

ORDINANCE NO. 3148-19

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY
OF SUNNYVALE TO AMEND CHAPTER 16.52 (FIRE
CODE) OF TITLE 16 (BUILDINGS AND CONSTRUCTION)
OF THE SUNNYVALE MUNICIPAL CODE TO ADOPT BY
REFERENCE THE 2019 CALIFORNIA FIRE CODE WITH
LOCAL AMENDMENTS AND RELATED FINDINGS**

WHEREAS, the International Fire Code (“IFC”) is a model fire code that regulates minimum fire safety requirements for new and existing buildings, facilities, storage and processes; and

WHEREAS, the IFC is in use or adopted in 42 states and is published every three years by the International Code Council; and

WHEREAS, in California, the California Building Standards Commission (“CSBC”) is responsible for administering the implementation of the California building codes, and adopts the IFC with new statewide amendments every three years; and

WHEREAS, this adopted code is known as the California Fire Code (“CFC”) and is found in Part 9 of Title 24 of the California Code of Regulations, and Title 24 is commonly referred to as the California Building Standards Code; and

WHEREAS, the State of California adopted the 2019 California Fire Code in January 2019, and published the documents on July 1, 2019; and

WHEREAS, all local jurisdictions are required to hold public hearings and adopt the CFC with any local amendments by January 1, 2020, or accept by default the version adopted by the State; and

WHEREAS, local amendments to the CFC must be supported with findings that are based on unique local climatic, geologic and topographic conditions of the area; and

WHEREAS, the City of Sunnyvale desires to amend Chapter 16.52 (Fire Code) of the Sunnyvale Municipal Code to adopt the California Fire Code with local amendments for implementation on January 1, 2020.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF SUNNYVALE DOES ORDAIN AS FOLLOWS:

SECTION 1. CHAPTER 16.52 AMENDED. Chapter 16.52 (Fire Code) of Title 16 (Buildings and Construction) of the Sunnyvale Municipal Code is hereby amended to read as follows:

Chapter 16.52

FIRE CODE

16.52.010.	Title.
16.52.020.	Adoption by reference.
16.52.030.	Fire district designated.
16.52.040.	Hazardous materials.
16.52.050.	Duties are discretionary.
16.52.060.	Referenced codes.
16.52.101.	Scope and administration.
16.52.103.	Department of fire prevention.
16.52.104.	General authority and responsibilities.
16.52.105.	Permits.
16.52.106.	Fees. [Renumbered]
16.52.107.	Inspections. [Renumbered]
16.52.108.	Maintenance. [Renumbered]
16.52.109.	Board of appeals. [Renumbered]
16.52.110.	Violations. [Renumbered]
16.52.111.	Unsafe buildings. [Renumbered]
16.52.112.	Stop work or use order. [Renumbered]
16.52.202.	General definitions.
16.52.315.	General storage.
16.52.321	Additive manufacturing.
16.52.401.	Emergency planning and preparedness.
16.52.403.	Emergency preparedness.
16.52.405.	Emergency evacuation drills.
16.52.503.	Fire apparatus access roads.
16.52.504.	Access to building openings and doors.
16.52.505.	Premises identification.
16.52.507.	Fire protection water supplies.
16.52.508.	Fire command center.
16.52.510.	Emergency responder radio coverage.
16.52.511.	Firefighter air replenishment systems.
16.52.512.	High rise building emergency helicopter landing facility.
16.52.601.	Building services and systems.
16.52.603	Fuel-fired appliances.
16.52.604.	Electrical equipment, wiring and hazards. [Renumbered]

- 16.52.605. Mechanical refrigeration. [Renumbered]**
- 16.52.901. Fire protection systems.**
- 16.52.903. Automatic sprinkler systems.**
- 16.52.904. Alternative automatic fire-extinguishing systems.**
- 16.52.905. Standpipe systems.**
- 16.52.909. Smoke control systems.**
- 16.52.913. Fire pumps.**
- 16.52.914. Fire protection based on special detailed requirements of use and occupancy.**
- 16.52.1011. Stairways. [Renumbered]**
- 16.52.1031. Maintenance of means of egress. [Renumbered]**
- 16.52.1103. Fire safety requirements for existing buildings.**
- 16.52.1203. Emergency and standby power systems.**
- 16.52.2311. Repair garages.**
- 16.52.3304. Precautions against fire.**
- 16.52.3311. Means of egress.**
- 16.52.5001. Hazardous materials: general.**
- 16.52.5003. Hazardous materials: general requirements.**
- 16.52.5004. Hazardous materials: storage.**
- 16.52.5601. Explosives and fireworks.**
- 16.52.5704. Flammable and combustible liquids.**
- 16.52.5706. Special operations. 16.52.5707. On-demand mobile fueling.**
- 16.52.5809. Mobile gaseous fueling of hydrogen vehicles.**
- 16.52.6004. Highly toxic and toxic compressed gases.**
- 16.52.6405. Pyrophoric materials.**
- 16.52.7000. Modifications.**
- 16.52.7100. Flow requirements for buildings.**
- 16.52.7500. Fire hydrant spacing.**
- 16.52.8101. Fire apparatus and access roads.**
- 16.52.8102. Required access.**
- 16.52.8103. Minimum specifications.**
- 16.52.8104. Aerial fire apparatus access roads.**
- 16.52.8105. Multi-family residential developments.**
- 16.52.9000. Firefighter air replenishment systems.**
- 16.52.9080. Reference Standards**

16.52.010. Title.
[Text unchanged.]

16.52.020. Adoption by reference.

The “2018 International Fire Code” in its entirety, along with Appendices B, C, D, E, F, G, H, I, L, N as published by the International Code Council, Inc., and amendments to sections of the 2018 International Fire Code and Appendix O adopted by the State Building Standards Commission in California Code of Regulations (CCR) Title 24, Part 9 known as the California Fire Code; is hereby adopted by reference, with changes and modifications as hereinafter set forth, as

the Fire Code of the City of Sunnyvale.

16.52.030 – 16.52.104

[Text unchanged.]

16.52.105. Permits.

(a) – (k) [Text unchanged]

(l) **Carnivals and fairs.**

California Fire Code Section 105.6.4 is hereby amended to read:

[A] 105.6.4 Carnivals and fairs. An operational permit is required to conduct a carnival, fair or outdoor assembly event. See also 105.6.36, Outdoor assembly event.

(m) **Explosives.** [Text unchanged; renumbered.]

California Fire Code Section 105.6.14 is hereby amended to read:

[A] 105.6.14 Explosives.

(n) **Limits established by law.** [Renumbered]

California Fire Code Section 105.6 is hereby amended by adding Section 105.6.14.1 to read:

105.6.14.1 Limits established by law. [Text unchanged]

(o) **Flammable and combustible liquids.** [Text unchanged; renumbered.]

California Fire Code Section 105.6.16 is hereby amended to read:

105.6.16 Flammable and combustible liquids. [Text unchanged.]

An operational permit is required:

1. To use or operate a pipeline for the transportation within facilities of flammable or combustible liquids. This requirement shall not apply to the off-site transportation in pipelines regulated by the Department of Transportation (DOTn) nor does it apply to piping systems.
2. To store, handle or use Class I liquids in excess of 5 gallons (19 L) in a building or in excess of 10 gallons (37.9 L) outside of a building, except that a permit is not required for the following:
 - 2.1. The storage or use of Class I liquids in the fuel tank of a motor vehicle, aircraft, motorboat, mobile power plant or mobile heating plant, unless such storage, in the opinion of the fire code official, would cause an unsafe condition.

- 2.2. The storage or use of paints, oils, varnishes or similar flammable mixtures where such liquids are stored for maintenance, painting or similar purposes for a period of not more than 30 days.
3. To store, handle or use Class II or Class IIIA liquids in excess of 25 gallons (95 L) in a building or in excess of 60 gallons (227 L) outside a building, except for fuel oil used in connection with oil-burning equipment.
4. To store, handle or use Class IIIB liquids in tanks or portable tanks for fueling motor vehicles at motor fuel-dispensing facilities or where connected to fuel-burning equipment.
Exception: Fuel oil and used motor oil used for space heating or water heating.
5. To remove Class I or II liquids from an underground storage tank used for fueling motor vehicles by any means other than the approved, stationary on-site pumps normally used for dispensing purposes.
6. To operate tank vehicles, equipment, tanks, plants, terminals, wells, fuel-dispensing stations, refineries, distilleries and similar facilities where flammable and combustible liquids are produced, processed, transported, stored, dispensed or used.
7. To place temporarily out of service (for more than 90 days) an underground, protected above-ground or above-ground flammable or combustible liquid tank.
8. To change the type of contents stored in a flammable or combustible liquid tank to a material that poses a greater hazard than that for which the tank was designed and constructed.
9. To manufacture, process, blend or refine flammable or combustible liquids.
10. To engage in the dispensing of liquid fuels into the fuel tanks of motor vehicles at commercial, industrial, governmental or manufacturing establishments in accordance with Section 5706.5.4 or to engage in on-demand mobile fueling operations in accordance with Section 5707.
11. To utilize a site for the dispensing of liquid fuels from tank vehicles into the fuel tanks of motor vehicles, marine craft and other special equipment at commercial, industrial, governmental or manufacturing establishments in accordance with Section 5706.5.4 or to utilize a site for on-demand mobile fueling operations in accordance with Section 5707.

(p) Mobile fueling of hydrogen-fueled vehicles.

California Fire Code Section 105.6.16.1 is hereby amended to read:

105.6.16.1 Mobile fueling of hydrogen-fueled vehicles. An operational permit is required:

1. To engage in the mobile dispensing of gaseous hydrogen as a fuel into

the fuel tanks of motor vehicles.

2. To utilize a site for the dispensing of gaseous hydrogen as a fuel from tank vehicles into the fuel tanks of motor vehicles.

Exception: In cases of an emergency, a site permit is not required.

(q) Outdoor assembly event.

California Fire Code Section 105.6.36 is hereby amended to read as follows:

105.6.36 Outdoor assembly event. An operational permit is required to conduct an outdoor assembly event where planned attendance exceeds 1,000 persons or where permanent or temporary installation of barricades or fencing confine more than 100.

Exception: Events held at Group R, Division 3 occupancies.

(r) Hot work operations. [Text unchanged; renumbered.]

California Fire Code Section 105.6.23 is hereby amended to read:

[A] 105.6.23 Hot work operations. [Text unchanged.]

(s) LP-gas. [Renumbered]

California Fire Code Section 105.6.27 is hereby amended to read:

[A] 105.6.27 LP-gas. [Text unchanged.]

(t) Miscellaneous combustible storage. [Text unchanged; renumbered.]

California Fire Code Section 105.6.29 is hereby amended to read:

[A] 105.6.29 Miscellaneous combustible storage. [Text unchanged.]

(u) Mobile food preparation vehicle.

California Fire Code Section 105.6 is hereby amended by deleting Section 105.6.30.

(v) Additive manufacturing.

California Fire Code Section 105.6 is hereby amended by adding Section 105.6.52 to read:

105.6.52 Additive manufacturing. An operational permit is required to conduct industrial additive manufacturing operations in accordance with Section 321.

(w) Lithium batteries.

California Fire Code Section 105.6 is hereby amended by adding Section 105.6.53 to read:

105.6.53 Lithium batteries. An operational permit is required to store or handle lithium batteries or cells in quantities exceeding 1,000 pounds.

- (x) **Stationary battery system.** [Text unchanged; renumbered.]
California Fire Code Section 105.6.54 is hereby amended to read as follows:

105.6.54 Stationary battery system. An operational permit is required for stationary storage battery systems regulated in Chapter 12.

- (y) **Child-care center.** [Text unchanged; renumbered.]
California Fire Code Section 105.6.55 is hereby amended to read as follows:

105.6.55 Child-care center. [Text unchanged.]

- (z) **Emergency responder radio coverage system.** [Text unchanged; renumbered.]
California Fire Code Section 105.6.56 is hereby amended to read as follows:

105.6.56 Emergency responder radio coverage system. [Text unchanged.]

- (aa) **Firefighter air replenishment system.** [Text unchanged; renumbered.]
California Fire Code Section 105.6.57 is hereby amended to read as follows:

105.6.57 Firefighter air replenishment system. [Text unchanged.]

- (bb) **Group home.** [Text unchanged; renumbered.]
California Fire Code Section 105.6.58 is hereby amended to read as follows:

105.6.58 Group home. [Text unchanged.]

- (cc) **Hazardous material stabilization.** [Text unchanged; renumbered.]
California Fire Code Section 105.6.59 is hereby amended to read as follows:

105.6.59 Hazardous material stabilization. [Text unchanged.]

- (dd) **Helicopter lifts.** [Text unchanged; renumbered.]
California Fire Code Section 105.6.60 is hereby amended to read as follows:

105.6.60 Helicopter lifts. [Text unchanged.]

- (ee) **Hospitals and psychiatric hospitals.** [Text unchanged; renumbered.]
California Fire Code Section 105.6.61 is hereby amended to read as follows:

105.6.61 Hospitals and psychiatric hospitals. [Text unchanged.]

- (ff) **Residential care facility for the elderly.** [Text unchanged; renumbered.]
California Fire Code Section 105.6.62 is hereby amended to read as follows:

105.6.62 Residential care facility for the elderly. [Text unchanged.]

- (gg) **Residential care facility for the chronically ill.** [Text unchanged; renumbered.]
California Fire Code Section 105.6.63 is hereby amended to read as follows:

105.6.63 Residential care facility for the chronically ill. [Text unchanged.]

- (hh) **Temporary assembly occupancy.** [Text unchanged; renumbered.]
California Fire Code Section 105.6.64 is hereby amended to read as follows:

105.6.64 Temporary assembly occupancy. [Text unchanged.]

- (ii) **Firefighter air replenishment system.** [Text unchanged; renumbered.]
California Fire Code Section 105.7 is hereby amended by adding Section 105.7.25 as follows:

105.7.25 Firefighter air replenishment system. [Text unchanged.]

16.52.106. Fees. [Text unchanged, renumbered.]
California Fire Code Section 106 is hereby amended to read:

[A] 106.1 Fees. [Text unchanged.]

[A] 106.2 Schedule of permit fees. [Text unchanged.]

[A] 106.3 Related fees. [Text unchanged.]

106.4 Refunds. [Text unchanged.]

16.52.107. Inspections. [Text unchanged; renumbered]

(a) **Special inspections.**

California Fire Code Section 107.5 is hereby amended to read:

107.5 Special inspections. [Text unchanged]

16.52.108. Maintenance. [Text unchanged; renumbered]

(a) **Overcrowding.**

California Fire Code Section 108.6 is hereby amended to read:

[A] 108.6 Overcrowding. [Text unchanged.]

(b) **Hazard abatement.**

California Fire Code Section 108.7 is hereby amended to read:

108.7 Hazard abatement. [Text unchanged.]

16.52.109. Board of appeals. Text unchanged; renumbered.]

16.52.110. Violations. [Text unchanged; renumbered.]

(a) **Unlawful acts.**

California Fire Code Section 110.1 is hereby amended to read as follows:

[A] 110.1 Unlawful acts. [Text unchanged.]

(b) **Violation penalties.**

California Fire Code Section 110.4 is hereby amended to read:

[A] 110.4 Violation penalties. [Text unchanged.]

(c) **Civil penalties.**

California Fire Code Section 110.4 is hereby amended to read:

110.4.2 Civil Penalties. [Text unchanged.]

16.52.111. Unsafe buildings. [Text unchanged; renumbered.]

(a) **General.**

California Fire Code Sections 111.1 – 111.1.2 is hereby amended to read:

[A] **111.1 General.** [Text unchanged.]

[A] **111.1.1 Unsafe conditions.** [Text unchanged.]

[A] **111.1.2 Structural hazards.** When an apparent structural hazard is caused by the faulty installation, operation or malfunction of any of the items or devices governed by this code, the *fire code official* is authorized to immediately notify the building code official in accordance with Section 111.1.

(b) **Notification.**

California Fire Code Section 111.5 is hereby amended to read:

111.5 Notification. [Text unchanged.]

16.52.112. Stop work or use order. [Text unchanged, renumbered.]

(a) **Order.**

California Fire Code Section 112.1 is hereby amended to read:

(b) **Issuance.**

California Fire Code Section 112.2 is hereby amended to read:

[A] **112.2 Issuance.** [Text unchanged.]

(c) **Emergencies.**

California Fire Code Section 112.3 is hereby amended to read:

[A] **112.3 Emergencies.**

(d) **Failure to comply.**

California Fire Code Section 112.4 is hereby amended to read:

[A] **112.4 Failure to comply.** [Text unchanged.]

16.52.202. General definitions.

California Fire Code Section 202 is hereby amended by adding and amending the following definitions:

3D PRINTER. A machine used in the additive manufacturing process for

fabricating objects through the deposition of a material using a print head, nozzle, or another printer technology.

ADDITIVE MANUFACTURING. A process of joining materials to make objects from 3D model data, usually layer upon layer, sometimes referred to as 3D printing. The Code recognizes two types of additive manufacturing:

1. Industrial additive manufacturing. 3D printing operations that typically utilize combustible powders or metals, an inert gas supply, a combustible dust collection system, or that create a hazardous (classified) location area or zone outside of the equipment.
2. Non-industrial additive manufacturing. 3D printing operations that do not create a hazardous (classified) location area outside of the equipment, and do not utilize an inert gas supply or a combustible dust collection system.

BONFIRE. [Text unchanged.]

is hereby deleted from Section 16.52.202 General definitions.

CORROSIVE LIQUID. [Text unchanged.]

FIRE CHIEF. [Text unchanged.]

FIRE DEPARTMENT. [Text unchanged.]

FIREFIGHTER AIR REPLENISHMENT SYSTEM (FARS). [Text unchanged.]

is hereby deleted from Section 16.52.202 General definitions.is hereby deleted from Section 16.52.202 General definitions.is hereby deleted from Section 16.52.202 General definitions.is hereby deleted from Section 16.52.202 General definitions.

is hereby deleted from Section 16.52.202 General definitions.

SECONDARY CONTAINMENT. [Text unchanged.]

SPILL CONTROL. [Text unchanged.]

WORKSTATION. A defined space or an independent principal piece of equipment using hazardous materials with a hazard rating of 3 or 4 in accordance with NFPA 704 where a specific function, laboratory procedure or research activity occurs. *Approved or listed* hazardous materials storage cabinets, flammable liquid storage cabinets or gas cabinets serving a workstation are included as part of the workstation. A workstation is allowed to contain ventilation equipment, fire protection devices, detection devices, electrical devices and other processing and scientific equipment.

16.52.315. General storage.

(a) Storage under stairways.

California Fire Code Section 315.3.5 is hereby amended to read:

315.3.5 Storage under stairways. [Text unchanged]

(b) Lithium battery storage and handling.

California Fire Code Section 315 is hereby amended by adding Section 315.8 to read:

315.8 Lithium Battery Storage and Handling. The storage and handling of lithium ion and lithium metal batteries or cells in quantities exceeding 1,000 pounds (4086 kg) shall comply with Section 315.8.1 through 315.8.10, and Chapter 32 where applicable.

315.8.1 Permits. Permits shall be required as set forth in Section 105.6.53.

315.8.2 Maximum quantity in a fire area. The aggregate amount of lithium batteries stored and handled in a single fire area shall not exceed 9,000 pounds (4086 kg).

315.8.3 Construction requirements. Fire areas shall be separated from each other by fire barriers having not less than 2-hour fire resistance rating constructed in accordance with Section 707 of the Building Code and horizontal assemblies constructed in accordance with Section 711 of the Building Code.

315.8.4 Number of fire areas. The maximum number of fire areas within a building shall be four.

315.8.5 Group H, Division 2 occupancy. Storage and handling of more than 9,000 pounds of lithium batteries per fire area shall be in an approved Group H, Division 2 occupancy constructed in accordance with the Building Code and provided throughout with approved automatic smoke detection and radiant-energy detection systems.

315.8.6 Automatic sprinkler system. Buildings containing fire areas used for lithium battery storage or handling shall be equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. The design of the sprinkler system within each fire area shall not be less than that required for Extra Hazard Group 2 with a minimum design area of 2,500 square feet. Where the storage arrangement is required by other provisions of this code to be provided with a higher level of sprinkler system protection, the higher level of sprinkler system protection shall be provided.

315.8.7 Automatic smoke detection system. An approved automatic smoke detection system that activates an approved occupant notification system shall be provided throughout each fire area in accordance with Section 907.

315.8.8 Radiant energy detection. An approved radiant-energy detection system that activates an approved occupant notification system shall be installed throughout each fire area in accordance with Section 907.

315.8.9 Collection containers. Containers used to collect or store lithium batteries shall be noncombustible and shall not have an individual capacity exceeding 30 gallons (113.6 L), or be approved for transportation in accordance with the Department of Transportation (DOTn).

315.8.10 Storage configuration. Lithium batteries shall be considered a high-hazard commodity in accordance with Chapter 32 and where applicable, lithium battery storage shall comply with Chapter 32 in addition to Section 315.8.

16.52.321. Additive manufacturing.

(a) Additive manufacturing.

California Fire Code Chapter 3 is hereby amended by adding Section 321 to read:

321. Additive Manufacturing.

321.1 General. Additive manufacturing equipment and operations shall comply with Section 321.

321.1.1 Scope. Additive manufacturing shall comply with one of the following:

1. Non-industrial additive manufacturing shall comply with Sections 321.1 and 321.2.
2. Industrial additive manufacturing shall comply with Sections 321.1 and 321.3.

321.1.2 Installation, operation and maintenance. 3D printers and associated additive manufacturing equipment shall be installed, operated and maintained in accordance with this Code, the listing and the manufacturer's instructions.

321.1.3 Production materials. Only the production materials listed for use with the equipment and included in the manufacturer's instructions shall be used.

321.2 Non-industrial additive manufacturing. Non-industrial additive

manufacturing equipment and operations shall comply with Section 321.2.1 through 321.2.2. Additive manufacturing equipment and operations that do not comply with Section 321.2 shall comply with Section 321.3.

321.2.1 Listing. 3D printers used in non-industrial additive manufacturing shall be listed and labeled in accordance with UL 60950-1, UL 62368-1 or UL 2011. The listing shall also verify:

1. The 3D printers are self-contained and utilize maximum 30-liter pre-packaged production materials.
2. The operation of the 3D printers shall not create a hazardous (classified) electrical area or outside of the unit.
3. If any hazardous (classified) electrical area or zone exists inside of the unit's outer enclosure, the area shall be protected by intrinsically safe electrical construction or other acceptable protection methods.
4. The 3D printers shall not utilize inert gas or an external combustible dust collection.

321.2.2 Occupancies. Non-industrial additive manufacturing shall be permitted in all occupancy groups.

321.3 Industrial additive manufacturing. Industrial additive manufacturing equipment and operations shall comply with Section 321.3.1 through 321.3.13.

321.3.1 Permits required. Permits shall be obtained from the *fire code official* in accordance with Section 105.6 prior to engaging in industrial additive manufacturing operations.

321.3.2 Listing. 3D printers used in industrial additive manufacturing shall be listed and labeled in accordance with UL 2011 or approved for the application based on a field evaluation conducted by an approved agency.

321.3.3 Combustible dusts and metals. Industrial additive manufacturing operations that store, use or produce combustible dust, combustible particulate solids or combustible metals shall comply with Chapter 22 and this section.

321.3.4 Powder evaluation. Printing powders used in industrial additive manufacturing operations shall be tested for combustibility in accordance with NFPA 484 or NFPA 652 as applicable. A copy of test reports shall be provided to the fire code official upon request.

321.3.5 Combustible (non-metallic) dusts. Industrial additive manufacturing that uses operations that store, use or produce combustible (non-metallic) dusts shall comply with NFPA 654.

321.3.6 Combustible metals. Industrial additive manufacturing operations that store or use combustible metals shall also comply with NFPA 484.

321.3.7 Ancillary equipment. Ancillary equipment provided for recycling, sieving, vacuuming or handling combustible powders shall be designed and approved for such use.

321.3.8 Hazardous materials. Industrial additive manufacturing operations that store or use hazardous materials exceeding the maximum allowable quantity limits shall comply with Chapter 50.

321.3.9 Inert Gas. Additive manufacturing processes that utilize inert gases shall comply with Chapter 53. Ventilation or gas detection shall be provided in accordance with Section 5307.

321.3.10 Technical assistance. Where required by the fire code official, a report evaluating the acceptability of technologies, processes, products, facilities, materials and uses associated with the operation shall be provided in accordance with 104.7.2 and approved.

321.3.11 Performance based design alternative. Where approved by the fire code official, buildings and facilities where industrial additive manufacturing is performed shall be permitted to comply with the performance-based design options in Section 5001.3 as an alternative to compliance with the other requirements set forth in this Section.

321.3.12 Occupancies. Industrial additive manufacturing shall only be conducted in the occupancy groups associated with manufacturing operations. The occupancy may be required by the fire code official to comply with Chapter 50 maximum allowable quantity tables. Where approved, the requirements in Sections 320.2.5 and 320.3.6 shall be permitted to provide the technical basis for determining compliance with Table 5003.1.1(1), footnote q.

321.3.13 Safety Certification. The equipment, process, training procedures and occupancy associated with industrial additive manufacturing may be required by the fire code official to receive a safety certification from Underwriter's Laboratory or equivalent.

16.52.401. Emergency planning and preparedness.

(a) [Text unchanged.]

16.52.403. Emergency preparedness requirements.

(a) **Duties.**

California Fire Code Section 403.12.1.1 is hereby amended to read:

403.12.1.1 Duty times. [Text unchanged.]

16.52.405. – 16.52.507. [Text unchanged.]

16.52.508. Fire command center.

(a) [Text unchanged.]

(b) **Required features.**

California Fire Code Section 508.1.6 is hereby amended to read:

508.1.6 Required features. [Text unchanged.]

(c) [Text unchanged.]

16.52.510. Emergency responder radio coverage.

(a) – (b) [Text unchanged.]

(c) **Permit required.**

California Fire Code Section 510.3 is hereby amended to read:

510.3 Permit required. A construction permit, for the installation of, or modification of, emergency responder radio coverage systems and related equipment is required as specified in Section 105.7.6. Maintenance performed in accordance with this code is not considered a modification and does not require a permit. A frequency change made to an existing system is considered to be new construction and will require a construction permit.

An operational permit is required to maintain an emergency responder radio coverage system as specified in Section 105.6.

(d) [Text unchanged.]

(e) **Technical requirements.**

California Fire Code Section 510.4 is amended to read:

510.4 Technical requirements. Systems, components and equipment required under this section to provide the emergency responder radio coverage system shall comply with Emergency Responder Radio Coverage Standards and Policies currently promulgated and in effect by the Sunnyvale Department of Public Safety.

(f) **Installation requirements.**

California Fire Code Section 510.5 is amended to read:

510.5 Installation requirements. The installation of the emergency responder radio coverage system shall be in accordance with NFPA 1221

and the current Emergency Responder Radio Coverage Standards and Policies currently promulgated and in effect by the Sunnyvale Department of Public Safety.

16.52.511. - 16.52.601. [Text unchanged.]

16.52.603 Fuel-fired appliances.

(a) Prohibited locations.

California Fire Code Section 603.4.2.1.1 is hereby amended to read:

603.4.2.1.1 Prohibited locations. The storage or use of portable outdoor gas-fired heating appliances is prohibited in any of the following locations:

1. Inside of any occupancy where connected to the fuel gas container.
2. Inside of tents, canopies and membrane structures.
3. On exterior balconies and rooftops at other than Group R3 occupancies.

16.52.604. Electrical equipment, wiring and hazards. [Renumbered]

(a) Immersion heaters.

California Fire Code Section 604 of Subsection 604.12 is hereby amended to read:

604.12 Immersion Heaters. [Text unchanged.]

16.52.605. Mechanical refrigeration. [Renumbered]

(a) Standby power.

California Fire Code Section 605 of Subsection 605.18 is hereby amended to read:

605.18 Standby power. [Text unchanged.]

16.52.901. Fire protection systems.

(a) – (b) [Text unchanged.]

(c) Records.

California Fire Code Section 901.6.3 is hereby amended to read:

901.6.3 Records. Records of all system inspections, tests and maintenance required by the referenced standard shall be maintained on the premises for a minimum of five years and shall be electronically copied to the fire code official by the company that performed the inspection, testing or maintenance in a manner prescribed by the fire code official. Inspections and tests performed on fire alarm systems shall be documented on appropriate NFPA 72 forms.

(d) [Text unchanged.]

16.52.903. Automatic sprinkler systems.

(a) – (b) [Text unchanged.]

(c) **Where required.**

California Fire Code Section 903.2 is hereby amended to read:

903.2 Where required. Approved automatic sprinkler systems in new and existing buildings and structures shall be provided in the locations described in this Section or in Sections 903.2.1 through 903.2.20, whichever is the more restrictive.

Exception: [Text unchanged.]

For the purposes of this Section, firewalls and fire barriers used to separate building areas shall be constructed in accordance with the California Building Code and shall be without openings or penetrations.

1. [Text unchanged.]

2. An automatic sprinkler system shall be provided throughout existing buildings and structures less than 3600 square feet, other than group R-3 occupancies and townhouses, when additions are made that increase the building area to 3600 square feet or greater, or that create conditions described in Sections 903.2.1 through 903.2.20.

Exception: [Text unchanged.]

3. An automatic sprinkler system shall be provided throughout existing buildings and structures 3600 square feet or greater, other than group R-3 occupancies and townhouses, when any addition is made, or that create conditions described in Sections 903.2.1 through 903.2.20.

Exception: [Text unchanged.]

4. An automatic sprinkler system shall be provided throughout existing buildings and structures 3600 square feet or greater, other than group R-3 occupancies and townhouses, when alterations or repairs are made that are in excess of 50 percent of the existing building area within a 12-month period, or that create conditions described in Sections 903.2.1 through 903.2.20 or Chapter 11. For the purposes of this chapter, alterations and repairs shall be determined by the *fire code official* and include, but not be limited to; changes in T-bar ceiling, changes in the means of egress system, extending travel distances that would otherwise require the addition of automatic fire sprinklers, and extended distances from fire apparatus access roads.

5. - 8. [Text unchanged.]

Such sprinklers may be connected to the domestic water, supply if the

structure is not otherwise required to be fire sprinklered. Systems using domestic water supply shall not be less than 1-inch (25.4-mm) diameter pipe. Sufficient coverage of the area shall be provided and an *approved* accessible shut-off valve is to be provided for each room or area. Where valves are subject to possible vandalism, an *approved* means of securing the valve in the open position shall be provided. Where there are no ceilings, an 18 square inch (11,613 square mm) heat baffle shall be provided not more than 6 inches (152.4 mm) above the sprinkler head. All exposed piping shall be brazed copper or steel.

(d) – (h) [Text unchanged.]

(i) **Corrosion-resistant paint.**

California Fire Code Section 903.3 is hereby amended by adding Section 903.3.10 to read:

903.3.10 Corrosion-resistant paint. In open parking garages, steel pipe shall be properly protected from corrosion by painting the pipe with corrosion-resistant paint.

(j) [Text unchanged; renumbered.]

16.52.904. Alternative automatic fire-extinguishing systems.

(a) **Monitoring.**

California Fire Code Section 904.3.5 is hereby amended to read:

904.3.5 Monitoring. Where a building fire alarm system or dedicated function fire alarm system is installed, automatic fire-extinguishing systems shall be monitored by the building fire alarm system or dedicated function fire alarm system in accordance with NFPA 72.

16.52.905. Standpipe systems.

(a) **Required installations.**

California Fire Code Section 905.3 is hereby amended to read:

905.3 Required installations. Standpipe systems shall be installed where required by Sections 905.3.1 through 905.3.11.1 and where the *fire code official* determines that additional standpipes are needed in accordance with Section 901.4.4. Standpipe systems are allowed to be combined with *automatic sprinkler systems*.

Exception: Standpipe systems are not required in Group R-3 occupancies.

16.52.909. Smoke control systems.

(a) **Schedule.**

California Fire Code Section 909.20.1 is hereby amended to read:

909.20.1 Schedule. A routine maintenance and operational testing program shall be initiated immediately after the smoke control system has passed the acceptance tests. A written schedule for routine maintenance and operational testing shall be established and both shall occur at least annually.

16.52.913. Fire pumps.

(a) Additional pump required. [Renumbered.]

California Fire Code Section 913.6 is hereby amended by adding Section 913.9.1 to read:

913.6.1 Additional pump required. Buildings having floors used for human occupancy located more than one hundred fifty feet above the lowest floor level having building access shall have a minimum of two independently driven fire pumps which shall be provided and sized for fire sprinkler demand and fire department standpipe operation.

16.52.914. Fire protection based on special detailed requirements of use and occupancy. [Text unchanged.]

16.52.1011. Stairways. [Renumbered.]

(a) Roof access

California Fire Code Section 1011.12.2 is hereby amended to read:

1011.12.2 Roof access. Where a *stairway* is provided to a roof, access to the roof shall be provided through a *penthouse* complying with Section 1510.2 of the *California Building Code*.

Exception: In buildings without an occupied roof, access to the roof shall be permitted to be a roof hatch or trap door not less than 16 square feet (1.5 m²) in area and having a minimum dimension of 2 feet 6 inches (762 mm).

16.52.1031. Maintenance of the means of egress. [Renumbered]

(a) Vehicular obstruction.

California Fire Code Section 1031 of Subsection 1031.3.2 is hereby amended to read:

1031.3.2 Vehicular obstructions. [Text unchanged.]

(b) Seismic supports for storage shelves.

California Fire Code Section 1031 of subsection 1031.6.1 is hereby amended to read:

1031.6.1 Seismic supports for storage shelves. [Text unchanged.]

16.52.1103. Fire safety requirements for existing buildings. [Text unchanged.]

16.52.1203. Emergency and standby power systems.

(a) Refrigeration systems.

California Fire Code Section 1203 is hereby amended by adding Section 1203.2.19 to read:

1203.2.19 Refrigeration systems. Where treatment, detection, mechanical ventilation, alarm or other electrically operated systems are required for refrigeration systems, such systems shall be provided with an approved standby source of power in accordance with the California Electrical Code.

(b) Repair garages.

California Fire Code Section 1203 is hereby amended by adding Section 1203.2.20 to read:

1203.2.20 Repair garages. Where mechanical ventilation, treatments systems, alarm, detection or other electrically operated systems are required in repair garages for lighter than air fuels, such systems shall be provided with an approved standby source of power in accordance with the California Electrical Code.

16.52.2311. Repair garages.

(a) Supervision and monitoring.

California Fire Code Section 2311.8.12 is hereby amended to read:

2311.8.12. Supervision and monitoring. Required gas detection and mechanical ventilation systems shall be electrically supervised and monitored in accordance with Section 5004.10.

(b) Standby power.

California Fire Code Section 2311.8.13 is hereby amended to read:

2311.8.13 Standby power. The gas detection system shall have a battery backup or an approved alternate source of power in accordance with NFPA 72.

16.52.3304. Precautions against fire.

(a) Fire Walls.

California Fire Code Section 3304.9 is hereby amended to read:

3304.9 Fire walls. When firewalls are required in combustible construction, the wall construction shall be completed (with all openings protected) immediately after the building is sufficiently weather-protected at the location of the wall(s).

16.52.3311. Means of Egress.

(a) **Stairways required.**

California Fire Code Section 3311.1 is hereby amended to read:

[BE] **3311.1 Stairways required.** [Text unchanged.]

(b) **Required means of egress.**

California Fire Code Section 3311.1.1 is hereby amended to read:

3311.1.1 Required means of egress. All new buildings under construction shall have at least one unobstructed means of egress. All means of egress shall be identified in the prefire plan as outlined in Section 3308.3.

16.52.5001. Hazardous materials: general.

(a) **Scope.**

California Fire Code Section 5001.1 is hereby amended to read:

5001.1 Scope. Prevention, control and mitigation of dangerous conditions related to the storage, dispensing, use and handling of hazardous materials shall be in accordance with this chapter.

This chapter shall apply to all hazardous materials, including those materials regulated elsewhere in this code, except that where specific requirements are provided in other chapters, those specific requirements shall apply in accordance with the applicable chapter. Where a material has multiple hazards, all hazards shall be addressed.

Exceptions:

1. – 5. [Text unchanged.]
6. Refrigeration systems (see Section 605).
7. Stationary storage battery systems regulated by Section 1206.2.
8. – 11. [Text unchanged.]
12. Storage and handling of lithium ion batteries regulated by Section 315.8.

5001.1.1 Waiver. [Text unchanged.]

(b) **Hazardous materials business plan.**

California Fire Code Section 5001 is hereby amended by adding Section 5001.5.3 to read:

5001.5.3 Hazardous materials business plan. Facilities that are required to submit a Hazardous Materials Business Plan (HMBP) as required by Health and Safety Code (HSC), Chapter 6.95, Sections 25500 through 25545, and Title 19, Division 2, Chapter 4, and facilities required to maintain a hazardous materials-related permit in accordance with Section 105.6 of this code, shall electronically submit a HMBP every year on or by the last day of the assigned month and no less frequently than that required

by the HSC.

Exception: The following facilities shall electronically submit a HMBP at least once every three years on or by the last day of the assigned month and no less frequently than that required by the HSC:

1. Cell tower sites.
2. Facilities with no hazardous materials-related permits other than carbon dioxide used in insulated liquid carbon dioxide beverage dispensing systems.
3. Dental offices with no other hazardous materials-related permits other than a permit for a fixed medical gas system and/or small quantity waste generator permit.

(c) [Text unchanged; renumbered.]

16.52.5003. Hazardous materials: general requirements.

(a) **Highly toxic and toxic gases and similarly used or handled materials.**

California Fire Code Section 5003 is hereby amended by adding Section 5003.1.3.1 to read:

5003.1.3.1 Highly toxic and toxic gases and similarly used or handled materials. The storage, use and handling of highly toxic and toxic gases in amounts exceeding Table 6004.2 or 6004.3 shall be in accordance with this chapter and Chapter 60. Any highly toxic or toxic material that is used or handled as a gas or vapor shall be in accordance with the requirements for highly toxic or toxic gases.

(b) **Spill control and secondary containment requirements.**

California Fire Code Section 5003 is hereby amended by adding Section 5003.1.5 to read:

5003.1.5 Additional spill control and secondary containment requirements. In addition to the requirements set forth in Section 5004.2, an approved containment system is required for any quantity of hazardous materials that are liquids or solids at normal temperature, and pressure (NTP) where a spill is determined to be a plausible event and where such an event would endanger people, property or the environment. The approved containment system may be required to include a combination of spill control and secondary containment meeting the design and construction requirements set forth in Section 5004.2.

(c) – (d) [Text unchanged; renumbered]

(e) **Equipment, devices and systems requiring testing.** [Renumbered]

California Fire Code Section 5003.2.9.1 is hereby amended to read:

5003.2.9.1 Equipment, devices and systems requiring testing. The following equipment, systems and devices shall be tested in accordance with Sections 5003.2.9 and 5003.2.9.2.

1. Gas detection systems, alarms and automatic emergency shutoff valves required by Section 6004.2.2.10 for highly toxic and toxic gases.
2. Limit control systems for liquid level, temperature and pressure required by Sections 5003.2.7, 5004.8 and 5005.1.4.
3. Emergency alarm systems and supervision required by Sections 5004.9 and 5005.4.4.
4. Monitoring and supervisory systems required by Sections 5004.10 and 5005.1.6.
5. Manually activated shutdown controls required by Section 6403.1.1.1 for compressed gas systems conveying pyrophoric gases.
6. Gas detection systems, alarms and automatic emergency shutoff valves installed in repair garages for vehicles fueled by lighter-than-air fuels in accordance with Section 2311.7.

(f) 5003.3.1 Unauthorized discharges. [Renumbered]
California Fire Code Section 5003.3.1 is hereby amended to read:

5003.3.1 Unauthorized discharges. In the event hazardous materials are released in quantities reportable under state, federal or local regulations or when there is release or a threatened release that presents a threat to health, property or the environment, the fire code official shall be notified immediately in an approved manner and the following procedures required in accordance with Sections 5003.3.1.1 through 5003.3.1.4.

(g) 5003.5.2 Ventilation ducting. [Renumbered]
California Fire Code Section 5003.5.2 is hereby amended to read:

5003.5.2 Ventilation ducting. Ducts venting hazardous materials operations shall be labeled with the hazard class of the material being vented and the direction of flow.

(h) – (i) [Text unchanged; renumbered]

16.52.5004. Hazardous materials: storage.

(a) Spill control for hazardous materials liquids.
California Fire Code Section 5004.2.1 is hereby amended to read:

5004.2.1 Spill control for hazardous material liquids. [Text unchanged.]

1. [Text unchanged.]
2. Liquid-tight floors in indoor locations or similar areas in outdoor locations provided with liquid-tight raised or recessed sills or dikes.
3. – 4. [Text unchanged.]

Except for surfacing, the floors, sills, dikes, sumps and collection systems shall be constructed of noncombustible material, and the liquid-tight seal shall be compatible with the material stored. When liquid-tight sills or dikes are provided, they are not required at perimeter openings having an open-grate trench across the opening that connects to an approved collection system.

(b) – (c) [Text unchanged.]

16.52.5601. Explosives and fireworks.

Chapter 56 of the 2018 International Fire Code is not adopted, except that section 5601.1.3 the 2019 California Fire Code is hereby adopted and amended to read as follows:

5601.1.3 Fireworks. [Text unchanged.]

16.52.5704. Flammable and combustible liquids.

(a) [Text unchanged.]

(b) **Overfill prevention.**

California Fire Code Section 5704.2.7.5.8 is hereby amended to read:

5704.2.7.5.8 Overfill Prevention. An approved means or method in accordance with Section 5704.2.9.7.5 shall be provided to prevent the overfilling of all Class I, II and III-A liquid storage tanks. Storage tanks in refineries, bulk plants or terminals regulated by Sections 5706.4 or 5706.7 shall have overfill protection in accordance with API 2350.

An approved means or method in accordance with Section 5704.2.9.7.5 shall be provided to prevent the overfilling of Class IIIB liquid storage tanks connected to fuel-burning equipment inside buildings.

(c) – (e) [Text unchanged.]

16.52.5706. Special operations. [Text unchanged.]

16.52.5707. On-demand mobile fueling

(a) **Mobile fueling vehicle.**

California Fire Code Section 5707.2 is hereby amended to read:

5707.2 Mobile fueling vehicle. [Text unchanged.]

(b) **Site plan.**

California Fire Code Section 5707.3.3 is hereby amended to read:

5707.3.3 Site plan. [Text unchanged]

(c) **Equipment.**

California Fire Code Section 5707.5 is hereby amended to read:

5707.5 Equipment. Mobile fueling equipment shall comply with Sections 5707.5.1 through 5707.5.5.

(d) **Break-away device.**

California Fire Code Section 5707.5 is hereby amended by adding 5707.5.5 to read:

5707.5.5 Break-away device. [Text unchanged; renumbered]

(e) **Operations.**

California Fire Code Section 5707.6 is hereby amended by adding Sections 5707.6.3 through 5707.6.7 to read:

5707.6.3 Nighttime deliveries. [Text unchanged.]

5707.6.4 Vehicle lights. [Text unchanged.]

5707.6.5 Safety cones. [Text unchanged.]

5707.6.6 Bonding. [Text unchanged.]

5707.6.7 Spill reporting. [Text unchanged.]

16.52.5809. Mobile gaseous fueling of hydrogen-fueled vehicles.

(a) **Site plan.**

California Fire Code Section 5809.3.4 is hereby amended to read:

5809.3.4 Site plan. For other than emergency-roadside service, a site plan shall be developed for each location at which mobile gaseous hydrogen fueling occurs. The site plan shall be in sufficient detail to indicate: all buildings, structures, lot lines, property lines and appurtenances on site and their use and function, and the scale of the site plan.

16.52.6004. Highly toxic and toxic compressed gases. [Replaced.]

(a) **Indoor storage and use.**

California Fire Code Section 6004.2 is hereby amended to read:

6004.2 Indoor storage and use. The indoor storage and use of highly toxic and toxic compressed gases shall be in accordance with Sections 6004.2.1 through 6004.2.4.

(b) **Applicability.**

California Fire Code Section 6004.2.1 is hereby amended to read:

6004.2.1 Applicability. The applicability of regulations governing the indoor storage and use of highly toxic and toxic compressed gases shall be as set forth in Sections 6004.2.1.1 through 6004.2.1.4.

(c) **Quantities exceeding minimum threshold quantities but not exceeding maximum allowable quantities per control area.**

California Fire Code Section 6004.2.1.4 is hereby amended to read:

6004.2.1.4 Quantities exceeding minimum threshold quantities but not exceeding maximum allowable quantities per control area. The indoor storage or use of highly toxic and toxic gases in amounts exceeding the minimum threshold quantities per control area set forth in Table 6004.2.1.4 but not exceeding maximum allowable quantity per control area set forth in Table 5003.1.1(2) shall be in accordance with Sections 5001, 5003, 6001, 6004.1, and 6004.4

(d) **Minimum threshold quantities of highly toxic and toxic compressed gases in indoor storage and use.**

California Fire Code 6004.2.1.4 Table is hereby amended to read:

Table 6004.2.1.4. Minimum threshold quantities of highly toxic and toxic gases in indoor storage and use.

Material	Gas (cubic feet at NTP)
Highly toxic	20
Toxic	405

(e) **Additional indoor requirements.**

California Fire Code Section 6004 is hereby amended by adding Sections 6004.4 through 6004.4.8.2 to read:

6004.4 Additional indoor requirements. Additional requirements applicable to the indoor storage and use of highly toxic and toxic compressed gases shall be in accordance with Sections 6004.4 through 6004.4.8.2

6004.4.1 Cylinder and tank location. Cylinders shall be located within gas

cabinets, exhausted enclosures or gas rooms. Portable and stationary tanks shall be located within gas rooms or exhausted enclosures.

Exception:

1. Where a gas detection system is provided in accordance with 6004.4.8

6004.4.2 Ventilated areas. The room or area in which gas cabinets or exhausted enclosures are located shall be provided with exhaust ventilation. Gas cabinets or exhausted enclosures shall not be used as the sole means of exhaust for any room or area.

6004.4.3 Piping and controls. In addition to the requirements of Section 5003.2.2, piping and controls on stationary tanks, portable tanks, and cylinders shall comply with the following requirement:

1. Stationary tanks, portable tanks, and cylinders in use shall be provided with a means of excess flow control on all tank and cylinder inlet or outlet connections.

Exceptions:

1. Inlet connections designed to prevent backflow.
2. Pressure relief devices.

6004.4.4 Gas rooms. Gas rooms shall comply with Section 5003.8.4 and both the following requirements:

1. The exhaust ventilation from gas rooms shall be directed to an exhaust system.
2. Gas rooms shall be equipped with an approved automatic sprinkler system. Alternative fire- extinguishing systems shall not be used.

6004.4.5 Treatment systems. The exhaust ventilation from gas cabinets, exhausted enclosures and gas rooms, required in Section 6004.4.1 shall be directed to a treatment system. The treatment system shall be utilized to handle the accidental release of gas and to process exhaust ventilation. The treatment system shall be designed in accordance with Sections 6004.2.2.7.1 through 6004.2.2.7.5 and Chapter 5 of the California Mechanical Code.

Exceptions:

1. Highly toxic and toxic gases—storage. A treatment system is not required for cylinders, containers and tanks in storage where all the following controls are provided:

- 1.1 Valve outlets are equipped with gas- tight outlet plugs or caps.
 - 1.2 Hand wheel-operated valves have handles secured to prevent movement.
 - 1.3 Approved containment vessels or containment systems are provided in accordance with Section 6004.2.2.3.
2. Highly toxic and toxic gases —use. Treatment systems are not required for highly toxic and toxic gases supplied by stationary tanks, portable tanks, or cylinders where a gas detection system complying with Section 6004.4.8 and listed or approved automatic-closing fail- safe valves are provided. The gas detection system shall have a sensing interval not exceeding 5 minutes. Automatic-closing fail- safe valves shall be located immediately adjacent to cylinder valves and shall close when gas is detected at the permissible exposure limit (PEL) by a gas sensor monitoring the exhaust system at the point of discharge from the gas cabinet, exhausted enclosure, ventilated enclosure or gas room.

6004.4.5.1 Design. Treatment systems shall be capable of diluting, adsorbing, absorbing, containing, neutralizing, burning or otherwise processing the contents of the largest single vessel of compressed gas. Where a total containment system is used, the system shall be designed to handle the maximum anticipated pressure of release to the system when it reaches equilibrium.

6004.4.5.2 Performance. Treatment systems shall be designed to reduce the maximum allowable discharge concentrations of the gas to one-half immediate by dangerous to life and health (IDLH) at the point of discharge to the atmosphere. Where more than one gas is emitted to the treatment system, the treatment system shall be designed to handle the worst-case release based on the release rate, the quantity and the IDLH for all compressed gases stored or used.

6004.4.5.3 Sizing. Treatment systems shall be sized to process the maximum worst-case release of gas based on the maximum flow rate of release from the largest vessel utilized. The entire contents of the largest compressed gas vessel shall be considered.

6004.4.5.4 Stationary tanks. Stationary tanks shall be labeled with the maximum rate of release for the compressed gas contained based on valves or fittings that are inserted directly into the tank. Where multiple valves or fittings are provided, the maximum flow rate of release for valves or fittings with the highest flow rate shall be indicated. Where liquefied compressed gases are in contact with valves or fittings, the liquid flow rate shall be utilized for computation purposes. Flow rates indicated on the label shall be

converted to cubic feet per minute (cfm/min) (m³/s) of gas at normal temperature and pressure (NTP).

6004.4.5.5 Portable tanks and cylinders. The maximum flow rate of release for portable tanks and cylinders shall be calculated based on the total release from the cylinder or tank within the time specified in Table 6004.2.2.7.5. Where portable tanks or cylinders are equipped with approved excess flow or reduced flow valves, the worst-case release shall be determined by the maximum achievable flow from the valve as determined by the valve manufacturer or compressed gas supplier. Reduced flow and excess flow valves shall be permanently marked by the valve manufacturer to indicate the maximum design flow rate. Such markings shall indicate the flow rate for air under normal temperature and pressure.

6004.4.6 Emergency power. Emergency power shall be provided for the following systems in accordance with Section 604:

1. Exhaust ventilation system.
2. Treatment system.
3. Gas detection system.
4. Smoke detection system.

6004.4.6.1 Fail-safe systems. Emergency power shall not be required for mechanical exhaust ventilation and treatment systems where approved fail-safe systems are installed and designed to stop gas flow.

6004.4.7 Automatic fire detection system. An approved automatic fire detection system shall be installed in rooms or areas where highly toxic and toxic compressed gases are stored or used. Activation of the detection system shall sound a local alarm. The fire detection system shall comply with Section 907.

6004.4.8 Gas detection system. A gas detection system complying with Section 916 shall be provided to detect the presence of gas at or below the PEL or ceiling limit of the gas for which detection is provided.

Exceptions:

1. A gas detection system is not required for toxic gases when the physiological warning threshold level for the gas is at a level below the accepted PEL for the gas.
2. A gas detection system is not required for highly toxic and toxic gases where cylinders, portable tanks, and all non-continuously welded connects are within a gas cabinet or exhausted enclosures.

6004.4.8.1 Alarms. The gas detection system shall initiate a local alarm and transmit a signal to an approved location.

6004.4.8.2 Shut off of gas supply. The gas detection system shall automatically close the shut off valve at the source on gas supply piping and tubing related to the system being monitored for whichever gas is detected.

Exception: Automatic shutdown is not required for highly toxic and toxic compressed gas systems where all the following controls are provided:

1. Constantly attended/supervised.
2. Provided with emergency shutoff valves that have ready access.

16.52.6405. Pyrophoric materials. [Text unchanged.]

16.52.7000. Modifications.

(a) **Deferment.**

2018 International Fire Code Section B103 is hereby amended by adding Section B103.4 to read:

B103.4 Deferment. [Text unchanged.]

16.52.7100 Fire flow requirements for buildings.

2018 California Fire Code Section B105.2 is hereby amended to read:

B105.2 Buildings other than one- and two-family dwellings, Group R-3 and R-4 buildings and townhouses. [Text unchanged.]

16.52.7500. Fire hydrant spacing.

(a) **Average spacing.**

Appendix C Section C103 of the 2018 California Fire Code is hereby amended to read:

C103.1 Hydrant spacing. [Text unchanged.]

16.52.8101. Fire apparatus and access roads.

(a) **Scope.**

Appendix D Section D101.1 of the 2018 International Fire Code is hereby amended to read:

D101.1 Scope. [Text unchanged.]

16.52.8102. Required access.

(a) **Access and loading.**

Appendix D Section D102.1 of the 2018 International Fire Code is hereby amended to read:

D102.1 Access and loading. [Text unchanged.]

16.52.8103. Minimum specifications.

(a) Turning radius.

Appendix D Section D103.3 of the 2018 International Fire Code is hereby amended to read:

D103.3 Turning radius. [Text unchanged.]

(b) Dead ends.

Appendix D Section D103.4 of the 2018 International Fire Code is hereby amended to read:

D103.4 Dead ends. [Text unchanged.]

**TABLE D103.4
REQUIREMENTS FOR DEAD-END FIRE APPARATUS ACCESS
ROADS**

[Table D103.4 not reproduced here. No amendments are proposed for the table.]

(c) Dead end fire apparatus access road turnaround.

Appendix D Section D103.4 of the 2018 International Fire Code is hereby amended by adding Figure D103.4 to read:

**FIGURE D103.4
DEAD-END FIRE APPARATUS ACCESS
ROAD TURNAROUND**

[Figure D103.4 not reproduced here. No amendments are proposed for the Figure.]

(d) – (f) [Text unchanged.]

16.52.8104. Aerial fire apparatus access roads.

(a) Where required.

Appendix D Section D105.1 of the 2018 International Fire Code is hereby amended to read:

D105.1 Where required. [Text unchanged.]

Exception: [Text unchanged.]

16.52.8105. Multi-family residential developments.

(a) Projects having more than 50 dwelling units.

Appendix D Section D106.1 of the 2018 International Fire Code is hereby amended to read:

106.1. Projects having more than 50 dwelling units. [Text unchanged.]

- (b) **Projects having more than 200 dwelling units.**
Appendix D Section D106.2 of the 2018 International Fire Code is hereby deleted.

16.52.9000. Fire fighter air replenishment systems.

- (a) **Breathing air supply.**
Appendix L Section L104.5 of the 2018 International Fire Code is hereby amended to read:

L104.5 Breathing air supply. [Text unchanged.]

- (b) **Fill station location.**
Appendix L Section L104.13.1 of the 2018 International Fire Code is hereby amended to read:

L104.13.1 Location. [Text unchanged.]

- (c) **External mobile air connection location.**
Appendix L Section L104.14.1 of the 2018 International Fire Code is hereby amended to read:

L104.14.1 Location. [Text unchanged.]

- (d) **Emergency fill station.**
Appendix L Section L104 of the 2018 International Fire Code is hereby amended by adding Section L104.16 to read:

L104.16 Emergency fill panel (EFP). [Text unchanged.]

16.52.9080 Reference Standards

- (a) **Chapter 80 Reference Standards**
The following standards in Chapter 80 of the 2019 California Fire Code are hereby amended to read. The remaining standards in Chapter 80 shall remain unchanged:

CGA

G-13 – (2016)	Storage and Handling of Silane and Silane Mixtures.
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SECTION 2. STATUTORY REFERENCES, INCLUSIONS OF AMENDMENTS AND ADDITIONS. Whenever reference is made to any portion of this ordinance, or of any other chapter or section of the Sunnyvale Municipal Code, or of any other ordinance of the City of Sunnyvale, or of any law of the State of California, the reference applies to all amendments and additions now or thereafter made.

SECTION 3. INTERPRETATIONS. In interpreting and applying the provisions of this ordinance, the requirements contained herein are declared to be minimum requirements for the purposes set forth. The provisions of this ordinance, insofar as they are substantially the same as existing statutory provisions relating to the same subject matter, shall be construed as restatements and continuations and not as new enactments. This ordinance shall not nullify the more restrictive provisions of covenants, agreements or other ordinances or laws, but shall prevail as to such provisions which are less restrictive.

SECTION 4. FINDINGS. To the extent the changes and modifications set forth in this ordinance to the 2019 California Building Standards Codes, including the California Fire Code are deemed more restrictive than the standards contained in the 2019 California Building Standards Codes, thus requiring findings describing local conditions that justify such modifications, the Council finds and determines that the changes are reasonably necessary because of local climatic, geologic, or topographic conditions and adopts the findings for local amendments to the California Fire Code, 2019 Edition, attached as Exhibit "A" and incorporated herein by reference.

SECTION 5. CEQA - EXEMPTION. The City Council finds, pursuant to Title 14 of the California Code of Regulations, Section 15308 (Class 8) Actions by Regulatory Agencies for Protection of the Environment and Section 15305 (Class 5) Minor alterations in Land Use Limitations and Section 15061(b)(3) of the CEQA Guidelines, because it can be seen with certainty that there is no possibility that the changes adopted will have a significant effect on the environment.

SECTION 6. CONSTITUTIONALITY; SEVERABILITY. If any section, subsection, sentence, clause or phrase of this ordinance is for any reason held to be invalid, such decision or decisions shall not affect the validity of the remaining portions of this ordinance. The City Council hereby declares that it would have passed this ordinance, and each section, subsection, sentence, clause and phrase thereof irrespective of the fact that any one or more sections, subsections, sentences, clauses or phrases be declared invalid.

SECTION 7. EFFECTIVE DATE. This ordinance shall be in full force and effect January 1, 2020.

SECTION 8. POSTING AND PUBLICATION. The City Clerk is directed to cause copies of this ordinance to be posted in three (3) prominent places in the City of Sunnyvale and to cause publication once in The Sun, the official publication of legal notices of the City of Sunnyvale, of a notice setting forth the date of adoption, the title of this ordinance, and a list of places where copies of this ordinance are posted, within fifteen (15) days after adoption of this ordinance.

Introduced at a regular meeting of the City Council held on _____, and adopted as an ordinance of the City of Sunnyvale at a regular meeting of the City Council held on _____, by the following vote:

AYES:

NOES:

ABSTAIN:

ABSENT:

RECUSAL:

ATTEST:

APPROVED:

City Clerk
Date of Attestation: _____

Mayor

(SEAL)

APPROVED AS TO FORM:

City Attorney

EXHIBIT A

FINDINGS

Section 17958 of the California Health and Safety Code provides that the City may make changes to the provisions of the California Building Standards Codes. Sections 17958.5 and 17958.7 of the Health and Safety Code require that for each proposed local change to those provisions of the California Building Standards Codes which regulate buildings used for human habitation, the City Council must make findings supporting its determination that each such local change is reasonably necessary because of local climatic, geological, or topographical conditions. The City need not show that local conditions deviate from prevailing statewide conditions, only that the changes are “reasonably necessary because of local climatic, geological, or topographical conditions.” (Cal. Health & Safety Code § 17958.5; *ABS Inst. v. City of Lancaster* (1994) 24 Cal. App. 4th 285, 294.).

Local building regulations having the effect of amending the uniform codes, which were adopted by the City prior to November 23, 1970, were unaffected by the regulations of Sections 17958, 17958.5 and 17958.7 of the Health and Safety Code. Therefore, amendments to the uniform codes which were adopted by the City Council prior to November 23, 1970, and have been carried through from year to year without significant change, need no required findings. Also, amendments to provisions not regulating buildings used for human habitation do not require findings.

General Findings

1. Climatic

a. Precipitation. Precipitation in Sunnyvale ranges from 4.83 to 30.30 inches per year with an average of approximately 13.86 inches per year. Approximately 90% falls during the months of November through April and 10% from May through October. This area experienced a major drought in 1977-78 and a moderate drought the next five years. It recently ended a seven-year drought and it is possible that more droughts will occur in the future. The local climate is characterized by markedly delineated rainy and dry seasons, which tend to maximize the expansive characteristics of soil. Drought conditions tend to create more frequent and larger fire incidents

b. Relative Humidity. Humidity generally ranges from 60% during daytime to 80% at night. It drops to 20% during the summer months and occasionally drops lower.

c. Temperatures. Temperatures have been recorded as high as 108° F. Average summer highs are in the 78°-82° F. range.

d. Winds. Prevailing winds are from the Northwest or Southeast. However, winds are experienced from virtually every direction at one time or another. Velocities are generally in the 5-mph to 15-mph range, gusting to 7.4 mph to 30 mph, particularly during the summer months. Extreme winds, up to 60 mph, have been known to occur.

e. **Summary and Analysis.** These local climatic conditions affect the acceleration, intensity and size of fire in the community. Times of little or no rainfall, of low humidity and high temperatures create extremely hazardous conditions, particularly as they relate to wood shake and shingle roof fires and conflagrations. The winds experienced in this area can have a tremendous impact upon structure fires of buildings in close proximity to one another commonly found in Sunnyvale.

During wood shake and shingle roof fires, or exposure fires, winds can carry sparks and burning brands to other structures, thus spreading the fire and causing conflagrations. In building fires, winds can literally force fires back into the building and can create a blowtorch effect, in addition to preventing "natural" ventilation and cross-ventilation efforts. In developed areas of the City, fires can occur in buildings, rubbish, vehicles, and vegetation on vacant lots.

2. Geological, Geographic and Topographic

a. **Geographic Location.** Sunnyvale is located in the Santa Clara Valley. It has taken its place as the second largest city in the "heart of the Silicon Valley," the center for an expanding and changing technology industry.

b. **Seismic Location.** Sunnyvale is situated on alluvial soils between San Francisco Bay and the San Andreas Fault zone. The City's location makes it particularly vulnerable to damage to taller and older structures caused by seismic events. The relatively young geological processes that have created the San Francisco Bay Area are still active today. Seismically, the City sits between two active earthquake faults (San Andreas and the Hayward/Calaveras) and numerous potentially active faults.

c. **Seismic and Fire Hazards.** In the event of a seismic occurrence, many areas of the city can expect damage or collapse of buildings due to Sunnyvale's proximity to active earthquake faults. Secondary impacts could include ruptured gas lines, collapsed power lines, and breaks in the water distribution system. Gypsum wallboard and exterior portland cement plaster have performed poorly during recent California seismic events. The shear values for gypsum wallboard and portland cement stucco contained in the code are based on mono-directional testing. It is appropriate to limit the use of these products until cyclic loading testing are performed and evaluated. Fire following an earthquake has the potential of causing greater loss of life and damage than the earthquake itself.

Hazardous materials, particularly toxic gases, could pose the greatest threat to the largest number, should a significant seismic event occur. Public safety resources would have to be prioritized to mitigate the greatest threat, and may likely be unavailable for smaller single dwelling or structure fires.

Other variables may tend to intensify the situation:

1. The extent of damage to the water system;
2. The extent of isolation due to bridge and/or freeway overpass collapse;
3. The extent of roadway damage and/or amount of debris blocking the roadways;
4. Climatic conditions (hot, dry weather with high winds);
5. Time of day will influence the amount of traffic on roadways and could intensify the risk to life during normal business hours;

6. The availability of timely mutual aid or military assistance;
7. The large portion of dwellings with wood shingle roof coverings could result in conflagrations.

d. Size and Population. The City has an area over 24 square miles in size and a population estimated to be 155,567.

e. Development. Sunnyvale is a community which is projected to add 15,500 new residential units within the next twenty years, primarily in multi-family configurations, for which building and fire-life safety is a matter of acute importance.

f. Public Safety Department. Sunnyvale utilizes a public safety (joint police/fire) department with personnel who function as both fire suppression and police officers, resulting in fewer personnel than otherwise would be required for a city of its size. A premium is therefore placed on built-in physical techniques and devices as crime preventative measures. It is therefore also imperative that fire detection and suppression occur as quickly as possible to minimize loss of property and life. Added protection of fire sprinkler systems and other fire protection measures will supplement normal public safety response by providing immediate protection for the building occupants and by containing and controlling the fire spread to the area of origin. For these reasons the most stringent provisions are required concerning fire detection, alarm and suppression systems.

g. Roads and Streets. Sunnyvale is characterized by large buildings and building complexes and is bounded by several major freeways and expressways, which intersect railroad tracks and additional expressways and major arterial streets. These surface features have a major adverse effect upon the road and street layout in the community, including major traffic routes. In addition, the number of vehicle miles driven in the City is steadily increasing and considerable efforts in traffic and roadway improvements are being made to ease the crush of commuters to and through the City to their homes and places of work. Because of the City's high concentration of jobs, much of the peak traffic is made by nonresidents traveling to or from Sunnyvale. Existing surface feature conditions limit the number and cause indirect routing of major arterial streets for normal traffic as well as emergency vehicle response. The impact of planned developments and traffic flow will continue to have an effect on the Department of Public Safety and delivery of fire services.

During the peak AM and PM traffic periods, the City experiences extremely heavy traffic congestion at key intersections and near freeway on-ramps and off-ramps. As noted above, the limited number and the indirect routing of some roads and streets in the community can create heavy, slow traffic conditions and excessively long travel routes from point to point within the community. Thus, in the event of an emergency at a key intersection, overpass, underpass, bridge or other circulation corridor, sections of the City may become temporarily isolated and response times for emergency crews increased beyond ideal times.

Intersections are rated on a level of service (LOS) scale ("A" for excellent operational conditions to "F" for poor conditions). Many of the City's major intersections are currently rated, or with new development, anticipated to be rated LOS D or less for both AM and PM peak hours. These conditions create barriers to effective emergency response times, which in turn increase the risk of injury or spread of fire.

h. Industry. Sunnyvale is the site of many manufacturing and research industries which use toxic, flammable and explosive chemicals and materials in potentially hazardous combinations. Special precautions thus are required to minimize the risk of damage to adjoining persons and properties.

i. Mixed Industrial/Residential Uses. High-density residential uses are located near high-risk industries, necessitating special precautions.

j. Transportation. Sunnyvale is divided by an interstate highway, which potentially could affect response times of fire suppression equipment.

k. Soil Conditions and Topography. Sunnyvale lies at the southern end of San Francisco Bay and is built atop the alluvial deposits that surround the margins of the Bay. The alluvium was created by the flooding of the many streams emptying into the San Francisco Bay depression, and from intermittent seawater inundation that has occurred over the last 2 or 3 million years. The areas closest to the Bay are overlain by unconsolidated fine silty clay, known as "Bay Mud" which varies in thickness from a few feet to as much as 30 feet. Generally, the older, more stable alluvium is to the south and the younger, less stable material is to the north. Bedrock lies beneath the area at depths generally 300' or more. The topography is essentially flat, dropping from an elevation of 300 feet to sea level. The slope across the City is in a northeasterly direction from the high point in the southwest corner to the Bay. The average slope is approximately 0.9%.

The Silicon Valley is within a very active seismic area and local soil conditions can be highly expansive (clay soils). The Northridge earthquake provided hundreds of examples of damage to plain concrete footings. This type of damage is extremely expensive to repair, in contrast to the small expense of providing nominal footing reinforcement. Footing reinforcement is also necessary to prevent damage due to pumping action caused by local expansive soils, which shrink and swell during seasonal drying and wetting conditions.

Most of the surface soils in the Silicon Valley are relatively young and unconsolidated sedimentary materials formed from a wide variety of parent materials. The varying chemical composition, degree of weathering, and the relatively acid environment have created soils of varying types, which are particularly corrosive in nature. Much of the surface soil in the Silicon Valley is highly expansive (i.e., shrink-swell behavior) and has low bearing strength.

l. Water/Sewer. Some parts of the Silicon Valley have hard water, which is corrosive to ferrous pipe. The groundwater table is unusually high in many places. Expansive soils create unstable conditions, which increase the potential of breaks in sewer laterals. To maintain health and sanitary services, it is necessary to gain access, to periodically maintain public sanitary laterals. Wastewater draining from indoor sources in Sunnyvale flows through sewer pipes that direct the wastewater to the Water Pollution Control Plant for treatment before being discharged to the San Francisco Bay. If left untreated before discharge, residential, commercial and industrial wastewater would upset the delicate ecosystem of southern San Francisco Bay. The City of Sunnyvale is one of 74 co-permittees listed under a regional municipal stormwater permit for the San Francisco Bay. On November 19, 2015, order No. R2-2015-0049 was adopted by the Regional Water Quality Control Board (RWQCB) for Region 2. This permit regulates discharges from municipal separate storm drain systems into waterways under each co-permittee's jurisdiction. The

City of Sunnyvale has developed an Urban Runoff Management Plan (URMP) to reduce, control, or otherwise address pollutant sources in discharges to the storm drain system. Departments within the City of Sunnyvale have adopted Best Management Practices (BMPs) and Standard Operating Procedures (SOPs) to reduce the presence of pollutants in stormwater discharges to the maximum extent practicable.

The Sunnyvale URMP focuses on prevention of illicit connection/illegal dumping, quality of industrial and commercial discharges, and minimizing impacts from new development and construction activities. The City implements BMPs for maintaining street and roads, storm drains, and water utilities, and preventing stormwater pollution.

m. Buildings, Landscaping and Clearances. Many of the newer large buildings and building complexes are of designs which greatly limit visibility and approach to and accessibility by Public Safety resources. Many houses and other buildings with wood roofs and/or sidings are so close together that fire may readily spread from one to another by both radiation and convection.

n. Business & Industry Centers. The current clusters of high-tech, bio-tech, manufacturing and similar companies create additional demands on water, sewer, and electrical facilities. These businesses offer opportunities and access to innovative products, services and technology, and may also be more likely to utilize such products, services, and technology. For example, the more businesses, the greater the demands on water, sewer and power facilities during peak mid-day periods, which could lead to shortages or service disruptions, or use of services and technology impacting health and safety. Similarly, the availability of high-tech and similar businesses creates unique access to innovative products and technology to reduce energy and water use to mitigate business demands.

o. Population. Sunnyvale has a current and rapidly growing population (both resident and daytime work) that impacts fire and police service. With more people, there is more traffic congestion during a greater part of the day, which not only slows emergency vehicle response but may also restrict access to fire and crime scenes. Similarly, more emergency incidents requiring a public safety response occur with a larger population, created a greater likelihood of simultaneous emergency incidents requiring a public safety response. This results in longer response times and fewer fire companies or police units to respond to emergencies within the community.

p. Summary and Analysis. The stated local geological, geographic and topographical conditions increase the magnitude, exposure, accessibility problems and fire hazards presented to the Department of Public Safety and have a negative impact upon the response capability of public safety resources. Lying beneath Sunnyvale are thick layers of sand, gravel and clay, known as alluvium, which amplify the effects of earthquakes. Based on the combination of these conditions, local experience from the damage caused in Santa Clara Valley by the 1906 earthquake and the poor performance of alluvial deposits during earthquakes, this area could be subject to severe structural damage or failure, multiple major fires and additional fire dangers, and place a great strain on police, fire and rescue resources. A seismic event could also trigger widespread damage to hazardous material storage vessels and cause substantial hazardous material releases into the environment.

The possibility of fire ignition increases as earthquake shaking increases. Fire due to broken gas lines or short circuits of electrical systems is a major established hazard associated with earthquakes. Most buildings in Sunnyvale are partially or entirely combustible which increases the City's vulnerability to fire. As discussed above, traffic conditions may slow or impede emergency response in any given fire or hazardous materials event, particularly in the event of a seismic event or other natural disaster. Thus, with the potential inability of emergency services to guarantee rapid response, it is necessary to mitigate this problem by requiring additional protections such as built-in fire protection systems, which will provide for early detection and additional fire control.

Conclusion and Findings.

Local climatic, geologic, and topographic conditions impact crime prevention efforts and the frequency, spread, acceleration, intensity and size of fires involving buildings, strength of building structural systems to resist local hazards and ability to deliver uninterrupted services in the community. The potential for significant damage arising from these conditions makes it reasonably necessary to modify the uniform codes to mitigate the effects of the above conditions.

Therefore, the City Council finds that (with the exception of changes justified on administrative grounds), the local amendments of the 2016 California Building Codes are justified by all of the aforementioned general findings as discussed below:

CODE SECTION	LOCAL AMENDMENT	FINDINGS
16.52.020	Adoption by reference	Admin
16.52.105	Permits	2(c),(f)-(j), (m)-(p) ¹
16.52.106-.110	Fees; Inspections; Maintenance; Board of Appeals; Violations	Admin. ²
16.52.111	Unsafe buildings	2(c),(f)-(j), (m)-(p)
16.52.112	Stop work or use order	Admin. ³
16.52.202	General definitions	Admin.; 2(h), (m)-(n) ⁴
16.52.315	General storage	2(f)-(j), (m)-(p) ⁵
16.52.321	Additive manufacturing	2(c), (f)-(j)
16.52.401	Emergency planning and preparedness	Admin; 2(f), (o)
16.52.403	Emergency preparedness requirements	Admin; 2(f), (o)
16.52.508	Fire Command Center	2(f), (o)
16.52.510	Emergency responder radio coverage	2(c)-(j), (m)-(p)
16.52.603	Fuel fired appliances	2(c), (f)-(j)
16.52.604	Electrical equipment, wiring and hazards	2(c),(f)-(j), (m)-(p)
16.52.605	Mechanical refrigeration	2(c),(f)-(j), (m)-(p)
16.52.901	Fire protection systems	2(c),(f)-(j), (m)-(p)
16.52.903	Automatic sprinkler systems	2(c),(f)-(j), (m)-(p)
16.52.904	Alternative automatic fire extinguishing systems	2(c),(f)-(j), (m)-(p)
16.52.905	Standpipe systems	2(c)-(j), (m)-(p)
16.52.909	Smoke control systems	2(c)-(j), (m)-(p)
16.52.913-.1103	Fire Pumps; Fire protection based on special detailed requirements of use and occupancy; Stairways; Maintenance of means of egress; Fire safety requirements for existing buildings.	2(c)-(j), (m)-(p)
16.52.1203	Emergency and standby power systems	2(c), (f)-(j), (m)-(p)
16.52.2311	Repair garages	2(c)-(j)
16.52.3304	Precautions against fire	2(c)-(j), (m)-(p)
16.52.3311	Means of egress	2(c)-(j), (m)-(p)
16.52.5001-.5005	Hazardous materials: general; Hazardous materials: general requirements; Hazardous materials: storage; Hazardous materials: use, dispensing and handling	2(c)-(j), (l)-(p) ⁶
16.52.5601	Explosives and fireworks	2(c)-(j), (m)-(p)
16.52.5704	Flammable and combustible liquids	2(c)-(j), (l)-(p)

16.52.5706	Special operations	2(c)-(j), (l)-(p)
16.52.5707	On demand mobile fueling	2(c)-(j), (l)-(p) ⁷
16.52.5809	Mobile gaseous fueling of hydrogen fueled vehicles	2(c)-(j), (l)-(p) ⁸
16.52. .6004	Highly toxic, toxic, and moderately toxic compressed gases	2(c)-(j), (m)-(p) ⁵
16.52.6405	Pyrophoric materials.	2(c)-(j), (l)-(p)
16.52.7000	Modifications	2(c)-(j), (l)-(p)
16.52.7100	Fire flow requirements for buildings	2(c)-(j), (l)-(p)
16.52.7500	Fire hydrant spacing	2(c)-(j), (m)-(p)
16.52.8101-.8105	Fire apparatus and access roads; Required access; Minimum specifications; Aerial fire apparatus access roads; Multi-family residential developments	2(c)-(j), (m)-(p)
16.52.9000	Firefighter air replenishment systems	2(c)-(j), (m)-(p)
16.52.9080	Reference standards	Admin

¹ The types of permits regulated in section 16.52.105 are necessary to ensure greater protections against fire and accidents associated with hazardous materials and protect against spread of fire and other disasters. Given the density of the development and population in Sunnyvale, these regulations promote public safety welfare.

² Payment of fees required to reflect policies and procedures of City's finance department.

³ Administrative clarification that regulations apply to uses as well as work.

⁴ Definition changes for consistency with other amendments and to address hazardous materials and fire hazards associated with emerging technology common in business and industry centers occupied by Sunnyvale businesses.

⁵ Storage of materials may be a source of or contribute to fire ignition and spread; regulation may help limit spread of fire and address many of the risks outlined in the findings.

⁶ Businesses located in developed and developing industry centers in Sunnyvale frequently use various types of hazardous materials. In addition, daytime work populations in these areas are also increasing as new buildings are developed and remodeled, making protections against hazardous materials increasingly important.

⁷ On-demand mobile fueling of motor vehicles is an emerging service industry in many locations around the country serving individual consumers and businesses alike. There is a demonstrated high interest in mobile fueling in Silicon Valley and the greater San Francisco Bay Area because of the tendency of the customer base in these areas to seek out and use services that offer cutting-edge personal conveniences. In 2016, model regulations were developed for the on-demand mobile

fueling industry, and because these regulations were included in the 2018 California Fire Code (CFC), the new code alleviates the need for duplicative local amendments. The statewide regulations provide technical and administrative safety controls, therefore the proposed local amendments relate only to areas in which the CFC is silent and fill the gap with additional safety controls that were not addressed by the IFC or CFC, especially in light of the uniquely dense development and population in Sunnyvale, as well as potential traffic delaying emergency responders responding to an event caused by mobile fueling.

Mobile gasoline fueling presents numerous inherent safety risks. Flammable liquids in comparison to combustible liquids are highly volatile and they present a significant fire and explosion hazard under specific conditions. Gasoline in particular has the dangerous combination of a low flash point combined with a high vapor density. The flash point of a liquid is defined as the temperature above which the liquid produces vapors which can ignite or explode. The flash point of gasoline is -45 degrees F. Like most flammable liquids, gasoline flows easily and a small spill can cover a large area, spreading fire widely. At ambient temperatures gasoline is continuously generating invisible, heavier than air vapor that travels away from the source seeking the lowest point. These vapors can settle and collect in low areas like sumps, sewers, pits, trenches and basements. The vapor trail can spread far from the liquid and if the vapor trail contacts an ignition source, the fire produced can flash back (or travel back) to the liquid very quickly. Flashback and fire can happen even if the liquid giving off the vapor and the ignition source are hundreds of feet apart. Similarly, gasoline spills into the City's storm drain system, which drains into the San Francisco Bay, could cause environmental hazards and violate the City's stormwater permit. The City has an interest in closely regulating this activity beyond the minimum standards from the CFC because of the potential for it to create or contribute to spread of fire and other hazards discussed in the findings.

Therefore, the Council finds that regulation of mobile gasoline fueling is appropriate and necessary based on the hazards and risks associated with the climatic, topographic and geological conditions described above. Regulating mobile fueling is necessary based on the risks and highly volatile nature of gasoline described above, and will further protect the public health safety and welfare of Sunnyvale residents by helping to mitigate potential fire, life safety, and environmental accidents that could result from mobile fueling in the city's residential neighborhoods and densely populated industrial and business areas.

⁸ Because of the State's policy initiatives, California remains a focal point for development of hydrogen fueling technology and implementation. Successful market launch and continued growth of California's hydrogen fueling network will contribute to the state meeting zero-emission vehicle goals as well as greenhouse gas reduction, air quality improvement, and petroleum reduction goals set forth in state and federal laws and programs.

Currently the California Fire Code adopts National Fire Protection Association (NFPA) 2, *Hydrogen Technologies Code*, which establishes safety controls and requirements for fueling of hydrogen at fixed and temporary fueling facilities. Sunnyvale has had some inquiries and interest regarding such facilities. Neither the CFC nor NFPA 2 addresses the activity of mobile delivery of hydrogen gas to vehicles, however. Fueling of hydrogen fuel cell electric vehicles (FCEVs) is

not generally considered to be more hazardous than gasoline fueling even though hydrogen requires only one 10th as much energy to ignite as gasoline does. However, a primary feature of hydrogen fueling is the high pressure tanks needed to store and dispense the fuel. Since FCEVs store hydrogen at pressures of up to 10,000 psi (70MPa), compressors, storage tanks, and dispensers designed and manufactured to handle these pressures safely are required. 10,000 psi is the highest pressure of any alternative fuel, with compressed natural gas as the next most pressurized fuel at 3,600 psi. Because the State of California is on the forefront of implementing hydrogen fueling technologies, regulation of hydrogen mobile fueling by adoption of a local amendment to establish safety controls is appropriate and necessary in light of the nature of the activity amongst the unique characteristics found in Sunnyvale as described in the findings, including dense building development, a growing workforce and population, as well as traffic limitations when responding to an emergency.