CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

TENTATIVE ORDER

RESCISSION OF SITE CLEANUP REQUIREMENTS ORDER NO. 00-010 for:

CHEVRON CHEMICAL COMPANY, PLANT SITE

for the property located at**:**

940 HENSLEY STREET
RICHMOND, CONTRA COSTA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (Water Board) finds that:

1. **Site Location and Description**: Chevron Chemical Company (hereafter the discharger) owns two facilities in Richmond about 20 miles northeast of San Francisco which formerly manufactured and distributed a variety of pesticides and fertilizers. A gasoline additive blending and packaging facility was also operated at the site. The facility consists of two separate areas. The first site (the Pond site) was a former Fertilizer Manufacturing Plant plus a system of ponds on the northwest side of Castro Street. The ponds were formerly used for evaporation of pesticide process wastewater, but are currently used to store nonhazardous storm water runoff. The second site, the Plant Site, is the former chemical processing area at 940 Hensley Street on the southeast side of Castro Street. The second area is the subject of this order. The attached map (Figure 1) shows the location of the Plant Site.

   Beginning in 1937, Chevron Chemical engaged in manufacturing and formulating of dry and liquid-based pesticides. While products and operations varied during the ensuing years, the major historical operations were grouped into three main manufacturing areas; (1) the Orthene Plant, located in the northwest corner of the site; (2) the Pesticide Plant located in the central portion of the site, and (3) the Polychem Gasoline Additives Manufacturing and Blending Plant located in the central and southern portions of the site (see Figure 2, Site Map). The Polychem Plant area was formerly used for the manufacture of a proprietary fungicide known as Captafol. The Castro Corridor lies immediately to the west of the Plant Site, between the Plant Site and Castro Street, and contains numerous railroad tracks and a low-lying marshy area adjacent to Castro Creek (see Figure 2).

   All chemical manufacturing activities at the site ended in 1997, and the Plant Site has since been converted into a multi-use complex for Chevron Companies in Richmond. Current site uses include the Chevron Training Center, the Chevron Environmental

Laboratory, warehousing for Chevron shipping, purchasing and stores, and maintenance, as well as storage of empty rail tank cars.

2. **Site Hydrogeology**: The Chevron Chemical Plant Site is located within an alluvial plain adjacent to a low- lying tidal flat in the Richmond Basin. Three water- bearing zones have been identified within 130 feet of ground surface at the Plant Site. These zones are continuous to varying degrees over the site and adjoining areas, and are of higher permeability than the intervening strata. The water-bearing zones are called, in order of increasing depth, the A-zone, the C-zone and the B-zone.

   Groundwater within the A-zone occurs in low permeability fill above the Bay Mud below a depth of about 5 feet and is considered non-potable because of its high salinity. The C-zone extends between depths of about 10 and 90 feet below grade and consists of an upper and lower alluvial sequence separated by near-shore estuarine deposits. In general, the upper 10 to 30 feet of alluvial soils consist of silty clay with occasional thin localized sandy lenses. The C-zone is also considered non-potable because of its high salinity. Below the C-zone, at a depth of 90-110 feet, a 20-foot-thick layer of estuarine clay is present. This clay unit acts as an aquitard between the C-zone and the deeper B-zone.

   The B-zone is encountered at depths ranging from 110 to 130 feet beneath the site. This thin water-bearing zone contains a higher proportion of alluvial sands and gravels compared to surrounding deposits. The B-zone is typically 5 to 15 feet thick and is overlain and underlain by alluvial and estuarine clays. The B-zone is considered the first fresh-water zone below the site. However, the B-zone groundwater quality degrades from east to west due to saltwater intrusion.

   In general, groundwater gradients in the three water-bearing zones slope in a westerly direction toward San Pablo Bay. The permeability and transitivity of all three zones are low, and none of the zones are capable of producing significant quantities of groundwater on a sustained yield basis. Chevron Chemical has calculated the rate of groundwater flow to range from 4 to 40 feet per year horizontally and a fraction of a foot per year vertically upward.

3. **Background Groundwater Quality**: Analysis of groundwater samples for major cations and anions confirms that water quality varies laterally in all three water-bearing zones, degrading in a northwesterly direction due to saltwater intrusion.
   In general, the quality of groundwater in the A-and C-zones is slightly brackish to saline with TDS ranging up to 13900 and 53280 ppm respectively, and the quality of groundwater in the B-zone is moderately fresh to brackish, with TDS ranging up to 671 ppm.

4. **Summary of Historic Groundwater Contamination**: Chemicals historically detected in A-zone groundwater beneath the Plant site include chlorinated volatile organic compounds (CVOCs), metals, pesticides, and the petroleum fuel components benzene, toluene, ethylbenzene, and xylenes (BTEX). The contaminants in C-zone wells are primarily limited to chlorinated solvents. The groundwater contaminants present in the A- and C-

zones have not been detected in the deeper B-zone, which is separated from the overlying C-zone by an aquitard approximately 20 feet thick. An upward hydraulic gradient between the B and C zones has also limited downward migration of contaminants.

i. The primary area of CVOC and VOC contamination at the plant site is located at the former Polychem Plant. The primary contaminants in the A-zone include cis-1,2-DCE, vinyl chloride, toluene, and benzene. A-zone CVOC concentrations greater than 10 mg/L were identified within the southern half of the former Polychem Plant area. Benzene and toluene concentrations greater than 5 mg/L were identified near the western boundary of the former Polychem Plant. Primary contaminants in the C-zone include TCE and methylene chloride, and concentrations greater than 10 mg/L were limited to the southern half of the former Polychem plant. TCE concentrations greater than 10 mg/L occurred to a depth of approximately 45 feet below ground surface.

ii. With a few exceptions, pesticide and arsenic contamination groundwater was limited to the former Pesticide Plant area. Pesticides historically detected in Plant Site groundwater included chlordane, dichlorodiphenyltrichloroethane (DDT), orthene, lindane, silvex, and paraquat. These pesticides, when detected, are localized at low levels and have decreased in concentration over time. Arsenic concentrations in groundwater have also generally decreased. Both arsenic and the majority of pesticides of concern at the site are attenuated by sorption to subsurface soil. The more water-soluble pesticides, paraquat and orthene, have been detected in only a few samples at low concentrations. With few exceptions, these chemicals are limited to the A-zone in the former Pesticide Plant area.

iii. Groundwater monitoring data collected between 1986 and 1994 showed evidence of biodegradation of PCE and TCE to 1,2-dichlorethene (1,2-DCE), to vinyl chloride, and to less toxic ethene/ethane. The data indicate that intrinsic remediation processes are causing an overall decline in CVOC parent compounds in the direction of groundwater flow, and that there is strong evidence of reductive dechlorination in the A-zone. Evidence for biodegradation is weaker in the C-zone.

5. **Regulatory Status**: Order No. 96-121 required corrective actions for groundwater with elevated levels of CVOCs in the former Polychem Plant area. These requirements were updated on September 18, 2000, when Site Cleanup Requirements Order No. 00-010 was adopted and Order No. 96-121 was rescinded.

6. **Final Corrective Action Remedy:** The corrective action requirements in Order 00-010 had five components, all of which were to be completed during 2001-2002:

i. Task 1: Excavation And Restoration in the Castro Corridor

Castro Corridor, located between Chevron Chemical's Plant Site and Castro Creek, contains a small marshy area bisected by Castro Creek. Surface water and sediments in the marsh and creek were found to contain contaminants of concern, principally arsenic

from past discharges of contaminated stormwater runoff. Task 1 of Order 00-010 required Chevron to excavate soil and sediment in the Castro Corridor marsh area, creek bed, and creek bank to remove approximately 99% of the total arsenic contamination. This would result in an approximate site-wide average arsenic concentration of 9 mg/kg in the top three feet of the marsh soil, and improve water quality in Castro Creek so that the Basin Plan objective of 36 µg/l would be met.

This remedial action was completed by October 15, 2001, and included excavation and offsite disposal of about 3,430 cubic yards of contaminated soil and sediment. Approximately 3,210 yards of clean fill replaced the excavated soil and sediment so that the natural topography was generally preserved. The marshy area was then restored and revegetated and the creek bed was stabilized. Surface water sampling conducted within the remediated area has exhibited an overall declining arsenic concentration trend since completion of the corrective action, with only sporadic samples exceeding the Basin Plan objective of 36 µg/l.

ii. Task 2: WP-4 Area Investigation

Chevron found elevated levels of CVOCs in shallow A-zone and upper C- Zone groundwater in the area of well WP-4, which is located offsite approximately 20 feet west of the former Polychem Plant barrier wall on Union Pacific Railroad property near Castro Creek. It was suspected that this contaminated groundwater had the potential to discharge into Castro Creek. Task 2 of Order 00-010 required Chevron to investigate whether elevated CVOC concentrations were impacting Castro Creek, and to determine whether corrective action was needed.

Groundwater from 7 subsurface borings and wells in the WP-4 area was analyzed to assess whether DNAPL was present and to determine the lateral and vertical extent of dissolved phase CVOCs. The investigation results were used to determine if remediation was necessary and, if so, to select appropriate remedial measures. In a report dated January 2001, Chevron concluded that the VOCs in the WP-4 area were not a risk to human health or the ecology of Castro Creek, and that the groundwater interceptor trench (discussed below) would intercept any impacted groundwater that might otherwise discharge to Castro Creek.

iii. Task 3: Interceptor Trench And Gradient Adjustment System

The former Polychem Plant has a concrete barrier wall extending eleven feet below ground surface along the western (downgradient) boundary of the Plant Site. This barrier wall separates Chevron's property from Castro Creek, which flows along the southwest edge of Chevron's property. Studies conducted by Chevron demonstrated that shallow A-Zone groundwater was mounding on the east side of this barrier wall, causing contaminants to flow around and potentially under the wall to Castro Creek. To prevent or limit contaminant migration, Task 3 of Order 00-010 required Chevron to install an interceptor trench to capture groundwater and reduce groundwater mounding.

Since completion of the trench in October 2001, Chevron has operated the trench continuously, and the captured groundwater is treated and pumped to the integrated wastewater pond system, pending discharge to either City of Richmond or the West Contra Costa Sanitary District POTW. Operation of the trench has maintained lower groundwater elevations behind the barrier wall and prevents migration of A-zone groundwater towards Castro Creek.

iv. Task 4: Electron Donor Evaluation

Task 4 required Chevron to perform a feasibility study to evaluate the feasibility of enhancing intrinsic biodegradation of CVOCs by injecting electron donor materials into C-zone groundwater. In August 2002, Chevron concluded that neither the injection of electron donors nor an alternative remedy (construction of a permeable barrier well) would measurably reduce the CVOC mass entering Castro Creek. However, groundwater monitoring indicated that intrinsic biodegradation of CVOCs is occurring naturally. Chevron also concluded the existing barrier wall and operation of the groundwater interceptor trench would acceptably reduce CVOC discharge to the Creek.

v. Task 5: Corrective Action Monitoring Plan for Groundwater and Surface Water

Task 5 required Chevron to submit a Corrective Action Monitoring Plan for groundwater and surface water, so that the effectiveness of Corrective Actions required in Tasks #1 and #3 could be evaluated. The goal of the Task 1 monitoring program was to determine whether the excavation and restoration of Castro Corridor marsh and Castro Creek resulted in decreased concentrations of chemicals of concern in Castro Creek and whether the requirements of the Basin Plan are being achieved. The goal of the Task #3 Monitoring Program was to determine whether the interceptor trench was controlling groundwater mounding in the back of the former Polychem Plant.

In March 2001, Chevron submitted the required plan that proposed a water level monitoring program to evaluate the operation of the interceptor trench; monitoring of Castro Creek to evaluate the effectiveness of its excavation and restoration; and monitoring of TCE breakdown products to evaluate the electron donor system (described above).

7. **Current Water Quality Conditions**

i. Groundwater Monitoring Results: Groundwater monitoring has been conducted continuously since 1986. Recent results indicate that the groundwater interceptor trench continues to successfully control groundwater mounding, and capture A-zone groundwater migrating towards Castro Creek.

ii. Demonstration of Intrinsic Remediation: Groundwater monitoring indicates that intrinsic remediation of CVOCs is occurring in the A-zone and to a lesser degree in the C-zone. Lines of evidence include loss of parent compounds and the appearance of their daughter

breakdown products, suitable redox geochemistry to support anaerobic conditions, and ample electron donors.

iii. Castro Creek Monitoring: Surface water monitoring has been occurring since 1997. The effectiveness of the Castro Corridor marsh removal and restoration was based on meeting the 36 ppb Basin Plan criterion for dissolved arsenic in surface water within the remediated area of Castro Creek. The Creek Monitoring program consists of eight sampling stations, and arsenic in surface water has been reduced and other contaminant concentrations have stable or decreasing trends. The annual biological assessment of Castro Creek indicates the general condition of the Creek has not changed since 1997, save for the restored section of the Creek which showed evidence of improved habitat. Also, plant health and vigor are good throughout the creek drainage.

8. **Justification for Rescinding the Order**: Chevron has completed the corrective actions required by Tasks 1-5 of Order 00-010. Surface water and groundwater monitoring are still required and the monitoring requirements required under Order 00-010 have been incorporated by administrative letter into those contained in the Waste Discharge Requirements for the pond site (WDR Order 97-049) on March 26, 2015. Continued operation of the Groundwater Interceptor Trench is also required, and this requirement will be incorporated into the updated Waste Discharge Requirements for the Plant and Pond sites. Order No. 00-010 is no longer necessary and should be rescinded.

9. Additional site investigation and corrective action may be required in the event of any change in land use, property transfer, or demolition of existing structures at the site.

CEQA, NOTIFICATION, AND PUBLIC HEARING

10. This action rescinds an Order to enforce the laws and regulations administered by the Regional Water Board. Rescission of the Order is not a project as defined in the California Environmental Quality Act (CEQA). There is no possibility that the activity in question may have a significant effect on the environment (Cal. Code Regs., title 14 §§ 15378 and 15061, subd. (b)(3).

11. The Water Board has notified the Discharger, and interested agencies and persons of its intent to rescind site cleanup requirements contained in Order No. 00-010, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

12. The Water Board, in a public meeting, heard and considered all comments pertaining to the rescission of site cleanup requirements for the site.

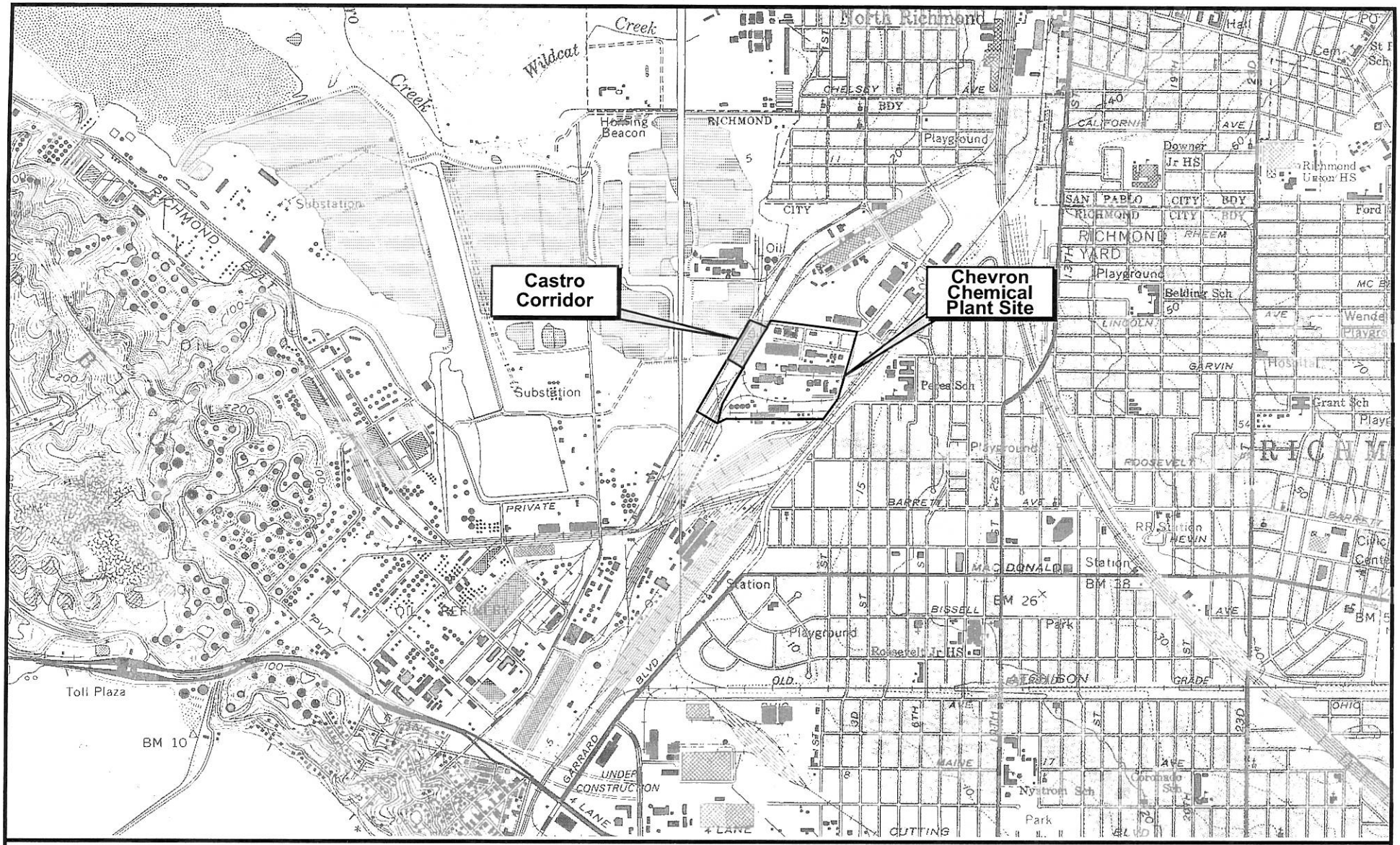
IT IS HEREBY ORDERED that Order No. 00-010 is rescinded.

I, Bruce H. Wolfe, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Region on

Bruce H. Wolfe
Executive Officer

Attachments:

Figure 1, Location Map
Figure 2. Detail map of Plant Site



SOURCE: USGS Richmond/San Quentin 7.5 Minute Quadrangle, 1958, Photorevised 1980.

Figure 1
Location of Chevron Chemical Richmond Facility

Chevron Chemical - Richmond CA

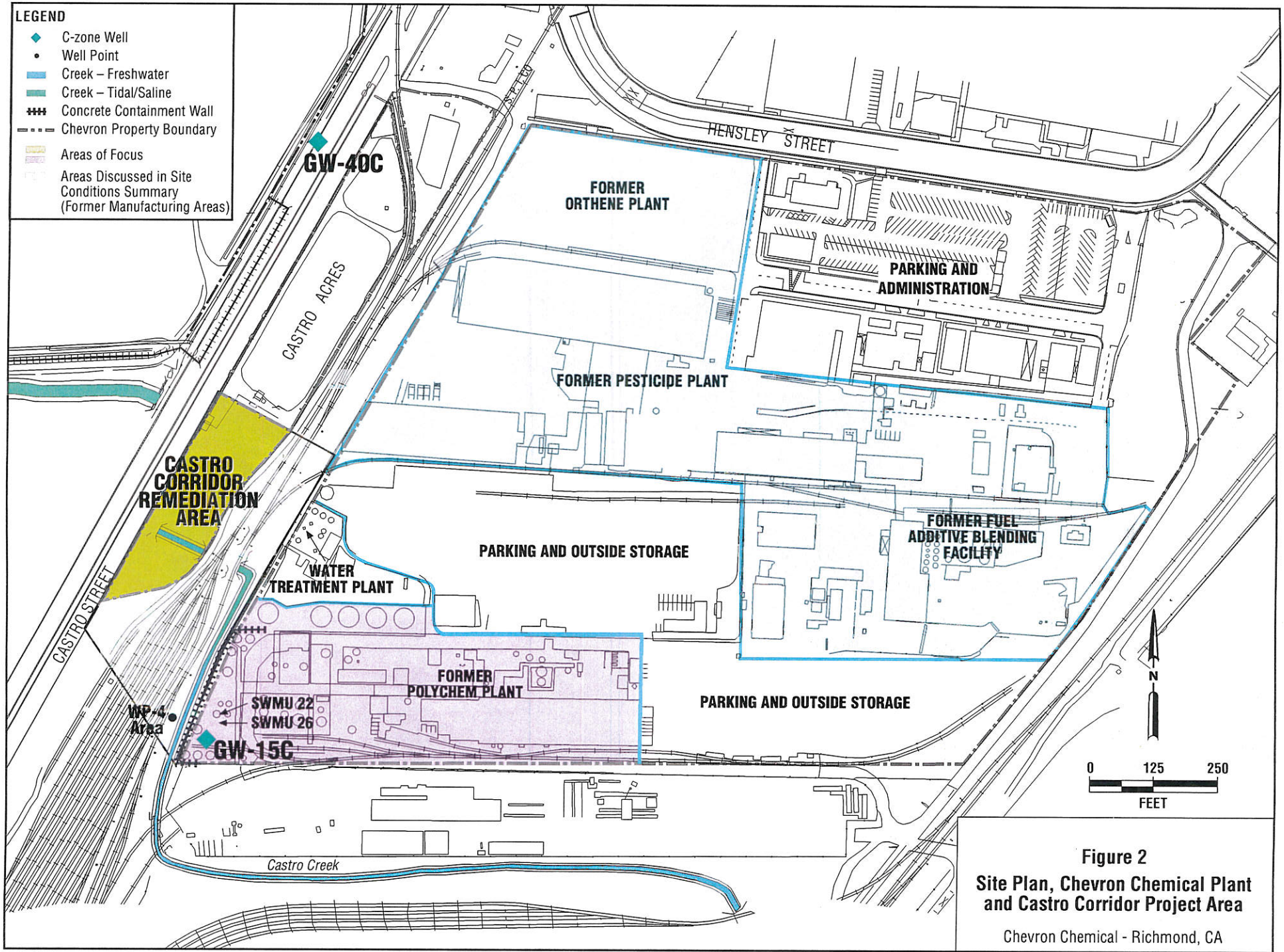


Figure 2
Site Plan, Chevron Chemical Plant and Castro Corridor Project Area
Chevron Chemical - Richmond, CA

151625IR.Z4 Castro Corridor.fh9 • 10/16/01 mai sfo

CH2MHILL