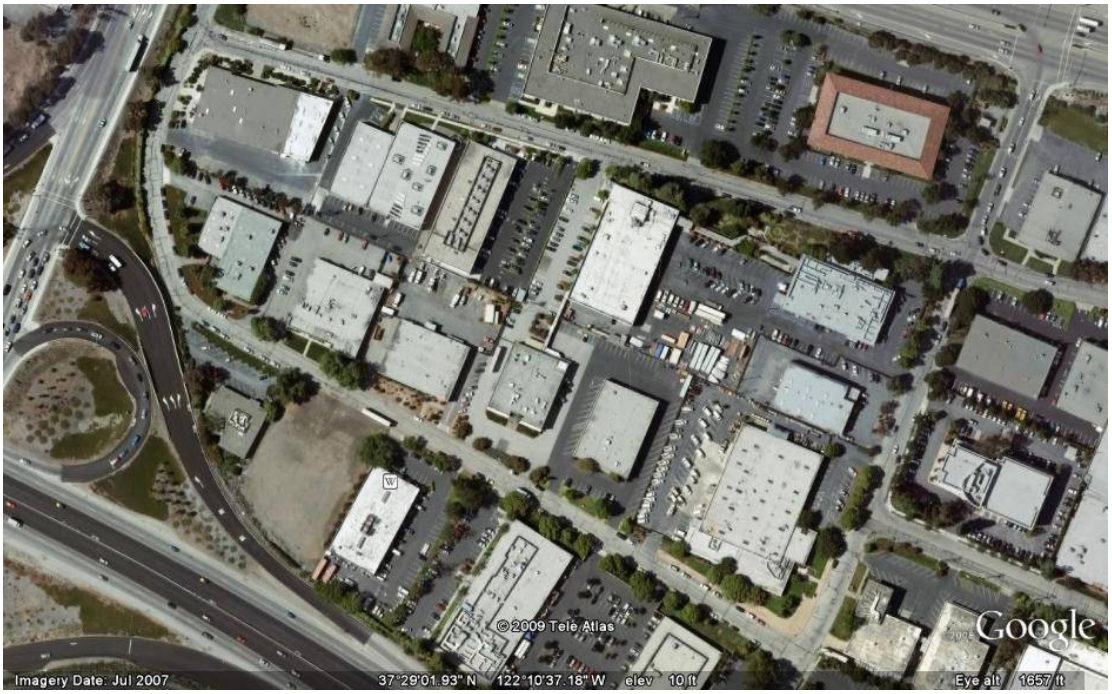
Appendix



Menlo Gateway area ca 2007.

I. Typical solar cell inefficiencies…

Table 1.
Efficiency of Various Photovoltaic Materials

Technology	Energy Conversion Efficiency	Advantages	Disadvantages
Monocrystalline Photovoltaic	14% to 19%	Highly efficient	High cost, crystals cylindrical shape
Multicrystalline Photovoltaic	13% to 17%	Less expensive, less waste	Lower efficiency than single cell
Ribbon Silicon	14% to 16%	Less expensive, less waste	Lower efficiency than single cell
Thin Film	6% to 8%	Much less silicon needed, can be integrated into buildings, can be transparent	Lowest efficiency of all silicon photovoltaic technologies

II. Reference NASA Ames architects: W. McDonough Partners, 434-979-1111.

III. Exemplary roof, paving and parking albedo/shading…

Schlumberger Research, Austin Texas.

IV. Good example of native trees used for parking & driveway shading (above). Shading is also accomplished by some concentrating solar-electric systems, such as by Skyline Solar (Mt. View, CA).