



*Designing Your Tap
Room & Brewery
For Start Ups*

BYO NanoCon Online
NOV. 4, 2022

T. Dustin Hauck

President & Principal Architect
Hauck Architecture
San, Diego, CA

- Practicing Architecture since 1996.
- QUAFF homebrew club member since 2004.
- Designing breweries since 2011.
- +215 craft brewery projects to date.
- Licensed in 27 states.
(AR, AZ, CA, CO, CT, FL, GA, HI, ID, IN, MD, MI, MO, NC, NJ, NV, NY, OH, PA, SC, SD, TN, TX, VA, WA, WV, WY)



01

Location

What to look for when choosing a location for your brewery.

02

Equipment & Layout

How much space do I need? What size system and how much cellar capacity do I need?
What is the best layout to optimize efficiency?

03

Permits

Planning, Zoning and Building Permits
(Architectural, Structural, Mechanical, Electrical, & Plumbing)

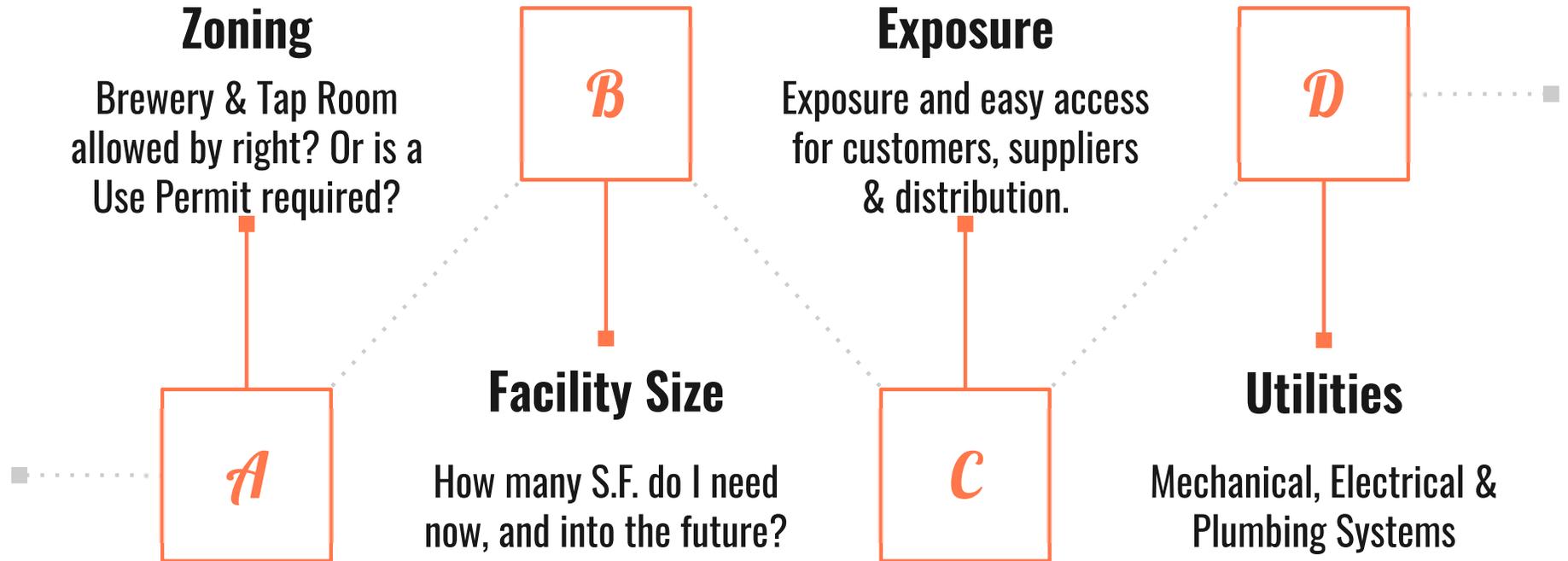


01

LOCATION

What to look for when choosing a location for your brewery.

Selecting Your Location



Zoning

Permits

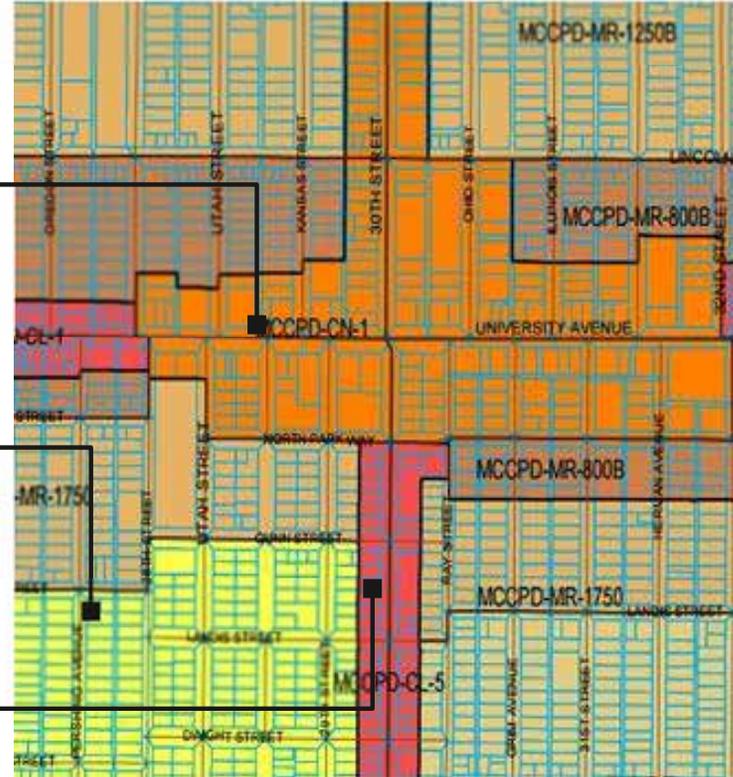
What permits are required for a brewery and tap room use?

Parking

What are the parking requirements in this zone?

Special Districts

Are there any special districts that make it easier, faster, or incentivized for a brewery?



Facility Size



1 S.F. per BBL of max annual production

General rule of thumb and starting point. Then adjust based on your business model.



Room for growth

Design for expansion
Plan for more cellar storage space.
First right of refusal on adjacent space?

Location



Exposure

High visibility. Easy access
for your customers.



Suppliers

Access to major supply routes
with easy arrival point.



Distribution

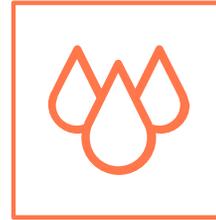
Centrally located.

Utilities



Mechanical

Heating, Cooling
& Ventilation



Plumbing

Water, Sewer/Drainage,
Natural Gas/Propane



Electrical

Voltage, Amperage, Phase



Fire Sprinklers

Required?



Mechanical

HVAC

HEATING & COOLING

Adequate for your use?
In good working order?
Who is responsible?

VENTILATION

Brewhouse steam, burner
exhaust & make up air.



Electrical

+400

AMPS

Most small breweries need at least 400 amps due to glycol and refrigeration needs.

220/480

VOLTAGE

Know what voltage is being supplied, and what your equipment requires.

3

PHASE

3 Phase is more efficient, and required for most modern equipment



Plumbing

20

GPM

Preferred min. water flow rate.
Requires min. 1" water line.

1.5"

GAS

Min. line size to feed boiler
or direct fire brewhouse.

4"

WASTE

Min. line size required.
Will depth & location of
existing drain lines work for
your layout and tie in point?



Fire Sprinklers

50 or 750

PERSONS or S.F.



Threshold for tap room to trigger fire sprinklers or 1-hour separation between it and the brewery.

100 or 5,000

PERSONS or S.F.



Threshold to trigger fire sprinklers for an A-2 occupancy.



02

EQUIPMENT & LAYOUT

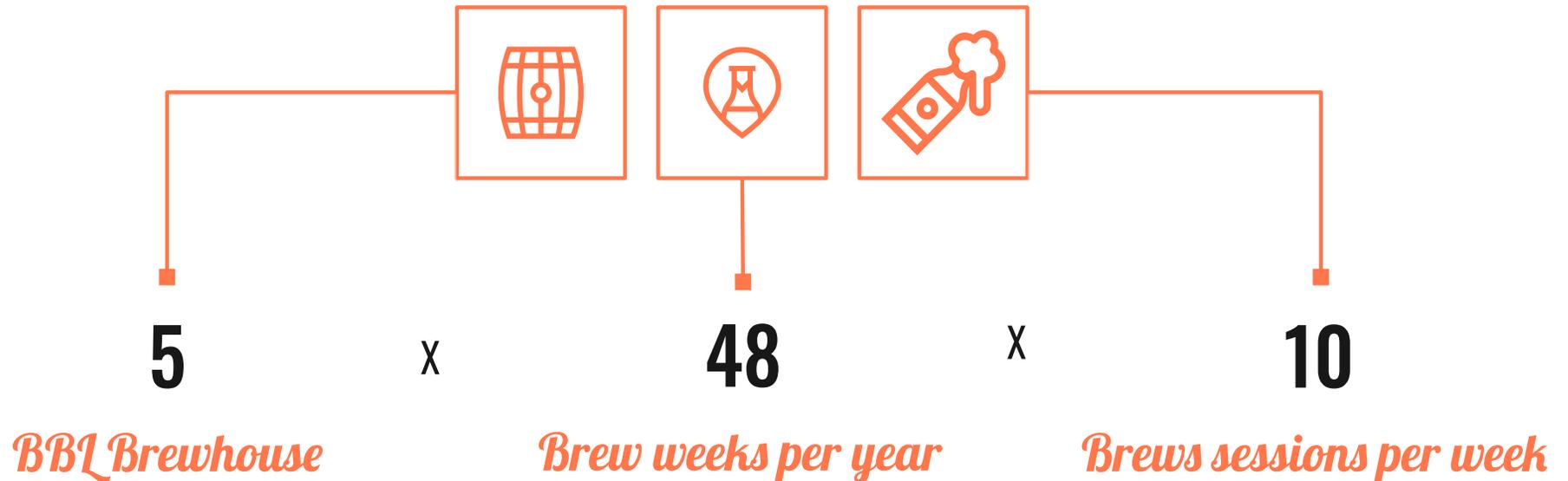
What size system and how much cellar capacity do I need?
How much space do I need? And what is the best layout to optimize efficiency?

**Annual Production =
Brewhouse size x Brews per
week x Weeks per year**

1 S.F. per BBL of max. annual production



Brewery Production



= 2,400 BBLs per year max. Annual Production
= ~2,400 S.F Facility

Production & Cellar Capacity

Max. Annual Production = 2,400 BBLs per Year Total

Ale vs Lager

14 Day Ale Fermentation x 75% of total volume = 1,800 BBLs per Year of Ale
28 Day Lager Fermentation x 25% of total volume = 600 BBLs per Year of Lager

Work Weeks per Year x Days per Week / Fermentation Time = Fermenter Cycles

(48 Weeks per Year x 7 Days per Week) / 14 Day Ale Fermentation = 24 Ale Fermenter Cycles per Year
(48 Weeks per Year x 7 Days per Week) / 28 Day Lager Fermentation = 12 Lager Fermenter Cycles per Year

(BBLs per Year / (System Size x FV Cycles per Year)) / Brews per FV = Fermenters Needed

Ale: (1,800 BBLs per year / (5 BBL x 24)) / 1 Brew per FV = (15) 5 BBL Fermenters (rounded up)
Lager: (600 BBLs per year / (5 BBL x 12)) / 1 Brew per FV = (10) 5 BBL Fermenters (rounded up)
= (18) Total 5 BBL Fermenters Needed

Batch Size x Total Fermenters Needed = Cellar Capacity

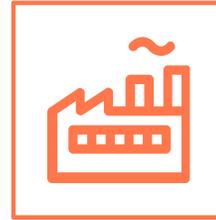
5 BBL Brewhouse x 18 Total Fermenters = 125 BBL Cellar Capacity

5,000 S.F. Facility Breakdown



20% Dry Storage

1,000 S.F.



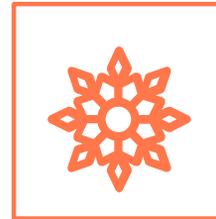
45% Brewery Operations

2,500 S.F.



15% Tap Room

750 S.F.

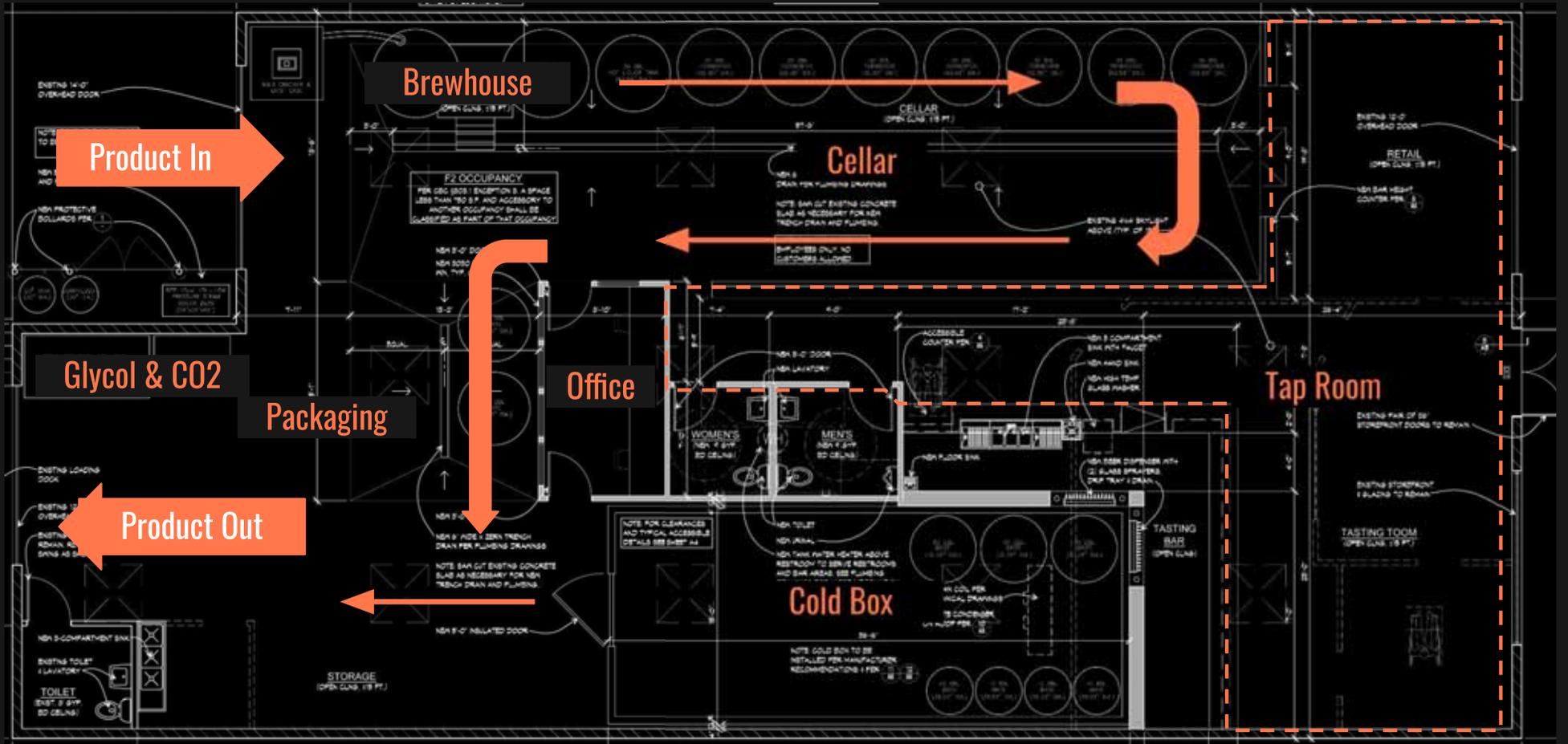


20% Cold Storage

1,000 S.F.

Note: Larger spaces will trigger a larger facility beyond the 1 S.F. per BBL of production

5,000 S.F. - 15 BBL Brewhouse - 750 S.F. tap room - 500 S.F. cold box - (14) 30 BBL FVs
5,000 BBL Annual Production



Brewhouse

Cellar

Tap Room

Cold Box

Product In

Product Out

Glycol & CO2

Packaging

Office

TASTING TOOM

TASTING BAR

STORAGE

RETAIL

F2 OCCUPANCY
PER IBC 308.1 EXCEPTION 3, A SPACE
LESS THAN 750 S.F. AND ACCESSORY TO
ANOTHER OCCUPANCY SHALL BE
CLASSIFIED AS PART OF THAT OCCUPANCY

EMPLOYEES ONLY, NO
CUSTOMERS ALLOWED

NOTE FOR CLEANERS
AND TYPICAL ACCESSIBLE
DETAILS SEE 5-807.4.1

NOTE: GOLD BIN TO BE
INSTALLED PER MANUFACTURER
RECOMMENDATIONS I PER

EXISTING 14'-0" OVERHEAD DOOR

OPEN CURB, 18 FT.

CELLAR
OPEN CURB, 18 FT.

EXISTING 12'-0" OVERHEAD DOOR

NEW PROTECTIVE BOLLARDS PER

NEW 2'-0" DOOR

EXISTING LOADING DOOR

EXISTING 12'-0" OVERHEAD DOOR

NEW 2-COMPARTMENT SINK

EXISTING TOILET LAVATORY

TOILET

EXISTING TOILET LAVATORY

NEW 2'-0" DOOR

Layout & Design

Things to consider

- Product Flow (raw materials in, product/waste out)
- Equipment
 - Brewhouse
 - Cellar
 - Glycol Chiller
 - CO2 Tanks
 - Boiler
 - CIP (Clean In Place)
 - Water Treatment
 - Packaging
- Grain Storage (fresh & spent)
- Cold Storage
- Distribution / Shipping
- Safety
- Dry Storage
 - Hops
 - Kegs (clean/dirty)
 - Barrels / Foeders
 - Cans / bottles
 - Packaging
- Lab & Office
- Break Room & Lockers
- Growth & Expansion
- Tasting Room
 - Customer Experience
 - View
 - Tours
 - Capacity
 - Merchandise
 - Food
 - Seasonal & General Storage
 - Restrooms



03

PERMITS

Planning, Zoning, & Building Permits

Code Compliance



Building Area

Area and height limitations based on Type of Construction and Use



Use

Brewery is F-2. Tap Room is A-2.
Change of use can trigger upgrades.



Occupant Load & Egress

Based on Load Factor & Square Footage



Accessibility

Path of Travel
Equal Access



Plumbing Fixtures

Based on Occupant Load



Separations

May be required based on
Use & Occupant Load

Permits



Building

Fire & Life Safety



Structural

Loading and anchorage



Mechanical

Heating, Ventilation
& Air Conditioning



Planning/Zoning

Use allowed in your zone.
Parking



Electrical

Power & Lighting



Plumbing

Water, Gas & Drainage

Additional AHJs



Dept. of Env. Health

Food & Beverage



Industrial Waste

Wastewater



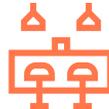
F.O.G.

Fats, Oils & Grease



Will Serve

Authority to supply



APCD

Air Pollution Control

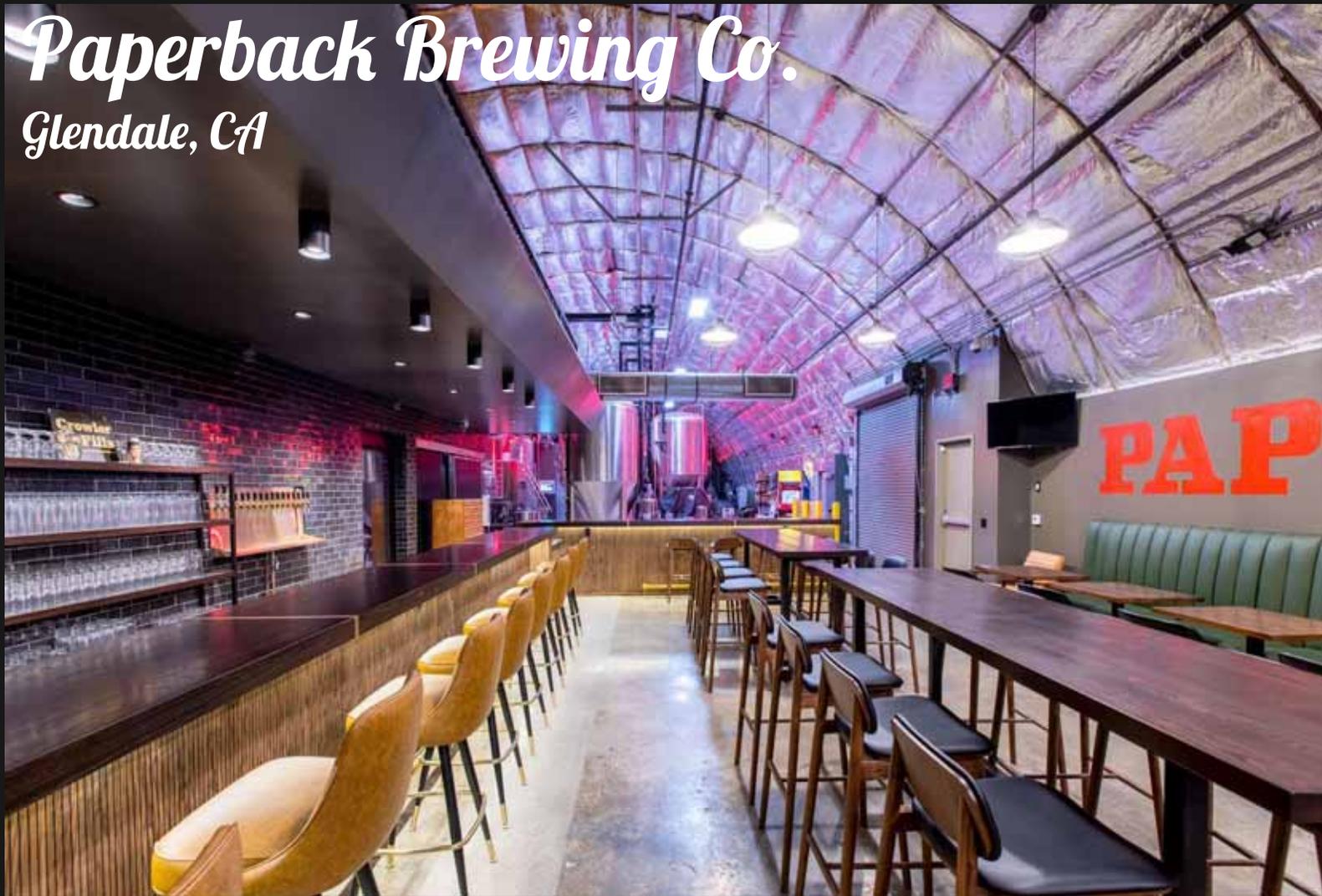


Stormwater

Environmental

Paperback Brewing Co.

Glendale, CA



North Park Beer Co.

San Diego, CA



Fall Brewing Co.

San Diego, CA



Mikkeller

San Diego, CA



Duck Foot Beer

San Diego, CA



Pure Project

Vista, CA



14 Cannons Brewing Co.

Westlake Village, CA



Original 40

San Diego, CA



Cheers!

Questions?

Dustin@HauckArchitecture.com
HauckArchitecture.com
(858) 384 7795



CREDITS: This presentation template was created by **Slidesgo**, including icons by **Flaticon**, infographics & images by **Freepik**





FAQs & Considerations

Frequently Asked Questions

- **How many square feet do I need?**
 - Start with assuming 1 S.F. per BBL of max. production. 15% of that for the Tap Room, 20% for dry storage, 20% for cold storage, and 45% for brewery operations. Then adjust based on your business model.
- **How big should my tap room be?**
 - The Brewer's Association estimates 6 BBLs per seat per year, depending on your market. The Building Code calculates occupancy at 1 person per 15 S.F. for tables and chairs areas, 1:5 for standing area, and 1:7 for fixed seating, such as the bar.

Frequently Asked Questions

- **Should I go with a direct fire, steam boiler or electric brewhouse?**
 - Direct fire is a great option if natural gas is available. Propane is an option but is not as efficient. Determine the BTUs required to brew a batch of beer. Then how much that will cost per batch. Steam boilers are great for efficiency and consistency. But there is added cost in the equipment, piping and maintenance. Keep the boiler close to where the steam is needed. Boilers also take up more space. Electric is also a great choice. It eliminates the need for exhaust piping. But, there are limits to how big of a system you can do on electric. And, electric costs are usually high. Again, determine the energy required to brew a batch and what that will cost. Compare that to other fuel options so you know what it is going to cost in the long run.

Frequently Asked Questions

- **What size system should I get?**
 - System size should be large enough to handle you max. production for at least up to 5 years. Take into consideration your beer line up, variety, and how often you want to brew
- **How big should my cold box be?**
 - Think about how many products you are going to have. Have space for at least one pallet position for each product. Leave room for a pallet jack or forklift to maneuver inside the cold box. You can only stack kegs two high with a keg lifter, so take into consideration. Don't make it taller than you can use it so you don't have to cool extra, unused space.

Frequently Asked Questions

- **What should I use for glycol piping?**
 - Cool-Fit pre-insulated piping is one of the best. But insulated copper is also a good choice. Sched. 80 PVC is sometimes used but it is not rated for glycol temperatures.
- **What is the best floor coating?**
 - Urethane for any areas subject to thermal shock. Any coating is only as good as the installation. Prep. and install is 80% of the coating's performance.
 - A floor sloped towards a trench drain is worth its weight in gold. Don't skimp on your wet floor design and coating.

Frequently Asked Questions

- **How can I find out local building and zoning requirements?**
 - Reach out to your city or local jurisdiction planning department. Talk to the Economic Development department and establish a relationship with them. Hire a professional and ask questions before you get too far into the process.

Considerations

- **Layout your brewery for efficiency and expansion. Think about how raw materials enter your space and flow through the facility. Don't forget about grain out. Don't waste space on long traffic routes.**
- **Set up your cellar with tanks facing each other so they can share the workspace between them and your drains can be in the middle, not under a tank where you can't clean them.**
- **Leave room for expansion and more dry storage. You will always need more space than you think.**

Considerations

- It is much easier to increase your production by adding more cellar tanks than it is to replace your brewhouse. Size your brewhouse for your maximum capacity. You can always half batch until you need it.
- Size your cellar for maximum capacity so all you need to do to increase capacity is add more or upsize fermenters.
- Glycol chillers are heavy, noisy and put off a lot of heat. Think about where this will go. Putting in on the roof could trigger structural work. Ideally, they are outside on a concrete pad.

Considerations

- Think about why your customers are coming to your brewery and tap room instead of a bar. Create an experience they can't get at a bar. They are drinking where the beer is made. Embrace and exploit that. Show off all that beautiful stainless steel.
- Consider adaptable tap room space that can be modified or expanded for different size events and parties.
- Think about how your customers enter, move about, and interact with your space.
- Be prepared for change. One thing that is certain is that trends will change. Your facility should be nimble and able to adapt to the market.



Bonus

Wastewater

Industrial Waste

(all jurisdictions may have their own limitations)

- **TSS** (Total Suspended Solids): Dry weight of non-dissolved suspended particles.
 - Untreated brewery wastewater is 200-1,500 PPM
 - Usually required to be below 350 PPM
 - Can be mitigated by simple filters.
- **TDS** (Total Dissolved Solids): Total content of inorganic and organic particles present, ie. minerals, salt, metals, etc.
 - Can be filtered out by reverse osmosis

Industrial Waste

(all jurisdictions may have their own limitations)

- **BOD** (Biochemical Oxygen Demand): Dissolved oxygen required for organic material decomposition.
 - Normally 60% of COD
- **COD** (Chemical Oxygen Demand): Oxygen required to decompose organic material
 - Brewery wastewater is 1,800 to 5,500 PPM
 - Impacted by yeast.

BOD and COD can be mitigated with coagulants and flocculants to bind and separate yeast and trub sludge. Yeast uses up oxygen needed by organisms relied upon to break down waste. Compost or kill yeast in buckets with chlorine prior to dumping.

Industrial Waste

(all jurisdictions may have their own limitations)

- **pH**
 - EPA limit 5 -11. Typical City limit 6 – 8.
 - Wort +/- 5.5. Beer +/-4.5. CIP solution +/- 12.
 - Muriatic acid can lower pH.
 - Sodium Hydroxide can raise pH.
 - Neutralizing agents can be hazardous.
- **Temperature**
 - Most building codes limit wastewater to 140°F max.

Industrial Waste

(all jurisdictions may have their own limitations)

- Your AHJ may require monthly, quarterly or yearly testing.
- Make a list of the chemicals you plan to use, what percentage of solution, and total volume.
- Use strainers and sediment traps in floor drains to capture solids.
- Separate yeast, hops and spent grain separately.
- Smaller towns are less capable of handling brewery wastewater.

Industrial Waste

(all jurisdictions may have their own limitations)

- Have a plan, educate yourself, and talk to your wastewater department about what you are doing to mitigate your impact to their system.
- If sending brewery wastewater to a septic system, divert solids as much as possible.
- Sidestream all trub, yeast hops and spent grain.
- Use a parabolic screen separator to filter out solids.
- Consider aerobic or anaerobic treatment systems with a neutralization tank and aeration system.

Wastewater Volumes

(will vary based on your system and processes)

- Estimate **8.25** BBLs of water used for each 1 BBL of beer produced.
- +/- **1%** Lost to Evaporation
- +/- **2%** Retained in Spent Grain
- +/- **12%** Product (Beer)
- +/- **25%** Process Wastewater (cleaning & packaging)
- +/- **60%** R.O. wastewater *(depends on your R.O. system)*