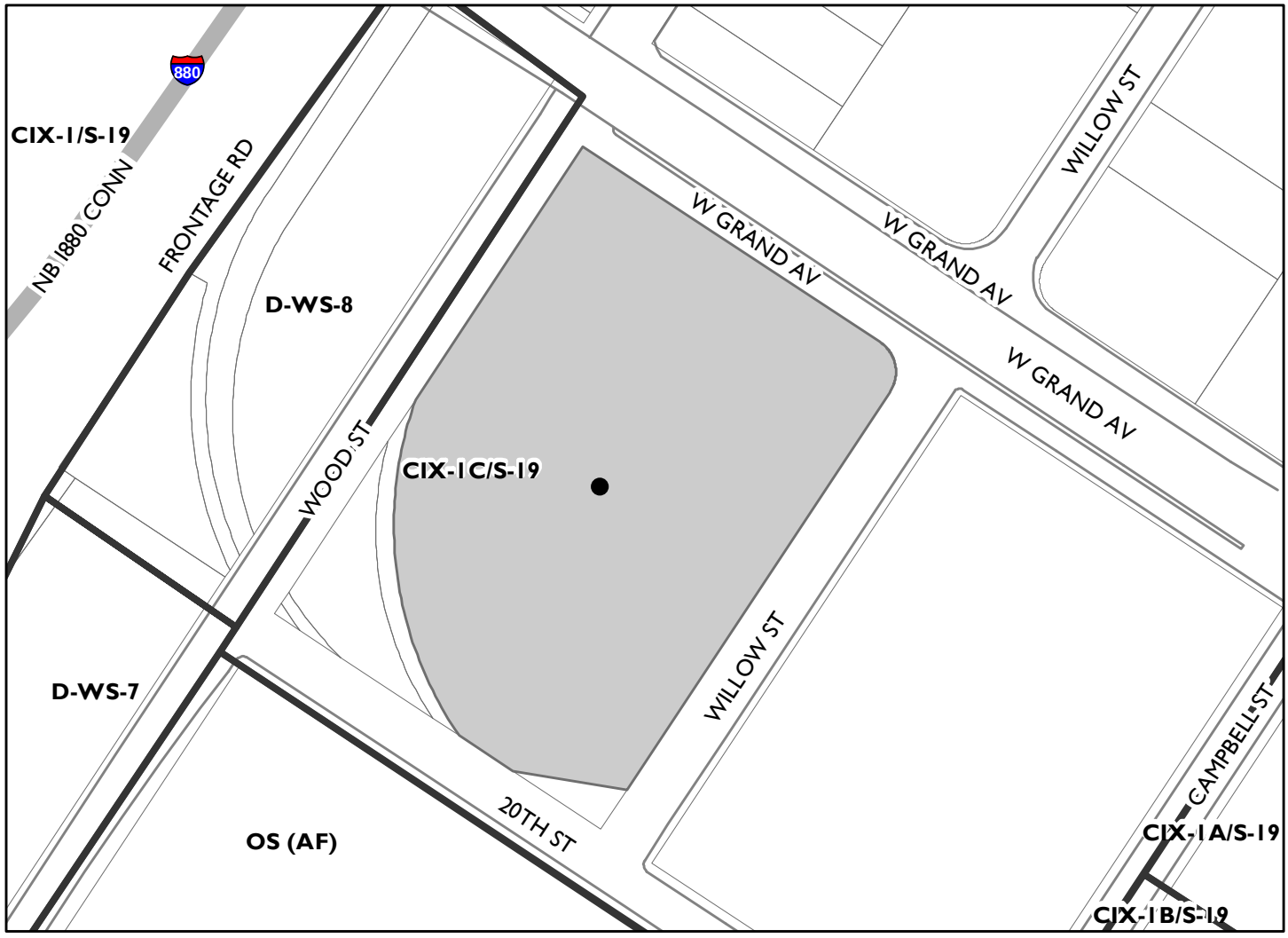
Location:	1700 20th Street
Assessor's Parcel Number	007 -0572-001-02
Proposal:	To establish an 82,000 square foot facility for the manufacture of ceramic beads and fabrication of lithium extraction units, and associated research and development.
Applicant:	Lilac Solutions, Inc. c/o Dennis Neymit
Phone Number:	(805)710-5333
Owner:	Terreno 20th Street LLC
Case File Number:	PLN21104
Planning Permits Required:	Major Conditional Use Permit for uses over 25,000 square-feet and within 300 feet of a residential zone per 17.73.020 (L4) and 17.134.020 of the Planning Code.
General Plan:	Business Mix
Zoning:	CIX-1C West Oakland Plan Area Commercial Industrial Mix - 1C Industrial Zone (High Intensity Business)/ S-19 Health and Safety Protection Overlay Zone
Environmental Determination:	Exempt, Section 15301 of the State CEQA Guidelines: Existing Facilities (Minor alterations and operation); Section 15183 of the State CEQA Guidelines: Projects Consistent with a Community Plan, General Plan or Zoning. Further, the anticipated environmental effects of the project have been evaluated by the West Oakland Specific Plan Final Environmental Impact Report (Final EIR) (certified June 2014). These analyses and exemptions satisfy CEQA requirements on a separate and independent basis.
Historic Status:	Not A Potentially Designated Historic Property: OCHS Rating: X
City Council district:	3
Status:	Pending
Staff Recommendation	Approve with conditions.
Finality of Decision:	Appealable to City Council within 10 days
For further information:	Contact case planner Jose M. Herrera-Preza at (510)238-3808 or jherrera@oaklandca.gov

SUMMARY

Lilac Solutions Inc. is requesting a Major Conditional Use Permit to relocate business operations to an existing 82,000 square-foot industrial building at 1700 20th Street. The facility would primarily manufacture ceramic beads, which are used for the extraction of lithium for electric batteries, and include research and development space. No lithium would be extracted at the facility.

Based on the attached environmental analyses and proposed conditions of approval, the project will have minimal adverse effects on the surrounding community in terms of air quality, traffic, noise, vibrations, or hazardous materials. Therefore, staff recommends approval of the requested permit.

CITY OF OAKLAND PLANNING COMMISSION



Case File: PLN21104
Applicant: Lillac Solutions/ Dennis Neymit
Address: 1700 20th Street
Zone: CIX-1C/S-19

PROJECT DESCRIPTION

Lilac Solutions Inc. is requesting a Conditional Use Permit (CUP) to relocate business operations to an existing 82,000 square-foot industrial building at 1700 20th Street. The facility would primarily manufacture ceramic beads, which are used for the extraction of lithium for electric batteries and would include research and development space. The ceramic beads manufactured at this facility would be delivered to lithium extraction projects in the southwestern United States and internationally.

The project involves tenant improvements to an 82,000 square-foot tenant space within an existing 188,000 square-foot industrial building. The parcel contains one building that would be separated into two warehouses with research and development activities in one and manufacturing in the other (see Attachment C for the site layout). The proposed project would include the production of ceramic beads for off-site lithium extraction, fabrication of lithium extraction units (units that extract lithium from the beads), distribution, and research and development. A full description of the process is described in Attachment C.

The facility would operate 24-hours a day, seven days a week. For the initial phases of operation, the proposed project is anticipated to include the following hiring plan:

- By the end of 2021, Lilac will have 30 employees;
- By the end of 2022, Lilac will have 60 employees; and
- By 2023 full-scale operations will expand to a total of 113 employees.

Of the 113 employees at full scale, there will be 12 executives, 38 engineers/scientists, and 63 administrators, technicians, and custodians.

The applicant proposes to utilize three shifts during the workdays and employees would arrive at the site at various times in accordance with the shift schedule below. Employees for the largest shift are expected to arrive between 7:00 am and 3:30 pm.

Employee count per shift:
Day Shift (7am to 3:30pm) - 82 (the manufacturing headcount is 24 out of the 82)
Swing Shift (3pm - 11:30pm) - 22
Night Shift (11pm to 7:30am) - 22
Total Headcount 126

PROPERTY DESCRIPTION

The subject property is a 4.5-acre site bounded by Wood Street to the north, Willow Street to the south, 20th Street to the east and West Grand to the west. The site contains an existing vacant 188,000 square-foot industrial building that was occupied several years prior by the Horizon Beverage Group. Topography in the area is relatively flat, with no significant grade changes either east or west. The nearest adjacent properties include Riamondi Park to the south, vacant residential parcels to the west and light industrial and warehouse facilities to the north and east.

Developers of the Wood Street area to the west have plans to construct new housing and develop the historic 16th Street Southern Pacific Station. Many buildings are in transition from prior industrial uses, with most of the industrial context consisting of smaller buildings and open lots, such as the Roadway Trucking site immediately south of Raimondi Park.

The site contains 20 large truck parking spaces (40’ x 10’) and 83 standard parking spaces (18’ x 9’) of which six are designated as American Disability Act accessible parking spaces. These parking spaces will

remain when the business is in operation. Refer to Attachment C for the site plan showing the existing parking areas.

GENERAL PLAN ANALYSIS

This Project meets the LUTE's Industry and Commerce goals in the Land Use and Transportation Element (LUTE) of the General Plan. The LUTE designates the site "Business Mix", which is a flexible economic development zone that accommodates older industries and anticipates new technologies, including light industrial, research and development, low impact manufacturing, and commercial operations. It is intended for areas that are appropriate for a wide variety of businesses, and related commercial and industrial establishments while buffering nearby residential districts from the heavier industrial uses. In addition, the project conforms to the following LUTE objectives and policies:

Objective I/C3
Expand and retain Oakland's job base and economic strength

Policy T1.5 Locating Truck Services.
Truck services should be concentrated in areas adjacent to freeways and near the seaport and airport, while ensuring the attractiveness of the environment for visitors, local business, and nearby neighborhoods.

WEST OAKLAND SPECIFIC PLAN ANALYSIS

This site is within the Mandela/West Grand opportunity subarea 1D of the West Oakland Specific Plan (WOSP). The vision for the Mandela/West Grand Opportunity Area includes:

- Promoting a mix of business activities and development types and a range of jobs at varying skill and education levels, in an area that is envisioned as the major business and employment center for West Oakland;
- Retaining existing compatible businesses that have well-paid blue collar and green collar jobs;
- Attracting traditional light industrial and business uses, similar to the types of businesses already well-established in this area, and new industries such as the life sciences, information technology and clean- tech businesses previously described in Chapter 3 of this Plan;
- Discouraging heavy industrial development between Adeline Street and Magnolia Street, in order to minimize the potential for creating greater incompatible land use adjacencies;

According to the DOSP, "In the near- and mid-term, the area should encourage and attract a mix of business development through the reuse of existing buildings and the construction of new lower-intensity commercial and light industrial uses, which will lay the groundwork for potential higher intensity business development in the future."

Growth in the Mandela/West Grand Opportunity Area is eventually expected to include new research and development and life sciences uses in mid-rise development sites at key locations such as at the intersection of Mandela Parkway and West Grand Avenue; and new larger format destination retail uses at the northern end of this opportunity area that extend the existing retail cluster near the Oakland/Emeryville border into West Oakland."

Per the WOSP, the "Business Mix" designation in West Oakland was mapped with consideration given to existing, contiguous business and residential areas. This resulted in application of the "Business Mix" land use classification in large areas surrounding the intersection of West Grand Avenue and Mandela Parkway, and along the east side of the new I-880 route. Retention of general industrial uses toward the core of this area (away from residential neighborhoods) is allowed.

Objective LU-1: Remove obstacles to community and economic development by increasing the attractiveness of the West Oakland business area, encouraging private rehabilitation of under-utilized, vacant and neglected properties, seeking to improve roadway conditions, and partnering with the private development community to remove conditions that constrain business development and revitalization.

Objective LU-2: Retain compatible businesses that provide jobs, that stimulate economic development, and that use existing buildings.

Objective LU-3: Spur private creation of additional living wage job opportunities that provide employment opportunities to West Oakland residents.

Objective LU-4: Attract new businesses to the West Oakland area that will contribute to the community's economic and environmental health.

As described in the "Key Issues and Impacts" section of this report, the proposal will provide a clean industrial and research and development operation that will have minimal environmental effects to the neighboring residential areas. Therefore, the project is consistent with the vision and objectives of the WOSP.

ZONING ANALYSIS

The subject property is in the CIX-1C (West Oakland Plan Area Commercial Industrial Mix – 1C Industrial Zone (High Intensity Business)) and the S-19 Health and Safety Protection Combining Zone. The intent of the CIX-1C zone is to support industrial areas in the West Oakland Specific Plan Area that are appropriate for a broad range of higher intensity commercial, retail, office, and advanced manufacturing-type users.

The proposal has been determined to be a General Manufacturing Industrial Activity because the operation will process raw materials (clay) into a finished product (ceramic balls) that will be sold to customers:

17.10.570 - General Manufacturing Industrial Activities.
General Manufacturing Industrial Activities include the manufacturing, compounding, processing, assembling, packaging or treatment of products from extracted, raw, recycled or secondary materials; they may have some or all activities conducted outdoors. This classification excludes all activities under Intermediate Recycling Processing Facilities. The Zoning Administrator or his/her designee may place an activity that otherwise fits this description, but does not produce noise, vibration, air pollution, fire hazard, or noxious emission that will violate standard in Chapter 17.120, or an other federal, State or local standards into the Light Manufacturing Industrial Activities classification. This classification also includes certain activities accessory to the above, as specified in Section 17.10.040. Examples of activities in this classification include, but are not limited to, the following:

A. Chemical manufacturing (except for the chemical products listed under Heavy/High/Impact Manufacturing);
B. Glass manufacturing;
C. Metal foundries;
D. Wood product manufacturing;
E. Heavy equipment and manufacturing;
F. Paper finishing;
G. Pipe production facilities;
H. Textile mills;
I. Tire retreading and recapping;
J. Wood product manufacturing.

Based on this land use activity classification and the requirements of the CIX-1C Zone, the project requires a Major CUP. The CIX-1C Zone requires a CUP to allow a General Manufacturing Industrial Activity within 300 feet of a residential zone (staff has determined the Wood Street District Zone – 7 is a residential zone). Per 17.134.020 of the Planning Code, the project is considered major because it involves more than 25,000 square feet of floor area and, therefore, requires Planning Commission approval.

The site is also located in the S-19 Health and Safety Protection Combining Zone. The S-19 Combining Zone is intended to control the storage or use of hazardous materials and wastes within 300 feet of a residential, institutional, or open space zoning district. The Zone states that the storage and use of all hazardous materials and hazardous waste must be reviewed and approved by the Fire Department prior to commencement of operation or any alteration of activity. A risk management plan may also be required, per the Certified Program Uniform Assistance Ordinance (O.M.C. Chapter 8.42). It also states that no storage or use of hazardous materials and waste can be located within 300 feet of a Residential, Institutional or Open Space Zone without written approval or consent of the Fire Department. The proposal meets the requirements of the S-19 Zone because the applicant has submitted an application with the Fire Department for the operation.

ENVIRONMENTAL DETERMINATION

The California Environmental Quality Act (CEQA) Guidelines categorically exempts specific types of projects from environmental review. This project is determined exempt per the following sections of the State CEQA Guidelines.

Section 15301 exempts minor alteration of existing private structures, involving negligible or no expansion of existing or former uses. The proposal meets this exemption as the building footprint and the use as an industrial manufacturing activity is not changing.

The anticipated environmental effects of the project have been evaluated by the West Oakland Specific Plan Final Environmental Impact Report (Final EIR) (certified June 2014).

Guidelines Section 15183 (Projects consistent with a Community Plan, General Plan or Zoning) is also applicable as noted in the "General Plan Analysis", "West Oakland Specific Plan Analysis", and "Zoning Analysis" sections above.

These analyses and exemptions satisfy CEQA requirements on a separate and independent basis.

KEY ISSUES AND IMPACTS

In considering applications that require a CUP for a new industrial activity staff considers factors including, but not limited to, air quality, truck trip generation, noise, fire prevention, the handling of hazardous materials, and car traffic and parking. The applicant has prepared an environmental assessment to analyze these issues, which staff summarizes below along with issues relating to landscaping and parking.

Air Quality

According to the consultant's report in Attachment C, the operation will produce less than ten pounds a day of nitrogen dioxide and organic solvents, emissions will be maintained within the allowable thresholds by the Bay Area Air Quality Management District, and the project will not produce any noticeable odors. The report states that the operation will have minimal negative effects on air quality and do not reach the City's thresholds of significance for mitigations under the California Environmental Quality Act.

Truck Trip Generation

The proposal will generate four truckloads per day or eight one-way truck trips per day. Staff does not anticipate these relatively few truck trips to create a large negative effect on residential neighborhoods or air quality because of the site's location near the West Grand Avenue I-880 off-ramp. Further, staff has conditioned that the applicant must provide a truck route map to drivers requiring that trucks follow all authorized routes and not drive through residential neighborhoods. Staff also recommends a condition that an increase in truck trips require a formal revision of the project.

Noise

A "Fence Line Noise Model Report" was prepared for this project that found that there will be no significant noises generated by the proposal past the property lines of the site. As described in the consultant report in Attachment C, the noise produced from the manufacturing use within the existing building is not expected to be detectable above normal community levels. The report was prepared using conservative assumptions and will not be changed even if sound levels from the manufacturing process are significantly higher than estimates used in the analysis, which is not expected.

Hazardous Materials/Waste and Fire Protection

A California Accidental Release Prevention (CalARP) Risk Management Plan (RMP) has been prepared and is included within Attachment C. The applicant will prepare other required studies (e.g., Hazardous Materials Business Plan, Process Hazard Analysis) before storage or use of chemicals more than reportable quantities on site. The reports will be coordinated with the applicable reviewing agency for approval and will implement any required best practice measures or other practices identified by the Oakland Fire Department, the Bay Area Air Quality District (BAAQD), Alameda County Environmental Health, and any other applicable departments/agencies.

Landscaping

The applicant does not propose any new structures or additions as part of this project, therefore no new on-site landscaping is required. However, Section 17.73.030 of the Planning Code requires that a minimum of one 15-gallon tree be provided for every 20 feet of street frontage. As conditioned, the project will meet this requirement.

Parking

The site has a total of 86 off-street parking spaces to accommodate the business operations. The parking spaces are allocated as follows: 60 parking spaces dedicated to employee's, 7 dedicated to visitors, 3 handicap accessible spaces, and 16 dedicated to heavy vehicles (Truck's). The business is not anticipated to have a significant parking demand as employee shifts are staggered throughout the workday and alternative transportation methods will be encouraged. The busiest time of the day will be 7:00am-3:30pm., at full-scale operation, 83 employees will be on-site with an anticipated 40 vehicle trips. The site has ample parking to accommodate all employee's even if they were all traveling as single car occupants. Therefore, the required parking is met.

CONCLUSION

Staff supports the project because it will bring over 100 industrial jobs to Oakland and will not create substantial negative effects on the community.

RECOMMENDATIONS:

For approvals:
1. Affirm staff's environmental determination.
2. Approve the Major Conditional Use Permit subject to the attached findings and conditions.

Prepared by:

Jose M. Herrera-Preza
Planner III

Reviewed by:

Robert D. Merkamp
Zoning Manager
Bureau of Planning

Approved for forwarding to the Planning Commission:

Catherine Payne for

Ed Manasse Deputy Director
Bureau of Planning

ATTACHMENTS:
A. Findings Approval
B. Conditions for Approval
C. SESPE Consultants Inc. Analysis

FINDINGS FOR APPROVAL

This proposal meets all the required findings under the section 17.134.050, General Use Permit Criteria of the Oakland Planning Code (OMC Title 17) as set forth below and which are required to approve your application. Required findings are shown in **bold** type; reasons your proposal satisfies them are shown in normal type.

SECTION 17.134.050 – GENERAL USE PERMIT CRITERIA:

A. That the location, size, design, and operating characteristics of the proposed development will be compatible with and will not adversely affect the livability or appropriate development of abutting properties and the surrounding neighborhood, with consideration to be given to harmony in scale, bulk, coverage, and density; to the availability of civic facilities and utilities; to harmful effect, if any, upon desirable neighborhood character; to the generation of traffic and the capacity of surrounding streets; and to any other relevant impact of the development.

As discussed in the "Key Issues and Impacts" section of this report, the facility will have minimal effects on truck trip generation, parking, noise, or air quality. As conditioned, the trucks will only travel on authorized routes. A California Accidental Release Prevention (CalARP) Risk Management Plan (RMP) has been prepared and is included within attachment C. The applicant will prepare other required studies (e.g., Hazardous Materials Business Plan, Process Hazard Analysis) before storage or use of chemicals more than reportable quantities on site. The reports will be coordinated with the applicable reviewing agency for approval and will implement any required best practice measures or other practices identified by the Oakland Fire Department, the Bay Area Air Quality District (BAAQD), Alameda County Environmental Health, and any other applicable departments/agencies.

The project does not require new construction. Therefore, it will not affect the scale, bulk, or coverage on the lot or the character of the neighborhood.

B. That the location, design, and site planning of the proposed development will provide a convenient and functional living, working, shopping, or civic environment, and will be as attractive as the nature of the use and its location and setting warrant.

The proposed General Manufacturing Industrial facility will result in minimal change in the exterior appearance of the building and will improve the local and regional energy distribution system while transitioning away from fossil fuels.

C. That the proposed development will enhance the successful operation of the surrounding area in its basic community functions, or will provide an essential service to the community or region.

The project will provide a low-impact and clean industrial activity in an existing industrial zone and employ 113 jobs to the area.

D. That the proposal conforms to all applicable design review criteria set forth in the design review procedure at Section 17.136.070.

The proposal does not include new construction that requires design review.

E. **That the proposal conforms in all significant respects with the Oakland Comprehensive Plan and with any other applicable plan or development control map which has been adopted by the City Council.**

See the "General Plan Analysis" and "West Oakland Specific Plan Analysis" sections of this report.

CONDITIONS OF APPROVAL

The proposal is hereby approved subject to the following Conditions of Approval:

STANDARD CONDITIONS OF APPROVAL

1. Approved Use

The project shall be constructed and operated in accordance with the authorized use as described in the approved application materials, and the approved plans **April 30, 2021**, as amended by the following conditions of approval and mitigation measures, if applicable ("Conditions of Approval" or "Conditions").

2. Effective Date, Expiration, Extensions and Extinguishment

This Approval shall become effective immediately, unless the Approval is appealable, in which case the Approval shall become effective in ten (10) calendar days unless an appeal is filed. Unless a different termination date is prescribed, this Approval shall expire **two years** from the Approval date, or from the date of the final decision in the event of an appeal, unless within such period a complete building permit application has been filed with the Bureau of Building and diligently pursued towards completion, or the authorized activities have commenced in the case of a permit not involving construction or alteration. Upon written request and payment of appropriate fees submitted no later than the expiration date of this Approval, the Director of City Planning or designee may grant a one-year extension of this date, with additional extensions subject to approval by the approving body. Expiration of any necessary building permit or other construction-related permit for this project may invalidate this Approval if said Approval has also expired. If litigation is filed challenging this Approval, or its implementation, then the time period stated above for obtaining necessary permits for construction or alteration and/or commencement of authorized activities is automatically extended for the duration of the litigation.

3. Compliance with Other Requirements

The project applicant shall comply with all other applicable federal, state, regional, and local laws/codes, requirements, regulations, and guidelines, including but not limited to those imposed by the City's Bureau of Building, Fire Marshal, Department of Transportation, and Public Works Department. Compliance with other applicable requirements may require changes to the approved use and/or plans. These changes shall be processed in accordance with the procedures contained in Condition #4.

4. Minor and Major Changes

a. Minor changes to the approved project, plans, Conditions, facilities, or use may be approved administratively by the Director of City Planning

b. Major changes to the approved project, plans, Conditions, facilities, or use shall be reviewed by the Director of City Planning to determine whether such changes require submittal and approval of a revision to the Approval by the original approving body or a new independent permit/approval. Major revisions shall be reviewed in accordance with the procedures required for the original permit/approval. A new independent permit/approval shall be reviewed in accordance with the procedures required for the new permit/approval.

5. Compliance with Conditions of Approval

a. The project applicant and property owner, including successors, (collectively referred to hereafter as the "project applicant" or "applicant") shall be responsible for compliance with all the Conditions of Approval and any recommendations contained in any submitted and approved technical report at his/her sole cost and expense, subject to review and approval by the City of Oakland.

b. The City of Oakland reserves the right at any time during construction to require certification by a licensed professional at the project applicant's expense that the as-built project conforms to all applicable requirements, including but not limited to, approved maximum heights and minimum setbacks. Failure to construct the project in accordance with the Approval may result in remedial reconstruction, permit revocation, permit modification, stop work, permit suspension, or other corrective action.

c. Violation of any term, Condition, or project description relating to the Approval is unlawful, prohibited, and a violation of the Oakland Municipal Code. The City of Oakland reserves the right to initiate civil and/or criminal enforcement and/or abatement proceedings, or after notice and public hearing, to revoke the Approval or alter these Conditions if it is found that there is violation of any of the Conditions or the provisions of the Planning Code or Municipal Code, or the project operates as or causes a public nuisance. This provision is not intended to, nor does it, limit in any manner whatsoever the ability of the City to take appropriate enforcement actions. The project applicant shall be responsible for paying fees in accordance with the City's Master Fee Schedule for inspections conducted by the City or a City-designated third-party to investigate alleged violations of the Approval or Conditions.

6. Signed Copy of the Approval/Conditions

A copy of the Approval letter and Conditions shall be signed by the project applicant, attached to each set of permit plans submitted to the appropriate City agency for the project, and made available for review at the project job site at all times.

7. Blight/Nuisances

The project site shall be kept in a blight/nuisance-free condition. Any existing blight or nuisance shall be abated within sixty (60) days of approval, unless an earlier date is specified elsewhere.

8. Indemnification

a. To the maximum extent permitted by law, the project applicant shall defend (with counsel acceptable to the City), indemnify, and hold harmless the City of Oakland, the Oakland City Council, the Oakland Redevelopment Successor Agency, the Oakland City Planning Commission, and their respective agents, officers, employees, and volunteers (hereafter collectively called "City") from any liability, damages, claim, judgment, loss (direct or indirect), action, causes of action, or proceeding (including legal costs, attorneys' fees, expert witness or consultant fees, City Attorney or staff time, expenses or costs) (collectively called "Action") against the City to attack, set aside, void or annul this Approval or implementation of this Approval. The City may elect, in its sole discretion, to participate in the defense of said Action and the project applicant shall reimburse the City for its reasonable legal costs and attorneys' fees.

b. Within ten (10) calendar days of the filing of any Action as specified in subsection (a) above, the project applicant shall execute a Joint Defense Letter of Agreement with the City, acceptable to the Office of the City Attorney, which memorializes the above obligations. These obligations and the Joint Defense Letter of Agreement shall survive termination, extinguishment, or invalidation of the Approval. Failure to timely execute the Letter of Agreement does not relieve the project applicant of any of the obligations contained in this Condition or other requirements or Conditions of Approval that may be imposed by the City.

9. Severability

The Approval would not have been granted but for the applicability and validity of each and every one of the specified Conditions, and if one or more of such Conditions is found to be invalid by a court of competent jurisdiction this Approval would not have been granted without requiring other valid Conditions consistent with achieving the same purpose and intent of such Approval.

10. Special Inspector/Inspections, Independent Technical Review, Project Coordination and Monitoring

The project applicant may be required to cover the full costs of independent third-party technical review and City monitoring and inspection, including without limitation, special inspector(s)/inspection(s) during times of extensive or specialized plan-check review or construction, and inspections of potential violations of the Conditions of Approval. The project applicant shall establish a deposit with Engineering Services and/or the Bureau of Building, if directed by the Director of Public Works, Building Official, Director of City Planning, Director of Transportation, or designee, prior to the issuance of a construction-related permit and on an ongoing as-needed basis.

11. Public Improvements

The project applicant shall obtain all necessary permits/approvals, such as encroachment permits, obstruction permits, curb/gutter/sidewalk permits, and public improvement ("p-job") permits from the City for work in the public right-of-way, including but not limited to, streets, curbs, gutters, sidewalks, utilities, and fire hydrants. Prior to any work in the public right-of-way, the applicant shall submit plans for review and approval by the Bureau of Planning, the Bureau of Building, Engineering Services, Department of Transportation, and other City departments as required. Public improvements shall be designed and installed to the satisfaction of the City.

12. Regulatory Permits and Authorizations from Other Agencies

Requirement: The project applicant shall obtain all necessary regulatory permits and authorizations from applicable resource/regulatory agencies including, but not limited to, the Regional Water Quality Control Board, Bay Area Air Quality Management District, Bay Conservation and Development Commission, California Department of Fish and Wildlife, U. S. Fish and Wildlife Service, and Army Corps of Engineers and shall comply with all requirements and conditions of the permits/authorizations. The project applicant shall submit evidence of the approved permits/authorizations to the City, along with evidence demonstrating compliance with any regulatory permit/authorization conditions of approval.

When Required: Prior to activity requiring permit/authorization from regulatory agency

Initial Approval: Approval by applicable regulatory agency with jurisdiction; evidence of approval submitted to Bureau of Planning

Monitoring/Inspection: Applicable regulatory agency with jurisdiction

13. Trash and Blight Removal

Requirement: The project applicant and his/her successors shall maintain the property free of blight, as defined in chapter 8.24 of the Oakland Municipal Code. For nonresidential and multi-family residential projects, the project applicant shall install and maintain trash receptacles near public entryways as needed to provide sufficient capacity for building users.

When Required: Ongoing

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

14. Graffiti Control

Requirement:

a. During construction and operation of the project, the project applicant shall incorporate best management practices reasonably related to the control of graffiti and/or the mitigation of the impacts of graffiti. Such best management practices may include, without limitation:
   i. Installation and maintenance of landscaping to discourage defacement of and/or protect likely graffiti-attracting surfaces.
   ii. Installation and maintenance of lighting to protect likely graffiti-attracting surfaces.
   iii. Use of paint with anti-graffiti coating.
   iv. Incorporation of architectural or design elements or features to discourage graffiti defacement in accordance with the principles of Crime Prevention Through Environmental Design (CPTED).
   v. Other practices approved by the City to deter, protect, or reduce the potential for graffiti defacement.

b. The project applicant shall remove graffiti by appropriate means within seventy-two (72) hours. Appropriate means include the following:
   i. Removal through scrubbing, washing, sanding, and/or scraping (or similar method) without damaging the surface and without discharging wash water or cleaning detergents into the City storm drain system.
   ii. Covering with new paint to match the color of the surrounding surface.
   iii. Replacing with new surfacing (with City permits if required).

When Required: Ongoing

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

15. Lighting

Requirement: Proposed new exterior lighting fixtures shall be adequately shielded to a point below the light bulb and reflector to prevent unnecessary glare onto adjacent properties.

When Required: Prior to building permit final

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

16. Dust Controls – Construction Related

Requirement: The project applicant shall implement all of the following applicable dust control measures during construction of the project:

a. Water all exposed surfaces of active construction areas at least twice daily. Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever feasible.
b. Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).
c. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
d. Limit vehicle speeds on unpaved roads to 15 miles per hour.
e. All demolition activities (if any) shall be suspended when average wind speeds exceed 20 mph.
f. All trucks and equipment, including tires, shall be washed off prior to leaving the site.

g. Site accesses to a distance of 100 feet from the paved road shall be treated with a 6 to 12 inch compacted layer of wood chips, mulch, or gravel.

When Required: During construction

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

17. Criteria Air Pollutant Controls - Construction Related

Requirement: The project applicant shall implement all of the following applicable basic control measures for criteria air pollutants during construction of the project as applicable:

a. Idling times on all diesel-fueled commercial vehicles over 10,000 lbs. shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to two minutes (as required by the California airborne toxics control measure Title 13, Section 2485, of the California Code of Regulations). Clear signage to this effect shall be provided for construction workers at all access points.

b. Idling times on all diesel-fueled off-road vehicles over 25 horsepower shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to two minutes and fleet operators must develop a written policy as required by Title 23, Section 2449, of the California Code of Regulations ("California Air Resources Board Off-Road Diesel Regulations").

c. All construction equipment shall be maintained and properly tuned in accordance with the manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. Equipment check documentation should be kept at the construction site and be available for review by the City and the Bay Area Air Quality District as needed.

d. Portable equipment shall be powered by grid electricity if available. If electricity is not available, propane or natural gas generators shall be used if feasible. Diesel engines shall only be used if grid electricity is not available and propane or natural gas generators cannot meet the electrical demand.

e. Low VOC (i.e., ROG) coatings shall be used that comply with BAAQMD Regulation 8, Rule 3: Architectural Coatings.

f. All equipment to be used on the construction site shall comply with the requirements of Title 13, Section 2449, of the California Code of Regulations ("California Air Resources Board Off-Road Diesel Regulations") and upon request by the City (and the Air District if specifically requested), the project applicant shall provide written documentation that fleet requirements have been met.

When Required: During construction

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

18. Diesel Particulate Matter Controls-Construction Related

a. Diesel Particulate Matter Reduction Measures

Requirement: The project applicant shall implement appropriate measures during construction to reduce potential health risks to sensitive receptors due to exposure to diesel particulate matter (DPM) from construction emissions. The project applicant shall choose **one** of the following methods:

i. The project applicant shall retain a qualified air quality consultant to prepare a Health Risk Assessment (HRA) in accordance with current guidance from the California Air Resources Board (CARB) and Office of Environmental Health and Hazard Assessment

to determine the health risk to sensitive receptors exposed to DPM from project construction emissions. The HRA shall be submitted to the City (and the Air District if specifically requested) for review and approval. If the HRA concludes that the health risk is at or below acceptable levels, then DPM reduction measures are not required. If the HRA concludes that the health risk exceeds acceptable levels, DPM reduction measures shall be identified to reduce the health risk to acceptable levels as set forth under subsection b below. Identified DPM reduction measures shall be submitted to the City for review and approval prior to the issuance of building permits and the approved DPM reduction measures shall be implemented during construction.

-or-

ii. All off-road diesel equipment shall be equipped with the most effective Verified Diesel Emission Control Strategies (VDECS) available for the engine type (Tier 4 engines automatically meet this requirement) as certified by CARB. The equipment shall be properly maintained and tuned in accordance with manufacturer specifications. This shall be verified through an equipment inventory submittal and Certification Statement that the Contractor agrees to compliance and acknowledges that a significant violation of this requirement shall constitute a material breach of contract.

When Required: Prior to issuance of a construction related permit (i), during construction (ii)

Initial Approval: Bureau of Planning

Monitoring/Inspection: Bureau of Building

b. Construction Emissions Minimization Plan (if required by a above)

Requirement: The project applicant shall prepare a Construction Emissions Minimization Plan (Emissions Plan) for all identified DPM reduction measures (if any). The Emissions Plan shall be submitted to the City (and the Bay Area Air Quality District if specifically requested) for review and approval prior to the issuance of building permits. The Emissions Plan shall include the following:

i. An equipment inventory summarizing the type of off-road equipment required for each phase of construction, including the equipment manufacturer, equipment identification number, engine model year, engine certification (tier rating), horsepower, and engine serial number. For all VDECS, the equipment inventory shall also include the technology type, serial number, make, model, manufacturer, CARB verification number level, and installation date.

ii. A Certification Statement that the Contractor agrees to comply fully with the Emissions Plan and acknowledges that a significant violation of the Emissions Plan shall constitute a material breach of contract.

When Required: Prior to issuance of a construction related permit

Initial Approval: Bureau of Planning

Monitoring/Inspection: Bureau of Building

19. Stationary Sources of Air Pollution (Toxic Air Contaminants)

Requirement: The project applicant shall incorporate appropriate measures into the project design in order to reduce the potential health risk due to on-site stationary sources of toxic air contaminants. The project applicant shall choose **one** of the following methods:

a. The project applicant shall retain a qualified air quality consultant to prepare a Health Risk Assessment (HRA) in accordance with California Air Resources Board (CARB) and Office of Environmental Health and Hazard Assessment requirements to determine the health risk associated with proposed stationary sources of pollution in the project. The HRA shall be

submitted to the City for review and approval. If the HRA concludes that the health risk is at or below acceptable levels, then health risk reduction measures are not required. If the HRA concludes the health risk exceeds acceptable levels, health risk reduction measures shall be identified to reduce the health risk to acceptable levels. Identified risk reduction measures shall be submitted to the City for review and approval and be included on the project drawings submitted for the construction-related permit or on other documentation submitted to the City. The approved risk reduction measures shall be implemented during construction and/or operations as applicable.

- or -

b. The project applicant shall incorporate the following health risk reduction measures into the project. These features shall be submitted to the City for review and approval and be included on the project drawings submitted for the construction-related permit or on other documentation submitted to the City:

i. Installation of non-diesel fueled generators, if feasible, or;

ii. Installation of diesel generators with an EPA-certified Tier 4 engine or engines that are retrofitted with a CARB Level 3 Verified Diesel Emissions Control Strategy, if feasible.

When Required: Prior to approval of construction-related permit

Initial Approval: Bureau of Planning

Monitoring/Inspection: Bureau of Building

20. Truck-Related Risk Reduction Measures (Toxic Air Contaminants)

a. ***Truck Loading Docks***

Requirement: The project applicant shall locate proposed truck loading docks as far from nearby sensitive receptors as feasible.

When Required: Prior to approval of construction-related permit

Initial Approval: Bureau of Planning

Monitoring/Inspection: Bureau of Building

b. ***Truck Fleet Emission Standards***

Requirement: The project applicant shall comply with all applicable California Air Resources Board (CARB) requirements to control emissions from diesel engines and demonstrate compliance to the satisfaction of the City. Methods to comply include, but are not limited to, new clean diesel trucks, higher-tier diesel engine trucks with added Particulate Matter (PM) filters, hybrid trucks, alternative energy trucks, or other methods that achieve the applicable CARB emission standard. Compliance with this requirement shall be verified through CARB's Verification Procedures for In-Use Strategies to Control Emissions from Diesel Engines.

When Required: Prior to building permit final; ongoing

Initial Approval: Bureau of Planning

Monitoring/Inspection: Bureau of Building

21. Asbestos in Structures

Requirement: The project applicant shall comply with all applicable laws and regulations regarding demolition and renovation of Asbestos Containing Materials (ACM), including but not limited to California Code of Regulations, Title 8; California Business and Professions Code, Division 3; California Health and Safety Code sections 25915-25919.7; and Bay Area Air Quality Management District, Regulation 11, Rule 2, as may be amended. Evidence of compliance shall be submitted to the City upon request.

When Required: Prior to approval of construction-related permit

Initial Approval: Applicable regulatory agency with jurisdiction

Monitoring/Inspection: Applicable regulatory agency with jurisdiction

22. Archaeological and Paleontological Resources – Discovery During Construction

Requirement: Pursuant to CEQA Guidelines section 15064.5(f), in the event that any historic or prehistoric subsurface cultural resources are discovered during ground disturbing activities, all work within 50 feet of the resources shall be halted and the project applicant shall notify the City and consult with a qualified archaeologist or paleontologist, as applicable, to assess the significance of the find. In the case of discovery of paleontological resources, the assessment shall be done in accordance with the Society of Vertebrate Paleontology standards. If any find is determined to be significant, appropriate avoidance measures recommended by the consultant and approved by the City must be followed unless avoidance is determined unnecessary or infeasible by the City. Feasibility of avoidance shall be determined with consideration of factors such as the nature of the find, project design, costs, and other considerations. If avoidance is unnecessary or infeasible, other appropriate measures (e.g., data recovery, excavation) shall be instituted. Work may proceed on other parts of the project site while measures for the cultural resources are implemented.

In the event of data recovery of archaeological resources, the project applicant shall submit an Archaeological Research Design and Treatment Plan (ARDTP) prepared by a qualified archaeologist for review and approval by the City. The ARDTP is required to identify how the proposed data recovery program would preserve the significant information the archaeological resource is expected to contain. The ARDTP shall identify the scientific/historic research questions applicable to the expected resource, the data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions. The ARDTP shall include the analysis and specify the curation and storage methods. Data recovery, in general, shall be limited to the portions of the archaeological resource that could be impacted by the proposed project. Destructive data recovery methods shall not be applied to portions of the archaeological resources if nondestructive methods are practicable. Because the intent of the ARDTP is to save as much of the archaeological resource as possible, including moving the resource, if feasible, preparation and implementation of the ARDTP would reduce the potential adverse impact to less than significant. The project applicant shall implement the ARDTP at his/her expense.

In the event of excavation of paleontological resources, the project applicant shall submit an excavation plan prepared by a qualified paleontologist to the City for review and approval. All significant cultural materials recovered shall be subject to scientific analysis, professional museum curation, and/or a report prepared by a qualified paleontologist, as appropriate, according to current professional standards and at the expense of the project applicant.

When Required: During construction

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

23. Human Remains – Discovery During Construction

Requirement: Pursuant to CEQA Guidelines section 15064.5(e)(1), in the event that human skeletal remains are uncovered at the project site during construction activities, all work shall immediately halt and the project applicant shall notify the City and the Alameda County Coroner. If the County Coroner determines that an investigation of the cause of death is required or that the remains are Native American, all work shall cease within 50 feet of the remains until appropriate arrangements are made. In the event that the remains are Native American, the City shall contact the California Native American Heritage Commission (NAHC), pursuant to subdivision (c) of section 7050.5 of the California Health and Safety Code. If the agencies determine that avoidance is not feasible, then an alternative plan shall be prepared with specific steps and timeframe required to resume construction

activities. Monitoring, data recovery, determination of significance, and avoidance measures (if applicable) shall be completed expeditiously and at the expense of the project applicant.

When Required: During construction

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

24. Construction-Related Permit(s)

Requirement: The project applicant shall obtain all required construction-related permits/approvals from the City. The project shall comply with all standards, requirements and conditions contained in construction-related codes, including but not limited to the Oakland Building Code and the Oakland Grading Regulations, to ensure structural integrity and safe construction.

When Required: Prior to approval of construction-related permit

Initial Approval: Bureau of Building

Monitoring/Inspection: Bureau of Building

25. Project Compliance with the Equitable Climate Action Plan (ECAP) Consistency Checklist

Requirement: The project applicant shall implement all the measures in the Equitable Climate Action Plan (ECAP) Consistency Checklist that was submitted during the Planning entitlement phase.

a. For physical ECAP Consistency Checklist measures to be incorporated into the design of the project, the measures shall be included on the drawings submitted for construction-related permits.

When Required: Prior to approval of construction-related permit.

Initial Approval: Bureau of Planning

Monitoring/Inspection: Bureau of Planning

b. For physical ECAP Consistency Checklist measures to be incorporated into the design of the project, the measures shall be implemented during construction.

When Required: During construction

Initial Approval: Bureau of Planning

Monitoring/Inspection: Bureau of Building

c. For ECAP Consistency Checklist measures that are operational but not otherwise covered by these SCAs, including but not limited to the requirement for transit passes or additional Transportation Demand Management measures, the applicant shall provide notice of these measures to employees and/or residents and post these requirements in a public place such as a lobby or work area accessible to the employees and/or residents.

When Required: Ongoing

Monitoring/Inspection: Bureau of Planning

26. Hazardous Materials Related to Construction

Requirement: The project applicant shall ensure that Best Management Practices (BMPs) are implemented by the contractor during construction to minimize potential negative effects on groundwater, soils, and human health. These shall include, at a minimum, the following:

a. Follow manufacture's recommendations for use, storage, and disposal of chemical products used in construction;

b. Avoid overtopping construction equipment fuel gas tanks;

c. During routine maintenance of construction equipment, properly contain and remove grease and oils;

d. Properly dispose of discarded containers of fuels and other chemicals;

e. Implement lead-safe work practices and comply with all local, regional, state, and federal requirements concerning lead (for more information refer to the Alameda County Lead Poisoning Prevention Program); and

f. If soil, groundwater, or other environmental medium with suspected contamination is encountered unexpectedly during construction activities (e.g., identified by odor or visual staining, or if any underground storage tanks, abandoned drums or other hazardous materials or wastes are encountered), the project applicant shall cease work in the vicinity of the suspect material, the area shall be secured as necessary, and the applicant shall take all appropriate measures to protect human health and the environment. Appropriate measures shall include notifying the City and applicable regulatory agency(ies) and implementation of the actions described in the City's Standard Conditions of Approval, as necessary, to identify the nature and extent of contamination. Work shall not resume in the area(s) affected until the measures have been implemented under the oversight of the City or regulatory agency, as appropriate.

When Required: During construction

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

27. Hazardous Building Materials and Site Contamination

a. ***Hazardous Building Materials Assessment***

Requirement: The project applicant shall submit a comprehensive assessment report to the Bureau of Building, signed by a qualified environmental professional, documenting the presence or lack thereof of asbestos-containing materials (ACMs), lead-based paint, polychlorinated biphenyls (PCBs), and any other building materials or stored materials classified as hazardous materials by State or federal law. If lead-based paint, ACMs, PCBs, or any other building materials or stored materials classified as hazardous materials are present, the project applicant shall submit specifications prepared and signed by a qualified environmental professional, for the stabilization and/or removal of the identified hazardous materials in accordance with all applicable laws and regulations. The project applicant shall implement the approved recommendations and submit to the City evidence of approval for any proposed remedial action and required clearances by the applicable local, state, or federal regulatory agency.

When Required: Prior to approval of demolition, grading, or building permits

Initial Approval: Bureau of Building

Monitoring/Inspection: Bureau of Building

b. ***Environmental Site Assessment Required***

Requirement: The project applicant shall submit a Phase I Environmental Site Assessment report, and Phase II Environmental Site Assessment report if warranted by the Phase I report, for the project site for review and approval by the City. The report(s) shall be prepared by a qualified environmental assessment professional and include recommendations for remedial action, as appropriate, for hazardous materials. The project applicant shall implement the approved recommendations and submit to the City evidence of approval for any proposed remedial action and required clearances by the applicable local, state, or federal regulatory agency.

When Required: Prior to approval of construction-related permit.

Initial Approval: Applicable regulatory agency with jurisdiction

Monitoring/Inspection: Applicable regulatory agency with jurisdiction

c. ***Health and Safety Plan Required***

Requirement: The project applicant shall submit a Health and Safety Plan for the review and approval by the City in order to protect project construction workers from risks associated with hazardous materials. The project applicant shall implement the approved Plan.

When Required: Prior to approval of construction-related permit

Initial Approval: Bureau of Building

Monitoring/Inspection: Bureau of Building

d. ***Best Management Practices (BMPs) Required for Contaminated Sites***

Requirement: The project applicant shall ensure that Best Management Practices (BMPs) are implemented by the contractor during construction to minimize potential soil and groundwater hazards. These shall include the following:

i. Soil generated by construction activities shall be stockpiled on-site in a secure and safe manner. All contaminated soils determined to be hazardous or non-hazardous waste must be adequately profiled (sampled) prior to acceptable reuse or disposal at an appropriate off-site facility. Specific sampling and handling and transport procedures for reuse or disposal shall be in accordance with applicable local, state, and federal requirements.

ii. Groundwater pumped from the subsurface shall be contained on-site in a secure and safe manner, prior to treatment and disposal, to ensure environmental and health issues are resolved pursuant to applicable laws and policies. Engineering controls shall be utilized, which include impermeable barriers to prohibit groundwater and vapor intrusion into the building.

When Required: During construction

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

28. Hazardous Materials Business Plan

Requirement: The project applicant shall submit a Hazardous Materials Business Plan for review and approval by the City, and shall implement the approved Plan. The approved Plan shall be kept on file with the City and the project applicant shall update the Plan as applicable. The purpose of the Hazardous Materials Business Plan is to ensure that employees are adequately trained to handle hazardous materials and provides information to the Fire Department should emergency response be required. Hazardous materials shall be handled in accordance with all applicable local, state, and federal requirements. The Hazardous Materials Business Plan shall include the following:

a. The types of hazardous materials or chemicals stored and/or used on-site, such as petroleum fuel products, lubricants, solvents, and cleaning fluids.

b. The location of such hazardous materials.

c. An emergency response plan including employee training information.

d. A plan that describes the manner in which these materials are handled, transported, and disposed.

When Required: Prior to building permit final

Initial Approval: Oakland Fire Department

Monitoring/Inspection: Oakland Fire Department

29. Erosion and Sedimentation Control Measures for Construction

Requirement: The project applicant shall implement Best Management Practices (BMPs) to reduce erosion, sedimentation, and water quality impacts during construction to the maximum extent practicable. At a minimum, the project applicant shall provide filter materials deemed acceptable to

the City at nearby catch basins to prevent any debris and dirt from flowing into the City's storm drain system and creeks.

When Required: During construction

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

30. Site Design Measures to Reduce Stormwater Runoff

Requirement: Pursuant to Provision C.3 of the Municipal Regional Stormwater Permit issued under the National Pollutant Discharge Elimination System (NPDES), the project applicant is encouraged to incorporate appropriate site design measures into the project to reduce the amount of stormwater runoff. These measures may include, but are not limited to, the following:

a. Minimize impervious surfaces, especially directly connected impervious surfaces and surface parking areas;
b. Utilize permeable paving in place of impervious paving where appropriate;
c. Cluster structures;
d. Direct roof runoff to vegetated areas;
e. Preserve quality open space; and
f. Establish vegetated buffer areas.

When Required: Ongoing

Initial Approval: N/A

Monitoring/Inspection: N/A

31. Construction Days/Hours

Requirement: The project applicant shall comply with the following restrictions concerning construction days and hours:

a. Construction activities are limited to between 7:00 a.m. and 7:00 p.m. Monday through Friday, except that pier drilling and/or other extreme noise generating activities greater than 90 dBA shall be limited to between 8:00 a.m. and 4:00 p.m.
b. Construction activities are limited to between 9:00 a.m. and 5:00 p.m. on Saturday. In residential zones and within 300 feet of a residential zone, construction activities are allowed from 9:00 a.m. to 5:00 p.m. only within the interior of the building with the doors and windows closed. No pier drilling or other extreme noise generating activities greater than 90 dBA are allowed on Saturday.
c. No construction is allowed on Sunday or federal holidays.

Construction activities include, but are not limited to, truck idling, moving equipment (including trucks, elevators, etc.) or materials, deliveries, and construction meetings held on-site in a non-enclosed area.

Any construction activity proposed outside of the above days and hours for special activities (such as concrete pouring which may require more continuous amounts of time) shall be evaluated on a case-by-case basis by the City, with criteria including the urgency/emergency nature of the work, the proximity of residential or other sensitive uses, and a consideration of nearby residents'/occupants' preferences. The project applicant shall notify property owners and occupants located within 300 feet at least 14 calendar days prior to construction activity proposed outside of the above days/hours. When submitting a request to the City to allow construction activity outside of the above days/hours, the project applicant shall submit information concerning the type and duration of proposed construction activity and the draft public notice for City review and approval prior to distribution of the public notice.

When Required: During construction

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

32. Construction Noise

Requirement: The project applicant shall implement noise reduction measures to reduce noise impacts due to construction. Noise reduction measures include, but are not limited to, the following:

a. Equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds) wherever feasible.

b. Except as provided herein, impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used, if such jackets are commercially available, and this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever such procedures are available and consistent with construction procedures.

c. Applicant shall use temporary power poles instead of generators where feasible.

d. Stationary noise sources shall be located as far from adjacent properties as possible, and they shall be muffled and enclosed within temporary sheds, incorporate insulation barriers, or use other measures as determined by the City to provide equivalent noise reduction.

e. The noisiest phases of construction shall be limited to less than 10 days at a time. Exceptions may be allowed if the City determines an extension is necessary and all available noise reduction controls are implemented.

When Required: During construction

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

33. Operational Noise

Requirement: Noise levels from the project site after completion of the project (i.e., during project operation) shall comply with the performance standards of chapter 17.120 of the Oakland Planning Code and chapter 8.18 of the Oakland Municipal Code. If noise levels exceed these standards, the activity causing the noise shall be abated until appropriate noise reduction measures have been installed and compliance verified by the City.

When Required: Ongoing

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

34. Jobs/Housing Impact Fee

Requirement: The project applicant shall comply with the requirements of the City of Oakland Jobs/Housing Impact Fee Ordinance (chapter 15.68 of the Oakland Municipal Code).

When Required: Prior to issuance of building permit; subsequent milestones pursuant to ordinance

Initial Approval: Bureau of Building

Monitoring/Inspection: N/A

35. Capital Improvements Impact Fee

Requirement: The project applicant shall comply with the requirements of the City of Oakland Capital Improvements Fee Ordinance (chapter 15.74 of the Oakland Municipal Code).

When Required: Prior to issuance of building permit

Initial Approval: Bureau of Building

Monitoring/Inspection: N/A

36. Construction Activity in the Public Right-of-Way

a. ***Obstruction Permit Required***

Requirement: The project applicant shall obtain an obstruction permit from the City prior to placing any temporary construction-related obstruction in the public right-of-way, including City streets, sidewalks, bicycle facilities, and bus stops.

When Required: Prior to approval of construction-related permit

Initial Approval: Department of Transportation

Monitoring/Inspection: Department of Transportation

b. ***Traffic Control Plan Required***

Requirement: In the event of obstructions to vehicle or bicycle travel lanes, bus stops, or sidewalks, the project applicant shall submit a Traffic Control Plan to the City for review and approval prior to obtaining an obstruction permit. The project applicant shall submit evidence of City approval of the Traffic Control Plan with the application for an obstruction permit. The Traffic Control Plan shall contain a set of comprehensive traffic control measures for auto, transit, bicycle, and pedestrian accommodations (or detours, if accommodations are not feasible), including detour signs if required, lane closure procedures, signs, cones for drivers, and designated construction access routes. The Traffic Control Plan shall be in conformance with the City's Supplemental Design Guidance for Accommodating Pedestrians, Bicyclists, and Bus Facilities in Construction Zones. The project applicant shall implement the approved Plan during construction.

Initial Approval: Department of Transportation

Monitoring/Inspection: Department of Transportation

c. ***Repair of City Streets***

Requirement: The project applicant shall repair any damage to the public right-of way, including streets and sidewalks, caused by project construction at his/her expense within one week of the occurrence of the damage (or excessive wear), unless further damage/excessive wear may continue; in such case, repair shall occur prior to approval of the final inspection of the construction-related permit. All damage that is a threat to public health or safety shall be repaired immediately.

When Required: Prior to building permit final

Initial Approval: N/A

Monitoring/Inspection: Department of Transportation

37. Bicycle Parking

Requirement: The project applicant shall comply with the City of Oakland Bicycle Parking Requirements (chapter 17.118 of the Oakland Planning Code). The project drawings submitted for construction-related permits shall demonstrate compliance with the requirements.

When Required: Prior to approval of construction-related permit

Initial Approval: Bureau of Planning

Monitoring/Inspection: Bureau of Building

38. Transportation Impact Fee

Requirement: The project applicant shall comply with the requirements of the City of Oakland Transportation Impact Fee Ordinance (chapter 15.74 of the Oakland Municipal Code).

When Required: Prior to issuance of building permit

Initial Approval: Bureau of Building

Monitoring/Inspection: N/A

39. Plug-In Electric Vehicle (PEV) Charging Infrastructure

a. ***PEV-Capable Parking Spaces***
Requirement: The applicant shall submit, for review and approval of the Building Official, plans that show the location of inaccessible conduit to supply PEV-capable parking spaces per the requirements of Chapter 15.04 of the Oakland Municipal Code. Building electrical plans shall indicate sufficient electrical capacity to supply the required PEV-capable parking spaces.

When Required: Prior to Issuance of Building Permit

Initial Approval: Bureau of Building

Monitoring/Inspection: Bureau of Building

b. ***ADA-Accessible Spaces***
Requirement: The applicant shall submit, for review and approval of the Building Official, plans that show the location of future accessible EV parking spaces as required under Title 24 Chapter 11B Table 11B-228.3.2.1, and specify plans to construct all future accessible EV parking spaces with appropriate grade, vertical clearance, and accessible path of travel to allow installation of accessible EV charging station(s).

When Required: Prior to Issuance of Building Permit

Initial Approval: Bureau of Building

Monitoring/Inspection: Bureau of Building

40. Construction and Demolition Waste Reduction and Recycling

Requirement: The project applicant shall comply with the City of Oakland Construction and Demolition Waste Reduction and Recycling Ordinance (chapter 15.34 of the Oakland Municipal Code) by submitting a Construction and Demolition Waste Reduction and Recycling Plan (WRRP) for City review and approval, and shall implement the approved WRRP. Projects subject to these requirements include all new construction, renovations/alterations/modifications with construction values of $50,000 or more (except R-3 type construction), and all demolition (including soft demolition) except demolition of type R-3 construction. The WRRP must specify the methods by which the project will divert construction and demolition debris waste from landfill disposal in accordance with current City requirements. The WRRP may be submitted electronically at www.greenhalosystems.com or manually at the City's Green Building Resource Center. Current standards, FAQs, and forms are available on the City's website and in the Green Building Resource Center.

When Required: Prior to approval of construction-related permit

Initial Approval: Public Works Department, Environmental Services Division

Monitoring/Inspection: Public Works Department, Environmental Services Division

41. Underground Utilities

Requirement: The project applicant shall place underground all new utilities serving the project and under the control of the project applicant and the City, including all new gas, electric, cable, and telephone facilities, fire alarm conduits, street light wiring, and other wiring, conduits, and similar

facilities. The new facilities shall be placed underground along the project's street frontage and from the project structures to the point of service. Utilities under the control of other agencies, such as PG&E, shall be placed underground if feasible. All utilities shall be installed in accordance with standard specifications of the serving utilities.

When Required: During construction

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

42. Recycling Collection and Storage Space

Requirement: The project applicant shall comply with the City of Oakland Recycling Space Allocation Ordinance (chapter 17.118 of the Oakland Planning Code). The project drawings submitted for construction-related permits shall contain recycling collection and storage areas in compliance with the Ordinance. For residential projects, at least two (2) cubic feet of storage and collection space per residential unit is required, with a minimum of ten (10) cubic feet. For nonresidential projects, at least two (2) cubic feet of storage and collection space per 1,000 square feet of building floor area is required, with a minimum of ten (10) cubic feet.

When Required: Prior to approval of construction-related permit

Initial Approval: Bureau of Planning

Monitoring/Inspection: Bureau of Building

43. Green Building Requirements

a. ***Compliance with Green Building Requirements During Plan-Check***
Requirement: The project applicant shall comply with the requirements of the California Green Building Standards (CALGreen) mandatory measures and the applicable requirements of the City of Oakland Green Building Ordinance (chapter 18.02 of the Oakland Municipal Code).

i. The following information shall be submitted to the City for review and approval with the application for a building permit:
- Documentation showing compliance with Title 24 of the current version of the California Building Energy Efficiency Standards.
- Completed copy of the final green building checklist approved during the review of the Planning and Zoning permit.
- Copy of the Unreasonable Hardship Exemption, if granted, during the review of the Planning and Zoning permit.
- Permit plans that show, in general notes, detailed design drawings, and specifications as necessary, compliance with the items listed in subsection (ii) below.
- Copy of the signed statement by the Green Building Certifier approved during the review of the Planning and Zoning permit that the project complied with the requirements of the Green Building Ordinance.
- Signed statement by the Green Building Certifier that the project still complies with the requirements of the Green Building Ordinance, unless an Unreasonable Hardship Exemption was granted during the review of the Planning and Zoning permit.
- Other documentation as deemed necessary by the City to demonstrate compliance with the Green Building Ordinance.

ii. The set of plans in subsection (i) shall demonstrate compliance with the following:
- CALGreen mandatory measures.
- The required point level per the appropriate checklist approved during the Planning entitlement process.

- All green building points identified on the checklist approved during review of the Planning and Zoning permit, unless a Request for Revision Plan-check application is submitted and approved by the Bureau of Planning that shows the previously approved points that will be eliminated or substituted.
- The required green building point minimums in the appropriate credit categories.

When Required: Prior to approval of construction-related permit

Initial Approval: Bureau of Building

Monitoring/Inspection: N/A

b. ***Compliance with Green Building Requirements During Construction***
Requirement: The project applicant shall comply with the applicable requirements of CALGreen and the Oakland Green Building Ordinance during construction of the project.

The following information shall be submitted to the City for review and approval:

i. Completed copies of the green building checklists approved during the review of the Planning and Zoning permit and during the review of the building permit.
ii. Signed statement(s) by the Green Building Certifier during all relevant phases of construction that the project complies with the requirements of the Green Building Ordinance.
iii. Other documentation as deemed necessary by the City to demonstrate compliance with the Green Building Ordinance.

When Required: During construction

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

c. ***Compliance with Green Building Requirements After Construction***
Requirement: Prior to the finaling the Building Permit, the Green Building Certifier shall submit the appropriate documentation to City staff and attain the minimum required point level.

When Required: Prior to Final Approval

Initial Approval: Bureau of Planning

Monitoring/Inspection: Bureau of Building

44. Water Efficient Landscape Ordinance (WELO)

Requirement: The project applicant shall comply with California's Water Efficient Landscape Ordinance (WELO) in order to reduce landscape water usage. For the specific ordinance requirements, see the link below:

http://www.water.ca.gov/wateruseefficiency/landscapeordinance/docs/Title%2023%20extract%20-%20Official%20CCR%20pages.pdf

For any landscape project with an aggregate (total noncontiguous) landscape area equal to 2,500 sq. ft. or less, the project applicant may implement either the Prescriptive Measures or the Performance Measures, of, and in accordance with the California's Model Water Efficient Landscape Ordinance. For any landscape project with an aggregate (total noncontiguous) landscape area over 2,500 sq. ft., the project applicant shall implement the Performance Measures in accordance with the WELO.

Prescriptive Measures: Prior to construction, the project applicant shall submit the Project Information (detailed below) and documentation showing compliance with Appendix D of California's Model Water Efficient Landscape Ordinance (see page 38.14(g) in the link above).

Performance Measures: Prior to construction, the project applicant shall prepare and submit a Landscape Documentation Package for review and approval, which includes the following.

a. Project Information:
   i. Date,
   ii. Applicant and property owner name,
   iii. Project address,
   iv. Total landscape area,
   v. Project type (new, rehabilitated, cemetery, or home owner installed),
   vi. Water supply type and water purveyor,
   vii. Checklist of documents in the package, and
   viii. Project contacts
   ix. Applicant signature and date with the statement: "I agree to comply with the requirements of the water efficient landscape ordinance and submit a complete Landscape Documentation Package."

b. Water Efficient Landscape Worksheet
   i. Hydrozone Information Table
   ii. Water Budget Calculations with Maximum Applied Water Allowance (MAWA) and Estimated Total Water Use

c. Soil Management Report

d. Landscape Design Plan

e. Irrigation Design Plan, and

f. Grading Plan

Upon installation of the landscaping and irrigation systems, and prior to the final of a construction-related permit, the Project applicant shall submit a Certificate of Completion (see page 38.6 in the link above) and landscape and irrigation maintenance schedule for review and approval by the City. The Certificate of Completion shall also be submitted to the local water purveyor and property owner or his or her designee.

When Required: Prior to approval of construction-related permit

Initial Approval: Bureau of Planning

Monitoring/Inspection: Bureau of Building

45. Employee Rights

Requirement: The project applicant and business owners in the project shall comply with all state and federal laws regarding employees' right to organize and bargain collectively with employers and shall comply with the City of Oakland Minimum Wage Ordinance (chapter 5.92 of the Oakland Municipal Code).

When Required: Ongoing

Initial Approval: N/A

Monitoring/Inspection: N/A

PROJECT SPECIFIC CONDITIONS

46. Trucks

Requirement: The operator shall provide a map to all truck drivers indicating the routes trucks are required to follow. The maps shall only include routes authorized by the City and the routes shall

not include travelling though residential neighborhoods. Any increase in truck trips more than indicated in the project application (four truckloads per day or eight one-way truck trips per day) require a formal revision of the project.
When Required: Ongoing
Initial Approval: N/A
Monitoring/Inspection: N/A

47. Street Trees

Requirement: The applicant shall submit plans for review and approval of the Bureau of Planning that show a minimum of one 15-gallon tree be provided for every 20 feet of street frontage. The trees shall be the same as those in front of the facility across Willow Street at 1699 Grand Avenue.
When Required: Prior to issuance of Building Permit. Installation shall be completed prior to issuance of an occupancy permit.
Initial Approval: N/A
Monitoring/Inspection: N/A

Applicant Statement

I have read and accept responsibility for the Conditions of Approval. I agree to abide by and conform to the Conditions of Approval, as well as to all provisions of the Oakland Planning Code and Oakland Municipal Code pertaining to the project.

_____
Name of Project Applicant

_____
Signature of Project Applicant

_____
Date

SESPE CONSULTING, INC.
A Trinity Consultants Company
1901 Harrison Street, Suite 1590 • Oakland, CA 94612 • Office (510) 285-6351

PROJECT DESCRIPTION

Conditional Use Permit Application

August 18, 2021

Prepared for:

City of Oakland
Planning & Building Department
250 Frank H. Ogawa Plaza, Suite 2114
Oakland, CA 94612
(510) 238-3443

Prepared by:

SESPE Consulting, Inc.
A Trinity Consultants Company
1901 Harrison Street, Suite 1590
Oakland, CA 94612
(510) 285-6351

Project Description

1700 20th Street,
Oakland, CA 94607

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   - Figure 1 - Site Plan
   - Figure 2 – General Floor Plan
   - Figure 3 – Office Floor Plan
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3. Parcel Maps
4. Environmental Assessment Letter
5. Air Quality Impact Analysis
6. Fence Line Model Noise Report
7. Risk Management Plan

1.0 BACKGROUND INFORMATION

Request: Lilac Solutions, Inc. ("Lilac" or "Applicant") is requesting a new Conditional Use Permit (CUP) for the production of ceramic beads (for off-site lithium extraction), fabrication of lithium extraction units, and related distribution, research, and development. The ceramic beads manufactured at this facility will be delivered to lithium projects in the Southwestern United States and South America for use in lithium processing. The Applicant will establish an accessory research and development laboratory for test-work related to ceramic bead quality control and processing of lithium contained in saltwater solutions. A portion of the existing building will be used as a research and development (R&D) laboratory and serve as a general headquarters. Incidental warehousing, shipping/receiving, and administrative functions will be present in the building as accessory uses.

Applicant Information:
Lilac Solutions, Inc.
1700 20th Street,
Oakland, CA 94607

Consultant Contact:
Helen Eloyan
SESPE Consulting, Inc.
A Trinity Consultants Company
1901 Harrison Street, Suite 1590
Oakland, CA 94612
(805) 358-1938
heloyan@sespeconsulting.com

Project Site Location and Access: The site can be accessed via Willow Street and 20th Street. Please refer to Attachment 1 for the exact location of the Project.

Project Address:
1700 20th Street,
Oakland, CA 94607

Property Owners / Parcel Numbers: Please see below for the Tax Assessor's parcel numbers, associated acreages, and property owners for the parcels that constitute the Project.

Table 1-1 Project Assessor Parcels

Parcel Number	Acreage	Property Owner / Mailing Address
007 -0572-001-02	4.315	Terreno 20th Street LLC
007 -0572-002-05	0.289	Terreno 20th Street LLC
007 -0572-002-02	0.107	Terreno 20th Street LLC

Project Site Zoning Designations:
GENERAL PLAN – Business Mix
ZONING DESIGNATION – CIX-1C/S-19

Table 1-2 Adjacent Zoning and Land Use

Location in Relation to Project Site	Zoning	Land Uses
Project Area	CIX-1C/S-19	Previously warehousing, currently for R&D, future manufacturing
North	CIX-1C/S-19	Miscellaneous uses (trucking, warehousing, etc.)
East	CIX-1C/S-19 & CIX-1A/S-19	Light industrial & warehousing
South	OS (AF)	Open space, athletic fields
West	D-WS-8	Vacant land

CIX-1C - West Oakland Plan Area Commercial Industrial Mix - 1C Industrial Zone (High-Intensity Business)
S-19 - Health and Safety Protection Combining Zone
CIX-1A - CIX-1A West Oakland Plan Area Commercial Industrial Mix - 1A Industrial Zone (Business Enhancement)
OS (AF) - Open Space Zone (Athletic Field Park)
D-WS-8 - Wood Street Zoning District

The proposed project area falls within the S-19 Health and Safety Protection Overlay Zone which requires hazardous materials to be stored at a minimum of 300 ft from open space (such as the athletic fields located to the south of the project site). The Applicant plans to store the hazardous materials in a portion of the existing structure which is over 300 ft away from the closest open space area. Please also note that hazardous materials will not be stored outdoors.

1.1 Company Background

Lilac Solutions, Inc. is a mining technology company that is developing innovative technology to produce lithium (outside of the Bay Area) for electric vehicle batteries and to meet California's climate action goals. In February 2020, Lilac received $20 million in Series A funding from a number of clean-tech investors, including funds led by Bill Gates and the Massachusetts Institute of Technology (MIT).

The core of Lilac's technology is a unique ceramic bead. The proposed project would manufacture this specific type of ceramic bead for distribution to lithium projects in the Southwestern United States and internationally for use in lithium processing. Please see below **Figure 1** showing the difference between the traditional lithium extraction process and Lilac's new process.

Figure 1 Lithium Processing Comparative Figure

Lilac indicated that lithium demand is projected to quadruple over the next decade as electric vehicles gain market share, and Lilac's technology will allow this demand to be met in a sustainable and environmentally friendly manner.

2.0 PROJECT JUSTIFICATION

California is focused on reducing dependency on fossil fuels, including by increasing the availability and usage of electric-powered vehicles which require lithium-powered batteries. Lithium demand is projected to quadruple over the next decade, and lithium supply would need to grow by 30x in order to convert the entire global vehicle market to battery power. Other uses for lithium, including grid storage, aerial drones, and scooters, are also anticipated to grow.

Lilac proposes this project to make Oakland a focal point for advanced manufacturing and green jobs and a critical link in the electric vehicle battery supply chain. Lilac has developed a new ion exchange technology scale lithium supply for electric vehicles in a sustainable and environmentally friendly way. As referenced in the Environmental Assessment Letter (Attachment 4) and Fence Line Noise Report (Attachment 6), Lilac's proprietary process does not involve any explosive materials, will not result in excess odors or sound, and does not involve the production of batteries.

As previously discussed, the proposed project area also falls within the S-19 Health and Safety Protection Overlay Zone which requires hazardous materials must be stored at a minimum of 300 ft from open spaces (the southern athletic fields). The Applicant plans to store the hazardous materials in a portion of the existing structure which is over 300 feet away from the closest open space area. Please also note that hazardous materials will not be stored outdoors.

2.1 Community Outreach

The following is a summary of community outreach efforts Lilac has completed as of the date of this report. Lilac's community outreach effort first began in March 2020 with a meeting with the Oakland Office of Economic Development to initiate this project. In the following months, Lilac initiated discussions with the fire department and zoning departments, whereupon Lilac introduced the City of Oakland to their core mission and operational goals. In October of 2020, Lilac connected with the former Councilmember Lynette McElhaney's office. Councilmember McElhaney has partnered with Lilac to make a positive impact on the West Oakland community, through partnerships with local non-profits along with local scientific partnerships. Lilac then followed up with Councilmember McElhaney's office in November to further community outreach efforts. Although in-person outreach efforts were hindered by the COVID-19 pandemic, Lilac was able to connect with various individuals and businesses which have positively impacted the community.

In July of 2021, Lilac connected with Mr. Marcus Johnson and the Prescott Neighborhood Council (PNC) to provide more information on Lilac and the proposed operations to the local community. Lilac has requested to get onto the agenda for the upcoming PNC meeting in September and will distribute project information before the September meeting so that the larger community has a chance to learn more and provide comments.

Lilac reconnected with the Oakland Deputy Director of Economic Development to get advice on getting involved further with the community, and general advice about Lilac business growth in Oakland in July 2021. The Economic Development Department also introduced Lilac to Councilmember Carroll Fife's office in August 2021. Lilac plans to meet with Councilmember Fife's office upon the soonest availability.

Lilac has maintained ongoing communication with the Environmental Indicators Project to continue working together. In early August 2021, Lilac reached out to several Oakland Planning Commissioners to schedule an

introductory call about the Lilac business prior the September 15 Planning Commission hearing.

Lilac has indicated that they have a commitment to bring high-quality jobs to West Oakland and make a significant contribution to the revitalization of West Oakland. Lilac is also directly engaging with local stakeholders, from buying local coffee for daily use to using local contractors for projects as they arise. Lilac is also working to develop working relationships with local non-profits such as the Environmental Indicators Project, the Cypress Mandela Training Center, and the West Oakland Job Resource Center. This includes having made donations to both the Cypress Mandela Training Center and the West Oakland Job Resource Center. Lilac will continue to actively pursue partnerships with foundations and organizations that align with our core goals and principles.

3.0 PROJECT DESCRIPTION

The proposed project would include:

1. Production of ceramic beads (for off-site lithium processing);
2. Fabrication of lithium extraction units;
3. Distribution of ceramic beads and lithium extraction units; and,
4. Associated research and development.

The ceramic beads manufactured at this facility would be delivered to lithium projects in the Southwestern United States and internationally for use in lithium processing. The Applicant is requesting a new CUP to manufacture the ceramic beads and establish an accessory research and development laboratory for test-work related to the processing of lithium contained in saltwater solutions. A portion of the existing building will be dedicated to a research and development (R&D) laboratory and general headquarters. Incidental warehousing, shipping/receiving, and administrative functions will also be present in the building as accessory uses.

The Applicant also proposes the following physical changes to the existing building:

- Secondary Containment Berms/Double Walled Tanks
- Ventilated Furnace Room
- Ventilated Liquid Storage Room
- Deflagration prevention for Liquid Storage Room
- Laboratory Hood Ventilation System
- Rooftop Ventilation System for Process Exhaust
- Dust Control Room
- Electrical Distribution 480/240/120V

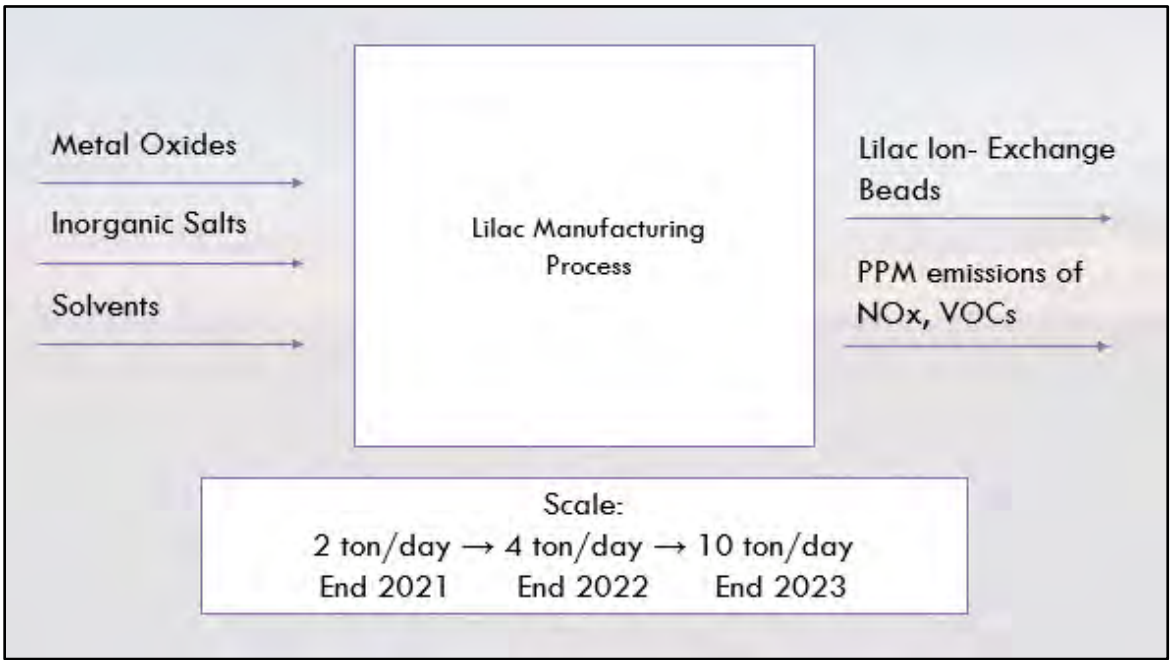
The building modifications are expected to be completed within six (6) months of obtaining the required use authorizations.

3.1 Ceramic Bead Manufacturing

The company will receive materials on-site and process these materials into ceramic beads. The proprietary manufacturing process for the ceramic beads consists of three main processing steps for furnace heating, chemical treatment involving a solvent, and bead formation.

Please refer to **Figure 2** below for a pictorial depiction of the general process for the manufacture of ceramic beads.

Figure 2 Manufacturing Process Overview



The following process description breaks down the technical aspects of this process in sequence, by zone.

Zone 1

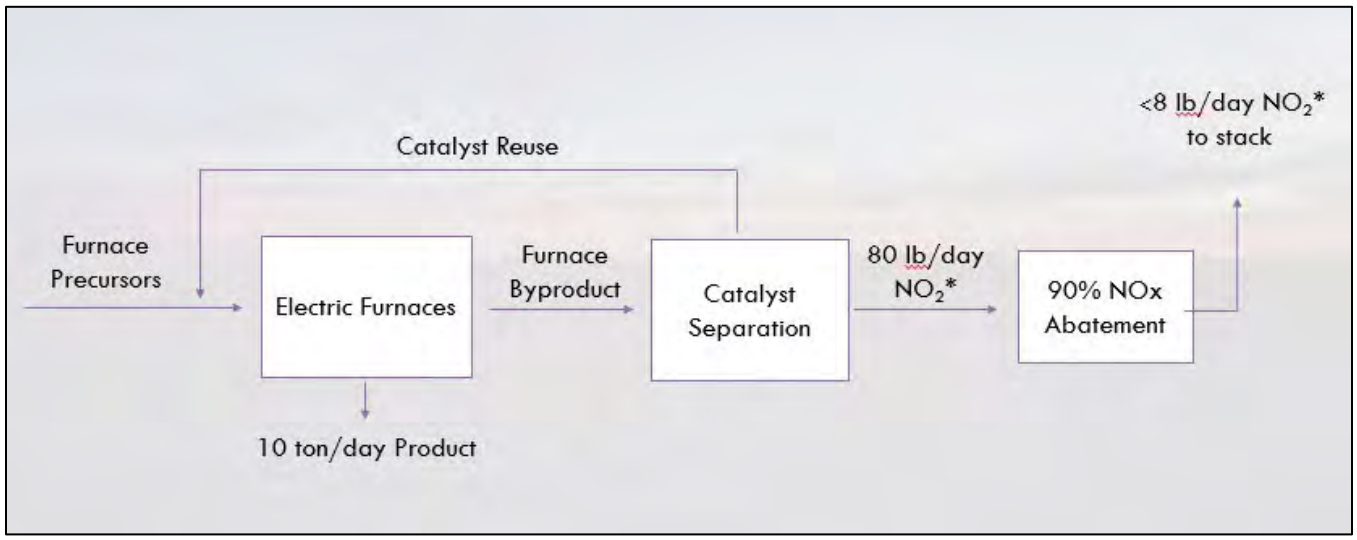
Chemical precursors are delivered by suppliers via bulk bags or other bulk delivery methods on a weekly basis. These chemical precursors are compounds that will participate in chemical reactions in Zone 1. Metal oxide precursors are forklifted into a first mixing vessel to form a dry mixed material, which is then transported to a hopper for combination with other materials. The resulting material is then transported to a final precursor mixing vessel.

Separately, salt materials that are delivered by suppliers are combined in a mixing vessel and then transferred to a hopper for further mixing. A conveyor then transfers the resulting material from the hopper to a final salt mixing vessel.

The two aforementioned mixtures are mixed in the Zone 1 final mixing vessel and subsequently conveyed to a loading hopper that feeds a kiln. The kiln heats the material to a temperature of 800 Celsius. The final Zone 1 material is then cooled in a cooling bin. Please note that the kiln also employs a gas stream which is recaptured in an absorption vessel in Zone 4 for reuse.

Dust ventilation hookups are affixed to certain of the equipment in Zone 1 as necessary. The dust, which is non-combustible and non-flammable, is discharged to the atmosphere after filtration.

Figure 3 Furnace Processing Flowchart

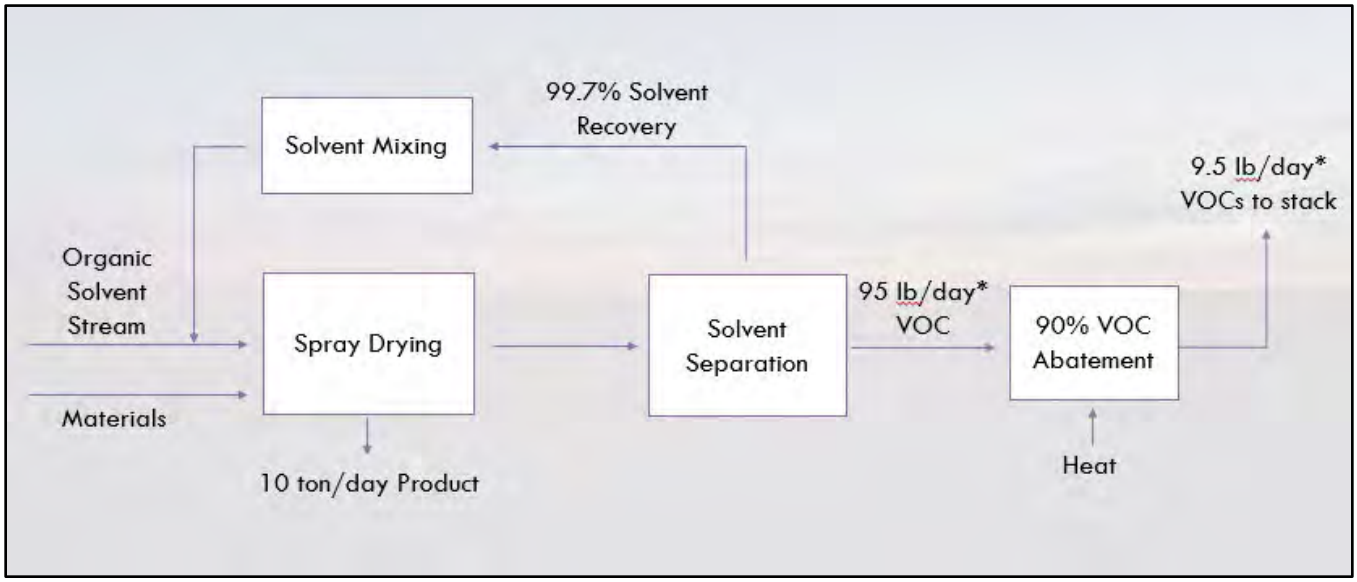


Zone 2

The final Zone 1 material is delivered by conveyor into a hopper for holding in Zone 2. This hopper has another conveyor that delivers the final Zone 1 material into a mixing vessel. This mixing vessel is filled with solvent, the final Zone 1 material, and certain other precursors. The materials are then mixed until forming a homogenous (consistent texture) mixture. A ventilation hookup is employed at this stage to deliver solvent vapors to a solvent recovery system.

The resulting mixture is then heated at 500 Celsius in an isolated chamber. The ventilation for the isolated chamber is sent to the solvent recovery system. The resulting heated material is then collected in large bins and transported to Zone 3 by conveyors. The entire Zone 2 system is an inert (non-reactive) atmosphere.

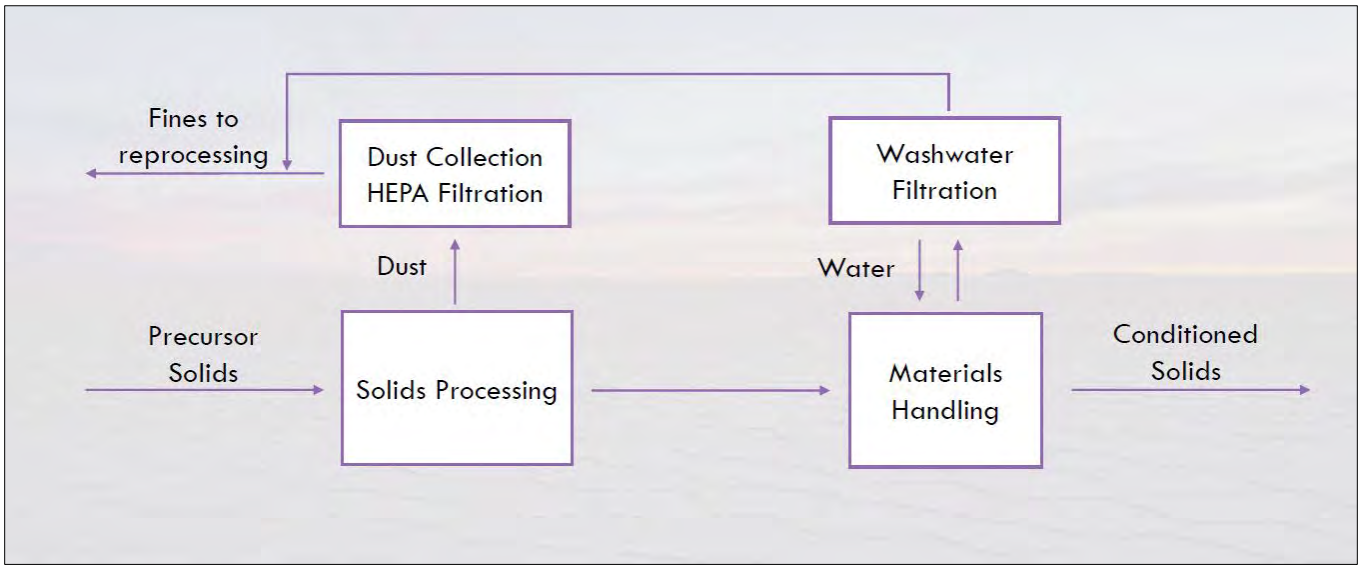
Figure 4 Solvent Processing Flowchart



Zone 3
The dried material from Zone 2 is conveyed into a hopper that holds the material for processing. Another conveyor is used to feed the material into a separate mixing chamber where additional precursors are added. A mechanical device then presses the mixture at 100C to form ceramic beads.

Dust collection will take place at the end of the conveyer via a ventilation hookup. Exhaust air and dust exiting the process will enter large cartridge filter houses with built-in pulse-jet pneumatic filter cleaning. Dust will be collected in barrels underneath the cartridge filter houses for disposal in accordance with local and state laws.

Figure 5 Solid Processing Flowchart



Recapture Processes:

Zone 4
The gas stream from the kiln described in Zone 1 is captured in an absorption vessel and any water vapor is removed using absorbent material. The gas stream is then returned to Zone 1 for reuse.

Zone 5
The solvent stream from Zone 2 is recaptured by condensing the vapors to a liquid state by utilizing instruments powered by an electrical chiller. The recaptured solvent is stored under an inert atmosphere and returned to Zone 2 for reuse. This process will recapture approximately 99.99% of the solvent.

Zone 6
Material from Zone 3 is moved through a washing process to remove debris which is captured in a filter and returned to Zone 3 for recycling.

The final product, the ceramic beads, is then conveyed for final packaging and shipping. Please refer to **Table 4-1** for a description of the chemicals utilized throughout the manufacturing process (Zones 1 through 6). Approximate locations for the solids processing, furnace, solvent, and chemical storage/receiving areas are provided in Attachment 1.

3.2 Accessory Uses

Research and development at the facility will be focused on improving the performance of the ceramic beads, testing different processing parameters for lithium extraction units (which units use the beads), and assessing ways to improve the ceramic bead manufacturing process. Please note that the research and development laboratory will use certain hazardous materials in small quantities not exceeding the Maximum Allowable Quantities (MAQ). Please refer to Attachment 1 for the proposed R&D layout and details.

A general office/headquarters space will be established for general work, routine administrative duties, and meetings. The office space will include restrooms, office facilities, meeting rooms, and other rooms. Please refer to Attachment 1 for details and the location of the proposed office space.

3.3 Project Phasing/Duration

The proposed project anticipates achieving a maximum production volume of 10 tons of ceramic beads per day by the end of 2023. A phased approach will be utilized to achieve the maximum production rate: initial production volume will be 2 tons per day by the end of 2021, increasing to 4 tons per day by the end of 2022, followed by the maximum/full-scale production of 10 tons per day in 2023.

Also, the Applicant proposes the following building modifications to ensure employee health and safety:

- Secondary Containment Berms / Double Walled Tanks
- Ventilated Furnace Room
- Ventilated Liquid Storage Room
- Deflagration prevention for Liquid Storage Room
- Laboratory Hood Ventilation System
- Rooftop Ventilation System for Process Exhaust
- Dust Control Room
- Electrical Distribution 480/240/120V

The building modifications are planned to be completed within six (6) months of obtaining the required use authorizations. Please refer to Attachment 1 for the project site plan.

3.4 Hours and Days of Operation and Employment

The facility will operate 24-hours a day, seven (7) days a week (Sunday to Saturday). For the initial phases of operation, the proposed project is anticipated to include the following hiring plan:

- By the end of 2021, Lilac will have thirty (30) employees
    - Six (6) executives,
    - Nineteen (19) engineers
    - Five (5) staff (technicians, administrators, custodians).
- By the end of 2022, Lilac will have fifty (60) employees:
    - Eight (8) executives
    - Thirty (30) engineers/scientists
    - Twenty-two (22) staff (technicians, administrators, custodians)
- 2023 full-scale operations will expand with a total of one hundred (113) employees.
    - Twelve (12) executives
    - Thirty-eight (38) engineers/scientists
    - Seventy-three (63) staff (technicians, administrators, custodians)

At full scale, employee shifts will be staggered as shown in the table below.

Table 3-1 Employee Shift Schedule

Shifts (Sunday – Saturday)	Employee trips (2-way)
6 am – 2 pm	40
2 pm – 10 pm	40
10 pm – 6 am	33

3.5 Site Security

The Applicant will maintain the existing approximately seven (7) foot fence with barbed wire and the site will be surveilled by an on-site security guard. The Applicant will continue to employ two (2) guards onsite.

4.0 PROJECT DESCRIPTION DETAILS/ ENVIRONMENTAL CONSIDERATIONS

4.1 Air Quality

An Air Quality Impact Assessment (AQIA) was prepared (please refer to Attachment 5) and found that the project would not result in impacts. The AQIA also finds that the proposed project implements design features result in air quality impacts below the Bay Area Air Quality Management District (BAAQMD) Thresholds of Significance. In addition, the proposed project will not produce any noticeable odors or negatively impact local air quality. Please refer to Attachment 5 for details regarding emissions and design features.

4.2 Biological Resources

The proposed project use will not impact biological resources. As previously mentioned, the existing project area has been developed and there are no areas of habitat on site. The Applicant does not propose any construction or development outside and will not impact the surrounding land uses and biological resources.

4.3 Cultural Resources

This project does not involve any exterior demolition, grading, or other excavation-type activity. Impacts on cultural resources will not occur as the project area has already been developed.

4.4 Floodplain Management

The project will not impact any floodplains and is located within a 0.2% Annual Chance Flood Hazard zone according to the FEMA National Flood Hazard map accessed in February 2021.

4.5 Geology, Site Grading, and Drainage

No earthwork or grading is proposed as part of this project.

4.6 Groundwater Resources

The proposed project will not impact groundwater resources and the Applicant will continue to utilize water from the existing utility provider.

4.7 Hazardous Materials/Waste and Fire Protection

A California Accidental Release Prevention (CalARP) Risk Management Plan (RMP) has been prepared and is included within Attachment 7. The Applicant will prepare other required studies (e.g., Hazardous Materials Business Plan, Process Hazard Analysis) before storage or use of chemicals in excess of reportable quantities on site. The reports will be coordinated with the applicable reviewing agency for approval and will implement any required best practice measures or other practices identified by the Oakland Fire Department, BAAQMD, Environmental Health, and any other applicable departments/agencies.

4.7.1 **Hazardous Materials:**

Any hazardous materials that are used in the manufacturing process will be stored in compliance with Oakland Fire Code and other applicable regulations. The Applicant will not manufacture or produce hazardous materials. Hazardous materials are used in the production of the ceramic bead, but the ceramic bead itself is not hazardous. The Applicant will prepare any required plans and obtain permits for the use and storage of hazardous materials. Please see below for a description of anticipated chemicals onsite and Attachment 1 for a site plan showing the location of the manufacturing areas.

Table 4-1 Onsite Hazardous Materials*

Name of Material	Physical State	DOT Hazard Class	Largest Container/ Tank	Secondary Containment
Hydrochloric acid (<15%)	Liquid	8 – Corrosive	< 7,500 gal	Berms, Double Walled Tanks
Nitric acid (<40%)	Liquid	5.1 – Oxidizing Substance 8 – Corrosive	< 4,000 gal	Berms, Double Walled Tanks
Nitric acid (70%)	Liquid	5.1 – Oxidizing Substance 8 – Corrosive	< 4,000 gal	Berms, Double Walled Tanks
Sulfuric acid (<30%)	Liquid	8 – Corrosive	< 15,000 gal	Berms, Double Walled Tanks
Hydrogen peroxide (<27%)	Liquid	5.1 – Oxidizing Substance	< 25,000 gal	Berms, Double Walled Tanks
Sodium hydroxide	Solid	8 – Corrosive	< 2 tons	-
Calcium hydroxide	Solid	8 – Corrosive	< 2 tons	-
Lithium Chloride	Solid, Aqueous**	Not Classified as Hazardous	< 125 tons	Berms
Lithium Carbonate	Solid, Aqueous**	Not Classified as Hazardous	< 125 tons	Berms
Lithium hydroxide	Solid, Aqueous**	8 – Corrosive	< 125 tons	Berms
Lithium nitrate	Solid, Aqueous**	5.1 – Oxidizing Substance	< 125 tons	Berms
Magnetite	Solid	Not Classified as Hazardous	< 75 tons	-
Manganese Dioxide	Solid	Not Classified as Hazardous	< 75 tons	-
Tin Oxide	Solid	Not Classified as Hazardous	< 75 tons	-

Name of Material	Physical State	DOT Hazard Class	Largest Container/ Tank	Secondary Containment
Titanium Oxide	Solid	Not Classified as Hazardous	< 75 tons	-
Nitrogen Dioxide	Gas	2.3 – Toxic Gas 5.1 – Oxidizing Substance 8 – Corrosive	200 lbs.	Furnace Room, Ventilation, Treatment System
Acetone	Liquid	3 – Flammable Liquid	< 1,000 gal	Berms, Ventilation, Deflagration Protection
Ethanol	Liquid	3 – Flammable Liquid	< 1,000 gal	Berms, Ventilation, Deflagration Protection
Tetrahydrofuran (stabilized)	Liquid	3 – Flammable Liquid	< 1,000 gal	Berms, Ventilation, Deflagration Protection
* The quantities of materials referenced in this report reflect the amounts necessary to support that 10 tons/day production level. Lilac plans to have the maximum amounts of materials on-site by the end of 2023. **Substance is a solid at room temperature, but it can be dissolved in a liquid to become an aqueous solution.				

The proposed project includes the use of hazardous materials for operations and maintenance of equipment at the processing facilities. According to the Applicant, three (3) principal hazards will be present on-site:

- Solid or liquid corrosive materials. Stored in double-walled tanks or bermed areas. These materials will not present an offsite hazard as the material is contained and would require direct contact to be hazardous. This group represents most of the hazardous materials at the project site.
- Solid Toxic Material. Stored in bermed areas. These materials will not present an offsite hazard as the material is contained and would require direct contact to be hazardous.
- Flammable solvents. Will be stored in double-walled UL-listed tanks. Situated and protected in accordance with Oakland Fire Code (OFC) and National Fire Protection Association (NFPA) standards. These materials will be located such that, in the event of a fire, the potential for exposure to persons and property beyond Lilac's parcel is minimized.

The emergency response and risk control described in the CalARP RMP and Emergency Response Plan will be a part of the Hazardous Materials Business Plan (HMBP). The HMBP will be prepared before bringing chemicals onsite. The Applicant does not propose to engage in hazardous waste operations or have any explosive material on site.

Please note that nitrogen dioxide is a byproduct of the production process and abated at the source. The Applicant does not propose to store nitrogen dioxide at the facility. The Applicant will store materials required to manufacture the ceramic beads inside of the building and will comply with any applicable local and state regulations. As previously discussed, there will be no storage of hazardous materials within 300 ft of the nearby open space/athletic park area. The proposed project area falls within the S-19 Health and Safety Protection Overlay Zone which requires hazardous materials must be stored at a minimum of 300 ft from open spaces (southern athletic fields). The Applicant plans to storage the hazardous materials in a portion of the existing structure which is over 300 ft away from the closest open space area.

The research and development laboratory will use certain hazardous materials, most in small quantities not exceeding the maximum allowable thresholds, and any applicable chemicals will be reported and included in the HMBP.

4.7.2 **Hazardous Waste:**

Any hazardous waste generated by this facility will be disposed of by a licensed hazardous waste disposal company in accordance with state and local laws.

4.7.3 **Fire Protection:**

The Applicant proposes to maintain and enhance the existing fire prevention systems within the existing building. Currently, the existing building meets the following specifications:

- Up-to-NFPA-code automatic sprinkler system
- Material-compatible fire protection systems
- Fire exit quantity and egress path compliance
- Up-to-code fire-rated separation between H occupancies and main occupancy
- <10% H occupancy floor space of unlimited area building
- H occupancy room placement on building exterior

In addition, the Applicant will prepare and submit an HMBP, CalARP RMP, and Process Hazard Analysis prior to storage of chemicals on site.

4.8 Lighting / Light Emanation

There will be no additional lighting proposed as part of this project.

4.9 Noise

A Fence Line Noise Model Report was prepared for this project and found that there will be no significant fence line impacts from the proposed project activities. As described in the report, the noise produced from the manufacturing use within the existing building will not be detectable above normal community levels. The report was prepared using conservative assumptions and will not be changed, even if sound levels from the manufacturing process are significantly higher than estimates used in the analysis. Due to this, proposed operations will not negatively impact community noise levels. Please refer to Attachment 6 for the Fence Line Noise Model Report.

4.10 Protected Trees

There are no existing protected trees within the proposed project area. Due to this, the Applicant does not anticipate any negative impacts to protected trees or other species.

4.11 Sewage Disposal

Three (3) restrooms are provided in the currently permitted area north of the proposed project area. No additional restrooms are proposed for the site.

4.12 Surface Water Quality

The proposed project will not negatively impact surface water quality as there are no increases/changes to impervious surfaces or new outdoor uses.

4.13 Trip Generation

The proposed project loading schedule, at full manufacturing scale, will accommodate four (4) truckloads per day or eight (8) one-way truck trips per day. Due to the low amount of proposed daily trips, the project will not impact local or regional traffic. The Applicant will also maintain the existing number of parking spaces; currently, there are twenty (20) large truck parking spaces (40' x 10') and eighty-three (83) standard parking spaces (18' x 9') of which six (6) are designated as American Disability Act accessible parking spaces. Please refer to Attachment 1 for the site plan showing the existing parking areas.

Employees and guests have the option to drive, walk, or ride a bike to and from the site daily. Lilac anticipates a minimum of fifty-eight (58) passenger vehicles round trips per day along with the alternative modes of transportation. Please refer to the below table with anticipated project traffic.

Table 4-2 Project Trips

Shifts (Sunday – Saturday)	Projected Deliveries & Shipping (round trips)	Employee & Guest Round Trips (round trips)
6 am – 2 pm	2	40
2 pm – 10 pm	2	40
10 pm – 6 am	2	33
Totals	6	113

The Applicant proposes to utilize three (3) shifts during the workdays (24-hour operation) and employees will arrive at the site at various times in accordance with the shift schedule above. Most employees will arrive at the site between 6:00 am- 9:00 am. The maximum amount of people on site at a given time is 30 employees.

4.14 Utilities

The proposed project will continue to utilize the existing utilities for water, trash, electricity, and sewage. This project proposes to utilize approximately 10,000 liters (2,641.7 gallons) of water per day for manufacturing operations. Water is provided via the city. The site is projected to produce approximately four (4) dumpsters (2-yard volume) per week of non-hazardous solid waste and recyclable materials. At full scale, the project could consume up to 4,000 amps at 480V (approximately 2,000 kW). The company is currently purchasing renewable electricity from PG&E through a 100% renewable plan.

4.15 Visual Resources and Landscaping

The Applicant does not plan to impact visual resources of the surrounding area and no signs are proposed as part of this project. As discussed, the Applicant does not propose any new structures as part of this project, therefore no new landscaping or beautification of the existing building is required. However, the exterior portions of the existing building are available for beautification by local artists if found to be required. The Applicant is also willing to plant trees within or around the project area to enhance the community characteristics.

ATTACHMENT 1
Site Plans

VICINITY MAP

N.T.S.

40 0 40 80
SCALE IN FEET

DATUM: HORZ= NAD83, CALIFORNIA ZONE 3, US FOOT
VERT=NAVD88

(E) = EXISTING
(N) = NEW

APPLICANT
LILAC SOLUTIONS, INC.
1700 20TH STREET,
OAKLAND, CA 94607

CONSULTANT CONTACT:
HELEN ELOYAN
SESPE CONSULTING, INC.
374 POLI STREET, STE. 200
VENTURA, CA 93001
(805) 275-1515
HELOYAN@SESPECONSULTING.COM

PROJECT ADDRESS & PARCELS:
1700 20TH STREET,
OAKLAND, CA 94607

PARCEL NUMBER	ACREAGE	PROPERTY OWNER / MAILING ADDRESS
007 -0572-001-02	4.315	TERRENO 20TH STREET LLC
007 -0572-002-05	0.289	TERRENO 20TH STREET LLC
007 -0572-002-02	0.107	TERRENO 20TH STREET LLC

PROJECT SITE ZONING DESIGNATIONS:
GENERAL PLAN - BUSINESS MIX
ZONING DESIGNATION - CIX-1C/S-19

SESPE CONSULTING, INC.
A Trinity Consultants Company.
374 Poli Street, Suite 200 • Ventura, CA 93001
(805) 275-1515 • www.sespeconsulting.com

LILAC SOLUTIONS, INC
SITE PLAN
1700 20TH STREET
OAKLAND, CA

SCALE: HORIZ. AS SHOWN
VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: HE
FIGURE NUMBER 1
DATE: FEBUARY 2021

20 0 20 40
SCALE IN FEET

NOTE:
THIS LAYOUT IS SUBJECT TO CHANGE BUT ANY MANUFACTURING LEVEL QUANTITIES OF CHEMICALS WILL BE AT MINIMUM 300' AWAY FROM THE NEARBY OPEN SPACE.

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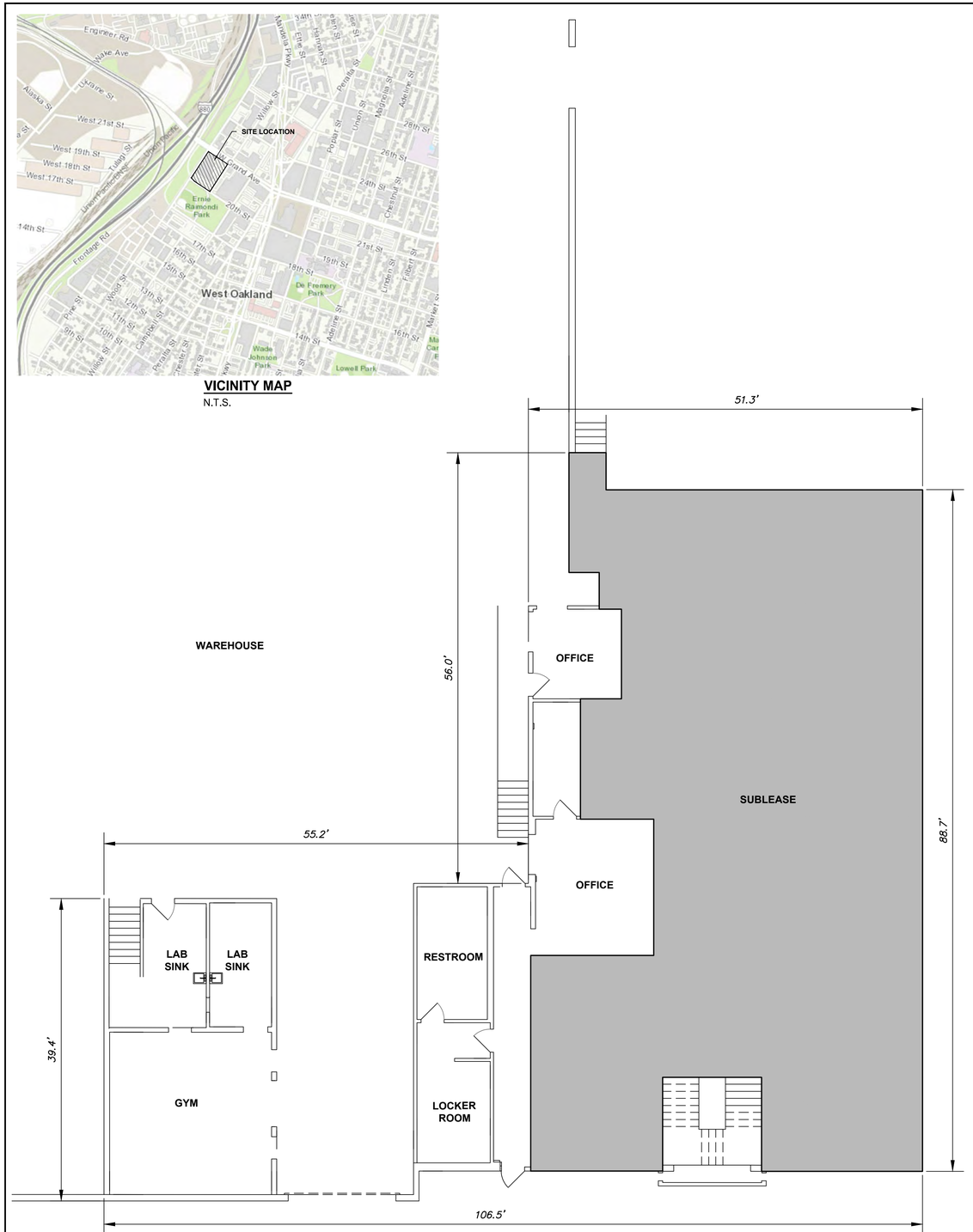
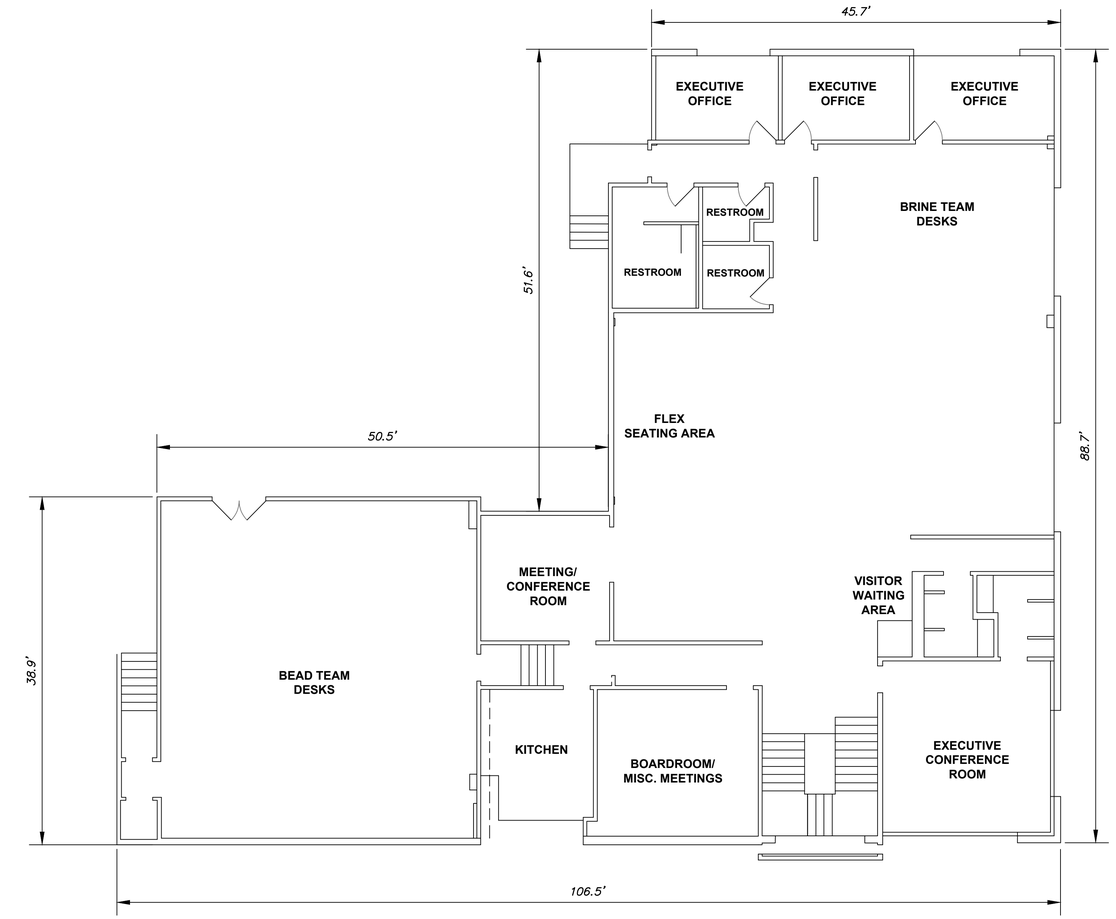
LILAC SOLUTIONS, INC
FLOOR PLAN
1700 20TH STREET
OAKLAND, CA

SCALE: HORIZ. AS SHOWN / VERT. AS SHOWN	FIGURE NUMBER 2
DRAWN BY: G.CAMUS	
CHECKED BY: HE	DATE: FEBUARY 2021

VICINITY MAP
N.T.S.



LILAC OFFICE SECOND FLOOR



LILAC OFFICE FIRST FLOOR

8 0 8 16
SCALE IN FEET

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LILAC SOLUTIONS, INC
FLOOR PLAN
1700 20TH STREET
OAKLAND, CA

SCALE: HORIZ. AS SHOWN
VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: HE.
FIGURE NUMBER 3
DATE: FEBUARY 2021

GAS STORAGE

MILL, LATHE & WELDING

MACHINE SHOP BENCHES

FUME HOOD

VENTILATION

PARTS STORAGE

BEAD LAB/PILOT

BRINE PILOT PROJECT FABRICATION, TESTING & STORAGE (60'X60')

BRINE STORAGE APPROX. 100 TOTES (60'X30')

BRINE DELIVERY/ UNLOADING (60'X20')

BRINE WORK BENCHES/FLEX

BEADS STORAGE SHELVES

BEAD FABRICATION, TESTING & STORAGE (60'X60')

BEADS WORK BENCHES

BRINE TEST BENCHES

BRINE EXPANSION (60'X30')

BRINE STORAGE SHELVES

SAFETY STORAGE

DEMOS, SHIPPING CONTAINER STORAGE, FLEX SPACE

SHIPPING/RECEIVING

WAREHOUSE SINK

BEAD EXPANSION (60'X40')

EQUIPMENT & LARGE DELIVERY RECEIVING AREA (40'X20')

BEAD LAB BENCHES

SNORKEL AREA

VENTILATION

BRINE LAB BENCHES

COMPRESSOR

VENTILATION

ICP

A 300

CHEMICAL CABINETS

FUME HOODS

GAS STORAGE

LARGE SHELVES

HIGH DOCK FOR FREIGHT, GAS, CONTAINERS

10 0 10 20

SCALE IN FEET

LILAC WAREHOUSE

VICINITY MAP

N.T.S.

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(805) 275-1515 • www.sespeconsulting.com

LILAC SOLUTIONS, INC

FLOOR PLAN

1700 20TH STREET

OAKLAND, CA

SCALE: HORIZ. AS SHOWN VERT. AS SHOWN

DRAWN BY: G.CAMUS

CHECKED BY: HE

FIGURE NUMBER 4

DATE: FEBUARY 2021

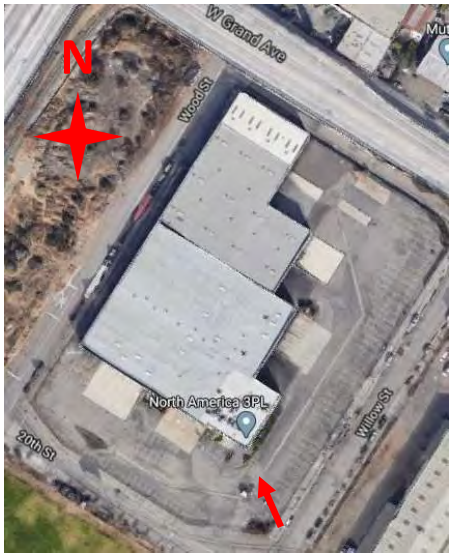
ATTACHMENT 2
Exterior Photos

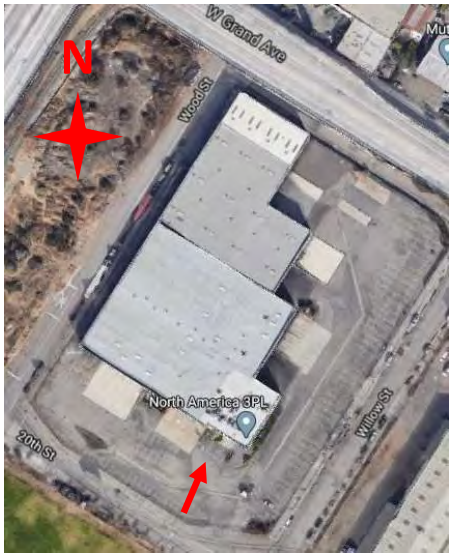
1700 20th St Exterior Photos

Photos taken on May 11, 2020

Satellite View

Note that red arrows on satellite photos designate where the photo was taken (base of the arrow) and in which direction the photo is facing.




N
W Grand Ave
Wood St
North America 3PL
Willow St
20th St


7
1700 20th Street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Wood St
Willow St
North America 3PL
20th St


N
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Wood St
North America 3PL
Willow St
20th St


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AVAILABLE
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JLL
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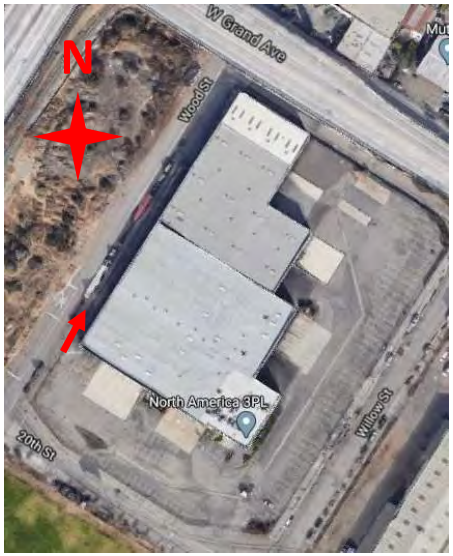
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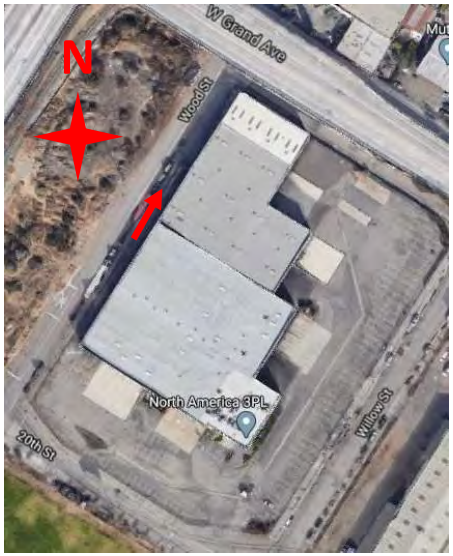
Wood St
North America 3PL
Willow St
20th St


N
W Grand Ave
Wood St
North America 3PL
20th St
Willow St

ATTACHMENT 3
Accessor Parcel Map

Code Area No. 17-046

7

ASSESSOR'S MAP 7

575

572
752

Map of the Hougham Tract (Bk. 4 Pg. 8)

Scale: 1" = 40'

West Grand (22ND ST) Ave

Rev. 10-6-80 AM
10-13-81 DD
6-26-89 PB
4-28-04 ES
11-9-10 MM

2180 TO 2150

2181 TO 2101

2130 TO 2100

2049 TO 2001

J&B

Wood Street

Willow Street

Twentieth Street

571

568

752

804-1-8P-19

804-1-8P-21

A.T.&S.F.R.R.

804-1-8M-15

804-1-8T

1733

1700

1-1 1-2 2-1 2-2 2-4 2-5

CITY

ATTACHMENT 4
Environmental Assessment Letter

To Whom It May Concern,

As discussed with the city, Lilac Solutions intends to establish a manufacturing facility for ceramic materials at 1700 20th Street, Oakland, CA 94607. I write to you on behalf of ACTenviro, which has been engaged by Lilac Solutions as a consultant on environmental, health and safety matters for this project. This letter is intended to address potential environmental issues associated with Lilac's planned manufacturing operations. In sum, Lilac's manufacturing operations will not have an adverse environmental impact, including with respect to air quality, noise, odors or vibrations.

Small-Scale Emissions

Lilac's manufacturing process has the potential to emit low levels of airborne contaminants, including nitrogen oxides (NOx) and VOCs. In order to ensure that this does not occur, effective industry-standard process design features will be used:

- Dust emissions associated with solids processing will be controlled through HEPA-filter systems;
- NOx emissions will be controlled through a NOx control system;
- VOC emissions will be controlled through a thermal system; and

Lilac will work with the Bay Area Air Quality Management District to acquire and maintain any applicable air permits for planned operations. However, overall emissions of NOx, VOC, and dust (after processing through applicable systems) are calculated at less than 10 pounds per day (per contaminant) even at maximum production levels.

Flammable liquids and other hazardous materials will be used and stored on site. These liquids will be stored and handled in dedicated "high-hazard" spaces, in compliance with applicable provisions of California fire code, including secondary containment to reduce the potential for off-site releases. Lilac will develop applicable procedures for workers to perform manufacturing activities safely and in compliance with applicable Cal/OSHA worker safety requirements as well as industry best practices. In addition to protecting workers, this will also further minimize the likelihood of any off-site release that would impact neighboring properties.

Odors

After processing through industry-standard processes, Lilac emissions will not create noticeable odors or negatively affect local air quality:

- There will not be a visible dust plume;
- There is will not be detectable levels of NOx or VOCs over local background; and
- Planned operations will not create nuisance odors.

Noise

Industrial machinery will be used in the manufacturing process, including for solids processing, filtration, and materials handling. In addition, a furnace and a solvent curing system, including compressors, fans, hydraulic equipment and similar, will be used. Noise levels inside the facility near this machinery and equipment may be elevated. If noise exposure to employees exceeds the Cal/OSHA noise "Action Level"

of 85-dBA (using an 8-hr time-weighted average), Lilac will implement a Hearing Conservation Program (HCP), as required by 8 CCR 5097, to ensure safety of Lilac employees in the facility.

- While noise levels may be elevated in production areas within the facility, there will no significant process noise outside the facility; and
- Fence-line noise levels from Lilac's manufacturing process will not lead to a noticeable increase in typical neighborhood background noise levels.

Vibrations

The machinery and equipment used by Lilac may create localized vibrations within the Lilac facility but will not create noticeable vibration outside of the Lilac facility and will not create noticeable vibration for neighboring properties.

Key Conclusions

Lilac is committed to building and operating its facility safely and in compliance with provisions of Oakland Municipal code, including (but not limited to) 17.120.050 through 17.120.090.

- There will be no excessive, annoying, or persistent noise from Lilac's manufacturing operations;
- Any airborne emissions will be in compliance with applicable BAAQMD standards and there will be no dense soot, smoke or particulate emissions;
- There will be no detectable vibrations associated with manufacturing activities at the fence line; and
- Manufacturing activities will not result in unpleasant odors at the fence line.

We are happy to provide any additional information and address any questions

Sincerely

Marissa Lopez

Marissa Lopez, CSP, DUSTO
EHS Program Manager
ACTenviro.

T 408.548.5050
F 408.548.5052
967 Mabury Road, San Jose, CA 95133
www.ACTenviro.com

ATTACHMENT 5
Air Quality Impact Analysis

CITY OF OAKLAND
AIR QUALITY IMPACT ASSESSMENT
Lilac Solutions, Inc. / Oakland, CA

Prepared By:

TRINITY CONSULTANTS
1939 Harrison Street, Suite 618
Oakland, CA 94612
(510) 285-6351

August 2021

Trinity Consultants

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

Trinity Consultants, Inc. (Trinity) has prepared an Air Quality Impact Assessment (herein referred to as the AQIA), to evaluate potential impacts associated with the proposed operation of the ceramic bead manufacturing facility (the Facility) proposed by Lilac Solutions, Inc. (Lilac). The Facility is located within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD), as such, this AQIA was prepared in accordance with the standards, procedures, and methodologies established in the BAAQMD California Environmental Quality Act (CEQA) Air Quality Guidelines, dated May 2017, and the 2021 CEQA Guidelines.[1] The AQIA covers air quality impacts associated with the production of ceramic beads, fabrication of lithium extraction units, and related distribution, research, and development (the Project).

Lilac proposes to dedicate its existing building for the production of ceramic beads and establish an accessory research and development (R&D) laboratory for test work related to the processing of lithium contained in saltwater solutions. The manufacturing process of the ceramic beads will consist of three processing steps: (1) furnace heating, (2) chemical treatment, and (3) bead formation. Hazardous materials will be stored at the Facility inside and outside of the existing structure. The Facility is proposing to reach full production capacity (10 tons of ceramics beads per day) by the end of 2023.

CEQA requires that a lead agency evaluate the potential air pollutant and greenhouse gas (GHG) emissions of a project and determine whether the emissions would result in a significant impact on the environment. This AQIA evaluates the potential emissions related to the proposed Project through individual calculations of air emissions for the proposed Project. Emissions from Lilac's ceramic bead manufacturing process are evaluated consistent with the BAAQMD CEQA Air Quality Guidelines. The AQIA provides substantial evidence that emissions resulting from the Project are below the BAAQMD's Thresholds of Significance and would result in less than significant impact associated with air quality and greenhouse gas emissions. [2]

[1] 2017 BAAQMD CEQA guidelines and 2021 CEQA statute and guidelines are available at the following links:
https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en
https://www.califaep.org/docs/CEQA_Handbook_2021.pdf

[2] Should Lilac proceed with the installation of a planned emergency generator, Lilac will ensure the calculated Project emissions summed with the emergency generator's emissions will remain below the CEQA Thresholds of Significance and will be further evaluated under the BAAQMD ATC permitting process.

2. PROJECT DESCRIPTION

Facility Description

This AQIA was prepared to evaluate potential air quality impacts associated with the proposed operation of the Facility located at 1700 20th Street, Oakland, CA 94607. The Facility operations will serve as R&D and manufacturing for ion exchange beads that allow for direct extraction of lithium. The end product will be distributed to other lithium extraction companies both locally and internationally. The lithium produced will be used for electric vehicle batteries which will result in the reduction of global GHG emissions. The Facility has one existing building, and Lilac is proposing to modify the existing building for ceramic bead manufacturing. A portion of the building will be dedicated to R&D activities and the other portion of the building will house the ceramic manufacturing operations. In addition, the Facility is proposing to store various hazardous chemicals inside and outside of the modified existing structure to be used by the R&D. The Facility is proposing to reach a full production capacity of 10 tons of ceramics per day by the end of 2023. The Project is further discussed in Section 2.2.

Project Description

The Project involves the production of ceramic beads (for off-site lithium processing), fabrication of lithium extraction units, distribution of ceramic beads and lithium extraction units, and associated R&D. Lilac will establish an accessory R&D laboratory for test work related to ceramic bead quality control and processing of lithium contained in saltwater containers. The Facility will receive materials on-site and process these materials into ceramic beads. The proprietary manufacturing process for the ceramic beads consists of the following processing steps:

- Furnace heating
- Chemical Treatment
- Bead Formation

Firstly, metal oxides and salt materials separately go through a mixing process where they are combined with other materials. The metal oxides and salt materials are combined in a mixing vessel, conveyed, and loaded onto a hopper that feeds into a furnace that heats the combined material. The heated material is then cooled in a cooling bin. The gas stream from the furnace is exhausted to a catalyst and then sent to a scrubber for abatement. Dust ventilations are affixed to some of the equipment as necessary.

The cooled material is conveyed and further mixed with a solvent and other chemical precursors. The solvent vapors are sent to a solvent recovery system. The resulting mixture is heated in an isolated chamber and the volatile organic carbon (VOCs) emitted are sent to a solvent recovery system. The heated material is collected in large bins and conveyed into a hopper that holds the material for processing. Another conveyor is used to feed the material into a separate mixing chamber where additional precursors are added. A mechanical device then presses the mixture to form ceramic beads. Dust is routed through particulate matter abatement devices, which may include large cartridge filter houses, built-in pulse jet pneumatic filter cleaning, and a cyclone filter. At this stage, the material is moved through a washing process to remove debris which is captured in a filter and returned for recycling.

The solvent stream is recaptured by condensing the vapors to a liquid state. The final product, the ceramic beads, are conveyed for final packaging and shipping. Furthermore, the Facility will store the following hazardous materials:[3]

- (2) 7,500-gallon Hydrochloric Acid
- (2) 4,000-gallon <40% Nitric Acid
- (1) 4,000-gallon 70% Nitric Acid
- (1) 15,000-gallon Sulfuric Acid
- (1) 4,000 lb Sodium Hydroxide

[3] Note the following list only includes tanks that contain TACs per BAAQMD Rule 2-5, Table 2-5-1. Please refer to the original application for a comprehensive list of hazardous materials stored at the Facility. In addition, the capacity and number of nitric acid tanks have been revised.

3. EMISSION CALCULATIONS

Potential emissions associated with the proposed Project are calculated using the methodologies described in the following sections. Detailed emission calculations are presented in Appendix A of this application. For the purpose of comparison to the BAAQMD CEQA Thresholds of Significance, the maximum daily emissions and maximum annual emissions are calculated.

Emission Calculation Methodology

The Project will be a source of particulate matter with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$), nitrogen oxides (NO_x), VOCs, TACs, and GHGs.

3.1.1 $PM_{2.5}$ Emissions

The $PM_{2.5}$ emissions will be from the material handling of the solids received and processed. The material handling will occur within the facility and will be abated by MERV 15 control technology.[4] The $PM_{2.5}$ emissions are a product of a proposed maximum cumulative control technology flow rate and a proposed maximum outlet concentration. The proposed maximum cumulative flow rate and outlet concentration are limited such that $PM_{2.5}$ emissions will not exceed 10 pounds per day. As such, calculations reflect the maximum potential emissions, and the Facility may choose to install control technology that may achieve a lower flow rate outlet concentration.

3.1.2 NO_x Emissions

The NO_x emissions will be from the furnace processing in which NO and NO_2 are produced. The furnace itself will be electrically powered and thus does not cause combustion-related emissions. The NO and NO_2 will be processed through catalyst separation and the remaining gases are fugitive and will be sent for further treatment through a NO_x scrubber system. The amount of NO/NO_2 gases exhausted is determined from the Facility's proprietary NO_x chemistry. The fugitive emissions will be abated by a scrubber with a worst-case 98% control efficiency per proposed manufacturer specification. The calculated maximum potential to emit (PTE) is the product of the maximum potential fugitive NO_x emissions with the worst-case scrubber control efficiency applied.

3.1.3 VOC Emissions

The VOC emissions will be emitted during the mixing process of the solvents. The VOC vapors will be recycled in a solvent recovery system which is conservatively assumed as 99% separation efficiency. The remaining VOC will be further abated by an activated carbon adsorption bed. The VOC emissions are calculated as the product of the maximum fugitive VOC emissions lost from the recycle stream with the worst-case activated carbon adsorption bed control efficiency of 98.1% applied.

In addition, the Facility will store acetone, ethanol, and tetrahydrofuran in tanks which emit VOCs when the tank headspace is displaced during loading. The VOC emissions from the process tanks are calculated based on the vapor pressure, molecular weight, and volume of headspace displaced. Antoine's equation and Grain's method from Estimation Programs Interface (EPI) Suite were used to determine the vapor pressure of the

[4] Because the control technology will be MERV 15-rated, the PM_{10} emissions are the same as $PM_{2.5}$ emissions and thus significantly below the CEQA Thresholds of Significance.

chemicals and the calculations assume ideal gas law.[5] The tank vents will be abated by another activated carbon adsorption abatement device, and as such, a 98.1% control efficiency is applied.

3.1.4 Emissions From Miscellaneous Sources

The Facility will store hazardous chemicals on-site in storage tanks which will be sources of TACs. Lilac will ensure emissions from these storage tanks will remain below the TAC thresholds listed in BAAQMD Rule 2-5, Table 2-5-1. In addition, Lilac plans to install an emergency generator to provide power for emergency purposes. All engine details (i.e., model, make, engine rating, and fuel type) are to be determined, and as such, emissions from the emergency generator were not quantified. However, Lilac will ensure the proposed emergency generator's daily and annual emissions will not cause an exceedance of the Thresholds of Significance in addition to Project emissions quantified in Table 3-1. Furthermore, Lilac will obtain an authority to construct/permit to operate from BAAQMD for the emergency generator prior to installation and operation.

Summary of Emissions

A summary of the potential criteria pollutant emissions is provided in Table 3-1 below.

Table 3-1: Summary of Criteria Pollutant Emissions [6]

Pollutant	Average Daily Emissions (lb/day)	Maximum Annual Emissions (tpy)
$PM_{2.5}$	9.94	1.81
NO_x	4.00	0.73
VOC	10.74	1.96

[5] Vapor pressure retrieved from EPI Suite – Estimation Programs Interface version 4.11

[6] Table 3-1 omits emissions from the planned emergency generator. The Project emissions with the planned emergency generator will remain below the CEQA Thresholds of Significance and will be further evaluated under the BAAQMD ATC permitting process.

Comparison to Thresholds of Significance

The emission calculation results were compared to the BAAQMD CEQA Threshold of Significance as shown in Table 4-1. Note that the Project would be constructed on the same building footprint and foundation as the existing building, and therefore will not require any substantial grading or site preparation. Therefore, construction-period emissions will not exceed daily or annual thresholds and are not further described in this AQIA.

Table 4-1. BAAQMD Air Quality CEQA Thresholds of Significance [7]

Pollutant/ Criteria	Operational-Related Threshold	Project Result [8]	Above Significant Threshold?
ROG	Average Daily (lb/day): 54 Maximum Annual (tpy): 10	Maximum Daily (lb/day): 10.74 Maximum Annual (tpy): 1.96	No
NO_X	Average Daily(lb/day): 54 Maximum Annual (tpy): 10	Maximum Daily (lb/day): 4.00 Maximum Annual (tpy): 0.73	No
$PM_{2.5}$	Average Daily (lb/day): 54 Maximum Annual (tpy): 10	Maximum Daily (lb/day): 9.94 Maximum Annual (tpy): 1.81	No
PM_{10} /$PM_{2.5}$ (Fugitive Dust)	None	N/A - fugitive dust not applicable to the Project	No
GHGs – Stationary Sources	10,000 MT CO_2e/yr	Emergency engine will emit <10,000 MT CO_2e/yr	No
Accidental Release of Acutely Hazardous Air Pollutants	Storage or use of acutely hazardous materials locating near receptors or new receptors locating near stored or used acutely hazardous materials considered significant	Hazardous materials that are used in the manufacturing process will be stored in compliance with Oakland Fire Code and other applicable regulations.	No
Odors	5 confirmed complaints per year averaged over 3 years	Lilac will ensure the Project will not produce any noticeable odors. As such, odor complaints are assumed to be minimal.	No

4.1.1 Criteria Pollutants

The maximum daily emissions are conservatively compared to the BAAQMD CEQA threshold of average daily emissions. Both the Project's maximum daily and annual emissions of criteria pollutants are below the Thresholds of Significance as shown in Table 4-1 above.

[7] Per Table 2-1 from the BAAQMD CEQA Guidelines available here: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

[8] Project Result for Criteria Pollutants omits emissions from the emergency generator. The Project emissions with the emergency generator will remain below the CEQA Thresholds of Significance and will be further evaluated under the BAAQMD ATC permitting process.

4.1.2 Hazardous Air Pollutants

Hazardous materials that are used in the manufacturing process will be stored in compliance with Oakland Fire Code and other applicable regulations. Lilac will not manufacture nor produce hazardous materials. Please see the risk management plan (RMP) for additional information. The Project's TAC emissions are below BAAQMD Rule 2-5, Table 2-5-1 thresholds, and as such, an HRA was not conducted.

4.1.3 Odor

Lilac is not considered a typical odor-producing source such as wastewater (sewage) treatment plant, landfill, composting facility, refinery, or chemical plant. As such, Lilac will ensure that the Project will not exceed the identified Threshold of Significance for odor.

Air Quality and GHG Checklist

Table 4-2 below summarizes the checklist questions from Appendix G of the California state CEQA Guidelines for air quality and greenhouse gas impacts and the impact results for the proposed Project.

Table 4-2. Environmental Impact Significance Determinations

Air Quality				
Would the project:	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less than Significant Impact**	**No Impact**
a. Conflict with or obstruct implementation of the applicable air quality plan?			**X**	
b. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard?			**X**	
c. Expose sensitive receptors to substantial pollutant concentrations?			**X**	
d. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?				**X**
Greenhouse Gas Emissions				
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			**X**	
b. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse			**X**	

Air Quality Criteria a: The Project will not conflict with any applicable plan or policy; therefore, the proposed Project emissions are considered to have less than significant impact associated with a potential conflict of applicable air quality plan and no mitigation is required.

Air Quality Criteria b and c: As shown in Table 4-1 above, the Project will not result in an exceedance of the BAAQMD CEQA Thresholds of Significance, and Lilac will ensure all Project emissions are below TAC thresholds.[9] Therefore, the Project will have less than significant health risks. As such, the Project's contribution to a cumulative considerable net increase of any criteria pollutant and sensitive receptors exposure to substantial pollutant concentrations can be considered less than significant.

Air Quality Criteria d: The proposed Project would not involve the development of the types of land uses that would result in odorous emissions, such as wastewater (sewage) treatment plants, landfills, composting facilities, refineries, or chemical plants. Therefore, the proposed Project will not result in impacts associated with odor.

GHG Emissions Criteria a: The proposed Project's operational GHG emissions from the emergency engine will be below the 10,000 MT CO_2e per year Threshold of Significance. The proposed Project's operational emissions are therefore considered to have less than significant GHG impacts, and no mitigation will be required.

GHG Emissions Criteria b: The operation of the emergency engine as part of the Project will not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. For this reason, the proposed Project's GHG emissions are considered to have less than significant impact associated with potential conflicts with a plan, policy or regulation adopted for the purpose of reducing GHG emissions and no mitigation will be required.

Conclusion

As described in this AQIA, all air quality and GHG impact categories under the Appendix G State CEQA Guidelines resulted in no impact or a less than significant impact without mitigation based on BAAQMD's CEQA Thresholds of Significance. All air quality impacts were below the BAAQMD Thresholds of Significance. To ensure the proposed Project will not require the implementation of mitigation measures and thus remain below the Thresholds of Significance, Lilac will ensure the guarantee of the following parameters:

- NO_x Scrubber Control Efficiency – at least 98%
- NO_x Maximum Potential Fugitive Emissions – no greater than 200 lb/day
- $PM_{2.5}$ Maximum Total Abatement Device Flow Rate – no greater than 6,900 cubic feet per minute (cfm)
- $PM_{2.5}$ Control Technology Outlet Concentration – no greater than 0.007 gr/dscf
- Solvent Maximum Daily Throughput – no greater than 51,000 lb/day
- Solvent Separation Control Efficiency – at least 99%
- Activated Carbon Bed Control Efficiency – at least 98.1%
- Total Daily Solvent Process Tank Throughput – no greater than 7,800 gallons/day
- Solvent Tank Activated Carbon Control Efficiency – at least 98.1%
- The emergency generator installation will not cause an exceedance of the CEQA Thresholds of Significance in addition to the Facility's calculated maximum daily and annual emissions.

[9] If emissions of the emergency generator are determined to exceed the Rule 2-5 TAC thresholds, Lilac will comply with the applicable health risk assessment requirements under the auspices of BAAQMD's permitting process.

APPENDIX A. EMISSION CALCULATIONS

Summary

Table 1. Facility-Wide Emissions Comparison to BAAQMD CEQA Thresholds of Significance

Pollutant	Daily Max PTE (lb/day)	BAAQMD CEQA Operational Significance Threshold (lb/day) [1]	Daily Threshold Exceeded ?	Annual Max PTE (tpy)	BAAQMD CEQA Operational Significance Threshold (tpy) [1]	Annual Threshold Exceeded?
$PM_{2.5}$	9.94	54	No	1.81	10	No
NOx	4.00	54	No	0.73	10	No
VOC	10.74	54	No	1.96	10	No

1. Facility-Wide Emissions Comparison omits emissions from the planned emergency generator. Lilac will ensure the selected emergency generator will remain below the CEQA Thresholds of Significance under the auspices of the BAAQMD ATC permitting process.

2. Per Table 2-1 of the BAAQMD California Environmental Quality Act Air Quality Guidelines, May 2017.

$PM_{2.5}$

Table 2. Particulate Matter Abatement Device Parameters

Parameter	Value
Proposed Maximum Total $PM_{2.5}$ Abatement Flow Rate (cfm) [1]	6,900
Proposed Maximum Outlet Concentration (gr/scf) [4]	0.007

1. The facility will ensure that the cumulative flow rates from all particulate matter abatement devices will not exceed the proposed maximum total flow rate.

4. The facility will commit to installing an abatement system such that the outlet $PM_{2.5}$ emission concentration is less than the proposed concentration.

Table 3. Ceramic Bead Manufacturing $PM_{2.5}$ Potential to Emit

Pollutant	Hourly Max PTE (lb/hr) [1,2]	Daily Max PTE (lb/day) [3]	Annual Max PTE (tpy) [4]
$PM_{2.5}$	4.14E-01	9.94	1.81

1. Commercial Scale Hourly Max PTE (lb/hr) = Proposed Maximum Total $PM_{2.5}$ Abatement Flow Rate (cfm) * (60 min/hr) * Proposed Maximum Outlet Concentration (gr/scf) / (7,000 gr/lb)

3. Daily Max PTE (lb/day) = Hourly Max PTE (lb/hr) * Daily Hours of Operation (hr/day).

Daily Hours of Operation:	24	hr/day

4. Annual Max PTE (tpy) = Daily Max PTE (lb/day) * Annual Operation (days/year) / 2,000 (lb/ton). Annual emissions conservatively assumes continuous operation:

Annual Operation	365	day/year

VOCs

Table 4. Volatile Organic Compound Manufacturing Parameters

Parameter	Value
Maximum Daily VOC Throughput (lb/day) [1]	51,000
Solvent Separation Efficiency (%) [2]	99%
VOC Abatement Efficiency (%) [2]	98.1%

1. Maximum amount of VOC processed per day during ceramic bead manufacturing process.

2. The solvent vapors from the mixed material are sent to a solvent recovery system which is represented by the solvent separation efficiency.

Table 5. VOC Process Tank Parameters

Parameter	Value
Total Process Tank Capacity (gallons) [1]	10,000
Total Solvent Daily Throughput (gallons/day) [2]	7,800
Activated Carbon Control Efficiency (%) [3]	98%

1. The Total Process Tank Capacity will be divided among multiple tanks to support the various solvents such that the cumulative sum does not exceed 10,000 gallons.

2. The cumulative sum of all solvent throughputs will not exceed 7,800 gallons/day.

3. Process tanks will be equipped with an activated carbon control device to abate VOC emissions during tank filling.

Table 6. Process Tank Chemicals Material Properties

Parameter	Acetone	Ethanol	Tetrahydrofuran
Vapor Pressure (mmHg) [1]	249	60.9	173
Moles % [2]	32.76%	8.01%	22.76%
Molecular Weight (kg/mol)	5.81E-02	4.61E-02	7.21E-02

1. Vapor pressure for chemicals determined using EPI Suite tool which calculates using the mean of Antoine & Grain methods.

2. Assumes ideal gas law and that the headspace of tank during pumping fully saturates with VOC.

Table 7. Ceramic Bead Manufacturing VOC Potential to Emit

Pollutant	Daily Max PTE (lb/day) [1]	Annual Max PTE (tpy) [2]
VOC	9.69	1.77

1. Daily Max PTE (lb/day) = Maximum Daily VOC Throughput (lb/day) * (1 - Solvent Separation Efficiency %) * (1 - VOC Abatement Efficiency %).

2. Annual Max PTE (tpy) = Daily Max PTE (lb/day) * Annual Operation (day/year) / 2,000 (lb/ton). Annual emissions conservatively assumes continuous operation:

Annual Operation	365	days/year

Table 8. Process Tank VOC Potential to Emit

Pollutant	Daily Max PTE (lb/day) [1]	Annual Max PTE (tpy) [2]
Acetone	1.05	0.19
Ethanol	0.20	0.04
Tetrahydrofuran	0.91	0.17
Maximum VOC Emissions [3]:	1.05	0.19

1. Daily Max PTE (lb/day) = Mole % * moles of gas @ STP (mol/gallon) * Molecular Weight (kg/mol) * Solvent Daily Throughput (gallon/day) * 1,000 (g/kg) * 0.0022 (lb/g) * (1 - Activated Carbon Control Efficiency). Assuming ideal gas law, moles of gas per gallon at standard temperature and pressure can be determined as follows:

Volume of 1 mol gas @ STP	22.4	L
Gallons per liter	0.264	gallons/liter
moles of gas per gallon @ STP	0.169	moles/gallon

2. Annual Max PTE (tpy) = Daily Max PTE (lb/day) * Annual Operation (day/year) / 2,000 (lb/ton). Annual Max PTE conservatively assumes continuous operation:

Annual Operation	365	days/year

3. Because the solvent throughput can consist of a combination of the proposed solvents, the maximum potential daily and annual emissions are determined as the maximum of emissions of each solvent using the maximum VOC throughputs.

NOx

Table 9. Furnace Manufacturing Parameters

Parameter	Value
Maximum Potential Fugitive NOx (lb/day) [1]	200
NOx Scrubber Control Efficiency (%) [2]	98%

1. Lilac is committed to ensuring the Maximum Potential Daily NOx Fugitives do not exceed 200 lbs/day. The Maximum Potential Daily NOx Fugitives is determined from Lilac's proprietary NOx recycle chemistry.

2. Scrubber control efficiency per vendor guarantee: 98%

Scrubber manufacturer sheet available here: https://tri-mer.com/pdf/nox-control-system.pdf

Table 10. Ceramic Bead Manufacturing NOx Potential to Emit

Pollutant	Daily Max PTE (lb/day) [1]	Annual Max PTE (tpy) [2]
NOx	4.00	7.30E-01

1. Daily Max PTE (lb/day) = Maximum Potential Daily NOx Fugitives (lb/day) * (1 - Control Efficiency %)

2. Annual Max PTE (tpy) = Daily Emissions (lb/day) * Annual Operation (day/year) / 2,000 (lb/ton).

Annual Operation	365	days/year

ATTACHMENT 6
Fence Line Noise Model

Lilac Solutions Fence Line Noise Model

Report date 01/05/2021, Revision 1.0

Purpose

Lilac Solutions is establishing a new manufacturing facility, to be located at 1700 20th Street, Oakland California, 94607, see figure 1 – Facility Location. The facility is bounded by Wood Street (east side), 20th Street (south side), Willow Street (north side) and West Grand Avenue (North). The area around the facility is primarily used for commercial and industrial purposes; there is a park south of the facility, across 20Th street.

The purpose of this report is to evaluate fence line noise levels associated with planned manufacturing operations.

Method

Fence line noise levels are evaluated by first estimating worst-case noise levels inside the facility, then evaluating sound transmission through exterior walls. The general process to evaluate fence line noise levels is:

1. Evaluate noise levels on the inside of the east, south and west walls, accounting for initial sound level, and distance from the wall (noise level at the north wall is not evaluated as that wall is bordered by a major highway ramp).

2. Estimate sound transmission through the walls, using the "sound transmission coefficient" (STC) for cast concrete walls.
3. Analyze transmitted noise levels based on distance to the fence line

Measuring Sound and Noise

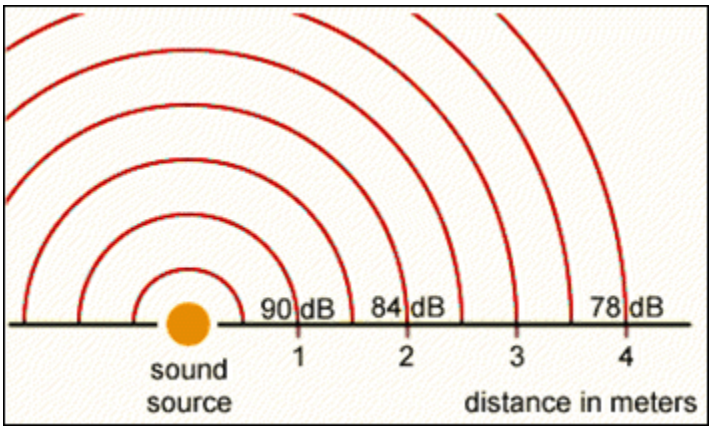
Decibels (dB)

Sound and noise are measured in units of "decibels" (dB) which compare the measured sound pressure (at different frequencies) to a reference pressure. The dB scale is logarithmic – for example, a 60 dB noise source is 10 times more powerful than a 50 dB noise source.

- A very quiet room is 45 – 50 db
- Normal conversation is approximately 60 dB
- OSHA (and Cal/OSHA) limit worker exposures to noise beginning at 85 dB (A-weighted)
- A jet engine can be 120 – 140 dB

Noise Attenuation

Sound waves travel through air and as the distance doubles, the measured sound-pressure levels (SPL) decrease by a factor of 4. This is referred to as the "inverse square law" and can be used to calculate decrease (or attenuation) in SPL (measured in dB) at a given distance from a noise source. This concept is shown in the noise attenuation diagram, below:



The formula for noise attenuation is:

$$SPL_2 = SPL_1 - 20 * \log (R_2 / R_1)$$

where:

- SPL_1 is the SPL at point 1,
- SPL_2 is the SPL at point 2,
- R_1 is the distance from the sound source to point 1, and
- R_2 is the distance from the sound source to point 2.

For example, if a noise source measures 100 dB at 10 feet, it will measure 94 dB at 20 feet:

$$100 – 20 \text{ Log } (20/10) = 100 – 20\ (0.3) = 100 – 6 = 94 \text{ dB}$$

Adding Sound Pressure Levels

Because SPL is measured in dB, which are logarithmic, they must be converted before they can be added or subtracted. The general formula for adding or subtracting SPLs (in dB) is:

$$L = 10 \log_{10}\left(\sum_{i=1}^{n} 10^{(L_i / 10)} \right)$$

For example, 90 dB, 95 dB and 100 dB are added as follows:

$$SPL = 10 \text{ Log } (10^{9.0} + 10^{9.5} + 10^{10.0}) = 101.5 \text{ dB}$$

Sound Transmission Class

Sound transmission class (STC) is a measure of how well a material attenuates airborne sound. STC determines the amount of noise energy that is ultimately transmitted through the wall material and the noise energy that reaches the receiver. A higher number indicates less sound transmission (and more effective sound insulation) than a lower number.

STC is calculated by taking the Transmission Loss (TL) values tested at 16 standard frequencies over the range of 125 Hz to 4000 Hz and comparing to reference curves, based on ASTM E413 and E90.

- A wall assembly with an STC rating of 50 can reduce 110 dB of airborne sound generated on one side of the wall to 60 dB of airborne sound on the other

Standard STC ratings for precast concrete walls are:

- 4" flat concrete panel STC = 49
- 6" flat concrete panel STC = 55
- 8" thick concrete panel STC = 58

(STC ratings based on DuPree, R.B. 1980. Catalog of STC and IIC Ratings for Wall and Floor/Ceiling Assemblies. California Department of Health Services, Office of Noise Control, Berkley, California, https://www.tsib.org/files/STC_IIC_Ratings.pdf).

The exterior walls of the Lilac facility are pre-cast concrete panels. While measurements of wall thickness are not available, exterior precast walls are typically at least 7" – 8".

- As a conservative measure, an STC of 55 (based on a 6" wall) will be used to evaluate sound transmission at the Lilac facility.

Evaluation of Lilac Noise Sources

Noise sources associated with manufacturing activities are primarily located along the wall bordering Wood street (referred to as the east wall for this evaluation), as shown in figure 2. These noise sources include sanding/grinding, sieving sorting and other equipment associated with material management and processing. Note that exact locations and configurations of equipment have not been determined and may change.

- For the purpose of this evaluation, each noise source is conservatively assumed to operate continuously and at the same time

- For the sake of noise attenuation, reported sound-pressure level from machines (dB) are assumed to be consistent within 1 foot (12") from the machine or process.

The basic process to evaluate external noise levels at the Lilac facility is to evaluate "worst case" noise level for each wall, then to evaluate transmission through the wall and attenuation based on distance to the fence line.

As can be seen from Figure 2 (below) most noise sources are adjacent to the east wall (along Wood Street). For the purpose of this evaluation, noise sources were grouped into 3 areas:

- Area 1 (Noise Sources 1, 2 and 3)
- Area 2 (Noise Sources 4 & 5)
- Area 3 (Noise Source 6)

To evaluate noise levels inside the facility, the noise levels from the sources in each area are adjusted, based on distance from adjacent walls as shown in Table 1 (below).

Table 1 - Noise Source Summary

Area	Source	SPL (dB)	Distance to East Wall	SPL (dB) @ East Wall	Distance to South Wall	SPL (dB) @ South Wall
Area 1	Source 1	94	20	68	20	68
Area 1	Source 2	100	40	68	20	74
Area 1	Source 3	90	60	55	20	64
Area 2	Source 4	80	20	54	60	45
Area 2	Source 5	80	20	54	80	42
Area 3	Source 6	80	20	54	160	36

Noise sources from each area can be added (as described above) to estimate maximum noise levels inside the buildings along the east and south walls. Results are shown in Table 2 (below)

Table 2 - Maximum Internal Noise Levels

	East Wall Cumulative Noise (dB)	South Wall Cumulative Noise (dB)
Area 1	71	75.3
Area 2	57	64.1
Area 3	54	36

The maximum interior noise levels along the East and South walls can then be used to estimate transmitted noise (on the outside of the wall). Transmitted noise levels can then be further adjusted based on distance to the fence line as shown in Figure 3 - Lilac Site Overview. These values are summarized in Table 3 (below).

- Noise levels for the East and South walls were evaluated. Noise levels at the West and North walls are not likely to be significant. For example, the distance from source 2 (100 dB) to the

west wall is 140' and the distance for source 3 is 120'. Based on these distances, the attenuated sound levels (inside the facility) are 57 dB and 53 dB.

Table 3 - Fence line Noise Levels

Wall	Internal (Max dB)	STC	Transmitted Noise (dB)	Fence line Distance	Fence line Noise (dB)
East	71	55	16	10	0 dB
South	75.3	55	20.3	105	0 dB

Conclusion

Based on this evaluation, there will be no significant fence line noise impacts from planned manufacturing activities at the Lilac Solutions facility at 1700 20th Street. Manufacturing noise is not likely to be detectable at the fence line above normal community noise levels even if sound levels from process equipment are significantly higher than the conservative estimates used for this evaluation.

- This was a conservative assessment that assumed all operations were active continuously and at the same time. No internal partitions or walls were included in this evaluation.
- Due to its greater mass, reinforced concrete has higher STC ratings and can block low frequency sounds better than wood or steel.
- Wall assemblies may have a lower STC than found in laboratory conditions, and penetrations in walls, such as doors, windows and any un-sealed openings can contribute to exterior noise levels. However even taking these into account, it is unlikely that manufacturing activities will generate significant noise at the fence line of the Lilac facility.

Exclusions and Limitations

The conclusions in this report are based on information and data provided to ACT, discussion with Lilac personnel as well as generally accepted standard of care for evaluation of physical and environmental hazards and regulatory compliance. The conclusions presented above apply to situations and conditions as they are understood by ACT, based on information provided to ACT. The evaluation was prepared for Lilac Solutions for their use only.

This evaluation was performed by a Certified Industrial Hygienist (CIH) / Certified Safety Professional (CSP) who is experienced in assessment of physical and health hazards and associated regulatory compliance however ACT cannot provide legal opinions regarding regulatory compliance or related issues. ACT provided these services using its commercially reasonable best efforts consistent with the level and skill ordinarily exercised by members of the profession currently practicing under similar conditions. No other warranty or limitation exists, either expressed or implied. ACT cannot be responsible for any use of the information contained in this report.

Figure 1- Facility Location

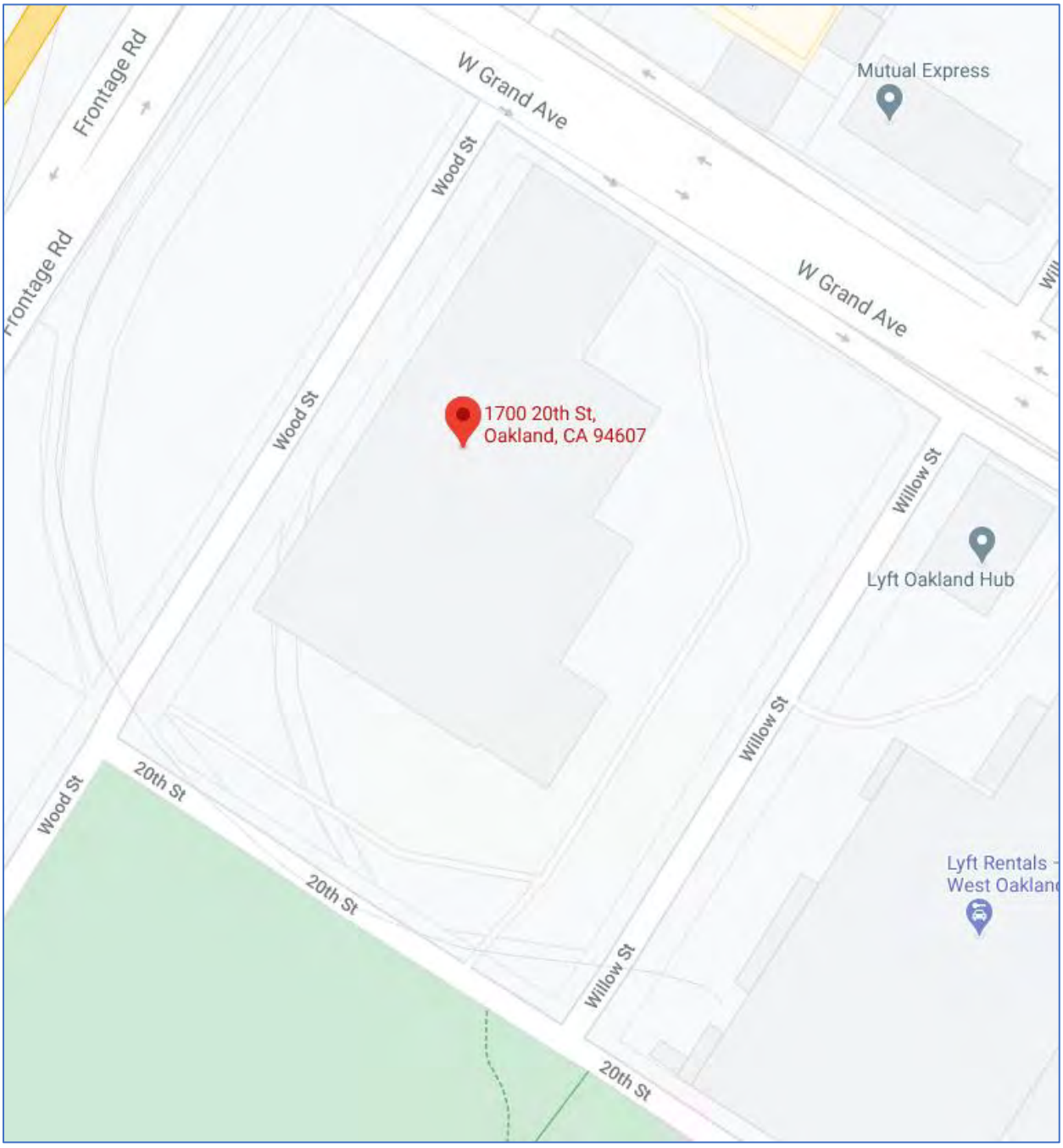


Figure 2 - Lilac Noise Producing Equipment

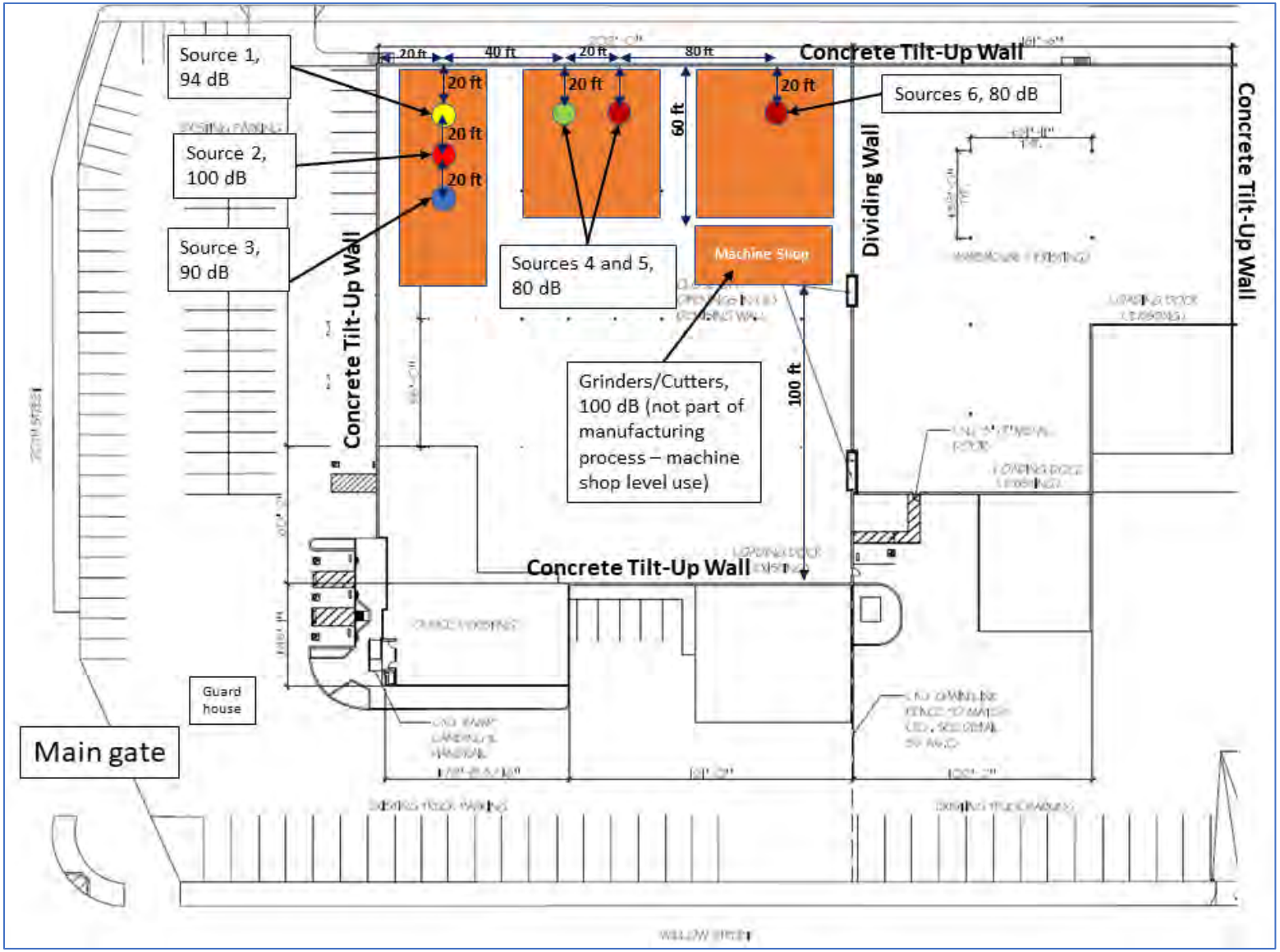


Figure 3 - Lilac Site Overview

ATTACHMENT 7
Risk Management Plan

California Accidental Release Program (CalARP) Risk Management Plan and Offsite Consequence Analysis for:

Lilac Solutions, Inc.

1700 20th Street

Oakland, CA 94607

Prepared by:

ACTenviro, Inc.

2010 Mission Road

Escondido, CA 92029

March 2021

Table of Contents

1 Executive Summary

Lilac Solutions, Inc. (Lilac) specializes in lithium extraction from brines located in Oakland, California. The facility operations serve as research, development, and manufacturing for ion exchange beads that allow for direct extraction. This end product is distributed for sale to other lithium extraction companies throughout the world. The facility has one (1) nitric acid tank (4,000 gallons, total of 32,000 pounds) of concentration 70%. Nitric acid (HNO_3) is utilized during the manufacturing process to produce a chemical needed for the bead generation. Nitrogen dioxide (NO_2) is generated within the process in maximum quantities of 200 pounds and is subsequently treated with scrubbers as an air pollution control device. Neither chemical leaves the property as a hazardous waste stream. The only chemicals analyzed in this report are HNO_3 and NO_2.

Storage of HNO_3 and NO_2 (and other hazardous materials) can trigger the requirements of the California Accidental Release Program (CalARP). Specifically, a facility that has more than a threshold quantity of a regulated substance listed in Tables 1-3 of Title 19 § 2770.5 in a process (or in storage) may have to complete and submit a risk management plan (RMP). As indicated in Table 3, the threshold for HNO_3 is 1,000 pounds while the threshold for NO_2 is 100 pounds. Note that the Table 3 thresholds are much lower than equivalent federal thresholds. Because the quantities in process and storage exceed the table 3 thresholds, the facility must prepare an RMP meeting the requirements of Program Level 2.

The purpose of this report is to meet the following objectives:

- Identify and characterize the quantities and locations of hazardous chemicals stored at the Lilac facility;
- Determine the distance from the chemical storage locations to the nearest residences or public receptors to the Lilac facility;
- Conduct computer modeling using USEPA's RMP or ALOHA computer program to determine worst-case accident release scenarios and distances to the toxic endpoints;
- Determine potential impact and safety risks at the nearest public receptors; and
- As appropriate, identify and develop mitigation measures to reduce risk to an acceptable level.

Facility Description

1.1 Facility Location

The Lilac facility is located in a commercial/industrial area of Oakland, California between Wood and 20th street. The total area of the facility, including pervious and impervious areas is approximately 4.5 acres. The facility is comprised of one (1) building that houses the operations onsite, including the storage of nitric acid, generated nitrogen dioxide, and other industrial and manufacturing materials. The building is separated into two (2) warehouses with R&D activities taking place in one and manufacturing in the other. The location of the processing and storage areas are shown in Appendix B: Site Layout and Chemical Storage Locations.

Topography in the area is relatively flat, with no gradients either east or west. The nearest residential land use is a proposed housing development approximately 600 feet south of the facility just across Wood Street. Aside from this, the nearest residential area is a couple of blocks away off 18th Street and Campbell Street. Other public receptors, such as neighboring and facilities and retail establishments are less than 100 feet from the property, with Raimondi Park directly across 20th Street. This land usage is depicted in Appendix C: Residential/Public Receptor Map.

1.2 Management System

The development, implementation, and integration of the RMP will be driven by the Management System. The qualified person, the Process Engineer, has the overall responsibility of overseeing and implementing the Management System and may delegate responsibility to another individual but will stay involved in at least the more critical aspects of the program. Whenever the Process Engineer delegates responsibility for part of the RMP, that person's name and position will be documented, and line of authority represented through an organization chart. The persons that are assigned responsibility by the Process Engineer to carry out the program Management System elements are integrated into an ongoing approach to identify hazards and manage risks.

1.3 5 Year Accident History

There have been no significant spills or releases of either chemical in the last 5 years.

1.4 RMP Program 2 Prevention Program Components

The NAICS code Lilac identifies with is 541330 – Engineering Services. This U.S. industry is comprised of establishments primarily engaged in applying physical laws and principles of engineering in the design, development, and utilization of machines, materials, instruments, structures, processes, and systems.

The only materials at this facility that exceed the CalARP thresholds are the 70% HNO_3 and NO_2. The maximum container volume for the nitric acid is the 4,000-gallon tank and the concentrated liquid primarily remains in the tank except for when it is being transferred to smaller secondarily contained process vessels ranging from 2000 to 3000 gallons. The maximum quantity of nitrogen dioxide generated in the process is 200 pounds which is immediately treated with pollution control equipment. The storage locations of the chemicals are shown in Appendix B.

The equipment involved in the Level 2 RMP processes are:

- 4,000-gallon double-walled tank
- 2,000 to 3,000 gallon secondarily contained vessels
- Pollution control equipment (scrubbers)
- Forklift

The most recent review of safety information took place on 3/2/21 when Lilac reviewed proposed processes and scaled down the expected nitric acid tank to 4,000 gallons from 15,000 gallons. Further details on safety reviews and updates to procedures can be found in Section 5.

The most recent compliance audit was conducted in April of 2019 by Alameda County Department of Environmental Health (ACDEH) and focused on environmental, health, and safety compliance of the facility processes, hazardous material management, and hazardous waste storage and management.

No chemical-related incidents have been identified so there are no recent incident investigations nor a date that one has triggered a review or revision of safety information, the hazard review, operating or maintenance procedures, or training. More information on Incident Investigations can be found in Section 11 Incident Investigation.

2 Safety Information

2.1 Nitric acid (HNO_3)

Nitric acid (Chemical formula HNO_3, CAS 7697-37-2) is a colorless, yellow, or red, fuming liquid with an acrid, suffocating odor. It is extremely corrosive, toxic, and is a strong oxidizing agent. Nitric acid can affect the body through ingestion, inhalation, skin contact, or eye contact. Nitric acid exposure can lead to severe chemical burns, mucosal membrane corrosion, permanent eye damage, excess fluid in the lungs, and even death. Nitric acid has not been reported to be a human carcinogen.

See Appendix A: Chemical Information for additional information on nitric acid.

2.2 Use of HNO_3 and Applicable Safety Provisions

Nitric acid is used at the facility to produce a proprietary chemical. This chemical then aids in the manufacture of the ion exchange beads. HNO_3 is stored as an in-process chemical in a 4,000-gallon double-walled tank that is secondarily contained by a berm. This 4,000-gallon tank is the maximum container volume for nitric acid at the facility. Any refilling of the tank will be done about once every 1-2 months and will involve qualified tankers coming onsite and pumping the HNO_3 directly into the tank.

The location of the chemical is shown in Appendix B: Site Layout and Chemical Storage Locations.

The primary hazard of nitric acid is its corrosivity. In the unlikely event of an accidental release of nitric acid from the work area that was not captured within the secondary containment, the material would be retained within the warehouse as there are no drains to allow for mobilization outside of the building.

All workers are trained in the hazards of HNO_3 and understand safe work practices as well as appropriate actions in the event of a spill or release. As HNO_3 is a liquid, leak detection equipment will be installed prior to filling the tanks with the acid. Lilac also employs ACT as their hazardous waste contractor fully equipped with 24-hour emergency response services. Safety information will be updated whenever there is a major change that makes the information inaccurate. Before starting up a process after a major change, all relevant elements of the risk management program, including prevention program elements, will be reviewed and updated as appropriate. Operators will be trained in any updated procedures before starting up the changed process. Any new or revised standards that are applicable to the change itself or to the changed process will be analyzed and reflected in the update.

70% Nitric Acid Storage	
SDS HNO_3	On file
Maximum Intended Inventory	32,000 pounds
Critical Temperature	-135.4°F
Critical Pressure	940.8 psia

2.3 Nitrogen Dioxide (NO_2)

Nitrogen dioxide (Chemical formula NO_2, CAS 10102-44-0) is a gaseous chemical that ranges from colorless to reddish-brown and has a pungent, acrid odor. It is a significant source of air pollution, causing a variety of respiratory issues and inflammation. It is corrosive, toxic, and is a strong oxidizing agent. Nitrogen dioxide affects the body via inhalation, skin contact, or eye contact. Effects of exposure include chemical burns, asthma, bronchitis and even death due to asphyxiation. Nitrogen dioxide has not been reported to be a human carcinogen.

See Appendix A: Chemical Information for additional information on nitrogen dioxide.

2.4 Use of NO_2 and Applicable Safety Provisions

Nitrogen dioxide is generated at the facility as a byproduct of production of ion-exchange beads. This chemical generation will occur in a gas room equipped with ventilation and a treatment system in the form of a scrubber. As the nitrogen dioxide is generated, it is not expected to exceed 200 pounds at any given time and is immediately treated before being released into the environment.

The location of the chemical is shown in Appendix B: Site Layout and Chemical Storage Locations.

The primary hazards of nitrogen dioxide are extreme toxicity and oxidizing nature. In the unlikely event of an accidental release of nitrogen dioxide from the generation point, the material would be retained within the building.

All workers are trained in the hazards of NO_2 and understand safe work practices as well as appropriate actions in the event of a spill or release. As NO_2 is a hazardous gas, leak detection equipment and alarms will be installed. Safety information will be updated whenever there is a major change that makes the information inaccurate. Before starting up a process after a major change, all relevant elements of the risk management program, including prevention program

elements, will be reviewed and updated as appropriate. Operators will be trained in any updated procedures before starting up the changed process. Any new or revised standards that are applicable to the change itself or to the changed process will be analyzed and reflected in the update.

3 Hazard Assessment & Off-Site Consequence Analysis

The worst-case scenario is defined as a release from the largest quantity of a regulated substance from a single vessel or process unit that results in the greatest distance to a toxic or flammable endpoint. Alternative release scenarios are scenarios that are more likely to occur than the worst-case scenario. Modeling assumptions and meteorological conditions that must be used in conducting the OCA are specified in the California Code of Regulations (CCR), Title 19, Chapter 4.5, Article 2735.1 et seq.

Chemicals analyzed in this report include nitric acid (70%) and nitrogen dioxide.

- Release rates were determined for a spill of nitric acid into secondary containment based on US EPA *Risk Management Program Guidance for Offsite Consequence Analysis*
    - Passive mitigation measures such as secondary containment and releases within buildings were considered as per USEPA guidance.
    - The distance to the toxic endpoint was determined using the estimated generation rate and the ALOHA model based on Stability Class F and wind speed of 1.5 m/sec.
    - The ALOHA model was used to calculate toxic endpoint distances in the near field so that more accurate safe separation distances can be calculated.
    - The impacts and risks to public receptors were determined using the toxic endpoints specified in Appendix A to 40 CFR 68.
- Release rates were determined for nitrogen dioxide based on US EPA *Risk Management Program Guidance for Offsite Consequence Analysis*
    - Passive mitigation measures including release within buildings was considered as per USEPA guidance.
    - The distance to the toxic endpoint was determined using the estimated generation rate and the ALOHA model based on Stability Class F and wind speed of 1.5 m/sec.
    - The ALOHA model was used to calculate toxic endpoint distances in the near field so that more accurate safe separation distances can be calculated.
    - The impacts and risks to public receptors were determined using the toxic endpoints specified in Appendix A to 40 CFR 68.

3.1 References Used in Analysis

The following references were used to develop accident scenarios and evaluate risk to the surrounding residents of the PMP facility:

- California Accidental Release Prevention (CalARP) Program, Administering Agency Guidance. Office of Emergency Services (OES). January 2005.
- *Risk Management Program Guidance for Offsite Consequence Analysis.* US Environmental Protection Agency (USEPA). March 2009. EPA Report No. 550-8-99-009.
- *RMP*Comp.* USEPA computer model, Version 2.01, for performing offsite consequence analysis required under USEPA's Risk Management Program (RMP) rule. 2012. Website: http://ww.epa.gov/oern/content/mp/mo_comp.htm
- Areal Location Hazardous Atmospheres (ALOHA) computer model. 2007.

3.2 Off-Site Consequence Analysis – Nitric Acid (70%) Worst Case & Alternate Scenario

A worst-case scenario release would be an indoor release of 4,000 gallons of 70% nitric acid into an indoor containment (approximately 400 ft^2)

As per the CalARP program and USEPA RMP guidance, worst-case scenario assumptions that were used to evaluate off-site impact of this release include:

- Release of the largest quantity of a regulated substance from the largest vessel or container within a process (a single 4,000 tank)
- Specific gravity, per product SDS, is 1.4, density is therefore assumed to be 11.7 lbs./gallon
- Release of 4000 gallons = 4000 * 11.7 = 46,704 pounds
- Nighttime conditions - wind speed of 1.5 meters per second (m/sec) and worst-case atmospheric stability class F
- Default release temperature of 75°F. This is higher than the average annual nighttime temperature of 57°F
- Humidity of 50%
- Height of release – ground level
- Surface roughness – urban
- Passive mitigation, including release into secondary containment berm or tank (approximately 400 ft2) and indoor release were used for Worst Case evaluation

A release of approximately 500 gallons into secondary containment was used for the alternate scenario – all other parameters were the same.

- Passive mitigation, including release into secondary containment berm or tank (approximately 240 ft2) and indoor release were used for Worst Case evaluation

Water solutions containing regulated substances, such as nitric acid, are analyzed differently from pure toxic liquids. The evaporation rate varies with the concentration of the solution. If a

concentrated water solution is spilled, the toxic substance will evaporate more quickly than the water from the spilled solution, and the vapor pressure and evaporation rate will decrease as the concentration of the toxic substance in solution decreases.

For estimating release rates from the chemical solutions that are stored at the Lilac facility, the procedures described in the USEPA's *Risk Management Program Guidance for Offsite Consequence Analysis (*Exhibit B-3*)* were used. Only the first 10 minutes of the release were considered in the analysis, as per the USEPA guidance. The toxic component in the solution evaporates fastest during the first few minutes of a spill when its concentration is highest. Although the toxic substance will continue to evaporate from the pool after 10 minutes, the rate of evaporation is so much lower than it can be safely ignored in estimating the consequence distance.

The toxic endpoint listed in Appendix A of 40 CFR nitric acid is the ERPG-2 of 0.026 mg/l, equivalent to 10 ppm.

- The Emergency Response Planning Guideline 2 (ERPG-2) is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action.

3.3 Nitric Acid Worst Case Scenario Analysis

For the worst-case scenario, the entire contents of a single 4,000-gallon storage tank were assumed to spill onto the concrete floor inside of a containment berm, inside the manufacturing area. Passive mitigation measures (i.e., secondary containment and release inside the building) are applicable to this scenario. For worst-case analysis, a wind speed of 1.5 meters per second (3.4 miles per hour) is used.

EPA guidance in Exhibit B-3 in Appendix B provides a Liquid Leak Factor Ambient (LFA) value of 0.0019 for 80% nitric acid at ambient temperature and Density Factor (DF) value of 0.33 that can be used to estimate average release rates for nitric acid from a pool formed by a spill.

For solutions at ambient temperature without passive mitigation, the guidance in Section 3.2.2 is used and the release rate for spills is calculated using equation 3-3:

QR = QS * 1.4 * LFA * DF where:

- QR = Release rate (pounds per minute)
- QS = quantity released (lbs.)

- 1.4 = Wind speed factor = 1.50[78], where 1.5 meters per second (3.4 miles per hour) is the wind speed for the worst case
- LFA = Liquid Factor Ambient (listed in Exhibit B-3, Appendix B)
- DF = Density Factor

The quantity released (QS) equals volume (gallons) * density (lbs./gallon):

4000 gallons * 11.676 lb/gal = 46704 lbs.

Using the values above the estimated release rate (QR) equals:

46704 * 1.4 * 0.0019 * 0.33 = 41 lbs/minute

Passive mitigation measures, such as secondary containment and release inside a building can be used for this scenario.

The release rate (Qr) for a spill into secondary containment is:

QR= A x 1.4 x LFA (equation 3 - 7, area-mitigated release of toxic liquid) where:

- A = area of containment (400 ft2)
- 1.4 = Wind speed factor = 1.50[78], where 1.5 meters per second (3.4 miles per hour) is the wind speed for the worst case
- LFA = Liquid Factor Ambient (listed in Exhibit B-3, Appendix B)

Using the values above the estimated release rate (QR) into containment equals:

400 * 1.4 * 0.0019 = **1.064 lbs/minute**

Indoor release rate (QRb) can be further adjusted based on an indoor mitigation factor of 0.1

QRb = QR x 0.1 = 1.064 * 0.1 = **0.1064 lbs/min**

The ALOHA release model was used to estimate distance to toxic endpoint.

- Specifically, the distance to a given endpoint can be calculated using the "Direct Source" leak scenario for nitric acid and a release rate equivalent to the QRB over 10 minutes. Other parameters include a wind speed of 1.5 M/S, urban conditions and stability class F.
- This calculation shows a distance to the toxic endpoint of **86 yards**.
    - Complete ALOHA information is included below.
- The nearest public receptor (adjacent retail establishment) is approximately 100 feet from the nitric acid storage area. The distance to the property line from the storage location is approximately 30 feet.

- Based on this evaluation, public receptors would potentially be exposed in excess of ERPG-2 in the unlikely event of this worst-case scenario.

3.4 Nitric Acid - Alternate Scenario Analysis

Evaluation of off-site consequences can incorporate active controls to reduce impacts and can evaluate different, and potentially more likely scenarios.

In this case, the alternate scenario will evaluate a spill from a smaller tank (approximately 2000 gallons) into secondary containment. For the model, a release of 500 gallons was assumed. Because the spill is contained, the size (in ft2) of the containment area is the primary fact in the release rate.

Using the same calculations above, and assuming an area of 144 ft2 (12' x 12')

QR= A x 1.4 x LFA (equation 3 - 7, area-mitigated release of toxic liquid) where:

- A = area of containment (144 ft2)
- 1.4 = Wind speed factor = 1.50[78], where 1.5 meters per second (3.4 miles per hour) is the wind speed for the worst case
- LFA = Liquid Factor Ambient (listed in Exhibit B-3, Appendix B)

Using the values above the estimated release rate (QR) into containment equals:

144* 1.4 * 0.0019 = **0.383 lbs/minute**

Indoor release rate (QRb) can be further adjusted based on an indoor mitigation factor of 0.1.

QRb = QR x 0.1 = 0.383 * 0.1 = **0.0383 lbs/min**

The ALOHA release model was used to calculate distance to toxic endpoint based on a "direct source" and the same modeling assumptions as for the worst-case scenario.

- This calculation shows a distance to the toxic endpoint of **53 yards.**
  - Complete ALOHA information is included below.
- The nearest public receptor (adjacent retail establishment) is approximately 100 feet from the nitric acid storage area. The distance to the property line from the storage location is approximately 30 feet.
- Based on this evaluation, public receptors would potentially be exposed in excess of ERPG-2 in the unlikely event of this alternate scenario.
- While this would extend over the property line, this model is very conservative, actual exposures above ERPG-2 level are not anticipated to extend that far in real life.
  - In the event of a significant release, nitric acid would be retained in secondary containment and spill response procedures would be activated, absorbent would

be applied, residual liquid would be pumped or transferred into other containers or other spill response measured would be taken.

- ERPG-2 is the maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing serious health effects.
- Response measures will be implemented immediately upon a release, duration of off-site impacts (if they were to occur) would be much less than 1 hour.

3.5 Off-Site Consequence Analysis – Nitrogen Dioxide Worst Case & Alternate Scenario

A worst-case scenario release of nitrogen dioxide (NO2) would be an indoor release of 200 pounds from the air pollution control system.

The air pollution control system is located indoors, inside the building. Any potential releases would be into the interior building space.

As described above, worst-case release model assumptions include:

- Release of the largest quantity of a regulated substance from the largest vessel or container within a process (200 lbs)
- Nighttime conditions - wind speed of 1.5 meters per second (m/sec) and worst-case atmospheric stability class F
- Default release temperature of 75°F.
- Humidity of 50%
- Height of release – ground level
- Surface roughness – urban
- Passive mitigation, including release indoor release.

The ERPG-2 of for NO2 of 155 ppm will be used to evaluate off-site consequences 10 ppm.

- The Emergency Response Planning Guideline 2 (ERPG-2) is the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action.

3.6 Nitrogen Dioxide Worst Case Scenario Analysis

A worst-case release of 200 lbs of NO2 represents the maximum estimated amount of NO2 that would be resident in the entire system at one time, based on a rate of generation of NO2 of 200 lbs/minute.

Passive mitigation measures (release inside the building) are applicable to this scenario. For worst-case analysis, a wind speed of 1.5 meters per second (3.4 miles per hour) is used.

EPA guidance (equation 3-2) allows a mitigation factor of 0.55 for release inside buildings.

Based on this, the release rate is

200 lbs/minute x 0.55 = **110 lbs/minute**

The ALOHA release model can be used to estimate distance to toxic endpoint.

- Specifically, the distance to a given endpoint can be calculated using the "Direct Source" leak scenario based on the release (and accounting for an indoor release). Other parameters include a wind speed of 1.5 M/S, urban conditions and stability class F.
- This calculation shows a distance to the toxic endpoint of **1.6 miles.**
    - Complete ALOHA information is included below.
- The nearest public receptor (adjacent retail establishment) is approximately 100 feet from the air-pollution control equipment. The distance to the property line from the storage location is approximately 30 feet.
- Based on this evaluation, public receptors would potentially be exposed in excess of ERPG-2 in the unlikely event of this worst-case scenario.

3.7 Nitrogen Dioxide Alternate Scenario Analysis

A worst-case release of 200 lbs of NO2 is extremely unlikely to occur – While still extremely unlikely, a release rate of 10% of the rate of generation was used for the alternate scenario.

200 lbs/minute x 0.1 = **20 lbs/minute**

Passive mitigation measures (release inside the building) are applicable to this scenario. For worst-case analysis, a wind speed of 1.5 meters per second (3.4 miles per hour) is used.

EPA guidance (equation 3-2) allows a mitigation factor of 0.55 for release inside buildings.

Based on this, the release rate is

20lbs/minute x 0.55 = **11 lbs/minute**

The ALOHA release model can be used to estimate distance to toxic endpoint.

- Specifically, the distance to a given endpoint can be calculated using the "Direct Source" leak scenario based on the release (and accounting for an indoor release). Other parameters include a wind speed of 1.5 M/S, urban conditions and stability class F.

- This calculation shows a distance to the toxic endpoint of **964 yards**.
    - Complete ALOHA information is included below.

- The nearest public receptor (adjacent retail establishment) is approximately 100 feet from the air-pollution control equipment. The distance to the property line from the storage location is approximately 30 feet.
- Based on this evaluation, public receptors would potentially be exposed in excess of ERPG-2 in the unlikely event of this alternate scenario.

- While this would extend over the property line, this model is very conservative, actual exposures above ERPG-2 level are not anticipated to extend that far in real life.
    - The estimated rate of NO2 generation is extremely conservative. In addition, the "alternate scenario" release rate is also very conservative.
    - The air pollution control system is not likely to fail in a manner that release significant amounts of NO2.
    - ERPG-2 is the maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing serious health effects.
    - If there are mechanical issues or problems with the pollution control system, they will be identified and responded to by facilities maintenance personnel, limiting the duration of any off-site impacts to less than 1 hour.

4 Hazard Review

This review evaluates hazards associated with HNO_3 and NO_2 storage and use at Lilac. This review is limited to the hazards (and associated controls) associated with 70% HNO_3. Other chemical exposures and are addressed by other Lilac safety programs.

This hazard review is intended to satisfy the requirements in 19 CCR 2755.2 as well as 40 CFR 68.50, however it is not a formal process hazard analysis (PHA) as described in 8 CCR 5189 and 29 CFR 1910.119 and does not include all elements that are associated with a formal PHA.

4.1 HNO_3 Process Description

- HNO_3 is used at Lilac to produce a proprietary chemical for ion-exchange bead manufacturing. Salts are added to the nitric acid, changing its form into a less hazardous salt solution form. The nitric acid is processed in 1000-gallon increments.
- 70% HNO_3 is delivered to Lilac via a licensed vendor. The acid is pumped directly into the double-walled holding tank.
- As needed, the HNO_3 is manually transferred into smaller 2,000 gallon – 3,000-gallon process vessels using a chemically compatible pneumatic peristaltic-type pump (or equivalent pump, suitable for the material).
- There is no residual to be disposed of as a hazardous waste stream.
- Transfer procedures can be found in Lilac's SOP for Transferring and Handling HNO_3.

4.2 HNO_3 Process Hazards

Process hazards are directly related to the hazards of HNO_3. As described above in the Chemical Safety Section, HNO3 is toxic and corrosive to the body, causing damaging effects via ingestion, inhalation, skin contact, or eye contact. Spills of 70% HNO_3 can also release HNO_3 vapors. HNO_3 vapors are a serious inhalation hazard and cause burns to the skin, eyes, and lungs.

Process hazards associated with HNO_3 management at Lilac include spills/releases during delivery or transfer to/from chemical storage area, spills or splashes while handling HNO_3 as well as structural failure of the storage tank or vessels, leading to an uncontained release.

The relatively low vapor pressure of 70% HNO_3 indicates that HNO_3 vapors will not readily be released in the event of a spill or leak.

4.3 NO_2 Process Description

4.4 NO_2 Process Hazards

The process generating nitrogen dioxide is a fully contained process preventing any direct human contact or interaction with nitrogen dioxide. Due to this, there are no likely or expected process hazards associated with the generation of NO_2 at the facility.

4.5 Risk Scenarios (Potential Equipment Malfunctions/Human Errors)

Based on a review of 70% HNO_3 management processes at Lilac (current as of the date of this plan), process hazards include:

- Splashes or dermal contact,
- Spills or releases of relatively small volumes (or larger amounts into secondary containment)
- Uncontained spills or leases of HNO_3 (>10 gallons) or spills/releases in excess of secondary containment capacity

These hazards are associated with management activities or processes, including:

1. Delivery/Receiving of 70% HNO_3
2. Storage of 70% HNO_3
3. Usage/Dispensing of 70% HNO_3

Note that large spills may be associated with all 3 activities (although unlikely). Small spills are not likely to be associated with storage – the only applicable release scenario would be a catastrophic failure, leading to a large-scale release)

The risk associated with these hazards can be evaluated in terms of likelihood and severity as shown below:

	Severity		
Likelihood	**L**ow (First Aid)	**M**oderate (Requires Medical Attention)	**S**evere (Severe/ Life Threatening)
Possible (Occurs Occasionally)	**Medium**	**High**	**High**
Unlikely (Very Rarely Occurs)	**Low**	**Medium**	**High**

Very Unlikely (Has not occurred before)	Low	Low	Medium

Based on this, risks associated potential HNO_3 process hazards are as follows:

Process/ Activity	Potential Risk Scenarios	Likelihood	Severity	Overall Risk
70% HNO_3 delivery	Splashes or dermal contact	V	M	**Low**
	Spills/Release (small volume)	V	L	**Low**
	Spills/Release (large volume)	V	S	**Medium**
70% HNO_3 storage	Splashes or dermal contact	V	M	**Low**
	Spills/Release (Large volume)	V	S	**Medium**
70% HNO_3 usage	Splashes or dermal contact	V	M	**Low**
	Spills/Release (small volume)	V	L	**Low**
	Spills/Release (small volume)	V	S	**Medium**

4.6 Safeguards to Address Risk Scenarios

The safeguards and procedures to address process hazards are consistent across the different activities. Procedures to minimize the likelihood of dermal contact from splashes and spills include:

Development of standard operating procedures for delivery/receiving of HNO_3, HNO_3 storage and HNO_3 usage that include procedures to minimize the likelihood of spills.

- General procedures include use of chemically compatible materials, inspecting all materials prior to use, ensure liquid-tight connections, attending active processes (pumping/dispensing) at all times and similar.
- See Standard Operating Procedures for more information.

Provide training to workers on applicable SOPs, as well as training on general HNO_3 handling and spill response procedures.

- See the Training Section, below for more information.

Use of appropriate PPE, when handling HNO_3 including:

- Extended length chemically protective gloves over surgical nitrile gloves
- Butyl, nitrile, or other materials based on manufacturer compatibility guides.

- Chemically protective boots or shoe/boot covers.
- Splash apron or suitable chemically protective clothing (per SOP)
- Respiratory protection, as needed based on potential hazards.
- Eye/face protection (face shield over chemically protective goggles or full-face air purifying respirator

PPE selection will be indicated on applicable SOPs as well as applicable job-hazard analyses (JHAs) for specific tasks or activities.

- PPE may be upgraded/downgraded based on evaluation from site safety officer.

In addition, effects of splashes releases will be mitigated by ready access to eyewash and or safety showers, consistent with Cal/OSHA requirements in 8 CCR 5162.

- Eyewash/safety showers will be tested monthly or per manufacturer recommendations.
- All workers will be trained on locations and procedures to use eyewash safety showers in flushing skin/eyes for 15 minutes.

As with splashes, SOPs for chemical management as well as receiving and movement within the facility will minimize the likelihood of small spills and releases.

Worker training on SOPs for receiving, storage and dispensing/use will reduce the likelihood of spills and releases. See Training Section below for additional information.

- General procedures include ensuring all active operations (pumping, dispensing and similar) will be attended at all times.
- Equipment including drums, containment pallets, pumps, tubing and fittings will be inspected regularly, replaced, or repaired as needed. See Maintenance Section below for additional information.
- Forklift will be maintained per the maintenance SOP.
- Workers will be trained on spill response procedures for small spills and spill supplies will be available as described in the Emergency Action Plan.
- PPE will be used as described above.

Control measures for smaller spills will be effective for reducing the likelihood of larger spills.

- Beyond the measures discussed above, Lilac will make arrangements with outside emergency responders to act as a resource in the event of a larger spill.

- Should a larger spill occur trained Lilac personnel will take defensive actions (as described in the Emergency Action Plan) and initiate an evacuation of affected areas of the facility until qualified personnel are able to respond.

Although there will not be direct human interaction with nitrogen dioxide, appropriate safety measures are put in place to ensure protection of employees and include the following:

- Appropriate eye, hand, and respiratory protection will be worn as needed.
- Gas leak detection methods, alarm systems, monitoring controls, and other engineering controls will be implemented and maintained:
    - Alarms will be relayed to a constantly attended location.
    - NO_2 will be piped directly to the scrubber.

Failure to be knowledgeable about the risks of NO_2, improper usage of equipment, or failure to wear proper PPE will lead to safety accidents. Therefore, safety trainings, meetings, and safety specific programs, will continue to be implemented to minimize risk associated with any chemical exposure at the facility.

4.7 Release detection or monitoring

Based on the nature of HNO_3 usage at Lilac, the primary method of detection of releases will be visual observation. Spills and releases will be captured by containment vessels or collect onto paved surfaces and would be detected during typical daily operations. NO_2 releases will be detected with installed gas detection equipment as gas detectors are maintained throughout the building and process. Employees detecting spills or release will report spills and activate spill procedures, based on size and extent of spill. See Emergency Action Plan for additional information. All processes and storage areas are held indoors so in the general event of a spill or leak, mobilization outside of the building is unlikely.

4.8 Review/Update and Corrective Actions

This hazard review will be updated at a minimum of every 5 years, or sooner if the process is significantly changed or expanded.

A corrective action plan will be prepared to address any gaps or deficiencies identified in the review.

5 Operating Procedures

Lilac has written operating procedures for tasks that HNO_3 handlers must perform and equipment that must be maintained to run processes safely and properly manage the treatment of NO_2. Safety is built into the procedures so that employees can work safely every day, giving everyone a quick and appropriate source of information that can prevent or mitigate the effects of an accident, and providing workers and management with a standard against which to assess performance. The written procedures are updated whenever there is a major change and before the startup of the changed process. Lilac audits procedures periodically to ensure that they explain how to operate equipment and processes safely. Training is administered based on the written procedures, as described in more detail in Section 7. Specific procedures include equipment operation and inspections, handling HNO_3 (including storage and dispensing), receiving HNO_3, responding to spills and other emergencies outlined in the Emergency Action Plan (EAP).

5.1 Emergency Action Plan (Including Spill Response)

The EAP provides procedures and a list of key personnel who are involved in response efforts for non-life threatening and life-threatening events. Specific events have been identified such as fire, evacuations, spills, and a great level of detail is given to guide employees of the appropriate and safe response. It is of high importance to Lilac to train its employees to the specific emergencies. Lilac will only respond to incidental spills and is considered a non-responding facility. This means that if there was an uncontrolled, large spill or release of HNO_3 or NO_2, Lilac will call 911 and have emergency responders address the incident. The spill procedures for minor, small spills are outlined in the EAP.

5.2 Handling HNO_3

This SOP outlines the safe procedures for handling HNO_3 that applies to each working task. Employees are trained on HNO_3 handling procedures outlined int the program and are further trained during safety tailgate meetings and on-the-job.

5.3 Receiving HNO_3

The purpose of this procedure is to establish a standard guideline for the safe and effective receiving of 70% HNO_3 during a delivery. This procedure effectively represents the hand-off of the product from the delivery driver to the storage tank as supervised by the appropriate Lilac representative. The role of the Lilac representative during onsite delivery of 70% HNO_3 will generally be in the capacity of preparing the receiving area for the incoming delivery and ensuring the product makes it safely into the storage tank without incident. Detailed instructions with built-in safety precautions are provided in every step of the process to ensure

that the Lilac employee has clear and concise direction, especially because this onsite process poses the greatest risk if the procedure is not followed properly. Training is given to Lilac receiving staff on the steps and any additional safeguards.

6 Training

Lilac personnel receive initial and continuing training in the classroom and on-the-job that teaches them to perform their duties in a way that ensures compliance with applicable hazardous materials standards and regulations as well as to continually enhance safe practices. Additionally, personnel attend tailgate meetings and classroom meetings to reinforce the onsite safety culture. Lilac's operations make them subject to comply with many regulatory programs, therefore several training systems are already in place. Hazard Communication and Hazardous Waste Awareness are some examples of the current curricula that are carried out at Lilac. To supplement these trainings, specific work instructions and SOPs are used as training tools and instructions to complete their duties effectively and safely. This plan is specific to employees that regularly or could reasonably anticipate handling 70% HNO_3 or operating manufacturing equipment that generates NO_2. Training provided will give employees the information they need to understand how to operate safely and why safe operations are necessary. This training program is implemented to ensure the rest of this prevention program is effective.

The following will be implemented:

- All affected employees – including maintenance and contract employees – will receive initial and refresher training. Refresher training will take place at least every 3 years;
- Any time operating procedures are revised, affected employees must be trained on the new procedures and potential hazards;
- Training will be presented both in a formal classroom setting as well as on-the-job training;
- To ensure competency of training material, testing will be provided after classroom training;
- Supervisors and managers observe individual performances on-the-job and will take action when a re-training assessment is made;
- Recent review or revision of training programs will be documented;
- Training materials, schedules, and attendance logs will be documented and retained on site;
- Evaluation of training effectiveness will take place periodically to assess if Lilac meets the goals set out in the learning objectives and Lilac will revise the content and media types, as appropriate.

At a minimum, chemical related training will include:

- The physical and health hazards of HNO_3 or NO_2 as found in the Safety Data Sheet (SDS);

- Industry and site-specific use of HNO_3 or NO_2 including what they are used for, how they are used, where they are used, and where they are stored or generated at Lilac;
- Following Standard Operating Procedures (SOPs) and consequences of deviations from SOPs and steps needed to address deviations;
- Methods and observations used to detect the presence or release of HNO_3 or NO_2 (such as monitoring conducted by the employer, visual appearance or odor of hazardous chemical when being released, etc.);
- Recognizing specific delayed onset of symptoms and signs from over-exposure and knowing what to do both while onsite and at home;
- The measures employees can take to protect themselves from HNO_3 or NO_2 hazards and mitigate potential hazards;
- Required Minimum PPE that must be used (depending on the degree of exposure)
    - Gloves: Medium, or heavyweight Viton, natural rubber, or nitrile over inner surgical-type gloves (double gloving)
    - Eye Protection: acid resistant goggles with plastic face shield
    - Body Protection: long pants and sleeves, acid-resistant apron made from natural rubber, neoprene, or Viton and rubber boots or spat
    - When and what type of respiratory protection is required
- Immediate internal response procedures in response to minor incidences;
- Immediate notification procedures to external agencies and to the appropriate local emergency rescue personnel in response to major incidences.

7 Maintenance

7.1 Tank and Vessels

Lilac has established routine, documented checks on the "Hazardous Waste Tank System Daily Inspection Log" of the various vessels housing the nitric acid. Daily visual inspections take place to ensure that the secondary containments are free of liquid, have no signs of corrosion or damage, and no evidence of leaks. The employees responsible for completing the log are formally trained at least annually and if need be, more informally while on-the-job. Formal tank assessments are done periodically by an independent, qualified Professional Engineer (PE) that is registered in the state of California. The transfer vessels themselves are brand new, never repurposed and are visually checked prior to use and while they are stored. Lilac employees are trained to look for signs of loss of integrity and will not put in use vessels that do not pass a visual inspection. While the vessels are stored onsite, they also undergo a daily visual inspection to ensure that any potential issues are addressed immediately to mitigate any potential leaks.

7.2 Pollution Control Equipment (Scrubbers)

Maintenance of pollution control treatment equipment will include the necessary procedures to ensure proper operation and efficacy of the physical scrubber system and its ventilation systems exhausting to the roof. This equipment is managed in a gas room with negative pressure that will feed any potential NO_2 release back into the system. Full servicing will be completed at least once a month or more depending on manufacture recommendations. This maintenance will include decommissioning, servicing, and recommissioning of the system. Further information can be found in the Pollution Control Operation and Maintenance SOP.

7.3 Forklift

The equipment identified that requires a robust maintenance procedure is the forklift/lift truck used in the process of mobilizing process equipment within the building. The forklift manufacturer provides detailed requirements and recommendations for operating and maintaining it which have been incorporated into the Forklift Maintenance Procedure and in the training. Each operator performs an inspection daily before they operate a forklift. Employees complete the "Mobile Equipment Safety Checklist" and indicate their employee ID # at the bottom and must answer every question. There are two types of pre-shift checks that must be done that are incorporated in the Checklist: a visual check and an operational pre-use check. The visual check is to be done before the start the forklift use. During this check, the general condition of the forklift is observed – tires, fluid levels, battery, overhead guard, rated capacity, obvious damage/leaks, seatbelt. The operational pre-use check is to be conducted when the forklift is turned on, before operating the lift. This check will include lights, horn,

hydraulic hoses, gauges and instruments, brakes, hydraulic controls, steering and unusual noises. If any issues are found during these daily checks, employees report it to their supervisor immediately and the forklift in question is taken out of commission until the issues are resolved. A forklift operator must complete this process for each forklift that is to be used on any given day.

8 Compliance Audits

A compliance audit is a way to evaluate and measure the effectiveness of this risk management program. An audit reviews each of the prevention program elements to ensure that they are up-to-date and are being implemented and will help identify program areas and take corrective actions.

A compliance audit will be completed at least every three years by at least one person knowledgeable in the covered process. A Compliance Audit Checklist is used by a Lilac employee and/or Lilac audit team. During the compliance audit, the auditor will also check on relevant items, writing down comments and recommendations. For example, talking with employees to determine if they have been trained and are familiar with the procedures.

All findings captured in the Compliance Audit Checklist will be reviewed by management to determine an appropriate corrective action to each finding. Once a corrective action is identified, the necessary steps will be taken to implement the corrective action and ensure it is effective. All compliance audits including findings, corrective actions, and corrected items will be documented and retained for five years.

If a compliance audit is conducted by a qualified outside party, such as someone from another part of the company or an expert in the process, an employee who works with or is responsible for the process will join the auditor to understand the findings and answer questions.

9 Emergency Response Program

As outlined in the EAP referenced in Section 6, the Lilac site team will respond to incidental spills and post-spill clean-ups. In the event of a large-scale release requiring emergency response, team will take defensive actions, consistent with HAZWOPER FRO, evacuate and call outside assistance. For these purposes, an uncontained release of more than 2 gallons will be considered an “emergency”. Spills or releases into containment are contained and will not be considered “emergencies”.

Major spill clean-up activities and spill-response information have been coordinated with local emergency responders, the Oakland Fire Department. The phone number, contact information, and contact procedures for local emergency responders are included in the facility spill-response plan. Spill clean-up kits with neutralizing agents and absorbent materials are onsite. Gas-detection systems within the warehouse are available to detect an NO_2 release.

10 Incident Investigation

Incidents can provide valuable information about site hazards and the steps needed to prevent accidental releases. Often, the immediate cause of an incident is the result of a series of other problems that need to be addressed to prevent recurrences.

Incidents which resulted in or could have resulted in a "catastrophic release of a regulated substance" will be investigated. A catastrophic release is one that presents an imminent and substantial endangerment to public health and the environment. If the incident meets the criteria for including in the five-year accident history, it warrants an incident investigation. Minor accidents or near misses will also be investigated to help identify problems that could lead to more serious accidents. The Incident Investigation Form will be utilized during an investigation.

The following actions will be taken for incident investigations:

- Initiate the investigation promptly. Begin investigation no later than 48 hours following the accident.
- Establish a knowledgeable investigation team. Establish an investigation team to gather the facts, analyze the event, and develop the "how" and "why" of what went wrong. At least one team member must have knowledge of the process. Consider adding other workers familiar with the process to the incident team. Their additional knowledge will assist in the fullest insight into the incident.
- Summarize the investigation in a report. Among other things, this report will include the factors contributing to the incident. Identifying the root cause may be more important than identifying the initiating event for the purpose of taking appropriate corrective action.
- Address the team's findings and recommendations. Incident report findings and recommendations will be evaluated by management to take appropriate corrective action. All corrective actions and resolutions will be documented.
- Review the report with staff and contractors. Investigation reports including its findings and recommendations will be reviewed with affected workers whose job tasks are relevant to the incident.
- Retain the report. Incident investigation summaries including a summary of the accident, recommendations, and actions will be retained for five years.

11 RMP Certification

Based on the criteria in Section 2735.4 of Title 19 of CCR, covered processes at this facility are eligible for, and subject to Program 2 requirements.

The undersigned certifies that, to the best of my knowledge, information, and belief formed after reasonable inquiry, the information submitted is true, accurate, and complete.

Dennis Veymit	EHS Manager, Process Engineer	8-18-2021
Signature	Title	Date Signed

12 Appendix A: Chemical Information

12.1 Nitric acid NIOSH Pocket Guide, DHHS (NIOSH) Publication No. 2005-149, page 225

Nitric acid	**Formula:** HNO_3	**CAS#:** 7697-37-2	**RTECS#:** QU5775000	**IDLH:** 25 ppm
Conversion: 1 ppm = 2.58 mg/m³	**DOT:** 2032 157 (fuming); 2031 157 (other than red fuming)			
Synonyms/Trade Names: Aqua fortis, Engravers acid, Hydrogen nitrate, Red fuming nitric acid (RFNA), White fuming nitric acid (WFNA)				
Exposure Limits: **NIOSH REL:** TWA 2 ppm (5 mg/m³) ST 4 ppm (10 mg/m³) **OSHA PEL†:** TWA 2 ppm (5 mg/m³)			**Measurement Methods (see Table 1):** **NIOSH** 7903 **OSHA** ID165SG	
Physical Description: Colorless, yellow, or red, fuming liquid with an acrid, suffocating odor. [**Note:** Often used in an aqueous solution. Fuming nitric acid is concentrated nitric acid that contains dissolved nitrogen dioxide.]				
Chemical & Physical Properties: **MW:** 63.0 **BP:** 181°F **Sol:** Miscible **FlP:** NA **IP:** 11.95 eV **Sp.Gr(77°F):** 1.50 **VP:** 48 mmHg **FRZ:** -44°F **UEL:** NA **LEL:** NA Noncombustible Liquid, but increases the flammability of combustible materials.	**Personal Protection/Sanitation (see Table 2):** **Skin:** Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** When contam **Remove:** When wet or contam **Change:** N.R. **Provide:** Eyewash (pH<2.5) Quick drench (pH<2.5)	**Respirator Recommendations (see Tables 3 and 4):** **NIOSH/OSHA** **25 ppm:** Sa:Cf*/CcrFS¿/GmFS¿/ ScbaF/SaF **§:** ScbaF:Pd,Pp/SaF:Pd,Pp:AScba **Escape:** GmFS¿/ScbaE		
	Incompatibilities and Reactivities: Combustible materials, metallic powders, hydrogen sulfide, carbides, alcohols [**Note:** Reacts with water to produce heat. Corrosive to metals.]			
Exposure Routes, Symptoms, Target Organs (see Table 5): **ER:** Inh, Ing, Con **SY:** Irrit eyes, skin, muc memb; delayed pulm edema, pneu, bron; dental erosion **TO:** Eyes, skin, resp sys, teeth		**First Aid (see Table 6):** **Eye:** Irr immed **Skin:** Water flush immed **Breath:** Resp support **Swallow:** Medical attention immed		

12.2 NIOSH International Chemical Safety Card (ICSC) – Nitric Acid (ICSC#0183)

NITRIC ACID (> 70% in water) **ICSC: 0183**
November 2016

CAS #: 7697-37-2
UN #: 2031
EC Number: 231-714-2

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Not combustible but enhances combustion of other substances. Gives off irritating or toxic fumes (or gases) in a fire. Risk of fire and explosion on contact with incompatible substances. See Chemical Dangers.	NO contact with incompatible materials: See Chemical Dangers	Use water in large amounts, carbon dioxide. NO powder, foam. In case of fire: keep drums, etc., cool by spraying with water. NO direct contact of the substance with water.

AVOID ALL CONTACT! IN ALL CASES CONSULT A DOCTOR!			
	SYMPTOMS	**PREVENTION**	**FIRST AID**
Inhalation	Cough. Sore throat. Burning sensation. Shortness of breath. Laboured breathing.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer immediately for medical attention.
Skin	Pain. Yellow staining of the skin. Serious skin burns.	Protective gloves. Protective clothing. Apron.	Wear protective gloves when administering first aid. First rinse with plenty of water for at least 15 minutes, then remove contaminated clothes and rinse again. Refer immediately for medical attention .
Eyes	Redness. Pain. Severe burns.	Wear face shield or eye protection in combination with breathing protection.	Rinse with plenty of water for several minutes (remove contact lenses if easily possible). Refer immediately for medical attention.
Ingestion	Burns in mouth and throat. Burning sensation behind the breastbone. Abdominal pain. Vomiting. Shock or collapse.	Do not eat, drink, or smoke during work.	Rinse mouth. Give nothing to drink. Do NOT induce vomiting. Refer immediately for medical attention.

SPILLAGE DISPOSAL

Evacuate danger area! Consult an expert! Personal protection: chemical protection suit including self-contained breathing apparatus. Do NOT absorb in saw-dust or other combustible absorbents. Ventilation. Collect leaking liquid in sealable containers. Cautiously neutralize remainder with sodium carbonate. Then wash away with plenty of water.

STORAGE

Separated from combustible substances, reducing agents, bases, organic chemicals and food and feedstuffs. Cool. Dry. Keep in a well-ventilated room. Store only in original container.

PACKAGING

Unbreakable packaging.
Put breakable packaging into closed unbreakable container.
Do not transport with food and feedstuffs.

CLASSIFICATION & LABELLING

According to UN GHS Criteria

DANGER

May be corrosive to metals
May intensify fire; oxidizer
May cause respiratory irritation
Causes severe skin burns and eye damage
See Notes

Transportation
UN Classification
UN Hazard Class: 8; UN Subsidiary Risks: 5.1; UN Pack Group: I

International Labour Organization
World Health Organization

Prepared by an international group of experts on behalf of ILO and WHO, with the financial assistance of the European Commission.

European Commission

NITRIC ACID (> 70% in water) **ICSC: 0183**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS-TO-YELLOW LIQUID WITH PUNGENT ODOUR.

Physical dangers
No data.

Chemical dangers
Decomposes on warming. This produces toxic and irritating fumes and gases including nitrogen oxides. The substance is a strong oxidant. It reacts violently with combustible and reducing materials, such as turpentine, charcoal and alcohol. The substance is a strong acid. It reacts violently with bases and is corrosive to metals. This produces flammable/explosive gas (hydrogen - see ICSC 0001). Reacts violently with organic compounds.

Formula: HNO_3
Molecular mass: 63.0
Boiling point: 121°C
Melting point: -41.6°C
Relative density (water = 1): 1.4
Solubility in water at 20°C: miscible
Vapour pressure, kPa at 20°C: 6.4
Relative vapour density (air = 1): 2.2
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.07
Octanol/water partition coefficient as log Pow: -0.21

EXPOSURE & HEALTH EFFECTS

Routes of exposure
Serious local effects by all routes of exposure.

Effects of short-term exposure
The substance is corrosive to the eyes, skin and respiratory tract. Corrosive on ingestion. Inhalation may cause asthma-like reactions (RADS). Exposure could cause asphyxiation due to swelling in the throat. Inhalation of high concentrations may cause pneumonitis and lung oedema. See Notes.

Inhalation risk
A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
Repeated or prolonged inhalation may cause effects on the teeth. This may result in tooth erosion. The substance may have effects on the upper respiratory tract and lungs. This may result in chronic inflammation of the respiratory tract and reduced lung function . Mists of this strong inorganic acid are carcinogenic to humans. See Notes.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 2 ppm as TWA; 4 ppm as STEL.
EU-OEL: 2.6 mg/m^3, 1 ppm as STEL

ENVIRONMENT

NOTES

The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential.
IARC considers mists of strong inorganic acid to be carcinogenic (group 1). However there is no information available on the carcinogenicity of other physical forms of this substance. Therefore no classification for carcinogenicity under GHS has been applied.
NEVER pour water into this substance; when dissolving or diluting always add it slowly to the water.
The odour warning when the exposure limit value is exceeded is insufficient.
Rinse contaminated clothing with plenty of water because of fire hazard.

ADDITIONAL INFORMATION

EC Classification
Symbol: O, C; R: 8-35; S: (1/2)-23-26-36-45; Note: B

12.3 Nitrogen dioxide NIOSH Pocket Guide, DHHS (NIOSH) Publication No. 2005-149, page 228

Nitrogen dioxide	Formula: NO_2	CAS#: 10102-44-0	RTECS#: QW9800000	IDLH: 20 ppm
Conversion: 1 ppm = 1.88 mg/m³	DOT: 1067 124			
Synonyms/Trade Names: Dinitrogen tetroxide (N_2O_4), Nitrogen peroxide				
Exposure Limits: **NIOSH REL:** ST 1 ppm (1.8 mg/m³) **OSHA PEL†:** C 5 ppm (9 mg/m³)			Measurement Methods (see Table 1): **NIOSH** 6014 **OSHA** ID182	
Physical Description: Yellowish-brown liquid or reddish-brown gas (above 70°F) with a pungent, acrid odor. [**Note:** In solid form (below 15°F) it is found structurally as N_2O_4.]				
Chemical & Physical Properties: **MW:** 46.0 **BP:** 70°F **Sol:** Reacts **FI.P:** NA **IP:** 9.75 eV **RGasD:** 2.62 **Sp.Gr:** 1.44 (Liquid at 68°F) **VP:** 720 mmHg **FRZ:** 15°F **UEL:** NA **LEL:** NA Noncombustible Liquid/Gas, but will accelerate the burning of combustible materials.	Personal Protection/Sanitation (see Table 2): **Skin:** Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** When contam **Remove:** When wet or contam **Change:** N.R. **Provide:** Eyewash Quick drench	Respirator Recommendations (see Tables 3 and 4): **NIOSH** **20 ppm:** Sa:Cf£/ScbaF/SaF **§:** ScbaF:Pd,Pp/SaF:Pd,Pp:AScba **Escape:** GmFS¿/ScbaE		
Incompatibilities and Reactivities: Combustible material, water, chlorinated hydrocarbons, carbon disulfide, ammonia [**Note:** Reacts with water to form nitric acid.]				
Exposure Routes, Symptoms, Target Organs (see Table 5): **ER:** Inh, Ing, Con **SY:** Irrit eyes, nose, throat; cough, mucoid frothy sputum, decr pulm func, chronic bron, dysp; chest pain; pulm edema, cyan, tachypnea, tacar **TO:** Eyes, resp sys, CVS		First Aid (see Table 6): **Eye:** Irr immed **Skin:** Water flush immed **Breath:** Resp support **Swallow:** Medical attention immed		

12.4 NIOSH International Chemical Safety Card (ICSC) – Nitrogen Dioxide (ICSC#0930)

NITROGEN DIOXIDE **ICSC: 0930**

Dinitrogen tetroxide (see notes)
Nitrogen tetroxide
Nitrogen peroxide

October 2013

CAS #: 10102-44-0
UN #: 1067
EC Number: 233-272-6

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Not combustible but enhances combustion of other substances.	NO contact with combustible substances.	In case of fire in the surroundings, use appropriate extinguishing media. In case of fire: keep cylinder cool by spraying with water.

AVOID ALL CONTACT! IN ALL CASES CONSULT A DOCTOR!

	SYMPTOMS	PREVENTION	FIRST AID
Inhalation	Cough. Sore throat. Shortness of breath. Dizziness. Headache. Burning sensation. Laboured breathing. Nausea. Symptoms may be delayed. See Notes.	Use breathing protection, closed system or ventilation.	Fresh air, rest. Half-upright position. Administration of oxygen may be needed. Refer immediately for medical attention.
Skin	Redness. Burning sensation. Pain. Serious skin burns.	Protective gloves. Protective clothing.	First rinse with plenty of water for at least 15 minutes, then remove contaminated clothes and rinse again. Refer immediately for medical attention.
Eyes	Redness. Pain. Severe burns.	Wear safety goggles or eye protection in combination with breathing protection.	Rinse with plenty of water for several minutes (remove contact lenses if easily possible). Refer immediately for medical attention.
Ingestion	Burns in mouth and throat.	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer immediately for medical attention.

SPILLAGE DISPOSAL

Evacuate danger area! Consult an expert! Personal protection: gas-tight chemical protection suit including self-contained breathing apparatus. Ventilation. Do NOT absorb in saw-dust or other combustible absorbents. Remove vapour with fine water spray. Neutralize used water with chalk or soda.

STORAGE

Ventilation along the floor. Separated from combustible substances and reducing agents.

PACKAGING

CLASSIFICATION & LABELLING

According to UN GHS Criteria

DANGER

Contains gas under pressure; may explode if heated
May cause or intensify fire; oxidizer
Fatal if inhaled
Causes severe skin burns and eye damage
Causes damage to lungs
Causes damage to the lungs through prolonged or repeated exposure

Transportation
UN Classification
UN Hazard Class: 2.3; UN Subsidiary Risks: 5.1 and 8

Prepared by an international group of experts on behalf of ILO and WHO, with

the financial assistance of the European Commission.

NITROGEN DIOXIDE **ICSC: 0930**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
REDDISH-BROWN GAS OR BROWN OR YELLOW LIQUID WITH PUNGENT ODOUR.

Physical dangers
The gas is heavier than air.

Chemical dangers
The substance is a strong oxidant. It reacts violently with combustible and reducing materials. Reacts with water. This produces nitric acid and nitric oxide. Attacks many metals in the presence of water.

Formula: NO_2
Molecular mass: 46.0
Boiling point: 21.2°C
Melting point: -11.2°C
Relative density (water = 1): 1.45 (liquid)
Solubility in water: reaction
Vapour pressure, kPa at 20°C: 96
Relative vapour density (air = 1): 1.58

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation.

Effects of short-term exposure
The substance is corrosive to the eyes, skin and respiratory tract. Exposure at high concentrations could cause asphyxiation due to swelling in the throat. Inhalation of the gas or vapour may cause lung oedema. See Notes. Exposure far above the OEL could cause death. The effects may be delayed. Severe effects may occur following a prolonged symptom-free period. Medical observation is indicated.

Inhalation risk
A harmful concentration of this gas in the air will be reached very quickly on loss of containment.

Effects of long-term or repeated exposure
The substance may have effects on the lungs. This may result in impaired functions and decreased resistance to infection.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 0.2 ppm as TWA; A4 (not classifiable as a human carcinogen).
MAK: 0.95 mg/m^3, 0.5 ppm; peak limitation category: I(1); carcinogen category: 3; pregnancy risk group: D.
EU-OEL: 0.96 mg/m^3, 0.5 ppm as TWA; 1.91 mg/m^3, 1 ppm as STEL

ENVIRONMENT

NOTES

The commercial brown liquid under pressure is an equilibrium mixture of nitrogen dioxide and the colourless nitrogen tetroxide (CAS 10544-72-6).
Non irritant concentration may cause lung oedema.
The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential.
Immediate administration of an appropriate inhalation therapy by a doctor, or by an authorized person, should be considered.
Rinse contaminated clothing with plenty of water because of fire hazard.
Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.

ADDITIONAL INFORMATION

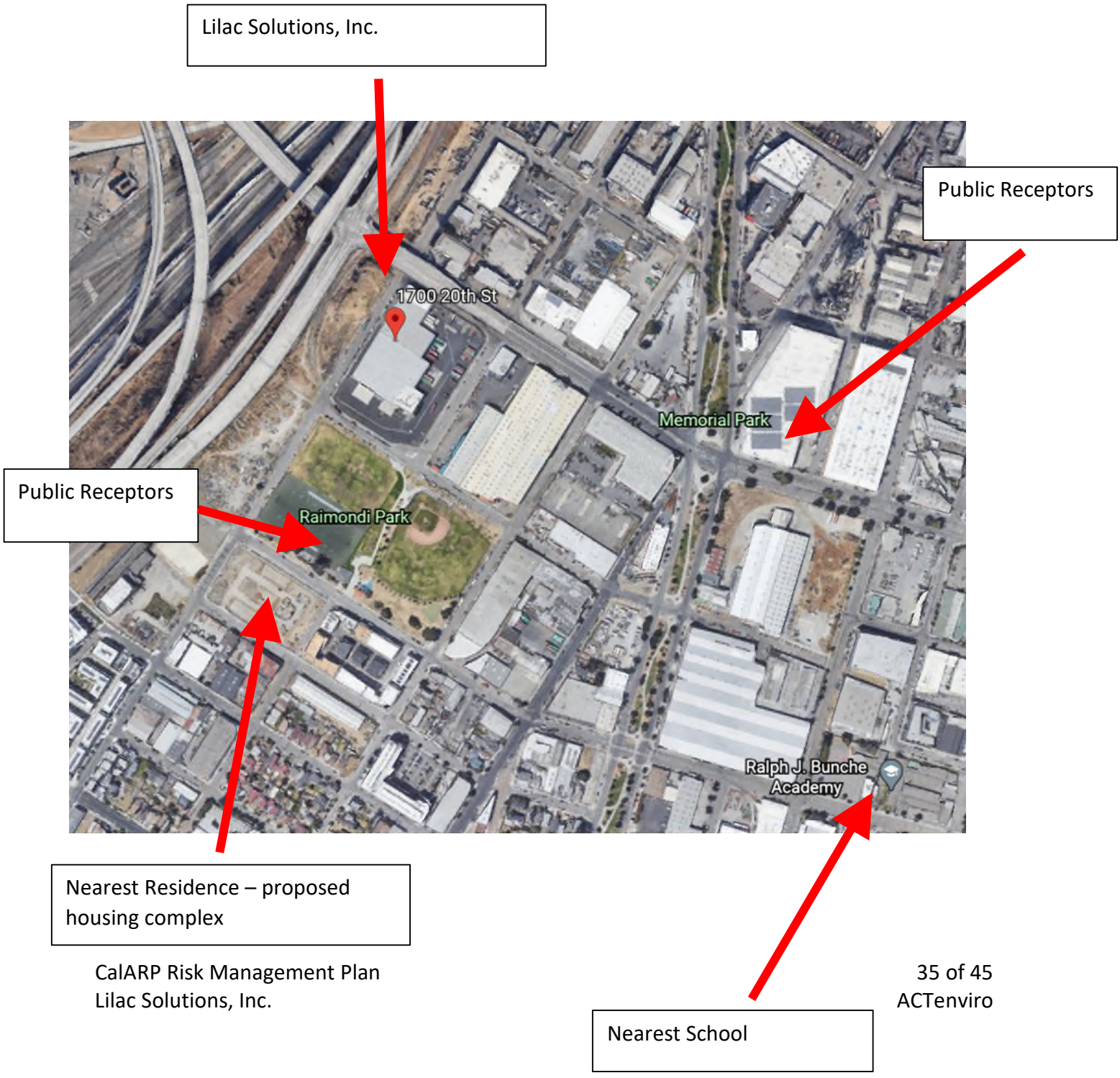
EC Classification
Symbol: O, T+; R: 8-26-34; S: (1/2)-9-26-28-36/37/39-45; Note: 5

13 Appendix B: Site Layout and Chemical Storage Locations

HNO_3 and NO_2 processing and generation areas

14 Appendix C: Residential/Public Receptor Map

Google Earth map indicates location of Lilac with respect to residential and public receptors



15 Appendix D: Registration Information

Stationary source name,	Lilac Solutions, Inc.
street, city, county, state, zip code,	1700 20th Street, Oakland, CA 94607
latitude, and longitude, method for obtaining latitude and longitude,	37.81822, -122.29348 Google Earth
description of location that latitude and longitude represent;	Lilac Solutions facility
The stationary source Dun and Bradstreet number;	N/A
Name and Dun and Bradstreet number of the corporate parent company;	N/A
The name, telephone number, and mailing address of the owner or operator;	Dennis Neymit (805) 710-5333 1700 20th Street Oakland, CA 94607
The name and title of the person or position with overall responsibility for RMP elements and implementation, and (optional) the e-mail address for that person or position;	Dennis Neymit – Process Engineer and EHS Manager dennis@lilacsolutions.com
The name, title, telephone number, and 24-hour telephone number, and, as of June 21, 2004, the e-mail address (if an e-mail address exists) of the emergency contact;	Dennis Neymit – Process Engineer and EHS Manager Tel: (805) 710-5333 24 hr: (805) 710-5333 dennis@lilacsolutions.com
For each covered process, the name and CAS number of each regulated substance held above the threshold quantity in the process, the maximum quantity of each regulated substance or mixture in the process (in pounds) to two significant digits,	Nitric acid (HNO_3) CAS: 7697-37-2 32,000 pounds Nitrogen dioxide (NO_2) CAS: 10102-44-0 200 pounds
the five- or six-digit NAICS code that most closely corresponds to the process,	541330
Program level of the process	2
The stationary source USEPA identifier;	CAR000314864
The number of full-time employees at the stationary source;	58
Whether the stationary source is subject to Section 5189 of Title 8 of CCR;	No

Whether the stationary source is subject to Part 355 of Title 40 of CFR;	No
If the stationary source has a CAA Title V operating permit, the permit number;	Not Applicable
The date of the last safety inspection of the stationary source by a federal, state, or local government agency and the identity of the inspecting entity;	April 25, 2019 Alameda County Department of Environmental Health (ACDEH)
As of June 21, 2004, the name, the mailing address, and the telephone number of the contractor who prepared the RMP (if any);	ACTenviro, Inc. 2010 W. Mission Rd, Escondido, CA 92029 (760) 489-5600
As of June 21, 2004, the type of and reason for any changes being made to a previously submitted RMP; the types of changes to RMP are categorized as follows:	N/A
Updates and re-submissions required under Section 2745.10(a) or (b);	N/A
Corrections under Section 2745.10.5 or for purposes of correcting minor clerical errors, updating administrative information, providing missing data elements or reflecting facility ownership changes, and which do not require an update and re-submission as specified in Section 2745.10(a) or (b);	N/A
De-registrations required under Section 2745.10(c) or (d); and,	N/A
Withdrawals of an RMP for any facility that was erroneously considered subject to the CalARP Program.	N/A

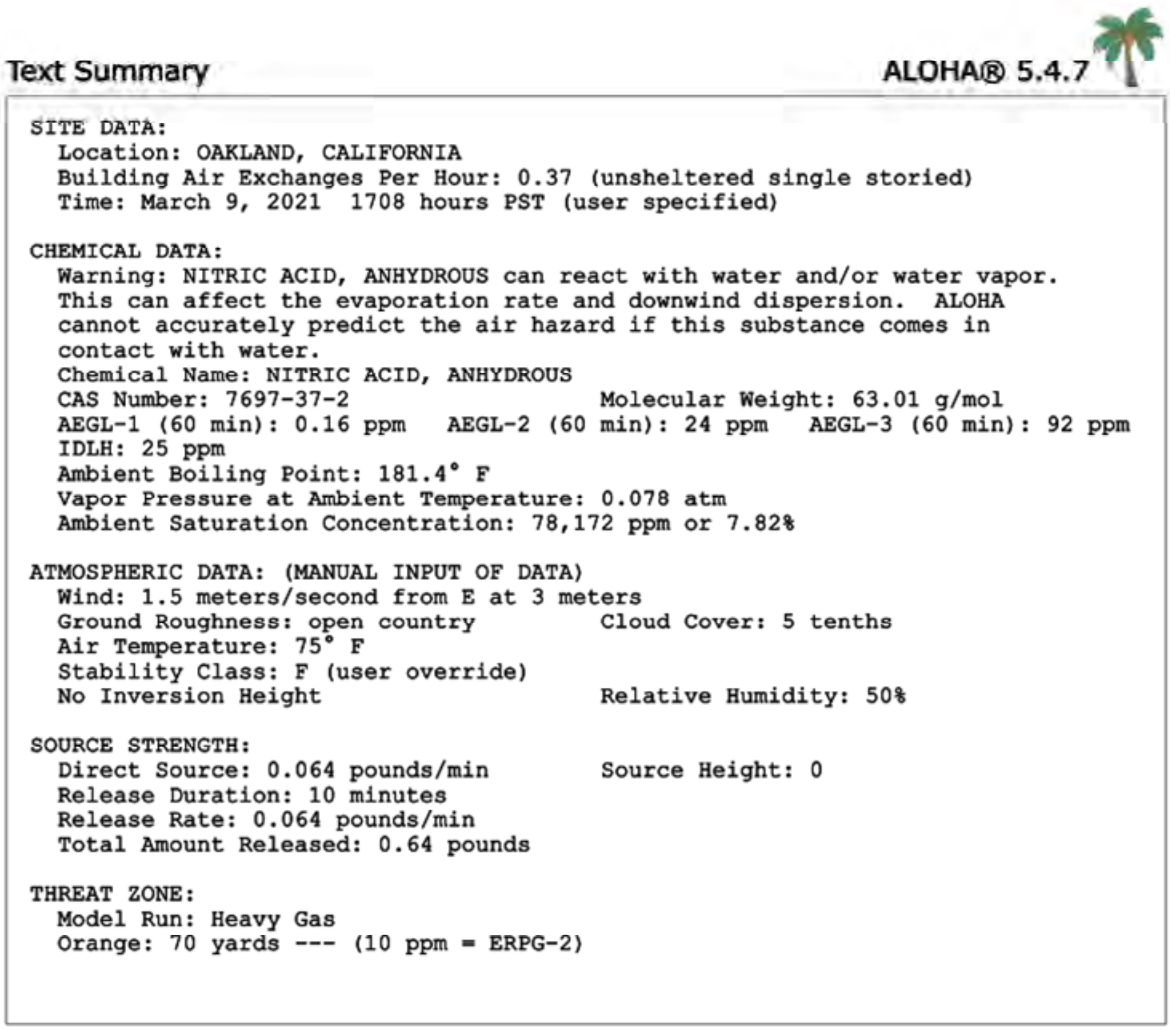
16 Appendix E: Off-Site Consequence Analysis Calculations

Nitric Acid Worst Case ALOHA Model:

Text Summary ALOHA® 5.4.7

```
SITE DATA:
  Location: OAKLAND, CALIFORNIA
  Building Air Exchanges Per Hour: 0.37 (unsheltered single storied)
  Time: March 9, 2021  1708 hours PST (user specified)

CHEMICAL DATA:
  Warning: NITRIC ACID, ANHYDROUS can react with water and/or water vapor.
  This can affect the evaporation rate and downwind dispersion.  ALOHA
  cannot accurately predict the air hazard if this substance comes in
  contact with water.
  Chemical Name: NITRIC ACID, ANHYDROUS
  CAS Number: 7697-37-2                  Molecular Weight: 63.01 g/mol
  AEGL-1 (60 min): 0.16 ppm   AEGL-2 (60 min): 24 ppm   AEGL-3 (60 min): 92 ppm
  IDLH: 25 ppm
  Ambient Boiling Point: 181.4° F
  Vapor Pressure at Ambient Temperature: 0.078 atm
  Ambient Saturation Concentration: 78,172 ppm or 7.82%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
  Wind: 1.5 meters/second from E at 3 meters
  Ground Roughness: open country         Cloud Cover: 5 tenths
  Air Temperature: 75° F
  Stability Class: F (user override)
  No Inversion Height                    Relative Humidity: 50%

SOURCE STRENGTH:
  Direct Source: 0.1 pounds/min          Source Height: 0
  Release Duration: 10 minutes
  Release Rate: 0.1 pounds/min
  Total Amount Released: 1.00 pounds

THREAT ZONE:
  Model Run: Heavy Gas
  Orange: 86 yards --- (10 ppm = ERPG-2)
```

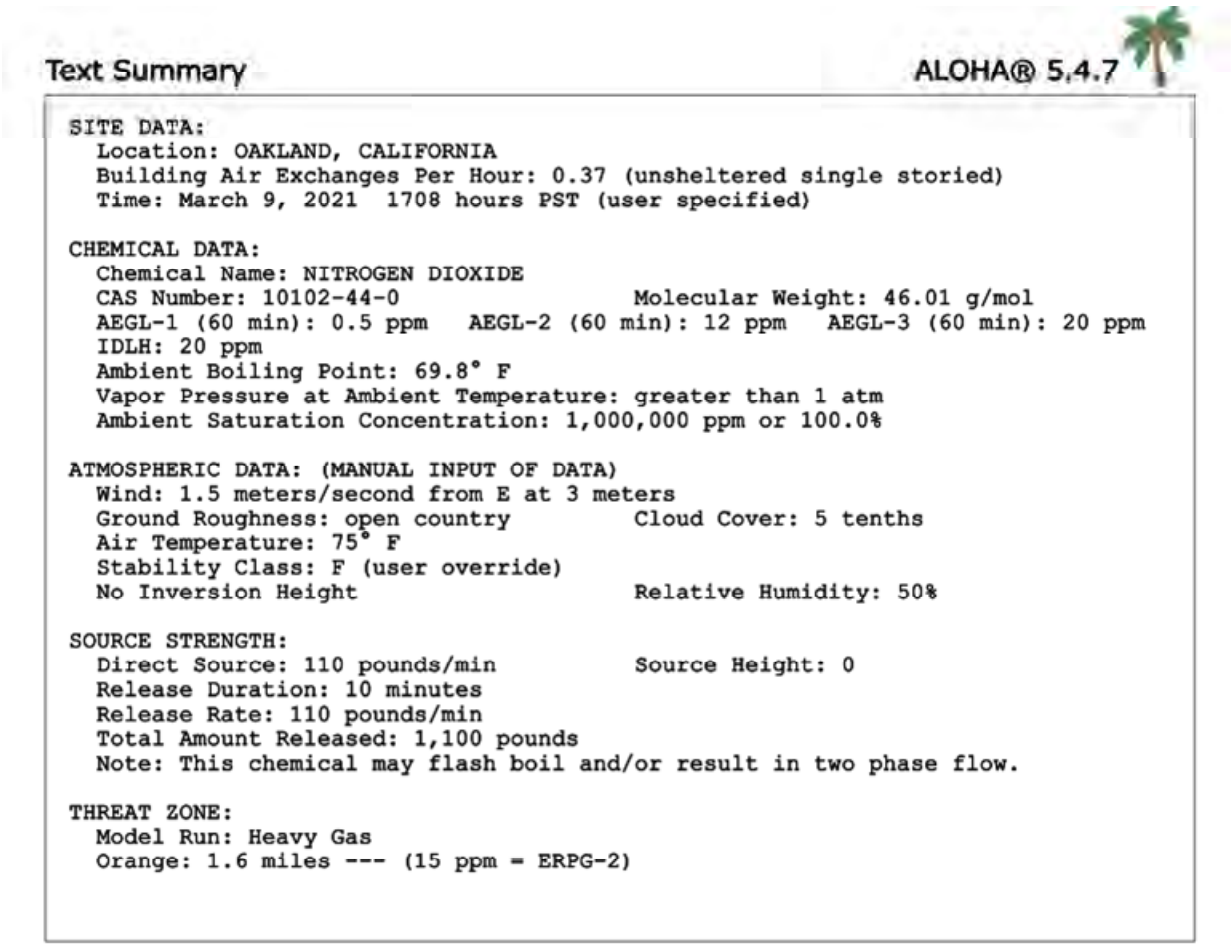
Nitric Acid Alternate Scenario ALOHA Model:



Text Summary ALOHA® 5.4.7

```
SITE DATA:
  Location: OAKLAND, CALIFORNIA
  Building Air Exchanges Per Hour: 0.37 (unsheltered single storied)
  Time: March 9, 2021  1708 hours PST (user specified)

CHEMICAL DATA:
  Warning: NITRIC ACID, ANHYDROUS can react with water and/or water vapor.
  This can affect the evaporation rate and downwind dispersion.  ALOHA
  cannot accurately predict the air hazard if this substance comes in
  contact with water.
  Chemical Name: NITRIC ACID, ANHYDROUS
  CAS Number: 7697-37-2                  Molecular Weight: 63.01 g/mol
  AEGL-1 (60 min): 0.16 ppm   AEGL-2 (60 min): 24 ppm   AEGL-3 (60 min): 92 ppm
  IDLH: 25 ppm
  Ambient Boiling Point: 181.4° F
  Vapor Pressure at Ambient Temperature: 0.078 atm
  Ambient Saturation Concentration: 78,172 ppm or 7.82%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
  Wind: 1.5 meters/second from E at 3 meters
  Ground Roughness: open country         Cloud Cover: 5 tenths
  Air Temperature: 75° F
  Stability Class: F (user override)
  No Inversion Height                    Relative Humidity: 50%

SOURCE STRENGTH:
  Direct Source: 0.064 pounds/min        Source Height: 0
  Release Duration: 10 minutes
  Release Rate: 0.064 pounds/min
  Total Amount Released: 0.64 pounds

THREAT ZONE:
  Model Run: Heavy Gas
  Orange: 70 yards --- (10 ppm = ERPG-2)
```

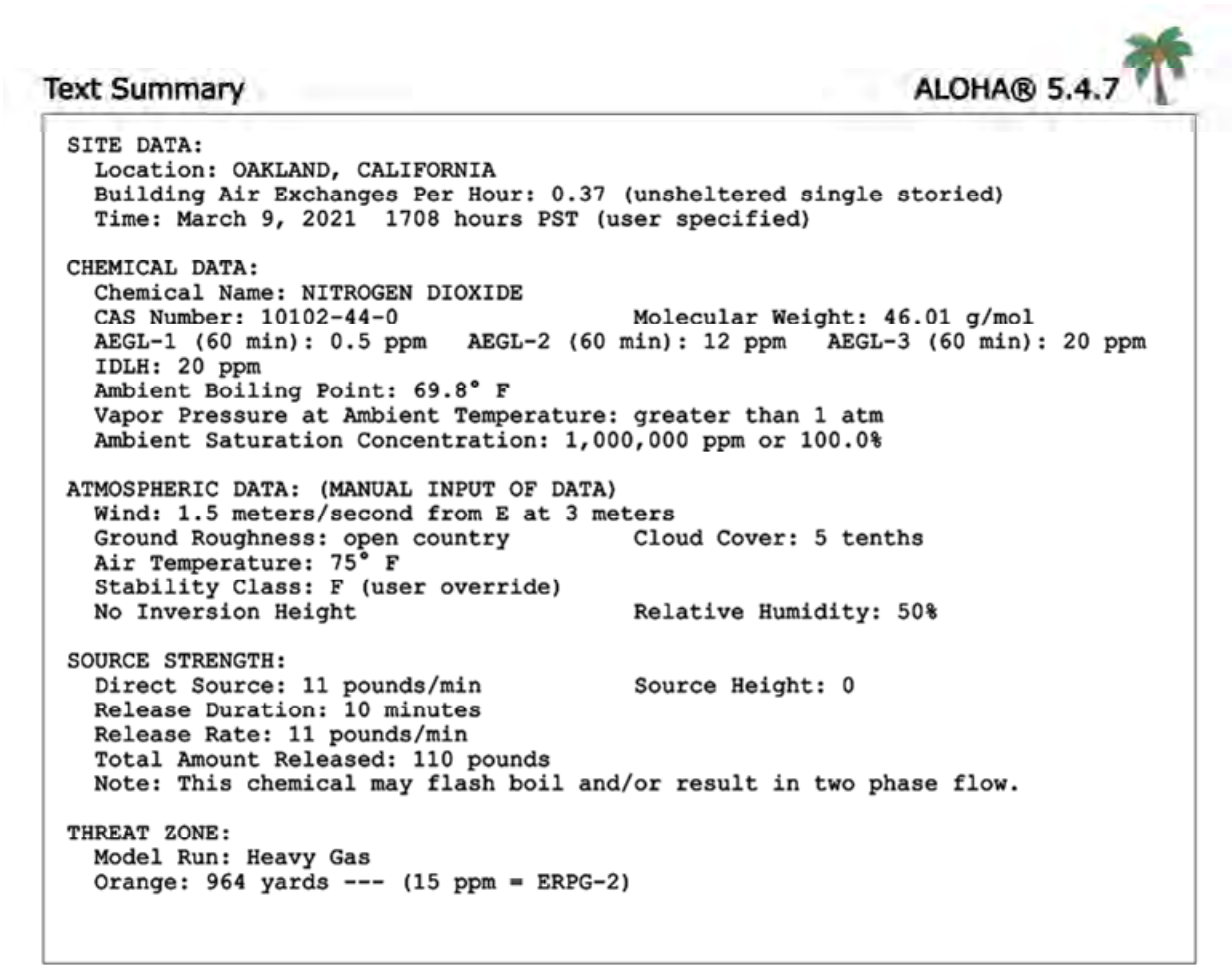
Nitrogen Dioxide Worst Case ALOHA Model:



Text Summary ALOHA® 5.4.7

```
SITE DATA:
  Location: OAKLAND, CALIFORNIA
  Building Air Exchanges Per Hour: 0.37 (unsheltered single storied)
  Time: March 9, 2021  1708 hours PST (user specified)

CHEMICAL DATA:
  Chemical Name: NITROGEN DIOXIDE
  CAS Number: 10102-44-0                  Molecular Weight: 46.01 g/mol
  AEGL-1 (60 min): 0.5 ppm   AEGL-2 (60 min): 12 ppm   AEGL-3 (60 min): 20 ppm
  IDLH: 20 ppm
  Ambient Boiling Point: 69.8° F
  Vapor Pressure at Ambient Temperature: greater than 1 atm
  Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
  Wind: 1.5 meters/second from E at 3 meters
  Ground Roughness: open country          Cloud Cover: 5 tenths
  Air Temperature: 75° F
  Stability Class: F (user override)
  No Inversion Height                     Relative Humidity: 50%

SOURCE STRENGTH:
  Direct Source: 110 pounds/min           Source Height: 0
  Release Duration: 10 minutes
  Release Rate: 110 pounds/min
  Total Amount Released: 1,100 pounds
  Note: This chemical may flash boil and/or result in two phase flow.

THREAT ZONE:
  Model Run: Heavy Gas
  Orange: 1.6 miles --- (15 ppm = ERPG-2)
```

Nitrogen Dioxide Alternate Scenario ALOHA Model:



Text Summary ALOHA® 5.4.7

```
SITE DATA:
  Location: OAKLAND, CALIFORNIA
  Building Air Exchanges Per Hour: 0.37 (unsheltered single storied)
  Time: March 9, 2021  1708 hours PST (user specified)

CHEMICAL DATA:
  Chemical Name: NITROGEN DIOXIDE
  CAS Number: 10102-44-0                  Molecular Weight: 46.01 g/mol
  AEGL-1 (60 min): 0.5 ppm   AEGL-2 (60 min): 12 ppm   AEGL-3 (60 min): 20 ppm
  IDLH: 20 ppm
  Ambient Boiling Point: 69.8° F
  Vapor Pressure at Ambient Temperature: greater than 1 atm
  Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
  Wind: 1.5 meters/second from E at 3 meters
  Ground Roughness: open country          Cloud Cover: 5 tenths
  Air Temperature: 75° F
  Stability Class: F (user override)
  No Inversion Height                     Relative Humidity: 50%

SOURCE STRENGTH:
  Direct Source: 11 pounds/min            Source Height: 0
  Release Duration: 10 minutes
  Release Rate: 11 pounds/min
  Total Amount Released: 110 pounds
  Note: This chemical may flash boil and/or result in two phase flow.

THREAT ZONE:
  Model Run: Heavy Gas
  Orange: 964 yards --- (15 ppm = ERPG-2)
```