Panel Set Two: Master Plan and Early Development

ARC-541:001 & 002 Architectural Systems and the Environment

Downtown San Jose Group

Ruth Morillo, Jose Sosa, Ben Stremming

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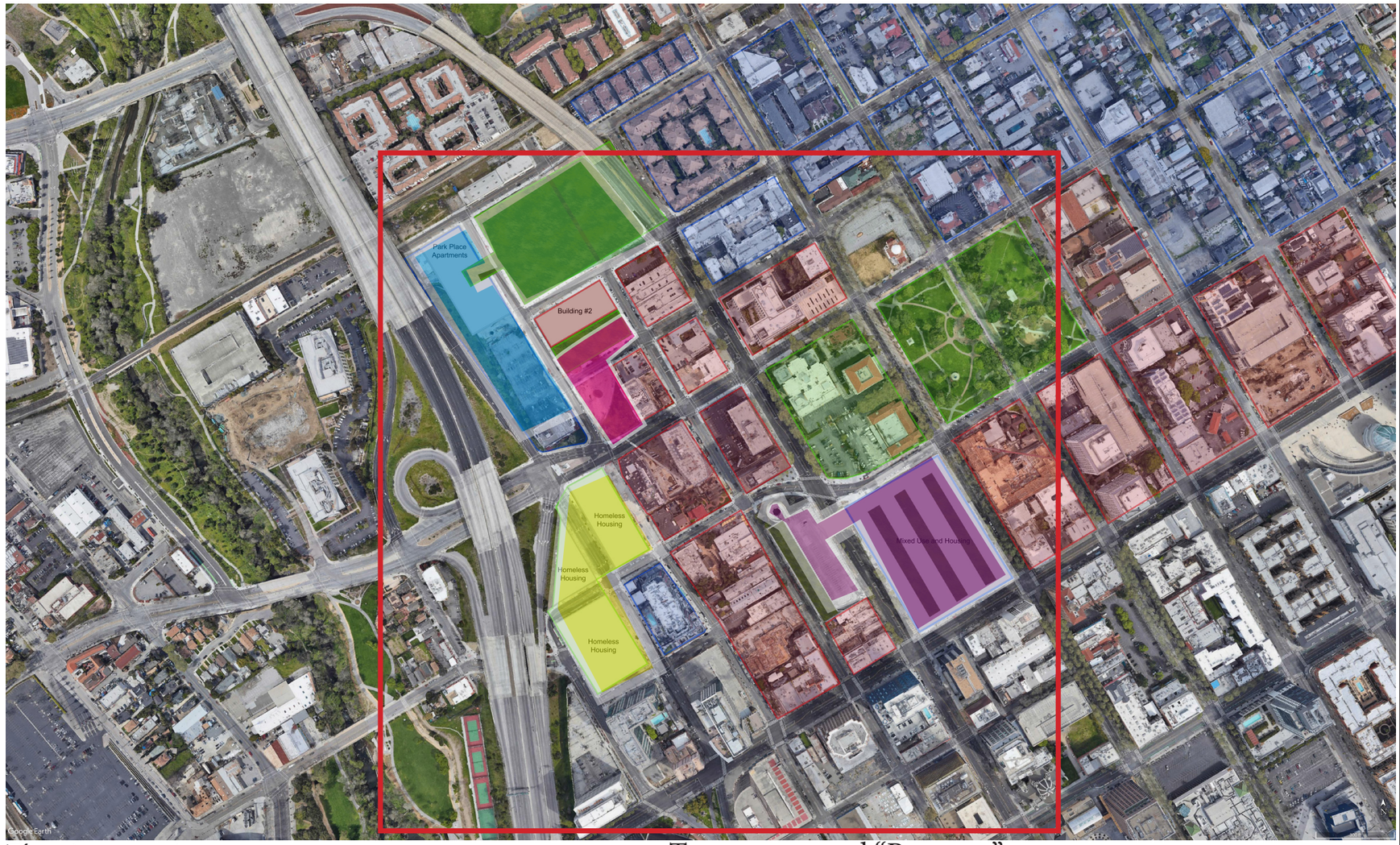
San Jose Downtown



The site contains

- Group Site
- Residential
- Commercial / Mix-use
- Green Space / Parks

Teams proposed "Program"

- Residential - Condominiums
- Residential - Mix used
- Green Space/Urban Space
- Residential - Homeless Housing
- Commercial / Mix-use

Issues Addresessed:

Proposed Master Plan

Decisions Made:

How the site will be laid out by program and preliminary building footprints

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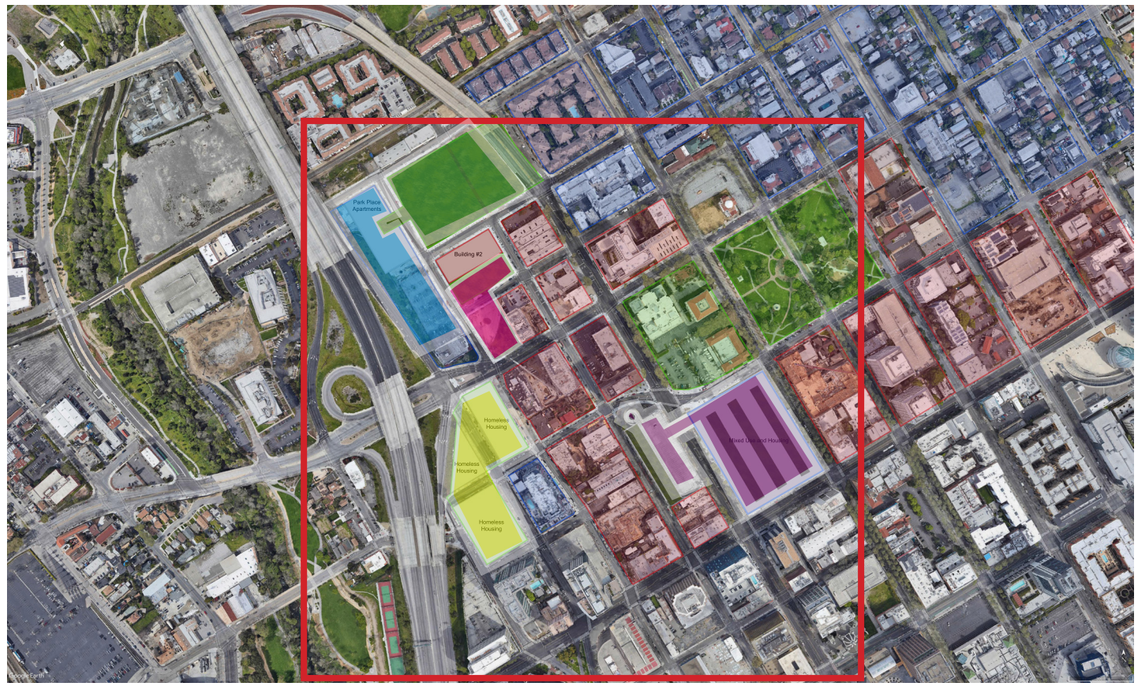
2.01

San Jose Downtown



The Site can be broken down into 3 areas of emphasis. In the North-West corner of the site, we have chose to integrate this area with the existing residential programming and develop mixed-use housing options with a centralized park integrated with the design of the area.

In the South-Western region of our site, we have selected an area that will be programmed towards community outreach and providing intermediate housing options for individuals struggling from homelessness. This area will have housing that is integrated into the transportation plan to help provide services and goods to people in need.

The final area of emphasis for the plan is a large mixed-use area located in the South-Eastern section of the site. The area is to be both residential and transportation centric. This area aims to provide the residents with effective and functional options that would help to eliminate the need for traditional methods of transportation. The structure would connect with an existing parking garage structure to help provide a the variety of resources required through LEED and LBC.

Overall, this masterplan aims to provide examples for integrating a new methodology of transportation in an inclusive manner that enables the individual. This helps break down the stigma of not owning a vehicle and helps to create greener and happier environments built around human scale, and not automobile scale.

Issues Addresessed:

Proposed Master Plan
-Summary and Explanation

Decisions Made:

How the site will be laid out by program and preliminary building footprints

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2.02

San Jose Downtown - Zoning Classification

Current Zoning Land Use Map

Downtown Commercial

Future Development

Future Residential Zone

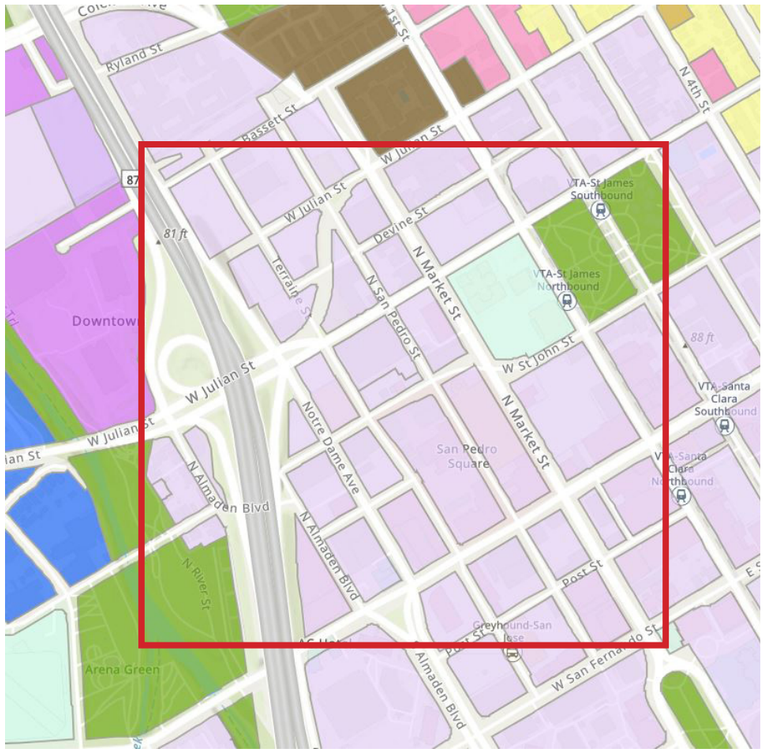
Proposed "Program" for this project

- Residential - Condominiums
- Residential - Homeless Housing
- Residential - Mix used
- Commercial / Mix-use
- Green Space/Urban Space
- Multi-modal transit station - Podcar

Proposed Occupancy Types for this Project

Section 303: Assembly Group A
Section 304: Business Group B
Section 306: Factory & Industrial Group F
> 306.3: Low Hazard Factory Industrial Group F-2
Section 309: Mercantile Group M
Section 310: residential Group R
> R-1 Through R-4, Potentially applicable

General Plan 2040 - Mix-use and/or special use opportunities Re-Proposed



The 2040 Downtown development plans. The sites that fall within our boundary are mostly generic "Downtown" zoning. This allows for many mixed use proposals. The site is also within close proximity to residential, and park spaces. It will be a major highlight of the design to effectively provide transportation and effective means of fair access to the wide variety of resources within the Downtown San Jose landscape.

- Downtown
- Combined Industrial/Commercial
- Open Space, Parklands and Habitat
- Public/Quasi-Public
- Transit Residential
- Transit Employment Center

Issues Addresessed:

Zoning and Programatic Land Use Plans

Decisions Made:

The site will follow with future design plans for the City of San Jose, and focus on providing more housing options. San Jose currently struggles with housing, and this aims to alleviate a lot of pressure being felt in regards to that problem.

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Zoning Classifications

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2.03

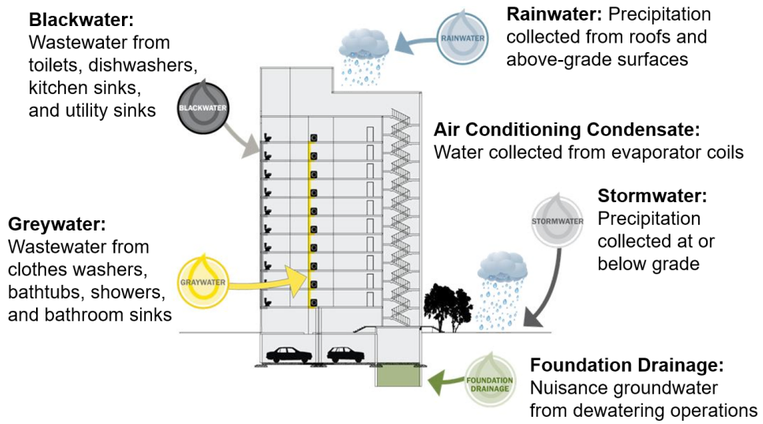
San Jose Downtown - Net-Zero Water Goals and Strategies

The Ideal Net Zero Water Building

An ideal net zero water building uses on-site alternative water sources to supply all of the building's water needs. All wastewater discharged from the building is treated on-site and returned to the original water source.

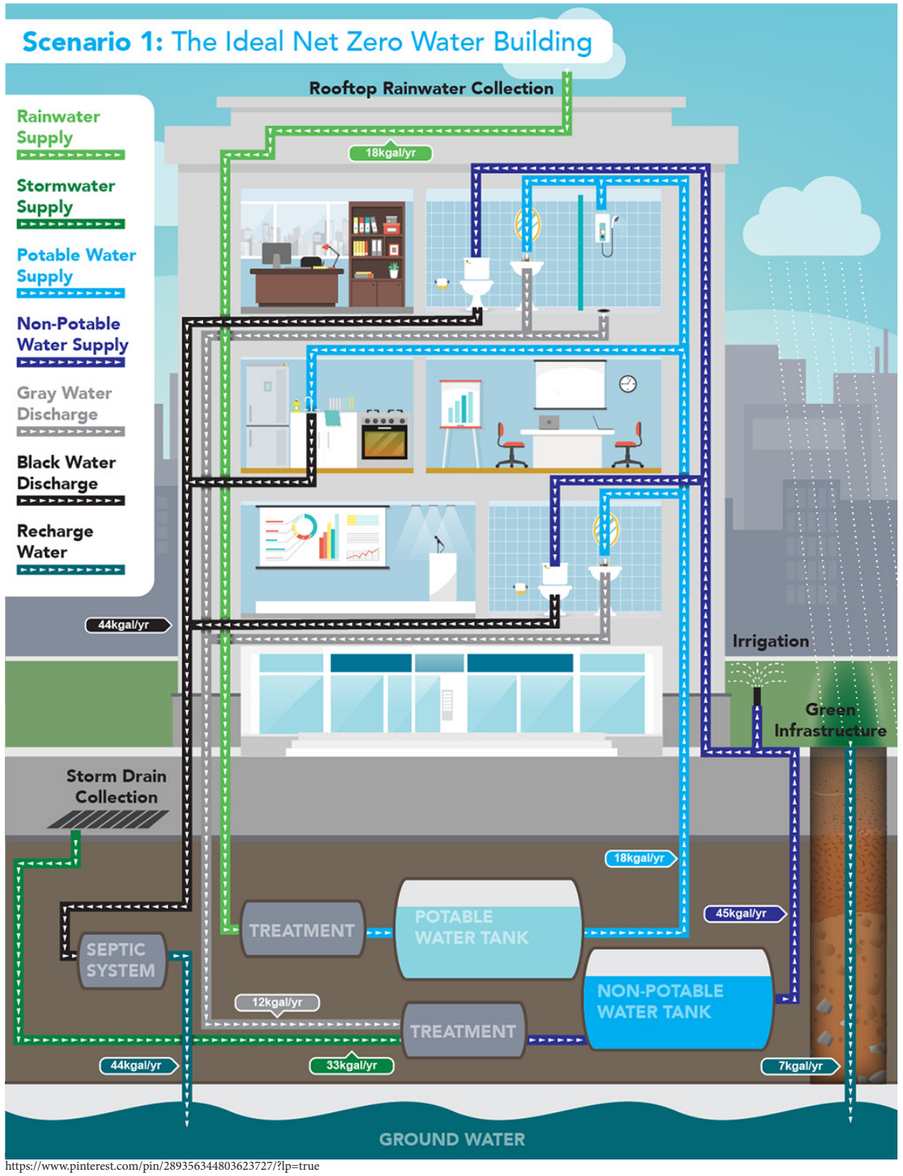
Constructing a net zero water building includes the following design elements:

- Reducing demand by employing innovative technologies that consume less water.
- Producing alternative water sources to offset purchased freshwater.
- Treating wastewater on-site and reuse or inject treated wastewater into the original water supply.
- Implementing green infrastructure by infiltrating storm-water to the original water supply.



https://www.epa.gov/water-research/onsite-non-potable-water-reuse-research

Increasing pressures on water resources have led to greater water scarcity and a growing demand for alternative water sources. Onsite non-potable water reuse is one solution that can help communities reclaim, recycle, and then reuse water for non-drinking water purposes. Onsite non-potable water reuse systems (ONWS) capture and treat water sources generated from within or surrounding a building, such as wastewater, greywater, stormwater, or roof collected rainwater. The treated water is then reused onsite or locally for non-drinking purposes, such as toilet flushing, clothes washing, and ornamental plant irrigation. (EPA)



https://www.pinterest.com/pin/289356344803623727/?lp=true

This graphic shows incoming and outgoing water flows of the building.

- Potable water is supplied and treated on-site from harvested rainwater.
- Alternative non-potable water is supplied and treated on-site from harvested stormwater and graywater, which is lightly contaminated wastewater generated by lavatory faucets and showers.
- Wastewater is treated on-site and returned to the local aquifer.
- Stormwater is recharged to the aquifer through on-site green infrastructure features on the building's landscape.

Issues Addresessed:

Net-Zero Water Consumption and Collection
LBC and LEED Guidelines
Building Systems

Decisions Made:

It is important to highlight effective strategies for having effective and efficient water usage on and around the site. Water is a precious resource and efficient and proper collection methods will help to create a healthier and more sustainable environment within our sites.

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Net-Zero Water

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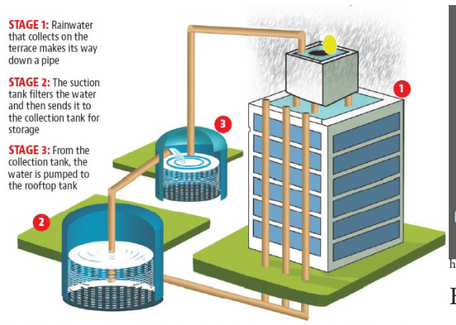
2.04

Harvesting - Rain water & Use

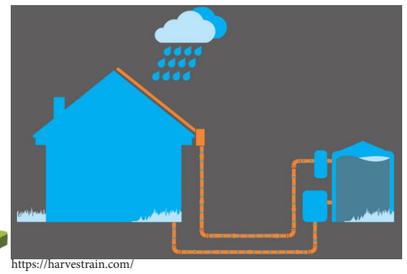
Rainwater harvesting systems are water storage systems that collect rainwater from roofs and other impervious building surfaces, and store it so it may be used for irrigation and other non-potable uses. Rainwater from a building's gutters and downspouts is conveyed to storage vessels, such as rain barrels or above- or below-ground cisterns. For rainwater to serve as a useful irrigation supply in the Bay Area, it may need to be stored until dry periods, requiring more storage capacity. As allowed by the local jurisdiction, harvested rainwater may be also used for toilet flushing, industrial processes, car washing, washing machines, and swimming pools (if chlorinated).

Achieve one of the following three objectives:

- Use the full water quality design volume of runoff for irrigation. In order to capture and use the full design volume for irrigation use, the following conditions must be met: (a) there must be sufficient irrigation demand for the design volume on or near the project during the wet season, or (b) it must be feasible to store the amount of the rainwater that is harvested during the wet season (October through April) until it is used for irrigation (primarily May through September, although some irrigation may occur during wet season months).
- Use the full water quality design volume of runoff for non-irrigation purposes. In order to harvest and use the full design volume for non-irrigation uses, the following conditions must be met: (a) there must be a reliable non-potable demand for the harvested rainwater during the wet season, and (b) the cistern or other water storage unit must be designed with sufficient volume to accommodate consecutive storms without discharging any of the required treatment volume to the storm drain system.
- Use the full water quality design volume of runoff from only a portion of the site. It may be possible to divide your site into drainage areas and store and use rainwater from only one drainage area, such as a rooftop or portion of a rooftop. As in the first two scenarios, the full design volume would need to be used for either irrigation or nonirrigation purposes, but in this case it would be the design volume of runoff from one drainage area, which would allow for a smaller cistern.

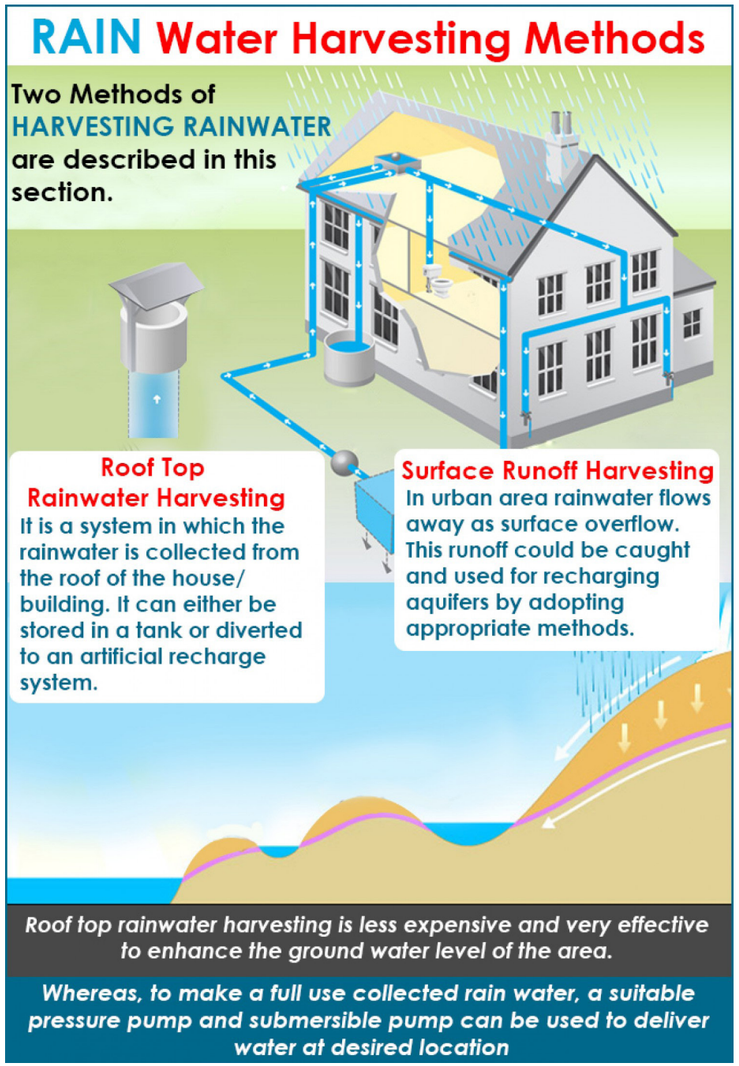


https://wheadlines.com/all-news/national-news/rainwater-harvesting-system-installed-in-pune/



https://harvestrain.com/

Harvesting Tanks may vary in size....



https://visual.ly/community/infographic/home/rainwater-harvesting-methods

The Living Community Challenge envisions a future whereby all buildings, infrastructure, and communities are configured based on the carrying capacity of the development's site: harvesting sufficient water to meet the needs of an entire population while respecting the natural hydrology of the land, the water needs of the ecosystem the site inhabits, and those of its neighbors. (LCC, Living-Future.org)

Issues Addresessed:

Net-Zero Water Consumption and Collection
LBC and LEED Guidelines
Building Systems

Decisions Made:

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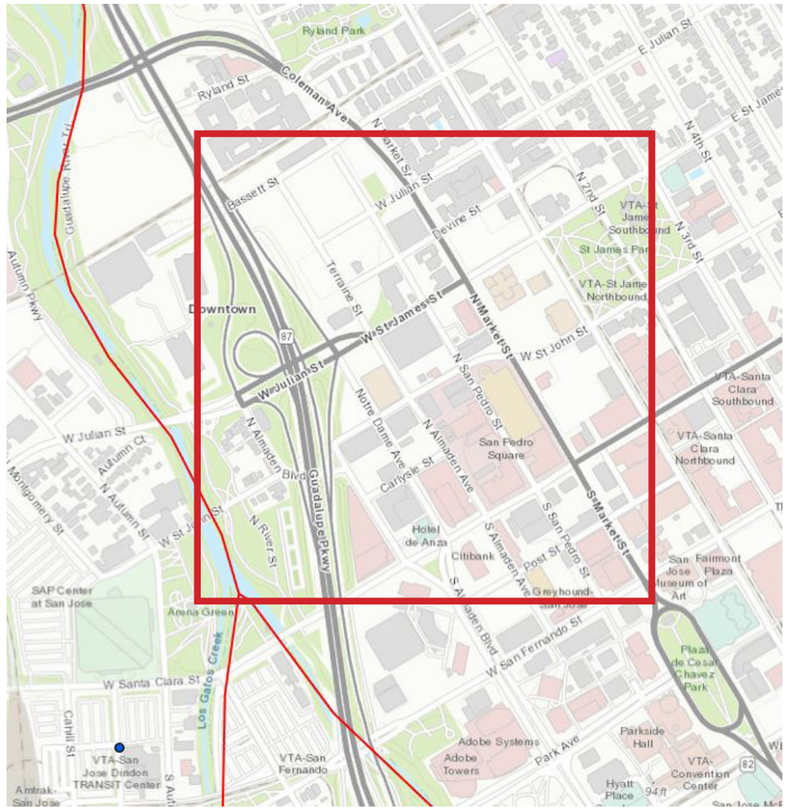
2.05

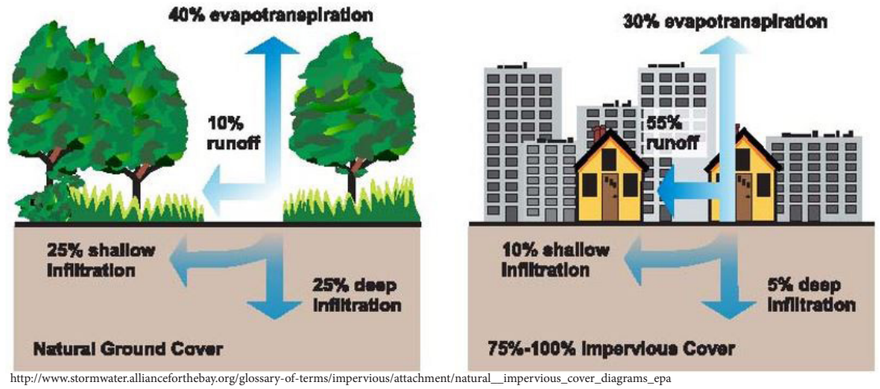
Storm Drainage - Streets

The nearest river to our site which storm-water flows is the Guadalupe River



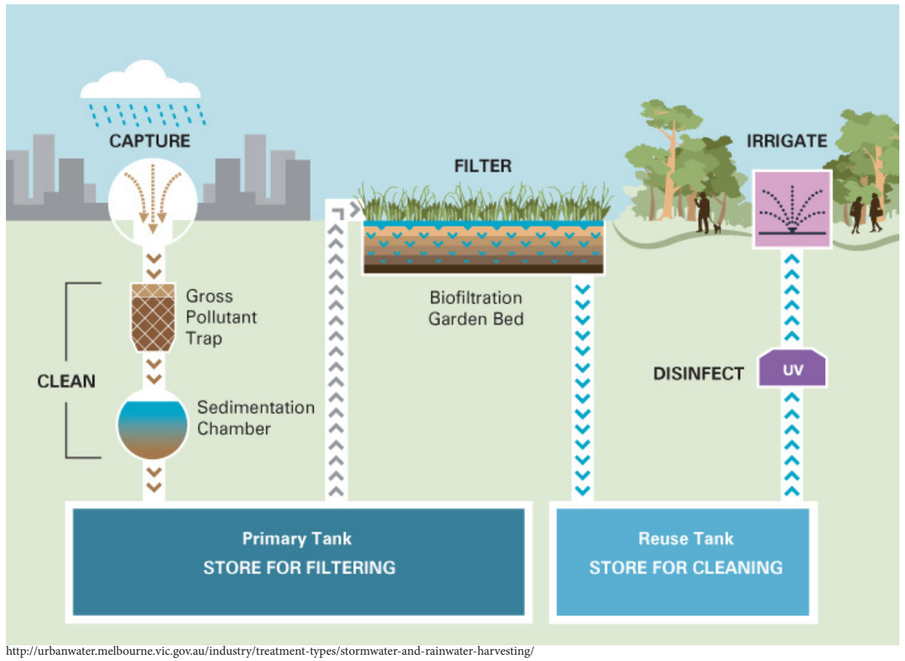
A traditional path would be to let the storm-water go to the storm drainage. A concerted effort to retrofit the existing urban landscape to green infrastructure is needed to restore storm water infiltration capacity previously lost in developed areas. While large-scale retrofits to urban landscapes appear to be costly, cost-effective options for increasing storm water capture and use while achieving environmental outcomes may include: (1) converting to green infrastructure at the end of existing infrastructure life-cycles; (2) using simple retrofits like standardized parkway curb cuts in public rights of way; and (3) establishing healthy, living soil in landscaped areas. Increasing storm water infiltration in developed areas provides multiple benefits, including improving groundwater recharge, restoring lost watershed processes such as base flow to creeks, and reducing pollutant loads discharged to surface waters. (California environmental protection agency)

In developed areas, impervious surfaces – such as roads, parking lots and rooftops – prevent water from infiltrating into the soil. Most of the rainfall remains on the surface, where it washes debris, dirt, vehicle fluids, chemicals, and other pollutants into the local storm drain systems. Once in the storm drain, polluted runoff flows directly into creeks and other natural bodies of water. Figure 2-2 contrasts the percentage of rainfall that becomes stormwater runoff in a natural vs. an urban setting.



http://www.stormwater.allianceforthebay.org/glossary-of-terms/impervious/attachment/natural__impervious_cover_diagrams_epa

With the collection of storm water we will be able to use it for potential irrigation and possibly filter the water which may be used for uses in buildings. The issue if we allow the storm water to control the area may lead to causes where the natural creeks channels will erode and damage the surrounding surfaces.



http://urbanwater.melbourne.vic.gov.au/industry/treatment-types/stormwater-and-rainwater-harvesting/

Issues Addresessed:

Net-Zero Water Consumption and Collection
LBC and LEED Guidelines
Building Systems

Decisions Made:

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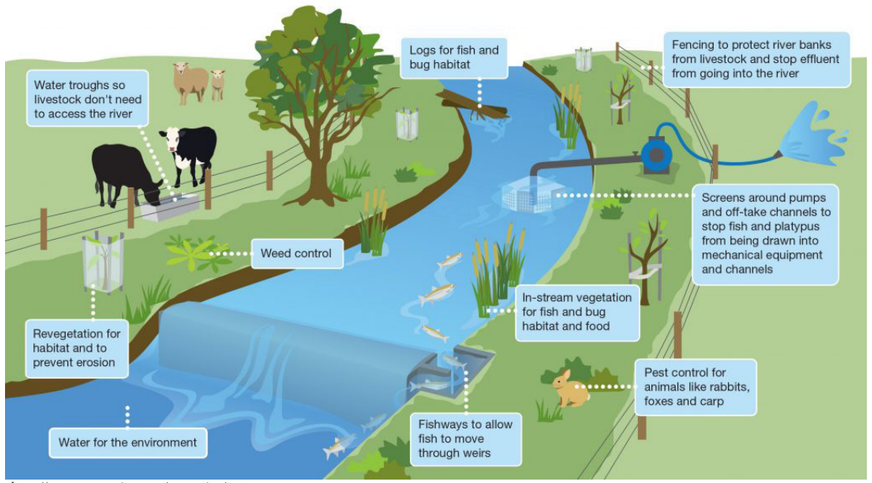
2.06

Waterways - Lakes, Rivers

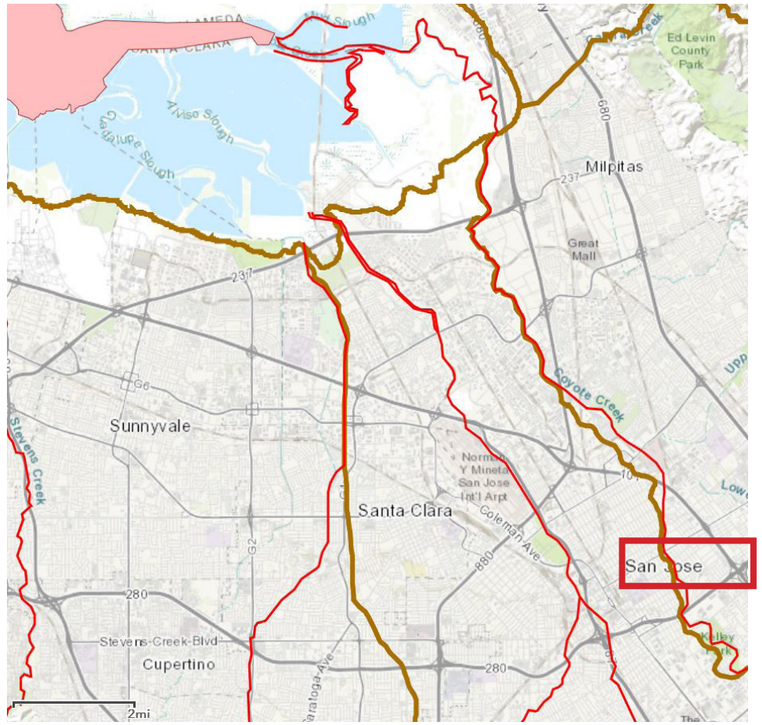
Natural Waterways: The Community shall provide access to and access pathways along natural waterways, except where such access can be proven to be a hazard to public safety or would severely compromise the function of specific water-oriented industries. No private entity may assume ownership of water contained in these bodies or compromise the quality or quantity of water that flows downstream. Thsi would allow the community to experience “Universal Access” to Nature & a Place of relaxation.

The two following map diagrams show how our site has a the Guadalupe River which eventually connects to the San Fransisco Bay. With part of the river in our site a strategy we can use it to use the moment of the water to generate electricity. although the river is to small thee use of the river may be difficult.

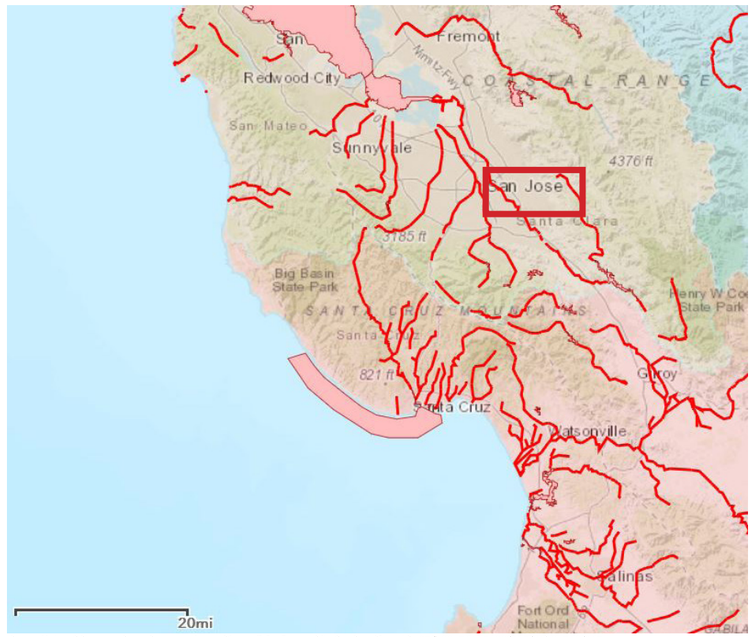


https://www.wgcma.vic.gov.au/our-region/waterways

One of the ideas proposed in our programis more green spaces such as parks whcih may allow for a natural waterway that may contribute towards the parks ecosystem. Allowing urban creeks are often much loved by local communities. Running through towns and providing places for exercise and recreation. They provide storm-water drainage for you, your neighborhood and for upstream catchments. A healthy waterway will help clean the water naturally, provide habitat for native fish and wildlife, be resistant to erosion and the build-up of sediment.



The California storm-water general map showing waterways



https://gispublic.waterboards.ca.gov/portal/apps/MapJournal/index.html?appid=27fb09e76665429f915f96b9e760f267

Issues Addresessed:

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LBC and LEED Guidelines
Building Systems

Decisions Made:

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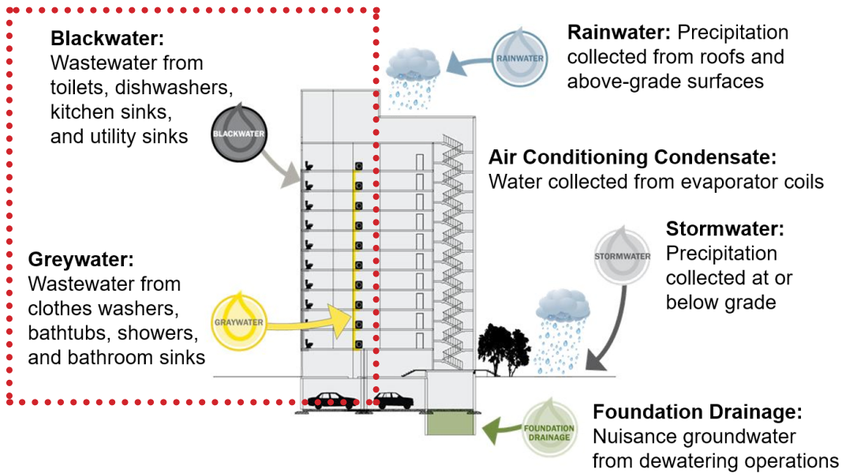
2.07

Sanitary Sewer

A Net Zero water goal would be to treat wastewater on-site and return to the original water source. A net zero water building closes the loop on the water system by returning water to the original water source. The original water source is considered freshwater sources from same local watershed or aquifer as the building's supply water.

If the building is located within the original water source, water can be returned through an on-site septic system or wastewater treatment system, which discharges treated wastewater to the local aquifer. (Treated wastewater can also be reclaimed as an alternative water source and reused within the building as stated above.)

It is important to note that treating wastewater on-site may not be a viable solution for many buildings due to space and cost constraints. If space or cost is an issue, the building will have to depend on using alternative water to offset the use of freshwater or return water back to the original source through green infrastructure.



https://www.epa.gov/water-research/onsite-non-potable-water-reuse-research

Recycling

According to the Living Building Challenge and the Living Community Challenge all projects must supply one hundred percent of the project's water needs through captured precipitation or other natural closed-loop water systems, and/or through recycling used project water, and all water must be purified as needed without the use of chemicals. No potable water may be used for non-potable uses. If captured precipitation is not adequate to supply the needs of the project after all possible efficiency measures are applied, connection to the municipal water system is allowed.

All projects must address all grey and black water through on-site treatment and management through reuse, a closed-loop system, or infiltration. Projects that are not able to treat and manage on-site may use handprinting within the watershed. With all theseprevious ideas placed they can be considered to be a way to recycle as long as the water is being cleaned and then sent back to its original source for re-use.

Scale Jumping

The Living Building Challenge has a Scale Jumping overlay to allow multiple buildings or projects to operate in a cooperative state—sharing green infrastructure as appropriate and allowing for environmental and social benefits to be achieved as elegantly and efficiently as possible. With our conceptual ideas the idea of Scale Jumping may be possible with all three of our ideal locations we are looking to develop into.

Inspiration & Education

Educational materials about the design and operation of the Community must be provided to share the intent of and motivate others within the Community to make change. Projects must provide information about the design and operation of the community and how they may help. As the new way of alternative water may be to reuse water or capture rain water on site or maybe have wastewater treated for it to be cleaned and sourced back to its location,

WATER

IMPERATIVE

06

NET POSITIVE WATER

SCALE JUMPING PERMITTED

https://living-future.org/lcc/

Issues Addresessed:

Net-Zero Water Consumption and Collection
LBC and LEED Guidelines
Building Systems

Decisions Made:

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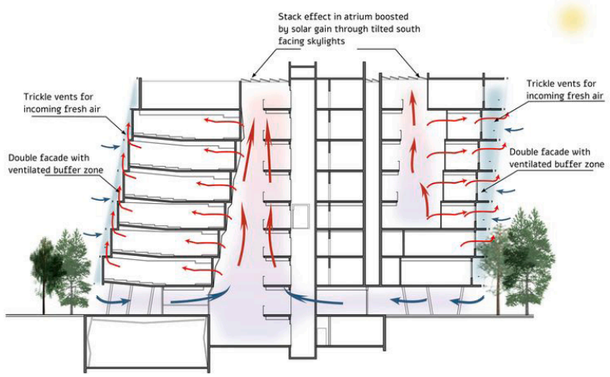
Date Submited: 9/30/2019

2.08

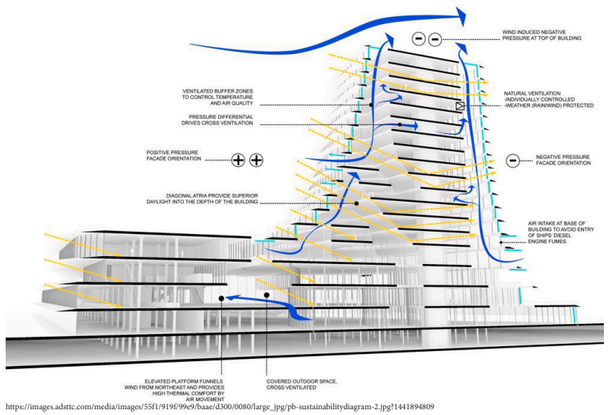
Net-Zero Energy Generation: Wind

Incorporating passive energy strategies is extremely important to meeting the LEED and LBC guidelines and goals. We will be looking to contextual examples of implementations currently within the area and examples being proposed and implemented in a variety of others. This will allow for flexible and creative methodolgies for wind to be incorporated into the sustainability model for our designs. Scale jumping is likely needed if Wind is the primary generation strategy.



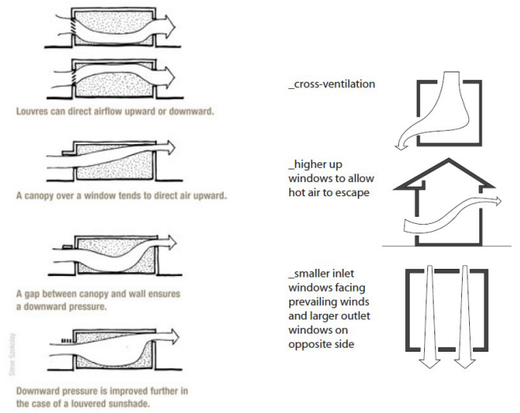
Climatic Diagram

https://i.pinimg.com/736x/fd/ac/3e/fdac3e62b95bff27c84efc488ed51a2d--architecture-diagrams-sustainable-design.jpg



https://images.adsttc.com/media/images/55f1/919f/99e9/baae/d300/0080/large_jpg/pb-sustainabilitydiagram-2.jpg?1441894809

https://www.buildinggreen.com/sites/default/files/live/images/avx100.jpg



https://swazischool.files.wordpress.com/2012/08/openings.jpg

https://i.dailymail.co.uk/i/pix/2014/11/07/1415359009387_wps_16_A_visionary_architect_has.jpg

Issues Addresessed:

Net-Zero Energy Prodcution

Decisions Made:

To incorporate methodolgies for generating passive energy on and around our site.

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NET-ZERO ENERGY PRODUCTION GOALS

Panel Set 2

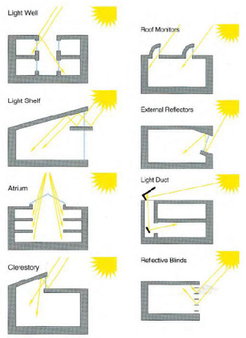
Date Submited: 9/30/2019

2.09

Net-Zero Energy Production: Solar

Applications of Solar on and Off Site

San Jose is fortunate to have a climate that can reliably use solar generation strategies to support everyday systems. Our projects will follow in the guidelines established by the contextual examples, and use similarily orieneted systems. Another facet of the project will use solar is the transportation system. SPARTAN pod-car system is a solar powered transportation network, that will help to generate power for the system as well as contextual structures.



https://agm2d.files.wordpress.com/2010/11/lighting-techniques.jpg

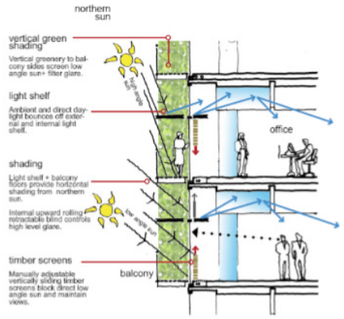
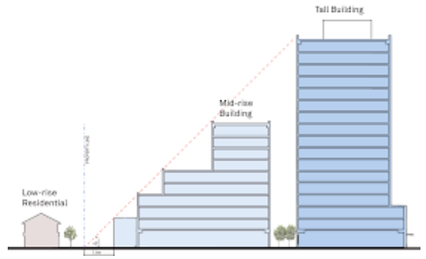


Figure 6. Using natural light and providing shading (DesignInc Melb)

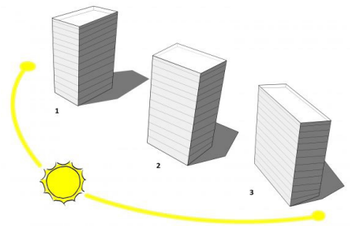
https://www.melbourne.vic.gov.au/SiteCollectionDocuments/ch2-snapshot-20-lighting.pdf

Solar Design Strategies

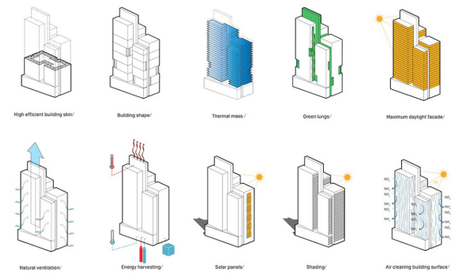
The masses on the site must take into consideration their orientation in regards to their solar gain, as well as the influence their mass has on the surrounding context. The current representations of the site show only the footprints for the to-be further developed sites.



https://www.burlington.ca/en/services-for-you/resources/Planning_and_Development/Urban-Design/Burlington-Tall-Building-Guidelines-Revised.pdf

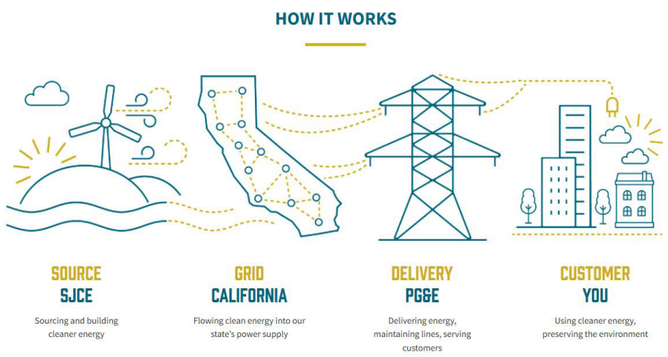


https://smartenergy.illinois.edu/sites/smartenergy.illinois.edu/files/2017-05/EST_NC_Envelope_final_1up.pdf



https://www.shl.dk/approach/

CLIMATE SMART SAN JOSE



https://www.sanjosecleanenergy.org/

https://www.sanjoseca.gov/

Issues Addresessed:

Net-Zero Energy Production

Decisions Made:

Solar generation strategies to emphasize within our projects, and examples of how products planned on being encorporated into our designs.

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ARC541-001: Architecture Systems and Environment Fall 2019

Sheet Content/Focus:

Net-Zero Energy Production Methodologies

Panel Set 2

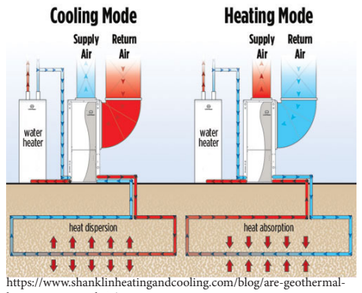
Date Submited: 9/30/2019

2.10

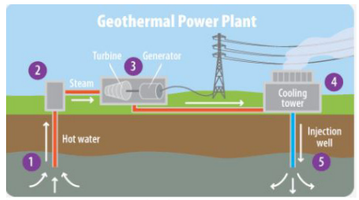
Passive Heating and Cooling Systems

Due to the favorable climate conditions of San Jose, it is highly possible to passively integrate a majority of the climate control into the building design and shape. Taking into consideration proper room sizes, air-flow patterns, and other passive means of controling interior environments, these can be integrated to help the buildings meet the high performance requirements established by the codes, standards, adn guidelines referenced.

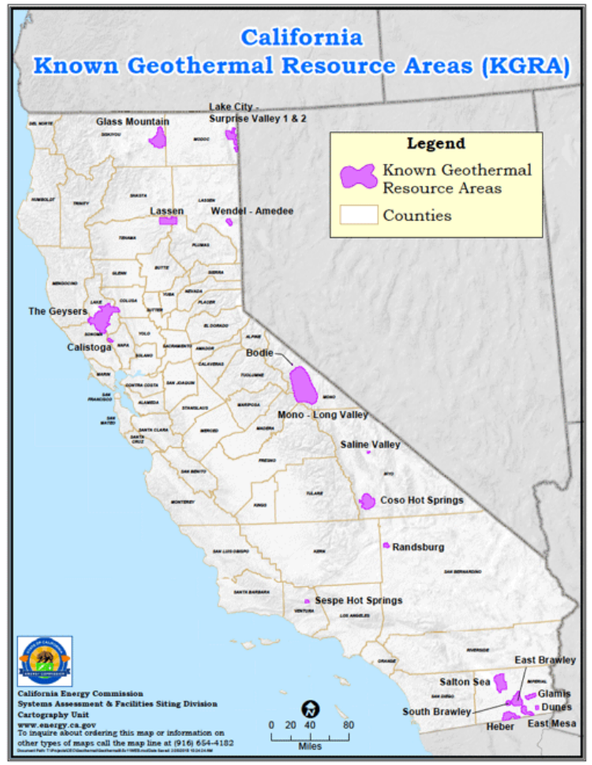
Geothermal



https://www.shanklinheatingandcooling.com/blog/are-geothermal-heat-pumps-worth-it/

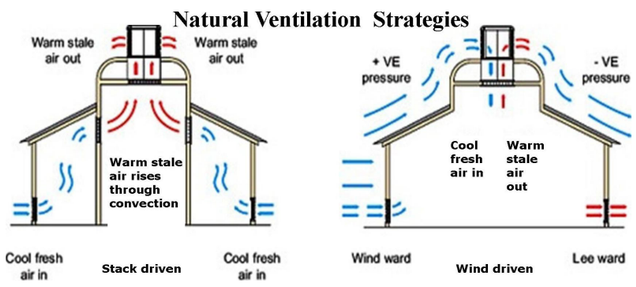


https://ca.audubon.org/conservation/geothermal-power

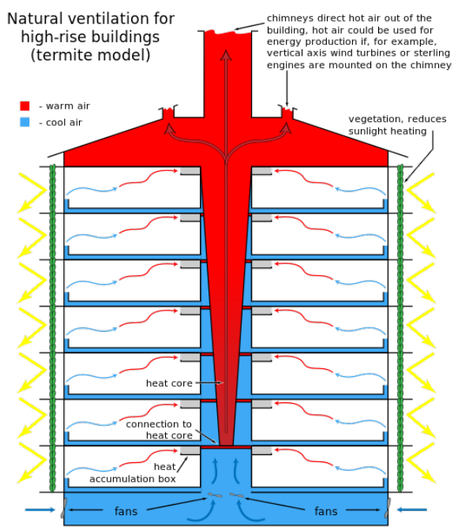


https://ww2.energy.ca.gov/maps/renewable/geothermal_areas.html

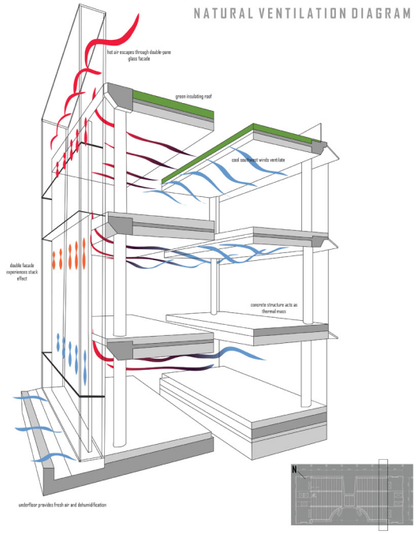
Natural Ventilation



http://adelaidehydronicheating.com.au/boiler%20fotos/natural-ventilation-stratergies.jpg



https://upload.wikimedia.org/wikipedia/commons/thumb/a/a7/Natural_ventilation_high-rise_buildings.svg/523px-Natural_ventilation_high-rise_buildings.svg.png



https://arch3230mayorga.files.wordpress.com/2012/11/arch-3230-assignment-8-natural-ventilation-diagram.jpg

Issues Addresessed:

Net-Zero Energy Production
Topographic & Landscape Modification

Decisions Made:

These strategies and methods will help to serve as design models for further development of masses.

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Sheet Content/Focus:

Net-Zero Building Systems Methodologies

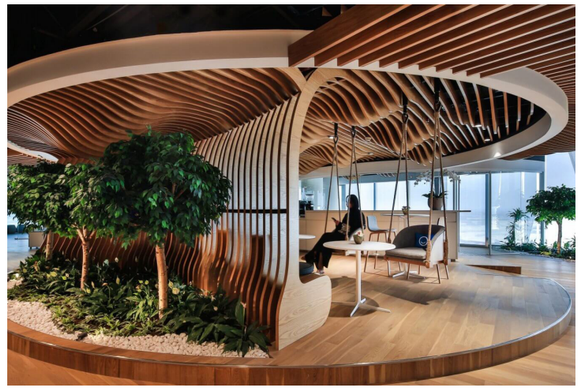
Panel Set 2

Date Submited: 9/30/2019

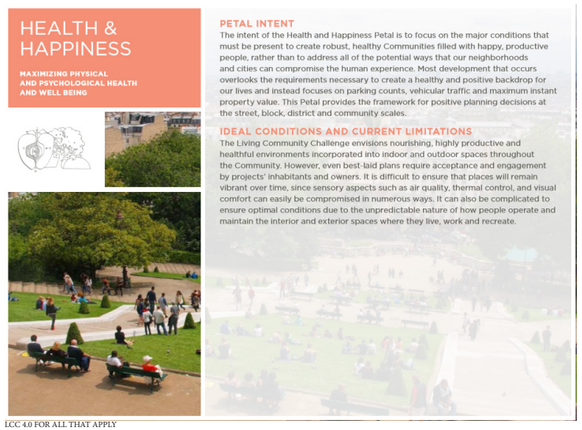
2.11

Biophilic Design and Integration with Environment

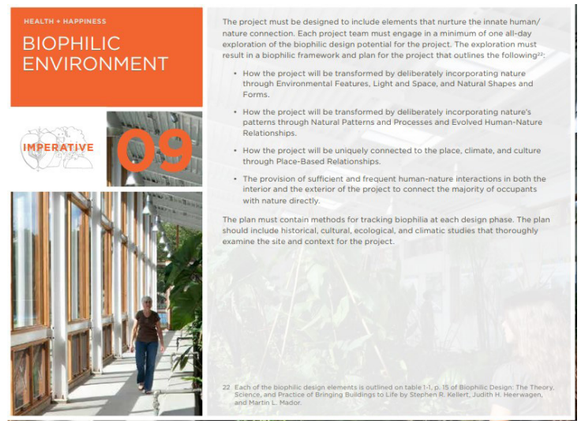
California Green Building Codes, LBC, and LEED all require areas that connect with their surrounding environment in a healthy and natural manner. This will be incorporated through a variety of large scale amenities, like a park space, and smaller biophillic lounges and resources. Early concepts and programming has emphasized reserving areas for growing crops and plants on-site. This aims to include biophilic amenities in a healthy and aesthetically pleasing manner.

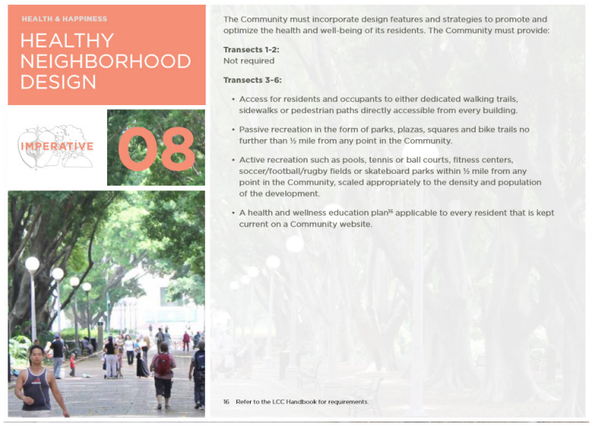


https://willieduggan.com/about/blog/importance-of-biophilic-design/



LCC 4.0 FOR ALL THAT APPLY





https://resonics.co.uk/biophilic-design-office-noise-acoustics/

Issues Addresessed:

BIOPHILIC
- NATURAL VENTILATION
- NATURAL MATERIALS
- VEGETATION
- NATURAL LIGHT
- NATURE VIEWS

LIVING COMMUNITY CHALLENGE

Decisions Made:

THE GOAL IS TO IMCORPORATE AS MUCH OF THIS INTO OUR DESIGNS

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Sheet Content/Focus:

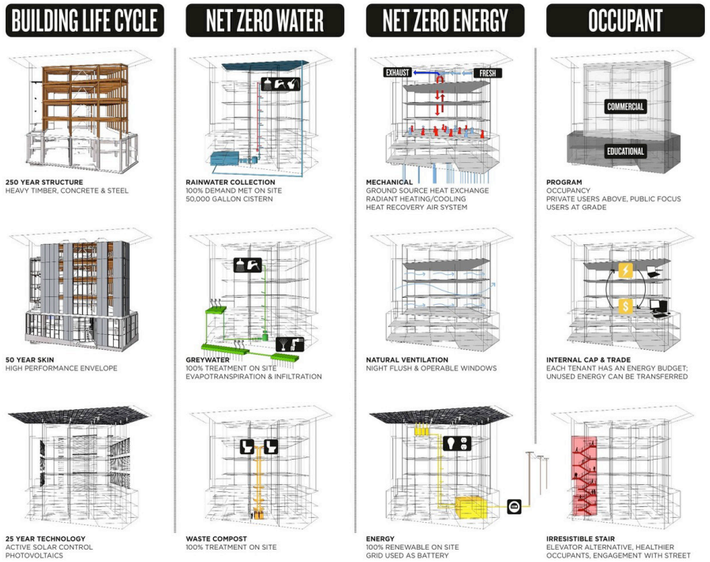
TOPOGRAPHY & LANDSCAPING MODIFICATIONS THAT COULD BE CONSIDERED TO PROVIDE A "BIOPHILIC" ENVIROMENT ON OUR SITE

Panel Set 2

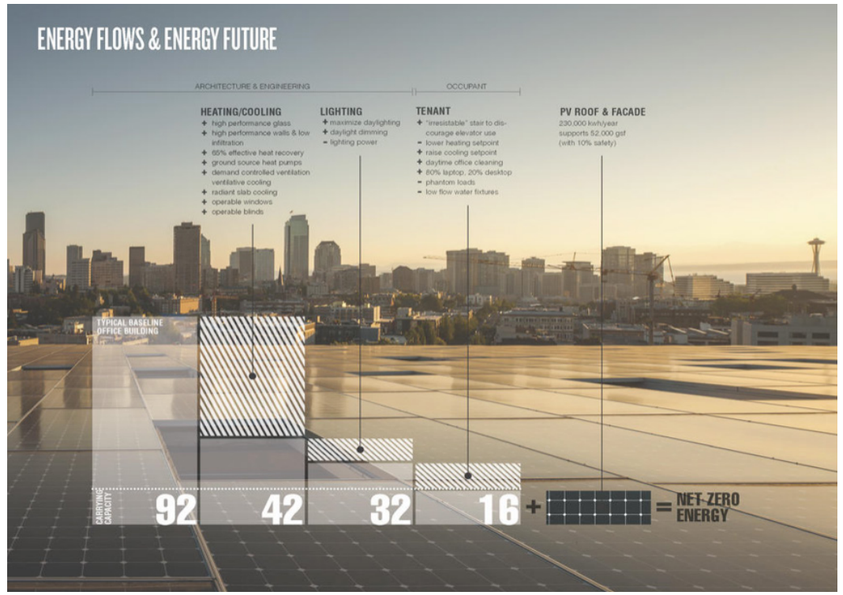
Date Submited: 9/30/2019

2.12

BULLITT CENTER



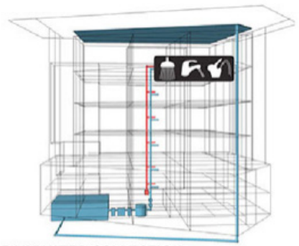
arquitecturaenacero.org/proyectos/sustentable/bullitt-center



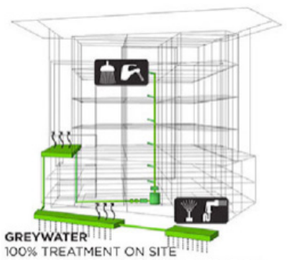
arquitecturaenacero.org/proyectos/sustentable/bullitt-center

ENVIROMENTAL FUNCTION

Building graphics courtesy of Miller Hull

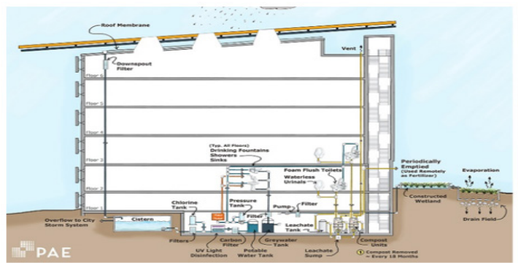


RAINWATER COLLECTION
100% DEMAND MET ON SITE

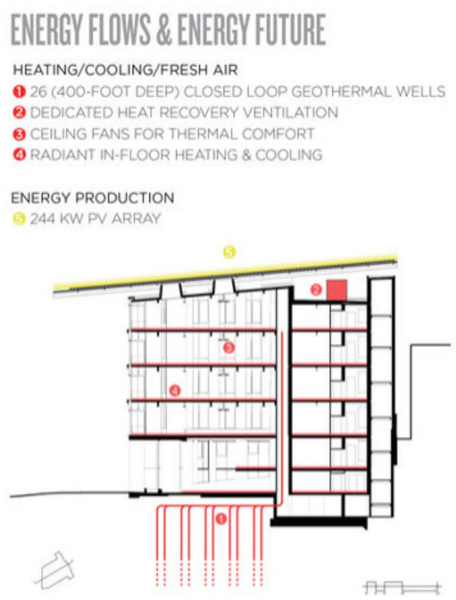


GREYWATER
100% TREATMENT ON SITE
EVAPOTRANSPIRATION & INFILTRATION

arquitecturaenacero.org/proyectos/sustentable/bullitt-center



arquitecturaenacero.org/proyectos/sustentable/bullitt-center



arquitecturaenacero.org/proyectos/sustentable/bullitt-center

Issues Addresessed:

Net-Zero Energy Production
Topographic & Landscape Modification

Decisions Made:

More guidelines and design principals for efficient systems incorporation. The inclusion of these principals within our design is integral.

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ARC541-001: Architecture Systems and Environment Fall 2019

Sheet Content/Focus:

Topography & Landscaping

Panel Set 2

Date Submited: 9/30/2019

2.13

PUBLIC TRANSPORTATION

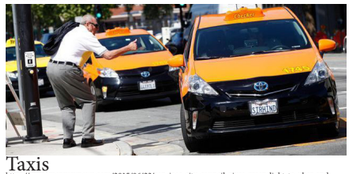
Existing Transportation Methodologies in San Jose

Light Rail https://sanfrancisco.cbslocal.com/2019/08/14/vta-light-rail-vehicle-collision-san-jose-north-1st-street-charcot-avenue/

Bus https://www.sanjoseinside.com/2019/04/05/op-ed-vta-should-use-measure-b-funds-to-save-critical-bus-service/

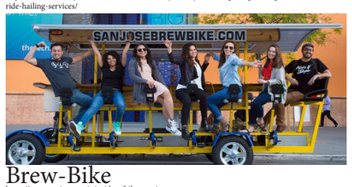
Train https://www.sanjoseinside.com/2019/04/05/op-ed-vta-should-use-measure-b-funds-to-save-critical-bus-service/

UBER https://www.latimes.com/local/lanow/la-me-ln-uber-stabbing-20180927-story.html



Taxis https://www.mercurynews.com/2015/06/23/san-jose-city-council-gives-green-light-to-uber-and-ride-hailing-services/

Bicycles https://www.sanjose.org/trip-ideas/bike-san-jose



Brew-Bike https://www.sanjose.org/trip-ideas/bike-san-jose

Scooters, skateboards, etc. https://bikesiliconvalley.org/2018/06/city-of-san-jose-hosts-community-meeting-on-shared-bikes-and-e-scooters/

Proposed Pod Car Network

This is our proposed network for a pod car based transportation system. The goal of the network layout is to provide flexible transportation routes and a variety of destinations, so as to limit the amount of unnecessary starting and stopping when delivering passengers and create an automated system that can seamlessly transport passengers to their desired location. The system will consist of a transit network with stations that allow other vehicles in the network to bypass loading and unloading passengers. This greatly improves the efficiency of the system and can transport users faster than traditional methods of transportation. The effieciency and predictability of the system lends itself to being entirely solar-powered, thus providing a clean alternative to fossil fuel based transportation.

Transportation Approach:

Our plan is to implement a pod car network in a manner that incentivizes a much more energy conscious and sustainable living typology within San Jose. This would be accomplished by the integration and reclamation of current infrastructure that has been deemed large enough to support the integration of the network or roads that would receive more functionality if replaced by pod car and human scale friendly navigation methods. Within the individual design process, the emphasis of first-to-last-mile transportation methodologies will need to be encouraged.

LBC Transportation Guidelines

PLACE

HUMAN-POWERED LIVING

IMPERATIVE 04

The Community should contribute toward the creation of walkable, pedestrian-oriented communities and provide public transit linkages to surrounding neighborhoods. It shall be predominantly designed for humans and human-powered mobility, rather than for cars.

Public bike storage shall be conveniently distributed throughout the Community, enough for 15% of the Community occupants.

A network of safe, secure, and pleasant walkways and bikeways, adequate to enable human-powered transportation and mass transit as the primary means of mobility, shall be provided throughout the Community. The Community must provide a mobility plan, which addresses and demonstrates at a minimum the following:

PROJECTS IN ALL TRANSECTS:

- Public bike storage shall be conveniently distributed throughout the Community, enough for 15% of the Community occupants
- A walkway network comprised of enhanced pedestrian routes
- At least one electric vehicle charging station
- A bicycle network that provides separation from vehicles
- Advocacy in the community to facilitate the uptake of human-powered transportation

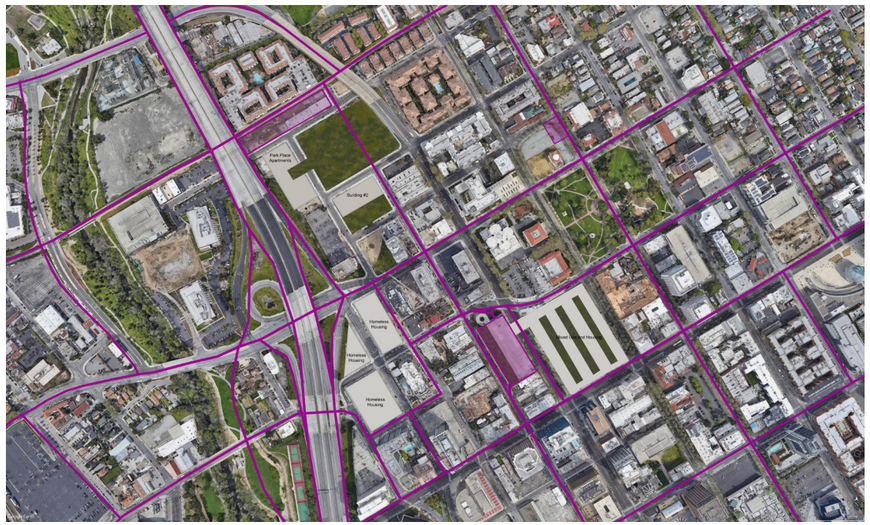
PROJECTS IN TRANSECTS L3-L6 MUST ALSO PROVIDE:

- Enhanced pedestrian routes, including weather protection on street frontages
- At least one public transit route within the community

The Community may not cause the predominant occupancy type within the catchment area[11] to exceed the maximum percentage allotted in the table below:

TRANSECT	L1	L2	L3	L4	L5	L6
Maximum percentage of any single occupancy type within catchment area	-	-	70%	60%	50%	40%

11 Refer to catchment area footnote on pg 13.



Issues Addresessed:

Transportation on Site
Net-Zero Energy Production
LBC Guidelines

Decisions Made:

To incorporate sustainable methods of transportation on our site.

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ARC541-001: Architecture Systems and Environment Fall 2019

Sheet Content/Focus:

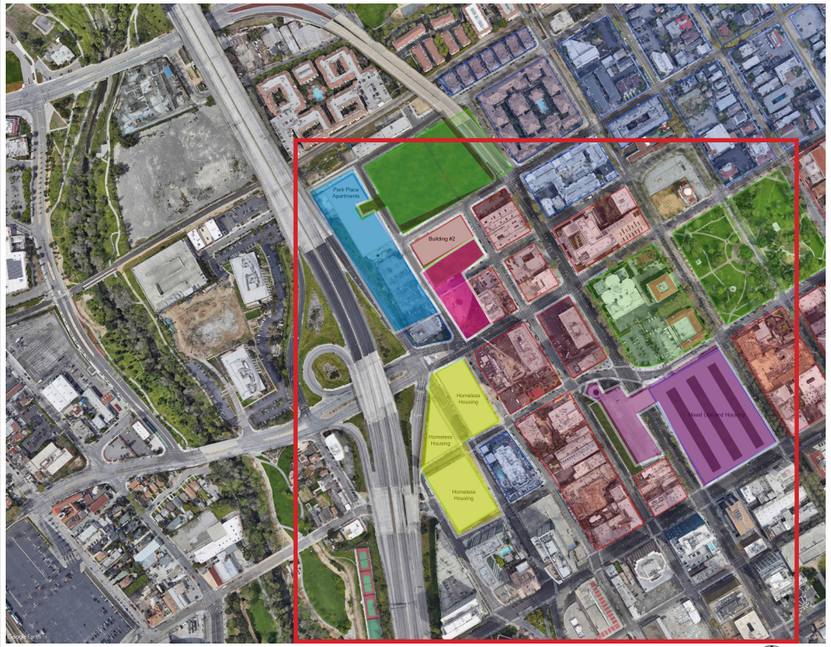
Planned Methodologies for Transportation

Panel Set 2

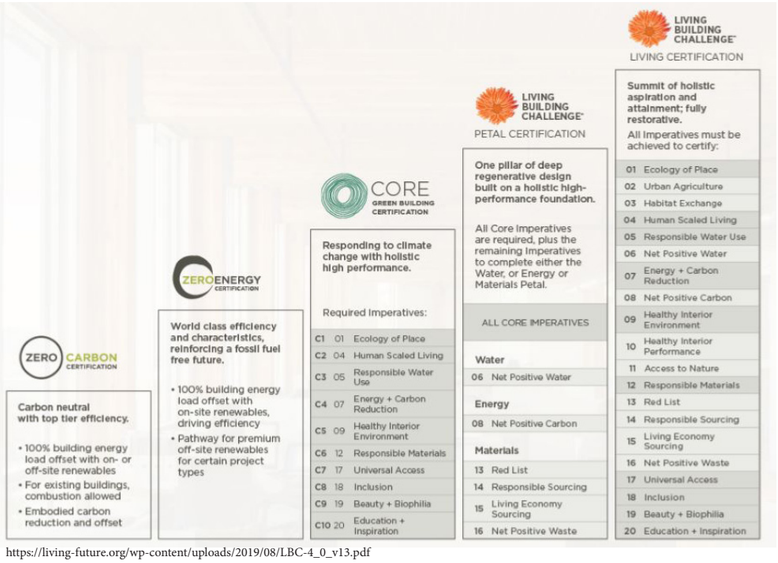
Date Submited: 9/30/2019

2.14

San Jose Downtown



Certification



https://living-future.org/wp-content/uploads/2019/08/LBC-4_0_v13.pdf

The proposed building shall at least become certified in one of the Living Building Challenge certifications

Living Building Challenge Ideas

SUMMARY TABLE

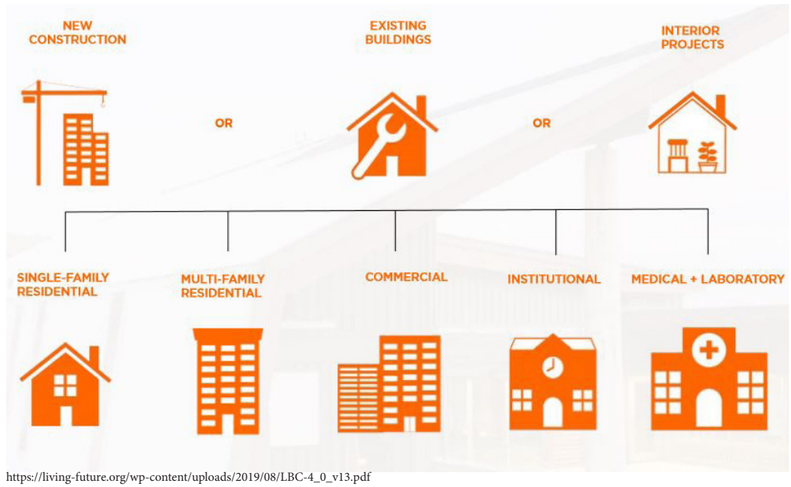
The Living Building Challenge is composed of 20 Imperatives grouped into seven petals. Some Imperatives are not required for all Typologies.

PETAL	IMPERATIVE	TYPOLOGY: New Building	Existing Building	Interior	Landscape + Infrastructure
PLACE	01 Ecology of Place	■	▨		■
	02 Urban Agriculture	■	■		
	03 Habitat Exchange	■	■	■	■
	04 Human Scaled Living	■	▨	▨	
WATER	05 Responsible Water Use	■	■	▨	■
	06 Net Positive Water	■	■		■
ENERGY	07 Energy + Carbon Reduction	■	■	▨	■
	08 Net Positive Energy	■	■	■	■
HEALTH + HAPPINESS	09 Healthy Interior Environment	■	■	■	
	10 Healthy Interior Performance	■	■	■	
	11 Access to Nature	■	■	■	
MATERIALS	12 Responsible Materials	■	■	■	■
	13 Red List	■	■	■	■
	14 Responsible Sourcing	■	■	■	■
	15 Living Economy Sourcing	■	■	■	■
	16 Net Positive Waste	■	■	■	■
EQUITY	17 Universal Access	■	▨	▨	▨
	18 Inclusion	■	■	■	■
BEAUTY	19 Beauty + Biophilia	■	■	■	■
	20 Education + Inspiration	■	■	■	■

■ CORE IMPERATIVE
■ SCALE JUMPING ALLOWED
■ HANDPRINTING IMPERATIVE
■ IMPERATIVE REQUIRED FOR TYPOLOGY
▨ REQUIREMENT DEPENDENT ON SCOPE
■ NOT REQUIRED FOR TYPOLOGY

https://living-future.org/wp-content/uploads/2019/08/LBC-4_0_v13.pdf

The goal according to LBC is to propose a project that will have their own utility, generate their own energy, capture their own energy, capture their own water and process their own waste. Our designs will focus on following the new building typology and try to adhere to the petals imperatives.



https://living-future.org/wp-content/uploads/2019/08/LBC-4_0_v13.pdf

The Living Building Challenge is versatile and can apply to any building project. These include the areas listed above, but can easily be expanded.

Issues Addresessed:

Living Building Challenge Ideas
- Certification goals
- Seven Petal Groups looked at for design purpose

Decisions Made:

No final decisions were made, but these guidelines are important to keep in mind when further developing the masses in orientation to their respective locations.

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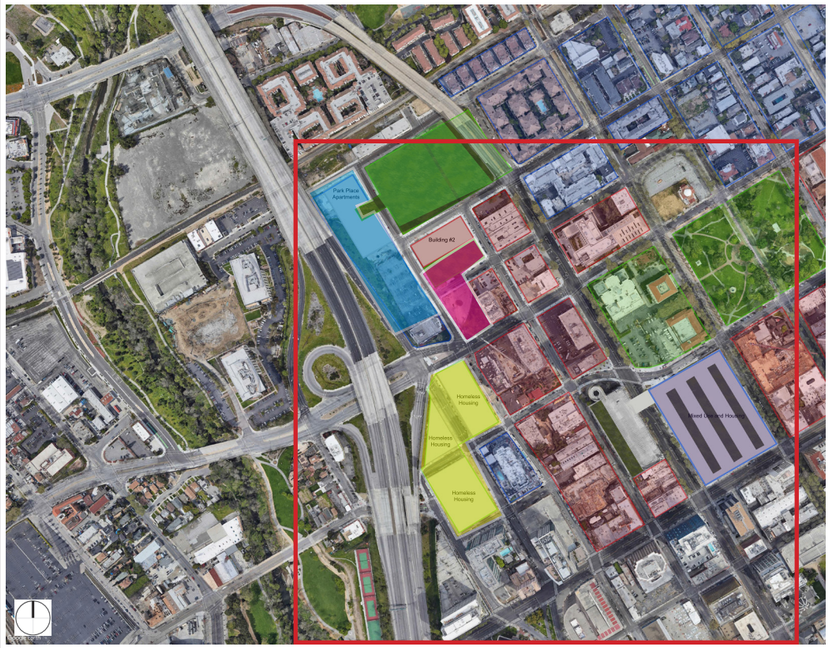
Sheet Content/Focus:
Living Building Challenge

Panel Set 2

Date Submited: 9/30/2019

2.15

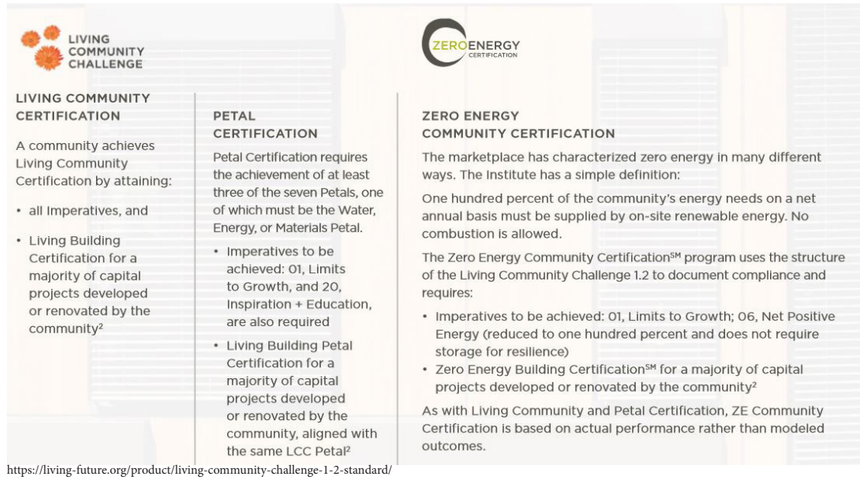
San Jose Downtown



https://living-future.org/product/living-community-challenge-1-2-standard/

THE CHALLENGE PROMOTES THE TRANSITION OF SUBURBAN ZONES TO GROW INTO NEW URBAN AREAS WITH GREATER DENSITY.

Living Community Challenge Ideas



https://living-future.org/product/living-community-challenge-1-2-standard/

There are two rules for Living Community Certification:
1. All Imperatives are mandatory for Living Certification.
2. Certification is based on actual, rather than modeled or anticipated, performance.

Therefore, projects must be operational for at least twelve consecutive months prior to evaluation.

According to the LCC every community must define their site boundaries and select a living transect category based on the community`s current zoning which San Jose Downtown is part of the L6. URBAN CORE ZONE: This is comprised of high-to very high-density mixed use development found in large cities and metropolises. (FAR of ≥ 3.0)

Project Goals

Urban Agriculture
- Community garden and food production

Human-Powered Living
- Adding additional walk-paths & Bicycle paths
- Electric vehicle charging station

Net Positive Water
- All storm-water and water discharge, including Grey and black water, must be treated and managed at the Community scale either through reuse, a closed loop system, or infiltration.

Civilized Environment
- Bike sharing program
- Recreation programs
- Community Hub
- Local food Program

Materials
- try to avoid effecting the carbon footprint through the construction

Issues Addresessed:

Living Community Challenge
- Project Goals
- Certification Levels
- Process to become LCC certified

Decisions Made:

The inclusion (or attempt to include) of the listed programs within the context of our buildings and their immediate site.

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ARC541-001: Architecture Systems and Environment Fall 2019

Sheet Content/Focus:

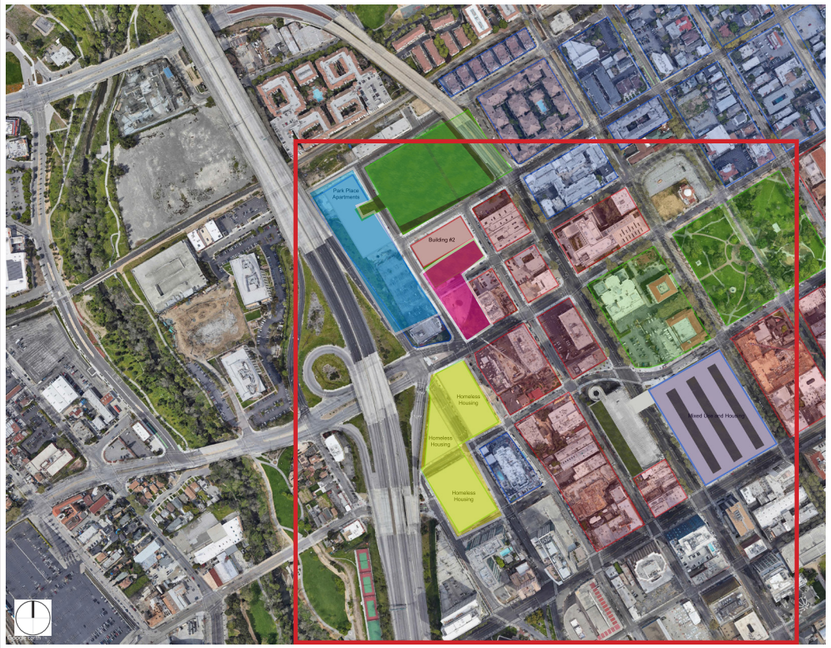
Living Building Challenge guidelines

Panel Set 2

Date Submited: 9/30/2019

2.16

San Jose Downtown



LEED Ideas

Achieve better buildings with LEED

Projects pursuing LEED certification earn points across several categories: Location & Transportation, Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, Indoor Environmental Quality, Innovation and more. Based on the number of points achieved, a project then earns one of four LEED rating levels: Certified, Silver, Gold or Platinum.

Certified	Silver	Gold	Platinum
40-49 points earned	50-59 points earned	60-79 points earned	80+ points earned

https://new.usgbc.org/

Project Goals

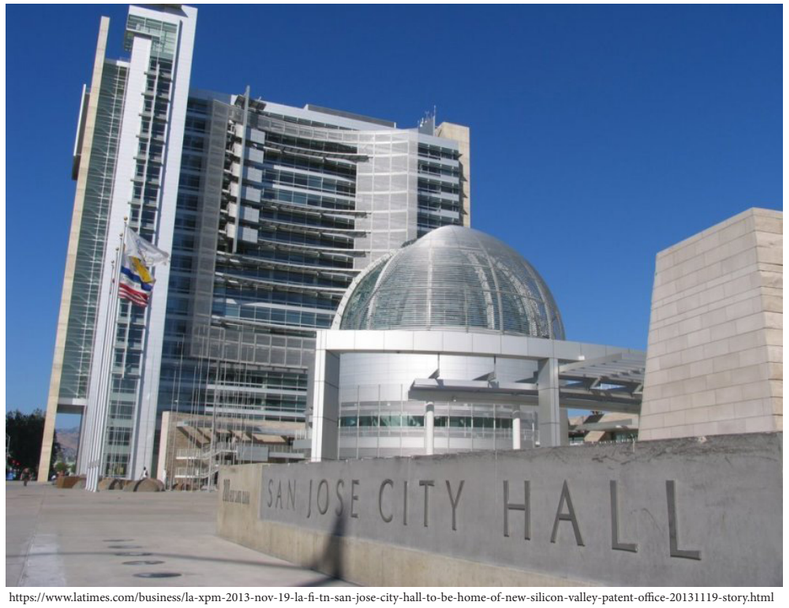
The site only contains one LEED certified building which is located just outside of the site boundaries. To make our designs more sustainable, some of the areas that have been chosen for emphasis are:
- Building location & community Impact
- Water Efficiency
- Energy & Emissions
- Material & waste
- Health & safety

Issues Addresessed:
LEED guidelines
Historical, Cultural, & Architectural significance

Decisions Made:
To include LEED standards within our projects and use surrounding context as an example of what to include within our designs.

Municipal Green Building Program

Since 2001, LEED-certified buildings have demonstrated measurable energy efficiency, water conservation, and improved air and water quality, which improve the environment and reduce operating costs.



https://www.latimes.com/business/la-xpm-2013-nov-19-la-fi-tn-san-jose-city-hall-to-be-home-of-new-silicon-valley-patent-office-20131119-story.html

SAN JOSE'S GREEN VISION IN ACTION

LEED certification of San Jose City Hall contributes to achieving the San Jose Green Vision goal to build or retrofit 50 million square feet of green buildings by 2022. It supports additional Green Vision goals related to energy and water efficiency, recycled water use and waste reduction. San Jose policies promote green building practices to reduce the impact of the built environment on global climate change

BUILDING PROFILE

San José City Hall was the first city hall in the nation to achieve LEED Platinum Certification for Existing Buildings. The 18-story structure is also the largest LEED-certified municipal building in San José.

FUNCTION: Administrative and departmental headquarters, housing the City Council Chambers and offices, as well as rooms for community meetings and special events.

BUILDING SIZE: 530,000 square feet, 18-story, 285 feet tall at highest point

OPENING DATE: October 15, 2005

CERTIFICATION: LEED© EB Platinum, March 2009

ARCHITECTS: Richard Meier & Partners (Los Angeles Office) and Steinberg Architects

CONSTRUCTION MANAGEMENT: Turner/Devcon Joint Venture

PROJECT MANAGEMENT:
San José Department of Public Works (CFAS)

FUNDING SOURCES:
Measure "I" passed by San José voters on Nov. 5, 1996

LEED SCORECARD*

CATEGORY	POINTS EARNED
Sustainable Sites	4
Water Efficiency	6
Energy & Atmosphere	23
Materials & Resources	12
Indoor Environmental Quality	17
Innovation & Design Process	7
TOTAL	69

* LEED for Existing Buildings: Operations & Maintenance. Certification Thresholds: Certified: 26-32 points, Silver: 33-38 points, Gold: 39-51 points, Platinum: 52-69 points www.usgbc.org

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Sheet Content/Focus:

LEED guidelines

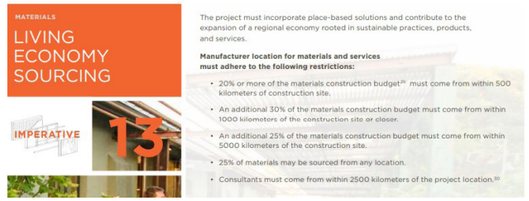
Panel Set 2

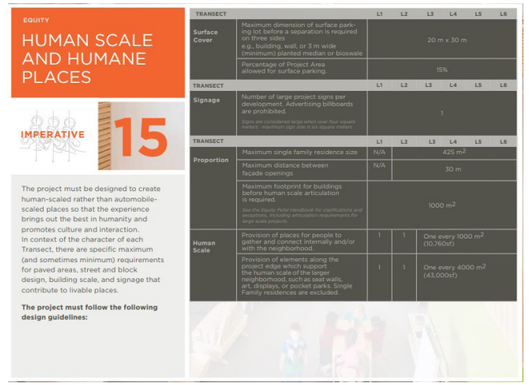
Date Submited: 9/30/2019

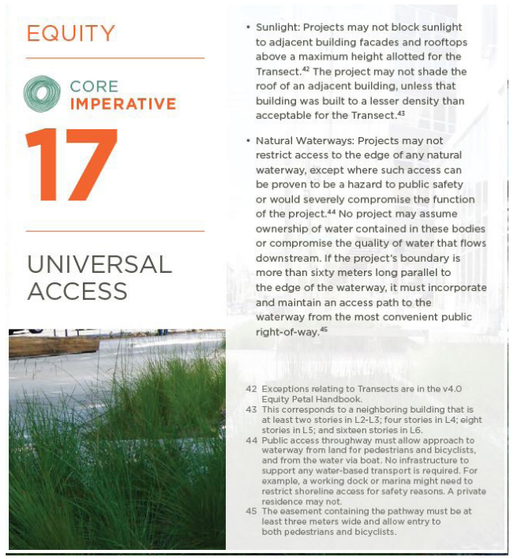
2.17

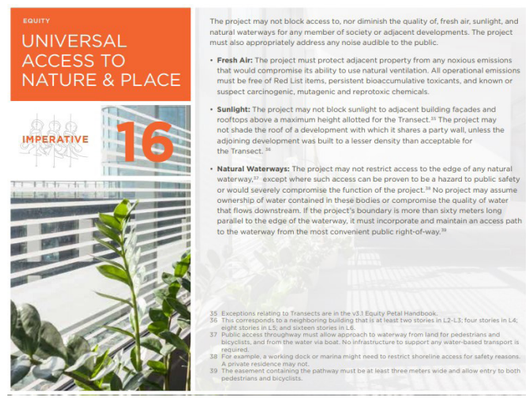
LBC Setbacks and Requirements

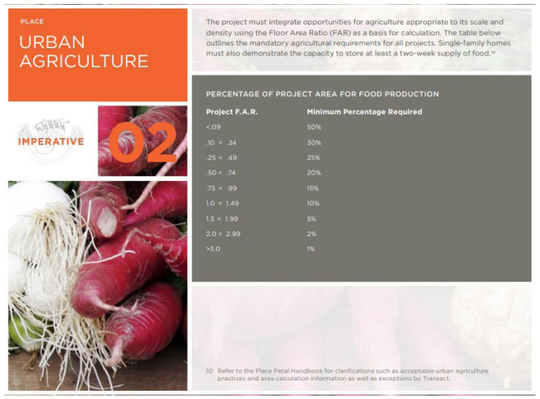
Here are a few selected ares from LBC's guidelines. These are included to show that that they are being highlighted and included into our design process. These were highlighted mostly because they emphasize and dictate what programming needs to be included within our structures, as well as dictate what resources need to be available to the occupants. It is important to consider these early on, because it allows for scale-jumping and sharing of resources throughout the site.











Issues Addresessed:

Net-Zero Energy Production
Topographic & Landscape Modification
Equity of Resources
Easement and Demolition Guidelines

Decisions Made:

More guidelines and design principals for efficient systems incorporation. The inclusion of these principals within our design is integral.

Ruth Morillo, Jose Sosa, & Benjamin Stremming
ARC541-001: Architecture Systems and Environment Fall 2019

Sheet Content/Focus:

Panel Set 2

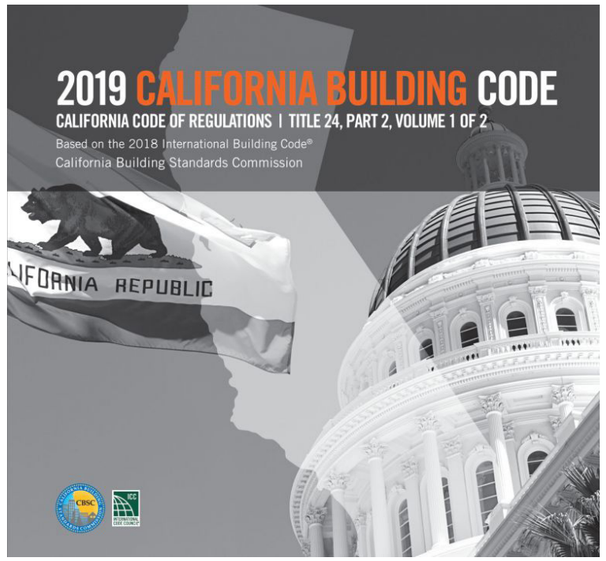
Date Submited: 9/30/2019

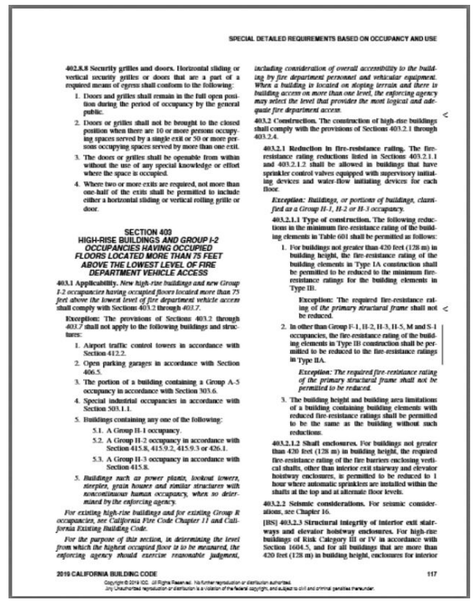
2.18

Restrictions Based on Occupancy Classification:

High Rise Buildings & Ect.

Information from California Building Code Chapter 3 - Occupancy Classification and Use





SPECIAL DETAILED REQUIREMENTS BASED ON OCCUPANCY AND USE

402.8.8 Security grilles and doors. Horizontal sliding or vertical security grilles or doors that are a part of a required means of egress shall conform to the following:

1. Doors and grilles shall remain in the full open position during the period of occupancy by the general public.
2. Doors or grilles shall not be brought to the closed position when there are 10 or more persons occupying spaces served by a single exit or 50 or more persons occupying spaces served by more than one exit.
3. The doors or grilles shall be operable from within without the use of any special knowledge or effort where the space is occupied.
4. Where two or more exits are required, not more than one-half of the exits shall be permitted to include either a horizontal sliding or vertical rolling grille or door.

SECTION 403
HIGH-RISE BUILDINGS *AND GROUP I-2 OCCUPANCIES HAVING OCCUPIED FLOORS LOCATED MORE THAN 75 FEET ABOVE THE LOWEST LEVEL OF FIRE DEPARTMENT VEHICLE ACCESS*

403.1 Applicability. *New high-rise buildings and new Group I-2 occupancies having occupied floors located more than 75 feet above the lowest level of fire department vehicle access* shall comply with Sections 403.2 through *403.7*.

Exception: The provisions of Sections 403.2 through *403.7* shall not apply to the following buildings and structures:

1. Airport traffic control towers in accordance with Section 412.2.
2. Open parking garages in accordance with Section 406.5.
3. The portion of a building containing a Group A-5 occupancy in accordance with Section 303.6.
4. Special industrial occupancies in accordance with Section 503.1.1.
5. Buildings containing any one of the following:
   5.1. A Group H-1 occupancy.
   5.2. A Group H-2 occupancy in accordance with Section 415.8, 415.9.2, 415.9.3 or 426.1.
   5.3. A Group H-3 occupancy in accordance with Section 415.8.
6. *Buildings such as power plants, lookout towers, steeples, grain houses and similar structures with nonoccupational human occupancy, when so determined by the enforcing agency.*

For existing high-rise buildings and for existing Group R occupancies, see California Fire Code Chapter 11 and California Existing Building Code.

For the purpose of this section, in determining the level from which the highest occupied floor is to be measured, the enforcing agency should exercise reasonable judgment, including consideration of overall accessibility to the building by fire department personnel and vehicular equipment. When a building is located on sloping terrain and there is building access on more than one level, the enforcing agency may select the level that provides the most logical and adequate fire department access.

403.2 Construction. The construction of high-rise buildings shall comply with the provisions of Sections 403.2.1 through 403.2.4.

403.2.1 Reduction in fire-resistance rating. The fire-resistance rating reductions listed in Sections 403.2.1.1 and 403.2.1.2 shall be allowed in buildings that have sprinkler control valves equipped with supervisory initiating devices and water-flow initiating devices for each floor.

Exception: Buildings, or portions of buildings, classified as a Group H-1, H-2 or H-3 occupancy.

403.2.1.1 Type of construction. The following reductions in the minimum fire-resistance rating of the building elements in Table 601 shall be permitted as follows:

1. For buildings not greater than 420 feet (128 m) in building height, the fire-resistance rating of the building elements in Type IA construction shall be permitted to be reduced to the minimum fire-resistance ratings for the building elements in Type IB.

   Exception: The required fire-resistance rating of *the primary structural frame* shall not be reduced.

2. In other than Group F-1, H-2, H-3, H-5, M and S-1 occupancies, the fire-resistance rating of the building elements in Type III construction shall be permitted to be reduced to the fire-resistance ratings in Type IIA.

   Exception: The required fire-resistance rating of the primary structural frame shall not be permitted to be reduced.

3. The building height and building area limitations of a building containing building elements with reduced fire-resistance ratings shall be permitted to be the same as the building without such reductions.

403.2.1.2 Shaft enclosures. For buildings not greater than 420 feet (128 m) in building height, the required fire-resistance rating of the fire barriers enclosing vertical shafts, other than interior exit stairway and elevator hoistway enclosures, is permitted to be reduced to 1 hour where automatic sprinklers are installed within the shafts at the top and at alternate floor levels.

403.2.2 Seismic considerations. For seismic considerations, see Chapter 16.

[BS] 403.2.3 Structural integrity of interior exit stairways and elevator hoistway enclosures. For high-rise buildings of Risk Category III or IV in accordance with Section 1604.5, and for all buildings that are more than 420 feet (128 m) in building height, enclosures for interior

SPECIAL DETAILED REQUIREMENTS BASED ON OCCUPANCY AND USE

exit stairways and elevator hoistway enclosures shall comply with Sections 403.2.3.1 through 403.2.3.4.

[BS] 403.2.3.1 Wall assembly. The wall assemblies making up the enclosures for interior exit stairways and elevator hoistway enclosures shall meet or exceed Soft Body Impact Classification Level 2 as measured by the test method described in ASTM C1629/C1629M.

[BS] 403.2.3.2 Wall assembly materials. The face of the wall assemblies making up the enclosures for interior exit stairways and elevator hoistway enclosures that are not exposed to the interior of the enclosures for interior exit stairways or elevator hoistway enclosure shall be constructed in accordance with one of the following methods:

1. The wall assembly shall incorporate not fewer than two layers of impact-resistant construction board each of which meets or exceeds Hard Body Impact Classification Level 2 as measured by the test method described in ASTM C1629/C1629M.
2. The wall assembly shall incorporate not fewer than one layer of impact-resistant construction material that meets or exceeds Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C1629/C1629M.
3. The wall assembly incorporates multiple layers of any material, tested in tandem, that meets or exceeds Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C1629/C1629M.

[BS] 403.2.3.3 Concrete and masonry walls. Concrete or masonry walls shall be deemed to satisfy the requirements of Sections 403.2.3.1 and 403.2.3.2.

[BS] 403.2.3.4 Other wall assemblies. Any other wall assembly that provides impact resistance equivalent to that required by Sections 403.2.3.1 and 403.2.3.2 for Hard Body Impact Classification Level 3, as measured by the test method described in ASTM C1629/C1629M, shall be permitted.

403.2.4 Sprayed fire-resistant materials (SFRM). The bond strength of the SFRM installed throughout the building shall be in accordance with Table 403.2.4.

TABLE 403.2.4
MINIMUM BOND STRENGTH

WEIGHT OF BUILDING[a]	SFRM MINIMUM BOND STRENGTH
Up to 420 feet	430 psf
Greater than 420 feet	1,000 psf

For SI: 1 foot = 304.8 mm, 1 pound per square foot (psf) = 0.0479 kN/m².
a. Above the lowest level of fire department vehicle access.

[F] 403.3 Automatic sprinkler system. Buildings and structures shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and a secondary water supply where required by Section 403.3.3. *A sprinkler water-flow alarm-initiating device and a control valve with a supervisory signal-initiating device shall be provided at the lateral connection to the riser for each floor.*

Exception: An automatic sprinkler system shall not be required in spaces or areas of:

1. Open parking garages in accordance with Section 406.5.
2. Telecommunications equipment buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided that those spaces or areas are equipped throughout with an automatic fire detection system in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour fire barriers constructed in accordance with Section 707 or not less than 2-hour horizontal assemblies constructed in accordance with Section 711, or both.

[F] 403.3.1 Number of sprinkler system risers and system design. Each sprinkler system serving a floor in buildings that are more than 420 feet (128 m) in building height shall be *connected to a minimum of two sprinkler risers or combination standpipe system risers located in separate shafts. Each sprinkler system shall be hydraulically designed so that when one connection is shut down, the other connection shall be capable of supplying the sprinkler system design demand.*

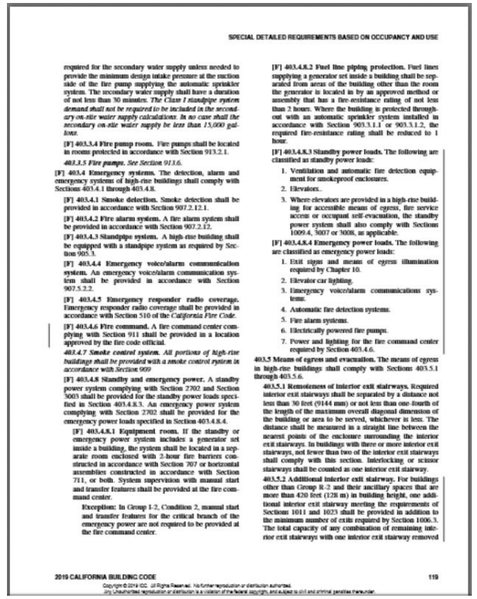
[F] 403.3.1.1 Riser location. Sprinkler risers shall be placed in interior exit stairways and ramps that are remotely located in accordance with Section 1007.1.

[F] 403.3.2 Water supply to required fire pumps. In buildings *having an occupied floor* that are more than *120 feet (36 576 mm) above the lowest level of fire department vehicle access*, required fire pumps shall be supplied by connections to not fewer than two water mains located in different streets. Separate supply piping shall be provided between each connection to the water main and the pumps. Each connection and the supply piping between the connection and the pumps shall be sized to supply the flow and pressure required for the pumps to operate.

Exception: Two connections to the same main shall be permitted provided that the main is valved such that an interruption can be isolated so that the water supply will continue without interruption through not fewer than one of the connections.

403.3.2.1 Fire pumps. Redundant fire pump systems shall be required for high-rise buildings having an occupied floor more than 300 feet above the lowest level of fire department vehicle access. Each fire pump system shall be capable of automatically supplying the required demand for the automatic sprinkler and standpipe systems.

[F] 403.3.3 Secondary water supply. An automatic secondary on-site water supply having a *usable* capacity of not less than the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for high-rise buildings *and Group I-2 occupancies having occupied floors located more than 75 ft above the lowest level of fire department vehicle access* assigned to Seismic Design Category C, D, E or F as determined by Section 1613. An additional fire pump shall not be



SPECIAL DETAILED REQUIREMENTS BASED ON OCCUPANCY AND USE

required for the secondary water supply unless needed to provide the minimum design intake pressure at the suction side of the fire pump supplying the automatic sprinkler system. The secondary water supply shall have a duration of not less than 30 minutes. *The Class I standpipe system demand shall not be required to be included in the secondary on-site water supply calculations. In no case shall the secondary on-site water supply be less than 15,000 gallons.*

[F] 403.3.4 Fire pump room. Fire pumps shall be located in rooms protected in accordance with Section 913.2.1.

403.3.5 Fire pumps. See Section 913.6.

[F] 403.4 Emergency systems. The detection, alarm and emergency systems of high-rise buildings shall comply with Sections 403.4.1 through 403.4.8.

[F] 403.4.1 Smoke detection. Smoke detection shall be provided in accordance with Section 907.2.12.1.

[F] 403.4.2 Fire alarm system. A fire alarm system shall be provided in accordance with Section 907.2.12.

[F] 403.4.3 Standpipe system. A high-rise building shall be equipped with a standpipe system as required by Section 905.3.

[F] 403.4.4 Emergency voice/alarm communication system. An emergency voice/alarm communication system shall be provided in accordance with Section 907.5.2.2.

[F] 403.4.5 Emergency responder radio coverage. Emergency responder radio coverage shall be provided in accordance with Section 510 of the *California Fire Code*.

[F] 403.4.6 Fire command. A fire command center complying with Section 911 shall be provided in a location approved by the fire code official.

403.4.7 Smoke control system. All portions of high-rise buildings shall be provided with a smoke control system in accordance with Section 909

[F] 403.4.8 Standby and emergency power. A standby power system complying with Section 2702 and Section 3003 shall be provided for the standby power loads specified in Section 403.4.8.3. An emergency power system complying with Section 2702 shall be provided for the emergency power loads specified in Section 403.4.8.4.

[F] 403.4.8.1 Equipment rooms. If the standby or emergency power system includes a generator set inside a building, the system shall be located in a separate room enclosed with 2-hour fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 711, or both. System supervision with manual start and transfer features shall be provided at the fire command center.

Exception: In Group I-2, Condition 2, manual start and transfer features for the critical branch of the emergency power are not required to be provided at the fire command center.

[F] 403.4.8.2 Fuel line piping protection. Fuel lines supplying a generator set inside a building shall be separated from areas of the building other than the room the generator is located in by an approved method or assembly that has a fire-resistance rating of not less than 2 hours. Where the building is protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, the required fire-resistance rating shall be reduced to 1 hour.

[F] 403.4.8.3 Standby power loads. The following are classified as standby power loads:

1. Ventilation and automatic fire detection equipment for smokeproof enclosures.
2. Elevators.
3. Where elevators are provided in a high-rise building for accessible means of egress, fire service access or occupant self-evacuation, the standby power system shall also comply with Sections 1009.4, 3007 or 3008, as applicable.

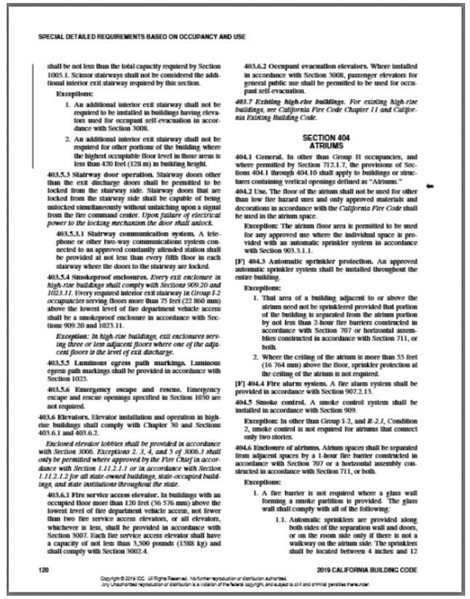
[F] 403.4.8.4 Emergency power loads. The following are classified as emergency power loads:

1. Exit signs and means of egress illumination required by Chapter 10.
2. Elevator car lighting.
3. Emergency voice/alarm communications system.
4. Automatic fire detection systems.
5. Fire alarm systems.
6. Electrically powered fire pumps.
7. Power and lighting for the fire command center required by Section 403.4.6.

403.5 Means of egress and evacuation. The means of egress in high-rise buildings shall comply with Sections 403.5.1 through 403.5.6.

403.5.1 Remoteness of interior exit stairways. Required interior exit stairways shall be separated by a distance not less than 30 feet (9144 mm) or not less than one fourth of the length of the maximum overall diagonal dimension of the building or area to be served, whichever is less. The distance shall be measured in a straight line between the nearest points of the enclosure surrounding the interior exit stairways. In buildings with three or more interior exit stairways, not fewer than two of the interior exit stairways shall comply with this section. Interlocking or scissor stairways shall be counted as one interior exit stairway.

403.5.2 Additional interior exit stairway. For buildings other than Group R-2 and their ancillary spaces that are more than 420 feet (128 m) in building height, one additional interior exit stairway meeting the requirements of Sections 1011 and 1023 shall be provided in addition to the minimum number of exits required by Section 1006.3. The total capacity of any combination of remaining interior exit stairways with one interior exit stairway removed



SPECIAL DETAILED REQUIREMENTS BASED ON OCCUPANCY AND USE

shall be not less than the total capacity required by Section 1005.1. Scissor stairways shall not be considered the additional interior exit stairway required by this section.

Exceptions:

1. An additional interior exit stairway shall not be required to be installed in buildings having elevators used for occupant self-evacuation in accordance with Section 3008.
2. An additional interior exit stairway shall not be required for other portions of the building where the highest occupiable floor level in those areas is less than 420 feet (128 m) in building height.

403.5.3 Stairway door operation. Stairway doors other than the exit discharge doors shall be permitted to be locked from the stairway side. Stairway doors that are locked from the stairway side shall be capable of being unlocked simultaneously without unlatching upon a signal from the fire command center. *Upon failure of electrical power to the locking mechanism the door shall unlock.*

403.5.3.1 Stairway communication systems. A telephone or other two-way communications system connected to an approved constantly attended station shall be provided at not less than every fifth floor in each stairway where the doors to the stairway are locked.

403.5.4 Smokeproof enclosures. *Every exit enclosure in high-rise buildings shall comply with Sections 909.20 and 1023.11.* Every required interior exit stairway *in Group I-2 occupancies* serving floors more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access shall be a smokeproof enclosure in accordance with Sections 909.20 and 1023.11.

Exception: In high-rise buildings, exit enclosures serving three or less adjacent floors where one of the adjacent floors is the level of exit discharge.

403.5.5 Luminous egress path markings. Luminous egress path markings shall be provided in accordance with Section 1025.

403.5.6 Emergency escape and rescue. Emergency escape and rescue openings specified in Section 1030 are not required.

403.6 Elevators. Elevator installation and operation in high-rise buildings shall comply with Chapter 30 and Sections 403.6.1 and 403.6.2.

Enclosed elevator lobbies shall be provided in accordance with Section 3006. Exceptions 2, 3, 4, and 5 of 3006.3 shall only be permitted where approved by the Fire Chief in accordance with Section 1.11.2.1.1 or in accordance with Section 1.11.2.1.2 for all state-owned buildings, state-occupied buildings, and state institutions throughout the state.

403.6.1 Fire service access elevator. In buildings with an occupied floor more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, not fewer than two fire service access elevators, or all elevators, whichever is less, shall be provided in accordance with Section 3007. Each fire service access elevator shall have a capacity of not less than 3,500 pounds (1588 kg) and shall comply with Section 3002.4.

403.6.2 Occupant evacuation elevators. Where installed in accordance with Section 3008, passenger elevators for general public use shall be permitted to be used for occupant self-evacuation.

403.7 Existing high-rise buildings. For existing high-rise buildings, see California Fire Code Chapter 11 and California Existing Building Code.

SECTION 404
ATRIUMS

404.1 General. In other than Group H occupancies, and where permitted by Section 712.1.7, the provisions of Sections 404.1 through 404.10 shall apply to buildings or structures containing vertical openings defined as "Atriums."

404.2 Use. The floor of the atrium shall not be used for other than low fire hazard uses and only approved materials and decorations in accordance with the *California Fire Code* shall be used in the atrium space.

Exception: The atrium floor area is permitted to be used for any approved use where the individual space is provided with an automatic sprinkler system in accordance with Section 903.3.1.1.

[F] 404.3 Automatic sprinkler protection. An approved automatic sprinkler system shall be installed throughout the entire building.

Exceptions:

1. That area of a building adjacent to or above the atrium need not be sprinklered provided that portion of the building is separated from the atrium portion by not less than 2-hour fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 711, or both.
2. Where the ceiling of the atrium is more than 55 feet (16 764 mm) above the floor, sprinkler protection at the ceiling of the atrium is not required.

[F] 404.4 Fire alarm system. A fire alarm system shall be provided in accordance with Section 907.2.13.

404.5 Smoke control. A smoke control system shall be installed in accordance with Section 909.

Exception: In other than Group I-2, and *R-2.1*, Condition 2, smoke control is not required for atriums that connect only two stories.

404.6 Enclosure of atriums. Atrium spaces shall be separated from adjacent spaces by a 1-hour fire barrier constructed in accordance with Section 707 or a horizontal assembly constructed in accordance with Section 711, or both.

Exceptions:

1. A fire barrier is not required where a glass wall forming a smoke partition is provided. The glass wall shall comply with all of the following:
   1.1. Automatic sprinklers are provided along both sides of the separation wall and door, or on the room side only if there is not a walkway on the atrium side. The sprinklers shall be located between 4 inches and 12

BOOK SOURCE: https://codes.iccsafe.org/content/CABCV12019/chapter-4-special-detailed-requirements-based-on-occupancy-and-use

Issues Addresessed:

Other Research Determined by Team

Decisions Made:

These were included because they will be used to help shape the sizes of the masses within the site. A variety of codes were included because a lot of the masses on the site are at preliminary stages of development.

Ruth Morillo, Jose Sosa, & Benjamin Stremming
ARC541-001: Architecture Systems and Environment Fall 2019

Sheet Content/Focus:

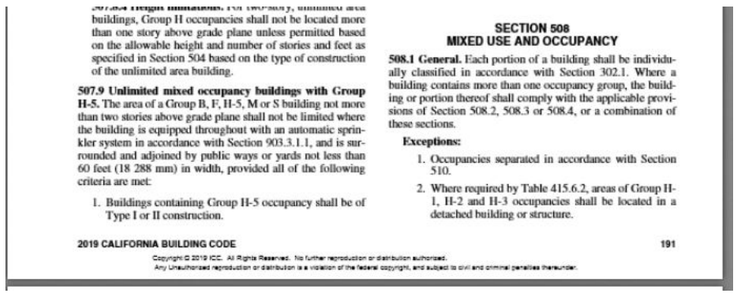
Codes and Sizing Guidelines

Panel Set 2

Date Submited: 9/30/2019

2.19

Mix-Use and Occupancy



buildings, Group H occupancies shall not be located more than one story above grade plane unless permitted based on the allowable height and number of stories and feet as specified in Section 504 based on the type of construction of the unlimited area building.

507.9 Unlimited mixed occupancy buildings with Group H-5. The area of a Group B, F, H-5, M or S building not more than two stories above grade plane shall not be limited where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, and is surrounded and adjoined by public ways or yards not less than 60 feet (18 288 mm) in width, provided all of the following criteria are met:

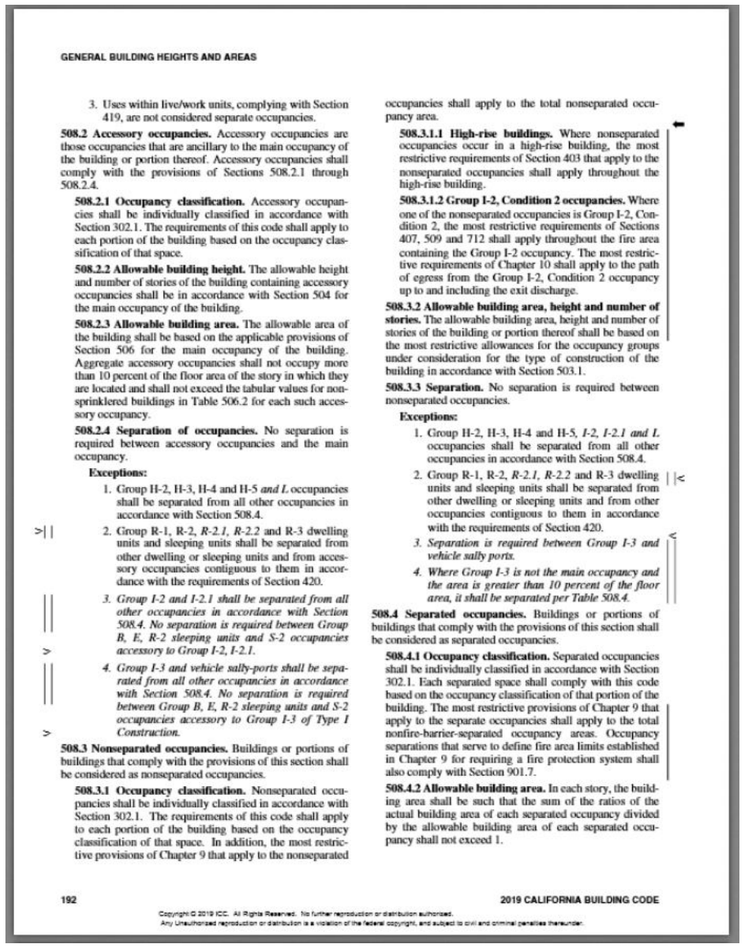
1. Buildings containing Group H-5 occupancy shall be of Type I or II construction.

SECTION 508
MIXED USE AND OCCUPANCY

508.1 General. Each portion of a building shall be individually classified in accordance with Section 302.1. Where a building contains more than one occupancy group, the building or portion thereof shall comply with the applicable provisions of Section 508.2, 508.3 or 508.4, or a combination of these sections.

Exceptions:

1. Occupancies separated in accordance with Section 510.
2. Where required by Table 415.6.2, areas of Group H-1, H-2 and H-3 occupancies shall be located in a detached building or structure.



3. Uses within live/work units, complying with Section 419, are not considered separate occupancies.

508.2 Accessory occupancies. Accessory occupancies are those occupancies that are ancillary to the main occupancy of the building or portion thereof. Accessory occupancies shall comply with the provisions of Sections 508.2.1 through 508.2.4.

508.2.1 Occupancy classification. Accessory occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space.

508.2.2 Allowable building height. The allowable height and number of stories of the building containing accessory occupancies shall be in accordance with Section 504 for the main occupancy of the building.

508.2.3 Allowable building area. The allowable area of the building shall be based on the applicable provisions of Section 506 for the main occupancy of the building. Aggregate accessory occupancies shall not occupy more than 10 percent of the floor area of the story in which they are located and shall not exceed the tabular values for nonsprinklered buildings in Table 506.2 for each such accessory occupancy.

508.2.4 Separation of occupancies. No separation is required between accessory occupancies and the main occupancy.

Exceptions:

1. Group H-2, H-3, H-4 and H-5 *and I,* occupancies shall be separated from all other occupancies in accordance with Section 508.4.
2. Group R-1, R-2, *R-2.1, R-2.2* and R-3 dwelling units and sleeping units shall be separated from other dwelling or sleeping units and from accessory occupancies contiguous to them in accordance with the requirements of Section 420.
3. *Group I-2 and I-2.1 shall be separated from all other occupancies in accordance with Section 508.4. No separation is required between Group B, E, R-2 sleeping units and S-2 occupancies accessory to Group I-2, I-2.1.*
4. *Group I-3 and vehicle sally-ports shall be separated from all other occupancies in accordance with Section 508.4. No separation is required between Group B, E, R-2 sleeping units and S-2 occupancies accessory to Group I-3 of Type I Construction.*

508.3 Nonseparated occupancies. Buildings or portions of buildings that comply with the provisions of this section shall be considered as nonseparated occupancies.

508.3.1 Occupancy classification. Nonseparated occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space. In addition, the most restrictive provisions of Chapter 9 that apply to the nonseparated occupancies shall apply to the total nonseparated occupancy area.

508.3.1.1 High-rise buildings. Where nonseparated occupancies occur in a high-rise building, the most restrictive requirements of Section 403 that apply to the nonseparated occupancies shall apply throughout the high-rise building.

508.3.1.2 Group I-2, Condition 2 occupancies. Where one of the nonseparated occupancies is Group I-2, Condition 2, the most restrictive requirements of Sections 407, 509 and 712 shall apply throughout the fire area containing the Group I-2 occupancy. The most restrictive requirements of Chapter 10 shall apply to the path of egress from the Group I-2, Condition 2 occupancy up to and including the exit discharge.

508.3.2 Allowable building area, height and number of stories. The allowable building area, height and number of stories of the building or portion thereof shall be based on the most restrictive allowances for the occupancy groups under consideration for the type of construction of the building in accordance with Section 503.1.

508.3.3 Separation. No separation is required between nonseparated occupancies.

Exceptions:

1. Group H-2, H-3, H-4 and H-5, *I-2, I-2.1 and I,* occupancies shall be separated from all other occupancies in accordance with Section 508.4.
2. Group R-1, R-2, *R-2.1, R-2.2* and R-3 dwelling units and sleeping units shall be separated from other dwelling or sleeping units and from other occupancies contiguous to them in accordance with the requirements of Section 420.
3. *Separation is required between Group I-3 and vehicle sally ports.*
4. *Where Group I-3 is not the main occupancy and the area is greater than 10 percent of the floor area, it shall be separated per Table 508.4.*

508.4 Separated occupancies. Buildings or portions of buildings that comply with the provisions of this section shall be considered as separated occupancies.

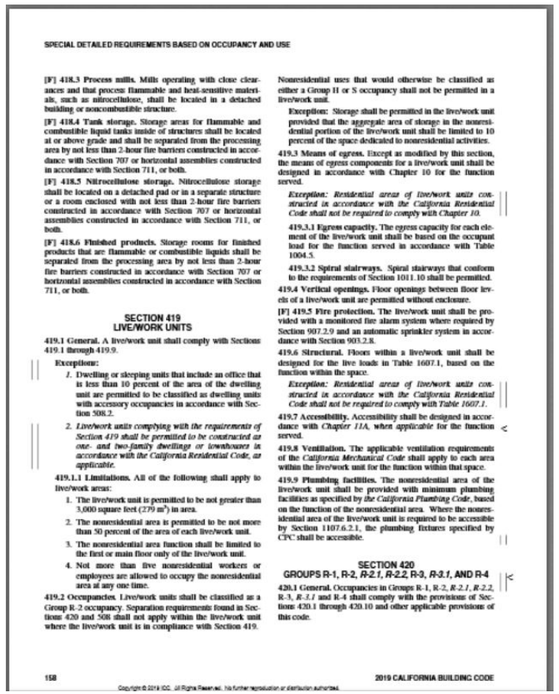
508.4.1 Occupancy classification. Separated occupancies shall be individually classified in accordance with Section 302.1. Each separated space shall comply with this code based on the occupancy classification of that portion of the building. The most restrictive provisions of Chapter 9 that apply to the separate occupancies shall apply to the total nonfire-barrier-separated occupancy areas. Occupancy separations that serve to define fire area limits established in Chapter 9 for requiring a fire protection system shall also comply with Section 901.7.

508.4.2 Allowable building area. In each story, the building area shall be such that the sum of the ratios of the actual building area of each separated occupancy divided by the allowable building area of each separated occupancy shall not exceed 1.

Summary: These codes are potentially going to be applied to the project. As of right now the decisions made have been focused on a residential with some areas being mix-used. These codes can be viewed in digital book format at the link below.

https://codes.iccsafe.org/content/CABCV12019/chapter-4-special-detailed-requirements-based-on-occupancy-and-use

Live - Work Units



[F] 418.3 Process mills. Mills operating with close clearances and that process flammable and heat-sensitive materials, such as nitrocellulose, shall be located in a detached building or noncombustible structure.

[F] 418.4 Tank storage. Storage areas for flammable and combustible liquid tanks inside of structures shall be located at or above grade and shall be separated from the processing area by not less than 2-hour fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 711, or both.

[F] 418.5 Nitrocellulose storage. Nitrocellulose storage shall be located on a detached pad or in a separate structure or a room enclosed with not less than 2-hour fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 711, or both.

[F] 418.6 Finished products. Storage rooms for finished products that are flammable or combustible liquids shall be separated from the processing area by not less than 2-hour fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 711, or both.

SECTION 419
LIVE/WORK UNITS

419.1 General. A live/work unit shall comply with Sections 419.1 through 419.9.

Exception:

1. *Dwelling or sleeping units that include an office that is less than 10 percent of the area of the dwelling unit are permitted to be classified as dwelling units with accessory occupancies in accordance with Section 508.2.*
2. *Live/work units complying with the requirements of Section 419 shall be permitted to be constructed as one- and two-family dwellings or townhouses in accordance with the California Residential Code, as applicable.*

419.1.1 Limitations. All of the following shall apply to live/work areas:

1. The live/work unit is permitted to be not greater than 3,000 square feet (279 m²) in area.
2. The nonresidential area is permitted to be not more than 50 percent of the area of each live/work unit.
3. The nonresidential area function shall be limited to the first or main floor only of the live/work unit.
4. Not more than five nonresidential workers or employees are allowed to occupy the nonresidential area at any one time.

419.2 Occupancies. Live/work units shall be classified as a Group R-2 occupancy. Separation requirements found in Sections 420 and 508 shall not apply within the live/work unit where the live/work unit is in compliance with Section 419.

Nonresidential uses that would otherwise be classified as either a Group H or S occupancy shall not be permitted in a live/work unit.

Exception: Storage shall be permitted in the live/work unit provided that the aggregate area of storage in the nonresidential portion of the live/work unit shall be limited to 10 percent of the space dedicated to nonresidential activities.

419.3 Means of egress. Except as modified by this section, the means of egress components for a live/work unit shall be designed in accordance with Chapter 10 for the function served.

***Exception:** Residential areas of live/work units constructed in accordance with the California Residential Code shall not be required to comply with Chapter 10.*

419.3.1 Egress capacity. The egress capacity for each element of the live/work unit shall be based on the occupant load for the function served in accordance with Table 1004.5.

419.3.2 Spiral stairways. Spiral stairways that conform to the requirements of Section 1011.10 shall be permitted.

419.4 Vertical openings. Floor openings between floor levels of a live/work unit are permitted without enclosure.

[F] 419.5 Fire protection. The live/work unit shall be provided with a monitored fire alarm system where required by Section 907.2.9 and an automatic sprinkler system in accordance with Section 903.2.8.

419.6 Structural. Floors within a live/work unit shall be designed for the live loads in Table 1607.1, based on the function within the space.

***Exception:** Residential areas of live/work units constructed in accordance with the California Residential Code shall not be required to comply with Table 1607.1.*

419.7 Accessibility. Accessibility shall be designed in accordance with *Chapter 11A, when applicable* for the function served.

419.8 Ventilation. The applicable ventilation requirements of the *California Mechanical Code* shall apply to each area within the live/work unit for the function within that space.

419.9 Plumbing facilities. The nonresidential area of the live/work unit shall be provided with minimum plumbing facilities as specified by *the California Plumbing Code*, based on the function of the nonresidential area. Where the nonresidential area of the live/work unit is required to be accessible by Section 1107.6.2.1, the plumbing fixtures specified by CPC shall be accessible.

SECTION 420
GROUPS R-1, R-2, *R-2.1, R-2.2,* R-3, *R-3.1,* AND R-4

420.1 General. Occupancies in Groups R-1, R-2, *R-2.1, R-2.2,* R-3, *R-3.1* and R-4 shall comply with the provisions of Sections 420.1 through 420.10 and other applicable provisions of this code.

420.2 Separation walls. Walls separating dwelling units in the same building, walls separating sleeping units in the same building and walls separating dwelling or sleeping units from other occupancies contiguous to them in the same building shall be constructed as fire partitions in accordance with Section 708.

420.3 Horizontal separation. Floor assemblies separating dwelling units in the same buildings, floor assemblies separating sleeping units in the same building and floor assemblies separating dwelling or sleeping units from other occupancies contiguous to them in the same building shall be constructed as horizontal assemblies in accordance with Section 711.

420.4 Automatic sprinkler system. Group R occupancies shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.2.8. *Group R-2.2 shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Group R-2.1* occupancies shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.2.6. Quick-response or residential automatic sprinklers shall be installed in accordance with Section 903.3.2.

420.5 Fire alarm systems and smoke alarms. Fire alarm systems and smoke alarms shall be provided in Group R-1, R-2 *and R-2.1* occupancies in accordance with Sections 907.2.8, 907.2.9 and *907.2.10,* respectively. Single- or multiple-station smoke alarms shall be provided in Groups R-2, *R-2.1,* R-3 and R-4 in accordance with Section 907.2.10. *Group R-2.2 shall be equipped throughout with an automatic fire alarm system per 907.2.9.2 and shall have a manual fire alarm pull station at the 24-hour staff watch office.*

420.6 Smoke barriers in Group *R-2.1.* Smoke barriers shall be provided in Group *R-2.1* to subdivide every story used by persons receiving care, treatment or sleeping and to provide other stories with an occupant load of 30 or more persons, into not fewer than two smoke compartments. Such stories shall be divided into smoke compartments with an area of not more than 22,500 square feet (2092 m²) and the distance of travel from any point in a smoke compartment to a smoke barrier door shall not exceed 200 feet (60 960 mm). The smoke barrier shall be in accordance with Section 709.

420.6.1 Smoke barrier in Group R-2.2. Occupancies in Group R-2.2 shall have smoke barriers complying with Sections 709 to divide every story occupied by residents for sleeping, into no fewer than two smoke compartments.

***Exception:** Spaces having a direct exit to a public way.*

420.6.2 Refuge area. Refuge areas shall be provided within each smoke compartment. The size of the refuge area shall accommodate the occupants and care recipients from the adjoining smoke compartment. Where a smoke compartment is adjoined by two or more smoke compartments, the minimum area of the refuge area shall accommodate the largest occupant load of the adjoining compartments. The size of the refuge area shall provide the following:

1. Not less than 15 net square feet (1.4 m²) for each care recipient.
2. Not less than 6 net square feet (0.56 m²) for other occupants.

Areas or spaces permitted to be included in the calculation of the refuge area are corridors, lounge or dining areas and other low-hazard areas.

420.7 Reserved.

420.8 Reserved.

420.9 Group R cooking facilities. In Group R occupancies, cooking appliances used for domestic cooking operations shall be in accordance with Section 917.2 of the *California Mechanical Code.*

420.10 Group R-2 dormitory cooking facilities. Domestic cooking appliances for use by residents of Group R-2 college dormitories shall be in accordance with Sections 420.10.1 and 420.10.2.

420.10.1 Cooking appliances. Where located in Group R-2 college dormitories, domestic cooking appliances for use by residents shall be in compliance with all of the following:

1. The types of domestic cooking appliances shall be limited to ovens, cooktops, ranges, warmers, coffee makers and microwaves.
2. Domestic cooking appliances shall be limited to approved locations.
3. Cooktops and ranges shall be protected in accordance with Section 904.13.
4. Cooktops and ranges shall be provided with a domestic cooking hood installed and constructed in accordance with *California Mechanical Code. Kitchen range hoods shall also be rated for sound and meet field verification requirements in the California Energy Code for low-rise and high-rise residential buildings.*

420.10.2 Cooking appliances in sleeping rooms. Cooktops, ranges and ovens shall not be installed or used in sleeping rooms.

***420.11 [IECD 1] Construction waste management.** Recycle and/or salvage for reuse a minimum of 65 percent of the nonhazardous construction and demolition waste in accordance with the California Green Building Standards Code (CALGreen), Chapter 4, Division 4.4.*

420.12 Special provisions for residential hotels. [IECD 1 & IECD 1-AC]

***420.12.1 Locking mail receptacles.** A locking mail receptacle for each residential unit shall be provided in all residential hotels pursuant to the requirements specified in Health and Safety Code Section 17958.3.*

***420.13 [IECD 1] Electric vehicle (EV) charging for new construction.** Newly constructed Group R-1, R-2 and R-3 buildings shall be provided with infrastructure to facilitate future installation and use of electric vehicle (EV) chargers in accordance with the California Green Building Standards Code (CALGreen), Chapter 4, Division 4.1.*

Issues Addresessed:

Other Research Determined by Team

Decisions Made:

These were included because they will be used to help shape the sizes of the masses within the site. A variety of codes were included because a lot of the masses on the site are at preliminary stages of development.

Ruth Morillo, Jose Sosa, & Benjamin Stremming
ARC541-001: Architecture Systems and Environment Fall 2019

Sheet Content/Focus:

Codes and Sizing Guidelines

Panel Set 2

Date Submited: 9/30/2019

2.20

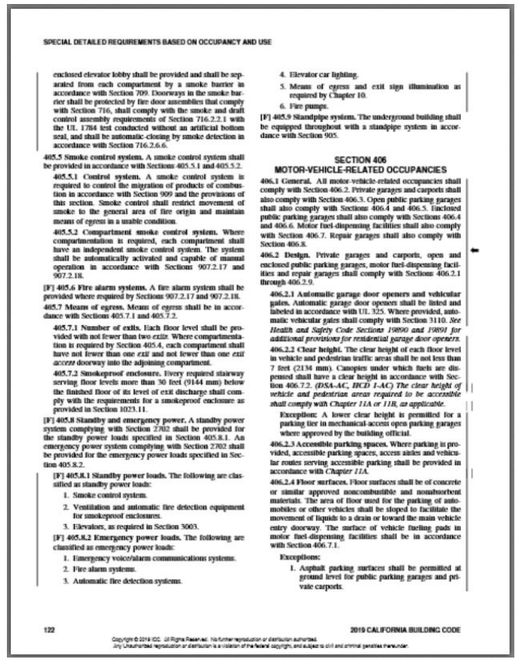
Motor Vehicle related Occupancy

Summary: These codes are potentially going to be applied to the project because with the addition of the podcar transit station, some of the motor vehicle related occupancy may be used.

https://www.pittsburghbeautiful.com/2019/07/07/pittsburghese-from-a-to-z-the-ultimate-collection-part-9-q-r/cars/

VS or Same

https://www.engineeringnews.co.nz/robot-transport-system-speeds-airport-travel/



SPECIAL DETAILED REQUIREMENTS BASED ON OCCUPANCY AND USE

enclosed elevator lobby shall be provided and shall be separated from each compartment by a smoke barrier in accordance with Section 709. Doorways in the smoke barrier shall be protected by fire door assemblies that comply with Section 716, shall comply with the smoke and draft control assembly requirements of Section 716.2.2.1 with the UL 1784 test conducted without an artificial bottom seal, and shall be automatic closing by smoke detection in accordance with Section 716.2.6.6.

405.5 Smoke control system. A smoke control system shall be provided in accordance with Sections 405.5.1 and 405.5.2.

405.5.1 Control system. A smoke control system is required to control the migration of products of combustion in accordance with Section 909 and the provisions of this section. Smoke control shall restrict movement of smoke to the general area of fire origin and maintain means of egress in a usable condition.

405.5.2 Compartment smoke control system. Where compartmentation is required, each compartment shall have an independent smoke control system. The system shall be automatically activated and capable of manual operation in accordance with Sections 907.2.17 and 907.2.18.

[F] 405.6 Fire alarm systems. A fire alarm system shall be provided where required by Sections 907.2.17 and 907.2.18.

405.7 Means of egress. Means of egress shall be in accordance with Sections 405.7.1 and 405.7.2.

405.7.1 Number of exits. Each floor level shall be provided with not fewer than two exits. Where compartmentation is required by Section 405.4, each compartment shall have not fewer than one *exit* and not fewer than one *exit access* doorway into the adjoining compartment.

405.7.2 Smokeproof enclosure. Every required stairway serving floor levels more than 30 feet (9144 mm) below the finished floor of its level of exit discharge shall comply with the requirements for a smokeproof enclosure as provided in Section 1023.11.

[F] 405.8 Standby and emergency power. A standby power system complying with Section 2702 shall be provided for the standby power loads specified in Section 405.8.1. An emergency power system complying with Section 2702 shall be provided for the emergency power loads specified in Section 405.8.2.

[F] 405.8.1 Standby power loads. The following are classified as standby power loads:

1. Smoke control system.
2. Ventilation and automatic fire detection equipment for smokeproof enclosures.
3. Elevators, as required in Section 3003.

[F] 405.8.2 Emergency power loads. The following are classified as emergency power loads:

1. Emergency voice/alarm communications systems.
2. Fire alarm systems.
3. Automatic fire detection systems.
4. Elevator car lighting.
5. Means of *egress* and exit sign illumination as required by Chapter 10.
6. Fire pumps.

[F] 405.9 Standpipe system. The underground building shall be equipped throughout with a standpipe system in accordance with Section 905.

SECTION 406
MOTOR-VEHICLE-RELATED OCCUPANCIES

406.1 General. All motor-vehicle-related occupancies shall comply with Section 406.2. Private garages and carports shall also comply with Section 406.3. Open public parking garages shall also comply with Sections 406.4 and 406.5. Enclosed public parking garages shall also comply with Sections 406.4 and 406.6. Motor fuel-dispensing facilities shall also comply with Section 406.7. Repair garages shall also comply with Section 406.8.

406.2 Design. Private garages and carports, open and enclosed public parking garages, motor fuel-dispensing facilities and repair garages shall comply with Sections 406.2.1 through 406.2.9.

406.2.1 Automatic garage door openers and vehicular gates. Automatic garage door openers shall be listed and labeled in accordance with UL 325. Where provided, automatic vehicular gates shall comply with Section 3110. *See Health and Safety Code Sections 19890 and 19891 for additional provisions for residential garage door openers.*

406.2.2 Clear height. The clear height of each floor level in vehicle and pedestrian traffic areas shall be not less than 7 feet (2134 mm). Canopies under which fuels are dispensed shall have a clear height in accordance with Section 406.7.2. *(IFGA-4C, IRCD 1-4C) The clear height of vehicle and pedestrian areas required to be accessible shall comply with Chapter 11A or 11B, as applicable.*

Exception: A lower clear height is permitted for a parking tier in mechanical-access open parking garages where approved by the building official.

406.2.3 Accessible parking spaces. Where parking is provided, accessible parking spaces, access aisles and vehicular routes serving accessible parking shall be provided in accordance with *Chapter 11A*.

406.2.4 Floor surfaces. Floor surfaces shall be of concrete or similar approved noncombustible and nonabsorbent materials. The area of floor used for the parking of automobiles or other vehicles shall be sloped to facilitate the movement of liquids to a drain or toward the main vehicle entry doorway. The surface of vehicle fueling pads in motor fuel-dispensing facilities shall be in accordance with Section 406.7.1.

Exceptions:

1. Asphalt parking surfaces shall be permitted at ground level for public parking garages and private carports.
2. Floors of Group S-2 parking garages shall not be required to have a sloped surface.
3. Slip-resistant, nonabsorbent, interior floor finishes having a critical radiant flux not more than 0.45 W/cm², as determined by ASTM E648 or NFPA 253, shall be permitted in repair garages.

406.2.5 Sleeping rooms. Openings between a motor vehicle-related occupancy and a room used for sleeping purposes shall not be permitted.

406.2.6 Fuel dispensing. The dispensing of fuel shall only be permitted in motor fuel-dispensing facilities in accordance with Section 406.7.

406.2.7 Electric vehicle charging stations. Where provided, electric vehicle charging stations shall be installed in accordance with the *California Electrical Code* and the *California Green Building Standards Code*. Electric vehicle charging system equipment shall be listed and labeled in accordance with UL 2202. Electric vehicle supply equipment shall be listed and labeled in accordance with UL 2594. Accessibility to electric vehicle charging stations shall be provided in accordance with *Chapters 11A and/or 11B*.

406.2.8 Mixed occupancies and uses. Mixed uses shall be allowed in the same building as public parking garages and repair garages in accordance with Section 508.1. Mixed uses in the same building as an open parking garage are subject to Sections 402.4.2.3, 406.5.11, 508.1, 510.3, 510.4 and 510.7.

406.2.9 Equipment and appliances. Equipment and appliances shall be installed in accordance with Sections 406.2.9.1 through 406.2.9.3 and the *California Mechanical Code*, *California Plumbing Code*, and *the California Electrical Code*.

406.2.9.1 Elevation of ignition sources. Equipment and appliances having an ignition source and located in hazardous locations and public garages, private garages, repair garages, automotive motor fuel-dispensing facilities and parking garages shall be elevated such that the source of ignition is not less than 18 inches (457 mm) above the floor surface on which the equipment or appliance rests. For the purpose of this section, rooms or spaces that are not part of the living space of a dwelling unit and that communicate directly with a private garage through openings shall be considered to be part of the private garage.

Exception: Elevation of the ignition source is not required for appliances that are listed as flammable vapor ignition resistant.

406.2.9.1.1 Parking garages. Connection of a parking garage with any room in which there is a fuel-fired appliance shall be by means of a vestibule providing a two-doorway separation, except that a single door is permitted where the sources of ignition in the appliance are elevated in accordance with Section 406.2.9.

Exception: This section shall not apply to appliances complying with Section 406.2.9.2 or 406.2.9.3.

406.2.9.2 Public garages. Appliances located in public garages, motor fuel-dispensing facilities, repair garages or other areas frequented by motor vehicles shall be installed not less than 8 feet (2438 mm) above the floor. Where motor vehicles are capable of passing under an appliance, the appliance shall be installed at the clearances required by the appliance manufacturer and not less than 1 foot (305 mm) higher than the tallest vehicle garage door opening.

Exception: The requirements of this section shall not apply where the appliances are protected from motor vehicle impact and installed in accordance with Section 406.2.9.1 and NFPA 30A.

406.2.9.3 Private garages. Appliances located in private garages and carports shall be installed with a minimum clearance of 6 feet (1829 mm) above the floor.

Exception: The requirements of this section shall not apply where the appliances are protected from motor vehicle impact and are installed in accordance with Section 406.2.9.1.

406.3 Private garages and carports. Private garages and carports shall comply with Sections 406.2 and 406.3, or they shall comply with Sections 406.2 and 406.4.

406.3.1 Classification. Private garages and carports shall be classified as Group U occupancies. Each private garage shall be not greater than 1,000 square feet (93 m²) in area. Multiple private garages are permitted in a building where each private garage is separated from the other private garages by 1-hour fire barriers in accordance with Section 707, or 1-hour horizontal assemblies in accordance with Section 711, or both.

406.3.2 Separation. For other than private garages adjacent to dwelling units, the separation of private garages from other occupancies shall comply with Section 508. Separation of private garages from dwelling units shall comply with Sections 406.3.2.1 and 406.3.2.2.

406.3.2.1 Dwelling unit separation. The private garage shall be separated from the dwelling unit and its attic area by means of gypsum board, not less than $\frac{5}{8}$ inch (12.7 mm) in thickness, applied to the garage side. Garages beneath habitable rooms shall be separated from all habitable rooms above by not less than a $\frac{5}{8}$-inch (15.9 mm) Type X gypsum board or equivalent and $\frac{5}{8}$-inch (12.7 mm) gypsum board applied to structures supporting the separation from habitable rooms above the garage. Door openings between a private garage and the dwelling unit shall be equipped with either solid wood doors or solid or honeycomb core steel doors not less than $1\frac{3}{8}$ inches (34.9 mm) in thickness, or doors in compliance with Section 716.2.2.1 with a fire protection rating of not less than 20 minutes. Doors shall be self-closing and self-latching.

406.3.2.2 Ducts. Ducts in a private garage and ducts penetrating the walls or ceilings separating the dwelling unit from the garage, including its attic area, shall be constructed of sheet steel of not less than 0.019 inch (0.48 mm) in thickness and shall not have openings into the garage.

SPECIAL DETAILED REQUIREMENTS BASED ON OCCUPANCY AND USE

2. Floors of Group S-2 parking garages shall not be required to have a sloped surface.
3. Slip-resistant, nonabsorbent, interior floor finishes having a critical radiant flux not more than 0.45 W/cm², as determined by ASTM E648 or NFPA 253, shall be permitted in repair garages.

406.2.5 Sleeping rooms. Openings between a motor vehicle-related occupancy and a room used for sleeping purposes shall not be permitted.

406.2.6 Fuel dispensing. The dispensing of fuel shall only be permitted in motor fuel-dispensing facilities in accordance with Section 406.7.

406.2.7 Electric vehicle charging stations. Where provided, electric vehicle charging stations shall be installed in accordance with the *California Electrical Code* and the *California Green Building Standards Code*. Electric vehicle charging system equipment shall be listed and labeled in accordance with UL 2202. Electric vehicle supply equipment shall be listed and labeled in accordance with UL 2594. Accessibility to electric vehicle charging stations shall be provided in accordance with *Chapters 11A and/or 11B*.

406.2.8 Mixed occupancies and uses. Mixed uses shall be allowed in the same building as public parking garages and repair garages in accordance with Section 508.1. Mixed uses in the same building as an open parking garage are subject to Sections 402.4.2.3, 406.5.11, 508.1, 510.3, 510.4 and 510.7.

406.2.9 Equipment and appliances. Equipment and appliances shall be installed in accordance with Sections 406.2.9.1 through 406.2.9.3 and the *California Mechanical Code*, *California Plumbing Code*, and *the California Electrical Code*.

406.2.9.1 Elevation of ignition sources. Equipment and appliances having an ignition source and located in hazardous locations and public garages, private garages, repair garages, automotive motor fuel-dispensing facilities and parking garages shall be elevated such that the source of ignition is not less than 18 inches (457 mm) above the floor surface on which the equipment or appliance rests. For the purpose of this section, rooms or spaces that are not part of the living space of a dwelling unit and that communicate directly with a private garage through openings shall be considered to be part of the private garage.

Exception: Elevation of the ignition source is not required for appliances that are listed as flammable vapor ignition resistant.

406.2.9.1.1 Parking garages. Connection of a parking garage with any room in which there is a fuel-fired appliance shall be by means of a vestibule providing a two-doorway separation, except that a single door is permitted where the sources of ignition in the appliance are elevated in accordance with Section 406.2.9.

Exception: This section shall not apply to appliances complying with Section 406.2.9.2 or 406.2.9.3.

406.2.9.2 Public garages. Appliances located in public garages, motor fuel-dispensing facilities, repair garages or other areas frequented by motor vehicles shall be installed not less than 8 feet (2438 mm) above the floor. Where motor vehicles are capable of passing under an appliance, the appliance shall be installed at the clearances required by the appliance manufacturer and not less than 1 foot (305 mm) higher than the tallest vehicle garage door opening.

Exception: The requirements of this section shall not apply where the appliances are protected from motor vehicle impact and installed in accordance with Section 406.2.9.1 and NFPA 30A.

406.2.9.3 Private garages. Appliances located in private garages and carports shall be installed with a minimum clearance of 6 feet (1829 mm) above the floor.

Exception: The requirements of this section shall not apply where the appliances are protected from motor vehicle impact and are installed in accordance with Section 406.2.9.1.

406.3 Private garages and carports. Private garages and carports shall comply with Sections 406.2 and 406.3, or they shall comply with Sections 406.2 and 406.4.

406.3.1 Classification. Private garages and carports shall be classified as Group U occupancies. Each private garage shall be not greater than 1,000 square feet (93 m²) in area. Multiple private garages are permitted in a building where each private garage is separated from the other private garages by 1-hour fire barriers in accordance with Section 707, or 1-hour horizontal assemblies in accordance with Section 711, or both.

406.3.2 Separation. For other than private garages adjacent to dwelling units, the separation of private garages from other occupancies shall comply with Section 508. Separation of private garages from dwelling units shall comply with Sections 406.3.2.1 and 406.3.2.2.

406.3.2.1 Dwelling unit separation. The private garage shall be separated from the dwelling unit and its attic area by means of gypsum board, not less than $\frac{5}{8}$ inch (12.7 mm) in thickness, applied to the garage side. Garages beneath habitable rooms shall be separated from all habitable rooms above by not less than a $\frac{5}{8}$-inch (15.9 mm) Type X gypsum board or equivalent and $\frac{5}{8}$-inch (12.7 mm) gypsum board applied to structures supporting the separation from habitable rooms above the garage. Door openings between a private garage and the dwelling unit shall be equipped with either solid wood doors or solid or honeycomb core steel doors not less than $1\frac{3}{8}$ inches (34.9 mm) in thickness, or doors in compliance with Section 716.2.2.1 with a fire protection rating of not less than 20 minutes. Doors shall be self-closing and self-latching.

406.3.2.2 Ducts. Ducts in a private garage and ducts penetrating the walls or ceilings separating the dwelling unit from the garage, including its attic area, shall be constructed of sheet steel of not less than 0.019 inch (0.48 mm) in thickness and shall not have openings into the garage.

BOOK SOURCE: https://codes.iccsafe.org/content/CABCV12019/chapter-4-special-detailed-requirements-based-on-occupancy-and-use

SPECIAL DETAILED REQUIREMENTS BASED ON OCCUPANCY AND USE

406.3.3 Carports. Carports shall be open on not fewer than two sides. Carports open on fewer than two sides shall be considered to be a garage and shall comply with the requirements for private garages.

406.3.3.1 Carport separation. A separation is not required between a Group R-3 and U carport, provided that the carport is entirely open on two or more sides and there are not enclosed areas above.

406.4 Public parking garages. Parking garages, other than private garages, shall be classified as public parking garages and shall comply with the provisions of Sections 406.2 and 406.4 and shall be classified as either an open parking garage or an enclosed parking garage. Open parking garages shall also comply with Section 406.5. Enclosed parking garages shall also comply with Section 406.6. See Section 510 for special provisions for parking garages.

406.4.1 Guards. Guards shall be provided in accordance with Section 1015. Guards serving as vehicle barriers shall comply with Sections 406.4.2 and 1015.

406.4.2 Vehicle barriers. Vehicle barriers not less than 2 feet 9 inches (835 mm) in height shall be placed where the vertical distance from the floor of a drive lane or parking space to the ground or surface directly below is greater than 1 foot (305 mm). Vehicle barriers shall comply with the loading requirements of Section 1607.8.3.

Exception: Vehicle barriers are not required in vehicle storage compartments in a mechanical access parking garage.

406.4.3 Ramps. Vehicle ramps shall not be considered as required exits unless pedestrian facilities are provided. Vehicle ramps that are utilized for vertical circulation as well as for parking shall not exceed a slope of 1:15 (6.67 percent).

406.5 Open parking garages. Open parking garages shall comply with Sections 406.2, 406.4 and 406.5.

406.5.1 Construction. Open parking garages shall be of Type I, II or IV construction. Open parking garages shall meet the design requirements of Chapter 16. For vehicle barriers, see Section 406.4.2.

406.5.2 Openings. For natural ventilation purposes, the exterior side of the structure shall have uniformly distributed openings on two or more sides. The area of such openings in exterior walls on a tier shall be not less than 20 percent of the total perimeter wall area of each tier. The aggregate length of the openings considered to be providing natural ventilation shall be not less than 40 percent of the perimeter of the tier. Interior walls shall be not less than 20 percent open with uniformly distributed openings.

Exception: Openings are not required to be distributed over 40 percent of the building perimeter where the required openings are uniformly distributed over two opposing sides of the building.

406.5.2.1 Openings below grade. Where openings below grade provide required natural ventilation, the outside horizontal clear space shall be one and one-half times the depth of the opening. The width of the horizontal clear space shall be maintained from grade down to the bottom of the lowest required opening.

406.5.3 Mixed occupancies and uses. Mixed uses shall be allowed in the same building as an open parking garage subject to the provisions of Sections 402.4.2.3, 406.5.11, 508.1, 510.3, 510.4 and 510.7.

406.5.4 Area and height. Area and height of open parking garages shall be limited as set forth in Chapter 5 for Group S-2 occupancies and as further provided for in Section 508.1.

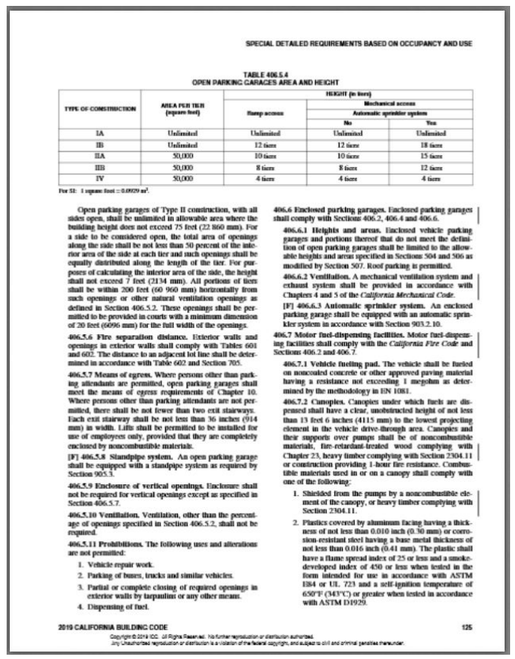
406.5.4.1 Single use. Where the open parking garage is used exclusively for the parking or storage of private motor vehicles, and the building is without other uses, the area and height shall be permitted to comply with Table 406.5.4, along with increases allowed by Section 406.5.5.

Exception: The grade-level tier is permitted to contain an office, waiting and toilet rooms having a total combined area of not more than 1,000 square feet (93 m²). Such area need not be separated from the open parking garage.

In open parking garages having a spiral or sloping floor, the horizontal projection of the structure at any cross section shall not exceed the allowable area per parking tier. In the case of an open parking garage having a continuous sloping floor, each 9 feet 6 inches (2896 mm) of height, or portion thereof, shall be considered under these provisions to be a tier.

406.5.5 Area and height increases. The allowable area and height of open parking garages shall be increased in accordance with the provisions of this section. Garages with sides open on three-fourths of the building's perimeter are permitted to be increased by 25 percent in area and one tier in height. Garages with sides open around the entire building's perimeter are permitted to be increased by 50 percent in area and one tier in height. For a side to be considered open under these provisions, the total area of openings along the side shall be not less than 50 percent of the interior area of the side at each tier and such openings shall be equally distributed along the length of the tier. For purposes of calculating the interior area of the side, the height shall not exceed 7 feet (2134 mm).

Allowable tier areas in Table 406.5.4 shall be increased for open parking garages constructed to heights less than the table maximum. The gross tier area of the garage shall not exceed that permitted for the higher structure. Not fewer than three sides of each such larger tier shall have continuous horizontal openings not less than 30 inches (762 mm) in clear height extending for not less than 80 percent of the length of the sides. All parts of such larger tier shall be not more than 200 feet (60 960 mm) horizontally from such an opening. In addition, each such opening shall face a street or yard accessible to a street with a width of not less than 50 feet (9144 mm) for the full length of the opening, and standpipes shall be provided in each such tier.



SPECIAL DETAILED REQUIREMENTS BASED ON OCCUPANCY AND USE

TABLE 406.5.4
OPEN PARKING GARAGES AREA AND HEIGHT

TYPE OF CONSTRUCTION	AREA PER TIER (square feet)	Ramp access	HEIGHT (in tiers)	
			Mechanical access	
			Automatic sprinkler system	
			No	Yes
IA	Unlimited	Unlimited	Unlimited	Unlimited
IB	Unlimited	12 tiers	12 tiers	18 tiers
IIA	50,000	10 tiers	10 tiers	15 tiers
IIIB	50,000	8 tiers	8 tiers	12 tiers
IV	50,000	4 tiers	4 tiers	6 tiers

For SI: 1 square foot = 0.0929 m².

Open parking garages of Type II construction, with all sides open, shall be unlimited in allowable area where the building height does not exceed 75 feet (22 860 mm). For a side to be considered open, the total area of openings along the side shall be not less than 50 percent of the interior area of the side at each tier and such openings shall be equally distributed along the length of the tier. For purposes of calculating the interior area of the side, the height shall not exceed 7 feet (2134 mm). All portions of tiers shall be within 200 feet (60 960 mm) horizontally from such openings or other natural ventilation openings as defined in Section 406.5.2. These openings shall be permitted to be provided in courts with a minimum dimension of 20 feet (6096 mm) for the full width of the openings.

406.5.6 Fire separation distance. Exterior walls and openings in exterior walls shall comply with Tables 601 and 602. The distance to an adjacent lot line shall be determined in accordance with Table 602 and Section 705.

406.5.7 Means of egress. Persons other than parking attendants are permitted, open parking garages shall meet the means of egress requirements of Chapter 10. Where persons other than parking attendants are not permitted, there shall be not fewer than two exit stairways. Each exit stairway shall be not less than 36 inches (914 mm) in width. Lifts shall be permitted to be installed for use of employees only, provided that they are completely enclosed by noncombustible materials.

[F] 406.5.8 Standpipe system. An open parking garage shall be equipped with a standpipe system as required by Section 905.3.1.

406.5.9 Enclosure of vertical openings. Enclosure shall not be required for vertical openings except as specified in Section 406.5.7.

406.5.10 Ventilation. Ventilation, other than the percentage of openings specified in Section 406.5.2, shall not be required.

406.5.11 Prohibitions. The following uses and alterations are not permitted:

1. Vehicle repair work.
2. Parking of buses, trucks and similar vehicles.
3. Partial or complete closing of required openings in exterior walls by tarpaulins or any other means.
4. Dispensing of fuel.

406.6 Enclosed parking garages. Enclosed parking garages shall comply with Sections 406.2, 406.4 and 406.6.

406.6.1 Heights and areas. Enclosed vehicle parking garages and portions thereof that do not meet the definition of open parking garages shall be limited to the allowable heights and areas specified in Sections 504 and 506 as modified by Section 507. Roof parking is permitted.

406.6.2 Ventilation. A mechanical ventilation system and exhaust system shall be provided in accordance with Chapters 4 and 5 of the *California Mechanical Code*.

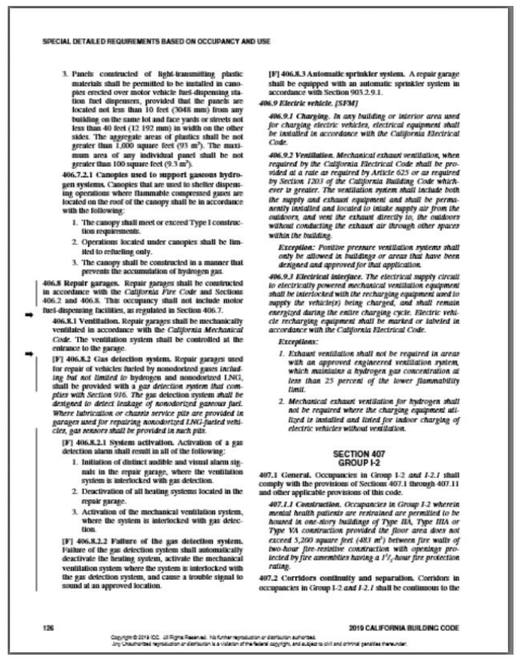
[F] 406.6.3 Automatic sprinkler system. An enclosed parking garage shall be equipped with an automatic sprinkler system in accordance with Section 903.2.10.

406.7 Motor fuel-dispensing facilities. Motor fuel-dispensing facilities shall comply with the *California Fire Code* and Sections 406.2 and 406.7.

406.7.1 Vehicle fueling pad. The vehicle shall be fueled on noncoated concrete or other approved paving material having a resistance not exceeding 1 megohm as determined by the methodology in EN 1081.

406.7.2 Canopies. Canopies under which fuels are dispensed shall have a clear, unobstructed height of not less than 13 feet 6 inches (4115 mm) to the lowest projecting element in the vehicle drive-through area. Canopies and their supports over pumps shall be of noncombustible construction, fire-retardant-treated wood complying with Chapter 23, heavy timber complying with Section 2304.11 or construction providing 1-hour fire resistance. Combustible materials used in or on a canopy shall comply with one of the following:

1. Shielded from the pumps by a noncombustible element of the canopy, or heavy timber complying with Section 2304.11.
2. Plastics covered by aluminum facing having a thickness of not less than 0.010 inch (0.30 mm) or corrosion-resistant steel having a base metal thickness of not less than 0.016 inch (0.41 mm). The plastic shall have a flame spread index of 25 or less and a smoke-developed index of 450 or less when tested in the form intended for use in accordance with ASTM E84 or UL 723 and a self-ignition temperature of 650°F (343°C) or greater when tested in accordance with ASTM D1929.



SPECIAL DETAILED REQUIREMENTS BASED ON OCCUPANCY AND USE

3. Panels constructed of light-transmitting plastic materials shall be permitted to be installed in canopies erected over motor vehicle fuel-dispensing station fuel dispensers, provided that the panels are located not less than 10 feet (3048 mm) from any building on the same lot and face yards or streets not less than 40 feet (12 192 mm) in width on the other sides. The aggregate areas of plastics shall be not greater than 1,000 square feet (93 m²). The maximum area of any individual panel shall be not greater than 100 square feet (9.3 m²).

406.7.2.1 Canopies used to support gaseous hydrogen systems. Canopies that are used to shelter dispensing operations where flammable compressed gases are located on the roof of the canopy shall be in accordance with the following:

1. The canopy shall meet or exceed Type I construction requirements.
2. Operations located under canopies shall be limited to refueling only.
3. The canopy shall be constructed in a manner that prevents the accumulation of hydrogen gas.

406.8 Repair garages. Repair garages shall be constructed in accordance with the *California Fire Code* and Sections 406.2 and 406.8. This occupancy shall not include motor fuel-dispensing facilities, as regulated in Section 406.7.

406.8.1 Ventilation. Repair garages shall be mechanically ventilated in accordance with the *California Mechanical Code*. The ventilation system shall be controlled at the entrance to the garage.

[F] 406.8.2 Gas detection system. Repair garages used for repair of vehicles fueled by nonodorized gases including but not limited to hydrogen and nonodorized LNG, shall be provided with a *gas detection system* that complies with Section 916. The gas detection system shall be designed to detect leakage of nonodorized gaseous fuel. Where lubrication or chassis service pits are provided in garages used for repairing nonodorized LNG-fueled vehicles, gas sensors shall be provided in such pits.

[F] 406.8.2.1 System activation. Activation of a gas detection alarm shall result in all of the following:

1. Initiation of distinct audible and visual alarm signals in the repair garage, where the ventilation system is interlocked with gas detection.
2. Deactivation of all heating systems located in the repair garage.
3. Activation of the mechanical ventilation system, where the system is interlocked with gas detection.

[F] 406.8.2.2 Failure of the gas detection system. Failure of the gas detection system shall automatically deactivate the heating system, activate the mechanical ventilation system where the system is interlocked with the gas detection system, and cause a trouble signal to sound at an approved location.

[F] 406.8.3 Automatic sprinkler system. A repair garage shall be equipped with an automatic sprinkler system in accordance with Section 903.2.9.1.

406.9 Electric vehicle. [SFM]

406.9.1 Charging. In any building or interior area used for charging electric vehicles, electrical equipment shall be installed in accordance with the California Electrical Code.

406.9.2 Ventilation. Mechanical exhaust ventilation, when required by the California Electrical Code shall be provided at a rate as required by Article 625 or as required by Section 1203 of the California Building Code whichever is greater. The ventilation system shall include both the supply and exhaust equipment and shall be permanently installed and located to intake supply air from the outdoors, and vent the exhaust directly to, the outdoors without conducting the exhaust air through other spaces within the building.

Exception: Positive pressure ventilation systems shall only be allowed in buildings or areas that have been designed and approved for that application.

406.9.3 Electrical interface. The electrical supply circuit to electrically powered mechanical ventilation equipment shall be interlocked with the recharging equipment used to supply the vehicle(s) being charged, and shall remain energized during the entire charging cycle. Electric vehicle recharging equipment shall be marked or labeled in accordance with the California Electrical Code.

Exceptions:

1. *Exhaust ventilation shall not be required in areas with an approved engineered ventilation system, which maintains a hydrogen gas concentration at less than 25 percent of the lower flammability limit.*
2. *Mechanical exhaust ventilation for hydrogen shall not be required where the charging equipment utilized is installed and listed for indoor charging of electric vehicles without ventilation.*

SECTION 407
GROUP I-2

407.1 General. Occupancies in Group I-2 and I-2.1 shall comply with the provisions of Sections 407.1 through 407.11 and other applicable provisions of this code.

407.1.1 Construction. Occupancies in Group I-2 wherein mental health patients are restrained are permitted to be housed in one-story buildings of Type IIA, Type IIIA or Type VA construction provided the floor area does not exceed 5,200 square feet (483 m²) between fire walls of two-hour fire-resistive construction with openings protected by fire assemblies having a 1½-hour fire protection rating.

407.2 Corridors continuity and separation. Corridors in occupancies in Group I-2 and I-2.1 shall be continuous to the

Issues Addresessed:

Other Research Determined by Team

Decisions Made:

These were included because they will be used to help shape the sizes of the masses within the site. A variety of codes were included because a lot of the masses on the site are at preliminary stages of development.

Ruth Morillo, Jose Sosa, & Benjamin Stremming

ARC541-001: Architecture Systems and Environment Fall 2019

Sheet Content/Focus:

Codes and Sizing Guidelines

Panel Set 2

Date Submited: 9/30/2019

2.21

Building Area by Occupancy Charts:

TABLE 506.2
ALLOWABLE AREA FACTOR (A_t = NS, S1, S13R, S13D or SM, as applicable) IN SQUARE FEET[a, b, j]

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A-1	NS	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	5,500
	S1	UL	UL	62,000	34,000	56,000	34,000	60,000	46,000	22,000
	SM (*without area increase*)	UL	UL	46,500	25,500	42,000	25,500	45,000	34,500	16,500
	SM (with area increase)	*UL*	*UL*	*15,500*	*8,500*	*14,000*	*8,500*	*15,000*	*11,500*	*5,500*
A-2	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	SM (*without area increase*)	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000
	SM (with area increase)	*UL*	*UL*	*15,500*	*9,500*	*14,000*	*9,500*	*15,000*	*11,500*	*6,000*
A-3	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	SM (*without area increase*)	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000
	SM (with area increase)	*UL*	*UL*	*15,500*	*9,500*	*14,000*	*9,500*	*15,000*	*11,500*	*6,000*
A-4	NS	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
	S1	UL	UL	62,000	38,000	56,000	38,000	60,000	46,000	24,000
	SM (*without area increase*)	UL	UL	46,500	28,500	42,000	28,500	45,000	34,500	18,000
	SM (with area increase)	*UL*	*UL*	*15,500*	*9,500*	*14,000*	*9,500*	*15,000*	*11,500*	*6,000*
A-5	NS	UL	UL	UL	UL	UL	UL	UL	UL	UL
	S1									
	SM									
B	NS	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	108,000	54,000	27,000
E	NS	UL	UL	26,500	14,500	23,500	14,500	25,500	18,500	9,500
	S1	UL	UL	106,000	58,000	94,000	58,000	102,000	74,000	38,000
	SM (*without area increase*)	UL	UL	79,500	43,500	70,500	43,500	76,500	55,500	28,500
	SM (with area increase)	*UL*	*UL*	*26,500*	*14,500*	*23,500*	*14,500*	*25,500*	*18,500*	*9,500*
F-1	NS	UL	UL	25,000	15,500	19,000	12,000	33,500	14,000	8,500
	S1	UL	UL	100,000	62,000	76,000	48,000	134,000	56,000	34,000
	SM	UL	UL	75,000	46,500	57,000	36,000	100,500	42,000	25,500
F-2	NS	UL	UL	37,500	23,000	28,500	18,000	50,500	21,000	13,000
	S1	UL	UL	150,000	92,000	114,000	72,000	202,000	84,000	52,000
	SM	UL	UL	112,500	69,000	85,500	54,000	151,500	63,000	39,000
H-1	NS[c]	21,000	16,500	11,000	7,000	9,500	7,000	10,500	7,500	NP
	S1									
H-2	NS[c]	21,000	16,500	11,000	7,000	9,500	7,000	10,500	7,500	3,000
	S1									
	SM									
H-3	NS[c]	UL	60,000	26,500	14,000	17,500	13,000	25,500	10,000	5,000
	S1									
	SM									

(continued)

TABLE 506.2—continued
ALLOWABLE AREA FACTOR (A_t = NS, S1, S13R, S13D or SM, as applicable) IN SQUARE FEET[a, b, j]

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
H-4	NS[c, d]	UL	UL	37,500	17,500	28,500	17,500	36,000	18,000	6,500
	S1	UL	UL	150,000	70,000	114,000	70,000	144,000	72,000	26,000
	SM (*without area increase*)	UL	UL	112,500	52,500	85,500	52,500	108,000	54,000	19,500
	SM (with area increase)	*UL*	*UL*	*37,500*	*17,500*	*28,500*	*17,500*	*36,000*	*18,000*	*6,500*
H-5	NS[c, d]	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	144,000	72,000	36,000
	SM (*without area increase*)	UL	UL	112,500	69,000	85,500	57,000	108000	54,000	27,000
	SM (with area increase)	*UL*	*UL*	*37,500*	*23,000*	*28,500*	*19,000*	*36,000*	*18,000*	*9,000*
I-2, *I-2.1*	NS[d, f]	UL	UL	15,000	11,000	12,000	NP	12,000	9,500	NP
	S1	UL	UL	60,000	44,000	48,000	NP	48,000	38,000	NP
	SM (*without area increase*)	UL	UL	45,000	33,000	36,000	NP	36,000	28,500	NP
	SM (with area increase)	*UL*	*UL*	*15,000*	*11,000*	*12,000*	*NP*	*12,000*	*9,500*	*NP*
I-3	NS[d, e]	UL	*15,100*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*
	S1	UL	*45,300*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*
	SM (*without area increase*)	UL	*30,200*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*
	SM (with area increase)	*UL*	*15,100*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*
I-4	NS[d, g]	UL	60,500	26,500	13,000	23,500	13,000	25,500	18,500	9,000
	S1	UL	121,000	106,000	52,000	94,000	52,000	102,000	74,000	36,000
	SM (*without area increase*)	UL	181,500	79,500	39,000	70,500	39,000	76,500	55,500	27,000
	SM (with area increase)	*UL*	*60,500*	*26,500*	*13,000*	*23,500*	*13,000*	*25,500*	*18,500*	*9,000*
L	*NS*	*UL*	*60,000*	*37,500*	*17,500*	*28,500*	*17,500*	*36,000*	*18,000*	*6,500*
	S1									
	SM									
M	NS	UL	UL	21,500	12,500	18,500	12,500	20,500	14,000	9,000
	S1	UL	UL	86,000	50,000	74,000	50,000	82,000	56,000	36,000
	SM	UL	UL	64,500	37,500	55,500	37,500	61,500	42,000	27,000
R-1[h]	NS[d]	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
	S13R									
	S1	UL	UL	96,000	64,000	96,000	64,000	82,000	48,000	28,000
	SM (*without area increase*)	UL	UL	72,000	48,000	72,000	48,000	61,500	36,000	21,000
	SM (with area increase)	*UL*	*UL*	*24,000*	*16,000*	*24,000*	*16,000*	*20,500*	*12,000*	*7,000*
R-2[h]	NS[d]	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
	S13R									
	S1	UL	UL	96,000	64,000	96,000	64,000	82,000	48,000	28,000
	SM (*without area increase*)	UL	UL	72,000	48,000	72,000	48,000	61,500	36,000	21,000
	SM (with area increase)	*UL*	*UL*	*24,000*	*16,000*	*24,000*	*16,000*	*20,500*	*12,000*	*7,000*
R-2 Type VA construction[k]	*NS*[d]	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*12,000*	*NP*
	S13R	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*12,000*	*NP*
	S1	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*48,000*	*NP*
	SM (without height increase)	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*36,000*	*NP*
	SM (with height increase)	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*36,000*[j]	*NP*

(continued)

TABLE 506.2—continued
ALLOWABLE AREA FACTOR (A_t = NS, S1, S13R, S13D or SM, as applicable) IN SQUARE FEET[a, b, j]

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
R-2.1[h]	*NS*[d]	*UL*	*55,000*	*19,000*	*NP*	*16,500*	*NP*	*NP*	*10,500*	*NP*
	S13R	*UL*	*55,000*	*19,000*	*NP*	*16,500*	*NP*	*NP*	*10,500*	*NP*
	S1	*UL*	*220,000*	*76,000*	*NP*	*66,000*	*NP*	*72,000*	*42,000*	*NP*
	SM (without height increase)	*UL*	*165,000*	*57,000*	*NP*	*49,500*	*NP*	*54,000*	*31,500*	*NP*
	SM (with height increase)	*UL*	*55,000*	*19,000*	*NP*	*16,500*	*NP*	*NP*	*10,500*	*NP*
R-2.2[h]	*S1*	*UL*	*UL*	*96,000*	*64,000*	*96,000*	*64,000*	*82,000*	*48,000*	*28,000*
	SM (without height increase)	*UL*	*UL*	*72,000*	*48,000*	*72,000*	*48,000*	*61,500*	*36,000*	*21,000*
	SM (with height increase)	*UL*	*UL*	*24,000*	*16,000*	*24,000*	*16,000*	*20,500*	*12,000*	*7,000*
R-3, *R-3.1*[h]	NS[d]	UL	UL	UL	UL	UL	UL	UL	UL	UL
	S13D									
	S13R									
	S1									
	SM									
R-4[h]	NS[d]	UL	UL	24,000	16,000	24,000	16,000	20,500	12,000	7,000
	S13D									
	S13R									
	S1	UL	UL	96,000	64,000	96,000	64,000	82,000	48,000	28,000
	SM (*without height increase*)	UL	UL	72,000	48,000	72,000	48,000	61,500	36,000	21,000
	SM (with height increase)	*UL*	*UL*	*24,000*	*16,000*	*24,000*	*16,000*	*20,500*	*12,000*	*7,000*
S-1	NS	UL	48,000	26,000	17,500	26,000	17,500	25,500	14,000	9,000
	S1	UL	192,000	104,000	70,000	104,000	70,000	102,000	56,000	36,000
	SM	UL	144,000	78,000	52,500	78,000	52,500	76,500	42,000	27,000
S-2	NS	UL	79,000	39,000	26,000	39,000	26,000	38,500	21,000	13,500
	S1	UL	316,000	156,000	104,000	156,000	104,000	154,000	84,000	54,000
	SM	UL	237,000	117,000	78,000	117,000	78,000	115,500	63,000	40,500
U	NS[i]	UL	35,500	19,000	8,500	14,000	8,500	18,000	9,000	5,500
	S1	UL	142,000	76,000	34,000	56,000	34,000	72,000	36,000	22,000
	SM	UL	106,500	57,000	25,500	42,000	25,500	54,000	27,000	16,500

For SI: 1 square foot = 0.0929 m^2.

UL = Unlimited; NP = Not Permitted; NS = Buildings not equipped throughout with an automatic sprinkler system; S1 = Buildings a maximum of one story above grade plane equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; SM = Buildings two or more stories above grade plane equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2; S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.3.

a. See Chapters 4 and 5 for specific exceptions to the allowable height in this chapter.
b. See Section 903.2 for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.
c. New Group H *and all Group L* occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.5.
d. The NS value is only for use in evaluation of existing building area in accordance with the *California Existing Building Code*.
e. New Group I-1 and I-3 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6. For new Group I-1 occupancies, Condition 1, see Exception 1 of Section 903.2.6.
f. New and existing Group I-2 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6 and Section 1103.5 of the *California Fire Code*.
g. New Group I-4 occupancies see Exceptions 2 and 3 of Section 903.2.6.
h. New Group R occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8.
i. The maximum allowable area for a single-story nonsprinklered Group U greenhouse is permitted to be 9,000 square feet, or the allowable area shall be permitted to comply with Table C102.1 of Appendix C.
j. *In other than Group A, E, H, I, L, and R occupancies, high-rise buildings, and other applications listed in Section 1.11 regulated by the Office of the State Fire Marshal, the S increases for height and stories in Tables 504.3 and 504.4 are permitted in addition to the S area increase in accordance with Table 506.2.*
k. *For Group R-2 buildings of Type VA construction equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, S area increase is permitted in addition to the height and story increase provided the height shall not exceed 60 feet and 4 stories.*

Building Height Determining Chart:

TABLE 504.3
ALLOWABLE BUILDING HEIGHT IN FEET ABOVE GRADE PLANE[a, i]

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
B, F, M, S, U	NS[b]	UL	160	65	55	65	55	65	50	40
	S	UL	180	85	75	85	75	85	70	60
A, E	NS[b]	UL	160	65	55	65	55	65	50	40
	S (*without area increase*)	UL	180	85	75	85	75	85	70	60
	S (with area increase)	*UL*	*160*	*65*	*55*	*65*	*55*	*65*	*50*	*40*
H-1, H-2, H-3, H-5, *L*	NS[c, d]	UL	160	65	55	65	55	65	50	40
	S (*without area increase*)									
	S (with area increase)	*UL*	*160*	*65*	*55*	*65*	*55*	*65*	*50*	*40*
H-4	NS[c, d]	UL	160	65	55	65	55	65	50	40
	S (*without area increase*)	UL	180	85	75	85	75	85	70	60
	S (with area increase)	*UL*	*160*	*65*	*55*	*65*	*55*	*65*	*50*	*40*
I-3	NS[d, e]	UL	160	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*
	S (*without area increase*)	UL	180	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*
	S (with area increase)	*UL*	*160*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*
I-2, *I-2.1*	NS[d, e, f]	UL	160	65	55	65	55	NP	50	NP
	S (*without area increase*)	UL	180	85						
	S (with area increase)	*UL*	*160*	*65*						
I-4	NS[d, g]	UL	160	65	55	65	55	65	50	40
	S (*without area increase*)	UL	180	85	75	85	75	85	70	60
	S (with area increase)	*UL*	*160*	*65*	*55*	*65*	*55*	*65*	*50*	*40*
R-*1*[h]	NS[d]	UL	160	65	55	65	55	65	50	40
	S13D	60	60	60	60	60	60	60	50	40
	S13R	60	60	60	55	60	55	60	50	40
	S (*without area increase*)	UL	180	85	75	85	75	85	70	60
	S (with area increase)	*UL*	*160*	*65*	*55*	*65*	*55*	*65*	*50*	*40*
R-2[h]	*NS*[d]	UL	160	65	55	65	55	65	50	40
	S13R	60	60	60	55	60	55	60	50	40
	S (*without area increase*)	UL	180	85	75	85	75	85	70	60
	S (with area increase)	*UL*	*160*	*65*	*55*	*65*	*55*	*65*	*60*[j]	*40*
R-2.2	*S (without area increase)*	*UL*	*180*	*85*	*75*	*85*	*75*	*85*	*70*	*60*
	S (with area increase)	*UL*	*160*	*65*	*55*	*65*	*55*	*65*	*60*[j]	*40*
R-3, R-3.1[h]	*NS*[d]	*UL*	*160*	*65*	*55*	*65*	*55*	*65*	*50*	*40*
	S13D	*60*	*60*	*60*	*55*	*60*	*55*	*60*	*50*	*40*
	S13R	*60*	*60*	*60*	*55*	*60*	*55*	*60*	*50*	*40*
	S	*UL*	*160*	*65*	*55*	*65*	*55*	*65*	*50*	*40*
R-2.1, R-4[h]	*NS*[d]	*UL*	*160*	*65*	*55*	*65*	*55*	*65*	*50*	*40*
	S13D	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*50*	*40*
	S13R	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*	*60*
	S	*UL*	*180*	*85*	*75*	*85*	*75*	*85*	*70*	*60*

For SI: 1 foot = 304.8 mm.

UL = Unlimited; *NP = Not Permitted;* NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2; S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.3.

a. See Chapters 4 and 5 for specific exceptions to the allowable height in this chapter.
b. See Section 903.2 for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.
c. New Group H *and all Group L* occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.5.
d. The NS value is only for use in evaluation of existing building height in accordance with the *California Existing Building Code*.
e. New Group I-3 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6.
f. New and existing Group I-2 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6 and Section 1103.5 of the *California Fire Code*.
g. For new Group I-4 occupancies, see Exceptions 2 and 3 of Section 903.2.6.
h. New Group R occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8.
i. *In other than Group A, E, H, I, L, and R occupancies, high-rise buildings, and other applications listed in Section 1.11 regulated by the Office of the State Fire Marshal, the S increases for height and stories in Tables 504.3 and 504.4 are permitted in addition to the S area increase in accordance with Table 506.2.*
j. *For Group R-2 buildings of Type VA construction equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, S area increase is permitted in addition to the height and story increase provided the height shall not exceed 60 feet and 4 stories.*

TABLE 504.4
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE[a, b, n]

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A-1	NS	UL	5	3	2	3	2	3	2	1
	S (*without area increase*)	UL	6	4	3	4	3	4	3	2
	S (with area increase)	*UL*	*5*	*3*	*2*	*3*	*2*	*3*	*2*	*1*
A-2	NS	UL	11	3	2	3	2	3	2	1
	S (*without area increase*)	UL	12	4	3	4	3	4	3	2
	S (with area increase)	*UL*	*11*	*3*	*2*	*3*	*2*	*3*	*2*	*1*
A-3	NS	UL	11	3	2	3	2	3	2	1
	S (*without area increase*)	UL	12	4	3	4	3	4	3	2
	S (with area increase)	*UL*	*11*	*3*	*2*	*3*	*2*	*3*	*2*	*1*
A-4	NS	UL	11	3	2	3	2	3	2	1
	S (*without area increase*)	UL	12	4	3	4	3	4	3	2
	S (with area increase)	*UL*	*11*	*3*	*2*	*3*	*2*	*3*	*2*	*1*
A-5	NS	UL	UL	UL	UL	UL	UL	UL	UL	UL
	S	UL	UL	UL	UL	UL	UL	UL	UL	UL
B	NS	UL	11	5	3	5	3	5	3	2
	S	UL	12	6	4	6	4	6	4	3
E	NS	UL	5	3	2	3	2	3	1	1
	S (*without area increase*)	UL	6	4	3	4	3	4	2	2
	S (with area increase)	*UL*	*5*	*3*	*2*	*3*	*2*	*3*	*1*	*1*
F-1	NS	UL	11	4	2	3	2	4	2	1
	S	UL	12	5	3	4	3	5	3	2
F-2	NS	UL	11	5	3	4	3	5	3	2
	S	UL	12	6	4	5	4	6	4	3
H-1	NS[c, d]	1	1	1	1	1	1	1	1	NP
	S									
H-2	NS[c, d]	20	3	2	1	2	1	2	1	1
	S									
H-3	NS[c, d]	20	6	4	2	4	2	4	2	1
	S									
H-4	NS[c, d]	20	7	5	3	5	3	5	3	2
	S (*without area increase*)	20	8	6	4	6	4	6	4	3
	S (with area increase)	*20*	*7*	*5*	*3*	*5*	*3*	*5*	*3*	*2*
H-5	NS[c, d]	4	4	3	3	3	3	3	3	2
	S									
I-2, *I-2.1*[j, i]	NS[d, f]	UL	4	2	1	1	NP	1	1	NP
	S (*without area increase*)	UL	5	3						
	S (with area increase)	*UL*	*4*	*2*						
I-3	NS[d, e]	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*
	S (*without area increase*)	*UL*	*3*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*
	S (with area increase)	UL	*2*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*
I-4	NS[d, g]	UL	5	3	2	3	2	3	1	1
	S (*without area increase*)	UL	6	4	3	4	3	4	2	2
	S (with area increase)	*UL*	*5*	*3*	*2*	*3*	*2*	*3*	*1*	*1*
L	*NS*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*	*NP*
	S	*20*	*6*	*5*	*3*	*5*	*3*	*5*	*3*	*2*
M	NS	UL	11	4	2	4	2	4	3	1
	S	UL	12	5	3	5	3	5	4	2

(continued)

TABLE 504.4—continued
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE[a, b, n]

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
R-1[h]	NS[d]	UL	11	4	4	4	4	4	3	2
	S13R	4	4						*3*	*2*
	S (*without area increase*)	UL	12	5	5	5	5	5	4	3
	S (with area increase)	*UL*	*11*	*4*	*4*	*4*	*4*	*4*	*3*	*2*
R-2[h]	NS[d]	UL	11	4	4	4	4	4	3	2
	S13R	4	4	4					4	3
	S (*without area increase*)	UL	12	5	5	5	5	5	4	3
	S (with area increase)	*UL*	*11*	*4*	*4*	*4*	*4*	*4*	*4*[o]	*2*
R-2.2[h]	*S (without area increase)*	*UL*	*12*	*5*	*5*	*5*	*5*	*5*	*4*	*3*
	S (with area increase)	*UL*	*11*	*4*	*4*	*4*	*4*	*4*	*4*[o]	*2*
R-2.1[h]	*NS*[d]	*UL*	*6*[l]	*3*[k]	*NP*	*3*[k]	*NP*	*NP*	*3*[k]	*NP*
	S13R	*UL*	*4*[l]	*3*[k]	*NP*	*3*[k]	*NP*	*NP*	*3*[k]	*NP*
	S	*UL*	*6*[l]	*3*[k]	*NP*	*3*[k]	*NP*	*NP*	*3*[k]	*NP*
R-3, *R-3.1*[h]	NS[d]	UL	11	4	4	4	4	4	3	3
	S13D	4	4						3	3
	S13R	4	4						4	4
	S	UL	12	5	5	5	5	5	4	4
R-4[h]	NS[d]	UL	11[l]	4[k]	4[m]	4[k]	4[m]	4[m]	3[k]	2[m]
	S13D	4	4[l]						3[k]	2[m]
	S13R	4	4[l]						4	3
	S	UL	*11*[l]	5	5	5	5	5	4	3
S-1	NS	UL	11	4	2	3	2	4	3	1
	S	UL	12	5	3	4	3	5	4	2
S-2[i]	NS	UL	11	5	3	4	3	4	4	2
	S	UL	12	6	4	5	4	5	5	3
U	NS	UL	5	4	2	3	2	4	2	1
	S	UL	6	5	3	4	3	5	3	2

UL = Unlimited; NP = Not Permitted; NS = Buildings not equipped throughout with an automatic sprinkler system; S = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1; S13R = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2; S13D = Buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.3.

a. See Chapters 4 and 5 for specific exceptions to the allowable height in this chapter.
b. See Section 903.2 for the minimum thresholds for protection by an automatic sprinkler system for specific occupancies.
c. New Group H occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.5.
d. The NS value is only for use in evaluation of existing building height in accordance with the *California Existing Building Code*.
e. New Group I-1 and I-3 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6. For new Group I-1 occupancies, Condition 1, see Exception 1 of Section 903.2.6.
f. New and existing Group I-2 occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.6 and 1103.5 of the *California Fire Code*.
g. For new Group I-4 occupancies, see Exceptions 2 and 3 of Section 903.2.6.
h. New Group R occupancies are required to be protected by an automatic sprinkler system in accordance with Section 903.2.8.
i. *See Sections 407.1.1 and 408.1.2 for specific exceptions to construction type, allowable building areas and allowable heights.*
j. *Restraint shall not be permitted in any building except in Group I-3 occupancies constructed for such use (see Section 408.1.2).*
k. *Nonambulatory persons shall be limited to the first 2 stories.*
l. *Nonambulatory persons shall be limited to the first 5 stories.*
m. *Nonambulatory elderly clients are not permitted in buildings of these types of construction. See Sections 435.3.3 and 435.3.4.*
n. *In other than Group A, E, H, I, L, and R occupancies, high-rise buildings, and other applications listed in Section 1.11 regulated by the Office of the State Fire Marshal, the S increases for height and stories in Tables 504.3 and 504.4 are permitted in addition to the S area increase in accordance with Table 506.2.*
o. *For Group R-2 buildings of Type VA construction equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, S area increase is permitted in addition to the height and story increase provided the height shall not exceed 60 feet and 4 stories.*

BOOK SOURCE: https://codes.iccsafe.org/content/CABCV12019/chapter-4-special-detailed-requirements-based-on-occupancy-and-use

Issues Addresessed:

Other Research Determined by Team

Decisions Made:

These were included because they will be used to help shape the sizes of the masses within the site. A variety of codes were included because a lot of the masses on the site are at preliminary stages of development.

Ruth Morillo, Jose Sosa, & Benjamin Stremming
ARC541-001: Architecture Systems and Environment Fall 2019

Sheet Content/Focus:

Codes and Sizing Guidelines

Panel Set 2

Date Submited: 9/30/2019

2.22