

25 Edelman Irvine CA 92618 949.420.3030 phone 530.756.5991 fax westyost.com

Semi-Annual Plume Status Report

Chino Airport Plumes April 2025

CONTAMINANTS

San Bernardino County Department of Airports (County) identifies four primary volatile organic compound (VOC) contaminants associated with the Chino Airport groundwater plumes: trichloroethene (TCE), 1,2,3-trichloropropane (1,2,3-TCP), cis-1,2-dichloroethene (cis-1,2-DCE), and 1,2-dichloroethane (1,2-DCA) with TCE and 1,2,3-TCP being the most frequently detected contaminants at the highest concentrations. For each of the four primary contaminants, the table below lists the California maximum contaminant level (MCL) and the maximum concentrations detected in groundwater samples from wells within the plumes over the last five years.

Table 1. Maximum Concentration of Contaminants of Concern between January 2020 to December2024				
Contaminant	MCL, micrograms per liter (µgl)	Max Concentration, μgl	Sample Date	Well
TCE	5	860	April 2023	CAMW30
1,2,3-TCP	0.005	39	November 2024	CAMW75
cis-1,2-DCE	6	1,300	November 2024	CAMW73
1,2- DCA	0.5	6.2	November 2024	CAMW75

Secondary contaminants of concern include 1,1-dichloroethene (1,1-DCE), carbon tetrachloride, 1,4-dioxane, tert-butyl alcohol (TBA), and 1,4-dichlorobenzene.

LOCATION

The Chino Airport is located in the southwestern portion of the Chino Basin within the City of Chino. Exhibit 1 shows the spatial extent of the TCE and 1,2,3-TCP plumes in groundwater, as delineated by both the Chino Basin Watermaster (Watermaster) for the 2022 State of the Basin Report and the County for their Semiannual Groundwater Monitoring Report – Winter and Spring 2024.^{1,2} The delineations prepared

¹ West Yost. (2023). *Optimum Basin Management Program – 2022 State of the Basin Report*. Prepared for the Chino Basin Watermaster. June 2023.

² Tetra Tech. (2025). *Semiannual Groundwater Monitoring Report-Winter and Spring 2024*. Prepared for San Bernardino County Department of Airports. January 2025.

by Watermaster show the spatial extent of the plumes with detectable concentrations of TCE and 1,2,3-TCP based on the five-year maximum concentrations measured over the period of July 2017 to June 2022. The delineations by the County show the area where TCE concentrations are greater than or equal to the MCL of 5 micrograms per liter (μ gl), and where 1,2,3-TCP concentrations are greater than or equal to the MCL of 0.005 μ gl, based on concentrations measured during the 2024 winter and spring sampling events and data provided by Chino Basin Desalter Authority (CDA) for the desalter wells within the plumes.

The County characterizes West and East plumes, originating from two different main source areas at the Chino Airport. TCE and 1,2,3-TCP concentrations are higher within the West plumes than the East plumes, and the extent of the West plumes are also longer. The West and East TCE plumes have been interpreted as comingling within the airport boundaries since 2017. The West and East 1,2,3-TCP plumes were shown to be comingled within the airport property for the first time in 2021.

TCE and 1,2,3-TCP Plumes

The extent of the West TCE Plume with detectable TCE concentrations greater than 0.5 µgl is about 2.5 miles long. The plume extends south-southwest approximately two miles from the source area to just north of Pine Avenue and then turns southeast extending another 0.6 miles in this direction terminating south of Pine Avenue. The change in direction of the plume in this area may be associated with the location of the Central Avenue Fault that forms a local groundwater barrier and historical pumping at irrigation wells. The source of the smaller East TCE Plume is approximately 1,500 feet northeast of the source of the West TCE Plume. The East TCE Plume comingles with the West TCE Plume on the airport property and extends southeast from the source area about 0.8 miles towards CDA well I-20. The known lateral extent of TCE at concentrations above the MCL covers an area of approximately 778 acres.

The extent of the West 1,2,3-TCP Plume with detectable 1,2,3-TCP concentrations greater than 0.005 µgl follows the same general path as the West TCE Plume and extends about 2.9 miles southwest past Pine Avenue, turning southeast for approximately 0.6 miles just east of Euclid Avenue. The smaller East 1,2,3-TCP Plume is approximately 0.7 miles lengthwise trending south and comingles with the West 1,2,3-TCP Plume on airport property. The known lateral extent of 1,2,3-TCP in groundwater above the MCL currently covers an area of approximately 1,692 acres.

Over time, the vertical and lateral extents of the plumes have changed in response to groundwater production at nearby wells and other hydrological factors. Since monitoring began, groundwater production at CDA wells I-1, I-2, and I-3 has increased the vertical thickness of the West Plumes by more than 100 feet, and the pumping from the Chino II desalter wells east of the Airport and CDA wells I-20 and I-21 has drawn the East plumes laterally in a southeast direction. Additionally, detections of 1,2,3-TCP in 2022 indicated that the low concentration portion of the 1,2,3-TCP plume south of Pine Avenue may exist further to the south, compared to earlier interpretation.

REGULATORY ORDERS

- Cleanup and Abatement Order (CAO) No. 90-134 for the County of San Bernardino Department of Airports, Chino Airport—Issued to the County to address the groundwater contamination originating from the Chino Airport.
- CAO No. R8-2008-0064 for the San Bernardino County Department of Airports, Chino Airport—Required the County to define the lateral and vertical extent of the plume offsite from the Chino Airport and prepare a remedial action plan (RAP).

> • CAO No. R8-2017-0011 for the San Bernardino County Department of Airports, Chino Airport—Required the County to respond to Santa Ana Regional Water Quality Control Board (Santa Ana Water Board) comments on the draft Feasibility Study and submit a final Feasibility Study. Additionally, it required the County to submit a final RAP within 60 days of the Santa Ana Water Board approval of the Final Feasibility Study and implement the RAP.

REGULATORY AND MONITORING HISTORY

In 1990, the Santa Ana Water Board issued CAO No. 90-134 to address groundwater contamination originating from the Chino Airport. From 1991 to 1992, ten inactive underground storage tanks and 310 containers of hazardous waste were removed, and 81 soil borings were drilled and sampled on the Chino Airport property. From 2003 to 2005, nine onsite monitoring wells were installed and used to collect groundwater quality samples. In 2007, the County conducted its first offsite groundwater characterization effort, which included 22 cone penetrometer tests (CPT) and direct push borings from which water quality samples were collected. In 2008, the Santa Ana Water Board issued CAO No. R8-2008-0064, requiring the County to define the lateral and vertical extent of the plume offsite and to prepare a RAP. From 2009 to 2012, 33 offsite monitoring wells were installed at 15 locations to characterize the extent of the contamination downgradient from the Chino Airport property. From 2013 to 2014, the County conducted an extensive investigation of 20 areas of concern identified for additional characterization of the soil and groundwater contamination associated with the Chino Airport. The investigative work included: piezocone-penetrometer tests, vertical-aquifer-profiling (VAP) borings with depth-discrete groundwater sampling, soil-gas probe sampling, high-resolution soil sampling and analysis, real-time data analysis, and three-dimensional contaminant distribution modeling. Following the completion of this investigative work, from September 2014 through February 2015, an additional 33 groundwater monitoring wells were installed in 17 locations on and adjacent to the Chino Airport property.

The County completed a draft feasibility study in August 2016 that identified remedial action objectives for groundwater contaminants originating from the Chino Airport and evaluated potential remediation alternatives for mitigation.³ On January 11, 2017, the Santa Ana Water Board issued CAO R8-2017-0011 to the County, which superseded CAO R8-2008-0064. The order required that the County: (1) submit a final feasibility study within 60 days of receiving the Santa Ana Water Board's comments on the draft feasibility study, (2) submit a final RAP within 60 days of the Santa Ana Water Board approval of the final feasibility study, (3) implement the RAP in accordance with a Santa Ana Water Board-approved schedule, and (4) prepare and submit technical reports and work plans as the Santa Ana Water Board deems necessary. The County submitted the final feasibility study on May 15, 2017.⁴ The feasibility study identified a groundwater pump-and-treat system as the preferred remedial action to provide hydraulic containment and cleanup of both the West and the East Plumes. The Santa Ana Water Board approved the final feasibility study on June 7, 2017, and requested that a RAP be prepared.

³ Tetra Tech. (2016). *Draft Feasibility Study Chino Airport San Bernardino County, California*. Prepared for San Bernardino County Department of Airports. August 2016.

⁴ Tetra Tech. (2017). *Final Feasibility Study Chino Airport San Bernardino County, California*. Prepared for San Bernardino County Department of Airports. May 2017.

On December 18, 2017, the County submitted a draft interim remedial action plan (IRAP).⁵ The IRAP was considered "interim" because the County is moving forward on an interim basis to initiate the remedial action as soon as possible, with the opportunity to evaluate and modify the remedy in the future. The draft IRAP identified a combination of institutional controls, monitored natural attenuation, and groundwater extraction and ex-situ treatment as the best remedial alternative. From April 2018 to January 2019 a CEQA analysis was completed for the proposed remedial strategy.⁶ During this time, the Santa Ana Water Board and County went through a series of comments and response to comments on the draft IRAP. Modifications were made to the draft IRAP and the Final IRAP was submitted to the Santa Ana Water Board on May 18, 2020.⁷ The Final IRAP was approved by the Santa Ana Water Board on November 4, 2020.

In April and May 2020, the County installed a cluster of three downgradient wells to monitor the increasing concentrations of TCE in wells located along the southeastern plume boundary. While the County was reviewing and finalizing the IRAP, they were simultaneously working on a Human Health and Screening Ecological Risk Assessment (HHERA) to support to the IRAP by identifying remedial actions to protect human health and the environment.⁸ A draft of the HHERA was submitted to the Santa Ana Water Board for review in August 2018. The Santa Ana Water Board and the Office of Environmental Health Hazard Assessment reviewed the report and identified several data gaps. The Santa Ana Water Board requested that the County produce a work plan to address these data gaps, including additional shallow soil and soil gas sampling to evaluate the potential presence of VOCs and other contaminants. In July 2021, the Santa Ana Water Board approved the HHERA Data Gap Workplan and in September 2021, the results of the investigation were published in The Supplemental Vapor Intrusion and Shallow Soil Investigation Report.^{9,10} The report concluded that no further investigation of shallow soils or soil gas was needed in several of the areas investigated, two of the areas investigated may require land-use controls, and one area will require additional investigation. In March, 2023, the Santa Ana Water Board approved the Work Plan for Focused Supplemental Investigation at Areas of Concern EE, HH, and J/K to perform vapor, soil, soil gas, and groundwater sampling at the additional locations identified.¹¹ In January 2024, the Santa Ana Water Board approved the Final Work Plan Addendum for Focused Supplemental Investigation at Areas of Concern EE, HH, and J/K as a follow-on to the 2023 work plan.¹² In June 2024, the County submitted the

⁵ Tetra Tech. (2017). *Draft Interim Remedial Action Plan Chino Airport, San Bernardino County, California*. Prepared for San Bernardino County Department of Airports. December 2017.

⁶ Filing of the Notice of Determination for the Mitigated Negative Declaration was completed on January 29, 2019.

⁷ Tetra Tech. (2020). *Final Interim Remedial Action Plan Chino Airport San Bernardino County, California*. Prepared for San Bernardino County Department of Airports. May 18, 2020.

⁸ Tetra Tech. (2018). *Human Health and Screening Ecological Risk Assessment Chino Airport San Bernardino County, California*. Prepared for San Bernardino County Department of Airports. August 8, 2018.

⁹ Tetra Tech. (2021). Final Work Plan for Supplemental Data Collection for Vapor Intrusion and Shallow Soil, Chino Airport, San Bernardino County, California. Prepared for San Bernardino County Department of Airports. April 9, 2021.

¹⁰ Tetra Tech. (2021). *Supplemental Vapor Intrusion and Shallow Soil Investigation Report, Chino Airport, San Bernadino County, California*. Prepared for San Bernardino County Department of Airports. September 2021.

¹¹ Tetra Tech. (2023). Work Plan for Focused Supplemental Investigation at Areas of Concern EE, HH, and J/K, Chino Airport, San Bernadino County, California. Prepared for the California Regional Water Quality Control Board, Santa Ana Region. January 3, 2023.

¹² Tetra Tech. (2024). *Final Work Plan Addendum for Focused Supplemental Investigation at Areas of Concern EE, HH, and J/K, Chino Airport, San Bernardino County, California*. Prepared for the San Bernardino County Department of Airports. January 19, 2024.

preliminary results to the Santa Ana Water Board from the soil gas investigations performed pursuant to the work plan along with the preliminary plan for the next phase of work, including the construction of six new groundwater monitoring wells to monitor areas where high concentrations of contaminants of concern were detected in the vapor sampling. On July 19, 2024, the Santa Ana Water Board emailed the County to concur with these proposed additional locations for sampling groundwater at the Chino Airport.

REMEDIAL ACTION

As described in the IRAP, the remedial action for the TCE and 1,2,3-TCP plumes consist of a groundwater pump-and-treat system, institutional controls, and monitored natural attenuation. The groundwater pump-and-treat system includes a total of 22 wells located across ten extraction well sites (EW-1 through EW-10) both onsite and offsite, termed "County extraction wells." Due to the depth of the plumes, each extraction well site will consist of up to three individual wells to focus extraction at different depths. Exhibit 1 shows the location of the ten existing and proposed wells sites for County extraction wells. Once fully operational, the County extraction wells are predicted to produce 1,700 gallons per minute (gpm) of groundwater, with individual wells ranging from 20-200 gpm each. The pump-and-treat system also includes existing CDA wells I-16, I-17, and I-18 to pump up to an additional 500 gpm of groundwater; and potentially CDA wells I-20 and I-21 if treatment is required in the future.

Extracted groundwater will be conveyed via a pipeline network to the main raw water influent line to the existing CDA Chino-I Desalter facility, where it will be treated for VOCs (including 1,2,3-TCP and TCE) at a new granular activated carbon (GAC) treatment system constructed at the CDA's existing Chino-I Desalter facility (South GAC system). The South GAC system is designed to treat a maximum flow rate of 2,400 gpm from the County extraction wells and CDA wells I-16, I-17, I-18, with an initial operating flow rate of 2,325 gpm and may be expanded for CDA wells I-20 and I-21. Once treated at the South GAC system, water will be conveyed to the existing Chino-I Desalter that uses reverse osmosis and ion exchange to treat for total dissolved solids (TDS) and nitrates, both of which are regional contaminants and not associated with Chino Airport operations or plumes. Treated water will be discharged for use as potable municipal water supply. An additional treatment system, the North GAC Treatment System, was also constructed by the CDA to treat water from four CDA wells (I-I through I-4) that produce from the lower aquifer; however, this system is not associated with the County's remedial action.

To assist in the design of the groundwater pump-and-treat system, the County installed two of the extraction well sites (EW-2 and EW-5) in 2018, along with twelve piezometers and eleven monitoring wells, and conducted aquifer pumping tests at these locations. The findings were submitted to the Santa Ana Water Board on June 19, 2019, and used by the County to refine the system design.¹³ On December 8, 2021, the County submitted the *Final Preliminary Well Design Report* for the pump-and-treat system for remediation of the plumes and began working on a remedial action work plan (RAWP) to provide a detailed description of the remediation and construction activities associated with the implementation of the remedial action, including the construction and installation of the extraction wells, pipelines for

¹³ Tetra Tech. (2019). *Well Installation, Well Destruction, and Aquifer Pumping Test Report, Chino Airport, San Bernardino County, California*. Prepared for San Bernardino County Department of Airports. June 19, 2019.

conveyance of extracted groundwater, and the groundwater treatment system.¹⁴ The 2022 RAWP was submitted to the Santa Ana Water Board on July 22, 2022 and approved in November 2024.¹⁵

The RAWP divides the construction of the pump-and-treat system into two phases: Phase 1 includes the construction of onsite extraction wells and conveyance piping, as well as five monitoring wells; and Phase 2 includes the construction of offsite extraction wells and conveyance piping. Phase 1 construction is almost completed which includes: five extraction wells at two well sites (EW-2 and EW-5) installed in 2018; five extraction wells at three well sites (EW-1, EW-3, and EW-4) installed in December 2023 along with their associated piezometers; and completion of the conveyance pipeline to connect the onsite wells to the South GAC System in July 2024. Well construction reports for all onsite extraction wells constructed in Phase 1 are available on GeoTracker. Phase 2 construction has not yet initiated. Because the 2022 RAWP only addresses Phase 1 construction, an addendum to the RAWP will be submitted for Phase 2 construction of the offsite extraction wells and the conveyance piping. This Phase 2 RAWP addendum is anticipated to be completed at the end of 2025.

The onsite County extraction wells constructed for Phase 1, along with the offsite County extraction wells to be constructed for Phase 2, will be operated, maintained, and monitored by CDA through a joint agreement between the County and CDA.

In April 2023, pumping began at CDA wells I-17 and I-18 and treatment of groundwater from these wells commenced at the South GAC System at Chino-I Desalter. Groundwater pumping and treatment has not yet commenced at the onsite County extraction wells, and it is anticipated that it will commence in the third quarter of 2025.

MONITORING AND REPORTING

The County conducts a groundwater monitoring program pursuant to CAO No. R8-2008-0064 to track the extent of the plume. Monitoring is performed per the 2023 *Sampling and Analysis Plan Update (SAP)*¹⁶ with the sampling frequency determined by well classification (i.e., background wells, horizontal or vertical extent wells, seasonal/increasing trend wells, and guard wells). Groundwater quality samples are collected quarterly, annually, or biennially at 96 site-related monitoring wells and four on-site agricultural wells to monitor the plume extents. Quarterly water-level monitoring is performed at the 96 site-related monitoring wells, ten extraction wells, fifteen onsite piezometers, and six riparian habitat area piezometers. All water quality data collected by the County are posted on the State Water Resources Control Board's GeoTracker website.¹⁷ Conclusions from the monitoring program can also be found in the semi-annual reports posted on GeoTracker. The most recent monitoring report, the *Semiannual*

¹⁴ Tetra Tech. (2021). *Final Preliminary Well Design Report, Chino Airport, San Bernardino County, California.* Prepared for San Bernardino County Department of Airports. December 8, 2021.

¹⁵ Tetra Tech. (2022). *Remedial Action Work Plan, Chino Airport, San Bernardino County, California.* Prepared for San Bernardino County Department of Airports. July 22, 2022.

¹⁶ Tetra Tech. (2023). *Sampling and Analysis Plan Update, Chino Airport, San Bernardino County, CA*. Prepared for San Bernardino County Department of Airports. May 5, 2023.

¹⁷ <u>https://geotracker.waterboards.ca.gov/profile_report?global_id=SL208634049</u>

Groundwater Monitoring Report-Winter and Spring 2024, was submitted to the Santa Ana Water Board on January 31, 2025.¹⁸

In June 2024, the County submitted a monitoring and reporting plan to the Santa Ana Water Board for the operation and performance monitoring of the Groundwater Extraction and Treatment System (GETS). Monitoring will be performed by both the County and CDA to evaluate the efficacy of the groundwater remediation program to permanently reduce concentrations of contaminants of concern in compliance with CAO R8-2017-0011. Monitoring of the GETS will be presented in quarterly Remedial Action Operation and Monitoring reports and the performance monitoring program will be reevaluated every five years and updated as needed. Because the Chino I Desalter facility is subject to the State Water Resources Control Board Division of Drinking Water (DDW) Process Memo 97-005 for groundwater that is considered an "extremely impaired source", the monitoring and reporting plan also includes the sampling and analysis of raw groundwater from the extraction wells in accordance with permit requirements. Per these requirements, the County, in cooperation with CDA, has been performing baseline water quality monitoring since fall 2021 to characterize the raw groundwater quality for treatment at the Chino-I Desalter facility. This data is submitted to the DDW for compliance as well as to the Santa Ana Water Board.

Watermaster also collects groundwater quality samples from private wells in the plume area and at its HCMP-4 monitoring well, located at the southern end of the plumes. Watermaster uses data from the County, CDA, and its own sampling to perform an independent characterization of the areal extent and concentration of the TCE and 1,2,3-TCP plumes.

RECENT ACTIVITY

The County has continued quarterly groundwater monitoring events through the first quarter of 2025. The most recent groundwater monitoring report prepared by the County was submitted to the Regional Board on January 31, 2025, for the winter and spring 2024 sampling events¹⁹. Concentrations of TCE, 1,2,3-TCP, and other contaminants of concern sampled during the winter and spring sampling events were consistent with previous monitoring results. TCE was detected above the MCL in 28 percent of wells and 1,2,3-TCP was detected above the MCL in 17 percent of the wells. Cis-1,2-DCE, 1,2-DCA, carbon tetrachloride, and 1,2-Dichlorobenzene were also detected above their respective MCLs. Water levels continued to decrease more in the deeper wells than in the shallow wells, indicating that influence from active production wells may be affecting water level drawdown and vertical gradients. Additionally, the onsite southeastern plume migration continued in 2024 and the east TCE and 1,2,3-TCP plumes continued to show increasing trends.

In August 2024, the County installed six new monitoring wells (CAMW 71-76) on the Airport property where high concentrations of contaminants of concern were detected in vapor sampling during the *Focused Supplemental Investigation at Areas of Concern EE, HH, and J/K.* Exhibit 1 shows the location of these new wells. Sampling at the new wells commenced during the Fall 2024 monitoring event during which CAMW73 had the highest cis-1,2-DCE concentration measured at a monitoring well in the last five years (from January 2020 to December 2024) and CAMW75 had the highest 1,2,3-TCP and 1,2-DCA

¹⁸ Tetra Tech. (2025). *Semiannual Groundwater Monitoring Report-Winter and Spring 2024*. Prepared for San Bernardino County Department of Airports. January 2025.

¹⁹ Tetra Tech. (2025). *Semiannual Groundwater Monitoring Report-Winter and Spring 2024*. Prepared for San Bernardino County Department of Airports. January 2025.

concentrations measured at a monitoring well in the last five years (from January 2020 to December 2024). These results show a newly identified potential source area beneath the northwestern portion of the airport property (Area of Concern HH). Further evaluation of these new wells will be completed after four quarters of monitoring have been completed and a report will be submitted to GeoTracker.

On January 15, 2025, the County provided the Santa Ana Water Board with results from the soil gas probe installations for the *Focused Supplemental Investigation at Areas of Concern EE, HH, and J/K*, along with a request to proceed with the next phase of the plan for vapor sampling at additional locations. On February 3, 2025, the Santa Ana Water Board emailed the County to concur with the proposed supplemental investigations. The contaminant distribution model will be updated with results and a report will be submitted to the Santa Ana Water Board upon completion of the investigation.

The County continues to work on the Phase 1 construction of the pump-and-treat system for the onsite portion of the system. The construction of the onsite extraction wells and raw water conveyance piping is complete. The remaining tasks include bringing electrical power to each well site by Southern California Edison, pressure testing and disinfection of the pipelines, installation of fiber optic cable and equipment, and final startup testing and sampling of each well site. Groundwater pumping and treatment has not yet commenced at the onsite County extraction wells, and it is anticipated that it will commence in the third quarter of 2025. The Phase 2 construction of the offsite County extraction wells is planned to commence in 2026.







Chino Airport *TCE and 1,2,3-TCP Plumes*

Exhibit 1





Prepared by:

0 1 Miles 0 1 2 **Chino Basin Watermaster** Semi-Annual Plume Report

Prepared for: