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Mr. Bob Silvestri, President
Community Venture Partners
73 Surrey Avenue
Mill Valley, CA 94941

Subject: Review of Final, Recirculated and Draft Environmental Impact Reports
Corte Madera Inn Rebuild Project, Marin County, California

Dear Bob:

I am a hydrologist with over twenty five years of technical and consulting experience in the fields of geology, hydrology, and hydrogeology. I have been providing professional hydrology services in California since 1991 and routinely manage projects in the areas of surface- and groundwater hydrology, flood hazard assessment, water quality, water resources management, and geomorphology. Most of my work is located in the Coast Range watersheds of California, with emphasis on Marin County. My areas of expertise include: characterizing and modeling watershed-scale hydrologic and geomorphic processes; evaluating surface- and ground-water resources/quality and their interaction; assessing hydrologic, geomorphic, and water quality responses to land-use changes in watersheds and causes of stream channel instability; and designing and implementing field investigations characterizing surface and subsurface hydrologic and water quality conditions. I co-own and operate the hydrology and engineering consulting firm Kamman Hydrology & Engineering, Inc. in San Rafael, California (established in 1997). I earned a Master of Science in Geology, specializing in Sedimentology and Hydrogeology as well as an A.B. in Geology from Miami University, Oxford, Ohio. I am a Certified Hydrogeologist (CHg) and a registered Professional Geologist (PG).

I have reviewed the Final, Recirculated and Draft Environmental Impact Reports for the Corte Madera Inn Rebuild Project (State Clearinghouse No. 2014042069), prepared by Amy Skewes-Cox between November 2014 and November 2015. In addition to reviewing the DEIR, I have reviewed the following documents and rely on information contained in these documents to help formulate my opinions.

- Federal Emergency Management Agency (FERC), 2016, (Pending) Flood Insurance Study, Marin County, California and Incorporated Areas. Flood Insurance Study Number 06041CV001C, Volumes 3 of 3, Second Revision, March 16.
- Town of Corte Madera, 2009, General Plan for the Town of Corte Madera. Chapter 7.0 Flooding and Floodplain Management, April, 18p.
- Town of Corte Madera, 1999, Corte Madera, California – Code of Ordinance, Supplement 17, Title 16 – Protection of Flood Hazard Areas. Retrieved from https://www.municode.com/library/ca/corte_madera/codes/code_of_ordinances

Based on my review of these materials, it is my professional opinion that the EIR has failed to demonstrate that the project will have no potential adverse impact on local groundwater resources, flood hazards, and surface/ground-water quality. In addition, the EIR does not provide technical hydrologic analyses or project descriptions that comply with CEQA and City policies and ordinances associated with groundwater, flooding and flood hazard management. The rationale for these opinions is provided below.

1. Potential Impact on Groundwater Recharge: The EIR states that there are existing and potential beneficial uses for local groundwater resources. Page 4.8-1 of the DEIR states, "*Existing and potential beneficial uses of the Ross Valley Groundwater Basin include municipal and domestic water supply, industrial process water supply, industrial service water supply, and agricultural water supply.*" The EIR significance criteria state that interference with groundwater recharge is a significant effect on hydrology (pg. 4.8-10). Specifically, this criteria states, "*Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level."*

   Groundwater recharge to the local project area aquifer comes from infiltration of rainwater through pervious soil as well as infiltration of water through local area canals, lagoons, drainage ditches and ponds. Currently, there is undoubtedly infiltration of water through the earthen base of the Inn Pond that recharges the local groundwater aquifer and unpaved areas. Reduction of surface water infiltration reduces the available supply in the underlying aquifer and impacts the potential beneficial uses listed above.

   The EIR claims that, "*The project would not substantially deplete groundwater resources or interfere with groundwater recharge. Changes in impervious surface as part of proposed project would be minor compared to the 24.7 square miles of the Ross Valley Watershed, and no significant changes in groundwater recharge would be expected as a result of development associated with the project.*" There are many independent and hydrologically disconnected groundwater basins/aquifers within the 24.7 square mile Ross Valley watershed. This variability is reflected in the different geologic rock types/deposits and physical environments in which they form throughout the watershed. As such, groundwater conditions (recharge, water level, storage volume, etc.) will behave different and independent between the hydrologically disconnected groundwater subbasins that underlie the Ross Valley watershed. Changes in groundwater recharge associated with the project has the potential to significantly affect LOCAL groundwater conditions. The EIR does not present any technical analyses on how the loss of groundwater recharge from the existing Inn Pond will affect the local water table, groundwater storage volume, and surrounding beneficial uses. For example: no water budget was prepared or presented in the EIR to quantify the change in recharge volumes due to filling and paving of the pond and increasing the area of impervious surfaces; the EIR does not perform or

cite any site-specific studies or field data that evaluate if reduced infiltration and recharge will effect (i.e. lower) underlying groundwater levels and storage volumes; and there is no mention of any attempt to inventory surrounding wells, pumping rates and the effect changes in groundwater conditions will have on those wells. Therefore, without an analysis that demonstrates otherwise, the effect of the project on local groundwater (i.e., reduced groundwater recharge due to filling of the pond and increased impervious surface area) remains unresolved and a potentially significant impact.

2. Potential Impact on Groundwater Quality: As stated above, beneficial uses of the Ross Valley Groundwater Basin include municipal, domestic, industrial and agricultural water supply. The degree of these activities within the area of project influence are not identified in the EIR. It's also important to note that, due to the close proximity to San Francisco Bay, groundwater pumping from wells in the vicinity of the project is subject to salt water intrusion from the Bay and its underlying saline aquifer. Scenarios that could lead to salt water intrusion include over-pumping or changes in recharge to the underlying aquifer. Much of the water contained in the Inn Pond is likely fresh to brackish water and low in salinity during much of the year. Therefore, the pond is likely a seasonal source of fresh groundwater recharge, which may help alleviate impacts of stated salt water intrusion. The EIR only evaluates the presence of wells on the project property and has not identified potential supply wells within the project vicinity that would be influenced by changes in pond recharge and potential enhanced salt water intrusion. Thus, the effect of the project on local groundwater quality and impacts to surrounding wells may be significant.

   In summary, the EIR does not present or cite any studies that identify surrounding groundwater conditions and uses, therefore no determination about how the project may effect an individual well or contribute to the possible cumulative effects (e.g., groundwater over-pumping) by other local area wells. In my opinion, a responsible analysis would include a detailed water budget of pre- and post-project conditions; inventory or surrounding wells and wells uses; characterization of existing and historic water levels and aquifer storage volume; and characterization of groundwater quality and presence/potential for salt water intrusion.

3. Loss of Flood Water Storage: The following section from the FEMA Flood Insurance Study (FIS; pages 12-13)) provides a good description about the causes for flooding in the project area.

   All floods of any consequence in the Town of Corte Madera have occurred in the low areas that have been reclaimed from the bay's marsh and tidal lands. Generally speaking, these reclaimed areas encompass everything in and east of the Madera Gardens and the lands north of Paradise Drive. These areas constitute one-half of the present town area.

Flooding can result from either of two phenomena. The first is from storm runoff originating within the Town of Corte Madera and flooding low lands due to inadequate drainage channels and pipes necessary to transport this water into San Francisco Bay (sheet flooding). The second cause is from high water in the bay that in turn pushes salt water up into the stream channels and inundates all lands below the tide level that are not leveed. The elevation of the water surface in the bay is dependent upon the tide, local runoff, and wind and wave effects.

The extent of flooding has been further complicated by the fact that some of the originally reclaimed tidal lands were not filled high enough. The clay materials in the bay mud are so unstable that land subsidence takes place over periods of 30 years to 50 years. Thus, certain areas in the Town of Corte Madera have subsided to elevations that now cannot be drained with the existing storm drainage system.

Another flood complication is the gradual filling of the tidal lands that served originally as natural ponding areas. The storm waters that would have drained to these areas must now proceed down the channels and into the bay, or to other low lands where ponding can occur.

A significant conclusion stated by FEMA FIS (page 44) is, "*The major flooding of the Town of Corte Madera considered is due to tidal flooding from San Francisco Bay*." Model results from a hydraulic study completed by the U.S. Army Corps of Engineers (USACE) cited in the FIS, indicates that a flood having a 1-percent annual chance recurrence (100-year flood) interval in Corte Madera Creek will not create an inundation problem as severe as that created by the estimated 1-perence annual chance tide (100-year tide) in San Francisco Bay.

The FEMA FIS also provides a summary of the flood protection measures that have been developed for the project area. The following section comes from pages 22-23 of the FIS.

A Marin County ordinance controlling tidal areas states that the first floor of a structure must be at an elevation of at least 9.69 feet (assumed to be NAVD 88).

In order to control the substantial amount of storm water runoff from the steep slopes of Corte Madera Ridge and the impervious surfaces in the developed areas of town, and to prevent flooding of the lowlands, developers in the past found it necessary to build a system of lagoons and drainage canals. Most of the storm water runoff is discharged into Corte Madera Creek but San Clemente Creek, east of the Redwood Highway, drains a large portion of the eastern half of the town to San Francisco Bay.

Foreseeing the need for additional drainage works to facilitate new development, the town adopted a comprehensive drainage plan in April 1956. The plan designates certain areas for the "high level" fill method and other areas for the "low level" fill method. The developer has the choice of alternatives on certain other properties. The "high level" method involves filling low areas to elevations that are high enough to drain properly against the highest probable tides. The "low level" method involves protection of the area to be developed by use of levees, so that fills are placed at a much lower elevation than with the high level method. The low level method also calls for a holding pond or a lagoon so as to hold storm water during high tide periods until the water can be discharged into the bay through use of pumps or culverts equipped with tide gates.

A comprehensive drainage plan has been in effect in the Town of Corte Madera. The drainage problems have become much more severe, and areas built in conformance with the drainage plan recommendations have also experienced flood damage. The rapid increase in population and the accompanying development of housing facilities during this period have served to accentuate the damage problems.

All drainage ways and channels that carry runoff in the Town of Corte Madera have been partially or fully modified from their natural state. These modifications have been in the form of straightened channels or pipelines. Each channel originates at the ridge on the southern boundary of the Town of Corte Madera and traverses northerly so as to empty into Corte Madera Creek, San Clemente Creek, or San Francisco Bay.

The channels are dry in the summer, except for small quantities of irrigation return waters. When the winter rains begin, the channels again carry water during and after each storm. There are no stream gaging stations for the channels in the Town of Corte Madera.

There are two manmade lagoons in the Madera Gardens area, designated as Lagoon No. 1 and Lagoon No. 2. These lagoons were constructed as part of the Madera Gardens subdivision for the purpose of collecting and holding storm runoff during high tide periods and then discharging the collected water into Corte Madera Creek during periods of low tide.

The Inn Pond is part of City's floodwater storage as it is tied directly to Lagoon No. 1 in Watershed 1. The City lowers levels of Lagoon No. 1 and Inn Pond in winter to maximize floodwater storage capacity. As affirmed in the FEMA FIS, the loss of floodwater storage in a flood-prone area located within the 100-year flood zone (i.e., filling of Inn Pond) would increase the risk of flood hazards. Yet, the EIR states (page 3-9): "*According to a 2005 flood control capacity analysis* [uncited], *the storage capacity of the pond is not necessary for flood control purposes, even during the worst-case scenario of a 100-year rainfall event*."

Arguably any loss of flood storage in an area prone to severe flooding, in this case more from rising tide waters than rainfall runoff, is certainly an adverse impact. Taken in combination with the displacement of floodwater storage due to the placement of project fill to raise the building pads out of the floodplain ("high level fill"), the project will displace flood water storage to surrounding low-lying areas. Again, the EIR fails to present any project specific information that characterize how existing flood storage and drainage patterns will be altered by the project or project alternatives and quantify the amount of floodwaters displaced by filling of the pond, raising building foundations and increasing runoff volume. The findings from these types of analyses are necessary to determine the magnitude, fate and impact of floodwaters forced onto surrounding areas by construction of the project.

4. Increase in Stormwater Runoff: The EIR states less than significant impact associated with the loss of flood storage associated with the filling of the Inn Pond because there is no increase in peak stormwater discharge from the site. A decrease in discharge rate alleviates an increased risk of erosion potential. However, I assume that due to the increase in impervious surface area, particularly under the Proposed Project and Alternative 3, which eliminate the pond, there will be a net increase in the TOTAL volume of water running off the site during any given storm. The rate (discharge) at which water runs off won't be higher, but, the EIR does not quantify/present if there will be an INCREASE in the total volume of water that runs off the site during any given storm. This increase in runoff VOLUME would increase the flood potential in this low-lying area, because the water has nowhere to go except other surrounding low lands (due to high tides and existing propensity for flooding). The main point here is that the rate of runoff doesn't really matter – it is the net change in total storm runoff VOLUME that will lead to increased flooding potential. An increase in total runoff volume further compounds the risk of flooding when considered in combination with the loss of flood storage from filling the Inn Pond and displacement of flood storage from importing and placing fill to raise site grades out of the current flood zone.

   The EIR does not present an analysis of how the total volume of runoff from the project will change (likely increase) due to increased impervious surface area. Such an analysis includes modeling or analytical solutions that quantify and account for how rainfall-runoff changes between pre- and post-project conditions. This type of analysis must have been started, if not completed, in order to quantify the change in peak discharge rates from the site, as cited in the EIR and discussed above. Yet, the EIR does not present data or analytical results on changes in flooding volume on-site or displaced from the site. Therefore the EIR does not contain sufficient information on changes in flood conditions to inform a conclusion of no significant impact.

5. Lack of Project Drainage Plan: The EIR does not answer or address how existing or increased drainage will be directed away from the site once the project is

constructed, including filling the Inn Pond, placing fill within an existing flood zone and generating increased runoff volumes from increased impervious surfaces. Without the storage associated with the Inn Pond or other site areas currently in the designated floodplain, will runoff from the project be able to flow to Lagoon #1? Where will project runoff be directed/displaced – west towards Lagoon #1 or east under Hwy 101? I would assume the pond provides some retention and storage such that it reduces the potential for flooding of Hwy 101 and surrounding properties. How will the project affect the flood hazard to Hwy 101 or other surrounding low-lying areas? The EIR does not provide an adequate project description (drainage plan) to evaluate these potential impacts to flooding.

6. Impacts of Sea Level Rise: The disparity between the severity of creek and tidal flooding in the project area will only increase with future sea-level rise (SLR). Rising sea level will translate to higher water levels in San Francisco Bay and increased flood hazard risk from tidal flooding. The EIR presents a reasonable description of estimated sea level rise rates and conclusion that additional measures may be required in the project vicinity to address increasing flooding hazards in the future.

   However, the EIR does not include any studies that quantify potential flood conditions or descriptions of how the project will mitigate for: a) increased runoff volume, b) decreased on-site retention (filling of Inn Pond), and c) construction of storm drainage facilities that will reduce or alleviate flood hazard conditions, for either current or future SLR hydrologic conditions. Thus, the EIR has not complied with local City policies and ordinances (esp. City Policies F-2.1, F-2.2, F-3.2, and F-4.3) specific to conducting flood studies or project planning that demonstrate the project will not increase flood hazards on the site or within the vicinity surrounding the project site. Nor does the EIR adequately address through study or mitigation the recognized and admitted increase in flood hazard due to sea level rise. Instead, the EIR implies that such measures may be deferred to the future.

7. Potential Impact on Surface Water Quality: The Inn Pond likely provides the opportunity for settling of sediment from turbid flood waters. The EIR does not address or answer how the loss of this water quality benefit (by filling of the Inn Pond) could adversely impact adjacent water bodies, esp. SF Bay and Corte Madera Creek, by allowing higher concentrations of suspended sediment (and organic urban contaminants that commonly adhere to fine sediment) to remain in local waterways that discharge to SF Bay.

8. Inadequate Mitigation Measures: The stated mitigation measure HYDRO-2 proposes to mitigate flood hazard by submitting verification that the project design complies with Corte Madera Municipal Code Chapter 16.10 and ensuring that all finished floor grades are at least 1 foot above the 100-year Base Flood Elevation (BFE). Currently, the project site grades are between 5- and 8-feet in elevation and lie within the FEMA flood zone. Proposed finish floor grades for the proposed project will be at 11-feet in elevation or 1 foot above the FEMA

base flood elevation of 10-feet. This will require importing and placing 14,600 cubic yards (cy) of earthen fill to raise finished floor grades out of the flood zone. Approximately 9,700 cy of fill material will be needed to fill the on-site pond.

As described above, the EIR does not present sufficient hydrologic study results or drainage plans that demonstrate that the project will not adversely impact flood hazards or mitigate for potential impacts. To state that the EIR will comply with these requirements in the future defers any potential mitigation that should be presented and evaluated in the EIR.

Without more detailed description of project fill and drainage plans, mitigation HYDRO-2 (raising finished floor elevations) could logically generate a potential adverse impact in-itself. Presumably, by raising the elevation of existing site grades out of the BFE, these areas will need to be filled or constructed in a way that displaces existing floodwaters. These displaced flood waters need to go somewhere, and most likely will be displaced to adjacent low-lying areas, increasing the flood hazard in those areas. Thus, the EIR should be considered inadequate as it has not adequately characterized and quantified potential flood impacts, defers mitigation for these potential impacts, and proposes a mitigation measure that could exacerbate flooding in on-site and surrounding low-lying areas. As discussed above, the EIR has not demonstrated that other potential adverse impacts to water resources and flooding have been avoided either, including:

- Substantial interference with groundwater recharge that may lead to declines in water levels, storage volume and groundwater quality impacts;
- Altered drainage patterns that increase the amount of surface runoff that could result in flooding on- or off-site; and
- Exposing people or structures to increased risk of flooding as a result of the project.

9. State Lands Commission Jurisdiction: The Inn Pond is historic Baylands and currently connected to tidal action from San Francisco Bay via Shorebird Marsh. Based on our experience in working on restoration and flood control projects around San Francisco Bay, I suspect that the project site falls under jurisdiction of the State Lands Commission. I did not see any mention of this in the "Regulatory Framework" section of the EIR.

Please feel free to contact me with any questions regarding the material and conclusions contained in this letter report.

Sincerely,

Greg Kamman, PG, CHG
Principal Hydrologist