MEMORANDUM

TO: Kenyon Webster, Sue Kelly – City of Sebastopol

FROM: Carl Michelsen, Marcus Trotta – PES Environmental, Inc.

SUBJECT: Best Management Practices/Measures
Water Supply Assessment
Northeast Area
Sebastopol, California

DATE: June 27, 2007

PROJECT NO.: 954.003.01.001

The draft Water Supply Assessment (PES, 2007) states that sufficient water is available in the Wilson Grove Formation Highlands Basin to supply the projected water demands. To reduce Sebastopol's overall "load" on the Basin, several opportunities may exist to reduce water demand and/or enhance recharge. The following is a summary of possible best management practices/measures that could serve this goal.

WATER SYSTEM MANAGEMENT

- In the last few years, the bulk of the water production has been from Wells No. 6 and 7, because of numerous well maintenance issues/problems with the older Wells No. 2 and 4 and the ultimate failure of Well No. 2. After well No. 8 is installed this summer, shifting some of the production from the southern wells (Wells No. 6 and 7) to the northern wells (Wells No. 4 and 8) should be conducted, as much as feasible. This well help to re-distribute pumping stresses within the aquifer to a greater geographical area, and may help to further stabilize and/or raise water levels in the southern part of the City. Also, because Well No. 8 is designed to minimize production of water from higher arsenic zones and Well No. 4 tends to have low arsenic concentrations, more production from these two wells may lower the overall arsenic concentration in the supplied water.

- Continued tracking of water level conditions within the City is warranted. At least annually, the Geotracker water level data from contamination sites should be downloaded and compiled for use in preparing a water level map. As contamination sites are closed and wells are proposed for destruction to the Regional Water Quality Control Board, the City should have the opportunity to comment on whether or not monitoring should continue before such approval is granted. In some cases it may be appropriate to retain wells for continued water level (and perhaps water quality monitoring), if arrangements with the responsible party can be made. For example, on the south end of town, the Tesoro gas station (former Ultramar) has received case closure and it is likely that the monitoring wells will be destroyed. As this area has experienced water level declines, continued monitoring (especially to observe if water levels rebound as Well No. 8 comes online) would be useful.

- Although expensive, PES concurs with the City's planned installation of wellhead carbon treatment at Well No. 5. Re-activation of this well will be advantageous for two reasons: (1) arsenic levels have been below the MCL in this well; and (2) this would help to re-distribute pumping stresses within the aquifer.

WATER DEMAND REDUCTIONS

- In the Northeast Area (and in other parts of the City) utilize recycled water to the extent feasible for irrigation, toilet flushing, decorative fountains, and other uses via dedicated pipelines (purple pipe). The recycled water line located at the northeast corner of the City may be useful for this purpose.

- Although the City has a comprehensive water conservation program built into the Municipal Code, it may be possible to create water bill incentives and more pro-active retrofit programs to further promote water conservation citywide. Currently, the City has toilet retrofit and commercial-only washer rebate programs. Offering rebates towards purchase of other high-efficiency appliances such as non-commercial clothes washers and Energy Star-rated dishwashers would be useful in reducing water demand. The City of Santa Rosa and the Sonoma County Water Agency currently have such programs for non-commercial high efficiency clothes washers. According to the U.S.EPA's Energy Star website, high-efficiency clothes washers use 35-50% less water than older washers and clothes washers are the second largest water use in the home. Also, Energy-Star rated dishwashers typically use 40% less water compared to non-rated models. Pro-active outreach to major water users to consider such rebates and to provide for incentives to implement conservation measures such as fixture replacement (e.g., motion-sensor faucets, low-flow showerheads) would also be useful.

RECHARGE ENHANCEMENTS

- Incorporate recharge devices such as porous pavement, infiltration trenches, percolating catch basins, detention basins designed for infiltration, and grassy drainage swales into the design of future projects, to the extent feasible. Proper design and maintenance to minimize infiltration of runoff pollutants into the subsurface, address sedimentation/clogging and foundation stability concerns would be necessary.

- Evaluate roof runoff recharge systems for new or remodel construction within the City limits. Such systems can provide a considerable amount of water. For example, for the projected 391,000 square feet of new commercial construction in the northeast area, a one-inch rainfall would generate about 244,000 gallons of water. Sebastopol's average annual precipitation is about 38 inches, thus roof runoff from the new commercial construction alone would annually produce about 9.3 million gallons of water or about 28 af of water per year. If all of this water were recharged, this volume of water is about 40% of the annual water demand for the commercial use estimated for the project (60 af/yr). In other words, the net annual extraction from the aquifer associated with the project would be reduced by 40%. Issues or concerns regarding roof contaminants, RWQCB approval, design of appropriate infiltration systems, maintaining foundations, and other geotechnical considerations, for example, would have to be resolved. Specifically, in the NE area, the challenges involved in designing the necessary temporary storage/infiltrations mechanisms within the intensive downtown-type urban development envisioned for the NE plan are significant. Thus full capture/recharge of the runoff may be unrealistic. As noted in the WSA, however the potential infiltration rate of the Wilson Grove Formation is rather substantial at an estimated 0.7 acre feet per day.

- As part of the City's compliance with NPDES and related stormwater issues, the City may want to evaluate implementation of municipal codes, such as currently in place at the City of Santa Monica (see http://www.qcode.us/codes/santamonica/) that are designed to reduce urban runoff from new developments. Such codes use permeable materials in lieu of or to replace hard capes and increase the amount of runoff seepage (recharge) into the ground.

- Currently, Zimpher Creek is contained within a 54-inch diameter culvert within the limits of the Northeast Area. To the extent feasible, incorporating design features (e.g., percolating catch basins) that contribute to recharge, should be a part of the re-design of the storm drain systems.

OTHER WATER MANAGEMENT TOOLS

- Numerous residential, commercial, and agricultural users located within unicorporated areas that surround the City draw on the same water sources as the City. The City may want to encourage the County of Sonoma to enhance monitoring and data collection efforts and to create programs promoting water conservation and stewardship that are comparable to the City's efforts.

- Another possible though costly measure is Aquifer Storage and Recovery (ASR). ASR involves injecting water into an aquifer through wells or by surface spreading and infiltration and then pumping it out when needed. The aquifer essentially functions as a water bank. Deposits are made in times of surplus, typically during the rainy season, and withdrawals occur as needed. Conceptually, such a system for the City might involve capture of surface water runoff and injection or spreading of water. Typically, ASR is not implemented unless there are long-term and substantial reductions in water levels (such as overdraft). As such conditions are not apparent, ASR is not recommended. Additionally, there a number of challenges associated with ASR such as the source of the water (e.g., excess runoff in creeks and streams), availability of land for surface spreading, concerns regarding trace-level contaminants in surface water and impacts to surrounding groundwater users, among others.