Attachment 4: Project Description

PURPOSE

This project will investigate and assess the presence of tetrachloroethylene (PCE) contamination in the Central Bernal Subbasin within the Livermore Valley Groundwater Basin, an important area for the future expansion of Zone 7 Water Agency's (Zone7's) conjunctive use program as they keep pace with the growing water demands of the region (Figure Att4-1). The purpose of this investigation is to identify the aquifer units that are contaminated, quantifying the degree of contamination, if possible, for input into Zone 7's plans and design of its future wellfield expansion in the Bernal Subbasin. Additionally, the project will attempt to identify and prioritize a list of all potential sources for the PCE contamination in the Central Bernal Subbasin for the San Francisco Bay Regional Water Quality Control Board (RWQCB) to use for establishing a Spills, Leaks & Investigation Cleanup (SLIC) case and issuing orders for characterization and clean-up of the PCE contamination in advance of Zone 7's wellfield expansion.

PROPOSAL GOALS

The goals of this proposed project are:

- Goal 1: Identify the interval(s) that are contributing to the PCE contamination to a small public supply well located in central part of the Bernal Subbasin, and their relationship to the potential wellfield expansion areas;
- Goal 2: Identify probable source(s) and pathways for the PCE contamination in the Bernal Subbasin for guidance of future investigation and clean-up activities; and
- Goal 3: Communicate findings and recommendations for follow-up Groundwater Management Plan activities to RWQCB, local well owners/operators, city planners and Zone 7 Board of Directors.

Public supply wells located in the Bernal Subbasin provide potable water to the City of Pleasanton, City of Dublin, Castlewood Country Club, Alameda County Fairgrounds, and unincorporated Kilkare Woods, near Sunol (Figure Att4-2). There are currently four operating municipal supply wells located in the Bernal Subbasin; two owned and operated by Zone 7 and two owned by the San Francisco Public Utilities Commission (SFPUC), which are operated by California Water Service for Castlewood's supply. There are two other public supply wells, both owned and operated by the Alameda County Fairgrounds for onsite irrigation and potable public uses.

PCE contamination from an unidentified source, or sources, has been impacting water quality in one of the Fairgrounds' wells since 2000, and has continued to be detected at levels above the State Maximum Contamination Level (above 5 ug/L) since that time. A wellhead treatment system was installed on the well and is operated in accordance with California Department of Public Health water supply permit requirements to remove PCE contamination and protect human health.

As the basin manager for the Livermore Valley Groundwater Basin, Zone 7 has worked collaboratively with the RWQCB and other Local Oversight Program (LOP) agencies to ensure that other contamination cases are prioritized appropriately based their threat to existing and future groundwater uses, and that contamination cleanup is progressing at an acceptable rate.

However, at this point, the RWQCB has not been able to take on this impacted well as a SLIC program case due to the lack of identified potentially responsible parties (PRPs) or contamination source, and their limited available resources to conduct the investigations necessary to identify the PRPs. A goal of this project is to gather enough information for the RWQCB to this case as an official SLIC case and initiate investigation and cleanup activities for the PCE contamination.

The Bernal Subbasin is one of the most prolific subbasins for groundwater production within the Livermore Valley Groundwater Basin, which is managed conjunctively by Zone 7 as sustainable public water supply (Zone 7, 2005). In response to community growth plans, Zone 7 has included plans for expanding its conjunctive use of the basin in its Groundwater Management Plan. Over the next 20 years, Zone 7 will be implementing its planned Chain of Lakes managed aquifer recharge projects, which will use reclaimed gravel quarry pits located in the adjacent Amador Subbasin to spread surplus surface water supplies. To recover these banked water supplies at sufficient rates to meet future dry-year and emergency demands when import water is in short supply, Zone 7 has developed plans to expand its ensemble of municipal supply wells (CH2M Hill, 2003). Locating some of the new wells in the Bernal Subbasin has multiple benefits for the managing groundwater in the Livermore Valley Basin:

- The Bernal Subbasin has the highest range of water levels that it can be operated over without dipping below the "Historic Low" limitation;
- Wellfields distributed away from the recharge facilities can be operated to circulate the lower salinity recharge water to more parts of the basin where it is needed to meet basin management objectives (BMOs);
- Groundwater modeling has shown that the Bernal Subbasin is an ideal area for desalting wells and a future groundwater desalination plant.

An area being considered for the construction of new municipal supply wells is shown on Figure Att4-2. Some of the potential future well locations being considered by Zone 7 are on the Fairgrounds property and within 3,000 feet of their impacted supply well. Not knowing the extent of the PCE contamination, and not starting its clean-up or containment in the near future could have negative consequences for these plans. A new well installed just outside of the contamination plume could spread the contamination further, and become impacted itself by the PCE contamination once the well is pumped for a length of time.

Knowing the depth(s) at which the contamination is entering the impacted supply well, will help staff to understand the vertical extent of the contamination, which is important for future municipal supply well planning in the basin. The project includes conducting a dynamic flow profile survey with depth-dependent water sampling in the impacted Fairgrounds well. The dynamic flow profile survey will measure the rate of flow into the well from each interval surveyed while the well is pumped normally. The results of the survey will be presented graphically and will include interval-dependent flow in gallons per minute (gpm), percentages of total well flow, and fluid velocities. The depth-dependent sampling is performed while the well is off, using a pressurized bailer that remains empty until the bailer's orifice is at the desired depth and the pressure is bled off at the surface. When this is done, the bailer is filled with water from that specific depth and is then retrieved and emptied into sample containers for subsequent analysis by Zone 7's State-certified laboratory. Afterwards, the results of the well profile survey and the depth-dependent sampling will be combined with the boring log information from the Fairgrounds well and other known local stratigraphic information and used to draw conclusions as to which aquifer intervals have PCE contamination present, how significant it is in each interval, and what is the potential for it to spread to other parts of the subbasin. The findings and conclusions from this portion of the fieldwork will be invaluable to the planning and design efforts for the future supply wells planned for the Bernal Subbasin.

An ambient flow profile will be conducted in the well after the dynamic survey. An ambient survey is conducted very similarly to the dynamic survey except that it is done under non-pumping conditions. The purpose of this second survey is to investigate whether PCE may be spreading vertically to other aquifer units that are open to the well that have lower static pressure head under ambient (non-pumping) conditions. If this turns out that the well itself is contributing to the spread of the PCE contamination, it may be possible to limit or eliminate the PCE from entering the well altogether. All information will be shared and thoroughly discussed with the well owner and the RWQCB. Any decision to make modifications to the well, or to the treatment and transmission systems, will be the well owner's responsibility, however, Zone 7 will be available to provide support and the information that these decisions may be based.

The impacted well is located in the center of the Alameda County Fairgrounds race track and golf course and there are not any known current or past activities at the fairgrounds that would have likely produced the PCE contamination. However, approximately 2,000 feet directly upgradient of the impacted well is an area where Zone 7 has preliminarily identified approximately seven current and past dry cleaners businesses (Figure Att4-2). This was by no means an exhaustive search for potential PCE sources. Accordingly another part of the proposed project will be to methodically investigate the potential source(s) of the PCE contamination. This investigation will start with a search through available current and historic records will be conducted, similar to that typically performed for Phase I Environmental Site Assessments, in an attempt to identify other active and former businesses that might have utilized PCE in their normal course of business, and may have discharged a significant quantity to the environment. The search will target potential PCE using businesses such as: dry cleaners, auto repair shops, metal plating shops, semi-conductor manufacturers, and chemical producers. A commercial records search service will be utilized for this initial task. Some of the possible records that will be researched include government databases of known discharges, hazardous materials storage plan holders, city directories, historic Sanborn fire insurance maps, and proprietary industry-specific databases kept by the service provider.

Once the historical research is completed and locations of potential discharger are identified and mapped, Zone 7, with the help of a contractor, will conduct a passive soil gas (PSG) survey adjacent to those areas identified as most probable PCE sources. The survey will consist of installing up to 5 soil gas probes at each identified potential source location, in adjacent public right-of-ways, and left in-place for 14 days to absorb PCE vapors, if present. After the prescribed wait time, Zone 7 staff will retrieve the probes and submit them to a contract laboratory for analysis. The borings will be backfilled and surface conditions restored.

After the results of the PSG survey have been compiled and reviewed, a plan for confirming the PSG results by way of in-situ measurements of volatile organic carbon compounds (VOC) using membrane interface probe (MIP) technology will be prepared and implemented. MIP technology provides real-time VOC detection as the MIP is advanced into the ground using a cone penetrometer testing (CPT) rig. The MIP can be used in conjunction with various VOC detectors, however, the electron capture detector is best for detecting chlorinated compounds, therefore it will be used for this survey.

If perched groundwater is encountered during the MIP survey, a grab groundwater sample will be collected and sent to Zone 7's certified water quality laboratory for analysis of VOC concentrations. If PCE is detected in the initial grab samples from a particular location, a second round of MIP and groundwater sampling may be conducted at a deeper interval at the same location and/or moving laterally toward the Fairgrounds, keeping on City of Pleasanton right-of-way, to see if the PCE contamination extends in that direction.

One of the final products of this project will be a written report describing all of the work completed, tabulating all of the data collected, expressing Zone 7's findings and conclusions, and providing staff's recommendations for future well design considerations. Much of the data will be presented in graphical form in the report. This report will be shared with the well owner, RWQCB, and other stakeholders such as SFPUC and City of Pleasanton. It will also be made available to the public during a public meeting of the Zone 7 Board of Directors and on Zone 7's website at: http://www.zone7water.com/publications-reports/ . Several times during the performance of the project tasks, Zone 7 will schedule face-to-face meetings with RWQCB and Fairgrounds staff to infom them of the progress being made and to give them opportunity to provide input for the next steps. Following the project, Zone 7 will continue to collaborate with the RWQCB on plans to confirm the identification of the Responsible Party or parties, and assist with technical issues pertaining to the hydrogeology and future groundwater development plans of the Bernal Subbasin.

GROUNDWATER MANAGEMENT PLAN RELEVANCE

The project goals and the future use of the proposed project products relate to, and are consistent with, the following Basin Management Objectives from the Groundwater Management Plan:

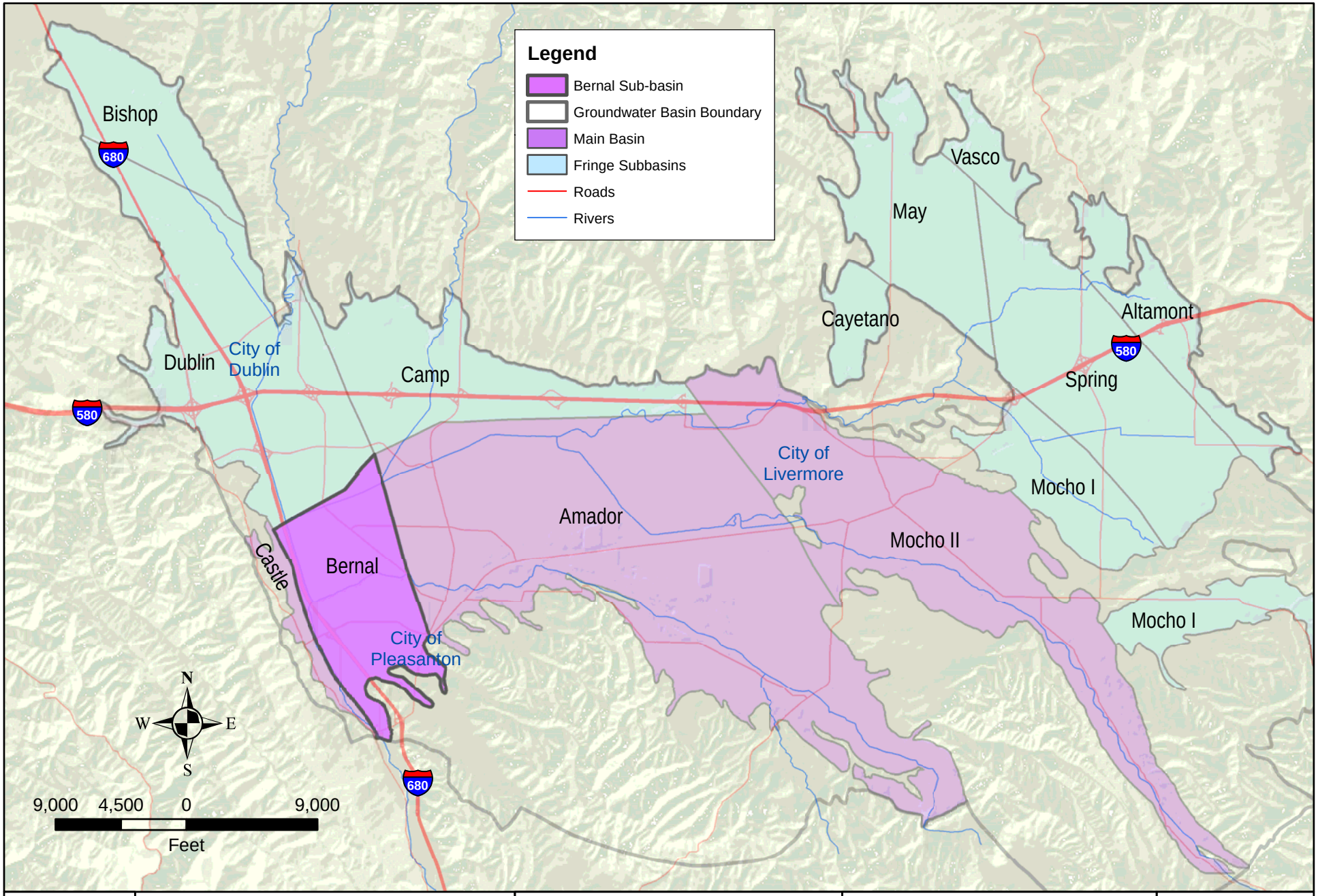
- Protect and enhance the quality of the groundwater;
- Manage quality on a regional basis as measured at municipal wells (such as those operated by both the retail water agencies and Zone 7), protecting and improving groundwater quality within the Main Basin
- Minimize threats of groundwater pollution through groundwater protection; and
- Store surface water supplies in the groundwater basin for use during emergencies and drought-related shortages;

Zone 7 has also had a long-standing policy of managing the groundwater basin to maximize conjunctive use, reliability and storage opportunities. This "Statement on Zone 7 Groundwater Management" was first adopted on August 19, 1987, and was later incorporated into the Groundwater Management Plan in 2005. The proposed project also supports Zone 7's Well Master Plan which was developed around the policy of "maximizing conjunctive use, reliability and storage opportunities" while maintaining a sustainable groundwater supply as provided for by the Groundwater Management Plan.

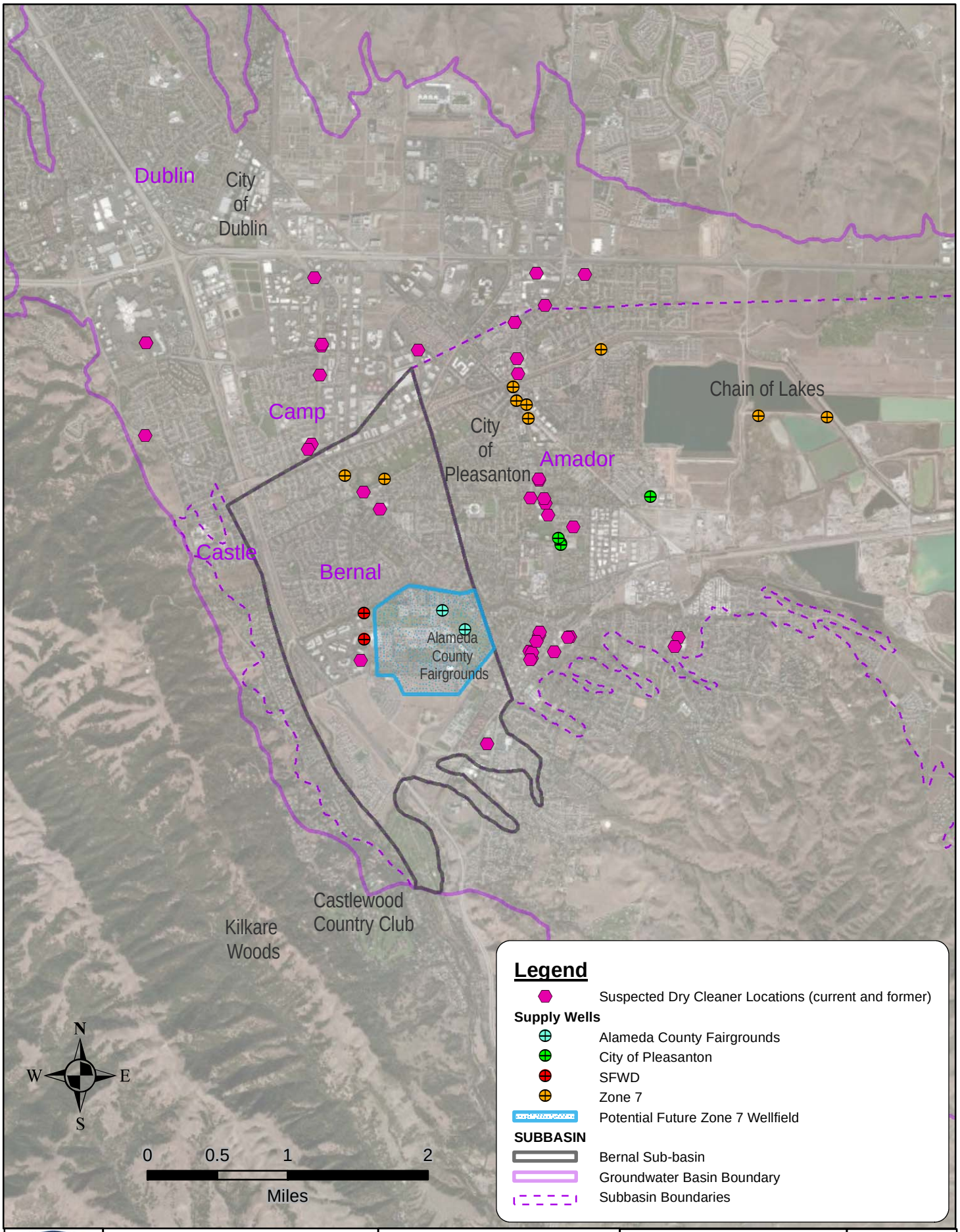
REFERENCES

CH2M Hill. 2003. Draft Report - Well Master Plan. Prepared for Zone 7 Water Agency. October
http://www.zone7water.com/well-master-plan-invisible-menu-552?task=view

Zone 7 Water Agency. 2005. Groundwater Management Plan for Livermore-Amador Valley Groundwater Basin. Prepared by Jones and Stokes. September.
http://www.zone7water.com/groundwater-management-plan-gw-plans-350



ZONE 7 WATER AGENCY 100 North Canyons Parkway, Livermore, CA	DRAWN: CW REVIEWED: MK File: E:\PROJECTS\LGAGrantStudy2012-PCE\FigAtt4-1GroundwaterBasin.mxd	**LIVERMORE VALLEY GROUNDWATER BASIN**	Scale: 1 in = 9,000 ft Date: 7/12/2012 FIGURE Att4-1



ZONE 7 WATER AGENCY
100 North Canyons Parkway,
Livermore, CA

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Project Area
PCE Contamination Assessment
Central Bernal Subbasin

1 in = 1 miles
Date: 7/13/2012
FIGURE Att 4-2