Navdeep Singh Grewal
349 Brianne Court
Pleasanton, CA 94566

May 17, 2014

Mr. Mark Detterman
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: CHEVRON #9-1851
451 Hegenberger Road
Oakland, California
ACEH Case No. 464

Dear Mr. Detterman:

I, Mr. Navdeep Singh Grewal, have retained Pangea Environmental Services, Inc. (Pangea) for environmental consulting services for the project referenced above. On my behalf, Pangea is submitting the attached *Response Letter*.

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached report is true and correct to the best of my knowledge.

Sincerely,

Navdeep Singh Grewal

May 17, 2014

VIA ALAMEDA COUNTY FTP SITE

Mr. Mark Detterman
Alameda County Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502

Re: **Response Letter**
451 Hegenberger, Oakland, California
ACEH Case #464

Dear Mr. Dettermen:

On behalf of Gurinder Grewal & Navdeep Singh, Pangea Environmental Services, Inc. (Pangea) prepared this letter responding to your letters dated December 23, 2013 and May 2, 2014. Our letter provides requested information pertaining to a diesel-use timeline at the site, diesel source evaluation, and travel time analysis. Additional pertinent information was also provided within our August 23, 2013 letter to your agency. Pangea also reviewed the April 25, 2014 letter provided by Chevron's representative.

INTRODUCTION

Chevron's remedial excavation was unfortunately unable to remove residual hydrocarbon impact at boring locations B-11 and B-14 due to the presence of the current site building. Property owner Singh performed additional excavation for geotechnical purposes. During both excavation phases, the bottom of the excavation was backfilled with ¾" drain/crushed rock that acts as a preferential pathway for groundwater flow. During Mr. Singh's excavation, the excavation floor was sloped toward the northwest which allowed infiltrating groundwater to collect adjacent well MW-5. Groundwater flow is toward MW-5 according Chevron's September 2012 groundwater elevation contour map (Appendix A). Elevated TPH impact was not detected in February 2013 in well MW-5 but was first detected in September 2013 just two days after the first significant precipitation event of the 2013-2014 rainy season. As described herein, Pangea concludes that the hydrocarbon impact detected in monitoring well MW-5 is the result of known prior impact rather than a recent release of diesel fuel associated with the diesel fueling facilities recently removed by Mr. Singh.

RESPONSE TO SPECIFIC AGENCY ITEMS

1.0 Timeline of Diesel Use at the Site

The timeline of diesel use is discussed in the ACEH December 23, 2013 letter and Chevron's April 25, 2014 letter. Chevron's letter indicates they did not dispense diesel fuel from the UST in question and should not be responsible for a diesel release associated with the UST. However, this does not preclude Chevron from being either fully or partially responsible for TPHd-range hydrocarbons found at the site in monitoring well MW-5 or elsewhere. TPHd impact as high as 8,500 ug/L has been reported within well MW-2 where elevated TPHmo impact and free product was detected, apparently associated with the prior waste oil UST. Figures 6 and 7 (Appendix A) from Chevron's *Remedial Excavation Report and Closure Request Report* show residual TPHd and TPHmo impact near the former diesel facilities and beneath the current site building.

2.0 Diesel Source Evaluation

Chevron Figure 7 shows the dispenser located immediately south of the former diesel UST and not near boring activities. Therefore, impact detected at well MW-5 is not related to underground piping, dispensing near that location, or from nicking product piping during assessment. Note that no TPHd or TPHmo impact was detected in well MW-5 groundwater on February 28, 2013, approximately five months after diesel UST removal, three months after Chevron's remedial excavation, and after soil excavation/replacement by Navdeep Singh for geotechnical purposes. Alos, Mr. Singh's excavation (described below) would have excavated any significant TPHd impact located between the former diesel UST and well MW-5. Elevated TPHd and TPHmo was only detected in well MW-5 on September 23, 2013, and this elevated impact was detected two days after the the second largest precipitation event of 2013, which was 0.933" on September 21, 2013 (Weatherspark.com). As the first significant rain event of the 2013-2014 rainy season, the precipitation could have contributed to migration of existing subsurface hydrocarbons.

The ACEH letter also states that boring activities (e.g., the August 2012 borings) could have nicked diesel UST facilities. This is a valid concern since TPHd impact was found in well MW-3 soon thereafter in September 2012. However, Pangea notes that TPHmo impact was previously detected in well MW-3 on March 23, 2011 and that no TPHd data was obtained at that time. Chevron's Figures 6 and 7 (Appendix A) indicate that TPHd and TPHmo impact is co-located. On September 13, 2013, just prior to the UST removal, both TPHd and TPHmo impact was detected in well MW-3 adjacent to the diesel UST. No significant impact was found in site soil below the diesel UST removed by Mr. Singh, and no UST holes or other indication of a significant release was found during UST removal and compliance soil sampling. These observations suggest that rising hydrocarbon concentrations in well MW-3 referenced by the ACEH letter prior to UST removal are likely due to prior migration of existing hydrocarbon impact rather than a concurrent new TPHd release from the diesel UST facilities.

3.0 Contaminant Travel Time

Pangea offers the above and below information to help evaluate contaminant travel from potential source areas to referenced boreholes and wells.

Chevron performed significant removal of secondary source and residual hydrocarbons during their excavation activities in November 2012. However, residual hydrocarbon impact remained at the site following their excavation (the excavation extent and residual TPHd and TPHmo impact is shown on Chevron Figures 6 and 7). The bottom of Chevron's excavation was backfilled with ¾" drain rock.

For geotechnical purposes, property owner Navdeep Singh performed extensive additional removal of residual impact during replacement of native material with certified import material in late 2012 and early 2013. The soil replacement involved removal of virtually all onsite soil to approximately 6 ft depth surrounding Chevron's excavation area, except east of Chevron's excavation and under the existing building. Mr. Singh noted that the excavation was sloped toward the northwest, which allowed infiltrating groundwater to collect adjacent well MW-5. The soil replacement terminated a few feet from monitoring well MW-5. Backfill information was provided in Wayne Ting & Associates report dated June 22, 2013. Mr. Singh's soil replacement provided additional remedial benefit, and would have excavated any significant TPHd impact located between the former diesel UST and monitoring well MW-5.

The geotechnical excavation was backfilled from 4 to 6 ft below grade surface with ¾" crushed rock and overlain by compacted sandy gravel. The relative higher permeability of the crushed rock installed by Chevron and Mr. Singh compared to the native clay allows faster groundwater flow and potential hydrocarbon migration. It is likely that residual impact under the site building near borings B-11 and B-14

migrated to well MW-5 via the ¾" drain rock backfilled within Chevon's excavation and Mr. Singh's soil replacement area. The final migration to well MW-5 would have occurred between February 28, 2013 and September 23, 2013, when increased TPHd and TPHmo impact was detected in well MW-5. The relative higher TPHd concentrations versus TPHmo concentrations may due to the lower mobility of TPHmo hydrocarbons than TPHd hydrocarbons.

A conceptual model of the above information is summarized on the attached figure.

4.0 Groundwater Monitoring

Until these issure are resolved, ACEH requested continuation of groundwater monitoring. Pangea agrees that additional monitoring can help evaluate plume stability and allow further consideration of case closure under the Low Threat Closure policy.

CONCLUSIONS AND RECOMMENDATIONS

Based on the above information, Pagnea offers the following conclusions and recommendations with respect to recent corrective action and residual subsurface impact at the site:

- Residual TPHg, TPHd, TPHmo and BTEX impact persists at the site, presumably associated with the former waste oil UST and fueling facilities for which Chevron has assumed responsibility (Chevron Figures 6 and 7). This residual impact can be managed following case closure with a Soil and Water Management Plan.

- During removal of the diesel UST by Mr. Singh there was no indication of a significant diesel release. Other information provided before and herein suggests that recent TPH impact observed in site wells MW-3 and MW-5 is due to migration of previously existing hydrocarbon impact.

- Chevron performed significant removal of secondary source and residual hydrocarbons during their excavation activities in November 2012, although residual hydrocarbon impact remained at the site following their excavation. In late 2012 and early 2013, property owner Navdeep Singh performed extensive additional soil and impact removal during soil replacement down to 6 ft depth for geotechnical purposes. Mr. Singh's excavation would have excavated any significant TPHd impact located between the former diesel UST and monitoring well MW-5.

- Both Chevron and Mr. Singh installed permeable ¾" drain rock in the bottom of their excavation within the historic capillary fringe and saturated zone. The drain rock terminated a few feet from residual impact at boring locations B-11 and B-14 and a few feet from monitoring well MW-5. Mr. Singh's excavation floor was sloped toward the northwest which allowed infiltrating groundwater to collect adjacent well MW-5. No TPHd or TPHmo impact was detected in well MW-5 groundwater on February 28, 2013. Elevated TPHd and TPHmo was only detected in well MW-5 on September 23, 2013, which corresponds to two days after first significant rain of the 2013-2014 season. The precipitation likely contributed to the migration of existing subsurface hydrocarbons from locations B-11 and B-14 toward well MW-5. The relative higher TPHd concentrations versus TPHmo concentrations may due to the lower mobility of TPHmo hydrocarbons than TPHd hydrocarbons.

- At this stage, Pangea recommends evaluation of additional groundwater monitoring data, which was requested by the December 23, 2013 ACEH letter and will presumably be performed by Chevron. The observation of stable TPHd and TPHmo conditions in well MW-5 would suggest plume stability and limited risk associated with residual hydrocarbon impact. The drain rock should help expedite attenuation of residual impact. TPH impact is not expected to migrate significantly beyond the excavation boundary since native material is very clayey and limited migration during prior groundwater monitoring. Residual TPH impact can be managed using the Soil and Water Management Plan.

- With all due respect, oversight agencies have discretion when applying the recently adopted Low Threat Closure Policy. Pangea feels that this site is an excellent candidate for case closure, especially if future groundwater data confirms plume stability and satisfaction of media-specific criteria for primary compounds of concern: benzene, ethylbenzene, naphthalene, and PAHs. (Future groundwater monitoring could provide naphthalene data if this represents a data gap). With respect to potential residual TPHd impact at well MW-5, TPHd-range hydrocarbons do not pose a vapor intrusion risk and are not included within the media-specific criteria for closure. The extensive soil removal completed at this site is sufficent to address LTCP criteria and to allow case closure with respect to residual TPHd, presuming plume stabilty is indicated by future monitoring.

- The existing building is scheduled for demolition and removal in approximately two months. If appropriate, residual shallow impact under the current site building could be removed soon thereafter and prior to additional facility improvements or resurfacing.

In closing, Pangea concludes that the hydrocarbon impact detected in monitoring well MW-5 is the result of known prior impact rather than a recent release of diesel fuel associated with the recently removed diesel fueling facilities. Your December 23, 2103 letter requested continuation of groundwater monitoring. Pangea recommends evaluation of future groundwater monitoring data to assess site conditions. If future groundwater confirms plume stability, Pangea recommends issuance of case closure.

If you have any questions, please contact me at briddell@pangeaenv.com or (510) 435-8664.

Sincerely,
Pangea Environmental Services, Inc.

Bob Clark-Riddell, P.E.
Principal Engineer

ATTACHMENTS

Figure – Conceptual Model Notes
Attachment A – Chevron Figures

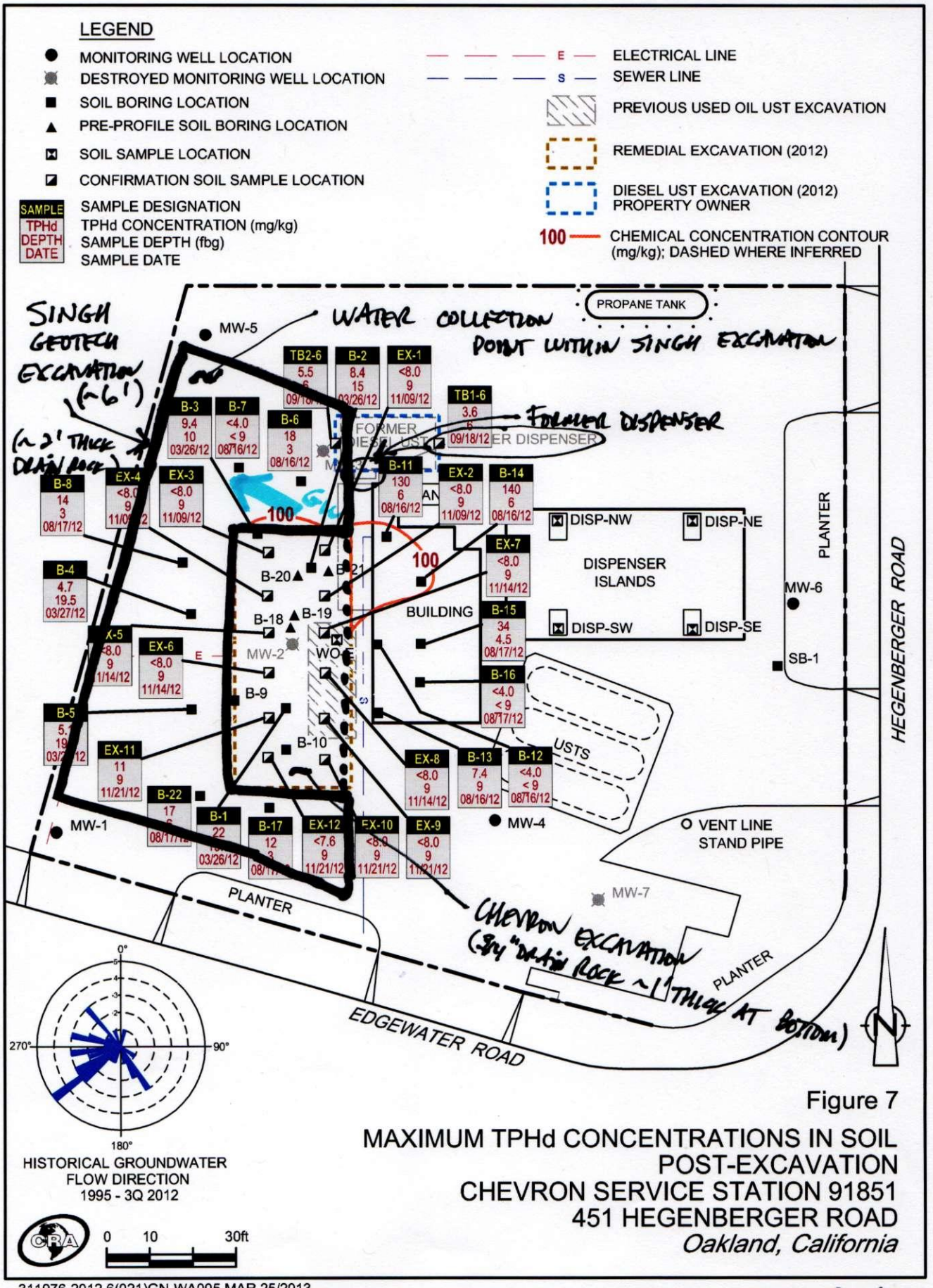

Figure 7

MAXIMUM TPHd CONCENTRATIONS IN SOIL
POST-EXCAVATION
CHEVRON SERVICE STATION 91851
451 HEGENBERGER ROAD
Oakland, California

311976-2012.6(021)GN-WA005 MAR 25/2013

CONCEPTUAL MODEL NOTES BY PANGEA

APPENDIX A

Chevron Figures

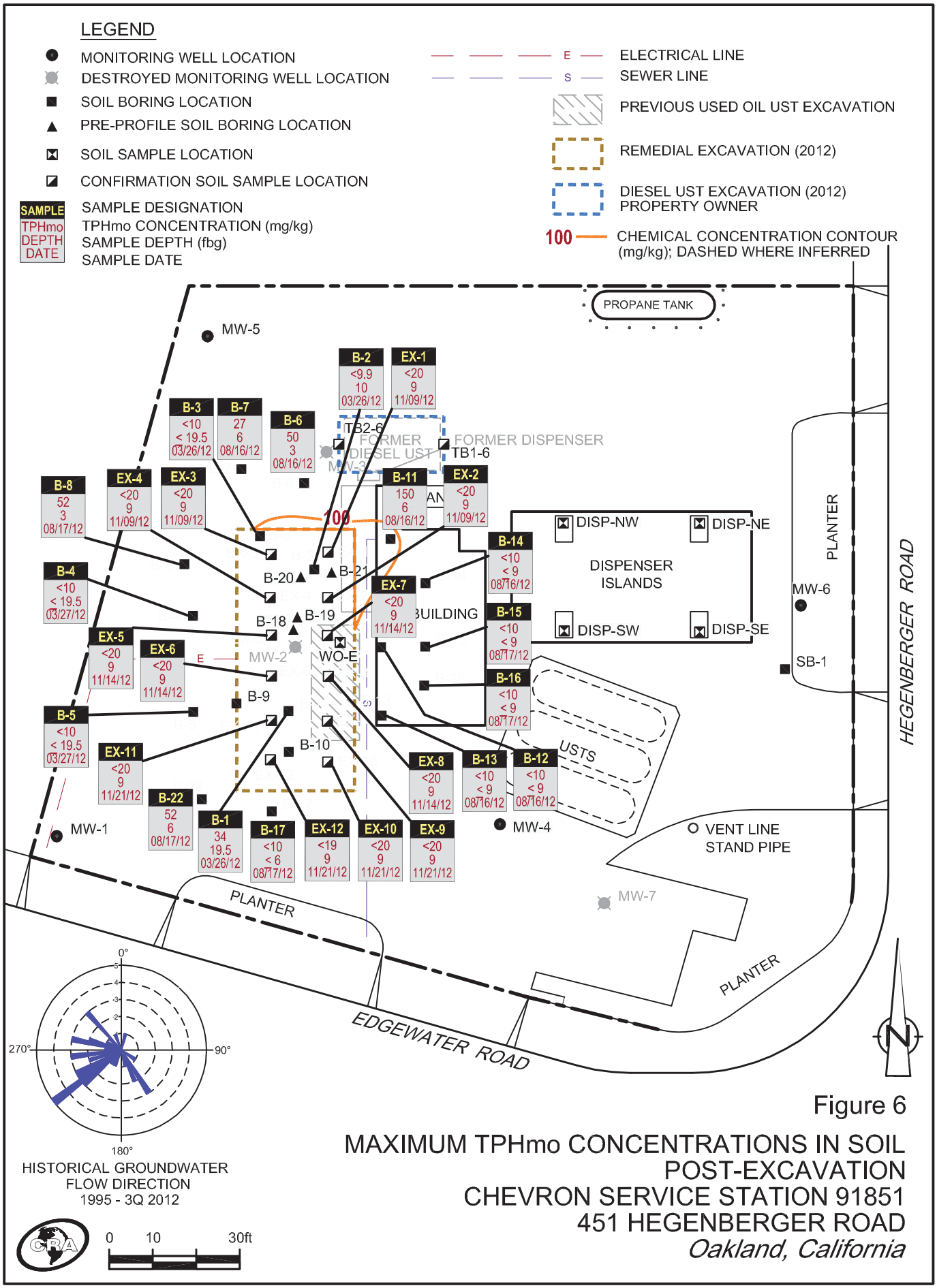

Figure 6

MAXIMUM TPHmo CONCENTRATIONS IN SOIL
POST-EXCAVATION
CHEVRON SERVICE STATION 91851
451 HEGENBERGER ROAD
Oakland, California

311976-2012.6(021)GN-WA004 MAR 25/2013

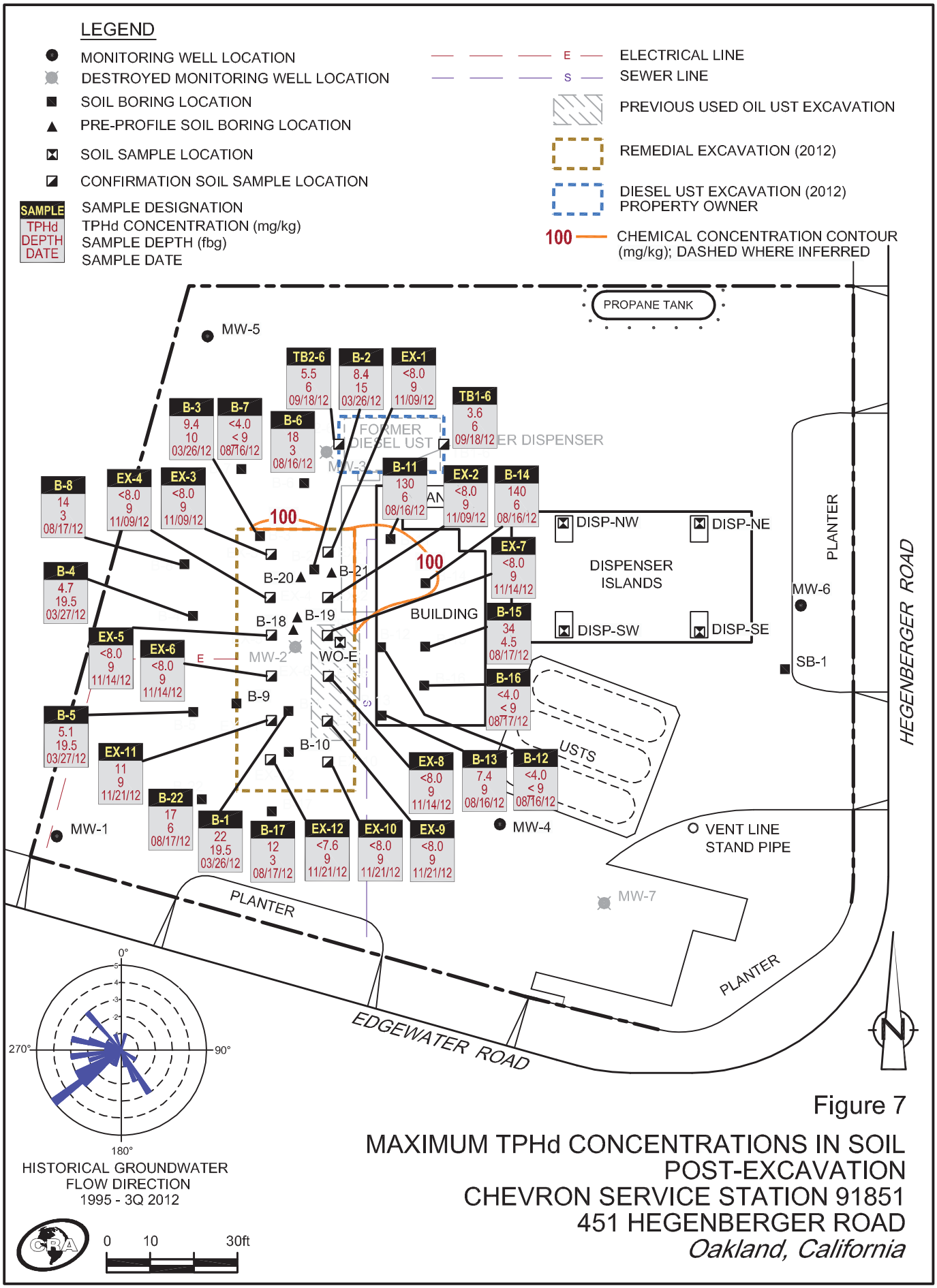

Figure 7

MAXIMUM TPHd CONCENTRATIONS IN SOIL
POST-EXCAVATION
CHEVRON SERVICE STATION 91851
451 HEGENBERGER ROAD
Oakland, California

311976-2012.6(021)GN-WA005 MAR 25/2013

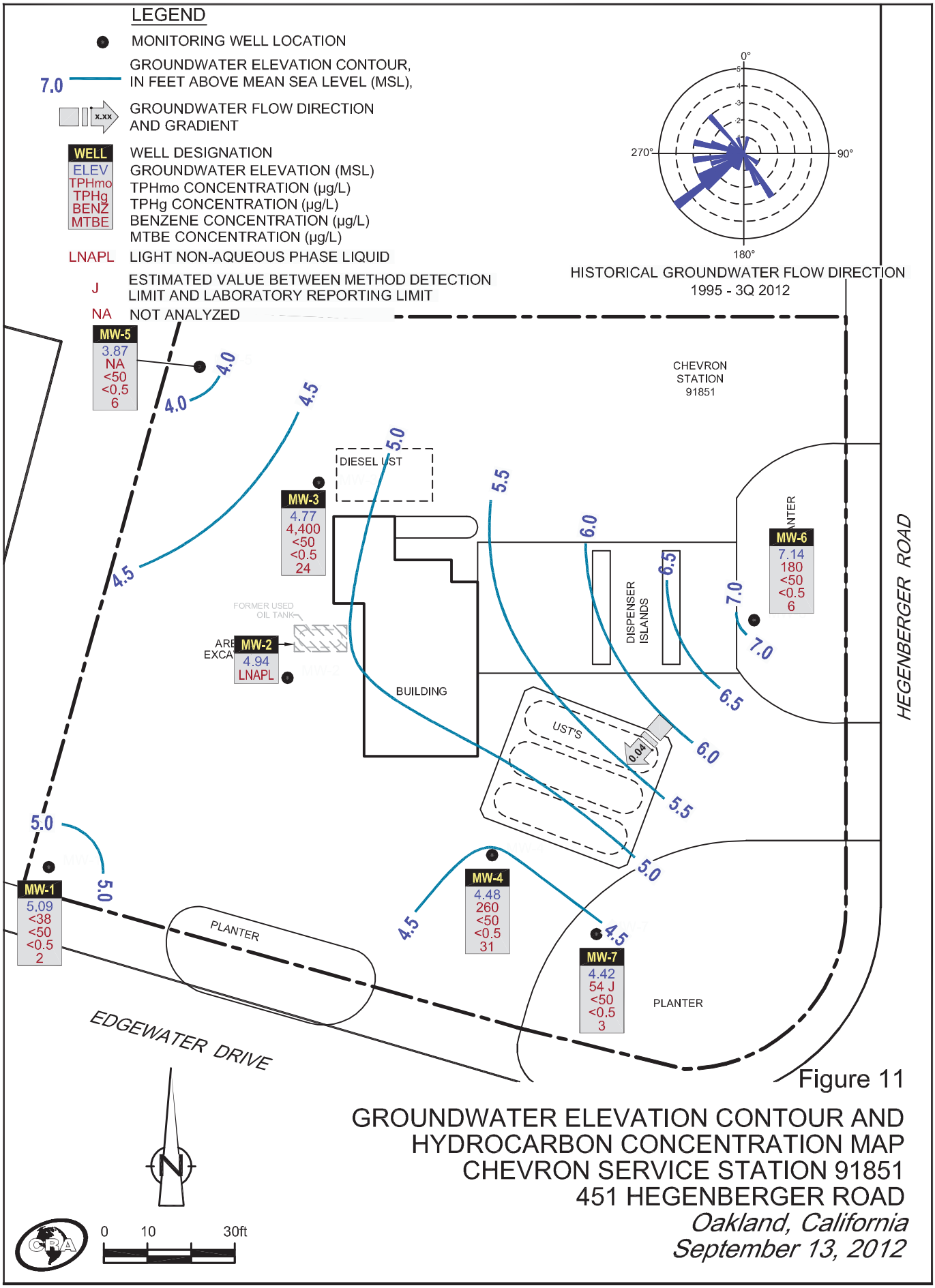

Figure 11

GROUNDWATER ELEVATION CONTOUR AND HYDROCARBON CONCENTRATION MAP
CHEVRON SERVICE STATION 91851
451 HEGENBERGER ROAD
Oakland, California
September 13, 2012

311976-2012.6(021)GN-WA003 MAR 25/2013