Ref: L10921/BH/21-038

16 April 2021

PLANS AND DOCUMENTS referred to in the PDA DEVELOPMENT APPROVAL
Approval no: DEV2017/891/12
Date: 28 May 2021
Queensland Government

A.N. Burnett Investments
c/- Bennett & Associates Pty Ltd
PO Box 953
Paddington QLD 4064

Attention: Mr Bill Bennett

Dear Bill

Re: Review of Air Quality Issues for Proposed Microbrewery at the Jubilee Hotel
470 St Pauls Terrace, Fortitude Valley

Further to your request, MWA Environmental has reviewed the potential air quality and odour issues relating to a proposed ancillary microbrewery at the Jubilee Hotel. The ancillary microbrewery is proposed to be installed as part of the Jubilee Hotel Refurbishment Stage 2 works.

The subject site has a street address of 470 St Pauls Terrace, Fortitude Valley. The site is bounded on all sides by road reserves associated with St Pauls Terrace, Constance Street, Brewers Street and Symes Street.

The site extent, Stage 2 works area and surrounding land uses are shown on **Figure 1**.

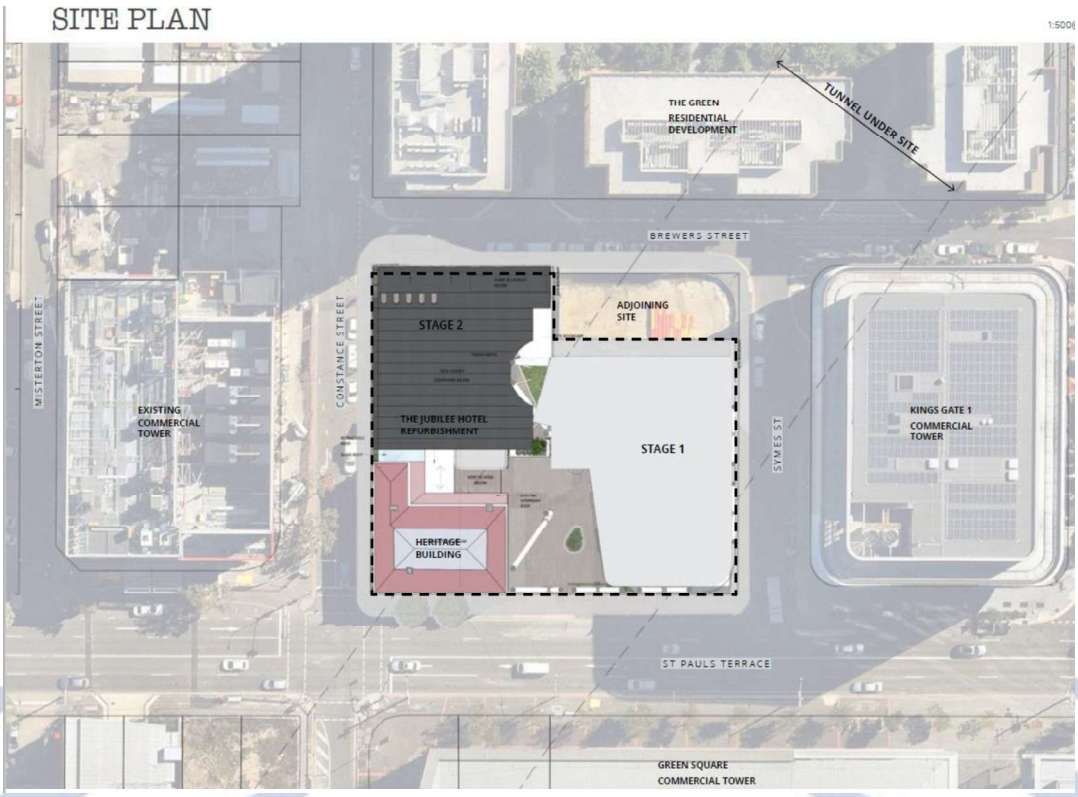

Figure 1: Site Context (Blight Rayner Site Plan 30.09.2020)

Max Winders & Associates Pty Ltd tas MWA Environmental
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The subject land and properties to the west (across Brewers Street) and north (across Symes Street) are within the Bowen Hills Priority Development Area. A small property adjoins the northern corner of the subject land. Land to the south (across Constance Street) and east (across St Pauls Terrace) is zoned MU1 Mixed Use (Inner city) (orange) and PC1 Principal Centre (City centre) (blue) as shown on **Figure 2**.

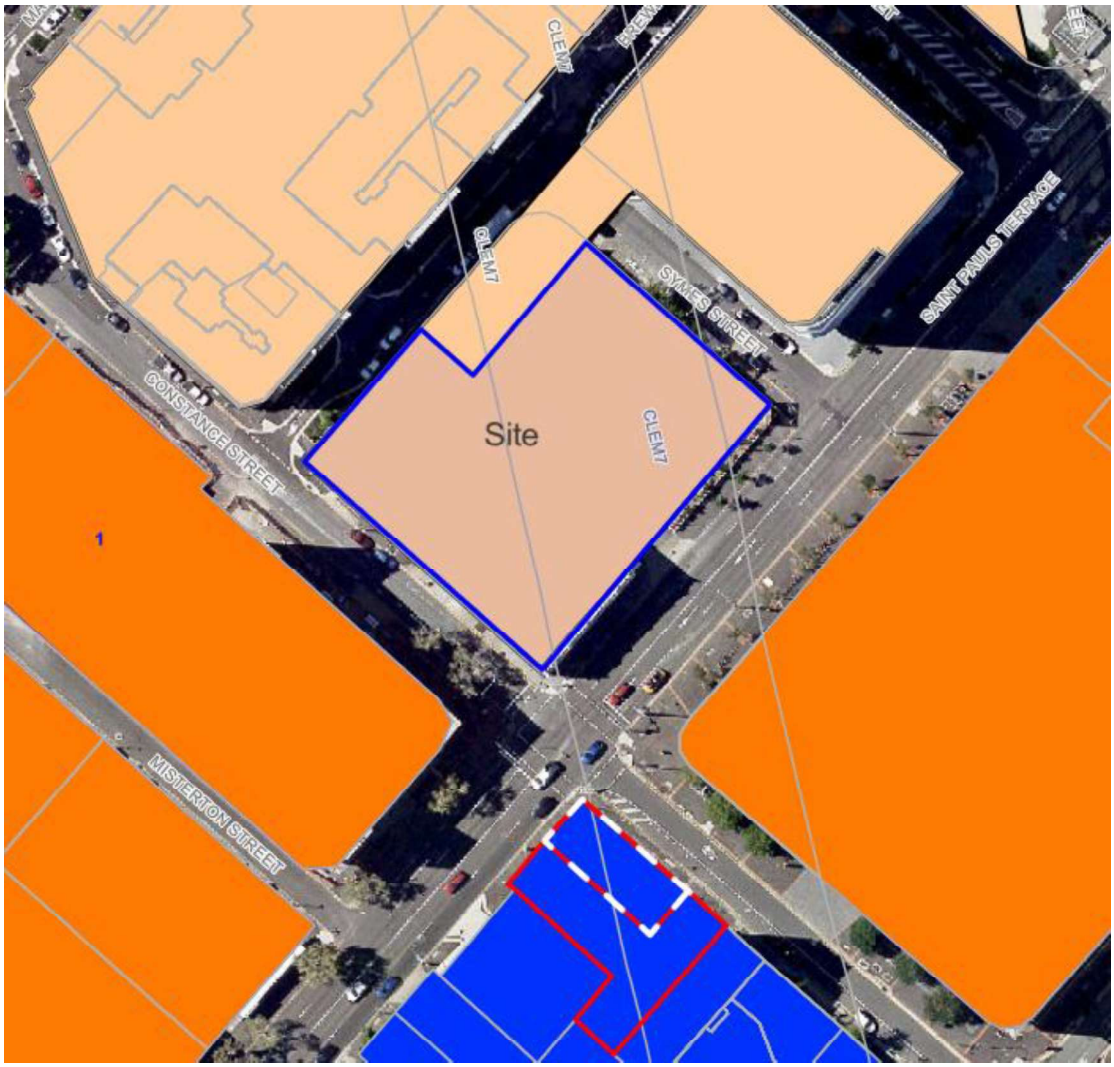


Figure 2: **CityPlan 2014 Zoning Map**

The nearest surrounding land uses are as follows:

To South:	Constance Street with a commercial building (data centre) beyond)
To West:	Brewers Street with a residential unit development (The Green) beyond)
To North:	Symes Street with a commercial building (Kings Gate) beyond)
To East:	St Pauls Terrace with a commercial building (Green Square) beyond)

The Jubilee Hotel Refurbishment Stage 2 works are shown on the Blight Rayner plans included as **Attachment 1**.

The Stage 2 works are located at the corner of Constance Street and Brewers Street. The ancillary microbrewery is to be sited on Ground Floor within an approximate 10m^2 area at the southwestern corner of the building, adjacent to the Beer Garden and Booth Seating areas. The Ground Floor space is enclosed with solid walls to Constance Street and Brewers Street and roof / canopy.

It is proposed to install and operate a small-scale packaged 'Nano Craft' microbrewery system supplied by 'Flying Foam'[1]. A summary of the 'Nano Craft' system is included as **Attachment 2**.

The 'Nano Craft' brewing system is a small-scale, low emission, microbrewery designed to be sited within hospitality areas. The system is based around a 600 litre batch size, which is at the lower end of the batch volume for contemporary microbreweries.

The anticipated annual production rate is 25 kilolitres ("kL") per annum, but no more than 35kL per annum. This equates to an anticipated 42 batches per year, or one in a week.

MWA Environmental notes that this is a small-scale microbrewery proposal, with the typical microbrewery production rates in the Brisbane City Council area ranging from 100kL to 1 million litres per annum.

All beer produced is to be sold on-site via kegs with no canning and no off-site sales proposed.

The primary air pollutant emission from the microbrewery is odour, with minor Volatile Organic Compounds. The 'Nano Craft' system information from the supplier (refer **Attachment 2** indicates no or negligible odour from the process. MWA Environmental agrees that, for the proposed small-scale microbrewery system with emission management measures, odours and air pollutant emissions off-site will be negligible.

No gas fired heating equipment is proposed within the brewhouse, with heating of the kettle for wort boiling via an electric element system. A 500 MJ per hour commercial instantaneous gas hot water system will supply the microbrewery with hot water for the brew process, cleaning and sterilisation. This instantaneous gas hot water system will be located at an external plant deck with other mechanical plant for the venue, as is typical for hot water supply to commercial premises.

Potential odours from the brewing process are primarily related to the heating stages of the process (e.g. wort boiling) prior to the fermentation phase. Wort boiling is undertaken in a brew kettle within the brewhouse. Boiling does not take place continuously but rather for short periods (generally less than 1 hour) during each of the 'batches' produced (i.e. one hour per week). Once the wort boiling process is complete the processes to the fermentation phase have a significantly lower odour potential.

[1] http://flyingfoam.com.au/

The 'Nano Craft' brewing system includes a tank vent discharge line (9mm nylon tube) which is shutoff by check valve during the brewing and fermentation processes and only opened to purge tank gases (Carbon Dioxide) from the tanks prior to cleaning between batches. Carbon Dioxide is not a regulated air pollutant in the Queensland *Environmental Protection (Air) Policy 2019* or Brisbane CityPlan 2014. The emission potential from 9mm tube tank purging line typically discharging above the roof space for a short period on an approximately weekly basis is extremely low.

The 'Nano Craft' brewing system includes a range of features which minimise the potential emissions, as follows:

- The kettle is fitted with a vapour condenser system which utilises a heat exchanger to condense approximately 80 percent of odorous steam from the wort boiling process into liquid for discharge directly to sewer via a sealed balancing tank, with minimal odour vented from the wort boiling process;
- Electric heating of the kettle for wort boiling (not gas fired), with all hot water for the brewery supplied via a traditional commercial instantaneous hot water system; and
- Spent grain and by-products from the brew preparation process are removed from the site in sealed containers on the day of brewing to ensure no excess odour from waste materials.

Efficient and effective housekeeping of the Brewery to clean up spills and maintain a clean working environment are necessary to minimise potential odours. Given the location of the Brewery within the internal patron area it will be necessary to manage odours to ensure appropriate amenity for customers on site, which will ensure that adverse odour impacts from within the building do not result in nuisance impacts off-site.

The proposed operating hours for the microbrewery are:

Brew Preparation:	7am to 6pm Monday to Sunday
Fermentation:	24 hours / 7 days

MWA Environmental has conducted development assessments and expansion assessments for numerous microbrewery projects in South East Queensland, all of which have been for significantly higher production rate breweries than proposed at the Jubilee Hotel. The previous assessments, including odour emission rate sampling from the wort boiling process have demonstrated that:

- Odour emissions from a microbrewery of this scale are minor.
- Peak odour emissions from the wort boiling process (approximately 1 hour per week) in the 600 litre batch will be in the order of 880 Odour Units per minute, equivalent to approximately 15 Odour Units per second ("OU/s"), which is well below the odour emission rate from a commercial kitchen range hood exhaust[2].

[2] which are in the order of 10 to 80 times higher from previous MWA Environmental projects

- The only other notable air pollutant emission from a microbrewery are minor Volatile Organic Compound ("VOC") emissions, primarily Ethanol and Propane. The Queensland *Environmental Protection (Air) Policy 2019* does not prescribe air quality objectives for either Ethanol and Propane and CityPlan 2014 only stipulates an air quality (planning) criterion for Ethanol. Irrespective, prior assessments have clearly demonstrated that VOC emissions from microbreweries are by far a secondary issue to odour. In other terms, if compliance with the odour guideline is achieved then VOC compliance is also achieved by a substantial margin.

Given the ancillary, small scale nature of the proposed microbrewery and the site context in a mixed use and centre precinct, reference is made to the Brisbane CityPlan 2014 *Centre or Mixed Use Code*.

Performance Outcome PO3 of the *Centre or Mixed Use Code* for consideration of potential air quality and odour amenity impacts at surrounding properties, as follows:

PO3

Development:

(a) avoids or minimises air emissions;

(b) complies with the air quality (planning) criteria in Table 9.3.3.3.I and odour criteria in Table 9.3.3.3.J in a sensitive zone or sensitive use.

Relevant Acceptable Outcomes for PO3 are as follows:

AO3.1

Development ensures that air pollutants, including odour, are not released external to the development except where complying with AO3.2 and AO3.3[3].

AO3.2

Development ensures that if food and cooking odour is released, exhaust vent outlets are discharged vertically and directed away from any sensitive use with the following constraints:

(a) separated by a minimum of 6m from a sensitive use, including any outdoor air intake of a sensitive use;

(b) does not cause an odour or air emission which is detectable and disturbing at a sensitive use.

[3] AO3.3 is only relevant to carpark and bus station exhaust vents

The food and cooking odour management provisions of AO3.2 are considered to be relevant to the management of emissions from the proposed small-scale ancillary microbrewery.

The microbrewery emissions are considered to satisfy the requirements of AO3.1 and AO3.2 subject to the following:

In response to AO3.1:

- **The proposed brewery will not directly release notable air pollutant emissions, including odour, external to the development**. The only external emission potential would be:
  - Via indirect fugitive releases from the building remote from the Brewery, at which point emissions would already be diluted within building space to below detectable levels; and
  - Via the 9mm tube tank vent discharge line that purges CO_2 from the tanks prior to cleaning for a short period on an approximately weekly basis.

In response to AO3.2 (a):

- Potential indirect fugitive releases from the building, remote from the Brewery, would be from locations that are more than 6 metres from a sensitive use.

In response to AO3.2 (b):

- Emissions from the microbrewery are minor and peak odour potential from wort boiling process (approximately 1 hour per week) will be minimised with the proposed vapour condenser system such that any **potential emissions from the building, remote from the Brewery, will not cause an odour or air pollutant emission which is detectable and disturbing at a sensitive use**.

Based upon the assessment undertaken, potential odour and air pollutant emissions from the microbrewery will satisfy Performance Outcome PO3 of the *Centre or Mixed Use Code* by way of Acceptable Outcomes AO3.1 and AO3.2.

Given the characteristics of the proposed small-scale 'Nano Craft' brewery at the Jubilee Hotel and the outcomes of detailed quantitative assessments **previously undertaken by MWA Environmental for numerous larger scale microbreweries it is clear that odour or air pollutant emissions from the will <u>not</u> result in amenity impacts off-site.**

SUMMARY

The outcomes of our review are summarised as follows:

1. **The proposed 'Nano Craft' package brewery system and annual production rates is of small-scale compared to the typical microbrewery use in the Brisbane City Council area.**
2. **The 'Nano Craft' package brewery system incorporates a range of features which minimise the potential emissions, including a vapour condenser system for the kettle (wort boiling process) and electric heating of the kettle (not gas firing).**
3. **Odour and air pollutant emissions from the brewery will be less than from commercial kitchen range hood exhausts that are common in centre and mixed-use precincts such as this and will not be directly released external to the development.**
4. **The proposed small-scale ancillary microbrewery is considered to be more akin to commercial kitchen use than a Medium Impact Industry in relation to potential off-site impacts based upon standard use definitions.**
5. **The overall potential for off-site odour or air quality impacts as a result of the proposed small-scale microbrewery is negligible.**
6. **It is clear from prior experience and the characteristics of the proposed small-scale 'Nano Craft' brewery system that odour or air pollutant emissions from the will not result in amenity impacts off-site.**

If you require any clarification or additional information please contact the undersigned.

Yours sincerely

Ben Hyde
Senior Environmental Engineer

ATTACHMENT 1

Development Plans

THE JUBILEE

HOTEL · REFURBISHMENT

STAGE 2 DEVELOPMENT APPLICATION AMENDMENT

30.09.2020

TB's HOTELS

JGL PROPERTIES

BlightRayner

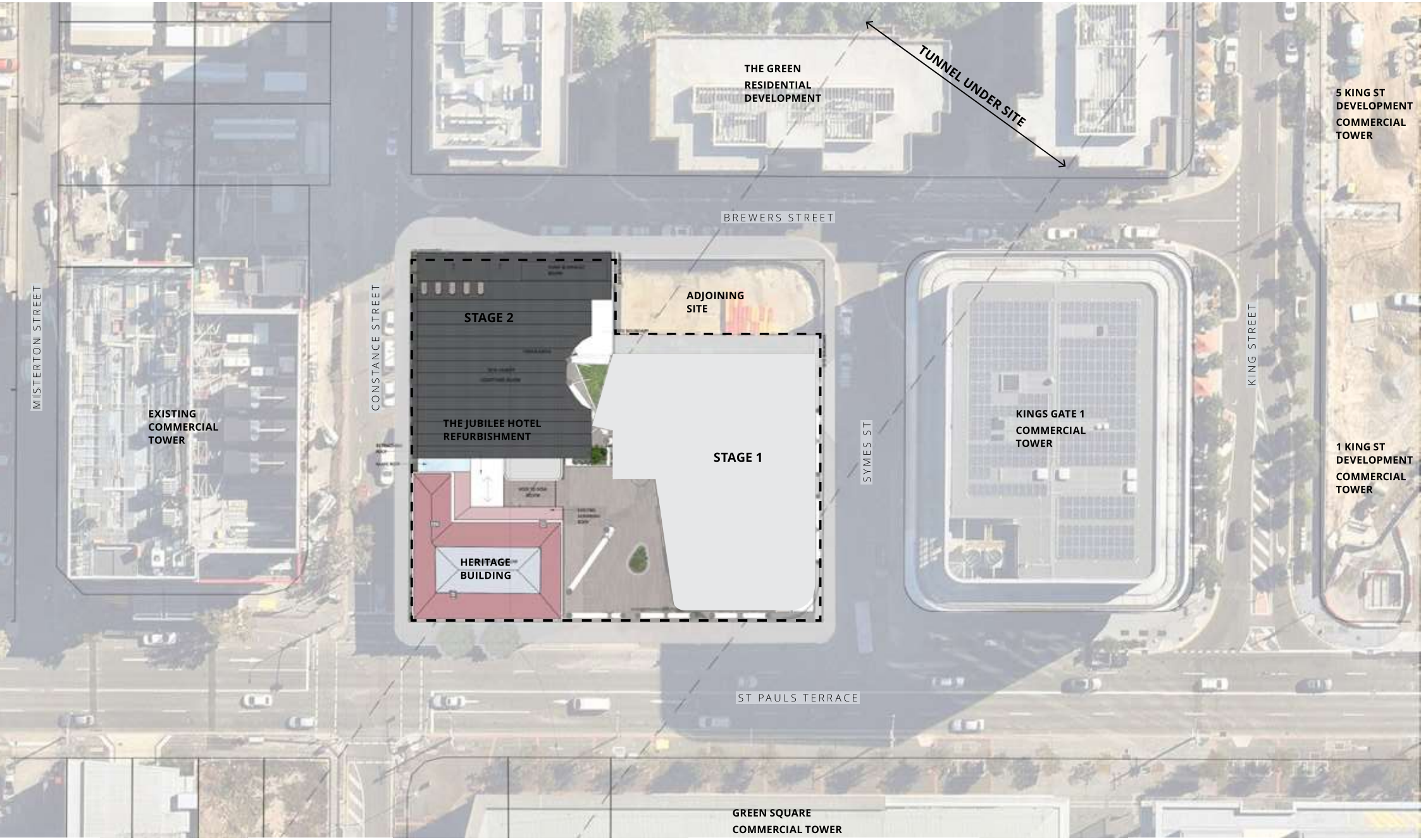
MEWING PLANNING CONSULTANTS

PART 2:

DRAWINGS

SITE PLAN

1:500@A3 0 5 10 15m



PROPOSED CELLAR LEVEL

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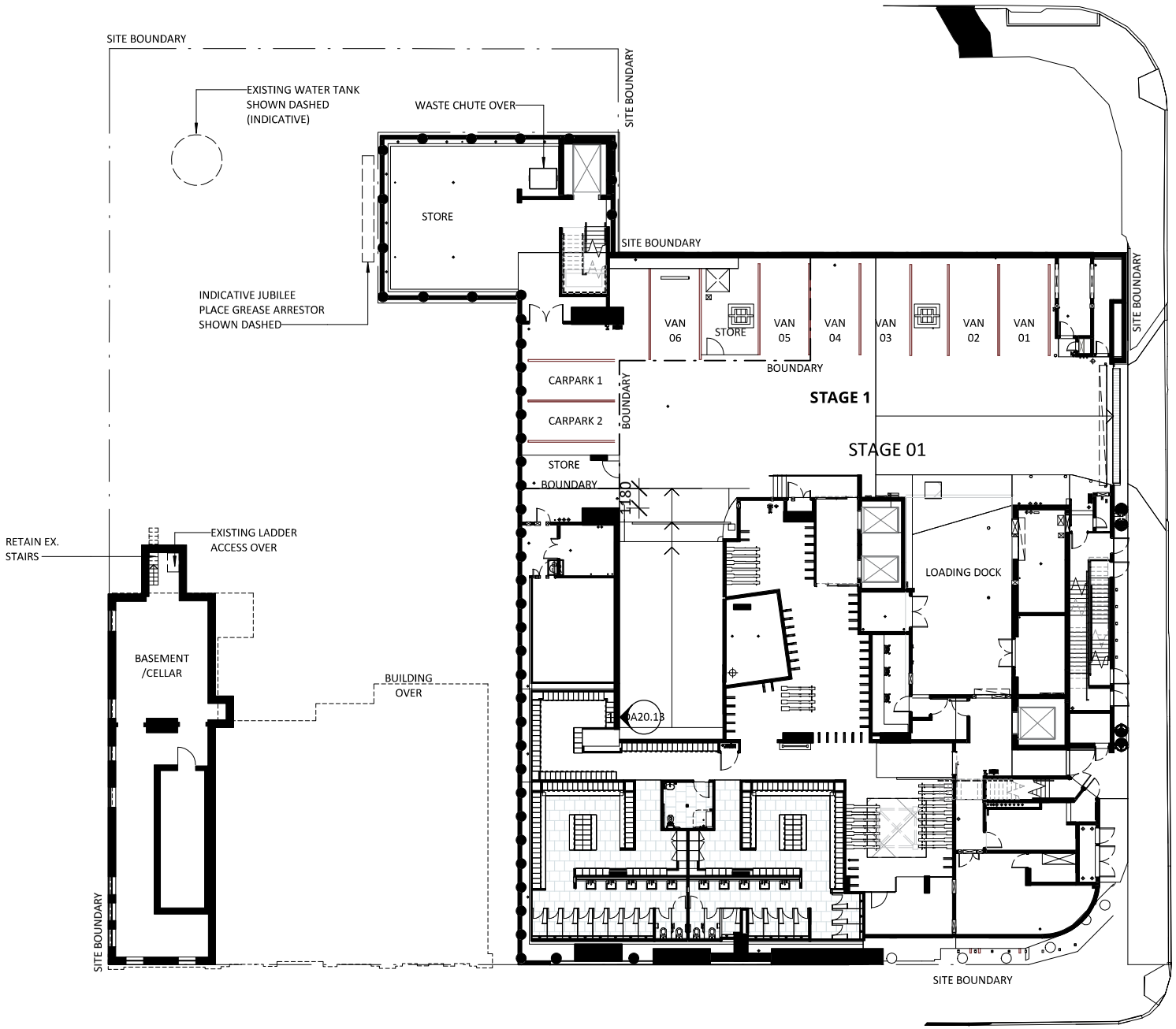
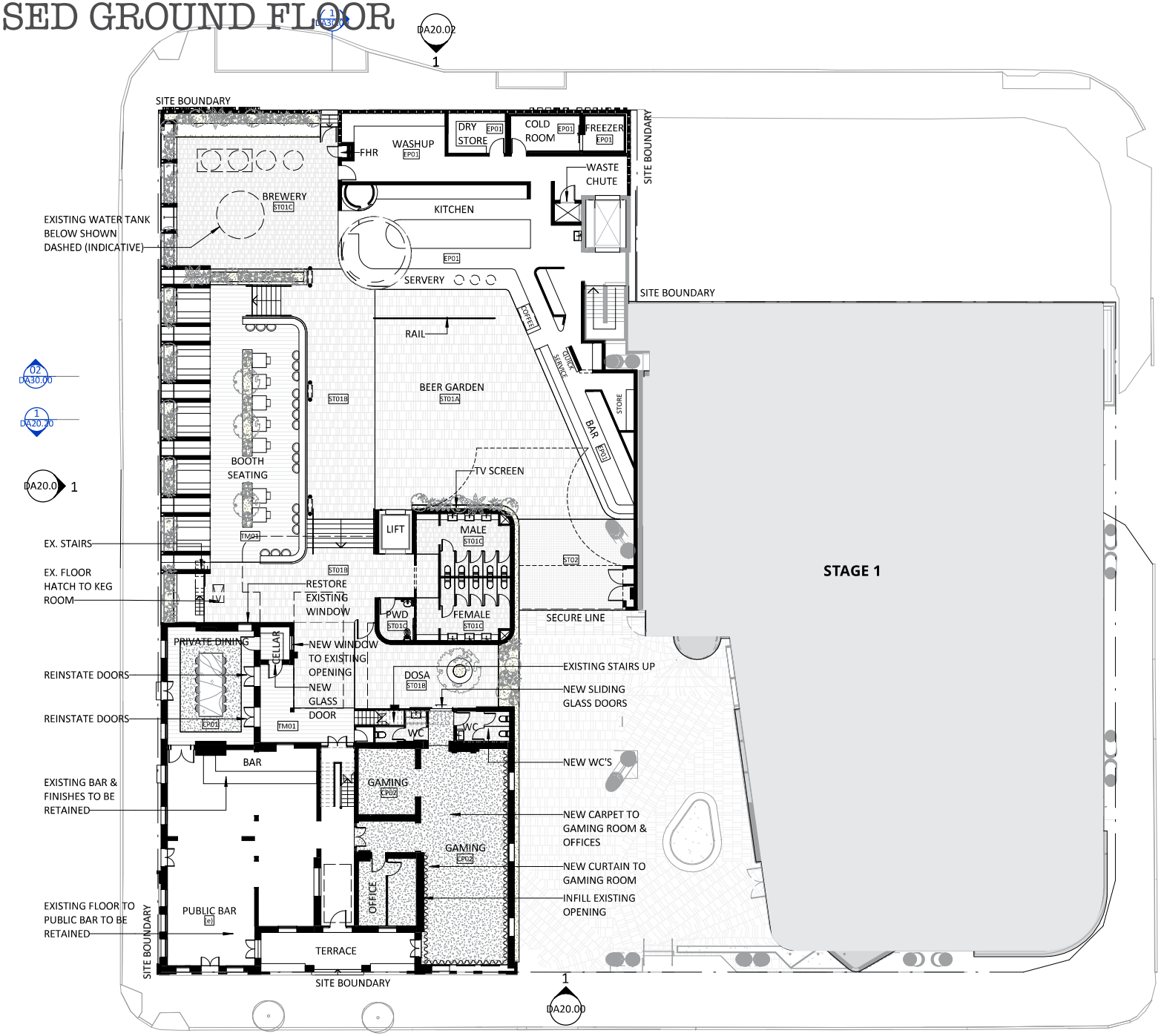


PROPOSED GROUND FLOOR



1:250@A3 0 2 4 6m

MATERIALS LEGENDS

CD01	Tiled cladding
CF01	Off form concrete
CP01	Feature carpet insert to private dining room
CP02	Gaming room carpet
CP03	Level 01 carpet
EP01	Epoxy flooring
FT01	Frameless clear glass
MA01	Solid patterned masonry
ST01A	Stone tiles (to match existing Jubilee Place Plaza floor
ST01B	Stoned tiles to match ST01A, smaller format
ST01C	Stone tiles to match ST01B, smaller format
ST02	Thresholds
TF01	Timber floor

PROPOSED LEVEL ONE

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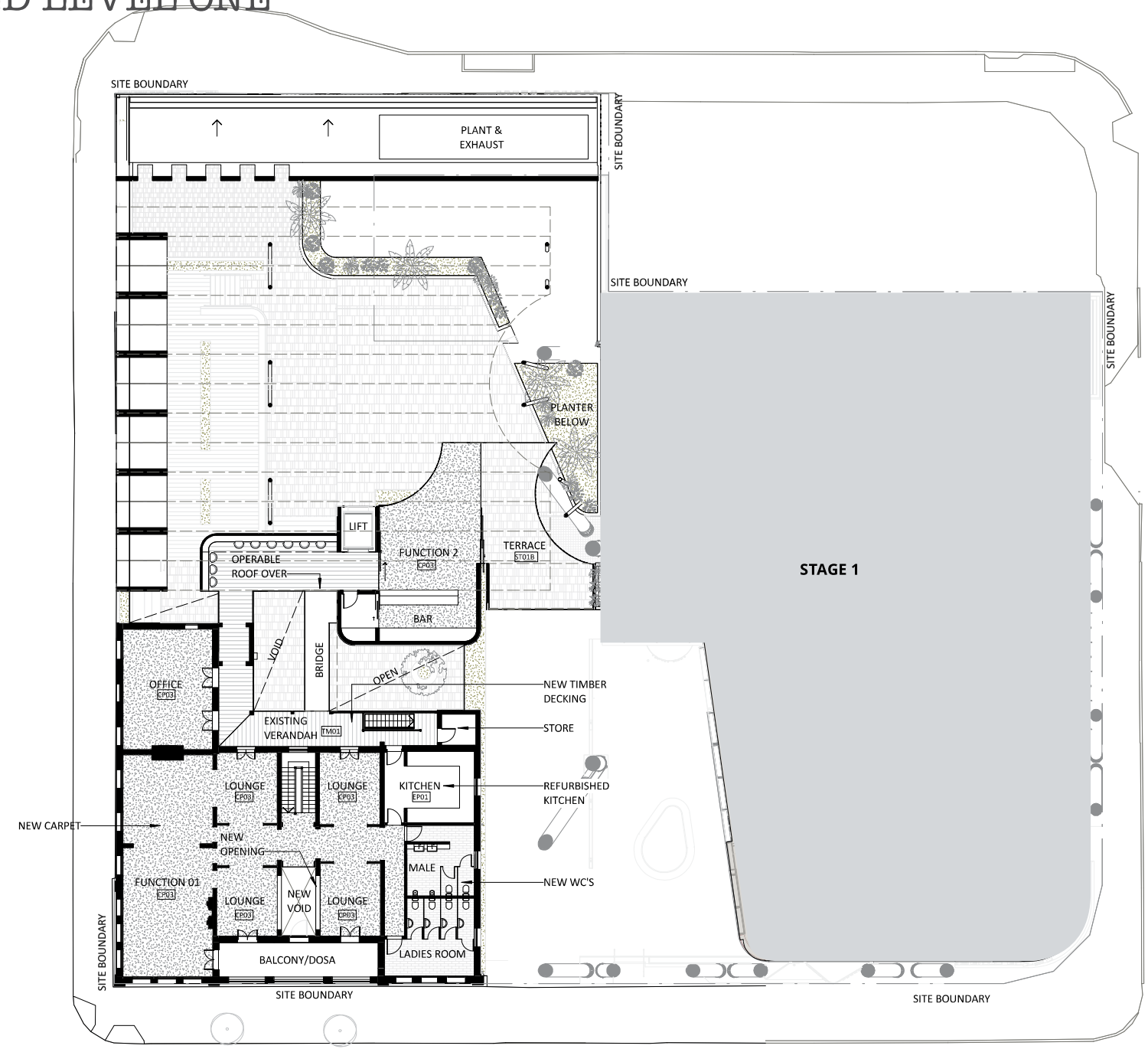

MATERIALS LEGENDS

CD01	Tiled cladding
CF01	Off form concrete
CP01	Feature carpet insert to private dining room
CP02	Gaming room carpet
CP03	Level 01 carpet
EP01	Epoxy flooring
FT01	Frameless clear glass
MA01	Solid patterned masonry
ST01A	Stone tiles (to match existing Jubilee Place Plaza floor
ST01B	Stoned tiles to match ST01A, smaller format
ST01C	Stone tiles to match ST01B, smaller format
ST02	Thresholds
TF01	Timber floor

PROPOSED ROOF PLAN

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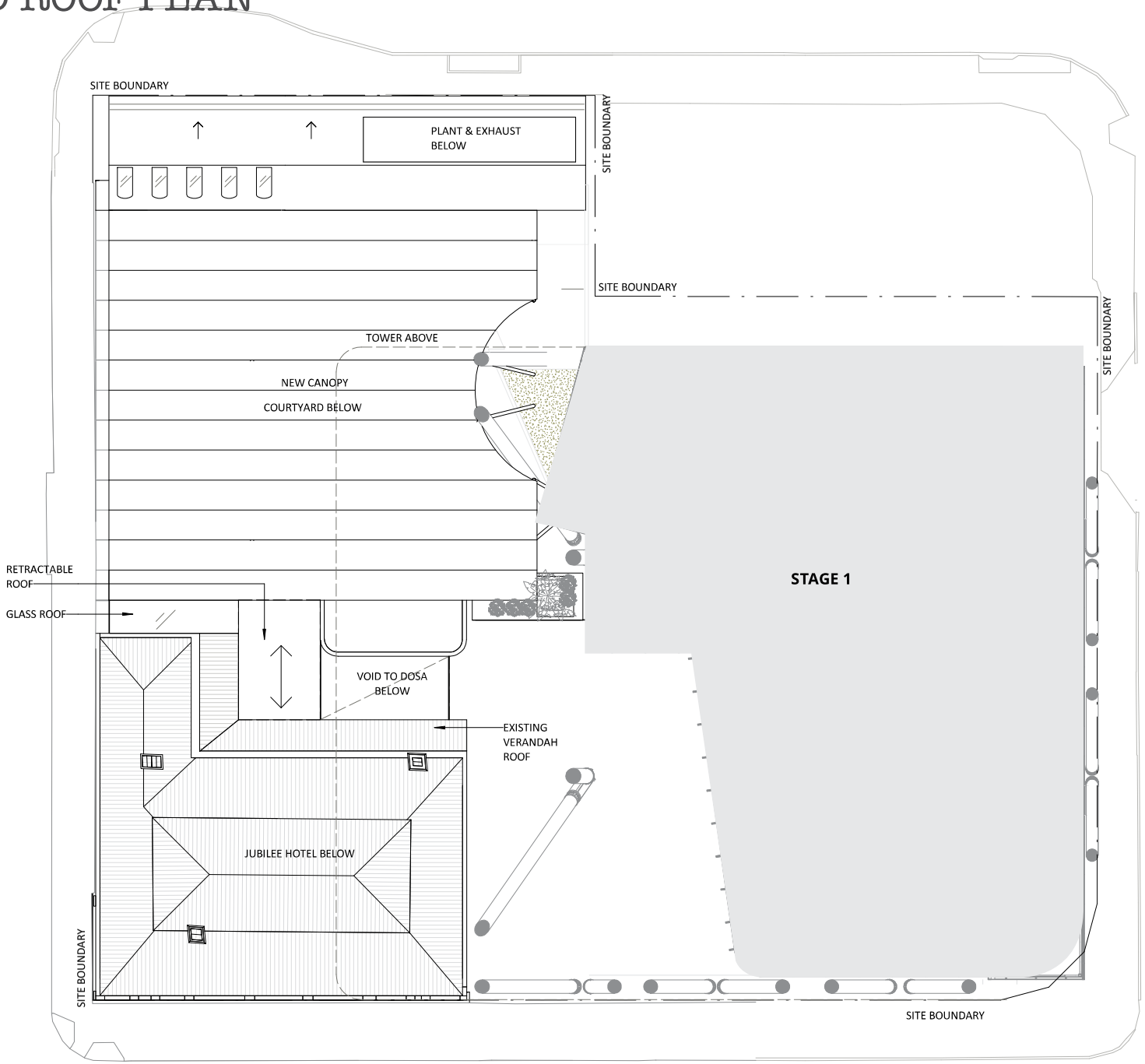
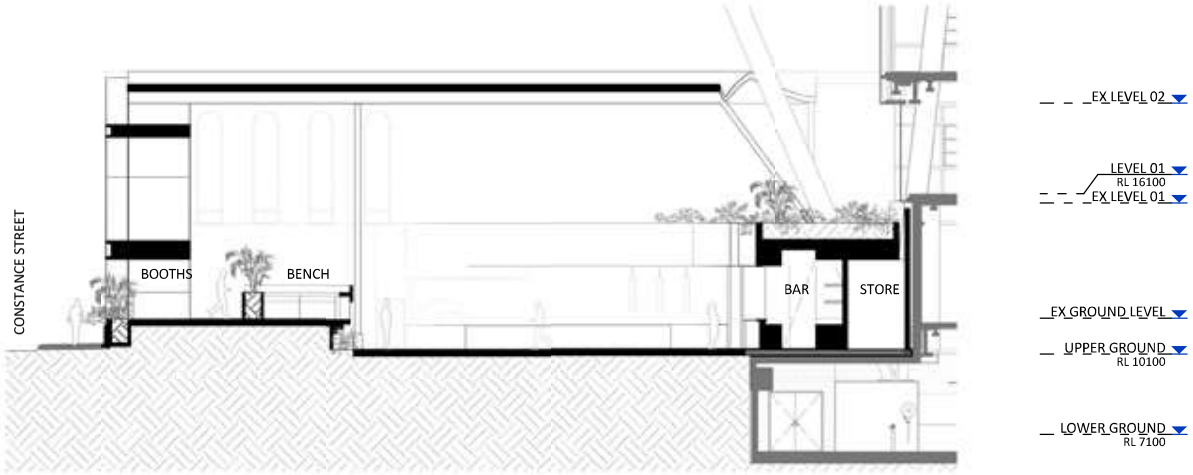


PROPOSED SECTIONS

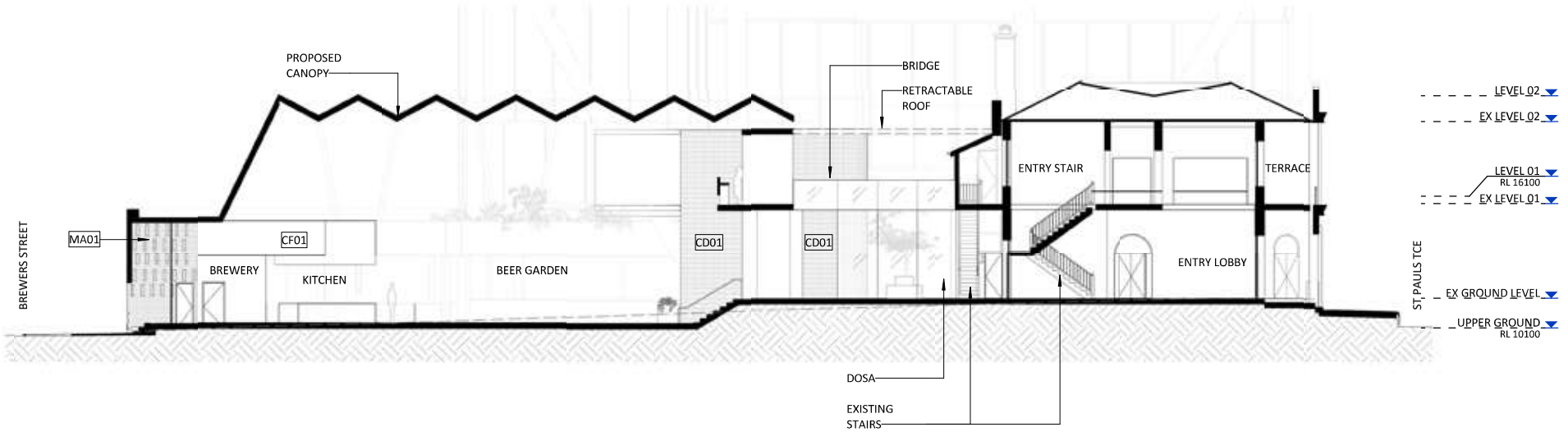
1:200@A3 0 2 4 6m

MATERIALS LEGENDS

CD01	Tiled cladding
CF01	Off form concrete
CP01	Feature carpet insert to private dining room
CP02	Gaming room carpet
CP03	Level 01 carpet
EP01	Epoxy flooring
FT01	Frameless clear glass
MA01	Solid patterned masonry
ST01A	Stone tiles (to match existing Jubilee Place Plaza floor
ST01B	Stoned tiles to match ST01A, smaller format
ST01C	Stone tiles to match ST01B, smaller format
ST02	Thresholds
TF01	Timber floor



CROSS SECTION A



CROSS SECTION B

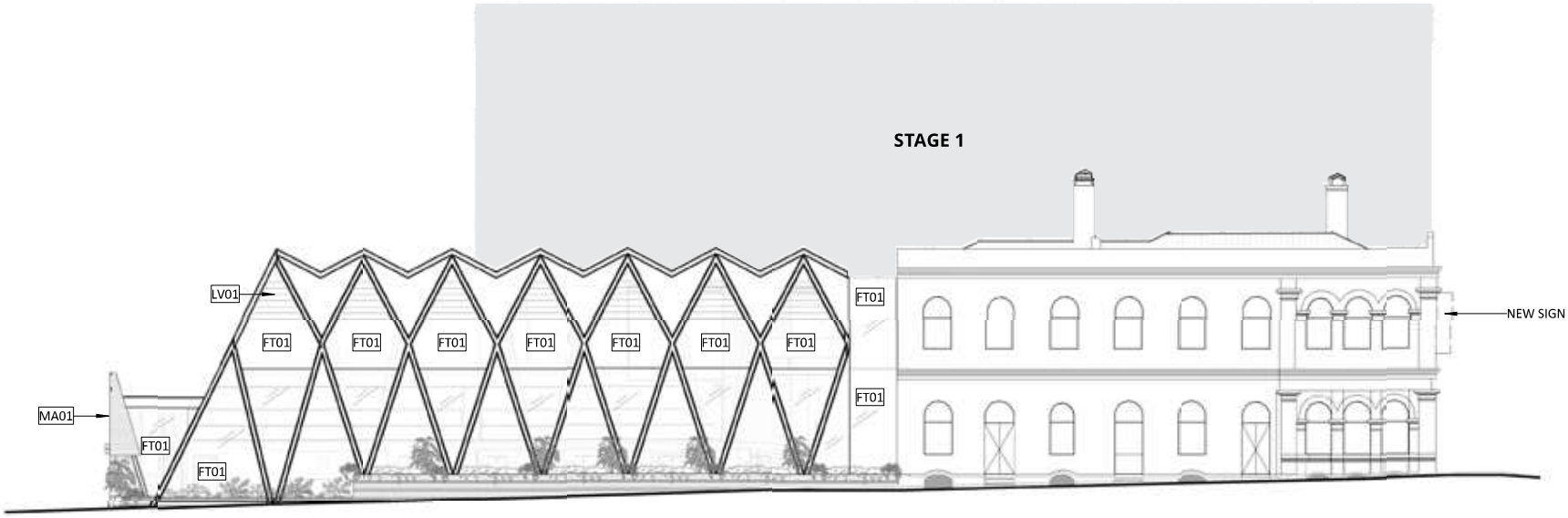
PROPOSED ELEVATIONS

1:200@A3 0 2 4 6m

MATERIALS LEGENDS

CD01	Tiled cladding
CF01	Off form concrete
CP01	Feature carpet insert to private dining room
CP02	Gaming room carpet
CP03	Level 01 carpet
EP01	Epoxy flooring
FT01	Frameless clear glass
MA01	Solid patterned masonry
ST01A	Stone tiles (to match existing Jubilee Place Plaza floor
ST01B	Stoned tiles to match ST01A, smaller format
ST01C	Stone tiles to match ST01B, smaller format
ST02	Thresholds
TF01	Timber floor

ST PAUL'S TERRACE ELEVATION



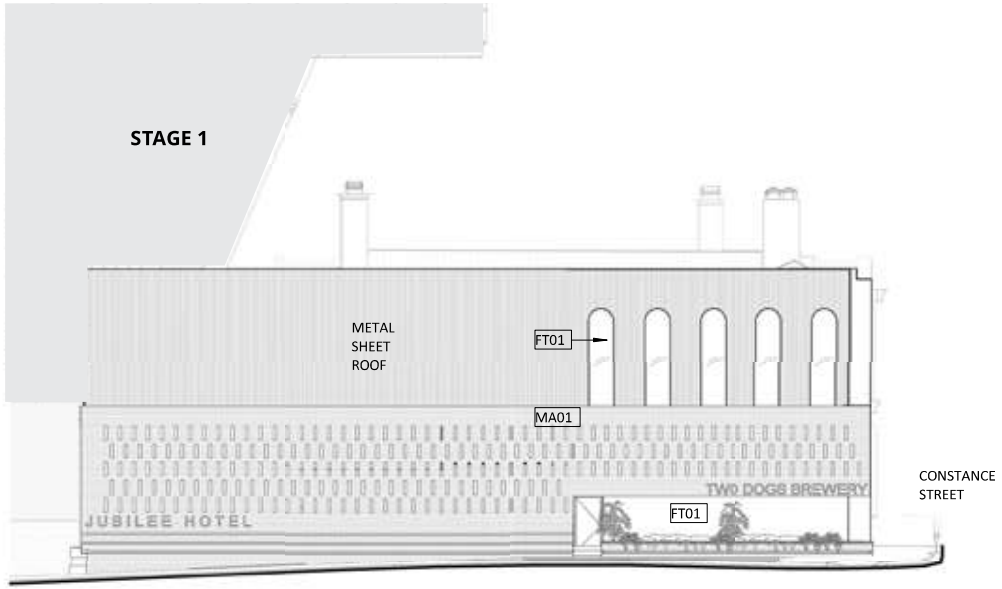
CONSTANCE STREET ELEVATION

PROPOSED ELEVATIONS

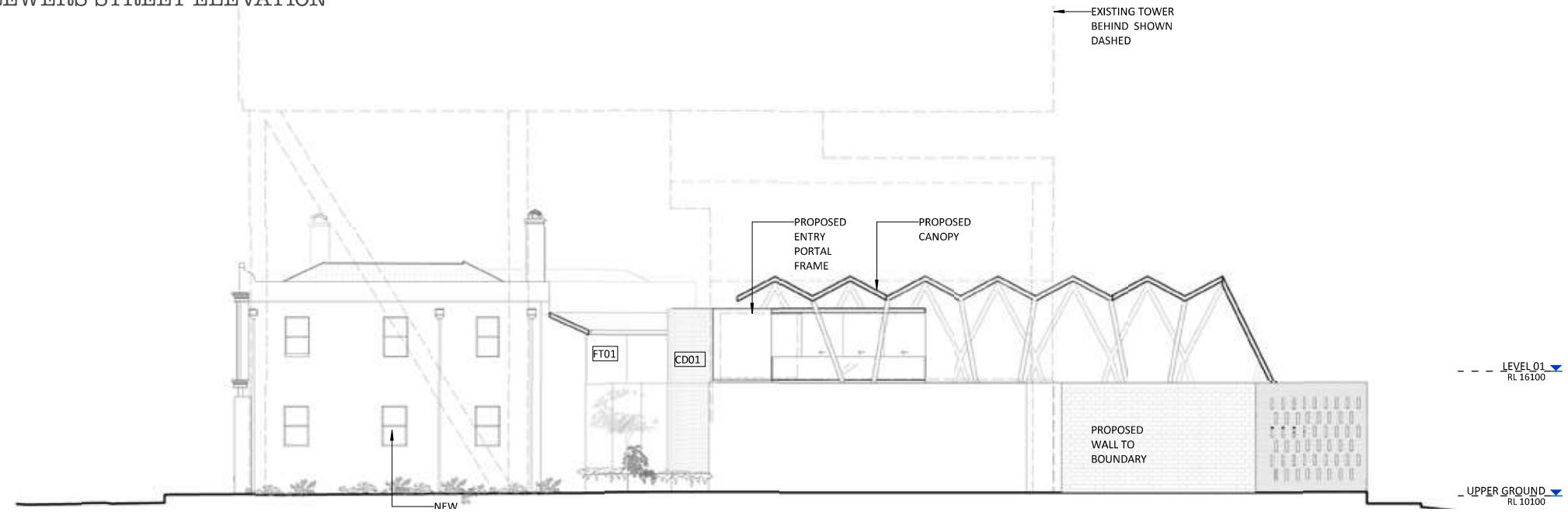
1:200@A3 0 2 4 6m

MATERIALS LEGENDS

CD01	Tiled cladding
CF01	Off form concrete
CP01	Feature carpet insert to private dining room
CP02	Gaming room carpet
CP03	Level 01 carpet
EP01	Epoxy flooring
FT01	Frameless clear glass
MA01	Solid patterned masonry
ST01A	Stone tiles (to match existing Jubilee Place Plaza floor
ST01B	Stoned tiles to match ST01A, smaller format
ST01C	Stone tiles to match ST01B, smaller format
ST02	Thresholds
TF01	Timber floor



BREWERS STREET ELEVATION



SIDE BOUNDARY ELEVATION

INTERNAL ELEVATIONS

1:200@A3 0 2 4 6m

MATERIALS LEGENDS

CD01	Tiled cladding
CF01	Off form concrete
CP01	Feature carpet insert to private dining room
CP02	Gaming room carpet
CP03	Level 01 carpet
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ST01C	Stone tiles to match ST01B, smaller format
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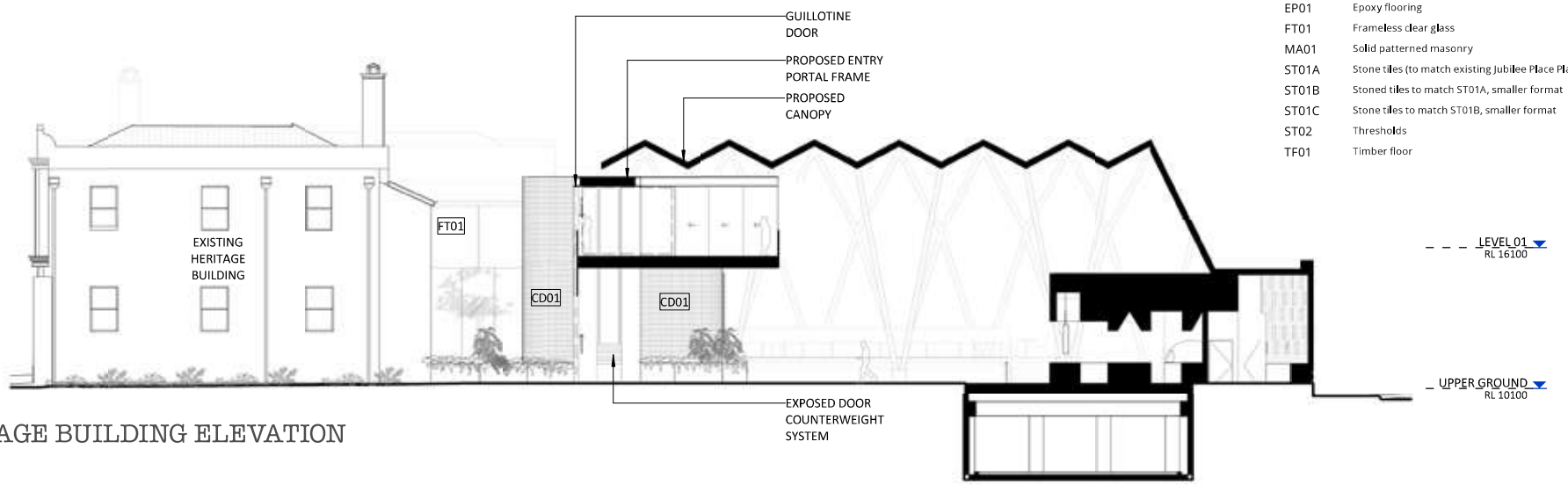
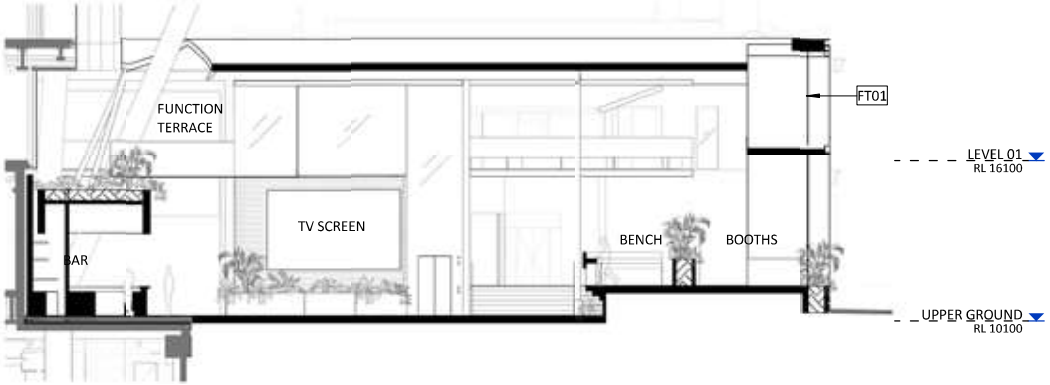
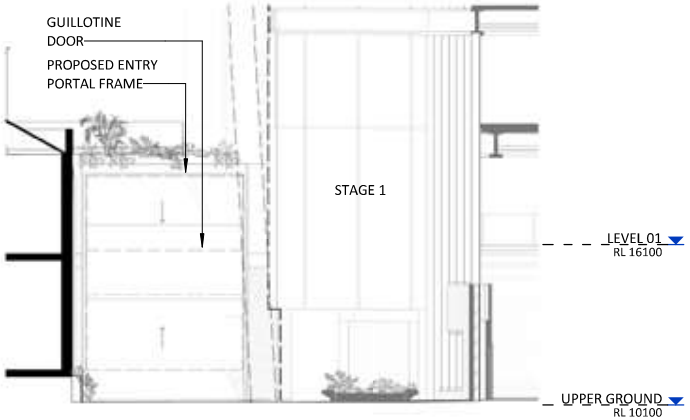
TF01	Timber floor



REAR OF HERITAGE BUILDING ELEVATION



INTERNAL COURTYARD ELEVATION



INTERNAL COURTYARD ELEVATION

BlightRayner

ATTACHMENT 2

Flying Foam 'Nano Craft' Information

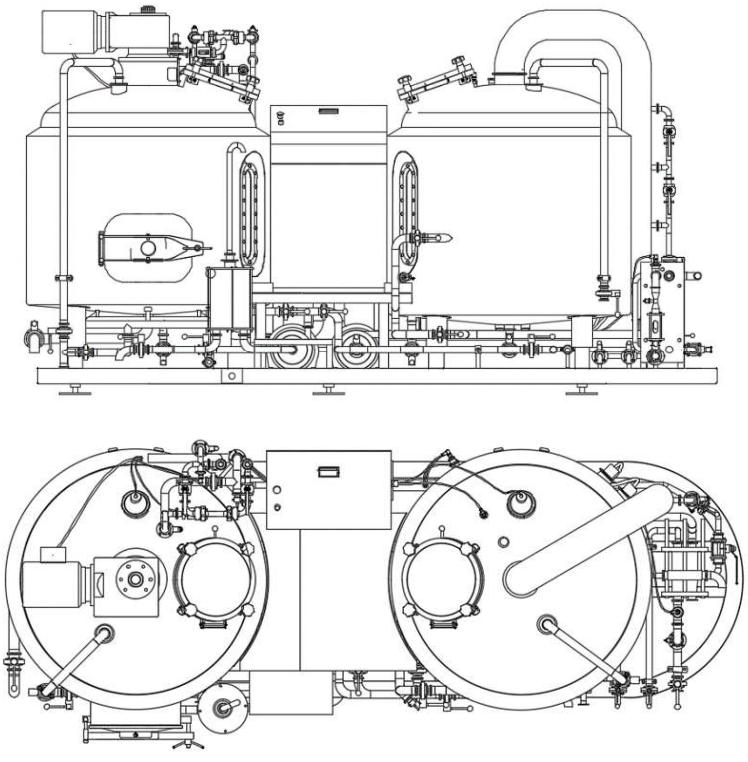
Nano Craft Introduction

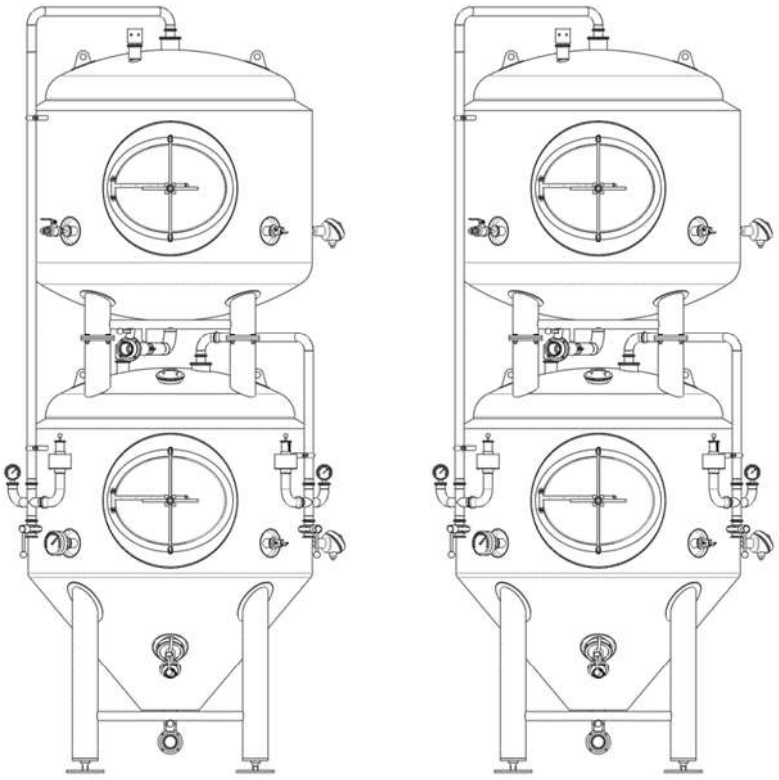
Flying Foam NanoCraft is a micro brewing platform designed to sit within hospitality arenas to form a connection with the venue's customers allowing brand development and the appreciation of freshly produced local beer.

Flying Foam NanoCraft is designed to produce small volumes of beer in 600 litre batches for in-house consumption distributed directly from the NanoCraft cellar stacks with a maximum production of 24,000 litres per year. To achieve this annual production the brewery typically operates one day per week on either a brewing or processing cycle.

Flying Foam provides brewing services to NanoCraft where upon experienced Flying Foam brewers attend site on the day of brewing with all of the equipment, ingredients and consumables required to brew and ferment local craft beer. Upon completion of the days brewing all of the equipment, and remaining consumables are returned to the Flying Foam depot leaving the venue hygienically clean.

To ensure that the brewing process is appreciated and so as not to be intrusive Flying Foam NanoCraft is engineered to mitigate the possible impact of brewing creating an exciting, safe but low impact connection with the brewing process and the production of local craft beer within the hospitality arena.





NanoCraft Brewing Service

Flying Foam provides a full brewing service on NanoCraft. Based on two site visitations the first being brewing the second being processing. Flying Foam attend each visitation with all ingredients, equipment, and consumables. Processing of raw materials is undertaken at the Flying Foam depot where ingredients, equipment and consumables are stored and prepared, meeting strict hygiene and industry standards.

NanoCraft Process Description

The brewhouse is in a 600 litre two vessel arrangement and has size matched fermentation and serving tank combinations. Brewing, being a food grade process, needs to be clean and hygienic by nature and is facilitated in the design.

NanoCraft is intended to be a closed system and brewhouse vessels are only open briefly for additions. The fermentation, beer processing and beer serving has a 0% tolerance with regards being exposed to atmosphere and therefore is an airtight process.

Pre-Brewing

The brewhouse is heated using instantaneous hot water delivered directly into the first vessel the mash tun/lauter with the internal sparging arm. The externally insulated tank is brought up to temperature and the remaining hot liquid is transferred to pre-warm the second vessel the kettle/whirlpool.

Grain Mash

Pre-milled grain (milled offsite) is added to a specific temperature of hot water at a steady pace. Once all the grain has been introduced the lid is sealed to prevent any heat loss or odour escape. The grain is rinsed with hot water to extract sugars using closed loop piping and pumps and the resulting sugar liquid (Wort) is transferred to the kettle using the closed loop piping. Once all the free liquid is transferred to the kettle the spent grain is removed from the mash tun/lauter and removed from site.

Boiling

The wort now located in the kettle/whirlpool is brought up to a boil and is boiled for one hour. During this process the manway is sealed, and the vapour condenser extracts steam and odour and discharges to waste. Through this process little or no steam or odour escapes to atmosphere.

Transfer

Once the boiling process is complete the wort is transferred through a heat exchanger where it is cooled within a closed loop from 100 degrees Celsius to 20 degrees Celsius on its way to the fermentation vessel.

Fermentation

Once the wort is in the fermentation tank yeast and hops are added and the vessel sealed to atmosphere for the duration of fermentation which is approximately fourteen days.

Process

Once fermentation is complete the beer is transferred within a closed loop through a filter on its way to the bright beer/serving tank. The beer is then carbonated and is ready to server direct through the inhouse tap system.

Cleaning

As brewing is falls within food production all vessels are treated with appropriate cleaning to ensure that no bacteria are present during the process and that all surfaces are sanitary. Chemicals used within the cleaning process include caustic soda, citric acid and peroxy-acetic acid. These chemicals are brought to and removed from site on the day of use. During the cleaning process thorough rinsing dilutes any residual chemical to safe levels before it discharges into the sewar. No chemicals are stored on site.

NanoCraft Environmental Impact Mitigation

Vapour Condenser

This equipment is designed and engineered for steam condensation and the removal of vapours and odours generated in boiling equipment during the brewing process. The vapor condenser allows suction of vapor from the container by ventilator and subsequent condensation in a tubular heat exchanger. From the heat exchanger then goes only condensed liquid of substantially lower temperature that is discharged directly to the sewar thus eliminating steam and odour without it escaping into the atmosphere.

Tank Purge Lines

NanoCraft services include a tank vent discharge line to purge tank gasses and odors to atmosphere. As part of the cleaning process fermentation and bright tanks are connected to this vent line prior to the vessels being opened ensuring that CO2 and odorous gasses are discharged safely without causing undue impact to the hospitality arena.

Industrial Waste Balancing Tank

All brewery hydraulic discharge is collected in a two-stage sealed balancing tank. The first stage collects any suspended solids and allows for temperature balancing. The second stage allows for further temperature balancing prior to discharge entering the sewar system. Through use of water traps and sealed tanks little or no odour escapes from the discharge of hydraulic waste.

Spent Grain Removal

Spent grain, that is milled grain that has been used in the first stage of brewing is removed from site on the day of brewing. This ensures that there is no undue environmental impact from spent grain being left on site.