Los Angeles Regional Water Quality Control Board

April 14, 2023

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

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Claim No. 7022 2410 0003 2801 2394

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SUBJECT: REVIEW OF A TECHNICAL MEMORANDUM - 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, GLOBAL ID NO. T10000014333)

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 October 18, 2022, the Los Angeles Water Board conditionally approved the *Groundwater Removal Action Workplan* (Groundwater IRAP) (attached), dated January 31, 2022, submitted on behalf of the City of Torrance (City) by Terraphase Engineering Inc. (Terraphase). The conditionally approved Groundwater IRAP included two components, the installation of a zero-valent iron (ZVI) barrier located roughly along the eastern boundary of the Site (i.e., along Crenshaw Boulevard) and enhanced in-situ bioremediation (EISB) at the Hi-Shear Corporation (HSC) property; the Groundwater IRAP implementation report (Report) is due by May 15, 2023.

On February 21, 2023, the Los Angeles Water Board staff received the *Response to October 18, 2022, Direction to Extend ZVI Barrier in Rationale for Proposed ZVI Barrier* (Tech Memo), submitted on behalf of the City by Terraphase for review. On March 21, 2023, the Los Angeles Water Board received the *Deadline Extension Request for Groundwater Removal Action Work Plan (Interim Remedial Action Plan for Site Groundwater) Implementation* (Letter), submitted on behalf of the City by Terraphase for review.

Summaries of the Tech Memo and Letter followed by Los Angeles Water Board comments are included below.

SUMMARY OF THE TECH MEMO

According to Terraphase, the Tech Memo provides the rationale for installing the ZVI barrier as originally proposed in the Groundwater IRAP (i.e., 500-foot-long ZVI barrier installed at a depth of 90 to 115 feet below ground surface [ft-bgs], serving as a removal/interim mitigation measure to reduce migration of contamination into the City of Lomita and related risks associated with potential vapor intrusion). The Tech Memo notes that modifications and expansion of the ZVI barrier, as conditionally approved on October 18, 2022, by the Los Angeles Water Board, would more than double the originally proposed ZVI barrier length, thus significantly increasing the costs, which Terraphase posits would not be cost-effective and has little additional benefit to human health and the environment.

Terraphase performed the following technical analyses and evaluations to justify installing the ZVI barrier, as originally proposed in the Groundwater IRAP:

1. Plume attenuation analysis to evaluate the chlorinated volatile organic compounds (CVOCs) trends in groundwater monitoring wells. The total CVOC concentration in the analysis(es) is calculated as the sum of select CVOCs, such as tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), 1,1-dichloroethene (1,1-DCE) and vinyl chloride (VC). The plume attenuation analysis utilizes standard methods related to first-order rate constants in monitored natural attenuation studies (i.e., absence of active remediation).

    a. Total CVOC Concentration Versus Time – evaluated select source area wells (MW-8, MW-12, MW-13, MW-15, MW-18, and MW-19), Crenshaw Boulevard wells (MW-20 and MW-21), and downgradient wells (MW-26, MW-28, MW-30, MW-31, and MW-36).

        i. Calculated negative rate constants and statistically significant decreasing trends for source area wells, except for MW-12. Additionally, the calculated half-lives for source area wells ranged from 2.1 to 22.3 years, with most of the source area wells ranging from approximately 2 to 4 years. Based on the most recent available groundwater monitoring data, at the time (i.e., *Second Tri-Annual 2022 Groundwater Monitoring Report* [sampling conduct June/July 2022]), Terraphase estimated the time required for groundwater conditions to reach a total CVOC concentration of 5 micrograms per liter (µg/L) ranges from 22 to 179 years.

        ii. Calculated a low negative rate constant with no statistically significant trend for Crenshaw Boulevard well, MW-20, and a positive rate constant with statistically significant increasing trend for Crenshaw Boulevard well, MW-21; however, Terraphase

emphasized that total CVOC concentrations at MW-21 have been decreasing since July 2019. Additionally, Terraphase suggests that degradation is occurring at MW-20 and MW-21 with detections of the degradant compounds (e.g., cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, etc.).

iii. Calculated negative rate constants for downgradient wells, except for MW-36. MW-36 and MW-28 indicating no statistically significant trend suggest the plume conditions at these locations are stable. MW-26 and MW-30 indicated statistically significant decreasing trends.

b. CVOC Concentration Versus Distance – used two transects oriented parallel with the groundwater flow direction (i.e., east-southeast), one to represent the highest concentrations of the plume and the other to provide more coverage, to calculate and evaluate bulk attenuation rate constant(s). The data used are from June/July 2016, December 2019, and June/July 2022.

i. Calculated negative bulk attenuation rate constants, which indicates consistent attenuation along transects.

ii. Estimated and extrapolated the maximum distance(s) the plume may have travelled or will travel before the toe of the plume attenuates to 5 µg/L of PCE or TCE based on the calculated bulk attenuation rate constants. The estimates overestimated the distance where 5 µg/L is reached by 1,000 feet and 400 feet in 2019 and 2022, respectively, when compared to the December 2019 and June/July 2022 datasets.

The concentration versus distance analysis demonstrates consistent plume attenuation and the plume has reached its maximum extent at approximately 3,000 feet from groundwater monitoring well MW-18.

Overall, the plume attenuation analysis concludes that CVOCs concentrations are stable to decreasing, most of the total CVOC plume will attenuate to 5 µg/L in between 20 to 40 years without active remediation, the plume is mature and equilibrium has been reached, and the plume has reached its maximum migration distance.

2. Mass flux analysis to estimate the total mass flux and the mass flux that the ZVI barrier would intercept. The analysis utilizes transects and a vertical cross section across the width of the shallow zone total CVOC plume perpendicular to groundwater flow direction to calculate total plume mass flux.

a. Calculated the total CVOC max flux through the cross section to be 182 grams per day.

b. Calculated the mass flux that would be intercepted by the ZVI barrier, as proposed in the Groundwater IRAP, to be 104 grams per day.

The mass flux analysis concludes that approximately 60% of the total mass flux would be intercepted by the ZVI barrier, as proposed in the Groundwater IRAP. The ZVI barrier, as proposed in the Groundwater IRAP, treats the highest concentrations of the CVOC plume and will lower downgradient plume concentration along with future vapor intrusion risks. Terraphase does not recommend treating lower concentration areas of the plume outside of the source removal/remedial work (i.e., on-Site remedial activities); the source remedies will address the source of the mass not encountered by the ZVI barrier.

The Tech Memo also notes funding is not available for modifications and expansion of the ZVI barrier, as conditionally approved on October 18, 2022, by the Los Angeles Water Board, and any requirement to expand the barrier would delay and/or make implementation unlikely.

SUMMARY OF THE LETTER

The Letter requests an extension of the due date for the submittal of the Report. The existing deadline for the Report is May 15, 2023, as required in the Los Angeles Water Board's issued Cleanup and Abatement Order No. R4-2021-0079 (Order), amended on October 18, 2022.

The reason for the requested time extension is to allow Los Angeles Water Board staff to review and respond to the Tech Memo and for negotiations to proceed between the City and HSC.

LOS ANGELES WATER BOARD COMMENTS AND REQUIREMENTS

The Los Angeles Water Board concurs with the Tech Memo with the addition of the following comments and requirements:

1. The installation of the ZVI barrier (size, length, and configuration, as originally proposed in the Groundwater IRAP) shall be implemented expeditiously. Its installation shall not be delayed during various ongoing investigative and remedial activities at the Site.

2. In the event that groundwater conditions are exacerbated and/or do not improve in Crenshaw Boulevard wells (MW-20 and MW-21) downgradient wells (MW-26, MW-28, MW-30, MW-31, and MW-36) following the installation of the ZVI barrier, as proposed in the Groundwater IRAP, future lateral and/or vertical expansion of the ZVI barrier and/or additional interim remedial actions may be warranted.

3. Results and data from the ongoing and future investigative and remedial activities at the Site may also warrant future lateral and/or vertical augmentation of the ZVI barrier and/or additional multi-media interim remedial actions.

4. After reviewing your Letter, the additional information and file documents for the Site, the Los Angeles Water Board approves your extension request from May 15, 2023 to **December 15, 2023** to submit the Report. A time extension of 7 months is granted based on Figure 7 – Project Schedule (i.e., Gantt chart) of the Groundwater IRAP; the tasks projected to be accomplished during this 7-month period include permitting, contracting, well installation, baseline groundwater sampling, injection, and the first quarter of post-injection groundwater monitoring. This time extension applies to both interim remedial components of the Groundwater IRAP (i.e., installation of the ZVI barrier along Crenshaw Boulevard and implementation of EISB at the HSC property).

5. Prepare and submit quarterly performance monitoring reports following implementation of the Groundwater IRAP (inclusive of both the ZVI barrier along Crenshaw Boulevard and EISB at the HSC property) with the first performance monitoring report due **April 15, 2024**. Continue to submit quarterly performance monitoring reports, in accordance with the following schedule, until otherwise instructed to do so by the Executive Officer of the Los Angeles Water Board.

Monitoring Months	Report(s) Due Date
January – March	April 15th
April – June	July 15th
July – September	October 15th
October – December	January 15th

6. Other comments and requirements from the Los Angeles Water Board conditional approval of the Groundwater IRAP, dated October 18, 2022, (attached) remain in full force and effect. Pertinent comments and requirements include, but are not limited to, Comment and Requirement Nos. 1, 5, 11, and 12.

The revisions to Cleanup and Abatement Order No. R4-2021-0079, *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,

Hugh Marley

Digitally signed by Hugh Marley
Date: 2023.04.14 10:36:06 -07'00'

Water Boards

for Renee Purdy
Executive Officer

Attachments:

1. *Review of Interim Remedial Action Plan*, dated October 18, 2022 (also known as conditional approval of Groundwater IRAP; attachments 3 through 6 were excluded for brevity)
2. Cleanup and Abatement Order No. R4-2021-0079, Attachment B Revised Time Schedule of Order
3. Cleanup and Abatement Order No. R4-2021-0079, Attachment B Revised Time Schedule of Order (underline/strikeout version)

cc (via email):

Dmitriy Ginzburg, State Water Board Division of Drinking Water
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.
Charlie Robinson, Terraphase Engineering Inc.
Timothy Wood, GSI Environmental Inc.
Peter Scaramella, GSI Environmental Inc.
Sonja A. Inglin, Cermak & Inglin, LLC
Scott D. Warner, BBJ Group
Patrick L. Rendon, Lamb and Kawakami, LLP
Mike Kinworthy, MK Environmental Consulting, Inc.
William J. Beverly, Law Offices of William J. Beverly
Brian M. Ledger, Gordon Rees Scully Mansukhani, LLP
Christopher T. Johnson, 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

Los Angeles Regional Water Quality Control Board

October 18, 2022

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Mr. Aram Chaparyan
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SUBJECT: REVIEW OF INTERIM REMEDIAL ACTION PLAN FOR SITE GROUNDWATER, 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 January 31, 2022, the Los Angeles Water Board staff received the *Groundwater Removal Action Workplan* (Groundwater IRAP), submitted on behalf of the City of Torrance by Terraphase Engineering Inc. (Terraphase) for review.

A summary of the Groundwater IRAP followed by Los Angeles Water Board comments are included below.

SUMMARY OF GROUNDWATER IRAP

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

1. Reduce the potential for vapor intrusion risk into the City of Lomita, east of Crenshaw Boulevard, by addressing the regional groundwater impacted by volatile organic compounds (VOCs).

2. Reduce contaminant mass and migration at and/or beneath the Hi-Shear Corporation portion (Hi-Shear Property) of the Site.

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

The Groundwater IRAP evaluated the following remedy alternatives to achieve the objectives:

1. No Action

2. Monitored Natural Attenuation (MNA)

3. Enhanced In-Situ Bioremediation (EISB)

4. Zero-Valent Iron (ZVI) Barrier

5. Groundwater Pump and Treat

6. Thermal Technologies with Soil Vapor Extraction

7. In-Situ Chemical Oxidation

Terraphase proposed to retain the following two remedy alternatives to achieve the objectives:

1. ZVI Barrier

    a. Intends to minimize the migration of the VOC plume into the City of Lomita and to reduce groundwater contaminant concentrations.

    b. Is located roughly along the eastern boundary of the Site (i.e., along Crenshaw Boulevard) and measuring approximately 500 feet (see attached Figure 6 – Plume Margin ZVI Barrier) to treat groundwater total VOC concentrations greater than 200 micrograms per liter (µg/L).

    c. Is installed by injecting ZVI, KB-1 Plus (a commercial bioaugmentation culture), and plant-based substrate (guar) at 28 injection points into a 25-foot zone approximately 90 to 115 feet below ground surface (ft-bgs). The injection points are organized in an array of two rows approximately in the center 250 feet of the groundwater VOC plume with single rows of injection points extending 125 to the north and south. The north and south extent and placement of the ZVI barrier will be better understood with confirmation groundwater samples collected during installation of the outmost injection wells.

        i. Injections through 4-inch-diameter polyvinyl chloride casings installed to 115 ft-bgs by sonic drilling technology

        ii. Terraphase estimates the barrier will be composed of 134 metric tons of ZVI injected under high pressure with 43 metric tons of sand in a water- and food-grade guar carrier fluid with 90 liters of KB-1 Plus. Limited EISB substrate will also be applied during ZVI placement to increase reductive conditions.

        iii. The radius of influence of each injection point is expected to be 15 feet and will be confirmed with continuous pressure logging. The 15 feet radii allow for a minimum of 30 percent and 10 percent overlap along the single injection rows and double injection rows, respectively.

iv. The exact locations of the 28 injection points are subject to change as confirmation groundwater samples will be collected during injection well installations that may better inform placement of injection points.

2. EISB, followed by MNA

    a. Intended to treat "the primary VOC source at the Hi-Shear Property" (as described by Terraphase) and to prevent continued migration of VOCs in the regional groundwater from the Hi-Shear Property.

    b. EISB pilot studies were conducted in 2013 and 2015 followed by one injection event in 2017 at the Hi-Shear Property. The results suggest that EISB is effective in the remediation of VOC impacts to groundwater. Terraphase cites short duration and incomplete and limited application of EISB within the Hi-Shear Property as key shortcomings of past efforts.

    c. Utilizes the existing 77 dual-nested injection wells, screened from 88 to 98 ft-bgs and 103 to 113 ft-bgs, at the Hi-Shear Property to reestablish and maintain a biologically active zone conducive for dechlorination (see attached Figure 5 – High-Shear Injection Well Locations).

        i. Terraphase estimates a total injection volume of 724,500 gallons. The EISB amendment concoction includes soybean oil, emulsifiers, nutrients, and other soluble organic carbon substrates (i.e., Electron Donor Solution-extended release [EDS-ER; soybean-oil based], Electron Donor Solution-Activator [EDS-Activator; alkaline and donor], substrate shuttle [alcohol based], and TersOx Nutrients-QR).

    d. Terraphase estimates 4 quarterly sampling events, 4 bi-annual sampling events, and 10 years of annual sampling post-injection.

3. Terraphase anticipates quarterly Waste Discharge Requirement (WDR) groundwater compliance monitoring for one year, bi-annually for two years, and annually thereafter for up to 15 groundwater monitoring wells.

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 May 11, 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 of the Update to participate in the cleanup process by reviewing and providing comments on the Groundwater IRAP to the Los Angeles Water Board by June 20, 2022.

LOS ANGELES WATER BOARD COMMENTS AND REQUIREMENTS

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

1. In addition to the groundwater monitoring wells highlighted in the Groundwater IRAP (MW-20, MW-21, and MW-23), groundwater monitoring wells MW-8, MW-12, and the five wells conditionally approved to be installed in the regional groundwater zone (three on Property 1, one on Property 2, and one on the former Nike Missile Base), as part of the investigative component of the revised *Removal Action Workplan for the East Adjacent Properties* (EAP IRAP), shall be included in the network of wells that monitors the effectiveness of the ZVI barrier.

2. Based on recent groundwater monitoring data reported in the *First Tri-Annual 2022 Groundwater Monitoring Report*, submitted on behalf of Hamrick & Evans, LLP (attorney representative for Hi-Shear Corporation) by Genesis Engineering & Redevelopment, Inc. on May 13, 2022, additional EISB injection wells shall be installed in the immediate vicinity of groundwater monitoring wells MW-4, MW-13, and MW-14. Recent tetrachloroethene, trichloroethene, and 1,1-dichloroethene groundwater concentrations at these wells were up to two orders of magnitude greater than their respective State Water Resources Control Board Division of Drinking Water's MCLs of 5 µg/L, 5 µg/L, and 6 µg/L, respectively, and have historically been elevated.

   These injection wells shall be installed in a similar construction and configuration as the existing injection points and incorporated in the implementation of the Groundwater IRAP.

3. The existing dual-nested injection wells that are deemed to be in poor working or nonworking conditions during inspection shall be rehabilitated or replaced with a new injection well of the same construction and configuration.

4. Consistent with the EISB activities implemented in 2017 by Hi-Shear Corporation at the Hi-Shear property, the network of wells that monitors the effectiveness of the EISB injections shall include groundwater monitoring wells MW-7R (serves as an upgradient well); MW-6, MW-15, MW-18, MW-5, MW-10, MW-16, MW-19, CMW-11C (serve as treatment zone wells); and MW-8 and MW-12 (serve as downgradient wells). Based on Los Angeles Water Board Comment No. 2, groundwater monitoring wells MW-4, MW-13, and MW-14 shall also be included in the network to serve as treatment zone monitoring wells.

5. Ensure that performance monitoring parameters for the selected remedy alternatives, at a minimum, include oxidation-reduction potential, terminal electron-accepting processes (i.e., ferrous iron, manganese), electrical conductivity, major cations (e.g., Al, Ba, Fe, Mn, Ca, Mg, Na, K), 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.

Note the primary performance measures for the remedy alternatives will be reduction in contaminant concentrations in groundwater. The geochemical and microbial data, where applicable, may be evaluated to identify any changes in environmental conditions that may impact the remedy alternatives' efficiencies.

6. In addition to the proposed criteria of treating groundwater total VOC concentrations greater than 200 µg/L, the north and south ends of the ZVI barrier shall also be extended along the eastern boundary of the Site, as necessary, to address groundwater VOC concentrations that exceed one order of magnitude of their respective MCLs. The extension of the north and south ends of the ZVI barrier shall be based on the proposed confirmation groundwater sampling during the ZVI barrier installation and data from the investigative component of the EAP IRAP (i.e., grab groundwater sample data from the transects).

7. The Los Angeles Water Board does not concur at this time with the MNA aspect of the EISB remedy alternative retained. It is premature at this time to conclude that MNA following EISB injections can achieve the necessary cleanup levels in a reasonable timeframe. MNA may be considered as an alternative in the future based on the positive results of interim and comprehensive remedial activities implemented at the Site.

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

9. Submit the Groundwater IRAP implementation report by **May 15, 2023**. The report should include field observations, a detailed map of the injection points, conclusions, and recommendations for the Site.

10. Prepare and submit tri-annual performance monitoring reports for the Site on the same schedule as the tri-annual groundwater monitoring reports with the first performance monitoring report due **May 15, 2023**. Continue to submit tri-annual performance monitoring reports and tri-annual groundwater monitoring reports until otherwise instructed to do so by the Executive Officer of the Los Angeles Water Board.

11. The Los Angeles Water Board does not consider the Groundwater IRAP as the final Site cleanup plan. The Groundwater IRAP provides source reduction and containment, but it does not actively address the VOC 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 necessary 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 reasonable. If background levels of water quality are not achievable, alternative cleanup levels must be established that are protective of human health and the environment and which take 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 Groundwater IRAP as the final Site cleanup plan. The final Site cleanup plan and the cleanup levels proposed therein must address the requirements of State Water Resources Control Board Resolution No. 92-49. Therefore, any discussion in the Groundwater IRAP regarding cleanup levels is premature without first demonstrating that cleanup to achieve background levels of water quality is not achievable.

13. On May 11, 2022, the Groundwater 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 June 20, 2022. The Los Angeles Water Board has reviewed the comments received and prepared the attached document, entitled *Response to Public Comments to Groundwater Removal Action Plan* (Response to Comments), summarizing the pertinent comments received and the responses to those comments.

The revisions to Attachment B Third Revised Time Schedule (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 Ms. Jillian Ly, Remediation Section II Manager, at (213) 576-6664 or via email at jillian.ly@waterboards.ca.gov.

Sincerely,

R Purdy
Digitally signed by R Purdy
Date: 2022.10.18 15:21:44 -07'00'
Water Boards

Renee Purdy
Executive Officer

Attachments:

1. Figure 6 – Plume Margin ZVI Barrier
2. Figure 5 – High-Shear Injection Well Locations
3. Attachment B Third Revised Time Schedule of Order
4. Attachment B Third Revised Time Schedule of Order (underline/strikeout version)
5. Response to Comments to Groundwater Removal Action Plan
6. Comments Received to Groundwater Removal Action Plan

cc:

Dmitriy Ginzburg, State Water Board Division of Drinking Water
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 6 – Plume Margin ZVI Barrier

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 50 100 150 200 Feet

1 inch = 100 feet

N

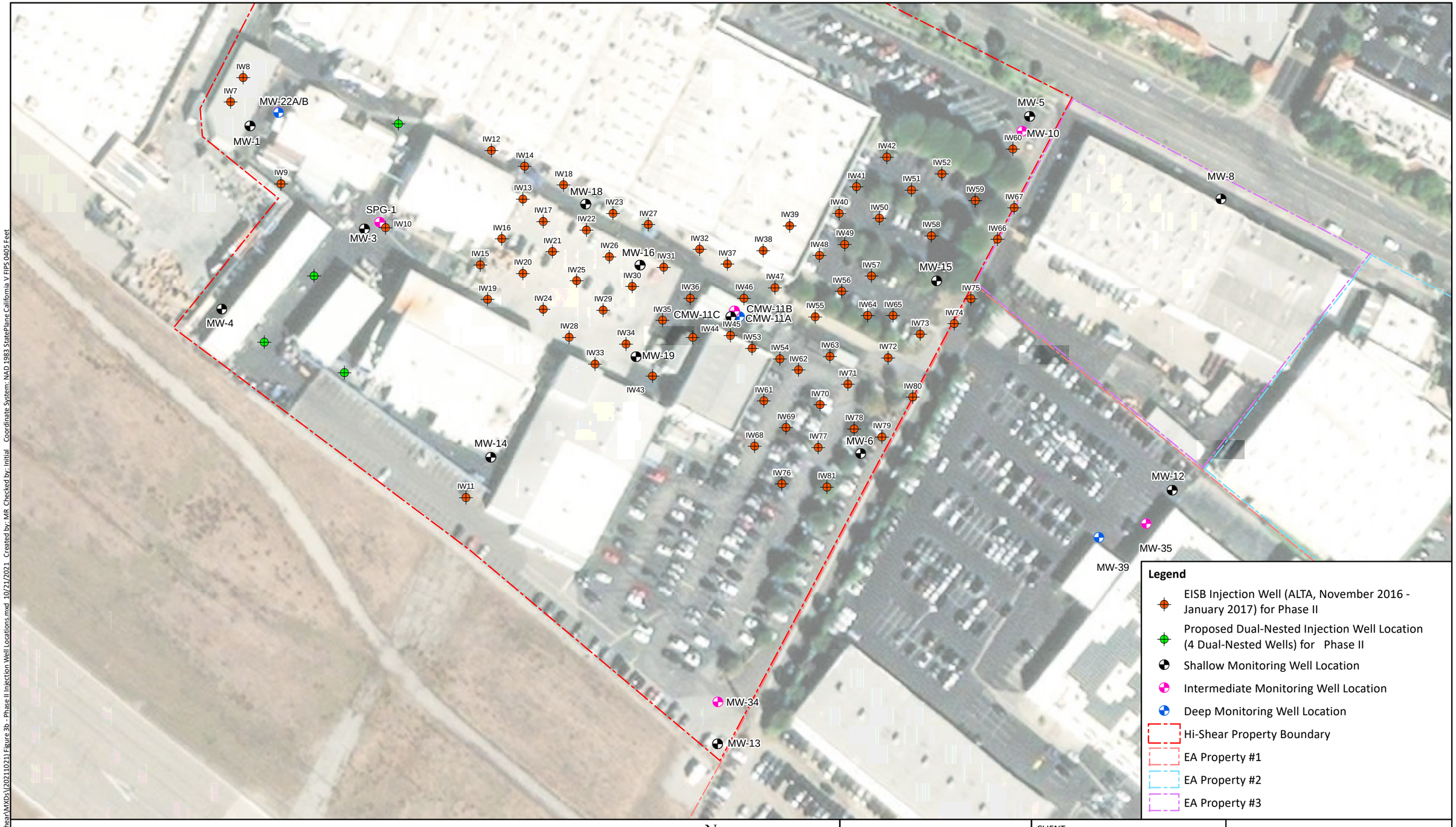
SAFETY FIRST

terraphase engineering

CLIENT: Rutan & Tucker	Plume Margin ZVI Barrier
PROJECT: Hi-Shear	
PROJECT NUMBER: S042.002.002	FIGURE 6

File: N:\GIS\Pr\S042.002_HiShear\MXDs\(20220111) Figure 6 - Plume Margin ZVI Barrier.mxd 1/11/2022 Created by: MR Checked by: Initial Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet

Attachment 2 - Figure 5 – High-Shear Injection Well Locations



Legend

- EISB Injection Well (ALTA, November 2016 - January 2017) for Phase II
- Proposed Dual-Nested Injection Well Location (4 Dual-Nested Wells) for Phase II
- Shallow Monitoring Well Location
- Intermediate Monitoring Well Location
- Deep Monitoring Well Location
- Hi-Shear Property Boundary
- EA Property #1
- EA Property #2
- EA Property #3

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 50 100 150 200 Feet

1 inch = 100 feet

N

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terraphase engineering

CLIENT:	Rutan & Tucker
PROJECT:	Hi-Shear
PROJECT NUMBER:	S042.002.002

High-Shear Injection Well Locations

FIGURE 5

File: N:\GIS\Prj\S042.002_HiShear\MXDs\(20211021) Figure 3b - Phase II Injection Well Locations.mxd 10/21/2021 Created by: MR Checked by: Initial Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet

CLEANUP AND ABATEMENT ORDER NO. R4-2021-0079
ATTACHMENT B: REVISED TIME SCHEDULE

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. [Note that the Regional Board may require revisions to the Site Conceptual Model as necessary to complete the Model.]	Site Conceptual Model due **September 10, 2021.** 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 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 ii. Interim completion report for the Evaluate Need for Action Zone. iii. Completion report for the Evaluate need for Action Zone c. Submit a revised Evaluate Need for Action Zone Plan and its Figure 7 – Proposed VI Assessment Sectors d. Prepare and submit **semi-annual** and **annual** soil vapor monitoring reports. i. Continue to monitor and submit semi-annual soil vapor probe monitoring reports for the	 **September 10, 2021** **August 15, 2022** **August 15, 2022** **March 17, 2023** **August 13, 2021** **Semi-annually beginning January 31, 2022**

DIRECTIVE	DUE DATE
network of soil vapor probes (at 5 and 15 feet below ground surface) east of Crenshaw Boulevard as conditionally approved on November 15, 2021.	
ii. Monitor and submit annual soil vapor monitoring reports for all soil vapor probes across all depths associated with the Site, not otherwise covered in Directive 2.d.i. (above).	First Site-wide annual soil vapor monitoring report due **July 31, 2024**.
Monitoring Periods April – June (Semiannual; Annual) October – December (Semiannual)	**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
Submit implementation report for the investigative component of the Revised EAP IRAP.	**December 30, 2022**
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**

DIRECTIVE	DUE DATE
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	**December 15, 2023**
ii. Prepare and submit Remediation Progress Reports for the implementation of the Groundwater IRAP according to the Los Angeles Regional Water Quality Control Board letter, "Review of a Technical Memorandum," dated April 14, 2023	Quarterly beginning April 15 of the year implementation of the Groundwater IRAP begins.
iii. Submit the Revised EAP IRAP implementation report	**September 15, 2023**
iv. Submit a complete application/report of Waste Discharge (Form 200)	**February 24, 2023**
v. 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

DIRECTIVE	DUE DATE
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 groundwater monitoring according to the Los Angeles Regional Water Quality Control Board letter, "Review of Proposed Revisions to the Groundwater Monitoring Plan and Second Tri-Annual 2022 Groundwater Monitoring Report," dated April 14, 2023; Attachment C (Monitoring and Reporting Program) and the following schedule. **Monitoring Period** January – March (Quarterly gauging; Semiannual monitoring and reporting) April – June (Quarterly gauging) July – September (Quarterly gauging; Semiannual monitoring and reporting; Select constituents monitored and reported annually or biennially, as detailed in Table 1 of the Los Angeles Regional Water Quality Control Board letter, "Review of Proposed Revisions to the Groundwater Monitoring Plan and Second Tri-Annual 2022 Groundwater Monitoring Report," dated April 14, 2023) October – December (Quarterly gauging)	The next groundwater monitoring report is due on **October 15, 2023**. **Report Due Date** April 15th To be included in the October 15th due date October 15th To be included in the April 15th due date
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 b. Submit an interested persons contact list	 According to the schedule approved by the Executive Officer. According to the schedule approved by the Executive Officer.

DIRECTIVE	DUE DATE
c. Submit a draft fact sheet	According to the schedule approved by the Executive Officer.

CLEANUP AND ABATEMENT ORDER NO. R4-2021-0079
ATTACHMENT B: REVISED TIME SCHEDULE

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. [Note that the Regional Board may require revisions to the Site Conceptual Model as necessary to complete the Model.]	Site Conceptual Model due **September 10, 2021.** Revisions due within 60 days of receiving directive from the Regional Board.
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DIRECTIVE	DUE DATE
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The Dischargers shall submit the Site Assessment Completion Report(s)	According to the schedule approved by the Executive Officer
Submit implementation report for the investigative component of the Revised EAP IRAP.	**December 30, 2022**
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**

DIRECTIVE	DUE DATE
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**~~**December 15, 2023**
ii. Prepare and submit Remediation Progress Reports for the implementation of the Groundwater IRAP according to the Los Angeles Regional Water Quality Control Board letter, "Review of a Technical Memorandum," dated April 14, 2023	~~Tri-annually~~Quarterly beginning ~~May~~ April 15 of the year implementation of the Groundwater IRAP begins.
iii. Submit the Revised EAP IRAP implementation report	**September 15, 2023**
iv. Submit a complete application/report of Waste Discharge (Form 200)	**February 24, 2023**
v. 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)	
Implement the RAP(s)	**March 31, 2022** 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)	

DIRECTIVE	DUE DATE
Upon completion of implementation of the RAP, submit a Remedial Action Completion Report	Quarterly beginning January 15 of the year implementation of the RAP begins 60 days after completion of implementation of the RAP
5. Groundwater Monitoring: The Dischargers shall conduct ~~tri-annual~~ groundwater monitoring according to the Los Angeles Regional Water Quality Control Board letter, "Review of Proposed Revisions to the Groundwater Monitoring Plan and Second Tri-Annual 2022 Groundwater Monitoring Report," dated April 14, 2023; Attachment C (Monitoring and Reporting Program) and the following schedule. **Monitoring Period** January – ~~April~~March (Quarterly gauging; Semiannual monitoring and reporting) ~~May – August~~April – June (Quarterly gauging) July – September (Quarterly gauging; Semiannual monitoring and reporting; Select constituents monitored and reported annually or biennially, as detailed in Table 1 of the Los Angeles Regional Water Quality Control Board letter, "Review of Proposed Revisions to the Groundwater Monitoring Plan and Second Tri-Annual 2022 Groundwater Monitoring Report," dated April 14, 2023) ~~September~~ October – December (Quarterly gauging)	The next groundwater monitoring report is due on ~~**September 15, 2021**~~**October 15, 2023**. **Report Due Date** ~~May~~ April 15th ~~September 15th~~To be included in the October 15th due date ~~January 15th~~October 15th To be included in the April 15th due date
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	According to the schedule approved by the Executive Officer.

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