APPENDIX I

Response to Comments on the December 2001 Stakeholder Draft Report

"A Comprehensive Groundwater Protection Evaluation for South San Francisco Bay Basins"

In the spring of 2000 three stakeholder meetings were held in Fremont, San Jose, and Redwood City. The purpose of these meetings was to explain the ***South Bay Groundwater Protection Evaluation*** project to stakeholders and to gain feedback to help define its purpose and scope. In December 2001, a draft version of the report, titled "A Comprehensive Groundwater Protection Evaluation for the South San Francisco Bay Basins" was distributed to stakeholders for comment.

Following is a summary of stakeholder comments received prior to April 30, 2002 and the Groundwater Committee's responses to those comments. Where report revisions were deemed appropriate based on the comments, the response indicates the section of the report that was revised and the exact revision(s) made.

1. Patrick Ferraro, Silicon Valley Pollution Prevention Center

Comment: Coyote Valley largest granular alluvium deposited on the bedrock in the Santa Clara Valley and has high capacity for infiltration. Therefore, groundwater protection must supercede any and all land use proposals. Recommends adding stronger language to address these concerns.

Response: We concur with Mr. Ferraro that sensitive groundwater areas warrant additional groundwater protection measures and that the Coyote Valley is a sensitive groundwater area. The following changes were made to the report:

- Added the following recommendation in Tables ES-3 and 20:

General Plan Implementation	Most cities do not take an active role in groundwater protection.	Cities should impose permit requirements for groundwater protection on development in sensitive groundwater areas.	The S.F. Regional Board, local groundwater management agencies, and local planners should work together to identify sensitive groundwater areas and appropriate groundwater protection strategies.

- Revised the second recommendation in Section 7.4.4 to include local land use agencies, so the second bullet now reads:

DHS should provide the S.F. Regional Board, local groundwater management agencies, and local land use agencies with maps of well locations and delineated protection areas. Regulators, groundwater management agencies, and local land use agencies can then use the information to prioritize cleanup, pollution prevention, and monitoring needs.

- Added a recommendation in Section 7.6 that reads:

The S.F. Regional Board and local groundwater management agencies need to encourage local planners to take a more active role in groundwater protection. Specifically, land use agencies need to be encouraged to impose permit requirements related to groundwater protection for development in sensitive groundwater areas. Examples of permit requirements could be sealing of vertical conduits and restrictions on hazardous materials storage and use.

2. Waste Management, Inc.

Comment:	Waste Management (WM) appreciates the opportunity to provide comments on the Draft Comprehensive Groundwater Protection Evaluation for South San Francisco Bay Basins (Report) prepared by the California Regional Water Quality Control Board - San Francisco Bay Region (RWQCB). The Report provides a detailed evaluation of the South Bay groundwater quality issues, and we found it to be very informative. A few minor comments for your consideration are highlighted below: <u>Section E.3 Project Methods:</u> "…and groundwater pollution sites (e.g, leaking underground fuels tanks, solvent plumes, and landfills)." We have two comments regarding the above statement. The inclusion of "landfills" as "groundwater pollution sites" is a broad generalization that is not supported by the data. All "leaking underground fuel tanks" and all "solvent plumes" are pollution sites. Not all "landfills" are "groundwater pollution sites". In fact, even landfills that are leaking may not be defined as "groundwater pollution sites" in every circumstance. We suggest that you modify the referenced statement to a) delete the reference to landfills per our comment below, or b) be specific in the use of terms and identify "leaking landfills" as "potential groundwater pollution sources". (Please note that this comment also applies to "Section 1.4 Methods" on page 2, first paragraph, third sentence). Secondly, the statement appears to leave out other groundwater pollution sources presented elsewhere in the Report. Please consider including leaking sanitary sewer lines as part of the referenced statement.
Response:	We agree. These sections have been extensively revised such that the above language has been removed.

Comment: Section E.4 Key Findings – Overall Groundwater Quality (second sentence):

"In contrast, there is significant and widespread pollution of the shallow aquifers from leaking fuel and solvent underground storage tanks and from landfills."

The inclusion of landfills in this summary statement concerning the primary sources of widespread pollution does not appear to be justified. The remainder of the Executive Summary and the main body of the Report indicates that the primary sources of groundwater contamination are from leaking USTs, dry cleaners, saltwater intrusion, and sewer lines. Additionally, review of the SLIC Program list did not identify any landfills sites. In general, the regulations governing landfill operations (siting, construction, operation and monitoring, etc.) greatly reduce the potential for landfills to impact groundwater resources. Identification of landfills as a significant contributor to widespread contamination does not appear to be appropriate. (Note: Comment 2 also applies to Section 8.1 – Overall Groundwater Quality.)

Response: We agree. These sections have been revised (see below) to include all of the major threats indicated in the report. Additionally, landfills have been qualified as "leaking" landfills.

Groundwater quality varies throughout the South Bay Basins, but is generally of very high quality, particularly in deeper aquifer systems. In contrast, there is significant and widespread pollution of the shallow aquifers from a variety of sources, including leaking fuel and solvent tanks (underground and aboveground), historic dry cleaner facilities, leaking sewer lines, agricultural fertilizers, and leaking landfills. Cleanups at these sites are regulated by six different agencies. Investigations are complete, and cleanup is underway at the majority of regulated sites. A wide range of pollutants and /or polluting activities has the potential to degrade water quality in the South Bay Basins, with the major chemical threats being MTBE, solvents, nitrates and salinity (via saltwater intrusion).

Comment: Section 5.13 Municipal Landfills (first paragraph, first sentence):

There appears to be a conflict between the text and Figure 25 as to the number of active and closed landfills.

Response: Thank you. This error has been corrected in the text and in Figure 25. The correct numbers are 9 active landfills and 22 closed landfills.

Comment: Section 5.13 Municipal Landfills (first paragraph, fifth sentence):

This statement identifies landfills as possible sources of erosion and sedimentation damage to streams if surface water runoff is not managed properly. This statement applies to most, if not all, development projects. Since landfills proportionally represent a very small fraction of development projects, should other non-landfill development projects also be identified as possible sources in the Report? Typically, landfills receive more regulatory oversight than most non-landfill development projects and therefore, pose less of a threat to water quality associated to storm water related impacts.

Response: You are correct. However, the report focuses on sites and activities that generally pose chemical threats to groundwater quality. The statement about stormwater runoff potentially causing degradation of surface water bodies is incidental to the primary reason for the landfill discussion. It would not be appropriate to discuss other development projects since they are not typically considered threats to groundwater quality. Section 5.13, now section 5.8, does acknowledge regulatory permitting requirements, which exist precisely because landfills do pose a significant threat to water quality.

Comment: Section 5.13 Municipal Landfills (second paragraph, fourth sentence):

"Both sites are leaking and have installed groundwater collection trenches to intercept pollutants and protect downstream beneficial uses."

This statement, in reference to the Guadalupe and Kirby Canyon Landfills, requires modification. Both landfills are canyon fills that have portions of their waste disposal areas underlain only by natural geologic materials. These "unlined" areas and were constructed in accordance with applicable regulations present at the time they were developed. Both landfills have groundwater barrier and collection systems for the "unlined" areas. Additionally, both landfills have constructed membrane lining systems since 1993, when Subtitle D and the associated state regulations were implemented.

A review of historic groundwater monitoring data at both sites indicates a historic episode of onsite impacts to groundwater associated with landfill operations, but never any offsite impacts to groundwater. In addition, the most recent analytical monitoring data from both facilities indicate that landfill operations are not impacting groundwater quality onsite nor offsite. The conclusion that both sites are leaking is based on dated information.

Response: You are correct. This section has been revised as follows:

None of the South Bay landfills is known to have contaminated drinking water wells. However, several have leaked and have been required to install groundwater or leachate extraction systems to control the leakage. For example, two active landfills (Guadalupe and Kirby Canyon), which are located upstream of recharge facilities in the Santa Clara Valley, have leaked in the past. As a result, both sites installed groundwater collection trenches to intercept pollutants and protect downstream beneficial uses. Neither site caused any off-site impacts. Current monitoring data indicates that the leaks have stopped.

Comment: Section 5.14 Protection Programs for Municipal Landfills (third paragraph, second sentence):

"Site-specific information and water quality data are not maintained in any database."

The California Integrated Waste Management Board has recently initiated compilation of a Landfill Facility Compliance Study database.

Response: Thank you. This information has been added to section 5.14, which is now section 6.1.8.

Comment:	Section 5.16 Aboveground Petroleum Storage Protection Programs (first paragraph, fourth sentence): "The program applies to aboveground storage tanks with capacities greater than 10,000 gallons." This statement may need revision based on Section 25270.2 (k) of the Aboveground Petroleum Storage Act. We understand that the program applies to facilities storing "petroleum" in a single tank greater than 660 gallons or facilities storing "petroleum" in aboveground tanks or containers with a cumulative storage capacity of greater than 1,320 gallons.
Response:	You are correct. Furthermore, the 660-gallon single tank requirement was eliminated when EPA's SPCC regulations were revised in July 2002. The statement in the report has been revised to read "The program applies to aboveground storage tanks or containers with a cumulative capacity greater than 1,320 gallons."

3. Trish Mulvey, Santa Clara Basin Watershed Management Initiative/San Francisquito Watershed Council

Comment: Please provide a "lead agency" for all the recommendations (Tables ES3-5 and 20-22) or at least identify who will "call the first meeting" to get things started.

Response: In many cases a lead agency is implied under the "Implementation" column heading. The groundwater committee intends to follow up with several of the report recommendations. In doing so, lead agencies and first steps will be further identified as appropriate.

Comment: Where do I look for issues about possible [emerging] contaminants in imported water that is used for groundwater recharge? Where do I look for guidance about issues associated with [the] use of recycled water either specifically associated with indirect potable reuse via groundwater recharge or associated with incidental recharge where recycled water may be used for irrigation in an area of unconfined aquifers?

Response: The two sections below were added to the report:

5.17 Emerging Contaminants

Emerging contaminants, including N-nitrosodimethylamine (NDMA), endocrine disruptors, and pharmaceutically active compounds, may be present in sanitary wastewater, recycled water, imported water, and any other water source that receives sanitary wastewater. Emerging contaminants may pose a threat to groundwater quality when such waters are used for artificial recharge or otherwise intentionally infiltrated. Studies are underway around the world to better understand the occurrence, fate and transport, and health effects of emerging contaminants. SCVWD studies that are either underway or planned include analyzing imported surface water, local surface water, recycled water, and groundwater for emerging contaminants; evaluating the impact of artificial recharge on groundwater quality; studying the fate and transport of NDMA in recycled water; and evaluating potential impacts of streamflow augmentation with recycled water on groundwater quality and stream ecological health.

5.18 Emerging Contaminant Protection Programs

The SCVWD, in addition to performing the studies listed above, is developing a water quality standard for intentional infiltration with recycled water, imported water, local surface water, and storm water runoff. The SCVWD is also evaluating if and to what extent recycled water needs to be treated to meet groundwater protection concerns and users needs for different uses. The water quality standard and the treatment requirements evaluation will address emerging contaminants, as well as more traditional contaminants like salts and nitrate.

Comment:	The recommendations on page 56 are excellent to better understand the potential impacts of withdrawing groundwater adjacent to South Bay creeks….What are "next steps" and who will take the lead? Also, please capture the recommendations in the tables of recommendations (ES3-5 and 20-22).
Response:	Please note, this section has been extensively revised. This topic will also be the focus of future groundwater committee discussions and the possible formation of a subcommittee workgroup. The recommendations have been included in Tables ES-3 & 4 and Tables 20 & 21.
Comment:	On page 56 there is a reference to "A recent report prepared for the SWRCB recommended that the SWRCB work with other state, federal, and local governments and academic institutions to promote improved hydrological and biological data collection and research to improve the management of riparian rights (Moyle and Kondolff, 2000)". Please include the citation in the references and include the recommendation in the tables of recommendations ES3-5 and 20-22. Also please suggest that this be incorporated in the next edition of the SWRCB Strategic Plan.
Response:	Thank you. Please note, this section has been extensively revised. The citation has been added as follows: Moyle, Peter B. and G. Mathais Kandolf, 2000, Fish Bypass Flows for Coastal Watersheds: A Review of Proposed Approaches for the State Water Resources Control Board.
Comment:	Please thank Jeff Kapellas and the other staff in your GIS-shop for the excellent graphics. Obviously the images took a lot of work, and they are very helpful.
Response:	Thank you!! We will pass your comment on to Jeff!

4. Jim Crowley, Santa Clara Valley Water District

Comment: Sections of the report that address fuel leaks, MTBE, and active service stations should be updated to more properly reflect groundwater quality concerns. It may also be useful to include a map of active service stations in the study area and a list of references pertaining to the issue (page 74). A column could also be added to Table ES-1 summarizing protection measures on the issue.

Response: Revisions have been made to the appropriate report sections to address these concerns.

- The following language has been added to the Executive Summary and Table ES-4:

Operating Gasoline Stations. As part of a Pilot Program by the SF Regional Board and SCVWD, monitoring of active service stations was conducted. Preliminary results indicate that MtBE and other gasoline constituents are detected at up to 60% facilities. Furthermore, at over 40% of the facilities MtBE is present at concentrations significant enough to threaten groundwater. All active service stations should be required to perform environmental monitoring program.

Evaluations of the effectiveness of leak detection and monitoring systems at gasoline Underground Storage Tank (UST) facilities indicate that MtBE and other gasoline constituents are detected at up to 60% facilities. The preliminary results of the operating station pilot study indicate that at over 40% of the facilities MtBE concentrations are present at concentrations significant enough to threaten groundwater. Direct environmental or groundwater monitoring is needed to properly detect releases (past and future) of gasoline and its constituents such as Methyl tert Butyl Ether (MtBE) that are not otherwise detected by the UST leak detection system. Releases that are not detected by existing UST system monitoring equipment will continue to pose a significant threat to groundwater supplies and drinking water wells. Several studies listed in the references section show that between 40 to 60 percent of facilities with upgraded or new UST systems have releases that go undetected by the UST monitoring equipment. When releases go undetected and impact groundwater quality, the contamination can, and has, migrated to nearby water supply wells (as was case of the MtBE impact to Great Oaks Water Company well Number 3 in Santa Clara County).

Threat posed by Operating Gasoline Stations	Studies show that operating gasoline stations with UST's pose a threat to groundwater quality.	Environmental Monitoring should be conducted at operating gasoline stations.	The SF Regional Board should begin to require monitoring of operating gasoline stations not currently performing groundwater monitoring. Legislative action is needed to make this a statewide requirement.

- The following revision has been made to Section 5.2:

Monitoring Active Service Stations. The S.F. Regional Board has instituted a pilot test with the SCVWD to perform environmental monitoring at operating service stations that are not currently in the LUST Cleanup Program. SCVWD investigations indicate that undetected MTBE releases are occurring at currently upgraded operating LUST facilities. The trend of undetected releases was found to be consistent across a larger spectrum of 50 sites. Previous studies and the preliminary results of the Pilot Program indicate that undetected MTBE releases from operating and upgraded LUST facilities are a greater threat to groundwater resources than earlier believed. Preliminary results from the pilot program based upon investigation at 30 active stations indicate that over 40% have concentrations significant enough to threaten groundwater quality such that additional investigation and cleanup are necessary.

- The following revision has been made to Section 6.3:

Active Gasoline Service Stations. Information on the location of active service stations with UST's is generally available and up to date. The Geotracker system incorporates data from all of the CUPA's and local agencies in one location accessible by the public. Studies are underway to identify the threats posed by the storage of gasoline at these facilities and which sites should be put into the LUST program. In addition, changes in leak prevention and monitoring requirements specify enhanced leak detection for UST's located within 1000 feet of public water supply wells.

- The following revision has been made to Section 8.2 and Table 21:

Monitoring Active Service Stations. As part of a Pilot Program by the SF Regional Board and SCVWD, monitoring of active service stations was conducted. The preliminary results of this study, together with other SCVWD studies, indicate that MtBE and other gasoline constituents are detected at up to 60% facilities. Furthermore, at over 40% of the facilities MtBE is present at concentrations significant enough to threaten groundwater. Direct environmental or groundwater monitoring is needed to properly detect releases (past and future) of gasoline and its constituents such as Methyl tert Butyl Ether (MtBE) that are not otherwise detected by the UST leak detection system. Releases that are not detected by existing UST system monitoring equipment will continue to pose a significant threat to groundwater supplies and drinking water wells. Several studies demonstrate that 40 to 60 percent of facilities with upgraded or new UST systems have releases that go undetected by the UST monitoring equipment. When releases go undetected and impact groundwater quality, the contamination can, and has, migrated to nearby water supply wells (as was case of the MtBE impact to Great Oaks Water Company well Number 3 in Santa Clara County).

Threat posed by Operating Gasoline Stations	Studies show that operating gasoline stations with UST's pose a threat to groundwater quality.	Environmental Monitoring should be conducted at operating gasoline stations.	The SF Regional Board should begin to require monitoring of operating gasoline stations not currently performing groundwater monitoring. Legislative action is needed to make this a statewide requirement.

5. Libby Lucas, League of Women Voters

Comment: The importance of groundwater protection and identification of vulnerable areas, especially in the Coyote Valley, should be highlighted.

Response: We concur with Ms. Lucas and made the following changes to the report:

- Added the following recommendation in Tables ES-3 and 20:

General Plan Implementation	Most cities do not take an active role in groundwater protection.	Cities should impose permit requirements for groundwater protection on development in sensitive groundwater areas.	The S.F. Regional Board, local groundwater management agencies, and local planners should work together to identify sensitive groundwater areas and appropriate groundwater protection strategies.

- Revised the second recommendation in Section 7.4.4 to include local land use agencies, so the second bullet now reads:

DHS should provide the S.F. Regional Board, local groundwater management agencies, and local land use agencies with maps of well locations and delineated protection areas. Regulators, groundwater management agencies, and local land use agencies can then use the information to prioritize cleanup, pollution prevention, and monitoring needs.

- Added a recommendation in Section 7.6 that reads:

The S.F. Regional Board and local groundwater management agencies need to encourage local planners to take a more active role in groundwater protection. Specifically, land use agencies need to be encouraged to impose permit requirements related to groundwater protection for development in sensitive groundwater areas. Examples of permit requirements could be sealing of vertical conduits and restrictions on hazardous materials storage and use.

Comment: Ms. Lucas made a number of recommendations to add geologic maps.

Response: We have added Tom Iwamura's Coyote Valley geologic cross-section schematic as Figure 8b in the report. We believe the other geologic references provided by Ms. Lucas are superceded by other references included in the report.

6. Richard McMurtry, Regional Water Quality Control Board, San Francisco Bay

Comment:	Is there any possibility in a future effort to look at groundwater management issues as they impact surface water stream ecological health? For example, in order to prevent exfiltration from certain segments of southern Coyote Creek that could result in high water table in adjacent lands, the entire creek is diverted. The groundwater "solution" has destroyed the creek.
Response:	We concur that surface water – groundwater interactions warrant additional study and action. This topic will be the focus of future groundwater committee discussions and the possible formation of a committee workgroup.

7. Laura Tom Bose, U.S. Environmental Protection Agency

Comment:	For a region where groundwater provides drinking water for almost one million people, this report is a long-needed compilation and analysis. Particularly, its recommendations for further action help direct limited resources to the highest priorities. It is an excellent model of what can be accomplished through regional coordination, for protection of source of drinking water.
Response:	Thank you for the encouraging comments!!

8. Elizabeth Janes, U.S. Environmental Protection Agency

Comment: EPA believes that overall, the study areas discussed in the report represent some of the most vulnerable and yet best protected ground water supplies in the west. To this end, EPA wants to support improvements to the good work that has already been done. We appreciate the critical evaluation of existing regulatory and non-regulatory programs as a basis for determining our future role.

On behalf of this office, I have specific questions/comments:

1. Regulation of stormwater disposal. Page 57 says that each individual stormwater drainage well is regulated. It is unclear to me if you are referring to local, state or federal authority.

EPA's authority is a Safe Drinking Water Act regulation applicable to the construction and use of injection wells (drywells, leachfields, and other subsurface conveyances) for stormwater disposal, which is currently being implemented on a very limited basis. But as urban stormwater permits may drive more construction of more injection wells, especially in ground water-reliant areas of the Central Valley, EPA is advising more care in this practice. EPA sees storm water injection wells as beneficial (recharge) and risky (vertical conduit.)

The report indicates that Regional Board 2 has a 1995 policy on stormwater disposal. Please send me a copy of that 1995 policy. After I review it, I will request a meeting with RB storm water staff to see if the draft EPA storm water injection guidance can better reflect the RB position. I am concerned that EPA will not receive inventory information from all the cities in California outside of RB2 if the federal guidance is too strict.

Response: We concur that the recharge of stormwater to soil and shallow groundwater provides both benefits to surface water quality and risks to groundwater quality. The Board's policy on recharge of stormwater is contained in the 1995 Water Quality Control Plan for the San Francisco Bay Region (Basin Plan) on pages IV-53 thru IV-55. We have forwarded a copy of this policy to you. The report mentions actions taken by the Board to implement this policy, including directives in NPDES permits issued to stormwater management agencies. The policy envisions that all shallow drainage wells would be regulated by local enforcing agencies via their well-permitting process, with assistance from the Board and DWR. This regulatory structure is not yet in place throughout the region. We would be glad to meet with EPA staff to discuss the inter-relationship between the Board's policy and EPA's draft storm water injection guidance.

Comment:	Study of vertical conduit identification and closure. This topic could be eligible for federal support per the Local Agency Ground Water grant program, if there were a local agency (perhaps amongst your contributors) interested in devoting the resources to write the report. See guidance document issued 4/3/02.
Response:	Thank you for the heads-up. We will pursue this avenue of funding with EPA staff and local groundwater agencies.
Comment:	Cross-training of all jurisdictions on the identification of endangering practices/discharges. EPA agrees that there are some weaknesses inherent in the motley approach that California has to regulating waste and water issues, and that the Bay area could pilot improvements. Specifically, more efficient use of field inspectors, by cross-training CUPA, LOP staff on water issues (to look for conduits, storm drains, obvious leaks) and pretreatment staff together on the most mobile and/or toxic contaminants, may help spot more problems while they are still in soil. EPA WTR-9 would also consider this an eligible use of its local agency grant funds, if there is a group who would apply to organize and present such training.
Response:	We concur that cross-training of staff from different state environmental regulatory programs would be beneficial. We will consider this topic when selecting future topics for our in-house training program.
Comment:	Data Coordination: I am representing EPA on the Public Advisory Committee for AB599, which will be making recommendations to SWRCB/legislature on how to improve ground water data sharing statewide. I hope that that forum will shed more light on the value of data integration without sacrificing gains made by individual programs. If any members of the committee who have specific data concerns, or front line experience with the value and limitations of GeoTracker, TurboSWAP, or other programs, and would like to provide that feedback to me, it will help me be a better representative of the regulatory community.
Response:	Thank you for the information. Your comment has been shared with committee members. As you know, Sarah Raker is the San Francisco RWQCB coordinator for the AB599 program and has been attending both the Interagency Task Force and Public Advisory Committee meetings. Results of the year-long effort will be presented to the legislature in Spring 2003.

9. Stanford Linear Accelerator Center (SLAC)

Comment: "…we would like to present results of our geologic and hydrologic investigations conducted over the past 40 years at this facility and to provide you with our supporting data, conclusions, and recommendations to be considered when finalizing your document".

"You have recommended modifying the San Mateo Plain Boundaries (***Table ES-3. Recommendations Requiring Coordination Between Agencies***), and we strongly agree. In addition to your recommendations, we would like to make some suggestions regarding the area around SLAC in Menlo Park in southern San Mateo County (Figure 1) that would affect your ***Figure 3*** (***Surficial Geology***), ***Figure 9*** (***Map of San Mateo Plain Groundwater Basin***), and ***Figure 26*** (***Interim Prioritization Approach for the South Bay Basins***). Our documentation and recommendations are as follows".

Recommendations for South San Francisco Bay Document

Figure 3: Surficial Geology

We recommend changing your draft *Figure 3: Surficial Geology* to what is shown on the attached Figure 8. This recommendation is based on:

- the distribution of mapped bedrock units in the SLAC area (Figure 2),
- the low permeability of rock units at SLAC (Figures 3 and 4),
- the elevated TDS of the groundwater at SLAC (Figure 5), and
- the distribution of groundwater production wells in the SLAC area (Figures 6 and 7).

Figure 8 (a modified version of your *Figure 3*) more accurately represents the distribution of Santa Clara Formation in southern San Mateo County based on SLAC's available on-site data as shown on Figure 2.

Figure 9: San Mateo Plain Groundwater Basin

Based on the distribution of bedrock and the Santa Clara Formation shown on Figure 8 (the revised *Figure 3: Surficial Geology*), *Figure 9: San Mateo Plain Groundwater Basin* should be modified to exclude the eastern part of SLAC as shown on Figure 9. We also noticed an error on your map that shows I-280 offset at Alpine Road (see "freeway offset" on Figure 9).

Figure 26: Interim Prioritization Approach for Groundwater Protection

Finally, based on modifications shown on Figures 8 and 9, *Figure 26: Interim Prioritization Approach for Groundwater Protection* should be modified as shown on Figure 10. In San Mateo County, the definition of priority protection areas should reflect the geology and hydrogeology of the San Mateo Plain Groundwater Basin and surrounding bedrock regions. To define the appropriate priority protection areas, the boundaries of the groundwater basin need to accurately reflect the

current understanding of the geology and hydrogeology of the area

Defining the Boundaries of the San Mateo Plain Groundwater Basin

Our data suggest that the majority of the SLAC area, including the eastern end of SLAC, is outside the San Mateo Plain Groundwater Basin. The EP&R group has been working on the SLAC site for over ten years, and we have installed over 80 monitoring and extraction wells. Many of these wells have both geophysical logs and continuous cores that have been described in detail. We have integrated our hydrochemical and hydraulic data with the subsurface data and with the extensive geologic mapping of the SLAC site. With this wealth of information, we developed our own site-specific hydrogeologic model that could provide better information to define the basin boundary in the model portrayed in your document. Specifically, you show much of the eastern end of SLAC to be within the San Mateo Plain Groundwater Basin, and our data suggest that it is outside the basin boundary and is within the bedrock region.

You define groundwater basin boundaries in section 2.1 Groundwater Basin Boundaries:

Groundwater basin boundaries, from a groundwater flow perspective, are generally drawn along barriers to groundwater flow. Most of the South Bay Basin boundaries are artificial and have been established for convenience rather than along "no-flow" boundaries. The only true boundaries that meet this definition in the South Bay are those between alluvium and bedrock.

You have defined the San Mateo Plain Groundwater Basin boundary (as shown on your *Figure 9*) as the contact between the Santa Clara Formation and Tertiary bedrock, rather than the bedrock – alluvium contact in the area around SLAC (see your *Figure 3*). Your *Figure 3* generalizes and misrepresents the distribution of Santa Clara Formation in the SLAC area. Our hydrologic model includes data indicating that most of SLAC is underlain by bedrock with a few isolated, thin veneers of generally unsaturated Santa Clara Formation resting locally on the bedrock. In your description of the Santa Clara Formation in *Appendix B South Bay Geology,* you state:

The Santa Clara Formation is considered to be partly water bearing. The portion that outcrops{sic} above the edges of the valley is generally considered to be non-water-bearing.

We agree and recommend changing the boundary of the San Mateo Plain Groundwater Basin to be consistent with this statement. This is supported by:

- the geology and hydrostratigraphy of SLAC (particularly the distribution of the Santa Clara Formation)
- groundwater flow and hydraulic conductivity at SLAC
- the hydrochemistry of groundwater at SLAC
- distribution of off-site groundwater production wells

Much of the data and reasoning for our recommendation are presented in SLAC (2001).

Response: SLAC's recommendations for report revisions are well supported and appropriate. The figures referenced in SLAC's comments have been modified to reflect a more accurate representation of the groundwater basin boundary as recommended by SLAC. Specifically, the basin boundary revisions apply to Figures 3 (***Surficial Geology***), Figure 9 (***San Mateo Plain Groundwater Basin***), and Figure 26 (***Interim Prioritization Approach for Groundwater Protection***). The San Mateo Plain Groundwater Basin boundary was drawn conservatively along the farthest reaching contact between unconsolidated terrestrial and alluvial sediments and outcropped bedrock, to maximize groundwater protection efforts. In the vicinity of the SLAC facility, unconsolidated sediments of the Santa Clara Formation (gravel, sand, silt and clay) overlie portions of bedrock. These sediments typically form a thin veneer (< 10 feet thick) overlying bedrock. The hydrogeologic evidence provide by SLAC demonstrates that these sediments yield little if any water, and of poor quality, and are essentially isolated from the larger groundwater basin. Thus we agree that these areas warrant exception from the groundwater basin.

10. Jerry Jones, TYCO/Raychem - East Palo Alto Facility

Comment:	Mr. Jones expressed concerned about the existence of "hyper-saline" wedges that occur in the shallow subsurface directly beneath salt evaporator ponds. Specifically, he would like to see this phenomenon discussed in the report in the sections that discuss water quality and saltwater intrusion near the South Bay margins. He would also like to see the phrase "hyper-saline" used to describe these areas, where salinity ranges from 30,000 to 100,000 ppm or 3 to 10%. Hyper-saline waters above good quality aquifers are a looming threat and can also serve as barriers to the flow of freshwater in the shallow subsurface. Mr. Jones believes that several vertical conduits may exist in the bay margin near these hyper-saline zones, such as the former Bear Valley Water Co. (or perhaps Spring Valley Water Co.) wells located along the fill area adjacent the Dumbarton Bridge.
Response:	Section 5.5, fourth paragraph has been revised as follows: There is no ongoing monitoring program in the San Mateo Plain and, therefore, there is minimal data on the extent of saltwater intrusion. A groundwater study conducted at the Raychem facility in Menlo Park, indicates that brackish (total dissolved solids > 10,000 mg/L) to hypersaline (total dissolved solids > 25,000 mg/L) conditions predominate in the shallow aquifers in the area of and immediately adjacent to salt evaporators. Hypersaline conditions can, locally, be found up to 1000 feet inland from the salt evaporators (Hydrofocus, 2002). Nevertheless, the conditions in the deep aquifers are, overall, unknown. Chloride:bromide and chloride:boron ratios for water samples collected from wells screened in the deep aquifers and located close to the bay in East Palo Alto show values substantially lower than those of sea water. However, there have been reports that saltwater from San Francisco Bay has migrated into deeper aquifers as a result of piles being driven into the subsurface for construction of the Dumbarton Bridge. Furthermore, a U.S. Geological Survey study in the Atherton area (Metzger and Fio, 1997), where over one hundred residential wells were installed during the 1987-1992 drought, found slightly saline groundwater near San Francisco Bay. However, these levels were not directly linked to over-pumping in Atherton. References: Metzger, L.F. and Fio J.L. (1997): Ground-Water Development and the Effects on Ground-Water Levels and Water Quality in the Town of Atherton, San Mateo County, California; U S. Geological Survey Water-Resources Investigations Report 97-4033. Hydrofocus (2002): Groundwater Flow System Description and Proposed Flow Model Work Plan, Raychem/TYCO Electronics Site.

11. Mary Rose Cassa, Regional Water Quality Control Board, San Francisco Bay

Comment:	The Association for Efficient Environmental Energy Systems, a non-profit organization, has a Geothermal Heating and Cooling Resource Center which provides information and training for all phases of geoexchange heating and cooling systems (heat pumps), from plumbing and well installation to homeowner information. Typically a 200-foot bore hole (uncased) is required for installation. Commonly, four to 12 bore holes might be used for a residence, depending on its size. Horizontal installations are also used, but these require a fair amount of property. Clearly, one main concern is the potential for the 200-foot bore holes to serve as vertical conduits. They are grouted with bentonite, but concerns remain about the integrity of the seal. This type of bore hole may not be specifically considered in the vertical conduits section of the Groundwater Committee's report.
Response:	The following language has been added to section 7.1 of the report: Geoexchange systems (also known as geothermal heat pumps or ground source heat pumps) are unique mechanical devices that conveniently heat and air condition buildings and heat domestic water at a lower cost. In the winter, a geoexchange system collects the earth's natural heat through a configuration of closed pipes, called loops, installed below the surface of the ground or submersed in a pond or lake. Water circulating in the loop carries this heat to the home, where electrically-driven compressors and heat exchangers concentrate the earth's energy and release it inside the home at a higher temperature. In summer, the process is reversed to cool the home. Excess heat is drawn from the home, expelled to the loop, and absorbed by the earth. Vertical loop systems consist of polyethylene loops up to 400 feet in length, which are placed in 4- to 6-inch bore holes where they act as heat exchangers. All vertical boreholes are grouted with bentonite. Vertical systems are the most common type of system installed on small town lots or in commercial applications. Commonly, four to twelve bore holes might be used for a residence, depending on its size. Horizontal systems are installed in trenches that are approximately 5.5 to 6 feet deep and require 15 to 20 percent more loop pipe because they are affected by the annual fluctuation of the earth's temperature. Other installation configurations include "slinky loops" and pond loops. For vertical loop systems, the potential exists to penetrate one or more water-bearing zones that may be polluted. Care must be taken to ensure the pollution is not spread and that existing remediation systems are not adversely impacted. This includes ensuring separation is maintained between the pipe and the borehole wall during grouting.

12. Leah Walker, California Department of Health Services

Comment:	"…I take exception to the statement on page 54, that "***there is no mechanism in place to map the [DWSAP] information and enter it into a master database***". We have been working for years on our mapping program and database, and this fact is widely known. The information is not being shared at this time, due to security concerns. But it is our long-term goal to make this information available to other agencies. Thanks for your time."
Response:	Thank you. Your comments are acknowledged and the document has been modified as follows (section 7.4.4, third paragraph): "A large amount of information will be collected as the DWSAPs are completed. Information will be collected on well locations (using GPS coordinates), PBEs, well construction, well operation, areas of contribution to individual wells, the presence of PCAs, and well vulnerability. This information will be accessible by reviewing individual assessments, but there is no mechanism in place at this time to make the maps and data available digitally outside of DHS due to security concerns. As a result, the usefulness to groundwater management agencies and regulators may be limited until the security concerns are addressed." Additionally, the recommendation for DHS to make this data available on the internet has been deleted from Table ES-3 and Table 20 because this data will be made available once security concerns are addressed.

13. City of Mountain View, Public Works Department

Comment:	Requests that the reference to the Mountain View municipal well be removed from the report statement on page 40, section 7.1.2, fifth paragraph: "Notable examples of abandoned wells that have led to cross aquifer contamination are the IBM Superfund site (San Jose) and the Middlefield-Ellis-Whiseman Superfund site (Mountain View). Solvents released at these facilities contaminated municipal wells to a depth of 510 feet…"
Response:	We concur and have revised the paragraph to read: Notable examples of abandoned wells that have led to cross-aquifer contamination are the Fairchild Superfund site (San Jose) and the Middlefield-Ellis-Whiseman Superfund site (Mountain View). Solvents released at the Fairchild facility contaminated a municipal well to a depth of nearly 275 feet. Solvents released at the Middlefield-Ellis-Whisman site contaminated an agricultural well to a depth of 510 feet. Fate and transport studies have shown that the mechanism for the vertical movement of contaminants was through improperly abandoned wells. The best-documented information of the vertical movement of contaminants through wells in Santa Clara County is in Iwamura (1980).

14. City of Santa Clara, Water Department

Comment: 1) I do question some of the aspersions cast toward the operations of the sanitary sewer collection systems. The POTWs (Sunnyvale, Palo Alto and San Jose/Santa Clara) all have programs to monitor, inspect and regulate all commercial and industrial discharges to the collection system.

2) In section 7.2 (p. 44 – 47) several statements were made that seem speculative and without documentation of examples of actual problems. In fact, the second paragraph of section 7.2.5 states, "**this evaluation has not revealed clear-cut evidence of any large problem or imminent threat to groundwater quality specifically resulting from sewers.**"

3) In spite of this statement the report goes on to claim possibilities that a sewer line could "intercept solvent plumes" and, in effect, redistribute solvents through a combination of infiltration and ex-filtration. While theoretically possible, I think this is rather far fetched and of extremely low-risk. Even if such could occur, the dilution factors alone…would reduce any "solvent plume" by at least 4 to 6-log equivalent treatment. As for conduction along bedding materials, the same issue exists with all underground construction…It seems to me that this effect, if it exists, should be demonstrable in some of the local instances of shallow aquifer contamination.

4) …I seriously doubt that any significant amounts of solvents are "pooled within the sewer system" since sewer collection systems are specifically designed to avoid accumulation of materials

5) …We do have several inverted siphons…that would be prime candidates for further study…We would be glad to cooperate with any study…conducted by the RWQCB or SCVWD.

6) The recommendation (sections 7.2 and 8.3) to impose more stringent pre-treatment limits…may not be legally defensible. Groundwater protection was not considered by EPA and absent a change in the underlying regulations, could not be used as justification to set more stringent discharge limits.

Response: 1) You are correct. The POTWs (Sunnyvale, Palo Alto and San Jose/Santa Clara) do all have programs to monitor, inspect and regulate all commercial and industrial discharges to the collection system. However, the solvent discharges emphasized in our report are primarily historical, and occurred before many of the programs were initiated. Historical solvent discharges, particularly in pure form, may comprise a continuing threat to groundwater quality.

2) You are correct. Many of the statements in section 7.2 are indeed speculative. This section is intended to evaluate the potential for water quality threats from leaking sewer lines. We do not have substantial case data in the South Bay from which to draw specific examples. We do know of examples from Gilroy, Davis, Merced and Modesto where leaking sewer lines are identified as a probable source of solvent pollution to the groundwater, and are documented in the following reference:

Izzo, Victor J.,1992, Dry Cleaners – A Major Source of PCE in Groundwater, prepared by staff of the Central Valley Regional Water Quality Control Board

3) We agree that the significance of solvent plume "interception" and redistribution by sewer lines is probably much less than solvent exfiltration from sewer lines to groundwater, in terms of overall threats to water quality. Interception of plumes by sewer lines and transport of pollution along more permeable sewer-line backfill is an issue of horizontal conduits, which is not addressed in detail in this report. This section has been revised accordingly.

4) We disagree. We believe that a little pure-phase solvent can easily be pooled in small joints or cracks along sewer lines. Furthermore, it wouldn't take much, perhaps as little as a quart, pooled in several locations along a few hundred feet of piping to cause significant pollution.

5) Thank you for your offer. We would be glad to work with you in the event a pilot project is initiated.

6) The recommendation in Section 7.2.5 was not intended to imply that pretreatment standards should necessarily be reduced. Rather, it was intended to emphasize the need for more evaluation of the potential for solvent impacts from leaking sewer lines. The wording of this recommendation has been clarified.

15. David Abbott, Todd Engineers

Comment:	Would like to see the "bed & banks" issue discussed in the report (e.g., when is water considered surface water vs. groundwater adjacent within alluvium where a stream exists).
Response:	The following sub-sections have been added to section 7.5.1 **Surface Water Diversion and Groundwater Withdrawl**: **Riparian Water Rights.** The California Water Code (Section 1200) provides property owners with the right to divert water on their own property, including surface water and groundwater that is considered to be a subterranean stream flowing through a known and definite channel. All diverters of both surface and groundwater claiming water under riparian water rights are required to file a Statement of Water Diversion and Use with the SWRCB. Certain physical conditions must be present for groundwater to be subject to riparian rights: (1) a subsurface channel must be present; (2) the channel must have relatively impermeable bed and banks; (3) the course of the channel must be known or capable of being determined by reasonable inference; and (4) groundwater must be flowing in the channel. All other groundwater is considered to be "percolating" groundwater and is not subject to riparian water rights permitting. In the past, the SWRCB has approved diversions from seasonal or perennial surface water bodies, and from groundwater adjacent to surface water bodies, but did not always have a full understanding of the biological and hydrological impacts of the diversions. A recent report prepared for the SWRCB (Moyle and Kondolf, 2000) recommended that the SWRCB work with other state, federal, and local agencies and academic institutions to promote better hydrological and biological data collection and research to improve the management of riparian rights. Riparian zones are commonly dependent upon both surface water and subsurface water. Specific impacts to riparian zones due to modifications in surface-subsurface water interaction include: • Reduced ability to provide aquatic habitat for invertebrates, fish and other wildlife • Reduced primary productivity, biodiversity, and reproductive success • Stress to riparian vegetation • Changes in nutrient and carbon cycling • Reduced ability to mitigate floods and erosion Effective management of water resources requires an understanding of the role of site-specific riparian zones and their dependence on the interaction of groundwater and surface water. For example, change due to addition of water in summer, when no-flow is normal, results in introduction of shallow-rooted plants and trees that can dislodge during flood events. **Wells in Alluvial Areas.** One specific concern in the South Bay is the reduction in the availability of water to riparian zones, such as along San Francisquito Creek, due to surface water diversion and/or

pumping of shallow groundwater from wells located along the creek banks. Throughout the study area, many wells were installed in alluvial areas during drought years. Since 1982, the San Mateo County Planning Department has required setbacks of wells from creeks and riparian corridors in the county's coastal zone. In areas where riparian vegetation is absent, new wells must be 50 feet away from the center line of a perennial creek or 30 feet from the center line of a seasonal creek. If there is riparian vegetation present in either a perennial or seasonal creek, the well setback distance is measured from the edge of the riparian vegetation. A similar setback requirement is also being considered for the San Francisquito Creek watershed.

SCVWD well standards require a minimum 50-foot sanitary seal on all water supply wells in Santa Clara County. However, the standards provide for a variance to the sanitary seal depth if (1) a water supply cannot be obtained from a deeper depth and (2) the Santa Clara County Environmental Health Department approves a shallower seal. According to the SCVWD, ecological criteria are not taken into account when wells are placed within streambed alluvium or when sanitary seal depth variances are approved.

The ACWD permits water supply wells within the vicinity of creeks and streams when the wells meet standard construction requirements. Because creeks and streams are considered potential sources of contamination, these requirements include: (1) a setback of 50 feet, (2) a location above known levels of flooding, and (3) a maximum seal depth. The Alameda County Health Department must certify water quality from the well prior to its use.