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May 23, 1988

Sebastopol City Council
Sebastopol, CA 95472

Subject: Laguna de Santa Rosa

I would like to comment on proposed fill in the Laguna based on my educational and professional experience. I received my Masters of Science in Water Resources from Oregon State University. I have performed stream surveys for the U. S. Forest Service, flood insurance studies and watershed modeling for Boyle Engineering Corporation, and land use planning for the Rancho Santa Fe Association. My interest in the Laguna is also personal, having grown up in Sonoma County and wanting to see its unique natural features preserved.

The City Engineer has calculated that if the entire floodplain within the city limits is filled, then the 100-year flood would increase 5/8 inch throughout the Laguna. This is an interesting figure, but cannot be used to justify broad policy decisions or land use decisions for individual parcels. The calculations do not consider the dynamics of the Laguna-Russian River system, nor do they account for localized effects of fill.

1. Cumulative Impacts. The 5/8-inch figure cannot be used as a basis for Council decisions because it does not take into consideration the cumulative impacts of such a rise. To use an analogy, for example, one more coal-fired power plant in Ohio will not significantly increase the acid rain problem in the world. However, acid rain is already at a critical level, and even one more contribution to the problem delays and complicates the solutions. We can look at the effects of a 5/8-inch rise in the Laguna the same way. Although the amount seems insignificant by itself, its contribution is important to the already critical flooding problem. That 5/8-inch increase may be the difference between a relatively harmless flood and one that produces high costs in property damage and interrupted services.

2. Localized Effects. To continue with our analogy, the power plant would also have local negative impacts, such as increased traffic and noise, and

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loss of open space. In the case of the Laguna, the 5/8-inch figure does not account for local effects of filling. For example, in the Morris Street-Highway 12 area, the city limits extend across the main Laguna channel. To fill this area may cause backwater effects upstream that could increase flooding on nearby parcels. Currently no agency has performed the computer modeling necessary to predict the local effect of fill on flood levels. Lacking this information, the Council should move cautiously in allowing fill within the city limits.

3. Increased Flood Peaks. In deciding what development to allow in the floodplain, the Council needs to remember that flood peaks will increase in the future. W. R. Stillman of the Sonoma County Water Agency explained the causes of these future increases in his letter to Melvin K. Davis, dated March 18, 1988. One cause is continued urban development of the watershed. Building in Santa Rosa, Cotati and Rohnert Park increases the impervious surfaces in the watershed, and causes more water to be delivered to the Laguna during a storm. Channelization of creeks, which often accompanies development, delivers runoff faster to the Laguna, also causing higher flood peaks. Continued sedimentation of the Laguna increases flood peaks by reducing storage capacity. The causes of increasing flood levels are complex and interacting, as Mr. Stillman points out. It would take a sophisticated computer model to quantify the amount of the increase. Even without such a model, however, we know that the increase in flood levels will occur. The more development the City allows in the floodplain, the greater the impacts of future increases. If the 100-year flood peak increases above the fill level of 76 feet, damage will be extensive. It is important the the Council mitigate future increases by limiting development in the floodplain and instituting a no-net-fill policy in areas where development is permitted.

4. Additional Floods. When speaking of "the floodplain" we must remember that there will be floods more severe than the 100-year event. The strategy of filling to the 75- or 76-foot level does not protect property from the 150-, 200- or 500-year floods that will inevitably occur. The 100-year flood elevation is a useful guide, not a guarantee of maximum flood levels.

5. Channel Instability. A stream system such as the Laguna-Russian River basins is a dynamic entity. Change in one part has a ripple effect throughout the system. One ripple effect of fill in the floodplain may be channel instability. Fill within the city limits which encroaches on the main channel of the Laguna may increase flow rates during frequent floods. Higher flow rates cause channel instability as the system adapts to the new regime. Channel instability in turn causes progressive erosion upstream, increased sedimentation downstream, loss of storage capacity, degraded water quality, and reduced aquatic and riparian habitats. Attention has centered on the effects of fill on flood peaks. But the effect on channel stability may be more important in the long term to the Laguna system.

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The five topics above show that in dealing with a natural system such as the Laguna, we must be careful not to oversimplify the system in our attempt to understand it. Quantifying one result of one action should not blind us to the other effects of that action or to the interaction of the ever-changing elements of the system. Although it is more comfortable to look at one small part of the system at a time, we must continue to see it as a dynamic whole where a single action has far-reaching, long-term effects.

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