Memorandum

To: Darren Levitt, Sea Breeze Properties

From: James Westbrook, BlueScape Environmental

Date: February 16, 2023

Subject: Project Number PRJ-1059203: Merge 56 Development; Research & Development Facility Hazardous Materials Screening Health Risk Assessment for Potential Impacts on a Proposed Child Care Center and the Nearest Residences

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BlueScape conducted an initial screening assessment of the potential health risk impacts from storage and use of hazardous materials at the future proposed Research and Development (R&D) facility, that is part of proposed changes to the Merge 56 development project (Project). The R&D facility will be located within 1,000 feet of a child care center and within 1,000 feet of on-site residences that are also proposed for the Merge 56 development; as well as within 1,000 feet of off-site residences that are not part of the Project. The assessment is being conducted as requested by the City in the Project Issues Report (PRJ-1059203) dated September 13, 2022; and as requested in a conference call on January 31, 2023, in which the City requested an update to this analysis to include potential impacts on nearby residences.

The Project Issues Report (PRJ-1059203) makes the following statement on page 10 (Comment 00048):

An updated Air Quality Technical Memorandum will be required for the proposed project... *the Updated Air Quality Technical Memorandum may include a HRA covering emissions from the proposed uses or this analysis may be covered with a stand-alone HRA covering accidental spills/explosions etc. risk for the proposed deviation locating the childcare center within 1,000 feet of R&D uses.*

Applicability of the Child Care Center Deviation Requirement

The City of San Diego requires developers to comply with the Conditional Use Permit (CUP) requirements for allowing a child care center to be located within 1,000 feet of a use that may handle or store hazardous materials. Per San Diego Municipal Code Chapter 14, Article 1, Division 6, Section 141.0606 (City Code) part (c)(1) and (2):

(c) Child Care Centers … may be permitted with a Conditional Use Permit … subject to the following regulations:

(1) Child care centers are not permitted within 1,000 feet of any known business that:

(A) Has or is required to have a permit from the County of San Diego Hazardous Materials Division … and handles regulated substances above the Threshold Quantity as listed in the California Code of Regulations, Title 19 Section 2770.5;

(B) Handles compressed flammable gases in excess of 1,500 pounds; or

(C) Handles flammable liquids in excess of 10,000 gallons.

(2) The 1,000-foot separation distance shall be measured from the property line of the proposed child care facility to the use, storage, or handling areas for the regulated substances. Businesses may satisfy the separation requirements on-site. The child care center operator has the burden of proof of demonstrating compliance with the separation requirement.

To comply with the CUP requirement, a project that exceeds the amounts of hazardous material storage or usage listed in the City Code, and is located within 1,000 feet of a child care center, would require a deviation per City Code part (c)(4), which states:

(4) Deviations from the hazardous materials separation requirements may be permitted with a Conditional Use Permit decided in accordance with Process Three. Issuance of the permit will be based in part on a "Health Risk Assessment Study" to be submitted by the applicant.

It is not expected that City Code (c)(1) will apply to any future tenants moving into the new R&D buildings on the Project site. Typically, R&D laboratories do not use or store hazardous materials in excess of the quantities stated in (c)(1)(A), (B) or (C). Therefore, it is not expected that the Project will require a deviation as stated in (c)(4), and a deviation is not proposed at this time.

However, this screening HRA has been prepared to initially discuss, at a high-level, the possible impact of any releases of chemicals that R&D facilities may use on the proposed child care center and nearest residences. See Figure 1 for the measurements between the two of three proposed R&D facility buildings that are within 1,000 feet of the proposed child care center, and for the measurements between the R&D buildings and the nearest on-site residences. Figure 2 shows the measurement between the closest R&D buildings and the nearest off-site residences. The nearest R&D facility to the child care center, labeled "R&D Bldg. 1", is located approximately 162 feet west of the child care center. The next nearest R&D facility, labeled "R&D Bldg. 2", is located approximately 884 feet west of the child care center. The 3rd proposed building is not with 1,000 feet of the proposed child care center. The nearest on-site residence is located approximately 90 feet south of R&D Bldg. 1. The nearest off-site residences within 1,000 feet of the R&D buildings are located approximately 500 feet south of R&D Bldg. 1; 750 feet northeast of R&D Bldg. 2; and 975 feet northeast of R&D Bldg. 3.

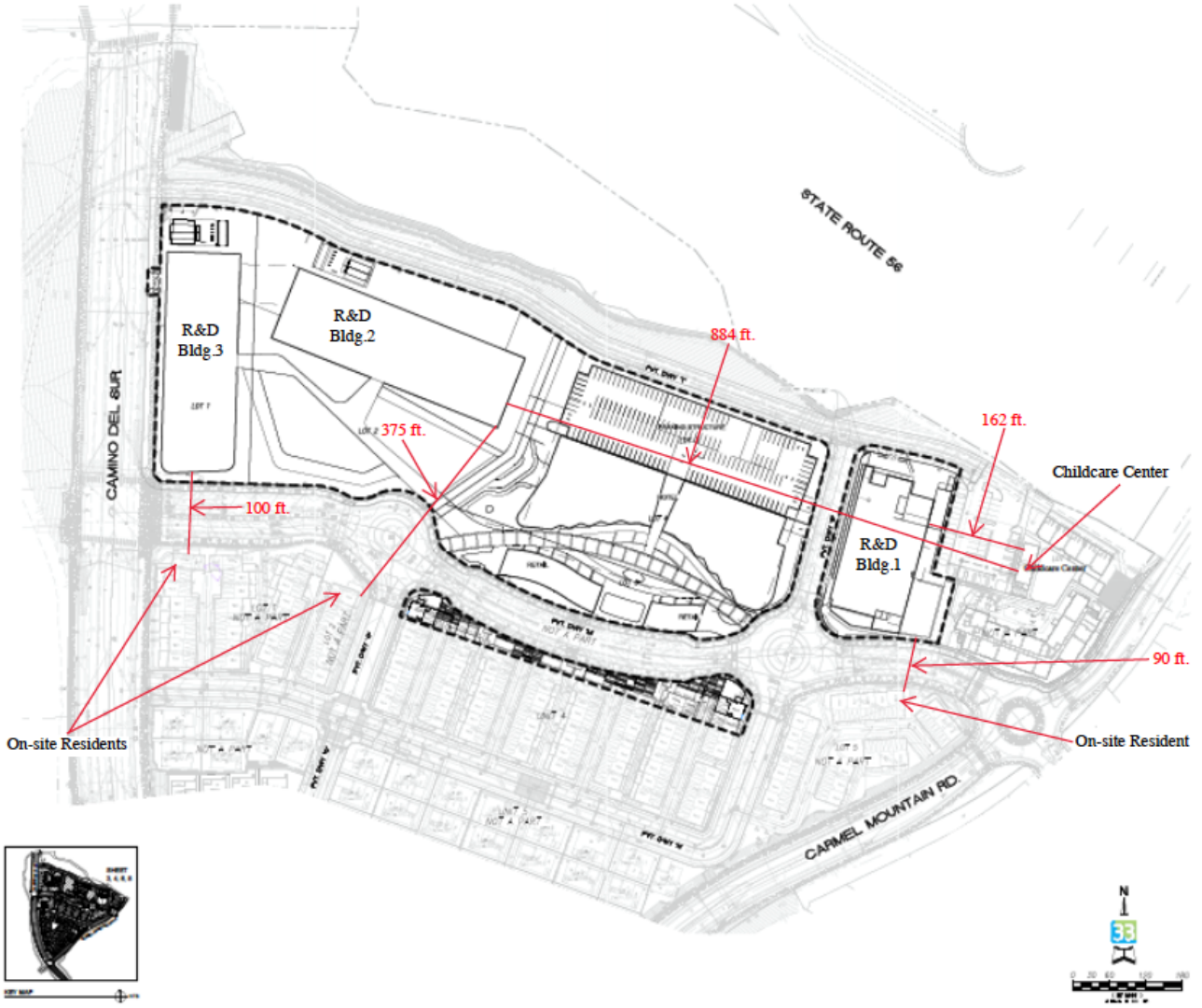

Figure 1. Merge 56 PDP Plans with Measurements to Child Care Center and Nearest On-site Residences

Figure 2. GoogleEarth Photo of Merge 56 R&D Building Measurements to Nearest Off-site Residences

The assessment described in this memorandum was conducted using the USEPA's online screening webtool RMP*Comp, which is typically used for Offsite Consequence Analyses (OCAs) because it can conservatively estimate the short-term impacts on nearby receptors due to accidental spills or explosions of various chemicals and gases. Because it is not known at this time what specific hazardous chemicals will be stored and used at the proposed R&D facility, lists of potential chemicals and amounts, were developed from surveying similar facilities currently operating in the San Diego area.

R&D Facility – Hazardous Materials Survey

Because the future Merge 56 development R&D facility tenant is not known at this time, it is not possible to identify the specific chemicals and amounts that will be stored and used. Therefore, this screening analysis worked with lists of chemicals developed from a survey of operations at biotechnology R&D laboratories in the San Diego area. A total of eight representative R&D facility chemical usage lists were reviewed and used. Combined, these lists are an example of the kinds of hazardous materials and amounts that could be used and stored at an R&D facility at the Merge 56 development site.

On January 1, 1997, the California Environmental Protection Agency (CalEPA) implemented the California Accidental Release Prevention (CalARP) program.[1] The purpose of this program is to prevent accidental releases of substances that can cause serious harm to the public and the environment, and to minimize the damage if releases do occur. CalARP requires certain facilities which handle, manufacture, use, or store any regulated substances above threshold quantities to take actions to proactively prevent and prepare for accidental releases.[2] Facilities subject to CalARP requirements must submit a Risk Management Plan (RMP).

The chemical lists from the eight laboratories were compared to the CalARP list of hazardous materials to determine which chemicals would have potential impacts on children and workers at the nearby child care facility or on the nearest residences, if an accident resulted in explosion or release of hazardous materials.[3] The chemicals that were on the CalARP list were then analyzed using RMP*Comp to determine the approximate distance to endpoint if a spill or explosion occurs for each CalARP-identified chemical.

The list of typical hazardous materials used and stored at an R&D facility, that are on the CalARP list, can be seen in Table 1. Typical amounts of each chemical that may

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[1] California Accidental Release Prevention (CalARP) program, California Environmental Protection Agency, January 1, 1997. Available at: https://calepa.ca.gov/cupa/lawsregs/california-accidental-release-prevention/

[2] California Code of Regulations, Title 19, Section 2770.5, Tables 1 – 3 list the threshold quantities of hazardous materials. Available at: https://www.law.cornell.edu/regulations/california/19-CCR-2770.5

[3] CalARP Program Combined List of Chemicals and Threshold Quantities (TQ), CalEPA, Available at: https://www.sfdph.org/dph/files/EHSdocs/ehsHMUPAdocs/CalARPChemicalList.pdf

TABLE 1
TYPICAL CHEMICALS/QUANTITIES AT AN R&D FACILITY – CALARP LIST
COMPARISON TO CCR TITLE 19, SECTION 2770.5 THRESHOLDS

Chemical Name	CAS #	Quantity	State	Volume (per Container)	Total Volume	Storage Location	CCR Title 19 Sec. 2770.5 Threshold* (lbs)	Exceeds CCR Title 19 Sec. 2770.5 Threshold?
Phosphorus(V) oxychloride	10025-87-3	1	solid	250 g	250 g (0.55 lb)	Hood	500	N
ACRYL/BIS 19:1, 40% (w/v) Solution	79-06-1	2	liquid	1 L	2 L (4.24 lb)	Cold Room	1,000	N
Chloroform	67-66-3	4	liquid	4 L	16 L (65.7 lb)	Hood	10,000	N
Diethyl Ether	60-29-7	4	liquid	1 L	4 L (31.1 lb)	Hood	10,000	N
Acrylonitrile	107-13-1	1	liquid	100 ml	100 ml (0.24 lb)	Chem Hood	10,000	N
Chlorotrimethylsilane	75-77-4	1	liquid	100 ml	100 ml (0.38 lb)	Under Hood	1,000	N
Dimethyl sulfate	77-78-1	1	liquid	100 ml	100 ml (0.29 lb)	Hood	500	N
Hydrochloric Acid	7647-01-0	1	liquid	500 ml	500 ml (5.29 lb)	BioLab Chemical Storage	500	N
Bromine	7726-95-6	1	liquid	100 ml	100 ml (0.69 lb)	Hood	500	N
Sodium Azide	26628-22-8	1	liquid	500 ml	500 ml (0.55 lb)	Lab Bench	500	N
1,3-Dichloroacetone	534-07-6	1	solid	25 g	25 g (0.055 lb)	Not indicated	10	N
Formaldehyde	50-00-0	4	liquid	4 L	16 L (38.4 lb)	Flammables Cabinet	500	N
Hydrogen	1333-74-0	1	gas	4 ft^3	4 ft^3 (0.02 lb)	Not indicated	10,000	N
Phosphorus Pentachloride	10026-13-8	1	solid	1 kg	1 kg (2.21 lb)	Not indicated	500	N
Propargyl Bromide (stabilized with MgO)	106-96-7	1	liquid	25 ml	25 ml (0.074 lb)	Not indicated	10	N

TABLE 1
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Chemical Name	CAS #	Quantity	State	Volume (per Container)	Total Volume	Storage Location	CCR Title 19 Sec. 2770.5 Threshold* (lbs)	Exceeds CCR Title 19 Sec. 2770.5 Threshold?
Sulfuric acid	7664-93-9	1	liquid	2.5 L	2.5 L (10.1 lb)	Not indicated	1,000	N
Thiosemicarbazide	79-19-6	1	solid	5 g	5 g (0.011 lb)	Not indicated	100	N
Colchicine	64-86-8	1	solid	1 g	1 g (0.0022 lb)	Lab Bench	10	N

* Values listed in this column are the most conservative (lowest) threshold limits for each chemical listed in CalARP Tables (CCR Title 19, Section 2770.5, Tables 1-3).

be stored at the facility are also included in this list. As shown in Table 1 above, the maximum amount stored for these chemicals, when converted to units of pounds, does not exceed the amount that would trigger CalARP RMP requirements. While this list of hazardous materials and their storage amounts is not exhaustive, it is considered representative of a typical R&D tenant's inventory of hazardous materials. There are three states for these hazardous materials: Solid, liquid, and gas.

Solid Hazardous Materials:

The spilling of such small amounts of solid hazardous materials as are stored or used at a typical R&D facility would not have any impacts beyond the immediate vicinity of the spill, and none of the solid chemicals on the list are explosive. For this reason, solids were not considered for the screening HRA.

Liquid Hazardous Materials:

A bottle of liquid chemical dropped from a height high enough to cause that bottle to break is highly unlikely, because the chemical manufacturers design the bottles to be unbreakable (with a combination of glass and plastic). The only way a liquid chemical could escape its bottle would be an accidental spill from the bottle or from laboratory glassware during use. In this case, only a small amount of chemical would likely spill and pool in a small puddle, and the spill would most likely occur in a fume hood, since this is where a laboratory worker would be working with a toxic chemical. Spill duration would likely be less than 10 seconds, before being stopped. Laboratories are typically equipped with neutralizers for acids and bases to help in cleanup of spills, so a spill would be neutralized and cleaned up within 10 to 15 minutes after the spill occurs.

Gaseous Hazardous Materials:

Gases tend to be more explosive than liquids or solids. The only gas on the list of typical chemicals used/stored at an R&D facility (Table 1) is hydrogen gas tanks in quantities of 4 cubic feet (ft^3) per tank; however, there could possibly be other types of gases used/stored at these biotech laboratories that are explosive (e.g. helium or hydrogen sulfide gas). Accidental release of these gases could impact receptors in the general vicinity before the release is stopped, if they are not contained. Since these gases are so flammable, and they are stored under pressure, an explosion could occur if fire or spark is near the leak. For this analysis, hydrogen gas was used as a representative explosive gas that may impact off-site receptors.

Screening Health Risk Assessment

The quantities of hazardous materials listed in Table 1 were first compared to the CCR Title 19, Section 2770.5 List of Substances, which lists the threshold quantity in pounds for each hazardous material on the CalARP list. If a facility uses or stores a hazardous material in quantities that are greater than the listed thresholds, that

facility is considered a higher risk for accidental spills and/or explosions that would affect nearby off-site receptors, such as residents, school children, and workers. As demonstrated in Table 1, none of the hazardous materials listed are stored or used in quantities above the CalARP thresholds; in fact, the amounts shown are a small fraction of the thresholds. Therefore, based upon the chemicals and quantities reviewed the R&D facility would be considered at a much lower risk for accidental spills and/or explosions that would affect nearby sensitive receptors, such as the children and workers at the nearby child care facility, or at the nearest residences. For this reason alone, potential accidental spills or explosions that may happen at the R&D facility would likely not be large enough to impact the proposed child care center nor the nearest residences, especially with controls on releases as will be required by the County of San Diego Department of Environmental Health and Quality (DEHQ) for tenants that occupy these R&D buildings.

In addition to the comparison to CalARP thresholds, an Offsite Consequence Analysis (OCA) using RMP*Comp, as well as a Boiling Liquid, Expanding Vapor Explosion (BLEVE) analysis were performed for the liquid and gas chemicals on the list. The most likely scenario of an accidental chemical release happening at the laboratories would be a spill or explosion within the R&D facility building, which would further prevent impacts at nearby off-site locations, since the spill or explosion would happen inside the building. However, another scenario that could have higher off-site impacts (although the scenario is much less likely and therefore risk is lower) is an accidental spill or explosion while the hazardous material is being delivered to the facility (at a loading dock, for example). For this reason, potential outdoor spills or explosions were chosen as the release scenario for this analysis.

RMP*Comp Analysis

The U.S. Environmental Protection Agency (USEPA) hosts a free online screening webtool called RMP*Comp to assist the user in completing an OCA.[4] The user can consult USEPA's *Risk Management Program Guidance for Offsite Consequence Analysis* for guidance on using RMP*Comp.[5] RMP*Comp estimates the distance from the source to the toxic endpoint based on the type of release, the chemical released, and characteristics of the environment.

RMP*Comp offers two OCA scenarios:

- A worst-case scenario, and
- An alternative release scenario.

[4] Access USEPA's RMP*Comp here: https://www.epa.gov/rmp/rmpcomp
[5] Risk Management Program Guidance for Offsite Consequence Analysis, USEPA, EPA-550-B-99-009, March 2009. Available at: https://www.epa.gov/rmp/rmp-guidance-offsite-consequence-analysis

The worst-case scenario is defined by EPA as "…the release of the largest quantity of a regulated substance from a single vessel or process line failure that results in the greatest distance to an endpoint." An alternate release scenario is one that is "…more likely to occur than the worst-case scenario and will reach an offsite endpoint, unless no such scenario exists."

The release scenario used in this analysis is an Alternate Scenario (or more realistic worst-case scenario) using conservative release amounts of each hazardous material. The scenario is conservative in that active control measures (quickly cleaning spills, using neutralizers, etc.) are not included in the release calculations. For example, the spill amount of chloroform would likely be much less than 1 liter with the release duration of one minute, but this is what was input into RMP*Comp. The following inputs were entered into RMP*Comp for each chemical listed in Table 1:

- Scenario Type: Alternative
- Release Rate Calculation: User-specified
- Release Rate: Quantity released in 1 minute
- Release Duration: 1 minute
- Quantity Released: Varies with each chemical (see Table 2)
- Release Type (for flammable liquids): Vapor cloud fire
- Release Type (for hydrogen gas): Vapor cloud explosion
- Surrounding Terrain Type: Urban (many obstacles in the immediate area)
- Liquid Temperature (for liquids): 77°F
- Control Measures: None

A wind speed of 3 m/sec, wind stability class D, and an air temperature of 77°F were assumed for the scenarios. Some of the chemicals, such as ACRYL/BIS 19:1 40% (w/v) solution (in the gray rows in Table 2), are not included in the list of chemicals in RMP*Comp and were therefore not analyzed.

The estimated distance to toxic endpoint (in miles) is the output from RMP*Comp. Toxic endpoints vary with each chemical and are shown in Table 2. The distance to the toxic endpoint is the estimated distance a toxic vapor cloud, heat from a fire, or blast waves from an explosion will travel before dissipating to the point that serious injuries from short-term exposures will no longer occur. Volatile, highly toxic liquids (i.e. liquids with high ambient vapor pressure and low toxic endpoints) are likely to give large distances to endpoint, while less volatile, and less toxic chemicals are likely to give shorter distances to endpoint.

The Distance to Endpoint output from RMP*Comp is attached to this memo and is shown in Table 2. When the distance to endpoint is less than 0.1 miles, the distance is reported as 0.1 miles for typical OCAs. However, for this analysis, if the distance

output is "< 0.1 miles", the "<" symbol is included in Table 2. It is important to note that, for some chemicals (like Chloroform), the lowest distance to endpoint that RMP*Comp will report is <0.1 miles, no matter how many containment measures are input into the webtool. This makes it very difficult to predict with this screening tool, with any accuracy, whether the actual distance to endpoint would be just a few feet or 500 feet. Distances to endpoint were converted from miles to feet for reporting purposes in Table 2.

TABLE 2
RMP*COMP INPUTS AND OUTPUT DISTANCE TO TOXIC ENDPOINT

Chemical Name	CAS #	State	Quantity Released	Toxic Endpoint*	Distance to Toxic Endpoint (ft)
ACRYL/BIS 19:1, 40% (w/v) Solution	79-06-1	liquid	--	--	--
Chloroform	67-66-3	liquid	1 L	0.49 mg/L	< 528 ft
Diethyl Ether	60-29-7	liquid	1 L	57 mg/L Lower Flammability Limit	< 528 ft
Acrylonitrile	107-13-1	liquid	100 mL	0.076 mg/L	< 528 ft
Chlorotrimethylsilane	75-77-4	liquid	200 mL	0.050 mg/L	< 528 ft
Dimethyl sulfate	77-78-1	liquid	--	--	--
Hydrochloric Acid, 38%	7647-01-0	liquid	1 L	0.030 mg/L	528 ft
Bromine	7726-95-6	liquid	100 mL	0.0065 mg/L	528 ft
Sodium Azide	26628-22-8	liquid	--	--	--
Formaldehyde, 37%	50-00-0	liquid	1 L	0.012 mg/L	528 ft
Hydrogen	1333-74-0	gas	4 ft^3 (0.02092 lbs)	1 psi Overpressure	10.6 ft
Propargyl Bromide (stabilized with MgO)	106-96-7	liquid	--	--	--
Sulfuric acid	7664-93-9	liquid	--	--	--

* Toxic endpoints are specified in the Appendix A to 40 CFR Part 68 in units of mg/L. They can also be found in the USEPA RMP guidance for OCAs in Appendix B.

As demonstrated in Table 2, any potential spills, fires, or vapor cloud explosions of the evaluated chemicals occurring at the R&D Building 2, would not have an impact at the proposed child care center, which is located 884 feet away. The distances to toxic endpoints shown in Table 2 are all less than 884 feet, so spills or explosions at the R&D Building 2 would not have short-term impacts on the children and workers at the child care center at levels that would be considered hazardous to their health.

Any potential spills, fires or vapor cloud explosions of the evaluated chemicals at R&D Buildings 2 or 3, which are located approximately 750 feet and 975 feet southwest of the nearest on-site resident, respectively, would not have an impact at that resident location.

At the initial screening level, this analysis concludes that there could potentially be impacts from chemical spills or fires that occur at the R&D Building 1 on the proposed child care center located approximately 162 feet away, on the on-site resident located approximately 90 feet away, and on the off-site resident located approximately 500 feet away, primarily due to the distance. This initial screening analysis also finds that there potentially could be impacts from spills or fires that occur at R&D Buildings 2 and 3 on the on-site residents located approximately 100 feet and 350 feet away, respectively. Additional analysis of actual planned usage of hazardous materials identified for a future tenant may be required by the County of San Diego DEHQ at the time of leasing, with control measures designed to reduce potential impact risk from potential spills, fires, or vapor cloud explosions on the child care center to be considered. DEHQ may require such preventative measures to minimize risks from spills, fires or explosions include, but are not limited to, the following:

- Proper storage of hazardous materials when the chemical is not in use (flammables in a flammable storage cabinet, toxic chemicals stored in a hood, etc.), inside of buildings as possible.
- Procedures and employee training on how to handle and clean up spills of hazardous materials.
- No outside storage of hazardous materials.
- Proper receipt and prompt transfer of hazardous materials to proper inside storage areas.
- Placing hazardous material and waste delivery and storage as far from the proposed child care center and residents as possible.
- Use of chemical hoods and scrubbers inside the R&D building rooms, as needed to minimize potential releases outside the building.

These and other measures will be determined when actual chemical usage in the building is identified and to meet occupancy Permit conditions 16 and 17:

Permit Condition 16: *All laboratory equipment and related operations associated with Research & Development (R&D) uses shall comply with all applicable rules and regulations relating to emission standards and the use of any hazardous materials associated with such equipment or operations including, without limitation, San Diego County Air Pollution Control District (SDAPCD) Regulation 11, Rule 11. Rule 11 generally exempts such equipment and operations from SDAPCD permitting requirements provided specified criteria are met. Any emission control devices or systems installed as necessary to meet SDAPCD standards for the exemption shall be shown on applicable plans.*

Permit Condition 17: *In conjunction with any Substantial Conformance Review (SCR) or amendments to this permit for new R&D buildings, the plans for such R&D buildings shall generally identify the proposed use and any hazardous materials or emissions*

that may be present and shall identify and emission control devices or systems that are installed to control or contain any potential hazards. An updated Exhibit "A" will be provided with any future SCR or amendment submittal; including the following information/tables: development summary, unit acreage summary, parking, and unit construction type/occupancy summary.

Permit conditions 16 and 17 will be implemented when a prospective tenant applies for laboratory occupancy. Any applicant must comply with all applicable rules and regulations relating to the use of hazardous materials by demonstrating that emissions are controlled to levels that will not impact the nearby child care center, nor any of the neighboring businesses or residents. For example, Rule 11(d)(4) states that the following laboratory equipment is exempt from permitting requirements:

i) Laboratory testing equipment, and quality control testing equipment, including associated wipe cleaning, used exclusively for chemical and physical analysis, or quality control.
ii) Laboratory equipment and laboratory operations conducted at secondary schools, colleges, or universities and used exclusively for instruction or research purposes.
iii) Vacuum-producing devices used in laboratory or R&D operations.
iv) Hoods, stacks, or ventilators used in laboratory or R&D operations.
v) Research and development equipment, including associated wipe cleaning.
vi) Equipment used to manufacture the following products, provided that the total uncontrolled VOC emissions from all operations specified below do not exceed 5 tons per calendar year:
a. Biotechnology pharmaceutical products for exclusive use in federal Food and Drug Administration (FDA) approved clinical trials, or
b. Biomedical devices and diagnostic kits for exclusive use in FDA approved clinical trials and laboratory failure analysis testing, or
c. Bioagricultural products for exclusive use in field testing required to obtain FDA, Environmental Protection Agency (EPA), United States Department of Agriculture (USDA) and/or California Environmental Protection Agency (Cal-EPA) approval.

All data and/or records necessary to demonstrate the applicability of this exemption shall be maintained on-site for three years and made available to the District upon request.
vii) Any temporary equipment installed in a pilot plant facility, provided that the total emissions increase from all such temporary equipment does not exceed 10 pounds per day of VOCs. For the purposes of this exemption, temporary equipment means equipment located at a pilot plant facility for a period not exceeding 90 days in any consecutive 12-month period excluding construction and installation periods. It shall be the responsibility of a person claiming this exemption to maintain daily records necessary for the District to determine its applicability.

In addition, the R&D building tenants will need to complete a Hazardous Materials Business Plan (HMBP) before starting operation including handling and use of covered hazardous materials, as required by the County of San Diego DEHQ. Then the DEHQ must approve the HMBP including review of potential impacts, or the R&D building tenants cannot begin operation. The purpose of the HMBP is to prevent or minimize damage to public health, safety, and the environment, from a release or threatened release of a hazardous material. The HMBP also provides emergency response personnel with adequate information to help them better prepare and respond to chemical-related incidents at regulated facilities.[6] It is expected that after meeting the permit conditions of occupancy and the DEHQ requirements for the HMBP, including the proposed and approved control devices or systems, any risk of impacts on the child care center and/or nearby residents will be minimized to acceptable levels.

BLEVE Analysis

There are two hazardous materials in Tables 1 and 2 that are considered explosive chemicals: Diethyl ether and hydrogen gas. For these two chemicals, a Boiling Liquid, Expanding Vapor Explosion (BLEVE) analysis was performed following USEPA's RMP guidance for OCAs (Table 30).

A BLEVE analysis estimates the distance to a potentially harmful radiant heat level due to an explosion at the R&D facility. If the distance to endpoint is less than 162 feet, then the hypothetical explosion would not impact the child care center children and workers. If the distance to endpoint is less than 90 feet, then the hypothetical explosion would not impact any of the nearby residents.

The following was assumed for each of the two chemicals:

- Quantity of chemical in fireball: 1,000 lbs
- Duration of fireball: 3.5 seconds

Table 30 in the RMP OCA guidance gave the following distances to endpoint:

- Diethyl ether: 211.4 ft
- Hydrogen: 422.4 ft

Impacts at the Child Care Center:

The distances to endpoints shown above are both less than 884 feet, so explosions at R&D Building 2 would not have short-term impacts on the children and workers at the child care center at levels that would be considered hazardous to their health. R&D Building 1 is located only 162 feet away from the child care center, so any explosions that may occur at Building 1 could have short-term impacts on children

[6] *Hazardous Materials Business Plan (HMBP)*, County of San Diego Department of Environmental Health and Quality, Effective January 1, 2013. Available at: https://www.sandiegocounty.gov/content/sdc/deh/hazmat/hazmat.html

and workers at the child care center. However, additional analysis of actual planned usage of potentially explosive hazardous materials identified for a future tenant may be required by San Diego County DEHQ at the time of leasing, with control measures designed to minimize the risk from explosions on the child care center, to be considered.

Impacts at Nearby Residences:

The distances to endpoints shown above are both less than 500 feet, which is the distance to the nearest off-site resident, so explosions at any of the three R&D buildings would not have short-term impacts on off-site residents. The distances to endpoint are more than 90 feet, 100 feet, and 375 feet, so any explosions that may occur at the three R&D buildings could have short-term impacts on some of the on-site residents. However, additional analysis of actual planned usage of potentially explosive hazardous materials identified for a future tenant may be required by San Diego County DEHQ at the time of leasing, with control measures designed to minimize the risk from explosions on nearby on-site residences.

As stated previously, measures needed will be determined as required to meet the permit condition of occupancy, and to obtain approval to operate by the County of San Diego DEHQ, when actual chemical usage in the building is identified. It is expected that after meeting these requirements, including the use of proposed and approved controls devices or systems, any risk of impacts on the child care center and/or on the nearby residents will be minimized to acceptable levels.

Conclusions

Spills or explosions of hazardous materials at any of the R&D facility buildings at the Merge 56 Project site are not expected to represent a health risk to the children and workers at the proposed child care center or at the nearby residences at levels considered to be hazardous. Occupancy permit conditions 16 and 17 must be met and the San Diego County DEHQ will require any R&D tenant(s) to comply with SDAPCD Rule 11 and to complete a HMBP prior to beginning operations, that requires analysis of proposed chemical usage and controls. For any tenant(s) at this building, additional analysis of actual planned usage of hazardous materials identified for any future tenant(s) would by conducted by the County of San Diego Department of Environmental Health and Quality as conditions of occupancy. The amounts of chemicals stored and used at typical biotech R&D facilities are so small that accidental spills or explosions do not cause impacts that occur even a few feet away from the release point. In addition, laboratories will have safety measures in place (e.g. training workers to quickly clean up spills and having neutralizers in place to minimize short-term impacts from toxic chemicals) to control any accidental spills, that were not considered for this assessment.

RMP*Comp

RMP*Comp

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Estimated Distance Calculation

Estimated distance to toxic endpoint: <0.1 miles (<0.16 kilometers); report as 0.1 mile

This is the downwind distance to the toxic endpoint specified for this regulated substance under the RMP Rule. Report all distances shorter than 0.1 mile as 0.1 mile, and all distances longer than 25 miles as 25 miles.

Scenario Summary

Chemical:	Chloroform
CAS number:	67-66-3
Threat type:	Toxic Liquid
Scenario type:	Alternative
Quantity released:	3.24 pounds
Release duration:	1 minutes
Release rate:	1 liters per min
Liquid temperature:	77 F
Mitigation measures:	NONE
Release rate to outside air:	0.141 pounds per minute
Evaporation time:	23 min
Surrounding terrain type:	Urban surroundings (many obstacles in the immediate area)
Toxic endpoint:	0.49 mg/L; basis: EHS-LOC (IDLH)

Assumptions about this scenario

Wind speed:	3 meters/second (6.7 miles/hour)
Stability class:	D
Air temperature:	77 degrees F (25 degrees C)

RMP*Comp

RMP*Comp

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Estimated Distance Calculation

Estimated distance to lower flammability limit: <0.1 miles (<0.16 kilometers)

This is the distance to the lower flammability limit specified for this regulated substance under the RMP Rule.

Scenario Summary

Chemical:	Ethyl ether [Ethane, 1,1'-oxybis-]
CAS number:	60-29-7
Threat type:	Flammable Liquid
Scenario type:	Alternative
Release duration:	1 minutes
Release type:	Vapor Cloud Fire
Release rate:	1 liters per min
Liquid temperature:	77 F
Mitigation measures:	NONE
Release rate to outside air:	0.282 pounds per minute
Surrounding terrain type:	Urban surroundings (many obstacles in the immediate area)
Lower flammability limit:	57 mg/L

Assumptions about this scenario

Wind speed:	3 meters/second (6.7 miles/hour)
Stability class:	D
Air temperature:	77 degrees F (25 degrees C)

EPA United States Environmental Protection Agency

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Estimated Distance Calculation

Estimated distance to toxic endpoint: <0.1 miles (<0.16 kilometers); report as 0.1 mile

This is the downwind distance to the toxic endpoint specified for this regulated substance under the RMP Rule. Report all distances shorter than 0.1 mile as 0.1 mile, and all distances longer than 25 miles as 25 miles.

Scenario Summary

Chemical:	Acrylonitrile
CAS number:	107-13-1
Threat type:	Toxic Liquid
Scenario type:	Alternative
Quantity released:	0.175 pounds
Release duration:	1 minutes
Release rate:	0.1 liters per min
Liquid temperature:	77 F
Mitigation measures:	NONE
Release rate to outside air:	0.00462 pounds per minute
Evaporation time:	37.9 min
Surrounding terrain type:	Urban surroundings (many obstacles in the immediate area)
Toxic endpoint:	0.076 mg/L; basis: ERPG-2

Assumptions about this scenario

Wind speed:	3 meters/second (6.7 miles/hour)
Stability class:	D
Air temperature:	77 degrees F (25 degrees C)

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Estimated Distance Calculation

Estimated distance to toxic endpoint: <0.1 miles (<0.16 kilometers); report as 0.1 mile

This is the downwind distance to the toxic endpoint specified for this regulated substance under the RMP Rule. Report all distances shorter than 0.1 mile as 0.1 mile, and all distances longer than 25 miles as 25 miles.

Scenario Summary

Chemical:	Trimethylchlorosilane
CAS number:	75-77-4
Threat type:	Toxic Liquid
Scenario type:	Alternative
Quantity released:	0.375 pounds
Release duration:	1 minutes
Release rate:	0.2 liters per min
Liquid temperature:	77 F
Mitigation measures:	NONE
Release rate to outside air:	0.0313 pounds per minute
Evaporation time:	12 min
Surrounding terrain type:	Urban surroundings (many obstacles in the immediate area)
Toxic endpoint:	0.05 mg/L; basis: EHS-LOC; LOC is based on IDLH-equivalent level estimated from toxicity data.

Assumptions about this scenario

Wind speed:	3 meters/second (6.7 miles/hour)
Stability class:	D
Air temperature:	77 degrees F (25 degrees C)

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Estimated Distance Calculation

Estimated distance to toxic endpoint: 0.1 miles (0.2 kilometers)

This is the downwind distance to the toxic endpoint specified for this regulated substance under the RMP Rule. Report all distances shorter than 0.1 mile as 0.1 mile, and all distances longer than 25 miles as 25 miles.

Scenario Summary

Chemical:	Hydrochloric acid
Initial concentration:	38 %
CAS number:	7647-01-0
Threat type:	Toxic Liquid
Scenario type:	Alternative
Liquid temperature:	77 F
Quantity released:	2.61 pounds
Release duration:	1 minutes
Release rate:	1 liters per min
Mitigation measures:	NONE
Release rate to outside air:	0.018 pounds per minute
Surrounding terrain type:	Urban surroundings (many obstacles in the immediate area)
Toxic endpoint:	0.03 mg/L; basis: ERPG-2

Assumptions about this scenario

Wind speed:	3 meters/second (6.7 miles/hour)
Stability class:	D
Air temperature:	77 degrees F (25 degrees C)

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Estimated Distance Calculation

Estimated distance to toxic endpoint: 0.1 miles (0.2 kilometers)

This is the downwind distance to the toxic endpoint specified for this regulated substance under the RMP Rule. Report all distances shorter than 0.1 mile as 0.1 mile, and all distances longer than 25 miles as 25 miles.

Scenario Summary

Chemical:	Bromine
CAS number:	7726-95-6
Threat type:	Toxic Liquid
Scenario type:	Alternative
Quantity released:	0.669 pounds
Release duration:	1 minutes
Release rate:	0.1 liters per min
Liquid temperature:	77 F
Mitigation measures:	NONE
Release rate to outside air:	0.0187 pounds per minute
Evaporation time:	35.7 min
Surrounding terrain type:	Urban surroundings (many obstacles in the immediate area)
Toxic endpoint:	0.0065 mg/L; basis: ERPG-2

Assumptions about this scenario

Wind speed:	3 meters/second (6.7 miles/hour)
Stability class:	D
Air temperature:	77 degrees F (25 degrees C)

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Estimated Distance Calculation

Estimated distance to toxic endpoint: 0.1 miles (0.2 kilometers)

This is the downwind distance to the toxic endpoint specified for this regulated substance under the RMP Rule. Report all distances shorter than 0.1 mile as 0.1 mile, and all distances longer than 25 miles as 25 miles.

Scenario Summary

Chemical:	Formaldehyde (water solution)
Initial concentration:	37 %
CAS number:	50-00-0
Threat type:	Toxic Liquid
Scenario type:	Alternative
Liquid temperature:	77 F
Quantity released:	2.43 pounds
Release duration:	1 minutes
Release rate:	1 liters per min
Mitigation measures:	NONE
Release rate to outside air:	0.000514 pounds per minute
Surrounding terrain type:	Urban surroundings (many obstacles in the immediate area)
Toxic endpoint:	0.012 mg/L; basis: ERPG-2

Assumptions about this scenario

Wind speed:	3 meters/second (6.7 miles/hour)
Stability class:	D
Air temperature:	77 degrees F (25 degrees C)

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Estimated Distance Calculation

Estimated distance to 1 psi overpressure: 0.002 miles (0.003 kilometers)

This is the distance to the overpressure endpoint of 1 pound per square inch specified for this regulated substance under the RMP Rule.

Scenario Summary

Chemical:	Hydrogen
CAS number:	1333-74-0
Threat type:	Flammable Gas
Scenario type:	Alternative
Release duration:	1 minutes
Release type:	Vapor Cloud Explosion
Release rate:	0.02092 pounds per min
Mitigation measures:	NONE

Assumptions about this scenario

Wind speed:	3 meters/second (6.7 miles/hour)
Stability class:	D
Air temperature:	77 degrees F (25 degrees C)