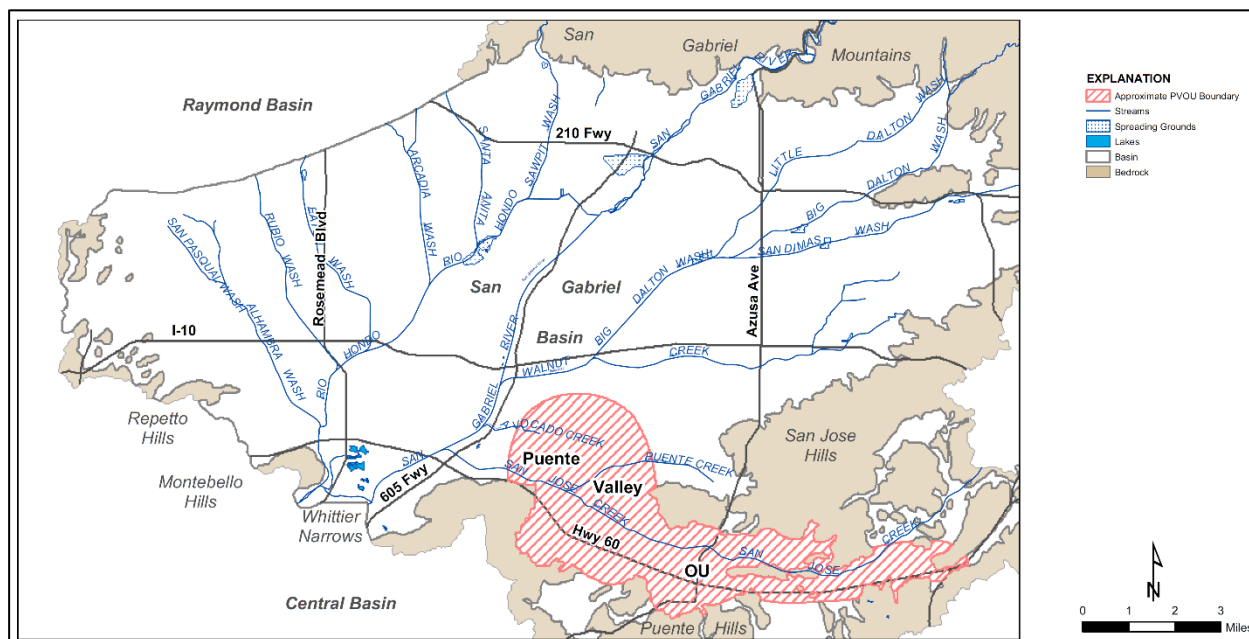


**DRAFT**  
**EXPLANATION OF SIGNIFICANT DIFFERENCES**  
**To the 1998 Interim Record of Decision, as modified by the 2005 ESD**  
**Puente Valley Operable Unit**  
**San Gabriel Valley (Area 4) Superfund Site**  
**September 15, 2021**

## I. Introduction and Purpose

The United States Environmental Protection Agency (EPA) is proposing to update the Superfund cleanup plan for the San Gabriel Valley (Area 4) Superfund Site, Puente Valley Operable Unit (PVOU) in Los Angeles County, California, to allow reinjection as a discharge option for treated groundwater water; to provide a response to the detection of hexavalent chromium in PVOU groundwater; to define the discharge of treated groundwater to surface water as an offsite activity; to describe updates to the conceptual site model; to update levels at which site contaminants require containment; to clarify lead agency regulatory oversight for the shallow zone south of Puente Creek; and to clarify groundwater monitoring requirements for the interim groundwater remedy.



**Location Map for the San Gabriel Valley (Area 4) Superfund Site, PVOU**

The EPA adopted the 1998 PVOU Interim Record of Decision (IROD) to address groundwater in the shallow and intermediate zones contaminated by volatile organic compounds (VOCs), including tetrachloroethylene (PCE), trichloroethylene (TCE), and other chlorinated solvents. The 1998 IROD was updated through an Explanation of Significant Difference (ESD) in June 2005 to

add two emergent chemicals, 1,4-dioxane, a chlorinated solvent stabilizer, and perchlorate, an oxidizer used in solid rocket fuel and other applications.

The 1998 IROD Remedial Action Objectives (RAOs) are to prevent exposure of the public to contaminated groundwater; inhibit contaminant migration from more highly contaminated portions of the aquifer to the less contaminated areas or depths; reduce the impact of contaminant migration on downgradient water supply wells; and protect future uses of less contaminated (groundwater) areas. The RAOs are met in part by compliance with IROD-established Performance Criteria as modified by the 2005 ESD to control the migration and reduce the mass of contaminated groundwater in both the shallow and intermediate zone aquifers.

### **Issuance of this Draft ESD and Potential Future Modifications**

When significant, but not fundamental changes are needed in a Superfund cleanup plan, EPA informs the community through an ESD.

The lead agency for the PVOU regional groundwater cleanup is EPA. The State support agencies are the California Department of Toxic Substances Control (DTSC) and Los Angeles Regional Water Quality Control Board (Regional Water Board).

EPA is issuing this draft Explanation of Significant Differences for public review and comment to satisfy its public participation responsibilities under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also known as Superfund) Section 117(c) and National Contingency Plan (NCP) Section 300.435(c)(2)(i) and notice was published in a local newspaper as required by the NCP, Section 300.435 (c)(2)(i)(B).

The draft ESD is part of the Administrative Record file for the Puente Valley OU pursuant to NCP Section 300.825(a)(2) and is available to the public online at EPA's web site at: [yosemite.epa.gov](http://yosemite.epa.gov) under the San Gabriel Valley (Area 4) heading. Print copies of the draft ESD will be available at site repositories pending opening of each library.

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## II. The Puente Valley Cleanup: A Brief History

### A. San Gabriel Valley Groundwater Contamination

Groundwater contamination was first discovered in the San Gabriel Valley in 1979. In 1984, the EPA added the San Gabriel Valley, with four separate areas, to the National Priorities list. The PVOU is also referred to as the *San Gabriel Valley (Area 4) Superfund Site*. Field investigations by the EPA and other parties revealed significant and extensive groundwater contamination in areas throughout the Main San Gabriel Valley groundwater basin. Numerous water supply wells throughout the San Gabriel Valley have been found to be contaminated with chlorinated VOCs and other compounds. The primary contaminants include TCE, PCE, carbon tetrachloride, perchlorate, 1,4-dioxane, and hexavalent chromium. In response to the groundwater contamination, water companies have shut down and, in most cases, decommissioned contaminated water supply wells, installed new treatment facilities, and taken other steps to ensure that they can continue to supply clean drinking water to the public.

### B. Puente Valley Groundwater Contamination

Since the 2005 ESD, EPA reached settlement agreements with two responsible parties, Northrop Grumman Systems Corporation (Northrop Grumman) and Carrier Corporation (Carrier), to implement the Remedial Design and Remedial Action for the PVOU interim groundwater remedy. The interim remedy will consist of three independent groundwater extraction and treatment systems to prevent the migration of VOC and 1,4-dioxane contaminated groundwater from impacting drinking water wells.

Contaminated groundwater occurs in several distinct aquifer zones in the Main San Gabriel Basin and is referred to as the mouth of the Puente Valley Operable Unit (Mouth of Valley or MOV). The main groundwater aquifers shown in **Figure 1** are referred to as the Shallow Zone (SZ), Intermediate Zone (IZ), and Deep Zone (DZ). The SZ is further divided into two water bearing units, SZ1 and SZ2, and the IZ is further divided into Upper IZ (UIZ) and Lower IZ (LIZ); the LIZ is subdivided into LIZ1 and LIZ2. These aquifer units are separated by low permeability aquitards. In the MOV, the contaminant plume in the SZ and IZ is over 3 miles long and 1.5 miles wide. The contaminant distribution is discussed in more detail as part of the Conceptual Site Model update in Section III.G.

Collectively, the responsible parties have installed and sampled numerous monitoring wells in the shallow and intermediate zones; installed several groundwater extraction wells. For the Intermediate Zone remedy, Northrop Grumman has installed over four miles of pipeline to convey water from extraction well locations to the future treatment plant under construction in the City of Industry (see **Figure 2**). In addition, Northrop Grumman has started construction of the Shallow Zone South remedy. Over the next two years, Carrier shall complete their pre-design investigation, shallow zone treatment plant and extraction well design, install pipelines, and construct the required treatment facility in the City of La Puente.

### C. 1998 Interim Record of Decision and as modified by 2005 ESD

On September 28, 1998, the EPA adopted the *Puente Valley Operable Unit Interim Record of Decision (IROD)* to address the groundwater contamination described in the Remedial Investigation/Feasibility Study (RI/FS). The 1998 IROD RAOs are to prevent exposure of the public to contaminated groundwater; inhibit contaminant migration from more highly contaminated portions of the aquifer to the less contaminated areas or depths; reduce the impact of contaminant migration on downgradient water supply wells; and protect future uses of less contaminated (groundwater) areas.

The IROD selected remedy requires the containment and treatment of VOC-contaminated groundwater at the mouth of the Puente Valley OU. More specifically, the selected remedy calls for the construction and operation of groundwater extraction wells, treatment facilities, and conveyance facilities capable of pumping and treating the volume of water necessary to contain and treat the VOC-contaminated groundwater from the shallow and intermediate groundwater zones. The Remedial Design for shallow zone remedy south of Puente Creek was approved in August 2020 and construction of treatment facility is expected to be completed in 2022. The remedial design of the shallow zone remedy north of Puente Creek is expected to be start in early 2022 and completed in 2023. Construction of the Intermediate Zone remedy began in December 2018 and is expected to be completed in late 2021. Final decisions on extraction rates will be made during the startup phase of each remedy. The remedy components installed to date are shown in **Figure 2**.

The 2005 ESD modified the 1998 cleanup plan by clarifying the Performance Criteria for containment at the mouth of the Puente Valley in two groundwater zones: the shallow zone and the intermediate zone and added two new pollutants 1,4-dioxane and perchlorate to the interim remedy. After the initial set of extraction wells was installed in 2006, EPA conducted five-year reviews for the Site in 2011 and 2016.

### **III. Proposed Actions**

#### **A. Reinjection of Treated Water**

In the IROD, EPA selected municipal supply and surface water discharge as end use options for the disposal of treated groundwater. In light of additional regulatory requirements, significant changes in climatic conditions, and renewed emphasis on maximizing the beneficial use of treated water and conserving groundwater, EPA in cooperation with the implementing parties reassessed the discharge options for the interim remedy (Discharge Option Study Report [DOSR], 2019). Reinjection of treated water was identified as a technically feasible option for the shallow zone remedy, and after thorough evaluation, EPA is proposing to allow for the reinjection of treated groundwater as part of the shallow zone interim groundwater remedy.

Consistent with Regional Water Quality Control Board (Regional Water Board) policy, treated water must be injected back into the same aquifer units from which it was extracted. EPA is defining reinjection as an “onsite activity” under CERCLA and treated water will need to meet Applicable, Relevant and Appropriate Requirements (ARARs). ARARs include only substantive and not administrative requirements and pertain only to onsite activities. EPA is proposing ARARs and To-Be-Considered (TBCs) (see **Table 1 of Attachment 1**) for reinjection based on discharge limits identified by the State of California. The Regional Water Board concurred with the proposed ARARs/TBCs in January 2019. The ARARs/TBCs are included in Appendix A of the DOSR, dated October 31, 2019. Except as noted in this ESD, the ARARs in the IROD as modified by the 2005 ESD, remain unchanged.

##### **a. Treatment Levels for Reinjection**

###### **Applicable or Relevant and Appropriate Requirements**

In 2017, at EPA’ request the State of California identified potential ARARs and TBCs for reinjection and in 2019 concurred with EPA’s proposed Chemical Specific ARAR/TBCs for reinjection (see **Table 1 of Attachment 1**).

##### **b. Estimated Cost of Reinjection**

Reinjection of treated water is estimated to cost approximately \$10 million less over the lifetime of the interim remedy as compared to surface water discharge.

The net present value (NPV) for construction and operation of the Shallow Zone North interim remedy with reinjection of extracted water treated for VOCs, 1,4-dioxane, perchlorate, and, if necessary, hexavalent chromium, is \$24.6 million. For surface water discharge, the estimated cost is approximately \$35 million to similarly treat all contaminants. The costs are higher for surface water discharge primarily to meet any applicable requirements and to pay replenishment fees assessed by the Main San Gabriel Watermaster for any loss of water from the Main San Gabriel Basin via surface water.

## **B. Surface Water Discharge of Treated Water**

The IROD selected surface water discharge as an allowable end use of PVOU treated water. The surface water conveyance systems, designed primarily for storm water runoff, are permitted systems and, thus are subject to waste discharge requirements under Regional Water Board regulatory authority. Any discharger to the surface water system is required to meet any applicable requirements from the Regional Water Board and in some cases from Los Angeles County Flood Control District.

Discharges of treated water to surface water within the PVOU are defined as an “offsite activity” under CERCLA and must meet any applicable National Pollutant Discharge Elimination System Permit (NPDES) requirements. The NPDES authority under the Clean Water Act has been delegated to the State of California. Offsite activities must comply with all applicable federal, state, and local laws that are in effect when the activity takes place. Therefore, EPA is proposing to withdraw Table 3 of Attachment 1 of the 2005 ESD, *ARARs for Surface Water Discharge*.

## **C. Sewer Discharge of Treatment Waste**

If waste is generated from select treatment processes, such as membrane filtration e.g., reverse osmosis, to remove both man-made and/or naturally occurring constituents in groundwater, the waste may require disposal into a sanitary sewer system. For example, brine (primarily concentrated salts) waste from membrane filtration technologies can constitute a fraction of the total influent flow (about 10 to 20 percent) and may require disposal to a sewer line. If required, EPA has defined discharge to a sewer system as an offsite activity under CERCLA and the discharge must meet all applicable requirements.

## **D. Disposal of Treated Water and Requirements**

The end use options for the disposal of treated water for the PVOU Interim Remedy are:

### Shallow Zone

- ReInjection (*proposed*)
- Municipal Supply
  - Drinking Water
  - Reclaimed Water
- Surface Water Discharge
- Discharge to Sewer (for disposal of brine waste from membrane filtration) (*proposed*)

### Intermediate Zone

- Municipal Supply
  - Drinking Water
- Surface Water Discharge
- Discharge to Sewer (for disposal of brine waste from membrane filtration) (*proposed*)

The following applicable requirements would apply to treated water for the selected discharge options:

- Municipal Supply (drinking water) – Applicable permit requirements under State Water Resources Control Board, Division of Drinking Water
- Municipal Supply (non-potable water) – Applicable permit requirements
- Reinjection – ARARs/TBCs proposed in **Table 1 of Attachment 1**, including
  - Hexavalent Chromium - 10 µg/L
  - 1,2,3-TCP – 0.005 µg/L
  - NDMA - 0.01 µg/L, and
  - TBA - 12 µg/L
- Surface Water – Applicable waste discharge requirements under Regional Water Quality Control Board

Reinjection of treated water is defined as an onsite activity under CERCLA. All other options, municipal supply, surface water discharge, and sewer discharge are offsite activities under CERCLA and are subject to state and local requirements.

#### **E. Detections of Hexavalent Chromium in the PVOU**

After the discovery in the late 1990s of several chemicals including 1,4-dioxane, perchlorate, NDMA, and hexavalent chromium in both San Fernando Valley and San Gabriel Valley groundwater, the Regional Water Board and EPA requested that facilities in several areas of the San Gabriel Valley, including the PVOU, conduct groundwater sampling for these “emergent chemicals.” In 2002, potential source facilities within the PVOU were required to sample groundwater monitoring wells within areas of VOC contamination for emergent contaminants. In addition, new monitoring wells installed as part of early remedial design investigation work in the shallow and intermediate zones were also sampled.

Based on the 2002/03 sampling, hexavalent chromium, NDMA, 1,4-dioxane, and perchlorate were detected in PVOU shallow zone and intermediate zone groundwater. Because groundwater concentrations of total chromium were detected at only two sampling locations above the MCL of 50 µg/L for total chromium, EPA did not include chromium as a Site contaminant in 2005. Since then, new toxicity information and improved sampling and laboratory methods were developed for hexavalent chromium.

Based on additional sampling and evaluation conducted to date, hexavalent chromium is found throughout the shallow zone at concentrations exceeding 10 µg/L (see **Figure 3**). In the deeper intermediate zone, hexavalent chromium concentrations are lower, but exceed the 10 µg/L level in analytical groundwater samples collected from several monitoring wells (see **Figure 4**). One production well located in the “mouth of the valley” area of the PVOU extracts groundwater from both the intermediate and deep zones of the PVOU and hexavalent chromium was detected in samples collected from extracted water at concentrations below 10 µg/L. Hexavalent chromium has been detected at concentrations below 10 µg/L in samples from extraction and monitoring wells screened in the deep zone.

Hexavalent chromium, a product of chromic acid used in metal plating operations, is a chemical contaminant which has been found in PVOU groundwater over the past 20 years. The highest detections of chromium were originally identified during the 2002-2003 sampling event. At that time, hexavalent chromium was detected in the shallow zone portion south of Puente Creek and beneath facilities overlying the middle and eastern portions of the PVOU. However, over the past ten years, new monitoring wells have been installed and recent sampling data identified detection of hexavalent chromium in all aquifer zones of the PVOU. During the period 2014-2018, hexavalent chromium was detected at concentrations exceeding 10 µg/L in 57 monitoring wells within PVOU. Despite the detections of hexavalent chromium, there does not appear to be a well-defined, contiguous hexavalent chromium plume in groundwater within the PVOU “mouth of the valley” area.

On July 1, 2014, the State of California adopted an MCL for drinking water of 10 µg/L for hexavalent chromium. The California MCL was rescinded on September 11, 2017 and the State is required to adopt a new MCL for hexavalent chromium in the future; at this time, there is no state MCL for hexavalent chromium.

EPA is proposing to add hexavalent chromium as PVOU contaminant of concern (COC). For reinjection, EPA is proposing a level of 10 µg/L for hexavalent chromium. For other disposal options, all offsite discharge requirements as applicable will need to be met.

Should the treatment of hexavalent chromium be necessary, an appropriate technology would need to be implemented to meet the applicable requirements for the selected discharge. If necessary, additional treatment components to remove hexavalent chromium in the extracted groundwater would result in a minor increase in the cost of the remedy as described below. Final decisions on treatment processes will be made during the remedial design and remedial action.

### **Description of Treatment Options for Hexavalent Chromium**

In accordance with the IROD, specific treatment technologies are not prescribed. The treatment technologies used must be capable of effectively and reliably removing hexavalent chromium to meet end use requirements.

Ion exchange treatment, using mixed bed resin(s) for example, can remove both hexavalent chromium and perchlorate from groundwater. Membrane filtration processes such as reverse osmosis will also remove hexavalent chromium and may be an option if naturally occurring constituents such as selenium require treatment to meet end use requirements. Chemical reduction technologies can also remove hexavalent chromium from water. Chemical reduction involves adding a chemical to provide a source of electrons to reduce hexavalent chromium (Cr VI) to trivalent chromium (Cr III), which precipitates from the water. Chemical reduction is comparable in cost to ion exchange treatment for removing hexavalent chromium.

Selection of treatment technologies for hexavalent chromium will be described in the remedial design for the Shallow Zone North remedy. The need to implement the designed hexavalent chromium treatment systems may be determined during the initial start-up of the Shallow Zone



North Remedial Actions, when actual concentrations of the treatment plant discharge can be measured to determine the need to install hexavalent chromium treatment.

### **Estimated Costs of Hexavalent Chromium Treatment**

Should hexavalent chromium treatment be necessary to reinject water from the SZ North remedy, the total capital cost would be approximately \$5 million, and an estimated \$2 million for operational and maintenance activities.

## **F. Groundwater Monitoring**

### **General Monitoring**

For groundwater cleanups, groundwater monitoring is necessary to define the nature and extent of contamination in order to delineate the plume in three dimensions. Once the extent of contamination is defined, a remedial system can be designed, and its subsequent operation evaluated to ensure effective capture/containment of contamination in groundwater.

The 1998 IROD as modified by the 2005 ESD required groundwater monitoring at PVOU for water quality i.e., contaminant concentrations, and water levels in groundwater monitoring wells. The PVOU contamination is a defined, contiguous commingled plume in groundwater that has originated from multiple sources and extends throughout the Puente Valley and contains chlorinated solvents, 1,4-dioxane, hexavalent chromium, and other chemicals. The PVOU contamination is present in groundwater mainly in the Shallow Zone and Intermediate Zone aquifer units. However, recent data suggests that PVOU contamination may extend into the underlying aquifer referred to as the Deep Zone. In the 2005 ESD, EPA clarified that groundwater monitoring is also required for chemicals that do not have a containment level. EPA has classified groundwater monitoring wells as “general”, “compliance”, and “sentinel” wells. The compliance and sentinel wells are selected for monitoring the performance of each Remedial Action of the interim remedy according to defined quantitative criteria. The general monitoring wells are used to monitor the extent of contamination at concentrations below the containment level, including the extent of chemicals that do not have a containment level. The results of the general monitoring supplement the compliance and sentinel well monitoring in evaluating the performance of each remedy. The frequency of monitoring is determined separately for each Remedial Action.

### **Deep Zone Monitoring**

The IROD established a goal of protecting existing production wells located within the PVOU known as the “B7 Well Field.” Many of these wells were screened across the multiple aquifer units including the Intermediate Zone. Production wells within the “B7 Well Field” were listed in Table 5 of the IROD; most of the old production wells have been decommissioned (i.e. destroyed according to state well standards) and new production wells were installed since 2005 with screens limited to the Deep Zone only.

EPA is proposing to update Table 5 from the IROD (see **Table 2 of Attachment 1**). Currently only one production well within the PVOU is screened across both the DZ and IZ, has wellhead treatment for VOCs, and will be decommissioned before startup of the IZ remedy. Despite the decommissioning of inactive production wells within the PVOU over the past five years, VOC contamination has been detected in monitoring and production wells screened in the DZ. Due to the high-volume production pumping expected in the future, VOC contamination could continue to migrate from the IZ into the DZ. Groundwater monitoring in the DZ will provide advanced warning of contamination potentially migrating toward the production wells.

The 2005 ESD established the goals of the DZ monitoring as:

- To evaluate the effectiveness of the intermediate zone remedy to protect the deep zone from vertical migration of contamination from the intermediate zone at the mouth of Puente Valley; and
- To monitor the potential for deep zone contamination originating up-valley to adversely impact the deep zone at the mouth of Puente Valley.

Water quality and water level monitoring in the DZ shall be required at locations that are below the IZ contaminant plume and upgradient laterally and vertically i.e., *not limited to the up-valley area to the east*, of production wells when the production wells are pumping and the IZ remedy is operating.

The PVOU interim remedy for the IZ aquifer unit is designed to contain contamination within the IZ and protect drinking water production wells located within the B7 Well Field. Once the IZ remedy is operational, all non-remedy production wells will pump groundwater solely from the DZ. Historically, several production wells were screened across the IZ and DZ and pumped contaminated groundwater. These wells were decommissioned to protect public health and destroyed to prevent them from acting as vertical conduits for contaminant transport from the IZ into the DZ. Currently only one production well (B11B) screened across both IZ and DZ is in operation and has wellhead treatment system to meet drinking water standards; this well will be destroyed prior to startup of the IZ remedy. New production wells, B24A and B24B, and B24C, were installed in 2005 and 2014, respectively. These wells are screened in the DZ only and considered part of the B7 Well Field (**Table 2 of Attachment 1**). Low concentrations of VOCs have been detected in extracted water from these wells therefore sentinel monitoring of upgradient water quality and water levels in the DZ is necessary to protect these wells.

Pumping from the production wells induces vertical gradients that have potentially resulted in downward migration of contaminated groundwater from the IZ into the DZ. The IROD as modified by the 2005 ESD specifies groundwater quality monitoring in the DZ as advanced warning before contamination reaches production wells. Currently, several of the existing production wells screened in the DZ extract low levels of contaminated groundwater when pumped and consequently are not able to operate continuously. The origin of the contamination found in water extracted from these production wells is uncertain but is likely from the upper water bearing aquifer units. New monitoring wells in the deep zone would in part reduce the uncertainty.

The monitoring well network for the IZ remedy will allow water quality and water level monitoring at locations that are upgradient of the production wells and downgradient of the IZ contamination. The locations of the monitoring wells shall be below the IZ contaminant plume and upgradient relative to the production wells when the production wells are pumping and the IZ remedy is operating. It is expected that the monitoring well locations will be selected with the help of numerical groundwater flow model simulations.

### **G. Update to Conceptual Site Model**

As a part of the design process, additional field investigations are conducted to aid in the understanding of the extent of contamination and subsurface conditions. The Conceptual Site Model (CSM) was updated based on groundwater investigations conducted between 2011 and 2018. The extent of permeable (aquifer) and low permeability (aquitard) units, and the extent of contamination in groundwater have been revised. The depths and thickness of the SZ, IZ, and DZ vary depending on location and therefore, these units cannot be defined by uniform thickness or depth below ground surface across the PVOU; they are defined by hydrogeologic characteristics. The PVOU contaminant plume contains mainly TCE, 1,1-dichloroethene (1,1-DCE), 1,4-dioxane, PCE, and the daughter products of PCE and TCE. Hexavalent chromium and perchlorate do not appear to form continuous plumes across PVOU. The CSM is continuously updated based on new information obtained throughout the Remedial Design and Remedial Action.

The hydrogeology at PVOU has been interpreted based on investigations conducted after 2005 and summarized in a draft 2015 Conceptual Site Model Report. The CSM is “living” technical document supported by multiple lines of evidence including lithologic and downhole geophysical logs, measured water levels, hydraulic responses to pumping from remedy and drinking water production wells, contaminant distribution, and published interpretation of regional geology. The vertical characteristics of the subsurface have continued to be refined as additional field data were collected after 2011. This is particularly relevant in the eastern portion of the shallow zone groundwater plume south of Puente Creek, where releases at the former TRW Benchmark facility have contributed a significant amount of contamination to both the shallow and intermediate zones.

The CSM updates also include an improved understanding of the extent of groundwater contamination. Specifically, the shallow zone groundwater contamination now extends further north/northwest as a result of contaminant transport in groundwater. Likewise, groundwater contamination in the intermediate zone has migrated into formerly clean areas to the west/northwest near Puente Avenue and required the installation of an additional IZ extraction well to contain the contamination. Site-related groundwater contamination in the shallow and intermediate zones now extends throughout the mouth of the Puente Valley. Contamination is now also found in the DZ although at lower concentrations than in overlying aquifers. On the other hand, the production wells screened through both the DZ and contaminated IZ aquifer have been decommissioned (except one production well that still operates with wellhead treatment of the extracted water and which will be decommissioned before startup of the interim IZ remedy) and can no longer become potential conduits for contamination into the DZ.

The conceptual hydrogeologic model is limited to the area known as the MOV where Puente Valley joins the Main San Gabriel Valley groundwater basin; the hydrogeology of the Puente Basin to the east has not been characterized in detail.

### Aquifers and Aquitards

The unconsolidated sediments in the mouth of Puente Valley area have been divided into several hydrostratigraphic units. Three primary coarse-grained, higher permeability (or aquifer) zones have been identified in the Puente Valley, and are referred to in Site documents as the Shallow zone, Intermediate Zone, and Deep Zone. The aquifers are hydraulically continuous within PVOU. These aquifer zones are separated by silt and clay confining layers (aquitards) that are laterally continuous within PVOU and allow for vertical head and water quality differences between aquifer zones.

The hydrostratigraphic units in the mouth of Puente Valley area dip to the north and west, as the geology of Puente Valley transitions to the Main San Gabriel Basin; therefore, the depths of the hydrogeologic units increase to the north and west. The units are also folded; Industry syncline is located along the center of the Puente Valley in the mouth of Puente Valley area and Walnut anticline is to the northeast of the syncline. The Walnut Creek fault extends to the mouth of Puente Valley area from the northeast and is thought to terminate near the former TRW Benchmark facility; the fault may act as a barrier to groundwater flow but its effect on groundwater flow at PVOU is unknown. A geologic map of Puente Valley with folds, faults, and cross-sections through the MOV area are shown in **Attachment 2** (selected graphics from 2015 CSM).

At the mouth of Puente Valley, the shallow zone extends from the water table to the top of the aquitard unit referred to as the Galaxy Clay, located at approximately 150 feet below ground surface (bgs) in the area south of Puente Creek and to over 300 feet bgs in the northern portion of PVOU. The shallow zone includes fine grained units; one of these units further divides this aquifer zone into upper and lower shallow zone (SZ1 and SZ2). A laterally continuous aquitard unit referred to as Galaxy Clay forms the boundary between the shallow and intermediate zones.

The intermediate zone includes the water-bearing strata approximately 200 feet thick in the interval between the shallow and the deep zones. The top of the intermediate zone is defined by the bottom of the overlying Galaxy Clay aquitard. Two aquifer units have been delineated within the IZ, the UIZ, and LIZ, separated by an aquitard. The lower intermediate zone has also been divided into the upper and lower subunits (LIZ1 and LIZ2, respectively). The intermediate zone is separated from the deep zone by an aquitard referred to as the Deeper Silt-Clay.

The Deep Zone aquifer is used for domestic groundwater production. In general, at the mouth of Puente Valley, the deep zone extends from a depth of approximately 400 to more than 1,100 feet bgs. The most significant groundwater pumping within PVOU occurs from several large public water supply wells in the B7 Well Field located in the MOV area. Because all but one production wells at the mouth of Puente Valley produce their water from the deep zone, hydraulic heads observed in this zone are comparatively lower than those found in the shallow and intermediate zones. Historically, this zone has not exhibited contamination although recently, VOC

contamination at low concentrations has been found in monitoring wells screened in the uppermost portion of the deep zone and in water extracted from the production wells.

#### Extent of Contamination in Groundwater

The PVOU contaminant plume contains mainly TCE, 1,1-dichloroethene (1,1-DCE), 1,4-dioxane, and PCE. Other contaminants include the daughter products of PCE and TCE, and hexavalent chromium. Although hexavalent chromium does not appear to form a continuous plume, its scattered distribution in groundwater suggests the contamination originated from multiple industrial sources in the PVOU (see **Figures 3 and 4**). Perchlorate is only present at low concentrations and does not appear to form a continuous plume at PVOU; its origins may be from industrial (flares, munitions, etc.) and agricultural (historically used Chilean fertilizer) activities throughout Puente Valley.

**Figures 5, 6, 7, and 8** show plumes defined by maximum exceedances of ARARs for all contaminants over the time period 2014-2018. VOCs form a generally continuous plume within the MOV area that is over 3 miles long and 1.5 miles wide in the SZ and IZ.

The shallow zone contains most of the VOC contaminant mass, with contaminant concentrations in some locations reaching hundreds of times drinking water standards. The majority of the contaminant mass originating at the mouth of Puente Valley is migrating within the shallow zone to the north and northwest; however, there is a downward hydraulic gradient in the area and some contaminant mass is migrating downward and into the intermediate zone, particularly in the southeastern portion of the MOV area. Current remedial design investigations of the shallow zone north of Puente Creek found groundwater contamination exceeding 10xARARs extending to the area between MW6-15 and MW8-3, farther than shown in Figure 5. The extent of the 10xARARs zone to the north and northeast in this area is under investigation. Contamination exceeding ARARs extends farther west than shown on Figure 5 in the area between MW4, MW6-35, and SW-5.

Based on monitoring well data, regional groundwater levels in the San Gabriel Basin and Puente Valley have generally declined over the past decade. Climatically induced fluctuations in natural recharge, groundwater pumping from the public water supply wells, and recharge of imported water are the most important forces that control water level changes in the DZ and IZ in the MOV area, while water levels in the SZ depend mostly on rainfall. Because of decreasing precipitation, the water table has declined in the MOV area by about 40 feet since mid-1990s. As a result, the eastern portion of SZ1 between Puente Creek and the former TRW Benchmark facility is now dewatered (dry) and contamination is present in the vadose zone; the rest of SZ1 in this area has very low saturated thickness increasing generally to the west from zero to about 25 feet (see **Figure 9**).

VOC contaminant concentrations found in the intermediate zone, while lower than those found in the shallow zone, still exceed drinking water standards (see **Figures 6 and 7**). VOC contamination in the intermediate zone originated in the shallow zone from the “mouth” of Puente Valley and from sources in the “mid-valley” of Puente Valley. The Mid-Valley Area generally encompasses

the subsurface area from Azusa Avenue to Hacienda Boulevard. The majority of the contaminant mass in the intermediate zone is present in the UIZ. Contamination in the DZ has been detected in monitoring wells screened near the top of the DZ and in water extracted from deep production wells. Hexavalent chromium concentrations in the DZ are below 10 µg/L. VOC concentrations in DZ monitoring wells are generally below ARARs except for one well south of Puente Creek. VOC concentrations exceeding ARARs are present in production wells at the B24 wellfield and at well B11B; the remaining production wells with historical detections were decommissioned in 2017 (see **Figure 8**). The distribution of VOC contamination in the DZ is not adequately characterized. The contamination present may have migrated into the DZ by a combination of transport pathways including vertical transport through inactive wells (prior to their destruction by sealing), and/or zones of higher permeability in aquitards, in groundwater from the eastern portion of Puente Valley, and in groundwater from the region between Puente Valley and Main San Gabriel basin.

## **H. Shallow Zone South Interim Remedy**

In the 2005 ESD, EPA described one portion of the shallow zone remedial action (i.e., south of Puente Creek), the downgradient portion of the former TRW Benchmark contaminant plume. This remedial action was to be performed under Regional Water Board oversight by Northrop Grumman (successor to TRW) under revised Cleanup and Abatement Order (89-034). In 2010, the Regional Water Board transferred this portion of the remedial action to EPA. In 2011, EPA issued Administrative Order 2011-14 to Northrop Grumman to implement the Remedial Design and Remedial Action for the PVOU Shallow Zone South Interim Remedy. Subsequent groundwater investigations conducted under EPA oversight confirmed that the former TRW Benchmark facility (TRW Benchmark) was a major source of groundwater contamination in the “mouth of the valley” area of the Puente Valley Operable Unit (see **Figures 2, 3, and 5**). The field investigation conducted from 2012 to 2015 found more extensive groundwater contamination originated from TRW Benchmark, and these contaminants, which include known releases of volatile organic compounds (VOCs), 1,4-dioxane, and hexavalent chromium, and other metals used in the manufacturing processes at the facility remain in the subsurface at high concentrations. Based on the data collected, and, an updated site conceptual model supported by multiple lines of evidence, there remains significant, uncontrolled, residual contamination in place beneath the former facility and adjacent properties. Addressing this source area would reduce the long-term operational costs and the cleanup timeframe of the regional groundwater remedy. As lead agency for individual source properties in the PVOU, the Regional Water Board will oversee source area work related to former TRW Benchmark.

## **I. Update and Clarification of Performance Criteria**

EPA proposes to modify Table 2 of Attachment 1 of the 2005 ESD, “Chemicals of Concern Requiring Containment,” with new containment limits based on updated regulatory requirements (see **Table 3 of Attachment 1**). The primary change is in the drinking water notification level for 1,4-dioxane from 3 to 1 µg/L. The 10x ARAR containment level for the Shallow Zone and the 1x ARAR containment level for the Intermediate Zone remain unchanged.

The description of the SZ, IZ, and DZ in Attachment 1 of the 2005 ESD is updated by the conceptual site model described in Section G.

The Shallow Zone interim remedy is being implemented as two distinct groundwater remedies physically separated by Puente Creek under EPA regulatory oversight. The interim remedy for SZ South will utilize two extraction wells installed south of Puente Creek. Additional extraction well(s) at or south of Valley Boulevard, may be required to fully contain the western extent of contamination greater than or equal to 10x ARAR; these wells and associated piping are part of a contingency for the SZ South interim remedy. Similarly, predesign groundwater investigations north of Puente Creek suggest design enhancements will be necessary to the SZ North extraction well network in order to achieve hydraulic containment.

After delineation of the PVOU contaminant plume in all aquifer units, all IZ wells outside the 1x ARAR plume in the IZ and all SZ wells outside the 10x ARAR plume in the SZ as defined by EPA shall be considered compliance wells. Additional wells may need to be installed to provide adequate monitoring outside the 1x ARAR and 10x ARAR plume contours in the IZ and SZ, respectively. The delineation of the IZ plume includes vertical delineation below the IZ. For the SZ plume, the vertical limit is the aquitard separating the SZ from the IZ.

For each groundwater remedy, compliance monitoring of plume migration shall use monitoring wells that provide sufficient coverage of the extent of contamination to be contained at the time the remedy is deemed Operation and Functional, and during the entire remedy operation. Some of the compliance wells shall be in locations that are horizontally and/or vertically downgradient of the contamination contained by each respective remedy when all remedies are operating. Vertical compliance monitoring for the IZ remedy shall account for potential future changes in groundwater production. Measured water levels and groundwater flow modeling shall be used for determining upgradient and downgradient locations. The wells used for assessing remedy performance will be identified in the relevant general/compliance monitoring plans, performance evaluation plans, and operation and maintenance plans. The volume of contaminated aquifer that each remedy must contain will be defined at the time the remedy is determined by EPA to be “Operational and Functional.”

Sentinel wells for the SZ remedies shall be located upgradient to the remedy extraction well and between the extraction wells and compliance wells (upgradient of remedy wells) for advanced detection of changes in COC concentrations.

Sentinel wells for the IZ remedy shall be located between the extraction wells and compliance wells for advanced detection of changes in COC concentrations, and upgradient of production wells to provide advanced warning of contamination that may be migrating toward the production wells, and allowing additional actions to be taken to protect drinking water supply. Additional investigation will be needed to site sentinel wells screened in the DZ and allow the monitoring to distinguish whether contamination is migrating from the eastern portion of Puente Valley, from the MOV area, or from the San Gabriel Basin.

Table 1 shows the significant differences between the remedy as presented in the 1998 IROD, as modified by the 2005 ESD, and the action now proposed.

**Table 1: Summary of Proposed Changes to PVOU Groundwater Remedy**

<b>Remedy Component</b>	<b>1998 IROD, as modified by 2005 ESD</b>	<b>Proposed 2021 ESD</b>
Remedial Objectives	Prevent exposure, limit further migration of contaminated groundwater, reduce impacts on down-gradient water supply wells, and protect future uses of clean areas.	No change in RAOs or operational lifetime of the interim remedy
Groundwater Extraction Areas	Extract groundwater from the intermediate zone and the shallow zone at the mouth of Puente Valley	Three independent groundwater extraction and treatment systems to address regional groundwater contamination
Groundwater Treatment Wells	The number of wells will be determined during the Remedial Design and Remedial Action	No change
Groundwater Extraction Wells and Pumping Rates	Extract contaminated groundwater at rates needed to meet remedial action objectives. Determine final rates during the remedial design and remedial action.	No change
Groundwater Treatment Technologies	Specific technologies will be selected during remedial design.	No change
Groundwater Containment and Treatment Standards	Design treatment systems to meet respective Performance Criteria for containment of VOCs and 1, 4 dioxane Treated water must meet ARARs or permitted limits for all site COCs including perchlorate. (Attachment 1 of 2005 ESD outlines method for assessing Compliance with Performance Criteria).	EPA is replacing Table 2 of Attachment 1 of the 2005 ESD, <i>COCs Requiring Containment</i> with Table 3 of Attachment 1 (herein). For reinjection, treated water, must meet all chemical-specific ARARs or TBCs in Table 1 of Attachment 1.



**Table 1: Summary of Proposed Changes to PVOU Groundwater Remedy (continued)**

Remedy Component	1998 IROD, as modified by 2005 ESD	Proposed Changes (2021 ESD)
Use of Treated Groundwater	Discharge to surface water or to a water supply line for municipal use.	<p>For the shallow zone remedy, reinjection would be allowed as an approved onsite activity.</p> <p>Municipal supply, discharge to sewer system, and surface water discharge of treated water are defined offsite activities under CERCLA and subject to applicable requirements.</p> <p>EPA is withdrawing Table 3 of Attachment 1 of the 2005 ESD, titled, <i>ARARs for Discharge to Surface Water</i></p>
Project Costs	The estimated total cost of the interim remedy is \$135 million.	If selected, reinjection would reduce the overall cost of the interim remedy by approximately \$10 million.

## **IV. State Consultation, Statutory Determination, and Public Participation**

### **A. State Consultation**

EPA consulted with the California Department of Toxic Substances Control and Regional Water Quality Control Board) on the draft ESD.

### **B. Statutory Determination**

As required by CERCLA Section 121(d), the modified cleanup plan for the Puente Valley OU is expected to remain protective of human health and the environment and will meet all ARARs identified in the 1998 Interim Record of Decision, as modified by the 2005 ESD, and this ESD.

### **C. Public Participation Compliance**

A notice was published in September 2021 in a local newspaper as required by the NCP, Section 300.435(c)(2)(i)(B). The public participation requirements set out in the NCP, Sections 300.435(c)(2)(i) and 300.825(a)(2) will continue to be met.

\_\_\_\_\_  
Michael S. Regan  
Administrator  
U.S. Environmental Protection Agency

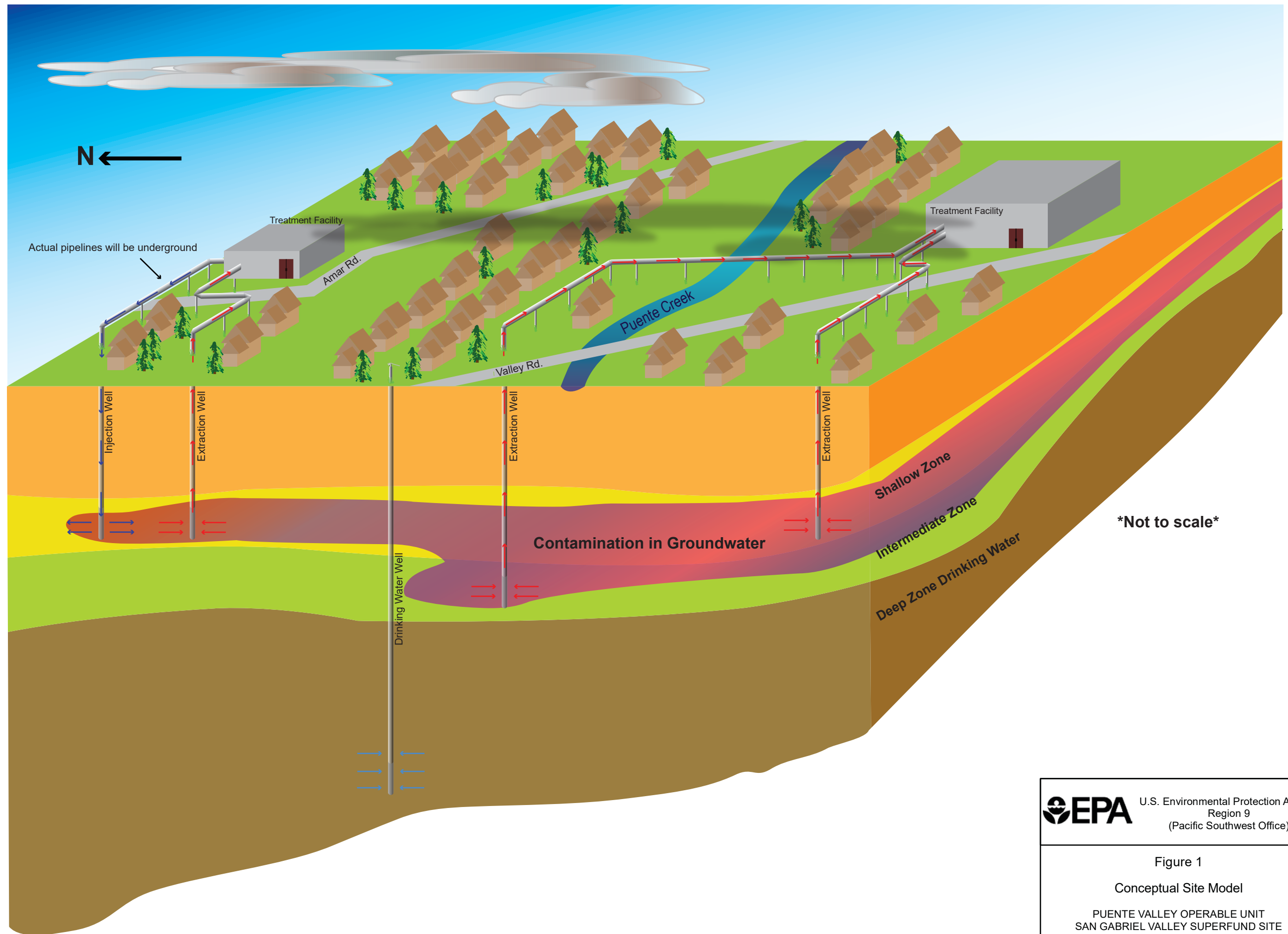
\_\_\_\_\_  
Date

## List of Acronyms/Abbreviations

Acronyms/Abbreviations	Definition
µg/L	micrograms per liter
1,2,3-TCP	1,2,3-Trichloropropane
ARAR	Applicable, Relevant and Appropriate Requirements
Carrier	Carrier Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
CSM	Conceptual Site Model
DTSC	California Department of Toxic Substances Control
DZ	Deep Zone
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Difference
IZ	Intermediate Zone
LIZ	Lower Intermediate Zone
MCL	maximum contaminant level
MOV	Mouth of Valley (mouth of PVOU)
PCE	tetrachloroethylene
NL	notification level
PVOU	Puente Valley Operable Unit
IROD	Interim Record of Decision
NCP	National Contingency Plan
NDMA	N-Nitrosodimethylamine
Northrop Grumman	Northrop Grumman Systems Corporation
NPDES	National Pollutant Discharge Elimination System Permit
RAO	Remedial Action Objective
Regional Water Board	Los Angeles Regional Water Quality Control Board
SZ	Shallow Zone
TBA	tertiary butyl alcohol
TBC	To-Be-Considered
TCE	trichloroethylene
UIZ	Upper Intermediate Zone
VOC	volatile organic compound

## Figures

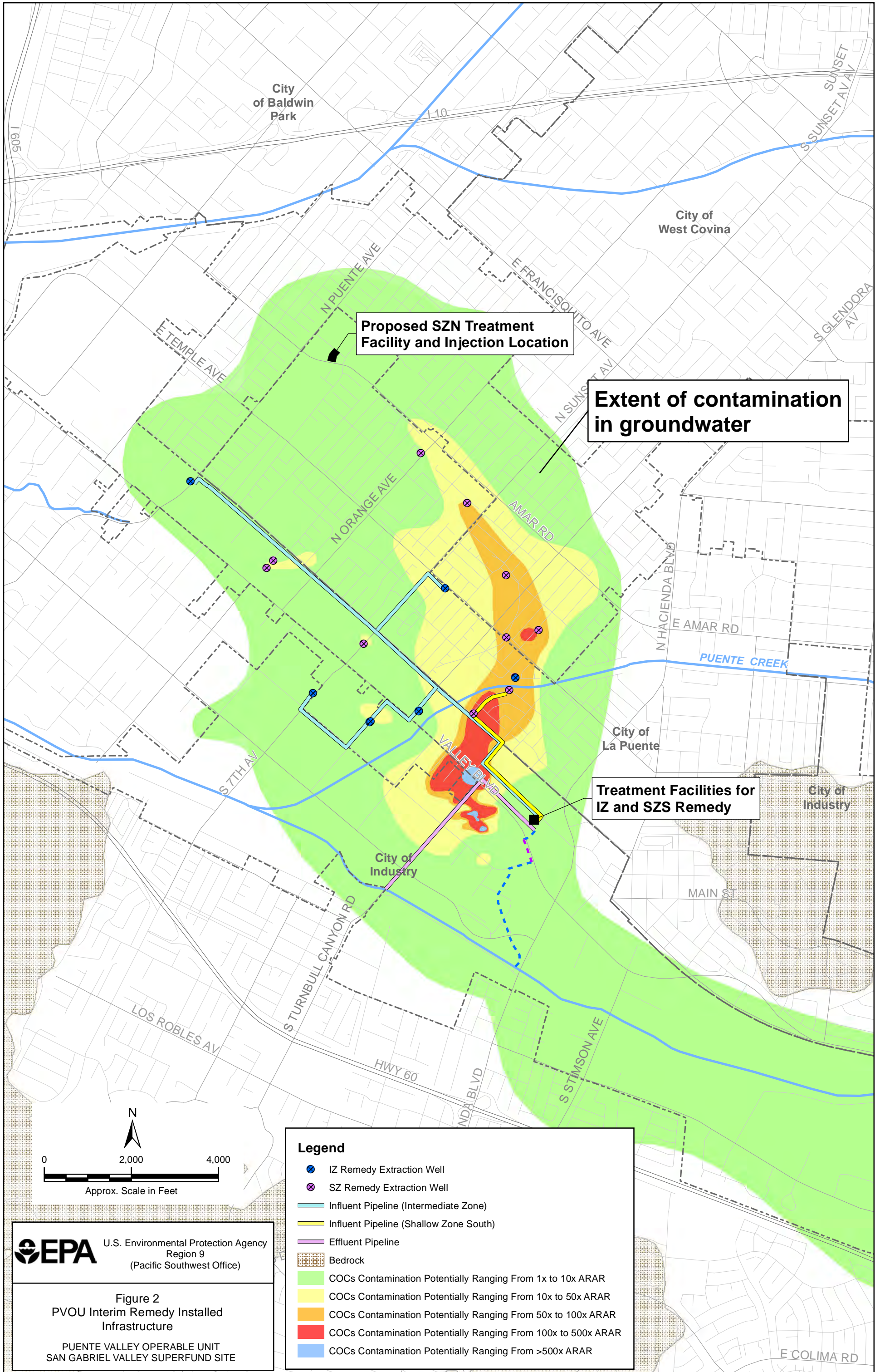
- Figure 1 Conceptual Site Model (draft diagram)  
Figure 2 PVOU Interim Remedy Approved Infrastructure (shows also Contaminant Distribution at the Mouth of Puente Valley)  
Figure 3 Hexavalent Chromium Distribution in 2014-2018 – Shallow Zone  
Figure 4 Hexavalent Chromium Distribution in 2014-2018 – Intermediate Zone  
Figure 5 Composite 2014-2018 Plume – Shallow Zone  
Figure 6 Composite 2014-2018 Plume – Upper Intermediate Zone  
Figure 7 Composite 2014-2018 Plume – Lower Intermediate Zone  
Figure 8 Composite 2014-2018 Plume – Deep Zone  
Figure 9 Shallow Zone South Area



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Figure 1  
 Conceptual Site Model  
 PUENTE VALLEY OPERABLE UNIT  
 SAN GABRIEL VALLEY SUPERFUND SITE

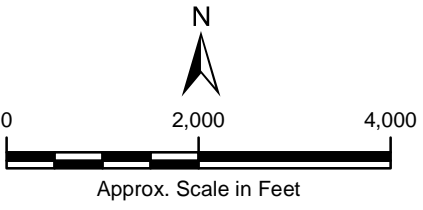




**Proposed SZN Treatment Facility and Injection Location**

**Extent of contamination in groundwater**

**Treatment Facilities for IZ and SZS Remedy**

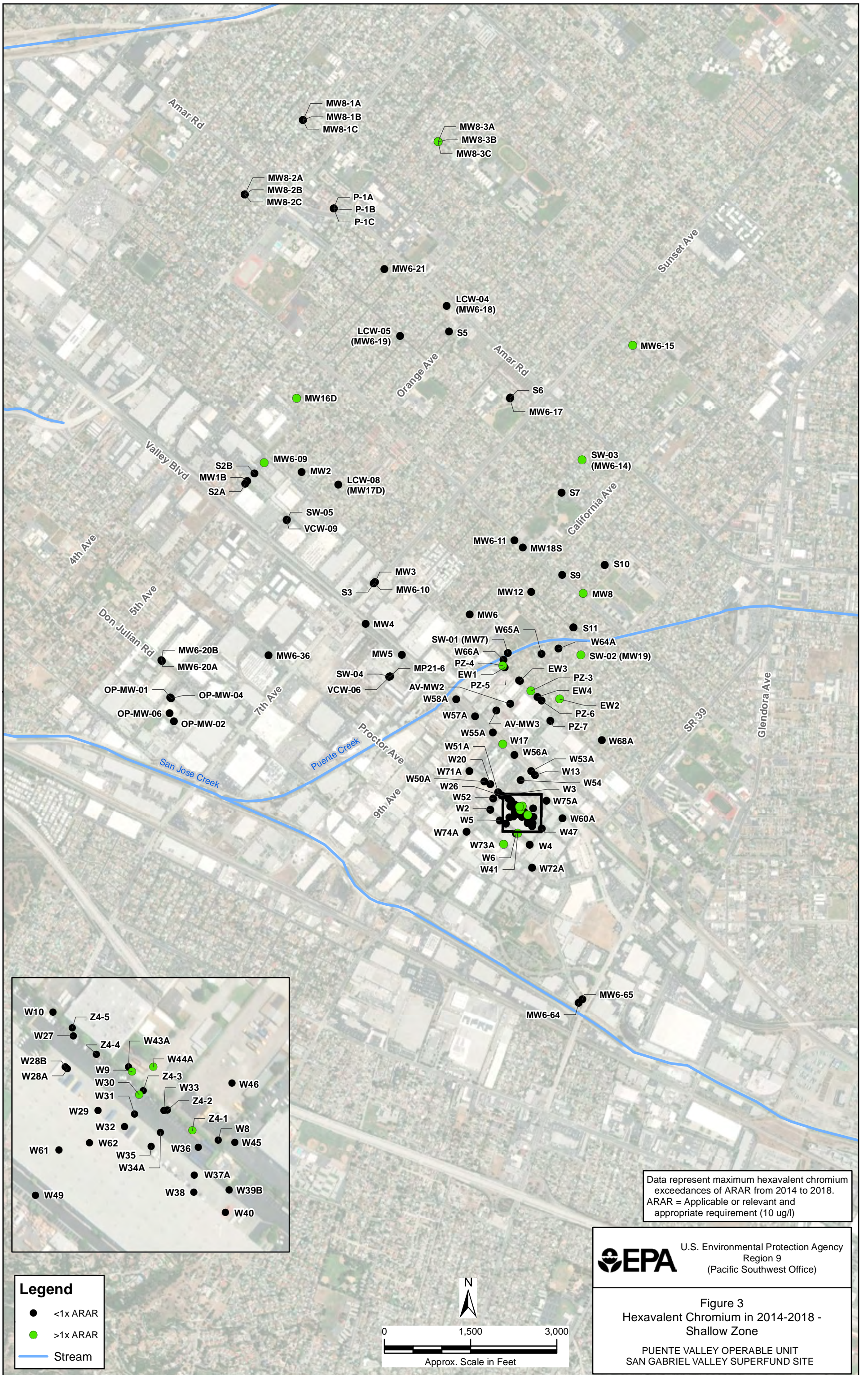


Legend	
	IZ Remedy Extraction Well
	SZ Remedy Extraction Well
	Influent Pipeline (Intermediate Zone)
	Influent Pipeline (Shallow Zone South)
	Effluent Pipeline
	Bedrock
	COCs Contamination Potentially Ranging From 1x to 10x ARAR
	COCs Contamination Potentially Ranging From 10x to 50x ARAR
	COCs Contamination Potentially Ranging From 50x to 100x ARAR
	COCs Contamination Potentially Ranging From 100x to 500x ARAR
	COCs Contamination Potentially Ranging From >500x ARAR

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**Figure 2**  
PVOU Interim Remedy Installed Infrastructure  
PUENTE VALLEY OPERABLE UNIT  
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Data represent maximum hexavalent chromium exceedances of ARAR from 2014 to 2018. ARAR = Applicable or relevant and appropriate requirement (10 ug/l)



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Figure 3  
Hexavalent Chromium in 2014-2018 - Shallow Zone

PUENTE VALLEY OPERABLE UNIT  
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**Legend**

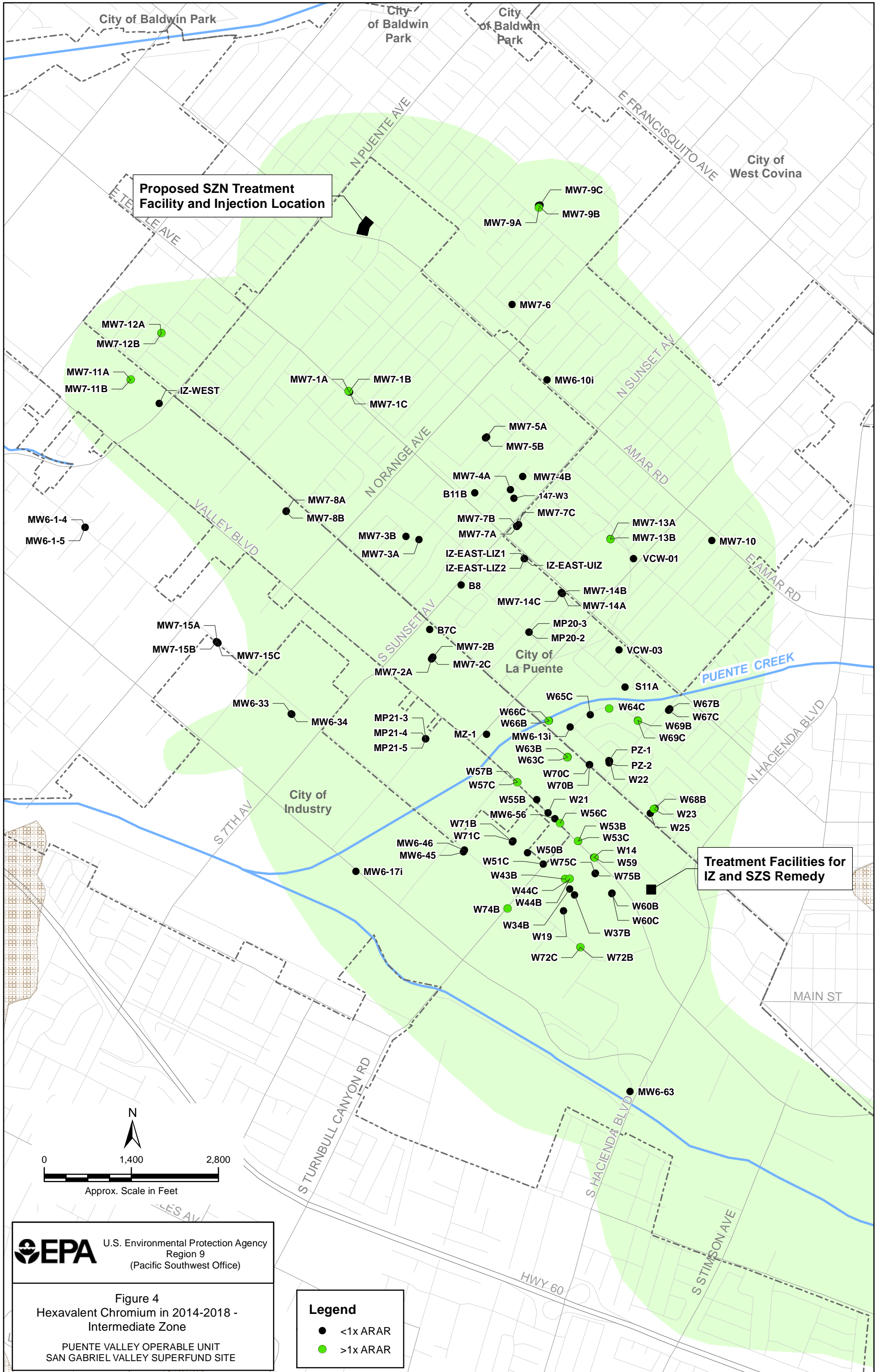
- <math>< 1\times</math> ARAR
- >1x ARAR
- Stream

N

0      1,500      3,000

Approx. Scale in Feet



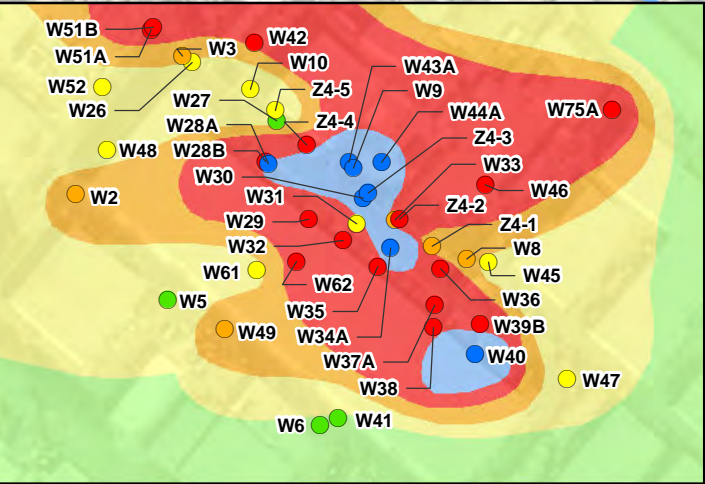
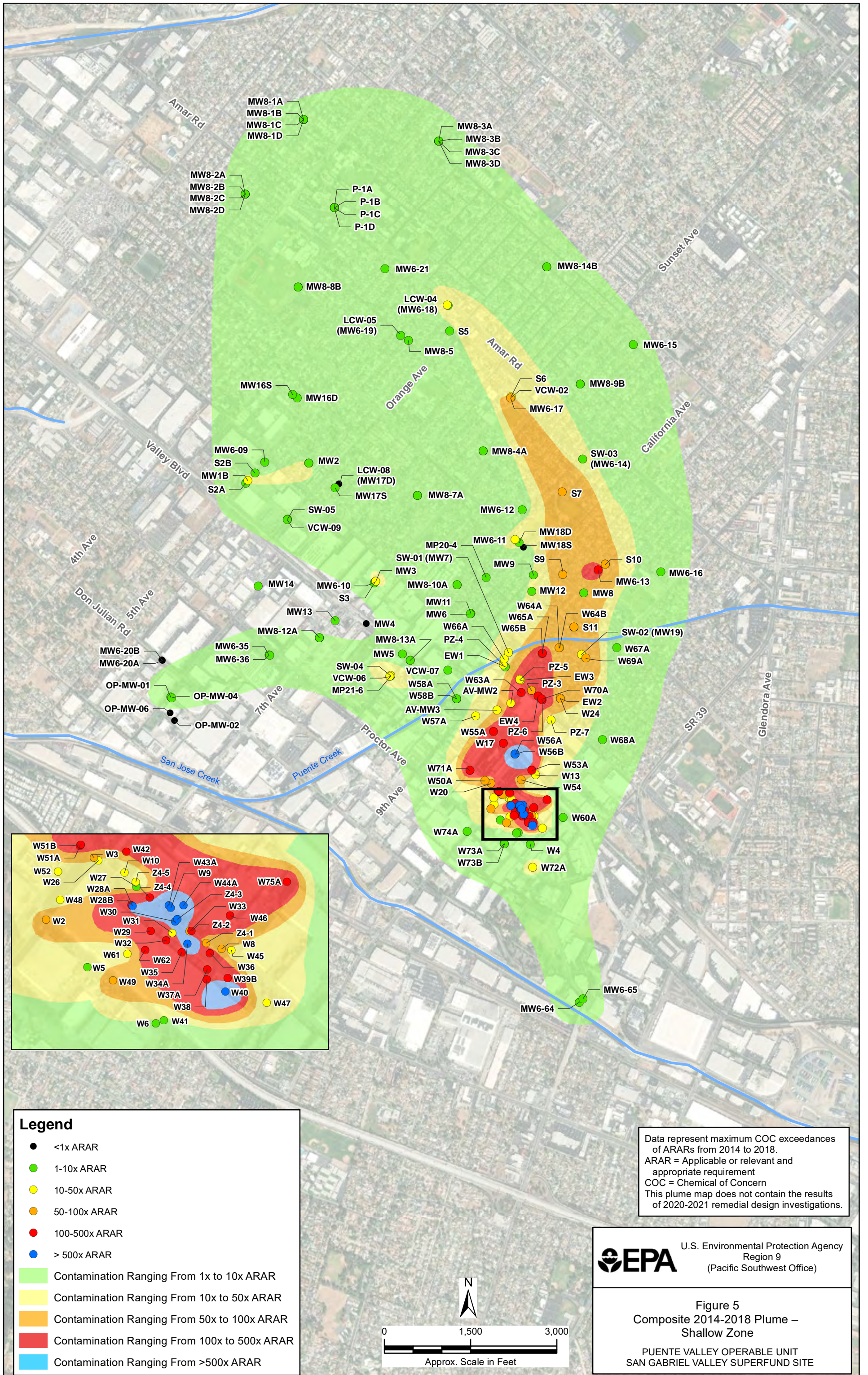


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**Figure 4**  
 Hexavalent Chromium in 2014-2018 -  
 Intermediate Zone  
 PUENTE VALLEY OPERABLE UNIT  
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**Legend**  
 ● <math><1\times</math> ARAR  
 ● >math>>1\times</math> ARAR

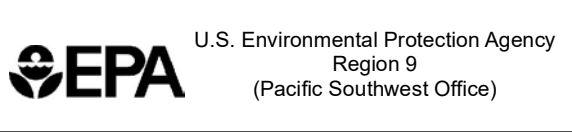




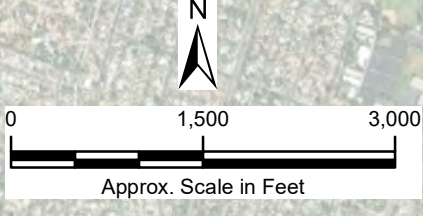
**Legend**

- <1x ARAR
- 1-10x ARAR
- 10-50x ARAR
- 50-100x ARAR
- 100-500x ARAR
- > 500x ARAR
- Contamination Ranging From 1x to 10x ARAR
- Contamination Ranging From 10x to 50x ARAR
- Contamination Ranging From 50x to 100x ARAR
- Contamination Ranging From 100x to 500x ARAR
- Contamination Ranging From >500x ARAR

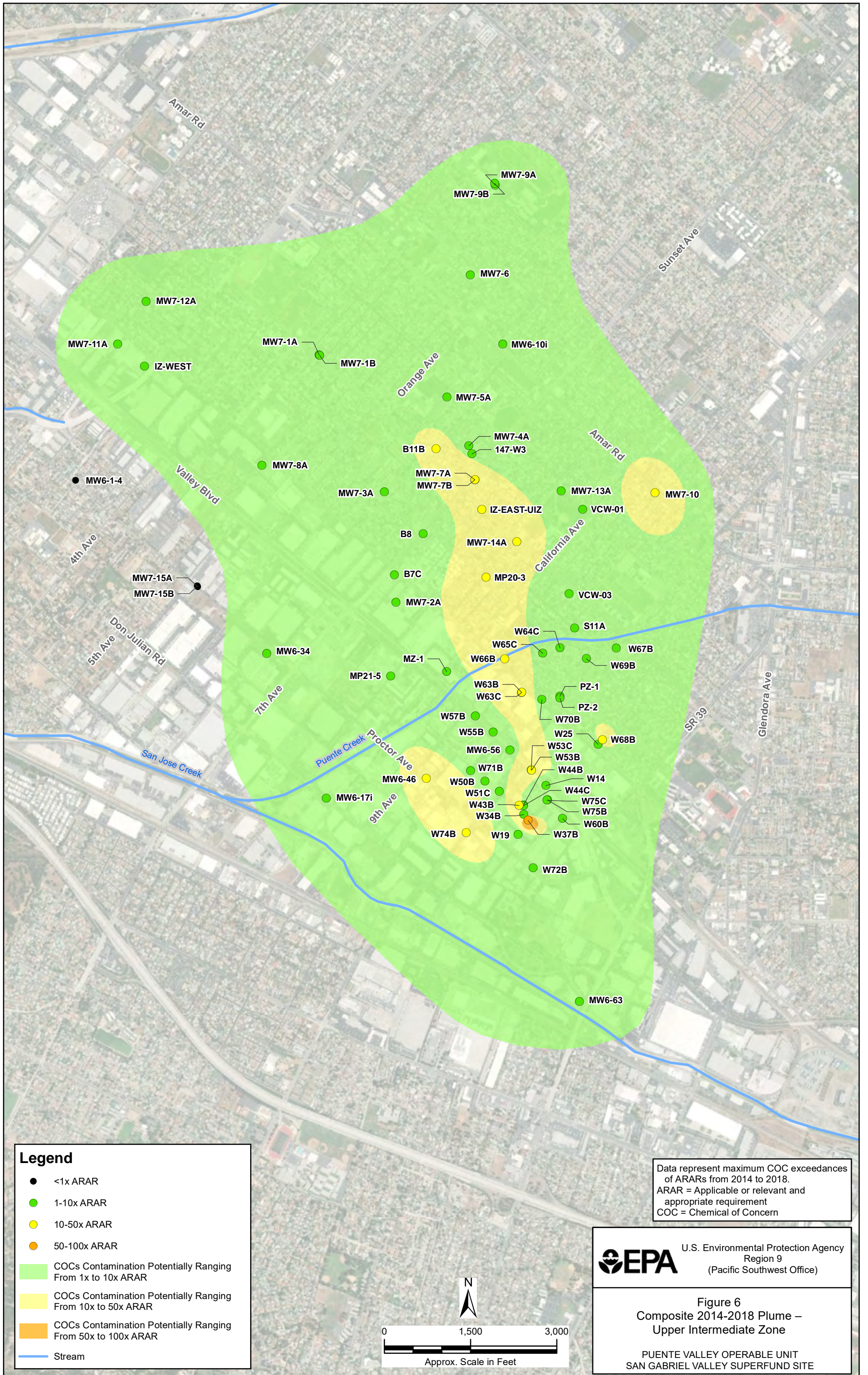
Data represent maximum COC exceedances of ARARs from 2014 to 2018.  
 ARAR = Applicable or relevant and appropriate requirement  
 COC = Chemical of Concern  
 This plume map does not contain the results of 2020-2021 remedial design investigations.



**Figure 5**  
 Composite 2014-2018 Plume – Shallow Zone  
 PUENTE VALLEY OPERABLE UNIT  
 SAN GABRIEL VALLEY SUPERFUND SITE







**Legend**

- <1x ARAR
- 1-10x ARAR
- 10-50x ARAR
- 50-100x ARAR
- COCs Contamination Potentially Ranging From 1x to 10x ARAR
- COCs Contamination Potentially Ranging From 10x to 50x ARAR
- COCs Contamination Potentially Ranging From 50x to 100x ARAR
- Stream

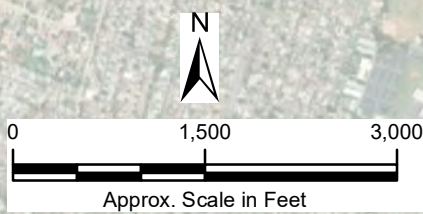
Data represent maximum COC exceedances of ARARs from 2014 to 2018.  
 ARAR = Applicable or relevant and appropriate requirement  
 COC = Chemical of Concern



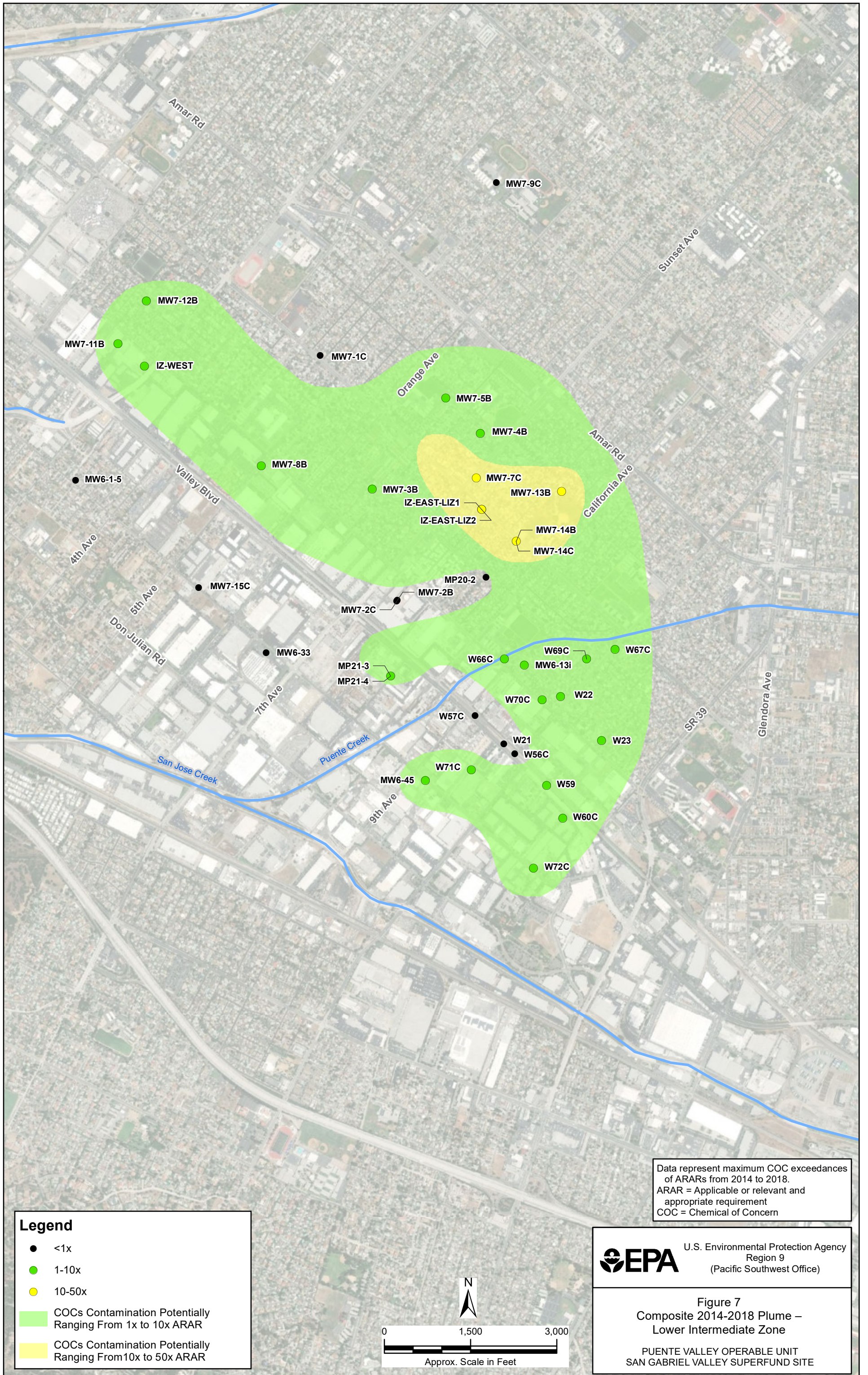
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**Figure 6**  
 Composite 2014-2018 Plume –  
 Upper Intermediate Zone

PUENTE VALLEY OPERABLE UNIT  
 SAN GABRIEL VALLEY SUPERFUND SITE



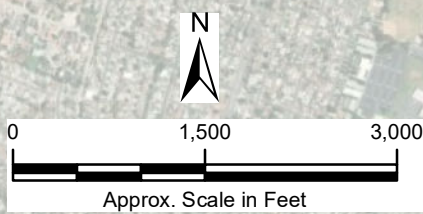




Data represent maximum COC exceedances of ARARs from 2014 to 2018.  
 ARAR = Applicable or relevant and appropriate requirement  
 COC = Chemical of Concern

**Legend**

- <1x
- 1-10x
- 10-50x
- COCs Contamination Potentially Ranging From 1x to 10x ARAR
- COCs Contamination Potentially Ranging From 10x to 50x ARAR



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**Figure 7**  
 Composite 2014-2018 Plume – Lower Intermediate Zone  
 PUENTE VALLEY OPERABLE UNIT  
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**Legend**

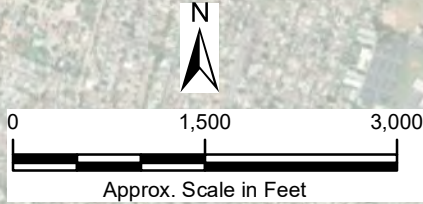
- <1x ARAR
- 1-10x ARAR
- 10-50x ARAR
- COCs Contamination Potentially Ranging From 1x to 10x ARAR
- COCs Contamination Potentially Ranging From 10x to 50x ARAR

Data represent maximum COC exceedances of ARARs from 2014 to 2018.  
 ARAR = Applicable or relevant and appropriate requirement  
 COC = Chemical of Concern

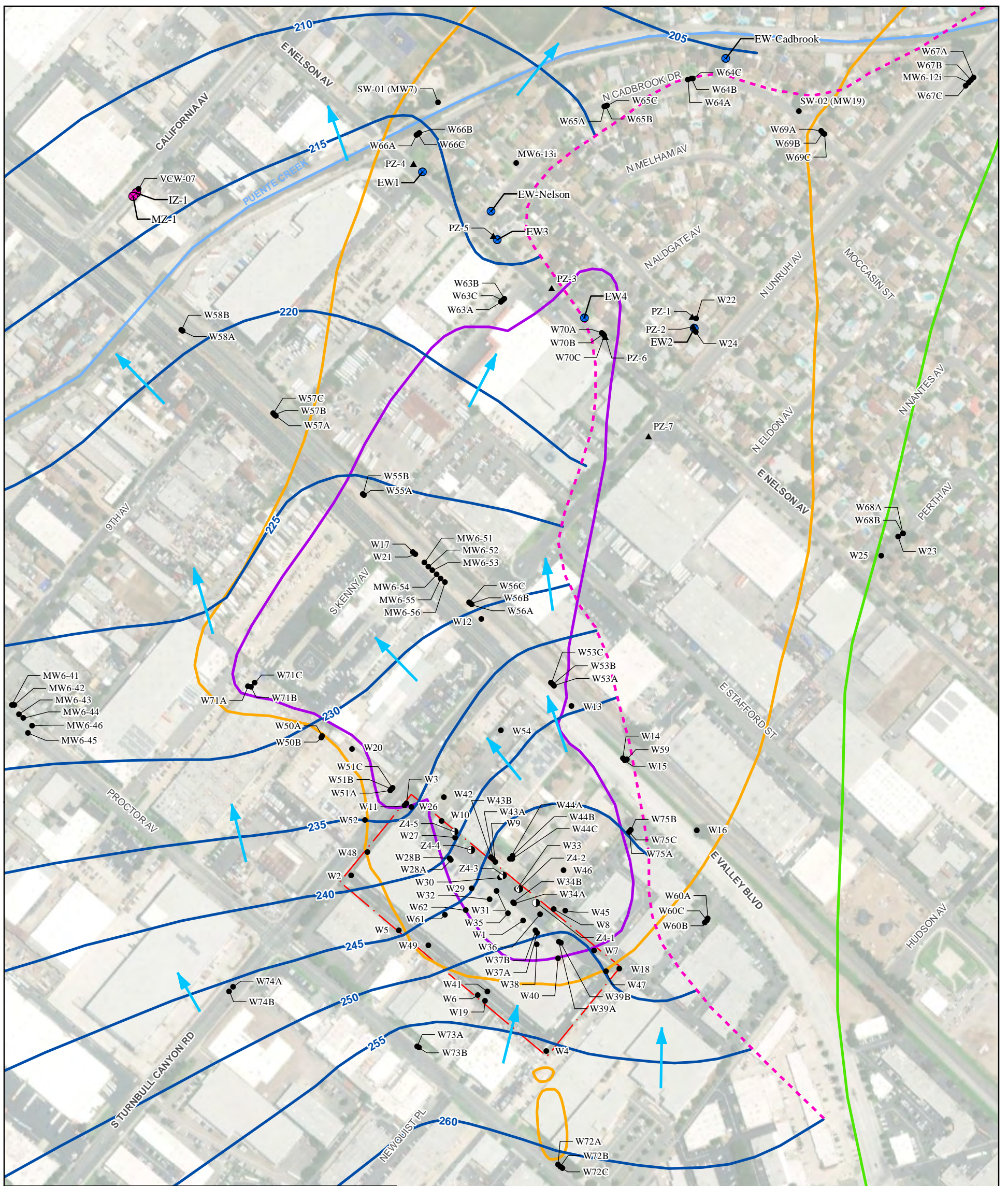
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**Figure 8**  
 Composite 2014-2018 Plume – Deep Zone

PUENTE VALLEY OPERABLE UNIT  
 SAN GABRIEL VALLEY SUPERFUND SITE







**Legend**

- SZ Remedy Extraction Well
- IZ Remedy Extraction Well
- Monitoring Well
- ▲ Piezometer
- ⊙ Dual Groundwater/Soil Vapor Well

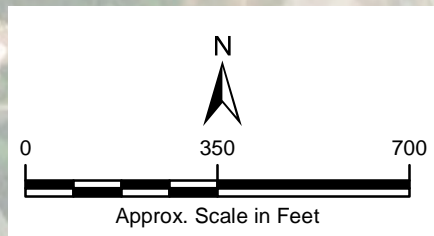
- Stream
- Benchmark Facility
- Eastern Extent of Saturation for SZ1
- Water Table Contours, September 2018 (feet above Mean Sea Level)
- ← Groundwater Flow Direction

**Composite Concentration September 2017 (Geosyntec, 2018)**

- 1x - 10x MCL and NL
- 10x - 100x MCL and NL
- 100x - 1,000x MCL and NL

Note: The composite contour lines represent the maximum lateral extent of groundwater quality exceedances relative to a multiple of the California Maximum Contaminant Level (MCL) or California Notification Level (NL) for volatile organic compounds and 1,4-dioxane.

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**Figure 9**  
Shallow Zone South Area

PUENTE VALLEY OPERABLE UNIT  
SAN GABRIEL VALLEY SUPERFUND SITE



## **Attachment 1**

- Table 1**      **DRAFT Chemical Specific ARARs/TBCs**
- Table 2**      **B7 Well Field Area Production Well Identified in IROD (Updated Table 5 of IROD)**
- Table 3**      **Chemicals of Concern Requiring Containment (Updated Table 2 of 2005 ESD)**
- Table 4**      **Abbreviated Index of Documents in Administrative Record**

Table 1  
DRAFT Chemical Specific ARARs/TBCs

	A	D	E	F	G	H
1	Constituent	Groundwater Reinjection Limit (µg/L)	Reference Limit (µg/L)	USEPA ARAR Reference <sup>1</sup>	LARWQCB Injection Discharge Option (6/29/2017 Letter from LARWQCB to EPA Attachment 2: Limitations Applicable for Discharges to Land (Reinjection))	
2					LARWQCB Permit Limit (µg/L)	Reference (Table in Attachment 2 of 6/29/2017 letter or in 12/19/13 Letter [Enclosure 3])
3	<b>Proposed - Discharge Requirements for Reinjection</b>					
4	<b>Organic Compounds</b>					
5	<b>Target Compound List Volatiles</b>					
6	Acrolein			SRWCB Resolution 68-16	No LARWQCB Limit	No LARWQCB Limit
7	Acrylonitrile			SRWCB Resolution 68-16	No LARWQCB Limit	No LARWQCB Limit
8	Acetone (see USEPA note)			SRWCB Resolution 68-16	No LARWQCB Limit	No LARWQCB Limit
9	Benzene	1	1	CA Primary MCL (A)	1	Table 2.3; MCL
10	Bromodichloromethane	100	100	USEPA Primary MCL (C)	No LARWQCB Limit	No LARWQCB Limit
11	Bromoform	100	100	USEPA Primary MCL (C)	No LARWQCB Limit	No LARWQCB Limit
12	Bromomethane	50	50	Drinking Water Equivalent Level (I)	No LARWQCB Limit	No LARWQCB Limit
13	n-Butyl benzene	260	260	CA SWRCB Drinking Water NL (F) TBC	260	Table 2.5; NL
14	sec-Butyl benzene	260	260	CA SWRCB Drinking Water NL (F) TBC	260	Table 2.5; NL
15	tert-Butyl benzene	260	260	CA SWRCB Drinking Water NL (F) TBC	260	Table 2.5; NL
16	Carbon Disulfide	160	160	CA SWRCB Drinking Water NL (F) TBC	160	Table 2.5; NL
17	Carbon Tetrachloride	0.5	0.5	CA Primary MCL (A)	0.5	Table 2.3; MCL
18	Chlorate	800	800	CA SWRCB Drinking Water NL (F) TBC	800	Table 2.3; MCL
19	Chlorobenzene	70	70	CA Primary MCL (A)	No LARWQCB Limit	No LARWQCB Limit
20	Chloroethane	16	16	Other Taste and Odor (H)	No LARWQCB Limit	No LARWQCB Limit
21	Chloroform	100	100	CA/USEPA Primary MCL (A,C)	No LARWQCB Limit	No LARWQCB Limit
22	Chloromethane			SRWCB Resolution 68-16	No LARWQCB Limit	No LARWQCB Limit
23	2-Chlorotoluene	140	140	CA SWRCB Drinking Water NL (F) TBC	140	Table 2.5; NL
24	4-Chlorotoluene	140	140	CA SWRCB Drinking Water NL (F) TBC	140	Table 2.5; NL
25	Cyclohexane			SRWCB Resolution 68-16	No LARWQCB Limit	No LARWQCB Limit
26	Dibromochloromethane	100	100	CA/USEPA Primary MCL (A,C)	No LARWQCB Limit	No LARWQCB Limit
27	Dibromochloropropane (DBCP)	0.2	0.2	CA/USEPA Primary MCL (A,C)	0.2	Table 2.3; MCL (1,2-dibromo-3-chloropropane)
28	1,2-Dibromoethane (EDB)	0.05	0.05	CA/USEPA Primary MCL (A)	0.05	Table 2.3; MCL (Ethylene Dibromide)
29	1,2-Dichlorobenzene	600	600	CA/USEPA Primary MCL (A,C)	600	Table 2.3; MCL
30	1,3-Dichlorobenzene	600	600	CA SWRCB Action Level (G)	No LARWQCB Limit	No LARWQCB Limit
31	1,4-Dichlorobenzene	5	5	CA Primary MCL (A)	5	Table 2.3; MCL
32	Dichlorodifluoromethane	1,000	1,000	CA SWRCB Drinking Water NL (F) TBC	1,000	Table 2.5; NL
33	Dichlorofluoromethane (see USEPA)			SRWCB Resolution 68-16	No LARWQCB Limit	No LARWQCB Limit
34	1,1-Dichloroethane	5	5	CA Primary MCL (A)	5	Table 2.3; MCL
35	1,2-Dichloroethane	0.5	0.5	CA Primary MCL (A)	0.5	Table 2.3; MCL
36	1,1-Dichloroethylene	6	6	CA Primary MCL (A)	6	Table 2.3; MCL
37	cis-1,2-Dichloroethylene	6	6	CA Primary MCL (A)	6	Table 2.3; MCL
38	trans-1,2-Dichloroethylene	10	10	CA Primary MCL (A)	10	Table 2.3; MCL
39	Dichloromethane (methylene chloride)	5	5	CA Primary MCL (A)	5	Table 2.3; MCL
40	1,2-Dichloropropane	5	5	CA/USEPA Primary MCL (A)	5	Table 2.3; MCL
41	cis-1,3-Dichloropropene	0.5	0.5	CA Primary MCL (A)	0.5	Table 2.3; MCL. Not split into cis and trans in Table 2.3

Table 1  
DRAFT Chemical Specific ARARs/TBCs

	A	D	E	F	G	H
1	Constituent	Groundwater Reinjection Limit (µg/L)	Reference Limit (µg/L)	USEPA ARAR Reference <sup>1</sup>	LARWQCB Injection Discharge Option (6/29/2017 Letter from LARWQCB to EPA Attachment 2: Limitations Applicable for Discharges to Land (Reinjection))	
2					LARWQCB Permit Limit (µg/L)	Reference (Table in Attachment 2 of 6/29/2017 letter or in 12/19/13 Letter [Enclosure 3])
42	trans-1,3-Dichloropropene	0.5	0.5	CA Primary MCL (A)	0.5	Table 2.3; MCL. Not split into cis and trans in Table 2.3
43	Ethylbenzene	300	30	USEPA Secondary MCL – proposed (D)	300	Table 2.3; MCL
44	Ethylene glycol	14,000	14,000	CA SWRCB Drinking Water NL (F) TBC	14,000	Table 2.5; NL
45	Formaldehyde	100	100	CA SWRCB Drinking Water NL (F) TBC	100	Table 2.5; NL
46	2-Hexanone				No LARWQCB Limit	No LARWQCB Limit
47	HMX	350	350	CA SWRCB Drinking Water NL (F) TBC	350	Table 2.5; NL
48	Isopropyl alcohol (Isopropanol)			SRWCB Resolution 68-16	No LARWQCB Limit	No LARWQCB Limit
49	Isopropylbenzene	770	770	CA SWRCB Drinking Water NL (F) TBC	770	Table 2.5; NL
50	Methyl acetate			SRWCB Resolution 68-16	No LARWQCB Limit	No LARWQCB Limit
51	Methyl bromide			SRWCB Resolution 68-16	No LARWQCB Limit	No LARWQCB Limit
52	Methyl ethyl ketone (2-butanone)				No LARWQCB Limit	No LARWQCB Limit
53	Methyl isobutyl ketone (MIBK)	120	120	CA SWRCB Drinking Water NL (F)	120	Table 2.5; NL
54	Methylcyclohexane			SRWCB Resolution 68-16	No LARWQCB Limit	No LARWQCB Limit
55	n-Propylbenzene	260	260	CA SWRCB Drinking Water NL (F) TBC	260	Table 2.5; NL
56	RDX	0.3	0.3	CA SWRCB Drinking Water NL (F) TBC	0.3	Table 2.5; NL
57	Styrene	100	10	USEPA Secondary MCL – proposed (D)	100	Table 2.3; MCL
58	1,1,2,2-Tetrachloroethane	1	1	CA Primary MCL (A)	1	Table 2.3; MCL
59	Tetrachloroethylene (PCE)	5	5	CA/USEPA Primary MCL (A)	5	Table 2.3; MCL
60	Toluene	150	40	USEPA Secondary MCL – proposed (D)	150	Table 2.3; MCL
61	1,2,4-Trichlorobenzene	5	5	CA PHG (E)	5	Table 2.3; MCL
62	1,1,1-Trichloroethane	200	200	CA Primary MCL (A)	200	Table 2.3; MCL
63	1,1,2-Trichloroethane	5	5	CA Primary MCL (A)	5	Table 2.3; MCL
64	Trichloroethylene (TCE)	5	5	CA/USEPA Primary MCL (A)	5	Table 2.3; MCL
65	Trichlorofluoromethane	150	150	CA Primary MCL (A)	150	Table 2.3; MCL
66	1,1,2-Trichloro-1,2,2-trifluoroethane	1,200	1,200	CA Primary MCL (A)	1,200	Table 2.3; MCL
67	1,2,4-Trimethylbenzene	330	330	CA SWRCB Drinking Water NL (F) TBC	330	Table 2.5; NL
68	1,3,5-Trimethylbenzene	330	330	CA SWRCB Drinking Water NL (F) TBC	330	Table 2.5; NL
69	2,4,6-Trinitrotoluene (TNT)	1	1	CA SWRCB Drinking Water NL (F) TBC	1	Table 2.5; NL
70	Vinyl chloride	0.5	0.5	CA Primary MCL (A)	0.5	Table 2.3; MCL
71	Xylene(s)	1,750	20	USEPA Secondary MCL – proposed (D)	1,750	Table 2.3; MCL
72	<b>Additional Volatiles</b>					
73	Methyl tert-butyl ether (MTBE)	13	5	CA Secondary MCL (B)	13/5	Table 2.3 (MCL)/Table 2.4 (SMCL)
74	<b>Emerging Contaminants</b>					
75	1,2,3-Trichloropropane (1,2,3-TCP)	0.005	0.005	CA Primary MCL (A)	0.005	Table 2.5; NL now MCL
76	1,4-Dioxane	1	1	CA SWRCB Drinking Water NL (F) TBC	1	Table 2.5; NL
77	N-Nitrosodimethylamine (NDMA)	0.01	0.01	CA SWRCB Drinking Water NL (F) TBC	0.01	Table 2.5; NL
78	<b>Other Organic Parameters</b>					
79	Total Organic Carbon (TOC)				No LARWQCB Limit	No LARWQCB Limit
80	Biological Oxygen Demand (BOD)				No LARWQCB Limit	No LARWQCB Limit
81	Chemical Oxygen Demand (COD)				No LARWQCB Limit	No LARWQCB Limit
82	<b>Inorganic Compounds</b>					
83	<b>TAL Metals</b>					
84	Aluminum	1,000	200	CA/USEPA Secondary MCL (B,D)	1000/200	Table 2.1, MCL/Table 2.4 SMCL
85	Antimony	6	6	CA/USEPA Primary MCL (A,C)	6	Table 2.1, MCL



Table 1  
DRAFT Chemical Specific ARARs/TBCs

1	A	D	E	F	G	H
	Constituent	Groundwater ReInjection Limit (µg/L)	Reference Limit (µg/L)	USEPA ARAR Reference <sup>1</sup>	LARWQCB Permit Limit (µg/L)	Reference (Table in Attachment 2 of 6/29/2017 letter or in 12/19/13 Letter [Enclosure 3])
86	Arsenic	10	10	CA/USEPA Primary MCL (A, C)	10	Table 2.1, MCL
87	Barium	1,000	1,000	CA Primary MCL (A)	1,000	Table 2.1, MCL
88	Beryllium	4	4	CA/USEPA Primary MCL (A,C)	4	Table 2.1, MCL
89	Cadmium	5	5	CA/USEPA Primary MCL (A,C)	5	Table 2.1, MCL
90	Calcium				No LARWQCB Limit	No LARWQCB Limit
91	Chromium (total)	50	50	CA Primary MCL (A)	50	Table 2.1, MCL
92	Cobalt				No LARWQCB Limit	No LARWQCB Limit
93	Copper	1,000	1,300	CA/USEPA Primary MCL (A,C)	1,000	Table 2.4; SMCL
94	Iron	300	300	CA/USEPA Secondary MCL (B,D)	300	Table 2.4; SMCL
95	Lead	15	15	CA/USEPA Primary MCL (A,C)	No LARWQCB Limit	No LARWQCB Limit
96	Magnesium				No LARWQCB Limit	No LARWQCB Limit
97	Manganese	50	50	CA/USEPA Secondary MCL (B,D)	50/500	Table 2.4 (SMCL)/Table 2.5 (NL)
98	Mercury	2	2	CA/USEPA Primary MCL (A,C)	2	Table 2.1; MCL
99	Molybdenum				No LARWQCB Limit	No LARWQCB Limit
100	Nickel	100	100	CA Primary MCL (A)	100	Table 2.1; MCL
101	Potassium				No LARWQCB Limit	No LARWQCB Limit
102	Selenium	50	50	CA/USEPA Primary MCL (A,C)	50	Table 2.1; MCL
103	Silver	100	100	CA/USEPA Secondary MCL (B,D)	100	Table 2.4; SMCL
104	Sodium				No LARWQCB Limit	No LARWQCB Limit
105	Thallium	2	2	CA/USEPA Primary MCL (A,C)	2	Table 2.1; MCL
106	Vanadium	50	50	CA SWRCB Drinking Water NL (F) TBC	50	Table 2.5; NL
107	Zinc	5,000	5,000	CA/USEPA Secondary MCL (B,D)	5,000	Table 2.5; NL
108	<b>Additional Inorganics</b>					
109	Boron	500 or Background	500	LA Basin Plan - Main San Gabriel Basin (J)	500 or Background	Paragraph B of 12/19/13 Letter
110	Silicon				No LARWQCB Limit	No LARWQCB Limit
111	Cyanide	150	150	CA Primary MCL (A)	150	Table 2.1; MCL
112	pH	6.5 to 8.5	6.5 to 8.5	USEPA Secondary MCL (D)	No LARWQCB Limit	No LARWQCB Limit
113	Ammonia	500	500	Other Tastes and Odors (H)	No LARWQCB Limit	No LARWQCB Limit
114	Bromide				No LARWQCB Limit	No LARWQCB Limit
115	Chloride	100,000 or Background	100,000	LA Basin Plan - Main San Gabriel Basin (J)	100,000 or Background	Paragraph B of 12/19/13 Letter
116	Fluoride	2,000	2,000	CA/USEPA Primary MCL (A,C)	2,000	Table 2.1; MCL
117	Nitrate+Nitrite (NO <sub>2</sub> as N and NO <sub>3</sub> as N)	10,000 or Background	10,000	NPDES Order No. R4-2014-0187 WDRs for nitrate and	10,000 or Background	Paragraph B of 12/19/13 Letter
118	Nitrate (NO <sub>3</sub> as N)	10,000 or Background	10,000	NPDES Order No. R4-2014-0187 WDRs for nitrate and	10,000 or Background	Paragraph B of 12/19/13 Letter
119	Nitrite (NO <sub>2</sub> as N)	1,000 or Background	1,000	NPDES Order No. R4-2014-0187 WDRs	1,000 or Background	Paragraph B of 12/19/13 Letter
120	Nitrate (as NO <sub>3</sub> )	45,000	45,000	CA PHG (E)	45,000	Table 2.1; MCL
121	Total Kjeldahl Nitrogen (TKN)				No LARWQCB Limit	No LARWQCB Limit
122	Phosphorus (orthophosphate, total)				No LARWQCB Limit	No LARWQCB Limit
123	Sulfate	100,000 or Background	250,000	CA Secondary MCL (B)	100,000 or Background	Paragraph B of 12/19/13 Letter
124	Total dissolved solids (TDS) (11)	600,000 or Background	600,000	LA Basin Plan - Main San Gabriel Basin, Eastern (J)	600,000 or Background	Paragraph B of 12/19/13 Letter
125	Alkalinity				No LARWQCB Limit	No LARWQCB Limit
126	Total Suspended Solids (TSS)				No LARWQCB Limit	No LARWQCB Limit
127	Oil and Grease				No LARWQCB Limit	No LARWQCB Limit
128	Sulfide				No LARWQCB Limit	No LARWQCB Limit
129	Residual Chlorine				No LARWQCB Limit	No LARWQCB Limit
130	Methylene Blue Active Substances	500	500	CA Secondary MCL (B)	500	Table 2.4; SMCL
131	<b>Emerging Contaminants</b>					

Table 1  
DRAFT Chemical Specific ARARs/TBCs

	A	D	E	F	G	H
1	Constituent	Groundwater Reinjection Limit (µg/L)			LARWQCB Injection Discharge Option (6/29/2017 Letter from LARWQCB to EPA Attachment 2: Limitations Applicable for Discharges to Land (Reinjection))	
2			Reference Limit (µg/L)	USEPA ARAR Reference <sup>1</sup>	LARWQCB Permit Limit (µg/L)	Reference (Table in Attachment 2 of 6/29/2017 letter or in 12/19/13 Letter [Enclosure 3])
132	Hexavalent Chromium	10	10	CA Primary MCL (A) <sup>3</sup>	10	Table 2.1; MCL
133	Perchlorate	6	6	CA Primary MCL (A)	6	Table 2.1; MCL
134	<b>Pesticides and PCBs</b>					
135	4,4-DDD				No LARWQCB Limit	No LARWQCB Limit
136	4,4-DDE				No LARWQCB Limit	No LARWQCB Limit
137	Aldrin				No LARWQCB Limit	No LARWQCB Limit
138	alpha-BHC				No LARWQCB Limit	No LARWQCB Limit
139	beta-BHC				No LARWQCB Limit	No LARWQCB Limit
140	Endosulfan Sulfate				No LARWQCB Limit	No LARWQCB Limit
141	Endrin Aldehyde				No LARWQCB Limit	No LARWQCB Limit
142	Gamma-BHC				No LARWQCB Limit	No LARWQCB Limit
143	PCBs	0.5	0.5	CA Primary MCL (A)	0.5	Table 2.3; MCL
144	Pentachlorophenol	1	1	CA Primary MCL (A)	1	Table 2.3; MCL
145	Chlordane	0.1	0.1	CA Primary MCL (A)	0.1	Table 2.3; MCL
146	2,4-D	70	70	CA Primary MCL (A)	70	Table 2.3; MCL
147	4,4'-DDT				No LARWQCB Limit	No LARWQCB Limit
148	Dieldrin				No LARWQCB Limit	No LARWQCB Limit
149	Diazinon	1.2	1.2	CA SWRCB Drinking Water NL (F) TBC	1.2	Table 2.5; NL
150	alpha-Endosulfan				No LARWQCB Limit	No LARWQCB Limit
151	beta-Endosulfan				No LARWQCB Limit	No LARWQCB Limit
152	Endrin	2	2	CA Primary MCL (A)	2	Table 2.3; MCL
153	Heptachlor	0.01	0.01	CA Primary MCL (A)	0.01	Table 2.3; MCL
154	Heptachlor Epoxide	0.01	0.01	CA Primary MCL (A)	0.01	Table 2.3; MCL (Heptachlor Epoxide)
155	Lindane	0.2	0.2	CA Primary MCL (A)	0.2	Table 2.3; MCL
156	Methoxychlor	30	30	CA Primary MCL (A)	30	Table 2.3; MCL
157	Thiobencarb	70	70	CA Primary MCL (A)	70/1	Table 2.3; MCL/ Table 2.4 SMCL
158	Toxaphene	3	3	CA Primary MCL (A)	3	Table 2.3; MCL
159	2,4,5-TP (Silvex)	50	50	CA Primary MCL (A)	50	Table 2.3; MCL
160	<b>Semi and non-volatile Organic</b>					
161	1,2-Diphenylhydrazine				No LARWQCB Limit	No LARWQCB Limit
162	2,4-Dichlorophenol				No LARWQCB Limit	No LARWQCB Limit
163	2,4-Dimethylphenol				No LARWQCB Limit	No LARWQCB Limit
164	2,4-Dinitrophenol				No LARWQCB Limit	No LARWQCB Limit
165	2,4-Dinitrotoluene				No LARWQCB Limit	No LARWQCB Limit
166	2,4,6-Trichlorophenol				No LARWQCB Limit	No LARWQCB Limit
167	2-Chloronaphthalene				No LARWQCB Limit	No LARWQCB Limit
168	2-Chlorophenol				No LARWQCB Limit	No LARWQCB Limit
169	2-Methyl-4,6-Dinitrophenol				No LARWQCB Limit	No LARWQCB Limit
170	3,3-Dichlorobenzidine				No LARWQCB Limit	No LARWQCB Limit
171	Acenaphthalene				No LARWQCB Limit	No LARWQCB Limit
172	Alachlor	2	2	CA Primary MCL (A)	2	Table 2.3; MCL
173	Anthracene				No LARWQCB Limit	No LARWQCB Limit
174	Atrazine	1	1	CA Primary MCL (A)	1	Table 2.3; MCL
175	Bentazon	18	18	CA Primary MCL (A)	18	Table 2.3; MCL

Table 1  
DRAFT Chemical Specific ARARs/TBCs

1	A	D	E	F	G	H
	Constituent	Groundwater ReInjection Limit (µg/L)	Reference Limit (µg/L)	USEPA ARAR Reference <sup>1</sup>	LARWQCB Permit Limit (µg/L)	Reference (Table in Attachment 2 of 6/29/2017 letter or in 12/19/13 Letter [Enclosure 3])
2						
176	Benzidine				No LARWQCB Limit	No LARWQCB Limit
177	Benzo(a)Anthracene				No LARWQCB Limit	No LARWQCB Limit
178	Benzo(a)Pyrene	0.2	0.2	CA Primary MCL (A)	0.2	Table 2.3: MCL
179	Benzo(b)Fluoranthene				No LARWQCB Limit	No LARWQCB Limit
180	Benzo(k)Fluoranthene				No LARWQCB Limit	No LARWQCB Limit
181	Bis(2-Chloroethyl)Ether				No LARWQCB Limit	No LARWQCB Limit
182	Bis(2-Chloroisopropyl)Ether				No LARWQCB Limit	No LARWQCB Limit
183	Bis(2-Ethylhexyl)Phthalate	4	4	CA Primary MCL (A)	4	Table 2.3; MCL
184	Butylbenzyl Phthalate				No LARWQCB Limit	No LARWQCB Limit
185	Carbofuran	18	18	CA Primary MCL (A)	18	Table 2.3: MCL
186	Chrysene				No LARWQCB Limit	No LARWQCB Limit
187	Dalapon	200	200	CA Primary MCL (A)	200	Table 2.3: MCL
188	Dibenzo(a,h)Anthracene				No LARWQCB Limit	No LARWQCB Limit
189	Diethyl Phthalate				No LARWQCB Limit	No LARWQCB Limit
190	Di(2-ethylhexyl)adipate	400	400	CA Primary MCL (A)	400	Table 2.3: MCL
191	Dimethyl Phthalate				No LARWQCB Limit	No LARWQCB Limit
192	Di-n-Butyl Phthalate			SWRCB Resolution 68-16	No LARWQCB Limit	No LARWQCB Limit
193	Dinoseb	7	7	CA Primary MCL (A)	7	Table 2.3: MCL
194	Diquat	20	20	CA Primary MCL (A)	20	Table 2.3: MCL
195	Endothall	100	100	CA Primary MCL (A)	100	Table 2.3: MCL
196	Fluoranthene				No LARWQCB Limit	No LARWQCB Limit
197	Fluorene				No LARWQCB Limit	No LARWQCB Limit
198	Glyphosate	700	700	CA Primary MCL (A)	700	Table 2.3: MCL
199	Hexachlorobenzene	1	1	CA Primary MCL (A)	1	Table 2.3: MCL
200	Hexachlorobutadiene				No LARWQCB Limit	No LARWQCB Limit
201	Hexachlorocyclopentadiene	50			50	Table 2.3: MCL
202	hexachloroethane				No LARWQCB Limit	No LARWQCB Limit
203	Indeno(1,2,3-cd) Pyrene				No LARWQCB Limit	No LARWQCB Limit
204	Isophorone				No LARWQCB Limit	No LARWQCB Limit
205	Molinate	20	20	CA Primary MCL (A)	20	Table 2.3: MCL
206	Naphthalene	17	17	CA SWRCB Drinking Water NL (F) TBC	17	Table 2.5: NL
207	Nitrobenzene				No LARWQCB Limit	No LARWQCB Limit
208	N-Nitrosodiethylamine	0.01	0.01	CA SWRCB Drinking Water NL (F) TBC	0.01	Table 2.5: NL
209	N-Nitrosodi-n-Propylamine	0.01	0.01	CA SWRCB Drinking Water NL (F) TBC	0.01	Table 2.5: NL
210	N-Nitrosodiphenylamine				No LARWQCB Limit	No LARWQCB Limit
211	Oxamyl	50	50	CA Primary MCL (A)	50	Table 2.3: MCL
212	Phenol				No LARWQCB Limit	No LARWQCB Limit
213	Picloram	500	500	CA Primary MCL (A)	500	Table 2.3: MCL
214	Propachlor	90	90	CA SWRCB Drinking Water NL (F) TBC	90	Table 2.5: NL
215	Pyrene				No LARWQCB Limit	No LARWQCB Limit
216	Simazine	4	4	CA Primary MCL (A)	4	Table 2.3: MCL
217	<b>Miscellaneous Organic Constituents</b>					
218	Di-isopropyl ether (DIPE)				No LARWQCB Limit	No LARWQCB Limit
219	2,3,7,8-TCDD (Dioxin)	3.00E-08	3.00E-08	CA Primary MCL (A)	0.00000003	Table 2.3: MCL
220	Tertiary butyl alcohol (TBA)	12	12	CA SWRCB Drinking Water NL (F) TBC	12	Table 2.5: NL
221	Total petroleum hydrocarbons			SWRCB Resolution 68-16	No LARWQCB Limit	No LARWQCB Limit

Table 1  
DRAFT Chemical Specific ARARs/TBCs

	A	D	E	F	G	H
1	Constituent	Groundwater Reinjection Limit (µg/L)			LARWQCB Injection Discharge Option (6/29/2017 Letter from LARWQCB to EPA Attachment 2: Limitations Applicable for Discharges to Land (Reinjection))	
2			Reference Limit (µg/L)	USEPA ARAR Reference <sup>1</sup>	LARWQCB Permit Limit (µg/L)	Reference (Table in Attachment 2 of 6/29/2017 letter or in 12/19/13 Letter [Enclosure 3])
222	Analytes Historically Detected in SZ North Wells but not related to Site:					
223	Acetochlor					
224	Di-n-Octyl Phthalate					
225	Diphenamid					
226	Ethion					
227	Methane					
228	Metolachlor					
229	Prometryn					
230	Vinyl Acetate					
231						
232	<b>Notes: Regarding Chemical-Specific ARARs or TBCs :</b>					
233	Chemical-Specific ARAR					
234	Compounds noted with "Y(a)" in under Table 2 do not have containment levels specified and will require monitoring only per the 2005 ESD.					
235	1. Acetone was included as a COC in Table 1 of the 1998 IROD and should remain to be included in the chemical-specific ARARs list.					
236	2. Dichlorofluoromethane is listed in Table 2 of the 2005 ESD but does not have any containment level.					
237	Proposed Chemical-Specific TBC					
238	TBA and chemicals included in Basin Plan Objectives					
239						
240						
241	Notes:					
242	ARAR = Applicable or Relevant and Appropriate Requirements, California Regional Water Quality Control Board, Los Angeles Region					
243	CA = California					
244	DHS = Department of Health Services, California (now SWRCB Division of Drinking Water )					
245	ESD = Explanation of Significant Differences					
246	LA = Los Angeles					
247	LARWQCB = Los Angeles Regional Water Quality Control Board					
248	MCL = maximum contaminant level					
249	NA is defined by EPA as not applicable					
250	NC = Not calculated. Not historically present; assumed nondetection value					
251	NL = notification level					
252	NS = Not in current analytical list					
253	PHG = Public Health Goal					
254	SMCL = Secondary MCL					
255	SWRCB = State Water Resources Control Board - Division of Drinking Water					
256	TAL = target analyte list					
257	TBC = to be considered					
258	TCL = target compound list					
259	TDS = total dissolved solids					
260	USEPA = U.S. Environmental Protection Agency					
261	µg/L = microgram per liter					
262	(1) ARARs from August 2000 California EPA Compilation of Water Quality Goals and Updates through November 2001, updated through June 2003. Additional update based on RWQCB's ARARs provided on June 29, 2017.					
263	(2) California SWRCB required Detection Limit for Purposes of Reporting (DLR).					
264	(3) Hexavalent chromium State MCL (10 ug/L) repealed September 2017. However, PHG (0.02 ug/L) of 2011 remains in effect for drinking water.					
265	(4) Discharge to groundwater aquifer shall also meet the MCLs for radionuclides specified in Tables 64442 and 64443 of Title 22 of the California Code of Regulation.					
266	(A) CA Primary MCL for Drinking Water.					
267	(B) CA Secondary MCL for "Consumer Acceptance Contaminant Levels", specified in Table 64449-A of Section 64449 of Title 22 of the California Code of Regulation (CCR).					
268	(C) USEPA Primary MCL for Drinking Water.					

Table 1  
DRAFT Chemical Specific ARARs/TBCs

	A	D	E	F	G	H
1	Constituent	Groundwater Reinjection Limit (µg/L)			LARWQCB Injection Discharge Option (6/29/2017 Letter from LARWQCB to EPA Attachment 2: Limitations Applicable for Discharges to Land (Reinjection))	
2			Reference Limit (µg/L)	USEPA ARAR Reference <sup>1</sup>	LARWQCB Permit Limit (µg/L)	Reference (Table in Attachment 2 of 6/29/2017 letter or in 12/19/13 Letter [Enclosure 3])
269	(D) USEPA Secondary MCL for Drinking Water.					
270	(E) CA Office of Environmental Health Hazard Assessment Public Health Goal for Drinking Water.					
271	(F) CA SWRCB Division of Drinking Water Notification levels (updated as of February 4, 2015) are TBCs					
272	(G) CA SWRCB Division of Drinking Water, Archived Advisory Action Level (as of January 30, 2015).					
273	(H) Other Taste and Odor Thresholds.					
274	(I) Drinking water equivalent level, U.S. EPA 2018 Edition of the Drinking Water Standards and Health Advisories Tables.					
275	(J) Water Quality Control Plan, Los Angeles Region (4), California Regional Water Quality Control Board.					
276						

**Table 2: B7 Well Field Area Production Wells Identified in the IROD (Updated Table 5 of IROD)**

<b>Well Identification</b>	<b>Station Identification/PS-Code<sup>#</sup></b>	<b>Status</b>
152W1	01900337	Decommissioned
147W1	01901596	Decommissioned
105W1	01901608	Decommissioned
134W1	01901623	Decommissioned
150W1	01902519	Decommissioned
147W3	08000077	Decommissioned
B7E	08000122	Active
B8	01901436	Decommissioned
B9	91901437	Decommissioned
B11A	91901439	Decommissioned
B7B	91901440	Decommissioned
B7C	98000068	Decommissioned
B7D	98000094	Decommissioned
B9B	98000099	Active
B11B	98000108	Active
B24A*	1910039-117	Active
B24B*	1910039-116	Active
B24C*	1910030-223	Pending active service

Notes:

# = PS-Code replaced Station ID

\* = New wells installed within the B7 Well Field since IROD and ESD

<b>Table 3. Chemicals of Concern Requiring Containment (Updated Table 2 of 2005 ESD)</b>		
<b>Compound</b>	<b>Containment Level (ug/L)</b>	<b>Source</b>
1,1-Dichloroethane	5	California MCL
1,1-Dichloroethene	6	California MCL
1,1,1-Trichloroethane	200	Federal MCL
1,1,2-Trichloro-1,2,2-Trifluoroethane	1,200	California MCL
1,1,2-Trichloroethane	<b>5</b>	<b>California MCL</b>
1,1,2,2-Tetrachloroethane	1	California MCL
1,2-Dichlorobenzene	600	Federal MCL
1,2-Dichloroethane	0.5	California MCL
1,2-Dichloroethene (total) <sup>1</sup>	6	California MCL
1,2-Dichloropropane	5	Federal MCL
1,2,4-Trichlorobenzene	70	Federal MCL
<b>1,2,4-Trimethylbenzene</b>	<b>330</b>	<b>State Notification Level</b>
1,3-Dichlorobenzene	600	Federal MCL
1,3-Dichloropropene	0.5	California MCL
<b>1,3,5-Trimethylbenzene</b>	<b>330</b>	<b>State Notification Level</b>
1,4-Dichlorobenzene	5	California MCL
Benzene	1	California MCL
bis(2-Ethylhexyl)phthalate	4	California MCL
Bromochloromethane	-	-
Bromodichloromethane <sup>2</sup>	100	Federal MCL
Bromoform <sup>2</sup>	100	Federal MCL
<b>Bromomethane</b>	<b>50</b>	<b>Drinking Water Equivalent Level (I)</b>

<b>Table 3. Chemicals of Concern Requiring Containment, (Updated Table 2 of 2005 ESD)</b>		
<b>Compound</b>	<b>Containment Level (ug/L)</b>	<b>Source</b>
<b>n-Butylbenzene</b>	<b>260</b>	<b>State Notification Level</b>
<b>sec-Butylbenzene</b>	<b>260</b>	<b>State Notification Level</b>
<b>tert-Butylbenzene</b>	<b>260</b>	<b>State Notification Level</b>
<b>Carbon Disulfide</b>	<b>160</b>	<b>State Notification Level</b>
Carbon Tetrachloride	0.5	California MCL
Chlorobenzene	70	California MCL
Chloroethane		-
Chloroform <sup>2</sup>	100	Federal MCL
cis-1,2-Dichloroethene	6	California MCL
<b>cis-1,3-Dichloropropene</b>	<b>0.5</b>	<b>California MCL</b>
Dibromochloromethane <sup>2</sup>	100	Federal MCL
Dibromochloropropane	0.2	Federal MCL
Di-n-butylphthalate	-	-
<b>Dichlorofluoromethane</b>	<b>1000</b>	Federal MCL
Ethylbenzene	300	Federal MCL
Isopropyl alcohol	-	-
<b>Isopropyl benzene</b>	<b>770</b>	<b>State Notification Level</b>
Methylene Chloride	5	California MCL
<b>Naphthalene</b>	<b>17</b>	<b>State Notification Level</b>
Styrene	100	Federal MCL
Tetrachloroethene	5	Federal MCL
Total petroleum hydrocarbons	-	-



<b>Table 3. Chemicals of Concern Requiring Containment, (Updated Table 2 of 2005 ESD)</b>		
<b>Compound</b>	<b>Containment Level (ug/L)</b>	<b>Source</b>
Total petroleum hydrocarbons-	-	-
trans-1,2-Dichloroethene	10	California MCL
<b>trans-1,3-Dichloropropene</b>	<b>0.5</b>	<b>California MCL</b>
Trichloroethylene	5	Federal MCL
Trichlorofluoromethane	150	California MCL
Toluene	150	Federal MCL
Vinyl Chloride	0.5	California MCL
m,p-Xylene <sup>3</sup>	-	-
o-Xylene <sup>3</sup>	-	-
Xylenes, total	1,750	Federal MCL
<b>1,4-dioxane</b>	<b>1</b>	<b>State Notification Level</b>

<sup>1</sup> Value for the cis-isomer; value for trans-isomer is 10 ug/L

<sup>2</sup> These chemicals are trihalomethanes (THMs); the MCL listed is for all four THMs: chloroform, bromodichloromethane, dibromochloromethane, and bromoform.

<sup>3</sup> Value for total xylenes is 10,000 ug/L; no values are provided for individual isomers

- indicates "no MCL has been established or proposed."

(I) Drinking water equivalent level, U.S. EPA 2018 Edition of the Drinking Water Standards and Health Advisories Tables

C USEPA Primary MCL for Drinking Water

**Changes from 2005 ESD are highlighted in bold.**

Table 4  
Puente Valley Operable Unit  
Update 5 Administrative Record Index

Document ID	Document Date	Title	Author	Addressee
40106	9/1/1998	Interim record of decision (ROD), Puente Valley OU, v1 & 2 (OU 01, ROD completion, sequence 001, action date 9/30/98)	R09: (Environmental Protection Agency - Region 9)	
2069134	6/14/2005	Explanation of significant differences (ESD) to 1998 interim record of decision (ROD), w/attchs	R09: Adams, Elizabeth (Environmental Protection Agency - Region 9)	
100021156	8/19/2011	Map: Location map, former Benchmark facility (attch 3, PVOU South of Puente Creek Remedy UAO), 1 in= 1500 ft		
1128425	9/13/2011	Administrative order for RD/RA, docket #2011-14, Puente Valley OU - attch 4, SOW, shallow zone south of Puente Creek (attch only)	R09: Salyer, Kathleen (Environmental Protection Agency - Region 9)	R09: (Northrop Grumman Systems Corp)
1128426	9/13/2011	Administrative order for RD/RA, docket #2011-14, Puente Valley OU, w/o attchs	R09: Salyer, Kathleen (Environmental Protection Agency - Region 9)	R09: (Northrop Grumman Systems Corp)
100021160	11/15/2013	Map: Baseline monitoring well locations, Puente Valley OU (North of Puente Creek), 1 in = 2000 ft	R09: (Tetra Tech, Inc)	
100021220	6/24/2014	Ltr: Amended comments to Section 28(e) permit for new San Gabriel Well 24C & planned protection of drinking water source areas (deep zone), w/o attch (Watermaster staff rpt for well B24C)	R09: Chavira, Raymond (Environmental Protection Agency - Region 9)	R09: Zampello, Tony (San Gabriel Basin Water Quality Authority)
100021158	9/22/2014	Memo: Evaluations of baseline sampling, Puente Valley OU, Shallow Zone North of Puente Creek, w/attchs 1 & 2	R09: Abrahams, Jennifer (Tetra Tech, Inc)	R09: Chavira, Raymond (Environmental Protection Agency - Region 9)
100021146	8/14/2015	Conceptual site model, SZ South (Zone) & IZ Intermediate (Zone), Puente Valley OU, w/TL to R Chavira fr K Rohwer & appendices A-G	R09: (Geosyntec Consultants, Inc)	R09: (Northrop Grumman Systems Corp)
1163908	9/29/2016	2nd 5-year review rpt, w/apps A-F	R09: (US Army Corps of Engineers - Seattle District)	R09: (Environmental Protection Agency - Region 9)
100021157	5/8/2017	Ltr: Request for ARARs for disposal of treated water, Puente Valley OU, w/o attchs	R09: Chavira, Raymond (Environmental Protection Agency - Region 9)	R09: Unger, Samuel (CA Regional Water Quality Control Board - Los Angeles Region)
100021164	6/26/2017	Map: Shallow Zone composite VOC plume 2011-2015, PVOU, 17 x 11 in, 1 in = 1500 ft	R09: (C B & I)	R09: (Environmental Protection Agency - Region 9)

Document ID	Document Date	Title	Author	Addressee
100021162	6/29/2017	Ltr: Request for potential ARARs for disposal of treated groundwater, Puente Valley OU, w/encls & attchs	R09: Unger, Samuel (CA Regional Water Quality Control Board - Los Angeles Region)	R09: Chavira, Raymond (Environmental Protection Agency - Region 9)
100021147	5/31/2018	2nd revised final design rpt, PV OU intermediate zone interim remedy, w/appendices A-P	R09: (Geosyntec Consultants, Inc)	R09: (Northrop Grumman Systems Corp)
100021222	5/31/2018	Ltr: Approval of 2nd revised final design rpt for Intermediate Zone interim remedy, Puente Valley OU	R09: Chavira, Raymond (Environmental Protection Agency - Region 9)	R09: L'esperance, James (Northrop Grumman Corp)
100021226	5/31/2018	Email: No further questions or comments re Puente Valley OU IZ (Intermediate Zone) interim remedy 2nd revised final design rpt response to comments & replacement parts, w/history	R09: Kim, Terrence (CA Regional Water Quality Control Board)	R09: Chavira, Raymond (Environmental Protection Agency - Region 9), R09: L'esperance, James (Northrop Grumman Corp)
100021227	6/8/2018	Email: Response to minor comments received 5/31/18 on Puente Valley OU IZ (Intermediate Zone) interim remedy 2nd revised final design rpt, w/history	R09: L'esperance, James (Northrop Grumman Corp)	R09: Chavira, Raymond (Environmental Protection Agency - Region 9)
100021225	9/1/2018	Fact Sheet: Construction of new groundwater treatment system in Puente Valley (English & Spanish)	R09: (Environmental Protection Agency - Region 9)	
100021166	9/11/2018	Ltr: Request for review of ARARs for reinjection of treated groundwater, w/attch (Discharge limits for reinjection, PVOU Shallow Zone Interim Remedy)	R09: Chavira, Raymond (Environmental Protection Agency - Region 9)	R09: Smith, Deborah (CA Regional Water Quality Control Board - Los Angeles Region)
100016371	11/1/2018	Community involvement plan (CIP) for San Gabriel Valley Area 4 (Puente Valley OU), w/appendices	R09: (Environmental Protection Agency - Region 9)	
100021165	11/13/2018	Email: Responses to questions on your monitoring & constituent concentration limit tables, Puente Valley OU (shallow zone), w/history, w/o attchs	R09: Chavira, Raymond (Environmental Protection Agency - Region 9)	R09: Raftery, Peter (CA Regional Water Quality Control Board - Los Angeles Region)

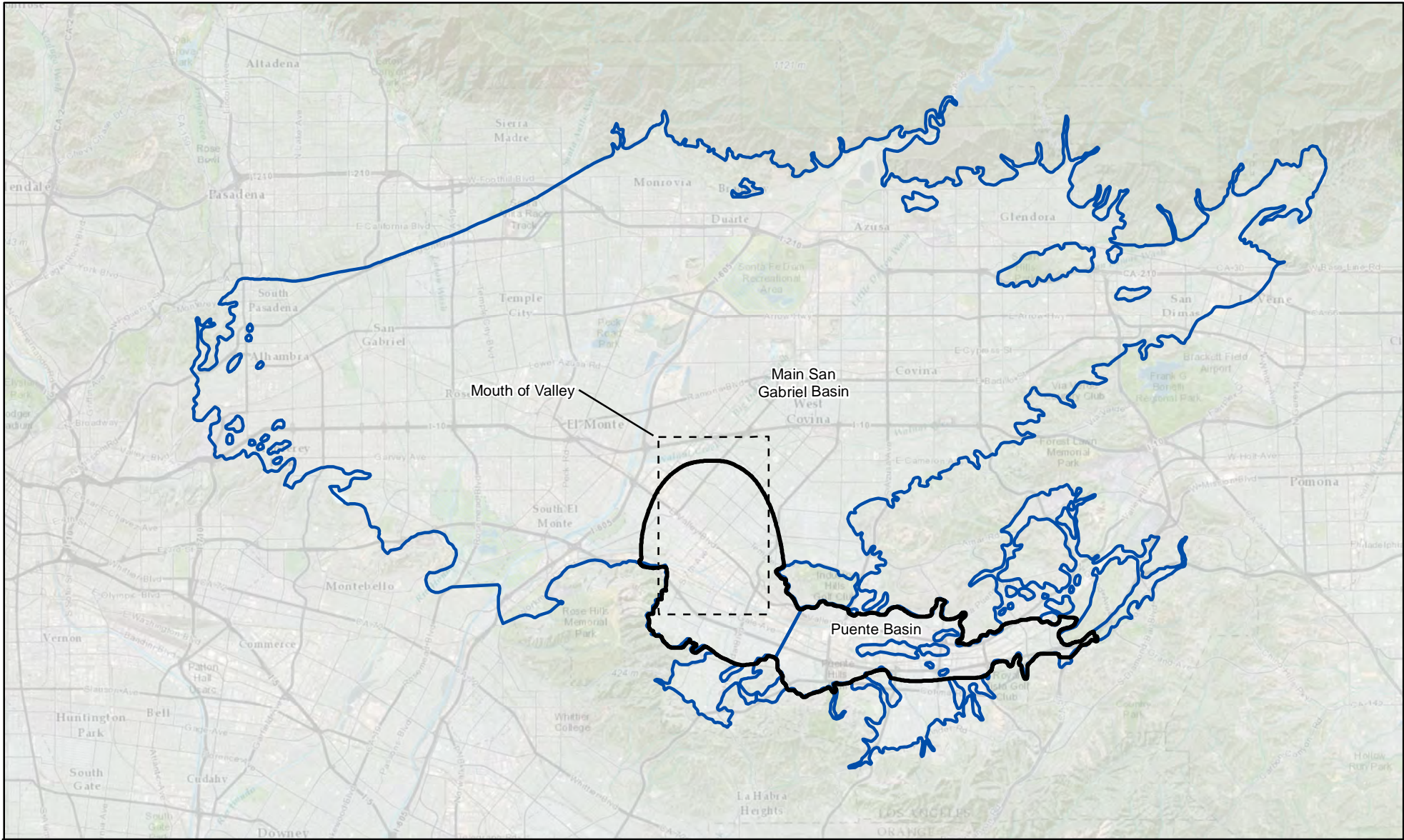
Document ID	Document Date	Title	Author	Addressee
100021163	1/29/2019	Ltr: Concurrence with proposed concentration limits for reinjection of treated groundwater into shallow zone, based on existing potential ARARs - Puente Valley OU	R09: Smith, Deborah (CA Regional Water Quality Control Board - Los Angeles Region)	R09: Chavira, Raymond (Environmental Protection Agency - Region 9)
100019790	3/8/2019	Joint motion to amend consent decree (CD), Case #2:05-CV-06022-ABC-FMO, USA v Carrier Corp	R09: Feldman, Elise (US Dept of Justice)	
100019789	3/14/2019	Joint motion for modification of consent decree (CD), Case #2:05-CV-06022-ABC-FMO, USA v Carrier Corp	R09: Phillips, Virginia (US District Court - Central District of California)	
100021219	6/27/2019	Ltr: EPA approval of revised RD workplan, Puente Valley OU, Shallow Zone North of Puente Creek	R09: Chavira, Raymond (Environmental Protection Agency - Region 9)	R09: Barquest, Bradley (United Technologies Corp)
100021224	6/27/2019	Revised RD workplan, Puente Valley OU Shallow Zone, North of Puente Creek, w/appendices A-D	R09: (AECOM Technical Services, Inc)	R09: (United Technologies Corp)
100021159	10/31/2019	Discharge options study rpt, Puente Valley OU Shallow Zone North of Puente Creek, w/appendices A-G	R09: Parsons, Scott (AECOM)	R09: (United Technologies/Carrier Corp)
100021151	1/1/2020	2019 comprehensive groundwater monitoring rpt, Mouth of Valley Shallow Zone (SZ) South of Puente Creek, PV OU (SZ South interim remedy), w/TL to R Chavira fr J L'Esperance 1/17/20 & appendices A-I	R09: (Groundwater & Environmental Services, Inc)	R09: (Northrop Grumman Systems Corp)
100021149	1/10/2020	Groundwater monitoring rpt, Intermediate Zone, Puente Valley, Sep/Oct 2019, w/appendices A-I	R09: (Groundwater & Environmental Services, Inc)	R09: (Northrop Grumman Systems Corp)
100021155	2/7/2020	2019 annual comprehensive groundwater monitoring rpt, Puente Valley OU, Shallow Zone North of Puente Creek, w/appendices A-D	R09: (AECOM)	R09: (Carrier Corp)
100021221	5/19/2020	Presentation: Puente Valley OU stakeholder meeting via Teams, 5/19/20	R09: Chavira, Raymond (Environmental Protection Agency - Region 9)	

Document ID	Document Date	Title	Author	Addressee
100021153	7/31/2020	Revised final design rpt - Puente Valley OU Shallow Zone (SZ) South interim remedy, w/TL to R Chavira fr J L'Esperance 8/3/20 & appendices A-Q	R09: (Geosyntec Consultants, Inc)	R09: (Northrop Grumman Systems Corp)
100021218	8/6/2020	Ltr: EPA approval of revised final design rpt for Puente Valley OU Shallow Zone South interim remedy, dated 7/31/20	R09: Chavira, Raymond (Environmental Protection Agency - Region 9)	R09: L'esperance, James (Northrop Grumman Corp)
100025279	9/1/2020	Drawing: Figure 1 - block flow diagram, Puente Valley OU, Shallow Zone South, City of Industry, CA, 11 x 17 in	R09: (Geosyntec Consultants, Inc)	
100025286	9/22/2020	Presentation: Puente Valley OU stakeholder meeting via Teams	R09: (Environmental Protection Agency - Region 9)	
100025280	10/5/2020	Revised remedial action workplan, Puente Valley OU, Shallow Zone South interim remedy, w/apps A-C	R09: (Geosyntec Consultants, Inc)	R09: (Northrop Grumman Systems Corp)
100025285	10/5/2020	Ltr: Informs of EPA approval of Revised RA Workplan, Puente Valley OU, Shallow Zone South interim remedy	R09: Chavira, Raymond (Environmental Protection Agency - Region 9)	R09: L'esperance, James (Northrop Grumman Corp)
100025281	10/23/2020	Memo: Transmits Puente Valley OU SZ-South interim remedy revised construction schedule, w/attchs	R09: L'esperance, James (Northrop Grumman Systems Corp)	R09: Chavira, Raymond (Environmental Protection Agency - Region 9)
100025282	1/1/2021	2020 comprehensive groundwater monitoring rpt, Intermediate Zone, Puente Valley OU, Sep/Oct 2020, w/TL to R Chavira fr J L'Esperance, 1/15/21, w/o apps A-I	R09: (Groundwater & Environmental Services, Inc)	R09: (Northrop Grumman Corp)
100025283	1/1/2021	2020 comprehensive groundwater monitoring rpt, Mouth of Valley Shallow Zone, Puente Valley OU, Sep/Oct 2020, w/TL to R Chavira fr J L'Esperance, 1/15/21, w/o apps A-I	R09: (Groundwater & Environmental Services, Inc)	R09: (Northrop Grumman Corp)
100025290	3/22/2021	2020 annual groundwater monitoring rpt, Puente Valley OU, Shallow Zone north of Puente Creek, Los Angeles County, CA, w/app A, w/o apps B-J	R09: (AECOM)	R09: (Carrier Corp)
100025287	3/23/2021	Presentation: Puente Valley OU stakeholder meeting via Teams	R09: (Environmental Protection Agency - Region 9)	

Document ID	Document Date	Title	Author	Addressee
100025288	4/29/2021	Email: Documents minor design update on stormwater drainage system for SZ-South interim remedy following 8/4/20 revised final design rpt	R09: L'esperance, James (Northrop Grumman Corp)	R09: Perina, Tomas (C H 2 M Hill, Inc)
100023871	5/1/2021	Fact Sheet: San Gabriel Valley All Site Update (English)	R09: (Environmental Protection Agency - Region 9)	
100025363	7/29/2021	Ltr: Request for review of 1998 interim ROD remedy, PVOU Shallow Zone North	R09: Brimo, Stella (Carrier Corp)	R09: Chavira, Raymond (Environmental Protection Agency - Region 9)
100025360	9/13/2021	Fact Sheet: EPA proposes changes to cleanup plan for Puente Valley (Sep 2021)	R09: (Environmental Protection Agency - Region 9)	
100025361	9/13/2021	Fact Sheet: EPA proposes changes to cleanup plan for Puente Valley (Sep 2021) (Spanish)	R09: (Environmental Protection Agency - Region 9)	
100025359	9/15/2021	Draft Explanation of Significant Differences to 1998 interim ROD, as modified by 2005 ESD, Puente Valley OU, w/attch 1	R09: (Environmental Protection Agency - Region 9)	

## **Attachment 2**

**CSM Tables/Figures**



**Legend**

- San Gabriel Basin
- Puente Valley Operable Unit
- Mouth of Valley Extent

**Notes**  
 Source: EPA San Gabriel Valley Groundwater Cleanup Superfund Progress Report, January 2014  
 OU = Operable Unit  
 MOV= Mouth of Valley



**San Gabriel Basin**  
 Conceptual Site Model Report  
 Puente Valley, California

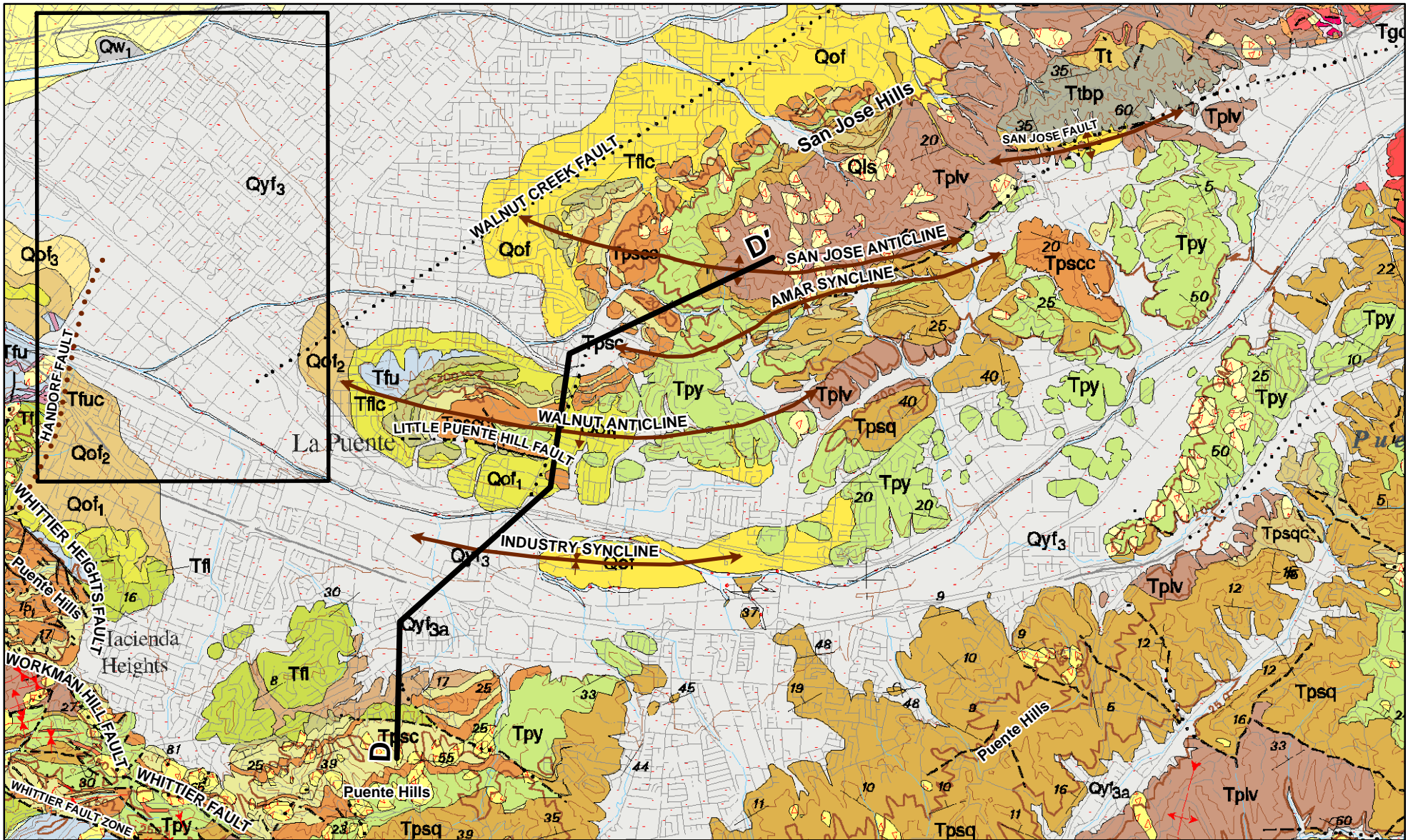
**Geosyntec**  
 consultants

**Figure**  
**1-2**

WR1585B

August 2015





**Legend**

**Geological Features**

- ↔ Anticline
- ↔ Syncline

- Yeats (2004)
- Fault Yeats (2004)

Notes  
Adapted From USGS Geologic Map of the San Bernardino and Santa Ana 30' x 60' quadrangles (Morton and Miller 2006).  
See Figure 3-2 for legend of geologic unit.

**Morton and Miller (2006)**

- Fault Location
- - - - - Approximate Fault Location
- Inferred Fault Location

D — D' Cross-Section (Yeats 2004)

□ MOV Area

⊥ Strike and Dip



**Geologic Map of PVOU**

Conceptual Site Model Report  
Puente Valley Operable Unit

**Geosyntec**  
consultants

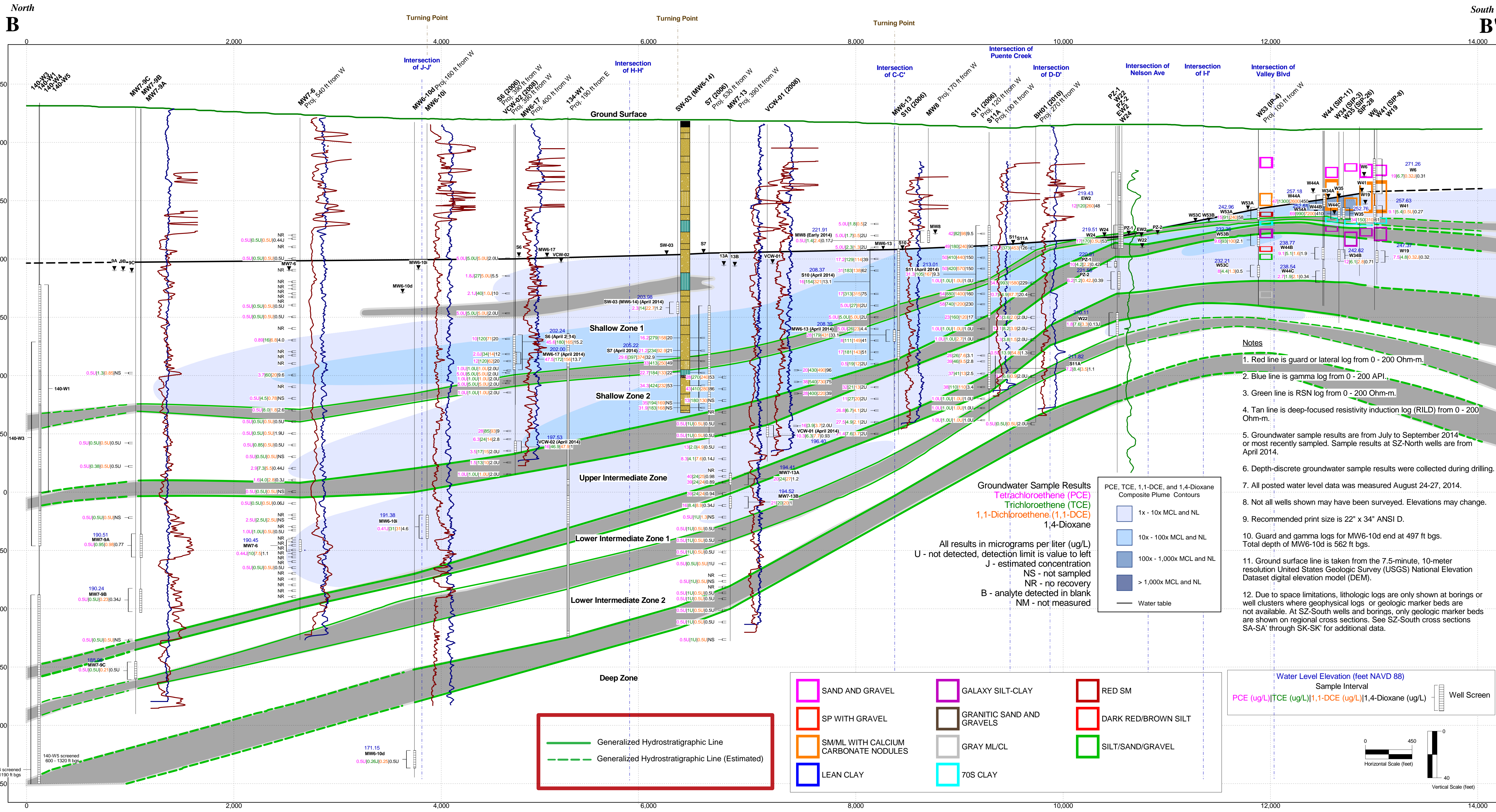
WR1585D

July 2015

**Figure**

**3-1**





- Notes**
1. Red line is guard or lateral log from 0 - 200 Ohm-m.
  2. Blue line is gamma log from 0 - 200 API.
  3. Green line is RSN log from 0 - 200 Ohm-m.
  4. Tan line is deep-focused resistivity induction log (RILD) from 0 - 200 Ohm-m.
  5. Groundwater sample results are from July to September 2014 or most recently sampled. Sample results at SZ-North wells are from April 2014.
  6. Depth-discrete groundwater sample results were collected during drilling.
  7. All posted water level data was measured August 24-27, 2014.
  8. Not all wells shown may have been surveyed. Elevations may change.
  9. Recommended print size is 22" x 34" ANSI D.
  10. Guard and gamma logs for MW6-10d end at 497 ft bgs. Total depth of MW6-10d is 562 ft bgs.
  11. Ground surface line is taken from the 7.5-minute, 10-meter resolution United States Geologic Survey (USGS) National Elevation Dataset digital elevation model (DEM).
  12. Due to space limitations, lithologic logs are only shown at borings or well clusters where geophysical logs or geologic marker beds are not available. At SZ-South wells and borings, only geologic marker beds are shown on regional cross sections. See SZ-South cross sections SA-SA' through SK-SK' for additional data.

**Groundwater Sample Results**  
 Tetrachloroethene (PCE)  
 Trichloroethene (TCE)  
 1,1-Dichloroethene (1,1-DCE)  
 1,4-Dioxane

All results in micrograms per liter (ug/L)  
 U - not detected, detection limit is value to left  
 J - estimated concentration  
 NS - not sampled  
 NR - no recovery  
 B - analyte detected in blank  
 NM - not measured

**Composite Plume Contours**

- 1x - 10x MCL and NL
- 10x - 100x MCL and NL
- 100x - 1,000x MCL and NL
- > 1,000x MCL and NL

Water table

**Geological Legend**

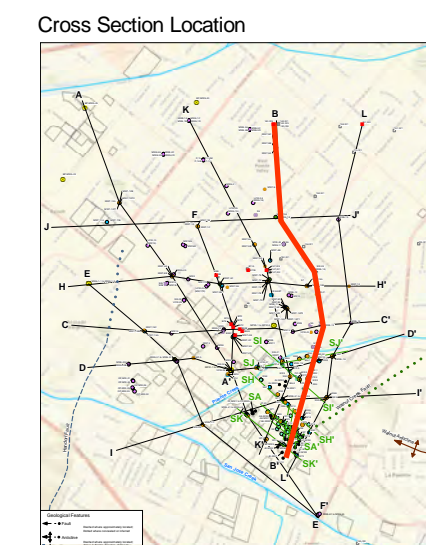
- SAND AND GRAVEL
- SP WITH GRAVEL
- SM/ML WITH CALCIUM CARBONATE NODULES
- LEAN CLAY
- GALAXY SILT-CLAY
- GRANITIC SAND AND GRAVELS
- GRAY ML/CL
- 70S CLAY
- RED SM
- DARK RED/BROWN SILT
- SILT/SAND/GRAVEL

**Water Level Elevation (feet NAVD 88)**  
 Sample Interval

PCE (ug/L) | TCE (ug/L) | 1,1-DCE (ug/L) | 1,4-Dioxane (ug/L)

Well Screen

Horizontal Scale (feet): 0 to 450  
 Vertical Scale (feet): 0 to 40



USCS Low Plasticity Clay (CL)	USCS Silty Gravel (GM)	USCS Poorly-graded Sand with Silt (SP-SM)	Asphalt (ASPHALT)	USCS Well-graded Sand with Silt (SW-SM)	USCS Silty Sand and Silty Clay (SM-SC)	USCS Silty Sand and Silt (SM-ML)
USCS Poorly-graded Sand (SP)	USCS Well-graded Sand (SW)	USCS Elastic Silt (MH)	USCS Poorly-Graded Sand and Gravel (SP-GP)	USCS Clayey Gravel (GC)	USCS Poorly-graded Gravel with Silt (GP-GM)	USCS Silty Sand (SM-SP)
USCS Silty Sand (SM)	USCS Clayey Sand (SC)	USCS Well-graded Gravel with Silt (GW-GM)	USCS Well-graded Gravel (GW)	USCS Silty Sand and Well Graded Sand (SM-SW)	USCS Well-graded Sand with Clay (SW-SC)	
USCS Silt (ML)	USCS Poorly-graded Gravel (GP)	USCS High Plasticity Clay (CH)	USCS Low Plasticity Clayey Silt (ML-CL)	USCS Poorly-graded Sand with Clay (SP-SC)	USCS Clay and Clayey Sand (CL-SC)	

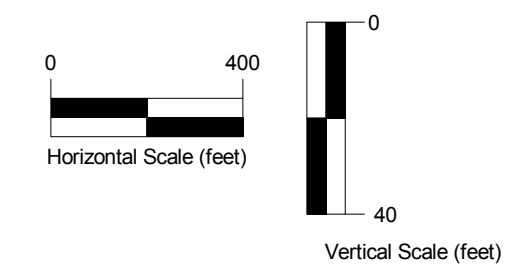
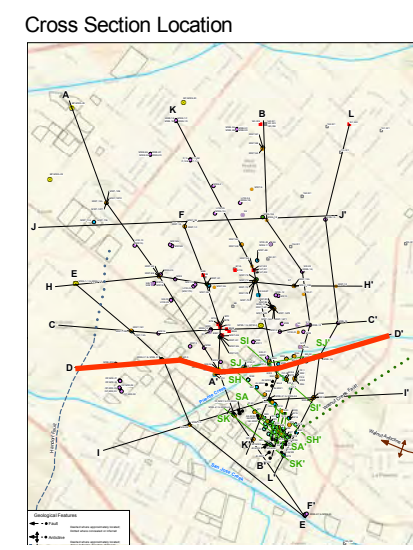
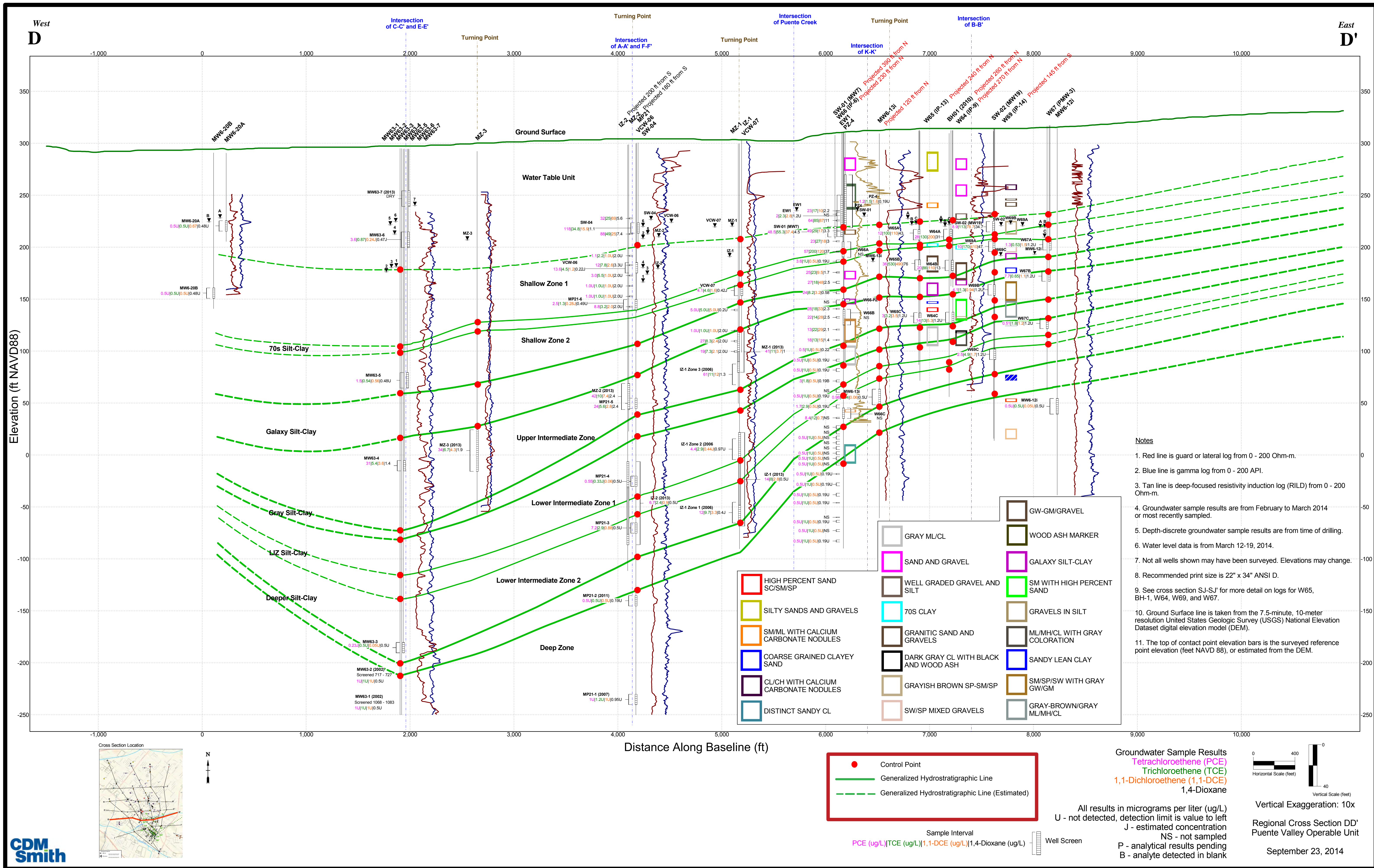
**Composite Isoconcentration Contours**  
 Cross Section B-B'  
 Conceptual Site Model Report  
 Puente Valley, California

**Geosyntec** consultants

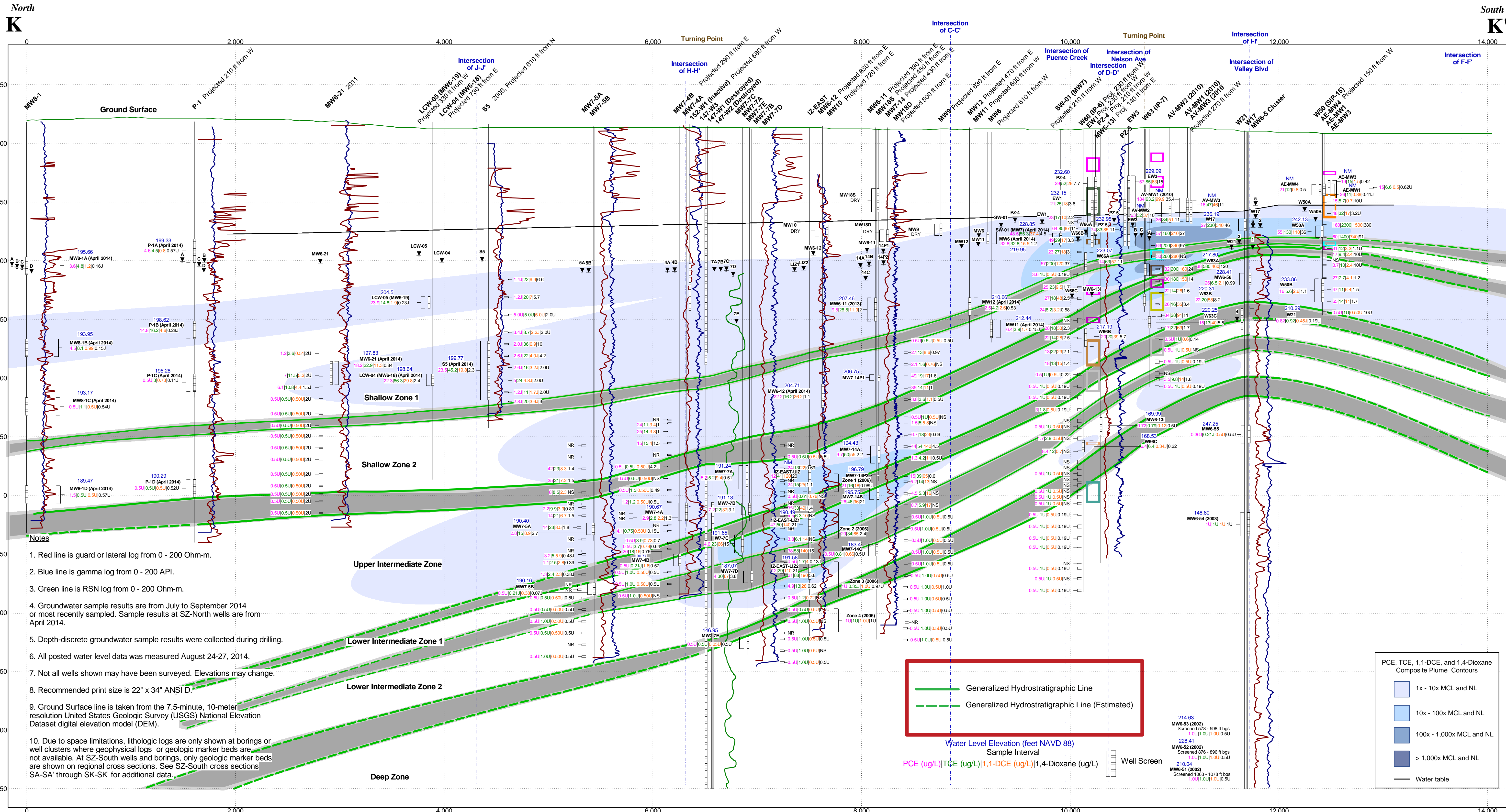
Vertical Exaggeration: 11.5x  
 Composite Plume Contours  
 Regional Cross Section B-B'  
 Puente Valley Operable Unit  
 November 7, 2014

WR1916B July 2015 **Figure 4-7**









- Notes
1. Red line is guard or lateral log from 0 - 200 Ohm-m.
  2. Blue line is gamma log from 0 - 200 API.
  3. Green line is RSN log from 0 - 200 Ohm-m.
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  10. Due to space limitations, lithologic logs are only shown at borings or well clusters where geophysical logs or geologic marker beds are not available. At SZ-South wells and borings, only geologic marker beds are shown on regional cross sections. See SZ-South cross sections SA-SA' through SK-SK' for additional data.

**Groundwater Sample Results**

Tetrachloroethene (PCE)  
Trichloroethene (TCE)  
1,1-Dichloroethene (1,1-DCE)  
1,4-Dioxane

All results in micrograms per liter (ug/L)  
U - not detected above laboratory reporting limit shown to left  
J - estimated concentration  
NS - not sampled  
NR - no recovery  
B - analyte detected in laboratory blank  
NM - not measured

Vertical Exaggeration: 11.5x

Regional Cross Section K-K'  
Puente Valley Operable Unit

October 29, 2014

	SAND AND GRAVEL		SP/SP-SM/SM/ORANGE		SM/ML WITH CALCIUM CARBONATE NODULES		RED SM
	THICK SM/SP-SM/SP		GRAY ML/CL		70S CLAY		GRANITIC SAND AND GRAVELS
	MIXED GRAVEL WITH SAND AND SILT		LARGE CACO3 CEMENTED SAND NODULES		DARK RED/BROWN SILT		SILTY SANDS AND GRAVELS
	GALAXY SILT-CLAY		CH/CL/MH		SILT/SAND/GRAVEL		

**Composite Isoconcentration Contours**  
Cross Section K-K'  
Conceptual Site Model Report  
Puente Valley, California

**Geosyntec**  
consultants

**Figure 4-8**

WR1916B July 2015



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