Los Angeles Regional Water Quality Control Board

January 17, 2023

Mr. Christian Darville
Lisi Aerospace/Hi-Shear Corporation
2600 Skypark Drive
Torrance, California 90509-2975

Certified Mail
Return Receipt Requested
Claim No. 7022 2410 0003 2800 9042

Mr. Richard Doyle
Magellan Aerospace, Middletown, Inc.
2320 Wedekind Drive
Middletown, Ohio 45042-2390

Certified Mail
Return Receipt Requested
Claim No. 7022 2410 0003 2800 9059

Mr. Bailey Su
Excellon Technologies, LLC
20001 S. Rancho Way
Rancho Dominguez, California 90220

Certified Mail
Return Receipt Requested
Claim No. 7022 2410 0003 2800 9066

Corporate Secretary
Esterline Technologies Corporation
1301 East 9th Street, Suite 3000
Cleveland, Ohio 44114

Certified Mail
Return Receipt Requested
Claim No. 7022 2410 0003 2800 9073

Mr. Tim A. Goetz
Robinson Helicopter Company
2901 Airport Drive
Torrance, California 90505

Certified Mail
Return Receipt Requested
Claim No. 7022 2410 0003 2800 9080

Mr. Ward Olson
Dasco Engineering Corporation
24747 Crenshaw Boulevard
Torrance, California 90505

Certified Mail
Return Receipt Requested
Claim No. 7022 2410 0003 2800 9097

Mr. Aram Chaparyan
City Manager
City of Torrance
3031 Torrance Boulevard
Torrance, California 90503

Certified Mail
Return Receipt Requested
Claim No. 7022 2410 0003 2800 9103

SUBJECT: REVIEW OF REVISED INTERIM REMEDIAL ACTION PLAN FOR EAST ADJACENT PROPERTIES, PURSUANT TO CALIFORNIA WATER CODE SECTION 13304 CLEANUP AND ABATEMENT ORDER NO. R4-2021-0079

SITE: SKYPARK COMMERCIAL PROPERTIES (ASSESSOR PARCEL NO. 7377-006-906), 24701 – 24777 CRENSHAW BOULEVARD AND 2530, 2540, AND 2600 SKYPARK DRIVE, TORRANCE, CALIFORNIA (SCP NO. 1499)

Dear Mr. Darville, et al.:

The California Regional Water Quality Control Board, Los Angeles Region (Los Angeles Water Board) is the state agency with primary responsibility for the protection of groundwater and surface water quality within major portions of Los Angeles and Ventura counties, including the above referenced site (Site). To accomplish this, the Los Angeles Water Board oversees the investigation and cleanup of discharges of waste that may affect the quality of waters of the state as authorized by the Porter-Cologne Water Quality Control Act (California Water Code [CWC], Division 7).

On February 28, 2022, the Los Angeles Water Board staff received the *Removal Action Workplan for the East Adjacent Properties*, submitted on behalf of the City of Torrance (City) by Terraphase Engineering Inc. (Terraphase) for review. In a letter dated May 19, 2022 (Letter), the Los Angeles Water Board identified that the scope of the proposed remedial component of the *Removal Action Workplan for the East Adjacent Properties* (EAP IRAP) did not adequately address areas of known VOC impacts at the East Adjacent Properties (EA Properties) and some overall discrepancies with the workplan. The Letter required a revised EAP IRAP.

On June 24, 2022, the Los Angeles Water Board staff received the revised *Removal Action Workplan for the East Adjacent Properties* (Revised EAP IRAP), submitted on behalf of the City by Terraphase for review. The investigative component of the Revised EAP IRAP was conditionally approved on July 27, 2022; therefore, this letter responds to only the remedial component of the Revised EAP IRAP.

A summary of the remedial component of the Revised EAP IRAP followed by Los Angeles Water Board comments are included below.

SUMMARY OF REVISED EAP IRAP

According to the Revised EAP IRAP, the objectives of the proposed remedial actions are to:

1. Reduce the potential for vapor intrusion risk on the EA Properties and adjacent impacted properties by addressing soil, soil vapor, and perched and regional

groundwater impacted by volatile organic compounds (VOCs) beneath the EA Properties.

2. Reduce contaminant mass and migration at and/or beneath the EA Properties portion of the Site.

3. Achieve water quality objectives (i.e., maximum contaminant levels [MCLs]) in the regional groundwater beneath the EA Properties within a reasonable time frame.

The remedial component of the Revised EAP IRAP considered the following remedial alternatives to achieve the objectives at the EA Properties by media (i.e., vadose zone [soil and soil vapor], perched groundwater, and regional groundwater):

1. Vadose zone remedial alternatives considered include no action, monitored natural attenuation (MNA), soil vapor extraction (SVE), and thermal technologies with SVE.

2. Perched groundwater remedial alternatives considered include no action, MNA, thermal technologies with SVE, in-situ chemical oxidation (ISCO), in-situ chemical reduction (ISCR), and enhanced in-situ bioremediation (EISB).

3. Regional groundwater remedial alternatives considered include no action, MNA, and EISB.

Terraphase proposed to retain the following remedial alternatives to achieve the objectives by media:

1. Vadose zone[1] will be treated using an SVE system, as shown in Attachment 1, *Figure 22 – Proposed Vadose Zone and Perched Groundwater Remediation Area* (Figure 22).

    a. Install the system in the vicinity of the former degreasers at Property 1.

        i. Install 30 SVE wells screened as follows:

[1] The SVE system, as proposed in the Revised EAP IRAP, is focused in the vicinity of soil vapor probe locations VP-49, VP-107, and VP-114. The most recent maximum tetrachloroethylene (PCE), trichloroethylene (TCE), and 1,1-dichloroethene (1,1-DCE) soil vapor concentrations at these locations are 26,800,000 micrograms per cubic meter (µg/m^3) [detected in sample VP-114 at 45 ft-bgs in 2020]; 325,000 µg/m^3 (detected in sample VP-107 at 30 ft-bgs in 2020); and 26,100,000 µg/m^3 (detected in sample VP-114 at 15 ft-bgs in 2020), respectively. These maximum concentrations of PCE, TCE, and 1,1-DCE in soil vapor exceed the 2019 San Francisco Bay Regional Water Quality Control Board's (SF Bay Water Board) Environmental Screening Levels (ESLs) of 15 µg/m^3, 16 µg/m^3, and 2,400 µg/m^3 for a residential scenario, respectively. These maximum concentrations of PCE, TCE, and 1,1-DCE in soil vapor also exceed the 2019 SF Bay Water Board's ESLs of 67 µg/m^3, 100 µg/m^3, and 10,000 µg/m^3 for a commercial scenario, respectively.

1. Ten SVE wells screened between approximately 5 and 25 feet below ground surface (ft-bgs)

2. Ten SVE wells screened between approximately 30 and 50 ft-bgs

3. Ten SVE wells screened between approximately 65 and 85 ft-bgs

ii. Operate the SVE system for approximately 5 to 8 years followed by rebound assessment(s).

2. Perched groundwater[2] will be treated using EISB, as shown in Figure 22.

   a. Conduct bench-scale testing and water quality assessment (i.e., pilot test[s]) concurrently with the conditionally approved investigative component of the Revised EAP IRAP

   b. Install 27 injection wells to target areas where concentrations of VOCs (primarily PCE and 1,1-DCE) exceed 10,000 micrograms per liter (µg/L)

      i. 5- to 10-foot screens screened within the perched groundwater zone which is expected to occur between 45 and 65 ft-bgs

   c. EISB amendment concoction includes soybean oil, emulsifiers, nutrients, and other soluble organic carbon substrates

   d. Assess radius of influence in nearby injection and groundwater monitoring wells

3. Regional groundwater[3] will be treated using EISB, as shown in Attachment 2, *Figure 21 – Proposed Regional Groundwater Remediation Area* (Figure 21).

   a. Install 30 dual-nested injection wells in the vicinity of groundwater monitoring wells MW-8 and MW-12

      i. Screened approximately 85 to 95 ft-bgs and 100 to 110 ft-bgs.

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[2] Based on available grab perched groundwater data, the maximum PCE and 1,1-DCE groundwater concentrations were 36,600 µg/L and 56,000 µg/L (detected in 2016) at VP-50, respectively. PCE and 1,1-DCE concentrations at VP-114 were 15,000 µg/L and 16,000 µg/L (detected in 2020), respectively. These concentrations of PCE and 1,1-DCE in the perched groundwater exceed their respective MCLs of 5 µg/L and 6 µg/L, respectively.

[3] The EISB injections, as proposed in the Revised EAP IRAP, are focused in the vicinity of regional groundwater monitoring wells MW-8 and MW-12. The most recent maximum PCE, TCE, and 1,1-DCE groundwater concentrations detected are 493 µg/L, 17,600 µg/L, and 66 µg/L, respectively, at MW-8 in July of 2022. These concentrations of PCE, TCE, and 1,1-DCE in the regional groundwater exceed their respective MCLs of 5 µg/L, 5 µg/L, and 6 µg/L, respectively.

b. EISB amendment concoction includes soybean oil, emulsifiers, nutrients, and other soluble organic carbon substrates

c. Implement four injection events; one performed on average every 3 years.

   i. Quarterly performance groundwater monitoring for the first year

   ii. Bi-annual performance groundwater monitoring for two years

   iii. Annual performance groundwater monitoring beginning the fourth year

FACT SHEET AND NOTICE OF OPPORTUNITY TO COMMENT

Pursuant to sections 13307.1 and 13307.5 of the California Water Code (CWC), Los Angeles Water Board staff issued a *Project Update and Notice of Opportunity to Comment* (Update) on August 31, 2022, to all businesses, residents, and property owners within a 500-foot radius of the aerial extent of the Site and to interested parties. The Update invited all recipients to participate in the cleanup process by reviewing and providing comments on the Revised EAP IRAP to the Los Angeles Water Board by October 14, 2022.Except for Esterline Technologies Corporation, the Los Angeles Water Board did not receive any new or resubmitted public comments during the public comment period for the Revised EAP IRAP.

LOS ANGELES WATER BOARD COMMENTS AND REQUIREMENTS

The Los Angeles Water Board conditionally approves the Revised EAP IRAP with the following comments and requirements:

1. Part of the Letter requiring the Revised EAP IRAP requested SVE wells to be located and screened to address the current known lateral and vertical extent of the soil vapor VOC contamination at the EA Properties. The Letter identified 14 multi-nested soil vapor probe locations that should be addressed; however, this was only partially addressed (approximately 3 of the 14 soil vapor probe locations [VP-49, VP-107, and VP-114]) by the Revised EAP IRAP. Terraphase explained that SVE wells covering nearly the entirety of the EA Properties is impractical and that the proposed SVE system was designed to address a source area (i.e., former degreasers on Property 1). Terraphase noted that the SVE system may be expanded to address additional source area(s) discovered during the implementation of the conditionally approved investigative component of the Revised EAP IRAP.

   Los Angeles Water Board partially concurs with Terraphase's explanation and rationale at this time; however, the expansion of the SVE system shall not be limited to just the findings from the conditionally approved investigative component of the Revised EAP IRAP. The expansion of the SVE system may be warranted

based on updated environmental data, any discovery of additional source area(s) from the conditionally approved investigative component of the Revised EAP IRAP, and/or any future investigations and assessments. The installation of the SVE system shall proceed, as proposed, such that its future expansion(s), if necessary, can be accommodated for and conducted in a phased manner.

2. Los Angeles Water Board staff shares a concern raised by Hamrick & Evans, LLP, on behalf of Hi-Shear Corporation, regarding the potential costs and longevity of the proposed granular activated carbon (GAC) SVE system. The concern is summarized in Response to Comment (RTC) B.4 of Attachment 5, *Response to Comments to Revised EAP IRAP* and identified in Attachment 6, *Comments Received to Revised EAP IRAP*. As indicated by RTC B.4, Los Angeles Water Board staff recommends consideration of catalytic oxidation in lieu of GAC during the SVE system installation and implementation.

3. The network of wells that monitors the effectiveness of the EISB injections to the regional groundwater at the EA Properties shall include groundwater monitoring wells MW-1, MW-17, MW-18 (to serve as upgradient wells); MW-5, MW-8, MW-12, MW-15 (to serve as treatment zone wells); and MW-20 and MW-28 (to serve as downgradient wells).

4. There are currently no groundwater monitoring wells in the perched groundwater zone. Part of the scope of the conditionally approved investigative component of the Revised EAP IRAP was the installation of three groundwater monitoring wells in the perched groundwater zone. These wells shall be included in the network of wells that monitor the effectiveness of the EISB injections in the perched groundwater zone.

5. Part of the scope of the conditionally approved investigative component of the Revised EAP IRAP includes the installation of perched and regional groundwater monitoring wells. Following their installation, the Los Angeles Water Board may require revisions to the network of wells used to monitor the effectiveness of the EISB injections at the EA Properties.

6. Ensure that performance monitoring parameters for the selected perched and regional groundwater remedial alternatives, at a minimum, include oxidation-reduction potential, terminal electron-accepting processes (i.e., ferrous iron, manganese), electrical conductivity, major cations (e.g., Al, As, Ba, Fe, Mn, Ca, Mg, Na, K, Se), major anions (e.g., HS^-, Cl^-, NO_2^-, NO_3^-, SO_4^{-2}, PO_4^{-3}, CO_3^{-2}), alkalinity, total dissolved solids, total sulfide, dissolved organic carbon or total organic carbon, dissolved gases (methane, ethane, ethene, carbon dioxide, hydrogen, oxygen), pH, temperature, and *Dehalococcoides* concentration.

   Note that the primary performance indicator for the remedial alternatives will be the reduction in concentrations of VOCs in groundwater. The geochemical and microbial data, where applicable, should be evaluated to identify any changes in

environmental conditions that may affect the progress and efficiency of the remediation, and to optimize the operation of the EISB. Additionally, the number and frequency of EISB injections shall be based on the reduction and/or rate of reduction in concentrations of VOCs in groundwater and performance monitoring parameters, which may exceed the number of injections proposed in the Revised EAP IRAP.

7. Prior to initiating the proposed EISB injection activities, you must apply for and obtain a waste discharge requirements (WDR) permit from the Los Angeles Water Board. You are required to submit a complete application/report of Waste Discharge (Form 200) by February 24, 2023, including the appropriate fee and supporting documents to the Los Angeles Water Board, Groundwater Permitting Unit, attention Dr. Jim Kang. Form 200 and the fee schedules can be found at the following addresses:

    a. https://www.waterboards.ca.gov/publications_forms/forms/docs/form200.pdf

    b. https://www.waterboards.ca.gov/resources/fees/water_quality/docs/fy1819_wdr_fees.pdf

    Note that WDRs permit(s) may warrant additional groundwater monitoring parameters that are not sampled and analyzed for in the routine tri-annual groundwater monitoring program and the performance monitoring parameters identified in Comment No. 6 above.

8. Notify the Los Angeles Water Board case manager at least ten working days in advance of any field work.

9. Submit the report documenting the implementation of the Revised EAP IRAP by **September 15, 2023**. The report should include field observations, a detailed map of the SVE wells, injection points, conclusions, and recommendations for the Site. The time schedule of the Cleanup and Abatement Order No. R4-2021-0079 (Order) has been revised to include the Revised EAP IRAP implementation, as shown in Attachment 3, *Attachment B: Revised Time Schedule of Order*, and Attachment 4, *Attachment B: Revised Time Schedule of Order (underline/strikeout version)*.

10. Prepare and submit tri-annual remediation progress reports for the Site on the same schedule as the tri-annual groundwater monitoring reports with the first progress report due **September 15, 2023**. Continue to submit tri-annual remediation progress reports and tri-annual groundwater monitoring reports until otherwise instructed to do so by the Executive Officer of the Los Angeles Water Board. The time schedule of the Order has been revised to include tri-annual remediation progress reports for the implementation of the Revised EAP IRAP, as shown in Attachment 3, *Attachment B: Revised Time Schedule of Order*, and

Attachment 4, *Attachment B: Revised Time Schedule of Order (underline/strikeout version)*.

11. The Los Angeles Water Board does not consider the Revised EAP IRAP as the final Site cleanup plan. The Revised EAP IRAP is intended to provide source reduction and containment, but it does not actively address the VOCs concentrations downgradient and off-Site. Subsequent interim remedial action plan(s) and/or comprehensive remedial action plan(s) are warranted to address impacts that have migrated off-Site.

12. Regarding proposed cleanup levels, note that State Water Resources Control Board Resolution No. 92-49 establishes that the Los Angeles Water Board shall require dischargers to clean up and abate the effects of discharges in a manner that promotes attainment of either background water quality or, if background levels of water quality are not achievable, the best water quality which is technically and economically feasible. If background levels of water quality are not achievable, alternative cleanup levels must be protective of human health and the environment and must be the best cleanup levels attainable taking into account technical and economic feasibility. (See Cal. Code Regs., tit. 23, § 2550.4.)

    As noted in Comment No. 11 above, the Los Angeles Water Board does not consider the Revised EAP IRAP as the final Site cleanup plan. The final Site cleanup plan and cleanup levels must address the requirements of State Water Resources Control Board Resolution No. 92-49. Therefore, any discussion in the Revised EAP IRAP regarding cleanup levels is premature without first demonstrating that cleanup to achieve background levels of water quality is not achievable.

13. On August 31, 2022, the Revised EAP IRAP was presented to you and posted for public comment with the issuance of a *Project Update and Notice of Opportunity to Comment*. The public comment period ended on October 14, 2022. The Los Angeles Water Board has reviewed the comments received and prepared the attached document, entitled *Response to Comments: Revised EAP IRAP*, summarizing the pertinent comments received and the responses to those comments.

The revisions to Attachment B Revised Time Schedule of Order (attached) constitute an amendment to the requirements of the Cleanup and Abatement Order No. R4-2021-0079 (Order) originally dated June 18, 2021. All other aspects of the Order No. R4-2021-0079 originally dated June 18, 2021, and the amendments thereto, remain in full force and effect. Pursuant to section 13350 of the California Water Code, failure to comply with the requirements of the Order No. R4-2021-0079 by the specified due date, including date(s) in this amendment, may result in civil liability administratively imposed by the Los Angeles Water Board in an amount up to five thousand dollars ($5,000) for each day of failure to comply.

If you have any questions regarding this letter, please contact Mr. Kevin Lin at (213) 576-6781 or via email at kevin.lin@waterboards.ca.gov, or contact Dr. Angelica Castaneda, Site Cleanup Unit IV Supervisor, at (213) 576-6737 or via email at angelica.castaneda@waterboards.ca.gov.

Sincerely,

R Purdy Digitally signed by R Purdy Date: 2023.01.17 15:41:10 -08'00'
Water Boards

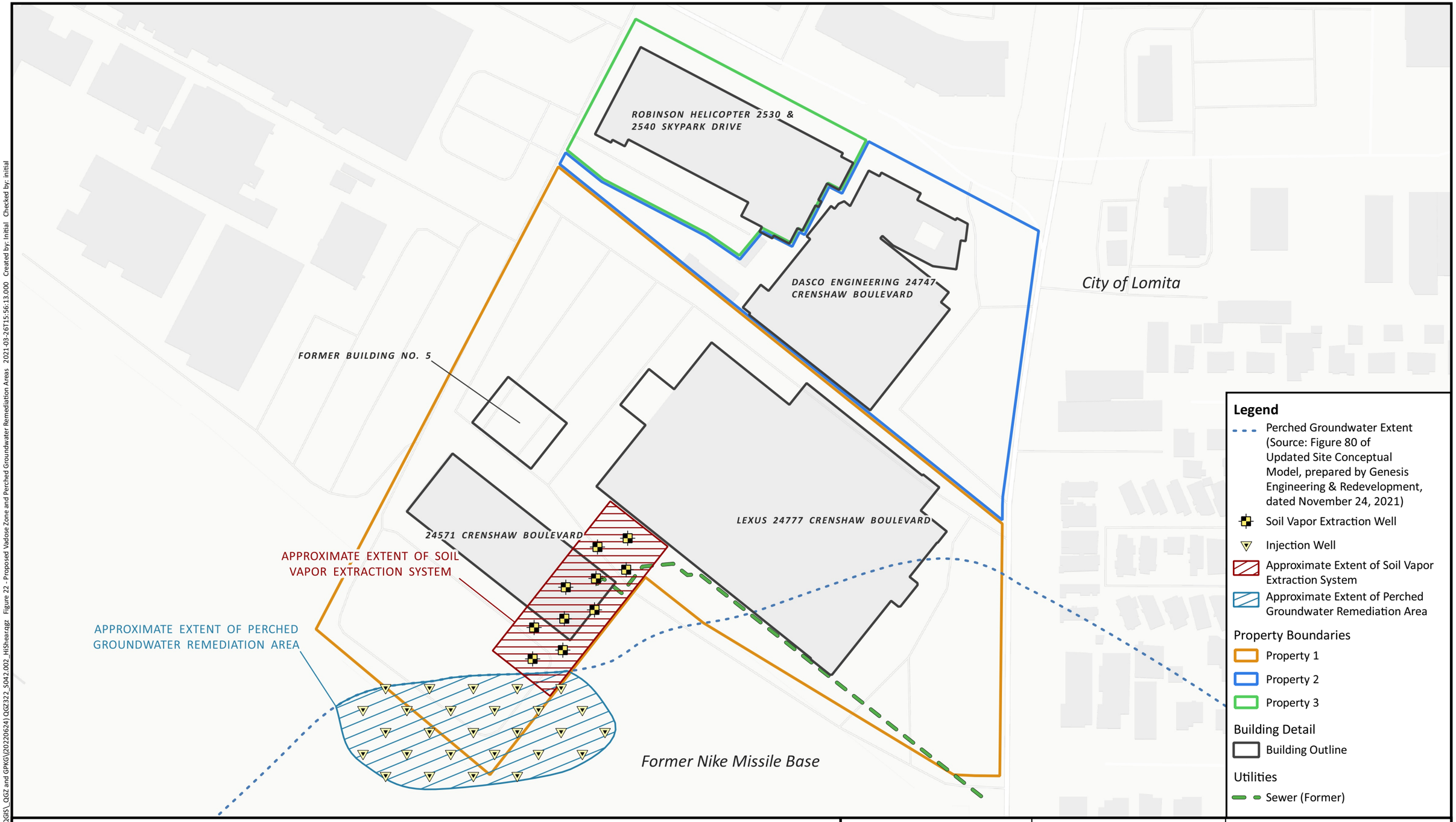
Renee Purdy
Executive Officer

Attachments:
1. Figure 22 – Proposed Vadose Zone and Perched Groundwater Remediation Area
2. Figure 21 – Proposed Regional Groundwater Remediation Area
3. Attachment B: Revised Time Schedule of Order
4. Attachment B: Revised Time Schedule of Order (underline/strikeout version)
5. Response to Comments: Revised EAP IRAP
6. Comments Received: Revised EAP IRAP

cc:

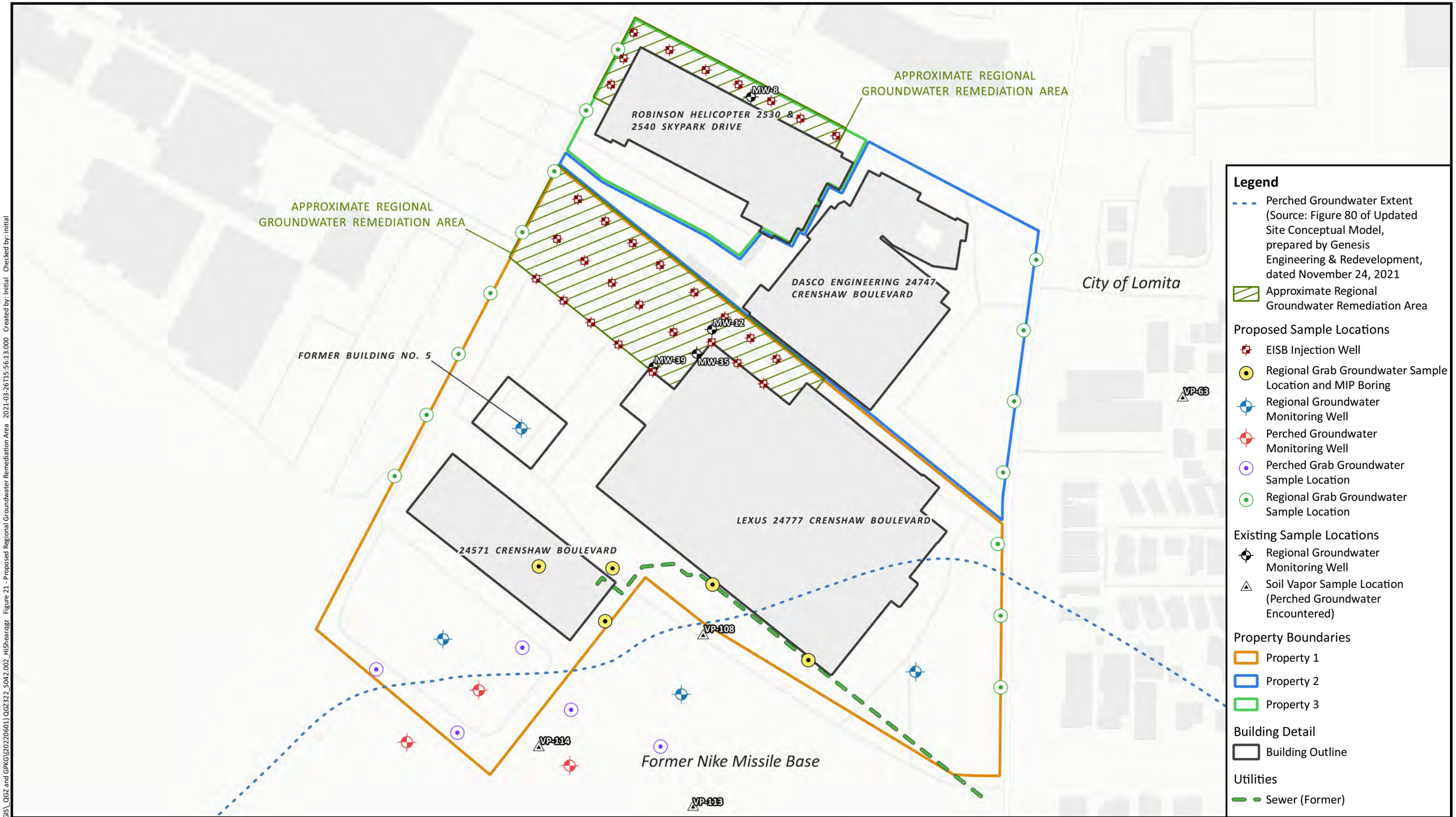
Dmitriy Ginzburg, State Water Board Division of Drinking Water
James Kang, Los Angeles Regional Water Quality Control Board
Joseph Liles, Water Replenishment District
Carla Dillon, City of Lomita
Ryan Smoot, City of Lomita
Trevor Rusin, City of Lomita
Alan B. Fenstermacher, Rutan & Tucker, LLP
Travis Van Ligten, Rutan & Tucker, LLP
Richard Montevideo, Rutan & Tucker, LLP
Darren Croteau, Terraphase Engineering Inc.
Sonja A. Inglin, Cermak & Inglin, LLC
Patrick L. Rendon, Lamb and Kawakami, LLP
William J. Beverly, Law Offices of William J. Beverly
Brian M. Ledger, Gordon Rees Scully Mansukhani, LLP
Thomas Schmidt, Hamrick & Evans, LLP
David L. Evans, Hamrick & Evans, LLP
Jeff W. Poole, Hamrick & Evans, LLP
Steve Van der Hoven, Genesis Engineering & Redevelopment
Solomon Seyum, Genesis Engineering & Redevelopment

Attachment 1 - Figure 22 – Proposed Vadose Zone and Perched Groundwater Remediation Area



N:\GIS\Prj\S042.002_HiShear\QGIS_QGZ and GPKG\(20220624) QGZ322_S042.002_HiShear.qgz Figure 22 - Proposed Vadose Zone and Perched Groundwater Remediation Areas 2021-03-26T15:56:13.000 Created by: Initial Checked by: initial

Attachment 2 - Figure 21 – Proposed Regional Groundwater Remediation Area



Legend

- Perched Groundwater Extent (Source: Figure 80 of Updated Site Conceptual Model, prepared by Genesis Engineering & Redevelopment, dated November 24, 2021
- Approximate Regional Groundwater Remediation Area

Proposed Sample Locations

- EISB Injection Well
- Regional Grab Groundwater Sample Location and MIP Boring
- Regional Groundwater Monitoring Well
- Perched Groundwater Monitoring Well
- Perched Grab Groundwater Sample Location
- Regional Grab Groundwater Sample Location

Existing Sample Locations

- Regional Groundwater Monitoring Well
- Soil Vapor Sample Location (Perched Groundwater Encountered)

Property Boundaries

- Property 1
- Property 2
- Property 3

Building Detail

- Building Outline

Utilities

- Sewer (Former)

0 50 100 150 200 ft

1 Inch = 125 Feet

N

SAFETY FIRST

terraphase engineering

CLIENT:	Rutan & Tucker
PROJECT:	EA Properties RAW
PROJECT NUMBER:	S042.002.002

Proposed Regional Groundwater Remediation Area

FIGURE 21

N:\GIS\Prj\S042.002_HiShear\QGIS_QGZ and GPKG\(20220601) QGZ322_S042.002_HiShear.qgz Figure 21 - Proposed Regional Groundwater Remediation Area 2021-03-26T15:56:13.000 Created by: initial Checked by: initial

ATTACHMENT B: REVISED TIME SCHEDULE OF ORDER

DIRECTIVE	DUE DATE
1. Site Conceptual Model: The Dischargers shall prepare and submit to the Regional Board a Site Conceptual Model which provides details on and illustrates waste discharge scenario(s), geology and hydrogeology, waste constituent fate and transport in soil, soil vapor, and groundwater, distribution of waste constituents, exposure pathways, sensitive receptors and other relevant information.	Site Conceptual Model due **September 10, 2021.**
[Note that the Regional Board may require revisions to the Site Conceptual Model as necessary to complete the Model.]	Revisions due within 60 days of receiving directive from the Regional Board.
2. Risk Assessment: The Dischargers shall:	
a. Prepare and submit a comprehensive HHRA	**September 10, 2021**
b. Prepare and submit implementation reports for the response zones designated in the Vapor Intrusion Response Plan.	
i. Completion report for the Accelerated Response Zone	**August 15, 2022**
ii. Interim completion report for the Evaluate Need for Action Zone.	**August 15, 2022**
iii. Completion report for the Evaluate need for Action Zone	**March 17, 2023**
c. Submit a revised Evaluate Need for Action Zone Plan and its Figure 7 – Proposed VI Assessment Sectors	**August 13, 2021**
d. Prepare and submit **semi-annual** soil vapor probe monitoring reports for the network of soil vapor probes east of Crenshaw Boulevard according to the following schedule:	**Semi-annually beginning January 31, 2022**

DIRECTIVE	DUE DATE
Monitoring Period June December	**Report Due Date** July 31st January 31st
3. Site Assessment:	
a. The Dischargers shall prepare and submit Site Assessment Work Plan(s) for each Property	**September 10, 2021**
The Dischargers shall implement the Site Assessment Work Plan(s) according to the approved schedule	According to the schedule approved by the Executive Officer. Vertical and lateral delineation must be completed no later than **September 12, 2022**
The Dischargers shall submit the Site Assessment Completion Report(s)	According to the schedule approved by the Executive Officer
b. Hi-Shear Corporation shall submit the Additional Scope Report	**October 15, 2021**
c. Hi-Shear Corporation shall submit the Module IV Report	**October 15, 2021**
d. Hi-Shear Corporation shall submit the Onsite Vertical Groundwater Investigation Report	**August 27, 2021**
e. The Dischargers shall submit the Groundwater Modeling Work Plan	**January 7, 2022**
4. Conduct Remedial Action: The Dischargers shall:	
a. Develop and submit the IRAP(s)	**August 31, 2021**
i. Submit the Groundwater IRAP implementation report	**May 15, 2023**

DIRECTIVE	DUE DATE
ii. Prepare and submit Remediation Progress Reports for the implementation of the Groundwater IRAP	Tri-annually beginning May 15 of the year implementation of the Groundwater IRAP begins.
iii. Submit the implementation report for the Revised EAP IRAP	**September 15, 2023**
iv. Prepare and submit Remediation Progress Reports for the implementation of the Revised EAP IRAP	Tri-annually beginning September 15 of the year implementation of the Revised EAP IRAP begins.
b. Develop and submit the RAP(s)	**March 31, 2022**
Implement the RAP(s)	According to the schedule in the RAP approved by the Executive Officer. RAP Implementation must be complete and cleanup achieved by **March 31, 2027**.
Prepare and submit Remediation Progress Reports for the implementation of the RAP(s)	Quarterly beginning January 15 of the year implementation of the RAP begins
Upon completion of implementation of the RAP, submit a Remedial Action Completion Report	60 days after completion of implementation of the RAP
5. Groundwater Monitoring: The Dischargers shall conduct tri-annual groundwater monitoring according to Attachment C (Monitoring and Reporting Program) and the following schedule. **Monitoring Period** January – April May – August September – December	The next groundwater monitoring report is due on **September 15, 2021**. **Report Due Date** May 15th September 15th January 15th
6. Public Participation: The Dischargers shall submit information and take actions addressing public participation requirements of CWC sections 13307.5 and 13307.6, including, but not limited to: a. Submit a baseline community assessment	

DIRECTIVE	DUE DATE
	According to the schedule approved by Executive Officer.
b. Submit an interested persons contact list	According to the schedule approved by Executive Officer.
c. Submit a draft fact sheet	According to the schedule approved by Executive Officer.

ATTACHMENT B: ~~THIRD~~ REVISED TIME SCHEDULE OF ORDER

DIRECTIVE	DUE DATE
1. Site Conceptual Model: The Dischargers shall prepare and submit to the Regional Board a Site Conceptual Model which provides details on and illustrates waste discharge scenario(s), geology and hydrogeology, waste constituent fate and transport in soil, soil vapor, and groundwater, distribution of waste constituents, exposure pathways, sensitive receptors and other relevant information.	Site Conceptual Model due **September 10, 2021.**
[Note that the Regional Board may require revisions to the Site Conceptual Model as necessary to complete the Model.]	Revisions due within 60 days of receiving directive from the Regional Board.
2. Risk Assessment: The Dischargers shall:	
a. Prepare and submit a comprehensive HHRA	**September 10, 2021**
b. Prepare and submit implementation reports for the response zones designated in the Vapor Intrusion Response Plan.	
i. Completion report for the Accelerated Response Zone	**August 15, 2022**
ii. Interim completion report for the Evaluate Need for Action Zone.	**August 15, 2022**
iii. Completion report for the Evaluate need for Action Zone	**March 17, 2023**
c. Submit a revised Evaluate Need for Action Zone Plan and its Figure 7 – Proposed VI Assessment Sectors	**August 13, 2021**
d. Prepare and submit **semi-annual** soil vapor probe monitoring reports for the network of soil vapor probes east of Crenshaw Boulevard according to the following schedule:	**Semi-annually beginning January 31, 2022**

DIRECTIVE	DUE DATE
Monitoring Period June December	**Report Due Date** July 31st January 31st
3. Site Assessment:	
a. The Dischargers shall prepare and submit Site Assessment Work Plan(s) for each Property	**September 10, 2021**
The Dischargers shall implement the Site Assessment Work Plan(s) according to the approved schedule	According to the schedule approved by the Executive Officer. Vertical and lateral delineation must be completed no later than **September 12, 2022**
The Dischargers shall submit the Site Assessment Completion Report(s)	According to the schedule approved by the Executive Officer
b. Hi-Shear Corporation shall submit the Additional Scope Report	**October 15, 2021**
c. Hi-Shear Corporation shall submit the Module IV Report	**October 15, 2021**
d. Hi-Shear Corporation shall submit the Onsite Vertical Groundwater Investigation Report	**August 27, 2021**
e. The Dischargers shall submit the Groundwater Modeling Work Plan	**January 7, 2022**
4. Conduct Remedial Action: The Dischargers shall:	
a. Develop and submit the IRAP(s)	**August 31, 2021**
i. Submit the Groundwater IRAP implementation report	**May 15, 2023**

DIRECTIVE	DUE DATE
ii. Prepare and submit Remediation Progress Reports for the implementation of the Groundwater IRAP	Tri-annually beginning May 15 of the year implementation of the Groundwater IRAP begins.
iii. Submit the implementation report for the Revised EAP IRAP ~~implementation report~~	**September 15, 2023**
~~ii.~~iv. Prepare and submit Remediation Progress Reports for the implementation of the Revised EAP IRAP	Tri-annually beginning September 15 of the year implementation of the Revised EAP IRAP begins.
b. Develop and submit the RAP(s)	**March 31, 2022**
Implement the RAP(s)	According to the schedule in the RAP approved by the Executive Officer. RAP Implementation must be complete and cleanup achieved by **March 31, 2027**.
Prepare and submit Remediation Progress Reports for the implementation of the RAP(s)	Quarterly beginning January 15 of the year implementation of the RAP begins
Upon completion of implementation of the RAP, submit a Remedial Action Completion Report	60 days after completion of implementation of the RAP
5. Groundwater Monitoring: The Dischargers shall conduct tri-annual groundwater monitoring according to Attachment C (Monitoring and Reporting Program) and the following schedule. **Monitoring Period** January – April May – August September – December	The next groundwater monitoring report is due on **September 15, 2021**. **Report Due Date** May 15th September 15th January 15th
6. Public Participation: The Dischargers shall submit information and take actions addressing public participation requirements of CWC sections 13307.5 and 13307.6, including, but not limited to: a. Submit a baseline community assessment	

DIRECTIVE	DUE DATE
	According to the schedule approved by Executive Officer.
b. Submit an interested persons contact list	According to the schedule approved by Executive Officer.
c. Submit a draft fact sheet	According to the schedule approved by Executive Officer.

Attachment 5 – Response to Comments: Revised EAP IRAP

CALIFORNIA Water Boards

GAVIN NEWSOM
GOVERNOR

YANA GARCIA
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Los Angeles Regional Water Quality Control Board

Response to Comments: Revised EAP IRAP

(Comment Period: August 30, 2022 – October 14, 2022)

Comments received **Bates Page**

Attachment 5 – Response to Comments: Revised EAP IRAP

Acronyms

ARZ	Accelerated Response Zone
City	City of Torrance
CAO	Cleanup and Abatement Order
COPC	Constituents of Primary Concern
Dischargers	City of Torrance; Magellan Aerospace, Middletown, Inc. (formerly known as Aeronca, Inc. formerly known as Aeronca Manufacturing Corporation); Excellon Industries, an Esterline Company (also known as Excellon Industries, Inc., Excellon Automation Company, and EA Technologies Corporation); Excellon Acquisitions, LLC; Excellon Technologies, LLC; Esterline Technologies Corporation; and Hi-Shear Corporation (also known as Lisi Aerospace)
EA Properties or EAP	East Adjacent Properties of Hi-Shear Corporation
EAP IRAP	Removal Action Workplan for the East Adjacent Properties, dated February 28, 2022
Revised EAP IRAP	Revised EA Properties RAW, dated June 24, 2022
EISB	Enhanced In Situ Bioremediation
ENA Zone	Evaluate Need for Action Zone
Esterline	Esterline Technologies Corporation
ft-bgs	Feet below ground surface
GER	Genesis Engineering & Redevelopment, Inc.
GW IRAP	Groundwater Removal Action Plan
GWRAP	Groundwater Remedial Action Plan, dated May 10, 2016
GSI	GSI Environmental, Inc.
HHRA	Human Health Risk Assessment
Hi-Shear	Hi-Shear Corporation
IRAP	Interim Remedial Action Plan
ISCO	In Situ Chemical Oxidation
Lomita	City of Lomita
MCL	Maximum Contaminant Level for drinking water
Middletown	Magellan Aerospace, Middleton, Inc.
MNA	Monitored Natural Attenuation
NCP	National Oil and Hazardous Substances Pollution Contingency Plan, commonly referred to as the National Contingency Plan
PCE	Tetrachloroethene
Project Update	Project Update and Notice of Opportunity to Comment, May 2022
Property 1	24751 and 24777 Crenshaw Boulevard; current day Lexus property

Property 2	24707, 24747 and 24701 Crenshaw Boulevard; current day Dasco Engineering property
Property 3	2530 and 2540 Skypark Drive; current day Robinson Helicopter property
RAO	Removal Action Objective
RAP	Remedial Action Plan
RAW	Removal Action Workplan
RTC	Response to Comment
RWB or LAWB	California Regional Water Quality Control Board, Los Angeles Region
SCM or CSM	Site Conceptual Model or Conceptual Site Model
SVE	Soil Vapor Extraction
SWRCB or State Water Board	State Water Resources Control Board
TCE	Trichloroethene
Terraphase	Terraphase Engineering, Inc.
VI	Vapor Intrusion
VIRP	Vapor Intrusion Response Plan
VOC	Volatile Organic Compound
WDR	Waste Discharge Requirements
ZVI barrier	Zero Valent Iron Barrier

Comment Identifier	Commenter	Comment Summary	Response
The public comment period for the Revised EAP IRAP commenced with the issuance of the *Project Update and Notice of Opportunity to Comment* on August 31, 2022, and concluded on October 14, 2022. As previously discussed in the *Response to Comments to Groundwater Removal Action Plan* that was part of the conditional approval of the GW IRAP, dated October 18, 2022, the public comments made to the EAP IRAP, dated February 28, 2022, then may be resubmitted for RWB's consideration during its respective 30-day public comment period. Except for Esterline, the RWB did not receive any new or resubmitted public comments during the public comment period for the Revised EAP IRAP. Nonetheless, the RWB staff revisited and reviewed the past public comments submitted prior to the IRAPs' public comment periods for pertinency and applicability to the Revised EAP IRAP to be addressed in this response (i.e., *Response to Comments: Revised EAP IRAP*). Some comments that were previously made to the EAP IRAP may not have had the benefit of reviewing the Revised EAP IRAP (i.e., comments submitted before June 24, 2022).			
A.1	Middletown	Middletown questions the conclusions made in the EAP IRAP and identified data gaps, primarily associated with Property 1, that need to be addressed with additional fieldwork.	RWB staff generally concurred with this comment. RWB issued a conditional approval of the investigative component of the Revised EAP IRAP on July 27, 2022. A technical report for the implementation of the investigative component of the Revised EAP IRAP was due December 30, 2022. Part of the scope of the conditionally approved investigative component would address the identified data gaps associated with Property 1, and it should be in Middletown's interest to see the field activities carried out. At the time of this response to comments, field activities associated with the investigative component have yet to commence.
A.2	Middletown	Middletown criticizes the EAP IRAP for targeting the "presumed release from Building 2" at Property 1. Middletown questions the location of SVE wells and notes that the locations do not address other areas of elevated concentrations.	RWB staff partially concurs. In a letter dated May 19, 2022, the RWB required the submittal of a revised EAP IRAP to have SVE wells be located and screened to address currently known lateral and vertical extents of the VOC contamination (determined by the existing soil vapor probes and their concentrations) beneath EA Properties and for the SVE wells to be depicted on a figure. The Revised EAP IRAP, submitted by Terraphase on behalf of the City, addressed the vertical aspect of the SVE wells but did not address the lateral aspect. Instead, Terraphase

Comment Identifier	Commenter	Comment Summary	Response
			explained that covering nearly the entirety of the EA Properties is impractical and that the SVE system was designed to address a source area (i.e., in the vicinity of the former degreasers on Property 1). However, Terraphase indicated the SVE system may be expanded to address additional source area(s) discovered during the Revised EAP IRAP's investigative component implementation. RWB staff finds that Terraphase's response has some merit. Expansion of the SVE system may be warranted based on findings from the investigative component of the Revised EAP IRAP, discovery of additional source area(s), and/or any future investigative and assessment activities. The SVE system as proposed in the Revised EAP IRAP (i.e., 30 SVE wells screened across various intervals) is conditionally approved such that future expansion shall be done in a phased approach. See Comments No. 1 and 2 in the January 17, 2023 RWB letter "Review of Revised Interim Remedial Action Plan for East Adjacent Properties."
A.3	Middletown	Middletown criticizes the GER's investigations conducted at the airport and former Nike Missile Base and questions the conclusion made in the EAP IRAP regarding the former Nike Missile Base.	The investigations conducted to date were to investigate and delineate the extent of the Site's impacts and not to investigate the former Nike Missile Base. Based on current available Site data, RWB staff generally concurs with conclusions made in the EAP IRAP regarding the former Nike Missile Base. Note that the conditionally approved investigative component of the Revised EAP IRAP will address data gaps at the EA Properties and may provide additional data at Property 1 and the former Nike Missile Base to better address Middletown's comments and concerns. The investigative component of the Revised EAP IRAP was conditionally approved on July 27, 2022, and a technical report for its implementation was due December 30, 2022.

Comment Identifier	Commenter	Comment Summary	Response
A.4	Middletown	Middletown references their September 2021 document that proposed field activities that has not received comments and/or approval from the RWB. Middletown notes that they will develop an updated workplan after reviewing the EAP IRAP.	Middletown's comment was submitted on March 21, 2022, prior to the submittal of the Revised EAP IRAP. The Revised EAP IRAP was submitted on June 24, 2022. Middletown proceeded with the submittal of an updated workplan on June 16, 2022. The RWB acknowledged and reviewed the updated workplan in its conditional approval of the investigative component of the Revised EAP IRAP, dated July 27, 2022. It was determined that Middletown's updated workplan significantly overlapped with portions of the investigative component of the Revised EAP IRAP. At the time of this response to comments, field activities associated with the investigative component have yet to commence.
B.1	Hi-Shear	Hi-Shear is concerned that contaminated groundwater beneath Property 1 may not migrate through and be treated by the GW IRAP's ZVI barrier during its lifetime. The EAP IRAP offers limited groundwater treatment via EISB injections.	Hi-Shear's comment was submitted on April 25, 2022, prior to the submittal of the Revised EAP IRAP. The Revised EAP IRAP was submitted on June 24, 2022. In reviewing the Revised EAP IRAP, RWB staff shares similar concerns; however, the injection wells proposed in the Revised EAP IRAP are based on current available groundwater monitoring data from the limited existing wells (MW-8 and MW-12) on the EA Properties. Part of the scope of the conditionally approved investigative component of the Revised EAP IRAP required the installation of three (3) groundwater monitoring wells in the perched groundwater zone and five (5) groundwater monitoring wells in the regional groundwater zone. The installation of these proposed wells and their incorporation to the tri-annual groundwater monitoring program will better inform RWB staff of area(s) of contaminated groundwater that may be left untreated by the ZVI barrier and EISB injections. At the time of this response to comments, field activities associated with the investigative component have yet to commence.

Comment Identifier	Commenter	Comment Summary	Response
B.2	Hi-Shear	Hi-Shear states that the GW IRAP and EAP IRAP fails to consider savings from comprehensive tandem remedial options for the Site and east of Crenshaw Boulevard.	RWB staff acknowledges and partially concurs with Hi-Shear's comment; however, the RWB does not specify the manner of compliance. Note that the RWB considers both the GW IRAP and the Revised EAP IRAP to be proposed interim remedial actions for onsite contamination source reduction and containment, that can occur more expeditiously than a final comprehensive RAP for the Site. A *Draft Remedial Action Plan* was submitted by GER on behalf of Hi-Shear on December 19, 2022. The *Draft Remedial Action Plan* will be reviewed by RWB staff and responded to under separate cover in future correspondence.
B.3	Hi-Shear	Hi-Shear recommends the SVE system be expanded beyond Property 1 to address the larger soil vapor contamination at EA Properties to reduce potential VI risk. Furthermore, Hi-Shear recommends expanding to address east of Crenshaw Boulevard.	RWB staff acknowledges and concurs with Hi-Shear's comment. See RTC A.2 and B.2.
B.4	Hi-Shear	Hi-Shear recommends that the SVE system include wells beyond 45 ft-bgs to address deeper elevated soil vapor concentrations. Hi-Shear advises against granular activated carbon and recommends a catalytic oxidation system for SVE to save costs. A SVE system will take more than the four years anticipated in the EAP IRAP.	Hi-Shear's comment was submitted on April 25, 2022, prior to the submittal of the Revised EAP IRAP. The Revised EAP IRAP was submitted on June 24, 2022. The Revised EAP IRAP proposes thirty (30) SVE wells; ten SVE wells screened between 5 and 25 ft-bgs, ten SVE wells screened between 30 and 50 ft-bgs, and ten SVE wells screened between 65 and 85 ft-bgs. The Revised EAP IRAP proposes to use granular activated carbon for adsorption. The Revised EAP IRAP anticipates SVE system operation for approximately 5 to 8 years followed by rebound assessment(s). See Comments No. 1 and 2 in the January 17, 2023 RWB letter "Review of Revised Interim Remedial Action Plan for East Adjacent Properties."

Comment Identifier	Commenter	Comment Summary	Response
B.5	Hi-Shear	Hi-Shear recommends EISB injections in groundwater where high VOC concentrations are located. Hi-Shear is concerned that the EAP IRAP will leave untreated groundwater beneath the EA Properties and believes a recirculation cell may be an effective approach for the Site and off-Site.	Hi-Shear's comment was submitted on April 25, 2022, prior to the submittal of the Revised EAP IRAP. The Revised EAP IRAP was submitted on June 24, 2022. See RTC B.1. With respect to a recirculation cell, RWB staff have previously expressed concerns about the logistics, timing, and feasibility of a recirculation cell for on- and off-Site. A conveyance system for a recirculation cell is a substantial undertaking when compared with remedial actions proposed in the GW IRAP and Revised EAP IRAP, which can be implemented on a faster timeframe. See RTC B.2.
B.6	Hi-Shear	Hi-Shear is concerned about the effectiveness of ISCO injections in the perched groundwater zone. The use of hydrogen peroxide and ozone for the ISCO compounds may be too quickly consumed and not come into contact with the chlorinated VOCs in the perched groundwater. Considering these concerns, Hi-Shear criticizes the EAP IRAP for not proposing a pilot study for ISCO injections into the perched groundwater zone.	Hi-Shear's comment was submitted on April 25, 2022, prior to the submittal of the Revised EAP IRAP. The Revised EAP IRAP was submitted on June 24, 2022. The Revised EAP IRAP proposes to treat the perched groundwater zone with EISB injections instead of ISCO injections. The proposed activities include a bench-scale study and water quality assessment study (i.e., pilot test). Part of the scope of the conditionally approved investigative component of the Revised EAP IRAP was the installation of three (3) perched groundwater monitoring wells and the collection of up to five (5) perched grab groundwater samples from borings advanced in the vicinity of the perched groundwater zone. Data from the investigative component will inform the field scale design of the EISB remedy for the perched groundwater zone. At the time of this response to comments, field activities associated with the investigative component have yet to commence.
C.1	Lomita	Lomita acknowledged that the remedial actions proposed in the GW IRAP and EAP IRAP will have a positive effect but expressed concerns that the IRAPs did not address contamination that is currently present in the City of Lomita.	RWB staff shares Lomita's concerns. The IRAPs are not intended to be a comprehensive final RAP, but rather interim actions for onsite contamination source reduction and containment. The RWB considers the IRAPs as

Comment Identifier	Commenter	Comment Summary	Response
			interim remedial actions, and a phased approach to Site cleanup, until a comprehensive RAP is submitted to address on- and off-site wastes. Requirement 4.b. of the CAO requires a comprehensive RAP to address on- and off-Site wastes in the soil matrix, soil vapor, and groundwater. A *Draft Remedial Action Plan* was submitted by GER on behalf of Hi-Shear on December 19, 2022. The *Draft Remedial Action Plan* will be reviewed by RWB staff and responded to under separate cover in future correspondence.
C.2	Lomita	Lomita identified groundwater monitoring well MW-20 when discussing recent maximum TCE and PCE groundwater concentrations beneath the City of Lomita. TCE and PCE groundwater concentrations were approximately 490 times and 87 times greater than their MCLs, respectively. Lomita is concerned that the portion of the contaminant plume already in the City of Lomita will continue to migrate and degrade the quality of downgradient regional groundwater.	RWB staff shares Lomita's concerns. See RTC C.1. Since Lomita's comment, two tri-annual groundwater monitoring events have occurred. According to Figure 3 – Site Layout and Monitoring Well Locations of the *Second Tri-Annual 2022 Groundwater Monitoring Report* (GER, October 19, 2022, on behalf of Hi-Shear), groundwater monitoring well MW-20 is in the vicinity of the shared boundaries between the cities of Torrance and Lomita. While PCE and TCE concentrations at this this well are greater than their respective MCLs, Table 3A – COPC Concentrations in Groundwater of the *Second Tri-Annual 2022 Groundwater Monitoring Report* indicate PCE and TCE concentrations at MW-20 have remained stable for the last few years of monitoring. The network of monitoring wells downgradient of MW-20 confirms that the TCE groundwater contaminant plume remains delineated to Cypress Street and the PCE groundwater contaminant plume has been delineated to Pennsylvania Avenue. The interim remedial alternatives already conditionally approved in the GW IRAP on October 18, 2022 (i.e., EISB injections at the Hi-Shear property and ZVI barrier along Crenshaw Boulevard), are expected to substantially and expeditiously reduce concentrations of pollutants beneath

Comment Identifier	Commenter	Comment Summary	Response
			the Hi-Shear property and in the contaminant plume migrating off-Site.
C.3	Lomita	Lomita expressed concerns regarding insufficient characterization of VOC soil vapor source(s) east of Crenshaw Boulevard.	RWB staff shares Lomita's concerns. The CAO requires the implementation of the VIRP, continued ongoing assessment of the ARZ and ENA Zone, and further off-Site delineation. Requirement 3.a. of the CAO requires assessment, characterization, and delineation of the extent of wastes in soil, soil vapor, and groundwater.
C.4	Lomita	Lomita expressed concerns that the GW IRAP and EAP IRAP do not address the soil vapor impacts and isolated areas of impacted perched groundwater east of Crenshaw Boulevard. Lomita further recommends that a HHRA should be conducted to assess potential risk to human health.	RWB staff acknowledges and shares Lomita's concerns. The ongoing implementation of the VIRP (i.e., assessment of the ENA Zone), tri-annual groundwater monitoring and semi-annual soil vapor monitoring program will help in the development of a more informative comprehensive HHRA. Following completion of the ARZ and ENA Zone sampling and off-Site assessment work, a comprehensive HHRA inclusive of portions of Lomita (i.e., off-Site, and downgradient of the Site) will be required.
C.5	Lomita	Lomita reiterates that more action is needed to address contamination that is above action levels within the City of Lomita.	RWB staff concurs. See RTC C.1 through C.4.
D.1	Esterline	Esterline suggests that it is premature to adopt interim or final remedial measures for EA Properties until the investigative component of the Revised EAP IRAP is completed. There may be excess costs associated with ineffective performance or failure.	The RWB disagrees with Esterline's comment. Remedial actions at numerous cleanup sites proceed in an iterative fashion, in which interim remedial actions are prioritized and implemented before fully investigating the site. Similarly, final remedial actions can be taken and then supplemented if investigation suggests the final remedy does not fully address the discharge(s). Based on feedback from Dischargers in past meetings and their shared interest in addressing the data gaps in an expeditious manner, the RWB staff segregated the review of the Revised EAP IRAP by its investigative and remedial

Comment Identifier	Commenter	Comment Summary	Response
			components. The RWB conditionally approved the investigative component of the Revised EAP IRAP in a letter issued on July 27, 2022. At the time of this response to comments, field activities associated with the investigative component have yet to commence. Comment #2 of the conditional approval also reiterated and clarified that the investigative component does not completely delineate the Site and additional investigative and assessment activities may be warranted even after its implementation. The RWB acknowledges that additional investigative and assessment work at the Site and off-Site is warranted; however, based on current available Site data, the RWB also concluded that the work should not delay the implementation of interim remedial actions at the Site. The Revised EAP IRAP will put in place interim remedial measures designed and expected to substantially reduce concentrations of pollutants beneath the EA Properties as well as in the contaminant plume migrating off-Site.
D.2	Esterline	Esterline recommends the Revised EAP IRAP (investigative and remedial components) be integrated with the GW IRAP to develop an effective overall risk management and remedy approach.	RWB staff acknowledges and generally would prefer to have one plan to review instead of two, as Esterline suggests. At this time, however, having already reviewed the two submissions, and already conditionally approved the GW IRAP, the RWB is not inclined to suggest that the plans be revised and resubmitted. See RTC B.2 and D.1. Also see Comments No. 3 through 7 and 10 in the January 17, 2023 RWB letter "Review of Revised Interim Remedial Action Plan for East Adjacent Properties."
D.3	Esterline	Esterline references their two September 10, 2022 documents (*Preliminary Site Conceptual model Report* and *Data Gap and Preliminary Site Assessment Work Plan*) to reiterate the need to investigate the adjacent former Nike Missile Base before adoption of any remedies.	RWB staff partially agrees with Esterline's comment. The remedial alternatives in the Revised EAP IRAP address subsurface impacts confirmed beneath the EA Properties that continue to pose a threat or the potential of a threat to

Comment Identifier	Commenter	Comment Summary	Response
			the environment and public health. Execution of the IRAP to protect human health is a priority. Part of the scope of the conditionally approved investigative component of the Revised EAP IRAP includes investigation of a portion of the former Nike Missile Base. At the time of this response to comments, field activities associated with the investigative component have yet to commence. See RTC D.1. To the extent that future investigations demonstrate an additional discharge, the RWB will address it, but there is no reason to delay implementation of a remedy at the EAP Property and many reasons to fast-track those efforts.
D.4	Esterline	Esterline recommends including interim objectives or milestones separate from the RAOs of the Revised EAP IRAP. Esterline suggests the RAOs to be designated as "eventual final RAOs" and the interim objectives or milestones to include the following: a) Completing site characterization b) Updating CSM c) Selecting interim remedies consistent with Site conditions d) Quantifying risk management objectives for water, soil, and soil vapor	RWB staff acknowledges Esterline's comment; however, RWB staff generally concurs with the RAOs listed in Section 1.2 of the Revised EAP IRAP. The interim objectives or milestones proposed by Esterline are not considered to be interim remedial action(s) by RWB staff in terms of an IRAP. Although the interim objectives or milestones listed by Esterline are necessary (eventual and/or concurrent) actions, they shall not delay the implementation of interim remedies at the EA Properties. See RTC D.1.
D.5	Esterline	Esterline implores integration between the Revised EAP IRAP and GW IRAP due to concerns for competitive actions and reduced remedial performance.	See RTC D.2. The remedial alternatives in both the GW IRAP and Revised EAP IRAP are not expected to negatively affect one another or exacerbate the groundwater conditions. The remedial alternatives (i.e., EISB and ZVI barrier) are reductive techniques and are anticipated to be complementary of each other.
D.6	Esterline	Esterline requests the Revised EAP IRAP and its project schedule to reflect the following: a) Characterization of the former Nike Missile Base	See RTC D.4.

Comment Identifier	Commenter	Comment Summary	Response
		b) Site-wise contemporaneous monitoring event of groundwater wells and soil vapor probes c) Evaluation of fate and migration of chemical constituents d) Evaluation of remedial measures performed at Hi-Shear property (i.e., SVE system and EISB) e) Development of a CSM	
D.7	Esterline	Esterline suggests that the Revised EAP IRAP should include description(s) of possible reasons for the perched groundwater zone and that a likely source is surface water recharge from drainage ditches on the airport property. Additionally, Esterline believes the surface water may be flowing through impacted zones and contributing to contamination seen beneath Property 1.	RWB staff acknowledges Esterline's comment. The perched groundwater zone needs additional assessment and characterization. Part of the scope of the conditionally approved investigative component of the Revised EAP IRAP includes the installation of three (3) perched groundwater monitoring wells and collection of up to five (5) perched grab groundwater samples from borings advanced in the vicinity of the perched groundwater zone. The soil and groundwater data associated with the installation of the monitoring wells and advancement of the borings will better characterize the perched groundwater zone. At the time of this response to comments, field activities associated with the investigative component have yet to commence.
D.8	Esterline	Esterline contends that there are no specific shallow soil release locations on Property 1, the high soil concentrations are deep and near the depth of the perched groundwater zone, and that the locations of the highest concentrations are on or adjacent to the former Nike Missile Base.	RWB staff disagrees with Esterline's comment. Based on available Site data, with respect to Property 1, degreasers that used PCE and 1,1,1-TCA would be categorized as source(s) and/or discharge location(s). These descriptions and findings are detailed in the CAO, Updated SCM (prepared by GER on behalf of Hi-Shear for the Site, dated November 24, 2021), GSI's response to the Lamb and Kawakami LLP Letter (aka response to Middletown, dated April 4, 2022), and the Revised EAP IRAP itself. RWB staff acknowledges that there are high soil concentrations near the depth of the perched groundwater

Comment Identifier	Commenter	Comment Summary	Response
			zone. Additional assessment and characterization of the perched groundwater zone is needed. See RTC D.7.
D.9	Esterline	Esterline contends that the Revised EAP IRAP's conclusion regarding PCE detections at Property 1 are not supported by data and such statement(s) should be deleted. "There are no data that definitively identify a shallow soil source" on Property 1 that can contribute to the deep elevated concentrations.	RWB staff disagrees with Esterline's comment. See RTC D.8.
D.10	Esterline	Esterline finds merit in the proposed bioremediation remedy alternative (i.e., EISB), but recommends that a thorough evaluation of the historical groundwater bioremediation (i.e., EISB) conducted at the Hi-Shear property should be performed. The evaluation may be beneficial and informative for future remedial attempts and design.	RWB staff acknowledges Esterline's comment. Given the similarities in the proposed remedial alternatives with remedies to be implemented as part of the GW IRAP and historical remedies already implemented at the Hi-Shear property, RWB staff anticipates similar benefits and trends for EISB at EA Properties. RWB staff provided an evaluation of the historical groundwater bioremediation conducted at the Hi-Shear property in RTC E.3 of *Response to Comments to Groundwater Removal Action* Plan, dated October 18, 2022 (part of RWB's *Review of Interim Remedial Action Plan for Site Groundwater*) and concluded that the effectiveness of the remedy hinges on successive injections, larger application area, and robust performance monitoring.
D.11	Esterline	Esterline disagrees with the Revised EAP IRAP's evaluation and conclusion regarding lines of evidence of chemical use(s)/release(s) at Property 1 and the lack of evidence of chemical use(s)/release(s) at the former Nike Missile Base.	See RTC D.7 and D.8.
D.12	Esterline	Esterline notes that it is premature to identify vadose zone and perched groundwater remediation areas until the investigative component of the Revised EAP IRAP and other activities are completed. Esterline suggests that the impacts in the southern area of Property 1 are possibly associated with source area(s) on the former Nike Missile Base.	See RTC B.6, D.1, and D.4.

Comment Identifier	Commenter	Comment Summary	Response
D.13	Esterline	Esterline recommends a thorough evaluation of the Hi-Shear property's bioremediation program. They have concerns that the remedy is contributing the generation of degradant products that are persistent in regional groundwater. Esterline recommends not using bioaugmentation unless treatability testing confirms it is necessary.	RWB staff acknowledges Esterline's comment. The historical remedies and the proposed remedial alternatives may potentially contribute to the generation of degradant products; however, PCE and TCE have historically (and currently) remain the dominant COPCs in groundwater. Interim remedial measures are warranted due to persistent elevated VOC groundwater concentrations exceeding MCLs that have remained untreated beneath the EA Properties. Any interim remedial actions taken will be accompanied with robust monitoring network(s) to analyze and evaluate their performance and effectiveness. See Comments No. 3 through 7 and 10 in the January 17, 2023 RWB letter "Review of Revised Interim Remedial Action Plan for East Adjacent Properties."
D.14	Esterline	Esterline recommends the following in the evaluation of the Hi-Shear property's bioremediation program: a) Hydraulic analysis b) Time and cost estimate following hydraulic analysis and geochemical evaluation Furthermore, Esterline questions the rationale for the selection of groundwater remedy areas as investigative activities are still warranted and/or ongoing.	Hi-Shear and their technical consultant developed an updated SCM dated November 24, 2021. The updated SCM includes discussion of the horizontal and vertical hydraulic gradients for the shallow and intermediate water bearing zones at the Site. Based on available Site data and the local hydrogeology described in the updated SCM, there is no evidence of fine-grained sediments (clay or silt) at or near the water table that act as a confining layer or geologic evidence of lithologic or structural changes that might create hydrogeologic barriers. The regional groundwater table, along with the contaminant plume, sits primarily in a permeable sand zone. The proposed remedial alternative for the regional groundwater beneath EA Properties (i.e., EISB) was selected as the most widely accepted and readily implementable approach. The proposed remedial alternative for the perched groundwater zone (i.e., EISB) will undergo bench-scale study(ies) and water quality assessment study(ies) (i.e., pilot test). See RTC D.13.

Comment Identifier	Commenter	Comment Summary	Response
			Additionally, part of the scope of the conditionally approved investigative component of the Revised EAP IRAP is the creation of two transects along the western and eastern boundaries of the EA Properties to better characterize the distribution and mass flux of contamination through the EA Properties. This will provide data and information for the suggested hydraulic analysis. At the time of this response to comments, field activities associated with the investigative component have yet to commence. The selection of groundwater remedy areas is based on current available Site data. See RTC D.1, D.4 and D.12.
D.15	Esterline	Esterline recommends assessing the hydraulic impact of EISB injection prior to implementation. They are concerned that inappropriate injections may exacerbate contaminant distribution and complicate conditions.	See RTC D.5 and D.14.

Attachment 6 – Comments Received: Revised EAP IRAP

CALIFORNIA Water Boards

Gavin Newsom
GOVERNOR

Yana Garcia
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Los Angeles Regional Water Quality Control Board

Response to Comments:
Revised EAP IRAP

(Comment Period: August 30, 2022 – October 14, 2022)

Comments received **Bates Page**

Magellan Aerospace, Middleton, Inc., 3/21/2022

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March 21, 2022

VIA E-MAIL

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Re: Cleanup & Abatement Order No. R4-2021-0079
Response to City of Torrance Removal Action Workplan

Dear Ms. Purdy:

On behalf of Magellan Aerospace, Middleton, Inc. ("Middletown"), we provide preliminary observations on the Terraphase Engineering, Inc. ("Terraphase") report entitled "Removal Action Workplan for the East Adjacent Properties" dated February 28, 2022 (the "RAW").

On March 11 we asked for the opportunity to meet with the Regional Water Quality Control Board ("RWQCB"). We are coordinating with Kevin Lin to schedule a meeting with the RWQCB team assigned to this matter where we will be able to more fully discuss the matters summarized in this letter.

We understand that the City of Torrance recently replaced its former environmental consultant GSI Environmental, Inc. ("GSI") with Terraphase which in about seven months was tasked with processing data which spans decades and with the development of the RAW.

During its review window, Terraphase drew conclusions which diverge from those reached by others who had the benefit of a longer review period, including the RWQCB and GSI. This letter highlights the diverging conclusions and provides the RWQCB with an opportunity to evaluate which conclusions are more reasonable and plausible especially in light of the underlying assumptions and foundation upon which those conclusions rest. At a minimum, the diverging conclusions, the underlying assumptions, and an action plan which at times is at odds with the existing data suggest that there is a need for additional field work. This letter concludes by highlighting specific areas where it may make sense to perform additional field work, the data from that work may shed light on the validity of the assumptions and conclusions drawn in the RAW or may indicate the need for additional field work.

A.1

1. *Environmental Reports Submitted by Middletown*

The RWQCB has received several documents from Middletown pertaining to this matter, including Property 1. These include:

- "Data Gap Workplan" prepared by MK Environmental Consulting Inc. ("MKECI"), dated August 21, 2020;
- "Indoor Air Quality Investigation and Sub-Slab Soil Vapor Sampling Report" prepared by Frey Environmental, Inc., dated February 11, 2021;
- "Subsurface Soil and MIP Boring Report" prepared by Frey Environmental, Inc., dated March 18, 2021 and submitted to the RWQCB on March 19, 2021;
- "Human Health Risk Assessment Report" prepared by Environmental Health Decisions, dated September 8, 2021 and submitted to the RWQCB on September 10, 2021;
- "Data Gap/Preliminary Site Assessment Workplan" prepared by MKECI, dated September 10, 2021; and a
- "Preliminary Site Conceptual Model" prepared by MKECI, dated September 10, 2021.

To date, Middletown has neither received any comments or approvals on these documents from the RWQCB.

2. *Property 1*

Property 1 currently consists of Building 1 which is the largest building at the property. There is a Lexus auto showroom and mechanic bays located at Building 1.

There is a smaller structure, referred to as Building 2 or the unoccupied building currently located to the south of Building 1. Building 2 is immediately to the north of the Torrance Airport. Building 2 is demised into three spaces and is used for warehousing and storage purposes.

As discussed below, there was a Nike Missile base located on the part of the airport which was adjacent to Property 1. Hi-Shear Corporation ("Hi-Shear") is located to the east of Property 1.

Exhibit 1 provides historic aerial photographs and diagrams of the area.

3. *There are Diverging Conclusions on the Source of the Perched Groundwater Contamination*

Terraphase, like every other environmental consultant who has worked on this matter, was unable to find any documents or witness accounts indicating that chlorinated volatile organic compounds ("cVOCs") were ever released at Building 2 or anywhere else at Property 1 by anyone. To date, the Hi-Shear site is the only confirmed location of cVOC releases.

However, the RAW now identifies Building 2 at Property 1 as a cVOC release point. This is based on the assumption that a degreaser located in the eastern portion of Building 2 released cVOCs with such frequency and at such volumes that cVOCs were pushed down 40 feet to the perched groundwater. RAW Section 5.1.2.

Outcome bias is a failing which many guard against by carefully considering the reasoning and conclusions drawn by peers and by opening up one's field of vision and analysis. In this case, the RAW singularly directs and constructs a workplan around the assumption that a degreaser located in the eastern portion of Building 2 released cVOCs with such frequency and at such volumes that cVOCs were pushed down 40 feet to the perched groundwater. More specifically, Terraphrase's premise is based on what it characterizes as "[f]our lines of evidence [which] indicate that releases potentially occurred at… Property 1." RAW Section 5.1.2. The four lines of "evidence" consist of assumptions and inferences drawn from data which others, including the RWQCB and GSI, have viewed very differently.

Based on the presumed leaking degreaser in Building 2, the RAW then constructs a workplan which focuses on the presumed Building 2 release area to address the cVOCs in the soil, soil vapor, and perched groundwater. RAW Section 5.2.

In contrast to the assumptions made in the RAW, based on the same data, GSI concluded that "[s]oil, soil vapor, and groundwater data identify releases of TCE and PCE at historical Hi-Shear operational Site features, and these releases have caused a soil vapor and groundwater plume beneath the Hi-Shear Site, EA Properties, and Residential Properties." Exhibit 2 p. 1, *see also*, pgs. 16, 20, 24, 27, 30-31, 32, 33.

The RWQCB similarly concluded that the source of PCE and TCE in down-gradient locations emanates from the Hi-Shear site. Exhibit 3. In its comments, the RWQCB notes:

> "The absence of the highest PCE concentrations in the 5-foot samples at VP-49 and VP-50 (located on Property 1) indicates that the PCE may not have been released at these two locations."
>
> "The detection of the highest PCE in soil gas at 85-feet bgs (above the water table) in VP-49 and its decrease to 17,700 ug/L at 5feet indicates upward migration of

> PCE vapors from the underlying groundwater plume and lateral migration of PCE vapors in the vadose zone."
>
> "Absence of the highest TCE concentrations in the 5-foot samples collected from VP-49, VP-50, and VP-25 (on Property 1) indicates that TCE may not have been released at these locations. Similarly, the detections of the highest TCE concentrations of 1,200 ug/L in the 85-foot soil gas sample collected from VP-49, 893 ug/L in the 53-foot samples from VP-50, and 874 ug/L in the 65-foot samples also indicates upward migration of TCE vapors from the underlying groundwater plume."
>
> Ex. 3 p. 3.

As the RWQCB observed, there are many anomalies in the data which go unexplained by Terraphase's premise of a leaking degreaser in Building 2 which become more understandable when viewed in the larger context of confirmed releases from the Hi-Shear site, from surface features on neighboring properties, from the lithology beneath neighboring properties, and from historic operations at neighboring properties. These are unaddressed in the RAW, and this raises grave questions about the soundness of the presumed leaking degreaser in Building 2 theory offered by Terraphase and, in turn, the workplan model built upon such a questionable foundation.

4. ***The Elevated cVOC Levels Along Property 1 – Former Nike Missile Site Border***

Given that there are no historic records or witnesses supporting the leaking degreaser premise, the RAW casts a myopic and very focused eye on the data from MIP-8 in Building 2 and the data from VP-49 and MIP-7 which are located in the driveway to the north of Building 2 and approximately 30-40 yards away from the presumed leaking degreaser.

The RAW ignores obvious anomalies even within the soil data column from MIP-7, MIP-8, and VP-49. Shallow soil sample collected in the area of the presumed leaking degreaser (MIP-8) fall short of supporting the premise. For example, as the table below illustrates the 5-foot sample detected very low concentrations of cVOCs whereas the 20-foot sample is higher in concentrations.

Boring Location	Depth	1,1,1-TCA	1,1-DCA	1,1-DCE	Cis-1,2-DCE	PCE	TCE
MIP-8	5’	1.5	ND	54	ND	210	19
	10’	2	ND	100	ND	650	23
	15’	9	1.7	430	1.3	1,100	48
	20’	20	2.1	600	2	1,100	56

Measured in micrograms per kilogram
ND – non-detect

There are ongoing assertions, sometimes affirmative and other times implicit, that because contamination happens to have been found at depth beneath Property 1, such contamination must have descended along an uninterrupted vertical path from the southern portion of Building 2 down to the perched groundwater. However, the analysis and reasoning gets more complicated when, as here, the cVOCs at or near the surface are below any action levels and only spike at depths of 40’ to 55’ bgs. This data suggests that the cVOC spikes found at depth are the product of volatilizing cVOCs from the perched groundwater rather than the product of a surface release from Building 2. The RAW fails to offer this more reasonable and plausible explanation of the data.

Lifting the analysis horizon by a few degrees raises other critical omissions in the RAW. The data from VP-50, VP-113, and VP-114 all establish a uniform and clear pattern of cVOCs spiking at depth (*i.e.*, 40-55’ bgs) while being at below action levels at or near the surface. The RAW offers no explanation or analysis as to how purported releases from Building 2 are found at depth at these other locations. VP-50, VP-113 and VP-114 are respectively approximately 120, 100, and 150 yards away from the presumed leaking degreaser in Building 2.

The RAW also lacks a contextual understanding of the boundaries of Property 1 and of the activities at the Nike Missile Site. As discussed in the September 10, 2021 Preliminary Site Conceptual Model prepared by MKECI, over the decades there has been a misunderstanding over the footprint of Property 1 and the Torrance Airport which shares a common border with Property 1. Exhibit 4. This has led to the more easily reached conclusion that contamination found beneath a property boundary necessarily originated from that property.

The Torrance Airport dates back to the 1940s when the United States established a flying field there known at the time as the Lomita Flight Strip. After World War II, the U.S. quitclaimed (1948) the airport to the City of Torrance. However, with the onset of the Cold War in 1955 the U.S. leased back the area immediately adjacent to Property 1 and built a Nike Missile Site there. The Nike Missile Site was decommissioned in the 1970s.

Despite the very clear record of owners and operators at the airport and the historic activity there, just last year Hi-Shear delivered a GE&R environmental report which, as has occurred on numerous prior occasions, incorrectly showed the boundary of Property 1 extending over and into the Nike Missile Site. This, compounded by the fact that data has been more readily obtainable from a private property than from a missile base or an operating airport, has led to more data being available on the private property side of a fence. This allows for statements like "PCE and 1,1-DCE detections in perched groundwater attenuate with distance away from…Property 1 until they are not detected on the former Nike Missile Base property." RAW Section 4.3. While this an accurate statement based on the existing data, such a statement incorrectly and misleadingly suggests that similar sampling protocols were implemented at the Nike Missile Site and other areas of the airport. A far more accurate statement is to plainly note that the reason for non-detects at the airport is that scant field work was performed there. However, concluding that the airport cannot be a source of the persistent contamination levels found at depth along the airport border based on an absence of data cannot measure up to finding non-detects in samples obtained through a well-designed sampling program at the airport.

2021 was the first year that environmental field work was ever performed at the airport. A close analysis of that field work suggests that it was sparing, random and incomplete. While Hi-Shear should be given credit for finally taking the lead in this important aspect of the investigation, the implemented sampling program stopped short of the groundwater in many instances. Other times, when overlayed with site features and operations visible from historic aerial photographs, sampling locations were picked with apparently little to no thought of the topography, the underlying lithology, or the historic operations. For example, there were no borings located in the area where 55-gallon drums were stored and scrap material was dumped on the former Nike Missile Site; an area which is located just 15 feet or so to the east of Building 2 – and on the former Nike Missile Site. Exhibit 5. Rather than concluding that the airport is not a potential source of the contamination observed at depth at VP-50, VP-108, VP-113 and VP-114, a more reasonable and plausible conclusion to reach is that the contamination found at depth originates from a source other than the presumed leaks from a degreaser in Building 2. Such conclusions were shared by others, including the RWQCB (Exhibit 3) and GSI (Exhibit 2).

The inferences drawn from the RAW seem to propagate the narrative which Hi-Shear (through GE&R) continues to offer as recently as last year by incorrectly stating that the Nike Missile Site was located within the footprint of Property 1. Using property lines as a simple benchmark from which to delineate source points of contamination, VP-108, VP-113 and VP-114 are all located within the boundaries of the former Nike Missile Site. VP-50 which is located at the airport – Property 1 border has the telltale characteristics of an offsite release. No one at Property 1 operated at that location, the cVOC levels at or near the surface are below action levels but at depth spike up. A review of historical aerial photographs shows that a trench runs from the former Nike Missile Site and ends in the vicinity of VP-50. Exhibit 4. As discussed below, other topographic features at, and the lithology under, the airport indicate that surface and subsurface releases at the airport would have migrated from the airport to Property 1,

not vice-versa. Even the RAW concedes that "the highest concentrations [of cVOCs are] centered around the southern portion of…Property 1…" adding that "the center mass is located around vapor probes VP-49, VP-50, and VP-114." RAW, Section 4.2.

Though VP-50, VP-108, VP-113 and VP-114 are now located within the boundaries of current-day Property 1, no one at Property 1 operated at these locations either in the past or today.

Historical aerial photographs clearly show that VP-50, VP-108, VP-113 and VP-114 are all far closer to activities associated with the former Nike Missile Site than those associated with the more distant and presumably leaking degreaser in Building 2.

Nonetheless, the RAW freely concludes that the presumed leaking degreaser in Building 2 is the sole source and explanation for the data found at these locations.

As noted above, this conclusion is not based on eye-witness accounts or on documented releases in historic records for Property 1 but instead is based on general practices of manufacturers who use cVOCs and degreasers.

According to the RAW, the standard for drawing inferences from general practices is reliable when applied to private property and operators but unreliable when applied to publicly owned land or government operators. In passing, the RAW discounts – or to be more accurate – disregards the Nike Missile Site altogether. The RAW dismissively asserts that although "general practices at Nike Missile sites are presented," these do "not directly link[]…the former Nike Missile Base south of…Property 1" to the contamination. RAW p. 25. Apparently, reputations and innuendos are fair foundations upon which to draw inferences when applied to private operators but unreliable in other settings despite the U.S.'s well-earned reputation for managing and closing military installations.

Through silence buttressed by omissions, the RAW implicitly infers that the former Nike Missile Site could not possibly be a source of the contamination found at VP-50, VP-108, VP-113 or VP-114. The RAW reaches this assumption without considering aerial historic photographs which show that the area at the Nike Missile Site which is immediately adjacent to Building 2 was used as an outdoor 55-gallon drum collection field and at other times as a debris collection field (euphemistically speaking). Though it is reasonable and plausible to conclude that such activities explain the elevated cVOCs found at depth at VP-50, VP-108, VP-113 or VP-114, the RAW is silent on this.

The RAW also fails to consider topographic features at the airport. Historic aerial photographs show that there were trenches at the former Nike Missile Site traces of which are still apparent. Since the former Nike Missile Site was historically at a higher elevation than Property 1, any runoff which was channeled into these trenches would have funneled to Property

1. One of these aerial photographs shows a trench located at the former Nike Missile Site running to and ending in the immediate vicinity of VP-50. Exhibit 4. Though it is reasonable and plausible to conclude that these surface features explain the elevated cVOCs found at depth at VP-50, VP-108, VP-113 or VP-114, the RAW is also silent on this.

The RAW also fails to consider the lithology beneath the airport. Based on the data which was collected from GE&R's field work and presented in their "Soil, soil Vapor, and Groundwater Delineation – Updated Module III Report" and "Updated Site Conceptual Model," there are two perched water zones converging beneath Property 1. The gradient from one perched water zone runs from the Hi-Shear site towards Property 1. The gradient from the other perched water zone runs from the former Nike Missile Site towards Property 1. Exhibit 7.

The discussion at p. 10 and 22 of the RAW on the perched groundwater beneath the southern portion of Property 1 is especially misleading: Terraphase states "Perched groundwater has been encountered in the southern portion of Property 1 and extends to the south and east on to the former Nike Missile base and into the City of Lomita." RAW p. 22 ¶ 3. In contrast, GE&R found that the perched groundwater zone is present beneath the Nike Missile Site and flows in a northwesterly direction to the southern portion of Property 1. *See*, GE&R "Soil, Soil Vapor, and Groundwater Delineation – Updated Module III Report" dated April 30, 2021, *see also*, GE&R "Updated Site Conceptual Model" dated November 24, 2021.

As the RWQCB correctly noted (Ex. 3), the highest concentrations of cVOCs in the perched groundwater beneath Property 1 were detected at VP-50, VP-108, VP-113, and VP-114. The highest concentrations in soil vapor were found at depths of 45 feet which is the reported perched groundwater depth. These concentrations are along the southern portion of Property 1 in the vicinity of the former Nike Missile Site and in areas which were never occupied by Aeronca or anyone else who leased space at Property 1. Exhibit 6.

The RAW summarizes the maximum detected concentrations in soil and soil vapor at Property 1 as follows:

- PCE at 3.39 mg/kg -- found at 55' bgs in VP-50 (at the airport – Property 1 border where there is no record of anyone at Property 1 operating);
- TCE at 0.223 mg/kg -- found at 40' bgs in VP-25;
- cis-1,2-DCE at 0.0429 mg.kg -- found at 40' bgs in VP-25; and
- 1,1-DCE at 6.32 mg.kg -- found at 55' bgs in VP-50.

All of these elevated concentrations – whether from soil samples or from soil vapor – were found at depth; none were found at or near the surface of Property 1. The highest

concentrations of PCE, TCE, and 1,1-DCE were found at 53' bgs in VP-50 which is at the airport – Property 1 border and where no one from Property 1 ever operated.

The historical aerial photographs obtained by Middletown run counter to the conclusion that Property 1 is the sole source point of cVOCs; these photographs reinforce the conclusion that the cVOCs detected at Property 1 are migrating from off-site sources. As discussed above, the aerial photographs show that about 15 feet to the east of Building 2 – at the former Nike Missile Site (not Property 1) – there was a 55-gallon drum storage area which devolved over the years into a debris field as so often happens to such areas at military installations. Exhibit 5.

Based on the foregoing, as the RWQCB and GE&R previously noted, the data points to an offsite source of contamination which is migrating onto and beneath Property 1. At a minimum, it is far too premature to speculate that activity at Building 2 is the sole source of the cVOCs in the perched groundwater or, as the RAW implicitly states, none of the cVOCs in the perched groundwater can possibly be attributed to confirmed releases at the Hi-Shear site and/or to activity at the former Nike Missile Site.

5. *Terraphase Proposed Workplan*

Although Terraphase proposes a workplan for the vadose zone, the perched groundwater, and the regional groundwater beneath Property 1, the workplan seems directed at the presumed release from Building 2 and ignores the actual data generated to date.

A.2 The workplan proposes soil vapor extractions on the eastern side of Building 2 based on the presumed degreaser release points. Leaving theory aside and developing a workplan on known facts, the highest cVOC concentrations are found to the south of Building 2 (*e.g.*, VP-50) and to the south and east of Building 2 along the current Nike Missile Site - Property 1 border (*e.g.*, VP-49, VP-108, VP-113.) Exhibit 8. The proposed workplan focuses on the high cVOC concentrations found at VP-50 and VP-114 but it does not address other areas where elevated cVOC concentrations are known to exist (*e.g.*, VP-49, VP-108, and VP-113). Exhibit 8.

A.3 GE&R's 2021 investigation of the airport and in particular of the former Nike Missile Site is incomplete. Borings were not advanced to consistent depths and the boring locations appear random and chosen without the valuable guidance provided by historical aerial photographs and an understanding of site operations. Key areas of interest based on site history (*e.g.*, drum and barrel storage at the former Nike Missile Site) were not investigated. Instead of acknowledging the images captured in historic aerial photographs, the RAW states that there is no evidence of chemical usage or releases at the Nike Missile Site.

6. *Areas Where Additional Investigations May be Warranted*

The existing data clearly shows that the cVOCs detected beneath Property 1 are migrating from offsite sources; the data uniformly shows that cVOCs are found at depth. The

data also confirms that there are two perched groundwater zones, one running from the Hi-Shear site to Property 1 and the other running from the airport to Property 1. To the extent cVOCs were detected in the shallow soils at Property 1, these have always fallen below action levels, even in the vicinity of the presumed leaking degreaser. The data is consistent with the historical information for Property 1. Despite decades of thorough investigations, there is no record nor an eyewitness account that anyone at Property 1 released cVOCs whether at Building 2 or anywhere else.

Since unfounded questions continue to be raised and unfounded theories continue to be offered, Middletown has offered to undertake investigations to address the foregoing.

A.4

The RWQCB may recall that in September 2021 MKECI proposed field investigations which are awaiting the RWQCB's comment or approval. Now that the RAW raises additional questions, MKECI will develop an updated workplan to address the questions and concerns identified in the RAW.

The RAW also appropriately notes that additional soil, soil vapor, and groundwater characterizations at the Nike Missile Site are necessary. As discussed above, the 2021 investigation of the airport and of the former Nike Missile Site is very deficient; borings were not advanced to consistent depths and the locations appear to have been randomly chosen. Key areas of interest based on the site history (*e.g.*, drum and barrel storage on the former Nike Missile Site) were not investigated.

7. Conclusion

We trust that this letter outlines some of the more salient issues raised by the RAW. Michael Kinworthy from MKECI and I look forward to discussing these with the RWQCB team when we meet. In the meantime, if you have any questions, please do not hesitate to contact me at the office (213) 630-5570, on my cell (310) 490-9999, or via e-mail at prendon@lkfirm.com.

Very truly yours,

Patrick L. Rendón, Esq.

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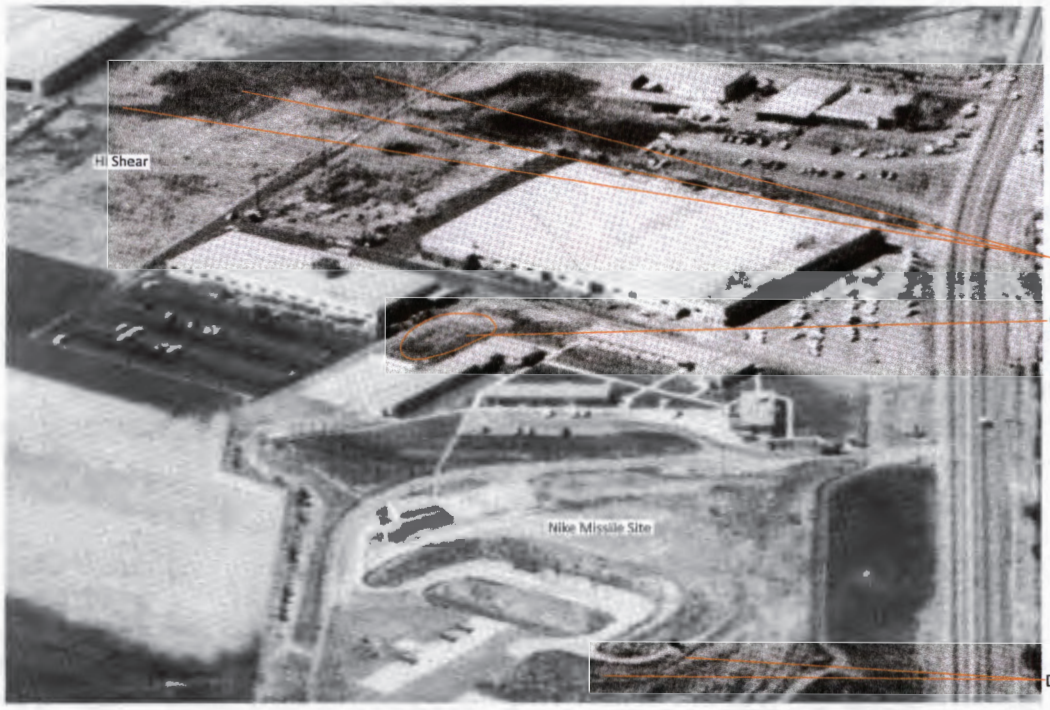
Service List for parties in *City of Torrance v. Hi-Shear Corporation*, Case 2:17-cv-07732-DSJ-JPR (Via Case Anywhere)

EXHIBIT 1

F:\JOBS\MK ENVIRONMENTAL\20-118\20-118 SP.DWG FIG1

RTC: Revised EAP IRAP - 0014



June 28, 1960 – UCLA Department of Geography, Benjamin and Gladys Thomas Air Photo Archives, Spence Air Photo Collection

Slot trench drainage directs surface water to area of darker vegetation

Cylindrical barrels or drums

Drainage ditch

June 28, 1960 AERIAL
24751/24777 Crenshaw Boulevard
LARRY D GURROLA, PHD, PG, CEG, INC

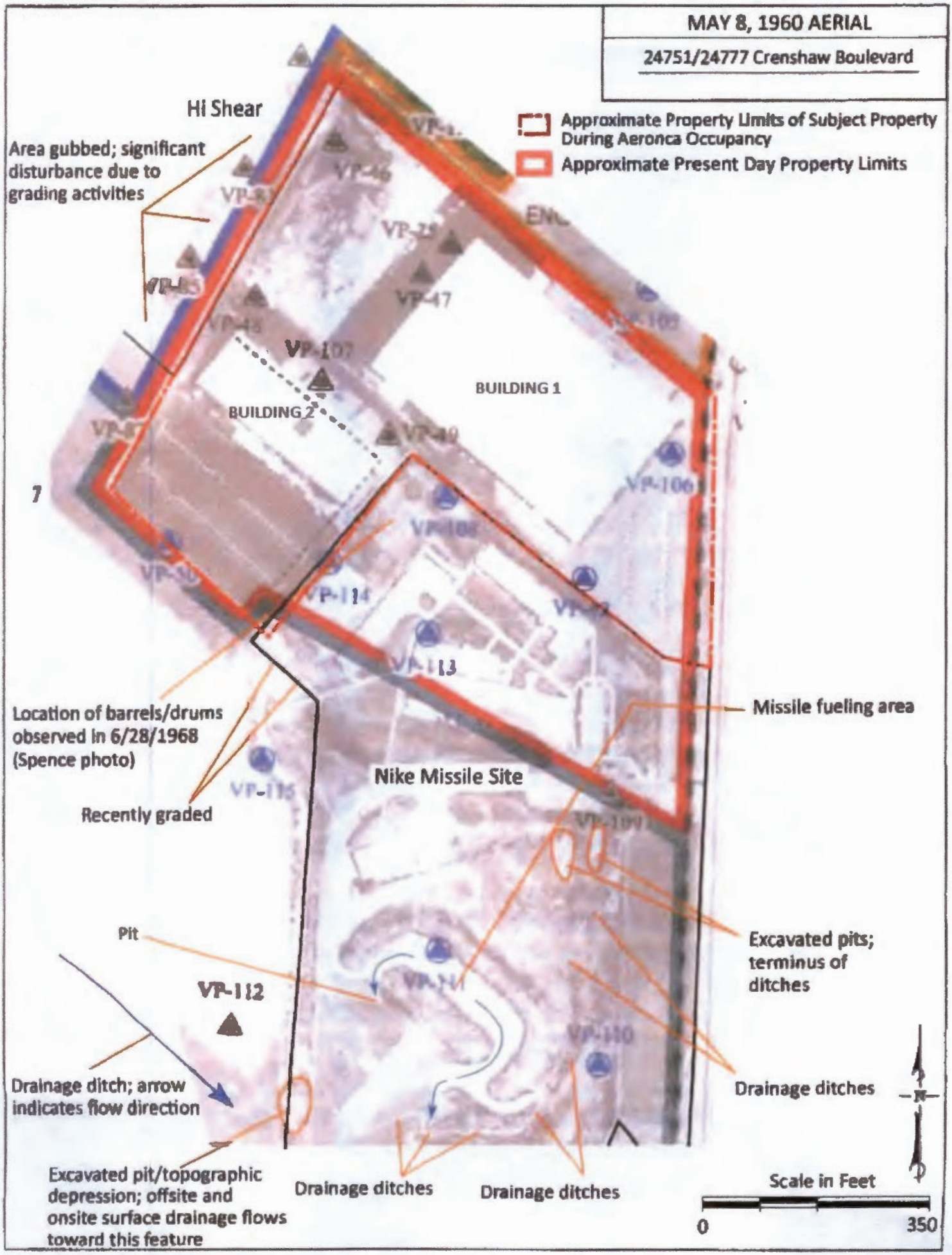

MAY 8, 1960 AERIAL
24751/24777 Crenshaw Boulevard
Approximate Property Limits of Subject Property During Aeronca Occupancy
Approximate Present Day Property Limits
Hi Shear
Area gubbed; significant disturbance due to grading activities
BUILDING 1
BUILDING 2
Nike Missile Site
Location of barrels/drums observed in 6/28/1968 (Spence photo)
Recently graded
Missile fueling area
Excavated pits; terminus of ditches
Pit
Drainage ditch; arrow indicates flow direction
Drainage ditches
Excavated pit/topographic depression; offsite and onsite surface drainage flows toward this feature
Drainage ditches
Drainage ditches
Scale in Feet
0
350

EXHIBIT 2

GSI ENVIRONMENTAL

TECHNICAL MEMORANDUM

TO: **Rene Purdy, Executive Officer, LA Regional Water Quality Control Board**

Cc: **Rutan & Tucker, LLP**

FROM: **Timothy F. Wood, P.G., CHG, Kate E. Richards, P.G., CHG, and Peter Scaramella**

RE: Review and Analysis of Current Data on Historical Site Use and Environmental Conditions at the Hi-Shear Site, 2600 Skypark Drive, Torrance, California

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GSI Environmental Inc. (GSI) has conducted a review of currently available historical records, Environmental Site Assessment reports, groundwater monitoring and remedial actions, and available analytical data for the groundwater plume containing chlorinated volatile organic compound (CVOC) concentrations (primarily trichloroethylene [TCE] and tetrachloroethene [PCE]) at the Hi-Shear Corporation ("Hi-Shear") site located at 2600 Skypark Drive, Torrance, California (referred to herein as the "Hi-Shear Site"). The Hi-Shear Site has been leased by H-Shear and its corporate successors (currently LISI Aerospace) since 1954 for the manufacture, production, assembly and cleaning of fasteners for the aerospace industry (Los Angeles Regional Water Quality Control Board [LARWQCB], 2020). Hi-Shear and its corporate successors are collectively referred to herein as "Hi-Shear."

This technical memorandum provides a preliminary summary of the Hi-Shear on-Site operations that involved the use of TCE and PCE and the results of Environmental Site Assessment activities that have identified significant source areas of TCE and PCE at the Hi-Shear Site to soil, soil vapor, and groundwater.

In addition, GSI has reviewed available soil vapor and groundwater data collected at the Hi-Shear Site and downgradient areas, which indicate that TCE and PCE are migrating in groundwater from the Hi-Shear Site to commercial and residential properties located east (and hydraulically downgradient) of the Hi-Shear Site.

Key findings of this review are:

1. Hi-Shear's operations involved the significant use and storage of TCE and PCE on the Hi-Shear Site, historical Hi-Shear operational Site features provided pathways for TCE and PCE to be released to the subsurface, and waste handling practices were documented to be poor in 1991.
2. Soil, soil vapor, and groundwater data identify releases of TCE and PCE at historical Hi-Shear operational Site features, and these releases have caused a soil vapor and groundwater plume beneath the Hi-Shear Site, EA Properties, and Residential Properties.
3. The TCE and PCE soil vapor and groundwater plumes represent a single plume emanating from the Hi-Shear Site.
4. TCE is the remedy driver for groundwater impacts both on the Hi-Shear Site and downgradient on the EA Properties and Residential Properties.

The narrative being forwarded by Hi-Shear's consultant (Genesis Engineering & Redevelopment,

Inc. [Genesis]) that there are two distinct plumes of soil vapor and groundwater is false and unsupported by the data. The plume was "bisected" in recent years from limited pilot test remediation efforts by Hi-Shear.

Background information related to this technical evaluation is presented below. The historical information and environmental site assessment data that support the key findings are presented in Sections 1 through 3.

Sources of Documents Reviewed

GSI obtained publicly available agency records and environmental site assessment reports from the following sources:

- South Coast Air Quality Management District (SCAQMD);
- Los Angeles County Sanitation Districts (LACSD) Industrial Waste Division; and
- State Water Resources Control Board (State Water Board) GeoTracker website.

Hi-Shear initiated operations at the Hi-Shear Site in the mid-1950s. However, the earliest environmental site assessment report identified by GSI was prepared in 1991.

Site Description

The approximately 12.25-acre Hi-Shear Site is identified within Los Angeles County Assessor's parcel number (APN) 7377-006-905. The Hi-Shear Site is bound to the south by the Torrance Municipal Airport, to the north by Skypark Drive, and to the west by Lowe's Home Improvement Center (Lowe's). The Hi-Shear Site historically included the area currently occupied by Lowe's until approximately 2006, when this portion of the Hi-Shear Site was subleased by Hi-Shear to La Caze Development and redeveloped.

The commercial properties located within APN 7377-006-905 and east of the Hi-Shear Site are referred to as the Eastern Adjacent Properties (EA Properties). The EA Properties are further subdivided into the following three properties:

- EA Property 1 is identified with 24751 and 24777 Crenshaw Boulevard and currently occupied by South Bay Lexus (vehicle dealership);
- EA Property 2 is identified with 24707, 24747 and 24701 Crenshaw Boulevard and currently occupied by Dasco Engineering Corporation (manufacturer of precision mechanic aircraft and space components); and
- EA Property 3 is identified with 2530 and 2540 Skypark Drive and currently occupied by Robinson Helicopter.

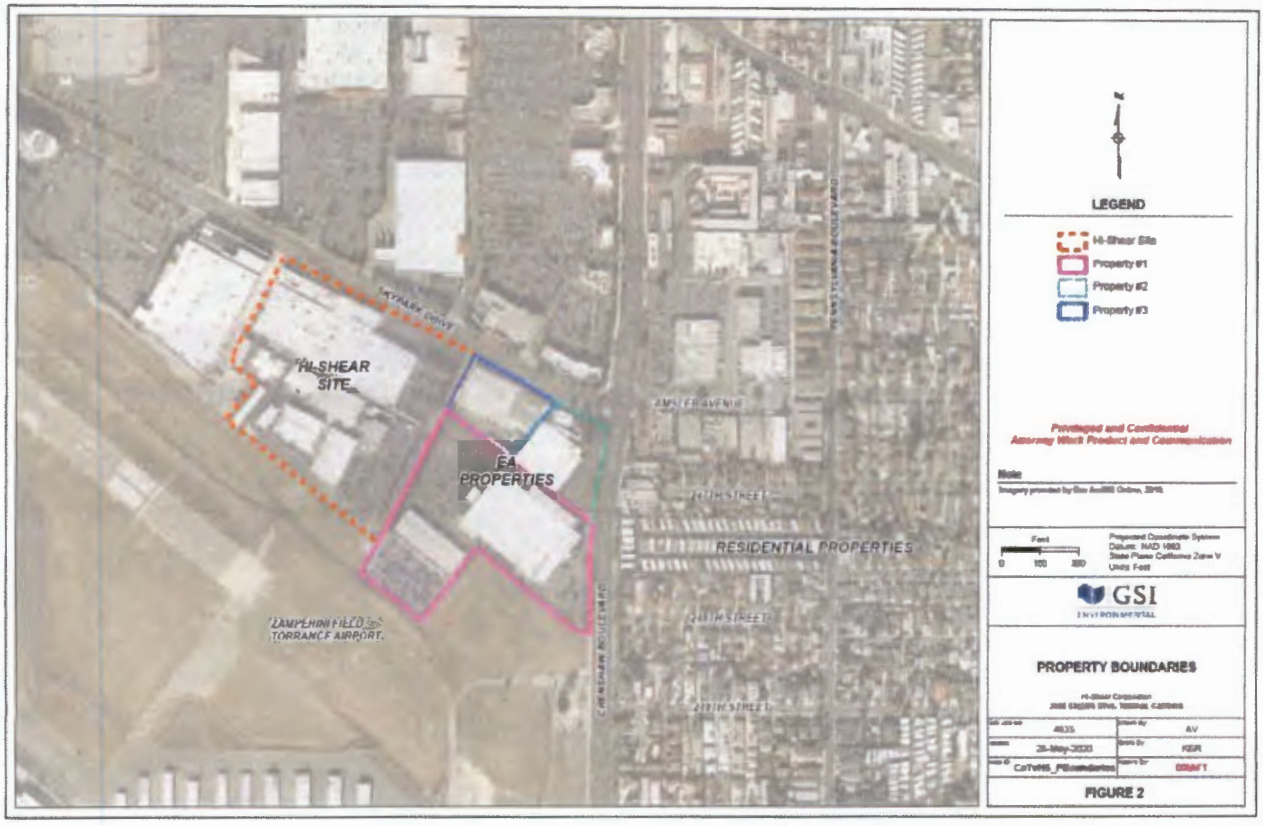
The entire parcel APN 7377-006-906, which includes the Hi-Shear Site, Lowe's, and EA Properties, is owned by the City of Torrance and has been leased to commercial entities since 1954.

The residential neighborhood located within the City of Lomita and east of the EA Properties and of Crenshaw Boulevard, is herein referred as the "Residential Properties."

The Hi-Shear Site, EA Properties, and Residential Properties are shown on Exhibit 1 below.

GSI ENVIRONMENTAL

Exhibit 1. Property Boundaries



Constituents of Concern (COCs) in Groundwater

The primary constituents of concern (COCs) in groundwater at the Hi-Shear and adjacent properties are TCE and PCE. Other detected VOCs include daughter products cis-1,2-dichloroethylene (cis-1,2-DCE) and vinyl chloride, as well as 1,1-dichloroethylene (1,1-DCE), 1,1,1-trichloroethane (1,1,1-TCA), trans-1,2-dichloroethylene (trans-1,2-DCE), 1,2-dichloroethane, 1,1,2-trichloroethane, benzene, toluene, ethylbenzene, hexavalent chromium, 1,4-dioxane, and perchlorate (Alta Environmental LP, [Alta], 2017). A review of available groundwater monitoring data indicates that TCE is the constituent detected at the highest concentrations and the remedy driver for groundwater impacts at the Hi-Shear Site, adjacent EA properties, and Residential Properties. For example, on-Site, the maximum historical measured TCE concentration (190,000 micrograms per liter [µg/L] in MW-3) is almost 12 times greater than the maximum measured historical concentration of PCE (16,000 µg/L in MW-3). In groundwater monitoring well MW-18 (which is located on the Hi-Shear Site and reported the highest TCE concentrations in August 2018), TCE concentrations have exceeded PCE concentrations by a factor of approximately 30 to 60 times (i.e., TCE concentrations are greater than 1 order-of-magnitude [OoM] than PCE).

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1.0 Hi-Shear's operations involved the significant use and storage of TCE and PCE on the Hi-Shear Site, historical Hi-Shear operational Site features provided pathways for TCE and PCE to be released to the subsurface, and waste handling practices were documented to be poor in 1991.

The Hi-Shear aerospace fastener manufacturing operations includes and previously included fastener manufacturing, heat treatment, process coating, ordinance assembly, plating with in-ground plating pits, and parts cleaning. These operations typically had included the use, storage and handling of significant quantities of chlorinated solvents. The use of significant quantities of TCE and PCE at the Hi-Shear Site is consistent with typical aerospace manufacturing and the subsurface data at the Site. "Aerospace manufacturers often use large quantities of solvents in a variety of cleaning and degreasing operations including parts cleaning, process equipment cleaning, and surface preparation for coating applications," (United States Environmental Protection Agency [USEPA], 1998).

Historical records obtained to date for the Hi-Shear Site identified equipment that typically involved the use of TCE and PCE and that was located throughout the Hi-Shear Site. Solvent degreasers were located at several buildings since at least 1968 and at least 18 underground storage tanks (USTs) were located at the Hi-Shear Site. The Hi-Shear operations included a distillation unit for the distillation of spent solvent and a wastewater treatment plant for treating industrial wastewater from the plating operations (Hygienetics, Inc., [Hygienetics], 1991). These features indicate the Hi-Shear operations were of considerable size and involved the use and storage of significant quantities of TCE and PCE.

Historical features at the Hi-Shear Site include structures that are frequently associated with chemical releases to the subsurface. A shallow drywell was located on the Hi-Shear Site, and dry-wells historically were used for waste disposal. In addition, clarifiers, and USTs were located at the Hi-Shear Site, and these structures are prone to leakage and release of solvents.

Historical records document that Hi-Shear waste handling practices were poor. Hi-Shear waste handling practices resulted in releases of TCE and PCE to the subsurface, including the discharge of waste to the sewer system that connected to the main sewer lines on Skypark Drive and Crenshaw Boulevard. TCE and PCE have been detected in samples collected from waste discharged to the sewer. The waste discharged at the Hi-Shear Site was associated with degradation of the sewer system.

A summary of historical information that describes the operations, historical features, and waste handling practices at the Hi-Shear Site is provided below. Note that we have not attempted to summarize all of the information reviewed to date and additional information likely is available at the LARWQCB office and from other sources, which have not been available for review due to COVID-19 impacts to the LARWQCB file review procedures. As such, the information presented below is a preliminary summary of key findings. Based on the records reviewed to date, GSI believes additional historical information may be available in the LARWQCB's physical files with information relevant to the identification of the historical use and release of TCE and PCE on the Hi-Shear Site.

1.1 Hi-Shear operations used TCE and PCE since at least 1968

SCAQMD "Permit to Operate" records were obtained for the Hi-Shear Site using their searchable online database for Facility ID No. 11192 (Hi-Shear Corporation).[1] These records document

[1] https://www.aqmd.gov/nav/online-services/public-records/public-document-search

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equipment that has been permitted for use at the Site since 1968, including equipment that utilizes TCE, PCE and other chlorinated solvents.

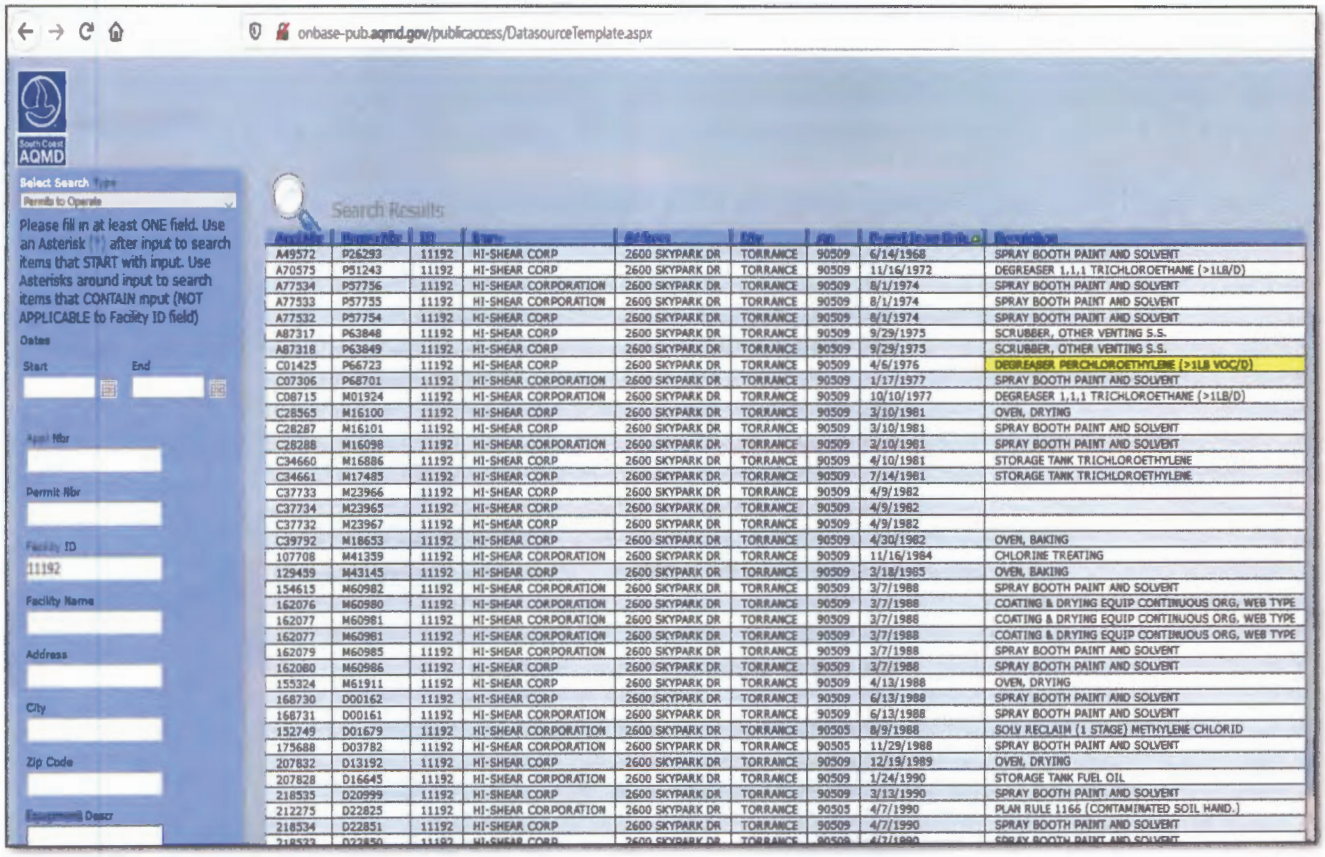
The list of equipment that has been operated by Hi-Shear under an SCAQMD permit for one or more years between 1968 and the present includes (listings verbatim from SCAQMD records):

- SPRAY BOOTH PAINT AND SOLVENT
- DEGREASER 1,1,1 TRICHLOROETHANE (>1LB/D)
- SCRUBBER, OTHER VENTING S.S.
- DEGREASER PERCHLOROETHYLENE (>1LB VOC/D)
- STORAGE TANK TRICHLOROETHYLENE
- CHLORINE TREATING
- COATING & DRYING EQUIP CONTINUOUS ORG, WEB TYPE
- SOLV RECLAIM (1 STAGE) METHYLENE CHLORID
- STORAGE TANK FUEL OIL
- PLAN RULE 1166 (CONTAMINATED SOIL HAND.)
- I C E (50-500 HP) EM ELEC GEN-DIESEL
- I C E (50-500 HP) EM FIRE FGHT-DIESEL
- WASTE WATER EVAPORATION
- AFTERBURNER, DIRECT FLAME
- WASTE WATER TREATING (>50000 GAL/DAY)
- TANK, CADMIUM - PLATING
- TANK, SURFACE PREPARATION - OTHER ACIDS
- SOIL TREAT VAPOR EXTRACT OTHER VOC UNDER
- TANK, NITRIC ACID
- TANK, OTHER AQUEOUS SOLUTION
- SCRUBBER, PARTICULATES VENTING S.S.
- SCRUBBER, PARTICULATES VENTING M.S>
- TANK, SULFURIC/PHOSPHORIC ACID - ANODIZING
- SOLV RECLAIM STILL (1 STAGE) HYDROCARB
- DIP TANK COATING WAX
- DIP TANK COATING MISC
- OVEN, COOKING OR CURING
- SPRAY MACHINE - COATING
- SPRAY BOOTH(S) (1 - 5) W/ AFTERBURNER
- SOIL TREAT VAPOR EXTRACT GASOLINE UNDER

- SCRUBBER, OTHER VENTING M.S.
- SPRAY BOOTHS (>5) WITH AFTERBURNER
- SURFACE PREP TANK CONT. CHROMIC ACID
- SCRUBBER, TOXICS VENTING
- SOLVENTS MISC STRIPPING
- WASTE WATER TREATING (20000-50000 GAL/D)

The permit below is listed in SCAQMD records as Permit Number P66723 dated 6 April 1976 for "Degreaser Perchloroethylene (<1LB VOC/D)." The permit listing (Exhibit 1-1) establishes that Hi-Shear operated a PCE degreasing operation in addition to TCE storage tanks. The permit identifies a Detrex degreaser and solvent recovery still (Exhibit 1-2).

Exhibit 1-1. SCAQMD Permit Records for Hi-Shear Site



A49572	P26293	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	6/14/1968	SPRAY BOOTH PAINT AND SOLVENT
A70575	P51243	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	11/16/1972	DEGREASER 1,1,1 TRICHLOROETHANE (>1LB/D)
A77534	P57756	11192	HI-SHEAR CORPORATION	2600 SKYPARK DR	TORRANCE	90509	8/1/1974	SPRAY BOOTH PAINT AND SOLVENT
A77533	P57755	11192	HI-SHEAR CORPORATION	2600 SKYPARK DR	TORRANCE	90509	8/1/1974	SPRAY BOOTH PAINT AND SOLVENT
A77532	P57754	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	8/1/1974	SPRAY BOOTH PAINT AND SOLVENT
A87317	P63848	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	9/29/1975	SCRUBBER, OTHER VENTING S.S.
A87318	P63849	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	9/29/1975	SCRUBBER, OTHER VENTING S.S.
C01425	P66723	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	4/6/1976	DEGREASER PERCHLOROETHYLENE (>1LB VOC/D)
C07306	P68701	11192	HI-SHEAR CORPORATION	2600 SKYPARK DR	TORRANCE	90509	1/17/1977	SPRAY BOOTH PAINT AND SOLVENT
C08715	M01924	11192	HI-SHEAR CORPORATION	2600 SKYPARK DR	TORRANCE	90509	10/10/1977	DEGREASER 1,1,1 TRICHLOROETHANE (>1LB/D)
C28565	M16100	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	3/10/1981	OVEN, DRYING
C28287	M16101	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	3/10/1981	SPRAY BOOTH PAINT AND SOLVENT
C28288	M16098	11192	HI-SHEAR CORPORATION	2600 SKYPARK DR	TORRANCE	90509	3/10/1981	SPRAY BOOTH PAINT AND SOLVENT
C34660	M16886	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	4/10/1981	STORAGE TANK TRICHLOROETHYLENE
C34661	M17485	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	7/14/1981	STORAGE TANK TRICHLOROETHYLENE
C37733	M23966	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	4/9/1982	
C37734	M23965	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	4/9/1982	
C37732	M23967	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	4/9/1982	
C39792	M18653	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	4/30/1982	OVEN, BAKING
107708	M41359	11192	HI-SHEAR CORPORATION	2600 SKYPARK DR	TORRANCE	90509	11/16/1984	CHLORINE TREATING
129459	M43145	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	3/18/1985	OVEN, BAKING
154615	M60982	11192	HI-SHEAR CORPORATION	2600 SKYPARK DR	TORRANCE	90509	3/7/1988	SPRAY BOOTH PAINT AND SOLVENT
162076	M60980	11192	HI-SHEAR CORPORATION	2600 SKYPARK DR	TORRANCE	90509	3/7/1988	COATING & DRYING EQUIP CONTINUOUS ORG, WEB TYPE
162077	M60981	11192	HI-SHEAR CORPORATION	2600 SKYPARK DR	TORRANCE	90509	3/7/1988	COATING & DRYING EQUIP CONTINUOUS ORG, WEB TYPE
162077	M60981	11192	HI-SHEAR CORPORATION	2600 SKYPARK DR	TORRANCE	90509	3/7/1988	COATING & DRYING EQUIP CONTINUOUS ORG, WEB TYPE
162079	M60985	11192	HI-SHEAR CORPORATION	2600 SKYPARK DR	TORRANCE	90509	3/7/1988	SPRAY BOOTH PAINT AND SOLVENT
162080	M60986	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	3/7/1988	SPRAY BOOTH PAINT AND SOLVENT
155324	M61911	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	4/13/1988	OVEN, DRYING
168730	D00162	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	6/13/1988	SPRAY BOOTH PAINT AND SOLVENT
168731	D00161	11192	HI-SHEAR CORPORATION	2600 SKYPARK DR	TORRANCE	90509	6/13/1988	SPRAY BOOTH PAINT AND SOLVENT
152749	D01679	11192	HI-SHEAR CORPORATION	2600 SKYPARK DR	TORRANCE	90505	8/9/1988	SOLV RECLAIM (1 STAGE) METHYLENE CHLORID
175688	D03782	11192	HI-SHEAR CORPORATION	2600 SKYPARK DR	TORRANCE	90505	11/29/1988	SPRAY BOOTH PAINT AND SOLVENT
207832	D13192	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	12/19/1989	OVEN, DRYING
207828	D16645	11192	HI-SHEAR CORPORATION	2600 SKYPARK DR	TORRANCE	90509	1/24/1990	STORAGE TANK FUEL OIL
218535	D20999	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	3/13/1990	SPRAY BOOTH PAINT AND SOLVENT
212275	D22825	11192	HI-SHEAR CORPORATION	2600 SKYPARK DR	TORRANCE	90505	4/7/1990	PLAN RULE 1166 (CONTAMINATED SOIL HAND.)
218534	D22851	11192	HI-SHEAR CORP	2600 SKYPARK DR	TORRANCE	90509	4/7/1990	SPRAY BOOTH PAINT AND SOLVENT

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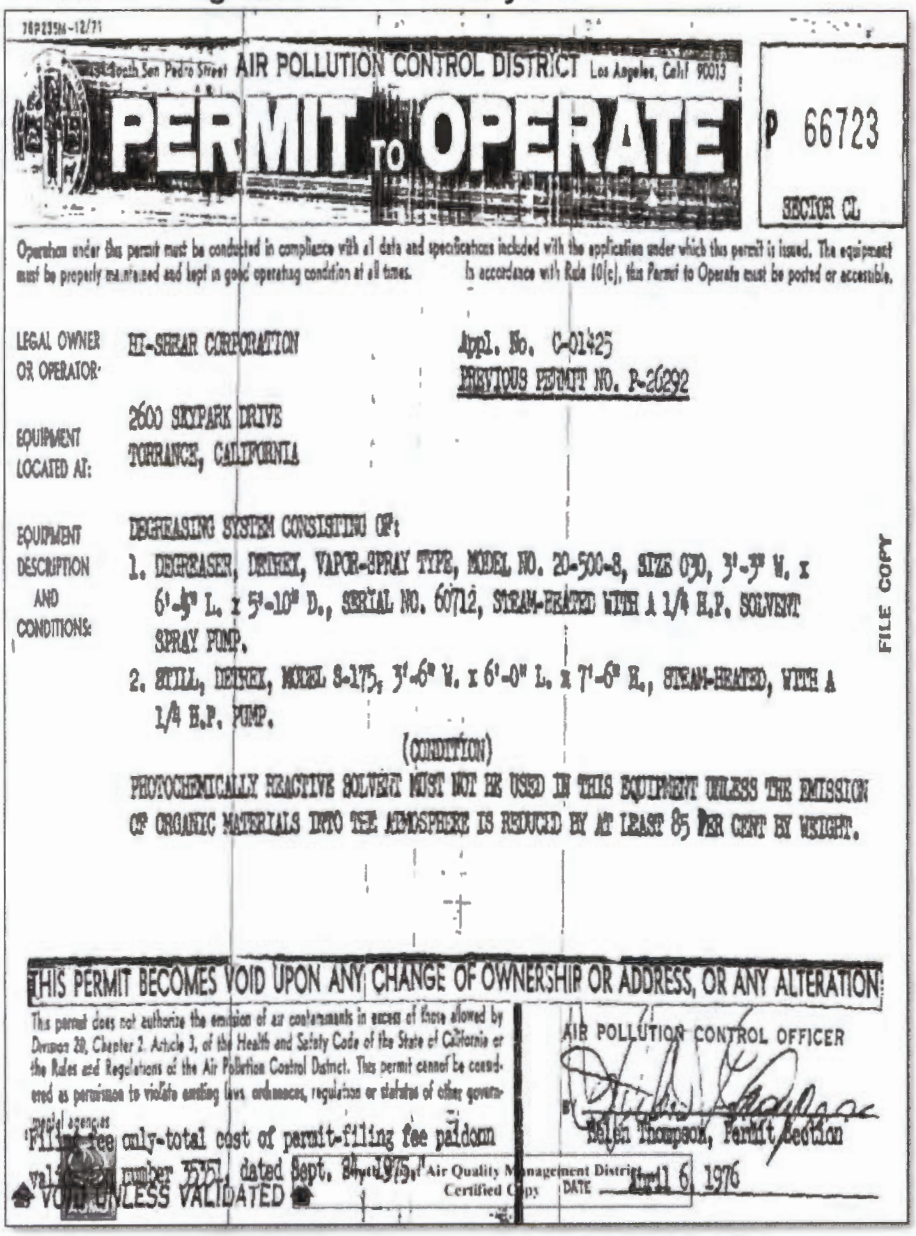
Exhibit 1-2. Permit for "Degreaser Perchloroethylene"



70P2356-12/71

AIR POLLUTION CONTROL DISTRICT 434 South San Pedro Street Los Angeles, Calif 90013

PERMIT TO OPERATE

P 66723

SECTOR CL

Operation under this permit must be conducted in compliance with all data and specifications included with the application under which this permit is issued. The equipment must be properly maintained and kept in good operating condition at all times. In accordance with Rule 10(c), this Permit to Operate must be posted or accessible.

LEGAL OWNER OR OPERATOR: HI-SHEAR CORPORATION

Appl. No. C-01425
PREVIOUS PERMIT NO. P-20292

EQUIPMENT LOCATED AT: 2600 SKYPARK DRIVE
TORRANCE, CALIFORNIA

EQUIPMENT DESCRIPTION AND CONDITIONS: DEGREASING SYSTEM CONSISTING OF:

1. DEGREASER, DETREX, VAPOR-SPRAY TYPE, MODEL NO. 20-500-S, SIZE 030, 3'-3" W. x 6'-5" L. x 5'-10" D., SERIAL NO. 60712, STEAM-HEATED WITH A 1/4 H.P. SOLVENT SPRAY PUMP.
2. STILL, DETREX, MODEL S-175, 3'-6" W. x 6'-0" L. x 7'-6" H., STEAM-HEATED, WITH A 1/4 H.P. PUMP.

FILE COPY

(CONDITION)

PHOTOCHEMICALLY REACTIVE SOLVENT MUST NOT BE USED IN THIS EQUIPMENT UNLESS THE EMISSION OF ORGANIC MATERIALS INTO THE ATMOSPHERE IS REDUCED BY AT LEAST 85 PER CENT BY WEIGHT.

THIS PERMIT BECOMES VOID UPON ANY CHANGE OF OWNERSHIP OR ADDRESS, OR ANY ALTERATION

This permit does not authorize the emission of air contaminants in excess of those allowed by Division 20, Chapter 2, Article 3, of the Health and Safety Code of the State of California or the Rules and Regulations of the Air Pollution Control District. This permit cannot be considered as permission to violate existing laws, ordinances, regulations or statutes of other governmental agencies.

AIR POLLUTION CONTROL OFFICER

BY Helen Thompson, Permit Section

Filing fee only-total cost of permit-filing fee paidcm
validation number 7251, dated Sept. 30, 1975.

Air Quality Management District
Certified Copy

DATE April 6 1976

VOID UNLESS VALIDATED

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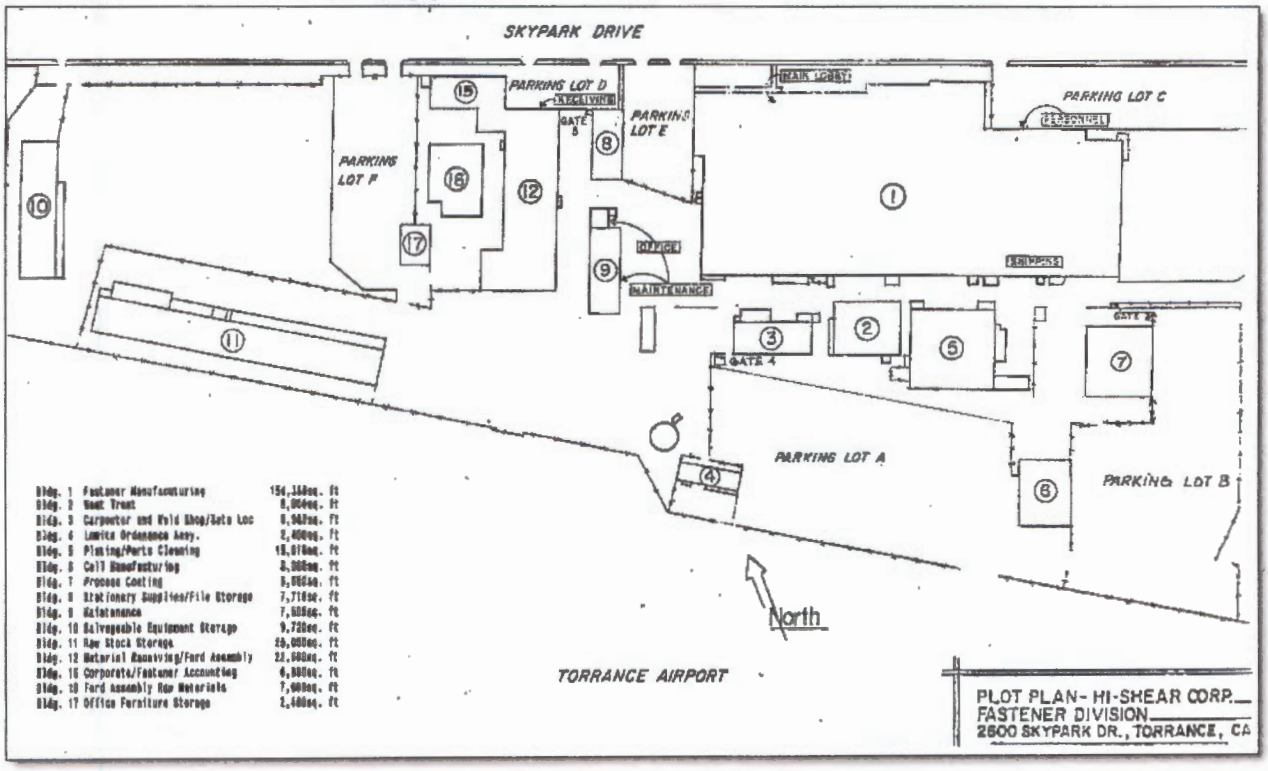
1.2 Hi-Shear operations involved extensive storage, handling and use of solvents

Hi-Shear operated a large-scale aerospace fastener manufacturing operation at the Hi-Shear Site. In 1991, a Phase I Environmental Site Assessment was performed at the Hi-Shear Site on behalf of Chemical Bank by Hygienetics (1991). The Hygienetics report included the following Site plan, which shows a large facility with significant manufacturing operations:

Exhibit 1-3. 1991 Site Plan (Hygienetics, 1991)



The Hygienetics report described the use and storage of chlorinated solvents, including the use of degreasers, at Heat Treat Building #2 and Plating/Parts Cleaning Building #5. The 1991 assessment summarized the USTs that were present at the Hi-Shear facility in 1991:

Exhibit 1-4. List of USTs at Hi-Shear in 1991 (Hygienetics, 1991)

UNDERGROUND STORAGE VESSELS
PAST AND PRESENT

NUMBER	LOCATION	CONTENTS	VOLUME
1*	Southeast of Bldg. #9	Waste Oil	?
2	North of Bldg. #5	Plating Clarifier	2,000 gal
3	East of Bldg. #5	Plating Clarifier	2,000 gal
4	East of Bldg. #5	East Plating Pit	50,000 gal
5	West of Bldg. #5	West Plating Pit	75,000 gal
6	Bldg. #1	Grind Oil	2,000 gal
7	Bldg. #1	Coolant Oil	800 gal
8	Bldg. #1	Grind Oil	2,000 gal
9	Bldg. #1	Water Sump	900 gal
10	Southwest of Bldg. #3	Waste Oil Sump	2,000 gal
11	Bldg. #3	Steam Clean Sump	275 gal
12*	West of Bldg. #3	Waste Oil	250 gal
13*	West of Bldg. #3	Waste Oil	250 gal
14*	West of Bldg. #3	Waste Oil	250 gal
15*	West of Bldg. #6	Gasoline	?
16*	West of Bldg. #6	Gasoline	?
17	South of Bldg. #3	Soap, Grease & Water	?
18	South of Bldg. #3	Soap, Grease & Water	?

The Hygienetics report describes poor tracking practices for the USTs:

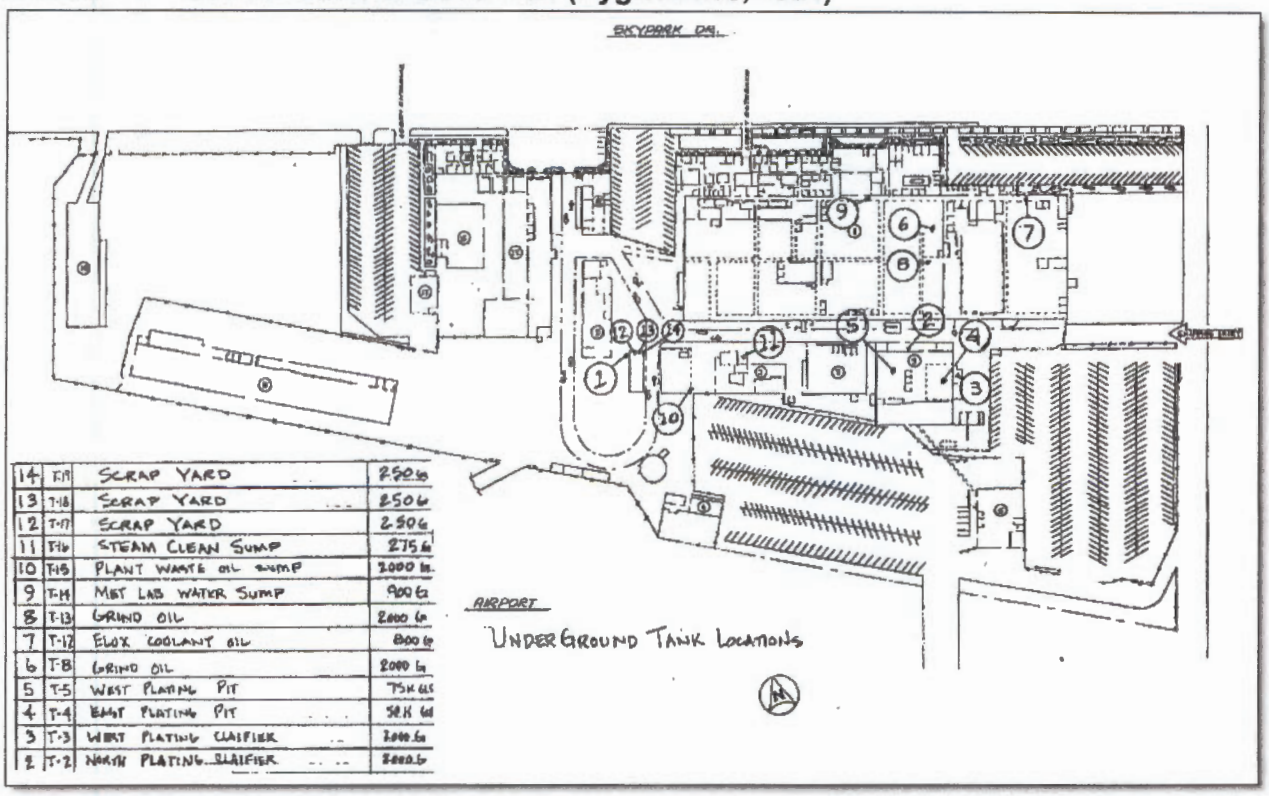
> *According to Hi-Shear, 11 underground storage tanks were registered. Of these 11 tanks, six have been removed and five still remain. However, it appears that there have been a total of 18 underground storage tanks on-Site (Hygienetics, 1991).*

In addition, Hygienetics noted that:

> *No documentation was available on-Site regarding the integrity testing of the tanks currently on-Site (Hygienetics, 1991).*

The Hygienetics presentation of the 18 USTs is included below as Exhibit 1-5.

Exhibit 1-5. 1991 Location of USTs Plan (Hygienetics, 1991)



At Building 5, two clarifiers and two plating pits were present in 1991 and the large capacity of the plating pits (50,000 and 75,000 gallons) indicate a large operation that would have involved significant quantities of solvents. The Hygienetics report also describes the degreasing operations at Building 5:

> *The southern part of Building #5 is dedicated to parts cleaning. Several degreasers are located here for removal of oil and grease with solvents (Hygienetics, 1991).*

Based on the SCAQMD permit records, the degreaser operations included the use of both TCE and PCE (Exhibit 1-1).

1.3 Historical site features provided pathways for release of solvents to subsurface

Historical Site features that provided pathways for the release of TCE and PCE to the subsurface include a drywell, clarifiers, USTs, and sewer lines.

Drywell

Based on a 1992 Floor Plan for the Process Coating Building by SM Daderian & Associates, a drywell with a drain leading to a 24-inch diameter by 18-inch long pipe filled with fist size stones and gravel was located at Building 3. Exhibit 1-6 shows the drywell detail and Exhibit 1-7 shows the complete floor plan that includes this detail.

Exhibit 1-6. 1992 Floor Plan Call Out showing Drywell Detail (Part of Exhibit 1-7)

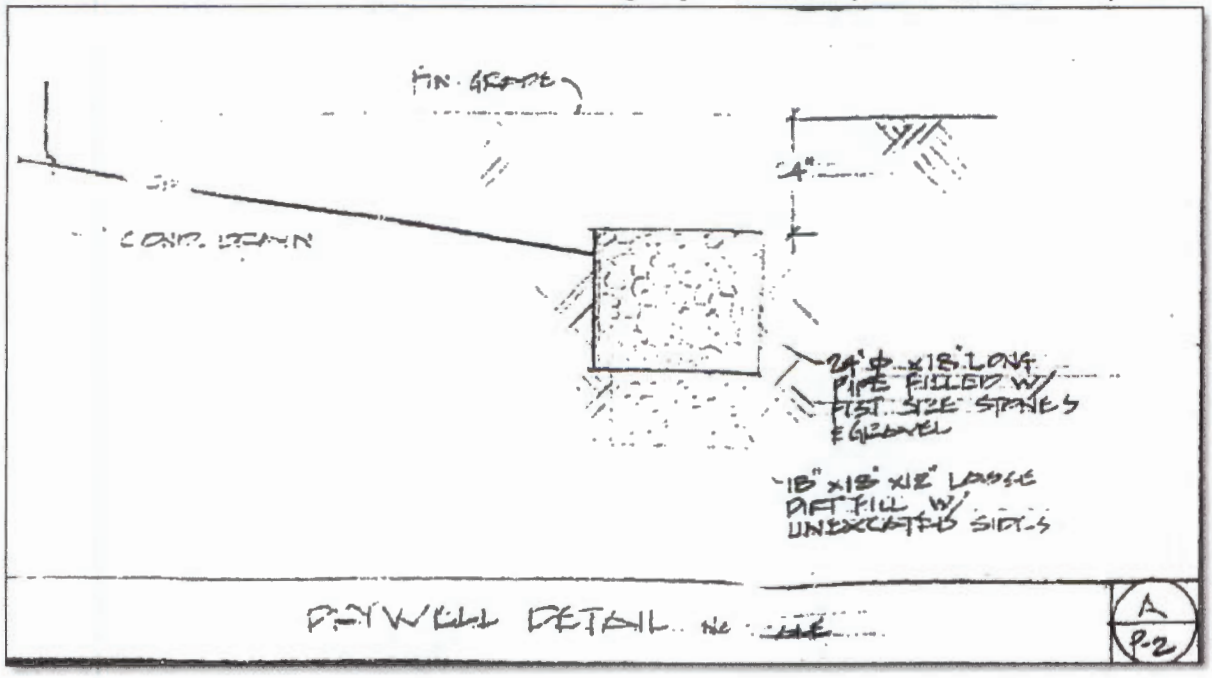
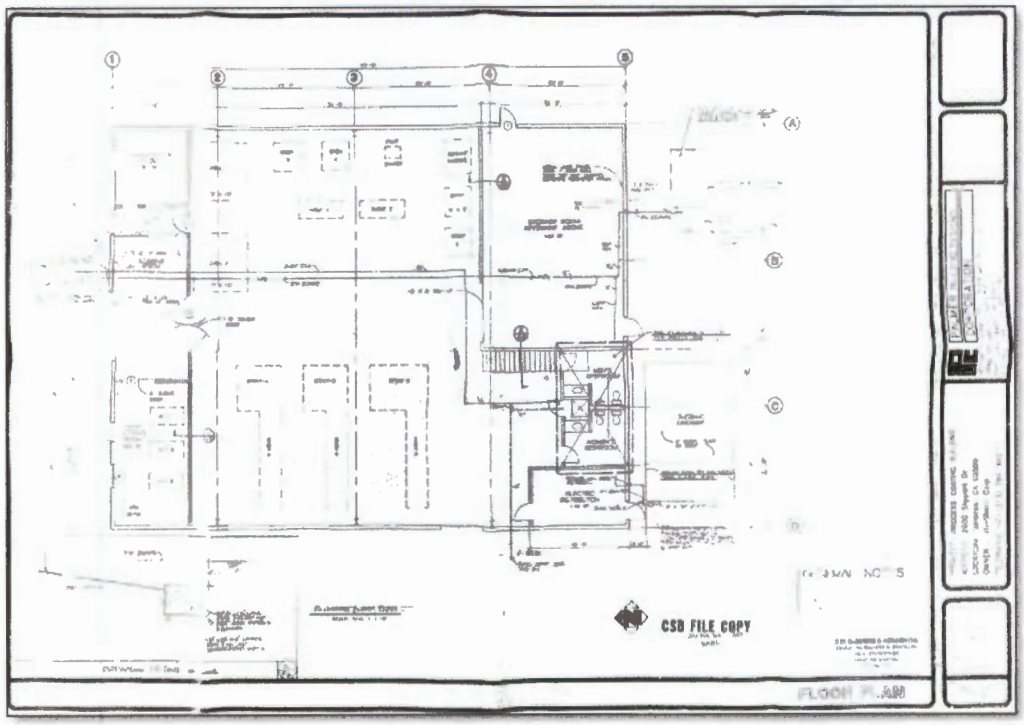


Exhibit 1-7. 1992 Floor Plan for the Process Coating Building Showing Drywell Detail



The dry well design provides a direct path to release liquids directly into soil.

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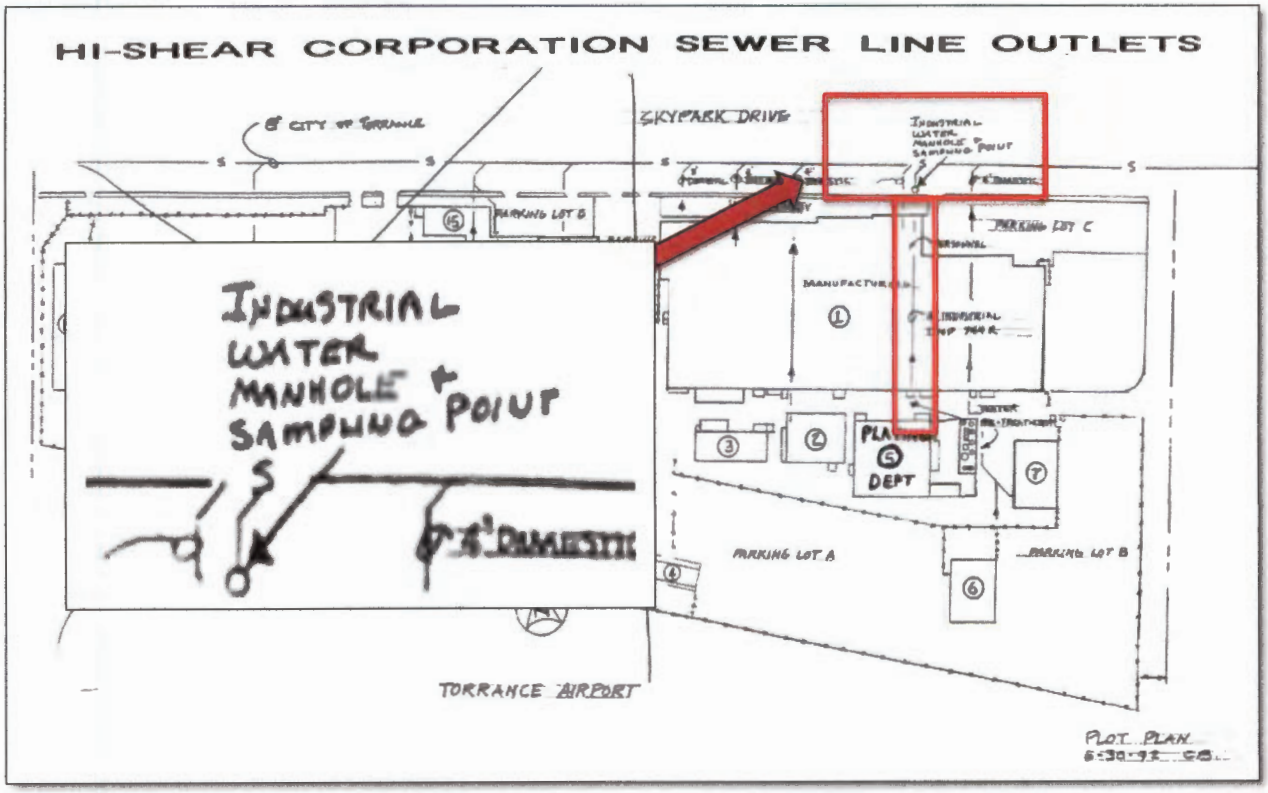
USTs and Clarifiers

As described above, at least 18 USTs, including in-ground plating pits and plating sumps, were located at the Hi-Shear Site. The Hygienetics report indicated that "[n]o documentation was available on-Site regarding the integrity testing of the tanks currently on-Site" (Hygienetics, 1991). USTs can leak from associated use activities including filling, dispensing, and storage through incidental and accidental spills, leaking piping and USTs from corrosion and compromise of seals and fittings. USTs are commonly associated with releases of VOCs to soil, soil vapor, and groundwater.

Sewer Lines Associated with Industrial Waste Water Discharge

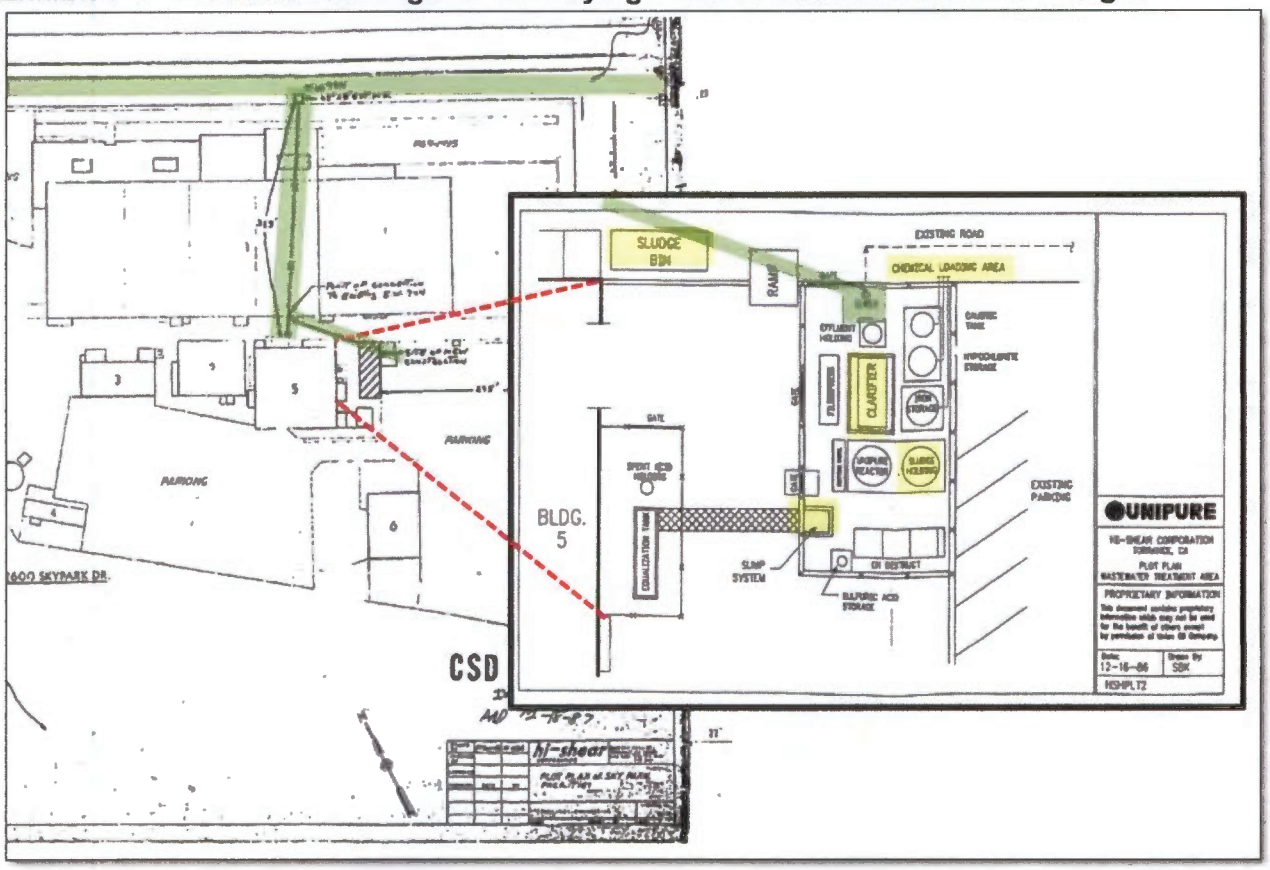
Records obtained from LACSD identify sewer lines between Building 5 and the sewer outfall identified as the "Industrial Water Manhole and Sampling Point" on the 1992 Plot Plan shown below (Exhibit 1-8). The sewer lines are shown to flow from the vicinity of Building 5 directly to the Industrial Water Manhole and Sampling Point.

Exhibit 1-8. 1992 Figure Identifying "Industrial Water Manhole and Sampling Point" and Sewer Lines



Additional LACSD records from 1986 identify the area to the east of Building 5 as having a clarifier, sump, sludge bin, and chemical loading area near a sewer inlet. The maps below identify the above ground features in yellow and the general location of the sewer lines in green (Exhibit 1-9).

Exhibit 1-9. 1986 and 1987 Figures Identifying Detail of Eastern Side of Building 5



Notes: Above ground features = Yellow; Sewer Lines = Green

Building 5 also contained two large (50,000 and 75,000 gallon) in-ground plating pits and a degreasing operation: The Hygeinetics report describes the degreasing operations at Building 5: "The southern part of Building #5 is dedicated to parts cleaning. Several degreasers are located here for removal of oil and grease with solvents" (Hygienetics, 1991). A plating pit and plating clarifier also were located at the southeast corner of Building 5 (Exhibit 1-5).

1.4 Historical records document the detection of TCE and PCE in discharge to the sewer system and degradation of sewer system due to Hi-Shear waste discharge

Hygienetics identified Hi-Shear had an Industrial Waste Water Discharge Permit since 1956 (Hygienetics, 1991). Plating operations at Hi-Shear generated two primary waste streams: (1) cyanide rinse water and (2) concentrated acid waste (Hygienetics, 1991). The Hygienetics report (1991) documented Hi-Shear acknowledged that discharges to the sewer by Hi-Shear degraded the main sewer line on Skypark Drive:

> *It appears that past discharges of acidic waste have dissolved the City of Torrance Skypark Drive sewer main in several places. Hi-Shear has agreed that this is most*

probably due to their discharge. A preliminary study was performed to determine if the manhole deterioration has resulted in the release of heavy metal contaminates into the exposed earth. Soil samples taken below the dissolved manhole indicate that all possible metal contaminants levels are within regulatory limits.

Soil samples were not analyzed for VOCs. However, discharges to the sewer by Hi-Shear likely has resulted in the release of TCE and PCE to the subsurface along the sewer main on Skypark Drive, which flows east to Crenshaw Boulevard.

In 1987, Hi-Shear built a waste treatment plant located east of Building 5 (Hygienetics, 1991). Despite the construction of this plant, industrial water discharge sample records indicate VOCs were present in industrial water discharge from the Hi-Shear Site. Industrial water discharge sample (IWS) analytical results from sampling events that included analysis for VOCs were obtained from LACSD files for the years 1989 through 2012. Twelve events identified concentrations of either PCE, TCE, or 1,1,1-TCA in IWS. Twelve events did not identify PCE, TCE, or 1,1,1-TCA, but used laboratory reporting limits for VOCs that exceeded 10 µg/L and three additional events used reporting limits for VOCs that exceeded 20 µg/L. After six sampling events in 1991 that identified concentrations of 1,1,1-TCA ranging to 1,040 µg/L, 1,1,1-TCA was only reported intermittently and not reported on 13 analytical reports that identified VOCs. The sampling events with reported VOC concentrations are identified in the table below (Exhibit 1-10).

Exhibit 1-10. IWS Events with Documented VOCs in Wastewater

Sampling Date	PCE (µg/L)	TCE (µg/L)	1,1,1-TCA (µg/L)
23 Jan 1989	**7.3**	<5	**110**
2 Feb 1989	<5	<5	**129**
25 Apr 1991	<5	<5	**220**
11 Oct 1991	<5	<5	**85**
6 Nov 1991	<5	<5	**370**
7 Nov 1991	<5	<5	**1040**
17 Feb 2000	**11**	<10	<10
7 Nov 2000	**1.5**	<0.5	NR
40 Apr 2002	**5.2**	<0.5	NR
25 Sep 2002	<1.0	**2.3**	NR
30 Apr 2010	<0.5	**2.9**	<0.5
4 Jun 2010	<2.0	**2.3**	<2

NR = Not Reported

Based on the evidence presented above, Hi-Shear has discharged PCE and TCE to the sewer system as well as acidic waste that had degraded the sewer system. This is an area where additional investigation is warranted by Hi-Shear.

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1.5 Historical records document poor handling and tracking practices of hazardous waste in 1991

Hygienetics indicated that poor compliance with hazardous waste labeling and tracking requirements were observed during its 1991 assessment:

> *Hygienetics investigated Hi-Shear's compliance with RCRA regulations concerning hazardous waste. Hygienetics' investigation revealed that labeling of containers is the biggest non-compliance issue. Hygienetics did not observe proper hazardous waste stickers applied to any hazardous waste on-Site*
>
> *Additionally, accumulation dates were not provided on hazardous waste containers in the temporary storage areas. Hi-Shear representatives indicated that they have been cited for improper labeling of on-Site hazardous waste. (Hygienetics, 1991).*

In summary, historical records describe an extensive manufacturing operation that involved significant quantities of solvents, including TCE and PCE, at the Hi-Shear Site. Multiple historical Site features are potential pathways for TCE and PCE to enter the subsurface, including at least 18 USTs and the sewer system that received industrial waste discharge. Finally, historical records also describe poor waste handling practices.

2.0 Soil, soil vapor, and groundwater data identify releases of TCE and PCE at historical at features Hi-Shear operational Site features, and these releases have caused a soil vapor and groundwater plume beneath the Hi-Shear Site, EA Properties, and residential properties.

Hi-Shear detected TCE and PCE in soil samples collected in 1990 as part of an investigation following the removal of a waste oil UST. Subsequent investigations identified the presence of dense nonaqueous phase liquid (DNAPL) and TCE beneath the Hi-Shear Site and indicated that TCE in groundwater associated with sources at the Hi-Shear Site was migrating east of the Hi-Shear Site to the EA Properties and Residential Properties. Soil sampling at the Hi-Shear Site identified eight areas of potential concern (AOPCs) for releases of total petroleum hydrocarbons (TPH), TCE and PCE. Both TCE and PCE were detected in soil samples collected at five of the eight AOPCs. Hi-Shear's soil and groundwater investigations have identified TCE and PCE source areas at the Hi-Shear Site, TCE and PCE in groundwater beneath the Hi-Shear Site and acknowledged that the groundwater plume has migrated from the Hi-Shear Site east to the EA Properties.

2.1 Groundwater monitoring reports prepared on behalf of Hi-Shear acknowledge migration of impacted groundwater off-site in the early 1990s

Groundwater monitoring was initiated at the Hi-Shear Site in 1991 with the installation of monitoring wells at the "oil yard" area southeast of Building 9 to evaluate groundwater impacts associated with a release at a waste oil UST (identified as Tank 1 in Exhibit 1-5). In December 1988, the 2,000 gallon capacity, steel UST that was used to store waste machine cutting and cooling oils was removed and TPH was detected in soil samples at concentrations of 22,040 and 125,130 milligrams per kilogram (mg/kg) (Camp, Dresser & McKee, Inc. [CDM], 1991). Subsequently, four soil borings (HS1 to HS4) were advanced to depths of 40 to 60 feet bgs using hollow stem augers in May 1991 (CDM, 1991). Two soil samples were collected from each boring and analyzed for TPH and VOCs:

- TCE was detected in all eight soil samples at concentrations ranging from 5,400 micrograms per kilogram (µg/kg) (HS1 at 61.5 feet bgs) to 5,500,000 µg/kg (HS3 at 50.0 feet bgs).
- PCE was detected in all eight soil samples at concentrations ranging from 1,700 µg/kg (HS1 at 61.5 feet bgs) to 1,600,000 µg/kg (HS3 at 50.0 feet bgs) (CDM, 1991).

To evaluate if VOCs detected in soil had impacted groundwater, seven groundwater monitoring wells (MW-1 through MW-7) were installed at the Hi-Shear Site in 1991 and 1992 and one monitoring well (MW-8) was installed downgradient of the Hi-Shear facility at the Robinson Helicopter property in 1992. Groundwater monitoring was conducted in 1993 on behalf of Hi-Shear by Blasland, Bouck & Lee (BBL). BBL concluded a TCE plume was present in groundwater at the Hi-Shear Site, the flow of groundwater beneath the Hi-Shear Site was to the east, and the TCE plume extended off-Site to the east: "*The downgradient offsite well MW-8 contained 2,900 [µg/L] of TCE indicating that the contaminant plume has extended off-Site*" (BBL, 1993). For this sampling event, TCE was detected at a concentration of the 23,000 µg/L in monitoring well MW-3, which is located south of Building 3. Thus, Hi-Shear acknowledged in 1993 that a release of TCE at the Hi-Shear Site had resulted in a groundwater plume that extended to the EA Properties.

The BBL figures showing the groundwater elevation contours and estimated TCE plume area are included as Exhibits 2-1 and 2-2. Note that MW-8 is located east of MW-5 (shown in Exhibit 2-5).

Exhibit 2-1. Groundwater Elevation Contour (BBL, 1993)

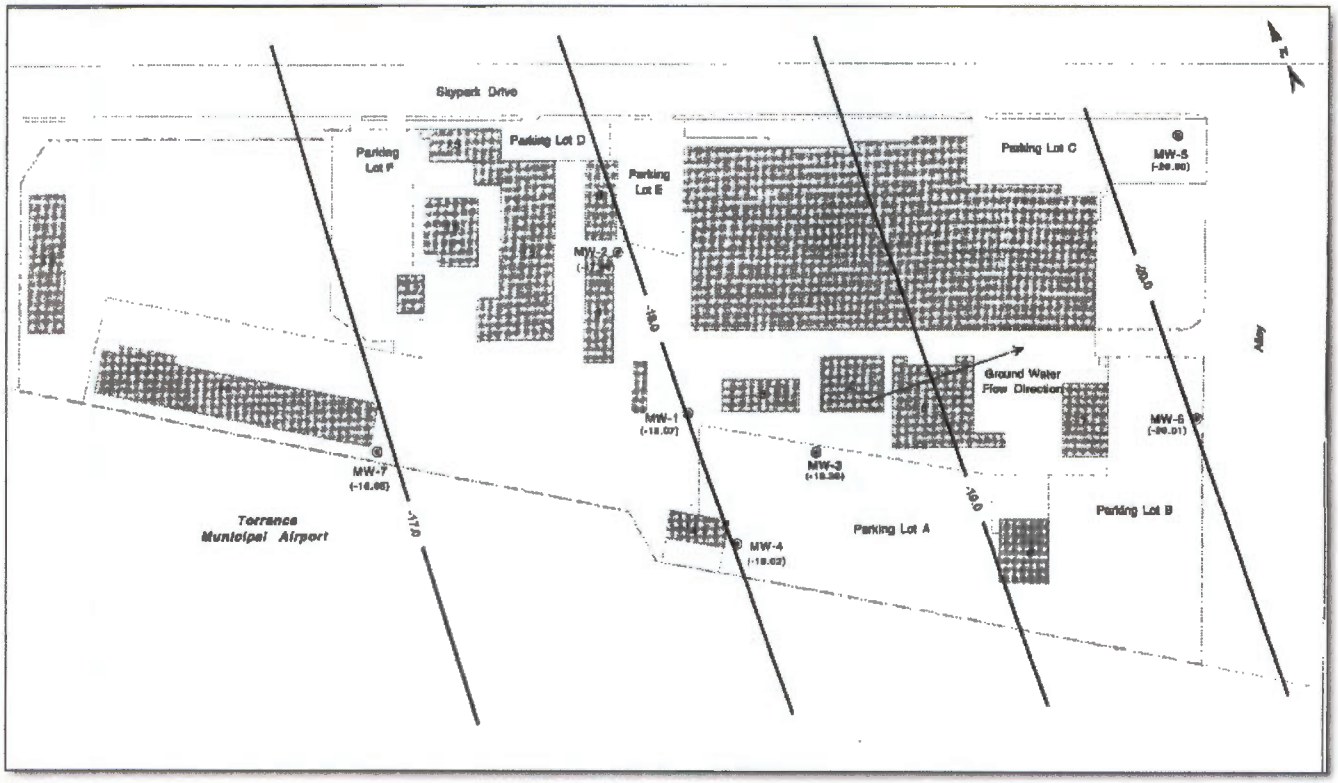

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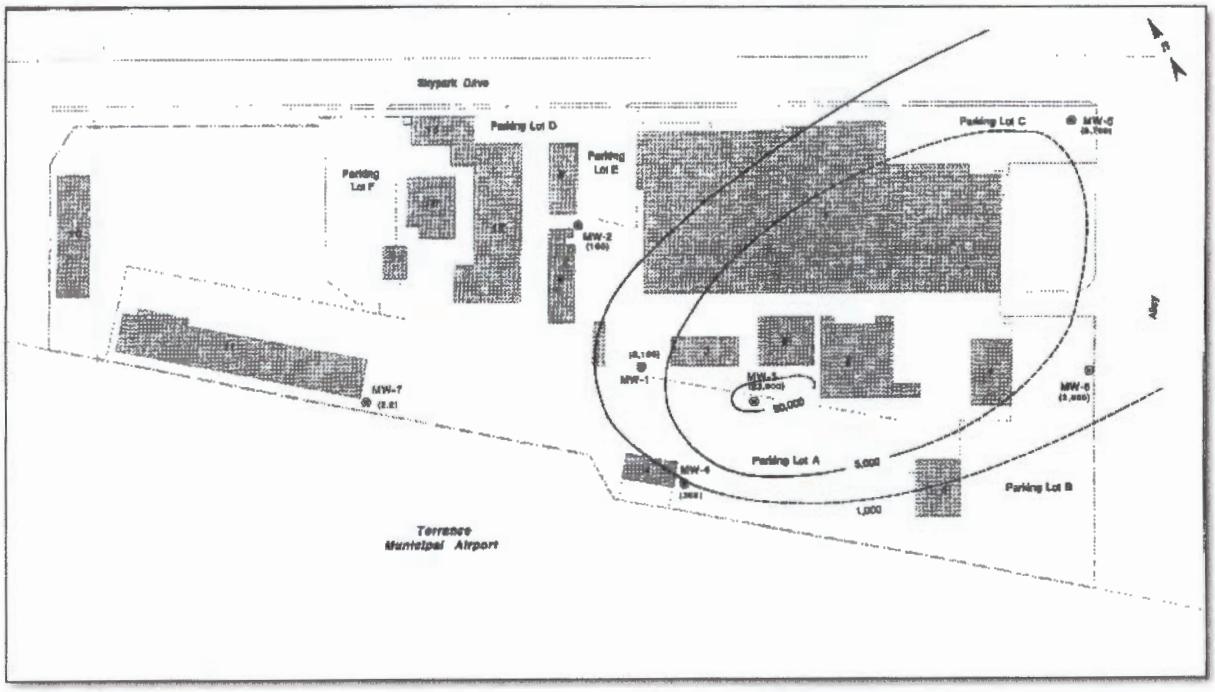
Exhibit 2-2. TCE Concentrations in Groundwater in 1993 (BBL, 1993)



Subsequent GW monitoring indicates the groundwater flow direction is generally toward the southeast perpendicular to the southeastern Hi-Shear Site boundary, resulting in groundwater moving from the Hi-Shear Site to the EA properties and residential properties, as shown on Exhibit 2-3 (Geosyntec Consultants, Inc. [Geosyntec], 2018).

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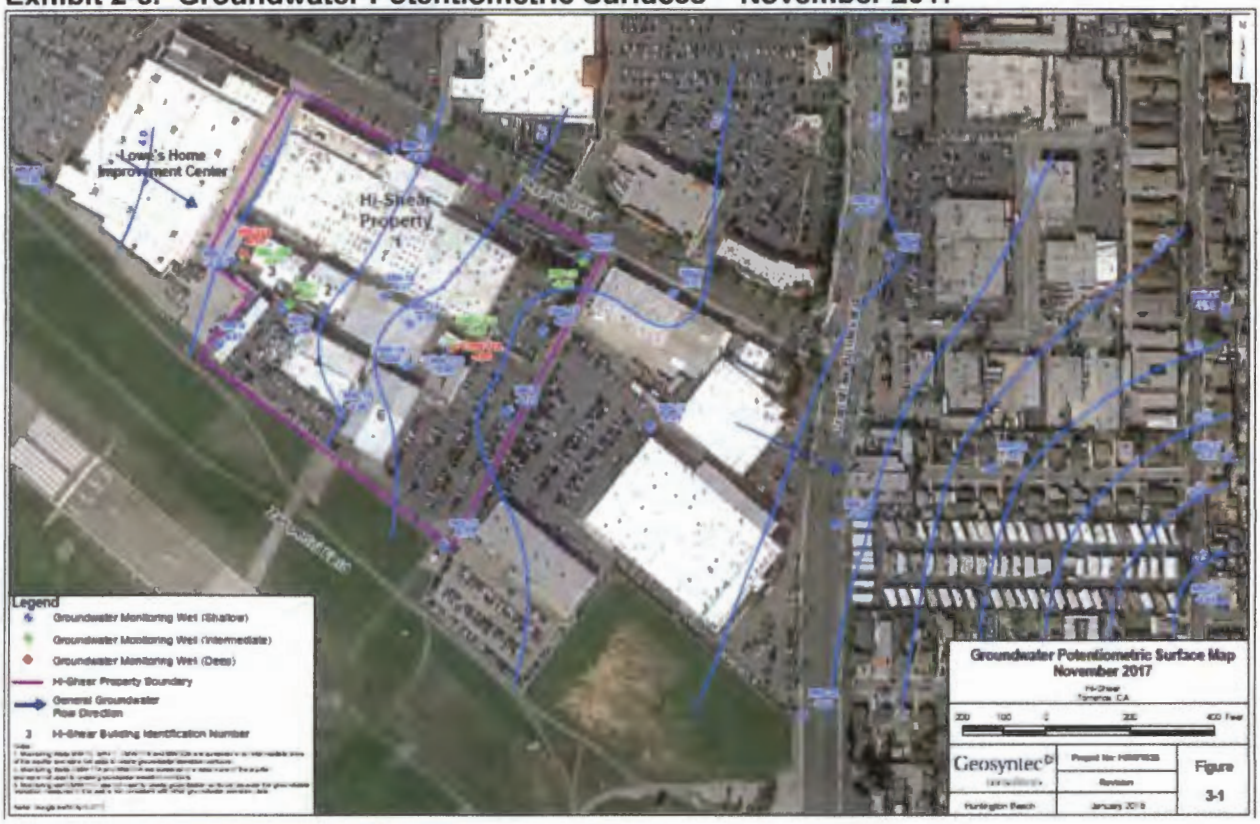
Exhibit 2-3. Groundwater Potentiometric Surfaces – November 2017



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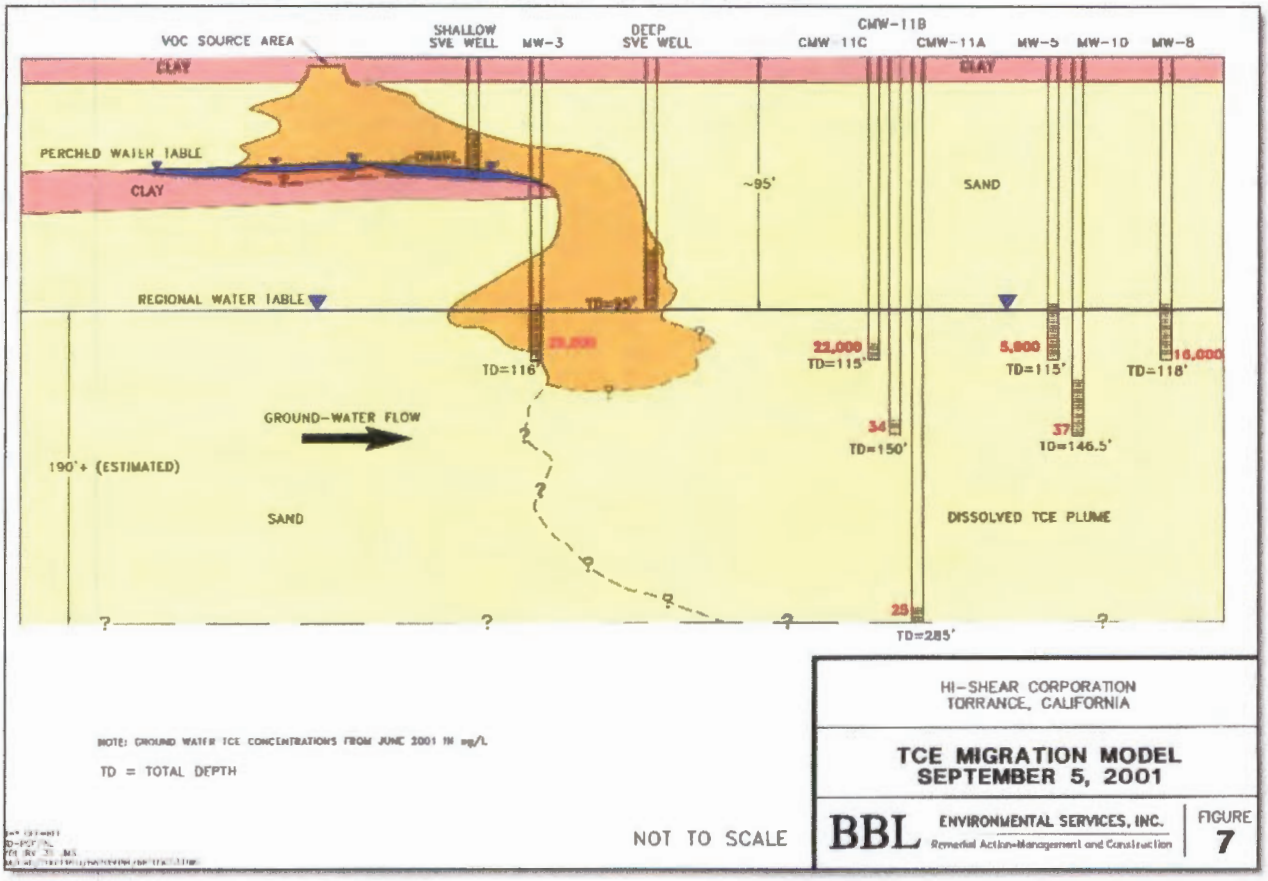
2.2 Hi-Shear site assessment reports acknowledge the presence of DNAPL beneath the Hi-Shear Site in 2001

In 2001, five soil borings were advanced to depths of 95 feet bgs to evaluate VOC concentrations and the presence of dense nonaqueous phase liquid (DNAPL; chlorinated solvents TCE and PCE are liquids that are denser than water) in deeper soils at depths of 60 feet bgs to groundwater (~95 feet bgs). In a progress report of the soil investigation, BBL included a figure depicting the presence of DNAPL within the on-Site TCE plume:

Exhibit 2-4. TCE Migration Model prepared by BBL (2001)



Hi-Shear acknowledged TCE and DNAPL associated with a "VOC Source Area" upgradient of MW-3 that resulted in a "dissolved TCE plume" moving offsite and impacted groundwater at the EA Properties (MW-8 at Robinson Helicopter) and further east. The BBL progress report also included a plan view depiction of the TCE plume migrating from the Hi-Shear Site east to the EA Properties and Residential Properties.

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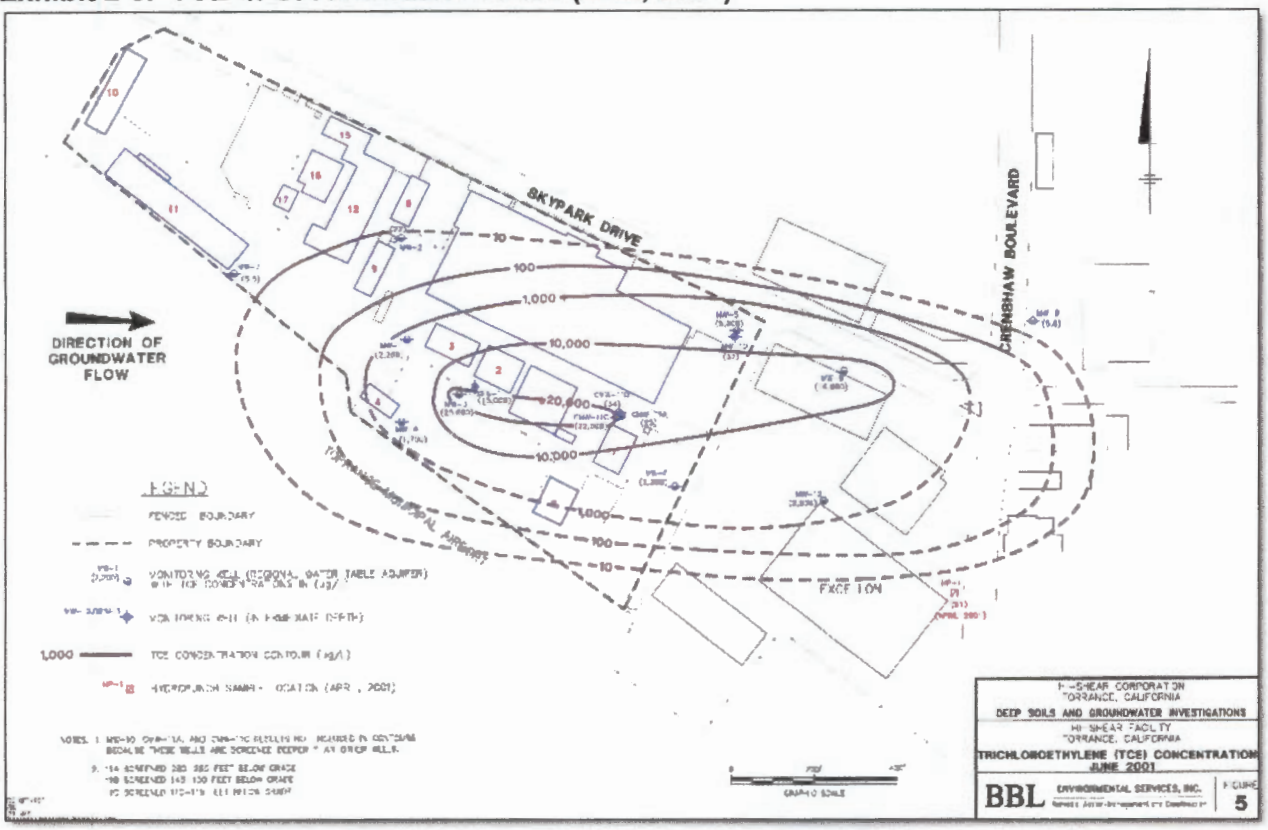
Exhibit 2-5. TCE in Groundwater in 2001 (BBL, 2001)



In addition to TCE, PCE was detected in soil samples collected by BBL at the Hi-Shear Site. The results of TCE and PCE in soil samples collected by BBL in 2001 indicated that detection of elevated concentrations of PCE was coincident with elevated concentrations of TCE. For example, both the highest detected concentration of TCE and PCE in soil samples collected in 2001 were collected in samples collected at VPO-2, which was located south of Building 2:

- At 44 feet bgs, 4,100,000 µg/kg of TCE and 190,000 µg/kg of PCE,
- At 65 feet bgs, 120,000 µg/kg of TCE and 120,000 µg/kg of PCE, and
- At 90 feet bgs, 15,000 µg/kg of TCE and 5,200 µg/kg of PCE (BBL, 2001).

In comparison, one soil sample was collected at 50 feet bgs at the soil boring advanced for the installation of MW-12 at the EA Property 1. In this soil sample, TCE was detected at a concentration of 120 µg/kg and PCE was detected at a concentration of 67 µg/kg. The detected concentrations of PCE and TCE are over 4 orders of magnitude lower than PCE and TCE concentrations at VPO-2 and are not consistent with a release at the EA Property 1.

The site investigation data indicate that the source area for VOCs at the Hi-Shear Site is associated with both PCE and TCE.

2.3 Hi-Shear's environmental site assessment reports identify TCE and PCE release areas at the Hi-Shear Site

In 2010, a Site Conceptual Model (SCM) report was prepared for the Hi-Shear Site by Winefield & Associates, Inc. (W&A). As part of the SCM, the existing site characterization data was compiled and AOPCs for the release of VOCs to the subsurface were identified. As shown in Exhibit 2-6, eight AOPCs were identified.

Exhibit 2-6. AOPCs Identified in 2010 at Hi-Shear Site (W&A, 2010)

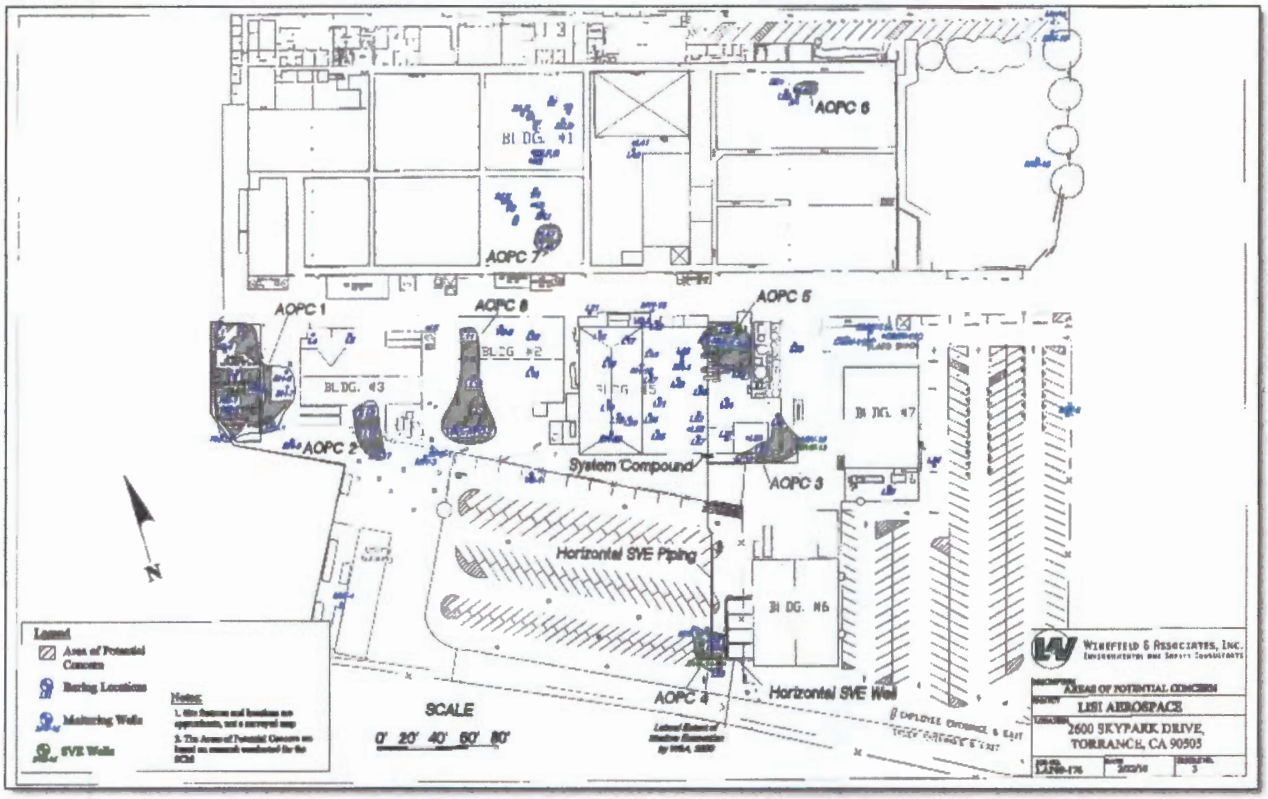


Exhibit 2-6 also shows that limited soil sampling was completed to investigate potential AOPCs and delineate areas associated with VOC release at the east portion of Building 1 (including areas around AOPC 8), Building 3 (where a dry-well was located and may still be present), exterior to Building 5 (south and east of AOPC 3; north and east of AOPC 5), Building 6, and Building 7.

A brief summary of soil data is presented in the 2010 SCM report for several AOPCs. Notably, the range of PCE, TCE, and TPH concentrations are presented by depth:

Exhibit 2-7. AOPC 1 Soil Data – Location of Former Waste Oil UST #1 (W&A 2010)

Contaminant	Depth found Below Grade	Concentration
PCE	5 to 10 feet & 25 to 50 Feet	11 to 840 (µg/kg)
TCE	5 to 70 feet	7 to 820 (µg/kg)
TPH	25 to 40 feet	84 to 1,034 (mg/kg)

Exhibit 2-8. AOPC 3 Soil Data – Southeast corner of Building 5 (W&A 2010)

Contaminant	Depth found Below Grade	Concentration
PCE	5 to 25 feet and 90 ft	30 to 1,600 µg/kg
TCE	5 to 45 feet and 60 to 90 ft	88 to 35,000 µg/kg
TPH	5 to 25 ft	380 to 2,372 mg/kg

Exhibit 2-9. AOPC 5 Soil Data – Northeast corner of Building 5 (W&A 2010)

Contaminant	Depth found Below Grade	Concentration
PCE	5 to 15 feet	12 to 150 µg/kg
TCE	5 to 15 feet	18 to 360 µg/kg

Exhibit 2-10. AOPC 7 Soil Data – Building 7 (W&A 2010)

Contaminant	Depth found Below Grade	Concentration
PCE	5 to 20 ft	50 to 250 µg/kg
TCE	5 to 20 ft	100 to 980 µg/kg
TPH	5 to 20 ft	230 to 9,461 mg/kg

The 2010 SCM Report summarizes significant concentrations of PCE and TCE in soil at multiple AOPCs across the Hi-Shear Site. PCE and TCE were detected in soil samples collected at depths from 5 feet to 90 feet bgs. Given the dates of operations at the Hi-Shear Site, these data indicate that a long-term source of both TCE and PCE was present that would impact groundwater at the Hi-Shear Site and migrate to downgradient off-Site properties.

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3.0 The TCE and PCE soil vapor and groundwater plume represents a single plume emanating from the Hi-Shear Site

There is a single plume of TCE and PCE spread across the Hi-Shear Site, EA properties, and Residential Properties, which has emanated from the Hi-Shear Site. The current plume appearance of having "two lobes" is a result of incomplete remediation efforts along the Hi-Shear Site boundary. Groundwater monitoring data collected following completion of the Phase I remediation program indicate the current plume contains two areas of elevated TCE concentrations, separated by the area where the Phase I remediation program successfully reduced the contaminant mass. One high concentration area remains on the Hi-Shear Site in the vicinity of MW-18, and the other high concentration area is located on the EA properties in the vicinity of MW-12.

GSI conducted semi-analytical modeling of TCE fate and transport from the Hi-Shear source to downgradient properties, which showed that the observed groundwater conditions are indicative of a single source located in the vicinity of MW-18. Modeling of historical mass flux from the Hi-Shear Site to the EA properties indicates substantial mass loading of TCE to off-Site properties, with ongoing mass flux to downgradient properties. Furthermore, given the historical TCE and PCE concentrations, TCE is the remedy driver for groundwater impacts on the Hi-Shear Site and downgradient EA properties and Residential Properties.

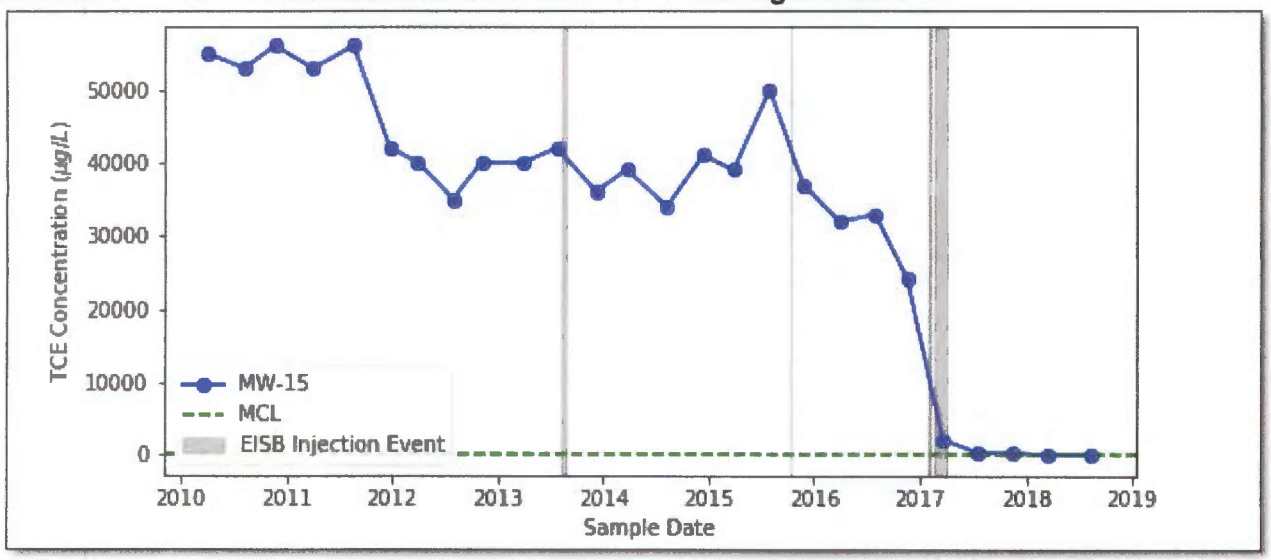
3.1 Groundwater Remedial Action Created the Current Groundwater Plume

Hi-Shear Corporation has implemented two pilot-scale and one full-scale remediation events. These events have included injection of bioremediation substrates (3DMe and HRC Primer), bioaugmentation culture (BDI Plus), and a chemical reductant (CRS). The dates of application and specific material injected were:

- August 12-22, 2013: Pilot-scale injections of 3DMe and HRC Primer through six injection wells (IW1 through IW6) screened from 87 to 112 feet below ground surface (bgs) and installed cross-gradient and upgradient of monitoring well MW-15 (Alta, 2014);
- October 13-15, 2015: Pilot-scale injections of 3DMe, CRS, and BDI Plus through the same six injection wells (IW1 through IW6) used in the August 2013 pilot test (Alta, 2016); and
- January 31 to April 5, 2017: Full-scale (Phase I) injections of 3DMe, CRS, and BDI Plus through 75 dual-nested injection wells (IW7 through IW81) screened from 88-98 feet bgs and 103-113 feet bgs and 2 previously installed single-cased wells IW3 and IW5 (Alta, 2017).

The results achieved at monitoring well MW-15, which is located downgradient of the source zone and along the Hi-Shear Site boundary, shows the success of the 2017 remedial action. Exhibit 3-1 summarizes the TCE concentrations measured over time at MW-15, along with the dates of remedial injections. As shown on Exhibit 3-1, TCE concentrations at MW-15 exhibited minimal response to the two pilot tests; however, significant reductions were achieved as a result of the more substantial remedial efforts of the full-scale Phase I program.

Exhibit 3-1. TCE concentrations over time in monitoring well MW-15.



The magnitude and extent of the TCE plume before treatment (2015) and after treatment (2018) are depicted on Exhibits 3-2 and 3-3, respectively. Exhibit 3-2 indicates a single plume emanating downgradient from a presumed source located in the vicinity of monitoring wells MW-3 and MW-18, which is the same area identified by BBL in 2001 with the highest concentrations of TCE in groundwater.

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Exhibit 3-2. TCE groundwater plume in July 2015, before Hi-Shear Phase I remediation

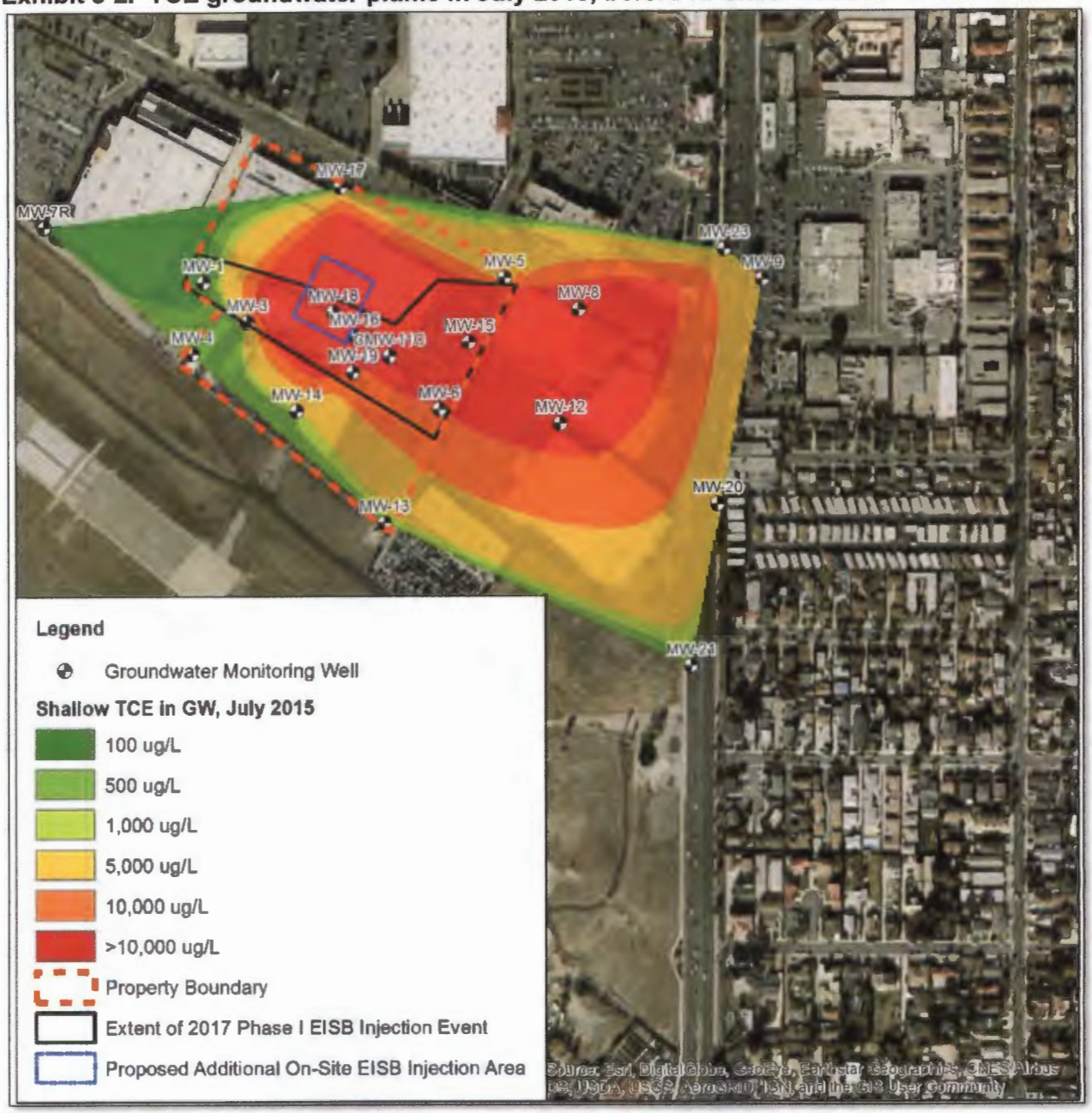

Exhibit 3-3 demonstrates that the 2017 full-scale Phase I injection program was effective in reducing TCE concentrations within the treatment zone, particularly in the area along and just upgradient of the Hi-Shear Site and EA properties boundary. As shown in this exhibit, the area of reduced concentrations in groundwater bisecting the former plume into two higher concentration lobes closely matches the shape of the injection area. Although not evident in this depiction, the density of the treatment injections along the eastern property boundary of the Hi-Shear Site was higher than other locations to the west. Combined with the higher source-area

initial concentrations in the MW-18 area, the resulting concentrations in groundwater correlate well with the completed injection program.

Two hot spots of elevated TCE concentrations exceeding 10,000 µg/L remain, one within the upgradient portion of the treatment zone near the MW-18 Hi-Shear source area; and one downgradient of the treatment zone in the vicinity of off-Site well MW-12. As discussed herein, the bifurcated plume is indicative of a single TCE plume with localized treatment and does not indicate the presence of a source around MW-12.

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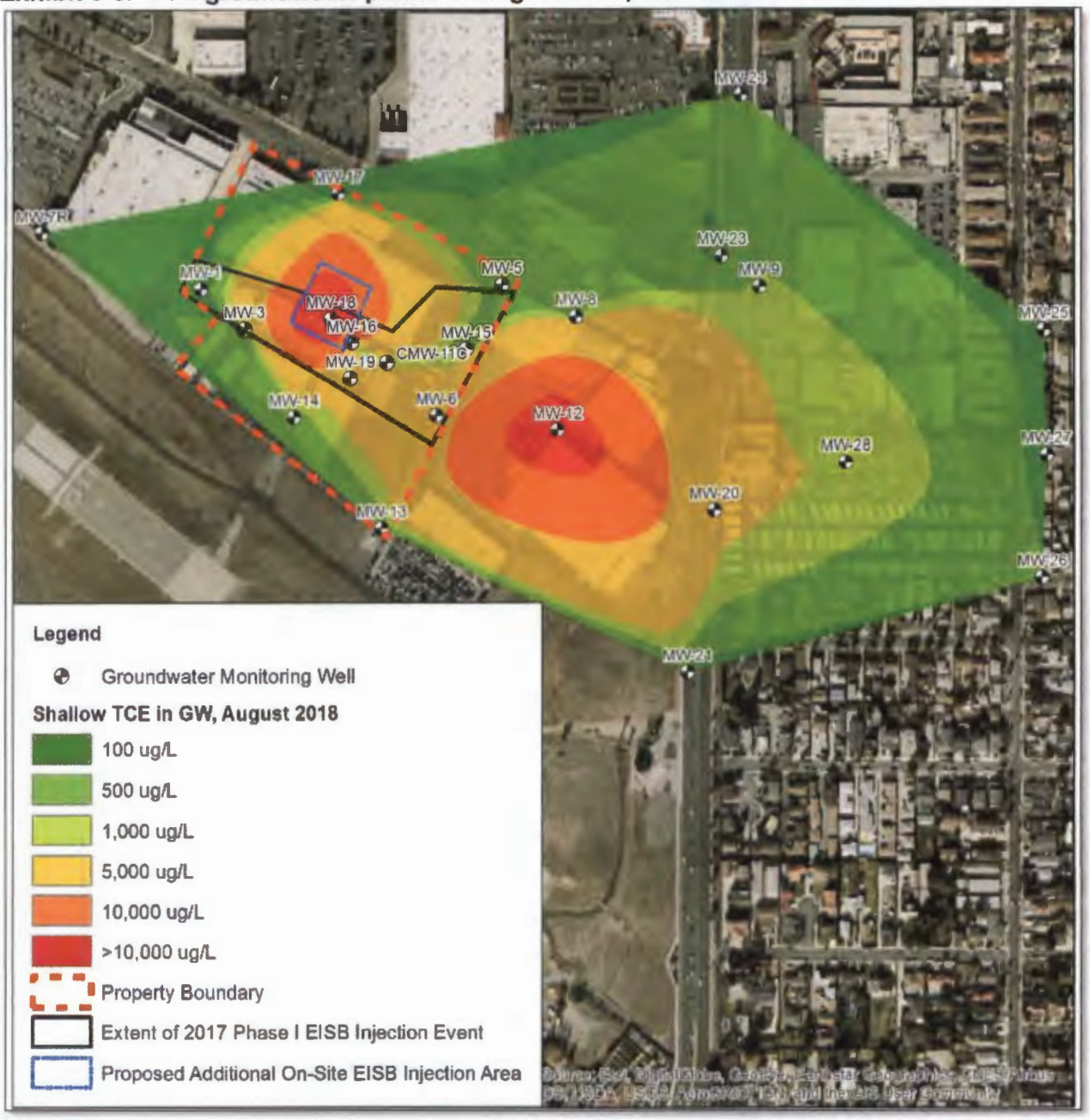
Exhibit 3-3. TCE groundwater plume in August 2018, after Hi-Shear Phase I remediation



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3.2 TCE Plume Modeling of TCE shows a TCE source on the Hi-Shear Site in the vicinity of MW-18

The BIOCHLOR Natural Attenuation Decision Support System (Aziz et al., 2000) model (version 2.2) was utilized to simulate plume conditions based on Site-specific hydrogeologic and decay parameters. BIOCHLOR is a screening-level model that simulates natural attenuation of dissolved chlorinated solvents (e.g., TCE) and has the ability to simulate one-dimensional advection, three-dimensional dispersion, linear adsorption, and biotransformation via reductive dichlorination (the dominant biotransformation process at many chlorinated solvent sites). The model was originally designed to help answer questions like how far a dissolved chlorinated solvent plume will extend if no engineered controls or source area reduction measures are implemented.

Input parameters for BIOCHLOR were selected based on documented Site-specific conditions and historical analytical results from groundwater monitoring wells. An approximate groundwater seepage velocity of 130 feet per year was estimated based on a gradient of 0.001 to 0.002 foot/foot in the east-southeast direction in 2018, consistent with historical observations (Alta, 2017), a horizontal hydraulic conductivity of 50 feet per day (Genesis, 2018), and an assumed effective porosity of 0.2. The source thickness was assumed to be 25 feet thick and 200 feet wide. Representative historical concentrations of CVOCs in monitoring well MW-18, which was installed in the approximate area of a source zone, were used as source concentrations in groundwater.

First-order decay rates were calculated for each groundwater monitoring well following the approach described in Newell et al. (2002). Exhibit 3-4 presents the results for the 32 monitoring wells. As shown on Exhibit 3-4, 18 monitoring wells show a positive first-order decay rate, thus indicating decreasing concentrations, and seven monitoring wells indicate increasing concentrations (negative decay rate). First-order decay rates were not calculated for seven wells that had over 50% non-detect values. The median decay rate was approximately 0.1 per year, equating to a half-life of about 7 years, meaning that concentrations are expected to reduce by approximately half every 7 years. Based on the first-order decay rates presented in Exhibit 3-4, a biotransformation decay rate of 0.1 per year was used for TCE.

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Exhibit 3-4. First-order decay rates calculated for monitoring wells

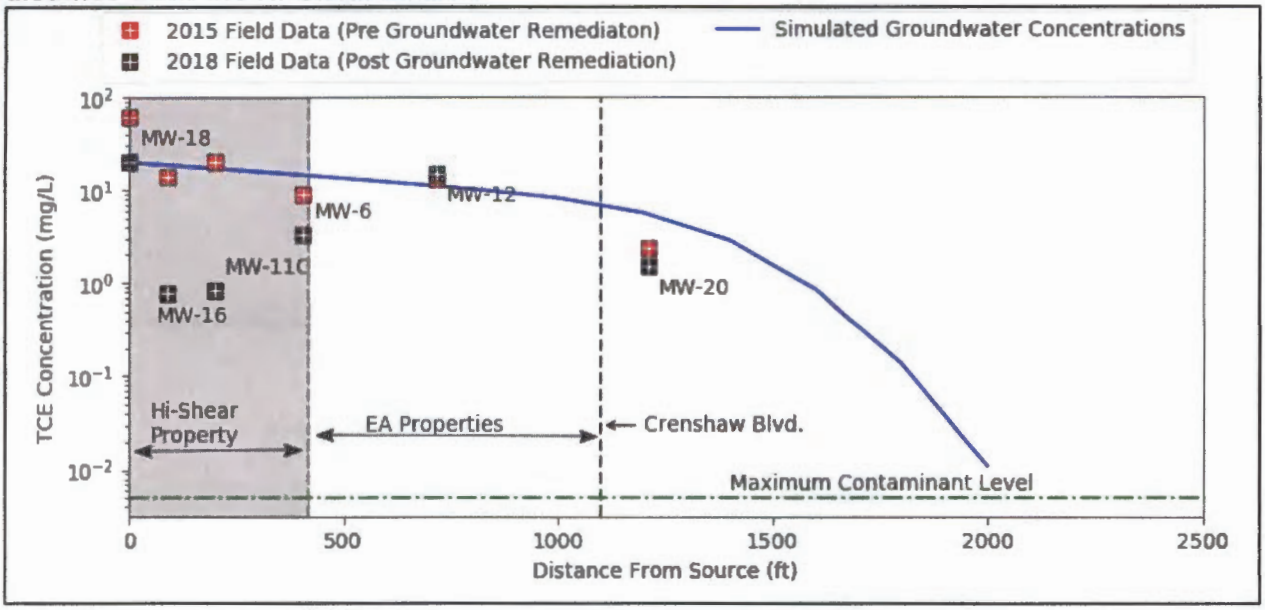
Well	K_{point} (1/yr)	Well	K_{point} (1/yr)
CMW-11A	ND	MW-15	0.667
CMW-11B	-0.0531	MW-16	0.183
CMW-11C	0.142	MW-17	0.303
MW-1	0.32	MW-18	0.126
MW-3	0.245	MW-19	0.128
MW-4	0.127	MW-20	0.0389
MW-5	0.0773	MW-21	-0.439
MW-6	-0.0929	MW-22A	ND
MW-7	0.146	MW-22B	ND
MW-7R	ND	MW-23	-0.234
MW-8	-0.0635	MW-24	ND
MW-9	-0.209	MW-25	ND
MW-10	0.176	MW-26	0.413
MW-12	-0.0725	MW-27	ND
MW-13	0.076	MW-28	0.127
MW-14	0.22	SPG-1	0.525

The simulated TCE profile shown in Exhibit 3-5, represents TCE concentrations in groundwater 30 years after a release on the Hi-Shear property near MW-18. This simulated TCE profile represents TCE concentrations with biodegradation, but without any remedial actions (i.e., without accounting for the recent 2017 enhanced in-situ bioremediation [EISB] injections). Exhibit 3-5 also shows measured TCE concentrations from before the full-scale injection event (July 2015 pre groundwater remediation; red) and after the full-scale injection event (August 2018 post groundwater remediation; black) measured in wells downgradient of MW-18 (presumed source), including MW-16, MW-11C, MW-6, MW-12, and MW-20.

Prior to the full-scale injection events in 2017, the historical TCE concentrations along the well transect (red squares) closely match the modeled TCE plume, indicating that the observed monitoring data are consistent with a single-source TCE plume migrating from the Hi-Shear property. Within the extent of the injections, the post groundwater remediation field data collected in 2018 (black squares) demonstrate a decrease in TCE concentrations below the simulated TCE profile, which highlights the effect the 2017 remedial action had on TCE concentrations within the injection area in groundwater. Downgradient of the property boundary and beyond the injection points, the TCE concentrations in 2018 (post groundwater remediation) more closely resemble the simulated TCE profile, with substantial TCE concentrations that exceed the MCL (extending approximately 1,000 feet downgradient of Crenshaw Boulevard). These findings support a single TCE plume that has emanated downgradient from the Hi-Shear property, with the observed bifurcation of the TCE plume (see Exhibit 3-3) resulting from the 2017 EISB injections and not

due to a second source of TCE downgradient of the Hi-Shear property. These modeling results indicate that a source of TCE in the vicinity of MW-18 has migrated downgradient at significant concentrations and was subsequently bifurcated from the limited Hi-Shear groundwater remediation efforts.

Exhibit 3-5. Simulated TCE concentrations without groundwater remediation shown as distance from the Hi-Shear source



3.3 TCE Mass Flux is leaving the Hi-Shear Site across the EA Properties Boundary

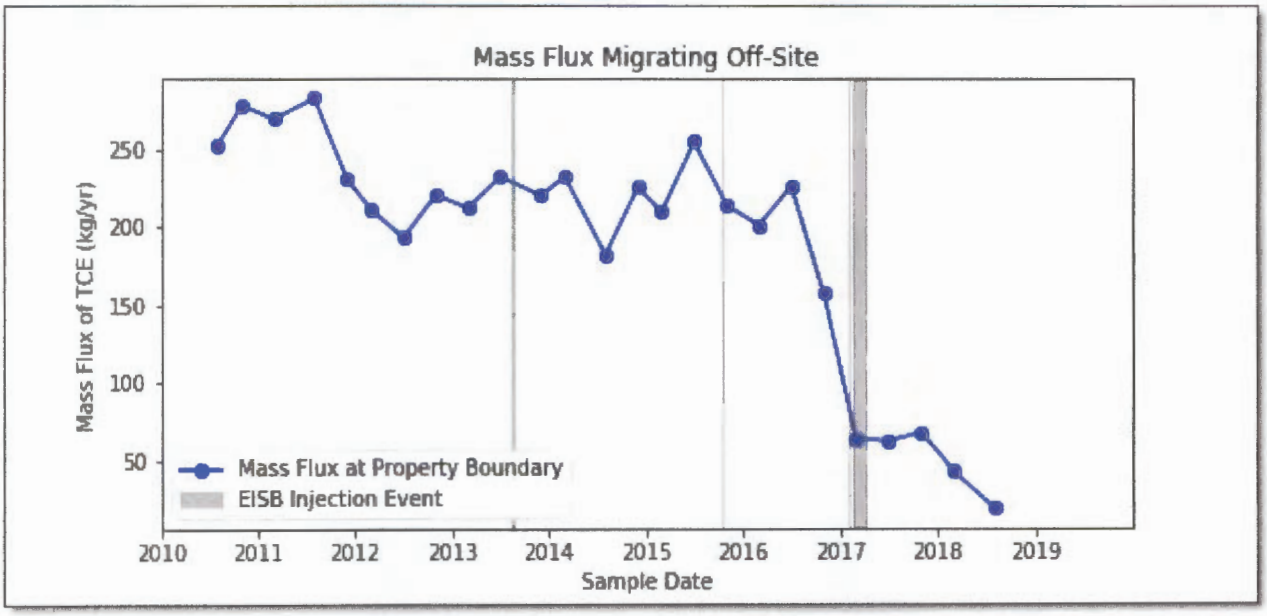
The GSI Mass Flux Toolkit (Farhat et al., 2011), which was developed for the Department of Defense ESTCP program, was utilized to estimate the mass flux currently leaving the Hi-Shear Site across the eastern property boundary, which is generally oriented perpendicular to groundwater flow. This mass flux represents the historical and ongoing loading of TCE (and other Site constituents) from the Hi-Shear Site to downgradient EA properties and Residential Properties.

A transect of monitoring wells across the eastern property boundary, generally oriented perpendicular to the predominant groundwater flow direction, was selected: MW-5, MW-15, MW-6, and MW-13. The Mass Flux Toolkit assumes that the ends of the transect are clean (i.e., contain a constituent concentration of 0 µg/L). Since the objective of this analysis was to estimate the mass flux of TCE across the eastern property boundary, not the width of the entire plume, the transect was truncated 1 foot beyond either terminal monitoring well (i.e., MW-5 to the north and MW-13 to the south). This assumption implies that the mass flux across the entire TCE plume is greater than the mass flux reported here. MW-10, which is located approximately 18 feet south of MW-5, was not used in this analysis because it is screened approximately 30 feet deeper than the other four monitoring wells utilized in this transect. Additional input parameters to the Mass Flux Toolkit include a representative hydraulic gradient of 0.0015 foot/foot and a horizontal hydraulic conductivity of 50 feet per day (Genesis, 2018). While the vertical extent of groundwater impacts has not been fully delineated, a 25-foot thickness was assumed here and represents the interval over which EISB injections were implemented (i.e., 88 to 113 feet bgs). The mass flux

was calculated for the time period for which monitoring data were collected from each of the four wells (i.e., August 2010 through August 2018).

Exhibit 3-6 illustrates the estimated mass flux across the eastern property boundary between wells MW-5 and MW-13. Approximately 230 kilogram (kg) of TCE per year migrated from the Hi-Shear Site to the EA properties between 2010 and 2017, with an unknown quantity having migrated prior to 2010. The 2017 full-scale Phase I EISB injections appear to have substantially reduced the mass flux across the eastern property boundary, but approximately 20 to 70 kg of TCE continue to migrate from the Hi-Shear Site to the EA properties annually, contributing to an ongoing release of TCE from the Hi-Shear to downgradient EA properties. Without additional significant groundwater remediation on the Hi-Shear Site, the rate of TCE migrating off-Site will continue to increase as the high TCE concentrations upgradient at a source, near MW-18, move downgradient and across the eastern property boundary.

Exhibit 3-6. Mass flux of TCE migrating from the Hi-Shear Site across the eastern property boundary, as calculated in the Mass Flux Toolkit



While monitoring data along Crenshaw Boulevard are more limited temporally, the mass flux of TCE was estimated across Crenshaw Boulevard with the following transect: MW-24, MW-23, MW-9, MW-20, and MW-21, with 100 feet included on either end of the transect to an assumed concentration of 0 µg/L TCE. Input concentrations were based on data collected between July 2016 and August 2018 from transect monitoring wells, which represents the period for which concentrations were measured in each of the monitoring wells. The total mass flux of TCE across Crenshaw Blvd. ranges from approximately 20 to 50 kg TCE per year, which represents the additional mass of TCE that continues to migrate across Crenshaw Blvd. each year.

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4.0 TCE is the remedy driver for groundwater impacts both on the Hi-Shear Site and downgradient on the EA Properties and the Residential properties.

A review of available groundwater monitoring data indicates that TCE is the remedy driver for groundwater impacts on the Hi-Shear Site, EA Properties, and Residential Properties. For example, the maximum historical measured TCE concentration on the Hi-Shear Site (190,000 µg/L in MW-3) is almost 12 times greater than the maximum measured historical concentration of PCE (16,000 µg/L) in MW-3.

TCE has also in most sample locations been detected at concentrations exceeding PCE on the EA properties:

- MW-20: TCE is 5 to 34 times greater than PCE;
- MW-9 and MW-23: TCE is 3 to over 475 times greater than PCE; and
- MW-21: PCE concentrations typically exceed TCE concentrations, but both concentrations are relatively low (within 1 OoM of the MCL).

Downgradient of Crenshaw Boulevard within the Residential Properties:

- MW-28: TCE is 11 to 38 times greater than PCE; and
- MW-22A, MW-22B, MW-24, MW-25, MW-26, and MW-27: PCE has not been detected.

These data clearly identify that potential sources of PCE are not contributing significantly to the primary TCE plume migrating downgradient from documented Hi-Shear sources.

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5.0 References

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EXHIBIT 3

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Los Angeles Regional Water Quality Control Board

August 28, 2018

Mr. Thomas P. Schmidt
Hamrick & Evans, LLP
2600 West Olive Avenue, Suite 1020
Burbank, CA 90266

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
CLAIM NO. 7017 2400 0000 3753 7431

SUBJECT: REGIONAL BOARD COMMENTS ON INTERIM OFFSITE ASSESSMENT REPORT, AND REQUIREMENT TO UPDATE CONCEPTUAL SITE MODEL UNDER THE 13267 ORDER DATED OCTOBER 29, 2009

SITE: HI-SHEAR CORPORATION, 2600 SKYPARK DRIVE, TORRANCE, CALIFORNIA (SCP CASE NO. 218, SITE ID NO. 2042300)

Dear Mr. Schmidt:

The California Water Code (CWC) section 13267 Order dated October 29, 2009, and issued by the California Regional Water Quality Control Board, Los Angeles Region (Regional Board) required Hi-Shear to submit a conceptual site model (CSM) by March 15, 2010 (attached). According to the Order:

> "The CSM must show complete lateral and vertical extent of soil, soil gas, and groundwater contamination in the impacted onsite and offsite areas of the site by all the chemicals of concern including TPH, VOCs, and Title 22 metals including hexavalent chromium. The CSM must include a 3-dimensional illustration of the potential pollutant pathways through different types of lithologies, relationship of lithologies to contaminant concentrations, cross-sections, groundwater flow directions, isoconcentration maps for significant contaminants, groundwater plume maps, and locations of all the water supply wells within one mile radius of the site as well as other receptors that may be affected by the release and migration of the contaminants to the subsurface environment."

The Regional Board received the *Site Conceptual Model* dated March 15, 2010 from Hi-Shear. The SCM, which was based on results of the previous subsurface investigations conducted up to 2010, identified eight onsite areas of potential concerns (AOPCs) in soil, described as AOPC 1 through AOPC 8, for future investigation and remediation. Based on the review of the *Soil Gas Survey Report* dated September 12, 2011, the Regional Board, in its letter dated December 12, 2011, did not require any soil and soil gas remediation in AOPC 6 and AOPC 7 at that time.

The SCM is a progressive document that must be updated to incorporate results of all subsequent onsite and offsite soil, soil vapor, and groundwater investigations. To date, Hi-Shear has conducted a significant amount of onsite soil, soil vapor, and groundwater investigations; continues to remediate the volatile organic compounds (VOCs) contaminated onsite soil using soil vapor extraction (SVE); conducted onsite enhanced in-situ bioremediation (EISB) to remediate groundwater; and conducted an interim offsite assessment. However, Hi-Shear has not updated the SCM to determine the complete lateral and vertical

extent of contamination originating from the Site, and has not achieved the Regional Board approved cleanup goals for onsite and offsite soil, soil vapor, and groundwater. Continued offsite migration of VOCs in the Hi-Shear groundwater plume and ongoing emission of VOCs in the vadose zone toward the ground surface poses significant potential risk to the receptors located above and adjacent to the footprint of Hi-Shear's VOC plume.

The Regional Board has reviewed the Interim Offsite Assessment Report (IOAR) dated September 9, 2016 submitted by Alta Environmental (Alta) on behalf of Hi-Shear Corporation. A summary of findings presented by Hi-Shear followed by the Regional Board's comments and requirements are included below:

Summary of Interim Offsite Assessment Report

The IOAR documented the installation of seven offsite groundwater monitoring wells and installation of 10 additional multi-depth offsite soil gas probes. The attached Figure 2 from the IOAR shows the onsite and offsite locations of the groundwater monitoring wells, vapor extraction wells, and soil gas probes installed by Hi-Shear during the previous and the subject investigations. In the IOAR, Hi-Shear also included offsite isoconcentration contours for tetrachloroethylene (PCE) in Figures 6a through 6f, and for trichloroethylene (TCE) in Figures 7a through 7f. The following are the key findings presented by Hi-Shear in the IOAR:

1. **PCE concentrations in soil matrix and soil gas at VP-49, VP-50, and VP-25:** Hi-Shear concluded that based on 24.7 micrograms per kilogram (µg/kg) of PCE, 202 µg/kg of PCE, and 11.4 µg/kg of PCE in the soil matrix samples from soil vapor probes VP-49, VP-25 and VP-50; and 17,700 micrograms per liter (µg/L) of PCE in the shallow soil gas sample collected from soil vapor probe VP-49 at 5 feet below ground surface (bgs) to the 35,900 µg/L of PCE in the deepest 85-foot sample from VP-49, on the SBL property, a local surficial or near surface release of PCE not associated with the Hi-Shear Site has occurred in the vicinity of VP-49, and that a continuous downward profile of PCE impact is present on the SBL property. Other sources of VOC contamination are likely present near the vicinities of VP-25 and VP-50.

2. **Comparison of 2016 offsite soil gas concentrations with 2011 onsite Hi-Shear soil gas concentrations:** Hi-Shear also suggested that the May-June 2016 PCE concentrations in soil gas from VP-49 are higher than in the 2011 soil gas samples collected from soil gas probes VP1 through VP-18, VP-22, and VP-24 locations on the Hi-Shear Site, indicating that PCE releases on the SBL property are likely of greater scope and concentration than the releases on the Hi-Shear Site. Hi-Shear suggested the presence of a similar continuous downward profile of TCE impact, which originated from the SBL property at VP-49, and consisted of 791 µg/L in the soil gas sample at 5 feet bgs to 1,100 µg/L in the soil gas sample at 85 feet bgs, as shown in Figures 7a through 7f in the IOAR.

3. **Potential additional source of downgradient solvent contamination in the Regional Water Table aquifer (RWTA):** Hi-Shear also suggested that the elevated PCE, TCE, and 1,1-dichloroethylene (1,1-DCE) concentrations in soil gas and soil matrix from 5 feet bgs to the water table at the SBL property, particularly at VP-49 and VP-50, are an offsite source of solvent contamination within the RWTA, and may be a source of PCE and TCE moving downgradient across Crenshaw Boulevard.

4. **PCE concentration in perched groundwater at VP-50:** Hi-Shear suggested that the source of elevated concentrations of PCE (36,600 µg/L), TCE (2,870 µg/L), and 1,1-DCE (56,000 µg/L) in the perched groundwater encountered at 58 feet bgs from VP-50, and 3,390 µg/kg of PCE in the soil matrix sample at 55 feet bgs from VP-50, did not originate at the Hi-Shear Site but is likely to

have originated at the SBL property, or at the adjoining Torrance Municipal Airport property just south of VP-50, where a former Nike Missile site is located.

Regional Board Comments on the Interim Offsite Assessment Report

Following are the Regional Board comments to the findings presented by Hi-Shear:

1. **PCE and TCE concentrations in soil matrix and soil gas at VP-49, VP-50, and VP-25:** The absence of the highest PCE concentrations in the 5-foot soil samples at VP-49 and VP-50 indicates that the PCE may not have been released at these two locations. However, a detection of 202 µg/kg in the 5-foot soil sample at VP-25 indicates that a release of PCE may have occurred near VP-25, and additional data needs to be collected to confirm the location and extent of the PCE source area.

   The detection of the highest PCE in soil gas at 85 feet bgs (above the water table) in VP-49 and its decrease to 17,700 µg/L at 5 feet bgs indicates upward migration of PCE vapors from the underlying groundwater plume and lateral migration of PCE vapors in the vadose zone.

   Absence of the highest TCE concentration in the 5-foot soil samples collected from VP-49, VP-50, and VP-25 indicates that TCE may not have been released at these locations. Similarly, the detections of the highest TCE concentration of 1,100 µg/L in the 85-foot soil gas sample collected from VP-49; 893 µg/L in the 53-foot sample from VP-50; and 874 µg/L in the 65-foot sample also indicates upward migration of TCE vapors from the underlying groundwater plume. The offsite extent of the Hi-Shear soil gas VOC plume in the vadose zone has not been fully delineated.

2. **Comparison of 2016 offsite soil gas concentrations with 2011 onsite Hi-Shear soil gas concentrations:** Considering the facts that Hi-Shear has been conducting onsite soil vapor extraction (SVE) during the last several years which has reduced the onsite PCE and TCE concentrations, it will not be appropriate to compare these reduced 2011 onsite concentrations to the un-remediated PCE and TCE soil gas hot spots detected during the May-June 2016 offsite investigation and sampling on the SBL property.

3. **Potential additional source of downgradient solvent contamination in the Regional Water Table Aquifer:**

   As seen on Figure 8 of the IOAR, and on Figure 3-3 of the Triannual Groundwater Monitoring Report dated January 31, 2018, the onsite groundwater monitoring wells MW-18, MW-16, and MW-6, and the offsite groundwater monitoring wells MW-12, MW-20, and MW-26 are aligned along the east-southeastward trending axis of the TCE plume originating from the Hi-Shear Site. The TCE plume, which originated from the Hi-Shear Site, continues to migrate offsite and downgradient from the Site east-southeastward since 1992, and has crossed past Crenshaw Boulevard and Pennsylvania Avenue. The offsite extent of this Hi-Shear VOC groundwater plume has not been fully delineated.

   As noted in the Regional Board's October 6, 2016 and February 4, 2016 letters, Hi-Shear is responsible for cleanup of not only the onsite but also offsite portions of the TCE and other VOC plumes that originated from the Hi-Shear Site such that the approved cleanup goals [maximum contaminant levels (MCLs) and notification levels (NLs)] are met in a reasonable amount of time as required in State Water Resources Control Board Resolution No. 92-49.

4. **PCE concentration in perched groundwater at VP-50:** This perched groundwater PCE, TCE, and 1,1-DCE hot spot, as shown on Figure 8 of the IOAR, appears to be a separate plume which is

located at the southeastern margin of the Hi-Shear TCE and PCE plumes. Additional delineation of the extent of the perched groundwater VOCs hot spot is needed to locate its VOC source.

Based on the above and review of the IOAR and reports of previous investigations, the onsite and offsite lateral and vertical extent of soil, soil vapor, and groundwater contamination originating from the Hi-Shear Site as required in the 13267 Order dated October 29, 2009 has not been fully delineated, therefore, Hi-Shear is required to submit the following to the Regional Board:

a. A complete chemical storage and use questionnaire (attached) by **September 30, 2018** in order to assess the potential for additional onsite sources of soil, soil gas, and groundwater contamination.

b. A work plan by **September 30, 2018** to completely determine the lateral and vertical extent of soil, soil gas, and groundwater contamination in all the onsite and offsite areas of the Site impacted by the chemicals of concern. The work plan shall include an offsite vapor intrusion risk assessment.

The requirements for submittal of technical reports including (a) a complete chemical storage and use questionnaire by **September 30, 2018,** and (b) a work plan by **September 30, 2018**, constitute an amendment to the requirements of the California Water Code section 13267 Order originally dated October 29, 2009. All other aspects of the Order originally dated October 29, 2009, and amendments thereto, remain in full force and effect. The required technical reports are necessary to investigate the characteristics of and extent of the discharges of waste at the site and to evaluate cleanup alternatives. Therefore, the burden, including costs, of the report bears a reasonable relationship to the need for the report and benefits to be obtained. Pursuant to section 13268 of the California Water Code, failure to submit the required technical reports by the specified due dates may result in civil liability administratively imposed by the Regional Board in an amount up to one thousand dollars ($1000) for each day each technical report is not received.

If you have any questions, please contact Mr. Mohammad Zaidi, Project Manager, at (213)576-6732 or (Mohammad.Zaidi@waterboards.ca.gov), or Ms. Jillian Ly, unit chief, at (213) 576-6664 or (Jillian.Ly@waterboards.ca.gov).

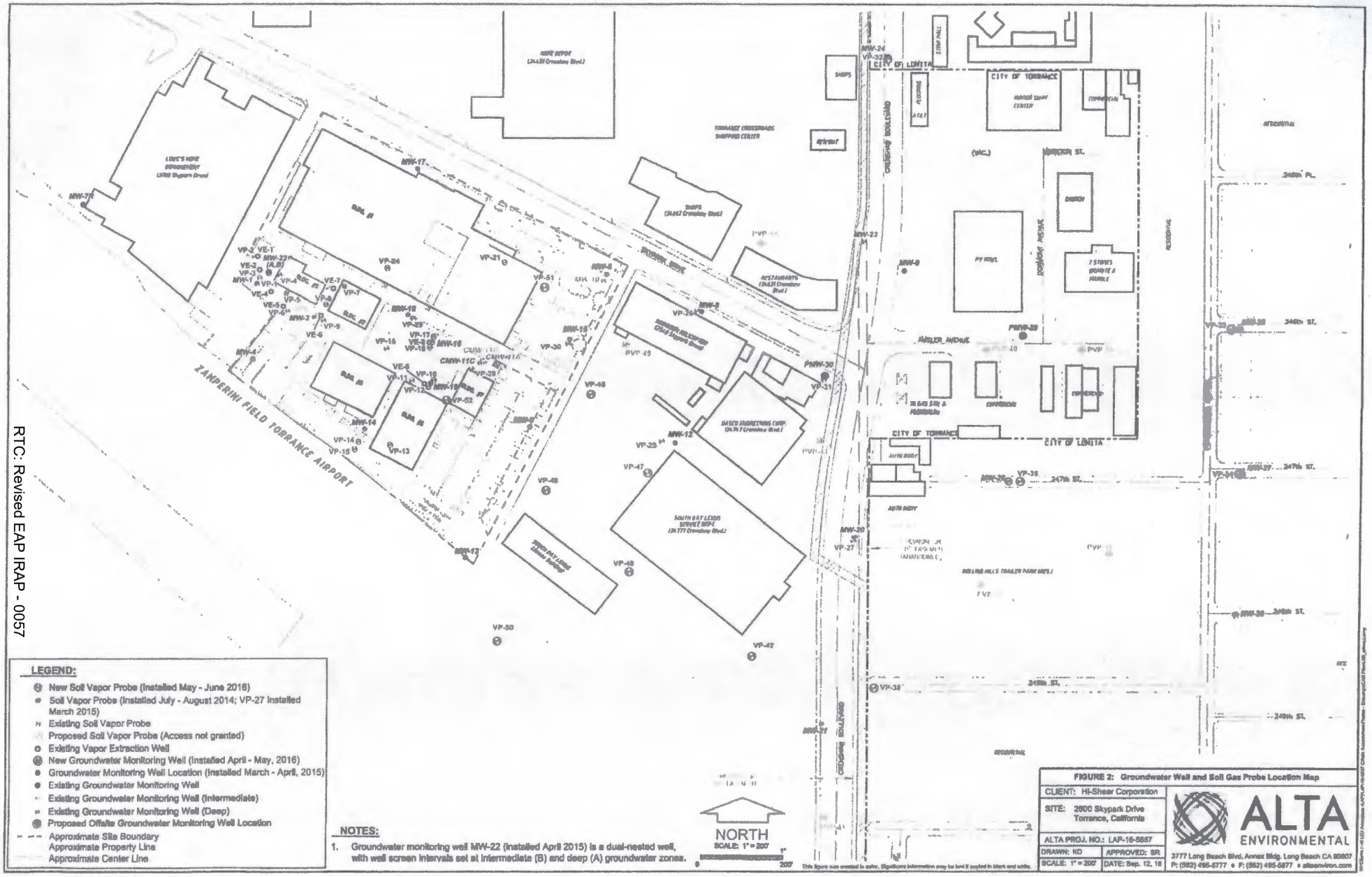
Sincerely,

Deborah J. Smith
Executive Officer

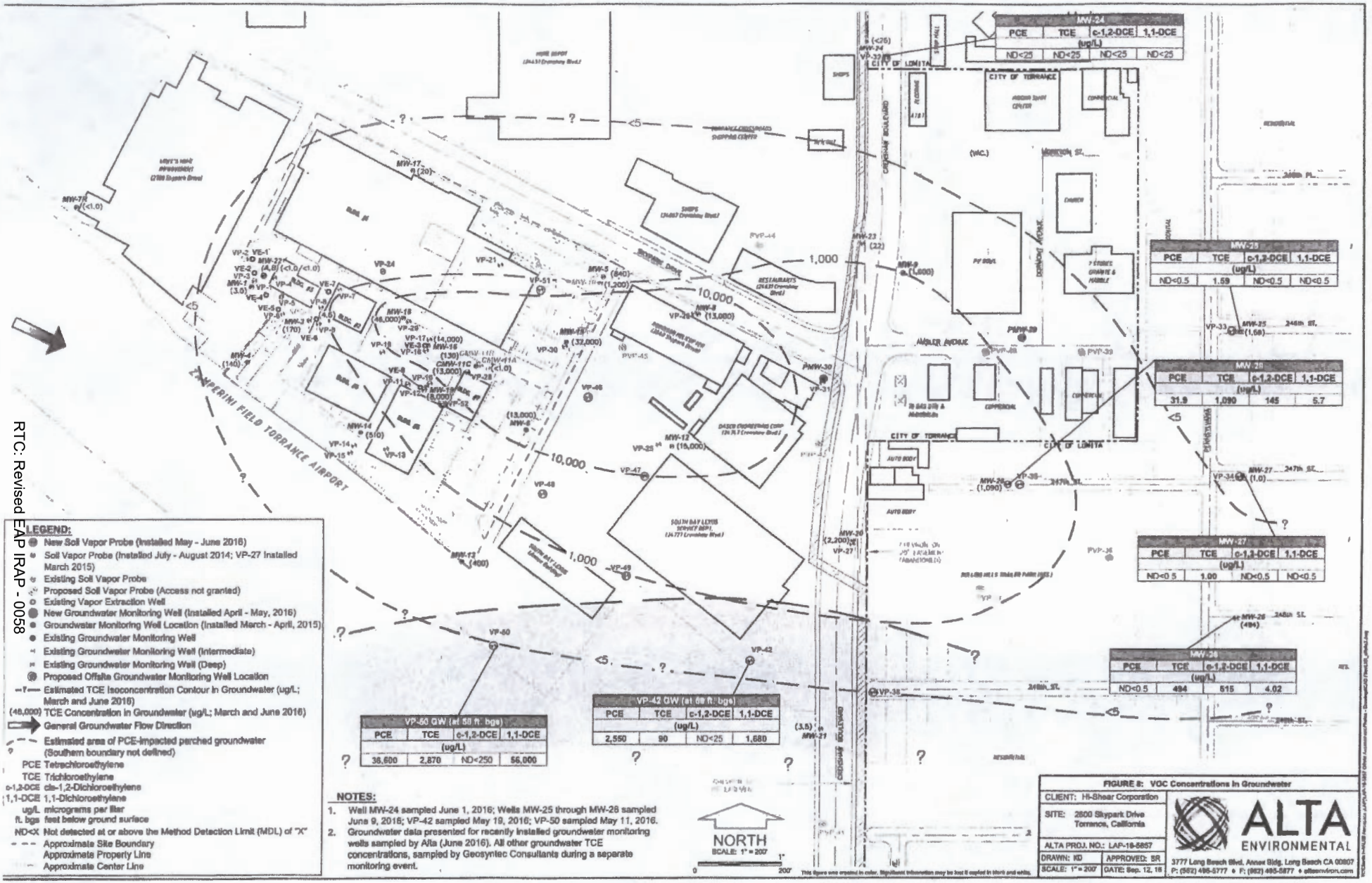
Attachments:

1. Figure 2: Groundwater Well and Soil Gas Probe Location Map
2. Figure 8: VOC Concentrations in Groundwater
3. Chemical Storage and Use Questionnaire
4. October 29, 2009 Order

Electronic copies:
Mr. Christian Darville, Lisi Aerospace/Hi-Shear Corporation
Ms. Lynze Franklin, Lisi Aerospace
Mr. Stephen Van der Hoven, Genesis Engineering and Redevelopment



RTC: Revised EAP IRAP - 0057



LEGEND:

- New Soil Vapor Probe (Installed May - June 2016)
- Soil Vapor Probe (Installed July - August 2014; VP-27 Installed March 2015)
- Existing Soil Vapor Probe
- Proposed Soil Vapor Probe (Access not granted)
- Existing Vapor Extraction Well
- New Groundwater Monitoring Well (Installed April - May, 2016)
- Groundwater Monitoring Well Location (Installed March - April, 2015)
- Existing Groundwater Monitoring Well
- Existing Groundwater Monitoring Well (Intermediate)
- Existing Groundwater Monitoring Well (Deep)
- Proposed Offsite Groundwater Monitoring Well Location
- Estimated TCE Isoconcentration Contour in Groundwater (ug/L; March and June 2016)
- (48,000) TCE Concentration in Groundwater (ug/L; March and June 2016)
- General Groundwater Flow Direction
- Estimated area of PCE-impacted perched groundwater (Southern boundary not defined)

PCE Tetrachloroethylene
TCE Trichloroethylene
c-1,2-DCE cis-1,2-Dichloroethylene
1,1-DCE 1,1-Dichloroethylene
ug/L micrograms per liter
ft. bgs feet below ground surface
ND<X Not detected at or above the Method Detection Limit (MDL) of "X"

- Approximate Site Boundary
- Approximate Property Line
- Approximate Center Line

NOTES:

1. Well MW-24 sampled June 1, 2016; Wells MW-25 through MW-28 sampled June 9, 2016; VP-42 sampled May 19, 2016; VP-50 sampled May 11, 2016.
2. Groundwater data presented for recently installed groundwater monitoring wells sampled by Alta (June 2016). All other groundwater TCE concentrations, sampled by Geosyntec Consultants during a separate monitoring event.

FIGURE 8: VOC Concentrations in Groundwater

CLIENT: Hi-Shear Corporation
SITE: 2500 Skypark Drive Torrance, California
ALTA PROJ. NO.: LAP-16-5857
DRAWN: KD | APPROVED: BR
SCALE: 1" = 200' | DATE: Sep. 12, 16

ALTA ENVIRONMENTAL
3777 Long Beach Blvd. Annex Bldg. Long Beach CA 90807
P: (562) 495-5777 • F: (562) 495-5877 • altaenviron.com

This figure was created in color. Significant information may be lost if copied in black and white.

RTC: Revised EAP IRAP - 0058

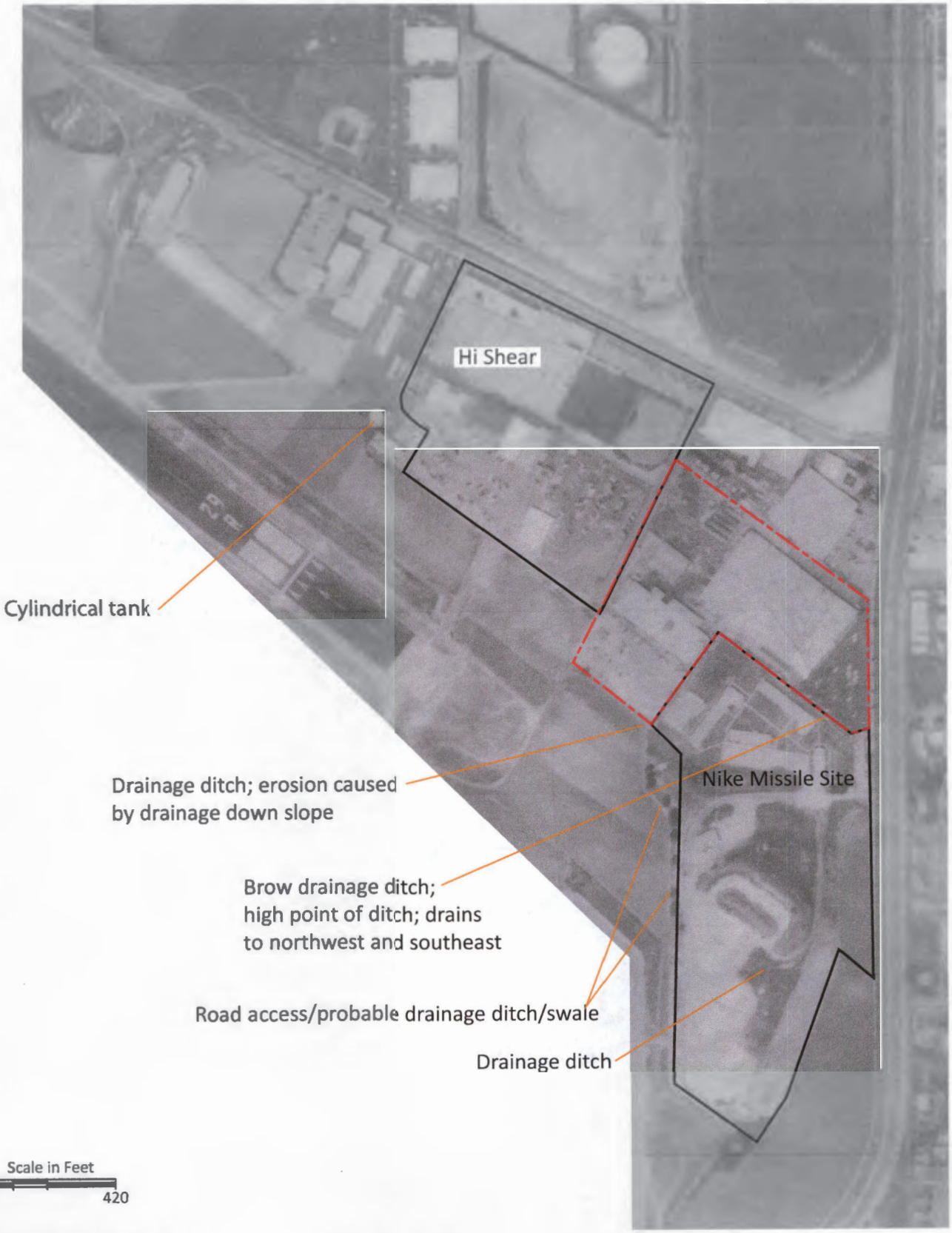
EXHIBIT 4

MARCH 22, 1976 AERIAL

24751/24777 Crenshaw Boulevard

LARRY D GURROLA, PHD, PG, CEG, INC

Aerial Photograph:
Flight TG-7600
Frame 3-15



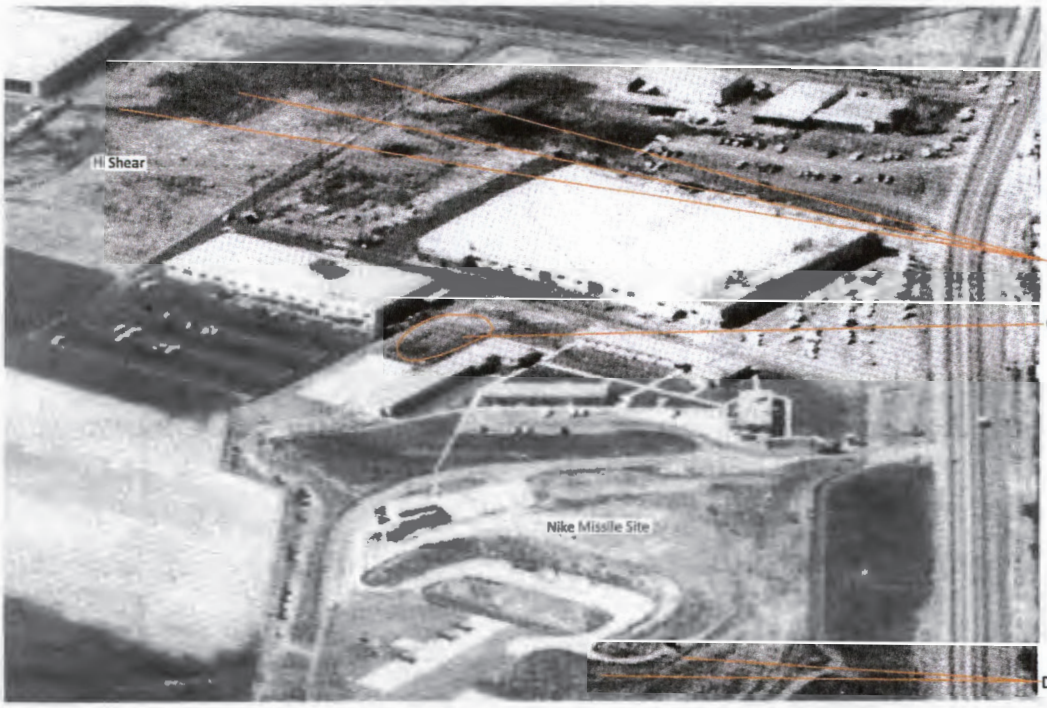
Scale in Feet
0 420

Approximate Property Limits of Subject Property

Approximate Property Limits


Hi-Shear
VP-48
VP-107
VP-47
VP-105
LEXUS
Subject Property
VP-49
DCH
SUBLEASE
Subject Property
VP-106
VP-108
Former Nike Missile Site
Current Subject Property
Recently Graded
Former Nike Missile Site
VP-109
Missile fueling area
Pit
VP-112
VP-111
VP-110
Break in earth berm;
excavation/depression
VP-131
Scale in Feet
100
Legend
Unlined, open pit excavation
Drainge ditch, arrow indicates flow direction
Former Nike Missile property, now DCH sublease
1960 AERIAL ENLARGEMENT
24751/24777 Crenshaw Boulevard

EXHIBIT 5



June 28, 1960 – UCLA Department of Geography, Benjamin and Gladys Thomas Air photo Archives, Spence Air Photo Collection

Slot trench drainage directs surface water to area of darker vegetation

Cylindrical barrels or drums

Drainage ditch

June 28, 1960 AERIAL

24751/24777 Crenshaw Boulevard

LARRY D GURROLA, PHD, PG, CEG, INC

1989 AERIAL

24751/24777 Crenshaw Boulevard

LARRY D GURROLA, PHD, PG, CEG, INC

Aerial Photograph:
USDA 1989

N

Scale in Feet
0 100

This aerial photographs depicts the demolition in-progress of two buildings on the former Nike Missile site. An apparent staging area is being used for equipment and for temporary storage of demolition materials and stockpiles, and tanks, barrels, and/drums drums. Note that the two buildings are no longer present in the 1990 aerial photograph.

Approximate Property Limits of Subject Property

Approximate Property Limits

1990 AERIAL

24751/24777 Crenshaw Boulevard

Aerial Photograph:
USDA 1990

This aerial photographs depicts the demolition in-progress and removal of two buildings that are no longer on the former Nike Missile site. The apparent staging area observed in the 1989 aerial is being used for temporary storage of demolition materials and stockpiles, and tanks, barrels, and/drums drums

Scale in Feet
0 100

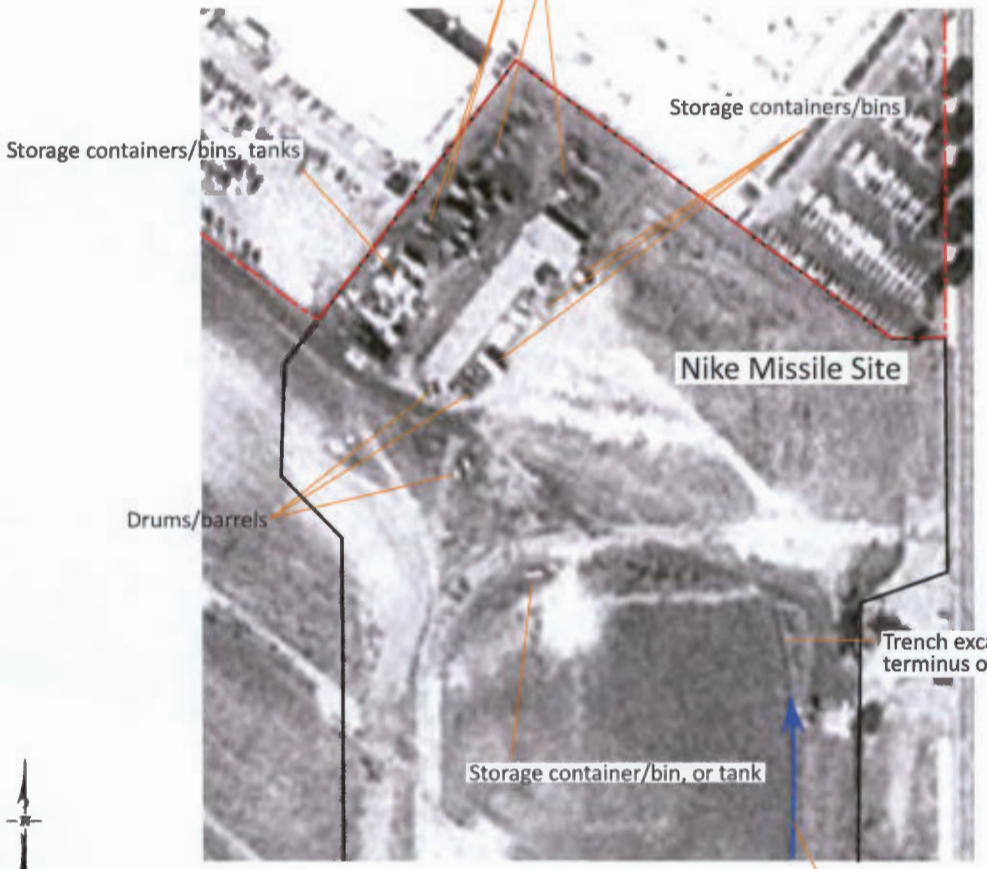
Approximate Property Limits of Subject Property

Approximate Property Limits

1991 AERIAL

24751/24777 Crenshaw Boulevard

Aerial Photograph:
AMI-LA-91 12701
Octoer 28, 1991



Scale in Feet
0 150

Approximate Property Limits of Subject Property

Approximate Property Limits

EXHIBIT 6

GENESIS ENGINEERING & REDEVELOPMENT

Table 5B

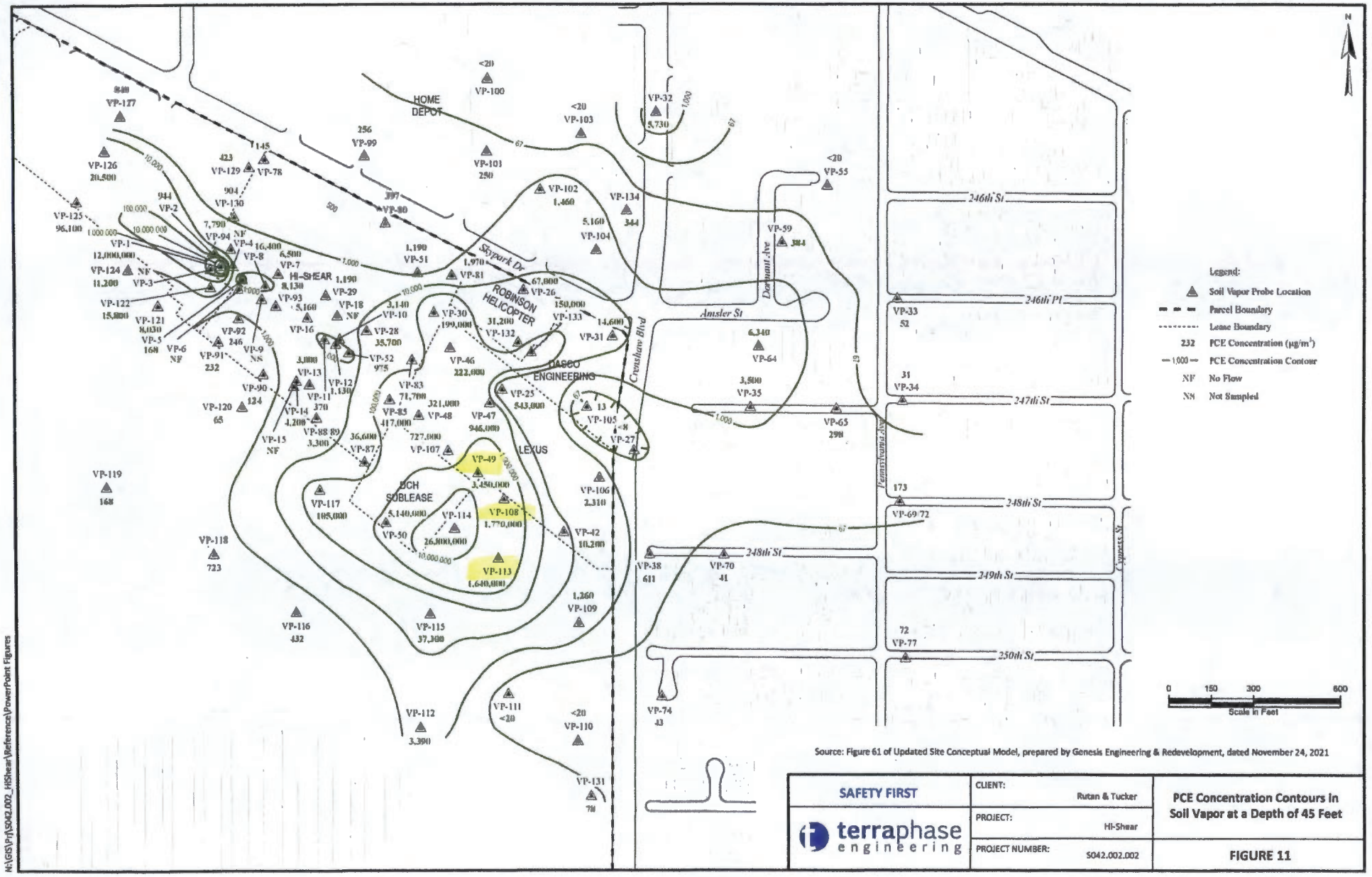
Skypark Commercial Properties Project
Updated Site Conceptual Model

COPC Concentration In Perched Groundwater

Well ID	Sampling Date	Concentration (µg/L)					
		PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	Vinyl Chloride
	MCL	5	5	6	10	6	0.5
2700 Skypark Drive - Former HSC Property							
VP-122-GW	7/16/20	**110**	**5,100**	**3,400**	**52**	**51**	0.48
24747 Crenshaw Boulevard - Property 2							
VP-105-GW	-	-	-	-	-	-	-
24751-24777 Crenshaw Boulevard - Property 1							
HP-1	4/9/01	**12**	**14**	2.9	<2.0	**13**	<5.0
VP-42-GW	5/19/16	**2,550**	**90**	<50	<50	**1,680**	<150
VP-50-GW	5/11/16	**36,600**	**2,870**	<500	<500	**56,000**	<1,500
VP-106-GW	1/14/20	<0.13	1.0	<0.085	<0.15	1.0	<0.12
VP-108-GW	1/8/20	**1,900**	**110**	**10**	0.87	**2,400**	0.2
VP-109-GW	1/2/20	0.39	<0.085	<0.085	<0.15	0.52	<0.12
VP-113-GW	1/6/20	**5,200**	**600**	**67**	4.6	**4,800**	**1.3**
VP-114-GW	1/8/20	**15,000**	**1,000**	**59**	5.9	**16,000**	0.51
East of Crenshaw Boulevard							
MW-29-GW	11/21/19	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
VP-63-GW	11/1/19	**7.3**	**812**	**94**	<0.5	**10**	<0.5
VP-70-GW	11/1/19	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
VP-74-GW	11/1/19	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Torrance Airport							
VP-110-GW	1/19/21	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
VP-111-GW	1/25/21	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
VP-115-GW	2/2/21	**51.1**	4.98	<1.00	<1.00	**194**	<1.00
VP-116-GW	2/4/21	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
VP-131-GW	1/21/21	0.550	<1.00	<1.00	<1.00	<1.00	<1.00

NOTES:

- "PCE" - tetrachloroethene
- "TCE" - trichloroethene
- "cis-1,2-DCE" - cis-1,2-dichloroethene
- "trans-1,2-DCE" - trans-1,2-dichloroethene
- "1,1-DCE" - 1,1-dichloroethene
- "µg/L" - microgram per liter
- **"Bold"**- concentration exceeds the residential screening level
- "MCL" - State Water Resources Control Board Maximum Contaminant Level (Feb. 2016)
- "ND" - Not Detected

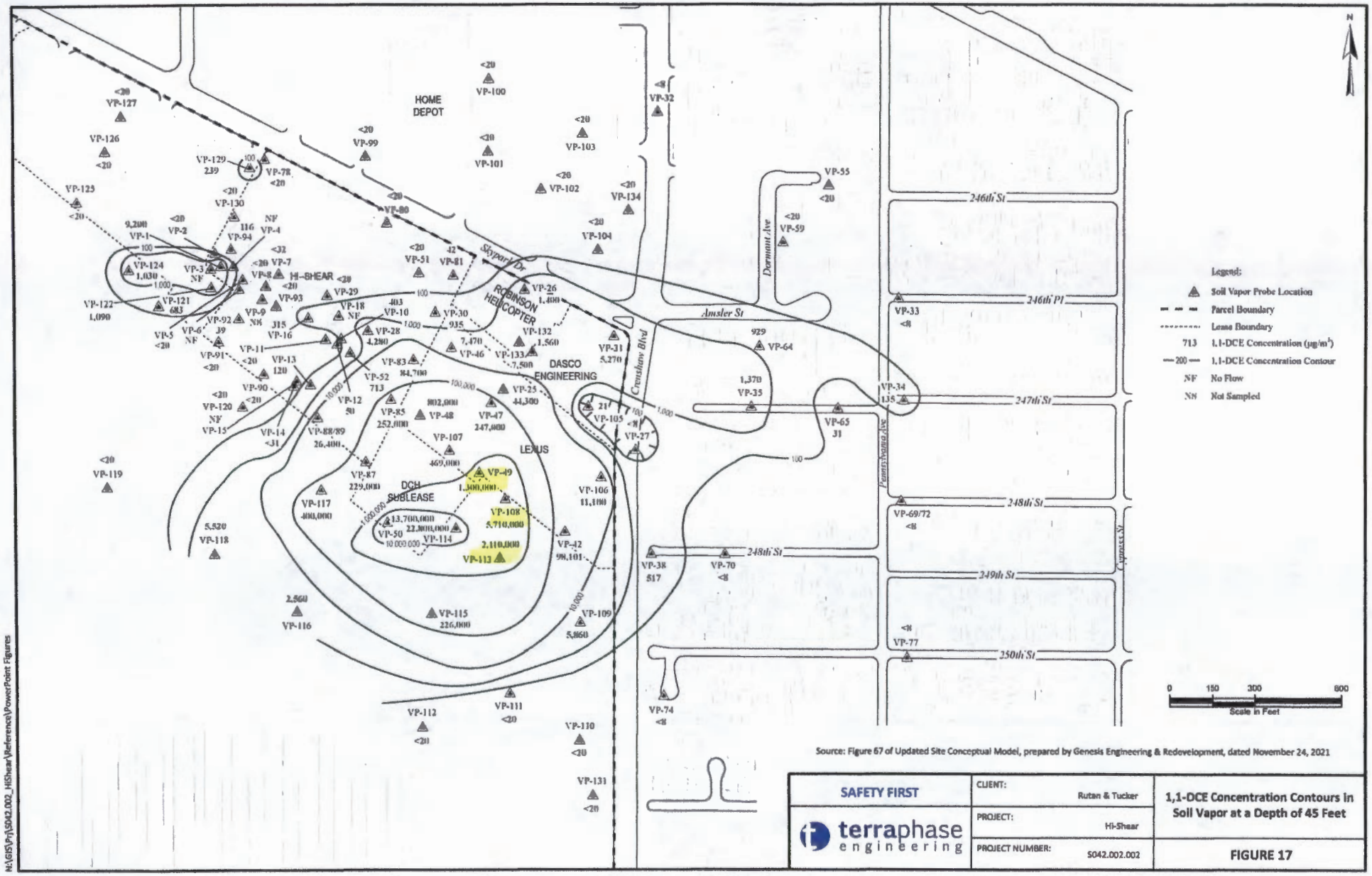


Source: Figure 61 of Updated Site Conceptual Model, prepared by Genesis Engineering & Redevelopment, dated November 24, 2021

SAFETY FIRST	CLIENT: Rutan & Tucker	PCE Concentration Contours in Soil Vapor at a Depth of 45 Feet
terraphase engineering	PROJECT: Hi-Shear	
	PROJECT NUMBER: S042.002.002	FIGURE 11

H:\GIS\P\S042.002_HiShear\Reference\PowerPoint Figures

RTC: Revised EAP IRAP - 0069



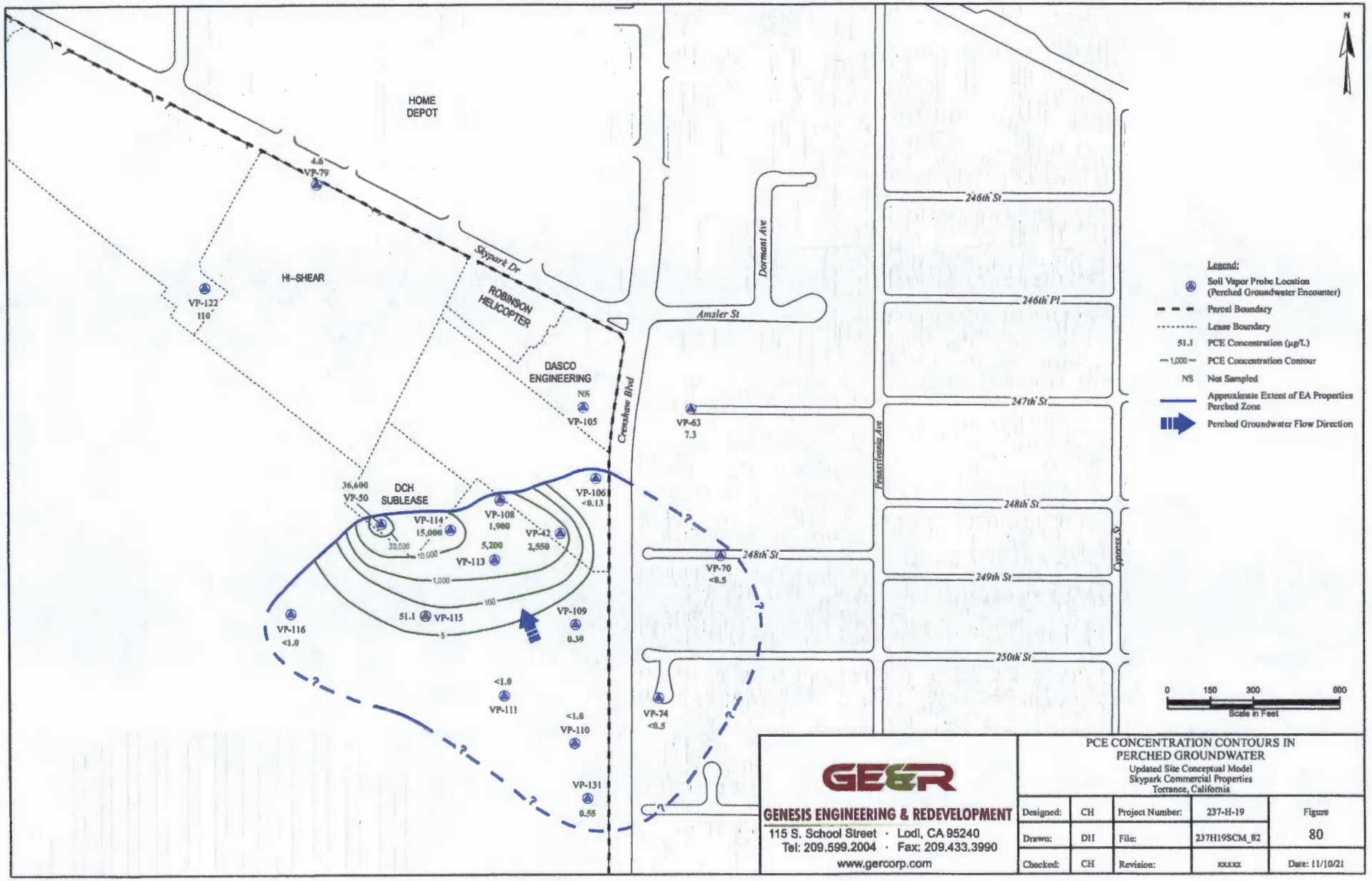
Source: Figure 67 of Updated Site Conceptual Model, prepared by Genesis Engineering & Redevelopment, dated November 24, 2021

SAFETY FIRST	CLIENT: Rutan & Tucker	1,1-DCE Concentration Contours in Soil Vapor at a Depth of 45 Feet
terraphase engineering	PROJECT: Hi-Shear	
	PROJECT NUMBER: S042.002.002	FIGURE 17

N:\GIS\Prj\S042.002_HiShear\Reference\PowerPoint Figures

RTC: Revised EAP IRAP - 0070

EXHIBIT 7

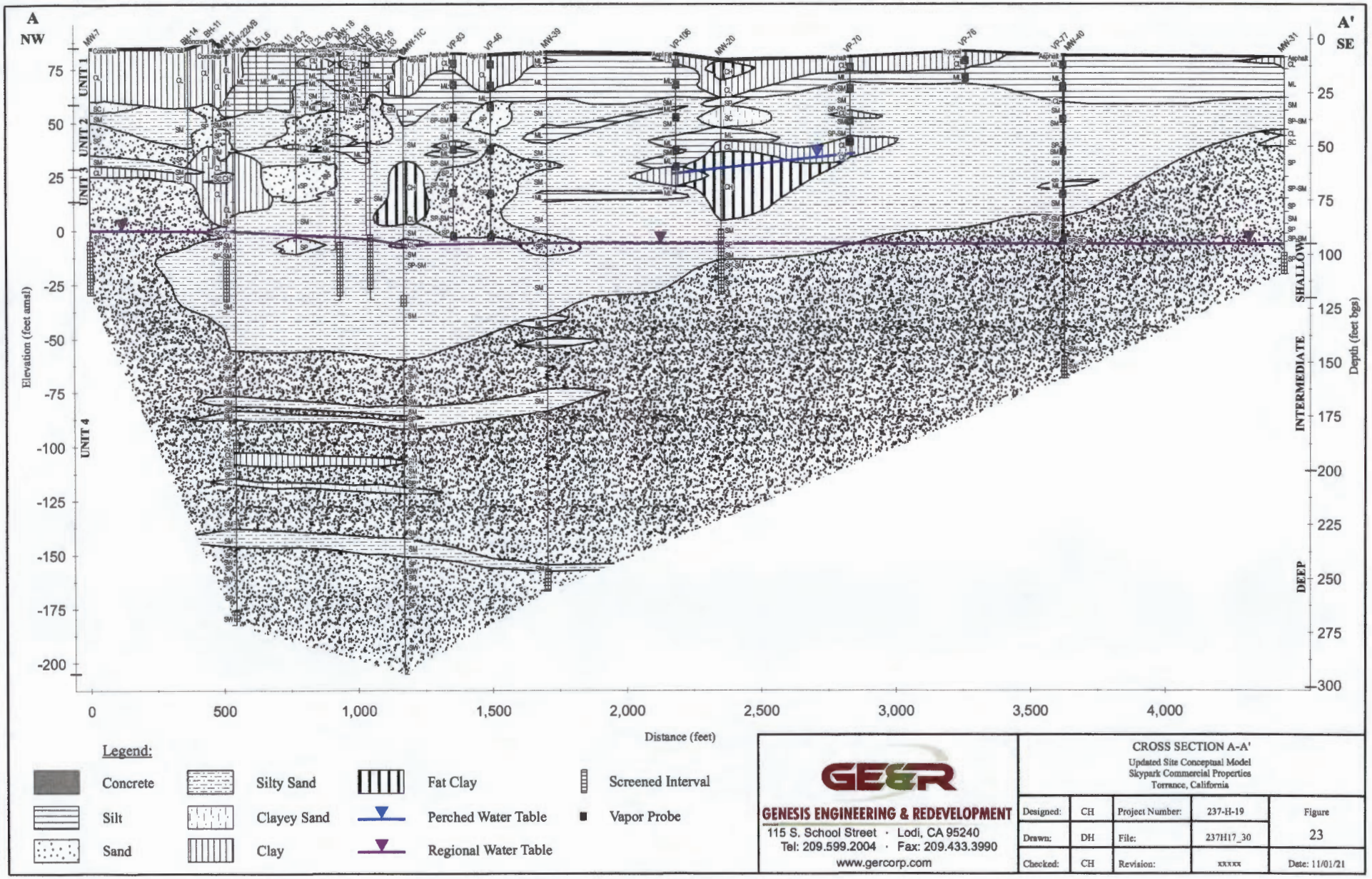


GENESIS ENGINEERING & REDEVELOPMENT
115 S. School Street · Lodi, CA 95240
Tel: 209.599.2004 · Fax: 209.433.3990
www.gercorp.com

PCE CONCENTRATION CONTOURS IN PERCHED GROUNDWATER
Updated Site Conceptual Model
Skypark Commercial Properties
Torrance, California

Designed:	CH	Project Number:	237-H-19	Figure
Drawn:	DH	File:	237H19SCM_82	80
Checked:	CH	Revision:	xxxxx	Date: 11/10/21

RTC: Revised EAP IRAP - 0072



GENESIS ENGINEERING & REDEVELOPMENT
115 S. School Street · Lodi, CA 95240
Tel: 209.599.2004 · Fax: 209.433.3990
www.gercorp.com

CROSS SECTION A-A'
Updated Site Conceptual Model
Skypark Commercial Properties
Torrance, California

Designed:	CH	Project Number:	237-H-19	Figure
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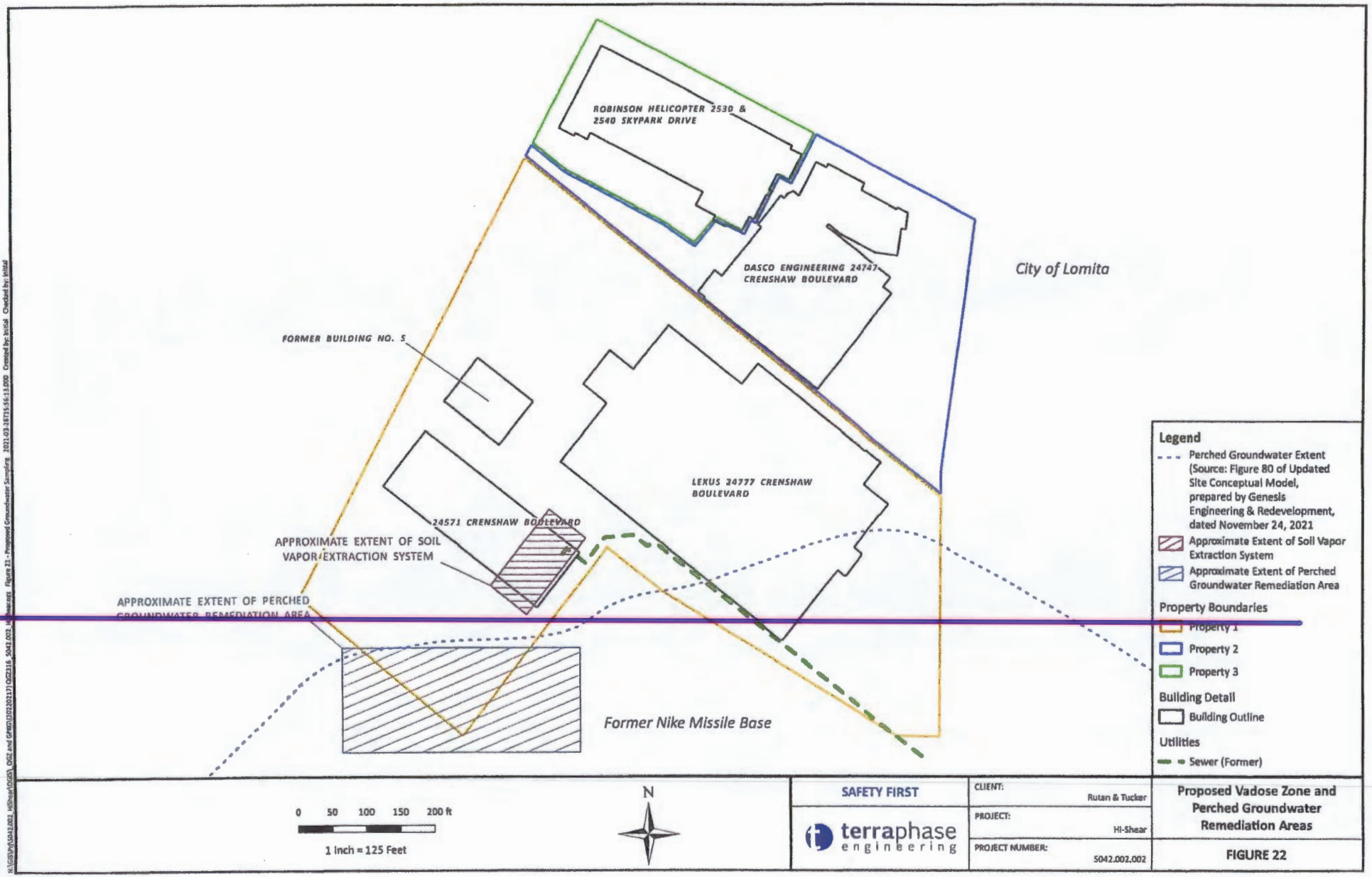
Checked:	CH	Revision:	xxxxx	Date: 11/01/21

RTC: Revised EAP IRAP - 0073

EXHIBIT 8



RTC: Revised EAP IRAP - 0075

Hi-Shear Corporation, 4/25/2022

A. RAYMOND HAMRICK, III *○
DAVID L. EVANS *○
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April 25, 2022

VIA E-MAIL ONLY

Ms. Jillian Ly
Mr. Kevin Lin
Los Angeles Regional Water Quality Control Board
320 West 4th Street, Suite 200
Los Angeles, CA 90013
Email: Jillian.Ly@waterboards.ca.gov
Kevin.lin@waterboards.ca.gov

Re: Skypark Commercial Properties
SCP Case No. 1499; CAO No. R4-2021-0079
H&E File No.: 8360.01

Dear Ms. Ly and Mr. Lin:

On behalf of Hi-Shear Corporation ("Hi-Shear"), this correspondence will serve to set forth Hi-Shear's comments to the City of Torrance's ("Torrance") Groundwater Removal Action Workplan ("Groundwater RAW") and Removal Action Workplan for the East Adjacent Properties (the "EA RAW"), which were prepared by Terraphase Engineering, Inc. ("Terraphase") and submitted on January 31, 2022 and February 28, 2022 respectively.

Hi-Shear requests that the Los Angeles Regional Water Quality Control Board ("RWQCB") convene a meeting between Hi-Shear, Torrance, and any other interested parties, including other Dischargers, to discuss the Groundwater RAW and the EA RAW.

General Comments to Torrance's Groundwater RAW

As an initial comment, Hi-Shear takes issue with Terraphase's characterization of the entire Skypark Commercial Properties contaminant plume, which extends east of Crenshaw

Boulevard, as the "Hi-Shear Plume." This characterization is technically inaccurate, and unfairly prejudicial and inflammatory to Hi-Shear, since years of ongoing investigation have confirmed that a significant portion of the commingled plume is due to releases on and from properties other than the Hi-Shear Property. Nonetheless, Terraphase seeks to portray the commingled plume as being the sole responsibility of Hi-Shear, a position that is completely untenable and unsupported by the data.

Indeed, as the RWQCB recognized in its June 18, 2021 Cleanup and Abatement Order No. R4-2021-0079 (the "CAO"), the groundwater contamination at issue at the Skypark Commercial Properties is the result of multiple separate releases emanating from Property 1, Property 2, Property 3, and the Hi-Shear Property, all of which appear to have impacted regional groundwater. (CAO, p. 14-15.) This conclusion is further supported by Hi-Shear's Updated Site Conceptual Model dated November 24, 2021 (the "Updated SCM"). Further, Terraphase even recognizes the separate and distinct releases on Properties 1, 2, and 3 in its separate EA RAW.

Interestingly, Terraphase appears to intentionally side step an analysis of the impact those releases have had on regional groundwater by limiting its discussion to the impacts of the releases to soil, soil vapor, and perched groundwater, while ignoring the elevated PCE and 1,1,-DCE detections in groundwater under the source area on Property 1. (EA RAW, section 5.1.2). As set forth in Hi-Shear's Updated SCM, the releases from Property 1 have indeed had significant impacts on groundwater below the source area on Property 1. (Updated SCM section 8.2.1).

Definitions matter, especially in public record documents, and the comingled groundwater plume should not be defined in a way that advocates or attempts to assign blame for the plume to only a single party. Given the data and Terraphase's acknowledgement of separate source areas on Properties 1, 2, and 3, a more accurate and appropriate title would be the "Skypark Commercial Properties Plume".

1. Permeable Reactive Barrier Along Crenshaw

The Groundwater RAW has three stated objectives: 1) reduce the risk of vapor intrusion ("VI") potential east of Crenshaw Boulevard; 2) reduce contaminant mass in groundwater at the Hi-Shear Property; and 3) achieve water quality objectives in groundwater east of Crenshaw Boulevard within a reasonable time frame.

To achieve these objectives, Torrance proposes two remedial options, one of which is the installation of a permeable reactive barrier along a portion of Crenshaw Boulevard that will inject zerovalent iron ("ZVI") and a bioaugmentation solution into regional groundwater. While ZVI is an established technique that will likely degrade chlorinated VOC concentrations in groundwater along Crenshaw Boulevard, Hi-Shear's experts do not believe that it will achieve the stated goal of reducing VI risk east of Crenshaw Boulevard, or of achieving water quality objectives in groundwater east of Crenshaw Boulevard in a reasonable time frame.

Specifically, a ZVI barrier along Crenshaw Boulevard leaves VOC untreated in the unsaturated zone on both sides of Crenshaw Boulevard and does not inhibit vapor phase migration of VOCs across Crenshaw Boulevard from Properties 1, 2, and 3. Further, a ZVI barrier along Crenshaw does not address the suspected VOC source area along Amsler Street, which remains under investigation (although private access problems have slowed the process). Neither of these issues are addressed by the proposed ZVI barrier. Moreover, Terraphase proposes operating the ZVI barrier for only fifteen (15) years. Since the Groundwater RAW does not propose any treatment of groundwater under Property 1 (and the EA RAW proposed only limited groundwater EISB injections), the contaminated groundwater located under Property 1 may not migrate through the ZVI barrier along Crenshaw Boulevard before the ZVI barrier is abandoned, leaving that contaminated groundwater free to cross Crenshaw Boulevard.

B.1

Additionally, the ZVI barrier does not address the leading edge of the plume to the east of Crenshaw Boulevard, in either groundwater or soil vapor. The Groundwater RAW does not propose any cleanup of soil vapor or groundwater east of Crenshaw Boulevard, meaning that the VI risk east of Crenshaw Boulevard will remain indefinitely. Since the Groundwater RAW rejects monitored natural attenuation, leaving the groundwater and soil vapor east of Crenshaw unaddressed, means that the Groundwater RAW fails to achieve two of its stated goals: to reduce VI risk east of Crenshaw Boulevard and achieve water quality objectives in groundwater east of Crenshaw Boulevard.

On a technical level, Terraphase proposes monitoring the effectiveness of the ZVI barrier through the use of two (2) existing monitoring wells, one of which is upgradient of the barrier. This is an insufficient network to monitor the effectiveness of the ZVI barrier. Moreover, the PRB does not extend far enough to the south along Crenshaw Boulevard to intercept impacts to regional groundwater originating from Property 1. Nor does the PBR extend far enough to the north along Crenshaw Boulevard to capture impacts beneath Property 3. The configuration of the PRB is also unclear. The Groundwater RAW references both 28

and 44 injection locations in the text and tables, and only 27 injection locations are shown on the attached figures.

2. EISB Injections at Hi-Shear Property

Hi-Shear agrees that further EISB injections at the Hi-Shear Property would meet the objective of further reductions of contaminant mass at the Hi-Shear Property. However, rather than simply utilizing the existing injection wells that were utilized in the past, Hi-Shear recommends that the injections focus on the highest concentrations of chlorinated VOCs remaining on the Hi-Shear Property, even if that requires installing new injection wells. These areas are identified in the recent groundwater monitoring reports submitted by Hi-Shear.

Moreover, as discussed below, Hi-Shear and its consultants believe a more comprehensive approach to the entire Skypark Commercial Properties, and the area east of Crenshaw Boulevard, would be the preferred strategy for ultimately remediating the entire site, rather than employing different remedial options at different areas of the site.

Furthermore, the Groundwater RAW alleges that DNAPL is currently present at the Hi-Shear Property. Terraphase and Torrance make this allegation based solely on a single line of evidence – VOC concentrations in groundwater. However, in contradiction, the guidance cited by the Groundwater RAW clearly states that the inference of the presence of DNAPL should not be made using a single line of evidence. Hi-Shear's Updated SCM contains a detailed explanation on this issue that relies on multiple lines of evidence to conclude that DNAPL is not present at the Hi-Shear Property. And, even if there is DNAPL present at the Hi-Shear Property (which there is not), the Groundwater RAW neither identifies the location of the DNAPL, nor proposes any plan to confirm its presences and subsequently remove it if found.

3. Terraphase Did Not Consider a Comprehensive Approach to Treating the Comingled Groundwater Plume

The Groundwater RAW fails to even consider groundwater extraction, amendment to treat the extracted groundwater, and reinjection at source areas on both the Hi-Shear Property and Properties 1, 2, and 3. While this remedial alternative was considered for the Hi-Shear Property (although it considered placing treated groundwater into the sewer rather than reinjecting it), it was not included as a consideration for a more comprehensive approach to remediating groundwater for the entire Skypark Commercial Properties. The creation of a recirculation cell where groundwater is extracted along the leading edge of the plume, treated,

and then reinjected at source areas would both assist in remediating those source areas and provide for greater protection east of Crenshaw Boulevard. A recirculation cell would also decrease the time necessary to cleanup the plume as it would increase the groundwater velocity rather than relying on the natural groundwater velocity as is the case with a ZVI barrier. Additionally, an amendment may also be incorporated into the reinjected groundwater to further enhance cleanup.

While such a recirculation cell may be initially more expensive than the ZVI barrier (although Hi-Shear believes that greater detail on estimated cost could have been provided in the Groundwater RAW), a recirculation cell may actually end up being of comparable cost. The initial capital cost for a recirculation cell would certainly be more expensive, but the operation and maintenance costs for the system could be less expensive over time than the continued ZVI barrier injections by increasing the groundwater flow velocity and decreasing the treatment time.

B.2 The Groundwater RAW should have considered a comprehensive approach to treat groundwater. This comprehensive approach should also have included, or at least considered, remedial options for treating soil and soil vapor at the Skypark Commercial Properties and east of Crenshaw Boulevard. The bifurcated approach proposed by the Groundwater RAW and the EA RAW fails to consider the potential time and cost savings that could result from the implementation of tandem remedial options at the entirety of the Skypark Commercial Properties and east of Crenshaw Boulevard.

General Comments to Torrance's EA RAW

As with the Groundwater RAW, the EA RAW inaccurately labels the entire comingled plume as the "Hi-Shear Plume," again ignoring data confirming source areas on other properties. To avoid misrepresentation and public confusion, any work plan submitted by Torrance, or any other Discharger, should refer to the comingled plume as the "Skypark Commercial Properties Plume." Moreover, the EA RAW avoids any analysis of impact to groundwater that the acknowledged releases on Properties 1, 2, and 3 have had. Instead, the EA RAW seems to limit its analysis to soil, soil vapor, and perched groundwater. The EA RAW should be revised to include an assessment of the impact (to both perched and regional groundwater) that the source areas located on Properties 1, 2, and 3 have had.

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1. Further Proposed Investigation

The EA RAW proposes additional investigation on Properties 1, 2, and 3 to fill in data gaps at those properties. In general, Hi-Shear believes that the investigation set forth in the EA RAW is adequate to fill those data gaps. However, Hi-Shear has several technical comments regarding the proposed scope of the investigation and the methods employed for the work.

Initially, the EA RAW proposed utilizing direct push drilling for several vapor monitoring probes, going to depths of 85-feet. It is Hi-Shear's experience that drilling refusal using a direct push rig is encountered at depths of 20 to 30 feet beneath the Skypark Commercial Properties. This could result in MIP profiling being incomplete in deeper soil. Other drilling methods such as hollow-stem auger or sonic drilling may need to be utilized to complete the investigation and gather the necessary data. Additionally, Hi-Shear believes that the perched, shallow, and intermediate wells should be co-located (i.e., clustered) to provide better data for evaluating and assessing the vertical extent and distribution of contamination.

Further, Hi-Shear believes that the proposed investigation should be expanded to provide additional data on known or suspected source areas on the properties. Specifically, shallow borings should be proposed to collect soil and soil vapor samples inside the building located at 24571 Crenshaw Boulevard to confirm the source area under the industrial chemical-using degreasers that were operated in the eastern side of that building. Hi-Shear understands that the building has sufficient clearance and is essentially empty, such that these drilling activities should pose no business interruption or permitting problems. Moreover, the additional investigation should include co-located wells and soil and soil vapor sample collections from Properties 2 and 3, centered around the spray booths and suspected source areas on those properties. Hi-Shear is willing to meet with Terraphase to discuss its suggestions as to the precise locations for these additional probes and wells.

Finally, the EA RAW states that one of its objectives is to quantify VOC mass flux from the Hi-Shear Property. However, there is no discussion about how this objective will be completed or what techniques will be used to calculate mass flux across the boundary between the Hi-Shear Property and Properties 1, 2, and 3. Nor does the EA RAW discuss why such a mass flux quantification is not proposed for Properties 1, 2, and 3. Investigation has of course confirmed that the Hi-Shear Property is not the lone source area, but rather just one of many, so this objective should be addressed by Torrance and Terraphase in greater detail.

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2. Operation of a SVE System

The EA RAW provides for the installation and operation of a limited SVE system at Property 1. While Hi-Shear agrees that SVE is the best technique for addressing chlorinated VOC in the unsaturated zone beneath Property 1, the SVE system proposed in the EA RAW is not sufficient to address the soil vapor contamination at Properties 1, 2, and 3, or the soil vapor contamination that extends off site across Crenshaw Boulevard.

Specifically, and as the EA RAW acknowledges, there are additional source areas on Properties 2 and 3 that have impacted soil vapor beneath those properties. Indeed, the EA RAW's figures show the data on soil vapor contamination at 5, 45, and 85 feet throughout the entire Skypark Commercial Properties and into the residential areas east of Crenshaw Boulevard. These figures demonstrate high levels of VOC contamination throughout Properties 1, 2, and 3.

B.3 However, the limited nature of the proposed SVE system under the former degreaser locations at Property 1 is insufficient to address the larger soil vapor contamination found at Properties 1, 2, and 3. The SVE system should be expanded to cover the entirety of Properties 1, 2, and 3 to reduce VOC concentrations throughout these properties and reduce the risk of VI. Further, the SVE system should likewise be extended to the west to at least just beyond Crenshaw Boulevard to reduce VOC contamination migrating through the unsaturated zone from the source areas on Properties 1, 2, and 3.

B.4 On a more technical note, the proposed SVE system only proposes wells going down 45-feet, while the data indicated high concentrations in soil vapor down to regional groundwater at 85-90-feet. The SVE system should extend further down to capture VOC contamination at depth. Additionally, the use of granular activated carbon in the SVE system will likely be prohibitively expensive given the very high VOC concentrations in soil vapor. The same situation was encounter at the Hi-Shear Property and the SVE system there was transitioned over to a catalytic oxidation system for removing VOC from vapor. Any comprehensive SVE system at Properties 1, 2, and 3 should utilize catalytic oxidation or applicable treatment system rather than granular activated carbon in order to save costs.

Further, the EA RAW proposes operating the limited SVE system for only four (4) years to achieve cleanup. This is not a realistic goal. Given the extremely high levels of VOCs, including PCE and 1,1-DCE at Properties 1, 2, and 3, any SVE system will need to be operated for a much longer period of time to achieve cleanup.

3. EISB Injections to Groundwater and ISCO Injections to Perched Groundwater

The EA RAW proposes EISB injections to groundwater under Property 1 and ISCO injections into the perched water zone underlying Property 1 and the former Nike Missile Base. While Hi-Shear agrees that EISB injections to the location proposed in the EA RAW would indeed reduce contamination at that area, the area outlined by the EA RAW for these injections does not seem to correspond to the location where VOC concentrations are highest in groundwater. The EA RAW should focus EISB injections in groundwater where the data, including from the additional investigation proposed by the EA RAW, shows the highest VOC concentrations are located.

B.5

Additionally, the EA RAW will leave untreated the remainder of groundwater under Properties 1, 2, and 3. As discussed above, Hi-Shear believes that a broader, more comprehensive approach should be taken to the entire Skypark Commercial Property and east of Crenshaw Boulevard. A recirculation cell may prove to be an effective approach to both treating groundwater under the Skypark Commercial Properties and preventing contaminated groundwater from migrating further downgradient.

Further, the ISCO injections proposed to treat the perched zone are an established technique for reducing chlorinated VOC in groundwater. However, they may not be effective when employed in the perched groundwater zone located under Property 1. The choice of injection compounds and low permeability of the sediments in the perched zone are not optimal for effectiveness. Specifically, the EA RAW proposes using hydrogen peroxide and ozone for the ISCO compounds, which should be consumed within a few hours of injection. This quick consumption will make it difficult for the compounds to come into contact with all the chlorinated VOCs that are dissolved in the perched groundwater. Further, the low permeability of the sediments in the perched zone will result in small radii of influence around each injection well and incomplete distribution of the ISCO compounds. And, the perched groundwater is likely to include organic matter and reduced mineral phases, which will consume the ISCO compounds and reduce the effectiveness of the injections.

B.6

The EA RAW fails to propose a pilot study despite these uncertainties as to the effectiveness of the ISCO injections. The EA RAW should propose such a study to see if ISCO injections using the proposed compounds would be effective at reducing chlorinated VOCs in the perched groundwater zone.

As a final note, while the Groundwater RAW does include an analysis of the presence of DNAPL at the Hi-Shear Property (based off a single line of evidence), the EA RAW does not contain a similar analysis of the potential presence of DNAPL in the perched groundwater zone. However, the data presented in Hi-Shear's Updated SCM indicates that PCE, 1,1-DCE, and 1,1,1-TCA are present in concentrations in the perched groundwater zones of 17.8, 2.3, and 1.8 percent of their relative solubilities in water. The EA RAW should be revised to include an analysis of the potential presence of DNAPL in the perched groundwater zone beneath Property 1.

Conclusion

Hi-Shear is optimistic that Torrance and Terraphase will voluntarily supplement or revise the Groundwater RAW and the EA RAW to take into account the above comments without the need for RWQCB intervention. In the event that Torrance and/or Terraphase do not do so, Hi-Shear requests that the RWQCB's comments to the Groundwater RAW and EA RAW take into account the comments herein and direct Torrance to submit revised workplans.

Again, Hi-Shear would like to work collaboratively with Torrance, Terraphase, the RWQCB, and the other Dischargers on the work that needs to be performed to move the Skypark Commercial Properties towards cleanup. As such, and again, Hi-Shear requests that the Los Angeles Regional Water Quality Control Board ("RWQCB") convene a meeting between Hi-Shear, Torrance, and the other Dischargers to discuss the Groundwater RAW and the EA RAW.

Very truly yours,

/s/ Thomas P. Schmidt
DAVID L. EVANS
THOMAS P. SCHMIDT
JEFF POOLE

cc: Hugh Marley
Arthur Heath
Tamarin Austin
Christian Darville
Holly Coates
Steve Van der Hoven; Chris Hammond

City of Lomita, 6/17/2022

CITY OF LOMITA

June 17, 2022

Mr. Kevin Lin, P.E.
320 West 4th St., Suite 200
Los Angeles, Ca. 90013
Kevin.Lin@waterboards.ca.gov

Dear Mr. Lin:

The City appreciates the efforts of the Los Angeles Regional Water Quality Control Board (Los Angeles Regional Board) related to the matter now referred to as Skypark Commercial Properties Site (Site). The City has reviewed the reports, Groundwater Removal Action Workplan (Groundwater RAW) prepared by Terraphase in 2022 and East Adjacent (EA) Properties Removal Action Workplan also by Terraphase in 2022.

The Groundwater Removal Action Workplan addresses groundwater beneath the Skypark Commercial Properties Site in the City of Torrance and proposes actions to address the Skypark Properties contamination/plumes. The East Adjacent (EA) Properties Removal Action Workplan addresses the plume margin within the Site. These removal actions are designed to achieve the remediation action objectives and the remedial goals, by abating further migration of the plume downgradient into the EA Properties and into the residential areas of Lomita, and reducing the vapor intrusion potential and VOC adverse impacts on water quality.

Following review of the two reports, while the proposed actions will have a positive effect, it does not appear the selected removal actions will adequately achieve the remediation action objectives, be protective of human health and the environment, and lower the observed soil and groundwater impacts to the community in Lomita. Further action is needed, particularly to address the contamination currently present in the City of Lomita.

C.1

The proposed removal method does not address risks posed by contamination (soil vapor and groundwater) already present in the City of Lomita. The most recent maximum TCE and PCE groundwater concentrations recorded beneath the City of Lomita in groundwater monitoring well MW-20 were 2,450 µg/L (490 times the MCL) and 433 µg/L (87 times the MCL), respectively. Also, the portion of the plume existing within the City of Lomita will continue to migrate and degrade the quality of regional groundwater as it moves into “cleaner” parts of the aquifer and away from the source.

C.2

Inconsistency as to the primary source of soil vapor east of Crenshaw Blvd. in the City of Lomita indicate the sources of VOC soil vapor have not been sufficiently characterized to support selected removal actions. Since characterization of the plume in the workplans are limited, the achievability of the remediation action objectives is questionable.

C.3

C.4 While the Groundwater Removal Action Workplan is directed at regional groundwater impacts and the EA Removal Action Workplan is directed at the on-Site plume, neither the Groundwater Removal Action Workplan nor the EA Removal Action Workplan address the soil vapor impacts (notably PCE, TCE, and 1,1-DCE) that have been observed east of Crenshaw Boulevard, or for the perched groundwater system east-northeast of the EA Properties (i.e., TCE and PCE concentrations above their respective MCLs at monitoring well VP-63; Figure 6 and 7 in the EA Removal Action Workplan). A human health risk assessment (HHRA) should be conducted to identify whether the current soil vapor and perched groundwater conditions pose a potential risk to human health and/or require removal or treatment action.

C.5 While the City supports taking action to prevent further migration of the plume, more is needed to address the contamination at levels well above action levels already present within Lomita. In addition, Lomita has one drinking water production well located within a mile of the currently estimated boundary of the plume. This proximity warrants a greater level of action to address the contamination already in Lomita.

Again, the City appreciates the Los Angeles Regional Board's efforts. Should you have any questions, I can be contacted at (310) 325-7110.

Sincerely,

Ryan Smoot
City Manager

Esterline Technologies Corporation, 10/14/2022

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October 14. 2022

BY EMAIL
Kevin, Lin, P.E.
Los Angeles Regional Quality Control Board 320
West Fourth Street, Suite 200
Los Angeles, California 90013

Re: September 2022 Project Update and Notice of Opportunity to Comment ("Public Notice") - Skypark Commercial Properties, 24701–24777 Crenshaw Blvd and 2530, 2540 and 2600 Skypark Drive, Torrance, California - Comments of Esterline Technologies Corporation

Dear Mr. Lin:

This letter is submitted on behalf of Esterline Technologies Corporation ("Esterline") in response to the above-referenced Public Notice, to provide the Los Angeles Regional Water Quality Control Board ("RWQCB") with comments on the interim remedial measures proposed in the Removal Action Workplan for the East Adjacent Properties dated February 28, 2022, prepared by Terraphase Engineering on behalf of the City of Torrance, and revised in response to RWQCB comments on June 24, 2022 (the "EAP IRAP"). The comments are contained in the attached memorandum prepared by Esterline's technical consultant, Scott Warner P.G., C.HG., C.EG. of the BBJ Group, LLC. Esterline's comments do not address the investigative component of the EAP IRAP, which was approved by the RWQCB on July 27, 2022.

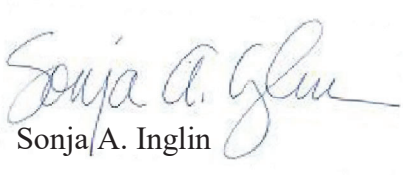
The EAP IRAP was submitted to the RWQCB pursuant to Cleanup and Abatement Order No. R4-2021-0079 ("Order"), which names the City of Torrance as well as others, including Esterline, as dischargers. Esterline disputes that it was properly named as a discharger in the Order and denies any liability or responsibility associated with groundwater contamination addressed in the EAP IRAP or any other aspect of the Order. [1] Esterline is providing these

[1] Esterline has a filed a Petition for Review of the Order which is pending before the State Water Resources Control Board. As addressed in that Petition and in submissions which Esterline has made to the RWQCB, Esterline never occupied or conducted operations at any of the properties subject to the Order and denies that it can be named as a discharger, based on the activities of a former long-dissolved subsidiary which operated at one of those properties (and whose activities in any event did not cause or contribute to the conditions addressed in the Order).

comments subject to and notwithstanding the above, and subject to a reservation of all of its rights and defenses, including with respect to any statements contained in the EAP IRAP with respect to Esterline's alleged connection to or liability associated with the groundwater contamination.

Thank you for your consideration of Esterline's comments. Mr. Warner is available to meet with you and other RWQCB staff to discuss any questions regarding Esterline's comments.

Sincerely yours,



Sonja A. Inglin

Encl.

BBJ GROUP

MEMORANDUM

TO: Renee Purdy, Executive Director, Los Angeles Regional Water Quality Control Board (LARWQCB)

FROM: Scott D. Warner, P.G. (5938), C.HG. (73), C.EG. (1896), BBJ Group, LLC (BBJ Group)

SUBJECT: Comments on the proposed Removal Action Workplan for the East Adjacent Properties, for the Skypark Study Area, Torrance, California

DATE: October 14, 2022

This memorandum provides comments, on behalf of Esterline Technologies Corporation (Esterline), in response to the Los Angeles Regional Water Quality Control Board's (LARWQCB's) *Project Update and Notice of Opportunity to Comment* dated September 2022 (Public Notice). In the Public Notice, the LARWQCB seeks comments on the proposed Removal Action Workplan for the East Adjacent Properties (EAP IRAP) submitted by Terraphase Engineering (Terraphase) on behalf of the City of Torrance for the East Adjacent Properties (EA Properties) of the Skypark Commercial Properties project located at 24701-24777 Crenshaw Boulevard and 2430, 2540, and 2600 Skypark Drive in Torrance California (collectively referred here to as "the Skypark Study Area"). [1] The EAP IRAP is dated June 24, 2022 and was revised from an initial version following initial review comments by the LARWQCB dated May 19, 2022.

The Skypark project site is bounded on the east by Crenshaw Boulevard and both residential and commercial property in the City of Lomita and on the south by the Torrance Municipal Airport, on which a Nike Missile Defense facility (not discussed in the Public Notice and known as Nike Missile Site Number LA-57) was located in the 1950s and 1960s. Esterline has been identified by the LARWQCB as a party associated with one of those properties, referred to as EA Property 1 (24777 and 24751 Crenshaw Boulevard).

My comments address the specific proposed application of soil vapor extraction (SVE) to treat contaminated soil and soil vapor beneath the EA Properties and enhanced in-situ bioremediation (EISB) to treat contamination in both the perched and regional groundwater beneath the EA Properties. Based on the LARWQCB's statements in the Public Notice, I have evaluated the proposed plan as potential interim remedial measures even though the Terraphase report appears to consider these as final measures.
The LARWQCB previously approved the investigative component of the EAP IRAP in a letter dated July 27, 2022. These comments therefore do not address the investigative component of the EAP IRAP.

[1] These comments are to provide the LARWQCB with technical input with respect the EAP IRAP. They are not intended to comprehensively address the content of the EAP IRAP, including any specific statements or conclusions in the EAP IRAP related to any responsibility of Esterline or others for conditions on the EA Properties or within the Skypark project site.

The following are four critical conclusions related to the EAP IRAP:

D.1

(1) It would be premature to adopt interim or final remedial measures for the EA Properties until the investigative component of the EAP IRAP has been completed. That is because the eventual remedies (whether interim or final) that are selected require detailed technical analysis of the subsurface hydraulic and biogeochemical conditions for the areas in which remedies may be applied; without that technical analysis, there is a risk of ineffective performance, possible failure, and excessive cost. The technical analysis should be performed for both the EA Properties and the property adjacent– including the Torrance Municipal Airport/Former Nike Defense Site to the south.

(2) If the interim remedies identified in the EAP IRAP are adopted, they should be labeled as conceptual, and as requiring reconsideration and refinement consistent with the specific comments below.

(3) Cost elements provided in the EAP IRAP are premature, because the remedies proposed are conceptual in nature and required investigative actions and analysis are not yet complete; and

D.2

(4) The proposed remedies in the EAP IRAP (which should be labeled as conceptual until the investigation is completed), together with the EAP IRAP's investigative component, should be integrated with and consider the technical aspects of the Groundwater Remedial Action Workplan (Groundwater RAW), developed by Terraphase on behalf of the City of Torrance and under consideration by the LARWQB in a separate process. The activities and remedies under the two plans rely on similar data and conditions, and their selection and operation must be integrated to develop an effective overall risk management and remedy approach for the site. Not doing so could lead to extraordinary costs and technical inefficiencies in performance.

Relevant to the comments in this memorandum, BBJ Group, under my technical lead, submitted two documents to the LARWCQB on behalf of Esterline in September 2021 that interpret historical and current site characteristics important to assessing the environmental conditions and identifying and proposing steps to fill data gaps in the understanding of site conditions. These documents were prepared specifically for evaluating conditions related to EA Property 1, but relate to the entire Skypark project area (referred to as the "Skypark Study Area" in the September 2021 reports) and include:

- Preliminary Site Conceptual Model Report, September 10, 2021(2021 pSCM)
- Data Gap and Preliminary Site Assessment Work Plan, September 10, 2021 (2021 Data Gap Work Plan)

D.3

Both documents were submitted to the LARWQCB and are available on the Geotracker website.[2] The information, analyses, and conclusions provided by the reports remain consistent with our current assessment and understanding of the subsurface conditions beneath the Skypark project site.[3] This includes the need to investigate the adjacent former Nike missile property located on the southern boundary of EA Property 1 as a potential source of groundwater contamination within the Skypark project site as part of the data gap investigation proposed by Esterline. The investigative component of the EAP IRAP incorporates some elements of that data gap investigation, and as stated above, should be completed before the LARWQCB considers the adoption of the specific remedies proposed in the EAP IRAP.

[2] https://geotracker.waterboards.ca.gov/profile_report?global_id=T10000013835

[3] The LARWQCB has not yet responded to or provided comments on these reports.

In providing these comments, I have substantial technical background and experience related to the environmental contaminant conditions that affect soil, soil vapor, and groundwater beneath the Skypark project site. I have worked on numerous similar projects over the past 35 years, having designed and implemented a substantial number of site characterization and assessment projects, and having analyzed, selected, designed, implemented, and monitored the performance of remedial actions and technologies that are proposed by the EAP IRAP (and that of the companion Groundwater RAW). A copy of my CV is attached.

General Comments

The primary objectives of the plan are stated as Remedial Action Objectives (RAOs) on Page 6 (Section 1.2) of the document:

- Further delineate VOC sources in subsurface media (soil, soil vapor, perched groundwater, and regional groundwater) and quantify VOC mass flux emanating from HSC to and beneath the EA Properties
- Reduce the potential for vapor intrusion (VI) on the EA Properties
- Address impacts of VOCs in soil and soil vapor beneath the EA Properties and reduce concentrations to acceptable risk
- Achieve water quality objectives in the regional groundwater and perched groundwater within a reasonable time frame.

D.4

These objectives are reasonable objectives in managing the potential risks of this site. If adoption of the EAP IRAP is not deferred pending the results of the investigative component of the EAP IRAP, interim objectives, as milestones, should be stated that would be more closely tied to the characterization and initial remedy alternative selection process that normally follows development of remedial actions for similar sites. The RAOs in Section 1.2 could be defined as "eventual final RAOs," and interim objectives could be listed, such as:

(a) Completing site characterization (with specific approaches including a complete site-wide monitoring program).

(b) Updating the conceptual site model (including hydraulic and geochemical analysis).

(c) Selecting interim remedial approaches and remedies consistent with site conditions (including the now proposed pilot testing or interim application, as appropriate).

(d) Quantifying risk management objectives for water quality, soil, and soil vapor conditions that are protective of human health and the environment.

D.5

Additionally, the EAP IRAP involves characterization activities and proposed remedies that affect the same properties and similar subsurface media within and adjacent to the Skypark Study area that are described by and are the focus of the Groundwater RAW. The programs and activities described in the EAP IRAP and Groundwater RAW are not mutually exclusive. In approving either or both plans, the LARWQCB needs to

require integration between them. Individual remedial actions proposed in one document may be synergistic or may be competitive with actions proposed in the other document. Competitive actions could reduce potential performance of a remedial action while increasing overall cost, while synergistic actions could result in better performance and lower costs.

The revised EAP IRAP appears to have considered and, for the most part, incorporated the May 2022 comments by the LARWQCB, including: (1) increasing sample collection frequency to approximately 5-ft intervals from groundwater surface to groundwater in all soil borings; (2) modifying or updating figures showing proposed soil vapor extraction well locations (Figure 22); (3) adding a laboratory bench test and water quality assessment study for using EISB for the perched groundwater environment; (4) adjusting the potential regional groundwater EISB remedy to integrate the rising contaminant concentration at well MW-8 beneath EA Property 3; and (5) updating all maps and tables for consistency.

Based on review of the EAP IRAP and project schedule illustrated by Figure 23, the document should be clarified to reflect that it includes the specific activities:

D.6

(1) Complete the characterization of the former Nike Missile facility adjacent to EA Property 1 (a part of which is now included as part of EA Property 1) in those areas where historical aerial photographs over several years indicate the presence of debris, apparent storage containers, and industrial activity.

(2) Perform a time-consistent, site-wide comprehensive monitoring event of all monitoring wells and soil vapor wells. For groundwater include all major target constituents, field water quality parameters (e.g., pH, dissolved oxygen, oxidation-reduction potential, etc.) plus perchlorate.

(3) Evaluate the fate and migration of chemical constituents in subsurface media beneath the EA Properties and adjacent areas, including from potential off-site source areas using quantitative methods, including numerical modeling as appropriate, for both groundwater hydraulics and geochemical characteristics.

(4) Evaluate the influence of remedial measures performed on the adjacent HSC property, including both vapor extraction and groundwater bioremediation, to assess the impact of these measures on the fate and transport of contaminants (including transformation of primary constituents into degradation products) found beneath the EA Properties.

(5) Complete the conceptual site model (CSM) development for the Skypark Study area including implementing a comprehensive hydraulic analysis of the site's subsurface – assessing VOC mass flux and both selecting and designing the remedies proposed require sufficient hydraulic characterization or risk severe underperformance and likely increased cost to meet performance objectives.

Specific Comments
Perched Water, Groundwater Monitoring Data, Soil Chemistry

- Page 10, Section 2.3. The description of the "perched groundwater" offered in this section should be clarified, and reflect that, as part of the investigative component of the EAP IRAP, there will be a data gap investigation for perched water as described in Section 5.2.2.1. The third paragraph under Section

D.7

2.3 accurately represents that the "perched groundwater zone has been reported to dip to the west and northwest (GE&R 2021). However, the fifth paragraph under Section 2.3 is misleading and should be modified to state: "Perched groundwater has been reported to be present with a hydraulic gradient directed from the southwest (on the former Nike defense property) to the northwest toward and beneath EA Property 1"). This proposed modification is supported by boring logs and cross-sections in the GE&R reports that show the fine-grained perching horizon to slope **from** the former Nike Missile Base **toward** EA Property 1 and not in a reverse direction. This section should describe the possible reason that perched water exist as that may be important in understanding chemical source locations and the hydraulics of the subsurface that are important to remedial selection and design. A likely contribution to the perched water is surface water recharged from the drainage ditches on the Torrance Airport property that has become entrained in the shallow subsurface and may be flowing through chemically impacted zones as it migrates down-gradient toward EA Property 1.

- Page 12, Section 3. The EAP IRAP notes correctly that little new groundwater monitoring data has been collected since November 2020, and that the data collected did not represent a comprehensive evaluation of the groundwater. We strongly recommend that a comprehensive and complete site monitoring event for existing monitoring wells in the Skypark Study area conducted prior to implementation of any interim groundwater remedies. We also recommend stating that perchlorate and field water quality parameters will be included in this site-wide monitoring event.

- Page 15, Section 3.3. The Groundwater RAW's description of "soil" chemistry is insufficient for developing a remedial action workplan and should be revised so better characterize subsurface conditions and determine the location of chemical sources. Current data shows, and supports the inclusion in this section of the following statements in this section:

D.8

  - No specific shallow soil release locations have yet been identified beneath EA Property 1 based on data from shallow soil investigations (e.g., Frey, 2021).
  - The high concentrations of soil impacts are deep and consistent with the approximate depth of the fine-grained perching horizon beneath the site (40 and 55 feet bgs) and,
  - The location of the highest concentrations at depth are on or adjacent to the former Nike Missile Base.

Soil Vapor Conditions

- Page 17, Section 3.5. The discussion of off-property soil vapor is incomplete based on the second paragraph that begins: "Shallow PCE and TCE concentrations decrease with distance from the EA Property 1 boundary." This paragraph does not provide the three-dimensional distribution of soil vapor as provided in several of the recent GE&R reports. At the very least, this paragraph should refer to specific figures in GE&R reports and include a statement that a time-current evaluation of the three-dimensional distribution of soil vapor will be included as part of a comprehensive site-wide monitoring event.

D.9

- Page 17, Section 3.5 Paragraph 5. The EAP IRAP's conclusion that PCE detections indicate a source on EA Property 1 is not supported by the data and should be deleted. The discussion appears not to consider the connection between the very high concentrations at depth with very low concentrations in samples of shallow surface soil. There are no data that definitively identify a shallow soil source on EA

Property 1 likely capable of creating the exceptionally high concentrations that are observed in the deeper system.

Also, assessment of soil vapor conditions should evaluate the soil vapor extraction system on the HSC property. The data from the February 2022 SVE Monitoring Report indicates a higher than anticipated mass of contaminants in the influent to the SVE was detected by the monitoring program as reported in the February 2022 report for the Fourth Quarter 2021 SVE monitoring program[4]. No explanation supported by technically defensible characterization data has been provided by HSC as to the source of the higher than anticipated mass. This work should be paramount to assessing both the occurrence of soil vapor that may also affect the EA Properties as well as the efficacy of the system and whether expansion of vapor extraction wells to other areas of the Skypark study area should occur. There also has been no evaluation as to the potential additional vapor phase that may have been produced through transformation of contaminants associated with the HSC bioremediation program performed from 2013 to 2017; the LARWQCB should require that a technical evaluation of these actions be performed in concert with the EAP IRAP.

- Page 19-20, Section 3.7. The approach of using bioremediation may be reasonable, however, a thorough evaluation of the impact of the bioremediation system on the groundwater beneath HSC and extending toward and beneath the EA Properties has not been performed. We propose including the statement: "the results of the groundwater bioremediation program conducted by HSC between 2013 and 2017 should be evaluated for long-term effectiveness, rebound potential, and transformation product development (including both -ethene and -ethane pathways) that may have substantial impact on future remedial attempts and contaminant distribution. The analysis will be informative for designing a subsequent bioremediation program that may be part of a final remedy for affected groundwater."

D.10

- Page 22, Section 4.3. This section should be updated to include the steep rise in VOC concentrations (particularly TCE and 1,1 DCE) seen in groundwater samples from well MW-8 at the northern edge of EA Property 3. Figures and appropriate analysis should be included, or at least cited, that show the VOC conditions (occurrence and concentration trend) in groundwater.

- Page 24, Section 5.1.2, last two paragraphs: These paragraphs are not consistent with the MKECI 2021 and BBJ Group 2021 conceptual model reports for EA Property 1 that point to the potential location of a VOC source to groundwater beneath the former Nike Missile Base. No specific site conditions are identified as a basis for the City's disagreement with those conclusions. This section should state that the potential source will be evaluated as part of the investigative component of the EAP IRAP.

D.11

Removal Action Objectives and Goals

- Page 29, Section 6. As noted earlier, changes should be made to define interim RAOs or at the very least, milestones for characterization activities (e.g., completion of the CSM) and remedial actions in addition to final objectives.

[4] https://www.waterboards.ca.gov/losangeles/water_issues/programs/remediation/

Removal Actions – Perched Groundwater

As an overall statement, the description of the Perched Zone program as the "EA Properties Perched Zone" should be changed simply to "Perched Zone" or perhaps "Southeast Skypark Perched Zone." The title "EA Properties Perched Zone" suggests that this zone as chiefly under the EA Properties, although it is very clear that data shows this zone to be emanating from the former Nike Defense site to the south and southeast. Like our prior comment, this hydrogeologic zone appears to slope TOWARD the EA Property 1 from the Airport property. This is an important and critical distinction to assess both occurrence and distribution of target constituents but also potential source areas.

- With respect to the discussion of EISB in Section 7.2.6, (1) we do not agree that bioaugmentation is a necessary component at this time considering that biodegradation has been used previously and transformation products exist under natural conditions, and (2) any use of EISB should be pilot tested, as using EISB for perched water conditions is not a standard remedy.

D.12

- The depiction of Vadose and Perched Groundwater Remediation Areas, as shown in Figure 22, is premature until the investigation component of the EAP IRAP and other activities are completed. The rationale for selecting the southern area of EA Property 1 for treatment is not clear. The characterization of this area is incomplete, and the depiction of the treatment area is not consistent with a known or identified source area, unless that source area exists on the former Nike Missile site (which is the only possible explanation based on the depicted location). There is no rationale for a remedial system at the eastern end of the EA Property 1 small building as no source in that location has yet been identified. The decision on remedial approach should come after this additional characterization is performed. This figure should be deleted.

Removal Actions – Regional Groundwater

D.13

With respect to EISB, this technology was shown to be successful for reducing mass at HSC, but also may be contributing to the generation of transformation (degradation) chemicals that continue to persist. A full evaluation of the HSC bioremediation program, including the dynamics of the process, degradation, extend, rebound, and transformation should be completed prior to finally selecting and designing the remedy. We do not suggest using bioaugmentation as an initial part of the remedy unless treatability testing dictates that bioaugmentation is necessary. While there may be some rationale for considering use of a commercial microbial consortium as an additive, the results of the laboratory bench study that looks at a control batch, as well as nutrient enhancement without bioaugmentation should be evaluated. In addition, the following should be required as part of the evaluation process:

- Hydraulic analysis of the subsurface should be completed prior to selecting any in situ remedy; without doing so will increase the likelihood of incomplete performance, and higher than necessary costs to implement.

D.14

- There is no indication of the "time component" necessary to complete removal actions for groundwater remedies. Without a hydraulic analysis and specific geochemical evaluation, the time component cannot be completed. Without the time component, the cost estimate also is incomplete and would not reflect the eventual costs of this remedy.

- Figure 21 labeled "Proposed Regional Groundwater Remediation Area" should be deleted. If it is retained, it should be labeled as depicting "Conceptual Groundwater Remediation Area." While bioremediation has been shown to be successful in correctly designed situations, the EAP IRAP appears to have selected and preliminarily "designed" a bioremediation as a remedy, without the performing the design characterization activities necessary to implement a technically effective and cost-efficient remedy. The rationale for selecting the groundwater remedy area in Figure 21 has not been made clear, as the investigative component of the work has not been completed. For that reason, this figure should be deleted or relabeled as set forth above.

Removal Action Implementation

D.15

The technical information that describes hydraulic impact of EISB injection, likely movement of the enhancements for groundwater and perched zones, should be completed prior to proposing details of any implementation. Inappropriate injections may further exacerbate contaminant occurrence and distribution which could substantially complicate conditions and add unanticipated costs to the mitigation program. Further, the suggestion of details of the reduction enhancement for regional groundwater also is premature without showing the background and defending the design using site characterization information. Solution injection is non-linear with respect to distribution within an aquifer system; lack of assessing hydraulics can lead to inadequate performance and in ability to meet remedial objectives.

Section 11 – Cost and Schedule

Without the completion of characterization activities (including the investigative component of the EAP IRAP), the estimated costs are premature and do not provide a meaningful basis for comparison and selection of remedial approaches. For the same reason, the estimated number of monitoring events and schedule are premature.

APPENDIX A

CURRICULUM VITAE FOR SCOTT WARNER

ATTACHED

Scott D. Warner, PG CHG CEG
Principal Hydrogeologist swarner@bbjgroup.com **415-799-1743**

Education
B.S., Engineering Geology
University of California, Los Angeles, 1983

M.S., Geology – (Hydrogeology), Indiana University, 1986

PhD Candidate – Enviro. Remediation/Climate Impact (In Progress/Part Time), University of Newcastle, Australia, 2019-Present

Professional Registration
Professional Geologist, Certified Hydrogeologist, Certified Engineering Geologist – California

Licensed Geologist / Hydrogeologist – Washington

Professional Associations
American Bar Association

Groundwater Resources Association of California

SF Bay Planning Coalition

Board Positions Held
American Bar Association – Vice Chair Water Resources Committee

Bay Planning Coalition, San Francisco (BPC) – Board of Directors, Former President

GENERAL CAREER BACKGROUND

Mr. Warner is a globally recognized environmental consultant with expertise in contaminant and site assessment, innovative remediation design, geochemistry, water resources protection, and litigation support. For approximately 35 years, his focus has been in groundwater and soil characterization and remediation, hydrogeology, hydrochemistry/geochemistry, water resources management, litigation support and expert witness assignments, policy and regulatory (including NCP, RCRA, CERCLA) review, and engineering geology. Work has been performed on behalf of industrial, agricultural, energy, waste and landfill, and private party and government organizations throughout California and North America as well as in Denmark, England, Scotland, Brazil, Hong Kong and Australia. Mr. Warner has provided lectures and short courses often and for both professional organizations and at academic institutions. He was a codeveloper and instructor for past State and US EPA led courses on innovative groundwater remediation using permeable reactive barrier (PRB) approaches developed by the US Interstate Technology Regulatory Council (ITRC) and Remediation Technology Development Forum (RTDF) and was a primary developer and lecturer for the CRC CARE (Australia) courses on site investigation and remediation.

REPRESENTATIVE EXPERTISE

Mr. Warner has worked on environmental and water resource matters for clients in the energy, food/beverage, manufacturing, mining, transportation, agriculture, recreation, government, legal, insurance, financial, and water supply communities.

For environmental projects, Mr. Warner has provided characterization, assessment and mitigation, and regulatory/policy support for soil, rock, surface water and groundwater sites impacted by legacy, chronic and catastrophic releases of inorganics and metals (including, but not limited to chloride salts, PCBs, lead, nickel, chromium, nitrate, sulfate, arsenic and radionuclides), petroleum hydrocarbons (including crude oil, benzene, toluene, and related additives including MTBE), chlorinated volatile organic compounds (including PCE, TCE and related degradation products), inorganic oxidizers (including perchlorate) and solvent stabilizers (such as 1,4 dioxane) and is involved in research into remediation alternatives for polyfluoroalkyl substances (PFAS) and related compounds.

Since 1991, Mr. Warner has specialized in the design, installation, and evaluation of numerous in situ groundwater remedies such as permeable reactive barriers (PRBs) and geochemical-based remediation at various sites including the first commercial site in California (1994) and a government site in New York (2011) that received the National Ground Water Association's Outstanding Remediation Project Award for a PRB site in New York USA.

For water resource projects, he has designed new and assessed aging water resource production wells, developed capture zone plans, and has assisted transaction projects involving assessment of water resource reliability and sustainability for food and beverage, recreation and manufacturing facilities in the US and internationally.

GEOGRAPHICAL EXPERIENCE

Mr. Warner's history includes work with most EPA Regions and numerous state regulatory agencies. He has worked on projects using Brownfield and/or voluntary cleanup regulations and state Superfund programs as well as provincial, territory, or country-specific regulatory programs. He has worked on sites in many U.S. states (including but not limited to Alabama, Arizona, California, Colorado, Georgia, Hawaii, Idaho, Illinois, Kentucky, Indiana, Michigan, Minnesota, Montana, Nevada, North Dakota, New York, Ohio, Oregon, Tennessee, and Washington), and in Australia, Brazil, Canada, Denmark, England, Hong Kong, Scotland, Sweden, Switzerland, and The Netherlands.

EXAMPLE PROJECTS (NOT LIMITED TO)

- Technical lead for numerous *in situ* groundwater treatment, including one of California's first applications of enhanced *in situ* bioremediation for cVOCs and PRB-type projects including, but not limited to, the first-in-the-world PRB installation using zero valent iron in northern California in the early-mid 1990s, a dual PRB system for TCE and perchlorate in the 2000s and project director and lead designer for a PRB remedy site in western New York that received the 2011 Outstanding Groundwater Remediation Project Award from the National Ground Water Association for removal of radioactive strontium-90.
- Development/evaluation of landfill sites, including RCRA permits, statistical analysis, groundwater monitoring, and remedial approaches for facilities in: CA, AL, KS, OR, OK, WA, IL, HI, NV, ID, MI and Hong Kong.
- Expert witness support for assessing the effect of brine and petroleum releases to the soil and groundwater from energy resource work and saltwater well disposal activities, and the subsequent remedial efforts and cost of restoration for large agricultural property in North Dakota.
- Lead hydrologic consultant for assessing groundwater conditions in the Mono Lake/Owens Valley, California area related to air quality management projects along the Los Angeles Aqueduct system.
- Forensic evaluation of soil, surface water and groundwater remedial measures and performance for major contaminant releases from train derailments in Alabama and Ontario, Canada, manufactured gas plant sites in northern California, and a major refinery site in southern California.
- Water resource availability and reliability assessment for ski & swim facilities in 17 US States and Canada; assessment of water resource stress conditions for 30 global manufacturing sites; evaluation of long-term water availability for beverage making in low water drought environment.
- Lead consultant assessing source and migration of VOC impact to soil, soil gas and groundwater beneath multiple PRP site involving manufacturing, aerospace, and defense sites in southern California.
- Multi-property MGP site assessment including occurrence and distribution of contaminants, historical infrastructure review, shoreline conditions, remedial

actions, regulatory review, and cost allocation.

- Evaluation of groundwater/surface water interaction and transport of pesticide chemicals from source areas into a sensitive major riverway, northwest Oregon.
- Principal investigator for natural hazard assessment (earthquakes, tsunamis, lava flow and air quality impact) using GIS and large data set analysis for a large coastal property Hawai'i County, Hawai'i.
- Lead investigator for development of innovative groundwater restoration methods for treating inorganic contamination (perchlorate, chromium, excess TDS) at a major former manufacturing site near Las Vegas, Nevada.
- Evaluation of PCB impacts in areas of potential residential use (Northern California) and where impacted water is used as water supply (Hudson River Valley, New York).
- Closure plan evaluation for a Rocky Mtn. copper mine with consideration of impact from long-term climatic change to slope and pit lake characteristics.
- Development of sulfate-reduction technology for groundwater adjacent to an active large iron mine site in northern Minnesota.
- Site assessment, investigation, and regulatory document development for radioactive waste repositories in various states.
- Review and analysis of water rights and long-term water resource security and sustainability for food/beverage, commercial manufacturing, and recreation sites in California (including Central Valley agricultural, mountain, and coast range sites) and numerous U.S. States (e.g., Washington, Colorado, Utah, Vermont, New Hampshire, New York, Oklahoma, etc.) related to property/business transactions.
- Site response, site characterization, remedy design and implementation, and regulatory support for major catastrophic releases as well as legacy tank releases of petroleum (crude and refined product– and including additives such as methyl tertiary butyl ether [MTBE]) at numerous pipeline, terminal, and distribution sites in California, and tank releases in California and Montana, USA.
- Expert witness support for remediation assessment at a chemical manufacturing/storage facility in Georgia.
- Deposition testimony regarding the impact of site characterization on PCE contaminant distribution and remediation in southern California.
- Arbitration support regarding environmental claims of impact and investigation and review of regulatory actions, including NCP compliance, for Manufactured Gas Plant sites in northern California.
- Trial (by jury) and deposition testimony as expert in hydrogeology, and fate and transport of chlorinated hydrocarbon compounds, including PCE and TCE:), CERCLA, hydrogeology, aerial photographic interpretation of waste storage and environmental conditions, historical forensic evaluation of the source, chlorinated hydrocarbon fate and transport, chemical source area field characterization and review of regulatory actions.

PUBLICATION SHORT LIST

Warner, S. D. and Ritchie, C.J. 2022. The Practitioner's Perspective of Zero-Valent Iron as a Pragmatic Media for Contaminant Remediation: It's not 1995 Anymore! 12th Annual Conference on Remediation of Chlorinated and Recalcitrant Compounds. Battelle Memorial Institute, Palm Springs, California, May 2022.

Newell, C. J., DiGuiseepi, W. H., Cassidy, D. P., Divine, C. E., Fenstermacher, J. M., Hagelin, N. W., Thomas, R. A., Tomiczek III, P., **Warner, S. D**., Xiong, Z (J)., AND Hatzinger, P. B. 2022. PFAS Experts Symposium 2: Evolution from past to present, current efforts, and potential futures. Remediation Journal, http://10.1002/rem.21705

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Warner, S.D., Bekele D.N., and P. Hadley (2019). Sustainable Remediation: Integrating Risk, Science, and Sustainability Principles. Ency. Sustainability of Science and Technology. https://doi.org/10.1007/978-1-4939-2493-6_55-5

Rowe, D., Greene, G., **Warner, S.** and Gimre, K. 2017. Remediation and water resource protection under changing climatic conditions. *Environmental Technology & Innovation*, 8 (2017) pp. 291-298. http://dx.doi.org/10.1016/j.eti.2017.07.008

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Henry S. and **Warner S**. 2003. *Chlorinated Solvent and DNAPL Remediation: Innovative Strategies for Subsurface Cleanup.* ACS Symposium Series 837, American Chemical Society, 330 pp. January.S

Sorel D., **Warner S.**, Longino B., Honniball J., and Hamilton L. 2003. *Performance Monitoring and Dissolved Hydrogen Measurements at a Permeable Zero Valent Iron Reactive Barrier.* In Chlorinated Solvent and DNAPL Remediation: Innovative Strategies for Subsurface Cleanup, ACS Symposium Series 837, American Chemical Society, pp. 278-285. January.

Warner S., Yamane C.L., Gallinatti J.D., and Hankins D.A. 1998. *Considerations for Monitoring Permeable Ground-Water Treatment Walls*. Journal of Environmental

Engineering (ASCE), v. 124, no. 6, pp. 524-529.

Warner S., Szerdy F.S., and Yamane C.L. 1997. *Permeable Reactive Treatment Zones: A Technology Update.* 12th Annual Contaminated Soils Conference, University of Massachusetts, Amherst, MA. October 22, 1997, p315-327, in Calabrese, E.J., P.T. Kostecki, and M. Bonazountas, (eds) Contaminated Soils, Volume 3, p. 315-327.

Warner S. and Szerdy F. 1995. *Design and Evaluation of an In-Situ Ground Water Treatment Wall Composed of Zero Valent Iron.* Ground Water, v. 33, no. 5, pp. 834-835.

Gallinatti J.D. and **Warner S**. 1994. Hydraulic Design Considerations for Permeable In Situ Groundwater Treatment Wells. AGWSE Educational Program, Groundwater Remediation: Existing Technology and Future Direction in Groundwater, v. 32, no. 5, p. 851.

Warner S., Krothe N.C., Solomon G.C., and Steinkampf W.C. 1986. *Modeling the Geochemical Evolution of Groundwater within the Grande Ronde Basalt, Columbia Plateau, Washington.* (Abs.) Geo. Soc. America Abs. with Programs, v. 18, p. 782. 1986.

SELECTED PRESENTATIONS

Battelle Conference on Innovations in Climate Resilience – "The Anthrohydrologic Conceptual Model for Groundwater Remedy Design." March 29-30, 2022, Columbus, Ohio.

Radio ABC (Australia) radio broadcast – "Cleaning up chemical contaminants" https://www.abc.net.au/radionational/programs/bigideas/cleaning-up-chemical-contaminants/11533770

CRC CARE Short Course – From Risk to Remediation. March 4-8, 2019, Newcastle, NSW Australia

Halfmoon Short Course – Legal Considerations in Water Resources, February 2019, Sacramento, CA

ITRC Web based courses on Permeable Reactive Barrier Technology – Numerous deliveries between 2000 and 2010 attracting over 2000 students globally.

RTDF Short Courses on Permeable Reactive Barrier Technology, 12 Cities (EPA Lead Cities plus Northern California and Southern California). Sponsored by States and EPA. February 1999 – November 2000

Academic presentations given at: Stanford University; University of California, Berkeley; University of Ferrara, Italy; State University of New York, Buffalo; Oregon Graduate Institute; Colorado State University; University of Nevada, Las Vegas; California State University, Maritime; Indiana University, Bloomington; University of Newcastle, Australia

LITIGATION EXPERIENCE

Mr. Warner was qualified as an expert in hydrogeology and remediation for cases (involving petroleum hydrocarbon and fuel constituents and chlorinated solvent chemicals) with the Court of Federal Claims (expert testimony at a jury trial for over 11 hours) and the Federal District Court of Northern California (expert testimony at a bench trial for more than 4 hours) and served as an expert, including testimony, in front of an arbitration tribunal in Amsterdam, The Netherlands. Some examples of litigation, trial, and resolution and deposition experience are listed here:

- Expert witness support for evaluating the performance of remedy applications for VOC affected groundwater (Superfund Case, New Hampshire – ongoing project CONFIDENTIAL). (2020 – 2021)
- Expert witness support for evaluation of VOC impact to soil, soil gas, and groundwater, and chemical fate and migration beneath multiple responsible party case for industrial/aerospace sites (Southern California, ongoing project CONFIDENTIAL). (2019 – 2021)
- Expert witness support for assessing the effect of brine and petroleum releases to the soil and groundwater from energy resource work and salt water well disposal activities, and the subsequent remedial efforts and cost of restoration for large agricultural property in Bottineau County, North Dakota. *D. Peterson and C. Peterson v. Petro Harvester Operating Company, LLC, District Court, Northeast Judicial District, State of North Dakota, County of Bottineau, Civil No. 05-2016-CV-00073.* (2018)
- Arbitration expert report and testimony for an international dispute involving remediation costs of specialty chemical/contaminant components, approaches, and regulatory process related to RCRA and State Response. *ChemicaInvest Holding B.V. and Fibrant LLC v. Koninklijke DSM NV*, Netherlands Arbitration Institute NAI 4464 (2017)
- Expert witness support for remediation assessment at a chemical manufacturing/storage facility in Kennesaw, Georgia. *Davis v. Baychem et al.* Superior Court of Cobb County, Georgia, Civil Action No. 16-1-2518-99 (2017).
- Deposition testimony regarding the impact of site characterization on PCE contaminant distribution and remediation, southern California. *Goldberg v. Goss-Jewett, Inc., et al (Intervenors) v. Pacific Engineering; and PPG Industries*. US District Court Central District of California Case 5:14-CV-01872-DSF (SHx) (2016).
- Deposition testimony regarding the remediation of inorganic constituents (perchlorate and lead) beneath a propellant device manufacturer in Mesa, Arizona. *Nammo Talley, Inc. vs. Allstate Insurance,* United States District Court, District of Arizona, Case No. CV-01007-PHX-GMS (2014).
- Expert witness support, assessment of petroleum impacts at a petroleum (crude) tank farm in Cut Bank, Montana, *Sundquist, et al v. Ashland, Inc./Black Eagle LLC*, Case No. CV 13-00075-DLC-RKS, United States District Court for the District of Montana, Great Falls Division (2014).
- Expert witness/litigation support on behalf of a large timber mill in coastal

northern California relating to history of chemical releases, remediation, and regulatory approach including review of NCP compliance and CERCLA related responses.

- Expert witness review and report development for assessing the fate and migration of PCBs along a river stretch in New York State and potential impact to shoreline aquifer and water resource collection systems for a small town alongside the river.
- Arbitration support regarding environmental claims of impact and investigation and review of regulatory actions, including NCP compliance, for Manufactured Gas Plant sites in northern California (2013).
- Trial (by jury) and deposition testimony as expert in hydrogeology, and fate and transport of chlorinated hydrocarbon compounds, including PCE and TCE:), CERCLA, hydrogeology, aerial photographic interpretation of waste storage and environmental conditions, historical forensic evaluation of the source, chlorinated hydrocarbon fate and transport, chemical source area field characterization and review of regulatory actions Walnut Creek Manor, Ltd. v. Mayhew Center, Ltd., United States District Court, Northern District of California No. C-07-05664 CW (2009) (various declarations continuing into 2014).
- Litigation support regarding a claim of land failure beneath a residential property due to improper construction of a water well (2009).
- Arbitration support regarding the impact of PCE beneath a dry cleaning site in San Jose, California (2008).
- Litigation support regarding a remediation patent infringement matter, Adventus v. Remediation Products, Inc. United States District Court, District of North Carolina, Civil Action No. 3:07cv00153 (2008).
- Deposition testimony as expert in hydrogeology, contaminant fate and transport, contaminants including VOCs, petroleum, and inorganic compounds, and tidal hydrology. Humboldt Baykeeper and Ecological Rights Foundation v. Union Pacific Railroad Company, United States District Court (Northern District of California Case Number 03:2006-cv-02560. (2008).
- Deposition testimony as fact witness: Angeles Chemical v. McKesson, US District Court, Central District California, site specific aspects of groundwater and chemical occurrence of VOCs including PCE, TCE and 1,4-dioxane (2007). Case Number 01-cv-10532
- Deposition testimony as expert in hydrogeology for an east SF Bay Landfill: West Coast Home Builders v. Ashland, Inc. US District Court (Northern California), direction and movement of groundwater flow (2004). Case No. C01-4029.
- Trial (Bench) and deposition testimony as expert in hydrogeology: Cross Petroleum v. United States (US Forest Service), U.S. Court of Federal Claims, groundwater remediation, groundwater movement, environmental forensics, chemical fate and transport of diesel and gasoline products, including MTBE, in sedimentary and fractured rock (2003). (Fed. Cl. No. 97-251C).