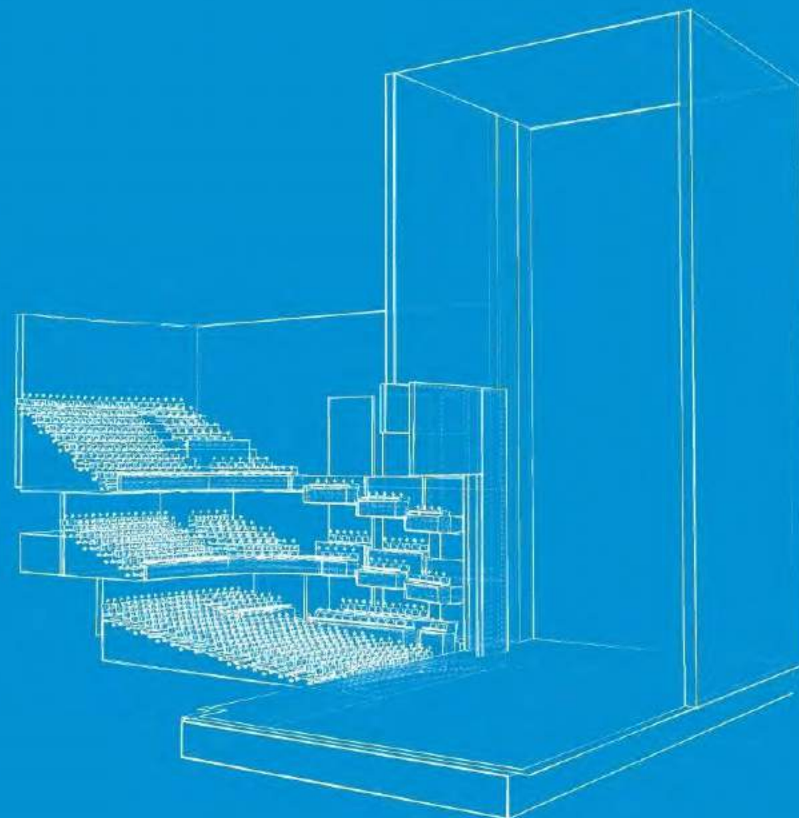
WAIKATO REGIONAL THEATRE

PRELIMINARY DESIGN REPORT

AUGUST 2018



CHARCOALBLUE
THEATRICAL INNOVATION | ESTD 2004

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EXECUTIVE SUMMARY

Charcoalblue are extremely proud to present the Preliminary Design Report for the Waikato Regional Theatre to the Momentum Waikato Community Foundation.

The report is the culmination of the Preliminary Design stage and the work undertaken by the Design team to build on the foundations set by the Concept Design Report Report issued in March 2018.

Following the Concept Design the design team undertook to develop the proposals in more detail following the standard scope of a Preliminary Design Work Stage. Included in this stage were two further goals, namely;

– Achieve a co-ordinated design alongside the proposed adjacent Hotel development to a level culminating in a Resource Consent application to Hamilton City Council
– Work further on cost targets identified at Concept Design by interrogating the design assumptions, thereby removing risk and giving surety to the cost plan and project budget.

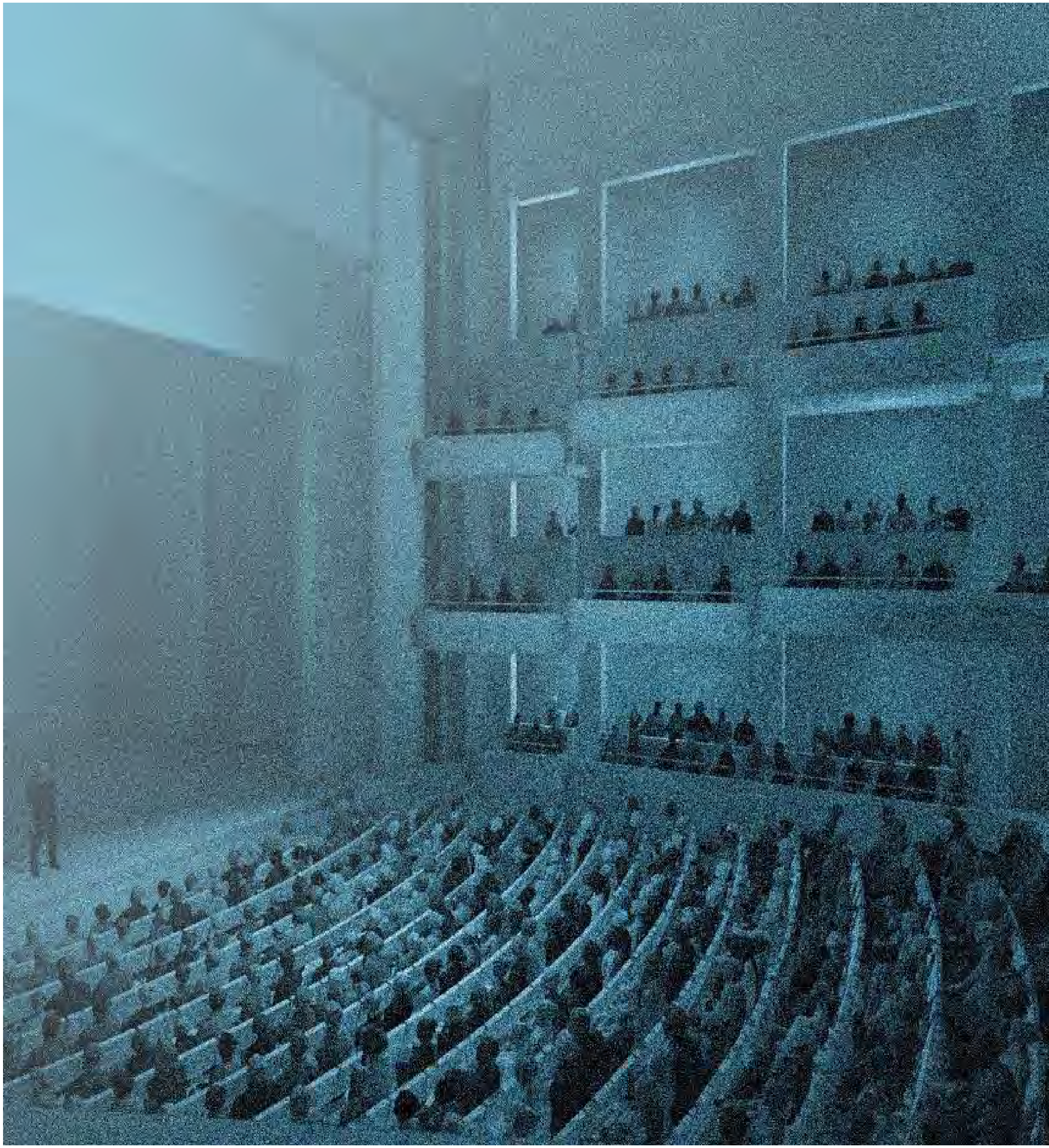
During the Preliminary Design phase, the team have reported back to the Governance Panel twice and on each occasion focussing on the development of the overall design but with an emphasis on cost reporting. This has included further detail on elements of the design identified as having significant cost risk or potential for savings.

As well as progressing the design we have continued the excellent stakeholder engagement process and re-enagaged with the local community groups, presenting the concept design for feedback. Workshops were organised by Creative Waikato in July 2018 with generally very positive feedback. A separate report has been prepared and sent to the client from CW.

This report details how the team have developed the design, how the Concept assumptions have been tested further and sets out the key moves in planning, form and operation and reports on the final design which will progress to Resource Consent Application on the agreement of the client.

At present it is anticipated that the Developed Design Phase will be undertaken immediately following the Preliminary Design (subject to client instruction) and run from mid August to mid December 2018. The Resource Consent Application is targeted for w/c 13th August 2018.

We look forward to being part of the next stage of consultation and remain committed to working with Momentum Waikato and Hamilton City Council to enable this project to move forward and to join everyone on the opening night of New Zealand's most exciting, innovative and world class performance arts and community venue.



1.1 CHARCOALBLUE TEAM

LEAD THEATRE EXPERT CONSULTANT

Charcoalblue are leading the theatre and acoustic design of the proposed venue, ensuring a coordinated and cohesive response to the challenges of the brief.

Working alongside and under the umbrella of Charcoalblue are a range of National and Local Consultants.

ARCHITECTS

Jasmax Architects are based in Auckland and are one of New Zealand's largest and inspiring architectural practices with offices in Auckland, Tauranga, Wellington and Christchurch and a portfolio of award winning public and cultural architecture. For over fifty years Jasmax have specialised in the design of engaging cultural and civic spaces.

STRUCTURAL, CIVIL AND FIRE ENGINEERS

Holmes Consulting operate 5 offices in New Zealand including their local office in Hamilton. They have extensive structural and theatre expertise and are well placed to understand the local conditions in Hamilton.

SERVICE AND SUSTAINABILITY CONSULTANTS

eCubed, based in Auckland and Wellington bring the important national perspective to an integrated services and environmental design, based on the latest innovative sustainability led process.

1.2 CLIENT TEAM

COST CONSULTANTS

Kingstons is one of New Zealand's longest established professional quantity surveying and construction cost consultancies and maintains offices in Auckland, Hamilton and Christchurch involving a total of about 20 professionals.

LOCAL COMMUNITY ADVISER

Creative Waikato, through their CEO Sarah Nathan, have joined the team to bring their extensive knowledge of community arts needs and ensures a local voice is an integral part of the stakeholder engagement.

THEATRE OPERATIONAL ADVISERS

The H3 group manage live venues in and around Hamilton including Claudelands Arena and the former Founders Theatre.

The WRTGP have also engaged Richard Jeffries and Sarah Nathan to advise on operarational management structures.

PROJECT MANAGEMENT

RDT Pacific are experienced Project Managers and Quantity Surveyors with in the public and private sector. With offices located in Auckland, Wellington, Rotorua and Christchurch.

1.3 MILESTONE REPORTING

The following timetable was agreed as the schedule for Concept Design reporting to the WRTGP and the interim design team meetings and workshops from November 2017 to March 2018.

- Wednesday 30th May	PM start up meeting at RDT office
- Thursday 31st May	Pre App meeting with Hamilton City Council
- Thursday 31st May	Design Team Meeting in Hamilton
- Tuesday 5th June	WRT GP update in Hamilton
- Wednesday 27th June	WRT urban design panel meeting in Hamilton
- Thursday 5th July	WRT GP meeting in Hamilton
- Monday 9th July	DTM coordination meeting in Auckland
- Tuesday 24th July	PD cost review with DT in Auckland
- Wednsesday 25th July	Local stakeholder presentation in Hamilton
- Monday 13th August	PD presentation in Hamilton

DESIGN REPORTS

2. AUDITORIUM DESIGN

3. ACOUSTICS

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2. AUDITORIUM DESIGN

2.1 SUMMARY

The Preliminary design phase captures our developments of the key principles established during the Concept Design stage.

We tested and fine-tuned the auditorium design for integration within the architectural masterplan, improvement of audience experience, better functionality and higher cost-efficiency.

The most notable change from the Concept Design stage proposals is the position of the side audience boxes, fixed for both theatre and music modes. The new proposals maintain the level of functionality envisaged in the Concept Design scheme, and in accordance with the established hierarchy of uses:

- Lyric Theatre (large scale drama, musicals, ballet, contemporary dance and opera)
- Classical music
- Haka dance
- Amplified music concerts
- Community events, awards and ceremonies
- Small scale drama

The following section is a summary of the design development and changes since the end of Concept Design stage.

2.2 DESIGN DEVELPOMENT

AUDITORIUM LEVELS AND CIRCULATION

Following updated site survey information and subsequent building-wide levels adjustments the auditorium entrance levels were relocated for coordination with the architectural scheme.

The new levels achieve slightly shallower section profiles which resulted in audience entrances being placed higher up the seating rake. The new entrance relationship to the seating rake presented an opportunity to revisit the Circle level circulation, omit the rear entrances and reduce space. All auditorium entrances are now placed to the side walls and short cross aisles lead to the more central aisles, keeping the audience circulation diagram consistent across all levels.

The escape strategy analysis indicated that the stalls forestage exits are not required for audience egress. However, they provide an extremely useful physical connection between the auditorium, the front of house areas, the forestage zone and the stage house, and we’ve kept them for audience and performer circulation.

AUDIENCE BOXES

The value engineering process identified the movable audience side boxes as an area of potential saving, not only in the associated capital cost but also in long term operational and maintenance costs. The advantages and disadvantages of a *fixed* box position are summarised below:

Advantages:

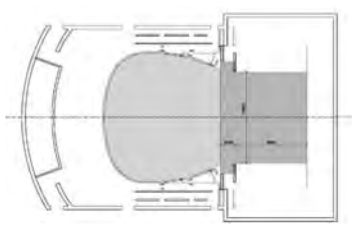
- Capital cost savings.
- Lower maintenance costs.
- Lower labour/operational costs.
- Better extreme downstage views from side boxes.

Disadvantages:

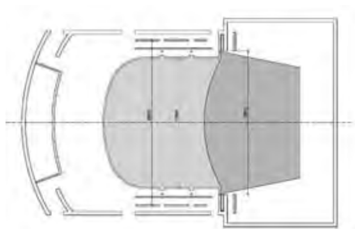
- Room form is less responsive to its function.
- Space feels wide and less connected to the proscenium in theatre mode.
- Loss of parallel arrangement and side boxes overhang the platform in music mode.
- Extreme upstage views from side boxes are degraded.

We presented the options to the board of trustees, and together we decided that Preliminary Design should proceed with the fixed boxes option.

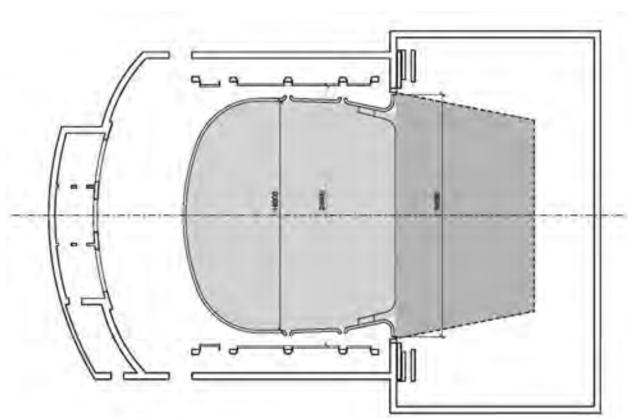
Our proposed layout places the upstage boxes in an intermediate location, striking the best possible balance for optimal sightlines and room form for both theatre and music modes.



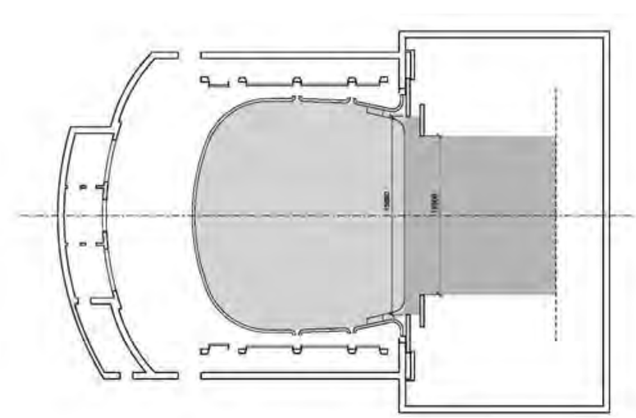
Theatre format at Concept Design



Music format at Concept Design



Music format at Preliminary Design



Theatre format at Preliminary Design

SIDE WALLS

The side walls made of layered surfaces were also revisited and simplified during Preliminary Design. There are three notional layers defining the side walls' surfaces: the first is the playful ribbon of the balcony and box fronts, the second is a free-standing surface behind the first row of seats which is punctured by the second row of audience boxes, and finally the outer solid wall of the auditorium box.

The second intermediate side wall layer will be reviewed and fine-tuned during the next stage, as it plays an important role for the room's acoustics. Although partially open and allowing views to the solid wall beyond, this layer will also form the visual boundary of the auditorium, greatly helping to reduce its perceived width and overall volume and scale. The second row of audience boxes push forward of the wall's notional plane which allows better sightlines and also places the audience within the main volume of the room maintaining the sense of a connected audience community.

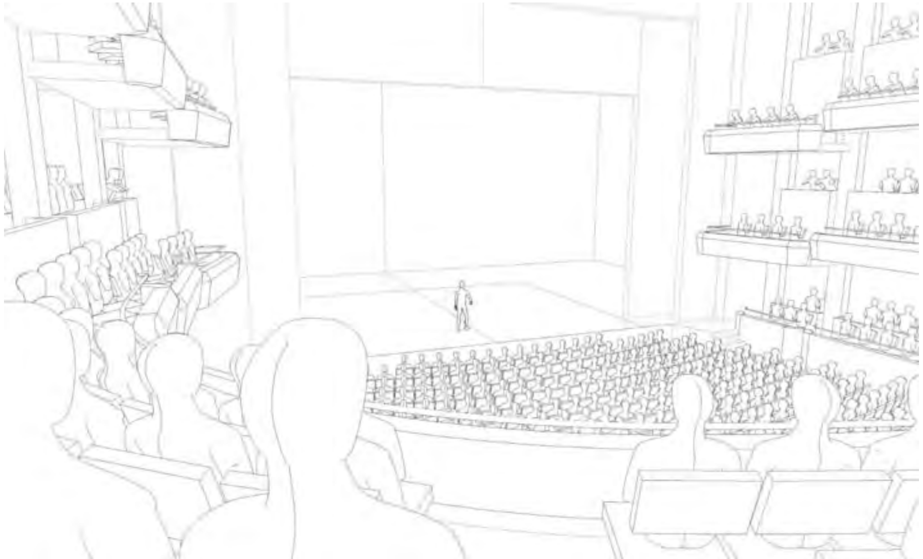
This second intermediate side wall surface spans along the side wall and merges with the stepped seating rakes, layering the facing audiences with the side boxes and fluidly transitions to the audience wrapped around the room.

The detailing and materiality of the layered surfaces will continue to be explored during the next design stage.

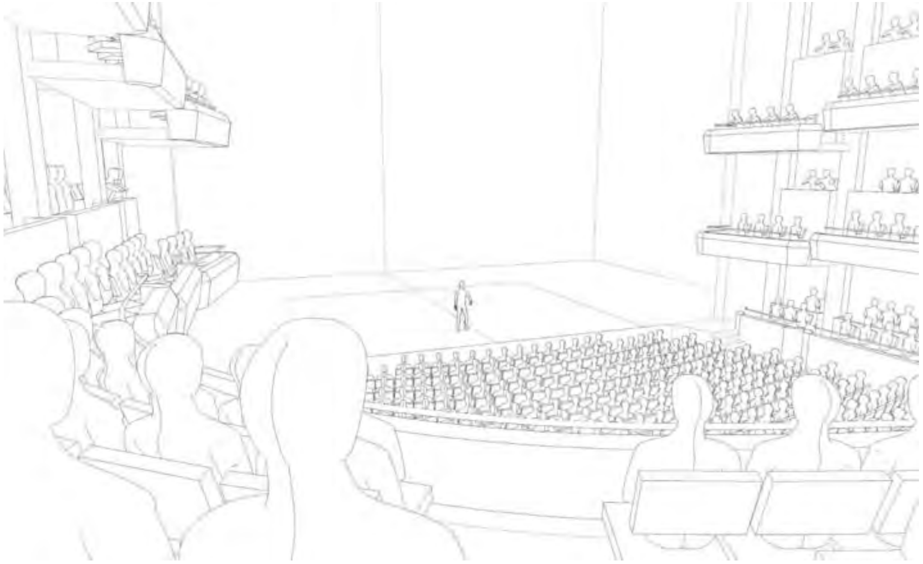
FLEXIBILITY

Although the audience side boxes are in a fixed position, the forestage elevators, double adjustable proscenium, and acoustic shell will ensure all room formats outlined in the Concept Design report are maintained.

The movable proscenium elements (moving architectural proscenium and theatrical masking) will play a key part in the room's responsiveness to the different functions. We will continue to develop the multi-dimensional definition and architectural articulation of the movable proscenium to ensure continuity and coherence of the room's design language.



View from Circle -12m wide proscenium



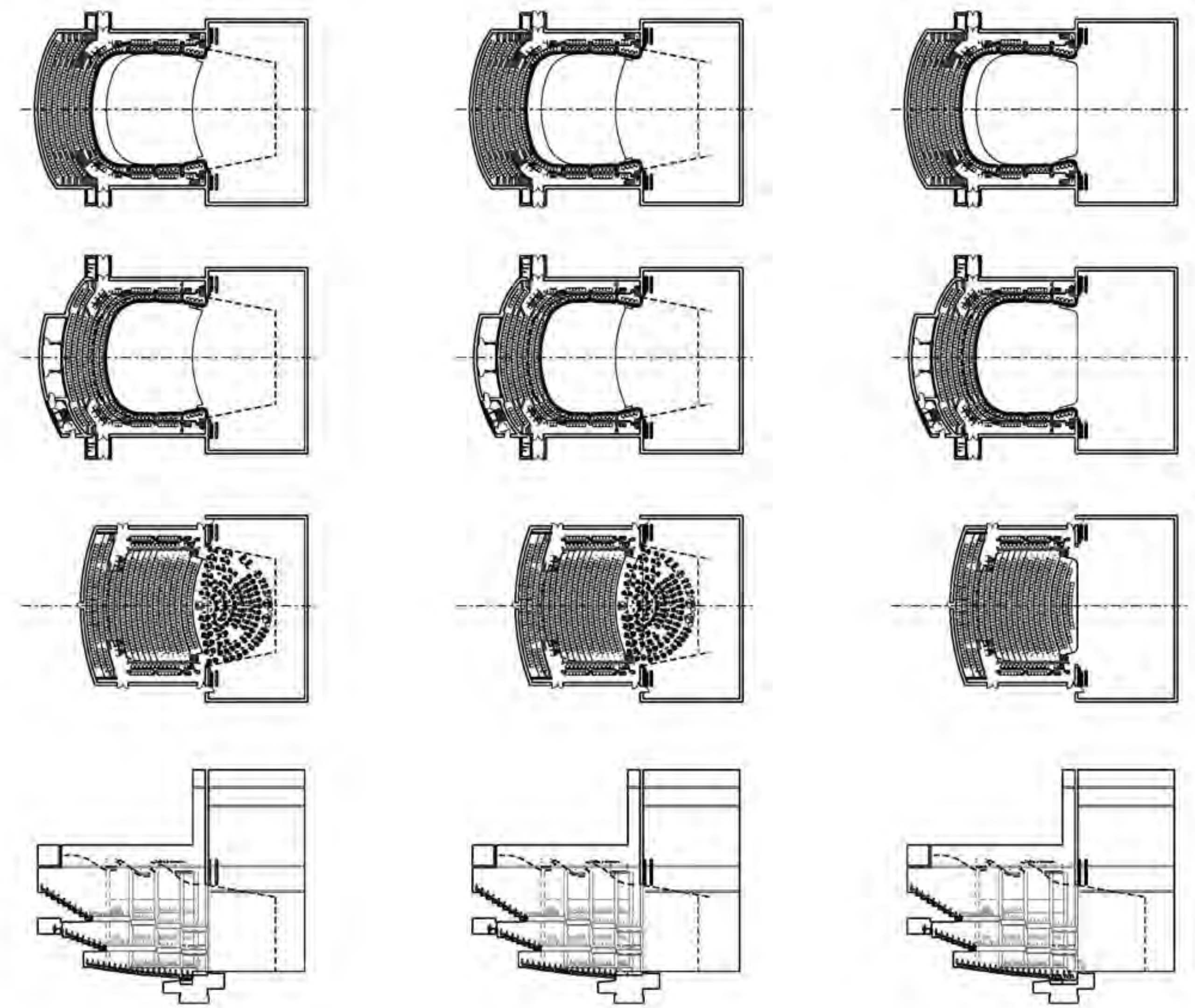
View from Circle - 20m wide proscenium

2.3 SEATING FORMATS

Balcony

Circle

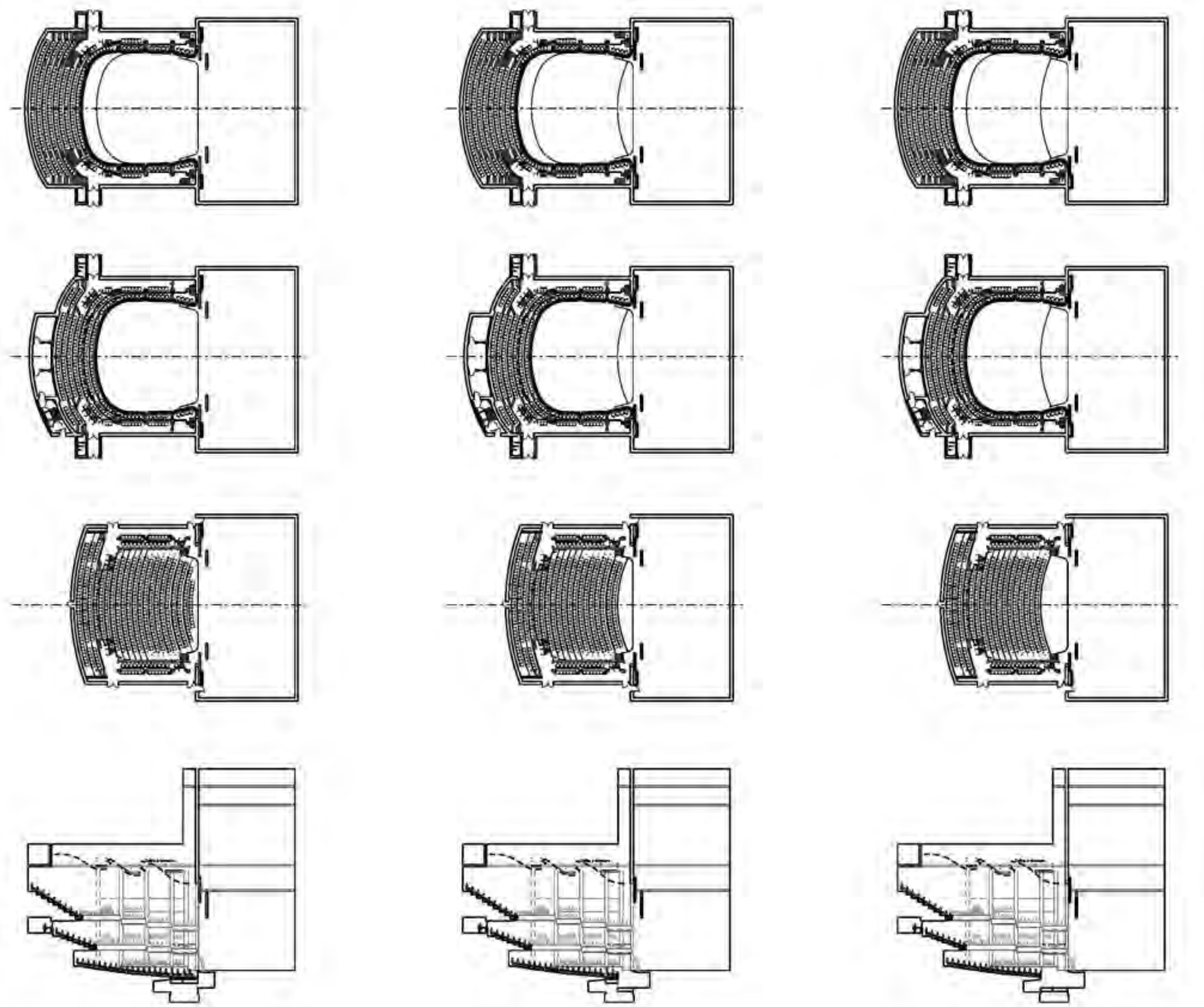
Stalls



Music:
Orchestra on first forestage elevator, wide prosc.

Music:
Orchestra on both forestage elevators, wide prosc.

Haka dance:
No pit, wide prosc.



Balcony

Circle

Stalls

Drama:
No orchestra pit, narrow prosc.

Musicals:
Small orchestra pit, narrow prosc.

Opera:
Large orchestra pit, narrow prosc.

2.4 CAPACITY OVERVIEW

The auditorium seating capacities at the end of preliminary design:

Music (large orchestra on one forestage elevator)	1292
Music (large orchestra on both forestage elevators)	1239
Haka dance, no pit	1313
Theatre, no pit	1305
Musicals, small pit	1268
Opera, large pit	1215
Excluding balcony, no pit	948
Excluding balcony and circle, no pit	640

Please note that the above capacities exclude temporary sound mixing position and wheelchairs, and are only indicative and likely to fluctuate as the design progresses.

2.5 ACCESSIBILITY

The number of wheelchair positions has been increased to twelve (12) during Preliminary Design to improve on the Concept Design stage's provision.

The stalls level wheelchair positions are increased from four to six: four at the crossover as per previous proposals and two additional positions at the upstage side boxes. The circulation within the stalls level was revised to allow step-free access from all wheelchair positions to the stage - a particularly useful feature for conferencing and award ceremonies.

There are four wheelchair positions on the circle level and a further two at the balcony level.

3. ACOUSTICS

During the Preliminary Design phase, the acoustic design of the Auditorium and surrounding spaces has been advanced, testing and building on the ideas from the concept study. We have studied the following:

- Auditorium form; including acoustic volume, geometries for early reflections, balcony overhangs, and locations for variable acoustic elements.
- Design criteria and strategies for noise and vibration control.
- Internal sound separation between spaces and strategies for specialty sound separating constructions.
- Building systems schematics to achieve noise control objectives.

3.1 ACOUSTIC DESIGN CRITERIA

The following sections describe the objective and subjective goals for the acoustic design.

SOUND SEPARATION CRITERIA

The perimeter envelope of the Auditorium should generally provide 70dB of sound reduction index at mid-frequencies. Some flexibility in that criteria can be allowed for the upper areas in the flytower (allowing for a reduction in the weight of the tall flytower walls).

The Rehearsal Room construction should provide 65dB of sound reduction to the hotel rooms and car park, with 50dB of sound reduction to adjacent public spaces.

In each of the above cases, low frequency sound reduction index will be considered in conjunction with the above and will influence the selection of construction types.

The sound separation criteria to the other less critical spaces will be developed during Schematic Design.

BACKGROUND NOISE CRITERIA

Our recommended background noise levels throughout the building are assigned according to requirements for critical listening conditions, communication, and comfort.

Maximum levels of continuous background noise are specified using noise criteria rating systems. These systems are used to describe and specify neutral-sounding sound spectra of a given perceived loudness. These criteria rating systems can be used to meaningfully compare the loudness of sound at different frequencies.

Many different noise criteria rating systems have been developed, each with their own intentions for use and application. These systems are referred to by two- or three-letter initialisms. We suggest using values from both the Preferred Noise Criteria (PNC) and Noise Rating (NR) systems. The recommended criteria (and associated octave band sound pressure levels) are listed below.

From a design perspective, these values will be used as not-to-exceed values for the purposes of calculating anticipated background noise levels produced by mechanical and electrical equipment.

Room	Noise Criteria	Sound Pressure Level (dB, re: 20 µPa) Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Auditorium, Stage, Flytower, Orchestra Pit, Trap Room	PNC-15	43	35	28	21	15	10	8	8
Control Rooms, Sound and Light Lock Vestibules	PNC-20	46	39	32	26	20	15	13	13
Rehearsal	PNC-25	49	43	37	31	25	20	18	18
Education Spaces	NR-25	55	44	35	29	25	22	20	18
Dressing Rooms, Green Room	NR-35	63	52	45	39	35	32	30	28
Offices	NR-35	63	52	45	39	35	32	30	28
Foyer	NR-40	67	57	49	44	40	37	35	33
Toilets	NR-45	71	61	54	49	45	42	40	38

Recommended Background Noise Criteria

3.2 ROOM ACOUSTIC GOALS

Our acoustic design for the Auditorium recognises that the subjective aims for both the audience and the performers are different.

Subjective acoustic goals for the audience include:

- Absence of background noise.
- High sound strength and impact.
- Clarity of musical detail and sung text.
- Warmth of tone for orchestra.
- An honest, natural vocal sound.
- Moderate reverberance but careful compromise with intelligibility of text.
- High acoustical intimacy and envelopment in the sound to promote audience involvement.
- Excellent balance between singers and orchestra to favour voices in loudness.

Subjective acoustical goals for the performers include:

- The Orchestra should be able to hear each other.
- The Orchestra should be able to hear singers and singers should be able to hear the orchestra.
- Loudness balance between singers and orchestra – to enhance the singers' voices relative to the orchestra.
- Sound in pit not too loud – to avoid hearing damage due to exposure to loud sound.

The above goals will influence many design decisions, including:

- Overall geometric form of the Auditorium and Orchestra Pit.
- Fine-scale orientation of sound reflecting surfaces.
- Texture of architectural finishes.
- Surface weight of architectural finishes.
- The quantity, location, and flexibility of variable acoustic systems.

ROOM ACOUSTIC CRITERIA

The objective acoustic criteria will continue to be advanced to correspond to the developing detailed brief, however we have set the following basic criteria to achieve the acoustic goals outlined above:

- Reverberation time between 1.9 and 2.2 seconds in Orchestra mode.
- Reverberation time between 1.4 and 1.7 seconds in Drama and Amplified Music mode.

Other spaces will also have room acoustic criteria – generally expressed as reverberation time (RT) – which will inform the type and extent of sound absorbing materials. For spaces in which the primary objective is to control loudness in high occupancy areas, the room acoustic criteria is expressed as the average absorption coefficient.

Initial acoustic criteria for other spaces are:

- Rehearsal Room: RT of 1.4 to 1.5 seconds.
- Function Rooms: RT of 1.0 seconds.
- Dressing Rooms: RT of 0.7 seconds.
- Control Rooms: RT of 0.5 seconds.
- Main foyer: Average absorption coefficient of 0.20.

3.3 ENVIRONMENTAL NOISE CRITERIA

We carried out an environmental noise survey to determine the existing background noise levels in the residential areas adjacent to the site.

SITE DESCRIPTION

The Hamilton Hotel site is in the heart of Hamilton's hospitality precinct - the South End. It is located on Victoria Street and runs along the Waikato River with the Waikato Museum and the Embassy Park nearby.

Currently, there is a mix of heritage and other buildings on the site with street access from Victoria Street and Sapper Moore-Jones Place.

The nearest noise sensitive residential premises are beyond the Waikato River and are approximately 240m to the north east on Riro St and approximately 380m to the east along Memorial Dr.

OVERVIEW OF THE PROPOSED THEATRE LOCATION (OUTLINED IN PINK) AND THE ENVIRONS, INCLUDING NEAREST RESIDENTIAL AREAS (OUTLINE IN YELLOW).

UNATTENDED NOISE MEASUREMENTS

A three-day unattended continuous noise monitoring survey was undertaken at the site to determine the existing ambient noise levels. The unattended measurements were performed over 15-minute periods from 20:00 hours on Sunday 24th June to 16:45 hours on Wednesday 27th June 2018.

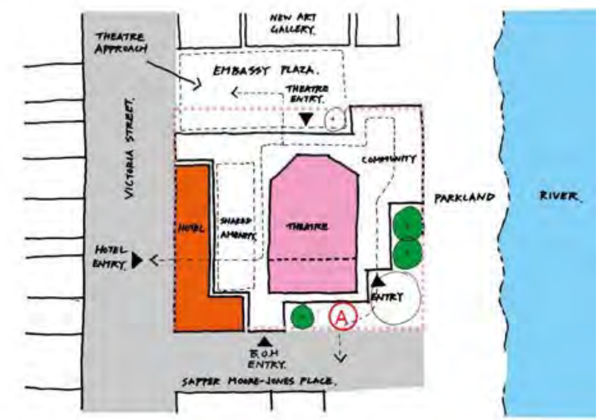
Noise levels were measured in accordance with NZS 6801:2008 "Acoustics – Measurement of Environmental Sound" and assessed in accordance with NZS 6802:2008 'Acoustics – Environmental Noise'.

The measurement position used during the unattended noise survey is indicated in **Error! Reference source not found.**, denoted by the letter A and summarised below.

- Location A: on top of a lower garage roof at the back of the Hamilton Hotel

We have chosen Location A as it is considered the lowest level of existing ambient noise environment around the site with the Hamilton Hotel acting as a barrier from road traffic noise along Victoria Street.

The microphone was mounted on a tripod at approximately 1.5m above a small roof, and more than 3m away from any sound reflective surfaces. The unattended measurement results can be considered free-field noise levels



UNATTENED MEASUREMENT RESULTS AT LOCATION A

Together with a graph showing the results of the unattended measurements the results of the unattended noise measurements performed at Location A are summarised in Tables 1 and 2.

The resulting ambient noise levels (L_{AEQ}) measured during the unattended survey are presented below during prescribed time frames.

DATE	06:00 – 07:00 HOURS $L_{AEQ(1HR)}$ (dB)	07:00 – 20:00 HOURS $L_{AEQ(12HRS)}$ (dB)	20:00 – 23:00 HOURS $L_{AEQ(3HRS)}$ (dB)	23:00 – 06:00 HOURS $L_{AEQ(8HRS)}$ (dB)
Sun 24th June	--	--	50	53
Mon 25th June	56	56	49	47
Tues 26th June	49	56	50	49
Wed 27th June	49	53*	--	--

TABLE 1: AMBIENT NOISE LEVELS MEASURED DURING THE SURVEY.

Note (*): Measurement not made over full period due to monitoring start and end time

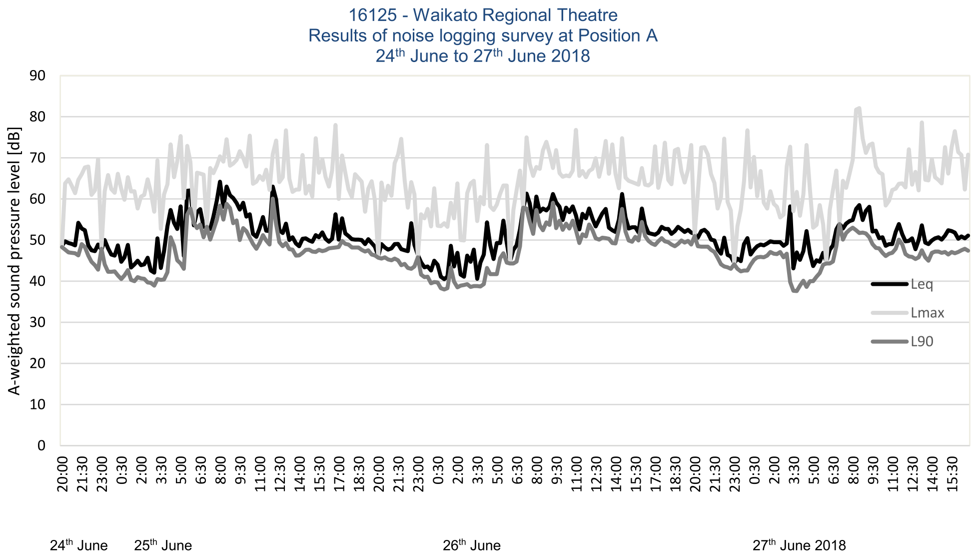


FIGURE 1: RESULTS OF NOISE MEASUREMENTS

The minimum (L_{A90}) background noise levels measured during the unattended survey at Location A are presented in Table 2.

DATE	06:00 – 07:00 HOURS $L_{A90(1HR)}$ dB	07:00 – 20:00 HOURS $L_{A90(12HRS)}$ dB	20:00 – 23:00 HOURS $L_{A90(3HRS)}$ dB	23:00 – 06:00 HOURS $L_{A90(8HRS)}$ dB
Sun 24th June	--	--	47	48
Mon 25th June	53	52	45	42
Tues 26th June	46	53	47	44
Wed 27th June	46	49*	--	--

TABLE 2: MINIMUM BACKGROUND NOISE LEVELS (L_{A90}) MEASURED DURING THE SURVEY AT LOCATION A.

Note (*): Measurement not made over full period due to monitoring start and end time

NOISE PERFORMANCE STANDARD

The applicable noise limits for noise at or within residential boundaries is found in rule 25.8.3.7(a) of the Hamilton Operational District Plan. It states:

> *Activities in all Zones except Major Facilities, Knowledge, Open Space, Ruakura Logistics and Ruakura Industrial Park Zones, shall not exceed the following noise levels at any point within the boundary of any other site in the:*
>
> *i. Residential Zones*
>
> ii. *Special Character Zone*

TIME	NOISE LEVEL MEASURED IN $L_{AEQ(15MIN)}$	NOISE LEVEL MEASURED IN L_{AFMAX}
06:00 – 07:00 hours	45dB	75dB
07:00 – 20:00 hours	50dB	-
20:00 – 23:00 hours	45dB	-
23:00 – 06:00 hours	40dB	75dB

There are no specified noise limits for the Central Business District (CBD) area, even in relation to any residential activity within the CBD. However, we understand the approach that is typically taken is to consider a level of 60dB $L_{Aeq(15\text{-}mins)}$. for activities within the CBD area.

3.4 SOUND SEPARATION DESIGN

To achieve acoustical excellence in the Auditorium, noise from mechanical and electrical systems should be silent enough – designed to meet stringent criteria. In addition, the building layout, the space adjacencies, and the structure serving the surrounding spaces must be carefully designed to avoid transmission of sound that would disturb performers and audience members.

To assist the architects and engineers in making the Auditorium and other rooms in the building as quiet while keeping noise control costs moderate, we integrated the following guidelines into the building layout.

- Sound/light lock (SLL) vestibules are included at all doors to the performance spaces and the large rehearsal room.
- There is no mechanical equipment above noise critical rooms.
- Plumbing fixtures and pipes should not be attached to the Auditorium walls, floor, or ceiling (more below).
- Mechanical and electrical equipment rooms are distant from noise critical spaces.
- Buffer spaces, corridors, some rooms are positioned between noisy and quiet spaces.

The acoustic requirements for the boundary line of the Auditorium and stage are attached in Appendix B.

3.5 BUILDING SYSTEMS NOISE CONTROL DESIGN

The acoustic design related to building services is largely informed by the overall criteria for background noise presented above. The following are criteria that should be used by the services engineers to design the building systems and preliminary guidance that should inform early cost estimates.

EQUIPMENT NOISE AND VIBRATION

Air handling equipment will be selected, in part, based on acoustic criteria. Any additional costs associated with quieter equipment is generally offset by savings in the reduced noise control scope and related spatial implications. For air handlers serving low noise spaces, we recommend 'fan wall' systems that include multiple small fans working in tandem.

Two noise control attenuators will be used on each of the supply and return systems of the Auditorium. For initial pricing and layout assume 3m long attenuators on each supply and return system associated with the Auditorium. Please assume a 2m long attenuator on each supply and return system associated with the Control Rooms, the followspot room, and rehearsal room. Additional attenuation of equipment noise will be required in the ductwork design.

Any vibration-generating equipment (and not only the equipment servicing the Auditorium) including but not limited to: air handling units; cooling towers; fans; air conditioning units; transformers; fan-coil units; split systems; pumps will be mounted on vibration isolators.

VENTILATION DISTRIBUTION DESIGN

The following recommendations relate to the ductwork distribution:

- Noise critical spaces (i.e. the Auditorium, the Rehearsal Room, and the Control Rooms) should be designed as passive self-balancing systems. We also advise against the use of air volume dampers for the Auditorium and the Rehearsal Room.
- All ductwork, serving the Auditorium (i.e. this includes the flytower, the stage, the orchestra pit, the audience areas), will be internally lined with 50mm thick glass fibre/mineral fibre lining from the fan to the terminal. This applies to both supply and return systems.
- All ductwork, serving the Control Rooms, the followspot room, the projector room, the Rehearsal Room will be internally lined with a glass fibre/mineral fibre lining (at least 25mm thick) from the fan to the terminal. This applies to both supply and return systems.
- Displacement Air Supply via underfloor plenum - The underfloor distribution plenum can provide some attenuation of fan noise at low frequencies. Initial design and cost estimates should include 100mm thick lining on 100% of the plenum walls and ceiling area of each underfloor plenum.
- Bends/elbows should either be radiused type or be fitted with equally short-cord turning vanes.
- Duct routing must be carefully planned and laid out to ensure it does not become a vehicle for sound to transfer from noisy spaces to noise critical spaces.
- The fire dampers should be of "out of the air stream" type, located at least 7 duct diameters from the terminal.
- The air terminal diffusers and grilles of the Auditorium must be selected to meet the noise criterion of PNC-15 and must avoid the use of dampers or vanes at the terminals.
- Any fan coil units (FCU) serving rooms with a noise criterion of less than or equal to NR-30 (see Table 1 above) should have its associated ductwork internally lined with 25mm thick ductliner. The FCU should also be outside of the room it serves to provide additional duct lengths to help attenuate outlet noise.

Low air velocities will be critical to achieve recommended background noise criteria, requiring large ductwork cross-sections and geometries that limit air turbulence noise. As reference, the following tables include our criteria for air velocities to inform preliminary duct and shaft sizes.

		Branch Duct or Clear Opening	Secondary Duct	Main Duct
Noise Criteria	At Diffuser	Upstream 1.5m	Upstream 1.5 to 3m	Upstream 3m to 6m
PNC-15	1.3 m/s	1.5 m/s	2.5 m/s	4.6 m/s
PNC-20	1.5 m/s	1.8 m/s	3.0 m/s	5.3 m/s
PNC-25	1.8 m/s	2.1 m/s	3.6 m/s	6.4 m/s
NR-35	3.3 m/s	4.0 m/s	6.0 m/s	8.3 m/s
NR-40	4.4 m/s	5.0 m/s	7.0 m/s	8.6 m/s

*Diffusers are not recommended for PNC-15 spaces. Use clear openings and locate where sufficient air mixing can be obtained without directing throw or using isothermal jet principals. Open slot supply openings can permit higher velocities than indicated here.

Recommended Supply Air Velocities

		Branch Duct or Clear Opening	Secondary Duct	Main Duct
Noise Criteria	At Grille	Downstream 1.5m	Downstream 1.5 to 3m	Downstream 3m to 6m
PNC-15	1.5 m/s	1.8 m/s	2.5 m/s	4.6 m/s
PNC-20	1.8 m/s	2.1 m/s	3.0 m/s	5.3 m/s
PNC-25	2.2 m/s	2.5 m/s	3.6 m/s	6.4 m/s
NR-35	3.3 m/s	4.0 m/s	6.0 m/s	8.3 m/s
NR-40	4.4 m/s	5.0 m/s	7.0 m/s	8.6 m/s

*Return grilles may be used in PNC-15 spaces where grilles have at least 70% open area and the velocity through the open portion of the grille is less than 1.5 m/s.

Recommended Return Air Velocities

SMOKE EXHAUST

The mechanical engineer has proposed a mechanical smoke exhaust system above the stage flytower. To limit noise break-in from aircraft passing overhead and roof plant we recommend a noise control attenuator fitted in the smoke extract duct. For initial pricing and layout, assume a 3m long attenuator will be included in-line.

ELECTRICAL AND LIGHTING

Some electrical services will require acoustic detailing, including:

- The selection of houselight and performance lighting systems will need to respond to the overall background noise criteria. Transformers for dimmable low-voltage fixtures may be required to be remotely located.
- The location of the dimmer and amplifier racks will require special detailing of the penetration of service trunking through the walls of the Auditorium and its associated spaces.
- Dimmer racks and the associated trunking will require vibration isolation from the surrounding structure.
- Transformers and the associated conduit will require vibration isolation from the surrounding structure.
- Cable passes to the Auditorium and the Rehearsal Room should be acoustically treated.

ENVIROMENTAL NOISE CONTROL DESIGN

While there have not been any detailed discussions about the noise control methods required to achieve good environmental stewardship and to limit risk of complaints from neighbours, we recommend the following general approaches should be incorporated in the developed design:

- A noise barrier screen wall surrounding rooftop plant above the back-of-house area.
- Silencers to all outside air and exhaust air connections at the lower level (to the River walk).

3.6 ROOM ACOUSTIC DESIGN

AUDITORIUM TYPOLOGY

While there is a broad and multi-dimensional range of performance space types, the simplest classification is “one-room” or “two-room,” distinguishing between rooms where the performer inhabits the same space as the audience and those where the performer is viewed through an aperture from the audience area. Spaces for listening to music (having derived from churches, royal courts, and town halls) are generally one-room spaces. Theatre has its origins in one-room spaces (from the story-telling circle, pageant wagon, and bear-bating pit), it has evolved to a two-room space paradigm (although many exceptions exist).

Acoustically this distinction is important; as the listening conditions on stage, loudness, and projection of sound in the two types of spaces are fundamentally different.

The functional brief that has been gathered from consultations for the WRT suggests that elements of both “one-room” and “two-room” spaces are required. This is not an unusual contradiction and many flexible performances spaces address this inherent conflict. It is mentioned here not because of the peculiarity of the design brief, but rather because it is the starting point for many decisions relating to the acoustic design.

We propose a “two-room” auditorium with a separated stage along with design features to allow “one room” functions.

Overture Centre, Madison, Wisconsin, USA with Temporary Proscenium creating a “two-room” functionality

Overture Centre, Madison, Wisconsin, USA with Orchestra Shell creating a “one-room” functionality

ROOM GEOMETRY

The macro geometry of the Auditorium takes its cues directly from the functional requirements of the different uses for the room, including stage width, audience orientation to the stage, quality of sightlines, and, of course, the acoustics. The traditional concert hall form has inspired some elements of the design, including parallel sidewalls with shallow, stacking side balconies. The details of these elements, along with the integration of the acoustic objectives with the requirements for drama and dance presentations, are described in the following section.

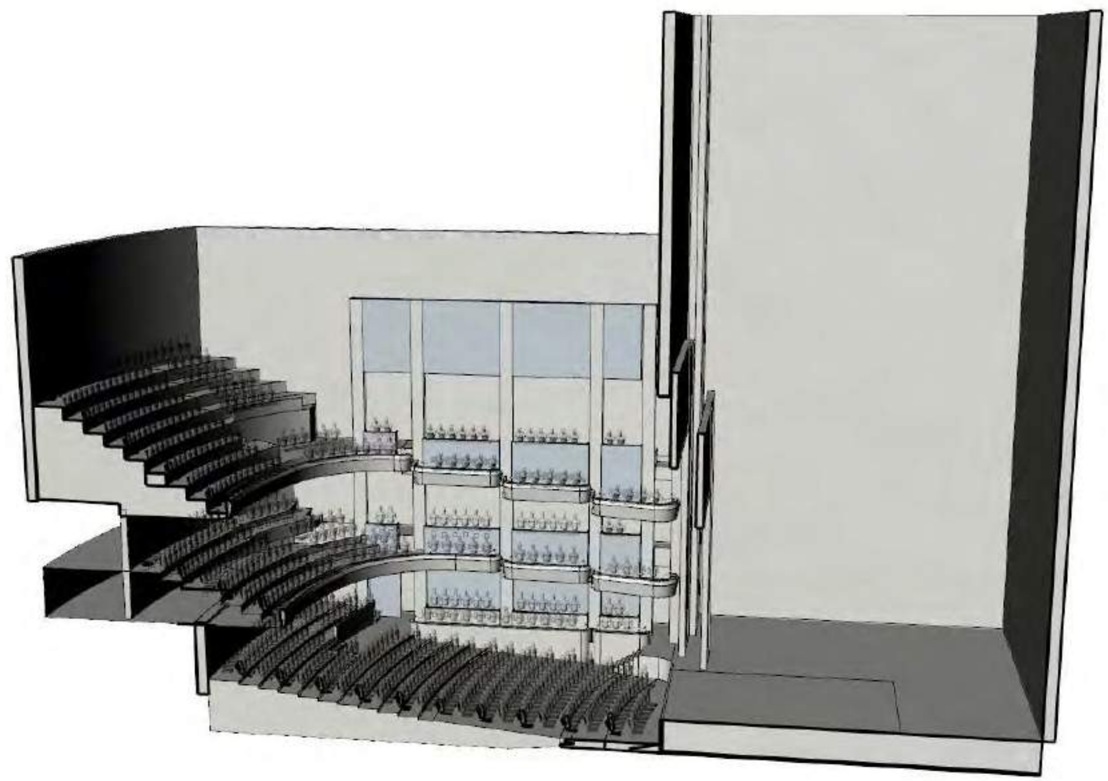
The Auditorium is as narrow as possible with a proscenium width of 20m to achieve good strength of sound and clarity. A narrower width yields shorter travel distances for the sound waves, which results in less attenuation and greater strength of sound. This makes for a more exciting experience for both the audience and the performers.

The Auditorium is tall with a narrow width to promote repeated lateral sound reflections with strong and long reverberation for symphony orchestra concerts.

The ceiling is sound-transparent, allowing sound to travel up to the roof level and maximizing the volume of the Auditorium.

The use of two balconies is acoustically and theatrically useful to reduce the distance to performers, improving sightlines and loudness. Drawing audiences near to the stage establishes intimacy and a sense of combined experience. Stacking of sidewall balconies aids sound reflection paths by providing early-arriving sound reflections and providing large-scale sound scattering.

The balcony overhang (i.e. the ratio of the depth to height) is limited in aperture (i.e., the ratio of the depth to height). The rear-most seats at each level will have a slightly different acoustic experience from those without the overhead obstruction, but this a necessary (and commonly accepted) compromise to meet the seating capacity targets and listening/viewing distances.



Long Section of the Auditorium with Reference Number to Acoustic Design Features

ACOUSTIC VOLUME

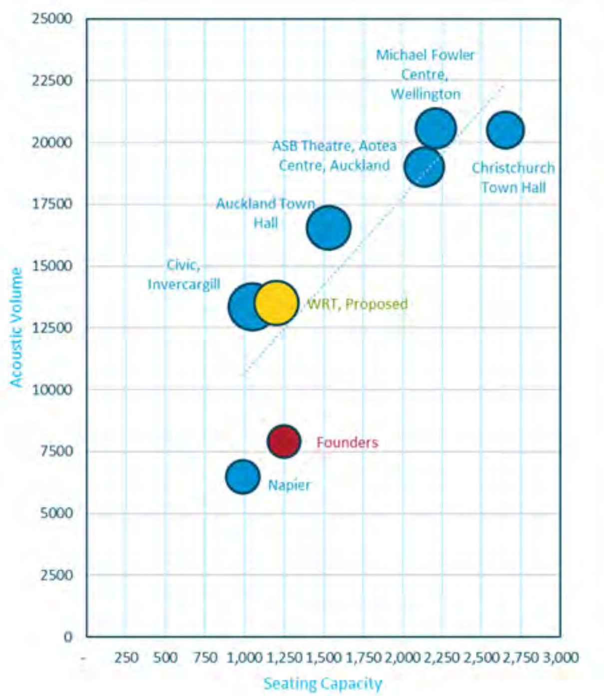
The overall volume within an architectural space has the most significant bearing on the perception of sound. Large spaces are reverberant and less loud which is often preferred for large, unamplified music ensembles. Small spaces are clearer and louder, which is more conducive to the spoken word. For multipurpose spaces, the largest volume to be accommodated is driven by the most stringent use: in this case, large orchestral ensembles. We use overall and relative (i.e., per seat) guidelines for acoustic volume, which can be explored in depth during design.

The overall acoustic volume of symphony halls influences both loudness and reverberation, key aspects of musical acoustics. The absolute volume (measured in cubic meters) is important and there are minimum values below which we would not advise due to potential loudness issues. However, because the audience area is the most significant contributor of sound absorption in these rooms, we tend to benchmark rooms on volume weighted by the number of seated occupants (cubic meters per person).

Charcoalblue have surveyed many of the larger symphonic halls in NZ (taken from the current schedule of the NZSO with the addition of Christchurch Town Hall) to benchmark acoustic volumes per seat and to inform the current discussions regarding the seating capacity for the proposed design

The accompanying graph shows seating capacity on the horizontal axis and acoustic volume on the vertical access. The size of the bubble also indicates the comparative volume per person. Halls to the upper left have greater volume per person; halls to the lower right have less volume per person. The halls surveyed have a volume per person that ranges from roughly 6.5m^3/person (Napier) to over 12.5m^3/person (Civic, Invercargill). The trendline shown on the graph includes the existing halls only (i.e., excluding Founders and the proposed WRT). The proposed volume for the WRT is 11.25m^3/person and falls wall above the trendline (i.e., more volume and generally more favourable for unamplified music).

As the size of the venue influences not only commercial viability but also suitability for types of performances including acoustic quality, this analysis should not be overlooked. It may not meaningfully influence the auditorium capacity but, rather, may simply assure constituent groups of the expectations for acoustic quality.



Comparative Analysis of Symphonic Halls in New Zealand

PROSCENIUM

A full-sized orchestra requires roughly 20m of playing width, depending on the number of players. This dimension greatly exceeds the theatrical requirements, therefore driving the need for flexibility.

The aperture formed by the proscenium should be maximized both in width and height to allow for evenness of acoustic projection throughout the ensemble. A scheme has been considered that brings musical ensembles forward into the Auditorium and onto the orchestra pit lifts. The orchestra shell and canopy over forestage then align to provide consistent overhead sound reflections from all parts of the ensemble to the audience.

Flexibility in the proscenium zone is required to effectively link the stage volume to the Auditorium volume.

AUDITORIUM CEILING

The ceiling is a critical factor in establishing an appropriate acoustic volume. The upper volume of the room is used to create long-delayed refection paths that create reverberation. Parallel side walls in the upper volume further reinforce long reflection paths.

To maximise the volume of the theatre, a portion of the ceiling is transparent to sound and part of the ceiling is solid to reflect sound uniformly around the audience areas and above the orchestra pit.

In conditions where greater loudness and less reverberation are more appropriate, flexible sound absorbing devices would be deployed in the upper volume.

The design currently assumes a fixed ceiling height with a combination of solid and sound transparent elements. The ceiling above the orchestra pit will move up and down depending on the programming.

3.7 ORCHESTRA PIT

The orchestra pit is at the centre of the auditorium. It is both a barrier between the stage and the audience and a connector between the stage and audience when the pit is part of the performance.

Acoustical goals for the orchestra pit are:

- Balance between orchestra and singer loudness.
- Frequency balance and tonal character – balance of high, mid, and low frequencies.
- Musicians should be able to hear each other well enough to play in ensemble.
- Musicians should be able to hear singers, and singers able to hear the orchestra.
- Loudness in the pit should be tolerable by the musicians.

Acoustics within the Orchestra pit are affected by:

- Geometry.
- Finishes.
- Orchestration.
- Ability of the conductor to communicate – balance between singers and orchestra.
- Auditorium design – integration of surfaces that support singers.
- Elevation of pit lift –crucially related to the size of ensemble and character of the sound for different.
- The size orchestras it is intended to host and musical intentions.

The pit depth (front to back opening dimension) is carefully balanced – deep to play in the open, and yet not so deep that it would cause an imbalance between the sound of orchestra and that of the singers on stage.

The front to back dimension of the pit is 4.5m with a 2.8m overhang. The pit width is matched to the proscenium width at 20m.

HEADROOM AND CLEARANCE

An additional consideration is that the stage edge should be as thin as possible to allow proper sightlines between conductor, musicians, and the singers on stage. This allows the players to be seated as high as possible with respect to the stage, which assists ease of ensemble listening between performers on stage and those in the pit.

A clear minimum vertical dimension of 2.2m from finished floor to the underside of beams at the upstage pit wall is acceptable. This dimension increases as the beams taper thinner going downstage.

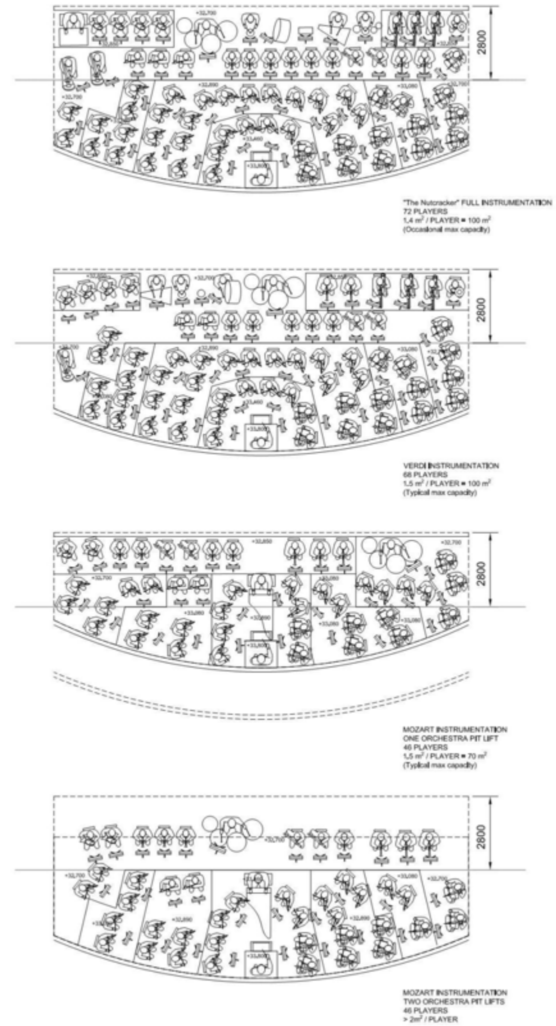
SERVICES

All necessary services (sprinkler pipes, conduits, etc..) must be above the clear height (i.e. within the beam depth) and not drop below the structure or ceiling. No ducts should be allowed in this ceiling zone.

3.8 ACOUSTIC FINISHES AND MATERIALS

One of the important subjective characteristics of a room for music is its "warmth" of tone. This characteristic is closely related to the strength of low-frequency sound in the room. It is often found lacking in modern concert halls, due in part to such halls having been finished with modern lightweight materials and large areas of thin finishes mounted over small air gaps. Hard, massive walls and ceiling materials efficiently reflect low-frequency sound to give warmth of tone and strength of bass.

We have designed the room with finishes that are as solid and massive as possible to reflect sound with minimal absorption at all frequencies. The absorption of sound in the hall is provided by the upholstered seats, the audience, and the variable sound-absorbing curtains around the Auditorium (see below). We aim to put all the sound energy to use in service of the music.



Orchestra Pit Layouts and Capacity Analysis

VARIABLE ACOUSTIC SYSTEMS

The Auditorium will serve multiple activities such as opera, dance performances, straight plays, and symphony concerts. The Auditorium should therefore be acoustically adjustable to accommodate these various types of events. A play and a concert hall require very contrasting acoustic environments.

We propose variable acoustics systems to transform the sound-reflective characteristics of the wall into sound-absorptive surfaces.

Extending sound-absorbing materials will reduce the reverberance and strength of the sound and increase the clarity of sound. The goal when using flexible acoustics systems is to have the flexibility to make a given surface (or surfaces) either acoustically reflective or acoustically absorptive. The normal state of the room for unamplified music will be with fixed, hard surfaces exposed. The normal state for amplified sound will be with the flexible absorption materials extended to cover as much of the walls as possible. When all the sound-absorbing material is extended, the acoustics will be relatively “dry”.

ACOUSTIC CURTAINS

We recommend acoustics curtains deployed on motorised track systems around the perimeter of the Auditorium, including the technical level.

The curtains move horizontally, and they typically hang with “fullness” which is bunching that provides performance at bass frequencies and creates space between the 2 layers which are hung together on one track.

The fabric material is formed of at least two heavy layers of cotton velour or woold serge fabric (each > 550g/m²), both hung with at least 50% fullness (fabric length 150% of deployed length).

Curtains are attached to a track at their top edge while the bottom edge usually remains free. The track can be concealed in a reveal.

The space for the curtains in the room is typically 400mm deep against the Auditorium walls, with the track 200mm from the wall. The storage pocket takes more space to accommodate the bundling of the curtain, and its length is typically a fraction of the curtain length (1:5 of the length of the curtain).

Variable acoustics curtains deployed on the walls, Sage Gateshead, UK

LOCATIONS

We propose locations that are harmoniously integrated into the complex architecture of the room.

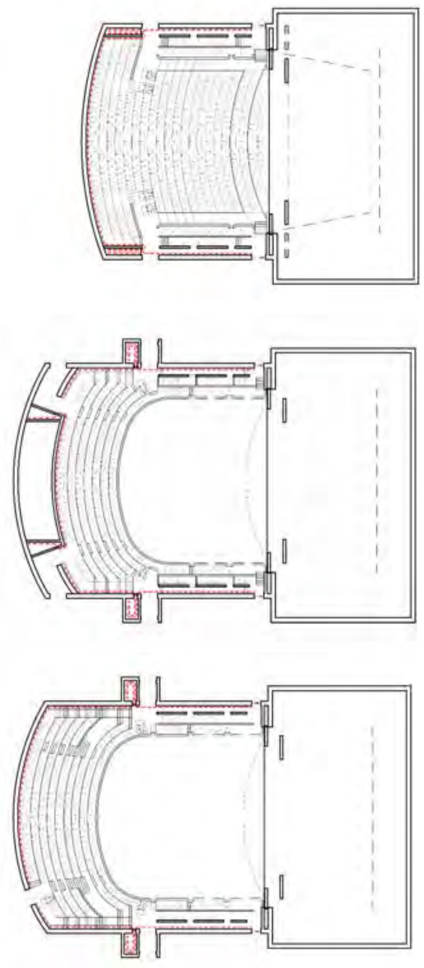
Audience areas
We show the minimum location where the acoustic curtains would be of acoustical benefit in the diagram to the right.

Curtains must be stored in a storage pocket, so that when retracted, they are not exposed to any sound in the room for events which require sound reflective surfaces. These storage pockets require an allocation of space

Orchestra pit
Manual acoustics curtains that come in pieces should be installed at the rear and side of the orchestra pit. These curtains do not need to be stored in a storage pocket.

LOW-FREQUENCY TUNED SOUND ABSORPTION

At the technical level, the variable acoustic provision allows for a type of absorber that is optimised for low frequency sound, such as a panel or Helmholtz resonator. This may be supplemented with curtains such as those used at other levels of the Auditorium. The extent, design, and storage of these finishes will be developed in the following stage, but assume custom perforated plywood or gypsum **board mounted roughly 500mm away from the wall boundaries**



Diagrams Indicating the Location of Sound Absorbing Curtains at the Perimeter of the Auditorium

ORCHESTRA SHELL

The main purpose of the orchestra shell is to improve the acoustic for orchestra concerts in the multipurpose Auditorium. The shell supports communication between musicians on stage whilst improving sound for the audience. It is also the device which transforms the room from two volumes into a single volume.

An orchestra shell is therefore necessary to improve the experience for both musicians and audience.

DESCRIPTION OF THE ORCHESTRA SHELL

Within the large flytower the shell system encloses musicians on stage with the following:

1. A set of identical floor-standing ***concert "towers"*** that form the back and side walls. The towers are slightly convex to provide sound reflections towards the string instruments. Lifted on air casters, the towers can be moved easily to form a flexible arrangement and can be stored away where each tower nests with one another to minimise storage space.

2. Motorised ***ceiling reflectors*** suspended from winches that will allow varying height and pitch. The control of the height and pitch tailors the acoustics to the type of musical work being played. The reflectors are convex to provide uniform distribution of sound and facilitate communication among musicians.

3. A flown acoustic ***overstage cap*** from which the ceiling reflectors will be supported. The cap reduces the large acoustic volume above the stage and limits sound from escaping into the stage flytower.

4. ***Upper walls*** are flown elements, which extend from the top of the towers to the underside of the overstage cap. The upper walls increase the height above the musicians and hence help reduce loudness caused by loud instruments.

5. The intersection of the upper walls and towers includes a ***ceiling ledge*** to provide additional sound reflections towards the musicians on stage.

6. Gaps may exist between the towers and in the upper wallsparticularly at the rear, to reduce sound levels produced by loud instruments such as percussion and brass.

BENEFITS OF A CUSTOM ORCHESTRA SHELL

Compared to an off-the-shelf orchestra shell, the proposed system provides the following benefits:

1. *Better acoustics* - with a custom design to tie in with the the auditorium the proposed orchestra shell provides better acoustics to BOTH the musicians on stage and the audience than proprietary systems.

2. *Loudness on stage* - Typically, proprietary concert towers are limited to 9m in height for stability reasons. Our current proposal provides greater height above the musicians to allow greater reverberance and less loudness than proprietary systems. Loudness on stage can be a major source of complaints from musicians who fear from damages their hearing.

3. *Optimised sound distribution* – The towers will have a customized convex geometry. Their radius is optimised to maximise the spread of sound across the stage contrary to proprietary towers that come with fixed radius curve options. The same applies to the suspended ceiling reflectors.

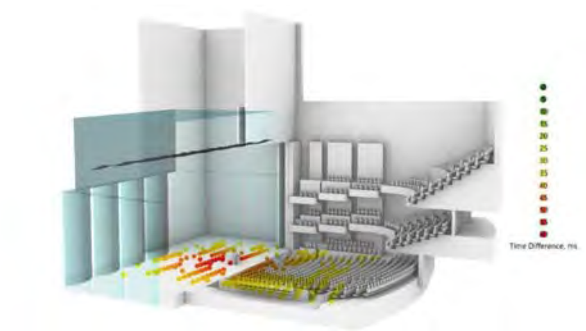


FIGURE 2: SOUND PROPAGATION - COLOURED DOTS REPRESENT SOUND PARTICLES REFELECTED FROM THE SUSPENDED CEILING REFLECTORS. THEIR GEOMETRY AND LOCATIONS ARE OPTIMISED TO PROVIDE UNIFORM SOUND DISTRIBUTION ACCROSS THE STAGE.

4. *On-stage hearing conditions* - Together with the towers, the ceiling ledge provides additional early sound reflections towards the musicians.

5. *Flexible arrangement* - It provides flexible arrangement that allows different acoustical and visual settings for different ensemble sizes and types.

6. *Visual warmth* – the orchestra shell creates a gathering form and a visual "warm". The finish of the orchestra shell will match that of the auditorium finish.

7. *Overstage cap manual handling risks* – by combining the overhead equipment into a single larger structure we are increasing the amount of mechanically assisted equipment being moved. This means that the movement of the system is not relying on the physical capability of the operators.

8. *Increased Flexibility* – A single structure will allow the users to have the flexibility of micro adjustments in the elements hanging below the structure. These items would otherwise have to be flown on counterweight bars which would require additional work to adjust the position of the systems.

9. *Faster turnovers* – by having the single structure all the additional rigging elements will be fixed directly to this truss, essentially becoming a 'mother-grid' support truss. There is no requirement to remove equipment from the flying bars – they can simply be flown out to grid level. There will also be no requirement for the timely handling of counterweight loading weights on the specified bars.

4. ARCHITECT

Jasmax

1.0 Introduction

1.1 Executive Summary

1.1 Executive Summary

The Waikato Regional Theatre Preliminary Design Report has been prepared by Jasmax to capture the Preliminary Design phase of the project conducted between 21st of May and 26th of July.

During this period the project team has:

- Established the primary set out of the building
- Developed internal planning
- Coordinated consultant inputs
- Incorporated Concept Design VM items into preliminary design
- Addressed the VM shopping list from Concept Design with the Governance Panel
- Prepared the architectural Resource Consent package and coordinated other required specialist consultant inputs for Resource Consent.

1.0 Introduction

1.1 Executive Summary

The building form has predominantly remained the same as that proposed at concept design. Changes to the form are limited to:

- Removal of concept design roof plant level
- Removal of the hotel roof terrace and bar level at rear balcony (outside of project scope)
- Reduction in quantum of glazing behind the screen including change from curtain wall system to precast with punched windows around the B.O.H spaces.
- Flytower and lightwell ceramic rain screen changed to precast
- Reduced the height of the screen from 10m to 8m.
- FOH Auditorium walls change from ceramic to timber.
- FOH floor finish change from sandstone to Terrazzo
- Removal of ceilings to BOH areas except wet areas/

GFA:

The Preliminary Design Theatre GFA is 7120m² which compares to the Concept Design GFA of 7265m².

- Concept Design VM targeted a 300m² reduction in GFA.
- An overall GFA reduction of 145m² has been achieved.
- The theatre B.O.H and F.O.H areas have reduced by 300m².
- The plant size has increased by 155m² to account for the theatre to operate independently to the hotel. Note that this includes infrastructure.

1.0 Introduction

1.2 Design Activities

1.2 Design Activities

The process for the Preliminary Design Phase has encompassed the following activities:

- Presentations to the Governance panel and design team
- Development of the WRT Precinct design in response to the surrounding urban and environmental conditions.
- Redesign to split the hotel and theatre services and structural systems. This included the coordination and requirements of the seismic gap in relation to the adjacent hotel development. Coordination of hotel and theatre buildings to have split, independent services.
- Development of consultants preliminary design via consultant coordination meetings
- Established building levels and developed relationship of truck dock to street levels
- Delivery of Urban Design Package and presentation to Urban Design Panel
- Review of the WRT against the Hamilton City Transformational Plan and Ferrybank Masterplan.
- Preapplication meeting and presentation to Hamilton City Council.
- Consultation with Hamilton City Council on matters pertaining to Traffic.
- Consultation with Heritage New Zealand
- Consultation with Iwi groups including THAWK and Waikato Tainui.
- Preparation of Resource Consent package in conjunction with specialist consultant input has been undertaken.

1.0 Introduction

1.2 Design Activities

- Incorporation of Concept Design Value Management decisions into the design including:

- Re-planning of building for sub stage level raft slab and relocating spaces from upper levels.

- Scope reduction of Screen

- Design to incorporate reduced quantitiy of glazing.

- Value Management studies and presentations to the Governance Panel including:
  - Screen
  - Foyer Staircase
  - Lightwell
  - Foyer Bleachers

- The cost plan allows for the VM option of a simplified switchback stair. However 3D visuals in this report show the original curved stair option as it is still an option that is dependant on sponsorship.

- Schematic Design and presentation to council on Sapper Moore-Jones Place street beautification option.

- Schematic design and presentation to Riff Raff Public Arts Trust on development of Embassy Plaza

- Meeting with Mesh Sculpture Hamilton on Public Arts opportunities for WRT.

- Explored Arts Integration Opportunities including the housing of the Hotere painting from Founders Theatre.

- Communication of all the above with the project team via Design Team Meetings.

- Project reporting at Governance Panel meetings.

1.0 Introduction

1.3 Momentum's Transformational Vision

Regenerate the city centre

Stimulate catalytic change within the heart of Hamilton by being positively disruptive, providing a visual identity, encouraging creative innovation, and creating a world class destination.

Engage the Community

Integrate and engage with the local community, encouraging 24/7 activity that builds on the existing vibrant restaurant and cafe culture as well as introducing outreach programs to help create a sense of place where people will come to and gather.

Creative Precinct

The Theatre will be seen as the head tenant and a benchmark of quality within the creative precinct that stimulates creative innovation.

Linkages

Build a strong and positive relationship between Victoria Street and the Waikato River by strengthening linkages between them. Integrate with the Ferrybank masterplan and Victoria on the River development by linking into these important developments.


Cultural Hospitality & Entertainment Precinct (From H.C Transformational Plan)
Proposed Arts Precinct
Ferrybank Masterplan
Proposed Park
Proposed Theatre
Proposed Hotel
Proposed Art Gallery
Proposed Library
Museum
Parkland
Woodland Escarpment
Cafe/Restaurants (Day Time/Evening)
VOTR
Proposed Bridge
River Ferry
Upper River Promenade
1 Shift centre ofprecinct
2 Front Door Theatre
3 Front Door Hotel
4 B.O.H Access
WAIKATO RIVER
RIO STREET
COLLINGWOOD STREET
ANGLESEA STREET
ALEXANDRA STREET
VICTORIA STREET
SAPPER MOORE-JONES PLACE
HOOD STREET
KNOX STREET
GRANTHAM STREET
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1.0 Introduction

1.4 Project Programme

1.3 Project Programme

The start date for the Preliminary Design Phase was the 21st of May 2018 and allowed for a PD phase programme of 10 weeks. We note that the original anticipated start date for PD was the 12th of March with an allowance of 10 weeks as issued by the client in the 'Indicative Master Development Programme V1.0'. This has meant that the start date of the preliminary design phase has been offset by approximately 11 weeks. Programme update will be required during early developed design to account for cost/value management phase and programme delay. Implications of the 11 week programme offset means that one or a combination of the following would need to be adopted:

- Compress the construction phase to keep original completion date
- Fast track the programme with overlapping workflows to keep to the original completion date
- Adopt an early contractor procurement process
- Retain original time/duration allowances for design and construction phases and push the completion date out.

1.0 Introduction

1.5 Assumptions

1.4 Assumptions

- Adjacent Development: That a development on the hotel site will be ready for open at the same time as the theatre and will have facilities available for lease by the theatre to satisfy sponsor rooms and rehearsal space requirements.

- The Hotel Egress Stair at Grid C, 2 is required for the balcony egress strategy. This hotel stair has not been accounted for in the Theatre GFA or cost plan and is part of the adjacent development.

- Hotel roof top bar: The theatre has been designed not to accommodate for the loading requirements of a roof top bar and sculpture terrace.

- Infrastructure: The theatres infrastructure including the Transformer, MSB, and Sprinkler Pump are housed in the hotel basement. They are therefore beyond the theatre seismic gap but is accounted for in the theatre GFA.

- The F.O.H WC's on circle level are accounted for within the project GFA, however we note that it currently sits on the hotel side of the seismic gap.

1.0 Introduction

1.6 Design Issues and Options

1.5 General Design Issues and Options

- Resource Consent – Resource Consent is being sought for a non-complying activity. The proposed development is non-complying due to the following infringements:

- Demolition of buildings on a heritage listed site

- The flytower infringes the 32m height plane.

- The screen sits over the river boundary

- Tattico planning consultants are managing the resource consent application and preparing the assessment of environmental effects (AEE)

- Foyer Staircase – 2 options for the foyer staircase are being developed. Option 01 is a curved staircase whilst Option 02 is an orthogonal switchback stair.

1.0 Introduction

1.7 Project Risk

1.6 Project Risk

– Refer to appendix 8.5 for the Jasmax Preliminary Risk Register. Key items identified include the recommendation for a team wide risk workshop on project risks and a separate session on Safety in Design.

– At a high level, a key risk for this project is budget. The team have made extensive efforts to minimise costs and have actively participated in Value Management processes throughout the Preliminary Design Phase. Constant monitoring of the project against the cost plan will be necessary throughout subsequent design phases. Budget sign off at the end of Preliminary Design phase will be required to minimise risk.

– The unknowns surrounding the Hotel project scope and programme provides risks that delays will impact the ability for the theatre to lease spaces for rehearsal or sponsors facilities until the Hotel site is complete. Any changes to the theatre design that arises during the design and construction phases due to the hotel project scope will need to be monitored.

– There remains an overall development risk for the project with the application for Resource Consent. The risk is that resource consent is being sought for a non complying activity. Support from the Urban Design Panel has been obtained and regular consultation with council has been carried out to mitigate this risk. Refer to separate reporting by Tattico.

1.0 Introduction

1.8 Value Management

1.7 Value Management

Approved Value Management items brought over from the Concept Design Phase and incorporated into the design during the preliminary design phase include:

- Redesign of Sub-Stage level to accommodate a revised raft slab and re-planning of building to relocate spaces from upper levels to sub-stage to reduce GFA and façade area.
- Scope reduction of Screen – reduced scope on Embassy Plaza and Sapper Moore-Jones Place and height reduction to 8m.
- Design to incorporate reduced quality of facades – Reduced scope of curtain wall and replaced with pre cast panels with punched windows.

GFA – A 300m² reduction in GFA was targeted at Concept design VM.

- An overall GFA reduction of 145m² has been achieved.
- The theatre B.O.H and F.O.H areas have reduced by 300m².
- The plant size has increased by 155m² to account for the theatre to operate independently to the hotel. Note that this includes infrastructure.

1.0 Introduction

1.9 VM Shopping List

1.8 VM Shopping List

VM shopping list items tested and presented to the Governance panel during the Preliminary Design phase include:

Screen

- Options to remove the screen were investigated and tested with the governance panel.
- Client decision was to keep the screen but to look at ways of reducing cost.
- Material options for the screen were investigated and presented to the governance panel. Refer Governance panel presentation dated 4th July 2018. A recommendation to retain the profilit glass was made by the team and was not challenged by the Governance panel.

Lightwell

- Option to remove the lightwell was investigated and presented to the governance panel on 5th June 2018.
- Client decision was to keep the lightwell

Foyer Bleachers

- Option to remove the foyer bleachers was investigated and presented to the governance panel on 5th June 2018 with client decision to remove the bleachers.

Foyer Staircase

- Design options that simplify the foyer staircase were investigated and presented to the governance panel on the 4th July 2018.
- Simplified orthogonal switch back staircase (Option 01) was recommended to the panel.
- Client decision was to proceed with option 01 but to keep spiral staircase option from Concept Design as parallel work stream pending on sponsorphip/funding.

Lift

- Option to reduce number of F.O.H passenger lifts from two to one was investigated and presented to the governance panel on 5th June 2018.
- Client decision was to proceed with reduced number of lifts.

2.0 Site

2.1 Site Description

2.1 Site Description

The proposed site is located at 170 Victoria Street, Hamilton Central and is bounded by Embassy Park, Victoria Street, Sapper-Moore Jones place and the Waikato River. The site sits within the Creative Precinct. Special characters and features within its context include:

- The Waikato River and river promenade
- Heritage buildings along Victoria Street
- Arts and cultural buildings within the precinct including the WaikatoMuseum and Arts Post.
- The café culture along Victoria Street
- The recently completed Victoria on the River Plaza
- Embassy Plaza and the Riff Raff sculpture
- Future development opportunities within the Ferrybank masterplan

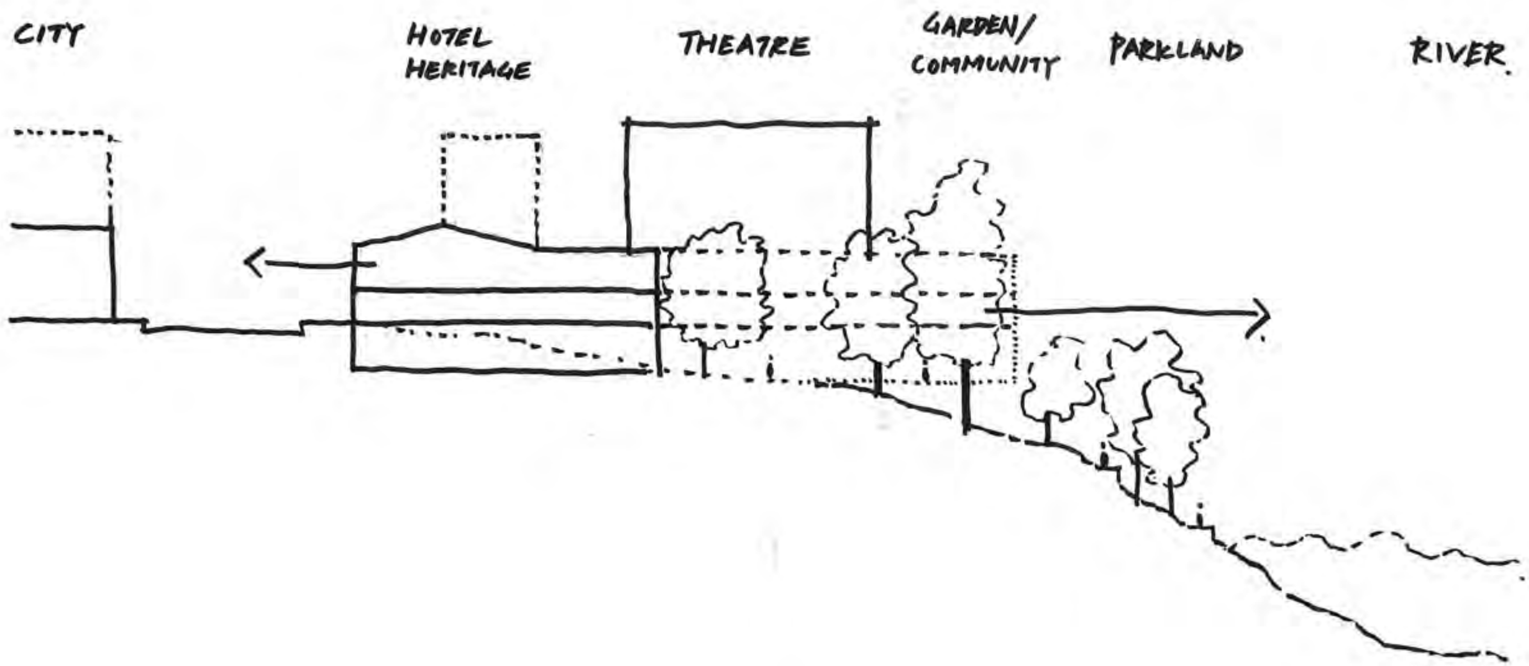
The proposed site slopes 15m with the high point on the corner of Victoria Street and Embassy Park and the lowpoint along the river bank. The buildings entry points are at RL 39.5 to match Victoria Street, and RL 34 to match the bottom of Sapper Moore-Jones Place.

LEGEND

- Site Boundary
- 1 Old Hamilton Hotel
- 2 Gardens/Significant trees
- 3 Pre-European
- 4 CFCA
- 5 Left Bank Theatre
- 6 Sapper Moore-Jones
- 7 QE II Suite
- 8 Theatre Royal/Embassy & Riff Raff

Section 3.0

DESIGN RESPONSE



1. CITY & RIVER

Strengthen connectivity and celebrate the difference between the dynamic city and tranquil river.

2. HERITAGE

Engage with the built, natural and cultural heritage of the site through conservation, interpretation and integration.

3. COMMUNITY

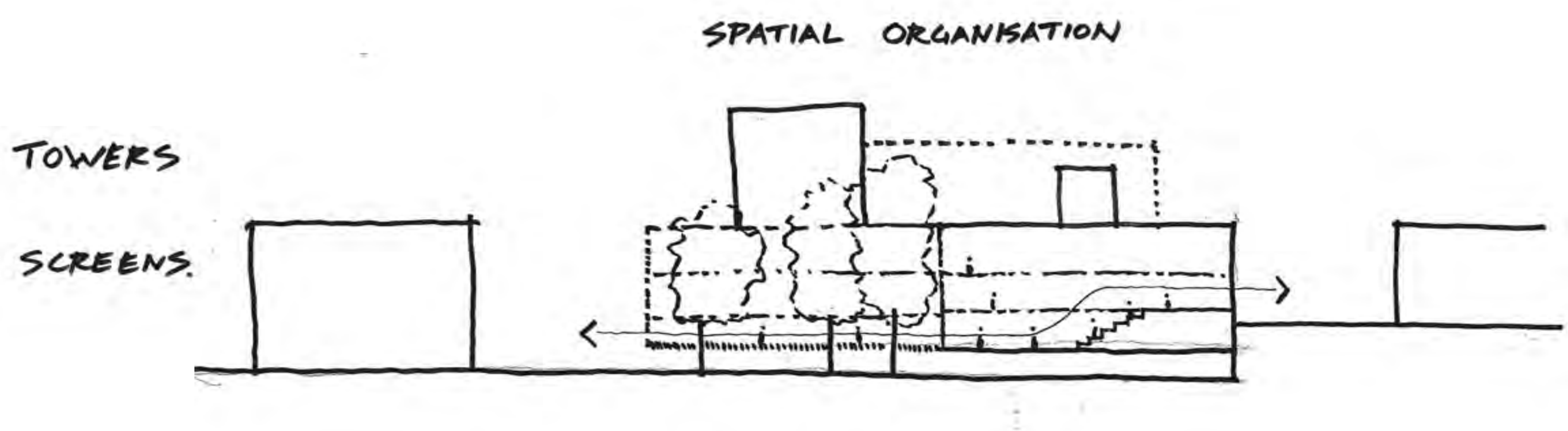
Foster sense of community by providing high quality public spaces for community use & engagement 24/7.

4. GARDEN & PARKLAND

Provide transitional spaces from outside to inside while protecting notable tress and reinforcing the history and character of the site's garden & parkland.

5. URBAN GRAIN

The massing of the building has been carefully composed to respect the scale of the streetscape and existing heritage building. Two key moves have been adopted to achieve this, the screen and stepped profile.



6.

SCREENS

A distinctive and dramatic crafted feature, that hovers over the landscape unifying the theatre with the street and river. Enclosing withholding and protecting the sites heritage features.

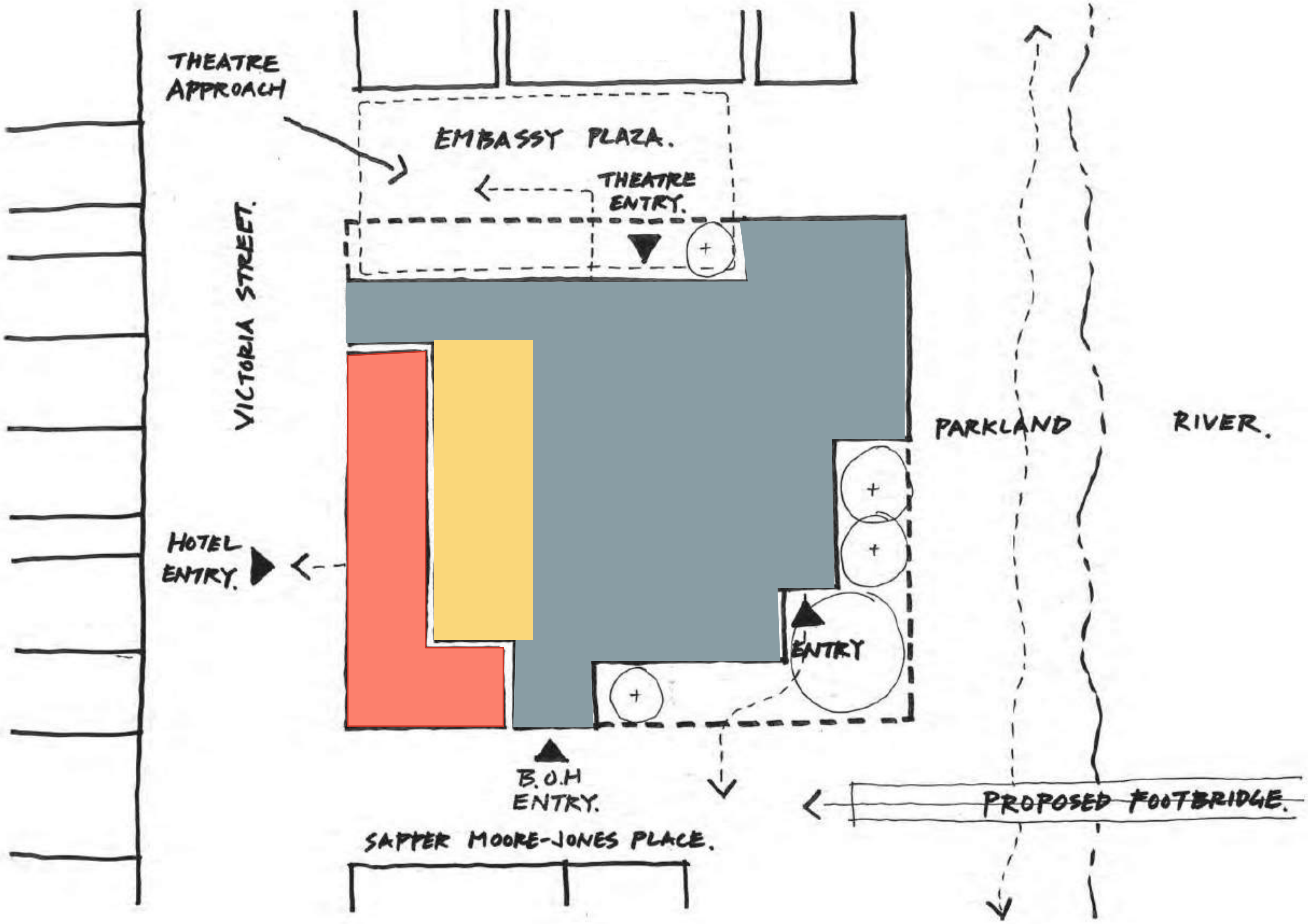
7.
TOWERS

Urban markers with a visual association to the tall trees on the site. Back lit to provide the dappled light closely related to the dappled light of the trees.

8.
SPATIAL

ORGANISATION

A dramatic arrival and entry sequence that progresses through a series of performance spaces; plazas, courtyards, foyers and the formal auditorium.


THEATRE
APPROACH
EMBASSY PLAZA.
THEATRE
ENTRY.
VICTORIA STREET.
PARKLAND
RIVER.
HOTEL
ENTRY.
ENTRY
B.O.H
ENTRY.
PROPOSED FOOTBRIDGE.
SAPPER MOORE-JONES PLACE.

View from the River

View from Victoria Street

View from corner of Collingwood Street & VictoriaStreet

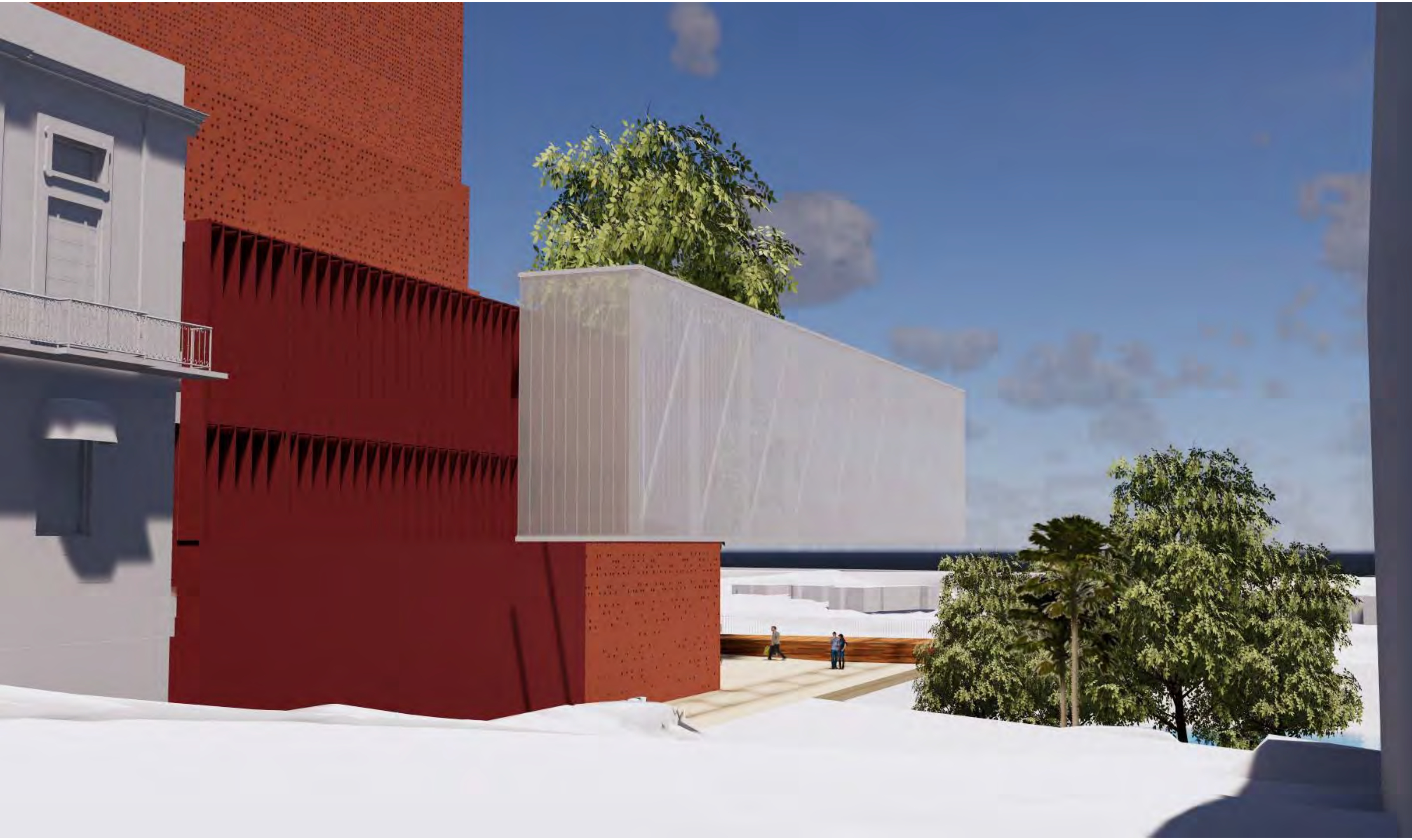
View from Victoria Street

View down Embassy Park from VictoriaStreet

View from corner of Hood Street & Victoria Street

View down Sapper Moore-Jones Place

View down Sapper Moore-Jones Place

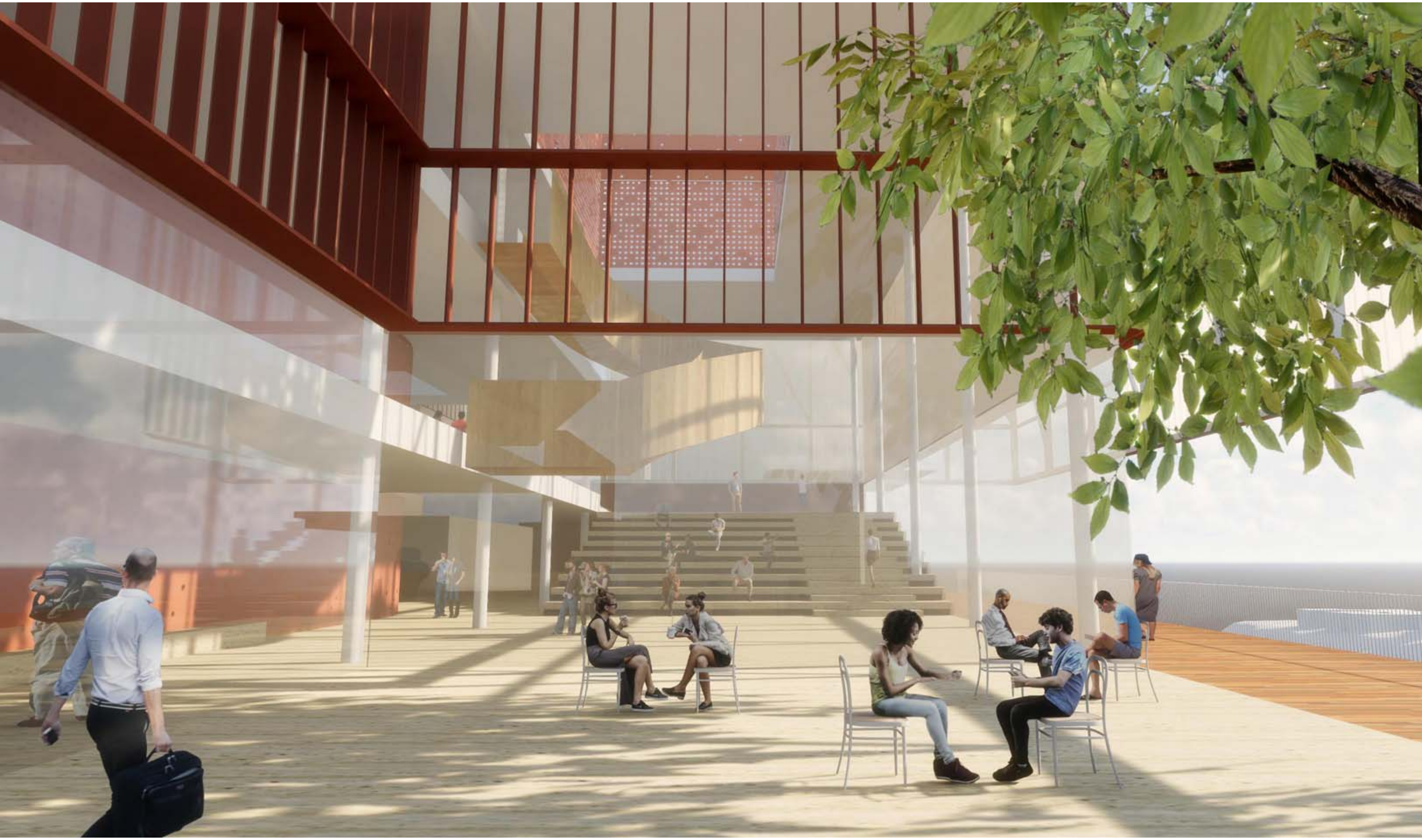


View towards river side courtyard

View in river side courtyard

View to foyer from river side courtyard

View to foyer from river side courtyard



View of Foyer at Circle Level

View of Foyer at Circle Level

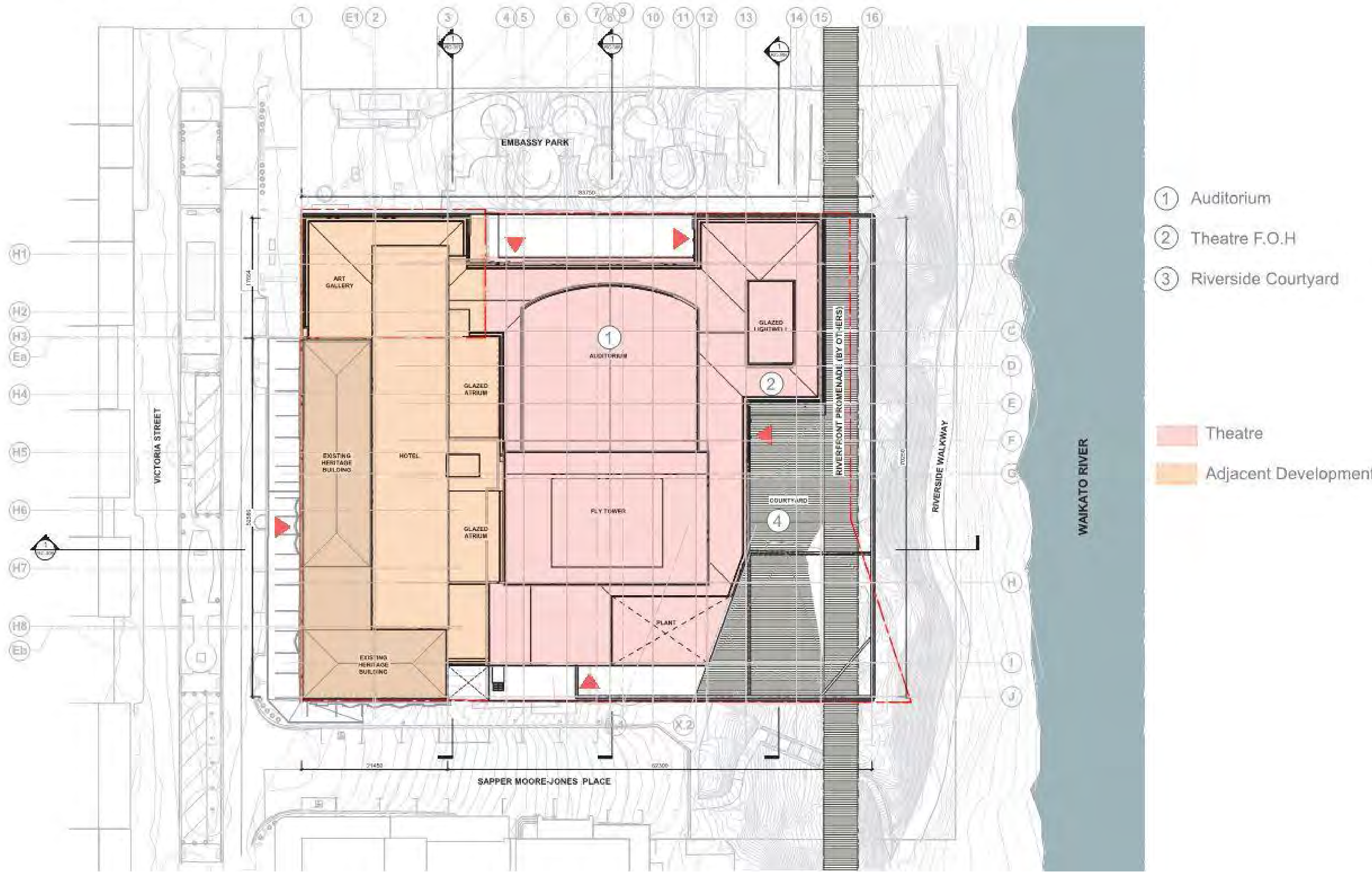
PLANS

3.0 Design Response

3.1 Space Planning Features

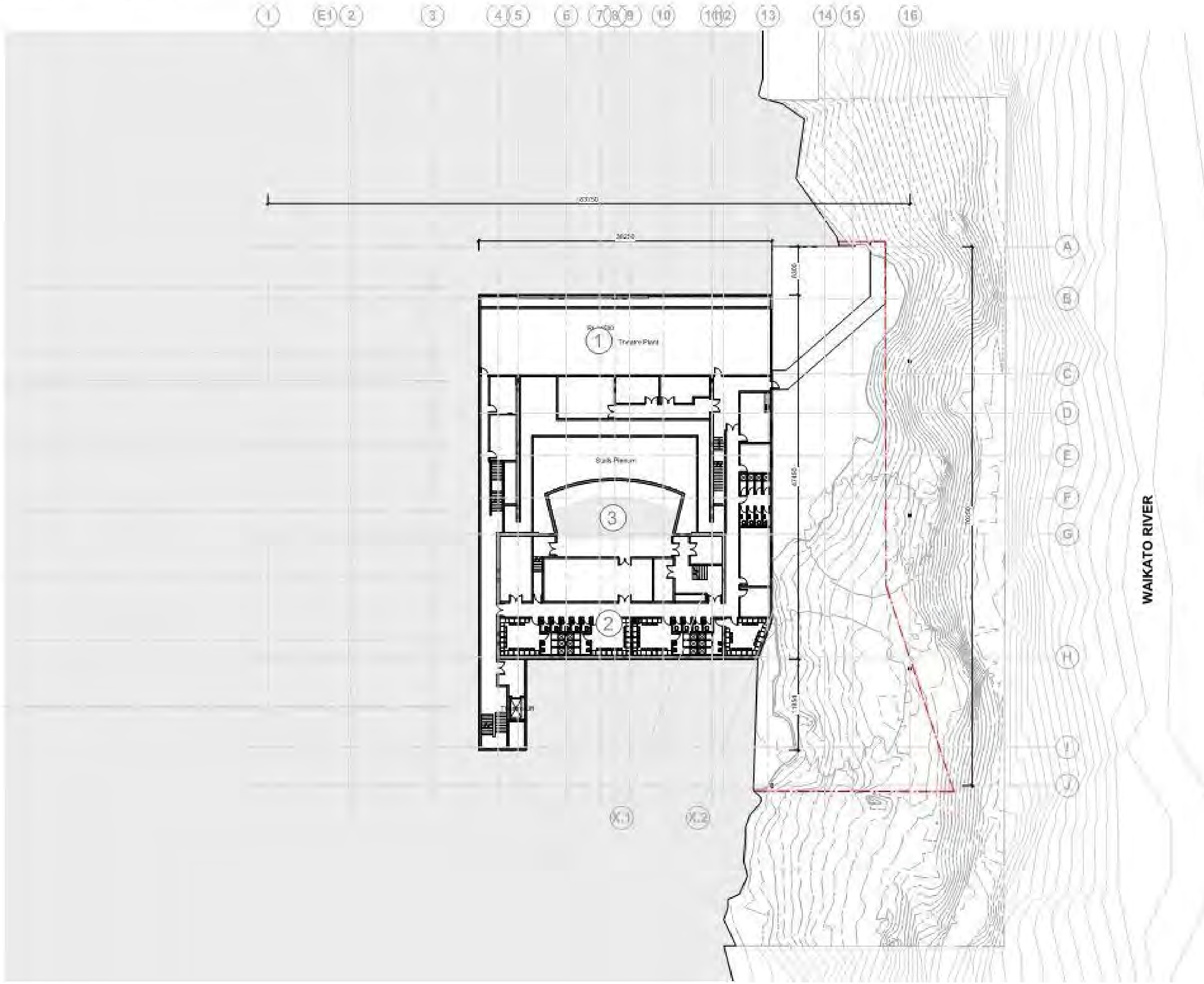
The overall Space planning concept is to accommodate all public F.O.H spaces to the north of the building around the expressed curved auditorium wall and within the triple height eastern foyer space that overlooks the Waikato River. The B.O.H spaces required for theatre productions are located behind the fly tower to the south of the site and within the sub stage basement levels. The space between the Hotel and Theatre will create a void atrium allowing for clear separation of use and allow daylight within all public areas.

Site Plan (Proposed)



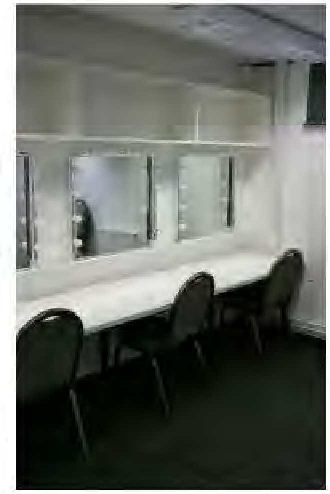
3.1 Plans

Level -2 (Sub-stage)

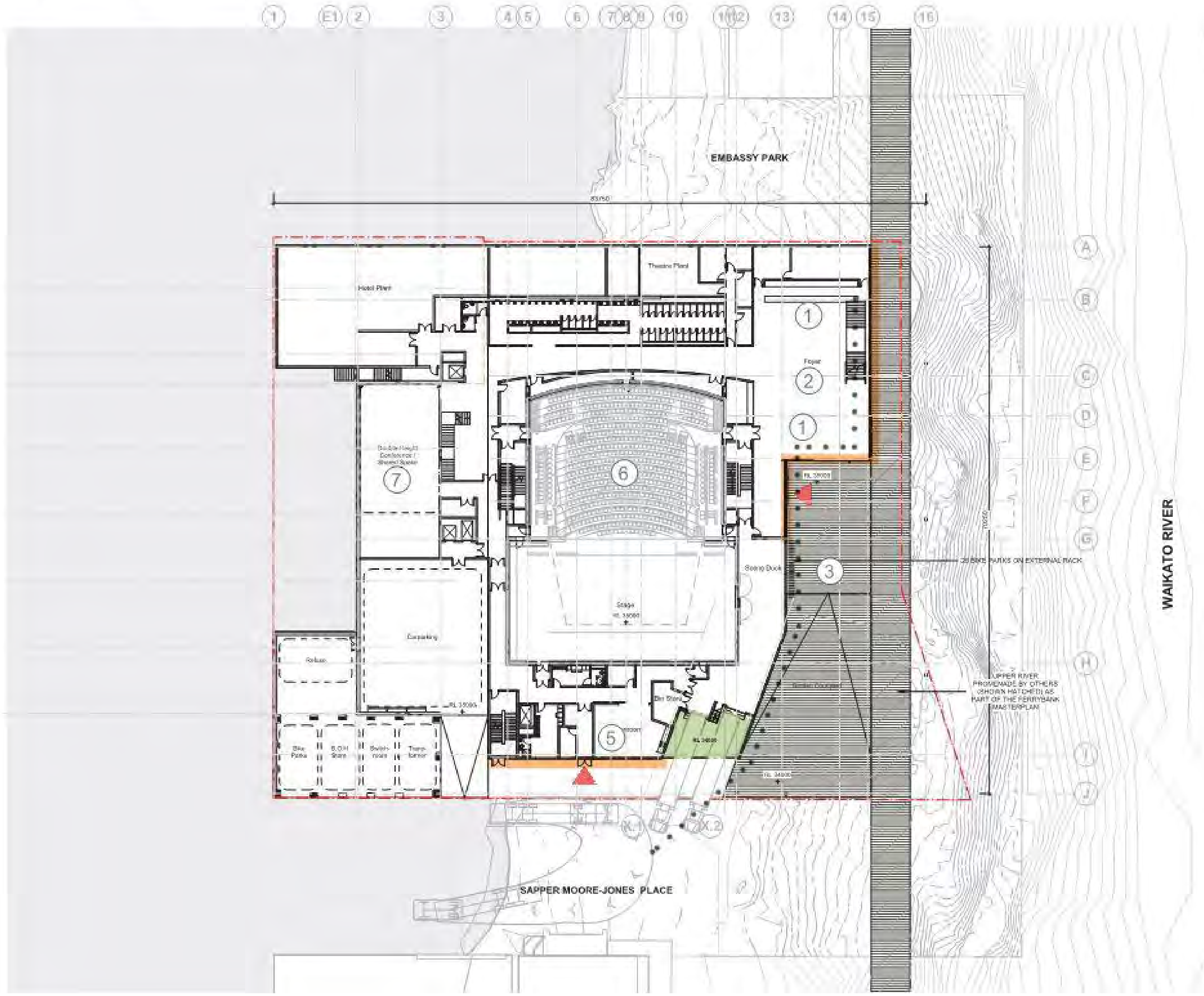


1 Plant

2 Dressing Rooms

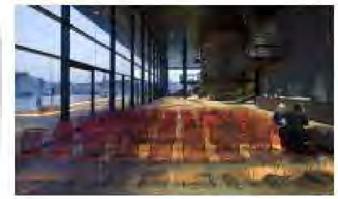


3 Orchestra Pit



1. Cafe & Bar

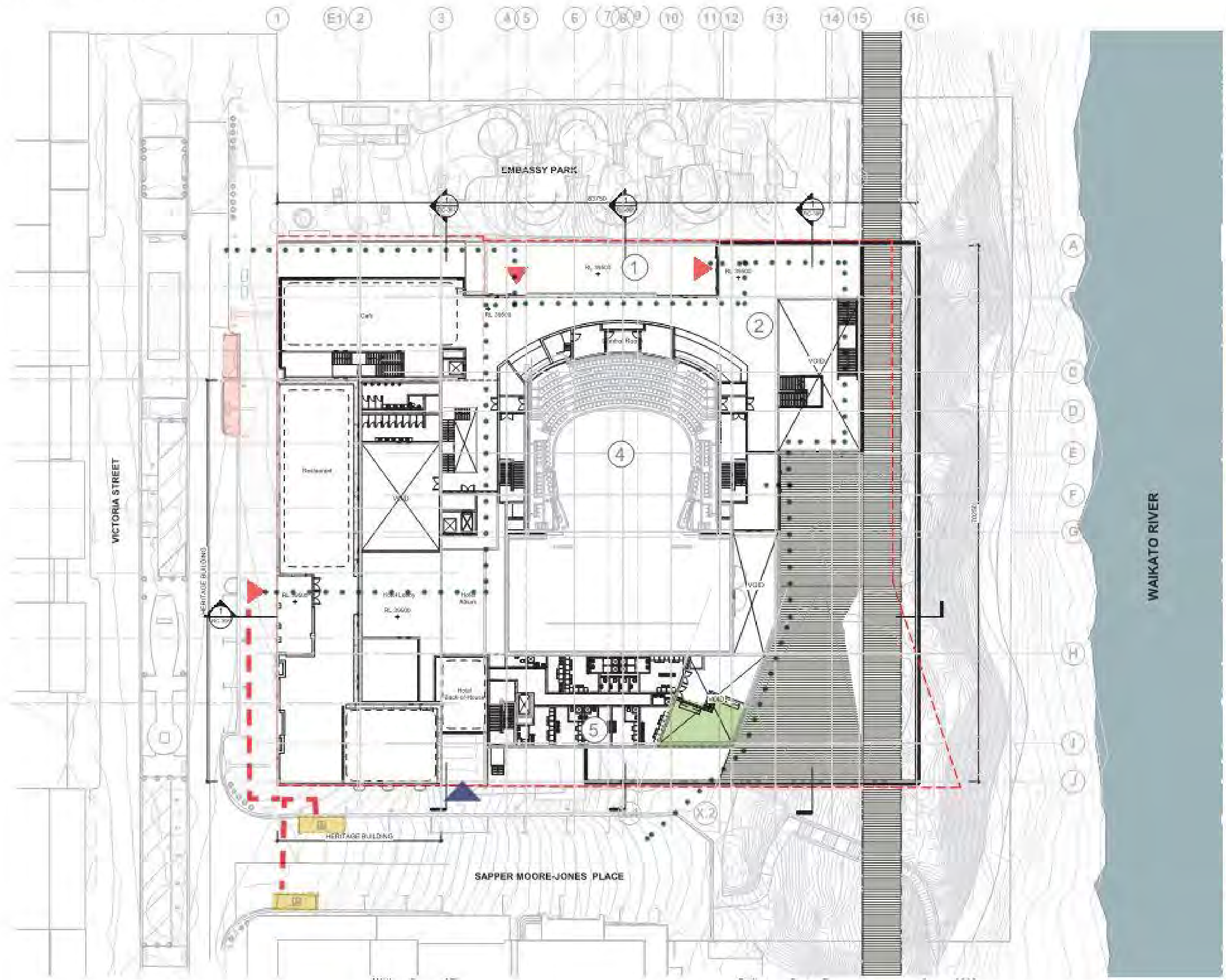
2. Informal Performance



3. Riverside Courtyard

4. Plant
5. Stage Door
6. Auditorium
7. Rehearsal

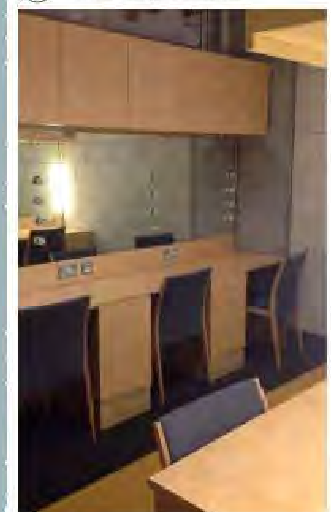
Level 1 (Circle)



① Entry Courtyard

② Foyer & Bar

③ Dressing Rooms

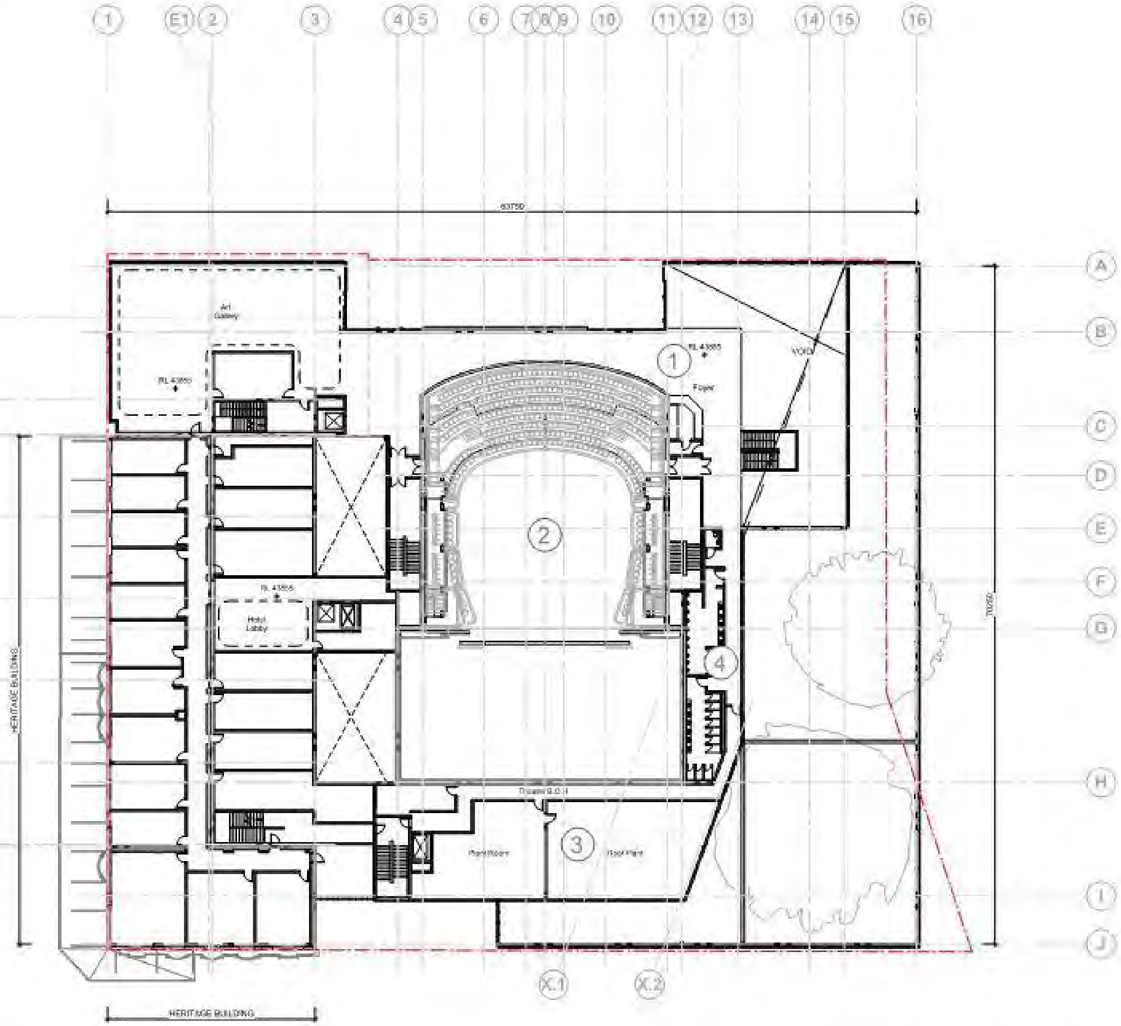


④ Auditorium

KEY

- Active Frontage
- Accessible Parking
- Bus Stop
- Loading Bay
- Access to Building from Accessible Park / Loading Bay
- Building Entry Points
- Vehicle Entry Points
- Building Circulation

Level 2 (Balcony)



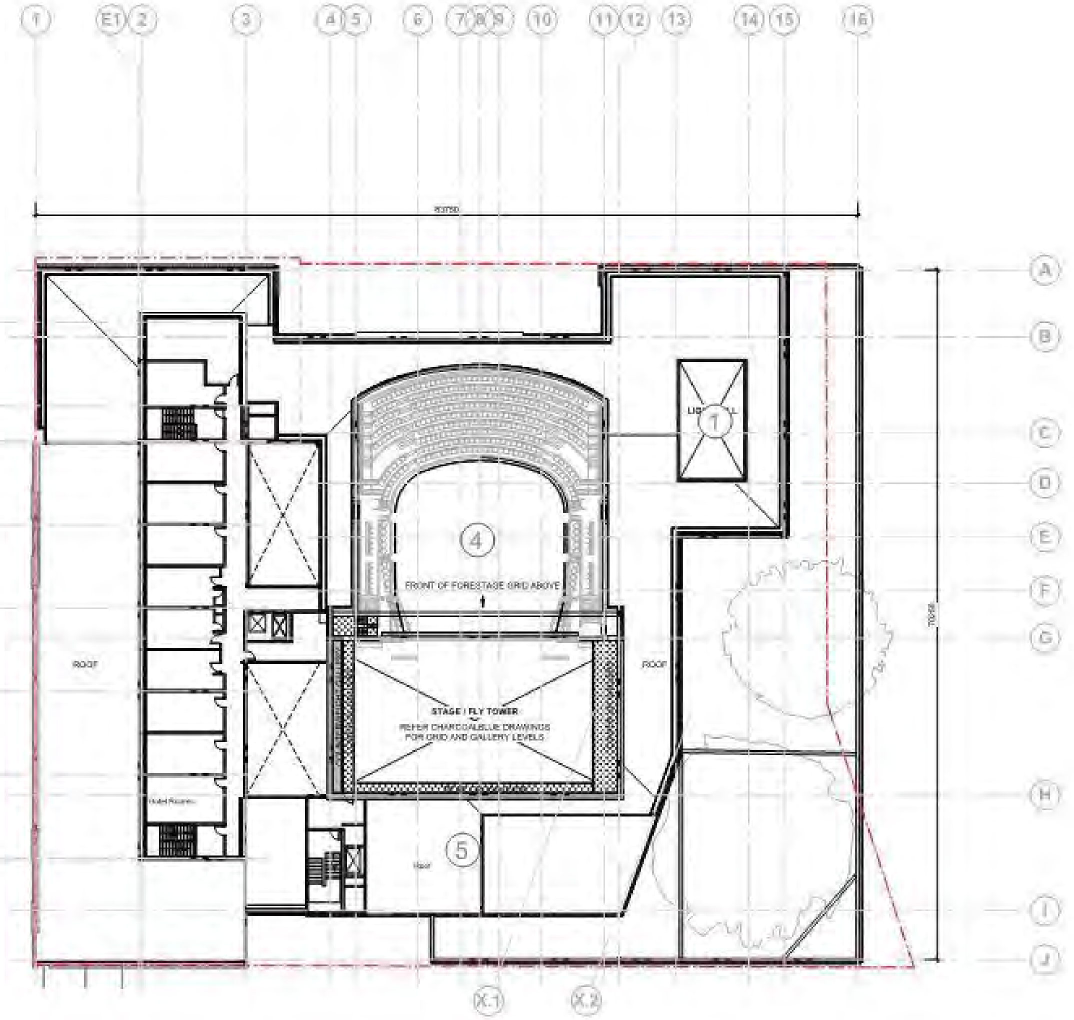
1 Foyer + Bar

2 Auditorium

3 Plant

4 WC

Level 3 (Terrace)

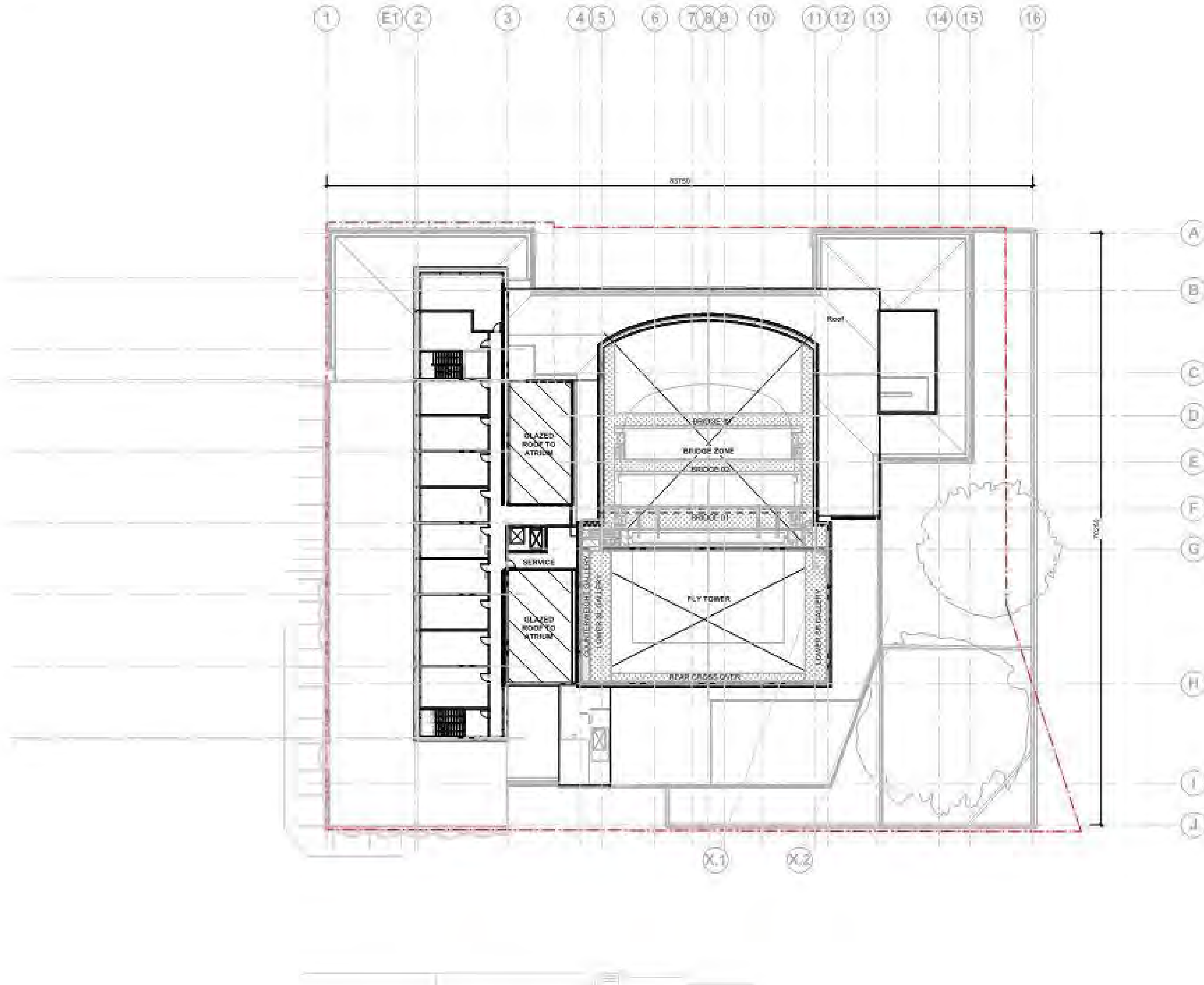


(1) Lightwell

(2) Auditorium

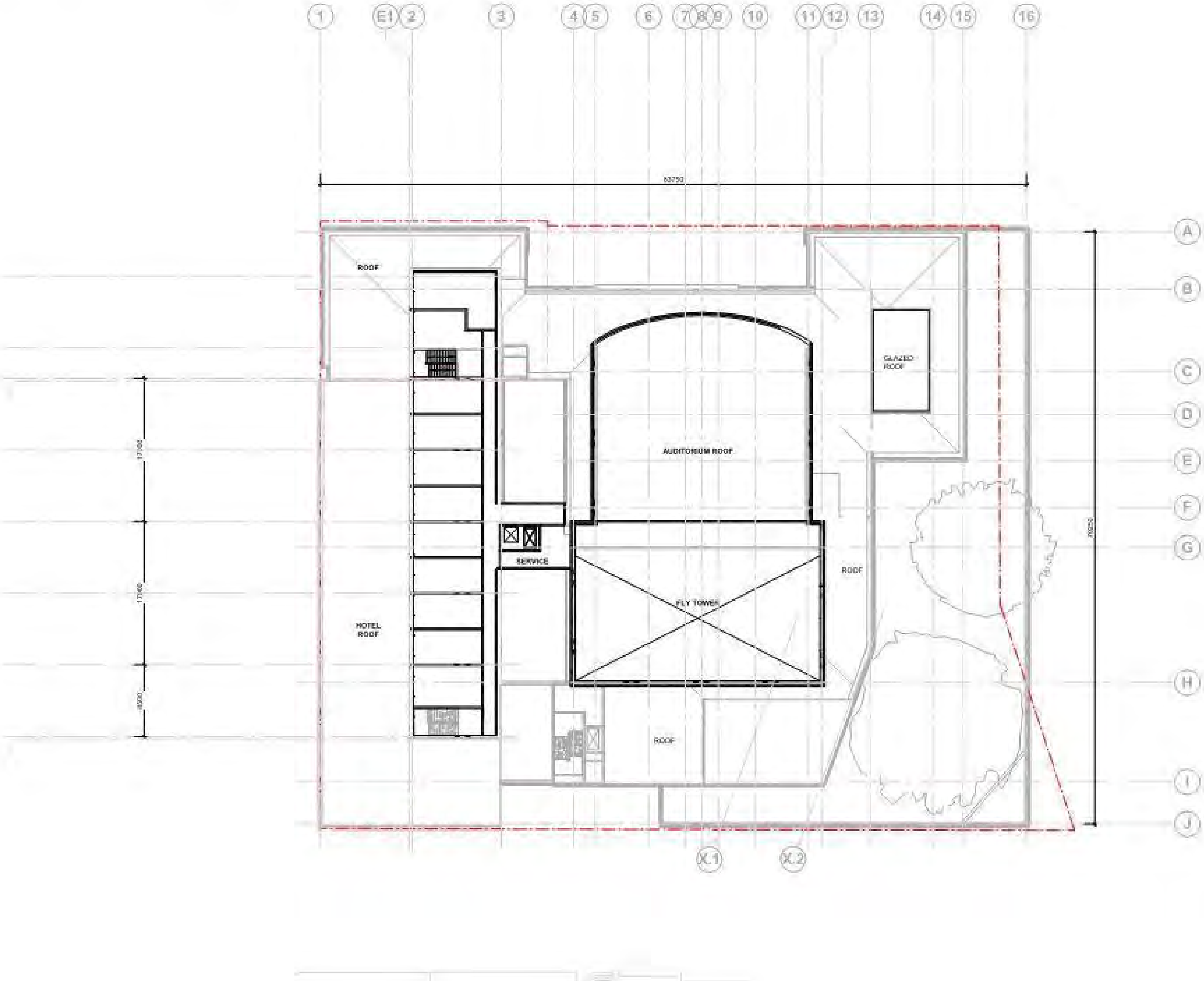
(3) Plant

Level 4 (Bridge)

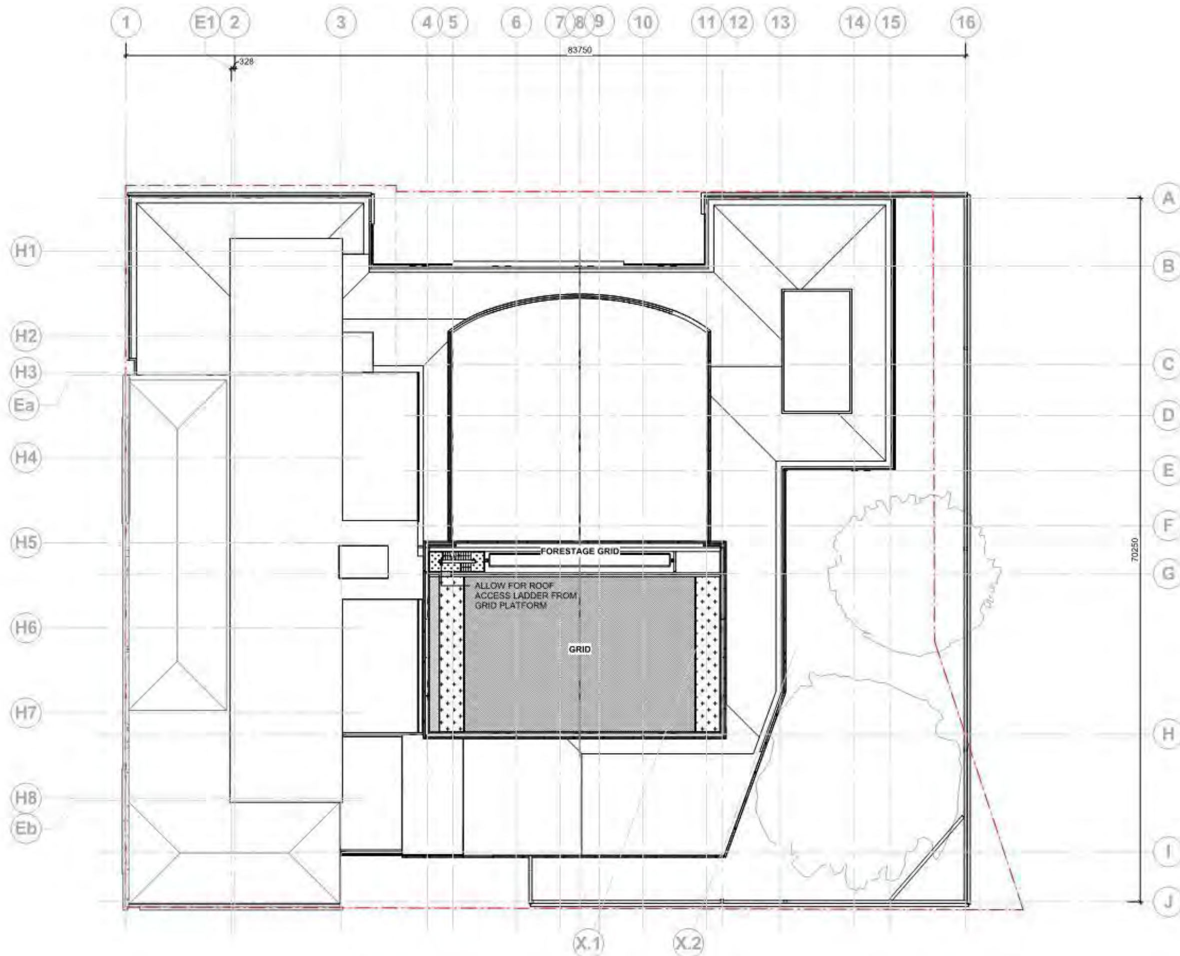


1. Galleries
2. Bridges

Level 5 (Auditorium Roof)



1 Flytower Grid



Level 8 (Flytower Roof)

MATERIAL CONCEPT

3.2 Material Concept

① Profilit Glass

② Precast Concrete with Red Oxide

② Precast Concrete with Moulded Finish

③ Curtain Wall Glazing

3.2 Material Concept

① Perforated Screen

② Timber Stair

③ Timber Battens

④ Flexible Foyer Space

4.0 Urban Design Panel

–

Summary

A presentation was made to the Hamilton Urban Design Panel on the 27th of June 2018. The panel provided overwhelming support for the proposal and supported the height plane and river boundary infringements. This endorsement will assist with the Resource Consent application. Refer appendix for Urban Design Panel Minutes

Key items raised by the panel include:

- Sapper Moore-Jones Place – Although outside of the current WRT scope of work, the panel was supportive of the street beautification proposal to Sapper Moore-Jones place. Refer section 8.8 for further detail on the proposal.
- Embassy Plaza – The panel was supportive of remodelling Embassy Park that would allow for level access across the boundary of Embassy Park and the Theatre.
- Heritage – Although in the Hotel projects domain and not in the theatre scope of work, the panel encourage that the back of the heritage building be expressed in order to delineate the new and historic building envelope interfaces.
- Iwi engagement – Encourage integrating tangible Mana Whenua design principles and cultural referencing in the design.
- Traffic – Encourage further dialogue with HCC on drop off street treatment.
- Wayfinding - Articulation of entrances and wayfinding understood to be further developed.

5.0 Resource Consent

Summary

Resource Consent is being sought for a non-complying activity. Non compliances include the fly tower going through the height plane, the screen overhanging the river boundary and the removal of heritage buildings.

Pre Application Meeting

- A pre application meeting was held with HCC on 31st May 2018. Feedback from the council is documented in the pre application minutes issued by council. Refer appendix for Pre App Minutes.

Archaeology

- An archaeologist report has been prepared for the Resource Consent submission.
- The archaeologist has undertaken a site visit with Mana Whenua.
- No record of artefacts have been found to date on site.
- The archaeologist will set up protocols with Mana Whenua for dealing with any find should there be a discovery on site.

5.0 Resource Consent

–

Traffic

A Transport Assessment report has been prepared by Transportation specialists Flow. Consent is being sought for the following amendments to Sapper Moore-Jones Place to allow for the truck dock operations. Refer drawing SK-40.

- Regrading of the bottom of Sapper Moore-Jones Place to tie in the truck dock level with the existing street on a 1:16 slope. This will also assist with the truck turning circle.
- Removal of metered street car parks
- Adjust Kerb on South of Truck dock to a mountable kerb

Removal of a taxi stand and metered on street car parks are being sought for a drop off zone on Victoria Street.

Arboricultural

An arboricultural assessment has been prepared by Arborlab for the Resource Consent Application. The proposal requires the removal of three protected trees and works within the protected root zone of two protected trees. The removal of the three trees will be mitigated by replacement planting. A tree protection methodology and mitigation plan will be implemented to minimise adverse effects that may arise as a result of the theatre building.

LVIA

The Landscape Visual Impact Assessment (LVIA) has identified that landscape character and visual effects of the WRT relate to the Waikato River, nearby public open spaces, Victoria Street and the City Centre. These effects have a positive benefit particularly in respect of the future aspirations of the City. Negative effects related to night time illumination are minor and are limited to localised residential areas close to the site on the opposing river bank.

5.0 Resource Consent

–

Iwi Engagement

Meetings have been held with Te Haa O Te Whenua O Kirikiriroa (THAWK) and Waikato Tainui. These meetings have established a relationship with the two groups and both have expressed an interest to be consulted on the Waikato Regional Theatre Project.

A memo documenting the interaction with Iwi will be submitted for Resource Consent

Acoustic

An acoustic report has been prepared by Charcoalblue that describes:

- Operational noise performance standards of the theatre and hotel
- Construction Noise and Vibration Management

Heritage

- A heritage assessment in support of the proposed theatre and hotel development is being prepared by the Heritage Architect Archifact. Archifact are leading consultation and approval from Heritage New Zealand and HCC Heritage

Assesment of Environmental Effects (AEE)

- An overall AEE will be prepared by the planning consultant Tattico for Resource Consent.

5.0 Resource Consent

-

Civil

A civil report has been prepared by Holmes to provide an assessment of the infrastructure capacity and siteworks required the for proposal. Scope includes:

- Wastewater
- Stormwater
- Water Supply
- Gas
- Electricity
- Telecommunications
- Siteworks
- Erosion and sediment control plan

The report notes that a an existing wastewater line that runs through the site will need to be relocated to prevent clashes with the proposed building & foundations

Geotechnical

A Geotechnical site investigation has been undertaken by CMW Geosciences and a report will be submitted for Resource Consent.

The site is underlain by a thin layer of localised crust over fluvial silt and sand river deposits of the Hinuera Formation approximately 20m thick. Below the river deposits are 20m of silts, clays and sands of the Walton Subgroup which overlay dense volcanic ignimbrite layers exceeding 10m in thickness.

Groundwater level for the site was observed at 12m below ground level. An additional perched water table was also observed at 5.5m below ground level. The proposed substage level is at the level of the measured perched water table. However, the orchestra pit proposed level is 2m below the measured perched ground water table so it is likely that this perched water table will be encountered on site.

The geotechnical report covers:

- Contaminated land investigations
- Ground water discharge and diversion
- Land stability matters

6.0 Consultant Coordination

-

Structure

- The Theatre development is seismically separated from the hotel development. The atrium glass roofs between the Theatre and Hotel will be anchored to the Hotel and supported on the Theatre side with supports to allow seismic movement.

- The Theatre is comprised of a 1m thick raft slab under the full size of the Sub Stage level and supported laterally with insitu concrete walls around the flytower and auditorium which anchors the building to the site.

- Some steel column transfer will be required at the lower levels at the rear of the auditorium to provide unobstructed public circulation zones.

M&E

- The Theatre and Hotel plant services are separated and housed in separate plant rooms.

- The transformer, switch room, and fire sprinkler pump is proposed to be located within the existing hotel basement, adjacent to the hotel service area. This is due to requirements of access and efficiency of required connection points.

- The mechanical AHU's are located in the Sub Stage plant and will supply air to the theatre via a displacement system within plenums underneath each level seating areas. Return air ducts have been integrated at Sub Stage level, a portion of which will route beneath the raft slab to connect to the return air plenum at the north of the plant, and exhaust to Embassy Plaza

- Exploration of River cooling has been paused for cost saving reasons.

6.0 Consultant Coordination

–

Fire

- Auditorium smoke extract is via a forestage plenum and through the flytower roof. The smoke extract fans on the flytower roof will only be in use during a fire event and therefore have been optimised to eliminate sound attenuation. Additional units for normal operation and make-up air are located in the lower plant areas and therefore require limited sound attenuation.
- Foyer area smoke extract will be via passive ventilation through louvres integrated into the light well.
- Fire and emergency access is expected to be on Sapper Moore-Jones Place and Victoria Street.
- Fire egress out of the auditorium is via two egress stairs located on the East and West side of the auditorium and via the main foyer spaces. The egress stairs discharge at a connection to Embassy Plaza and Sapper Moore-Jones Place and respectively
- Design is based on the assumption that no unit titles or similar boundary arrangement is proposed between the Theatre and Hotel
- Egress from Balcony foyer area is via the hotel egress stair in the northwest corner within the art gallery and via the east foyer staircase.

5. STRUCTURE

Holmes Consulting

EXECUTIVE SUMMARY

This Preliminary Design Report summarises the status of the Waikato Regional Theatre project design as it stands at this point in time. The primary purpose is to explain the design and how it has been developed. It identifies the site investigations undertaken, the structural and civil brief for the project, and records the issues and options that have been investigated and developed.

The theatre will share the river front site with an attached hotel complex in a restored heritage building. A number of spaces within the theatre and hotel footprint will be shared spaces.

The Building
The Waikato Regional Theatre is a new theatre and community performing arts centre replacing the existing Founders Theatre. The main auditorium will have capacity for approximately 1300, with attached public spaces including a community performance space and educational facilities.

The Theatre comprises of a basement and substage level, with three suspended floor levels above stage level linking the three seating tiers in the auditorium. The Theatre floor plate measures around 65mx50m, with a large opening in the centre forming the auditorium. A 15mx30m fly tower rises 35m above stage level to house the stage flying gear.

At the beginning of Preliminary Design, the client decision was to split the Theatre and Hotel due to the uncertainty of the timing for the Hotel project.

Above ground level, two large atrium spaces are located between the auditorium and potential Hotel.

Gravity Structure
A structural steel gravity framing system has been developed for the design. The steel frame structure has the benefit of being lighter (reduced foundation and seismic demands), has smaller columns and can accommodate higher ceiling heights than concrete alternatives. A steel structure also suits the geometry of the curved auditorium.

A composite steel deck floor system on steel secondary beams is the adopted flooring system as it provides a lightweight system with an efficient construction methodology and cost effective spans. The composite steel deck system provides good versatility for a complex floor plate compared to the main alternative of precast concrete floors. It also provides good thermal and acoustic mass for the theatre and hotel occupancies.

The steel decking will be supported on cellular steel beams. Cellular beams have circular holes cut out to reduce their weight and allow services to pass through beams. The use of cellular beams provides lightweight spans to minimise structural weight and minimise ceiling space.

The roof structure will comprise steel frames supporting DHS purlins. Over the long span auditorium, steel trusses will span across and provide support to the access gantries and lighting systems over the auditorium space.

Lateral Load Resisting Structure
The lateral system for the building utilises reinforced concrete walls in both directions, with the fly tower braced by a steel frame at high level.

The selected bracing system is governed by the geometry and acoustic requirements of the auditorium. The structural walls around the auditorium and fly tower also act as an acoustic separation to prevent noise pollution between the theatre and public spaces. The steel braced frame alternative would require a discrete acoustic build up which would increase the overall thickness of the main walls.

At high level of the fly tower, braced steel frames, clad with non-structural precast concrete cladding panels is preferred as the construction of structural concrete above roof level becomes complex due to the temporary restraints required.

The use of structural walls provide a stiff building response during an earthquake which reduces the size of seismic gaps to other buildings and services. It also provides a continuous structural element into the basement retaining walls and concrete foundations.

Foundations & Basement
The foundations consist of a mixture of bored cast-insitu piles and screw piles embedded into the underlying soil strata.

An insitu concrete raft slab is proposed for the base of the sub storage level, supported by building piles. The basement retaining walls are to be reinforced concrete.

Auditorium Render (courtesy of Charcoal Blue)

Architectural Render (courtesy of Charcoal Blue)

1. INTRODUCTION

Holmes Consulting are providing structural and civil engineering services for the Waikato Regional Theatre for Momentum Waikato.

The project involves construction of a new theatre and performing arts complex in the centre of Hamilton between Victoria Street and the Waikato River.

The design phase to date has involved participation at a number of client briefing sessions, design workshops and design coordination meetings. A significant value engineering process was undertaken at the end of concept design.

This report summarises the status of the design as it stands at this point in time. The primary purpose is to explain the design and how it has been developed. It identifies the site investigations undertaken, the structural brief for the project, and records the issues

2. THE PROJECT

The Waikato Regional Theatre is a new theatre and community performing arts centre for the Waikato region.

The project comprises a new 1300 seat (approx.) auditorium with attached public spaces including a community performance space and educational facilities.

The Theatre is located on Victoria Street on a site which slopes down towards the Waikato River. The Theatre will be linked in to a number of public spaces along the river frontage by a public walkway.

At the beginning of Preliminary Design, the client directed the team to split the Theatre and Hotel structure. Previously efficiencies had been made to connect the two new buildings. This split was instructed due to the uncertainty in timing for the Hotel project.

The Theatre structure links with an historic hotel refurbishment and extension which occupies the Victoria St frontage. Large atrium and creative spaces are shared by the Theatre and Hotel. The Hotel is separated from the Theatre.

A substage and basement level provides stage access as well as car parking below street level. Part of this sub stage area is already exposed due to the sloping site and the existing structures retaining walls, while the rest will be excavated during construction.

3. GEOTECHNICAL CONSIDERATIONS

A geotechnical investigation has been undertaken by CMW Geosciences.

The site is underlain by a thin layer of localised crust over fluvial silt and sand river deposits of the Hinuera Formation approximately 20m thick. Below the river deposits are 20m of silts, clays and sands of the Walton Subgroup which overlay dense volcanic ignimbrite layers exceeding 10m thickness.

Groundwater level for the site was observed at approximately 12m below ground level. An additional perched water table was also observed at 5.5m below ground level. The proposed substage level is at the level of the measured perched water table. However the orchestra pit proposed level is 2m below the measured perched water table so it is likely that this perched water table will be encountered on site.

Due to the soft nature of the overlying river sediments, the buildings foundations will need to consist of piles, embedded into underlying soil strata.

The piles will be founded at varying depths. The most heavily load piles will be founded in the dense ignimbrite layer which is expected to be encountered at a depth of between 40m and 50m below existing ground level.

Architectural Render (courtesy of Charcoal Blue)

Geological Investigation Locations (courtesy of CMW)

Waikato Regional Theatre Site Selection (courtesy of Charcoal Blue)

4. STRUCTURAL DESIGN CRITERIA

Structural Design Loads
Structural design actions for the project have been determined in accordance with AS/NZS1170.

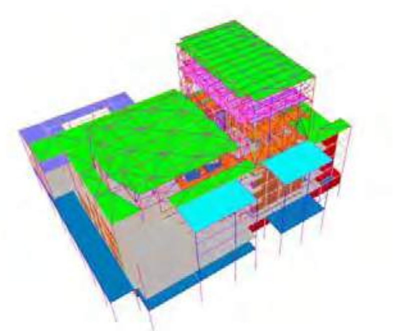
The building is required to have a design life of 50 years under The Building Act.

Design Superimposed Loads
The recommended design superimposed loads for the project are outlined on the table adjacent.

These loads are generally derived from AS/NZS1170.1 and/or based on experience with the level of services and finishes anticipated in the buildings. Specific theatre loads have been supplied by the theatre consultants.

The superimposed dead loads cover allowances for services, suspended ceilings, fixed partitions, floor finishes, non structural screeds, landscaping and cladding.

Live load allowances cover furniture, movable partitions, shelving, storage, equipment and people. These are items that are non-permanent or transient and of more uncertain nature.



Building Structural Analysis Model

Design Use	Nature of Load*	Uniformly Distributed Loads (kPa)	Concentrated Point Loads (kN)
Shared Space/	LL	4.0	4.5
Concourses	SDL	1.0	
Basement	LL	2.5	13.0
Carparking	SDL	0.5	
Stages	LL	7.5	4.5
	SDL	2.0	
Non-Trafficable	LL	0.25	1.8
Roof	SDL	0.5	
Heavy Plant Spaces	LL	5.0	10.0
	SDL	2.0	
Fly Tower Grid	LL	2.5	3.5
	SDL	0.5	
Fly Galleries	LL	-	4.5kN/m
(per m run)			

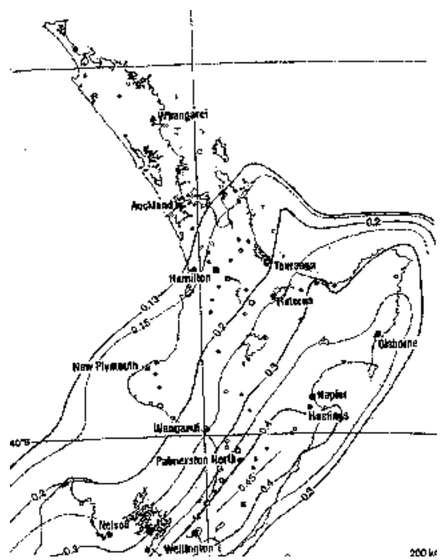
*LL = Live Load, SDL = Superimposed Dead Load

** Heavy Load areas to be provided in the locations shown in the loadings plan. Total area of heavy load is provided for an average of 5% of each floor, not exceeding 10% on any one floor.

Building Importance Levels
Using AS/NZS1170, new buildings in New Zealand are assigned with an Importance Level. For a public space where more than 300 people can congregate in one area and a theatre of greater than 1200m², AS/NZS 1170 requires the structure to be designed as an Importance Level 3 building.

The significance of the structure Importance Level is primarily in the return period of earthquake and wind load events that need to be designed for. Accordingly the buildings will be designed for the following return periods:

Importance	Earthquake Return Period	
3	ULS	SLS
	1/1000	1/25
Importance level	Wind Return Period	
3	ULS	SLS
	1/1000	1/25



Seismic Hazard Map - North Island of New Zealand

Design Earthquake Loads
Using AS/NZS1170.5 (elastic response, zero period):

Ultimate Limit State (ULS)

Importance Level		:	3
Return Period (ULS)		:	1/1000
Site Soil Category		:	D
Spectral Shape Factor	$C_{h(T)}$	:	3.00
Hazard Factor	Z	:	0.16
Return Period Factor	Ru	:	1.3
Near Fault Factor	$N_{(T,D)}$	:	1.0
Seismic Coefficient	C	:	0.62

Serviceability Limit States (SLS1)

Importance Level		:	3
Return Periods (SLS)		:	1/25
Site Soil Category		:	D
Spectral Shape Factor	$C_{h(T)}$	:	3.00
Hazard Factor	Z	:	0.16
Return Period Factor	Ru	:	0.25
Near Fault Factor	$N_{(T,D)}$	:	1.0
Seismic Coefficient	C	:	0.12

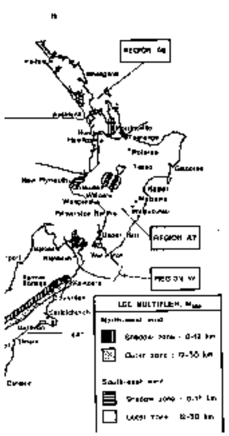
Note S_p varies depending on the level of ductility designed and detailed for.

Design Wind Loads
The design wind loads are derived from AS/NZS1170.2.

The static analysis procedure set out in AS/NZS1170 shall be used to calculate the wind pressures on all cladding elements and supporting frameworks. Refer calculations for detailed direction loads (auditorium roof westerly wind shown below).

Site Wind Speed and Design Pressures

Height to top of building		:	22 m
Using AS/NZS1170.2			
Importance Level		:	3
Directional Multiplier	M_d	:	1.0
Terrain Category		:	3
Terrain/Height Multiplier	$M_{(z,cat)}$	:	0.95
Shielding Multiplier	M_s	:	1.0
Topographic Multiplier	M_t	:	1.0
Ultimate Limit State (ULS)			
Return Period		:	1/1000
Regional 3s Gust Speed	$V_{1000\ R}$	:	46 m/s
Site Wind Speed	$V_{sit,b}$	:	44 m/s
Design Wind Pressures*	p	:	1.15 kPa
Serviceability Limit States (SLS1)			
Return Period		:	1/25
Regional 3s Gust Speed	$V_{25\ R}$	:	37 m/s
Site Wind Speed	$V_{sit,b}$	:	35 m/s
Design Wind Pressures*	p	:	0.74kPa



* Nett internal and external pressure coefficients (including area reduction, local and permeability pressure factors) are applied to these basic wind pressures to give design pressures for specific elements eg glazing, roof and wall claddings, canopies, internal partitions, etc.

SERVICEABILITY LIMIT STATE DESIGN CRITERIA
Durability
The building is located in an inland area with the exterior environment is classified as Category B (low corrosivity) to AS/NZS2312 for structural steelwork, or Category A2 to NZS3101 for concrete.

Movement Limits
The deflection, drift and movement limits adopted will be generally in accordance with Table C1 of AS/NZS1170.0 Specifically the relevant movements, drifts and deflections for the buildings are:

- Flooring deflections both under short term and long term load conditions (impacts on serviceability of floor use, clearances to non structural elements on the floor below, ongoing functionality of mobile storage units and operable walls)
- Beam deflections both under short term and long term load conditions (impacts on serviceability of floor use, clearances to non structural elements on the floor below)
- Differential foundation settlement (needs to be low to avoid significant problems for the building)
- Overall seismic drifts of the building (impacts on size of seismic gaps under ULS to adjacent independent structures and boundaries, to avoid interference with structural performance and avoid significant damage if structures were to impact)
- Inter-storey seismic drifts between adjacent levels (impacts on detailing of partitions, cladding elements, etc)

Schedule of Building Movements
Inter-storey Drifts (horizontal movement @ ULS)
EW direction: +/- 15mm (Level 03)
NS direction: +/- 15mm (Level 03)

Total Building Displacement at Top @ ULS
EW direction: +/- 95mm (Fly Tower Roof)
NS direction: +/- 75mm (Fly Tower Roof)

Flooring Unit Vertical Deflection Allowance up to 30mm, Floor flatness not to vary more than 10mm in 6m.

Live load vertical movement edge beams up to 20mm.

Robustness for Impacts and Face Loads
Barriers such as balustrades and handrails designed in accordance with NZS1170 Table 3.6 in addition to design stiffness for security.

Partitions stiffness, and robustness designed for strength under seismic face loads and stiffness for human impact.

Fire Resistance Ratings
Details of required ratings will be provided by the fire engineering consultant and will be provided for accordingly.

Item	Form of Construction	F.R.R. to be provided by
Floors	Comflor w/ topping	60/60/60
Exterior Panels	Concrete	60/60/-
Interior Walls	Concrete	60/60/60

For the typical levels above ground floor the following F.R.R will be provided by the structure:

Crack Widths
Crack widths will be kept within recommended limits of Table C2.1 of NZS3101:2006.

OTHER SERVICEABILITY LIMIT STATE DESIGN CRITERIA
Acoustic, vibration, temperature effects and other serviceability criteria not covered above will be covered by other consultants' reports.

Ultimate Limit State Design Criteria
The ultimate limit state is the condition under which the buildings are required to withstand extreme events (of specified probability of occurrence) and avoid collapse of the structure, avoid collapse of parts of the structure leading to loss of life and preservation of means of evacuation.

The structure will be designed to resist the following combination of loads for ultimate limit state:

where G = dead load
Q = live load
$Q_u = \psi_u Q$
where ψ_u = live load factor = 0.4
W_u = wind load (ULS)
E_u = earthquake load (ULS)

i.e. The relevant specific design load combinations are:

a. 1.35 G
b. 1.2 G & 1.5 Q
c. 1.2 G & Q_u & W_u
d. 0.9 G & W_u
e. G & Q_u & E_u

5. STRUCTURAL SYSTEM

Vertical Load System

The Theatre floor plate consists of a circulation and amenities area which wraps around the semi-circular auditorium space and fly tower structure. Tiered seating and viewing lines result in predominantly open space within the auditorium facing the stage to the south. The tiered seats link through into the circulation space at three levels and the seats overhang as they step down towards the stage.

To the north and east of the auditorium is the public circulation and display area, whilst the backstage performers area is located to the south of the stage. Two large atriums create shared public spaces and separate the hotel structure from the theatre. A public performance area and open air courtyard are screened from the Waikato River to the east by a tall glass screen structure which extends over a public walkway.

Structural Options

A Comflor steel composite decking system supported on lightweight steel cellular beams has been adopted for the theatre flooring system. The Comflor system provides a lightweight floor that is well suited to the complex geometry and numerous penetrations of the theatre floor plate The steel decking will be supported on cellular steel beams which have circular holes cut out to reduce their weight and allow services to pass through beams.

Alternative flooring systems also considered included precast concrete double tee floor units on steel composite beams. Compared to Comflor, precast concrete floors have less versatile span arrangements to deal with the complex theatre floor geometry. A Comflor system is also significantly lighter than precast floors which reduces the supporting structure and foundations required.

Steel primary beams and columns have been adopted to support the flooring system under gravity. The steel system provides efficient spans for the primary beams to maximise ceiling clearances and the simplicity of steel-steel connections to the columns speeds up construction time.

Alternatives considered for the primary structure included reinforced concrete beams/columns and concrete filled hollow section columns. The concrete alternatives have a larger size and weight than their steel equivalents which has implications for the ceiling height and column aesthetics. Concrete filled steel columns provide their own inherent fire protection. In selected locations where these columns will be exposed, CHS's have been adopted. Where an architectural finish is included as cladding to the columns so the benefit of the concrete filled sections was negated.

Circulation Space/Gallery

Comflor on cellular secondary beams has been adopted for the circulation space, which have been precambered to minimise deflections. Cell beams are generally orientated east-west to allow the services to distribute north-south along the auditorium length. Supporting these cellular beams are steel primary beams with shorter spans to allow a consistent beam depth and ceiling line. The primary beams span to the steel I-section columns or structural walls which brace the building laterally.

Auditorium Structure

The auditorium comprises open space framed on three sides with overhanging seats facing the stage to the south. The stalls level seating is made up of a timber build up supported off the reinforced concrete raft slab below. Timber build up was adopted rather than a sloping raft slab because the space below these seats is used for distributed ventilation. The suspended tiered seating comprises raking steel cantilever beams and a combination of precast concrete bleachers and timber framing to suit the stepped seating arrangement.

The roof is made up of deep steel trusses spanning east -west across the auditorium. Spanning between the trusses and a double layer of steel purlins with an acoustic build up and lightweight metal roofing. These trusses also support the lighting equipment and access gantries in the roof space.

Fly Tower Structure

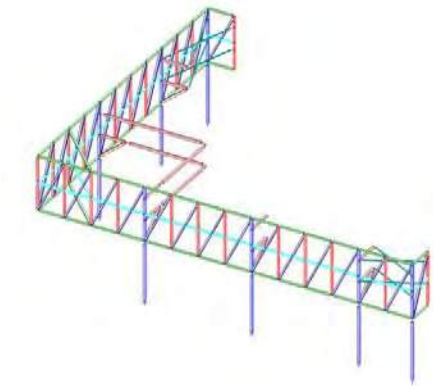
The flytower comprises a 35m high tower over the stage for the housing and flying of stage equipment and sets. As such the tower is predominantly open space with the first floor being the fly gallery at 22m above stage level. The gallery flooring system comprises closely spaced steel channels which allow ropes to pass through but also access for the stage operators. These channels are supported at a high level by the flytower walls which also provide lateral bracing to the overall building.

Screen

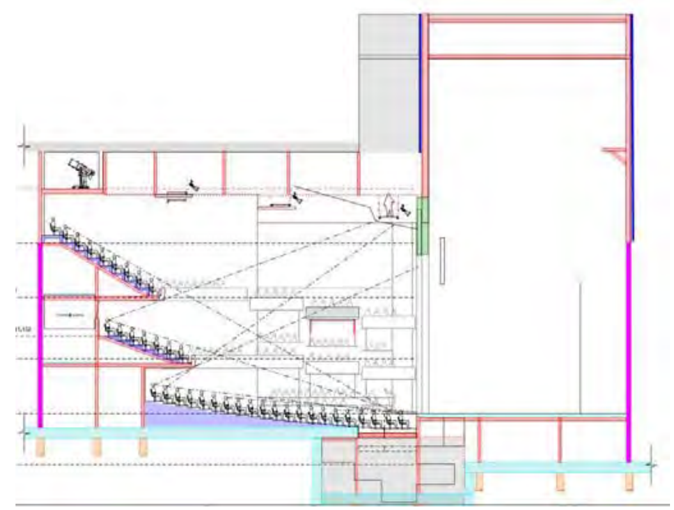
To the east of the theatre, an external glass screen frames the building against the Waikato River, enclosing large existing trees. The screen comprises of an approximately 7m deep glass channels which are supported 15m above the sloping ground by a 7m deep steel truss made up of square hollow steel sections. Steel columns support the trusses. At the north-east and south-east corners, a large two-way cantilever creates the feel of the screen floating out over the river bank on the outside of the trees.

Hotel Interface

As part of the theatre complex, the site also contains a hotel development which occupies the street frontage of Victoria Street to the west. At the start of Preliminary Design, the client instructed the team to keep the Theatre and Hotel separate. This simplified the interface between the two buildings.



Screen Structural Model



Auditorium Section

Lateral Load System
The theatre comprises a relatively narrow strip of floor framed around the large void which makes up the auditorium and fly tower. To brace a building shape with large floor voids requires a number of discrete bracing elements placed around floor plate to support each of the narrow pieces of flooring.

Structural Options
The choice of lateral bracing system has been determined largely by acoustic considerations. Sound transmission through the auditorium into the circulation spaces is required to be minimised by means of an acoustically dense material enclosing the auditorium. Reinforced concrete walls are well suited to this purpose because they provide a solid, dense barrier for sound transmission and fire resistance.

As heavy concrete walls were required acoustically, it was logical to utilise these structurally for the building bracing. Reinforced concrete walls provide a robust and stiff building response with a large number of contractors experienced in this type of system in New Zealand.

The primary alternative bracing systems considered included moment resisting steel frames and steel braced frames.

Moment resisting frames provide clear spans which are useful for the circulation spaces. However these result in large columns sizes and numbers and tend to be very flexible, leading to large seismic gap and deflection head requirements on facades and services. Significantly more columns would need to be introduced to provide sufficient bracing.

Braced steel frames provide a stiff seismic response and the braces can be well distributed around the building and concealed within wall linings. Braced frames were not adopted because they provide no benefit to the building acoustic performance, and a separate acoustic cladding would be required around the auditorium. Consequently the wall build-up around the auditorium became very thick and occupied more of the floor plate. Preliminary costings showed this system to be more expensive than the concrete wall.

Circulation Space/Gallery & Auditorium
Structural walls frame around the auditorium and flytower to provide bracing to the entire building in addition to their acoustic and fire barrier functions.

Additional walls have been introduced behind the fly tower to provide stability to the floor slabs in the BOH area. These were introduced as a result of separating the Hotel and Theatre projects.

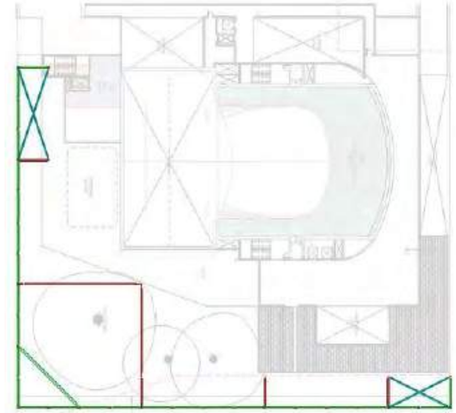
These structural walls are tied together by the flooring system which is made up of reinforced concrete cast onto steel decking. The large number of penetrations in the floor plate result in discrete areas of the floor plate being heavily reinforced to drag lateral load into the structural walls.

Fly Tower Structure
Structural walls make up the 3-sided flytower up to the upper most theatre floor and provide bracing to the entire building. Above the uppermost floor, the bracing system for the flytower changes from 3-sided concrete walls to 4-sided steel braced frames with precast concrete cladding.

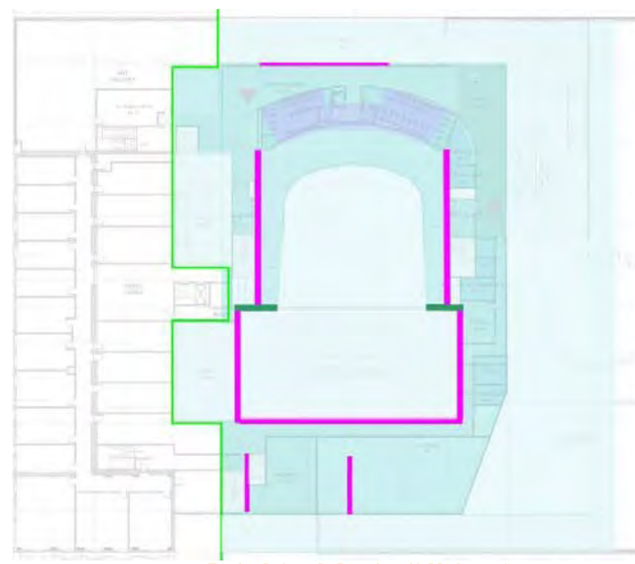
The change in system was adopted because construction of concrete walls above the last floor level is difficult as there is no restraint of the walls while under construction. Braced frames can be lifted into place at high level without the need for significant temporary restraint. Braced frames are also significantly lighter which decreases the lateral demand on the walls below. Non-structural precast concrete cladding will be clipped onto the braced frames to meet the architectural brief and to reduce sound transmission.

Screen
The screen is a lightweight, thin planar structure which tends to catch a significant wind load. It's geometry means that it's inherent bracing capacity against wind loading is low. Consequently lateral bracing of the screen is provided by a series of props and braces which frame back into the main building. These props frame in at floor level to activate the main building walls for resisting load. Careful coordination with the existing trees is required to find locations where these props can connect back to the main building.

Hotel Interface
The Hotel is now entirely seismically separate from the Theatre project.



Screen Bracing Props Layout



Typical Level Bracing Wall Layout

Foundation System
Based on the known likely ground conditions to be encountered, and the loads on the foundations, the building is to be founded on piles.

Due to the loads on the foundations, a mixture of bored cast-insitu piles and screw piles are likely to be the most cost effective solution. The R/C piles also provide lateral resistance to resist the building seismic base shears and to retain the slope.

The piles will be tied together by a reinforced concrete raft slab on grade. The raft distributes loads from the columns and walls to the grid of piles and ties the structure together at ground level.

Piled Foundations
The pile depths alter across the site based on their particular demand and the material that they are founded in. Some piles are in the order of 50m deep.

Bored cast insitu reinforced concrete piles will be used for the primary building piles. These piles are capable of supporting large building loads and can be bored to significant depth. Piles below the walls are also subject to large uplift forces during an earthquake and bored concrete piles can be reinforced to suit these demands. The building piles are also used to resist seismic base shear lateral forces induced by the building and ground motion during an earthquake.

Steel screw piles are proposed to be used to support the lightweight screen columns and gravity only columns. Screw piles are an effective system for the lightly loaded screen columns as they can be installed using the reach of an excavator boom over the steep sloping riverbank. Screw piles or driven steel piles are not suitable for the main building uplift piles due to the large loads and founding depth required.

Raft Slab
An insitu concrete raft slab is proposed for the base of the Theatre. The raft slab is used to distribute vertical and horizontal loads between the piles and to restrain the base of the retaining walls against the piles. The 1m thick raft slab has been optimised to limit the number of steps at the sub-stage levels.

Retention Structure
The structure tends to step down with the slope towards the river, however some retaining is required due to the extent and depths of the sub-stage area. The retention is partially provided by the existing hotel basement retaining walls. These walls will require temporary support during the construction of foundations and retaining for the theatre and hotel extension.

Reinforced concrete retaining walls are proposed where required to retain the soil for the basement structure. Based on the proposed floor levels, these retaining walls are required along the existing hotel interface, around the auditorium and orchestra pit levels. Retaining walls are designed to span between floor levels with the lateral load taken out by the building piles.

Slope Stability
The theatre is located on a sloping site underlain by soft fluvial river deposits. CMW have performed a preliminary analysis of the slope stability and have identified that a concrete palisade wall along the river frontage may be the most cost effective slope stabilisation method.

The palisade wall involves drilling bored concrete piles at approximately 1m centres at the top of the slope to create a wall which resists lateral movement of the slope. These piles are proposed to be 17m deep and are tied back into the structure by the raft slab. This is currently being reviewed as it is looking likely that a section of the wall may not be required.

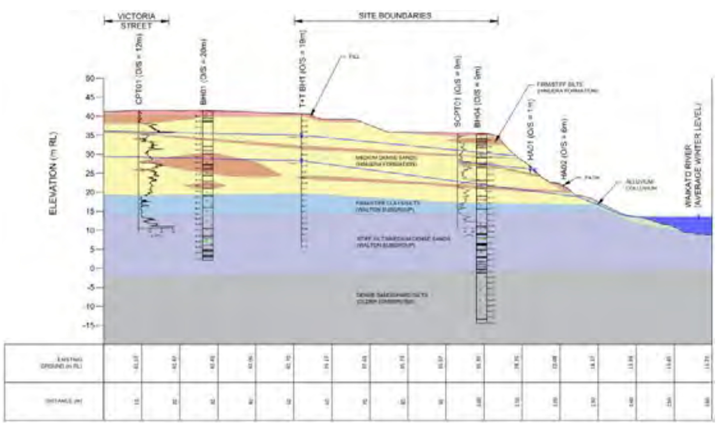
Significant Design Features
Cantilever Auditorium Seating
The tiered seating within the auditorium comprises three main levels, with the upper levels overhanging the lower seating. These cantilever seating tiers are sensitive to dynamic excitation from the crowd which can significantly increase the beam demand. Consequently these beams are designed for increased demands to account for dynamic excitation.

Auditorium Roof
The auditorium roof includes long steel trusses which span between the main walls of the theatre. In addition to supporting the roof, these trusses are also required to support the access gantries and suspended equipment which makes up the auditorium which significantly increases their design demands.

Orchestra Pit
At the base of the stage, an orchestra pit is designed to retract into a recess to allow flexibility in the theatre usage. The base raft slab is designed to handle large point loads imposed by the jacking equipment which moves the orchestra pit and seating into place.

Floor Plate Openings
The Theatre floor plate includes a large number of openings which make up the auditorium, atriums and stairs/lifts. As the floor plate is structurally relied upon to tie the bracing walls together during an earthquake event, the location and size of these penetrations has an impact on the building's structural response. To provide robustness to the floor diaphragm, a number of key locations around the walls and openings contain additional reinforcement to drag load into the bracing walls.

Typical Floor Plate Openings



Geological Soil Profile (Courtesy of CMW)

WASTEWATER

Existing Infrastructure

There is an existing 150 mm dia. clay wastewater main located west of the subject site in Victoria Street. At the south west corner of the subject site, the wastewater main flows east down Sapper Moore-Jones Place. From Sapper Moore-Jones Place, the main passes through private land and continues south.

There is an existing 150 mm dia. clay wastewater line passing through the site. This is a council owned main and it is assumed it services an apartment block to the north of the subject site as well as the existing building located on the property's north west corner. There are a number of manholes providing access to this wastewater line. Two manholes adjacent to the northern boundary of the property will need to be relocated to prevent any clashes with proposed foundations.

Proposed Infrastructure

A new manhole and wastewater line will be constructed along the southern boundary of the site. This will reticulate any wastewater from the theatre and hotel.

To maintain the existing wastewater line through the site, it is proposed to install a new deep wastewater manhole (invert level approx. 4.5 m) to the north of the boundary line and redirect the existing line under the foundation of the hotel. A new deep manhole to the south of the building is required for access to the wastewater line. From this new manhole, the wastewater line will connect into an existing manhole on Sapper Moore-Jones Place.

Any proposal to direct the line directly under the theatre is likely to cause issues with Finished Floor Levels of the plant room and orchestra pit. Both these rooms have proposed floor levels below the invert level of the existing wastewater infrastructure in Sapper Moore-Jones Place. We recommend avoiding this option for the redirection of the line as it would require the wastewater to be pumped.

STORMWATER

Existing Infrastructure

There is an existing 450 mm dia. concrete main in Victoria Street. A double sump and manhole at the south west corner of the site could provide a connection point for stormwater from the proposed development. The double sumps receive stormwater roof runoff from buildings in the subject site through a number of kerb adaptors in Victoria Street. The sub-catchment contributing stormwater to the kerb will be investigated during developed design.

There are 2 small stormwater detention tanks located within the subject site. The Harrison Grierson survey shows these tanks eventually discharge into the wastewater line within the subject site. However this is to be confirmed by Council.

There is some stormwater infrastructure in Sapper Moore-Jones Place which collects runoff from a number of sumps and discharges this to the river.

Proposed Infrastructure

Roof runoff shall be collected by a number of downpipes and drains before discharging to the Council network. The proposed canopy over Victoria Street will discharge stormwater to the Victoria Street main, through kerb adaptors. The remainder of the bulk of roof runoff will discharge to the Sapper Moore-Jones main. The proposed roofing material (eg. Waterproof membrane) is non-reactive therefore roof runoff will not require treatment prior to discharge from site.

Any hardstand or landscaped areas shall require grading to convey any surface runoff to the primary stormwater system. The design of any external hardstand areas will ensure that no stormwater runoff from the proposed impervious surfaces will discharge over the Waikato River embankment along the east side of the site.

Only runoff from trafficable areas shall require treatment prior to discharge from site. Therefore, hardstand runoff shall be kept separate from roof runoff prior to treatment.

The post-development stormwater runoff shall need to be limited to match the pre-development runoff ('pre-development' is defined as the site in its current condition). This will be done by providing above ground or below ground storage tanks which will release stormwater at a reduced flow rate.

The total volume of rainwater to be attenuated is 36 m^3. How this volume is to be provided will be confirmed during developed design.

The existing buildings have a basement level which will be extended and used for underground carparking. Stormwater sumps will be required to collect any rain water which runs off the cars. This drain is for rainwater only and not for any water discharged from fire sprinkler systems.

One discharge point for post-development runoff will be established from site and connect into the existing infrastructure on Sapper Moore-Jones Place.

WATER SUPPLY

Existing Infrastructure

There is a 250 mm dia. trunk main in Victoria Street and a 150 mm dia. main in Sapper Moore-Jones Place.

Proposed Infrastructure

We propose to extend one potable water supply connection from the existing 150 mm dia. main in Sapper Moore-Jones Place. The new connection will require a water meter, isolation valve and back flow prevention device.

The size of the new water connection will be determined by the firefighting demand, therefore it will be confirmed by the fire engineer.

It should be noted that as design proceeds, it may be decided to provide two water connections; one for the hotel and one for the theatre. Any water supply connection will require water meter, back flow prevention and isolation valve. This will be confirmed during developed design.

OTHER SERVICES

Power

The requirement of a power supply will be documented by building services engineers during developed design.

Telecoms

The requirement of telecoms will be documented by building services engineers during developed design.

Gas

The requirement of a gas supply will be documented by building services engineers during developed design.

SITE WORKS

Earthworks

Large scale earthworks will be required for works across the whole site. Bulk earthwork modelling has been carried out as part of preliminary design and detailed in the Holmes Consulting Resource Consent Infrastructure Report, revision 1 issued 13th July 2018.

Design Carpark Pavement

To date, no design CBR values have been provided. An indicative flexible pavement build up (heavy use) consisting of the following is proposed, based on a preliminary CBR of 3%:

35 mm AC10,

100 mm AP40,

250 mm AP65.

Flexible pavement design will be confirmed when the geotechnical engineer can provide a design CBR for the site soils.

Any concrete hardstand areas required will be designed by the structural engineers.

OVERALL SITE ISSUES

Archaeological and Cultural Sites

The south east corner of the site has been designated as a location with the potential for discovery of archaeological or cultural artefacts or sites.

In the event that during earthworks on site, any archaeological features, artifacts or human remains are found, the Hamilton City Council's Accidental Discovery Protocol within the District Plan shall be complied with.

Erosion and Sediment Control

An Erosion and Sediment Control Plan has been prepared and is part of the Holmes Consulting Resource Consent Infrastructure Report, revision 1 issued 13 July 2018.

7. Risks and Opportunities

Several key risks and opportunities items have been identified which have a potential impact on the theatre project. Suitable cost contingency should be made for these items.

- Geotechnical conditions—soil variability across the site may impact pile founding levels. Slope stabilisation of the riverside site may require additional soil anchoring.
- Consenting risk with proposed screen location outside of boundary and resource consent risk with proximity to river.
- Heritage NZ requirements for preservation of the existing hotel may impact any strengthening required.
- Relocation of any existing services within the building footprint not identified on the Council records.
- Allowance should be made for fire protection to the structure. Extent of fire protection may be reduced with a fire engineering specific design.
- Location and condition of existing trees within external screen.

8. Items Not Fully Resolved during Preliminary Design

A number of key structural items have yet to be resolved at the Preliminary Design stage. These items include:

- Courtyard structure—floor build up and support over the sloping site. Further coordination with trees and ground stability required.
- General roof and lightwell framing support. Refer to sketches for current design.
- Orchestra pit equipment support—selection of jacking equipment impacts depth of pit required.
- Tiered seating timber build-up and sprung timber stage floor.
- Potential refinement to the slope stabilisation—geotechnical stabilisation requirements to be confirmed.
- Access routes for maintenance/replacement of plant to be determined since the main plant is located at substage level.
- Catwalks and steel gantries for access in the auditorium roof space and flytower grid levels.

These items will be resolved in discussions with other consultants as the design progresses.

9. Greenstar

The project is currently considering Green Star. From a structural engineering perspective, some material points are available through specifying certain criteria for steel and concrete.

MAT-7 Concrete: Up to 3 points are available

Pre-requisite requires water recycling at concrete plant.

- Criteria A - enables concrete that holds one of a spectrum of sustainability initiative to be recognised.
- Criteria B - recognises reduction in cement - 2 points are available, the benchmarks for this have changed from 2009. It also introduces 1 point to recognise cement that is sourced from manufacturers using 10% alternative fuels.
- Criteria C - the benchmark has increased for recycled aggregate in the concrete mix.
- Criteria D - introduces recognition for use of recycled aggregate in hardfill and backfill applications.

MAT-8 Steel: Up to 3 points are available

Pre-requisite requires steel maker to meet responsible sourcing criteria.

- Criteria A - enables steel that holds one of a spectrum of sustainability initiative to be recognised.
- Criteria B - introduces recognition of steel fabricators and processors that have environmental management plans.

Recycled content in steel is no longer recognised.

10. Items Considered Outside of Current Scope

- Any works associated with the Hotel project.
- Any works required outside the site boundary on Sapper Moore-Jones Place.
- Any works required outside the site boundary within the Embassy Plaza.
- Ferrybank walkway to the east of the building.

11. STRUCTURAL OUTLINE MATERIAL SPECIFICATION

Concrete

Foundation Beams and Piles	:	40MPa
Columns - Insitu	:	40MPa
Panels - Precast	:	35MPa
Walls - Insitu (typical)	:	35MPa
Beams - Insitu	:	35MPa
Beams - Precast	:	35MPa
Stairs - Precast	:	35MPa
Floor Units		
Proprietary Precast	:	35MPa
(or as reqd by floor manufacturer)		
Other Floor toppings	:	30MPa

[Concrete finishes will be resolved in conjunction with the architect]

Reinforcing Steel

Foundation Reinforcing	:	Grade 500E
Column Reinforcing	:	Grade 500E
Column Ties	:	Grade 500E
Wall Reinforcing	:	Grade 500E
Beam Longitudinal Reinforcing	:	Grade 500E
Beam Stirrups	:	Grade 500E
Slab Reinforcing	:	Grade 500E
Blockwall Reinforcing	:	Grade 500E

NOTE: Grade 500E reinforcement shall comply fully with all aspects of AS/NZS 4671. All reinforcement shall be manufactured by Pacific Steel Ltd. Alternative manufacturers may be approved by the Engineer, but typically only for specific non-structural situations.

Concrete Masonry

Blockwalls	:	Grade B

Structural Steel

Rolled Steel Sections	:	Grade 300
Fabricated Sections & Plate	:	Grade 350
Square Hollow Sections	:	Grade 350L0
CHS Columns		
(rolled seam welded pipe)	:	Grade 350L0
Bolt Grades (uno)	:	Grade 8.8 /S, /TB, /TF
Bolt Grade for purlins/girts	:	Grade 4.6 /S

Timber

Timber Framing	Pinus Radiata (Dry), SG8 minimum
Plywood	Grade F11 C-D

12. STRUCTURAL STANDARDS

The structural standards that are proposed for the design of the Buildings are as follows:

Design Standards

Structural Design Actions:	AS/NZS 1170.0 : 2002 AS/NZS 1170.1 : 2002 AS/NZS 1170.2 : 2011 AS/NZS 1170.3 : 2003 AS/NZS 1170.5 : 2004
Concrete :	NZS 3101 : 2006
Concrete Masonry :	NZS 4230 : 2004
Structural Steel :	NZS 3404 : 2009
Timber :	NZS 3603 : 1993

Material Standards

Concrete :	NZS 3104 : 2003 NZS 3109 : 1997 NZS 3112 : 1986 NZS 3114 : 1987
Reinforcing Steel :	AS/NZS 4671: 2001 AS/NZS 1554.3 : 2002
Prestressing Steel :	AS 1311 : 1987 BS 5896 : 1980
Structural Steel :	NZS 3404 : 2009 NZS 4701 : 1981 AS/NZS 1111 : 1996 AS/NZS 1112 : 1996 AS 1163 : 1991 AS/NZS 1252 : 1996 AS/NZS 1554.1 : 2004 AS/NZS 1554.2 : 2003 AS/NZS 3678 : 1996 AS/NZS 3679.1 : 1996 AS/NZS 3679.2 : 1996 AS/NZS 2312 : 2002
Masonry :	NZS 4455 : 1997 NZS 4210 : 2001
Timber / Plywood:	NZS 3602 : 2003 AS/NZS 2269 : 2004

13. CIVIL OUTLINE MATERIAL

Outlined below is a summary of material and design specifications.

Siteworks

- Insitu concrete kerb and/or channel: min. 25MPa.
- Precast kerbing blocks- concrete bedding: min 17.5 MPa.
- Subsoil drainage shall be installed below kerb lines.
- Kerb and channel- contraction joint spacing: approx. 5m (max 6m).
- Asphaltic concrete compacted depth (light duty): 25mm.
- Basecourse aggregate material: AP40.
- Subbase aggregate material: AP65.
- Thickness of combined basecourse and sub-base: 385 mm—based on design CBR of 3%.
- For pavement repairs where depth to be made up of basecourse is less than 100mm, aggregate size may be AP20 at the Contractor's discretion.

Earthworks/Excavations

- Refer to geotechnical engineer for recommendation of side slopes of excavations.
- Hardfilling beneath structures, etc: min 130 mm, max 250mm layers.
- Erosion and sediment control measures to be implemented as per Waikato Regional Council requirements.

Drainage Pipes

- PVC pipes to be SN 16
- Min 100 mm gravel bedding below underside of pipes, backfill to 150mm above pipe with material <20 mm diameter (AP20 material).
- Above this, can backfill in max 300mm thick layers, with approved free draining gravel material.
- Minimum cover = 600mm unless specified otherwise.
- Testing to be carried out, via water or air pressure

Building Connection Lateral Drains

- To have minimum gradient of 1:60.
- Minimum cover beneath roads: 1000mm (measured to top of collar).
- Minimum cover elsewhere: 600mm (measured to top of collar).

Manholes

- Internal diameter = 1050mm for depth up to 3m.
- 1350mm internal diameter for depths 3.0 to 5.5m.
- 1500mm internal diameter for depths >5.5m, and shall incorporate safety landings.
- Drop structures required when difference of invert levels of more than 600mm.
- Frames and covers of heavy-duty type in cast iron, >508mm in diameter.
- To have flexible joints within 600mm of the wall in each line entering or leaving the manhole.
- Flood testing to be carried out.

Catchpits

- To have submerged outlets as per NZ Building Code Clause E1.

Water Supply Pipes and Fittings

- Pipes to be polyethylene, type PE100 or PE80.
- Pipes and fittings to have a working pressure of 1250kPa.
- If ductile iron fittings, min pressure rating 1600kPa.
- Butt welding is the preferred method of joining PE pipes.
- Thrust and/or anchor blocks to be installed at all bends, valves, off side of tees, dead end caps and blank flanges, with minimum thickness of 150mm.
- Pressure testing to be conducted prior to backfill, as per NZS 2566.2.

Sluice Valves

- PN16 pressure rating.
- Resilient seats.
- "O" ring seals.
- Anti-clockwise closing with double flanges and painted blue.

14. CIVIL STANDARDS

The civil standards that are proposed for the design of the civil infrastructure are as follows:

DESIGN STANDARDS

General

- Waikato Regional Infrastructure Technical Specification.
- Waikato Regional Council's Erosion & Sediment Control; Guidelines for Soil Disturbing Activities, Jan 2009 issue.
- NZS 4404: Land Development and Subdivision Engineering.

Siteworks

- TNZ B/2: Basecourse placement and compaction.
- TNZ T/1: Benkelman Beam Testing
- TNZ P/9: Laying of asphaltic seal
- NZS 3109: Concrete Construction
- NZTA Manual of Traffic Signs and Markings (MOTSAM)
- NZTA Traffic Control Devices Manual
- NZS 4431: Earth Fill for Residential Development
- NZS 4402: Methods of Testing Soils

Drainage

- New Zealand Building Code- Clauses E1, G12, and G13
- AS/NZS 3500 Parts 1 and 2: Plumbing and Drainage
- AS/NZS 2032: Installation of PVC Pipe Systems
- AS/NZS 2033: Installation of Polyethylene Pipe Systems
- AS/NZS 2556 Parts 1 and 2: Buried Flexible Pipelines
- AS/NZS 7643: Installation of Unplasticized PVC Pipe Systems
- AS/NZS 4058: Precast Concrete Pipes (Pressure and Non-Pressure)

MATERIAL STANDARDS

Siteworks

- TNZ M/4: Specification for Crushed Rock Aggregates
- TNZ M/10: Asphaltic Concrete
- TNZ F/2: Subsoil drainage
- TNZ M/7: Road Marking Paint
- TNZ P/16: Marker Posts

Drainage

- AS/NZS 1260: PVC-u Pipes and Fittings for Drain, Waste and Vent Applications.
- AS/NZS 1254: PVC-u Pipes and Fittings for Stormwater and Surface Water Applications.
- NZS 3107: Precast manhole slabs and seating rings.
- AS 3996: Access Covers and Grates.
- AS/NZS 5065: Polyethylene and Polypropylene Pipes and Fittings for Drainage and Sewerage Applications.

6. SUSTAINABILITY AND ENVIRONMENTAL DESIGN

eCubed

1 INTRODUCTION

This Preliminary Design Report outlines the proposals for the mechanical, electrical and hydraulic services for the Waikato Regional Theatre. The focus of this stage has been to reduce area, including plant area and capital cost, whilst retaining as far as possible environmental quality and operational efficiency.

2 MECHANICAL SERVICES

2.1 Design Standards to be used

- Mechanical Ventilation and Air Conditioning
- AS/NZS1668.1, Fire and smoke control in multi-compartment buildings.
- AS/NZS1668.2, Mechanical ventilation for acceptable indoor air quality.
- NZS 4303: Ventilation for acceptable indoor air quality.
- AS/NZS 3666, all parts Air handling and Water systems of Buildings – Microbial Control

- Electrical Work
- AS/NZS 3000, Australian/New Zealand wiring rules.
- Seismic Loading to NZS 4219 Earthquake Loads.

2.2 Design Criteria – Outdoor air temperatures

The design shall be based on the following criteria:

External ambient: Summer 28°C db, 22°C wb.

Winter 0°C db

These conditions assume a full matinee performance in the afternoon.

2.3 Design Criteria – Indoor air temperatures

DESCRIPTION	ENVIRONMENTAL CONTROL PROVISIONS	WINTER MINIMUM DESIGN TEMP.[°C]	SUMMER MAXIMUM DESIGN TEMP.[°C]
Main Auditorium	Underseat air conditioning with high level extract/return.	20	24
Stage	Perimeter high level displacement air conditioning with high level extract.	20	25
Conference, Foyer, Bar, Food & Beverage & Front of House	Mixed Mode / VAV air conditioning with electric reheat.	18	26
Dressing Rooms, Green Room & Back of House	VAV air conditioning with electric reheat.	20	24
Offices/Meeting	VAV air conditioning with electric reheat.	20	24
Toilets	Mechanical Extract Ventilation	Uncontrolled	Uncontrolled
Kitchens	Mechanical extract and make-up ventilation	Un-controlled	Un-controlled

2.4 Design Criteria – Outdoor Air Ventilation Rates

The design shall be based on the following criteria:

Occupancies – as per Fire Report
Outdoor Air Ventilation Rates - As NZS4303, Generally 10 l/s/person
Toilet Ventilation Rates – High Use (Public toilets and dressing rooms), generally 50l/s per fixture.
Kitchen Ventilation– As AS/NZS 1668.2 utilizing UV technology to allow horizontal discharge at low level.

2.5 Other Loads

General Lighting - Based on finalised specific design loads for artificial lighting.
Stage Lighting -100kw Auditorium, 60kW Stage (averaged heat load over performance and subject to further review with Charcoal Blue.

2.6 Building Fabric

The following fabric performance is currently being assumed.

- Foyer Vision Glazing IGU – SC 0.43, U-Value (winter) 1.59W/m²°C.
- Walls - 1.5 W/m²°C.
- Roof - 3.5 W/m²°C.

The foyer spaces are highly glazed, allowing natural lighting and views by comparison to the totally enclosed auditorium.

As the building is an 'Assembly' type there is no requirement to demonstrate compliance with the NZ Building Code Clause H1 although the building will be modelled to demonstrate compliance.

3 HVAC SYSTEMS

The resultant solutions for the HVAC systems within the building are as follows.

Fundamentally four air conditioning system types are recommended as follows:

- Auditorium Displacement AC System with separate air handling systems for the stalls/orchestra pit/circle/balcony and stage.
- Standalone 24/7 cooling systems for dimmer/AV/IT,and control rooms and instrument storage rooms.
- FOH, BOH, Conference, Food & Beverage, VAV AC systems with electric reheat.

These enable the differing load type, acoustic and thermal requirements to be separately accommodated and finely tailored to use. The theatre is heavily cooling load dominated and as such, we have targeted all-air systems to maximise free-cooling potential. As part of the value management for this stage, gas water heating has been limited to the main air handling systems with VAV reheat coils, changed from hot water to electric. This allows cost-effective pre-heating by gas hot water and trimming only by electric re-heaters.

The Stage and Auditorium system is essentially an under-seat displacement system with 4No air handling systems. The circle and balcony air systems have been combined with shut-off dampers at each level to allow for partial occupation of the auditorium and closing off of levels.

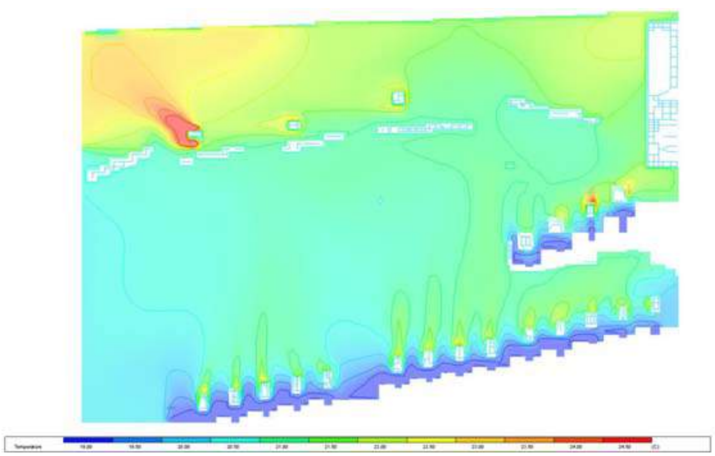


Figure 1 – Typical underfloor displacement with temperature contours

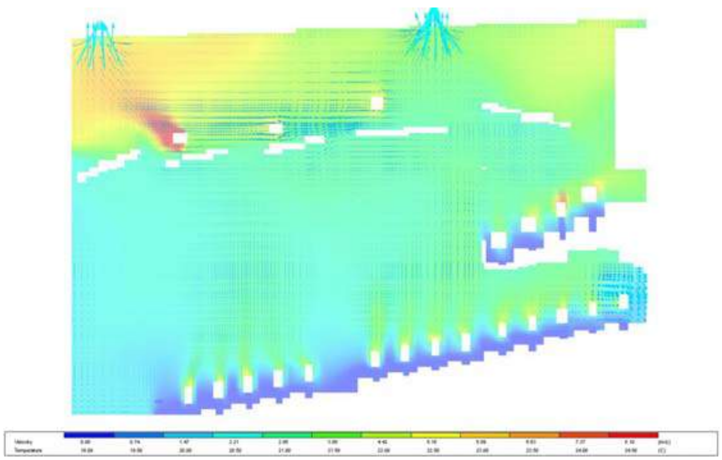


Figure 2 – Typical underfloor displacement with velocity vectors

Auditorium Air Conditioning

Both the stalls and circle/balcony levels will have under-seat supply. At this stage we envisage the air supply via a proprietary circular annular perforated diffuser integral to the seat pedestal and nominally supplying 15l/s per seat or 50% more than the minimum outdoor air requirement. As an alternative, floor diffusers can be used, particularly where seats are removable. Step and sidewall diffusers will be provided in the front most seats to cover additional temporary seating for the orchestra pit and for the boxes. All the air to the auditorium and the stage will be supplied at a nominal 17 - 18ºC to prevent draughts. High level extract has been arranged via builder's work riser ducts adjoining the proscenium arch. These draw air from a high level in the auditorium and stage. at the front/centre of the auditorium to maximise capture of the convective stage lighting lights. Whilst the system has the potential for full recirculation for pre-heating and cooling of the Auditorium and Stage it is envisaged that the system will operate with full cooling by outdoor air for much of the year which is one of the advantages of the under – seat method of air distribution. The other being improved indoor air quality. Air will be exhausted at high level via the forestage grid using ½ of the proposed smoke extract forms.

Figure 3 - Typical Under-seat Air Supply

Treatment of the stage always proves difficult, if not impossible to achieve due to the presence of stage machinery, rigging, props, scenery and curtains/backdrops. The proposed solution supplies air beneath the sub gallery to the perimeter of the stage using low velocity, high level industrial displacement diffusers.

Treatment of the sound, dimmer, control rooms, It, AV and instrument storage rooms will be based on loadings from Charcoal Blue. We propose stand-alone 24/7 VRF type air conditioning to these rooms.

The Auditorium and Stage systems are provided with primary attenuators at the main air handling units and fans for the control of plant noise and secondary attenuators and lined duct for the control of any downstream residual noise and regenerated noise and secondary attenuators athe point of supply to the auditorium and stage spaces. Duct velocities will be kept to recommended levels by Charcoal Blue to mitigate regenerated noise levels.

Subject to final confirmation and modelling by Holmes Fire and Safety the normal Auditorium and Stage supply and extract systems will also be used in part for smoke control to assist escape from the main auditorium and stage. This will include high integrity, fire rated wiring, controls, duct and fan construction to make the systems suitable for this purpose. This arrangement will be supplemented by separate smoke extract fans and also motorised doors for make-up air. The current supply and exhaust rates to the auditorium are in the order of 100-120m³/s.

Front & Back of House Air Conditioning
The Front and Back of House areas, Food & Beverage and Conference areas will be served by variable air volume (VAV) air conditioning systems. VAV is being used because of the high outdoor air requirements for these densely occupied areas and the ability to provide free cooling. Primary heating and cooling will be via the air handling plants with supply air being scheduled to meet the needs of the downstream VAV boxes. Trim re-heating will be via electric reheats in the VAV boxes. Supply air duct pressure will be scheduled to meet the sum of the needs of the pressure independent VAV boxes.

Extract Ventilation
Public toilets and Dressing Room toilets will be provided with mechanical extract ventilation at levels double the code minimum to cope with concentrated usage.

The complex kitchens will be provided with a supply and extract canopy with UV technology to allow horizontal discharge at low level.

Heating & Cooling
Heating will be provided by two gas fired condensing boilers with stretched return temperature to maximise condensation and energy efficiency. Cooling will be provided by cooled refrigeration plant. Each chiller and boiler will be air rated at 50% capacity to enable a measure of standby in the event of failure of one plant item.

Option 2
Heating and cooling will be provided with water source heat pumps for heating and water-cooled refrigeration plant for cooling using the Waikato River as a heat source/sink.

Building Management System
A building management systems (BMS) will be provided to control the mechanical services only together with monitoring of lifts, time control of the hot water services rig and a main/basic level of electrical and water metering.

The BMS shall have one permanent operator station to provide the interface to the users.

Energy and water management

- Main Electrical energy metering (Consumption and MD)
- Main Water metering (Consumption)

Control

- Optimum and scheduled start and stop of plant
- Primary plant control – Boilers & Air Chillers.
- Secondary plant control – Air Handling Units, Fans, VAV Boxes & Fan Coil Units
- System optimisation

Alarm functions

- Fault alarms from each item of mechanical plant
- Fault alarms of non-mechanical equipment such as kitchen cool rooms, fire diesel pumps, lifts and hot water services rig.

Fire Interface

- Fire alarm interface. Plant shut down and smoke control in Auditorium and Stage

Diagnostics and Logging

- Data logging of plant run hours
- Performance trend logging (e.g. temperature profiles)
- Fault / alarm logging

A UPS will be provided to enable orderly shut-down and start up under a power failure.

4 HYDRAULIC SERVICES

4.1 Design Standards

- Water Supply
- AS/NZS 3500: 1.1, Water supply - performance requirements
- AS/NZS 3500: 1.2 Water supply - Acceptable solutions.

- Gas Installation
- AS 5601, Gas installations.

- Plumbing and Drainage
- AS/NZS 3500.2, Sanitary plumbing and drainage.
- AS/NZBC E1 Stormwater.

- Seismic Loading
- Design criteria to NZ 4219 Earthquake loads.

- Electrical Work
- AS/NZS 3000, Australian/New Zealand wiring rules.

4.2 General

The design of the hydraulics shall include the following systems:

- Domestic hot water (DHW)
- Domestic potable water (DCW)
- Rainwater (RW)
- Sanitary system

4.3 Incoming cold water main - potable

The theatre will be provided with one potable cold water supply connected to the utility network via an incoming back-flow prevention device.

4.4 Hot water systems

Kitchen, Bar, and Toilet areas will be provided with a mix of storage and instantaneous gas water heating via a proprietary gas hot water supply rig with recirculation and local tempering valves serving a range of fixtures

4.5 Kitchen grease trap

Subject to agreement with Council the kitchen will be provided with an above-ground big dipper type grease trap serving the wash-up area and dishwasher areas. Floor wastes will have double basket strainers.

4.6 Rainwater Collection

Rainwater collection and re-use was considered previously, but has been discounted as part of value management, due to the high capital cost and limited operating cost-saving potential.

5 ELECTRICAL SERVICES

5.1 Design Standards

- Electrical Work
- AS/NZS 3000, Australian/New Zealand wiring rules.
- AS/NZS 4243 Energy Efficiency

- Seismic Loading
- Design criteria to NZ 4219 Earthquake loads.

5.2 Design Criteria

The proposed development will require a New Electrical Supply with a capacity in the order of 1.0 MVA dependant on final event power and theatre lighting requirements. The supply to the theatre will be entirely separate from the Hotel.

The new supply will be provided by WEL Supply Authority. The authority will supply a new transformer with high voltage switches in a dedicated Theatre plant area with good access provisions.

The transformer area will consist of HV switchgear and transformer supplying a dedicated LV switchboard.

5.3 Main Switchboard (MSB) and Site Distribution

A main and sub-main distribution system will be provided to the Theatre in the form of dedicated main switch board MSB located at ground level adjacent to the main transformer.

The main distribution system will comprise of Main L.V. switchboard consisting of a combination of moulded case circuit breakers feeding to building distribution boards. The MSB will feed to smaller building floor by floor distribution boards generally broken down to location and type of area served.

The sub main distribution system will be reticulated from the main MSB using multi core and single core PVC/XLPE insulated cables and Fire Rated Cables where required dropping to each specific power load or riser location as appropriate. Cables will also be reticulated on cable trays throughout the building.

Each floor distribution board will comprise of a combination of moulded case circuit breakers and miniature circuit breakers feeding final circuits as appropriate.

The sub main distribution system will be reticulated from the main LV switchboard using either multi core or single core cables.

5.4 Dedicated 'Theatre Lighting Power Board'.

Due to the high power supplies required for specialist lighting and also roll in event lighting and stage effects dedicated Theatre Distribution boards will be provided and fed from a separate section of the MSB.

5.5 Standby Generation

No standby power generation will be provided to the development. All life safety and other critical electrical services throughout the development will be provided with dedicated battery backup as required.

5.6 Earthing

The development will be provided with a complete and effective system of lightning protection system and main earthing. The systems shall comply with the NZ Electricity Regulations, associated Codes of Practice and NZS/AS 1768.

The method of down conductors will be by bonds to the structural steel frame with connections to ground.

5.7 Small Power Supplies

A small power system will be developed and reticulated to each building area.

The final installed location of all socket outlets and final connection units' needs to be agreed with the Client and Charcoal Blue taking into account the room furniture arrangements, Theatre settings and future needs.

Office and function areas small power system will be rated at 230V/50Hz/16A comprising of flush or surface mounted two gang units as appropriate and will be wired using multi core TPS type cables.

Small power outlets will generally be protected by single pole MCB's for over current.

5.8 RCD Protection.

30mA RCD's for over current and earth fault protection shall be provided in accordance with AS/NZS 3000.

5.9 Artificial Lighting

The Theatre will be provided with artificial lighting in accordance with the relevant lighting standards; AS/NZS1680 for interior spaces and AS/NZS1158 for exterior open spaces and roadways as well as the relevant sections of the New Zealand Building Code and AS/NZS 4243 Large Building Energy Efficiency.

All exterior lighting shall be designed in accordance with the relevant Hamilton City Council Bylaws and the Operative District Plan with respect to control of adverse environmental effects.

The developed design lighting proposals will be developed with the Architect and theatre specialists and will utilize energy efficient long life light sources.

The development will be supplied with an easy to use, energy efficient, lighting control system zoned into the principal spaces and with a flexible switching arrangement to suit the differing functions, the presence of people, the time of day and availability of daylight as appropriate.

Throughout the Theatre each area will have different requirements with respects to lighting.

Some of the initiatives we propose include; Utilization of luminaire "families" where possible to facilitate variations in light sources and photometric performance for different tasks while maintaining a continuous aesthetic appearance of equipment where appropriate.

The construction quality of lighting equipment will be assessed to ensure longevity and maximum reliability through life

Types of lamps and consumables will be minimized wherever possible. The result of this will mean fewer spares will be required for future maintenance.

Light sources will be selected as appropriate for the different tasks

General area lighting will comprise of good colour rendering fluorescent and metal halide technology.

Colour features & highlights will use low-energy fluorescent and LED where applicable.

The use of incandescent light sources, including halogen, will be avoided other than for stage lighting.

House lighting in the auditorium and front of house spaces will be dimmable. Stage House lighting will not be dimmable but will include back up auxiliary lamps with a blue filter to enable safe use of circulation spaces during 'theatre live' events.

All selected lighting equipment will be assessed with respect to photometric performance, energy efficiency and sustainability to minimize adverse impact on the environment including unwanted spill, glare and sky glow were applicable.

Emergency lighting will be incorporated into the general lighting system where possible by having "joint use" luminaires in selected areas. This will reduce the overall number of light fittings required resulting in a cleaner, less cluttered appearance and fewer installation points.

Stage lighting will be designed by Charcoal Blue.

5.10 Lighting Control

A specialist Front of House lighting control system will be included in the design to provide flexibility of control for the various front of house and auditorium house lighting areas as required.

The FOH system will be interconnected with the Theatre lighting system via two way DMX control.

The Auditorium and Stage lighting control system will be as described in Charcoal Blue's report.

5.11 In Seat & Aisle Lighting

Each auditorium seat, row end and aisle lighting will be provided with dimmable LED lights. These lights shall be controlled by the theatre lighting system.

5.12 Emergency Lighting

The building will be provided with an emergency lighting system will be designed to provide the required illumination in accordance with the Approved Building Code Document F6: 'Lighting For Emergency' and the requirements for both exit signage and egress lighting as set out in the developments fire report.

Emergency luminaires shall comprise of compact fluorescent & LED sources.

5.13 Theatre Lighting Power Supplies.

An extensive Theatre Light Power reticulation and control system will be provided. Refer to Charcoal Blue's report for further details of these requirements.

6 Structured Cabling System Provisions

Each area will be reticulated with three Class E (broadly equivalent to Category 6) cable runs. Cabling will reticulate vertically, via the service risers.

- Installation of Class E requires specific criteria. Particularly, bend radius tolerance can be tight, which may cause installation problems in the tight and congested service access typically found in Event Centre construction.

The cable capacity proposed for each area shall provide a degree of future proofing. Inclusion of a consolidation point means pairs within a cable can be split out for different uses, effectively requiring fewer cables to be run.

6.1 Communications Systems General Standards

The following standards are applicable throughout the project:

- Communications cabling work: Generally to AS/NZS 3000:2002, AS 3084:1993, AS/NZS 3085.1:1995 and AS/NZS 3815:1998 except where specifically countermanded.
- Degree of protection: to AS 1939:1990
- The New Zealand Building Code
- Radio frequency interference: To 1044:1995 including Amendments 1 (1997) & 2 (2000)
- Electromagnetic compatibility: To AS/NZS 4251.1:1999 and AS/NZS 4252.1:1994

6.2 Radio Frequency Interference

No equipment that generates interference outside the limits set by AS/NZS 1044:1995 shall be used. Where necessary, provide suppression devices. If appropriate, shield equipment to AS/NZS 1044:1995.

6.3 Design Criteria

The communications services will comply with the requirements of the New Zealand Building Code, AS/NZS 3080:2002 and associated codes of practice.

Performance requirements = AS/NZS 3080:2002 and ISO 11801:2002, to Class E minimum.

6.4 Fibre patch panels

Wall-mounted or rack-mounted panels shall be provided as appropriate. Rack-mounted panels shall have a minimum density of 24 terminated cores per 1 RU.

6.5 Telecommunications Cabling

AS/NZS 3080:2002:	Integrated Telecommunications Cabling for Commercial Premises
AS 3084:1993	Telecommunications and Pathways for Commercial Buildings (Mandatory Requirements Only)
AS/NZS 3085.1:1995:	Administration of Communications Cabling Systems: Basic Requirements

6.6 Materials and Performance:

AS/NZS 3080:2002:	Integrated Telecommunications Cabling for Commercial Premises
AS 3084:1993:	Telecommunications and Pathways for Commercial Buildings (Mandatory Requirements Only)
AS/NZS 3085.1:1995:	Administration of Communications Cabling Systems: Basic Requirements
ISO/IEC 11801:2002:	Information Technology – Generic cabling for customer premises

6.7 Testing

AS/NZS 3087:2000:	Telecommunications Installations - Generic cabling systems - Specification for the testing of balanced communications cabling in accordance with values set in AS/NZS 3080:2002.

7 MATV

A new MATV and Sky TV system will be provided for the Theatre. This will be accomplished by broadband optical fibre modems. Single mode optical fibre cores will be required to extend the SKY TV services to selected areas.

MATV and Sky connectivity will be designed in association with the PA and Background music system as appropriate.

- AS/NZS 1367:2000 Coaxial cabling systems for the distribution of analogue television and sound signals in single and multiple unit installations.
- AS 3815:1998 A guide to coaxial cabling in single and multiple premises.
- EMI:AS/NZS 3548:1995
- AS/NZS 4251.1:1999
- Radiated Electromagnetic Susceptibility: AS/NZS 4252.1:1994

8 *SECURITY SERVICES*

8.1 Electronic access control

Electronic access control will be considered with the Client.

The preferred system is the Cardax FT security system or similar.

We have found on other Theatres that it is more cost effective and better operationally to allow for card access as part of the main building perimeter doors and to key operational areas such as dimmer rooms/equipment rooms and secure areas such as cash handling, but to provide mechanical punch lock systems to less sensitive areas.

Fire alarm activation will release all doors associated with the occupied building.

8.2 Intruder Detection

Each ground level perimeter door, will be provided with a monitored REED Switch.

Each ground floor room and each accessible upper floor room with an external door or window will also be provided with security dual technology movement detectors.

There will be after-hours external monitoring of the intrusion detection system critical alarms.

8.3 CCTV surveillance system

The CCTV system will provide high quality video recording.

The system will provide video storage and retrieval to a standard that can be used as evidence in court to support a prosecution case. The proposed design proposes both short term and long term video archiving to meet the needs of users with specifically different requirements.

The CCTV control equipment will have the ability to be programmed to set up a range of specific scenarios as related to different events. This library of events (favourites) will minimise programming and set up time for the operators who can therefore operate more efficiently.

The design will put the emphasis on live viewing and control of the cameras and the systems will support full screen images from multiple cameras

CCTV cameras will be a mix of Pan/Tilt and Zoom units and fixed units.

All equipment will be sourced from reputable manufacturers and the solution will be such as to avoid restriction to a single brand.

CCTV will also be used to provide operational connectivity between the auditorium and the stage manager dressing rooms.

8.4 Cable reticulation

All primary runs of cables shall be installed on a network of shared cable support structures (cable ladders and trays) installed throughout, the Theatre. All primary cable support structures shall be fully accessible to facilitate cable installation. Separate cable support structures will be provided for security services although shared services should be considered in the interest of space and cost.

It is proposed that cable reticulation be via a number of vertical services risers located to meet needs of security/communications/AV systems. At each level a cupboard will be provided to contain all local equipment.

9 SUSTAINABLE DEVELOPMENT FRAMEWORK

The Theatre will be a strong endorsement of the role that arts and culture can make to a community and will make a significant contribution to the sense of place, economic vitality of Hamilton. As the project develops a full Sustainable Development Framework (SDF) will be developed to set out the vision and targets for the environmental, social, cultural and economic outcomes for the new theatre.

Further to the value management exercises. we are not pursuing a formal Green Star Certified Building approach. Instead, we will pursue the following sustainable development framework, developed specifically for the project.

Some initial potential key indicators have been identified below:

Environment & Resources

- Building and public space energy efficiency and low carbon design. Energy target 150kWh/m²/yr.
- Renewable energy component potentially as part of power purchase agreement with WEL.
- Healthy and environmentally friendly materials.
- Close connection and integration with the riverside ecology
- Low water use fittings and rainwater harvesting
- Stormwater treatment and reuse
- Waste recycling

Connectedness

- Sustainable modes of transportation – walking, cycling and public transport linkages

Sense of Place

- Reflection of site heritage, patterns of settlement and archeology.
- Retain and enhance all character/heritage structures through adaptive hotel re-use.
- Integration of public art and design should foster local identity and character and reflect of interpret local characteristics like natural heritage and Mana Whenua cultural narratives history, art and particular traits of the local community.
- The development should be high quality, lively, diverse and authentic and contribute to an overall coherent sense of place.
- Bulk, scale and massing of structures should be sympathetic with the surrounding built form.
- Development should present active frontages towards public spaces such as streets, squares, pedestrian walkways etc.
- Design should provide an expression that reflects the local context and cultural identity.
- Opportunities will be taken for the incorporation of Maori urban design principles in development projects.
- The design and construction of streetscapes should be coherent with the wider area and/or recent public realm upgrades in the area.

Community

- Community use and engagement– performing and visual arts hub, meeting place, conferences, events
- Engage with local stakeholders including residents building owners, businesses and other interested parties throughout the design and construction process.
- Inform, discuss, listen and learn from the community. Consider opportunities raised by the community and incorporate ideas where practical and economic to do so
- The development has the potential to act as catalyst project to breathe new life into Hamilton.
- A safe pedestrian crossing should be considered in the immediate vicinity of Theatre entrances.
- Building should promote universal/inclusive access principles.

Cultural

- Opportunities for promotion of cultural values will be considered in development proposals.
- Acknowledge and celebrate the rich history of Maori settlement in the area pre-and post-European contact.
- Mana Whenua's participation is important to ensure a richer result.
- Mana/rangatiratanga: Engage with mana whenua at a high level and as a partnership.
- Whakapapa: Revive names and genealogical connections to ancestors and associated narratives.
- Tohu: Acknowledge significant landmarks and their cultural connections.
- Taiao: Explore opportunities for the incorporation of natural landscape elements with cultural associations.
- Mauri tu: Enhance environmental health/life essence in the wider site.
- Mahi toi: Harness creative talent to inscribe iwi/hapu narratives into the built environment.
- Ahi kaa: Create opportunities for iwi/hapu to maintain a presence in the area through living, commercial, customary or cultural activities as part of a partnership.

Urban Environment

- Active street frontages
- High performance building
- Open space and linkage to streetscapes
- Active street frontage

Economic Vitality

- Increased foot traffic and retail sales for local businesses around the theatre and hotel site.
- Potential synergies with the hotel
- Assist in the revitalization of Hamilton's after-dark experience.
- Provide a catalyst for permeable land use intensification and regeneration of the development area, thus inducing capital investment in development of the city.
- Conferences and events.

9.1 ENVIRONMENT & RESOURCES

9.1.1 Introduction

Opportunities will be taken in the new Theatre Design to implement sustainable building design practices which:

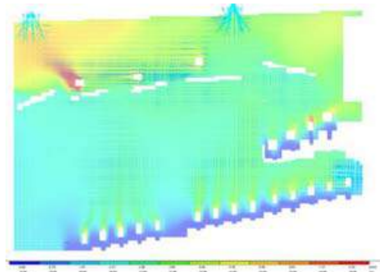
- Reduce energy consumption and greenhouse gas emissions.
- Improve water conservation.
- Reduce waste.
- Adopt environmentally friendly materials.
- Lower the impact on the urban environment and infrastructure including reduced quantities of water, sewerage, storm water, power and fossil fuel use, improved air/water quality and traffic congestion.

9.1.2 Management

POTENTIAL DESIGN FEATURES

- Best practice testing and commissioning procedures will be provided.
- The building systems and operation will be fine-tuned during the first year following completion. As part of this process first year energy and water use and waste generation/recycling will be reviewed and any necessary improvements targeted. The first year performance data will be collated into a report with recommendations for further targeted improvements.
- In addition to normal 'as built' and O & M documentation, building user and manager guides and structured training will be provided on the sustainable use of the Theatre.
- The Builder will provide a waste management plan together with targets for recycling and salvage. Target 80% of waste by weight to be either re-used or recycled.
- The builder will also be required to provide an environmental management plan.
- Environmental Issues will be added to the agenda of the project's site meetings to ensure that there is a forum to discuss waste management, environmental management and the issue of environmental certification for the specified products.
- The building will be subject to a maintainability review.

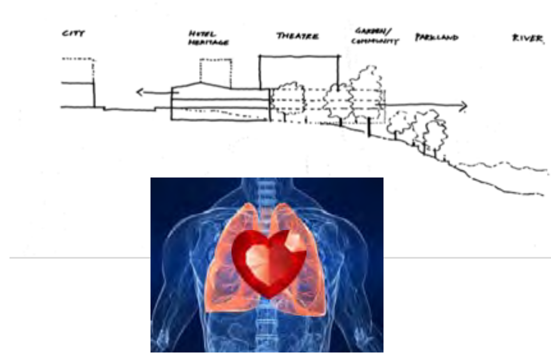
9.1.3 Theatre Indoor Environmental Quality



POTENTIAL DESIGN FEATURES

- Front of house spaces will be mixed mode. A high level of openness and transparency will be adopted with connection to the natural environment with high levels of natural light and natural ventilation.
- Main auditorium will have a displacement air conditioning system to maximise indoor air quality and free cooling potential.
- HVAC arrangements exceed minimum outdoor air requirements of NZBC G4/AS1 by up to 100%. Improved ventilation effectiveness will be provided by the under-seat displacement air supply arrangements.
- HVAC systems will have CO2 monitoring and control facilities.
- Where appropriate and with due regard to the durability requirements for a Public Building, low toxicity materials will be used including seating adhesives, paints, sealants, carpets, ceiling tiles and composite timber board products.
- Local exhaust systems will be provided for kitchens and toilets.
- Daylighting, transparency and views/outside awareness to the Riverside Environment will be are key design features of the Front of House areas.
- Lighting levels will meet AS/NZS 1680 standards and the design lighting quality reveals/enhances spaces and ambience.
- A very high standard of acoustic environment will be provided within the main auditorium. PNC 15-20 to facilitate a ‘spoken word’ theatre.

9.1.4 Energy Efficient Design



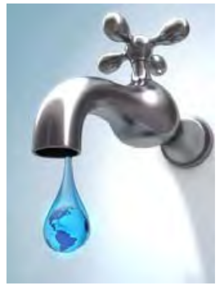
POTENTIAL DESIGN FEATURES

- The functionality of the theatre is similar to ‘heart and lungs’. The inwardly focused auditorium will use active air conditioning systems. The outwardly focused front of house spaces will breath naturally and use a mixed mode strategy.
- An energy efficient façade will be used with a high level of transparency. Use of efficient glazing with double glazed low e IGUs with selective coatings for control of heat loss and heat gain. Highly insulated and reflective roof and moderately insulated walls to suit the high internal gains within the building.
- The ability for mixed mode ventilation of the Front of House areas with low level opening elements within the façade and roof level atrium vents.
- Predominantly daylit Front of House spaces.
- Use of energy efficient displacement air conditioning in the main auditorium and VAV air conditioning for the front and back of house areas. Both allow all-air free cooling potential for the predominant cooling load
- Use of high efficiency condensing boilers (98% efficient) and greenspeed variable speed air cooled chillers (COP 5.0) for energy efficient heating and cooling.
- Low energy lighting design including use of 95% LED lighting to rear and front of house and a lighting control system
- State-of-the-art stage dimming system. Review quality and cost of LED stage lighting at last possible time of procurement.
- Efficient external feature lighting and controls
- Building management system and energy metering for energy and event management. Just in time delivery of air conditioning and lighting to suit patterns of use
- Potential to add PV panel canopy to roof by 3rd Party vendor such as WEL at no capital cost to the project.

9.1.5 Water Conservation

POTENTIAL DESIGN FEATURES

- Use of low water use plumbing fittings, including sensor taps.
- Water meters for potable water use linked to BMS.



9.1.6 Materials Selection and Waste Minimisation

POTENTIAL DESIGN FEATURES

- The facilities will allow or a designated space for the collection, separation and storage of waste.
- Potential for Australasian sourced theatre seating with durable fabric and low VOC emissions.
- Paints certified under the Environmental Choice Labelling Scheme.
- Locally sourced low embodied materials such as insulation; timber framing and NZ manufactured components where appropriate.
- Zero ODP refrigerants, insulation and pipe lagging.
- Low formaldehyde wood board products or phenol formaldehyde bonded plywood.
- Use of water based glues and paint finishes.
- Use of recycled materials where possible and appropriate.

The materials Palette could include:

Floor Finishes
- Sealed Concrete
- Environmental Choice carpet tiles

Wall and Ceiling Finishes
- Plywood
- Low formaldehyde MDF with FSC veneer
- Gib board
- PEFC sourced western red cedar
- Polyester acoustic absorption sheet
- Painted steelwork & exposed surfaces

Furnishings
- Durable seating with a 15-year warranty on the chair and built to last for 40 years.
- All parts of the chair to be inter-changeable. Chairs to have zip off covers for replacing/cleaning. So the chairs never have to be removed for re-upholstery.
- 100 % New Zealand wool covers woven in New Zealand.
- The polyurethane foam blown only with water – no additives.
- No PVC is used in the seat
- The timber arms are made from PEFC sustainably managed plantation timber either sourced from Australia or New Zealand.
- End of aisle LED courtesy lighting
- Integrated seat pedestal air diffuser.
- 100 % of the seat is recyclable at the end of its life and is easily broken down into component parts
- The chairs are delivered in component form in cardboard boxes which are then sent for recycling

Other Joinery
- Low formaldehyde MDF or plywood carcassing with FSC veneer where used

Other potential considerations
- Declare labelling and no Red List materials strategy

9.1.7 Transport and Connectedness

POTENTIAL DESIGN FEATURES

- No car parking provided specifically for the Theatre
- Public transport links, bus stops – part of Hamilton transport initiative.
- Walking and cycling linkages
- Water ferry linkages
- Potential through site and footbridge linkages.

9.1.8 Emissions

POTENTIAL DESIGN FEATURES

- Low carbon, low greenhouse emission design potentially incorporating renewable energy from PV array, supplied by 3rd party vendor.
- Use of zero ODP refrigerants and insulants.
- Reduced sanitary water quantities by use of low water use sanitary fixtures.
- Compliance with Resource consent conditions regarding light and noise pollution.

9.1.9 Land Use, Ecology and Urban Design

POTENTIAL DESIGN FEATURES

- Building on the heritage and archaeology of the site and the challenges and opportunities that brings.
- Synergies between Theatre and Hotel uses
- Active frontages and upgraded streetscapes surrounding development.
- Significant contribution to the sense of place, economic vitality, and community of central Hamilton.
- Strong connections with the ecology of the waterfront environment.

TECHNICAL

7. STAGE ENGINEERING SYSTEMS

8. STAGELIGHTING SYSTEMS

9. AUDIOVISUAL SYSTEMS

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THEATRICAL INNOVATION | ESTD 2004

7. STAGE ENGINEERING SYSTEMS

7.1 INTRODUCTION

The multi-purpose nature of this space requires multiple technical solutions to ensure the needs of each format are catered for in the best possible way.

A full height fly tower and grid over the stage area will provide users with the ability to fly scenic elements out of view above the proscenium line and provide the required suspension system for other technical equipment including lighting, sound fixtures and the acoustic canopy.

A forestage grid, extending auditorium side of the proscenium line, provides high-level storage of the acoustic ceiling when the theatre is not in 'concert' mode and will provide rigging positions for the architectural header amongst other items.

Technical galleries have been provided within the stagehouse flytower including rear crossovers to ensure easy circulation in the technical areas. These stagehouse technical galleries will be linked to over-auditorium high level catwalks that provide rigging and lighting positions over the auditorium.

At stage level there is a removable trapped area and two orchestra pit elevators. The pit elevators include seating wagons for transformation into pit or seating rows as required and their associated storage.

The dock area will require a small amount of rigging capacity and more basic rigging systems to allow it to function easily.

The foyer space within the main atrium and foyer on the river side of the building is being designed as a performance space. A lightweight flown rigging truss is provided in this area to allow the opportunity for equipment to be suspended overhead.

7.2 THEATRE OVERHEAD SYSTEMS

COUNTERWEIGHT FLYING

The flying system in the stage house will be made up of:

Cross-stage bars - 750kg bars at 180mm centres for a counterweight system with potential expansion for a 200mm centres for a powered flying system in the future.

Up/Down-stage bars onstage of the galleries - two bars on each side of the stage.

A cohesive and efficient rigging system overstage to allow the rigging of chain hoists or point hoists at any point over the stage.

A series of pulleys divert the steel wire rope from the lifting mechanism at the side of the stage and direct the lines over the grid at high level. Having been directed across the stage a series of drop pulley are located to divert the lift lines down and through wells in the gird floor to the bars below.

Having the pulleys mounted above two back-to-back steel channels allows easy maintenance access to the pulleys and provides a position for a series of traveling beams to aid the rigging.

A typical counterweight flying system

The steel wire rope running between the grid in wells allows users to brail bars from above, and a rear cross over can allow equipment to be moved between grid bays with relative ease.

It is important to understand the impact bar setting will have on the use and cost of the system. We are currently designing to 180mm bar centre-to-centres for the counterweight system, which is in line with Theatre practices in New Zealand. Venues such as St James Theatre, Wellington and Isaac Newton Theatre, Christchurch have bar centres between 150mm and 180mm.
We have incorporated design provisions for a powered flying system into the galleries at grid level in the stage house, this design however will only provide sufficient space for a powered flying system at 200mm centres

Wide angled photograph of a grate style grid floor with typical pulley arrangement.

Manual counterweight flying has several advantages; it is relatively cost effective and consists of a simple mechanical concept which, properly maintained, can operate successfully for many years. Whilst this type of system has been successfully used within theatres, and essentially unchanged for over the last 100 years, there are considerations which are being increasingly recognised. The onus with this type of system is on manual handling and its nature requires repeated twisting movements supporting loads. When operated by untrained or inexperienced operators, there is a real potential for serious injury or damage.

It should be noted that the inclusion of a counterweight system will require the installation of a structural frame along the entire length of one of the side walls of the stage. A flyfloor and loading gallery with associated access and egress will also be required.

TRAVELLING BEAMS

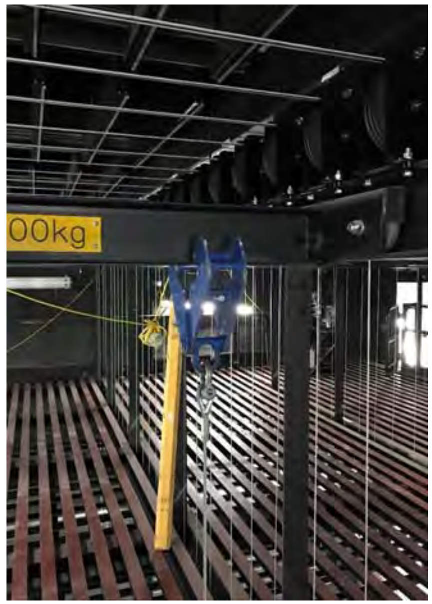
The grid area includes twenty travelling beams. These provide adjustable strong point positions across the grid floor which offer greater capacity points than those provided by the flying system. These beams run between the bays created by the steel wire rope lines of the flying system and roll unobstructed up to down stage along steel frame work provided.

Example travelling beam arrangement with flying system pulleys rigged above

Travelling beams will have a locking system allowing them to be secured in place that will prevent movement during show use, providing users with multiple functions, from chain hoist hanging to withstanding diverted lines from point hoists located elsewhere on the grid floor.

Four rolling beams are provided within each bay, with each beam having a safe working load (SWL) capacity of 1200kgs.

The runway beams will require an installed tolerance of no greater than +- 5mm in parallel alignment and +-10mm in vertical tolerance at supporting locations over their entire length. It is essential that the bottom flanges of the runway beams are level.



Example of a travelling beam with accessories

In addition to the beam trolleys, a wide range of rigging accessories can be mounted to the beams to offer several different rigging possibilities, including:

- Beam Clamps
- Chain hoists
- Eye bolts
- Diversion pulleys
- 48.3mm tube

The associated loading on the roof structure will require coordination with the structural engineer and has been incorporated into the structural design.

Coordination will also be required to ensure the setting out of the primary structure is appropriate for the rolling beams and flying system.

We assume that fire protection need not be applied to any beam used as part of the rigging system.

Typical beam trolley

CHAIN HOISTS

A budgetary allowance for twenty motorised chain hoists has been made within the FF&E budget. It is expected that these motorised chain hoists will have a SWL ranging between 500kg and 1000kg and can be located either in the grid or the forestage gallery in the auditorium. The hoists in the grid will be used with the rolling beams/ beam trollies and allocated for use in suspending oversized or high loading items. These chain hoists will be for static suspension use only and will be controlled via a separate control system to other stage engineering elements such as the seating elevators.

Example of a chain hoist suspended from a travelling beam

GRID FLOOR

There are a variety of options available to create a working surface at the top of the flytower. Grid floors are designed to provide a safe area for work to take place over the entire stage and forestage area. We would anticipate that the grid floor will be supplied as part of the steelwork contract.

There are several key operational requirements for the floor:

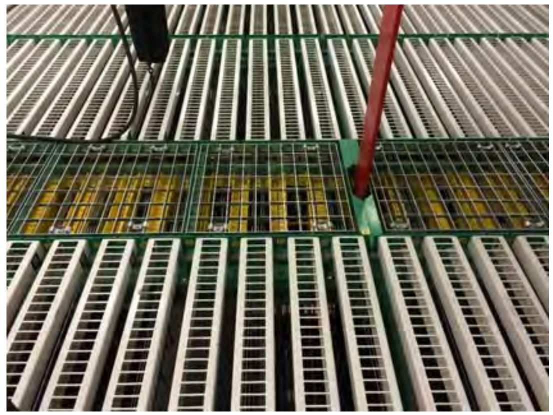
- It is anticipated that the majority of the heavier items will be suspended from lifting equipment located above the technical grid. Therefore, it is vital that 1t hooks from a range of hoist manufacturers can pass through the gaps in the floor. From previous research we anticipate that these will range in size from 80mm x 145mm to 100mm x 140mm. This means that grid openings should be at least 110mm x 150mm.
- The floor loading needs to meet or exceed a 10kN/m^2 show equipment load plus 2.5kN/m^2 personnel and equipment self-weight (these are indicative static loads and allowance must be made for a dynamic, consequential and resultant loads).
- The costs for the chosen grid floor will need to be within the allowances in the current cost plan unless savings can be achieved elsewhere.

Historically, the origin for grid floors came from timber battens spaced across the stage at high level. Modern alternatives are now common place, the most notable of which are:
- Solid steel channels
- Perforated steel planks
- Steel mesh grating planks
- Continuous steel mesh grating
- Hinged / lift-up mesh grating or perforated steel planks

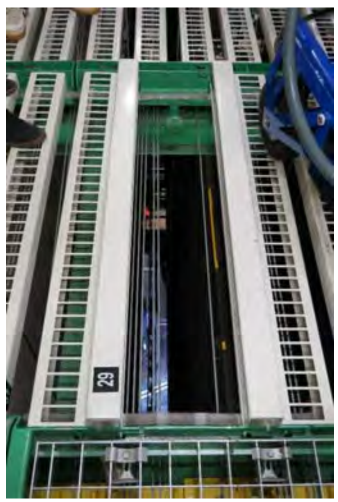
Solid steel channels allow for a great quantity of clear space to allow hooks to pass through in the gaps between the channels. It is generally easy to install and is not of high cost.

Typical solid steel channels

Hinged Perforated planks can offer a similar working surface to steel mesh grating if set out correctly and are generally easier to move around on compared to solid steel channel. However, they often require simple hinged mounting to allow for hoist hooks to pass through.



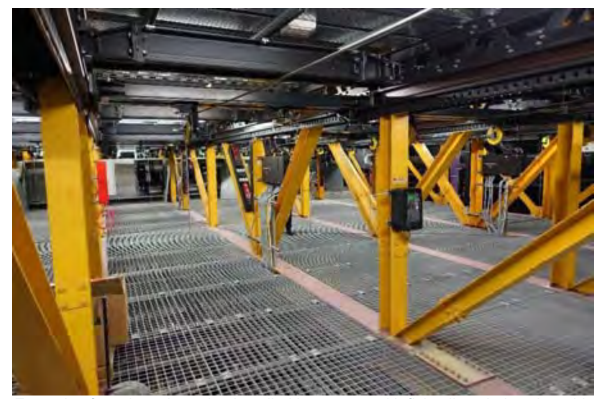
Example of perforated steel planks



Example of perforated planks hinged to allow hook of chain hoist to pass through before closing to maintain a safe working area

Steel grating is generally accepted to be an easier walking surface in relation to the others proposed but can be difficult to pass chain hoist hooks through, due to size limitation, which can require specific selection of the grating floor and may require hoists to be provided without hooks, which has operational implications that should be considered.

Example of steel mesh grating with flying lines above the grid.



Example of steel mesh grating installed in a venue with flying lines below the grid

AUDITORIUM CATWALKS

Over the auditorium there shall be a series of high-level catwalks that allow lighting equipment and other technical accessories to be installed and adjusted at high level. They will also provide safe working-at-height solution without the need for PPE. We expect these elements would be supplied as part as the steelwork package.

Example catwalks with outrigged equipment bar

Example lighting bar fixed back from catwalk edge

FIXED EQUIPMENT RAIL

Around the venue there will be a requirement for fixed equipment bars, particularly located on the front of balcony edges, which will predominately be used to support lighting fixtures and AV equipment.

These elements are not included in the stage engineering package.

Example of a balcony front fixed equipment rail

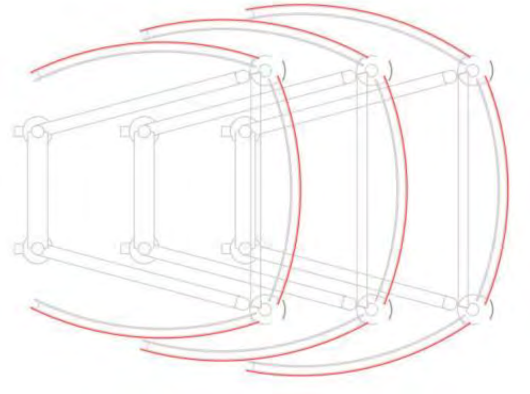
ACOUSTIC SHELL AND ADJUSTABLE ACOUTSIC PANELIING

The venue is being designed to accommodate orchestral concerts. An orchestra shell will be provided to help achieve the desired acoustic performance of the space. Please refer to the Acoustics section of this narrative for a description of the acoustic shell's design features.

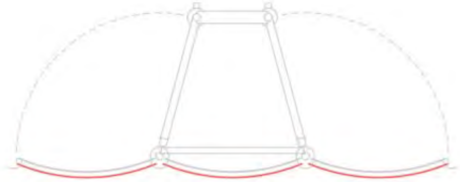
This shell will be made up of 3 major elements:

- Stackable towers, to provide the lower portion of the sides.
- Flown vertical elements, to provide the upper portion of the sides.
- Acoustic overstage ceiling.

The towers will be constructed from a metal framework with the acoustic architectural cladding and are designed to disassemble to a manageable storage height and stack efficiently to limit the space required for their storage. When deployed, their hinged wings spread to cover a greater area, they are supported by weights in the base of each tower.



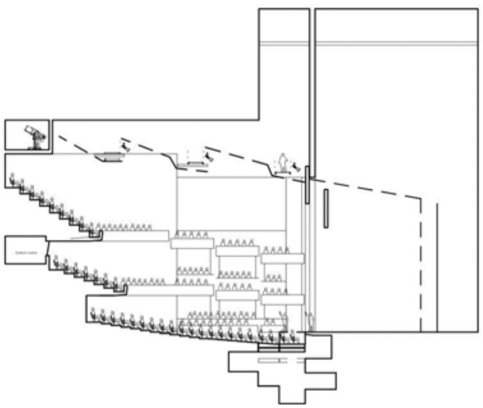
Acoustic shell towers, in stacked position



Acoustic shell tower in open position

The over-stage canopy will be suspended from the grid using steel wire rope to allow the users to move it to the required position. The design and operational impact of the ceiling will be developed in greater detail in the next design phase.

Theatre stage with acoustic ceiling

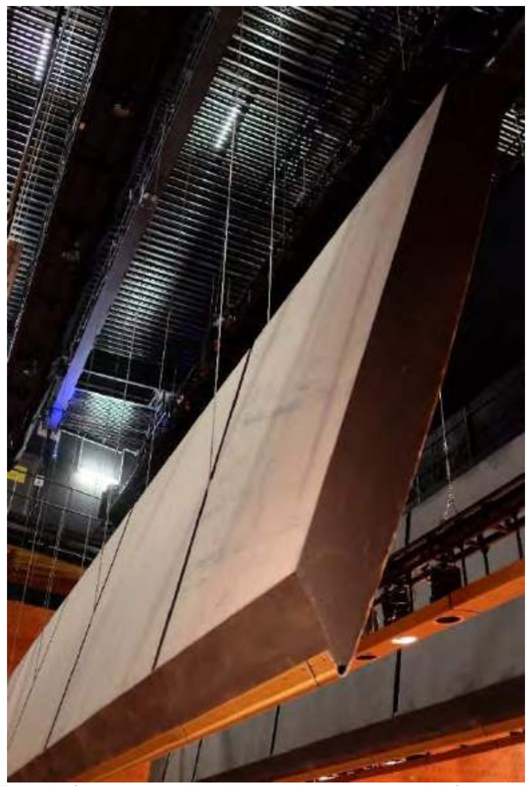


Anticipated design of the acoustic shell and acoustic auditorium ceiling (dashed linework)

During a concert performance, the orchestra will utilise the forestage elevators to maximise impact in the space. This requires a variable acoustic canopy in the area below the first technical catwalk .

The acoustic panelling under the first bridge in the auditorium will have to be adjusted during drama performances to allow toured rigging equipment to be suspended beneath the catwalks which may include AV line arrays and lighting advanced trusses.

Any form of adjustable acoustic ceiling will require motors to allow the motorised control of the panels. It is intended that the ceiling will have preprogramed states to ensure the acoustic ceiling is easy to operate.



Example of a permanent adjustable acoustic canopy suspended from steel wire ropes

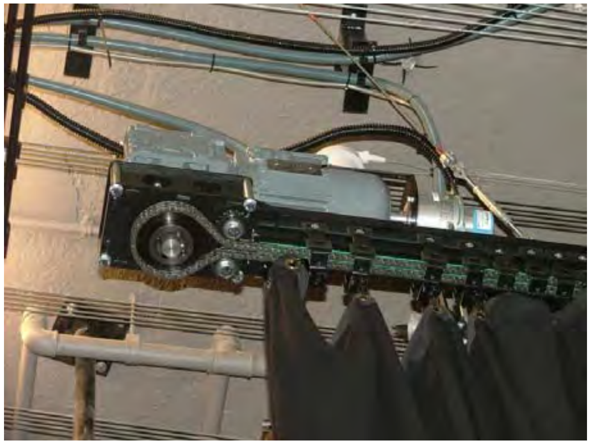
Line array speakers suspended from catwalks above

VARIABLE ACOUSTIC CURTAINS

Around the auditorium a series of variable acoustic solutions are proposed. It is expected that the majority will be in the form of a motorised curtain track which will deploy drapes along the side and back walls of the auditorium. These tracks will be mounted flush to the soffit and will allow electrical control of the drape positing, either revealed or concealed.

The tracks will each have a motor attached to drive the runners, with the storage areas both inside and outside of the external auditorium walls.

Details on the position of the variable acoustic drapes can be found in the acoustic section of this report.

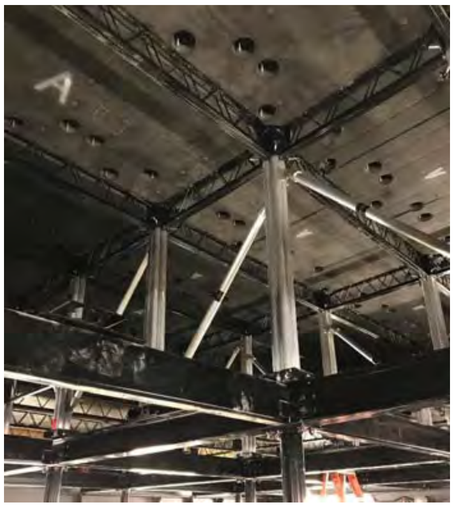


Motor driven track and drape

7.3 THEATRE STAGE LEVEL AND SUBSTAGE SYSTEMS

TRAPPED AREA

An area of the stage floor shall be made up of modular sections that can be removed or adjusted individually to create raised areas, depressions and access hatches. This area is formed of a series of decks with adjustable steel legs that sit on top of a demountable steel framed substructure which offers the user the opportunity to remove a large section of the stage if required it will also allow productions to accommodate substage machinery if required.



Example of decks supported by demountable steel frame

The finished surface of the decks will be designed to match the stage floor finish and they will be rated to the same loading capacity as the rest of the stage floor to ensure a selection of mobile working platforms can be used on them.

It will require a build out zone around the permanastage trap area to allow for tolerances between permanent and demountable floors to be met.

SEATING PIT ELEVATORS, DECKING AND SEATING WAGONS

The current design features one electrically operated elevator installed downstage of the permanent stage edge. In place of the second lift a manual decking system will provide the flexibility required. There will continue to be 4 basic positions for the first elevator with the ability to record several intermediate heights to suit the requirements of an individual show if needed. Legs will be provided for the decking to match these 4 positions.

The predetermined positions are:

- Stage level to create the extended stage configuration.
- Auditorium level to form the front rows of the stalls.
- Orchestra Pit level for use with a show orchestra.
- Seating wagon storage to allow the seating wagons on the elevator to be moved into storage.

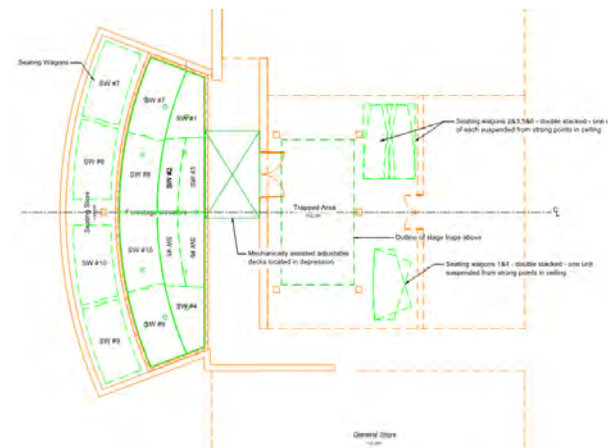
The elevator will be provided with a control system and all required pit rails, fascias etc. that are required for safe operation.

Typical example of a stage lift

The seating wagons on elevator 1 are trucks on air deployed casters that are split to allow storage within the trap room. To reduce storage space, the seating wagons will be stored one on top of the other. This will require strong points in the ceiling to allow the suspension of chain blocks to allow lifting of the seating wagons. Omission of lift 2 in favour of manual decking means that seating wagons are no longer available for rows 3 and 4, and the seats will be manually installed to fixings in the floor of the manual decking. As such, the seating wagon store is not required.

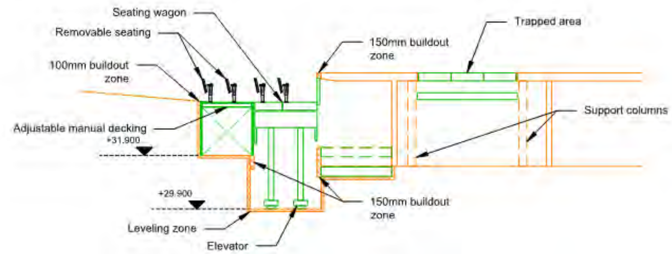
Typical example of seats fixing directly to manual decking

The elevators shall accommodate the positioning of the seating wagons to the correct height for their storage. The accuracy of theatrical lifts ensures that repeatability is a simple operation, therefore minimising time required to change between a bare elevator and a seating wagon.

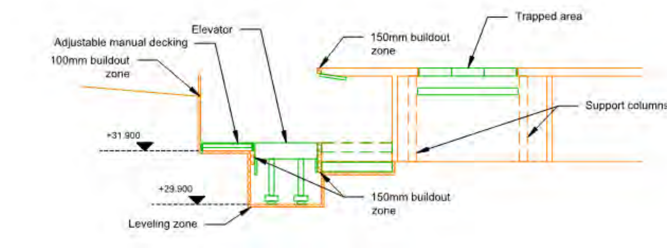


Plan view sketch indicating position of seating wagon storage

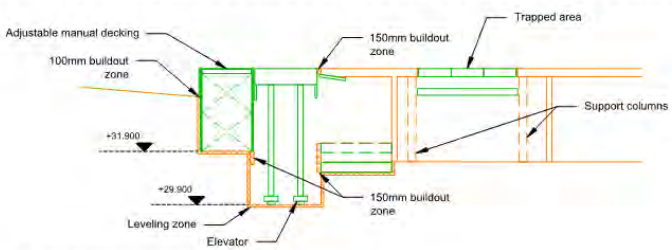
ELEVATORS FORMATS



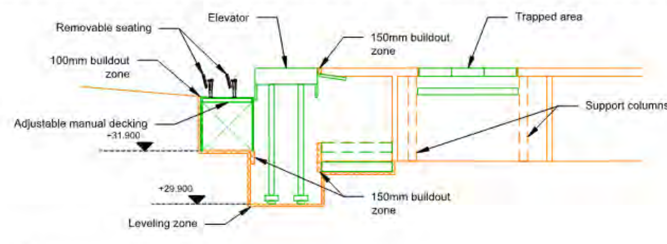
1 Elevator and decking in seating arrangement



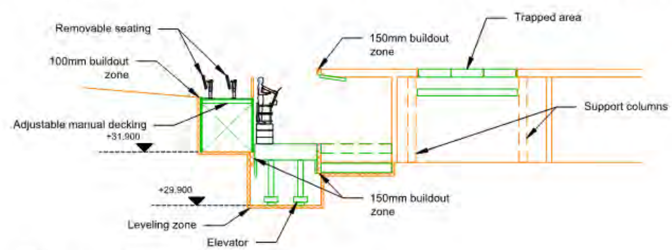
2 Elevators and decking in seating wagon storage arrangement



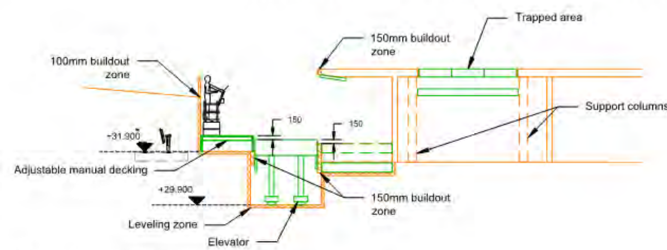
3 Elevator and decking in large forestage arrangement



4 Elevator and decking in small forestage arrangement



5 Elevator and decking in small pit arrangement



6 Elevator and decking in large pit arrangement

7.4 STRUCTURAL LOADING ADVICE

Where no specific loads are noted elsewhere in Charcoalblue documentation, the recommended design loadings should follow those summarized in the table below,

Whilst the 'Technical Standards for Places of Entertainment' is a UK publication, much of the information that it contains is based on the practical experience from a considerable number of venues. As such, we find that it is a very good starting point for performance venues throughout the world unless particular jurisdictions have more onerous regulatory requirements.

THEATRES AND PREMISES WITH LARGE STAGES	
Stage floors:	
Distributed loading	7.5kN/m^2
Point load measured over a square with 300mm sides	4.5kN
Fixed lighting bars	50kg per metre run
	Note: This is to take account of the weight of motorised luminaires
Grids	Minimum distributed loading of 2.5kN/m^2 excluding any loads designed to be applied by any permanently installed flying system Note: Allowance for significant point loads of up to 12.5kN. More details can be found later in this report
Fly galleries	4.5kN per metre run uniformly distributed over the width of the gallery. This allows for limited stacking of counterweights on the gallery floor.
Loading galleries	To carry the full capacity of the counterweight cradles (rather than the weights supplied) uniformly distributed along the length of the gallery
Walkways on front-of-house lighting bridges	2.5kN/m^2 floor loading, uniformly distributed
Followspot positions, dimmer rooms, projection rooms	5kN/m^2 floor loading, uniformly distributed
Other elements should be capable of resisting the loadings set out all applicable local codes.	

Wherever loading information is provided in this narrative and our associated sketches, the figures are indicative static loads only. Allowance must be made for all dynamic, consequential and resultant loads.

FLOOR LOADS

The stage floor loads in the table above are to be applied to all areas of the stage including the orchestra pit lifts and any trapped areas. To minimise the risk of injury to performers, it is essential that the resilience and consistency of the stage floor is consistent across the entire performance area including the transitions between the fixed stage and any moving / removable elements.

The stage floor loading shall extend to any side / rear stages, scene docks and get-in routes.

7.5 OVERHEAD LOADS

STAGE HOUSE

There is a significant amount of diversity in theatre flying systems which makes it impractical to define the overhead loading as the safe working load of each bar multiplied by the number of bars. It is more practical to start with an estimate of the maximum load required for scenic / technical elements for a show and then add the dead weight of the lifting devices.

The next pages set out loading information based upon the assumption that the **maximum scenic / equipment load will be approximately 25 metric tonnes**. This figure is based upon information gathered from historic data and conversations with a major theatre operator.

Whilst the cross-stage bar system will not be the sole method of overhead suspension, we anticipate that the loads from other suspension methods such as chain hoists and point hoists can be diversified against the 25t load described above.

INDIVIDUAL SYSTEM COMPONENTS

In addition to the total diversified loading in the stage house, we have provided the structural loading accommodations required of each individual system component in the following sections. These loads should be used to help design the building's primary structure to accommodate each system including mounting.

Individual system component loading begins with a comparison of the total system load, both temporary and installed, associated with each of the current flying system proposal. These estimates are preliminary. More detailed loading will be provided once the system typology is selected.

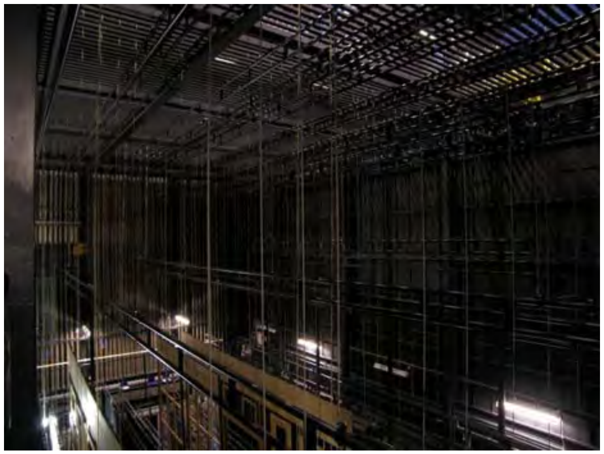
The detailed explanation of the summary load table for flying system is below:

Single Purchase	Loading
Scenic load	250kN
Counterweight load / loading allowance for winches	150kN
Equipment dead load (assuming approx. 73 bars)	215kN
Total load for single purchase counterweight system	**615kN**
Single Purchase with loading provision for powered flying	
Scenic load	250kN
Counterweight load / loading allowance for winches	320kN
Equipment dead load (assuming approx. 73 bars)	215kN
Total load for single purchase counterweight system	**785kN**

SINGLE PURCHASE COUNTERWEIGHTS

Scenic load	250kN
Counterweight load	150kN
Equipment dead load (assuming approx. 73 bars)	215kN

Total load for single purchase counterweight system **615kN**



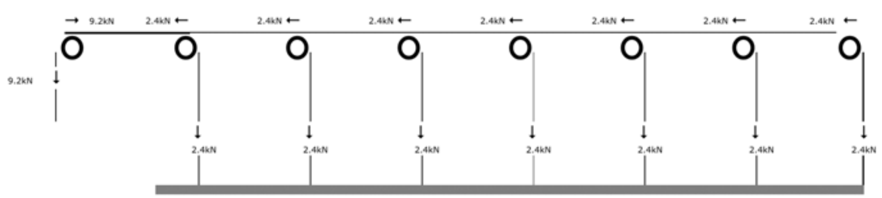
A typical counterweight flying system

FLYING SYSTEM LOADING DIAGRAM

SINGLE PURCHASE

General note applied to all:
The sum of the loads shown at the drop pulleys may be greater than the total load of the fully loaded bar, this is to account for an unevenly loaded bar. Loads shown for the bar at SWL.
Bars will be loaded at 125% of SWL for load testing

Figures show indicative static loads. Allowances must be made for all dynamic, consequential and resultant loads



TRAVELLING BEAMS

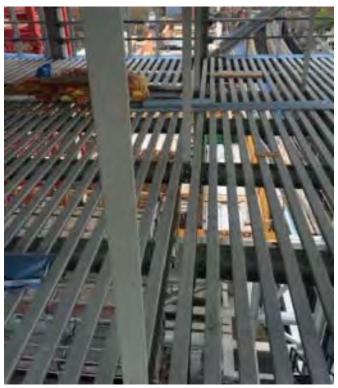
Travelling beams are provided to suspend heavy loads which are not suitable for flybar suspension with stagehouse grid.

Technical equipment	240kN
Equipment dead load	60kN
Total load for travelling beams	**300kN**

It should be noted that the technical equipment load can be fully diversified against the flying system.

GRID CONSTRUCTION

Traditional theatre grid floors would typically be formed from 76mm x 38mm tapered flange channel set at 150mm centres. This would create a solid floor strip 76mm wide followed by a 74mm void.



Alternative methods of floor construction are possible as described earlier in this report, and will be considered as the design progresses, but a steel channel grid should be assumed for the purposes of loading information at this point. Point loads on the grid must be accommodated, the quantity and location of these will be subject to future discussion in the next design phase.

Live load on grid floor (in either vertical direction)	2.5kN/m²
Point loads on grid floor (over square with 1m sides)	12.5kN
Horizontal point load in any direction (within a square with 1m sides)	1.0kN

STAGEHOUSE GALLERIES

Around the perimeter of the stage house are a variety of gallery levels of which some have a requirement to withstand different loading criteria to that stated in the typical load table. Those that differ are mentioned below:

Winch gallery static equipment load	9kN/m
Winch gallery uplift load	19kN/m
Loading gallery static equipment load	250kN

AUDITORIUM

There will be a need to hang equipment over the forestage / pit area, this is typically done using a combination of spot suspensions and equipment bars or trusses. This includes suspension of the acoustic ceilings.

Technical equipment	40kN
Acoustic ceiling dead load	70kN
Equipment dead load	80kN
Total load for forestage suspensions	**190kN**

All lighting bridges will incorporate a system of lighting bars with a capacity of 50kg per m run. The potential diversity in this load will be calculated once the arrangement of the lighting bars has been agreed.

FOYER PERFORMANCE SPACE

An allowance must be made for the suspension of equipment above the earmarked performance area.

Technical equipment load	30kN
Equipment dead load	15kN
Total load for foyer performance space	**45kN**

It is likely that a percentage of the technical equipment load will be a semi-permanent installation, removed only for maintenance and in special circumstances

STAGE LEVEL LOADS

The general floor loadings shall be as in the table above, these loadings will be reviewed as the access strategy is developed due to the heavy loads imposed by some pieces of access equipment.

Strong points located in the ceiling in the substage trapped room, there are 6 points and the load is divided into these points.

Strong point live load	15kN
Strong point dead load	3.0kN
Total load for strong ponts	**18kN**

Allowance for load applied by trapped room decking to the columns supplied to support the decking and framework.

Live load imposed on column	210kN
Dead load imposed on column	12kN
Total load for Imposed on six columns	**222kN**

FORESTAGE ELEVATOR AND DECKING

The orchestra pit elevators will be electrically operated platforms with a static floor loading to match the stage floor. These will impose significant point loads on the slab under the lifts at the locations of the lifting columns. The manual decking system will also impose loads through to the slab level but will be pointedly less that the elevator.

Orchestra pit elevator 1	**280kN** spread over 4-6 points
Manual decking system	**230kN** spread over 22 points

The elevator will require guide columns for stability, it is expected that the elevator will have 2-4.no guides. The location of these will be developed in next design phase. The manual decking system will also require secure fixing to the pit edge.

Elevator 1 guides	**18kN** per guide

7.6 STAGE ENGINEERING COSTS

Project costs (including an allowance for contractor design costs, labour, project management and other sundry costs) are provided below for stage engineering systems.

Note, however, that these costs do not include the supply, installation and termination of any power supplies, distribution boards, containment or wiring for the stage engineering system - these items should form part of the electrical contractor's (EC's) works and must be included in that package. They also exclude structural steel required for operation and support.
A full list of exclusions from our costs is to be found below.

STAGE ENGINEERING - THEATRE	BUDGET NZD $
Containment systems	in EC's scope
Power supplies and distribution	in EC's scope
Power and data wiring	in EC's scope
Flying system	$830,000
Travelling beams	$115,000
Additional rigging systems	$28,000
Acoustic enclosure	$1,500,000
Variable acoustics	$400,000
Adjustable Proscenium	$95,000
Trapped area	$60,000
Forestage elevators	$390,000
Seating wagons	$62,000
Mix position decks	$35,000
Loose equipment – Truss, drapes, rigging accessories, access equipment etc	**$200,000**
Design & Project Management	$880,000
TOTAL (excl. loose equipment)	**$4,395,000**

7.7 EXCLUSIONS

ELECTRICAL SYSTEMS

- All containment for stage engineering systems (wiring is included).
- LV feeds to stage engineering equipment.

THEATRE AUDITOIRUM

- Any secondary steelwork required within auditorium ceiling to support performance lighting equipment.
- Steelwork for lighting rigging positions (lighting bars) around the various levels of the auditorium, including balcony fronts.
- Fit out / construction of any high-level access grids or lighting bridges in the auditorium, e.g. technical gantries, lighting bridges, access ladders, etc.
- Any PPE or fall-restraint systems for safe access to auditorium lighting positions.

THEATRE STAGEHOUSE

- Any secondary steelwork required within the stage house ceiling to support the over stage flying system.
- Stage floor and sub-floor construction, unless specifically identified within the costs above.
- All floor timber and floor finishes, including those to stage lifts and orchestra pit lift, including all fascia's and access hatches / traps and dip troughs (these would normally be included in the joinery allowances for these floors).
- Grid, galleries, handrails and access ladders in the stage house.
- Rigging eyes, beams or any secondary steelwork required at high level above stage to support technical theatre equipment.
- Recessed channels - Halfen or Unistrut channel - surface mounted or cast-in to walls and soffits of performance spaces for rigging purposes.
- Access equipment for safe access to high level lighting bars.
- Any PPE or fall-restraint systems for safe access to any work positions.
- Get-in lift, hoist, ramp or dock leveller, should these be required.
- Material handling equipment - e.g. pallet trucks, forklifts, etc.

FRONT OF HOUSE AREAS

- Any secondary steelwork required within the FOH areas to support the rigging system.
- Access equipment for safe access to high level lighting bars.

GENERAL

- Additional staff training covering anything other than equipment familiarisation by contractors under CDM. The client may need their staff or a nominated member of management to have suitable qualifications (e.g. NVQs in manual handling techniques, use of access equipment etc) in order for the new building to function safely.
- Maintenance contract cover post warranty period (this is not included but should be considered essential with a new installation).
- Main contractor's discount.
- Inflation - costs are as at the date of this report.
- VAT.

The costs detailed in the tables above are for the systems and equipment that will be included in the Charcoalblue specifications for specialist packages at tender stage.

There will be additional, associated costs that are not included in the tables

8. STAGELIGHTING SYSTEM

A full stagelighting wiring infrastructure is to be provided for the Waikato Regional Theatre. Loose equipment will form part of the FF&E package, procured directly by the client. Outline budget costs are also provided.

8.1 THEATRE

A comprehensive stagelighting system in the theatre will be provided to support the intended programme of professional shows. The design and layout of the wiring infrastructure will also be designed to support the use of the space in its varied configurations without excessive amounts of temporary installation.

DIMMERS AND WIRING INFRASTRUCTURE

The stagelighting wiring infrastructure will comprise a dedicated containment system and associated wiring, supplying stagelighting power and data services to custom socket outlet boxes (facility panels) distributed throughout the space. Dedicated power distribution boards in the theatre dimmer room will supply power to the system.

Two separate containment groups - SL/1 & SL/2 - will distribute the stagelighting system wiring:

- SL/1 - 230V/400V power wiring (dimmed, switched and unswitched).
- SL/2 - DMX, Ethernet and worklight data wiring.

Each of the individual facilities and power outlets will be star-wired back to dimmer racks, control equipment racks or distribution boards (as appropriate) in the dimmer room. The only facilities which will not be wired in this way are the 10A stagelighting power sockets (GPO's) in the facility panels, which will be geographically wired as standard ring mains.

The stagelighting dimmers will be modular, digital dimmers, capable of being soft-configured as dimmers, switched power or hard power circuits. Each way will be RCD protected. The flexibility of module configuration will remove the need for a separate power distribution system for moving lights.

A total of 576no. dimmer / relay ways is proposed - the majority at 10A capacity, with a small proportion at 20A capacity.

The dimmer / relay racks are included in the attached cost allowances but the containment and wiring for these systems form part of the electrical services designer's works and will be included in the electrical contract.

Typical floor-standing modular stagelighting dimmer rack

STAGELIGHTING POWER OUTLETS

Stagelighting power outlets (GPO's) in the facility panels will be wired with standard electrical ring mains cabling and terminated with 10A socket outlets. The outlets are to be used for powering general small electrical items for use with the stagelighting system.

Equipment in control locations will be protected via deck-mounted UPS. This will allow sensitive equipment such as the stagelighting control desks and network equipment to be connected to UPS-maintained supplies at all times.

Some facility panels, for followspot positions etc., will contain larger 40A power supplies, wired radially from the dimmer room distribution boards.

In addition to the power supplies in the facility panels and for all installed stagelighting system equipment, the electrical installation will include several 40A and 55A three-phase RCD-protected power socket outlets for the connection of temporary equipment, which may be brought in for a specific show. These supplies will be radially wired with standard electrical cabling of an appropriate capacity from the distribution boards in the dimmer room, terminated with appropriate AS/NZS 3112:2011 compliant sockets with integral RCD protection.

For touring shows that bring their own dimmer systems and other large items of temporary equipment, a custom 400A power panel will be located in the stagehouse at stage level, housing Powerlock connectors, local RCD protection, metering and a number of locally sub-fused outlets at 40A, 55A and 125A ratings.

This custom power panel and custom facilities panels are included in the attached cost allowances but all other power supplies, wiring and containment form part of the electrical services designer's works and will be included in the electrical contract.

Typical custom temporary power panel

STAGELIGHTING CONTROL DESKS & INFRASTRUCTURE

Dedicated stagelighting control consoles will be provided for the theatre, supplied with all necessary displays and peripheral equipment. Two desks will be provided as in most professional theatres, so that the second desk can act as a back-up to the main desk or be used as a rehearsal control at the production desk location.

The consoles will be multi-user style desks designed to control large rigs of mixed fixture types via a dedicated network. They will be supplied with all necessary displays and desk furniture, bought new as part of the loose equipment budget.

The primary control protocol for the stagelighting will be Ethernet, complying with IEEE standard 802.3af, distributed over the dedicated stagelighting control network. This network will provide a data rate of 1000Mb/s and all stagelighting equipment connected to this network will comply with ANSI E1.17-2006, Architecture for Control Networks.

A full DMX wiring infrastructure will be provided in parallel, alongside the Ethernet wiring to allow for shows that do not wish to use the network. The DMX infrastructure will be wired with Ethernet cabling so that it can be converted to use as a network in the future if the use of DMX is phased out completely.

The final leg of each link between the network and remotely controlled devices will use DMX512-A. The DMX link will comply with ANSI E1.11-2004, DMX512-A and ANSI E1.20-2006, Remote Device Management.

The network will be radially-wired from control equipment racks located in the dimmer room or control room. These data distribution and control equipment racks will be standard 19" rack frames which will contain the network equipment and the DMX distribution equipment and will be UPS-protected to prevent disruption in the event of a temporary loss of power.

The links between the control room and the dimmer room will include sufficient redundancy to enable the data links to be re-patched in the event of a failure of a single cable or network switch.

Wiring infrastructure will be installed for both DMX and Ethernet outlets at each socket box location. No dedicated stagelighting fibre infrastructure is proposed - the stagelighting system will utilise the audiovisual fibre wiring infrastructure when needed.

WORKLIGHT SYSTEM

The theatre will be provided with a programmable houselight and work light control system, to control the dimmable auditorium lighting, the switched white worklighting for use outside performance times and the switched 'blue' worklighting for use during performances.

The worklight control system will be based around a central processor in the equipment racks, linked to main control panels and local push-button panels in control rooms and distributed around all technical areas.
The house lighting and worklights will normally be controlled by this dedicated control system, but with network links that will enable control from the stagelighting control console when required.

Main control panels will be installed at key locations both at stage level and in the control room, with a portable main control panel provided for use at the rehearsal production desk or any other temporary control location.

Typical screenshot of a worklight master panel

All houselight fittings, white and blue worklight fittings and circuiting will form part of the electrical services designer's works and will be included in the electrical contract. However, Charcoalblue will work closely with the electrical services designers to identify fittings, locations and circuit grouping to suit the operational requirements of the stage area.

Extra low voltage 'blue' worklight

The worklight control points, main panels, control wiring and control processor will be supplied, installed and terminated by the Specialist Stagelighting Contractor.

STAGELIGHTING FIXTURES

The development of LED fixtures continues to advance rapidly. By procuring these directly, the client will be able to take advantage of the very latest models, price deals and support agreements that the manufacturers will have available when the building is complete. It is typical to exclude these from the main construction contract.

We would suggest a budget allowance should be allocated for this fixture package within the FF&E costs – a provisional sum is detailed in the below cost tables, which allows for stock of mixed fixture types, including generic lights, moving heads and followspots.

PLATFORM LIGHTING FIXTURES

The use of LED sources for platform lighting allows for the equipment to be used continuously without the need for frequent lamp replacements, and additional heat load that would be associated with tungsten or discharge sources.

The LED's will also offer full smooth dimming and allow for an average light level of 750 lux on stage, all with a "tungsten" colour temperature of 3000K. To avoid unsightly spill onto architectural fixtures and audience seating it is assumed the light levels will drop slightly at the very edges of the space, while still offering a flat field across the anticipated area where the orchestra will be located.

The fittings will need to adhere to the strict acoustic criteria set by Charcoalblue acousticians. At this stage we have allowed for convection cooled units. At the next stage of design, we will engage with UK-based firm Global Design Solutions, this will enable us to draw on their proven LED dimming technology used for silent operations. Recent examples of their orchestral halls include Queens Hall – Denmark, Vereeniging Concert Hall – Netherlands, Calouste Gulbenkian – Portugal and Stockholm Concert house -Sweden.

Although these would be silent in cooling and operation to ensure the acoustic critiera is met it is anticipated that additional testing by Charcoalblue will be required prior to final design.

The platform concert lighting will be fitted within the construction of the acoustic reflectors as part of the overall canopy design. The acoustic reflectors are designed as a series of panels suspended below a 'fixed' ceiling. The design of containment and cabling routes to the acoustic canopy will require each panel to have a unique power and data feed. It is anticipated that each panel will be fitted with a junction box and a power outlet box, the feed to these boxes from above is likely to be manually managed to allow for slight movement of the flown pieces, and the anticipated movement associated with the relfectors which angle to allow for the variable acoustic requirements of each event.

The detailing of the installation of these fixtures will need considerable coordination during the next design stage, and as part of the Specialists Contractor Design Portion of their contract.

The platform lighting will be provided by the Specialist Subcontractor to the Electrical Contractor for installation. The load wiring, data wiring, power supplies and containment routes will be specified by the Electrical Services designer, for supply and installation as part of the main electrical contract.

GDS 4 cell platform light

LOOSE EQUIPMENT - RIGGING AND CABLING

Allowances for loose cabling and general rigging accessories are included in the FF&E costs.

Loose cabling will be provided for all facility types. Rigging accessories include ballet booms and sidelighting ladders, temporary/portable distro, etc.

STAGELIGHTING POSITIONS

Rigging of stagelighting fixtures over the stage area will be carried out at ground level through use of the powered flying system.

The following comprises the proposed stagelighting positions:

- There will be permanently installed front-of-house lighting bars around the full extent of each balcony front.
- There will also be front-of-house lighting bars incorporated into the handrail structure of the technical bridges and walkways above the auditorium.
- A flown advance bar position can be accommodated via the forestage bridge area.
- Horizontal and vertical runs of Halfen channel will be distributed throughout the auditorium and proscenium opening to allow for rigging of key equipment (detailed on Stage Engineering loading drawings appended to this report).
- Vertical booms will be located in the boxes either side of the auditorium, to cater for the varying proscenium widths.
- There is a dedicated followspot room at the rear of the auditorium at high level.

These lighting positions and any supporting structural steelwork will form part of the architectural package and are not included in the attached costs, unless specifically identified within the Stage Engineering section of this report.

ACCESS EQUIPMENT

Every effort will be made to provide easy and safe access to all stagelighting positions.

However the best solutions, especially for the balcony front positions, will likely involve the use of personal protection equipment (PPE) as work-positioning or fall-restraint. The cost of this PPE is not included in the cost allowances, as this is best procured directly by the operator, in accordance with their building management procedures. The cost of tie-off points and installed safety equipment - e.g. harness clip-on points under the first row of seats - should be included within the architectural package.

For the stagelighting equipment rigged on bars over the stage area, access equipment will be required to facilitate safe working at height when focussing - whether tallescope, scaffolding tower, or powered lift access. The choice of equipment here will be closely linked with the operator's risk management and work procedures, so the cost of this access equipment is not included here but should be allowed for within the FF&E costs.

To remove the need for accessing the advance bar position once trimmed to its dead height, intelligent light fixtures will be used, with remote control. This will negate the need to access the equipment for focussing during show setup when the seats will already be in position below. However, it will be possible to use the forestage lift and some form of powered access should you need to get to the equipment for maintenance during show times.

Sequencing of seat removal/replacement would need to be considered here. For general maintenance at all other times, this advance bar position will be able to be flown into the deck.

DEAD BLACKOUT SYSTEM

A 'dead blackout' control system will be required to be able to override the emergency lighting and exit signs within the auditorium for short periods of time for dramatic purposes. This will need to be coordinated with local authories and be in line with New Zealand Standards.

This work falls within the electrical services designer's works and should be included in the electrical contract.

8.2 STAGELIGHTING SYSTEM COSTS

Project costs (including an allowance for contractor design costs, labour, project management and other sundry costs) are provided opposite.

Note that these costs do not include the supply, installation and termination of any power supplies, distribution boards, containment or wiring for the stagelighting system - these items will form part of the electrical contractor's (EC's) works and must be included in that package.

A full list of exclusions from our costs is to be found elsewhere in this report.

The cost tables opposite allow for all budgetary allowances within the main contract works and FF&E budget.

STAGELIGHTING - THEATRE	PROPOSAL
Containment systems	in EC's scope
Power supplies and distribution	in EC's scope
Power and data wiring	in EC's scope
Stagelighting infrastructure	$701,000
Control system	$79,290
House and worklight control system	$47,000
Platform lighting fixtures	$104,100
Design, installation and project management	$280,000
GRAND TOTAL – THEATRE	**$1,212,290**

STAGELIGHTING – FF&E	PROPOSAL
Loose equipment (fixtures, cabling, accessories, etc.)	$1,110,000
Design, installation and project management	$200,000
GRAND TOTAL – FF&E	**$1,310,000**

8.3 MECHANICAL LOADINGS

The following advice represents Charcoalblue's assessment of the likely mechanical loading requirements for the performance technical equipment in the performance spaces at the new Waikato Regional Theatre, Hamilton.

These estimates are based on our previous experience of similar buildings and take account of our current assumptions for the building usage.

The heat loads given in this section are for the effect of specialist performance technical equipment only, and do not include the loads resulting from audience occupancy or operators, bars and catering, dressing rooms, wardrobe, etc.

We anticipate that from time to time, larger events may require additional specialist equipment to be brought in to supplement the installed technical equipment, and the installed theatre infrastructure will be designed to allow for this.

In the figures below, we have given reasonable estimates for the heat load from the technical equipment, but it should be noted that when additional equipment is brought in for larger events, these loads may be higher.

LED STAGELIGHTING

Whilst we recognise the increased demand for the use of LED lighting wherever practicable, it would be unrealistic to assume that the stagelighting will be entirely LED-based, at least in the near future.

At present there is a reluctance from theatre designers (lighting and set) to embrace LED as the results and control of the equipment still have a long way to go to achieve the same effects and aesthetic as the more traditional, widely-used fixtures of tungsten and arc-source.

The stagelighting rigs will be a mixture of tungsten, arc-source and LED according to the demands of the productions. It is reasonable to assume that in the long-term, lighting rigs will incorporate higher proportions of LED fixtures, but the use of tungsten and arc sources will certainly continue in the short term and is unlikely to die out completely. The stagelighting infrastructure will be designed to be configurable for varying proportions of each type of fixture and it is therefore prudent to provide heat loadings based on a mixed lighting rig, to reflect a ‘real-world’ scenario.

THEATRE

DIMMER ROOM

The dimmers to be installed in this room are likely to be SCR-based dimmers, which are in the region of 96-98% efficient. These dimmers produce 2-4% as heat and we therefore anticipate that this room will require cooling. The dimmer and AV rooms should average 22 degrees celsius, with a peak range either side of this figure of +/- 4 degrees C. and a relative humidity of 30-90%.

DIMMERS

At this stage of the design, we anticipate around 576 dimmers - 556no. 10A and 20no. 20A. However, the number of dimmers is designed to allow flexibility in where equipment can be located, and it is not anticipated that full load will be connected to all dimmers at the same time, nor that all the dimmers will be used at the same time.

Each dimmer can also be configured as a relay when required to control LED or Arc sources - in relay mode they produce negligible heat.

Total dimming capacity = (556 x 10 x 230) + (20 x 20 x 230) = 1371kW
Asume around 20% of the dimmers are configured as relays at any one time
Apply diversity of 0.80 = 1097kW
Assume 60% of dimmers are loaded at any one time
Apply diversity of 0.60 = 658kW
Assume average load connected to any 10A dimmer is a 750W fixture (2kW for 20A dimmer) i.e. around 33% of maximum dimmer capacity
Apply diversity of 0.33 = 217kW
Assume around 50% of fixtures are in use at any one time
Apply diversity of 0.50 = 108kW
So the typical heat load for stagelighting dimmers = 4% of 108kW = 4.3kW

This room will also house stagelighting data distribution equipment (network switches etc.), but the heat load from this will be negligible.

Typical heat load generated by Stagelighting equipment in the dimmer room up to 4.3kW

AV EQUIPMENT RACK ROOM

The AV equipment rack room will house all the installed rack mounted AV equipment. This will include many amplifiers, processing equipment along with network swtiches and patch bays. Much of this equipment will be fan cooled.

The heat load from this equipment will depend upon the final choice of equipment during detailed system design, but at this stage it is reasonable to assume approximately 4kW of heat load generated by 4 equipment racks. This figure will be tested and revised during later design stages.

Typical heat load generated in the Audiovisual Equipment Rack Room up to 4kW

THEATRE CONTROL ROOMS

There is currently one large control room located at the rear of the auditorium at circle level. This room is currently designed as acoustically sealed work-spaces, separated from the auditorium by openable windows and will therefore require dedicated cooling, and suitable extraction, to cope with the equipment and occupants.

The control equipment will consist of consoles, screens, task lighting and a small playback equipment rack, all of which totals approximately 2Kw of heat load.

At this time, it is prudent to allow for high powered video projection to take place from this room which would add an approximately 3Kw of head load to the room. However, this will be tested in the next design phase.

In certain circumstances, the shows will be operated with the windows open, so the cooling units in these rooms must be sufficiently quiet in operation for this to be possible.

Heat load for equipment in control rooms (excluding operators) **up to 5kW**

8.4 EQUIPMENT WITHIN THEATRE AUDITORIUM

CONTROL AREA / SOUND MIX POSITION

From time to time, performances will require an open control and/or sound mixing position towards the rear of the seating. This equipment will contribute to the heat load within the auditorium.

The control equipment will consist of consoles, screens, task lighting and source equipment and small processing racks.

Heat load for control equipment (excluding operators) **around 1kW**

LOUDSPEAKERS

The loudspeakers in the auditorium will generally be located around the sides and at high level throughout the space, however at this stage we anticipate that these will be un-powered and therefore will have a negligible effect on the heat load within the auditorium. The heat load associated with the loudspeaker system will mostly be generated by the amplifiers, which is included in the figures given for the AV Equipment Rack Room above.

PROJECTION

When projection is required as part of a performance, the projector may be located within the auditorium, and will generate heat. Although for many uses smaller projectors will suffice, there will be occasions when large projectors, in the region of 3kW, may be used.

(Note - it is unlikely that projectors will be used in both the auditorium and the control room simultaneously).

Maximum heat load for projector **up to 3kW**

STAGE ENGINEERING

Although there are likely to be several motorised hoists at high level above the stage and auditorium, as well as provision for additional stage engineering equipment to be brought in and connected, it is not anticipated that the majority of this equipment will be used during performances.

The heat loads from this equipment will mostly occur during show set-up times when the stagelighting is in minimal use, rather than during performances. The heat load from this stage engineering equipment can therefore be fully diversified against the stagelighting load.

FOLLOWSPOTS

If and when followspots are required, it is likely that these will be located within the main volume of the auditorium and will generate heat. Whilst such fixtures will be used very infrequently, it would be sensible to include for the possibility at this time.

Typical heat load for followspots:
4no. 2.5kW spots, each with an operator **= 10kW**

EFFECTS

It is customary for performances to use effects - smoke, haze, etc. to enhance the visual aspects of the performance.

This equipment will likely be located in the stage or sidestage areas and the heat load will generally remain constant throughout a performance.

Typical heat load for effects equipment **= 2kW**

8.5 STAGELIGHTING FIXTURES

DIMMED STAGELIGHTING

As with the calculations above for the dimmer room and applying the same diversity factors as used above, the typical load in use at any one time will be around **107kW**

In practice, the dimmed level of each stagelighting fixture will vary throughout a performance, and not all fixtures will be at 100% at the same time:

Typical heat load peak (x 0.90 factor) = 97kW
Typical heat load average (x 0.55 factor) = 59kW
Typical heat load low (x 0.25 factor) = 27kW

NON-DIMMED STAGELIGHTING

In addition to the heat load of the dimmed stagelighting, there will be several 'moving' lighting fixtures, which generally have arc sources and on-board mechanical dimming.

As these fixtures are mechanically dimmed, the heat load remains constant throughout a performance.

We have also allowed for a proportion of LED fixtures, which generally have much lower power consumption than the equivalent tungsten fixtures, but which also varies according to the light output required.

Both of these types of fixtures will be connected to the dimmers in the dimmer room, but with those dimmers configured to be relays.

Total heat dissipation from a typical moving fixture = 1kW
For this size of space, assume a typical lighting rig includes around 60no. moving fixtures of various sizes:
Total heat load for moving fixtures = 60 x 1kw **= 60kW**
Total heat dissipation from a typical LED fixture = 200W
For this size of space, assume a typical lighting rig includes around 100no. LED fixtures of various sizes.
We have assumed that these will be in use throughout each show, but at an average level of 50%:
Total heat load for LED fixtures = 100 x 200W x 0.5 **= 10kW**

Total combined heat load generated by non-dimmed stagelighting equipment up to 70kW

Note that the use of LED sources for these fixtures is growing, but the majority of stagelighting rigs still utilise mostly arc source fixtures. The advantage of LED moving head fixtures is that their heat output is not constant - they generate much less heat when they are not in use - and is generally lower than the equivalent arc-source fixture. However, the initial cost of these fixtures is higher, as well as the rental cost, so we have presented a 'worst-case' scenario here, on the assumption that only a small portion of the rig will be LED-based.

SUMMARY - EQUIPMENT WITHIN THEATRE AUDITORIUM

The distribution of the stagelighting fixtures around the performance area will vary according to the type of event and staging configuration, but it is reasonable to assume the following:

- Over stage: 50%
- Auditorium sides and bridges - high level: 30%
- Around auditorium sides - low level: 10%
- Stage level: 10%

When the non-dimmed stagelighting loads are added to the figures for the dimmed stagelighting, control, loudspeakers, projection, followspots and effects etc., we get the following:

Peak heat load for performance equipment	**=**	**183 kW**
Average heat load for performance equipment	**=**	**149 kW**
Low heat load for performance equipment	**=**	**98 kW**

Please note that the ‘Peak’ figure is based on a large performance requiring the maximum of each type of equipment described above.

The ‘Low’ figure illustrates a much smaller show - it excludes projection, followspots, effects and moving light fixtures.

It is reasonable to assume that most of a performance will be at the ‘average’ level, rising to the ‘peak’ figure for short durations totalling 20% of the show, and dropping to ‘low’ level for a similar 20%.

Some smaller events will run at around (or below) the ‘low’ figure throughout the event.

Dimmable stagelighting fixtures transmit 10-30% (depending upon type) of the heat through the light beam, with the remainder dissipated at the fixture.

‘Moving head’ fixtures (arc sources and mechanical dimmers) dissipate around 90% of their heat load at the fixture.

In this type of performance space, it is usual for the decorative house lighting and worklight to be reduced to a low level (or off) when the stage lighting is in use. It can, therefore, be fully diversified against the figures above.

As mentioned earlier, these loads do not allow for extraordinary events when unusual quantities of additional equipment are hired in. In certain circumstances these loads may be higher.

8.6 ELECTRICAL SUPPLIES

INTRODUCTION

The information below represents Charcoalblue's assessment of the anticipated electrical supply requirements for the performance technical equipment in the performance space of the new Waikato Reginal Theatre, Hamilton.
These estimates are based on our previous experience of similar buildings and on our current assumptions of the building usage.

The technical performance systems in the building require 9 separate and discrete electrical supplies, drawn directly from the main incoming LV panel. This is to avoid interference between the systems.

1. Theatre – Temporary Audiovisual Power - 125A TPN
2. Theatre – Audiovisual power – 120A TPN
3. Theatre – Stage Engineering Power – 600A TPN
4. Theatre – Stage Engineering Power – 125A TPN
5. Theatre – Stage Engineering Power – 125A TPN
6. Theatre – Stage Engineering Power – 200A TPN
7. Theatre – Stage Engineering Power – 200A TPN
8. Theatre – Stagelighting Power – 800A TPN
9. Theatre – Stagelighting Temporary Power – 400A TPN

These 9 main supplies, along with the anticipated individual supplies required, are detailed in the drawings accompanying this document – 16125-ES-SC-series.

It is important that the distribution boards supplying services for the technical performance systems do not supply any of the other building-wide services. This is to ensure that noise-inducing harmonics from general building equipment are not induced within the technical performance systems, and vice versa.

All distribution boards for performance equipment are to have provision for 20% additional supplies to be added for future expansion.

The sockets shown on the schematics are to be AS/NZS 3112:2011 compliant, Clipsal by Schneider-type sockets or similar would be appropriate, with integral RCD and isolating switch for the connection of loose equipment.

The power supplies shown on the accompanying schematic drawings are for performance equipment only and do not include power for Emergency lighting, General building power, IT/data systems, Foyers, Wardrobe facilities and Dressing rooms, etc.

Overall design responsibility for the electrical services remains the responsibility of the Electrical Services Designer.

8.7 AUDIOVISUAL POWER

The individual power supplies for the Audiovisual systems at this stage of the design are shown on the accompanying schematic drawings.

Several ring/radial circuits are required for the Audiovisual power sockets in the distributed facilities panels, but the actual number of circuits required will need confirmation from the Electrical Services Designer pending completion of their design.

AV CONTAINMENT REQUIREMENTS

The Audiovisual containment systems play an important role in protecting the integrity of sensitive audio equipment from induced noise. The Audiovisual system will require 4 separate containment classes:

- LV mains supplies (AV/1)
- Loudspeakers (AV/2)
- Data, video and communication services (AV/3)
- Audio line signals (AV/4)

The audio signal class AV/4 is the most sensitive and should be sited a minimum 500mm from parallel runs of power containment. Where a crossover is required between audio services and other electrical services, this should be done with a variance angle of 90°.

Temporary equipment outlets may be fed from single cables contained within AV/1 or from SWA cable mounted on a separate tray system.

8.8 STAGE ENGINEERING POWER

The individual power supplies for Stage Engineering at this stage of the design are shown on the accompanying schematic drawings.

SE CONTAINMENT REQUIREMENTS

The Stage Engineering system will require 2 separate containment classes:

- LV mains supplies (SE/1)
- ELV control & data services (SE/2)

Power supplies for connection of temporary equipment may be fed from single cables contained within SE/1 or from SWA cable mounted on a separate tray system.
The architecture of the power and control distribution for Stage Engineering systems varies enormously between different manufacturers. Depending upon the products eventually chosen, it may be possible to combine SE/1 and SE/2, or to combine both with the stagelighting containment groups.
The type of control system will be defined during the following stages of the design. For this stage it would be appropriate to assume that Stage Engineering systems will require their own discrete containment.

8.9 STAGELIGHTING POWER

The individual power supplies for Stagelighting at this stage of the design are shown on the accompanying schematic drawings.

Several ring/radial circuits are required for the Stagelighting power sockets in the distributed facilities panels, but the actual number of circuits required will need confirmation from the Electrical Services Designer pending completion of their design.

SL CONTAINMENT REQUIREMENTS

The Stagelighting system will require 2 separate containment classes:

- LV mains supplies (SL/1)
- ELV stagelighting data services (SL/2)

Power supplies for connection of temporary equipment may be fed from single cables contained within SL/1 or from SWA cable mounted on a separate tray system.

8.10 DIVERSITY CONSIDERATIONS

Not all the supplies detailed above will be in use at the same time or to their full capacity.

Although the supplies and the switchgear should be sized as per the list above to cope with peak demand and switch-on, the following considerations should provide a reasonable approach to specifying the normal expected loads on these supplies:

- The Audiovisual power for Theatre temporary equipment - supply #1 - is for the use when touring shows bring in their own audiovisual equipment. In this case, there will be less of the installed audiovisual system in use, so we usually recommend that this supply can be **fully diversified** against supply #2.

- The Audiovisual power for Theatre equipment - supply #2 - will generally not be used at full capacity. This supply is sized to prevent unwanted tripping at system switch-on and at times of peak load, but the normal daily load on this supply is likely to be around **16%** (16kW) of the maximum possible load, in line with the heat load figures provided above.

- The Stage Engineering equipment is very unlikely to be used at times of peak stagelighting load. Most of the stage engineering use will be during show set-up times, i.e. not in performances. Scenery changes that do take place during shows usually occur in darker lighting states, i.e. not at the same time as the stagelighting peak load. So, it is normal practice to **fully diversify** the stage engineering loads on supplies #3 - #7 against the stagelighting loads on supplies #4 & #9.

- The Stagelighting power for the Theatre - supply #8 - will generally not be used at full capacity. This supply is sized to prevent unwanted tripping at times of peak load, but the normal load on this supply is likely to be around **33%** (180kW) of the maximum possible load, in line with the heat load figures provided above.

- The 250A Stagelighting power supply for temporary equipment - supply #9 - is for the use when touring shows bring in their own stagelighting equipment. In this case, there will be less of the installed stagelighting system in use, so we usually recommend that this supply can be **fully diversified** against supply #8.

9. AUDIOVISUAL SYSTEMS

Dedicated audiovisual systems will be provided for the Main theatre and supporting spaces and for buildingwide paging and show relay. These systems will include both an installed infrastructure and a budget allowance for loose equipment to support performances and events.

The design principle for the infrastructure is the same for all spaces, and links will be provided between areas. This will allow performance spaces to be interconnected and equipment to be moved between areas as required.

AUDIOVISUAL CONTAINMENT AND WIRING

In each of the performance spaces the AV system infrastructure will comprise a dedicated containment system and associated wiring supplying wired AV services to custom outlet boxes and AS/NZS 3112 compliant power sockets distributed throughout the spaces. The containment system and technical power panels will form part of the electrical system designers works and be included in the electrical contract.

Four separate containment groups - AV/1 to AV/4 - contain the AV system wiring:

- AV/1 contains 230v/415v power wiring.
- AV/2 contains amplified audio wiring for loudspeakers.
- AV/3 contains communications, data and video wiring.
- AV/4 contains mic/line and AES 3 audio wiring.

Each of the individual ELV audiovisual facilities is wired back to the equipment racks in the AV equipment rooms. The only facilities which may not be "star-wired" in this way are the ring intercom outlets, which can be looped box to box with one home run per building level.

The power wiring in AV/1 is part of the electrical contract, although they terminate to the 10A power sockets (GPO's) located in the custom outlet boxes. These should be wired radially and dedicated distribution boards in the Dimmer / AV equipment rooms will supply power to the system as shown on drawings 16125-ES-SC-series.

AUDIOVISUAL SOCKET OUTLET BOXES

Bespoke socket outlet boxes (or facilities panels) will be provided to house the audiovisual facilities. The exact facilities in each outlet box will be determined at the next stage, but will likely include;

- Microphone tielines: single tielines normally up to a maximum of 8 per box and multicore tielines in groups of 8.
- Digital audio tielines: Cat 6 tielines for remote stageboxes, and networked audio systems.
- Ring intercom tielines: Wired as ring with 2 channels on each outlet.
- Cuelight tielines: Suitable for use with cuelight outstations.
- Stage Manager's panel plug-in points:for custom SM panel.
- Paging microphone plug-in points: see paging system below.
- Video: suitable for use with SDV or analogue video.
- Fibre: OM4 mulitmode fibre connections for video and audio connections.
- Assisted listening output: 50ohm cable for assisted listening distribution.
- Loudspeakers: Wired in either 2 or 4 core for loudspeaker systems.
- AV system power: Dedicated audiovisual system power on 10A RCD connectors.

Typical audiovisual facilities panel

The socket outlet boxes provide a comprehensive infrastructure for the audiovisual systems with as much future proofing as possible. There will, however, inevitably be occasions when a production requires an unusual combination of cables that has not been allowed for, so it is essential that this infrastructure is supported by appropriate temporary cable routes, which will be detailed at the next stage.

9.1 MAIN THEATRE

The programming brief for the main theatre is wide ranging and is likely to include large scale professional theatre and dance performance, orchestral and other music performances as well as a range of community and traditional cultural events. As such, the technical systems must be capable of supporting all types of performance and be easily adaptable to the needs of each one.

INFRASTRUCTURE

The hub of the audiovisual wiring is the central equipment racks which are the destination for all of the wiring from the audiovisual socket outlet boxes. The equipment racks will be equipped with audio, video, data and loudspeaker patchbays, distribution and processing equipment. Where possible, digital and network-based protocols will be used but special care will be taken to minimise the latency caused by this processing. The audiovisual infrastructure will have many networked connections. These are to be completely independent to the buildingwide IT system, with a small number of links to allow interconnection when required. This is intended to provide a level of security for show critical equipment, and ensures the high bandwidth usage of the technical systems does not put unnecessary demands on the buildwide IT system.

At this stage around 90 facilities panels, and an additional 30 dedicated loudspeaker outlets and power points have been allowed for. This is consistent with a theatre of this size and anticipated programme, however this will be looked at in more detail in the next stage.

COMMUNICATIONS EQUIPMENT

The communications system will consist of a stage manager's console, cuelights, ring intercom, audio and video show relay capture and distribution. The stage manager's console will be a custom-manufactured desktop unit. This will include facilities for cuelight control, front-of-house and backstage paging, ring intercom, stopwatches and clocks.

A two-channel ring intercom system will be provided for technical staff communications. This will primarily be based around a wired system, whilst maintaining a small number of wireless packs for use by stage management and mobile staff.

Audio and video capture for relay of the performance to technical and backstage areas will be provided. This will be primarily an analogue system to avoid latency issues. It will be possible to route this signal anywhere in the performance area via the provided patchbays.

High definition PTZ cameras have also been allowed for front of house relay feeds, as well as an IR feed for use in blackouts.

ASSISTED LISTENING AND AUDIO DESCRIPTION

In order that the theatre is as accessible as possible for the maximum number of people, provision must be made for an assisted listening system. We are proposing a mixture of an induction loop throughout the fixed auditorium for hearing aid users as well as a two channel FM system with portable headsets for the hard of hearing which can provided show audio hearing assist and audio description.

LOUDSPEAKERS AND AMPLIFIERS

The loudspeaker system will need to be suitable for all uses of the space and must therefore contain a degree of flexibility.

There are several high-quality manufactures, and the choice of model and loudspeaker position will be developed at the next stage alongside the client team. At this stage, we envisage this will consist of a large, high-powered line array system which will provide the main stereo left and right, with a centre locate cluster and subwoofers along with several smaller installed delay loudspeakers to cover the areas under the balconies and a series of surround sound loudspeakers. Alongside this will be a stock of loose loudspeakers for use as performer foldback and spot effects/supplementary loudspeakers.

To maintain a consistent audio coverage, all loudspeakers and amplifiers should be from a single manufacturer this will allow for better servicing will come with significant commercial advantages. We also recommend that the loudspeaker system is procured outside of the main contract so should be allowed for in the FF&E budget.

Typical line array loudspeaker system

AUDIO MIXING CONSOLE AND PLAYBACK

As is appropriate in any venue of this size, a large scale digital audio mixing console will be required to support all types of events. There are several suitable high-quality manufactures available and the final choice of console should be made as late as possible in the process to take advantage of the latest technology. The infrastructure will be designed to support any console using standard protocols to allow for maximum future flexibility.

A dual redundant computer-based playback system will also be allowed for which will run industry standard audio and video show control software and will include an emergency switchover system.

Typical digital audio mixing console

PRODUCTION VIDEO SYSTEM

The projection system currently proposed is not Digital Cinema (DCI) compliant, this means that it cannot be used to present feature films, however it is of a suitable quality for performance video, presentation events and live streaming. A projection system that is not DCI compliant offers much more flexibility of use, as it allows projectors to be repositioned and refocused so is much more appropriate for a flexible space. In our opinion, this offers the best compromise between likely use, value and quality.

An allowance is included for video processing and switching to support the video system – it is assumed that additional projectors will be hired in as required for unusually large or complex performances.

MICROPHONES

Microphones will form part of the client's FF&E budget. We will work with the client team to detail this equipment at the next stage of design.

ACCESSORIES

An allowance for a range of cables, stands, cases and general accessories has been allowed for to support the equipment described above – costs are included in the FF&E costs.

9.2 BUILDINGWIDE SUPPORTING SPACES

There will be minimal installed audiovisual equipment and links to the main theatre AV systems as part of the buildingwide infrastructure. This will consist of several facilities panels in key locations (production offices, dressing rooms, green room and rehearsal rooms etc), providing communication and relay links as well as the ability to connect local inputs into the technical systems in some locations.

PAGING

A series of volume controls and paging loudspeakers are provided to distribute calls and show relay around the building, to the dressing rooms, back-of-house and front-of-house areas, toilets and other public areas. This will be based around a simple 100V line loudspeaker system and a central processor in the equipment racks.

Local music input will also be made available for the bar area.

9.3 AUDIOVISUAL SYSTEM COSTS

Project costs (including an allowance for contractor design costs, labour, project management and other sundry costs) are included below. Note that these costs do not include the supply, installation and termination of any power supplies, distribution boards, containment or load wiring for the audiovisual system. These items will form part of the electrical contractor's works and must be included in that package.

A full list of exclusions from our costs is to be found elsewhere in this report.

The cost tables opposite allow for all budgetary allowances within the main contract works and for loose equipment procured directly by the client with their FF&E budget.

FF&E allowances for stage engineering and stagelighting systems can be found elsewhere in this report.

MAIN THEATRE – AUDIOVISUAL INSTALLED	BUDGET
Containment systems	in EC's scope
Power supplies and distribution (inc. power conditioner)	in EC's scope
Power wiring	in EC's scope
Audiovisual infrastructure	$485,000
Communications equipment	$71,600
Assisted listening and audio show relay	$43,000
Video and video show relay	$27,400
Project costs	$313,500
GRAND TOTAL – MAIN THEATRE	**$940,500**

BUILDINGWIDE & PAGING – AUDIOVISUAL INSTALLED	BUDGET
Containment systems	in EC's scope
Power supplies and distribution (inc. power conditioner)	in EC's scope
Power wiring	in EC's scope
Audiovisual infrastructure	$20,000
Paging system	$87,000
Project costs	$53,500
GRAND TOTAL – BUILDINGWIDE & PAGING	**$160,500**

AUDIOVISUAL SYSTEM FF&E	BUDGET
Loudspeakers, amplifiers, mixing consoles and playback	$457,000
Communications equipment	$28,800
Video system	0
Project costs	$121,450
GRAND TOTAL – FF&E	**$607,250**

10. FIRE ENGINEERING REPORT

Holmes Fire

INTRODUCTION

The purpose of this report is to determine the minimum fire safety precautions required within the proposed Waikato Regional Theatre in Hamilton, New Zealand to demonstrate compliance with Section 17 of the New Zealand Building Act 2004 with respect to the fire regulations.

This is a legal requirement whereby it must be shown that after the completion of works, the objectives of clauses of the New Zealand Building Code relating to means of escape from fire, protection of other property, and structural and fire rating behaviour are satisfied.

This Fire Engineering Strategy report includes a performance based Scope of Works advising of fire safety issues affecting architecture, building services and structure in accordance with the requirements of the New Zealand Building Code. This Fire Engineering Strategy must be read in conjunction with the accompanying fire safety sketches which are marked up on drawings prepared by other consultants.

This is not a 'For Construction' document, but a performance document that is intended to be used by the Architect and other consultants in implementing their detailed designs and preparing their working drawings and specifications. The consultants whose documentation is required to incorporate the requirements of this Fire Engineering Strategy are expected to have read this report, understood the implications as it affects their scope of work, and incorporated the relevant fire requirements into their drawings, specifications, and other construction documents.

> This report is issued for the purpose of allowing the design to develop in compliance with the relevant performance requirements of the Building Code with respect to fire.
>
> Additional comments have been included in shaded boxes similar to this to give further information to be considered by the design team.

SUPPORTING DOCUMENTS

This Fire Engineering Strategy document is one of a suite of documents prepared by the fire engineer:

- Fire Engineering Brief (FEB)
- Fire Engineering Verification (FEV)
- Fire Engineering Strategy (FES) – this document, with associated Fire Engineering sketches

The Fire Engineering Brief outlines what the design intends to achieve, the factors that affect the design solution, and the design methodology and acceptance criteria that are used to verify that the design objectives are met. The FEB does not detail the final design solution.

The Fire Engineering Verification document contains the calculations and engineering background to the fire safety design – the verification showing how the design solution meets the acceptance criteria.

The Fire Engineering Strategy document outlines the fire safety solution for the proposed works and describes the design solution and specific fire safety requirements necessary to achieve the design objectives.

The Fire Engineering sketches (prepared by Holmes Fire) are to be read in conjunction with the Fire Engineering Strategy.

WORK BY OTHERS

Access Routes

Escape route widths specified in this fire engineering strategy are the minimum widths for fire safety only, and may not specifically address requirements for access for people with disabilities. Other escape routes features that are not related to fire safety - and hence not specified in this Fire Engineering Strategy - may be required for compliance with Clauses D1 of the New Zealand Building Code.

Visibility in Escape Routes

The design of systems to achieve compliance with F6 of the NZBC is outside the scope of this report. Any comments in the Fire Engineering documentation for visibility in escape routes are for purposes of assisting the designers responsible for F6 compliance.

The design of systems to provide artificial lighting to escape routes (both internal and external parts) in compliance with G8 of the NZBC is outside the scope of this report. To assist, the fire strategy identifies the intended escape routes.

Wayfinding/Signage

The design of exit signage for compliance with F8.3.3 a) of the NZBC is outside the scope of this report. Any comments in the Fire Engineering documentation for exit signage positioning are for purposes of assisting the designers responsible for F8.3.3 a) compliance.

Structure

Defining the period of fire resistance and fire severity in consideration of 6.2 b, c, and d of the NZBC is addressed by this fire strategy. Identification of the structural systems and its need for structural stability to achieve the performance requirements is to be provided by others. The methodology to achieve the performance is to be provided by others.

Any load bearing walls identified by the structural engineers for the purposes of compliance with C6 have not been annotated onto the fire strategy sketches.

HSNO

This Fire Engineering Strategy does not specifically consider requirements for Hazardous Substances and New Organisms (HSNO). Therefore, clause C5.7 c) of the NZBC is not addressed by this report.

Other

Details and approval of the Evacuation Scheme/Plan, are to be provided by others.

Operational Management plan to support the Fire Engineering Strategy, are to be provided by others.

DESIGN APPROACH

Philosophy

To demonstrate compliance with the relevant fire safety clauses of the Building Code, we have utilised the following Compliance Documents as the design basis:

- C/VM2 – Verification Method: Framework for Fire Safety Design, Amendment 5, 24 November 2017.

Parameters

The following key parameters form the basis of this design. These parameters are to be verified as the design progresses.

1. No unit title or similar other boundary arrangements exist or are proposed.
2. There are no Memorandum of Encumbrances or similar that exist or proposed which relate to fire.
3. The Building Importance Level is not IL4 or IL5.
4. The fire design is based around a building wide evacuation strategy. In this building, all occupants evacuate to a place of safety outside the building.
5. There are no solid fuel, gas burning, and oil fired appliances and open fires, proposed in the works.
6. There are no specific spaces for which the sprinkler system is not permitted to be installed as defined by other disciplines.

SCOPE OF WORKS

The following is the proposed scope of work for compliance with the objectives of the New Zealand Building Code clauses C1 to C6 Protection from Fire, to the extent required by the Building Act. These are to be read in conjunction with the attached Fire Safety sketches.

Fire Engineering requirements have been summarised by discipline they are most applicable to, the design team is expected to read each section for items relevant across disciplines. Note: This scope of works will evolve as the design progresses

1 FIRE PROTECTION

1.1 Alarm / Detection Systems Requirements

1.1.1 A new Type 7 fire alarm system is required to be installed throughout the building in accordance with NZS 4512:2010.

1.1.2 A new fire alarm sounder system shall be installed throughout the building in accordance with NZS 4512:2010.

1.1.3 In areas with high ambient noise level (e.g. Theatre), visual alert system shall be provided in accordance with NZS 4512. Indicative locations of the visual alerting device are indicated on the fire strategy sketches. Actual/exact locations of the visual alert devices are design & build item by the Fire Alarm Contractor and shall comply with NZS 4512.

1.1.4 The fire alarm system is to be connected to the fire brigade monitoring system and Theatre Facilities Management team.

1.1.5 The fire alarm/sprinkler system is to be designed with zoning. A minimum of two fire alarm/sprinkler zones shall be provided – (1) Theatre firecell zone and (2) Remainder of the building firecells zone. Indicative zoning is shown on the attached sketches.

1.1.6 The proposed location for the indicator panel, sprinkler and hydrant inlets are expected to be on Sapper-Moore Jones Place, indicated in the fire strategy sketches. Access to the indicator panel shall be available at all times and not obstructed by security gates or similar.

> This is to be confirmed and agreed with the local Fire and Emergency NZ operations personnel.

1.1.7 Duct smoke detectors will be required to support the prevention of the recirculation of smoke through an air handling system to different firecells. The control and output from the self-contained duct detection system shall comply with AS/NZS 1668.1:1998, so that, upon activation, the associated ventilation and air handling system is to shut down. This requirement does not extend to kitchen extract.

1.1.8 Smoke detectors must be provided with functionality to signal for the release of electromagnetic hold open devices, at least one detector shall be located within 1.5 m in plan, on both sides of the magnetically held open doors.

1.1.9 Smoke detection is required within the theatre for quick response and activation of fire safety systems.

> The theatre smoke detection system will need to avoid nuisance alarms considering the use of performance items such as theatrical smoke and fire. Potential solutions might involve different alarm modes for management with varying sensitivity or multi-criteria systems.

1.2 Sprinkler System Requirements

1.2.1 A new automatic fire sprinkler system is required to be installed throughout the building in accordance with NZS 4541:2013 with the amendments outlined in Appendix B of C/AS1 to C/AS/6.

1.2.2 The proposed position of the Fire Service inlets is as indicated in the fire strategy sketches. The inlets are intended to be within 5 m of the fire indicator panel.

1.2.3 The sprinklers are to have the following operational characteristics in the designated locations:

- Unless noted below all sprinklers are to be quick response (RTI ≤ 50), with an activation temperature (T_{act}) of 68 °C. Any concealed heads must also meet these parameters.
- In plant rooms, store rooms, rubbish handling, storage rooms: provide sprinklers with standard response and T_{act} being 68 °C.

1.2.4 A Class C water supply is to be provided, in accordance with NZS 4541:2013.

1.2.5 The sprinkler system may be compromised when the acoustic ceiling is in place within the flytower. The Fire Protection designer will need to propose an alternative solution for compliance, to be coordinated with the fire engineering design.

1.3 Fire Alarm System Interface Requirements

1.3.1 The functional automatic interfaces to other services following an automatic alarm are summarised in a draft alarm matrix in Appendix A.

1.3.2 As good practice as opposed to strict NZBC compliance, provide an interface from fire alarm system so that in the event of fire alarm activation, the main house lights are switched on to full illumination and the volume of event sound is immediately reduced to less than 30 dBA. These actions provide illumination of the escape route and allow occupants to hear the emergency warning system and instructions from event management. Such interface shall be provided to the Theatre only.

1.3.3 Any components within the Theatre firecell that are required to interface with fire alarm system (i.e. scene dock non-lacthing, non-alerting smoke detector) shall be provided with controls within the Stage Manager's Panel.

1.3.4 In addition to direct interface from the fire alarm system, in two locations (Stage Manager Space and Control Room) where staff will be present during events, provide additional emergency push button (manual call point) with frangible cover switches.

> Activation of manual call point is to provide direct interface to the control for the main building lighting and "event sound" so that on manual activation of these switches, the house lighting and sound systems perform as described above. These switches are may be provided with alarmed lift up covers. It is acknowledged that not all sound systems can be isolated by this mechanism. In such cases, a management system must be in place to achieve a reduction in ambient sound levels.

1.4 Hydrants

1.4.1 The internal charged fire hydrant riser is proposed to be located in the Western fire protected stair as shown on the attached sketches. The hydrant is to be installed in in accordance with NZS 4510:2008.

1.5 First Aid Firefighting Equipment

1.5.1 Portable hand held extinguishers to NZS 4503:2005 and AS 1221:1997 as appropriate, are to be provided throughout the building.

1.5.2 We recommend providing portable hand held extinguishers within all transformer rooms, electrical switch rooms, electrical distribution boards and control rooms.

2 ARCHITECTURAL

2.1 Internal Passive Fire and Smoke Separations

2.1.1 Fire resistant construction is given a **XX/XX/XX Sm** designation which represents the fire resistance rating performance. The 3 numbers representing **stability/integrity/insulation** values in minutes when tested to AS 1530.4.

2.1.2 Assemblies of construction to achieve the fire resistance rating performance must be tested in accordance with AS 1530.4:2005, or NZS/BS 476:1987 Parts 21 and 22, or EN 1363 Part 1:1999.

2.1.3 Firecells are as indicated in the fire strategy sketches. The firecells are generally described as:

- Theatre
- Surrounding foyer areas
- Supporting areas and areas with higher fire load

2.1.4 Internal fire separations are as indicated in the fire strategy sketches.

2.1.5 Unless noted otherwise, fire resistant construction shall provide two-way fire resistance rating. Floors need only provide a one-way fire resistance rating from the underside, with the applicable rating being that of the firecell below.

2.1.6 Full floors as horizontal fire separations and their support structure (defined by the structural engineer) shall achieve a fire resistance rating of (60)/60/60 SM and 60/-/- for the supporting structure, except where noted otherwise on the attached sketches.

Any normally occupied floor requires a fire resistant rating. This will typically include balconies.

2.1.7 Each intermediate floor level and its support structure (defined by the structural engineer) is required to achieve a fire resistance rating of not less than (30)/30/30 SM and 30/-/- for the supporting structure.

2.1.8 Vertical risers within the building are required to be either enclosed with two-way fire rated constructions that achieve a FRR of no less than that identified in the fire strategy sketches as a vertical shaft, or are to be fire separated at each floor level with materials which achieve a FRR of no less than the nominated floor fire separations.

2.1.9 Vertical fire separations are required to be continuous from the ground or floor slab below, to either:

- the underside of the fire rated floor slab above, or
- the fire rated ceiling above, or
- underside of the roofing material.

2.1.10 The horizontal fire separations which separate firecells, are required to extend to the inside face of the external cladding material.

2.1.11 Windows in the fire separations are required to be certified fire rated windows complying with NZS 4232.2:1998 that achieve an FRR of no less than that as indicated in the fire strategy sketches.

2.1.12 The nominated fire rating for glazing elements need not have the insulation criteria applied.

2.1.13 Any new smoke separation as indicated in the fire strategy sketches shall achieve the performance with the construction/materials meeting the following:

1. Be a smoke barrier complying with BS EN 12101 Part 1:2005, or
2. Consist of rigid building elements capable of resisting without collapse:
   a. a horizontal pressure of 0.1 kPa applied from either side, and
   b. self-weight plus the intended vertically applied live loads; and
3. Form an imperforate barrier to the spread of smoke, and
4. Be constructed of non-combustible materials or achieve a fire resistance rating of (10)/10/-sm, except that non-fire resisting glazing may be used if it is toughened or laminated safety glass.

2.1.14 Where glazing is used to provide a smoke separation the glazing is required to be fixed (non-openable).

2.2 Automatic Fire Curtains

Fire curtains may be proposed to separate the foyer areas to minimise exposure of occupants to a fire originating in the surrounding fire cell. This intends to reduce the required smoke control within these areas as the geometry is challenging for effective smoke control.

2.2.1 Fire curtains/shutters are required to comply with AS 1530.4:2005 and AS 1905.2:2005. The required performance and locations of the curtains are identified in the fire strategy sketches.

2.2.2 The nominated fire rating for the curtains need not have the insulation criteria.

2.2.3 Initiation of the system shall be as per the fire alarm matrix.

2.3 Automatic Smoke Curtains

Smoke curtains may be proposed within the theatre at ceiling level to support the active smoke control in maintaining tenability. Drops are expected to be 2-3 m from ceiling level, for the width of the auditorium. Refer to attached fire engineering sketches.

2.3.1 Smoke curtains are required to comply with BS EN12101-1:2005+A1:2006 "Smoke and Heat Control Systems. Specification for smoke Barriers", BS 476.6 and BS 476.7 (being able to withstand 600°C for 30 minutes) and are to be installed in accordance with the manufacturer's instructions.

2.3.2 Initiation of the system shall be as per the fire alarm matrix.

2.4 External Passive Fire Separations

2.4.1 No external passive fire separations are required.

2.5 Fire/Smoke Doors, Panels and Hatches

2.5.1 All doors within fire separations (excluding lift landing doors) are required to be certified fire rated door-sets complying with NZS 4520:2010 that achieve a FRR of no less than -/XX/XX, where XX is the fire resistance rating of the separation the door is to be installed within.

Fire doors are to include self-closers and smoke seals to the top and both side edges of the door leaf or the door frame (and in the latter option, where the door is multi-leave smoke seals are also to be provided at the meeting stile).

2.5.2 A fire door may have a vision panel of no greater than 65,000 mm^2 using non insulated glass.

2.5.3 Lift landing doors within fire separations are required to achieve a FRR of no less than -/XX/- or as noted on the fire strategy sketches with the explicit note that they need only achieve integrity rating. The doors shall be certified as a one way fire rating from the landing side to the shaft.

2.5.4 All access panels or hatches within fire separations are required to be certified to AS 1530.4:2005 to achieve a FRR of no less than -/XX/XX, where XX is the fire resistance rating of the separation where the hatch is to be installed within.

2.5.5 All doors in smoke separations as indicated in the fire strategy sketches shall meet the required performance with the construction/materials meeting the following:

1. Be constructed of non-combustible materials or achieve a fire resistance rating of (10)/10/-sm, except that non-fire resisting glazing may be used if it is toughened or laminated safety glass.
2. Where constructed of solid core leaves be no less than 35 mm in thickness.
3. Provided with smoke seals which are in continuous contact with the mating element, and located to minimise interruption of hardware.
4. Have frames constructed of non-combustible materials such as aluminium or steel or alternatively, have frames constructed of timber and jambs of no less than 30 mm thickness.
5. Have maximum average clearances (excluding pre-easing) of 3 mm between leaf to frame, 5 mm leaf to leaf, and 10 mm leaf to top of any floor covering.
6. Be fitted with door closers.
7. If vision panels present, no then the cutout no closer than 150 mm from the leaf edges.

2.5.6 Electromagnetic Hold Open Devices including associated smoke detection devices shall be provided at locations as identified in the fire strategy sketches. They are to be installed to BS 7273.4:2007, or EN 1155:1997.

2.6 Closures and Penetrations in Fire and/or Smoke Separations

2.6.1 All penetrations through fire separations (created by wires, cables, pipes, flush boxes, etc.) or any gaps, or control joints, that are created or uncovered as part of these works are required to be fire stopped with systems (collars, wraps, sleeves, mastics, etc.) that are approved for the proposed use (e.g. rating, orientation, penetration type, construction type) in accordance with AS 1530.4 2005 and AS 4072.1:2005. Where fire stopping systems to AS 4072.1 :2005 are not able to be provided, it is acceptable to incorporate systems tested to BS EN 1366.3:2009, or UL 1479. Fire stopping systems are required to be installed strictly in accordance with the manufacturer's instructions. To be coordinated with the Passive Fire Designer.

2.6.2 Penetrations shall be supported to resist movement or collapse during fire. Supports shall not prevent normal expansion and contraction of the penetration.

2.6.3 Kitchen extract ducts that would penetrate fire barriers, shall either be contained within their own fire rated service riser shaft (two-way (60)/60/60 sm FRR) or may be within a shared fire rated service riser, but be wrapped in fire rated product that achieves a two-way fire rating of not less than -/60/60 sm. To be coordinated with Mechanical.

2.7 Theatre Seating Requirements

2.7.1 The aisles shall have a minimum clear width of 1500 mm.

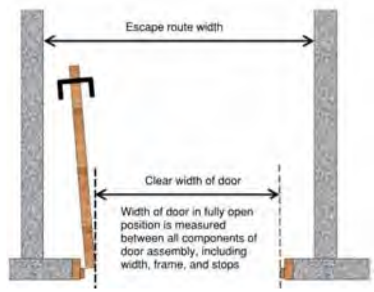
2.7.2 For the fixed seating, the distance between the back of seat to the back of seat shall be a minimum of 760mm, where arms are provided, the seat walkway width must be at least 500 mm.

2.8 Escape Route Requirements

2.8.1 Escape routes which are enclosed by fire rated separations are **exitways.**

2.8.2 Horizontal and Vertical escape routes are to have minimum clear widths as identified in the fire safety sketches.

2.8.3 Clear widths of doors shall be measured taking into account the door frame and the width of the door. Door hardware is not permitted to intrude into this minimum clear width of doorway.



2.8.4 The clear height of escape routes shall be no less than 2100 mm across the full width (except for isolated ceiling fittings less than 200 mm in diameter, which may project downwards to reduce this clearance by no more than 100 mm).

2.8.5 On Level -1 and Level -2, as identified in the attached fire strategy sketches, keep clear painting on floors are recommended.

One method is yellow hatching in accordance with AS 1319:1994 Table A1.

2.9 Doors on Escape Routes

2.9.1 Doors on escape routes serving more than 50 must swing in the direction of escape.

2.9.2 All doors on escape routes shall have a clear height of no less than 1955 mm for the required width of the opening, open onto a level floor area on both sides of the door, and where side hinged shall open no less than 90° and the door swing shall not reduce the width of any escape route.

2.9.3 For means of escape provisions, all manually operated doors on escape routes shall have door handles complying with D1/AS1 and door opening forces that do not exceed 67 N to release the latch, 133 N to set the door in motion, and 67 N to open the door to the minimum required width.

2.9.4 Automatic sliding doors on escape routes are required on malfunction or power failure to automatically slide open and remain open or be readily pushed to the outward open position by the building occupants in an emergency.

Alternatively, sliding doors may be provided with battery backup (rated for a period of no less than 60 minutes) which allows them to function normally.

2.9.5 Doors which open into a stair must swing into the stair. The final exit for the stair must swing outwards in the direction of escape.

2.9.6 Vision panels are to be provided to the doors as noted on the fire strategy sketches:

- into exitways where the door serves more than 10 persons
- in corridors along an escape route
- that swing in two directions.

2.9.7 All locking devices on doors on escape routes shall be clearly visible, located where such a device would normally be expected, designed to be easily operated without a key or other implement and allow the door to open in a normal manner.

2.9.8 All electronic locking devices on doors on escape routes shall either act under free handle or be fitted with a push button or switch that is fail safe (i.e. independent of any BMS or Security [illegible] door to be opened.

2.9.9 Crash bars are required to doors on escape routes as identified in the fire strategy sketches. The associated actuating portion shall consist of a horizontal bar that is not less than half the width of the escape route door leaf and be located between 800 mm and 1200 mm above the floor. The horizontal force is not to exceed 67 N and the door lock is to release allowing the door to swing freely.

Crash bars are not required where the mechanism on the egress door is such that it demonstrates a simple push to open without operating a latching mechanism.

2.10 Control of Internal Hazards Including Surface Finish Requirements

2.10.1 All fixed retractable seating throughout the Performance Centre must demonstrate a “pass” with respect to BS5852 Source 5 testing protocol.

2.10.2 Internal surface finishes shall meet the following early fire hazard indices limitations (when tested to ISO 9705:1993 as per C/VM2 Clause A1.2, or ISO 5660:2002 as per C/VM2 Clause A1.3). Refer to Clause **Error! Reference source not found.** for exceptions.

Table 1: Group Number limitations

Building Elements	Location	Maximum Material Group
Ceilings and walls	Exitways	1 or 2
Ceilings	Public accessible spaces	1 or 2
Walls	Public accessible spaces	1, 2 or 3
Ceilings and walls	All other occupied spaces	1, 2 or 3
HVAC ducts	Internal surfaces	1 or 2
	External surfaces	1, 2 or 3
Acoustic treatment and pipe insulation	Within air handling plenum	3

2.10.3 Note surface finish controls do not apply to:

- Small areas of non-conforming product within a space with a total aggregate surface area not more than 5.0 m^2.
- Electrical switches, outlets, cover plates and similar small discontinuous areas.
- Pipes and cables used to distribute power or services.
- Handrails and general decorative trim of any material such as architraves, skirtings and window components including reveals, provided these do not exceed 5% of the surface area of the wall or ceiling to which it is attached.
- Damp-proof courses, seals, caulking, flashings, thermal breaks and ground moisture barriers.
- Timber joinery and structural timber building elements constructed from solid wood, glulam or laminated veneer lumber. This includes heavy timber columns, beams, portals and shear walls not more than 3.0 m wide, but does not include exposed timber panels or permanent formwork on the underside of floor/ceiling systems.
- Individual doorsets.
- Continuous areas of permanently installed openable wall partitions not more than 3.0 m high and having a surface area of not more than 25% of the divided room floor area or 5.0 m^2, whichever is less.

2.10.4 Any foamed plastic building materials or exposed combustible insulating materials forming part of a wall, ceiling or roof system are required to have a completed system (foamed plastic and/or foamed plastic plus a surface lining) meeting the above maximum material group number as applicable for the location of this building material. In addition, the foamed plastic is to meet the flame propagation criteria as specified in latest versions of AS 1366. It is strongly recommended that foamed plastic materials are not used. No foamed plastics are proposed for use.

2.10.5 Flooring shall meet the following critical radiant flux limitations (when tested to ISO 9239-1:2010).

Table 2: Critical flux limitations for flooring.

Area of Building	Minimum Critical Radiant Flux [kW/m^2]
Exitways	2.2
All other spaces	1.2

2.10.6 Suspended flexible fabrics shall have a Flammability Index of not greater than 12 (when tested to AS 1530.2).

2.10.7 Flexible fabrics used as underlay to roofing or exterior cladding that are exposed to view, shall have a flammability index of no greater than 5 (when tested to NZS/AS 1530.2:1993).

2.11 Control of External Surface Finish Requirements

2.11.1 There are no fire limitations on external surface finishes.

3 MECHANICAL

3.1 General

3.1.1 Air ducts passing through exitways shall not include combustible materials.

3.1.2 Fire dampers are required to be installed where HVAC ductwork penetrates through fire separations. Dampers are to be installed in accordance with AS 1682.2:1990 and the manufacturer's instructions.

> Ducts which penetrate fire separations requiring fire dampers may be a fusible link or equivalent mechanical activation. However, it is recommended a back-flow prevention device is included – to be coordinated with the Fire Engineer.

3.1.3 Where HVAC ductwork penetrates through fire separations that protect exitways, Fire/Smoke motorised dampers are to be installed in accordance with AS 1682.2:1990 and the manufacturer's instructions.

3.1.4 Kitchen extract ducts that would penetrate fire barriers, shall either be contained within their own fire rated service riser shaft (two-way (60)/60/60 sm FRR) or may be within a shared fire rated service riser, but be wrapped in fire rated product that achieves a two-way fire rating of not less than -/60/60 sm.

3.1.5 Duct smoke detectors will be required to support the prevention of the recirculation of smoke through an air handling system to different firecells. The control and output from the self-contained duct detection system shall comply with AS/NZS 1668.1:1998, so that, upon activation, the associated ventilation and air handling system is to shut down. This requirement does not extend to kitchen extract.

3.2 Mechanical Smoke Exhaust System

3.2.1 Mechanical smoke extract is required as indicated in the fire strategy sketches to achieve **120 m^3/s** of smoke extract from the theatre firecell. The system components and controls are to be designed and installed generally in accordance with AS/NZS 1668.1:2015 and AS 1670.1:2015, and to be coordinated with the Fire Engineering smoke control modelling.

3.2.2 Smoke exhaust outlets are to be designed and arranged so as to prevent plug-holing wherever possible. To be coordinated with Fire Engineering smoke control modelling.

3.2.3 Smoke control fans are to be temperature rated in accordance with AS/NZS 1668.1:2015.

3.2.4 Make up air is to be provided mechanically (no more than 80%) at low level with the remainder being available to be drawn from ambient. The system components and controls are to be designed and installed generally in accordance with AS/NZS 1668.1:2015 and AS 1670.1:2015.

3.2.5 Make up air velocities are to be minimised at the outlet.

> Prescribed solutions require less than 1 m/s, but specific design might allow slightly greater velocities. To be coordinated with Fire Engineering smoke control modelling.

3.2.6 A fire fans control panel is required to be design and installed in accordance with AS 1670.1:2015. The fire fan control panel is to be co-located with the primary fire alarm panel.

3.2.7 Any control systems related to the mechanical smoke exhaust system (including inlet systems) shall be wired with fire rated cabling.

3.3 Natural Ventilation

3.3.1 Effective natural venting shall be provided within the Eastern public foyer, as indicated in the fire strategy sketches to achieve **100 m^2** of free area. The system components and controls are to be designed and installed in accordance with AS/NZS 1668.1:2015 and AS 1670.1:2015.

> Natural venting can be achieved via passive openings or actuated louvres which open upon fire alarm activation.

3.3.2 Where free area is provided by perforated screens, the minimum opening percentage of any section of the panel is to be 40%.

3.3.3 Make up air shall be provided at low level using external doors which are mechanically opened upon fire alarm signal. The system components and controls are to be designed and installed in accordance with AS/NZS 1668.1:2015 and AS 1670.1:2015.

3.3.4 Any control systems related to natural ventilation smoke control shall be wired with fire rated cabling.

4 ELECTRICAL

4.1 Lighting and Signage

4.1.1 Emergency lighting is required to be installed throughout the building including associated external escape routes to a safe place, in accordance with F6. Refer to attached fire safety sketches for escape routes and safe places/final exit .

4.1.2 Fire egress times require emergency lighting for at least 60 minutes.

4.1.3 Emergency exit signage is required to be installed throughout the building and associated external escape routes to a safe place, in accordance with F8.

4.1.4 Exit signage type is to be consistent throughout the building.

4.1.5 Signage for the fire related (manual call points etc) safety features is required to be installed throughout the building in accordance with F8.

4.1.6 As good practice as opposed to strict NZBC compliance, provide an interface from fire alarm system so that in the event of fire alarm activation, the main house lights are switched on to full illumination and the volume of event sound is immediately reduced to less than 30 dBA. These actions provide illumination of the escape route and allow occupants to hear the emergency warning system and instructions from event management. Such interface shall be provided to the Theatre. Refer to draft alarm matrix in Appendix A.

4.2 Escape routes

4.2.1 Where required by the architect, automatic sliding doors which rely on powered function during egress must be provided with battery backup which allows normal operation for at least 60 minutes.

4.2.2 All electronic locking devices on doors on escape routes shall either act under free handle or be fitted with a push button or switch that is fail safe (i.e. independent of any BMS or Security System). The operation must be such that it releases the lock and allows the door to be opened.

4.3 Passive Fire Stopping

4.3.1 Any switches or other electrical fittings in fire separations are to have steel flush boxes and be specified to be fitted with intumescent pads, or equivalent. To be coordinated with the Passive Fire designer.

5 STRUCTURAL

5.1 Structural Fire Resistance

5.1.1 The Structural Engineer is required to identify the *primary elements* that provide support to the fire rated construction. The primary elements shall either:

1. Inherently achieve the structural adequacy, integrity, and insulation component of the fire rating as appropriate, or
2. Have applied treatment or fire protection to achieve the adequacy component of the fire rating as appropriate.

5.1.2 Primary elements are required to achieve a fire resistance rating for structural adequacy of not less than the fire rated construction elements they support. The separation elements are identified in the fire strategy sketches and in the body of the fire strategy.

Note that as an occupied floor the forestage lift pit structure will require fire resistance rating, or specific design.

5.1.3 Fire rated construction that are for protection of fire spread to other properties (i.e. external walls, internal building elements separating different titles) shall achieve structural *stability* during and post fire.

5.1.4 Consider providing structural stability of 30/-/- for the raked seating platforms within the theatre where large numbers of people are supported on elevations greater than 1m in height.

6 CIVIL AND TRAFFIC

6.1 Fire and Emergency NZ Access

6.1.1 FENZ vehicle appliance access is required to the FENZ attendance point within the site boundary (as distinct from a location on a street frontage). The associated pavements for vehicle access situated on the property which provide vehicular access by fire appliances shall:

- The positions shall provide access to within 20 m of the firefighter access into the building and any associated inlets.
- Be able to withstand a laden weight of up to 25 tonnes with an axle load of 8 tonnes or, have a load bearing capacity of no less than the public roadway serving the property, whichever is the lower, and
- Be trafficable in all weathers, and
- Have a minimum width of 4.0 m, and
- Provide a clear passageway of no less than 3.5 m in width and 4.0 m in height at site entrances, internal entrances and between buildings, and

Fire and Emergency Access is expected to be on Sapper Moore-Jones Place and Victoria Street.

7 PROJECT MANAGER

7.1 Construction Management

7.1.1 It is required that a specialist installer of fire-stopping materials provides a Producer Statement – Construction (acceptable to the Building Consent Authority), certifying that penetrations in fire separations have been correctly identified, stopped and sealed in accordance with the fire-stopping material manufacturer's requirements.

The contractor will be required to submit details of the proposed fire stopping systems for review, prior to installation on site. The details need to identify the system manufacturer/supplier and include certification of fire resistance rating in accordance with a relevant standard. Test data may be required to verify performance of these systems. Care should be taken to select and submit details that have been tested in the relevant wall/floor construction.

APPENDICES

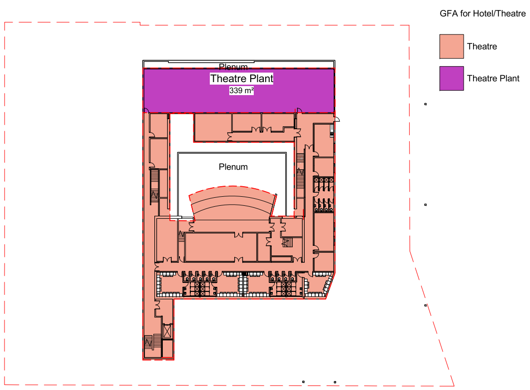
APPENDIX A - JASMAX DRAWINGS

8.0 Appendix

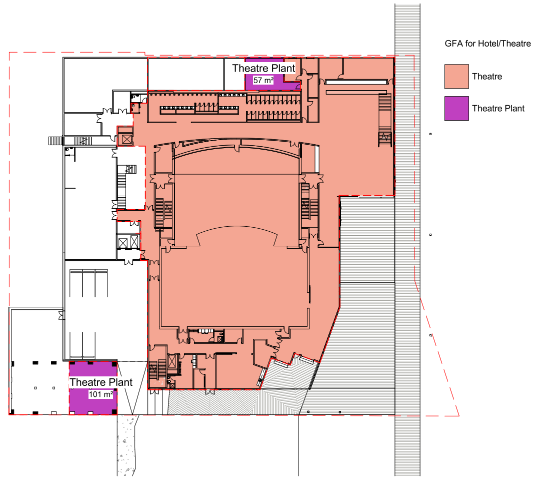
8.1 Area Schedule

The Preliminary Design Theatre GFA is 7120m^2

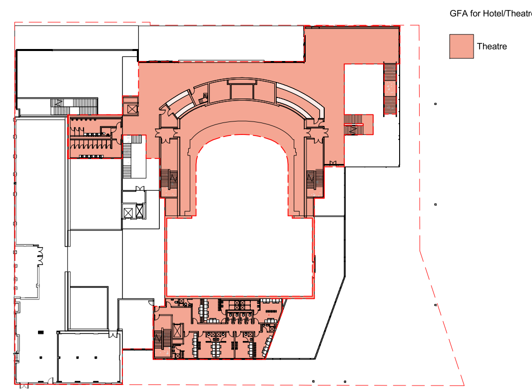
The Preliminary Design NLA is 6427m^2



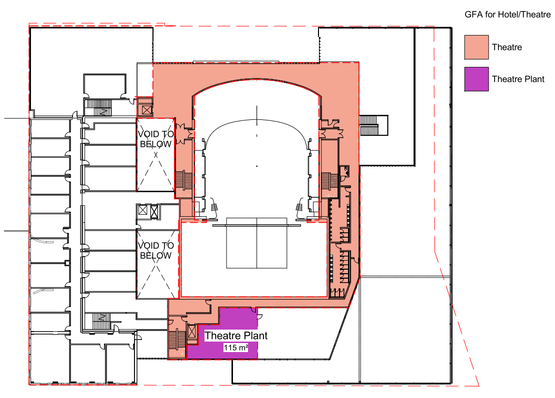
1 | 1 : 500 Plan Detail
RC-201 | SK-130 - GFA for Hotel/Theatre - Level -2 (Sub-stage)



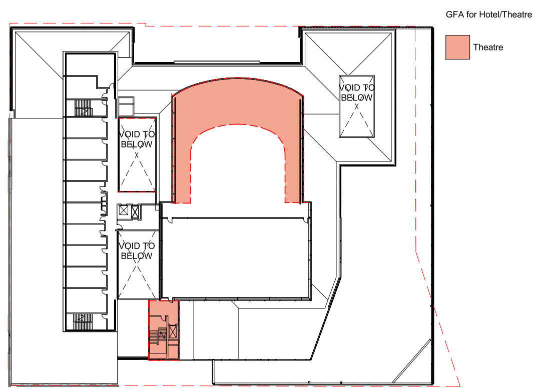
2 | 1 : 500 Plan Detail
RC-201 | SK-131 - GFA for Hotel/Theatre - Level -1 (Stalls)



3 | 1 : 500 Plan Detail
RC-201 | SK-132 - GFA for Hotel/Theatre - Level 1 (Circle)



4 | 1 : 500 Plan Detail
RC-201 | SK-133 - GFA for Hotel/Theatre - Level 2 (Balcony)



5 | 1 : 500 Plan Detail
RC-201 | SK-134 - GFA for Hotel/Theatre - Level 3 (Terrace)

(Theatre GFA - by Level) SPLIT

Name	Level	Area
Theatre	Level -2 - Sub-stage	1182.54 m^2
Theatre	Level -1 - Stalls	2600.86 m^2
Theatre	Level 1 - Circle	1502.58 m^2
Theatre	Level 2 - Balcony	800.61 m^2
Theatre	Level 3 - Terrace	421.77 m^2
Theatre: 7		6508.37 m^2
Theatre Plant	Level -2 - Sub-stage	339.37 m^2
Theatre Plant	Level -1 - Stalls	158.25 m^2
Theatre Plant	Level 2 - Balcony	114.94 m^2
Theatre Plant: 4		612.56 m^2
Grand total: 11		7120.93 m^2

(Theatre GFA - by Level)...

Level	Area
Level -2 - Sub-stage	1521.92 m^2
Level -1 - Stalls	2759.11 m^2
Level 1 - Circle	1502.58 m^2
Level 2 - Balcony	915.55 m^2
Level 3 - Terrace	421.77 m^2
	7120.93 m^2

WAIKATO REGIONAL THEATRE

JOB No. **216365.00**

ISSUE DATE: 19/07/2018 | DRAWING **GFA - Area Plans** | SCALE @ A1 **1 : 500** | DRAWING No. **SK-900** | REV. **B**

Jasmax

THEATRE SCHEDULE OF ACCOMODATION

PUBLIC AREAS

ROOM SCHEDULE - NET - FOYER

ROOM NAME	AREA	LEVEL	SUB CATEGORY
Foyer	419.97 m^2	Level 1 - Circle	Foyer
Foyer	307.77 m^2	Level 2 - Balcony	Foyer
Foyer	305.99 m^2	Level -1 - Stalls	Foyer
Foyer	1033.74 m^2		
Foyer	1033.74 m^2		

ROOM SCHEDULE - NET - PUBLIC AREAS

ROOM NAME	AREA	LEVEL	SUB CATEGORY
Balcony Bar	14.81 m^2	Level 2 - Balcony	Catering
Balcony Bar Store	4.76 m^2	Level 2 - Balcony	Catering
Cafe / Servery / Cafe Kitchen, Stores, Prep	42.94 m^2	Level -1 - Stalls	Catering
Central Bar Store	20.17 m^2	Level -1 - Stalls	Catering
Circle Bar	36.45 m^2	Level 1 - Circle	Catering
Circle Bar Store	5.09 m^2	Level 1 - Circle	Catering
Stalls Bar & Store	39.68 m^2	Level -1 - Stalls	Catering
Catering	163.90 m^2		
FOH Store	9.07 m^2	Level -1 - Stalls	FOH Services
Foyer Furniture Store	19.27 m^2	Level -1 - Stalls	FOH Services
House Manager	14.38 m^2	Level -1 - Stalls	FOH Services
Ice Cream & Programme Store	9.20 m^2	Level -1 - Stalls	FOH Services
Usher Changing Area	9.72 m^2	Level -1 - Stalls	FOH Services
FOH Services	61.63 m^2		
Cloak/First Aid	19.32 m^2	Level -1 - Stalls	Foyer
Foyer	19.32 m^2		
Acc WC	3.12 m^2	Level -1 - Stalls	Public Toilets
Acc WC	3.04 m^2	Level 2 - Balcony	Public Toilets
Balcony Mens WC	36.33 m^2	Level 2 - Balcony	Public Toilets
Balcony Womens WC	35.23 m^2	Level 2 - Balcony	Public Toilets
Circle Mens WC	30.00 m^2	Level 1 - Circle	Public Toilets
Circle Womens WC	35.54 m^2	Level 1 - Circle	Public Toilets
Stalls Mens WC	53.72 m^2	Level -1 - Stalls	Public Toilets
Stalls Womens WC	85.25 m^2	Level -1 - Stalls	Public Toilets
Public Toilets	282.23 m^2		
Shop / Merch / Confectionary	8.08 m^2	Level 1 - Circle	Retail
Retail	8.08 m^2		
Box Office	8.79 m^2	Level 1 - Circle	Ticketing
Box Office Manager	10.78 m^2	Level 1 - Circle	Ticketing
Ticketing	19.57 m^2		
Public	554.73 m^2		

THEATRE OPPERATIONS

ROOM SCHEDULE - NET - AUDITORIUM

ROOM NAME	AREA	LEVEL	SUB CATEGORY
Circle	265.75 m^2	Level 1 - Circle	Auditorium
Balcony	319.42 m^2	Level 3 - Terrace	Auditorium
Stalls	471.29 m^2	Level -1 - Stalls	Auditorium
Auditorium	1056.46 m^2		
Bin Store	15.86 m^2	Level -1 - Stalls	Get-in
Scene Dock	96.73 m^2	Level -1 - Stalls	Get-in
Get-in	112.59 m^2		
Trap Room	79.22 m^2	Level -2 - Sub-stage	Stage
Stage	454.50 m^2	Level -1 - Stalls	Stage
Stage	533.72 m^2		
Crew Unisex WC + Showers	26.45 m^2	Level -2 - Sub-stage	Sub-Stage Toilets
Sub-Stage Toilets	26.45 m^2		
Storage	20.58 m^2	Level -2 - Sub-stage	Technical Accom.
Instr. Store	14.11 m^2	Level -2 - Sub-stage	Technical Accom.
General Store / Drape Store	40.00 m^2	Level -2 - Sub-stage	Technical Accom.
AV and LX WS	19.69 m^2	Level -2 - Sub-stage	Technical Accom.
Maintenance WS	20.29 m^2	Level -2 - Sub-stage	Technical Accom.
Piano Store	14.97 m^2	Level -2 - Sub-stage	Technical Accom.
Technical Accom.	129.64 m^2		
Auditorium / Stage	1858.86 m^2		

ROOM SCHEDULE - NET - TECHNICAL AREAS

ROOM NAME	AREA	LEVEL	SUB CATEGORY
Audio Rack	18.28 m^2	Level -1 - Stalls	Technical Areas
Control Room	56.73 m^2	Level 1 - Circle	Technical Areas
Dimmer	23.57 m^2	Level 2 - Balcony	Technical Areas
Follow Spot	6.22 m^2	Level 4 - Bridge	Technical Areas
Technical Areas	104.79 m^2		
Technical Areas	104.79 m^2		

ROOM SCHEDULE - NET - PERFORMER AREAS

ROOM NAME	AREA	LEVEL	SUB CATEGORY
Chorus DR	25.23 m^2	Level -2 - Sub-stage	Dressing Rooms
Chorus DR	24.74 m^2	Level -2 - Sub-stage	Dressing Rooms
Chorus DR	24.74 m^2	Level -2 - Sub-stage	Dressing Rooms
Chorus DR	24.36 m^2	Level -2 - Sub-stage	Dressing Rooms
DR2	13.51 m^2	Level 1 - Circle	Dressing Rooms
DR2 (Acc.)	17.18 m^2	Level -1 - Stalls	Dressing Rooms
DR4	20.11 m^2	Level 1 - Circle	Dressing Rooms
DR4	18.96 m^2	Level 1 - Circle	Dressing Rooms
DR6	30.38 m^2	Level 1 - Circle	Dressing Rooms
DR6	25.51 m^2	Level 1 - Circle	Dressing Rooms
Musician / Band	29.81 m^2	Level -2 - Sub-stage	Dressing Rooms
Shower	10.80 m^2	Level -2 - Sub-stage	Dressing Rooms
Shower	8.62 m^2	Level -2 - Sub-stage	Dressing Rooms
Shower	8.62 m^2	Level -2 - Sub-stage	Dressing Rooms
Shower	8.62 m^2	Level -2 - Sub-stage	Dressing Rooms
STAR	18.00 m^2	Level 1 - Circle	Dressing Rooms
STAR	18.00 m^2	Level 1 - Circle	Dressing Rooms
STAR	17.96 m^2	Level 1 - Circle	Dressing Rooms
Star / Conductor DR	26.31 m^2	Level -1 - Stalls	Dressing Rooms
WC	1.96 m^2	Level -2 - Sub-stage	Dressing Rooms
WC	1.96 m^2	Level -2 - Sub-stage	Dressing Rooms
WC	1.96 m^2	Level -2 - Sub-stage	Dressing Rooms
WC	1.96 m^2	Level -2 - Sub-stage	Dressing Rooms
WC	1.96 m^2	Level -2 - Sub-stage	Dressing Rooms
WC	1.96 m^2	Level -2 - Sub-stage	Dressing Rooms
WC	1.96 m^2	Level -2 - Sub-stage	Dressing Rooms
WC	1.96 m^2	Level -2 - Sub-stage	Dressing Rooms
WC	1.96 m^2	Level -2 - Sub-stage	Dressing Rooms
WC	9.66 m^2	Level 1 - Circle	Dressing Rooms
WC	3.74 m^2	Level 1 - Circle	Dressing Rooms
Dressing Rooms	402.55 m^2		
Greenroom	58.12 m^2	Level -1 - Stalls	Support Accomodation
Wardrobe / Laundry	35.27 m^2	Level -2 - Sub-stage	Support Accomodation
Wigs	14.82 m^2	Level -2 - Sub-stage	Support Accomodation
Support Accomodation	108.21 m^2		
Performer Areas	510.76 m^2		

ROOM SCHEDULE - NET - ADMIN/ STAFF

ROOM NAME	AREA	LEVEL	SUB CATEGORY
Crew	25.27 m^2	Level -2 - Sub-stage	Admin/ Staff Rooms
IT/Comms	16.47 m^2	Level -2 - Sub-stage	Admin/ Staff Rooms
Tech Office	14.53 m^2	Level -2 - Sub-stage	Admin/ Staff Rooms
Visiting Office	9.29 m^2	Level -1 - Stalls	Admin/ Staff Rooms
Admin/ Staff Rooms	65.56 m^2		
Stage Door	7.88 m^2	Level -1 - Stalls	Stage Door
Waiting	3.89 m^2	Level -1 - Stalls	Stage Door
Stage Door	11.77 m^2		
Admin / Staff	77.33 m^2		

THEATRE GROSS AREAS

ROOM SCHEDULE - NET - THEATRE GROSS

ROOM NAME	AREA	LEVEL	SUB CATEGORY
Closet	3.58 m^2	Level -2 - Sub-stage	Theatre Circulation - BOH
Theatre Circulation	107.14 m^2	Level -2 - Sub-stage	Theatre Circulation - BOH
Theatre Circulation	14.48 m^2	Level -2 - Sub-stage	Theatre Circulation - BOH
Theatre Circulation	138.80 m^2	Level -2 - Sub-stage	Theatre Circulation - BOH
Theatre Circulation	23.81 m^2	Level -2 - Sub-stage	Theatre Circulation - BOH
Theatre Circulation	18.12 m^2	Level -1 - Stalls	Theatre Circulation - BOH
Theatre Circulation	41.33 m^2	Level -2 - Sub-stage	Theatre Circulation - BOH
Theatre Circulation	31.96 m^2	Level -2 - Sub-stage	Theatre Circulation - BOH
Theatre Circulation	13.73 m^2	Level -2 - Sub-stage	Theatre Circulation - BOH
Theatre Circulation	20.70 m^2	Level 3 - Terrace	Theatre Circulation - BOH
Theatre Circulation	40.30 m^2	Level 1 - Circle	Theatre Circulation - BOH
Theatre Circulation	14.06 m^2	Level -1 - Stalls	Theatre Circulation - BOH
Theatre Circulation	149.37 m^2	Level -1 - Stalls	Theatre Circulation - BOH
Theatre Circulation	54.14 m^2	Level -1 - Stalls	Theatre Circulation - BOH
Theatre Circulation	69.78 m^2	Level 2 - Balcony	Theatre Circulation - BOH
Theatre Circulation	11.42 m^2	Level -1 - Stalls	Theatre Circulation - BOH
Theatre Lift	5.83 m^2	Level -1 - Stalls	Theatre Circulation - BOH
Theatre Lift	5.83 m^2	Level 2 - Balcony	Theatre Circulation - BOH
Theatre Lift	5.83 m^2	Level 3 - Terrace	Theatre Circulation - BOH
Theatre Lift	5.83 m^2	Level -2 - Sub-stage	Theatre Circulation - BOH
Theatre Lift	5.83 m^2	Level 1 - Circle	Theatre Circulation - BOH
Theatre Stair	28.87 m^2	Level -1 - Stalls	Theatre Circulation - BOH
Theatre Stair	28.93 m^2	Level 2 - Balcony	Theatre Circulation - BOH
Theatre Stair	28.25 m^2	Level 3 - Terrace	Theatre Circulation - BOH
Theatre Stair	29.23 m^2	Level 1 - Circle	Theatre Circulation - BOH
Theatre Circulation - BOH	897.14 m^2		
Foyer Stair	24.12 m^2	Level 1 - Circle	Theatre Circulation - FOH
Theatre Circulation	6.60 m^2	Level -1 - Stalls	Theatre Circulation - FOH
Theatre Circulation	181.53 m^2	Level -1 - Stalls	Theatre Circulation - FOH
Theatre Circulation	6.60 m^2	Level -1 - Stalls	Theatre Circulation - FOH
Theatre Circulation	39.08 m^2	Level -1 - Stalls	Theatre Circulation - FOH
Theatre Circulation	34.42 m^2	Level 1 - Circle	Theatre Circulation - FOH
Theatre Circulation	6.60 m^2	Level 2 - Balcony	Theatre Circulation - FOH
Theatre Circulation	7.00 m^2	Level 2 - Balcony	Theatre Circulation - FOH
Theatre Circulation	3.33 m^2	Level -1 - Stalls	Theatre Circulation - FOH
Theatre Circulation	6.79 m^2	Level 1 - Circle	Theatre Circulation - FOH
Theatre Circulation	6.60 m^2	Level 1 - Circle	Theatre Circulation - FOH
Theatre Circulation	41.07 m^2	Level 2 - Balcony	Theatre Circulation - FOH
Theatre Lift	6.43 m^2	Level 2 - Balcony	Theatre Circulation - FOH
Theatre Lift	6.43 m^2	Level -1 - Stalls	Theatre Circulation - FOH
Theatre Lift	6.43 m^2	Level 1 - Circle	Theatre Circulation - FOH
Theatre Stair	27.90 m^2	Level -1 - Stalls	Theatre Circulation - FOH
Theatre Stair	31.54 m^2	Level -1 - Stalls	Theatre Circulation - FOH
Theatre Stair	38.06 m^2	Level 1 - Circle	Theatre Circulation - FOH
Theatre Stair	38.06 m^2	Level 2 - Balcony	Theatre Circulation - FOH
Theatre Stair	38.06 m^2	Level 1 - Circle	Theatre Circulation - FOH
Theatre Stair	40.37 m^2	Level 2 - Balcony	Theatre Circulation - FOH
Theatre Circulation - FOH	597.02 m^2		
Roof Plant	111.60 m^2	Level 2 - Balcony	Theatre Plant
Theatre Plant	328.19 m^2	Level -2 - Sub-stage	Theatre Plant
Theatre Plant	52.59 m^2	Level -1 - Stalls	Theatre Plant
Theatre Plant	492.37 m^2		
Theatre Gross	1986.53 m^2		

THEATRE / HOTEL SHARED AREAS

ROOM SCHEDULE - NET - SHARED THEATRE/ HOTEL

ROOM NAME	AREA	LEVEL	SUB CATEGORY
Conference/Sponsors	47.91 m^2	Level 1 - Circle	Break-out Spaces
Conference/Sponsors	118.24 m^2	Level 1 - Circle	Break-out Spaces
Education/Store	67.58 m^2	Level -1 - Stalls	Break-out Spaces
Family Room	5.04 m^2	Level -1 - Stalls	Break-out Spaces
Furniture Store	31.89 m^2	Level -1 - Stalls	Break-out Spaces
Pantry, Cloaks, Store	14.23 m^2	Level -1 - Stalls	Break-out Spaces
Break-out Spaces	284.89 m^2		
Catering Staff/Kitchen	60.73 m^2	Level 1 - Circle	Catering
Catering	60.73 m^2		
Hotel Circulation	59.20 m^2	Level -1 - Stalls	Hotel Circulation
Hotel Circulation	59.20 m^2		
Kitchenette/WC	16.30 m^2	Level -1 - Stalls	Support Accomodation
Rehearsal / Multi purpose	143.23 m^2	Level -1 - Stalls	Support Accomodation
Support Accomodation	159.53 m^2		
Theare Plant	169.34 m^2	Level -1 - Stalls	Theatre Plant
Theatre Plant	169.34 m^2		
Shared Hotel / Theatre	733.70 m^2		

PUBLIC AREAS AND THEATRE OPPERATIONS (NON GROSS AREAS) SUBTOTAL

NET ACCOMODATION SUBTOTAL 4440.92 m^2

THEATRE GROSS AREAS SUBTOTAL

GROSS AREAS SUBTOTAL 1986.53 m^2

THEATRE GRAND TOTAL (EXCLUDING SHARED SPACES)

GRAND TOTAL 6427.44 m^2

WAIKATO REGIONAL THEATRE

JOB No. **216365.00**

ISSUE DATE: 19/07/2018

DRAWING **Net Usable Area - By Department**

SCALE @ A1

DRAWING No. **SK-901** REV. **E**

Jasmax

8.0 Appendix

8.2 Occupancy Schedule

The maximum capacity of the auditorium is 1300 people.

The maximum capacity of F.O.H staff + B.O.H is 183 people. This figure includes capacity to the conference and sponsors facilities.

LEVEL	SPACE TYPE	AREA	OCCUPANT DENSITY	MAXIMUM OCCUPANCY
		m²	User / m²	Persons
SUB STAGE (LEVEL -2)	CIRCULATION	678	0	0
	OFFICES	40	0.1	4
	DRESSING ROOMS	167 48 seats	1 / seat	48
	BAND ROOM	30	0.5	15
	WORKSHOPS	40	0	0
	STORAGE	185	0	0
	LAUNDRY	35	0.2	7
	PLANT	345	0	0
	WC	44	0	0
SUBTOTAL				74
STALLS (LEVEL -1)	STALLS SEATING	640 seats	1 / seat	640
	STAGE	455	0	0
	FOYER	306	0	0
	CIRCULATION	590	0	0
	BAR / KITCHEN BOH	101	0.1	10.1
	DRESSING ROOMS	53 4 seats	1 / seat	4
	GREENROOM	58	0.9	50
	OFFICES	32	0.1	3.2
	STORAGE	57	0	0
	LOADING / SCENE DOCK	96	0	0
	PLANT	87	0	0
	WC	142	0	0
SUBTOTAL				707.3
CIRCLE (LEVEL 1)	CIRCLE SEATING	310 seats	1 / seat	310
	FOYER	420	0	0
	CIRCULATION	200	0	0
	BAR BOH	36	0.1	3.6
	BOX OFFICE/ SHOP	17	0.1	1.7
	DRESSING ROOMS	161 28 seats	1 / seat	28
	CONTROL ROOM	57	0.1	5.7
	OFFICES	11	0.1	1.1
	STORAGE	5	0	0
	WC	65	0	0
SUBTOTAL				350.1
BALCONY (LEVEL 2)	BALCONY SEATING	350 seats	1 / seat	350
	FOYER	308	0	0
	CIRCULATION	244	0	0
	BAR BOH	15	0.1	1.5
	STORAGE	5	0	0
	PLANT	135	0	0
	WC	74	0	0
SUBTOTAL				351.5
TOTAL				1483

8.0 Appendix

8.3 Summary of WC Facilities

WRT Toilet Facilities Comparison - Preliminary Design - 23/07/2018

Front of House Toilets

	Charcoalblue Minimum	Charcoalblue Preferred	NZBC Minimum	Jasmax Achieved
SubStage	N/A	N/A	N/A	N/A
Stalls (640 audience)	15 Female Pans 2 Male Pans 6 Urinals	22 Female Pans 6 Male Pans 15 Urinals 1 Accessible toilet	N/A	22 Female Pans 10 Female Basins 5 Male Pans 15 Urinals 7 Male Basins 1 Accessible Toilet
Circle (310 occupants)	8 Female Pans 2 Male Pans 4 Urinals	12 Female Pans 4 Male Pans 8 Urinals 1 Accessible toilet	N/A	9 Female Pans 5 Female Basins 3 Male Pans 6 Urinals 3 Male Basins 1 Accessible Toilet
Balcony (350 occupants)	12 Female Pans 2 Male Pans 4 Urinals	16 Female Pans 5 Male Pans 11 Urinals	N/A	10 Female Pans 6 Female Basins 3 Male Pans 10 Urinals 5 Male Basins 1 Accessible Toilet
Totals (1300 occupants)	35 Female Pans 6 Male Pans 14 Urinals	50 Female Pans 15 Male Pans 34 Urinals 2 Accessible toilet	16 Female Pans 6 Female Basins 9 Male Pans 4 Urinals 6 Male Basins 2 Acessible Unisex	41 Female Pans 21 Female Basins 11 Male Pans 31 Urinals 15 Male Basins 3 Accessible Unisex

FOH Staff (staff to use FOH Toilets when Audience is in show)

	Charcoalblue Minimum	Charcoalblue Preferred	NZBC Minimum (by level)	Jasmax Achieved
SubStage	N/A	N/A	N/A	N/A
Stalls (10 Staff)	N/A	N/A	N/A	(staff to use FOH toilets)
Circle (11 Staff)	N/A	N/A	N/A	(staff to use FOH toilets)
Balcony (2 staff)	N/A	N/A	N/A	(staff to use FOH toilets)
Totals (23 Staff)	N/A	N/A	23 * (0.65) = 15 Female 2 Female Pans 23 * (1.0) = 23 Male 2 Male Pans	N/A (staff to use FOH toilets) FOH toilets provided meet additional FOH staff requirements

Performers / BOH Crew (Separate toilet facilities provided from FOH/ Audience)

	Charcoalblue Minimum	Charcoalblue Preferred	NZBC Minimum	Jasmax Achieved
SubStage 63 performers 11 Crew (74 occupants total)	N/A	Dressing Rooms 1 per 4 occupants Crew: 4 male, 4 female Total: 20	N/A	13 (unisex)
Stalls 4 performers 4 Staff (8 occupants total)	N/A	Dressing Rooms 1 per 4 occupants Total: 2	N/A	2 (in dressing rooms)
Circle (28 Performers)	N/A	Dressing Rooms 1 per 4 occupants Total: 8	N/A	4 (in dressing rooms) 5 (unisex)
Balcony (0 occupants)	N/A	0	N/A	0
Totals (110 Performers/ Crew)		Total: 30	110 * (0.7) = 77 Female 3 Female Pans 110 * (0.6) = 66 Male 3 Male Pans	Total: 24

8.0 Appendix

8.4 Outline Specification

1 Project Description

The site is located at 170-206 Victoria Street, Hamilton and is bounded by Embassy Plaza, Victoria Street, Sapper-Moore Jones and the Waikato River bank.

Refer to Concept Design Report for full project description.

All materials and workmanship shall comply with the following requirements.

a) Statutory laws and regulations
b) The NZ Building Act
c) Local Authority District Plan and Bylaws
d) NZ Building Code: Acceptable Solutions
e) Health and Safety & Employment Act
f) Appropriate NZ or Australian Standards
g) All external materials shall be suitable for a marine environment
h) Warranties and to be provided for materials and workmanship
i) Accessibility report to be provided for consenting.

2 Demolition

2.1 Demolition

Allow for provisional sum for the removal of existing buildings, existing landscape elements and existing vegetation, while protecting existing trees to remain. Refer SK-012 Demolition plan.

Refer to consultants reports for the decommissioning of existing services.

2.2 Site Preparation

- Allow for the levelling of site to new building levels.
- For more detailed information, refer to Civil and structural documentation.

2.3 Waste Management and Hazardous Substances

- Allow for provisional sum for waste management and removal of any potential hazardous substances.
- Allow for the removal of contaminated soils if needed.

2.4 Archaeology

- Refer archaeologist report for any finds on site.

3 Exterior

3.1 Ground and Exterior Works

- **Landscape**
  - Courtyard adjacent to Embassy Park
    - Hard landscaping: Allow for 60mm basalt pavers on 30mm bedding
    - Allow provisional sum for Landscape fixings, and fitting including lighting, stainless steel handrails and balustrades.
  - Elevated Courtyard along river side (East side of site)
    - Hard landscaping: Allow for 140x42mm Purpleheart Watershed Decking. Allow for 90mm x 14g Hermpac Hexdrive counter sunk stainless steel screws.
    - Refer structural engineers drawings for courtyard structure.
    - Allow provisional sum for Landscape fixings, and fitting including stainless steel handrails and balustrades, and feature lighting up Trees and deck.
  - Allow for stainless steel strip drains for full extent of all door openings.
  - Excavations at boundary
    - Recontour landscape at boundaries to suit along Embassy Park and Sapper Moore Jones Place.
- **Site Works**
  - Civil
    - Make good civil works including re routing of 150 diameter existing sewer. Refer Civil report.
  - Sapper Moore Jones Place
    - Allow for recontouring of road and amendments to infrastructure required for truck dock access and truck turning circle.
    - Refer SK – 040 Landscape plan of Sapper Moore Jones Place and civil report for information on
- Tanking to substage level & stalls level to North West corridor.
  Allow Volclay Voltex Geotextile DS and Swelltite waterproofing systems to under slabs and all single skin retaining walls.
  Allow for subsoil pressure relief drainage under all slabs and behind all single skin retaining walls.

3.2 Exterior Wall Cladding

Refer to architectural elevation drawings for cladding type scope and location. Allow for the following –

Cladding Type	Typical Location Refer architectural elevations for full scope.	Description
Type A1	Along North, East, and South boundary of site	- Pilkington Profilit OW (Low Iron) opal finish channel glass wall system. Single Layer including secondary support frame. Allow for feature LED lighting.
Type A2	Along North Boundary of site.	- Pilkington Profilit OW (Low Iron) opal finish channel glass wall system. Double Layer including secondary support frame. Allow for feature LED lighting.
Type B1	Fly Tower	- Precast concrete with 5% red oxide with water repellent sealer and moulded finish to exterior face. Precast concrete to be overall 250mm thick. Allow for 150mm structural zone, and 100mm zone for a moulded finish. Average weight to be equivalent to 200mm precast concrete. - Allow for feature LED lighting
Type B2	Light Well located above Foyer	- Precast concrete with 5% red oxide with water repellent sealer and moulded finish to exterior face. Precast concrete to be overall 250mm thick. Allow for 150mm structural zone, and 100mm zone for a moulded finish. Average weight to be equivalent to 200mm precast concrete. - Lower portion of light well to be an automated operable louvre. - Inside of lightwell to be lined in perforated anodised aluminium panelised system with customised perforation pattern on support rail system allowing for cavity to meet fire and services engineer air flow requirements. - Allow for feature LED lighting
Type B3	Insitu Concrete Walls	- Allow for 5% red oxide with Keim Lotexan clear water repellent sealer and moulded finish to exterior face.
Type C1	North, East and South Elevations.	- Commercial grade fully unitised four-side mechanically entrapped aluminium frame curtain wall system. - Glazing Type – Stop Ray 40. Clear IGU high performance glass, with low emissivity coating. - Spandrel panels, where required, to be double glazed with the same glass type as the vision glass panels. Allow shadow box with powder coated aluminium back pan and insulation. - Anodised aluminium frame extrusion. Colour TBC. - Nominally 600mm centre mullions.
Type C2	Glazing along ground level of North elevation along Embassy Plaza and lower level along river side elevation facing out to external suspended deck.	- Commercial grade fully unitised four-side structurally glazed curtain wall system using Insulating Glass Units (IGU). - Spandrel panels, where required, to be double glazed with the same glass type as the vision glass panels. Allow shadow box with powder coated aluminium back pan and insulation. - Nominally 3000mm mullion centres. - Glazing Type – Stop Ray 40. Clear IGU high performance glass, with low emissivity coating. - Anodised aluminium frame extrusion. Colour TBC. - Allow glazed side hung and frameless sliding doors at entrances.

Type D1	East Elevation	- Precast concrete non-structural cladding panels, F5 finish. - 5% red oxide with water repellent sealer. - Insulate, strap and line inside face of precast wall panels.
Type D2	South Elevation.	- Precast concrete non-structural cladding panels, F5 finish with commercial aluminium frame double glazed punched windows. - Anodised aluminium frame extrusion. - 5% red oxide with water repellent sealer. - Insulate, strap and line inside face of precast wall panels.
Type E1	Truck Dock on Sapper Moore Jones Place	- Perforated, anodised screen on anodised frame on sliding running gear.
Type E2	Pant Room Screen	- Perforated, anodised screen on anodised frame
F	East façade under suspended deck	- Mechanical Louvres - Aluminium UL3 louvres in façade, fully integrated into precast window system to match Cladding Type D2. - Aluminium powder coated (Dulux Duratec)

Anti Graffiti

- All raw concrete finishes within 3m of ground level to be protected with graffiti guard.

3.3 Exterior Windows + Doors

- General
  Glass sliding and side hung doors to be fully integrated with glazed curtainwall system (Cladding Type C) as indicated on architectural elevations.
  Doors to be fire rated as required by Fire Engineer.
- Embassy plaza Entrances
  Allow for x2 sets of frameless glass automatic sliding doors. Clear laminated toughened glass door.
- Riverside Entrance 1 – River East Elevation
  Frameless glass automatic sliding door. Clear laminated toughened glass door.
- Riverside Entrance 2 – Refer South Elevation
  Aluminium framed automatic glass sliding door for use in favourable weather. Clear laminated toughened glass door.
- Roof plantroom doors
  Steel framed solid core door with metal facing/edge clashing.

3.4 Roof + Decking

Reference SK- 116 & SK -118 Roof Plans

Cladding Type	Typical Location Refer architectural roof plan for full scope.	Description
RF-1	F.O.H and B.O.H roof	- 'Warm' roof system with double layer mineral chip finish fibre-bitumen roof membrane over fibre board over rigid insulation over concrete. Rooflogic UltraTherm Xtreme (over concrete) system. - Minimum R-Value 3.45, nominal 80mm thick PIR board. - Producer statements and warranties/guarantees to be provided for complete roofing system. - 2mm powder coated aluminium cap flashing to parapet to match cladding. - Allow for electronic EFVM leak detection testing to all membrane roofing.
RF-2	Auditorium Roof – Acoustic	- Lightweight 'warm' roof system with double layer mineral chip finish fibre-bitumen roof membrane over fibre board over rigid insulation and corrugated metal tray over plywood and DHS purlins to Structural Engineer's drawings with thermal and acoustic insulation. Rooflogic UltraTherm Xtreme (over metal tray base deck) or Nuralite Nuratherm Warm Roofing System. - Minimum R-Value 3.45, nominal 80mm thick PIR board. - Producer statements and warranties/guarantees to be provided for complete roofing system. - 2mm powder coated aluminium cap flashing to parapet to match cladding. - Allow for electronic EFVM leak detection testing to all membrane roofing. - Acoustic performance to be achieved as per Charcoal Blue requirements with a build-up such as below: - 80kg/m2 divided over two layers (continuous impermeable mass) separated by 800mm cavity. For example, 45 kg/m2 of metal deck & gypsum based sheathing / 800mm airspace with insulation / 35kg/m2 plasterboard ceiling.
RF-3	Glazed skylight to Light tower above foyer	- Insulating Glass Units (IGU) high performance toughened & laminated glass.
RF-4	Plantroom Roof	- Lightweight 'cold' metal roofing system. Dimondek 400 profile, long run, 0.55 BMT - Pre-finished Colorcote MagnaFlow X system. - Allow heavy duty breather type building paper, safety mesh and timber packers over DHS purlins as required by Structural Engineer - For enclosed areas above stair and lift overrun, allow 200mm (R3.4) Autex GreenStuff polyester batts supported on strapping.

		- All flashings to match roofing material.
RF-5	F.O.H & B.O.H & Flytower	- Lightweight ‘warm’ roof system with double layer mineral chip finish fibre-bitumen roof membrane over rigid insulation and corrugated metal tray over plywood and DHS purlins to Structural Engineer’s drawings with thermal and acoustic insulation. Rooflogic UltraTherm Xtreme (over metal tray base deck) or Nuralite Nuratherm Warm Roofing System. - Minimum R-Value 3.45, nominal 80mm thick PIR board. - Producer statements and warranties/guarantees to be provided for complete roofing system. - 2mm powder coated aluminium cap flashing to parapet to match cladding. - Allow for electronic EFVM leak detection testing to all membrane roofing.

3.5 Gutters, sumps and parapets

- Double layer torch-on membrane over H3, 17mm CD grade plywood and timber framing to line the full extent of the inside of all parapets and to lap over top of precast or curtainwall cladding, under cap flashing.
- Double layer torch-on membrane over H3, 17mm CD grade plywood and timber framing to line the full extent of gutters and sumps.
- Parapet cap flashings to be robust and well supported. Allow 2mm aluminium to match joinery finish on H3 17mm CD grade plywood. Fully welded aluminium corners, ends, junctions and soaker joints for weathering and expansion.
- Parapet cap flashing joints to align with façade module.
- Powder coated aluminium to match external joinery finish (Dulux Duratec)
- Domed cast bronze gutter drain outlets and overflows generally – Allproof Industries or equal approved.
- For insulated roofs, rigid insulation (PIR board) to line all sumps, gutters and inside of all parapets to provide continuity in insulation.

3.6 Canopies

- Laminated toughened clear glass canopy to entrances. Glass canopy suspended from steel structure with stainless steel external grade spider fixings. Allow ceramic frit to glass and custom profile stainless steel gutter. Canopies located at Embassy Plaza Entrance and River Side entrance.

3.7 Façade Maintenance

- Abseiling anchor points in pairs at approximately 5m spacing or continuous rail to allow access to all areas of façade. Roof access system (abseil system) fixed to roof structure. Installation to include additional strengthening to comply with AS/NZS 1891.4:2000.
- Horizontal line restraint system to all roofs as required. Allow PBI Roofsafe Cable Horizontal Lifeline system.
- Screen maintenance
    - Allow for high level web grate gantry integrated into design of screen structure for maintenance access to screen with safety line and abseil fixing points.

3.8 Building Signage

- Allow provisional sum.

4 Interior – Front of House Spaces – including Foyer and F.O.H circulation spaces

4.1 F.O.H Floors

Typical Location	Description
Stalls Level, Circle level	Monolithic Terrazo flooring with metal inlay at control joints.
Balcony Level	Commercial grade carpet

Matwells: Proprietary recessed matwell to all entries.

4.2 F.O.H Walls

Auditorium foyer facing wall.

- Allow for selected timber battens factory assembled into panels with polyester acoustic batts behind with black painted steel supports. Allow provisional sum for feature lighting.

General Partitions

- 13mm plasterboard on timber framing paint fnish

Refer Charcoalblue acoustic report for auditorium wall types.

4.3 F.O.H Ceilings

Fibrous plaster Gib ceiling with wrap around to form slab edge detail, paint finish.

4.4 F.O.H Balustrades

Cantilevered toughened laminated glass balustrade with stainless steel posts and rails.

4.5 F.O.H feature Staircases – (Level -1 ~ Level 1) & (Level 1 ~ Level 2)

Balustrade: Birch timber to both sides with clear finish. Allow for handrail to be integrated into balustrade.

Riser and treads: Victorian Ash closed riser.

Light fitting: Allow for provisional sum for high quality concealed LED light fitting integrated into handrail.

4.6 F.O.H Toilets

Floors: Tiled stone flooring

Walls: Ceramic tiles on timber or steel framing, staggered for acoustic separation around plumbing and with acoustic sound insulation.

Ceilings: High density gib ceiling painted gib aqualine

Lighting: Allow provisional sum for feature lighting

Vanity & white ware: Allow for custom vanity and high quality white ware.

Doors – Acoustic & Fire rated Doors

Doorless Lobbies – Allow for acoustic treatment

Pumped Drainage – Allow for pumped drainage for lower levels that are below the existing drain invert. Plumb chamber and back up system.

4.7 F.O.H Doors

General: 2.3m high solid core flush doors, hardwood clashed edges with acoustic seals as necessary. Timber veneer finish.

Fire rated doorsets: Proprietary, fire tested, fire rated doorsets to NZS 4232, solid core flush doors, hardwood clashed on two edges, with wired glass vision panels as necessary, for paint finish, for new stair enclosures and storerooms and doors along fire egress routes.

Smoke rated doorsets: Proprietary, smoke tested, smoke rated doorsets to NZS 4232, solid core flush doors, hardwood clashed on two edges, with glass vision panels as necessary, for paint finish to all Smoke Separation rated walls as required by Fire Engineering. Hold open / automatic closers to fire doors in main circulation routes

4.8 F.O.H Bars and Cafe

Allow for provisional sum for bar on Stalls, circle, and balcony.

Allow for provisional sum for cafe on Stalls level.

4.9 FF&E

Allow for provisional sum for FF&E items to F.O.H spaces

5 Auditorium

Walls:

- Auditorium Side Wing Walls: Poured insitu concrete off the form rough sawn board finish. Concrete finish to NZS 3114: clause 105.5, F5 finish.
- Auditorium Back Wall: Allow for Victorian Ash timber battens with various thicknesses and negative details site fixed and screwed and plugged with timber plates fixed to black painted speedwall.
- Balconies: Timber panelling to front of balconies.

Ceilings:

- Allow for provisional sum for main auditorium ceiling.
- Allow for Fibrous plaster Gib ceiling with paint finish for underside of circle and balcony.

6 Back of House

Walls: General Internal partitions – 13mm plasterboard on timber framing paint finish.

Skirting: Flush timber skirting

Ceilings: No ceilings except for toilets and star dressing rooms.

Floors: Concrete slab to U3 steel trowel finish with commercial grade carpet. Allow for vinyl to service rooms.

Doors: Solid timber leaf and jambs, paint finish with fire/smoke/acoustic seals. Provide vision panels to stairways.

Hardware: Mortise lock set, door closer, door stop, mag clamp suitable for security provisions.

Kitchenettes: Allow provisional sum for kitchenette and services.

Lighting: LED recessed pan fitting to suite tile set out.

FF&E: Refer Charcoal Blue documentation

Toilets & Bathrooms:

- Toilets are full height plasterboard (fire rated where required) with 2 layers of 13mm Gib both sides of metal stud. Toilet walls and ceilings 13mm Gib Aqualine. Door shall be 2.4m high solid core doors with timber jamb and selected hardware. Allow for high quality white ware. Floors will be Viny Tarkett Tapiflex Excellence thermal welded seams, fully coved skirting on acoustic substrate to acoustic engineer requiremetns.

- Pumped Drainage – Allow for pumped drainage for lower levels that are below the existing drain invert. Plumb chamber and back up system.

7 Egress stairs

Egress stairs are precast concrete F4 finish (protect during construction) with painted steel balustrades (1000mm), vertical rails and timber handrails. Stair treads to have natural anodised aluminium stair nosings with black inserts. Walls are strapped and lined shear walls with 13mm Gib toughline on rails or full height plasterboard (fire rated) with 2 layers of 13mm Gib both sides of metal stud. Ceiling/ soffits are generally unpainted except at landings and level 9 which has painted plasterboard linings on suspension system paint finish. Fire doors to stairways shall be fire rated 2.4m high solid core doors with timber jamb and selected fire rated hardware. Provide vision panels to stairways.

8 Lifts

8.1 F.O.H Lifts

- 1 Accessible lift with 1100 x 2200 door openings.
- Lift car interior
  Manufacturer's standard selection mirror to high rear wall panels. Selected satin or linen stainless steel panels to lower rear panels and full height side panels. Heavy duty rubber flooring. Stainless steel handrail. Stainless steel ceiling with flush LED lighting.
- Allow stainless steel lift car doors + jambs.
- Allow for the following for lift car control panel:
  - Stainless steel car operating panel (to comply with Code)
  - Access card reader
  - LCD display unit
  - Finished s/s buttons
  - Load Notice/Lift Overloaded Sign
  - Door Open/Door Close
  - Landing Buttons
  - Surface mounted landing buttons in stainless steel
  - Hall Lanterns
  - Emergency Light
  - Emergency telephone
  - Autodial telephone
  - Lift buttons and lanterns are to have flush mounted satin finished stainless steel back plates. Lift buttons to have braille.

8.2 B.O.H Lift

- 1 service lift, internal car dimension to be 1400 x 2400 and 2900 ceiling height.
- Lift car interior
  Manufacturer's standard selection mirror to high rear wall panels. Selected satin or linen stainless steel panels to lower rear panels and full height side panels. Heavy duty rubber flooring. Stainless steel handrail. Stainless steel ceiling with flush LED lighting.
- Allow stainless steel lift car doors + jambs.
- Allow for the following for lift car control panel:
  - Stainless steel car operating panel (to comply with Code)
  - Access card reader
  - LCD display unit
  - Finished s/s buttons
  - Load Notice/Lift Overloaded Sign
  - Door Open/Door Close

- Landing Buttons
- Surface mounted landing buttons in stainless steel
- Hall Lanterns
- Emergency Light
- Emergency telephone
- Autodial telephone
- Lift buttons and lanterns are to have flush mounted satin finished stainless steel back plates. Lift buttons to have braille.

9 Technical Areas

Refer Charcoal Blue documentation.

10 Security

Allow provisional sum for:

- Active surveillance
- Passive infrared
- Zoning
- Security and Access

11 Rubbish Area

Walls: Block wall with painted finish and crash rails

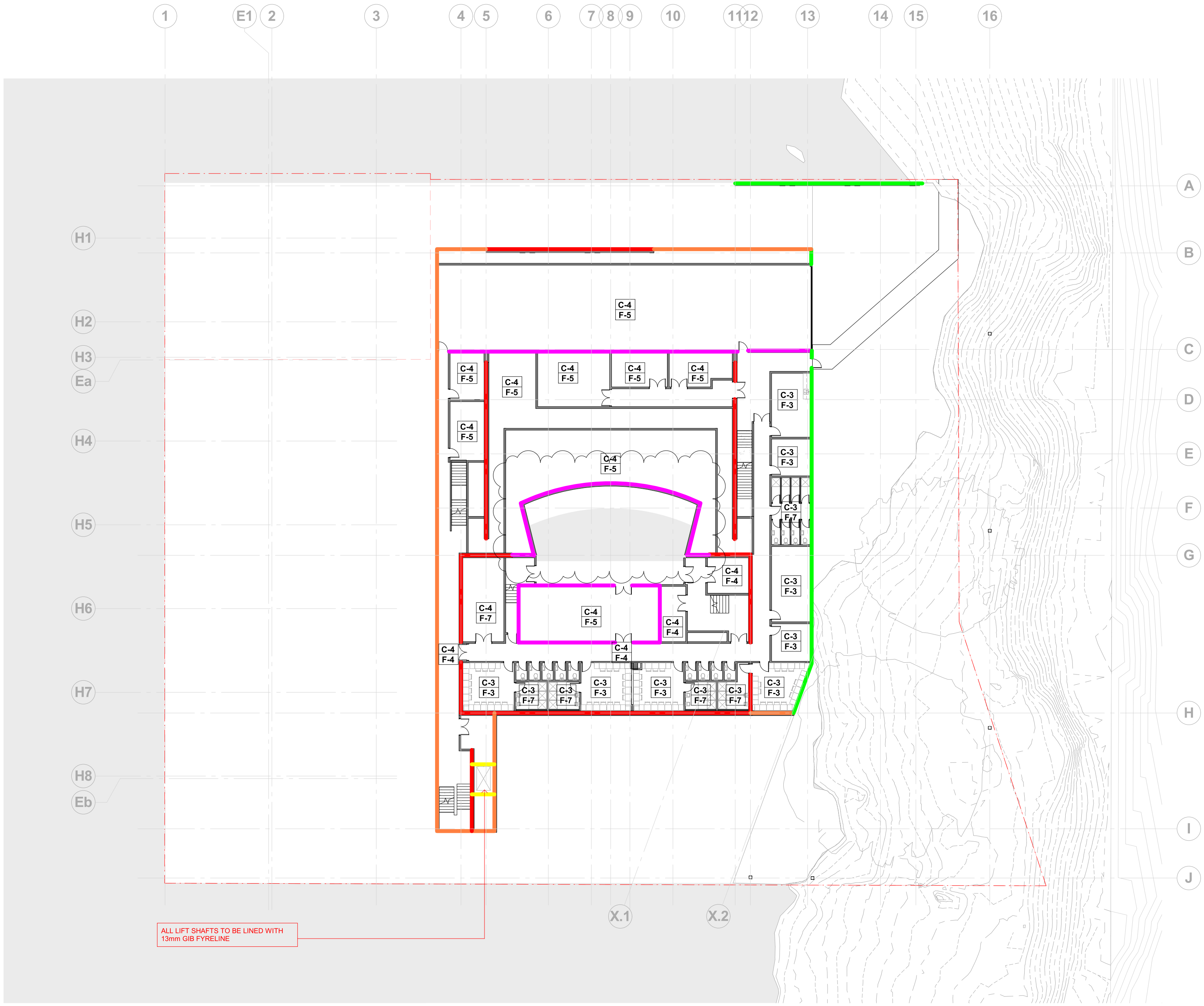
Ceilings: No ceilings

Floor: Allow for hydrophilic post applied finish to concrete slab.

Ventilation: Allow for room to be ventilated

8.0 Appendix

8.5 Finishes Plans



WALL FINISH LEGEND

- **STRUCTURAL SHEAR WALL** – INSITU CONCRETE
- **STRUCTURAL RETAINING WALL** – INSITU CONCTRETE
- **BLOCK WALL** – CONCRETE BLOCK
- **SPEEDWALL** – X
- **PRECAST WALL** – X
- **AUDITORIUM FOYER FACING WALL** – VICTORIAN ASH TIMBER BATTENS FACTORY ASSEMBLED INTO PANELS WITH POLYESTER ACCOUSTIC BATTS BEHIND WITH BACK PAINTED STEEL SUPPORTS
- **AUDITORIUM INTERIOR FINISH 1** – SPEEDWALL WITH VICTORIAN ASH TIMBER BATTENS FACTORY ASSEMBLED INTO PANELS
- **AUDITORIUM INTERIOR FINISH 2** – VICTORIAN ASH TIMBER BATTENS FIXED TO CAST IN SITU SHEAR WALL
- **AUDITORIUM INTERIOR FINISH 3** – TIMBER PANELLING - ALLOW FOR VICTORIAN ASH VENEER FINISH
- **WET AREA TILE FINISH** – TIMBER FRAMING WITH AQUALINE PLASTERBOARD SUBSTRATE WITH WALL TILE FINISH
- **INTERIOR TIMBER FRAMED WALLS** – ALL WALLS NOT OTHERWISE INDICATED. TIMBER FRAMING WITH PLASTERBOARD LINING, PAINTED. PROVIDE FYRELINE AND ADDITIONAL LAYERS AS REQUIRED AT RATED WALLS INDICATED ON FIRE ENGINEERS DRAWINGS
- **FLY TOWER PLASTERBOARD LINING**

FLOOR FINISH LEGEND

F-1	FOYER TERRAZZO
F-2	AUDITORIUM CARPET
F-3	DRESSING ROOMS / OFFICES VINYL
F-4	BOH / CIRCULATION VINYL
F-5	STORAGE CONCRETE
F-6	FOH TOILETS TILE
F-7	BOH TOILETS VINYL - ALLOW FOR NON SLIP VINYL TO WET AREAS
F-8	GREEN ROOM / STAR DRESSING ROOMS CARPET

CEILING FINISH LEGEND

C-1	FOYER PLASTER
C-2	AUDITORIUM TIMBER
C-3	DRESSING ROOMS / OFFICES NONE
C-4	BOH / CIRCULATION NONE
C-5	FOH TOILETS PLASTERBOARD

NOTE

REFER CBL ACOUSTIC REPORT FOR ACOUSTIC WALL TYPES

WAIKATO REGIONAL THEATRE

ISSUE DATE:06/08/2018

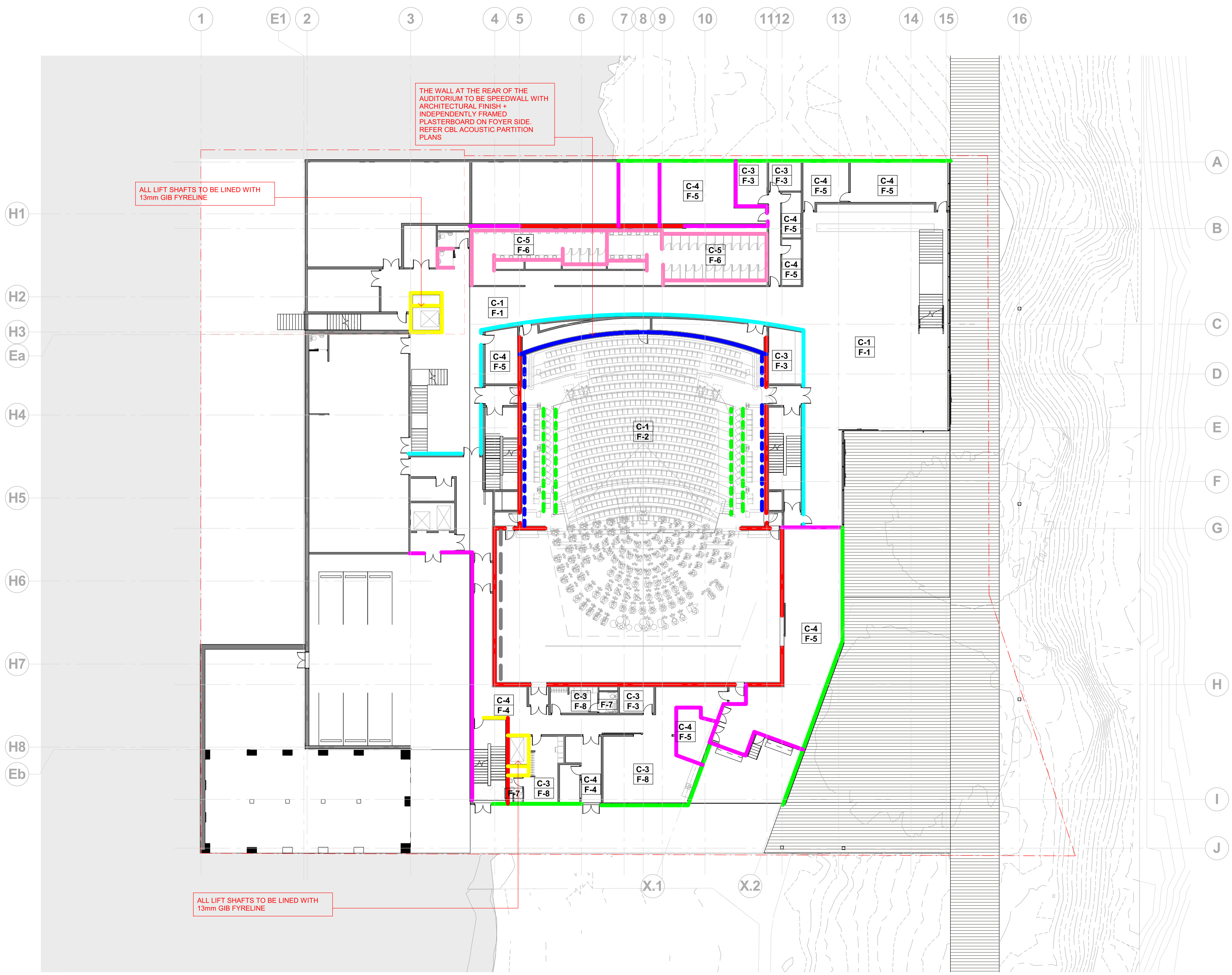
DRAWING **Finish Plan - Level -2 (Sub-stage)**

SCALE @ A1 **As indicated**

JOB No. **216365.00**

DRAWING No. **SK-140** REV. **C**

Jasmax



WALL FINISH LEGEND

- **STRUCTURAL SHEAR WALL** INSITU CONCRETE
- **STRUCTURAL RETAINING WALL** INSITU CONCTRETE
- **BLOCK WALL** CONCRETE BLOCK
- **SPEEDWALL** X
- **PRECAST WALL** X
- **AUDITORIUM FOYER FACING WALL** VICTORIAN ASH TIMBER BATTENS FACTORY ASSEMBLED INTO PANELS WITH POLYESTER ACCOUSTIC BATTS BEHIND WITH BACK PAINTED STEEL SUPPORTS
- **AUDITORIUM INTERIOR FINISH 1** SPEEDWALL WITH VICTORIAN ASH TIMBER BATTENS FACTORY ASSEMBLED INTO PANELS
- **AUDITORIUM INTERIOR FINISH 2** VICTORIAN ASH TIMBER BATTENS FIXED TO CAST IN SITU SHEAR WALL
- **AUDITORIUM INTERIOR FINISH 3** TIMBER PANELLING - ALLOW FOR VICTORIAN ASH VENEER FINISH
- **WET AREA TILE FINISH** TIMBER FRAMING WITH AQUALINE PLASTERBOARD SUBSTRATE WITH WALL TILE FINISH
- **INTERIOR TIMBER FRAMED WALLS** ALL WALLS NOT OTHERWISE INDICATED. TIMBER FRAMING WITH PLASTERBOARD LINING, PAINTED. PROVIDE FYRELINE AND ADDITIONAL LAYERS AS REQUIRED AT RATED WALLS INDICATED ON FIRE ENGINEERS DRAWINGS
- **FLY TOWER PLASTERBOARD LINING**

FLOOR FINISH LEGEND

F-1	FOYER	TERRAZZO
F-2	AUDITORIUM	CARPET
F-3	DRESSING ROOMS / OFFICES	VINYL
F-4	BOH / CIRCULATION	VINYL
F-5	STORAGE	CONCRETE
F-6	FOH TOILETS	TILE
F-7	BOH TOILETS	VINYL - ALLOW FOR NON SLIP VINYL TO WET AREAS
F-8	GREEN ROOM / STAR DRESSING ROOMS	CARPET

CEILING FINISH LEGEND

C-1	FOYER	PLASTER
C-2	AUDITORIUM	TIMBER
C-3	DRESSING ROOMS / OFFICES	NONE
C-4	BOH / CIRCULATION	NONE
C-5	FOH TOILETS	PLASTERBOARD

NOTE

REFER CBL ACOUSTIC REPORT FOR ACOUSTIC WALL TYPES

WAIKATO REGIONAL THEATRE

JOB No. 216365.00

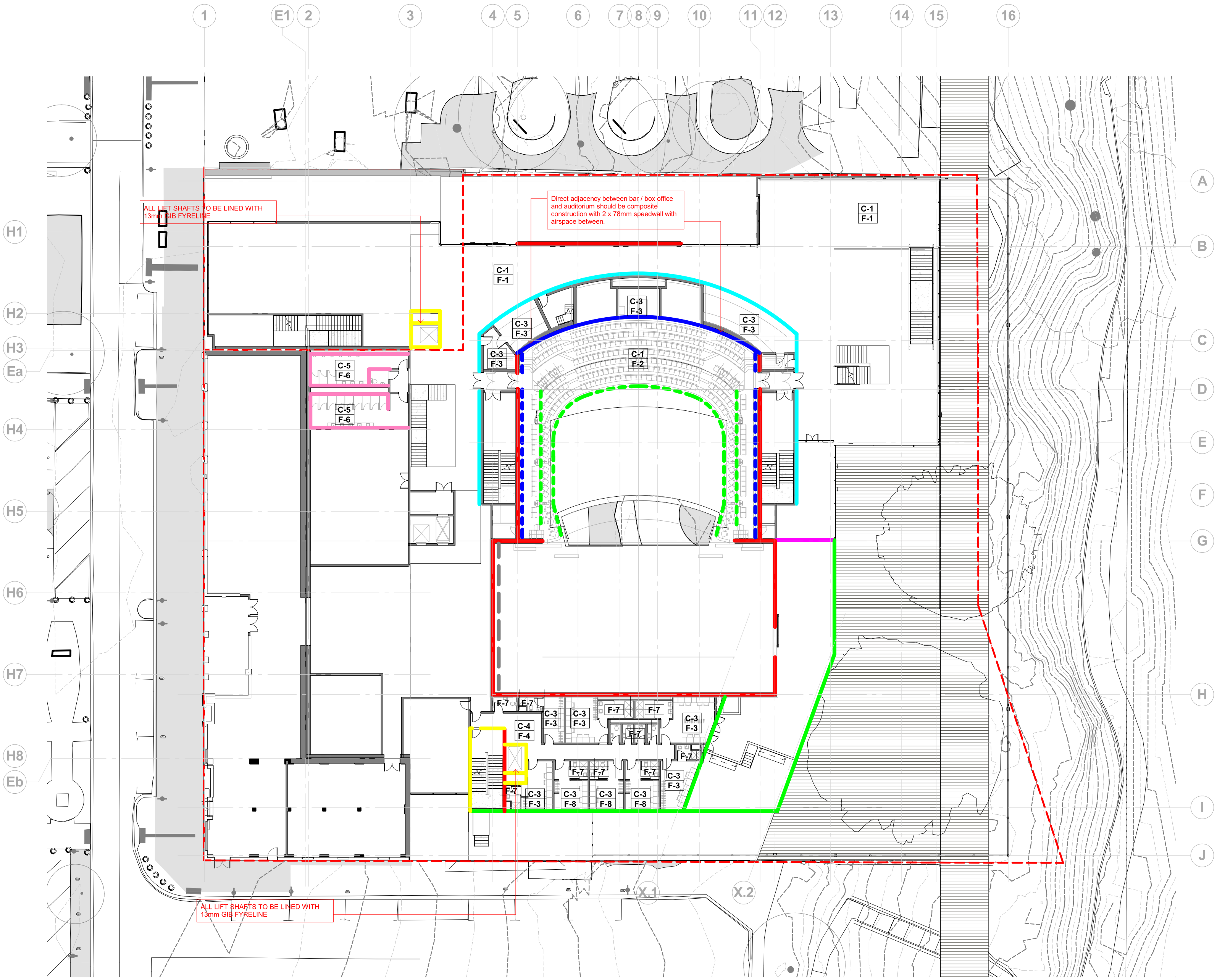
ISSUE DATE:06/08/2018

DRAWING **Finish Plan - Level -1 (Stalls)**

SCALE @ A1 **As indicated**

DRAWING No. **SK-141** REV. **C**

Jasmax



WALL FINISH LEGEND

- **STRUCTURAL SHEAR WALL** – INSITU CONCRETE
- **STRUCTURAL RETAINING WALL** – INSITU CONCTRETE
- **BLOCK WALL** – CONCRETE BLOCK
- **SPEEDWALL** – X
- **PRECAST WALL** – X
- **AUDITORIUM FOYER FACING WALL** – VICTORIAN ASH TIMBER BATTENS FACTORY ASSEMBLED INTO PANELS WITH POLYESTER ACCOUSTIC BATTS BEHIND WITH BACK PAINTED STEEL SUPPORTS
- **AUDITORIUM INTERIOR FINISH 1** – SPEEDWALL WITH VICTORIAN ASH TIMBER BATTENS FACTORY ASSEMBLED INTO PANELS
- **AUDITORIUM INTERIOR FINISH 2** – VICTORIAN ASH TIMBER BATTENS FIXED TO CAST IN SITU SHEAR WALL
- **AUDITORIUM INTERIOR FINISH 3** – TIMBER PANELLING - ALLOW FOR VICTORIAN ASH VENEER FINISH
- **WET AREA TILE FINISH** – TIMBER FRAMING WITH AQUALINE PLASTERBOARD SUBSTRATE WITH WALL TILE FINISH
- **INTERIOR TIMBER FRAMED WALLS** – ALL WALLS NOT OTHERWISE INDICATED. TIMBER FRAMING WITH PLASTERBOARD LINING, PAINTED. PROVIDE FYRELINE AND ADDITIONAL LAYERS AS REQUIRED AT RATED WALLS INDICATED ON FIRE ENGINEERS DRAWINGS
- **FLY TOWER PLASTERBOARD LINING**

FLOOR FINISH LEGEND

F-1	FOYER	TERRAZZO
F-2	AUDITORIUM	CARPET
F-3	DRESSING ROOMS / OFFICES	VINYL
F-4	BOH / CIRCULATION	VINYL
F-5	STORAGE	CONCRETE
F-6	FOH TOILETS	TILE
F-7	BOH TOILETS	VINYL - ALLOW FOR NON SLIP VINYL TO WET AREAS
F-8	GREEN ROOM / STAR DRESSING ROOMS	CARPET

CEILING FINISH LEGEND

C-1	FOYER	PLASTER
C-2	AUDITORIUM	TIMBER
C-3	DRESSING ROOMS / OFFICES	NONE
C-4	BOH / CIRCULATION	NONE
C-5	FOH TOILETS	PLASTERBOARD

NOTE

REFER CBL ACOUSTIC REPORT FOR ACOUSTIC WALL TYPES

WAIKATO REGIONAL THEATRE

ISSUE DATE: 06/08/2018

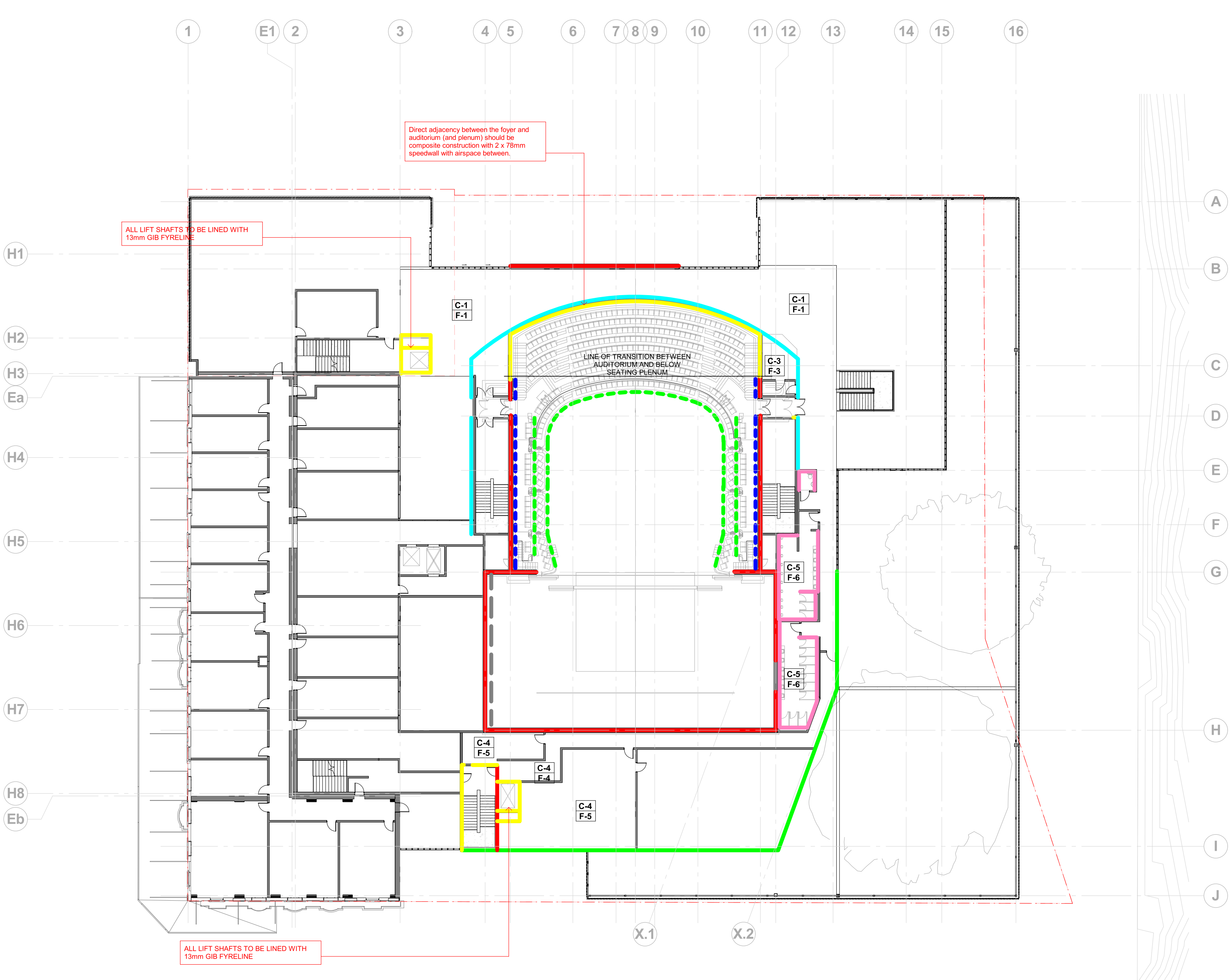
DRAWING **Finish Plan - Level 1 (Circle)**

SCALE @ A1 **As indicated**

JOB No. **216365.00**

DRAWING No. **SK-142** REV. **C**

Jasmax



WALL FINISH LEGEND

- **STRUCTURAL SHEAR WALL** – INSITU CONCRETE
- **STRUCTURAL RETAINING WALL** – INSITU CONCTRETE
- **BLOCK WALL** – CONCRETE BLOCK
- **SPEEDWALL** – X
- **PRECAST WALL** – X
- **AUDITORIUM FOYER FACING WALL** – VICTORIAN ASH TIMBER BATTENS FACTORY ASSEMBLED INTO PANELS WITH POLYESTER ACCOUSTIC BATTS BEHIND WITH BACK PAINTED STEEL SUPPORTS
- **AUDITORIUM INTERIOR FINISH 1** – SPEEDWALL WITH VICTORIAN ASH TIMBER BATTENS FACTORY ASSEMBLED INTO PANELS
- **AUDITORIUM INTERIOR FINISH 2** – VICTORIAN ASH TIMBER BATTENS FIXED TO CAST IN SITU SHEAR WALL
- **AUDITORIUM INTERIOR FINISH 3** – TIMBER PANELLING - ALLOW FOR VICTORIAN ASH VENEER FINISH
- **WET AREA TILE FINISH** – TIMBER FRAMING WITH AQUALINE PLASTERBOARD SUBSTRATE WITH WALL TILE FINISH
- **INTERIOR TIMBER FRAMED WALLS** – ALL WALLS NOT OTHERWISE INDICATED. TIMBER FRAMING WITH PLASTERBOARD LINING, PAINTED. PROVIDE FYRELINE AND ADDITIONAL LAYERS AS REQUIRED AT RATED WALLS INDICATED ON FIRE ENGINEERS DRAWINGS
- **FLY TOWER PLASTERBOARD LINING**

FLOOR FINISH LEGEND

F-1	**FOYER** TERRAZZO
F-2	**AUDITORIUM** CARPET
F-3	**DRESSING ROOMS / OFFICES** VINYL
F-4	**BOH / CIRCULATION** VINYL
F-5	**STORAGE** CONCRETE
F-6	**FOH TOILETS** TILE
F-7	**BOH TOILETS** VINYL - ALLOW FOR NON SLIP VINYL TO WET AREAS
F-8	**GREEN ROOM / STAR DRESSING ROOMS** CARPET

CEILING FINISH LEGEND

C-1	**FOYER** PLASTER
C-2	**AUDITORIUM** TIMBER
C-3	**DRESSING ROOMS / OFFICES** NONE
C-4	**BOH / CIRCULATION** NONE
C-5	**FOH TOILETS** PLASTERBOARD

NOTE

REFER CBL ACOUSTIC REPORT FOR ACOUSTIC WALL TYPES

WAIKATO REGIONAL THEATRE

ISSUE DATE:06/08/2018

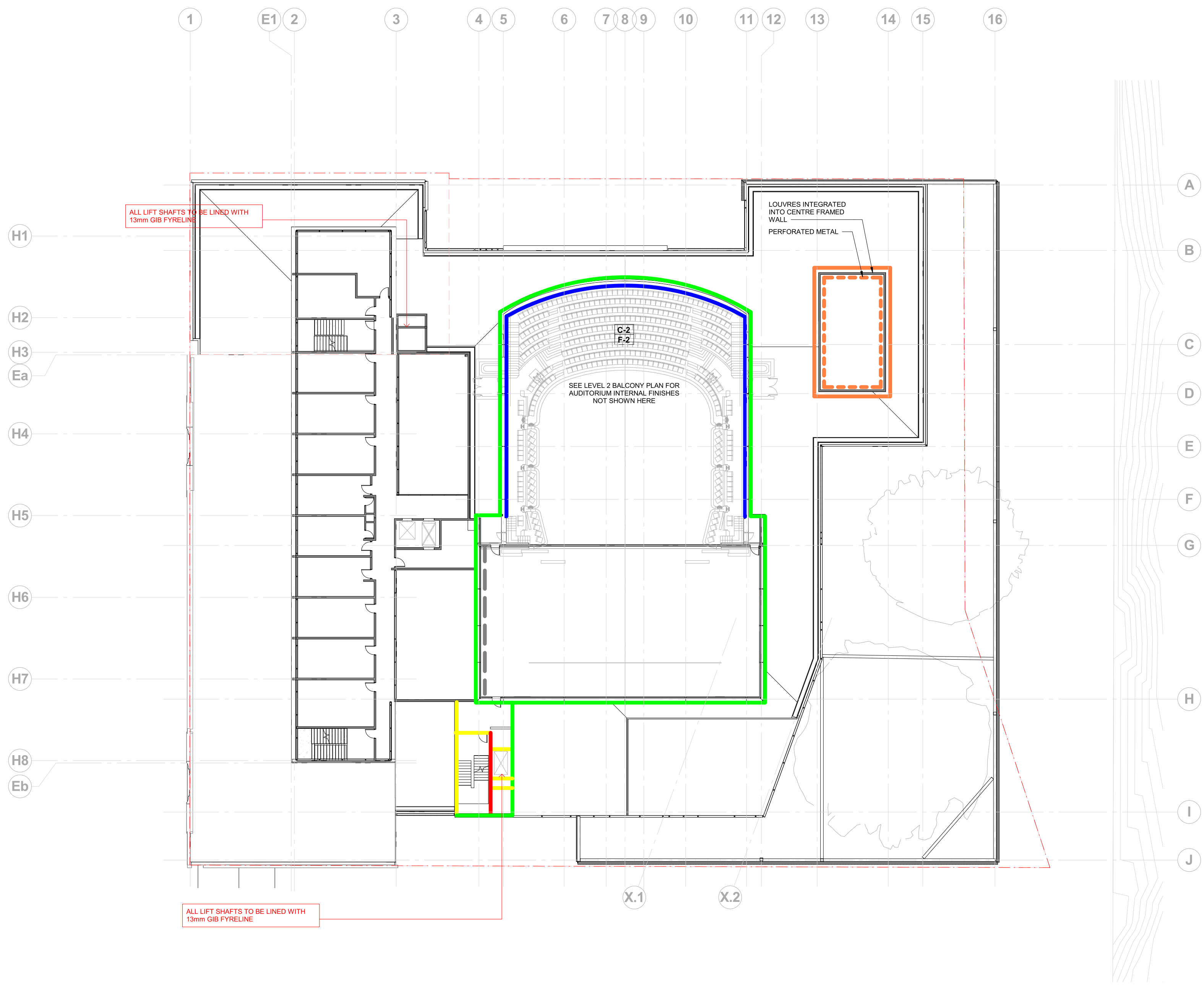
DRAWING **Finish Plan - Level 2 (Balcony)**

SCALE @ A1 **As indicated**

JOB No. **216365.00**

DRAWING No. **SK-143** REV. **C**

Jasmax



WALL FINISH LEGEND

(red)	**STRUCTURAL SHEAR WALL** INSITU CONCRETE
(orange)	**STRUCTURAL RETAINING WALL** INSITU CONCTRETE
(magenta)	**BLOCK WALL** CONCRETE BLOCK
(yellow)	**SPEEDWALL** X
(green)	**PRECAST WALL** X
(cyan)	**AUDITORIUM FOYER FACING WALL** VICTORIAN ASH TIMBER BATTENS FACTORY ASSEMBLED INTO PANELS WITH POLYESTER ACCOUSTIC BATTS BEHIND WITH BACK PAINTED STEEL SUPPORTS
(blue)	**AUDITORIUM INTERIOR FINISH 1** SPEEDWALL WITH VICTORIAN ASH TIMBER BATTENS FACTORY ASSEMBLED INTO PANELS
(blue double)	**AUDITORIUM INTERIOR FINISH 2** VICTORIAN ASH TIMBER BATTENS FIXED TO CAST IN SITU SHEAR WALL
(green double)	**AUDITORIUM INTERIOR FINISH 3** TIMBER PANELLING - ALLOW FOR VICTORIAN ASH VENEER FINISH
(pink)	**WET AREA TILE FINISH** TIMBER FRAMING WITH AQUALINE PLASTERBOARD SUBSTRATE WITH WALL TILE FINISH
(grey)	**INTERIOR TIMBER FRAMED WALLS** ALL WALLS NOT OTHERWISE INDICATED. TIMBER FRAMING WITH PLASTERBOARD LINING, PAINTED. PROVIDE FYRELINE AND ADDITIONAL LAYERS AS REQUIRED AT RATED WALLS INDICATED ON FIRE ENGINEERS DRAWINGS
(grey double)	**FLY TOWER PLASTERBOARD LINING**

FLOOR FINISH LEGEND

F-1	**FOYER** TERRAZZO
F-2	**AUDITORIUM** CARPET
F-3	**DRESSING ROOMS / OFFICES** VINYL
F-4	**BOH / CIRCULATION** VINYL
F-5	**STORAGE** CONCRETE
F-6	**FOH TOILETS** TILE
F-7	**BOH TOILETS** VINYL - ALLOW FOR NON SLIP VINYL TO WET AREAS
F-8	**GREEN ROOM / STAR DRESSING ROOMS** CARPET

CEILING FINISH LEGEND

C-1	**FOYER** PLASTER
C-2	**AUDITORIUM** TIMBER
C-3	**DRESSING ROOMS / OFFICES** NONE
C-4	**BOH / CIRCULATION** NONE
C-5	**FOH TOILETS** PLASTERBOARD

NOTE

REFER CBL ACOUSTIC REPORT FOR ACOUSTIC WALL TYPES

WAIKATO REGIONAL THEATRE

ISSUE DATE:06/08/2018

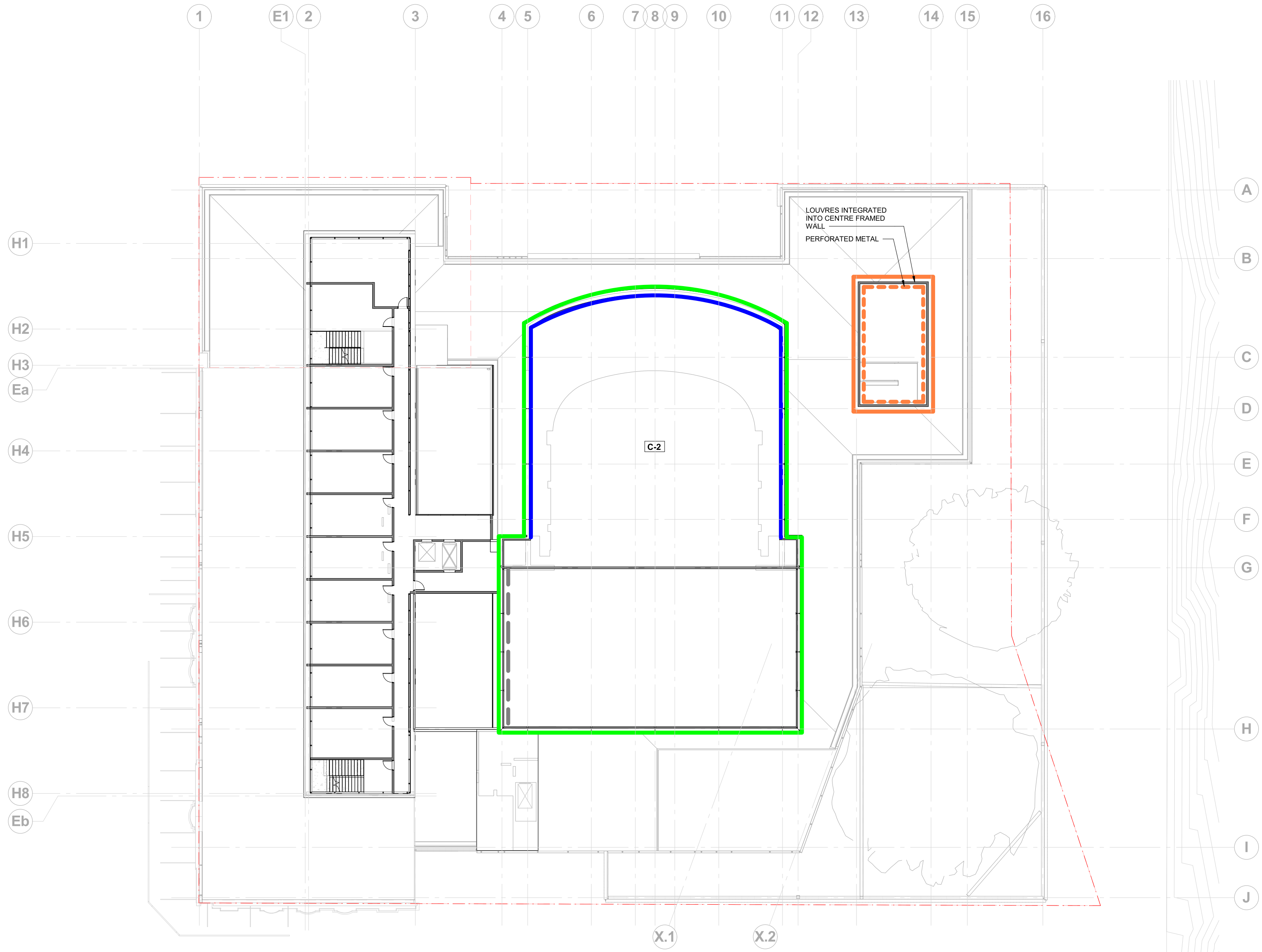
DRAWING **Finish Plan - Level 3 (Terrace)**

SCALE @ A1 **As indicated**

JOB No. **216365.00**

DRAWING No. **SK-144** REV. **C**

Jasmax



WALL FINISH LEGEND

STRUCTURAL SHEAR WALL
INSITU CONCRETE

STRUCTURAL RETAINING WALL
INSITU CONCTRETE

BLOCK WALL
CONCRETE BLOCK

SPEEDWALL
X

PRECAST WALL
X

AUDITORIUM FOYER FACING WALL
VICTORIAN ASH TIMBER BATTENS FACTORY ASSEMBLED INTO PANELS WITH POLYESTER ACCOUSTIC BATTS BEHIND WITH BACK PAINTED STEEL SUPPORTS

AUDITORIUM INTERIOR FINISH 1
SPEEDWALL WITH VICTORIAN ASH TIMBER BATTENS FACTORY ASSEMBLED INTO PANELS

AUDITORIUM INTERIOR FINISH 2
VICTORIAN ASH TIMBER BATTENS FIXED TO CAST IN SITU SHEAR WALL

AUDITORIUM INTERIOR FINISH 3
TIMBER PANELLING - ALLOW FOR VICTORIAN ASH VENEER FINISH

WET AREA TILE FINISH
TIMBER FRAMING WITH AQUALINE PLASTERBOARD SUBSTRATE WITH WALL TILE FINISH

INTERIOR TIMBER FRAMED WALLS
ALL WALLS NOT OTHERWISE INDICATED. TIMBER FRAMING WITH PLASTERBOARD LINING, PAINTED. PROVIDE FYRELINE AND ADDITIONAL LAYERS AS REQUIRED AT RATED WALLS INDICATED ON FIRE ENGINEERS DRAWINGS

FLY TOWER PLASTERBOARD LINING

FLOOR FINISH LEGEND

F-1	**FOYER** TERRAZZO
F-2	**AUDITORIUM** CARPET
F-3	**DRESSING ROOMS / OFFICES** VINYL
F-4	**BOH / CIRCULATION** VINYL
F-5	**STORAGE** CONCRETE
F-6	**FOH TOILETS** TILE
F-7	**BOH TOILETS** VINYL - ALLOW FOR NON SLIP VINYL TO WET AREAS
F-8	**GREEN ROOM / STAR DRESSING ROOMS** CARPET

CEILING FINISH LEGEND

C-1	**FOYER** PLASTER
C-2	**AUDITORIUM** TIMBER
C-3	**DRESSING ROOMS / OFFICES** NONE
C-4	**BOH / CIRCULATION** NONE
C-5	**FOH TOILETS** PLASTERBOARD

NOTE

REFER CBL ACOUSTIC REPORT FOR ACOUSTIC WALL TYPES

WAIKATO REGIONAL THEATRE

ISSUE DATE:06/08/2018

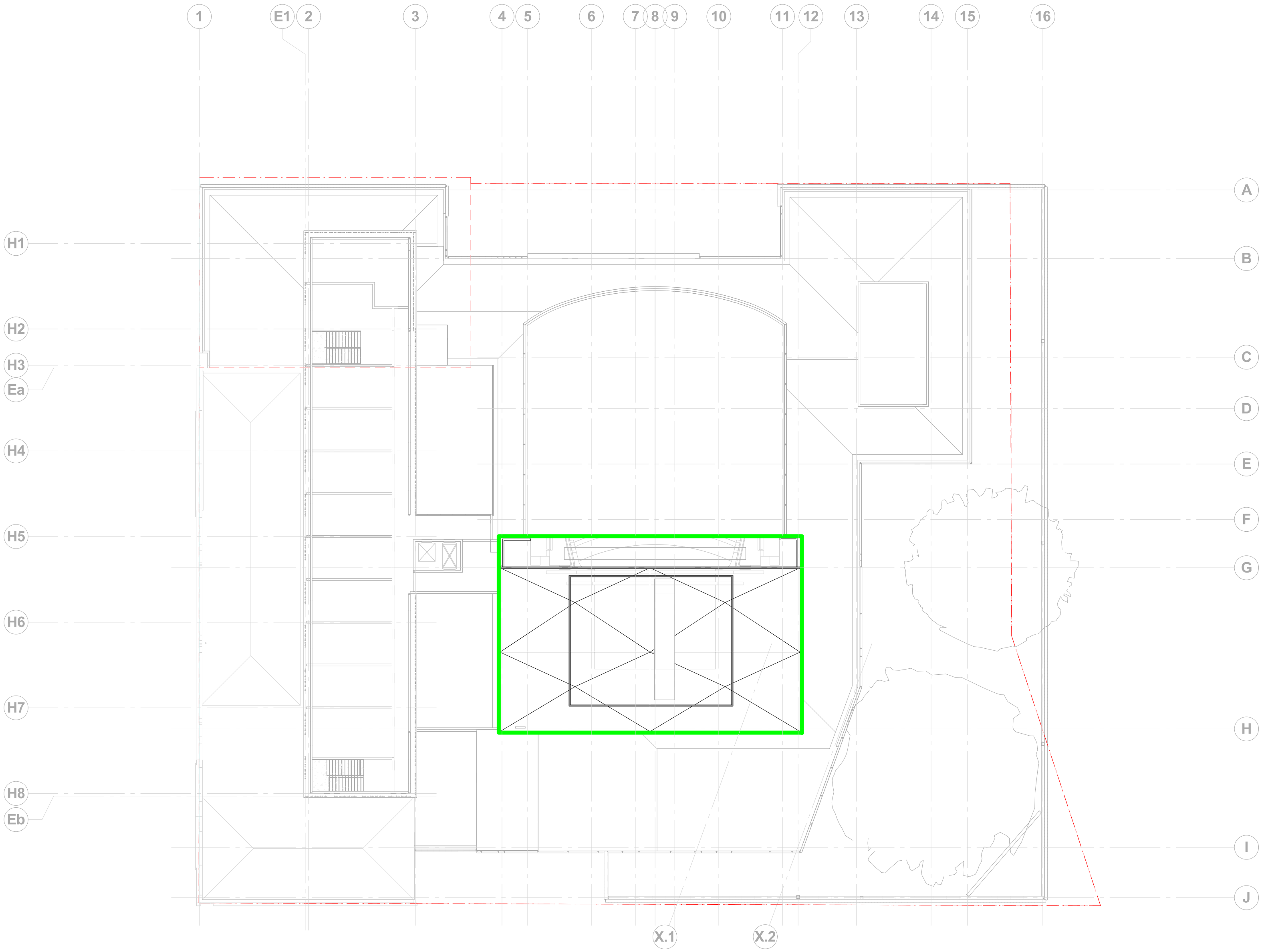
DRAWING **Finish Plan - Level 4 (Bridge)**

SCALE @ A1 **As indicated**

JOB No. **216365.00**

DRAWING No. **SK-145** REV. **C**

Jasmax



WALL FINISH LEGEND

(red)	**STRUCTURAL SHEAR WALL** INSITU CONCRETE
(orange)	**STRUCTURAL RETAINING WALL** INSITU CONCTRETE
(magenta)	**BLOCK WALL** CONCRETE BLOCK
(yellow)	**SPEEDWALL** X
(green)	**PRECAST WALL** X
(cyan)	**AUDITORIUM FOYER FACING WALL** VICTORIAN ASH TIMBER BATTENS FACTORY ASSEMBLED INTO PANELS WITH POLYESTER ACCOUSTIC BATTS BEHIND WITH BACK PAINTED STEEL SUPPORTS
(blue)	**AUDITORIUM INTERIOR FINISH 1** SPEEDWALL WITH VICTORIAN ASH TIMBER BATTENS FACTORY ASSEMBLED INTO PANELS
(blue, double)	**AUDITORIUM INTERIOR FINISH 2** VICTORIAN ASH TIMBER BATTENS FIXED TO CAST IN SITU SHEAR WALL
(green, double)	**AUDITORIUM INTERIOR FINISH 3** TIMBER PANELLING - ALLOW FOR VICTORIAN ASH VENEER FINISH
(pink)	**WET AREA TILE FINISH** TIMBER FRAMING WITH AQUALINE PLASTERBOARD SUBSTRATE WITH WALL TILE FINISH
(grey)	**INTERIOR TIMBER FRAMED WALLS** ALL WALLS NOT OTHERWISE INDICATED. TIMBER FRAMING WITH PLASTERBOARD LINING, PAINTED. PROVIDE FYRELINE AND ADDITIONAL LAYERS AS REQUIRED AT RATED WALLS INDICATED ON FIRE ENGINEERS DRAWINGS
(grey, double)	**FLY TOWER PLASTERBOARD LINING**

FLOOR FINISH LEGEND

F-1	**FOYER** TERRAZZO
F-2	**AUDITORIUM** CARPET
F-3	**DRESSING ROOMS / OFFICES** VINYL
F-4	**BOH / CIRCULATION** VINYL
F-5	**STORAGE** CONCRETE
F-6	**FOH TOILETS** TILE
F-7	**BOH TOILETS** VINYL - ALLOW FOR NON SLIP VINYL TO WET AREAS
F-8	**GREEN ROOM / STAR DRESSING ROOMS** CARPET

CEILING FINISH LEGEND

C-1	**FOYER** PLASTER
C-2	**AUDITORIUM** TIMBER
C-3	**DRESSING ROOMS / OFFICES** NONE
C-4	**BOH / CIRCULATION** NONE
C-5	**FOH TOILETS** PLASTERBOARD

NOTE

REFER CBL ACOUSTIC REPORT FOR ACOUSTIC WALL TYPES

JOB No. **216365.00**

WAIKATO REGIONAL THEATRE

ISSUE DATE:06/08/2018

DRAWING **Finish Plan - Level Roof**

SCALE @ A1 **As indicated**

DRAWING No. **SK-146** REV. **C**

Jasmax

8.5 Special Project Risks

Item	Risk	Description	Action to Date/Proposed Action
1.0	General Risk		
	Team wide Risk Workshop required	Team wide risk workshop is recommended	Propose Workshop in early Developed Design
2.0	Design Process Risk		
2.1	Resource Consent	Non complying aspects to the resource consent application	Appropriate reporting and processes lead by Tattico have been managed and coordinated. Support obtained from the Urban Design Panel for several infringements. Council and Heritage New Zealand have been appropriately.
		The Resource Consent submission covers both the theatre and hotel developments as a single application. Any changes to the hotel development that effect bulk, mass or use will require an amendment to the Resource Consent.	
		Cultural Impact Assessment (CIA). Although not required by the district plan, due to the proposed non compliance of removing heritage buildings, the planning consultant (Tattico) has advised that a CIA by iwi may be requested by council as part of the Resource Consent to form a robust application.	As a CIA is not required under the district plan, Tattico have advised that the RC be submitted without one and to follow up with a CIA if requested. Team to maintain relationship with Iwi.
2.2	Hotel design programme	The hotel has been on hold during the WRT PD phase and there is now uncertainty raised around the viability of the hotel business plan. The hotel client has ensured that the hotel site will be built up to one level above Victoria street to match the theatre opening date and will have functioning conference facilities that will be fit for use and leasable to the theatre to use as sponsors rooms and orchestra rehearsal rooms.	

8.5 Special Project Risks

Item	Risk	Description	Action to Date/Proposed Action
2.3	Brief		
	Shared Space	A clear leasing agreement that prioritises the theatre access to the shared spaces will need to be established with the Hotel Operator at the outset of the contract.	
	Theatre Admin Spaces	The Preliminary Design scheme does not allow for the provision of Theatre Administration spaces and assumes they will be accommodated via alternative means.	
2.4	Theatre Operator	An operator for the theatre has not been identified.	
3.0	Site Risk		
3.1	Archaeology		
	Archaeological Authority	As per the operative district plan the site is an Archaelological and Cultural site – A123, Hua O Te Atua Urupa. An Archaeological Authority will be required from HNZ prior to any earthworks commence on site.	Appropriate reporting, engagement with Iwi and HNZ and process lead by Archaeologist Clough & Associates.
	Accidental Discoveries	As there is an archaeological overlay identified on the site in the district plan, there is potential for accidental discoveries of artifacts on site.	Appropriate reporting, engagement with Iwi and HNZ and process lead by Archaeologist Clough & Associates.
	Stability of Heritage building	Heritage buildings site stability and site dewatering.	Has been considered in Resource Consent by Civil and Geotech Engineer. Construction Methodology should be established.
	Stability of river bank		
	Ground Water	Any water table issues as identified by geotechnical reporting	Basement design to accommodate. i.e tanking and sub soil drainage systems to Sub stage and orchestra pit.

8.5 Special Project Risks

Item	Risk	Description	Action to Date/Proposed Action
4.0	Safety in Design		
4.1	Undertake Workshop on Safety in Design.	Consultant Team to undertake SiD workshop in Developed Design.	Developed Design SiD Workshop recommended.
4.2	Site		
	Contamination	Resource Consent application will address any potential risks associated with site contamination.	Geotech Engineer has been engaged to provide desktop analysis on any potential site contamination.
	Geotech	Given the site is on the river bank, potential land stability issues have been identified.	Appropriate reporting and investigations are being undertaken by Geotech and structural engineers
	Construction Management Plan	Construction Management plan to be developed.	Propose to develop construction management plan in early Developed Design
4.3	Design		
	Safety from Falling	Appropriate maintenance access for building to be developed including access to external screen, light well, foyer spaces and external envelope.	Develop design of maintenance access with appropriate consultants.
5.0	Programme Risk		
5.1	Programme delay due to Value Management process between Concept and Preliminary Design Phase	Programme allowance for Value Management.	Programme update during early developed design to account for cost/value management and programme delay.

8.0 Appendix

8.5 Key Design Issues to Resolve During DD

- Auditorium Interior Design – Design consideration have been discussed with QS and Acoustic engineer for appropriate cost accounting. Further design exploration will occur during Developed Design.

- Design of maintenance Access to external screen

- Foyer Interior Design

- Plant – Further optimisation of the plant areas and service zones will be undertaken during developed design.

8.0 Appendix

8.7 Sapper Moore-Jones Street Beautification

As encouraged by the Urban Design Panel, a proposal to upgrade Sapper Moore-Jones has been developed and presented to the council. The scope of the street beautification upgrade sits outside of the Waikato Regional Theatre Project Scope and has been provided in the Preliminary Design on a 'For Information' basis. The overall intent for the proposal is to transform the bottom of the street into a pedestrian priority 'shared street' public space that will create a welcoming point of arrival to the theatre and increase safety

- Key aspects include:
- Allow for a raised table at the bottom of Sapper Moore-Jones Place to slow down vehicular traffic
- Allow for flush kerbs along the bottom of Sapper Moore-Jones Place to allow for better manoeuvrability of the trucks tracking curve.
- Upgrade the street finishes to a durable slip resistant concrete

① Raised Table Shared Zone

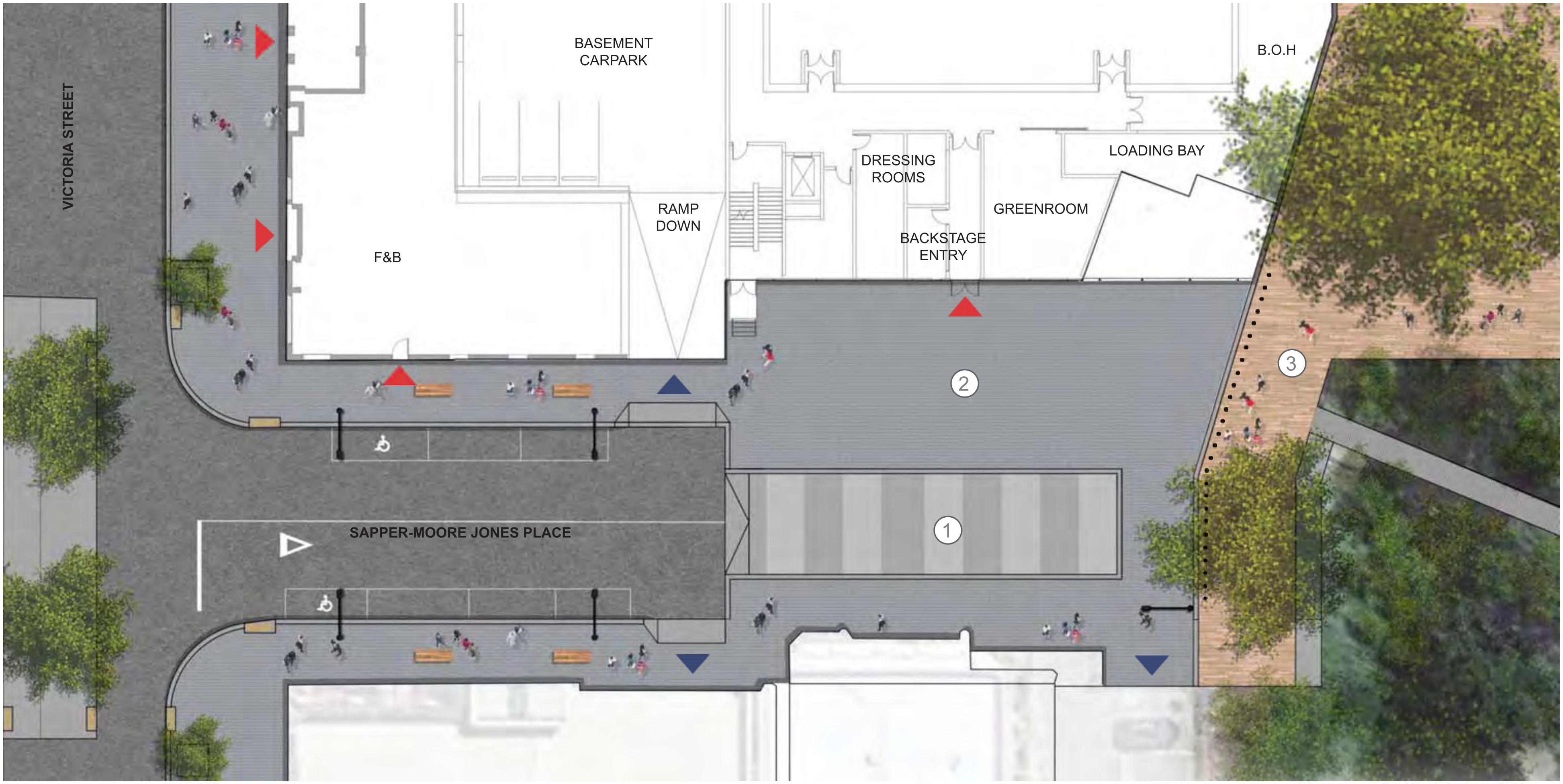
② Plaza Area

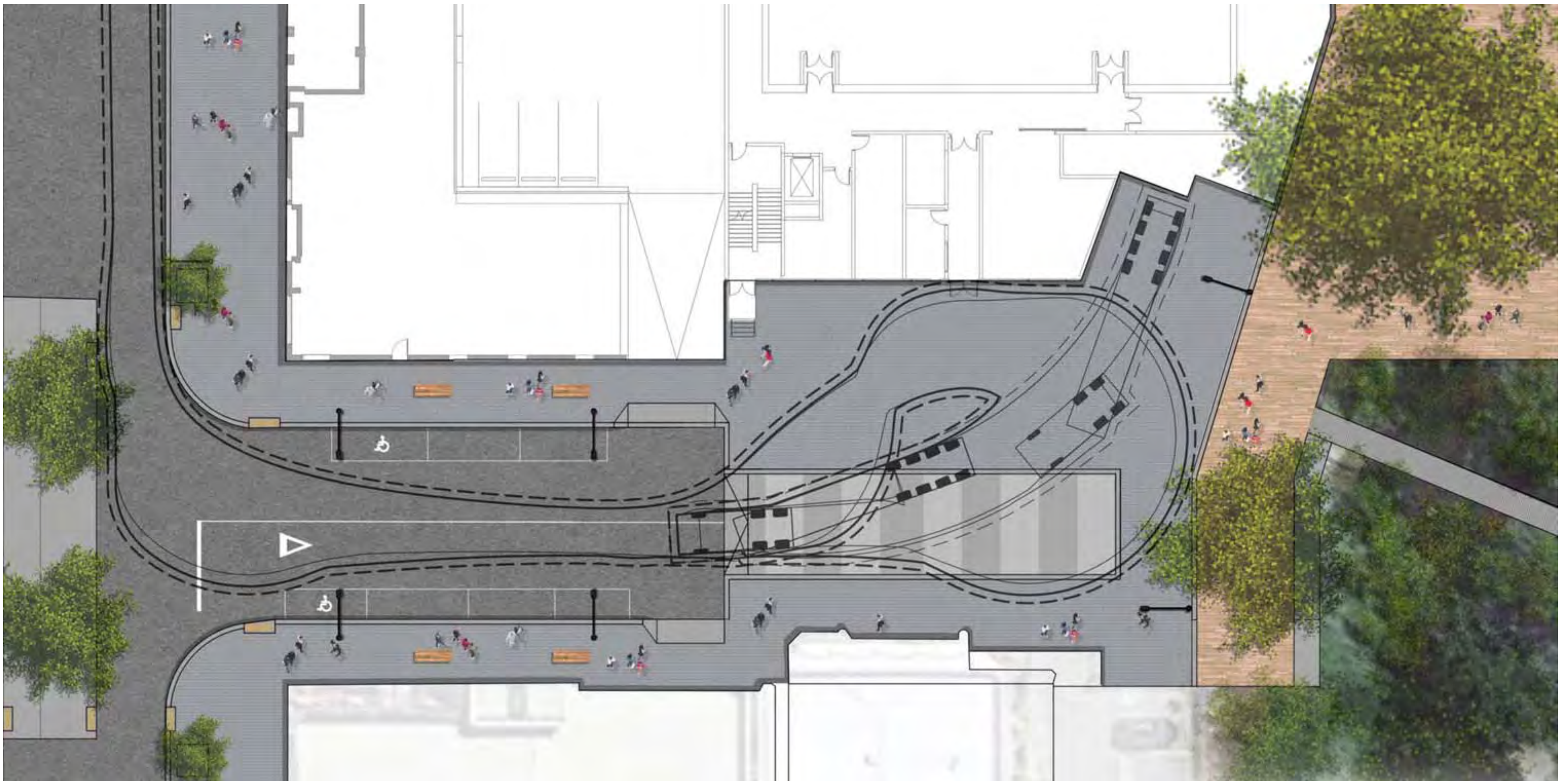
③ Timber Decking

KEY

▲ Building Entry Points

▲ Vehicle Entry Points





8.0 Appendix

8.8 Development of Embassy Park

As encouraged by the Urban Design Panel, a proposal to modify Embassy Park has been developed and presented to key stakeholders including the Riff Raff Public Art Trust.

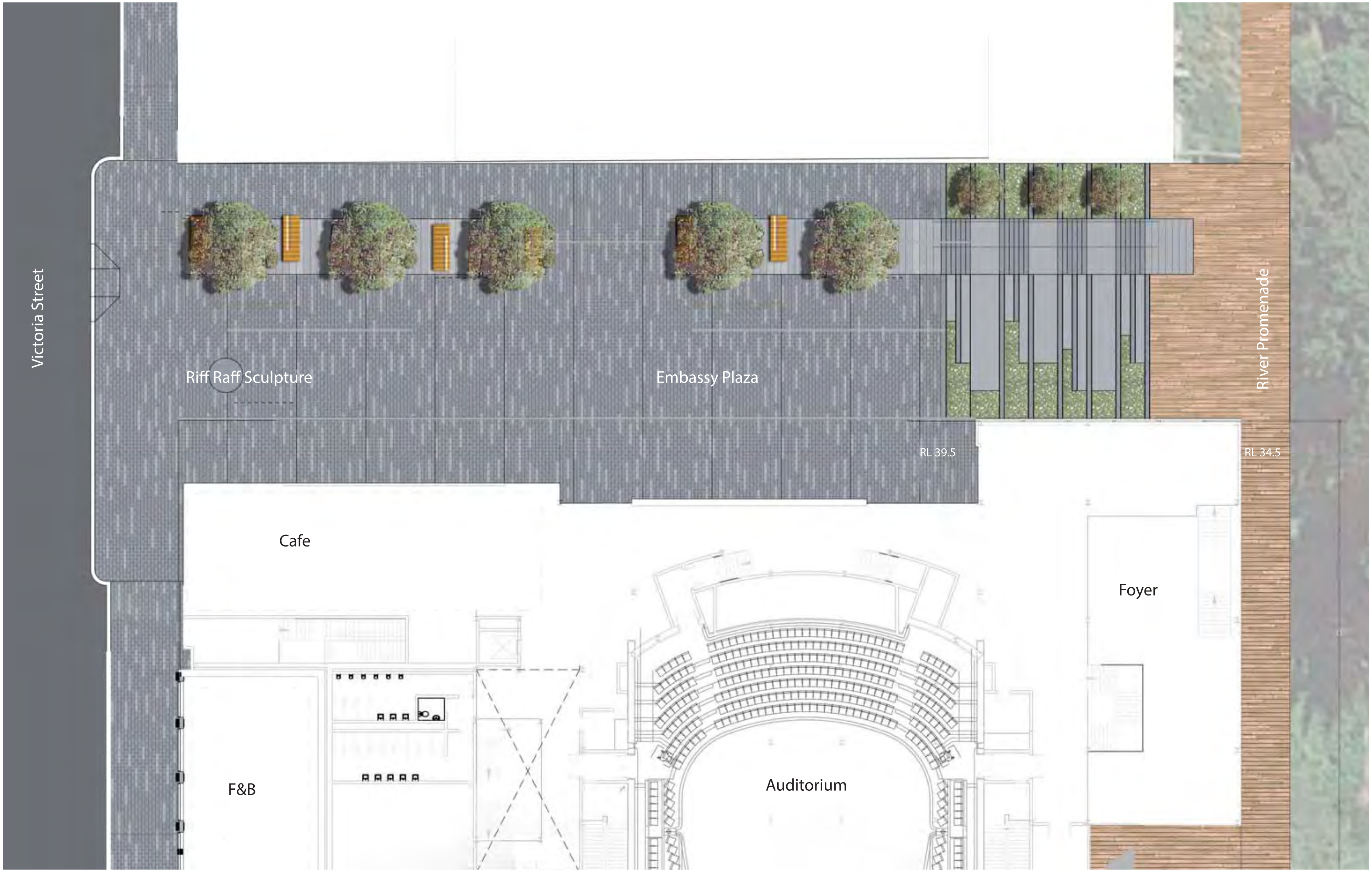
The scope of the street beautification upgrade sits outside of the Waikato Regional Theatre project scope and has been provided in the Preliminary Design on a 'For Information' stakeholder engagement basis.

The current condition of Embassy Park is a linear park that does not have active frontages along the theatre site and Northern property. With the introduction of the theatre on the site, the nature of the park will change.

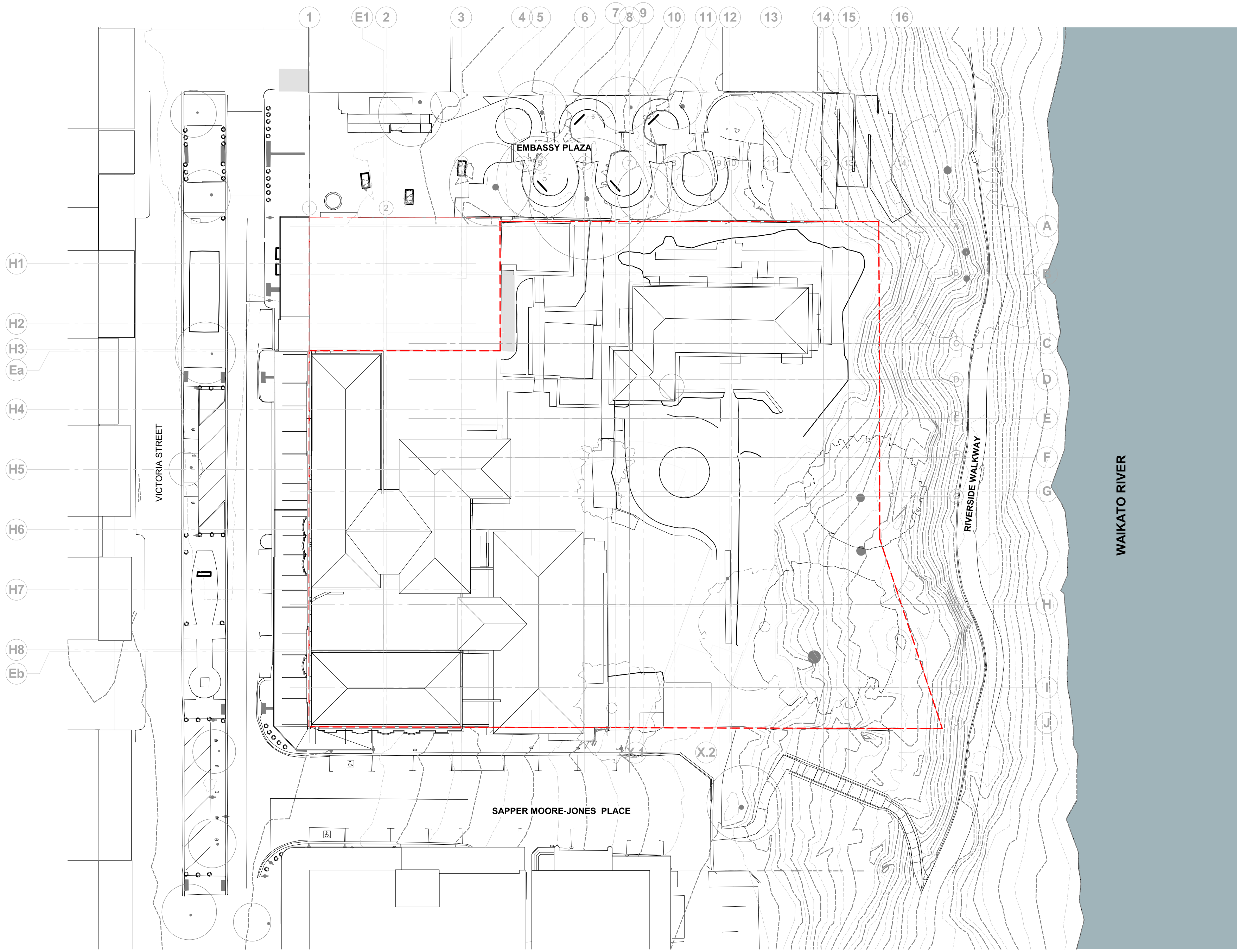
The overall intent for the proposal is to allow Embassy Park to respond to the proposed front door location of the theatre with a better level connection. The current levels along the Southern boundary of Embassy Park drop away from the Theatre Ground floor RL across the length of the park.

Key aspects of the proposal include:

- A generous level area outside the theatre front doors that will be able to be used as a flexible informal performance space.
- Open up views down the river in similar way to Victoria on the River.
- Connect to the Ferrybank Masterplans proposed upper river promenade and theatre outdoor deck level.
- Future proof for potential development at property to the North of Embassy Park.
- Increase safety in park with better connection to the theatre
- Enhance the connection to the hotel café on the corner of Victoria Street and Embassy Park.


Victoria Street
Riff Raff Sculpture
Embassy Plaza
River Promenade
RL 39.5
RL 34.5
Cafe
Foyer
F&B
Auditorium

DRAWINGS



WAIKATO REGIONAL THEATRE

ISSUE DATE:19/07/2018

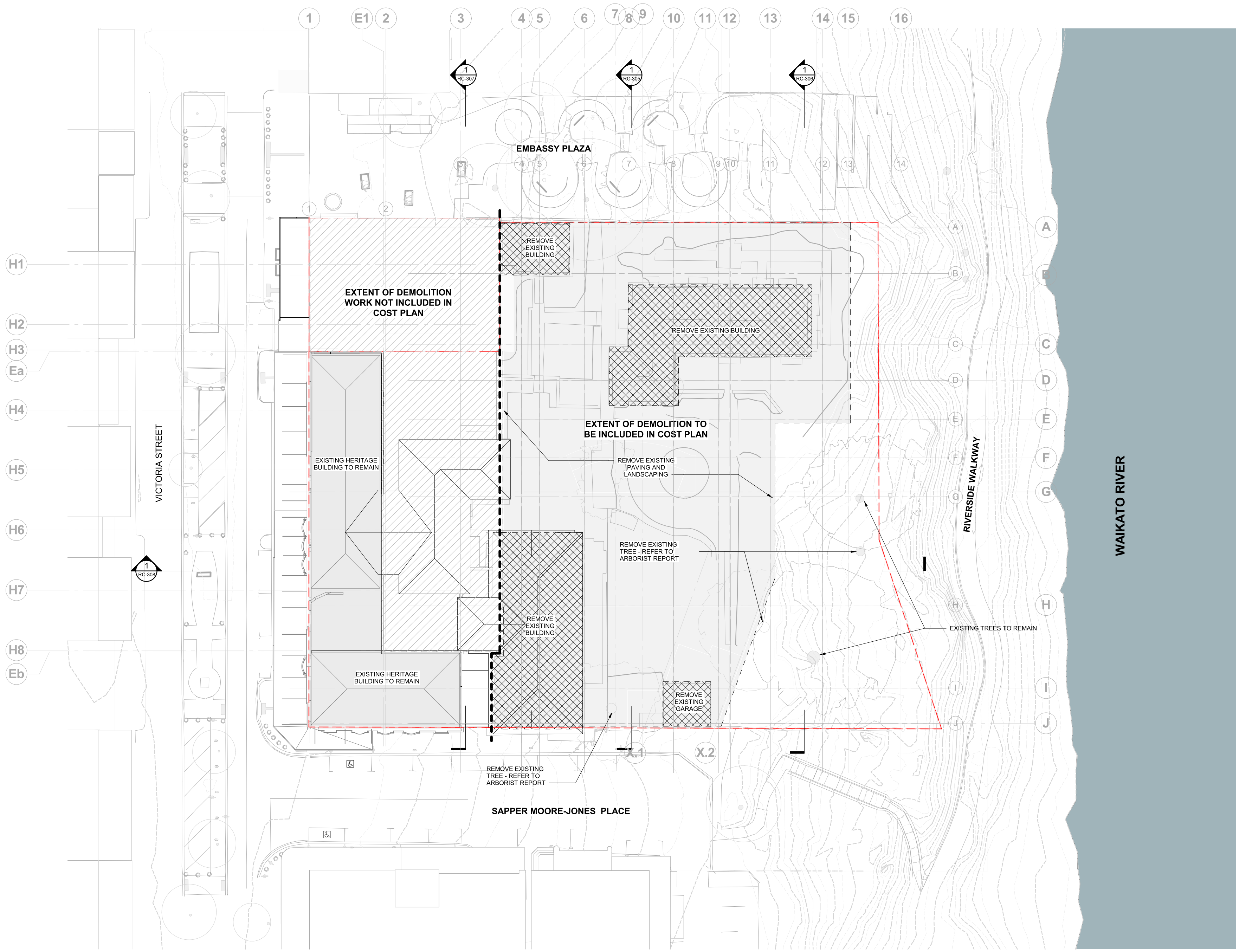
DRAWING **Site Plan - Existing**

SCALE @ A1 **1 : 250**

JOB No. **216365.00**

DRAWING No. **SK-011** REV. **A**

Jasmax



WAIKATO REGIONAL THEATRE

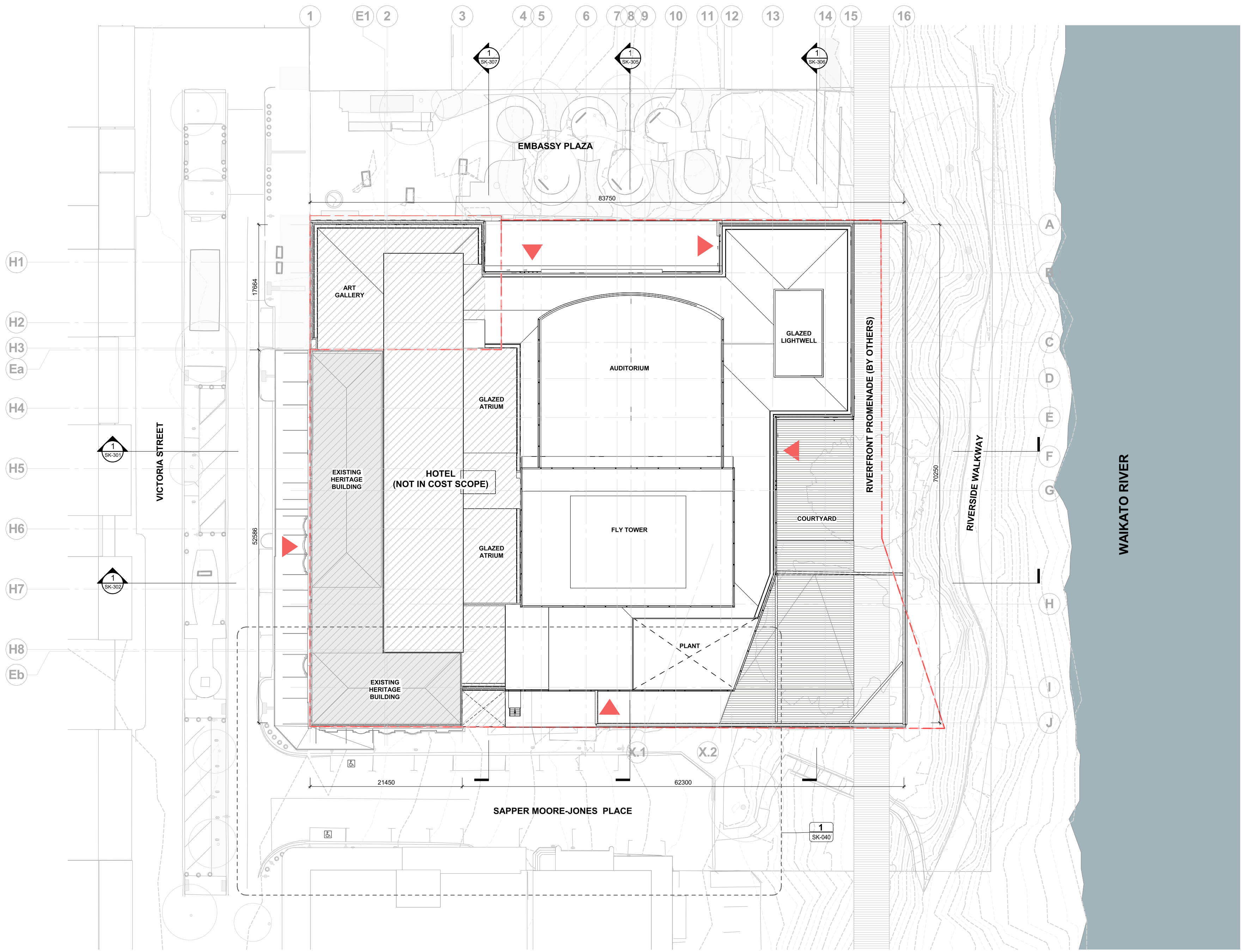
JOB No. **216365.00**

ISSUE DATE:19/07/2018

DRAWING **Demolition Plan**

SCALE @ A1 **1 : 250**

DRAWING No. **SK-012** REV. **A**



WAIKATO REGIONAL THEATRE

JOB No. 216365.00

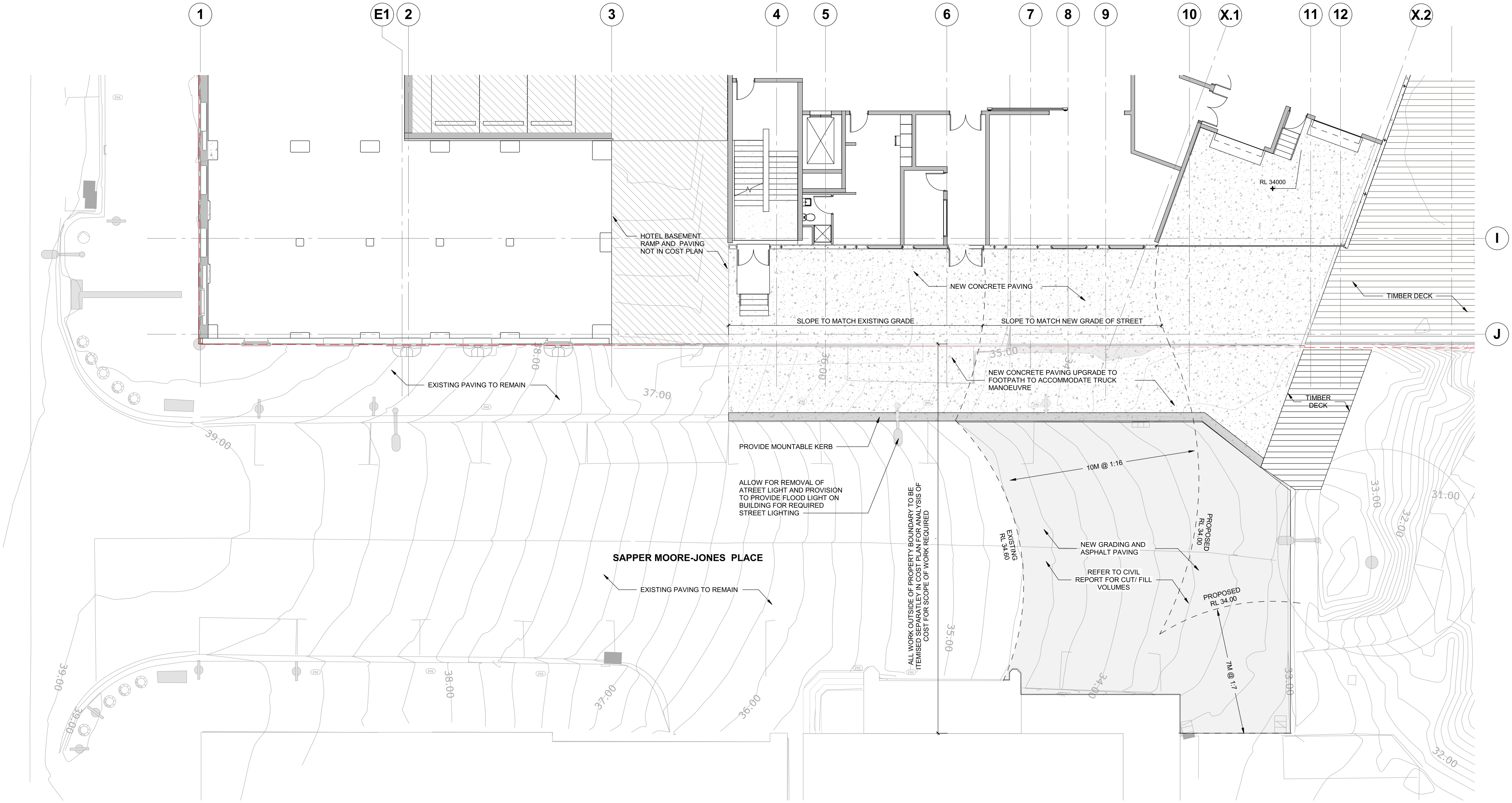
ISSUE DATE:19/07/2018

DRAWING **Site Plan - Proposed**

SCALE @ A1 **1 : 250**

DRAWING No. **SK-013** REV. **A**

Jasmax



1 | 1 : 100 Plan Detail
SK-013 | SK-040 - Enlarged Site Plan - Sapper Moore-Jones Place

WAIKATO REGIONAL THEATRE

JOB No. **216365.00**

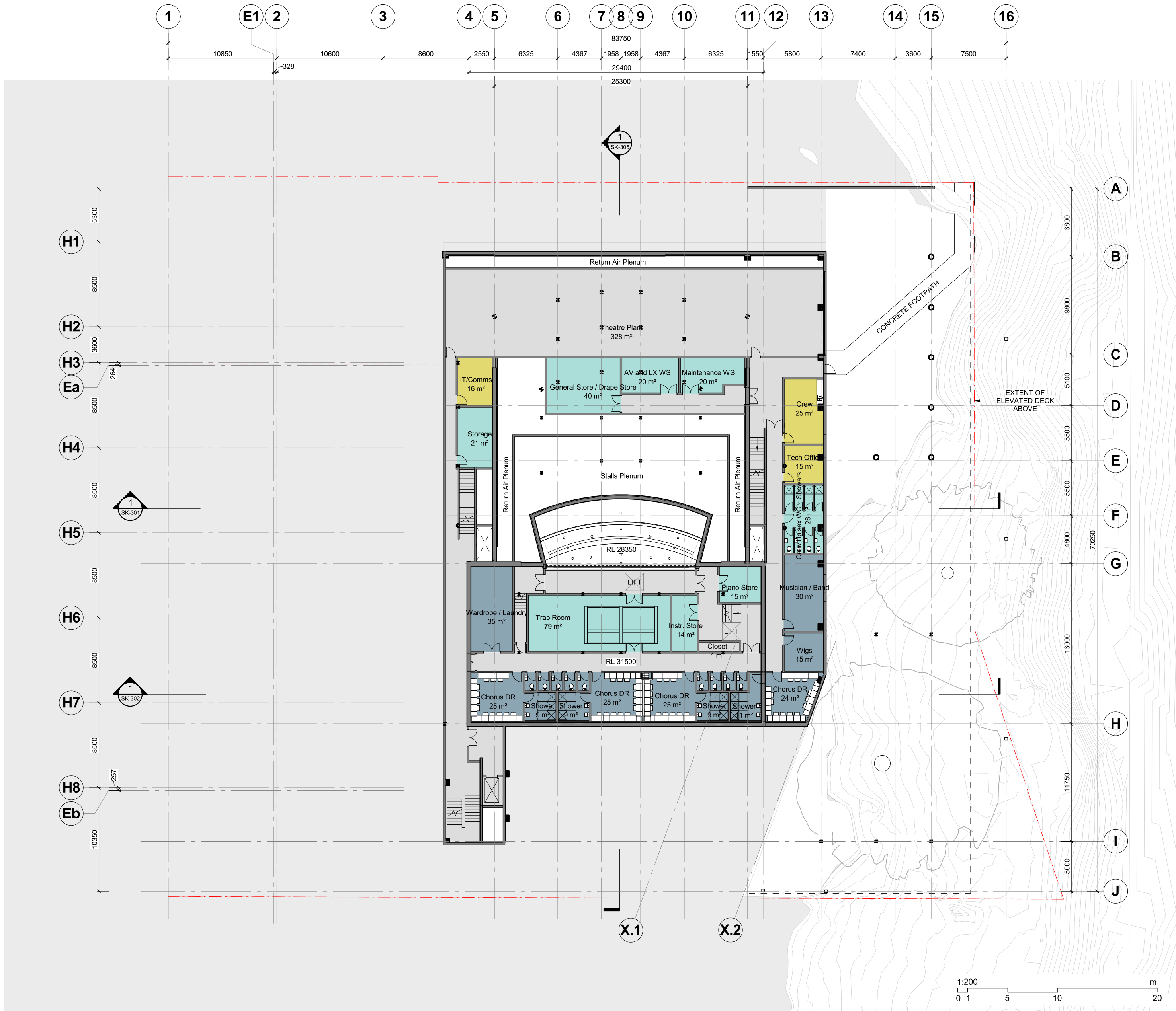
ISSUE DATE:19/07/2018

DRAWING **Sapper Moore-Jones Place - Enlarged Plan**

SCALE @ A1 **1 : 100**

DRAWING No. **SK-040** REV. **A**

Jasmax

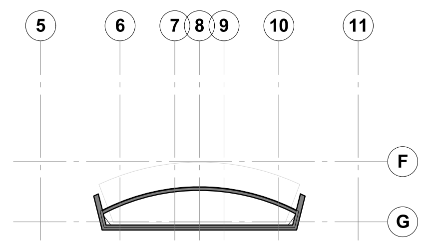


1 | 1 : 200 Plan
RC-201 | Sub-stage Space Planning

Area Zoning

- Auditorium / Stage
- Performer Areas
- Admin / Staff
- Theatre Gross

ROOM SCHEDULE - LEVEL -2...		
Name	**Area**	**Department**
Stalls Plenum	300.71 m²	
	300.71 m²	
Crew	25.27 m²	Admin / Staff
IT/Comms	16.47 m²	Admin / Staff
Tech Office	14.53 m²	Admin / Staff
	56.27 m²	
AV and LX WS	19.69 m²	Auditorium / Stage
Crew Unisex WC + Showers	26.45 m²	Auditorium / Stage
General Store / Drape Store	40.00 m²	Auditorium / Stage
Instr. Store	14.11 m²	Auditorium / Stage
Maintenance WS	20.29 m²	Auditorium / Stage
Piano Store	14.97 m²	Auditorium / Stage
Storage	20.58 m²	Auditorium / Stage
Trap Room	79.22 m²	Auditorium / Stage
	235.31 m²	
Chorus DR	25.23 m²	Performer Areas
Chorus DR	24.74 m²	Performer Areas
Chorus DR	24.74 m²	Performer Areas
Chorus DR	24.36 m²	Performer Areas
Musician / Band	29.81 m²	Performer Areas
Shower	10.80 m²	Performer Areas
Shower	8.62 m²	Performer Areas
Shower	8.62 m²	Performer Areas
Shower	8.62 m²	Performer Areas
Wardrobe / Laundry	35.27 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
Wigs	14.82 m²	Performer Areas
	233.30 m²	
Closet	3.58 m²	Theatre Gross
Theatre Circulation	107.14 m²	Theatre Gross
Theatre Circulation	14.48 m²	Theatre Gross
Theatre Circulation	138.80 m²	Theatre Gross
Theatre Circulation	23.81 m²	Theatre Gross
Theatre Circulation	41.33 m²	Theatre Gross
Theatre Circulation	31.96 m²	Theatre Gross
Theatre Circulation	13.73 m²	Theatre Gross
Theatre Lift	5.83 m²	Theatre Gross
Theatre Plant	328.19 m²	Theatre Gross
	708.84 m²	
Grand total	1534.42 m²	



2 | 1 : 200 Part Plan
RC-201 | Orchestra Pit/Seating Wagon

WAIKATO REGIONAL THEATRE

ISSUE DATE:19/07/2018

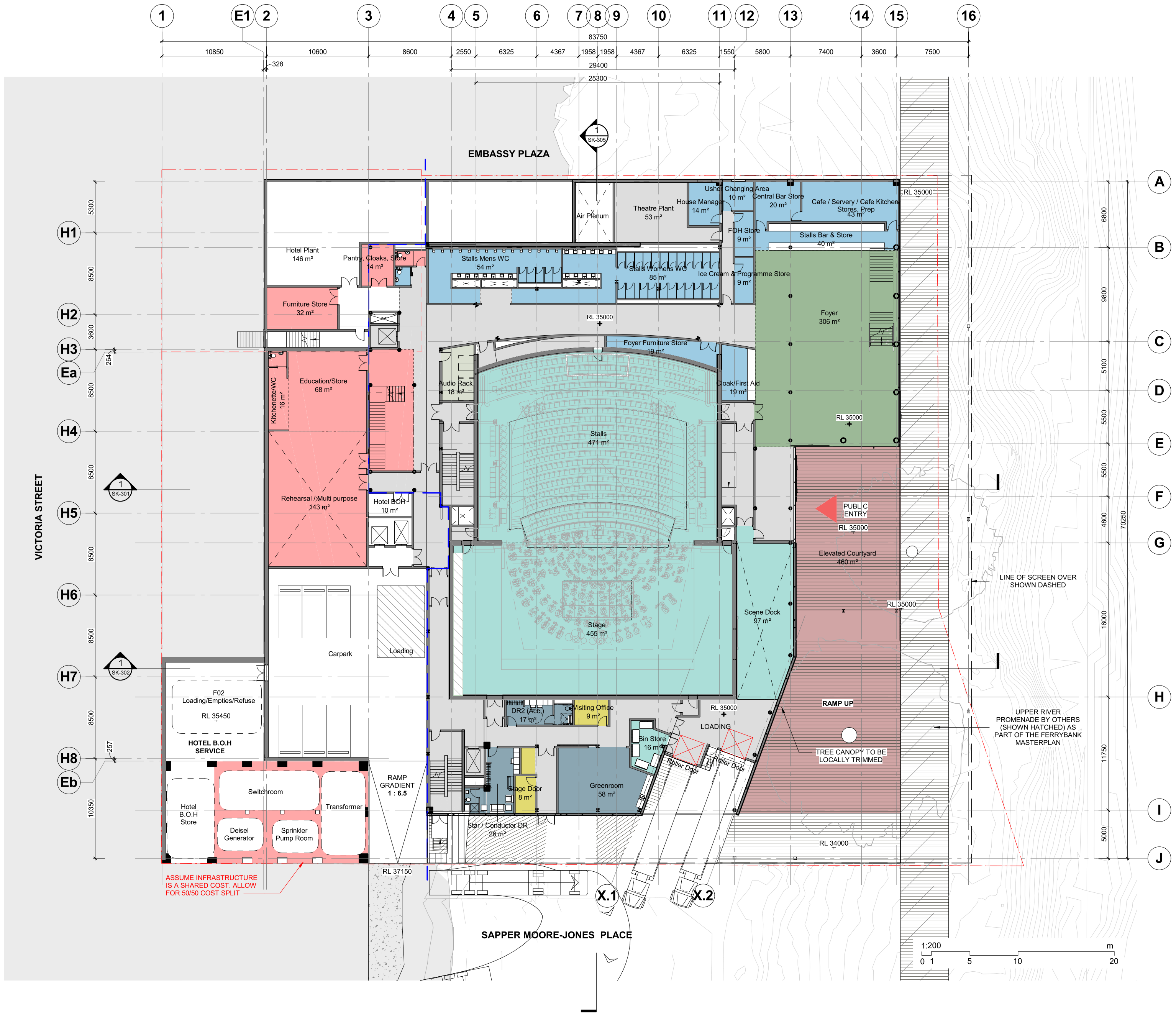
DRAWING **Space Planning - Level -2 (Sub-stage)**

SCALE @ A1 **1 : 200**

JOB No. **216365.00**

DRAWING No. **SK-110** REV. **Q**

Jasmax



ROOM SCHEDULE - LEVEL -1...

Name	Area	Department
Waiting	3.89 m²	Admin / Staff
Visiting Office	9.29 m²	Admin / Staff
Stage Door	7.88 m²	Admin / Staff
	21.06 m²	
Bin Store	15.86 m²	Auditorium / Stage
Scene Dock	96.73 m²	Auditorium / Stage
Stalls	471.29 m²	Auditorium / Stage
Stage	454.50 m²	Auditorium / Stage
	1038.38 m²	
Foyer	305.99 m²	Foyer
	305.99 m²	
Star / Conductor DR	26.31 m²	Performer Areas
DR2 (Acc.)	17.18 m²	Performer Areas
Greenroom	58.12 m²	Performer Areas
	101.62 m²	
Cloak/First Aid	19.32 m²	Public
Stalls Bar & Store	39.68 m²	Public
Cafe / Servery / Cafe Kitchen, Stores, Prep	42.94 m²	Public
Central Bar Store	20.17 m²	Public
Usher Changing Area	9.72 m²	Public
FOH Store	9.07 m²	Public
Ice Cream & Programme Store	9.20 m²	Public
House Manager	14.38 m²	Public
Acc WC	3.12 m²	Public
Foyer Furniture Store	19.27 m²	Public
Stalls Womens WC	85.25 m²	Public
Stalls Mens WC	53.72 m²	Public
	325.84 m²	
Audio Rack	18.28 m²	Technical Areas
	18.28 m²	
Theatre Circulation	54.14 m²	Theatre Gross
Theatre Circulation	3.33 m²	Theatre Gross
Theatre Circulation	11.42 m²	Theatre Gross
Theatre Circulation	14.06 m²	Theatre Gross
Theatre Circulation	149.37 m²	Theatre Gross
Theatre Lift	5.83 m²	Theatre Gross
Theatre Stair	27.90 m²	Theatre Gross
Theatre Stair	31.54 m²	Theatre Gross
Theatre Stair	28.87 m²	Theatre Gross
Theatre Circulation	6.60 m²	Theatre Gross
Theatre Circulation	181.53 m²	Theatre Gross
Theatre Circulation	6.60 m²	Theatre Gross
Theatre Circulation	18.12 m²	Theatre Gross
Theatre Plant	52.59 m²	Theatre Gross
Theatre Lift	6.43 m²	Theatre Gross
Theatre Circulation	39.08 m²	Theatre Gross
	637.41 m²	
Grand total	2448.59 m²	

Area Zoning

- Foyer
- Public
- Auditorium / Stage
- Performer Areas
- Technical Areas
- Admin / Staff
- Theatre Gross
- Shared Hotel / Theatre
- Courtyard
- Hotel Gross

WAIKATO REGIONAL THEATRE

JOB No. 216365.00

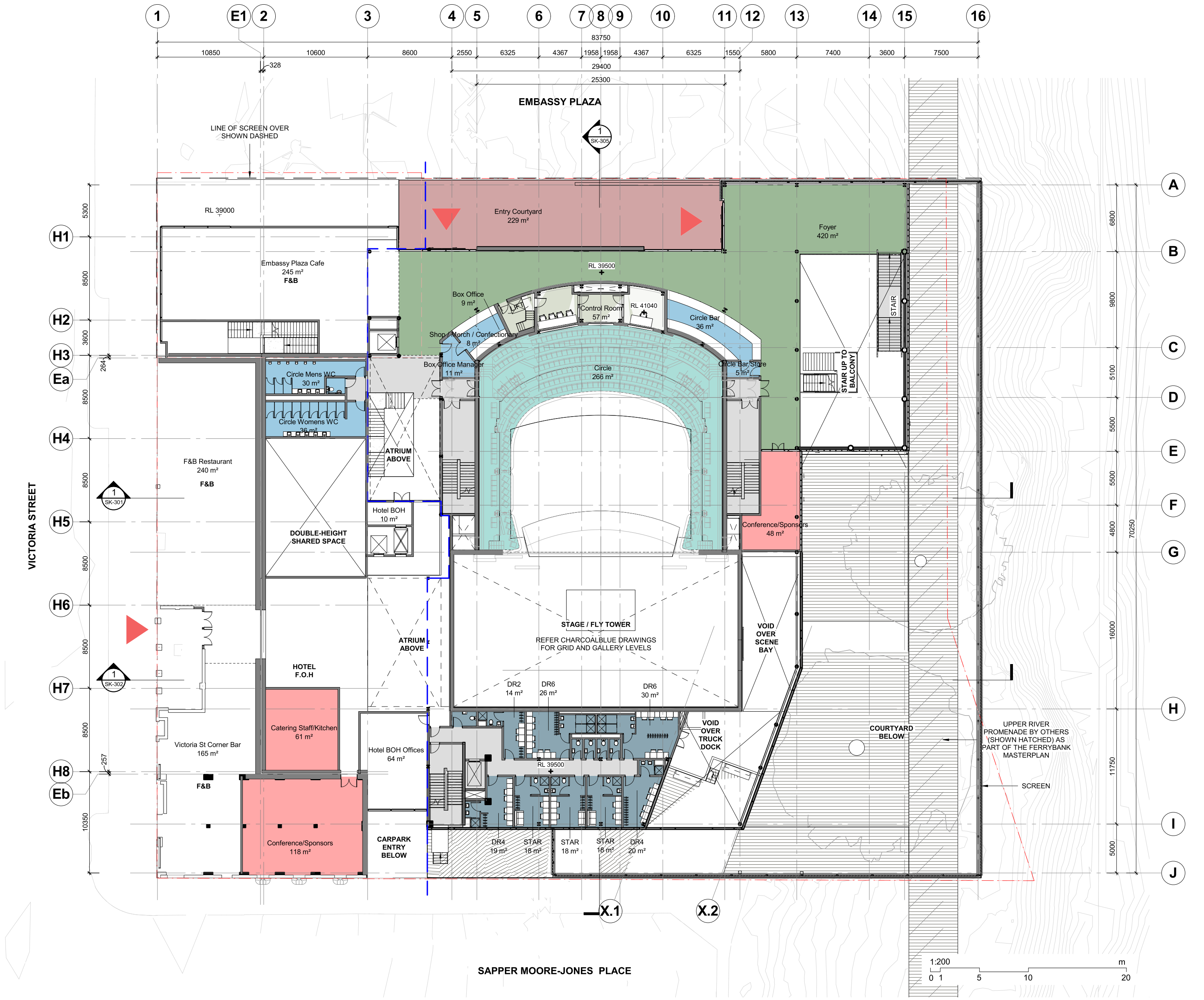
ISSUE DATE: 19/07/2018

DRAWING **Space Planning - Level -1 (Stalls)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-111** REV. **P**

Jasmax



ROOM SCHEDULE - LEVEL 1...		
Name	**Area**	**Department**
Circle	265.75 m²	Auditorium / Stage
	265.75 m²	
Foyer	419.97 m²	Foyer
	419.97 m²	
DR2	13.51 m²	Performer Areas
DR4	20.11 m²	Performer Areas
DR4	18.96 m²	Performer Areas
DR6	30.38 m²	Performer Areas
DR6	25.51 m²	Performer Areas
STAR	18.00 m²	Performer Areas
STAR	18.00 m²	Performer Areas
STAR	17.96 m²	Performer Areas
WC	9.66 m²	Performer Areas
WC	3.74 m²	Performer Areas
	175.85 m²	
Box Office	8.79 m²	Public
Box Office Manager	10.78 m²	Public
Circle Bar	36.45 m²	Public
Circle Bar Store	5.09 m²	Public
Circle Mens WC	30.00 m²	Public
Circle Womens WC	35.54 m²	Public
Shop / Merch / Confectionary	8.08 m²	Public
	134.72 m²	
Control Room	56.73 m²	Technical Areas
	56.73 m²	
Foyer Stair	24.12 m²	Theatre Gross
Theatre Circulation	34.42 m²	Theatre Gross
Theatre Circulation	40.30 m²	Theatre Gross
Theatre Circulation	6.79 m²	Theatre Gross
Theatre Circulation	6.60 m²	Theatre Gross
Theatre Lift	6.43 m²	Theatre Gross
Theatre Lift	5.83 m²	Theatre Gross
Theatre Stair	38.06 m²	Theatre Gross
Theatre Stair	38.06 m²	Theatre Gross
Theatre Stair	29.23 m²	Theatre Gross
	229.84 m²	
Grand total	1282.87 m²	

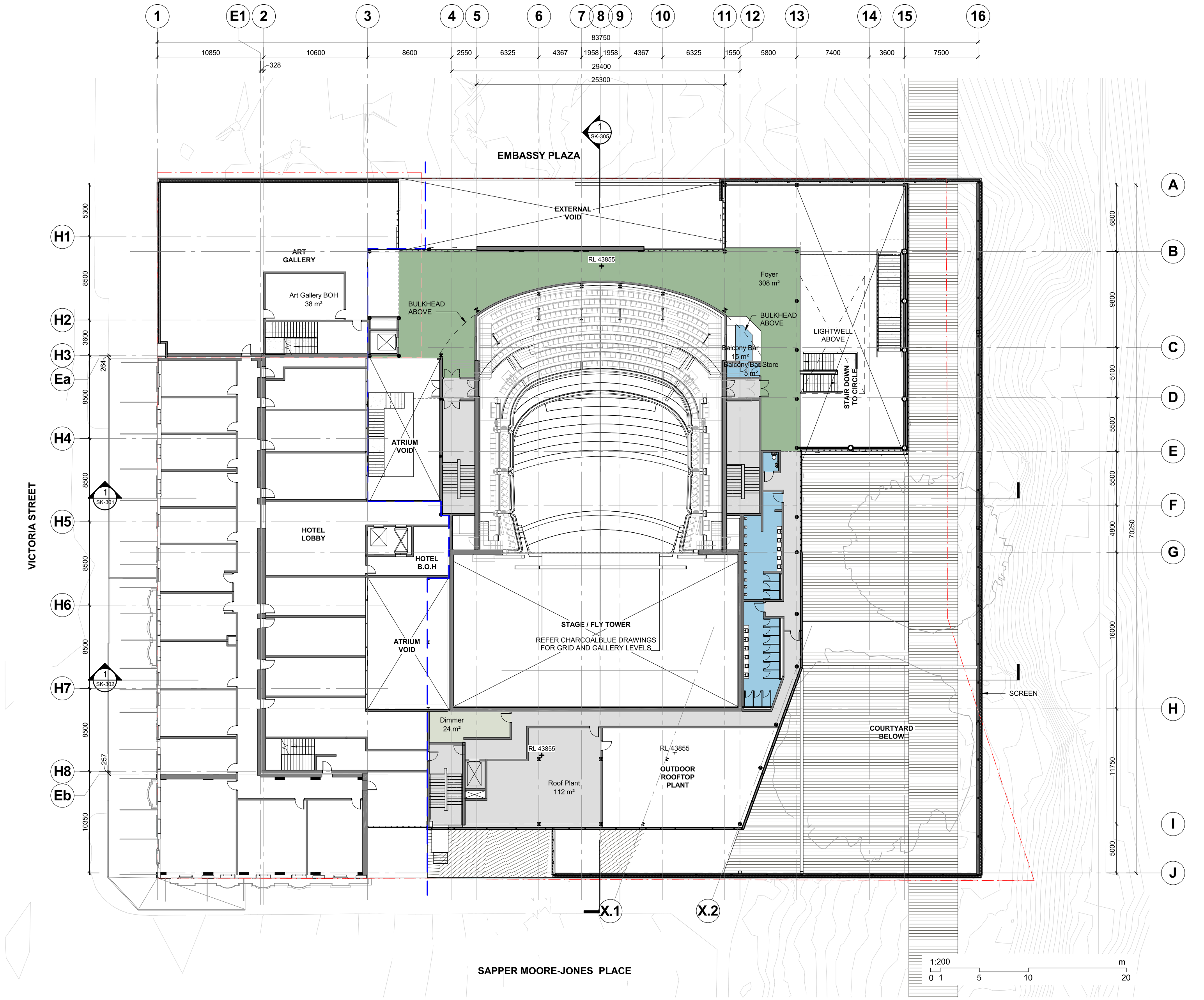
Area Zoning

- Foyer
- Public
- Auditorium / Stage
- Performer Areas
- Technical Areas
- Theatre Gross
- Shared Hotel / Theatre
- Courtyard
- Hotel Gross
- Hotel F&B

WAIKATO REGIONAL THEATRE

JOB No. **216365.00**

ISSUE DATE: 19/07/2018 | DRAWING **Space Planning - Level 1 (Circle)** | SCALE @ A1 **1 : 200** | DRAWING No. **SK-112** | REV. **P**



ROOM SCHEDULE - LEVEL 2...		
Name	**Area**	**Department**
Foyer	307.77 m²	Foyer
	307.77 m²	
Acc WC	3.04 m²	Public
Balcony Bar	14.81 m²	Public
Balcony Bar Store	4.76 m²	Public
Balcony Mens WC	36.33 m²	Public
Balcony Womens WC	35.23 m²	Public
	94.17 m²	
Dimmer	23.57 m²	Technical Areas
	23.57 m²	
Roof Plant	111.60 m²	Theatre Gross
Theatre Circulation	6.60 m²	Theatre Gross
Theatre Circulation	7.00 m²	Theatre Gross
Theatre Circulation	69.78 m²	Theatre Gross
Theatre Circulation	41.07 m²	Theatre Gross
Theatre Lift	5.83 m²	Theatre Gross
Theatre Lift	6.43 m²	Theatre Gross
Theatre Stair	38.06 m²	Theatre Gross
Theatre Stair	28.93 m²	Theatre Gross
Theatre Stair	40.37 m²	Theatre Gross
	355.66 m²	
Grand total	781.16 m²	

Area Zoning

- Foyer
- Public
- Technical Areas
- Theatre Gross
- Hotel
- Hotel Gross
- Hotel Art Gallery

FOR INFORMATION

WAIKATO REGIONAL THEATRE

JOB No. **216365.00**

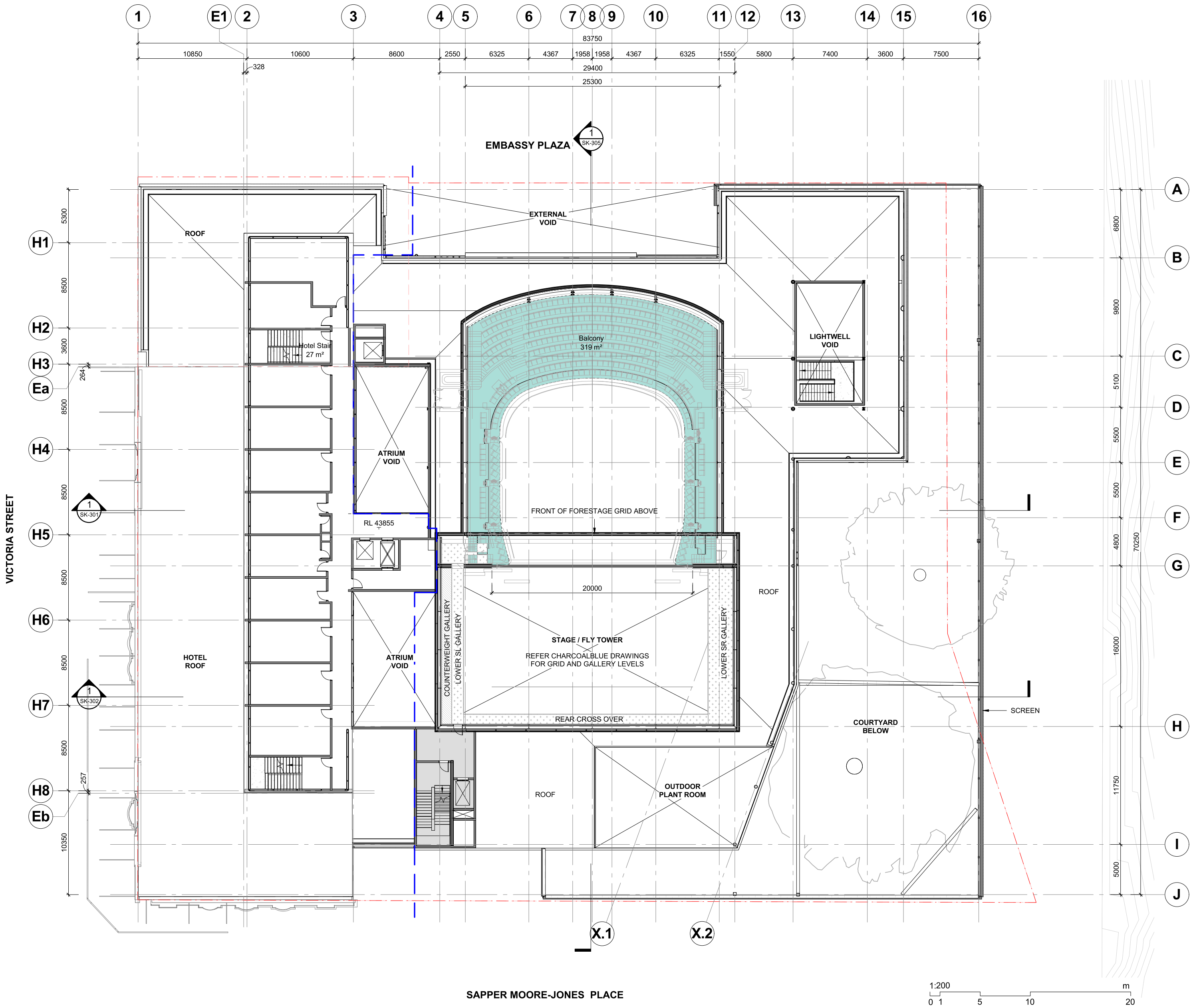
ISSUE DATE:19/07/2018

DRAWING **Space Planning - Level 2 (Balcony)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-113** REV. **N**

Jasmax



ROOM SCHEDULE - LEVEL 3...		
Name	Area	Department
Balcony	319.42 m²	Auditorium / Stage
	319.42 m²	
Theatre Circulation	20.70 m²	Theatre Gross
Theatre Lift	5.83 m²	Theatre Gross
Theatre Stair	28.25 m²	Theatre Gross
	54.77 m²	
Grand total	374.20 m²	

Area Zoning

- Auditorium / Stage
- Theatre Gross
- Hotel
- Hotel Gross

FOR INFORMATION

JOB No. 216365.00

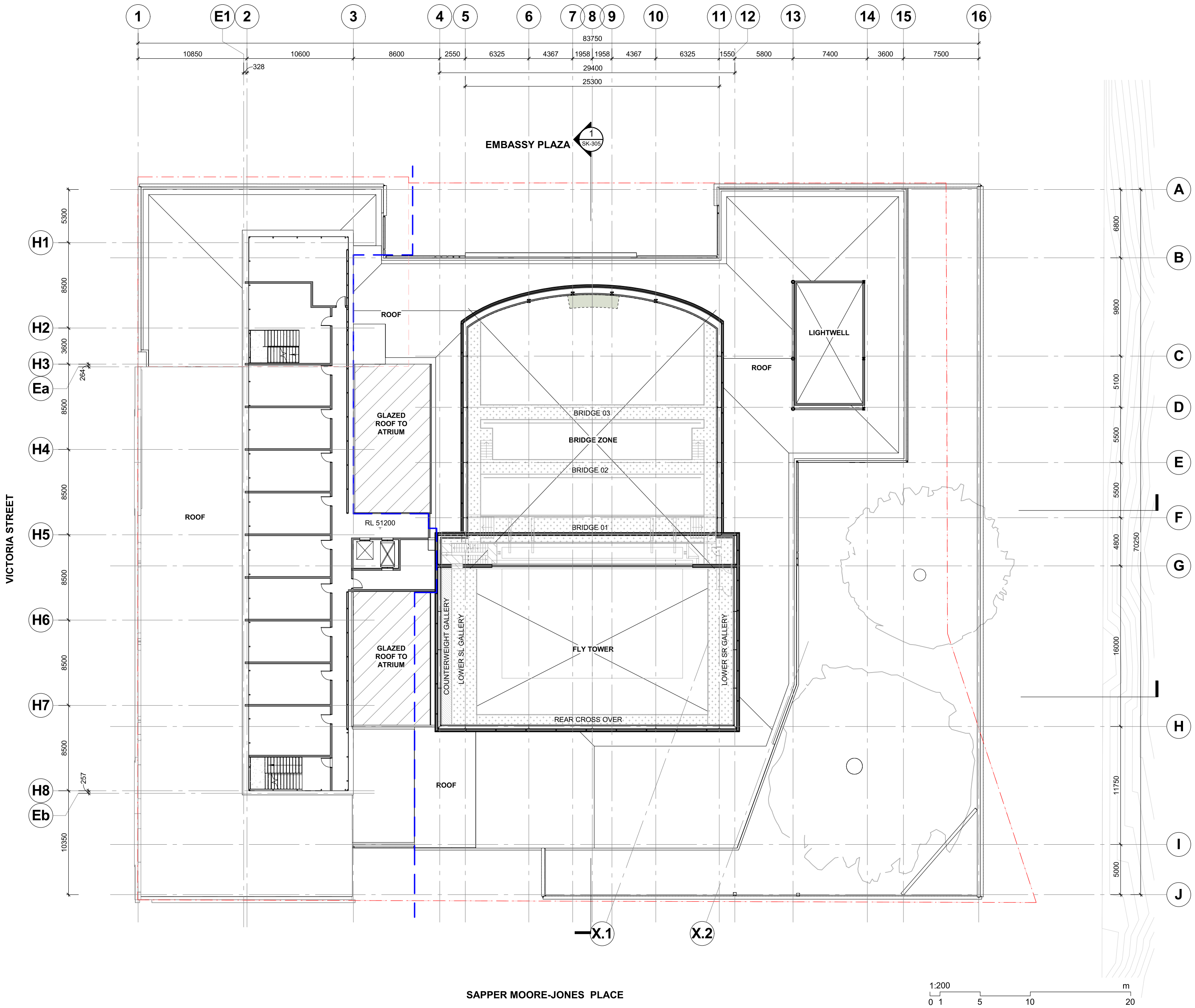
WAIKATO REGIONAL THEATRE

ISSUE DATE: 19/07/2018

DRAWING **Space Planning - Level 3 (Terrace)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-114** REV. **N**



ROOM SCHEDULE - LEVEL 4...		
Name	Area	Department
Follow Spot	6.22 m²	Technical Areas
	6.22 m²	
Grand total	6.22 m²	

Area Zoning
- Technical Areas
- Hotel
- Hotel Gross

1:200 m 0 1 5 10 20

FOR INFORMATION

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

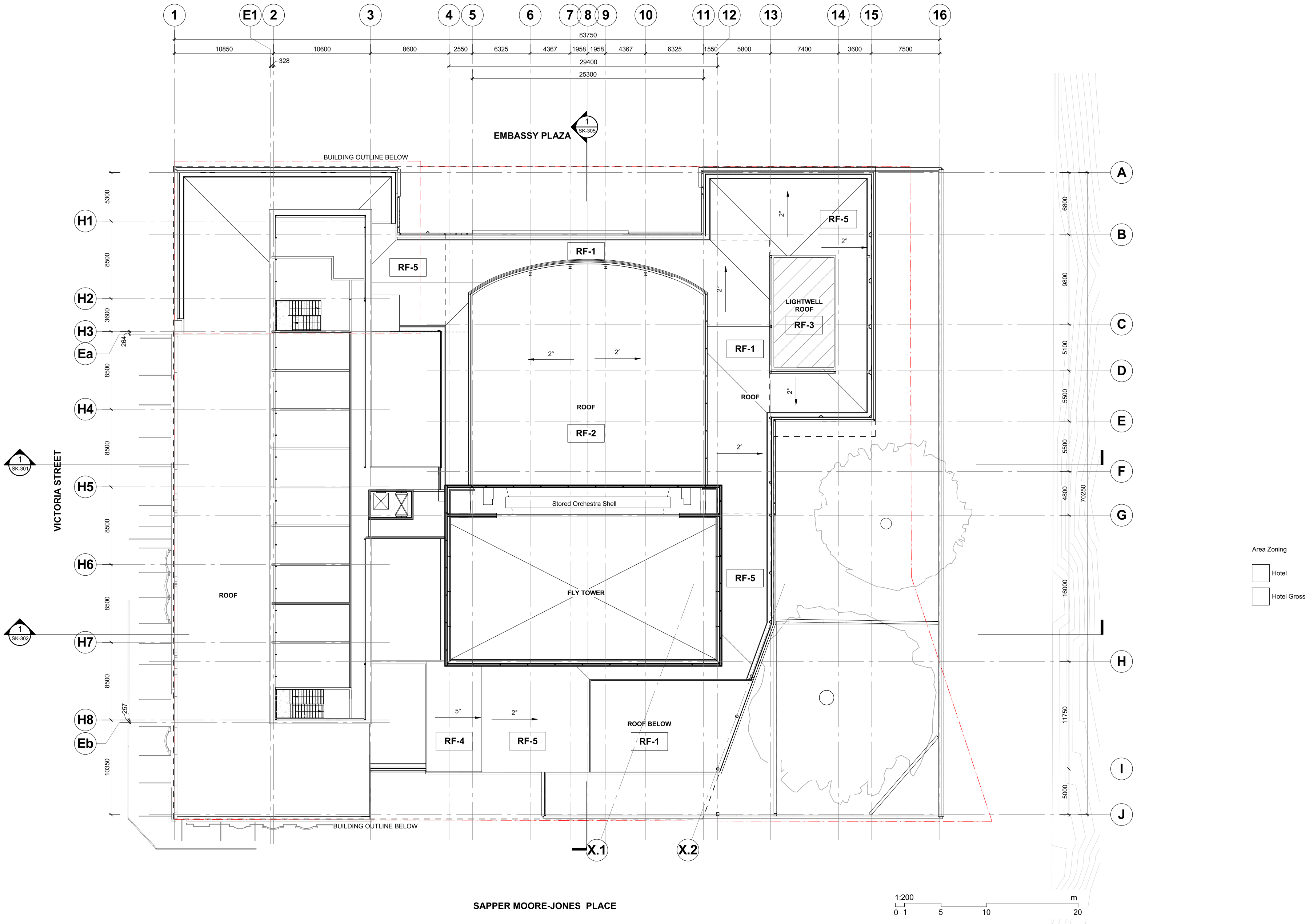
ISSUE DATE:19/07/2018

DRAWING **Space Planning - Level 4 (Bridge)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-115** REV. **L**

Jasmax



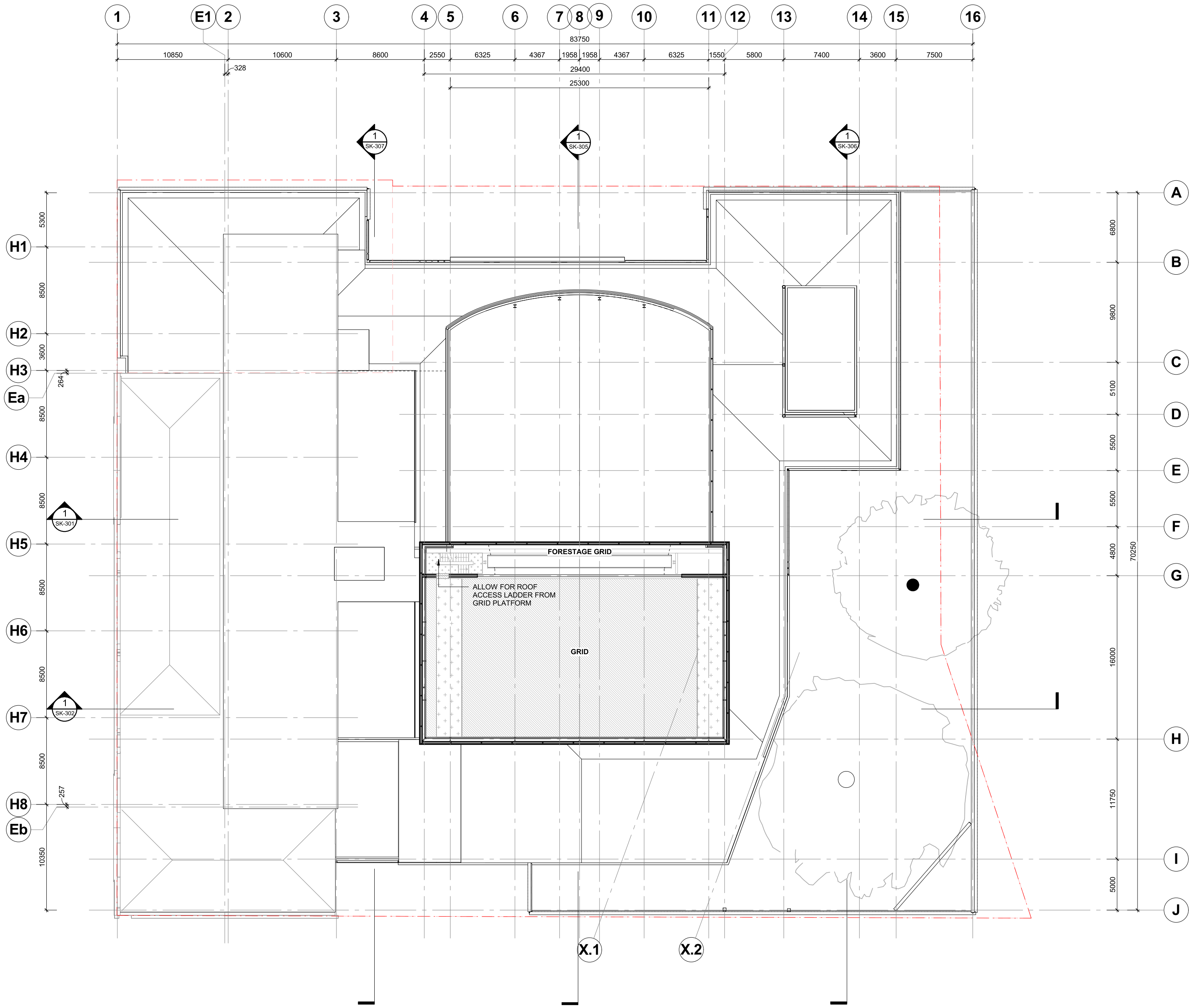
FOR INFORMATION

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

ISSUE DATE:19/07/2018 DRAWING **Space Planning - Level 5 (Auditorium Roof)** SCALE @ A1 **1 : 200** DRAWING No. **SK-116** REV. **J**

Jasmax



1 | 1 : 200 Plan Detail
RC-201 | SK-117 - Space Planning - Level 7 (Fly Tower Grid)

WAIKATO REGIONAL THEATRE

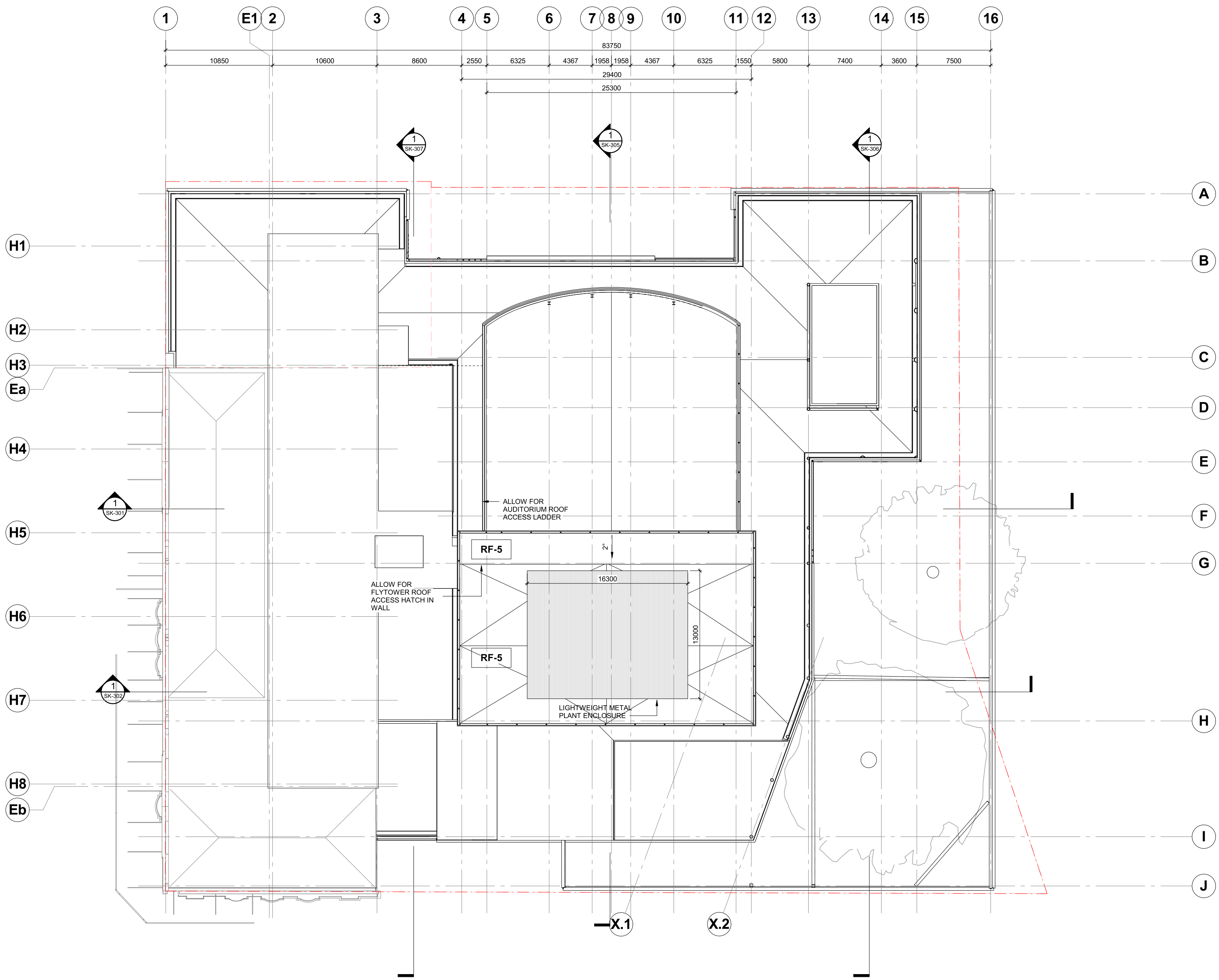
JOB No. 216365.00

ISSUE DATE: 19/07/2018

DRAWING Space Planning - Level 7 (Fly Tower Grid)

SCALE @ A1 1 : 200

DRAWING No. SK-117 REV. F



WAIKATO REGIONAL THEATRE

ISSUE DATE: 19/07/2018

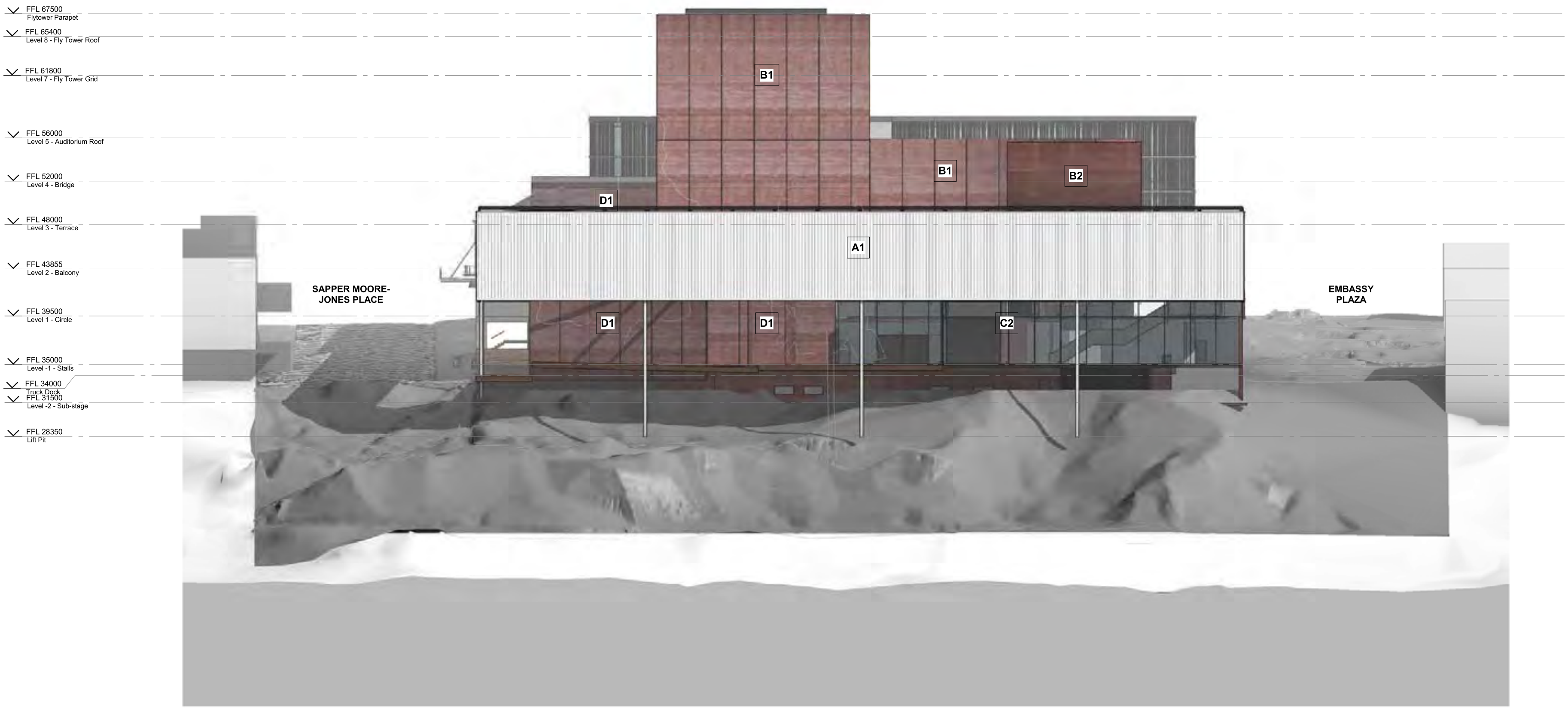
DRAWING **Space Planning - Level 8 (Fly Tower Roof)**

SCALE @ A1 **1 : 200**

JOB No. **216365.00**

DRAWING No. **SK-118** REV. **C**

Jasmax



1 | 1 : 200 Plan Detail
Elevation - Waikato River (Northeast)

WAIKATO REGIONAL THEATRE

JOB No. **216365.00**

ISSUE DATE:19/07/2018

DRAWING **Colour Elevation - Waikato River (Northeast)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-211** REV. **B**

Jasmax

1 | 1 : 200 Plan Detail
Elevation - Embassy Plaza (Northwest)

WAIKATO REGIONAL THEATRE

JOB No. **216365.00**

ISSUE DATE: 19/07/2018

DRAWING **Colour Elevation - Embassy Plaza (Northwest)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-212** REV. **B**

Jasmax

1 | 1 : 200 Plan Detail
Elevation - Sapper Moore-Jones Place (Southeast)

WAIKATO REGIONAL THEATRE

JOB No. **216365.00**

ISSUE DATE: 19/07/2018

DRAWING **Colour Elevation - Sapper Moore-Jones Place (Southeast)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-213** REV. **B**

Jasmax

1 | 1 : 200 Plan Detail
Elevation - Victoria Street (Southwest)

WAIKATO REGIONAL THEATRE

JOB No. **216365.00**

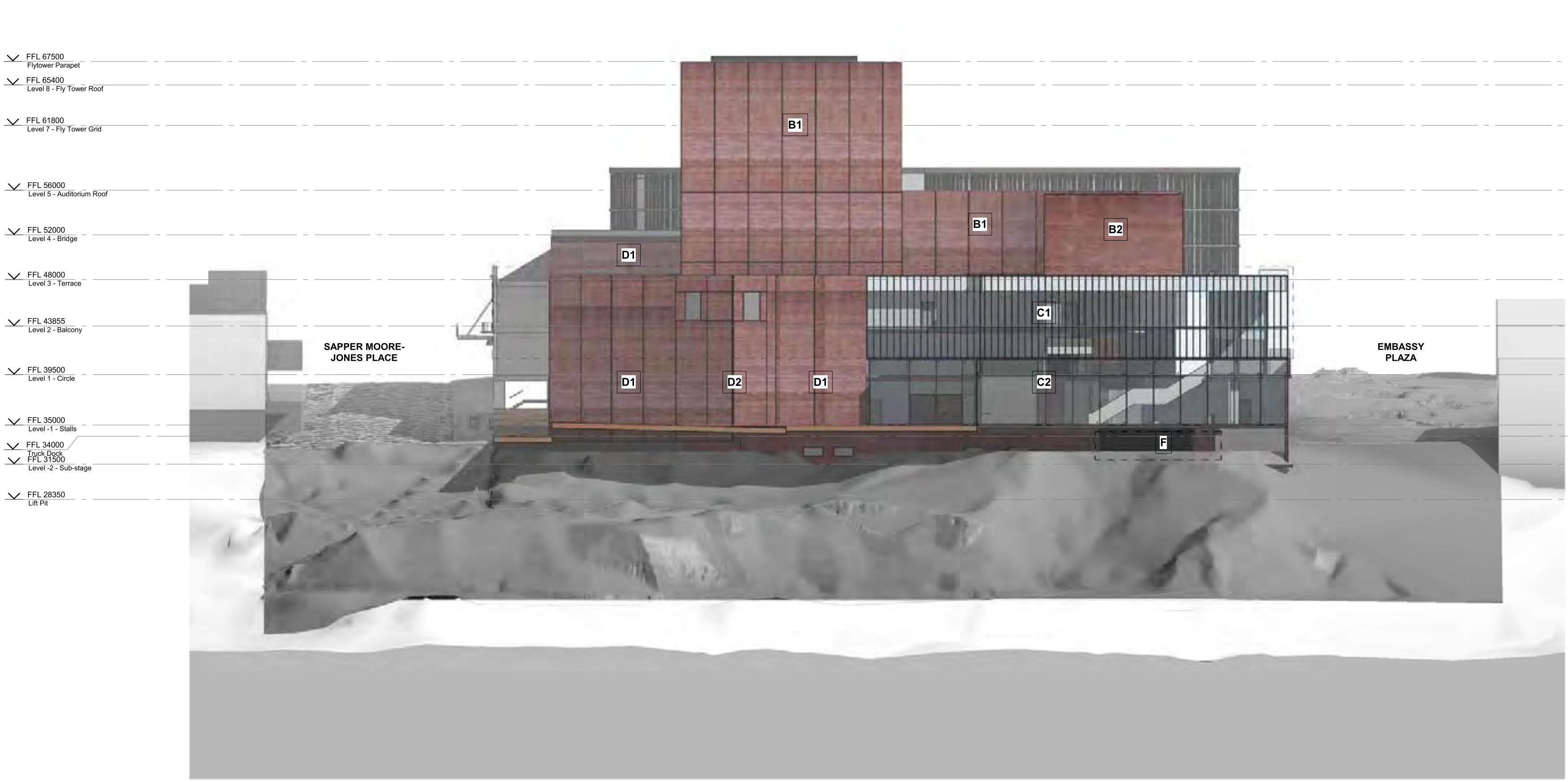
ISSUE DATE:19/07/2018

DRAWING **Colour Elevation - Victoria Street (Southwest)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-214** REV. **B**

Jasmax



1 | 1 : 200 Plan Detail
Elevation - Waikato River (Northeast)

WAIKATO REGIONAL THEATRE

JOB No. 216365.00

ISSUE DATE: 19/07/2018

DRAWING **Colour Elevation - Waikato River (Northeast) - No Screen**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-215** REV. **B**

1 | 1 : 200 Plan Detail
Elevation - Sapper Moore-Jones Place (Southeast)

WAIKATO REGIONAL THEATRE

JOB No. **216365.00**

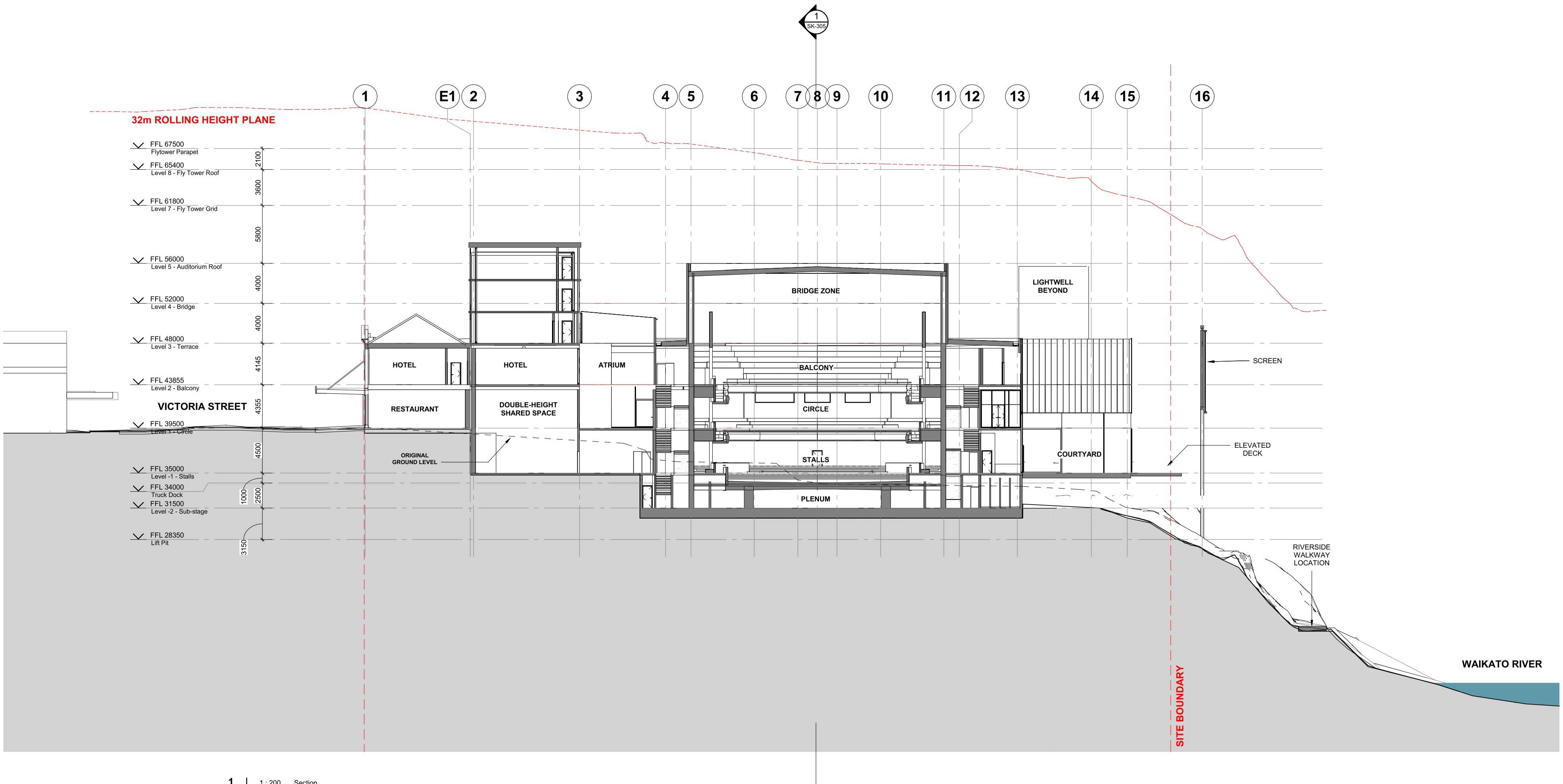
ISSUE DATE:19/07/2018

DRAWING **Colour Elevation - Sapper Moore-Jones Place (Southeast) - No Screen**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-216** REV. **B**

Jasmax



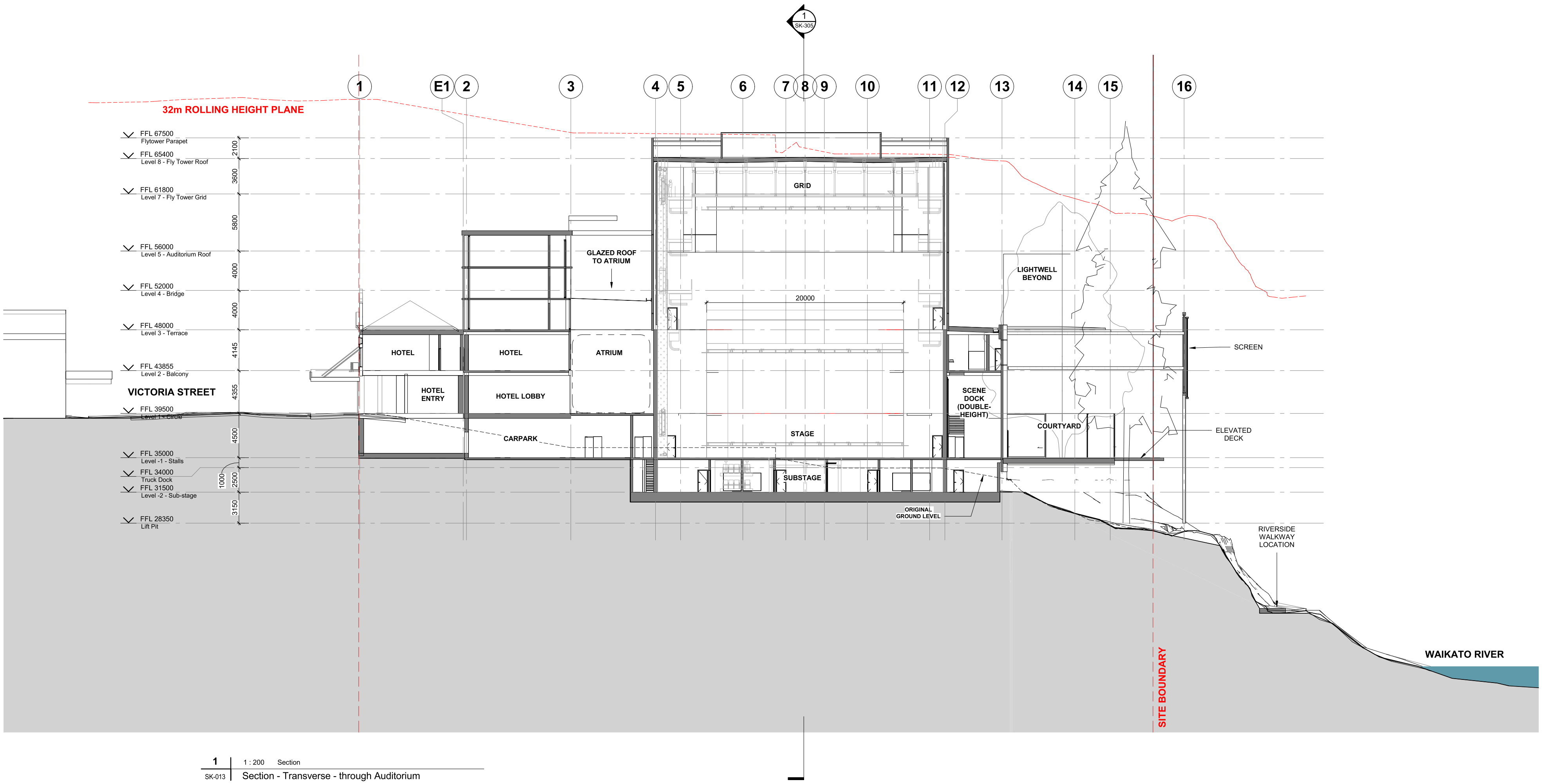
1 | 1 : 200 Section
SK-013 | Section - Transverse - through Auditorium

FOR INFORMATION

JOB No. **216365.00**

WAIKATO REGIONAL THEATRE

ISSUE DATE: 19/07/2018 DRAWING **Section - Transverse - through Auditorium** SCALE @ A1 **1 : 200** DRAWING No. **SK-301** REV. **P**



1 | 1 : 200 Section
SK-013 | Section - Transverse - through Auditorium

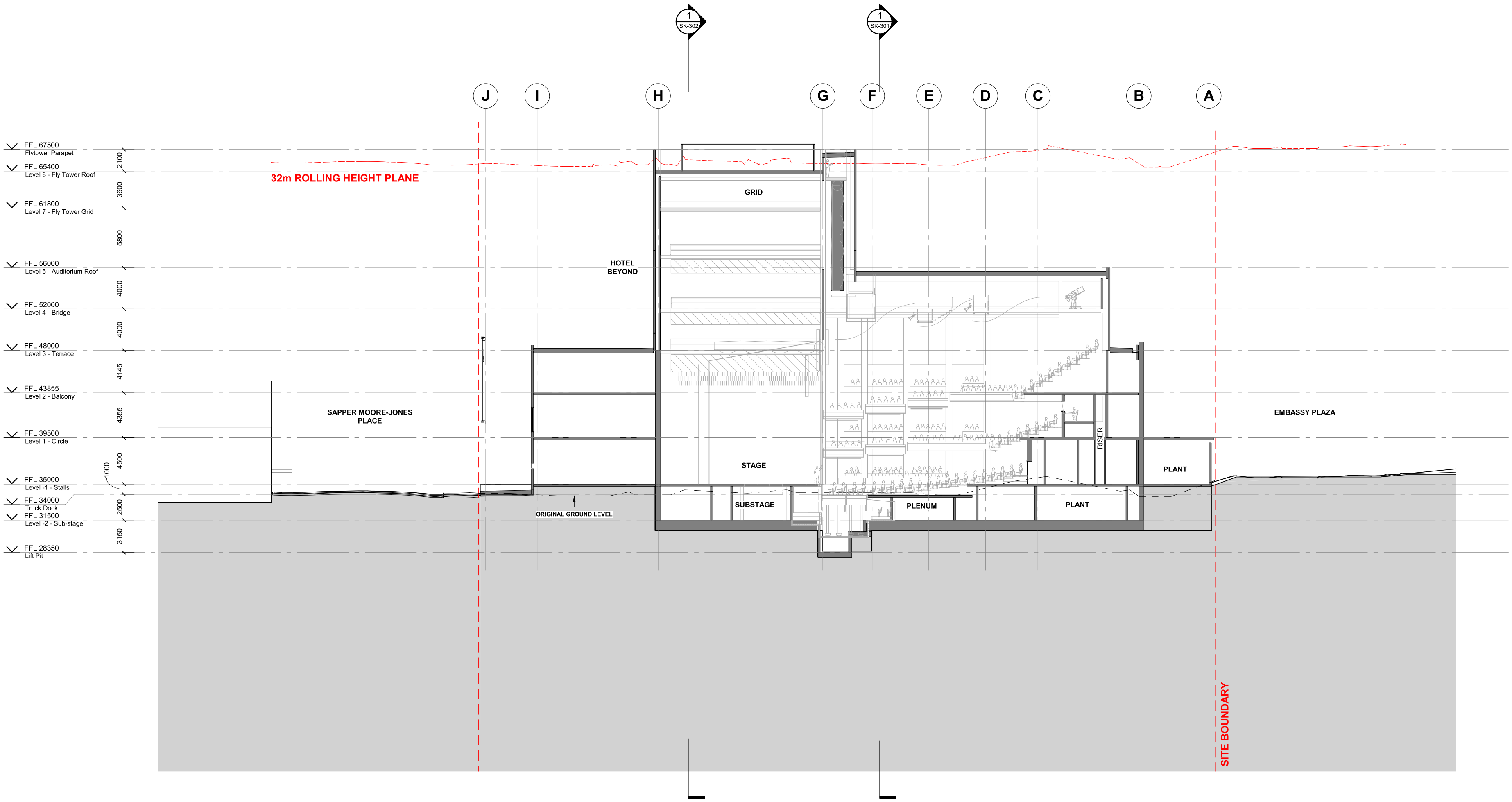
FOR INFORMATION

JOB No. **216365.00**

WAIKATO REGIONAL THEATRE

ISSUE DATE:19/07/2018 DRAWING **Section - Transverse - through Flytower** SCALE @ A1 **1 : 200** DRAWING No. **SK-302** REV. **L**

Jasmax



1 | 1 : 200 Section
SK-013 | Section - Longitudinal - through Auditorium

FOR INFORMATION

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

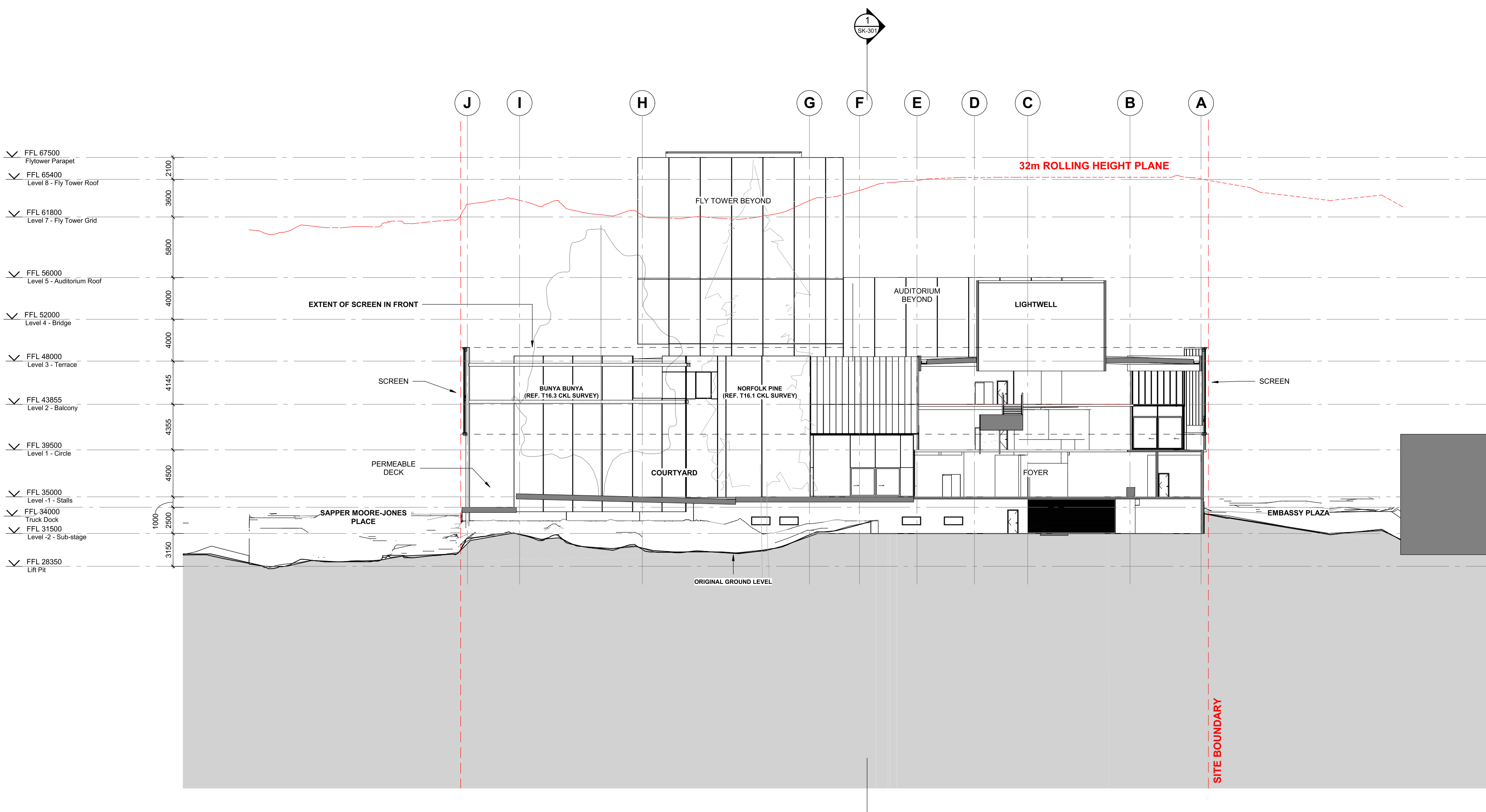
ISSUE DATE: 19/07/2018

DRAWING **Section - Longitudinal - through Auditorium**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-305** REV. **M**

Jasmax



1 | 1 : 200 Section
SK-013 | Section - Longitudinal - through Courtyard and Theatre F.O.H.

WAIKATO REGIONAL THEATRE

JOB No. **216365.00**

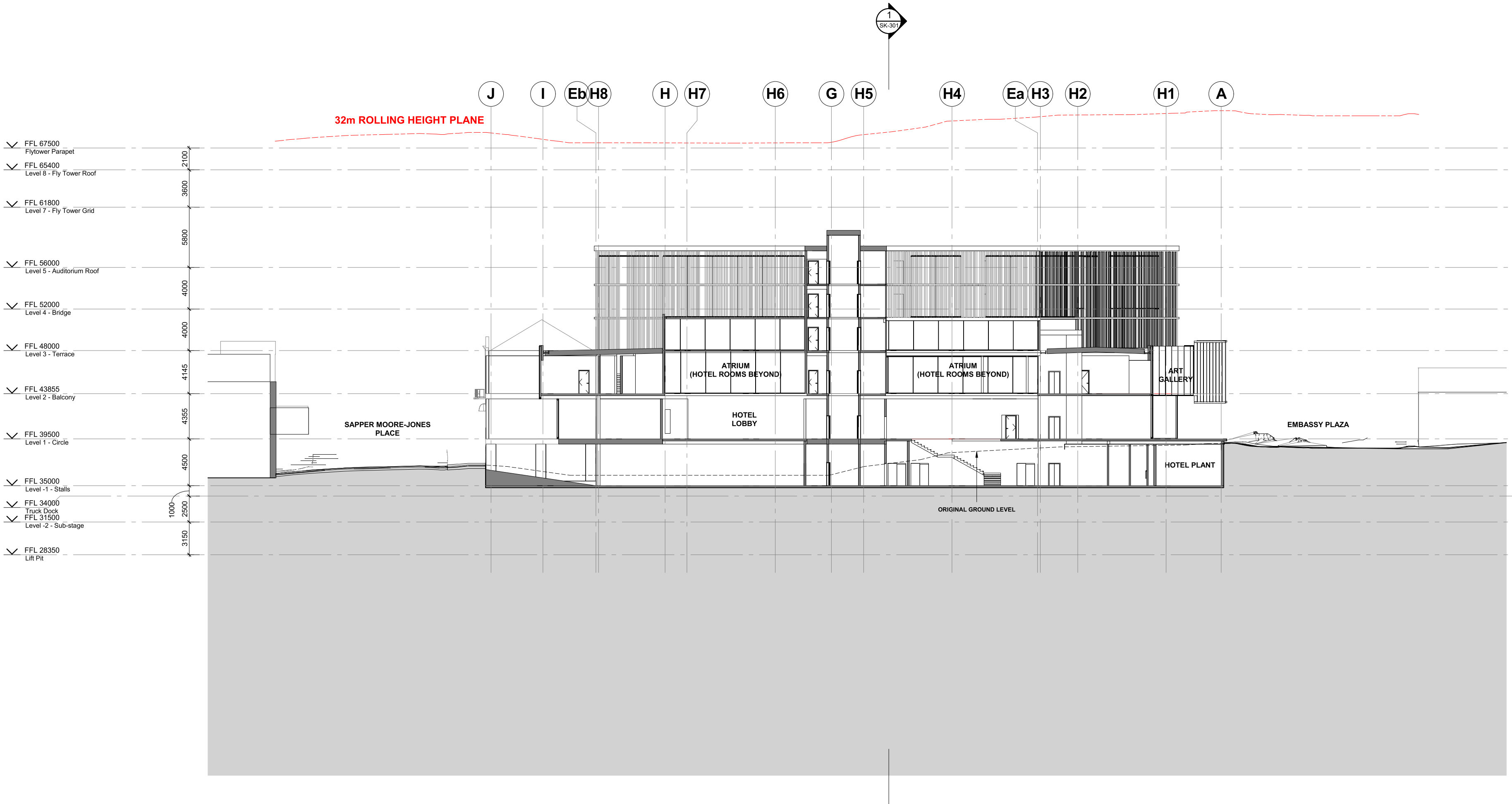
ISSUE DATE: 19/07/2018

DRAWING **Section - Longitudinal - through Courtyard and Theatre F.O.H.**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-306** REV. **H**

Jasmax



1 | 1 : 200 Section

SK-013 | Section - Longitudinal - through Car Entry and Atrium

WAIKATO REGIONAL THEATRE

JOB No. **216365.00**

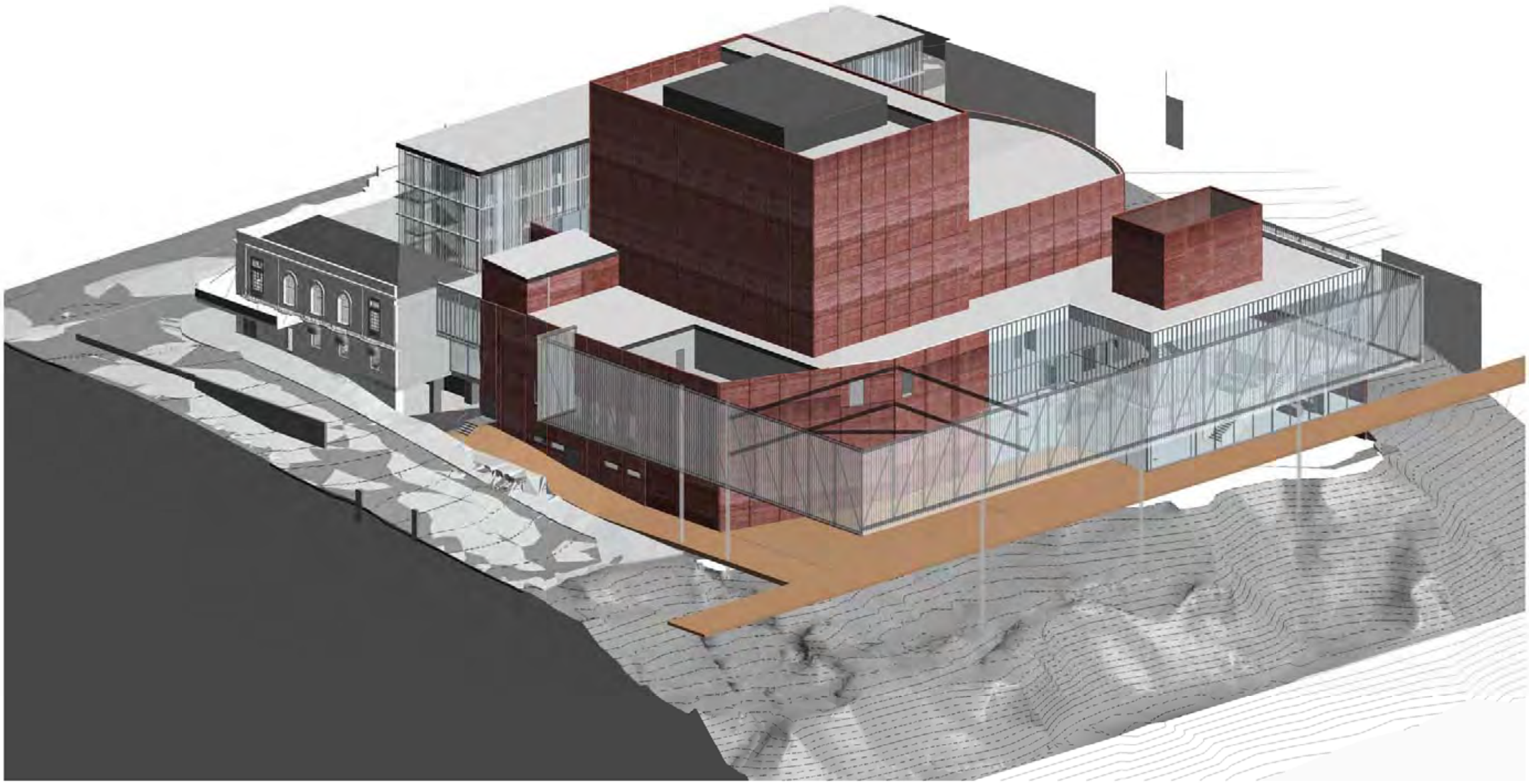
ISSUE DATE: 19/07/2018

DRAWING **Section - Longitudinal - through Car Entry and Atrium**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-307** REV. **K**

Jasmax



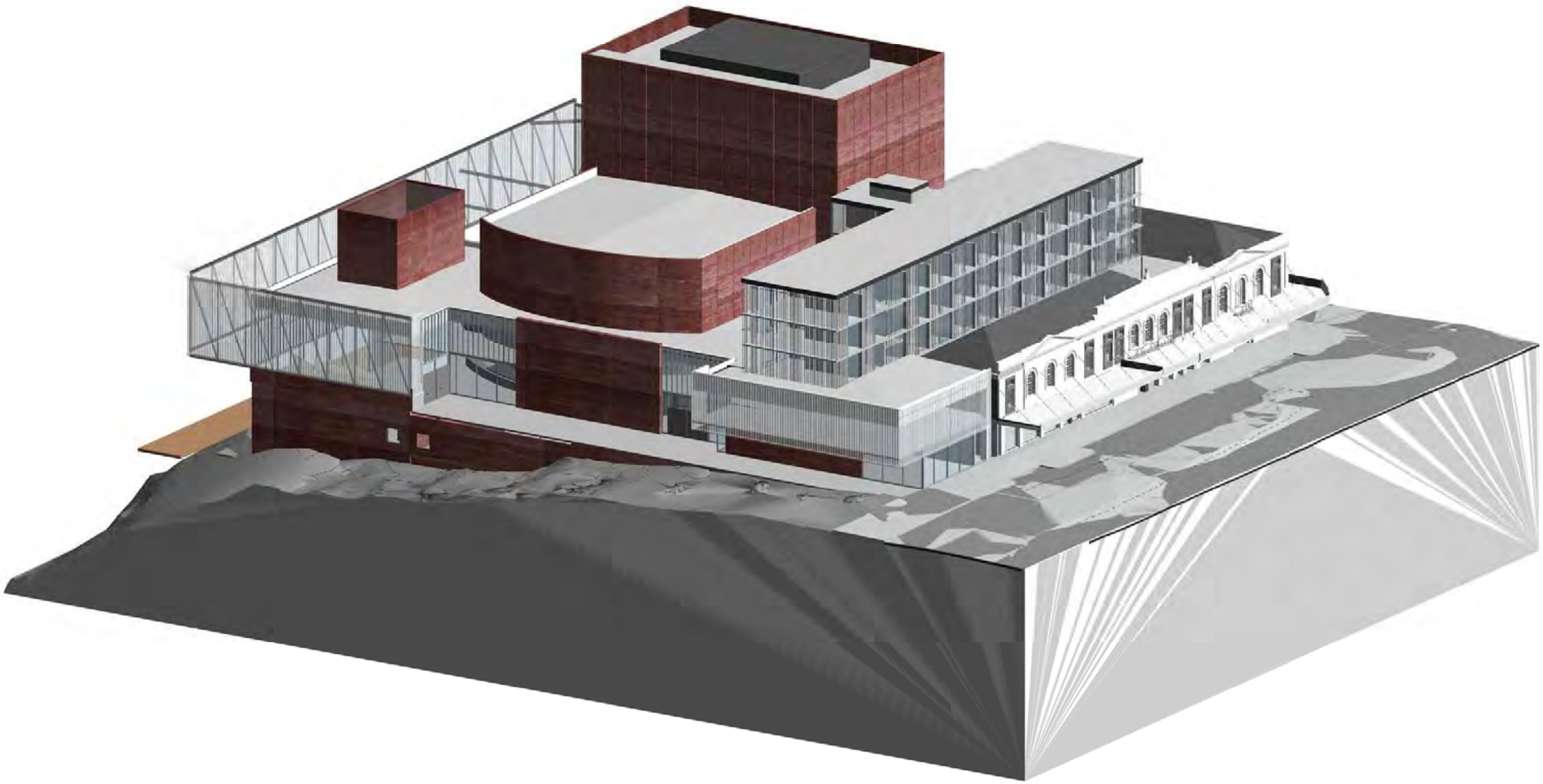
FOR INFORMATION

WAIKATO REGIONAL THEATRE

JOB No. **216365.00**

ISSUE DATE:19/07/2018 | DRAWING **Axonometric** | SCALE @ A1 | DRAWING No. **SK-601** | REV. **B**

Jasmax



1 | Plan Detail
3D - AXON FROM NORTHWEST

WAIKATO REGIONAL THEATRE

JOB No. **216365.00**

ISSUE DATE:19/07/2018

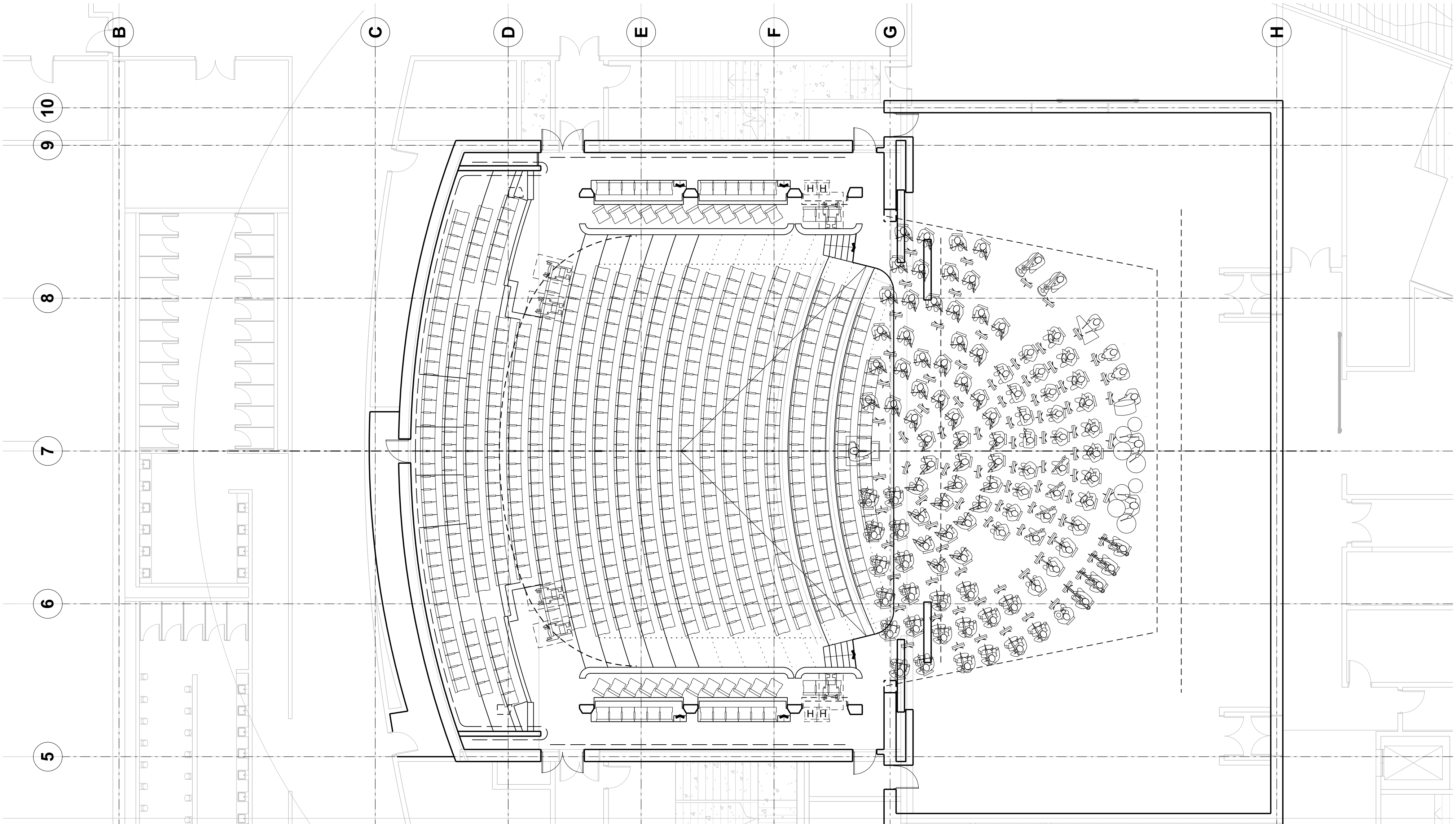
DRAWING **Axonometric**

SCALE @ A1

DRAWING No. **SK-602** REV. **B**

Jasmax

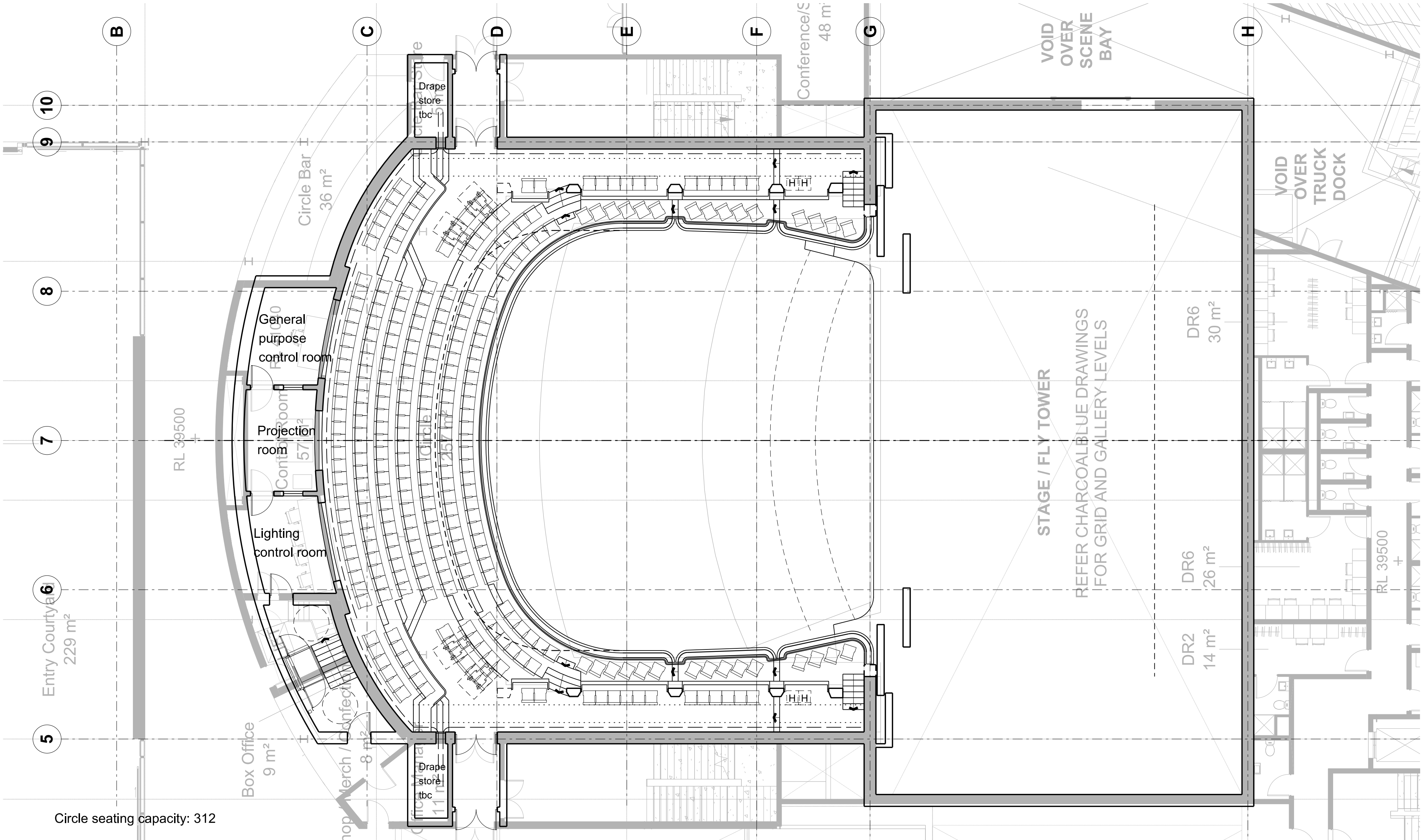
APPENDIX B - CHARCOALBLUE DRAWINGS



Stalls seating capacity: 636-640 (without orchestra pit/forestage extension/sound mixing position)

0m 1m 2m 5m 10m

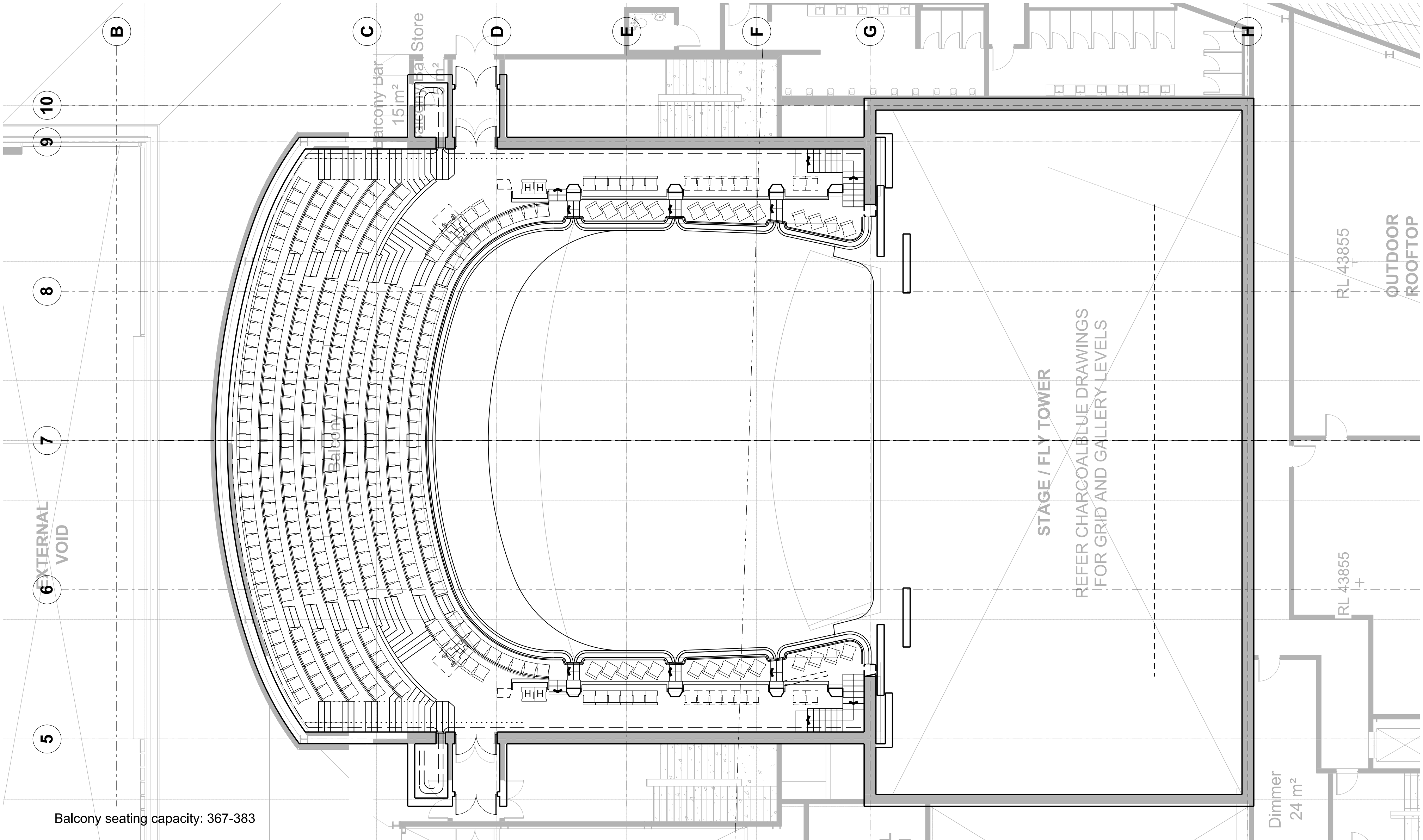
CHARCOALBLUE THEATRICAL INNOVATION ESTD 2004 180 THE STRAND 2 ARUNDEL STREET LONDON WC2R 3DA T +44 (0)20 7928 0000 W www.charcoalblue.com	Project 16125 Waikato Regional Theatre	Scale 1:150 / Size A3
	Drawing Title Stalls plan	Date 03/07/2018 / Drawn/Checked EG/EL
	Status PRELIMINARY DESIGN	Drawing Number 16125 - TD - SK - 101 / Rev F



Circle seating capacity: 312

0m 1m 2m 5m 10m

CHARCOALBLUE THEATRICAL INNOVATION ESTD 2004 180 THE STRAND 2 ARUNDEL STREET LONDON WC2R 3DA T +44 (0)20 7928 0000 W www.charcoalblue.com	Project 16125 Waikato Regional Theatre	Scale 1:150 / Size A3
	Drawing Title Circle plan	Date 03/07/2018 / Drawn/Checked EG/EL
	Status PRELIMINARY DESIGN	Drawing Number 16125 - TD - SK - 102 / Rev F



Balcony seating capacity: 367-383

0m 1m 2m 5m 10m

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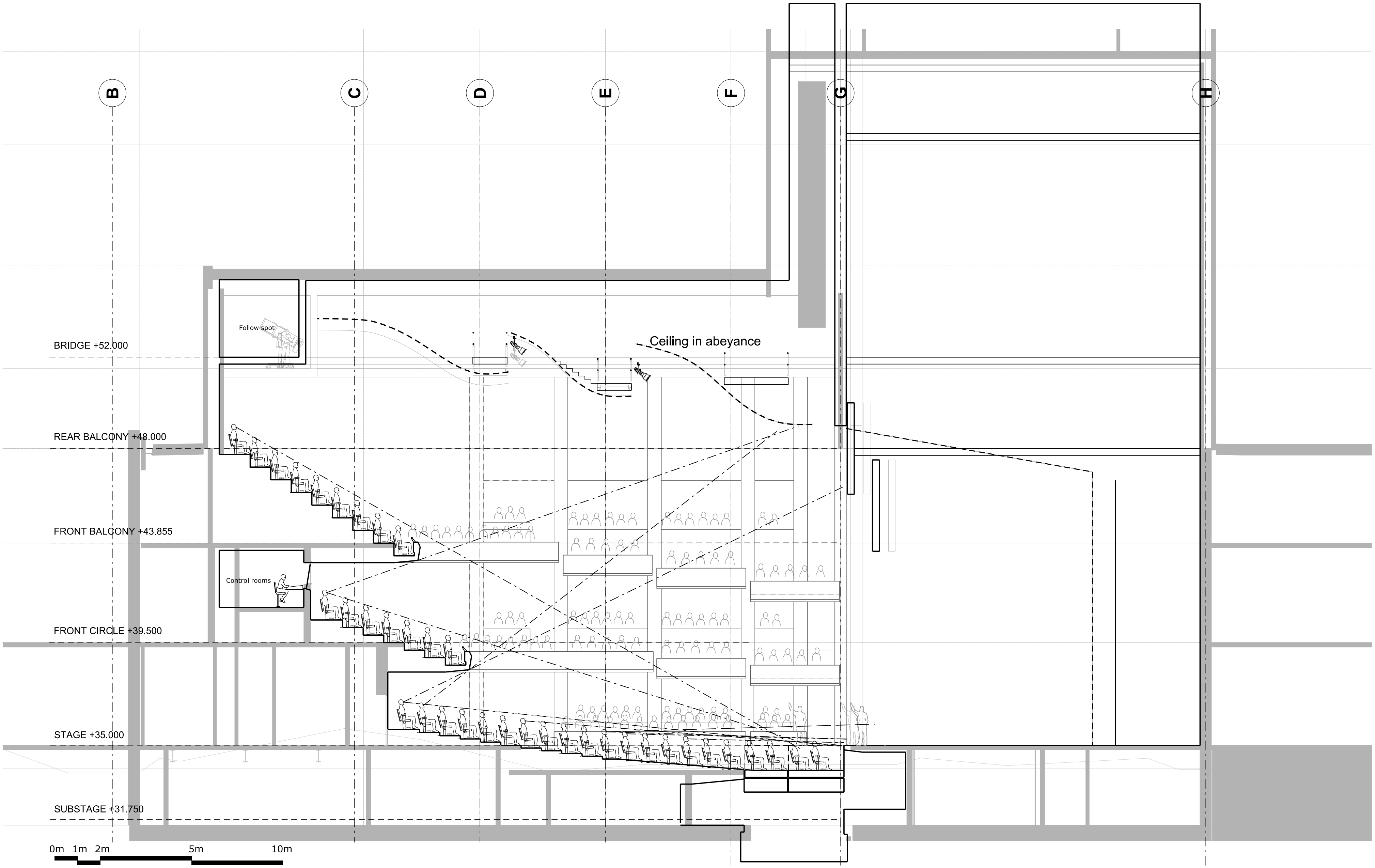
Project	16125 Waikato Regional Theatre	Scale 1:150	Size A3
Drawing Title	Balcony plan	Date 03/07/2018	Drawn/Checked EG/EL
Status	PRELIMINARY DESIGN	Drawing Number 16125 - TD - SK - 103	Rev F



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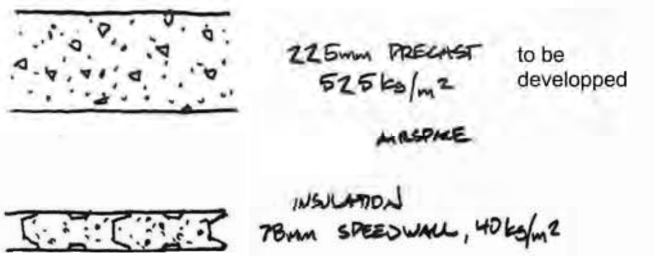
Project	16125 Waikato Regional Theatre	Scale 1:150	Size A3
Drawing Title	Long section - Udjusted levels - Option 2	Date 03/07/2018	Drawn/Checked EG/EL
Status	PRELIMINARY DESIGN	Drawing Number 16125 - TD - SK - 100	Rev G

A



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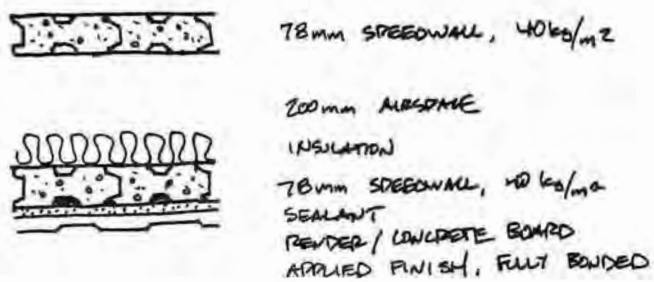

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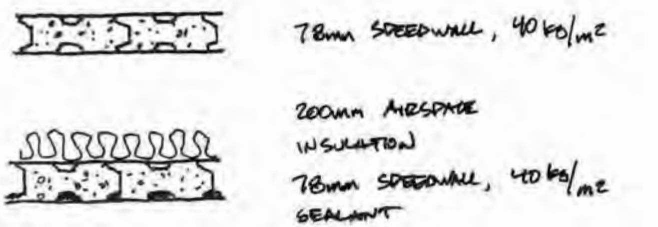

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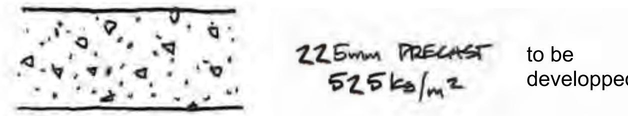

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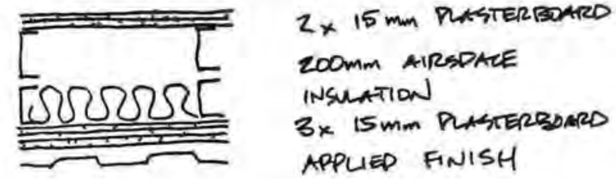

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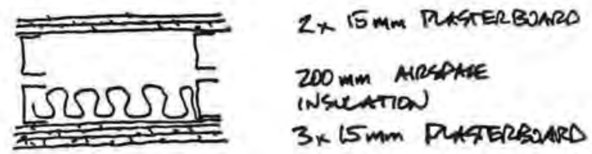
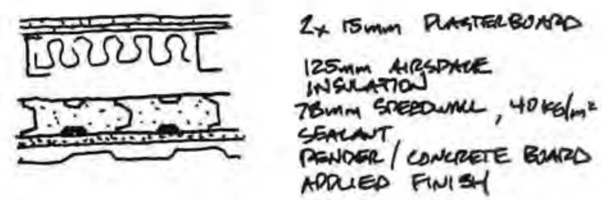


G



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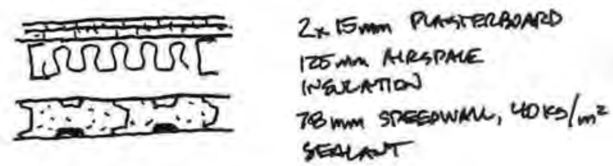

CHARCOALBLUE THEATRICAL INNOVATION ESTD 2004	180 THE STRAND 2 ARUNDEL STREET LONDON WC2R 3DA T +44 (0)20 7928 0000 W www.charcoalblue.com	Project WAIKATO REGIONAL THEATRE	Scale NTS / Size A3
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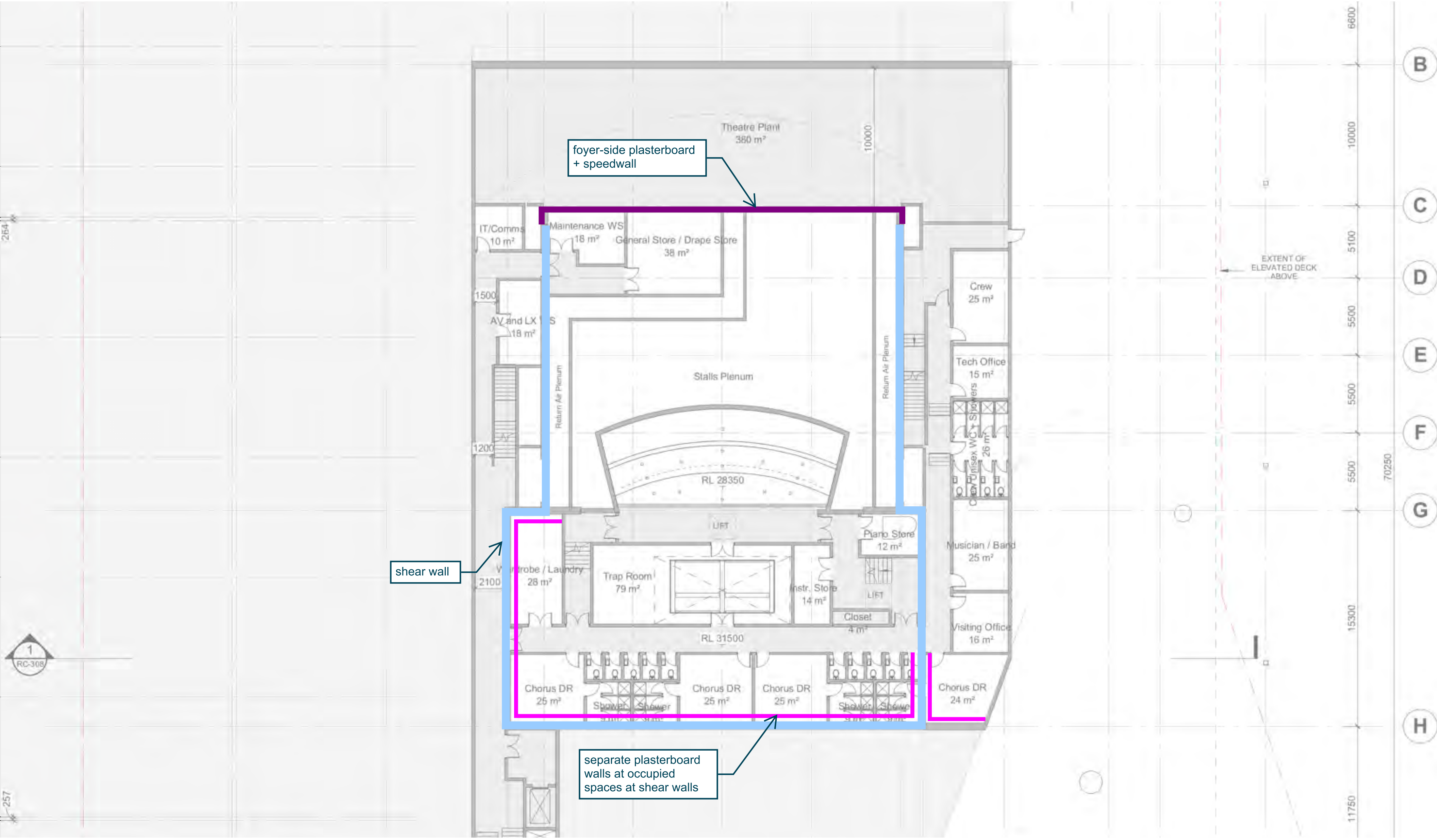
		Status FOR 100% PD	Sketch Number 16125-AC-SK-001 / Rev -



CHARCOALBLUE THEATRICAL INNOVATION | ESTD 2004 180 THE STRAND 2 ARUNDEL STREET LONDON WC2R 3DA T +44 (0)20 7928 0000 W www.charcoalblue.com	Project WAIKATO REGIONAL THEATRE	Scale NTS Size A3
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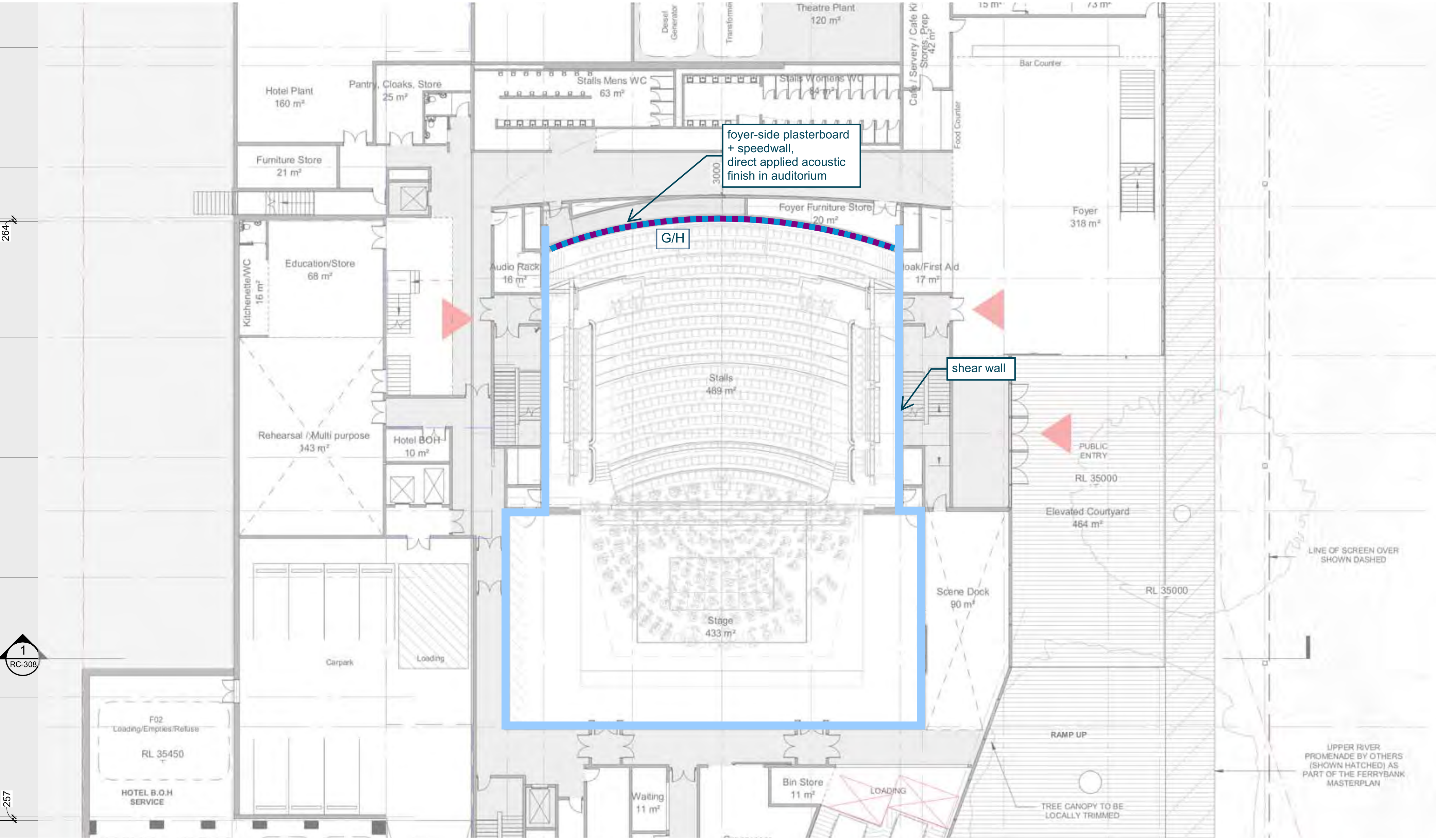
	Status FOR 100% PD	Sketch Number 16125-AC-SK-101 Rev -



CHARCOALBLUE THEATRICAL INNOVATION ESTD 2004	180 THE STRAND 2 ARUNDEL STREET LONDON WC2R 3DA T +44 (0)20 7928 0000 W www.charcoalblue.com	Project WAIKATO REGIONAL THEATRE	Scale NTS / Size A3
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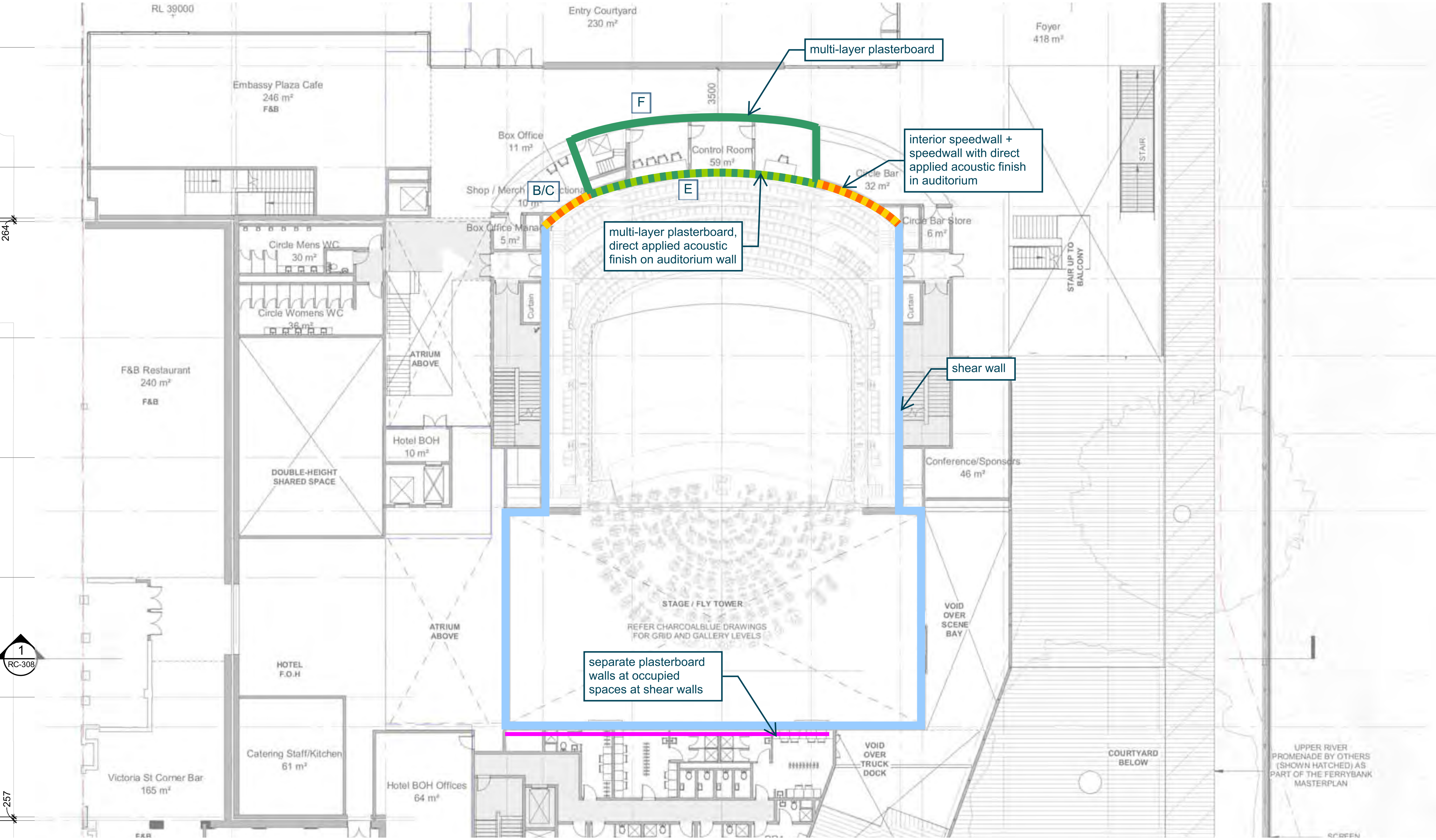
		Status FOR 100% PD	Sketch Number 16125-AC-SK-102 / Rev -



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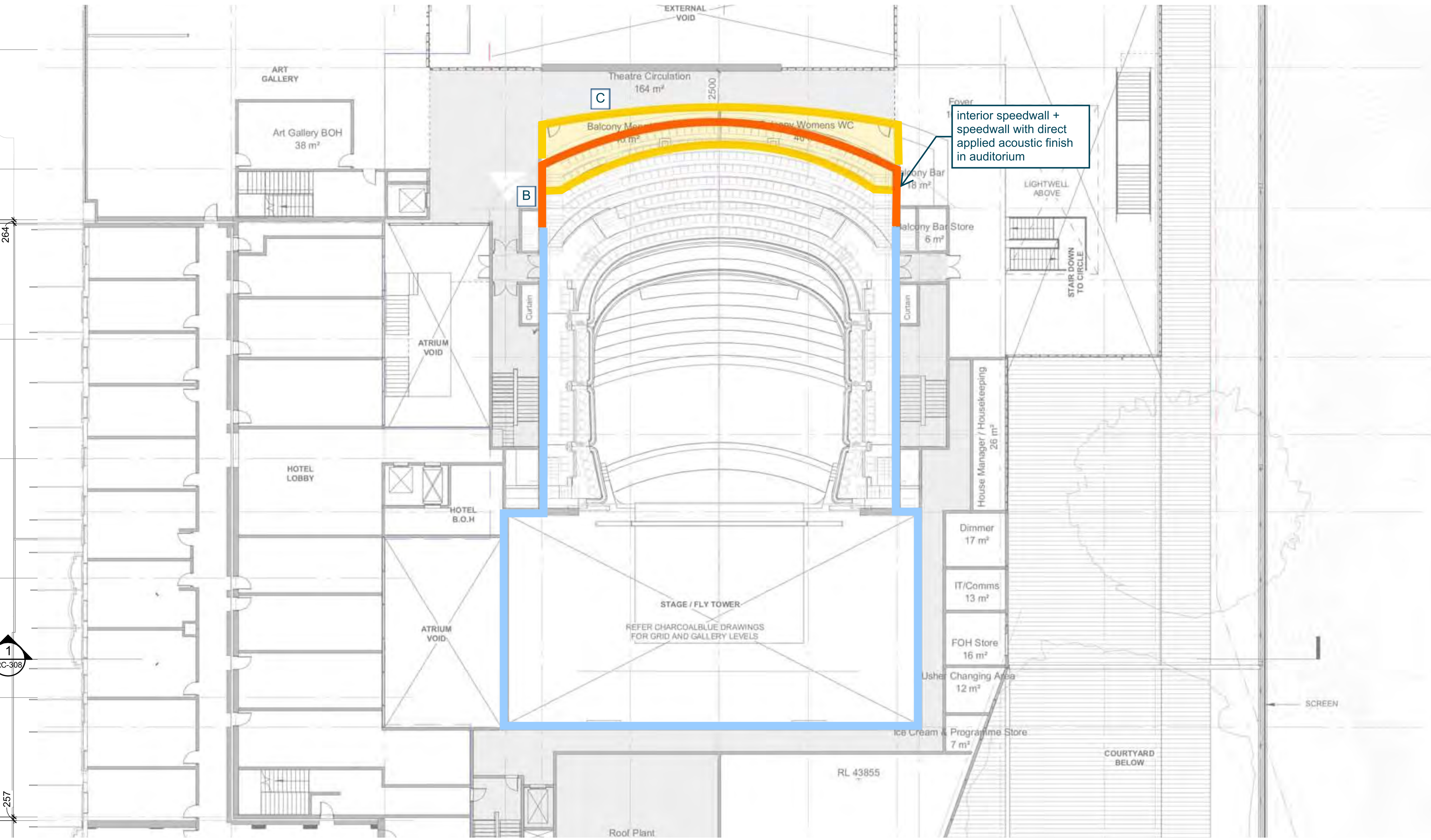
Project WAIKATO REGIONAL THEATRE	Scale NTS	Size A3
Drawing Title AUDITORIUM CONSTRUCTION - CIRCLE LEVEL	Date 10 JULY 2018	Drawn/Checked BWH / ES
Status FOR 100% PD	Sketch Number 16125-AC-SK-103	Rev -



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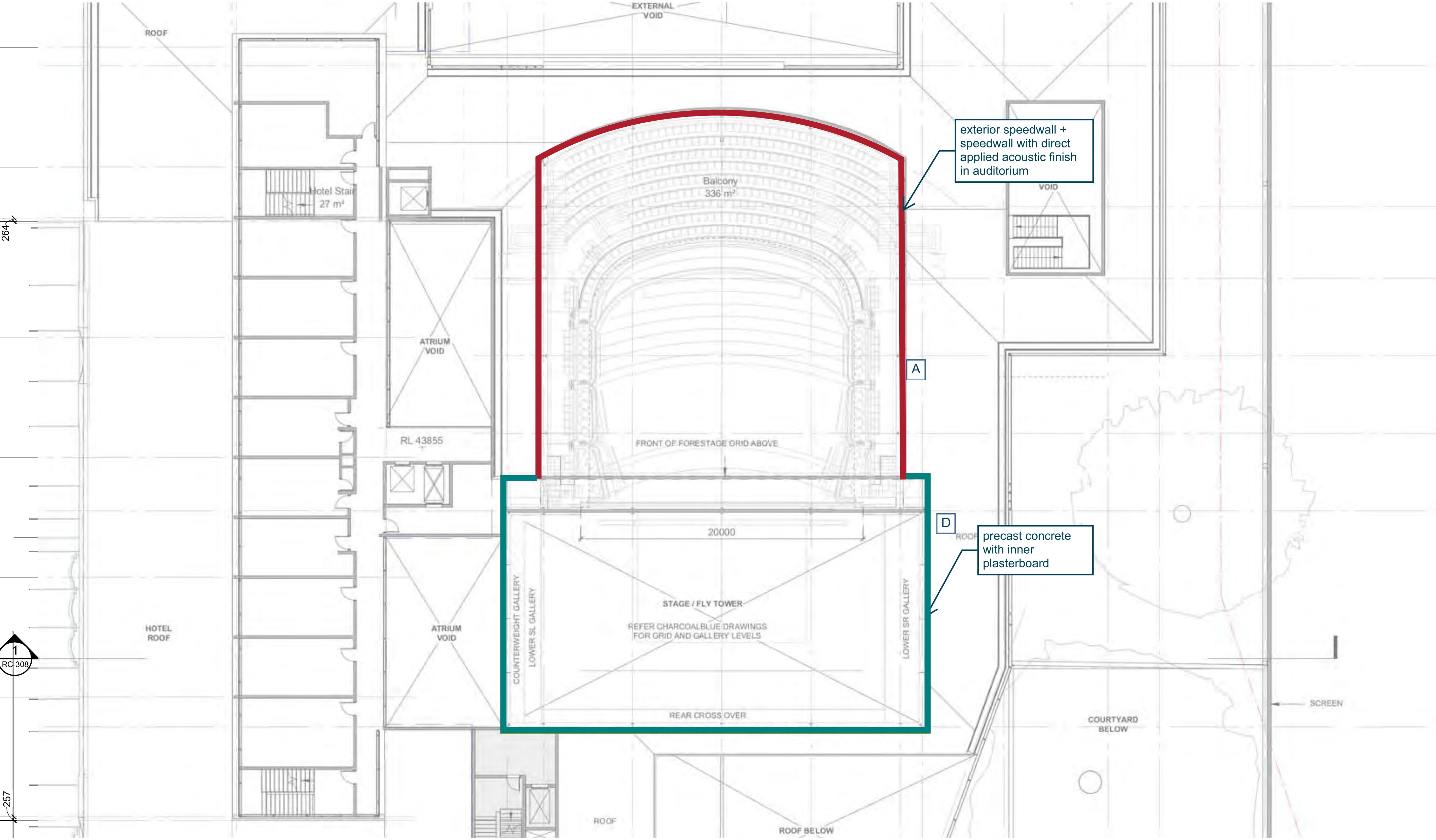
Project WAIKATO REGIONAL THEATRE		Scale NTS	Size A3
Drawing Title AUDITORIUM CONSTRUCTION - BALCONY LEVEL		Date 10 JULY 2018	Drawn/Checked BWH / ES
Status FOR 100% PD		Sketch Number 16125-AC-SK-104	Rev -



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THEATRICAL INNOVATION | ESTD 2004

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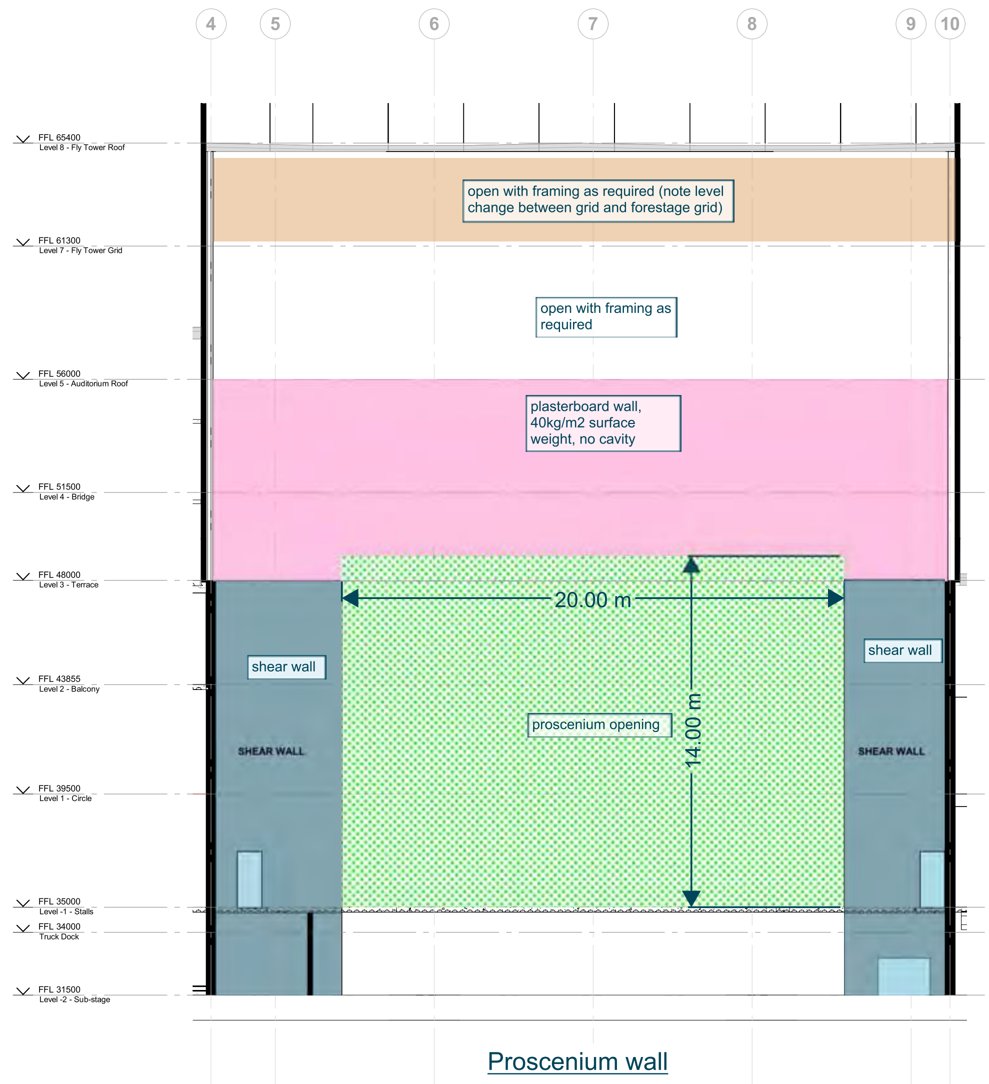
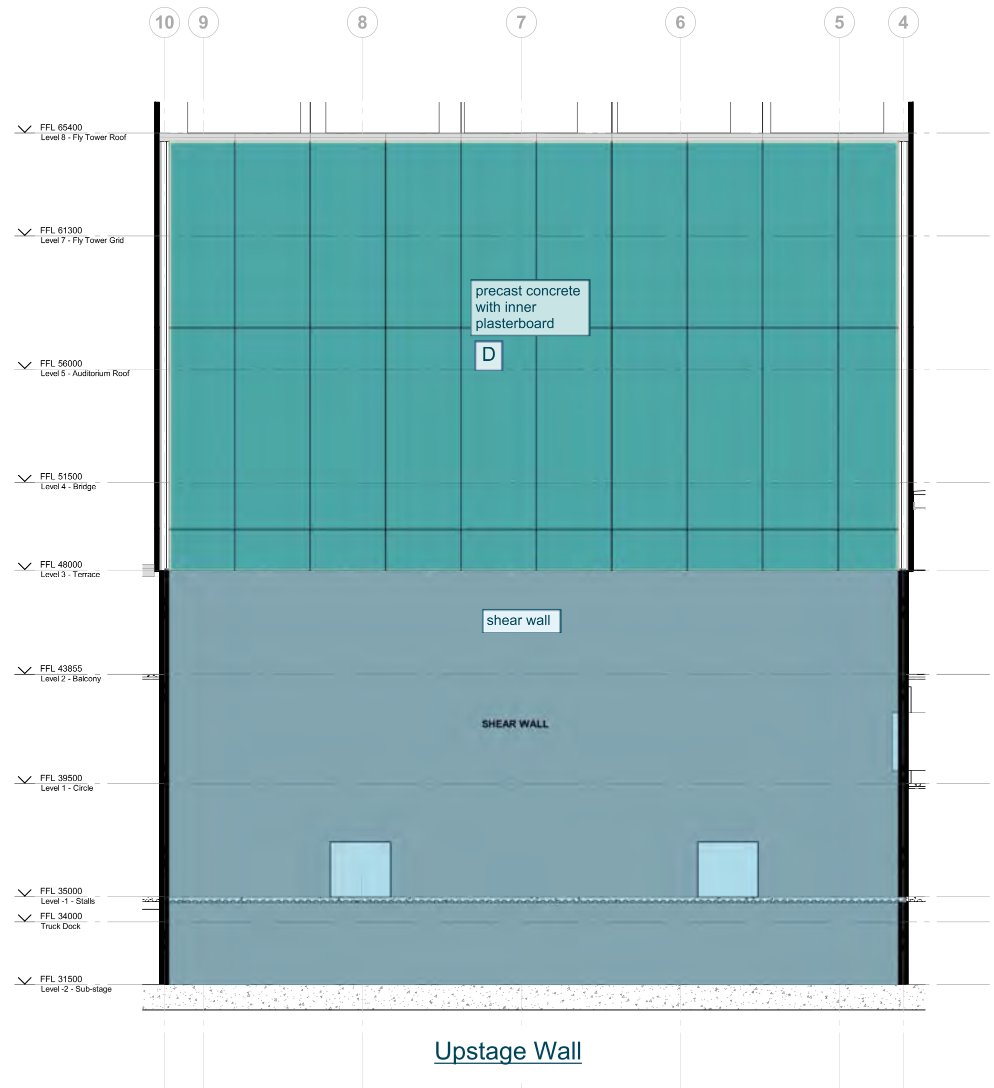
Project WAIKATO REGIONAL THEATRE	Scale: NTS Size: A3
Drawing Title AUDITORIUM CONSTRUCTION - REAR BALCONY LEVEL	Date: 10 JULY 2018 Drawn/Checked: BWH / ES
Status FOR 100% PD	Sketch Number: 16125-AC-SK-105 Rev: -



Proscenium wall

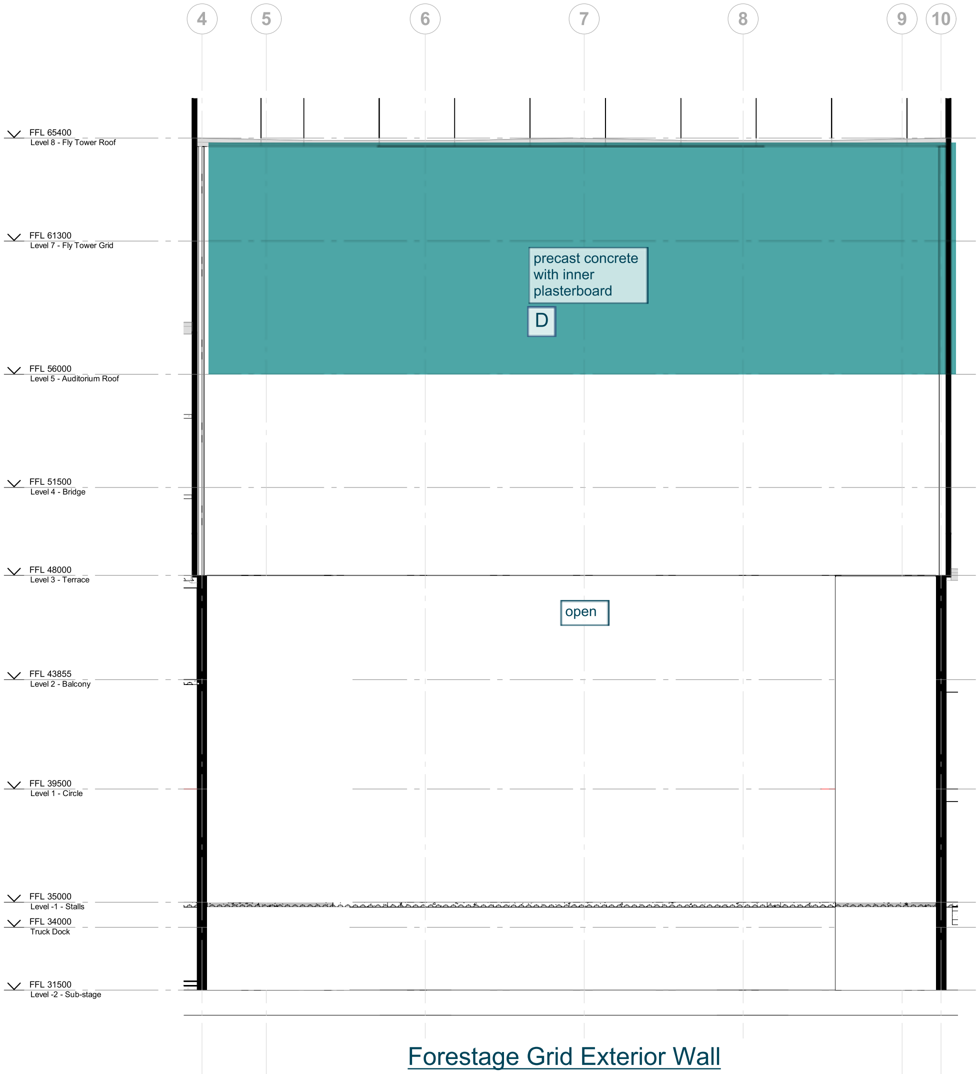
1 | 1 : 100 Plan Detail
FLYTOWER - AUDITORIUM



Upstage Wall

2 | 1 : 100 Plan Detail
FLYTOWER - REAR

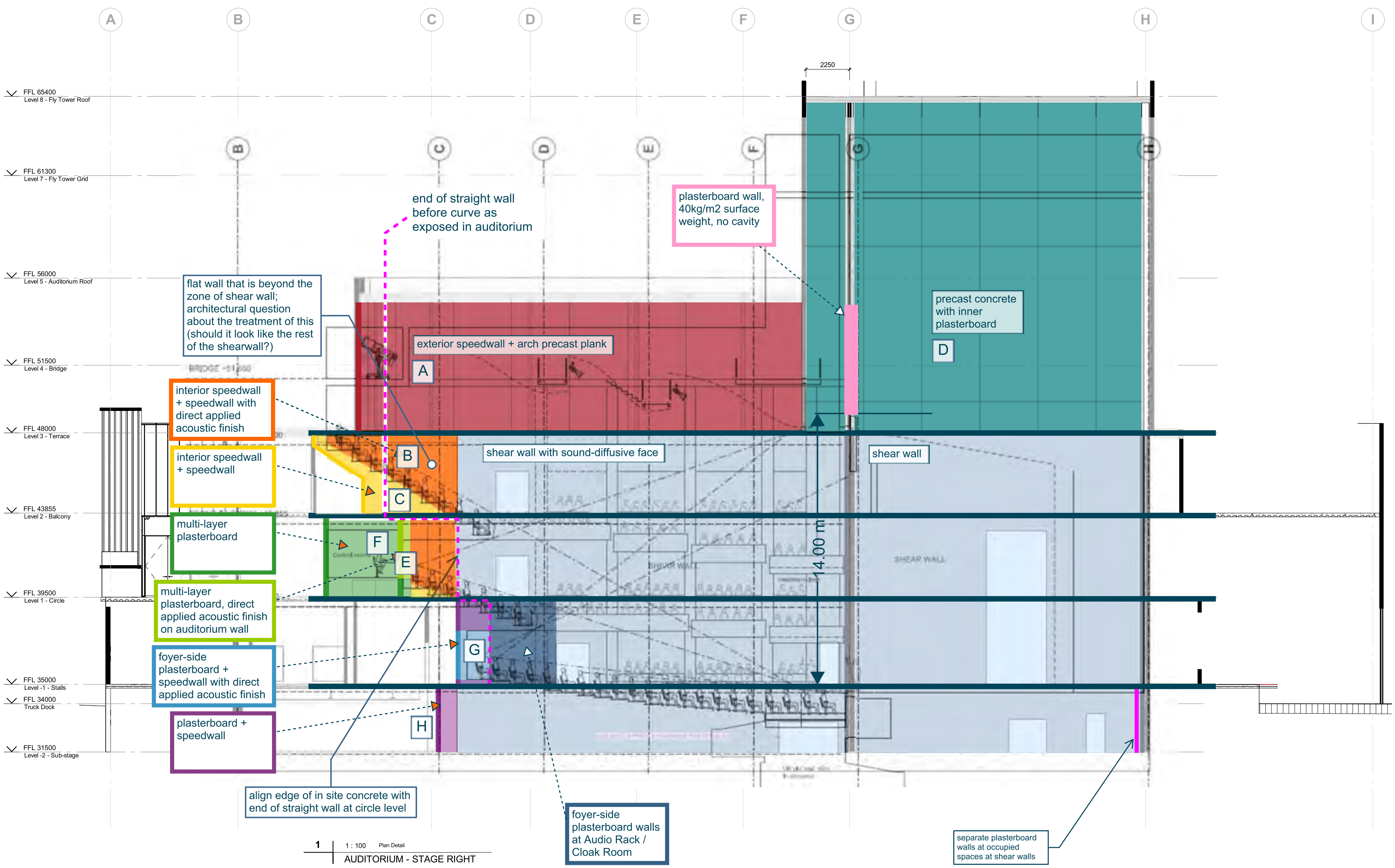
CHARCOALBLUE THEATRICAL INNOVATION ESTD 2004 180 THE STRAND 2 ARUNDEL STREET LONDON WC2R 3DA T +44 (0)20 7928 0000 W www.charcoalblue.com	Project WAIKATO REGIONAL THEATRE	Scale: NTS Size: A3
	Drawing Title AUDITORIUM CONSTRUCTION - STAGE WALL ELEVATIONS	Date: 10 JULY 2018 Drawn/Checked: BWH / ES
	Status FOR 100% PD	Sketch Number: 16125-AC-SK-201 Rev: -



Forestage Grid Exterior Wall

1 | 1 : 100 Plan Detail
FLYTOWER - AUDITORIUM

CHARCOALBLUE THEATRICAL INNOVATION ESTD 2004	180 THE STRAND 2 ARUNDEL STREET LONDON WC2R 3DA T +44 (0)20 7928 0000 W www.charcoalblue.com	Project WAIKATO REGIONAL THEATRE	Scale NTS / Size A3
		Drawing Title AUDITORIUM CONSTRUCTION - FORESTAGE WALL ELEVATION	Date 10 JULY 2018 / Drawn/Checked BWH / ES
		Status FOR 100% PD	Sketch Number 16125-AC-SK-202 / Rev -



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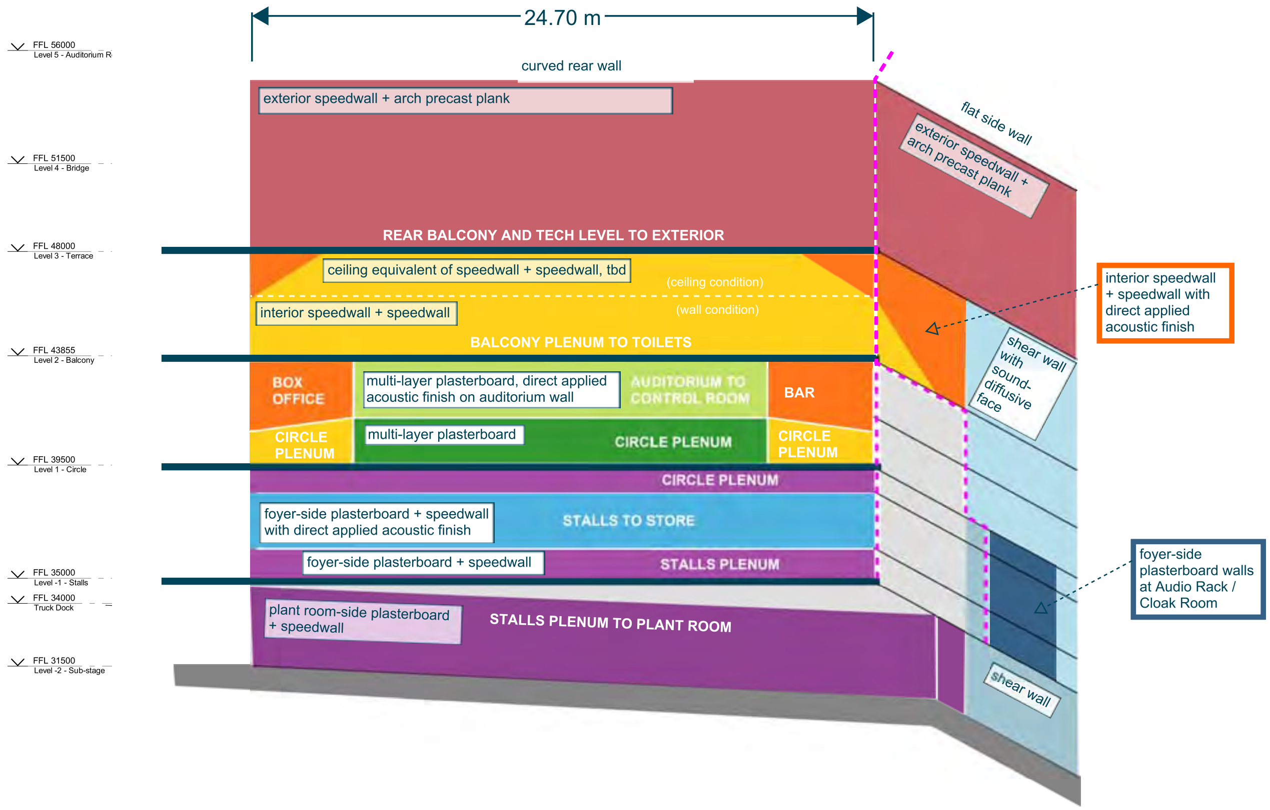
Project WAIKATO REGIONAL THEATRE	Scale NTS	Size A3
Drawing Title AUDITORIUM CONSTRUCTION - LONG SECTION	Date 10 JULY 2018	Drawn/Checked BWH / ES
Status FOR 100% PD	Sketch Number 16125-AC-SK-203	Rev -



CHARCOALBLUE THEATRICAL INNOVATION ESTD 2004	180 THE STRAND 2 ARUNDEL STREET LONDON WC2R 3DA T +44 (0)20 7928 0000 W www.charcoalblue.com	Project WAIKATO REGIONAL THEATRE	Scale: NTS Size: A3
		Drawing Title AUDITORIUM CONSTRUCTION - CURVED WALL ELEVATION	Date: 10 JULY 2018 Drawn/Checked: BWH / ES
		Status FOR 100% PD	Sketch Number: 16125-AC-SK-204 Rev: -

CHARCOALBLUE

STAGE ENGINEERING SYSTEMS - DRAWINGS

16125 – WAIKATO REGIONAL THEATRE, HAMILTON

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Issued for Preliminary Design

July 2018

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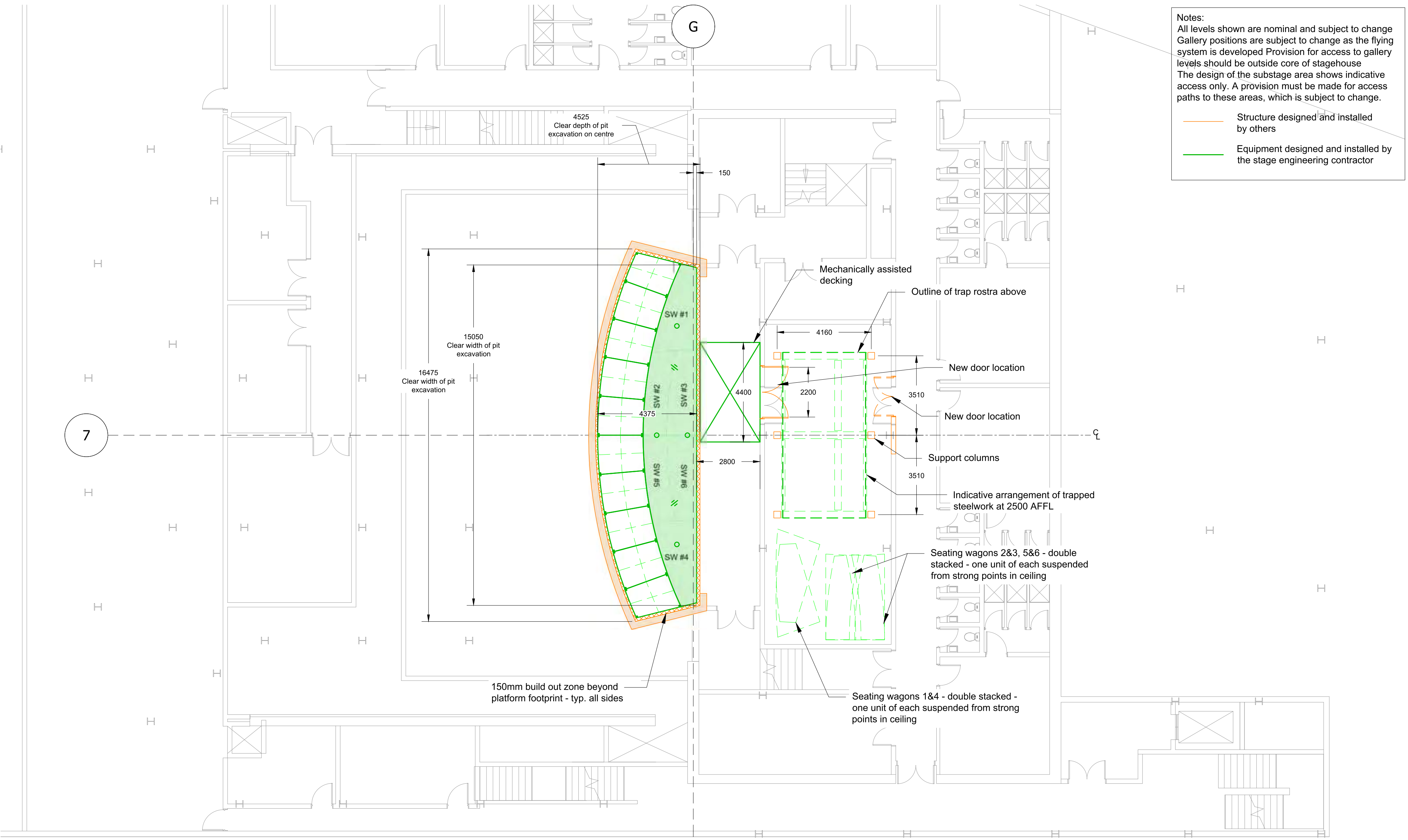

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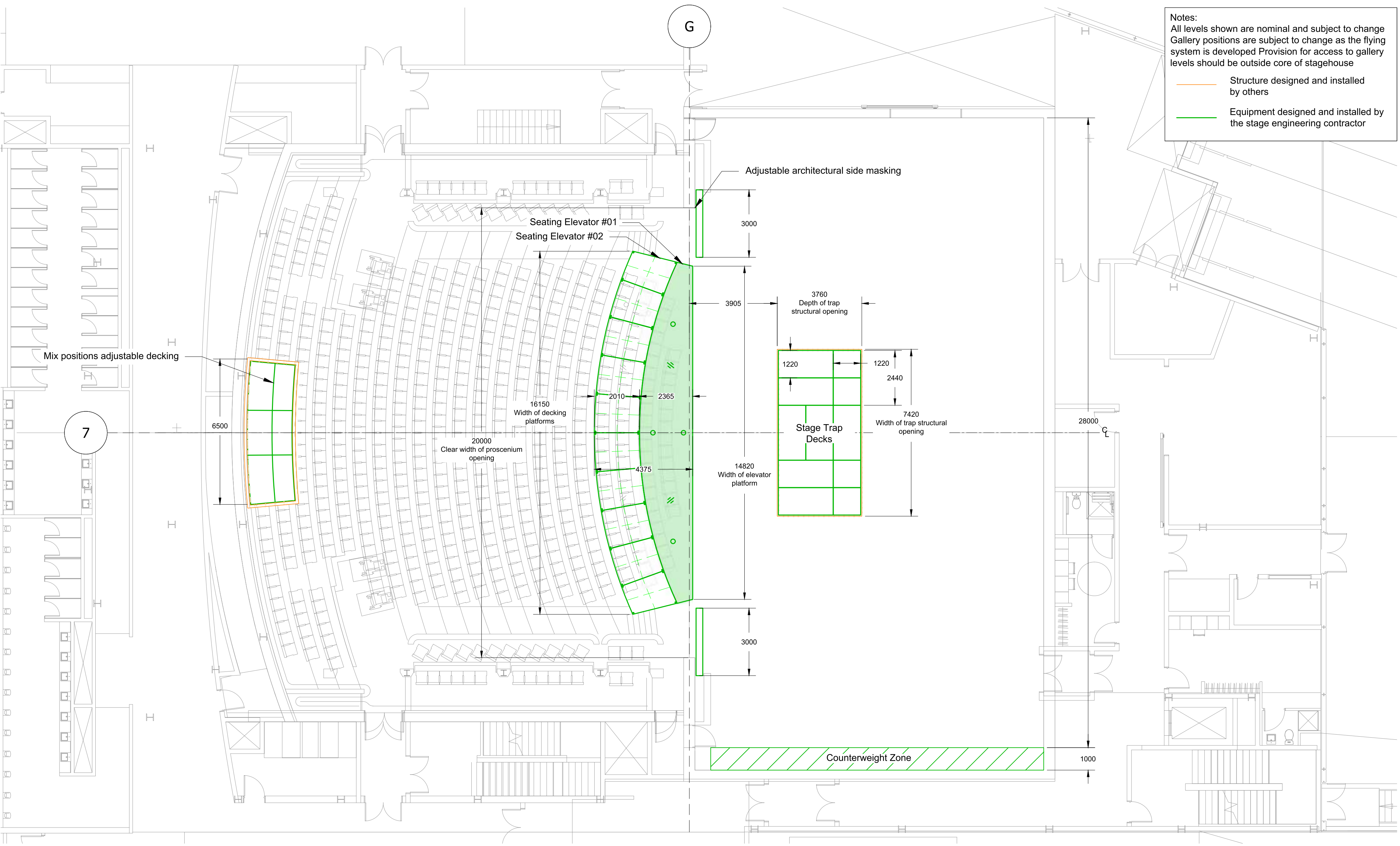
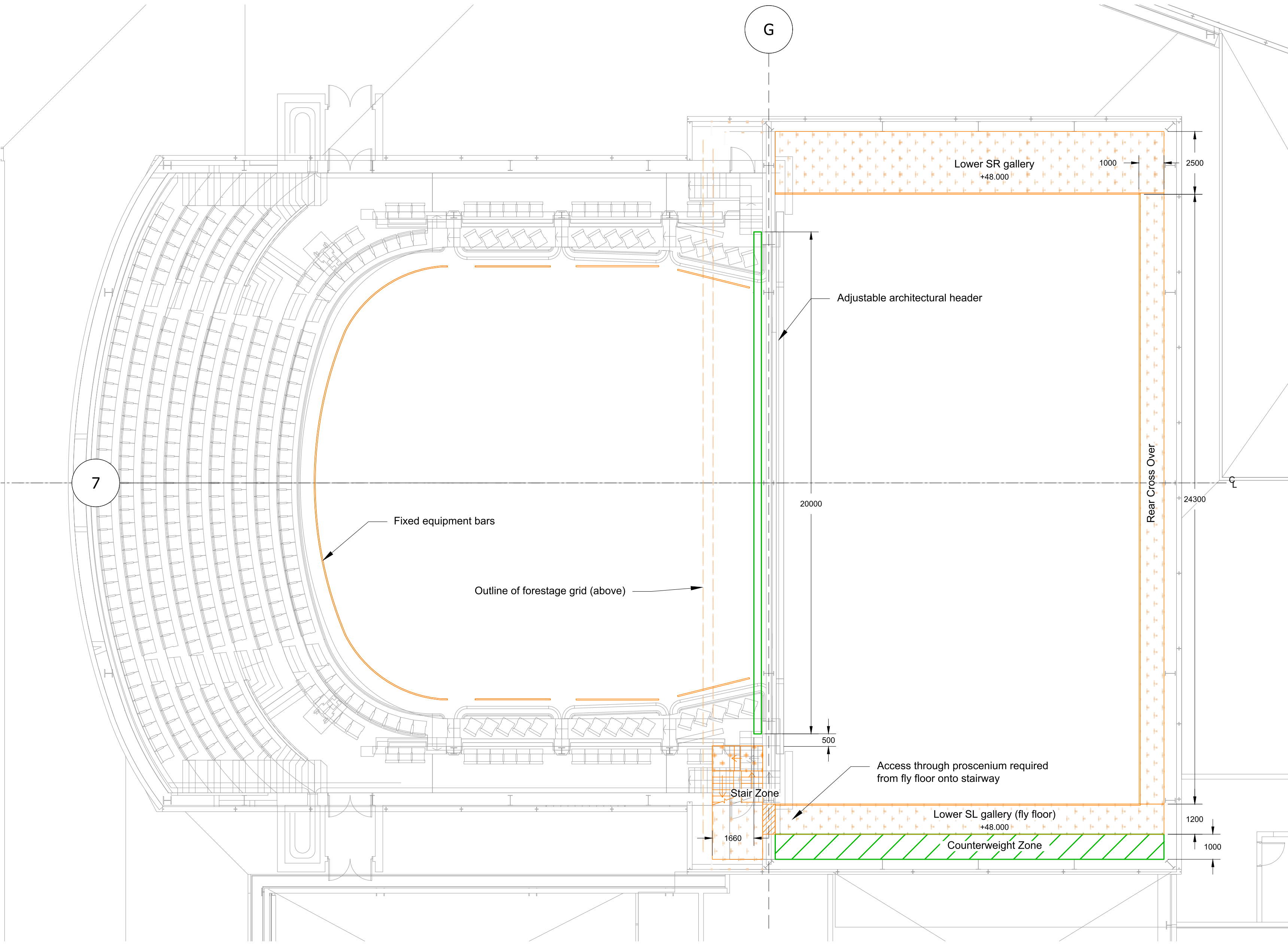
Project	Scale	Size
WAIKATO REGIONAL THEATRE, NEW ZEALAND	1 : 150	A3
Drawing Title	Date	Drawn/Checked
Stage Engineering Systems - Substage level	20/07/18	SG/ SR
Status	Sketch Number	Rev
PRELIMINARY DESIGN	16125-SE-SK-310	07



CHARCOALBLUE THEATRICAL INNOVATION ESTD 2004 4A/104 JOHNSTON STREET FITZROY, VIC 3065 MELBOURNE TEL: +61 (03) 9417 6524 W WWW.CHARCOALBLUE.COM	Project WAIKATO REGIONAL THEATRE, NEW ZEALAND	Scale 1 : 150	Size A3
	Drawing Title Stage Engineering Systems - Level 1 Stalls (Stage level)	Date 20/07/18	Drawn/Checked SG/ SR
	Status PRELIMINARY DESIGN	Sketch Number 16125-SE-SK-311	Rev 07

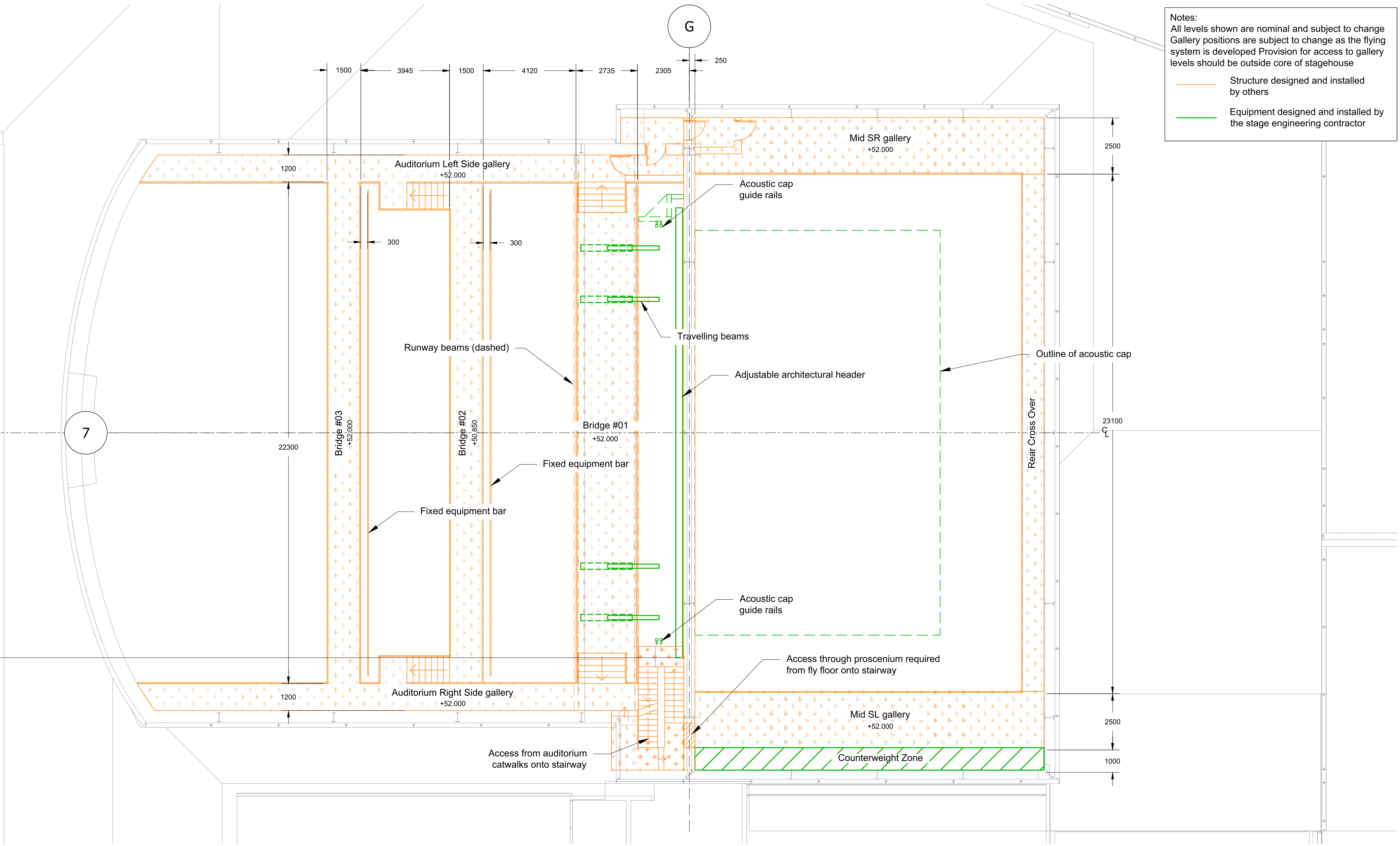


Notes:
All levels shown are nominal and subject to change
Gallery positions are subject to change as the flying system is developed Provision for access to gallery levels should be outside core of stagehouse

Structure designed and installed by others

Equipment designed and installed by the stage engineering contractor

CHARCOALBLUE THEATRICAL INNOVATION ESTD 2004 4A/104 JOHNSTON STREET FITZROY, VIC 3065 MELBOURNE TEL: +61 (03) 9417 6524 W WWW.CHARCOALBLUE.COM	Project WAIKATO REGIONAL THEATRE, NEW ZEALAND	Scale 1 : 150 / Size A3
	Drawing Title Stage Engineering Systems - Level 3 Terrace (Fly floor)	Date 20/07/18 / Drawn/Checked SG/ SR
	Status PRELIMINARY DESIGN	Sketch Number 16125-SE-SK-312 / Rev 06



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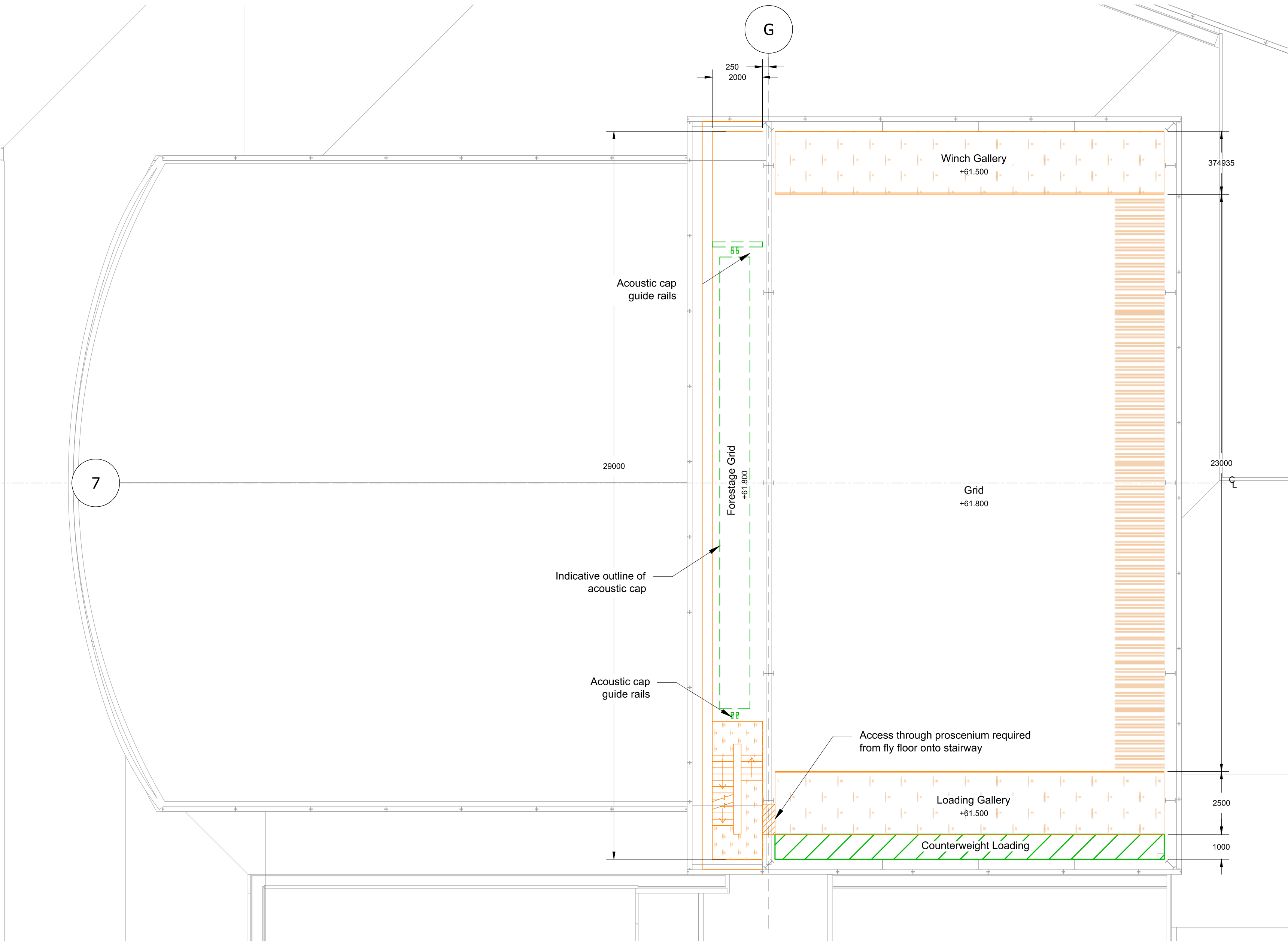
Project WAIKATO REGIONAL THEATRE, NEW ZEALAND	Scale 1 : 150 / Size A3
Drawing Title Stage Engineering Systems - Level 4 Bridge (Trimming gallery and catwalks)	Date 20/07/18 / Drawn/Checked SG/ SR
Status PRELIMINARY DESIGN	Sketch Number 16125-SE-SK-313 / Rev 06



Notes:
All levels shown are nominal and subject to change
Gallery positions are subject to change as the flying system is developed Provision for access to gallery levels should be outside core of stagehouse

Structure designed and installed by others

Equipment designed and installed by the stage engineering contractor

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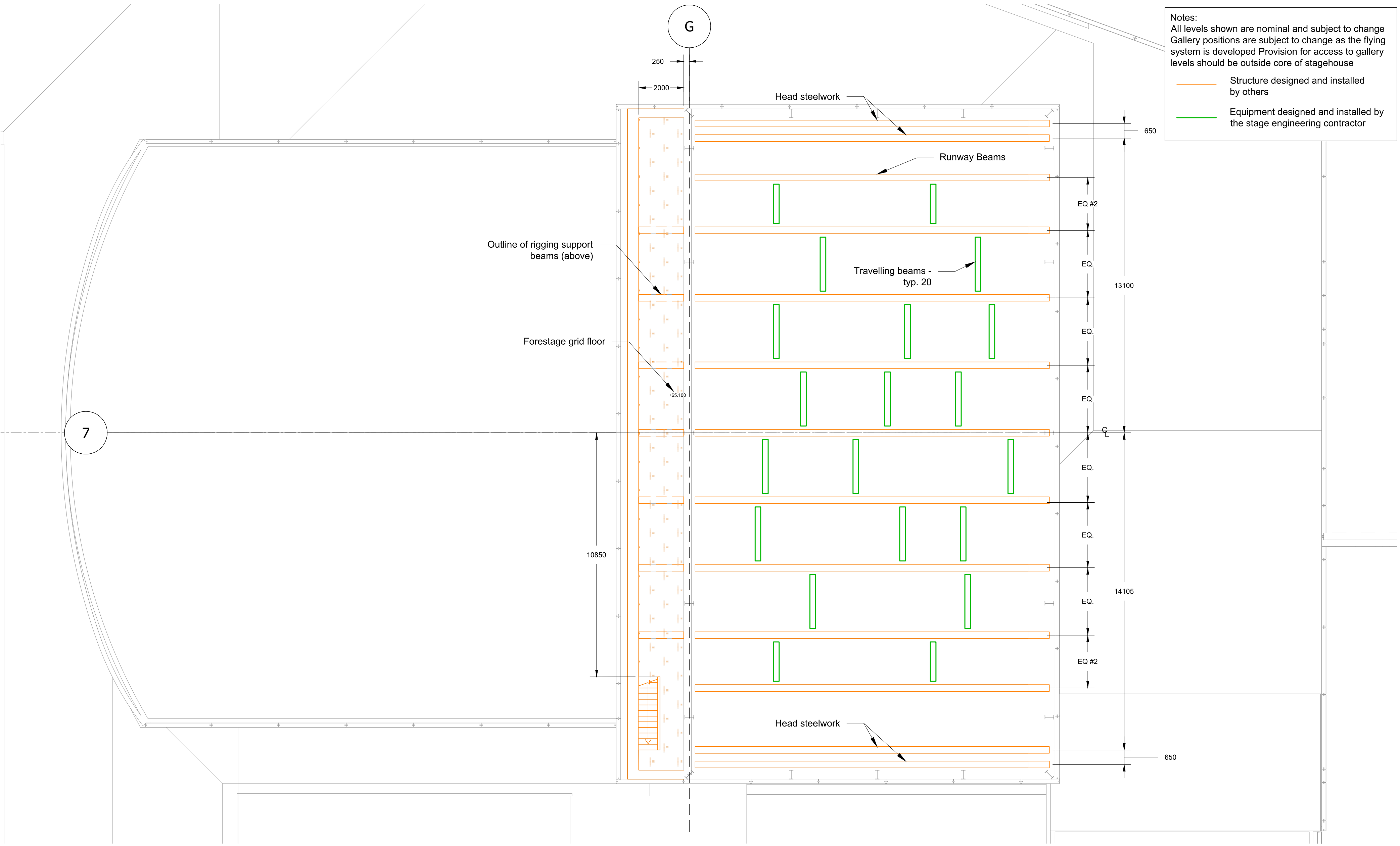
Project WAIKATO REGIONAL THEATRE, NEW ZEALAND	Scale 1 : 150 / Size A3
Drawing Title Stage Engineering Systems - Level 7 Fly tower grid	Date 20/07/18 / Drawn/Checked SG/ SR
Status PRELIMINARY DESIGN	Sketch Number 16125-SE-SK-314 / Rev 06



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THEATRICAL INNOVATION ESTD 2004
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MELBOURNE
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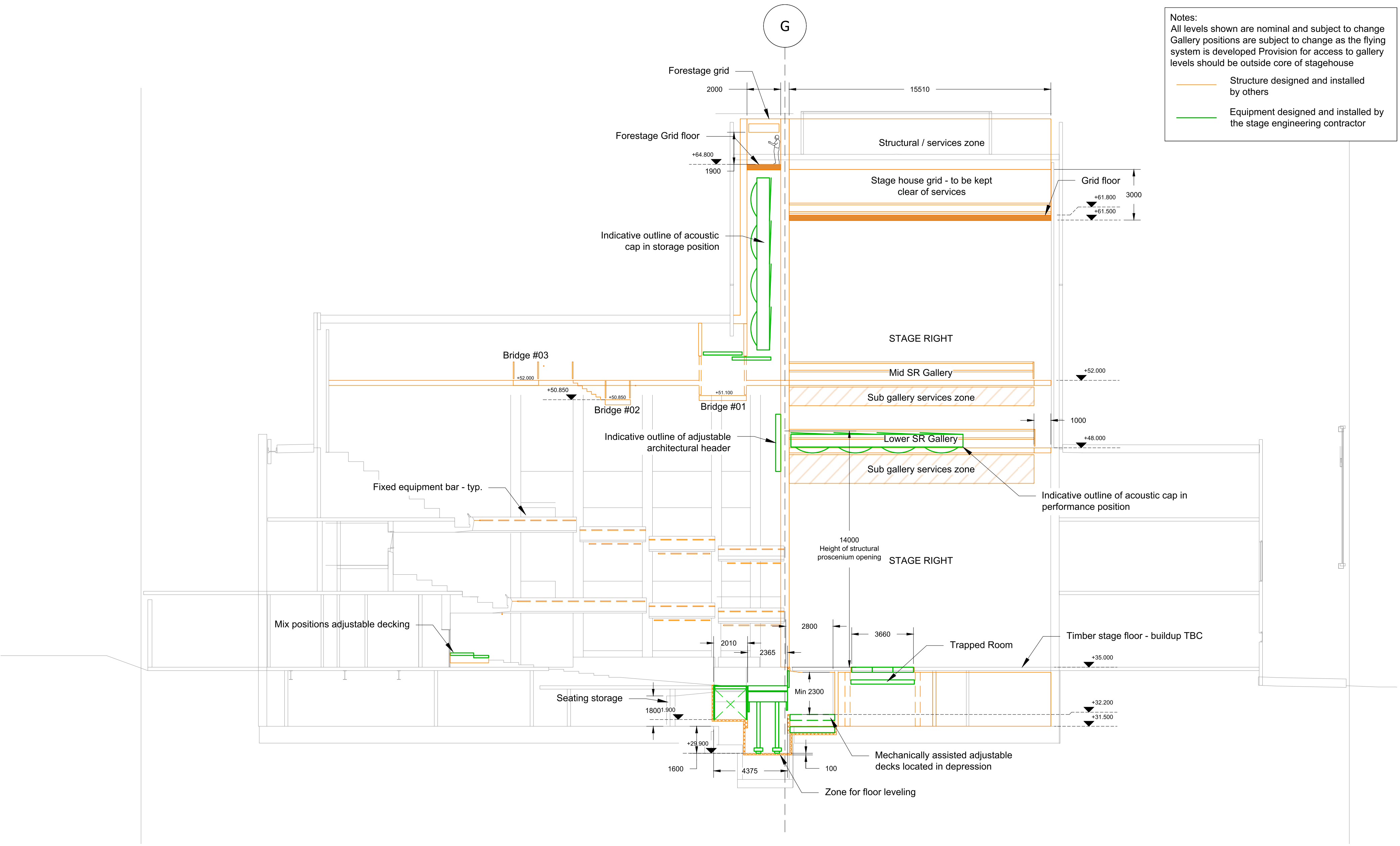
Project WAIKATO REGIONAL THEATRE, NEW ZEALAND	Scale 1 : 150	Size A3
Drawing Title Stage Engineering Systems - Level 7 Fly tower grid high	Date 20/07/18	Drawn/Checked SG/ SR
Status PRELIMINARY DESIGN	Sketch Number 16125-SE-SK-315	Rev 06

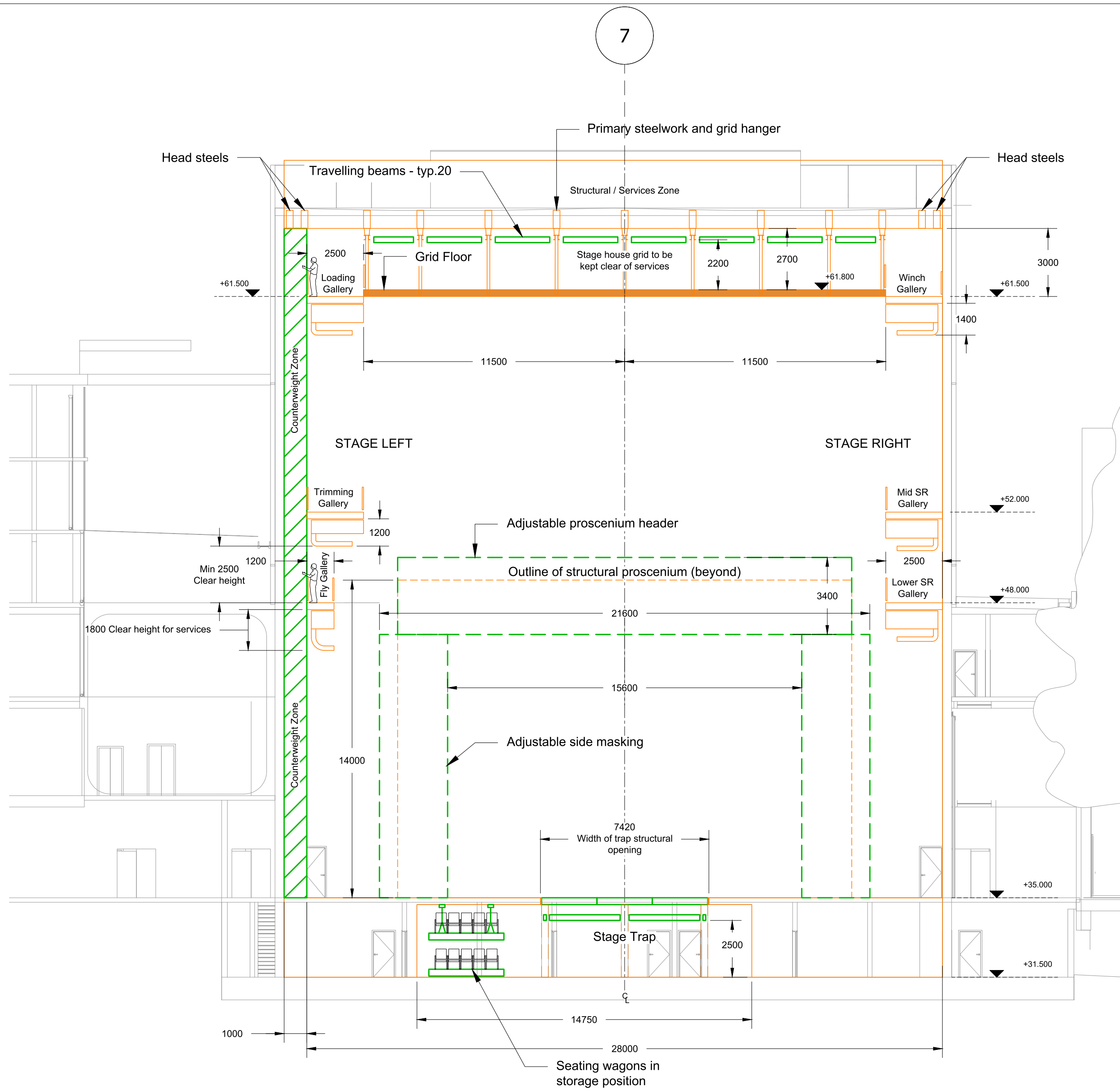


CHARCOALBLUE THEATRICAL INNOVATION ESTD 2004 4A/104 JOHNSTON STREET FITZROY, VIC 3065 MELBOURNE TEL: +61 (03) 9417 6524 W WWW.CHARCOALBLUE.COM	Project WAIKATO REGIONAL THEATRE, NEW ZEALAND	Scale: 1 : 200 — Size: A3
	Drawing Title Stage Engineering Systems - Long Section	Date: 20/07/18 — Drawn/Checked: SG/ SR
	Status PRELIMINARY DESIGN	Sketch Number: 16125-SE-SK-316 — Rev: 06

Notes:
All levels shown are nominal and subject to change
Gallery positions are subject to change as the flying system is developed Provision for access to gallery levels should be outside core of stagehouse

Structure designed and installed by others

Equipment designed and installed by the stage engineering contractor

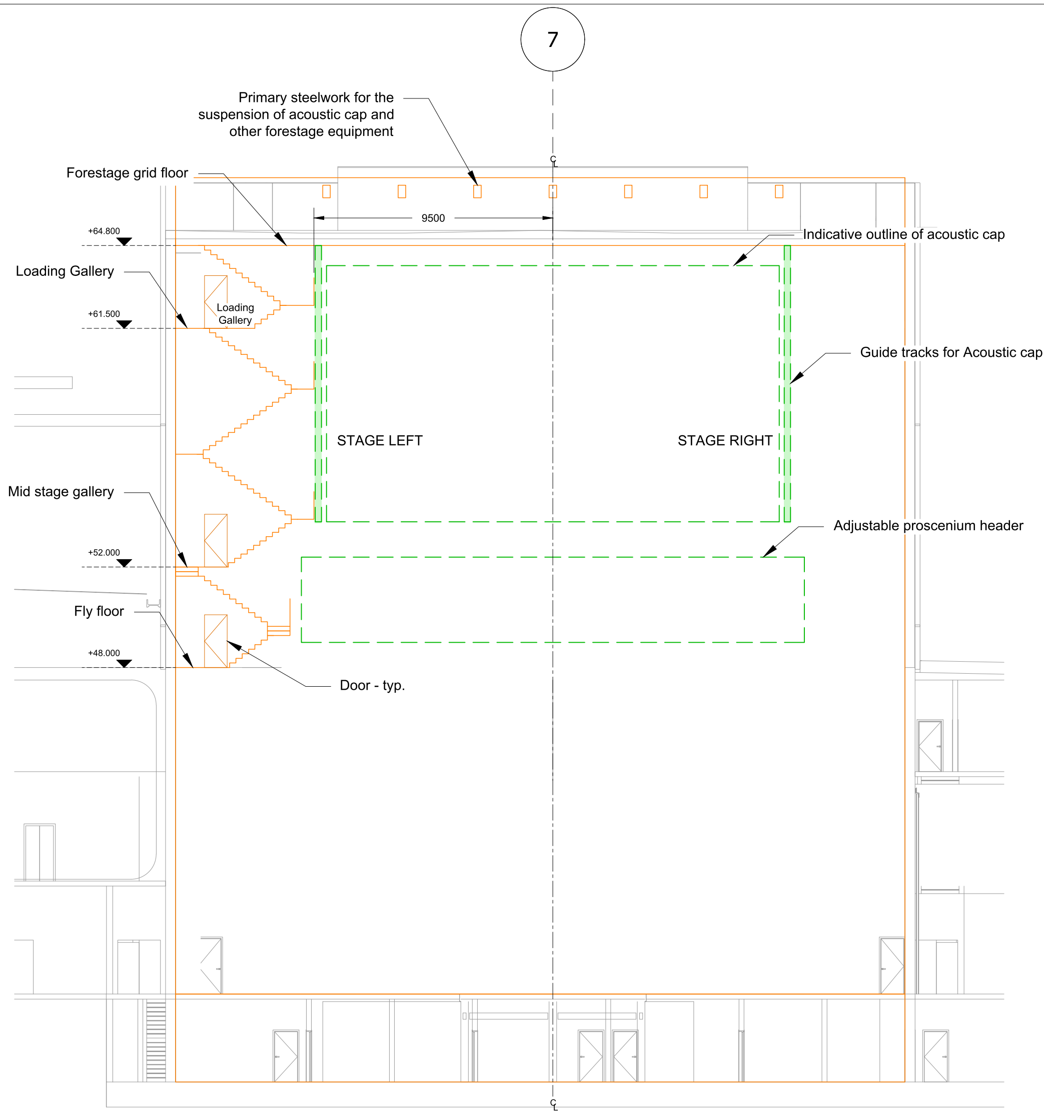


CHARCOALBLUE THEATRICAL INNOVATION ESTD 2004 4A/104 JOHNSTON STREET FITZROY, VIC 3065 MELBOURNE TEL: +61 (03) 9417 6524 W WWW.CHARCOALBLUE.COM	Project WAIKATO REGIONAL THEATRE, NEW ZEALAND	Scale 1 : 200 / Size A3
	Drawing Title Stage Engineering Systems - Short section stage house	Date 20/07/18 / Drawn/Checked SG/ SR
	Status PRELIMINARY DESIGN	Sketch Number 16125-SE-SK-317 / Rev 06

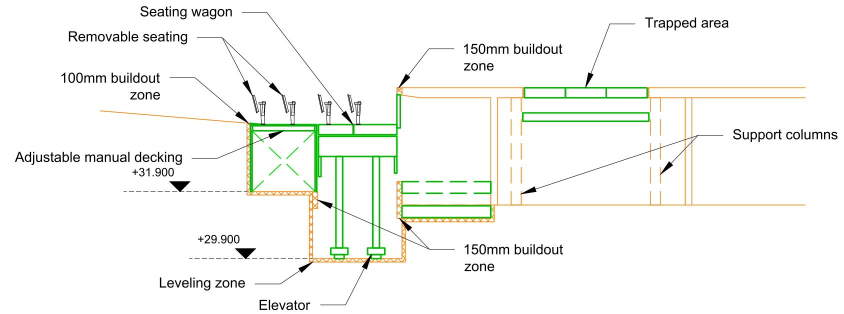
Notes:
All levels shown are nominal and subject to change
Gallery positions are subject to change as the flying system is developed Provision for access to gallery levels should be outside core of stagehouse

Structure designed and installed by others

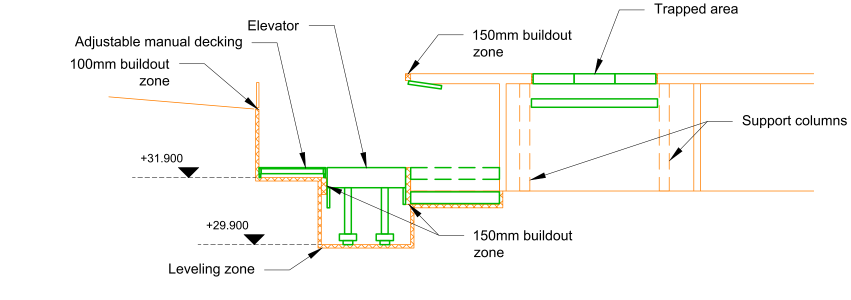
Equipment designed and installed by the stage engineering contractor



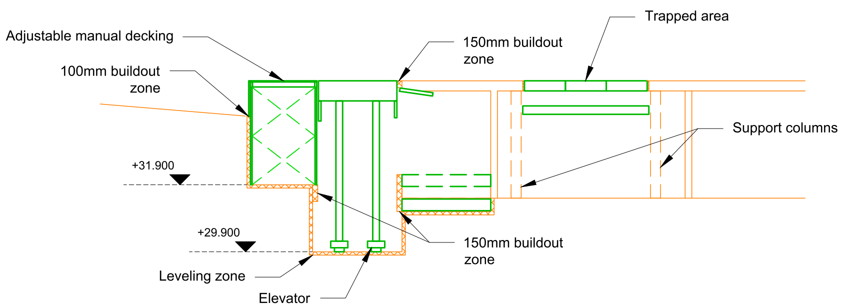
CHARCOALBLUE THEATRICAL INNOVATION ESTD 2004 4A/104 JOHNSTON STREET FITZROY, VIC 3065 MELBOURNE TEL: +61 (03) 9417 6524 W WWW.CHARCOALBLUE.COM	Project WAIKATO REGIONAL THEATRE, NEW ZEALAND	Scale 1 : 200 / Size A3
	Drawing Title Stage Engineering Systems - Short section forestage pocket	Date 20/07/18 / Drawn/Checked SG/ SR
	Status PRELIMINARY DESIGN	Sketch Number 16125-SE-SK-318 / Rev 02



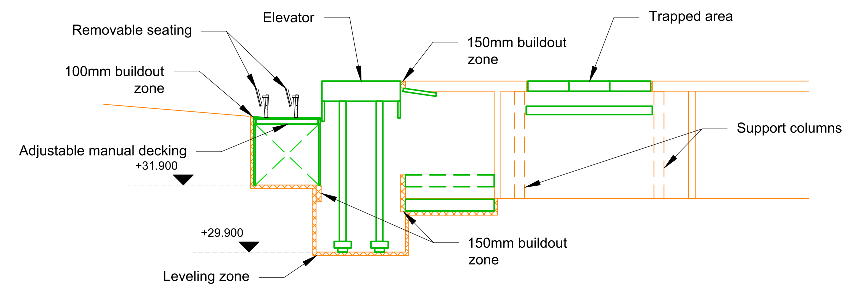
1 Elevator and decking in seating arrangement
Scale: 1:150



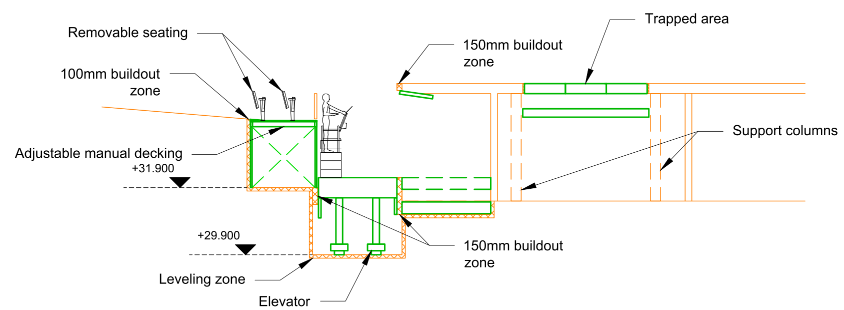
2 Elevators and decking in seating wagon storage arrangement
Scale: 1:150



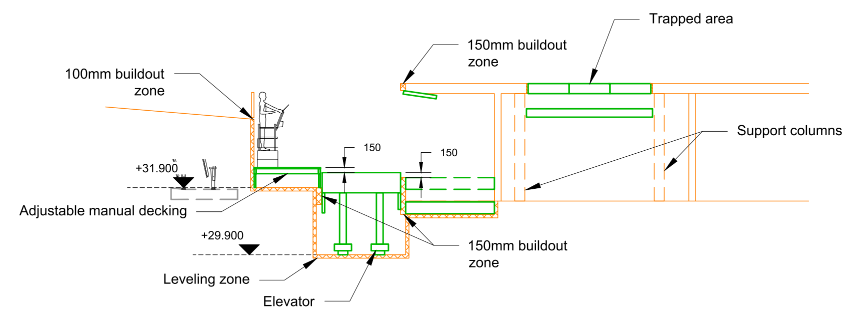
3 Elevator and decking in large forestage arrangement
Scale: 1:150



4 Elevator and decking in small forestage arrrangement
Scale: 1:150



5 Elevator and decking in small pit arrangement
Scale: 1:150



6 Elevator and decking in large pit arrangment
Scale: 1:150

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Project	Scale	Size
WAIKATO REGIONAL THEATRE, NEW ZEALAND	1 : 200	A3
Drawing Title	Date	Drawn/Checked
Stage Engineering Systems - Lift and decking configurations	20/07/18	SG/ SR
Status	Sketch Number	Rev
PRELIMINARY DESIGN	16125-SE-SK-320	02

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STAGE ENGINEERING SYSTEMS LOADING DRAWINGS

16125 – WAIKATO REGIONAL THEATRE, HAMILTON

16125-SE-LD-100 Series Drawing – Stage engineering systems preliminary loading information
Indicate significant static loads applied to building structure by Stage Engineering Systems

16125-SE-LD-300 Series Drawing – Preliminary architectural live loading information
Indicate specific static live loads applied to building structure by permanently fixed elements outside the Stage Engineering Scope

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Preliminary Design

August 2018

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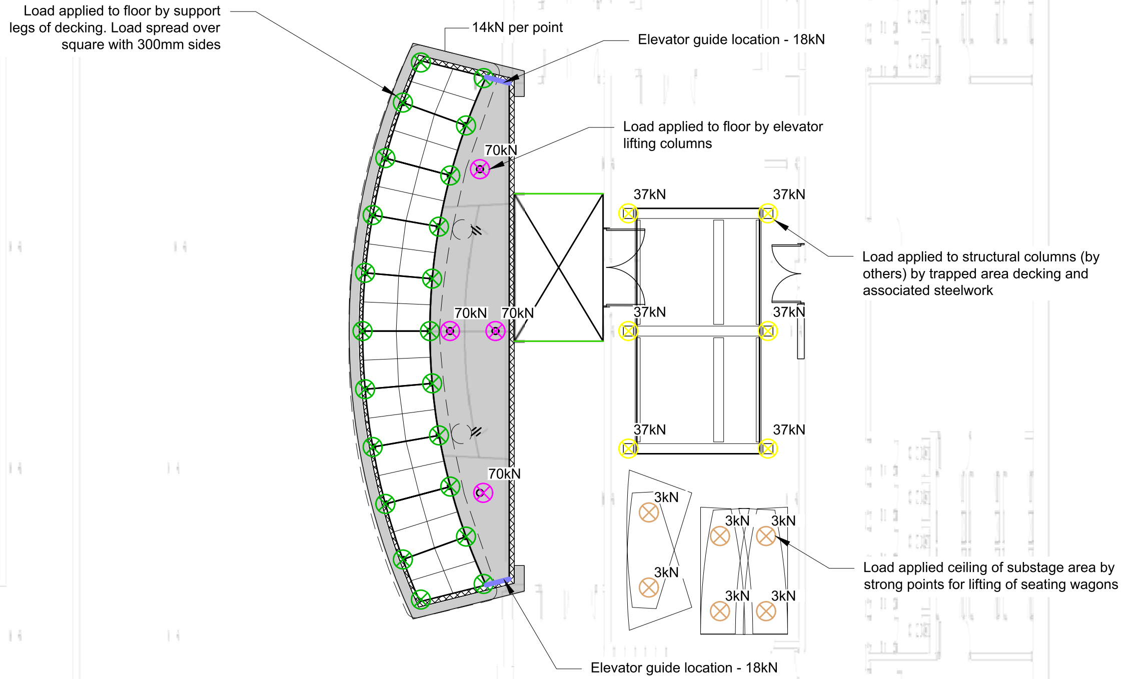

NOTES:

Do not scale from this drawing.

Figures show indicative, unfactored, static loads. Allowance must be made for all dynamic, consequential & resultant loads.

This drawing is issued for information only.

Fixed lighting bars are not included in the Stage Engineering package

Structural / secondary steelwork is not included as part of the Stage Engineering package. Structural Engineer to size all required steelwork.

LOADING KEY

- 70kN - Elevator load per column
- 14kN - Load over square with 300mm sides
  - 13.0kN Live load
  - 1.0kN Dead Load
- 37kN - Trapped room load per column
  - 35.0kN Live Load
  - 2.0kN Dead Load
- 3.0kN - Point load in ceiling
  - 2.5kN Live load
  - 0.5kN Dead load
- 18.0kN - Horizontal Load elevator guide rail on pit wall
- 14.0kN - Load along edge of floor
  - 11.5kN Live Load
  - 2.5kN Dead Load

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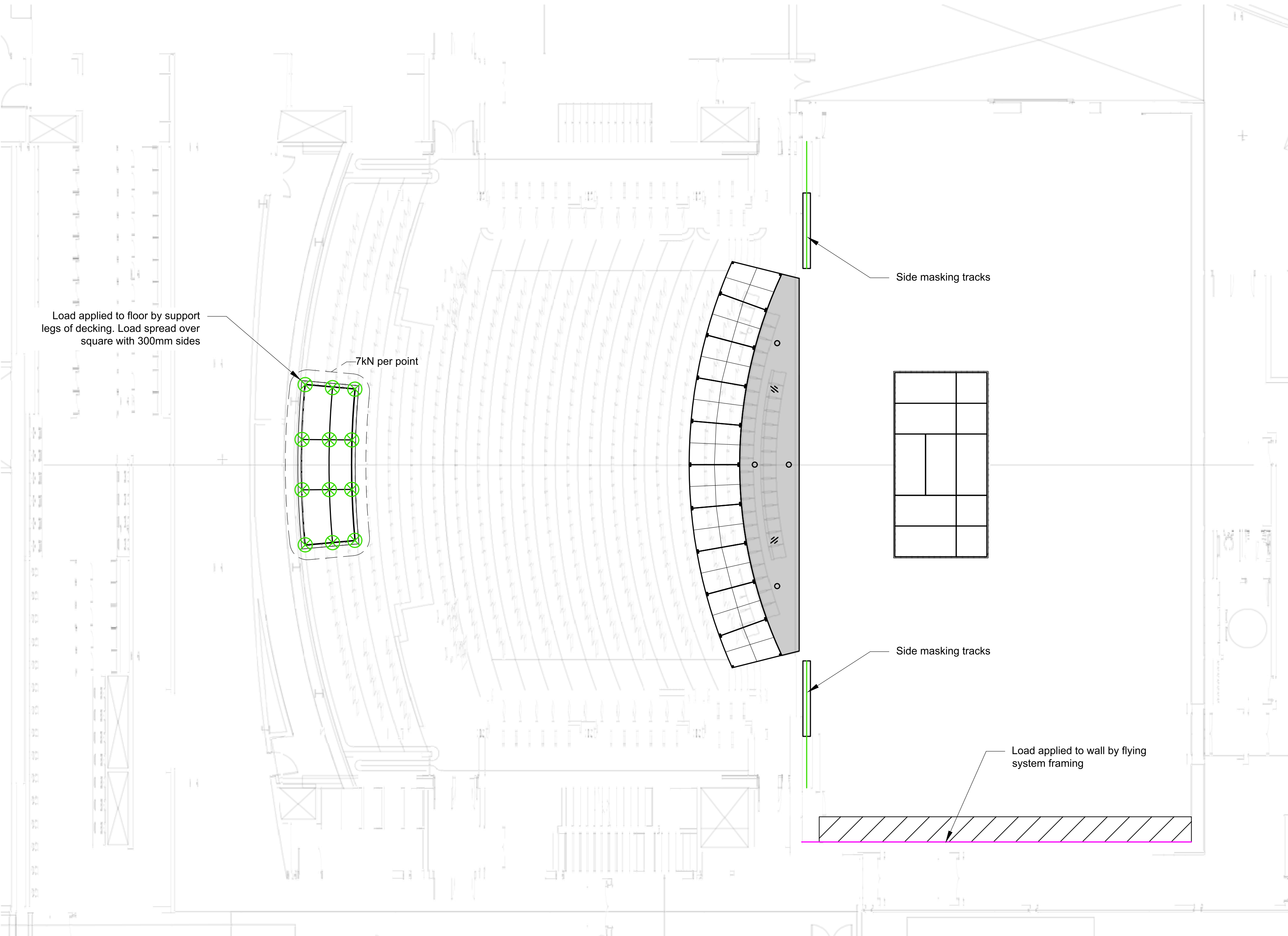
Project	Scale	Size
WAIKATO REGIONAL THEATRE, NEW ZEALAND	1:150	A3
Drawing Title	Date	Drawn/Checked
Plan - Stage engineering systems preliminary loading information - Level -2 Substage	24/07/18	SG/ CLA
Status	Sketch Number	Rev
FOR INFORMATION	16125-SE-LD-100	-



NOTES:

Do not scale from this drawing.

Figures show indicative, unfactored, static loads. Allowance must be made for all dynamic, consequential & resultant loads.

This drawing is issued for information only.

Fixed lighting bars are not included in the Stage Engineering package

Structural / secondary steelwork is not included as part of the Stage Engineering package. Structural Engineer to size all required steelwork.

LOADING KEY

- 7.0kN - Load over square with 300mm sides
  6.0kN Live load
  1.0kN Dead Load

- Horizontal load distributed across wall by flying system
  12kN - Live load (impact on top or bottom cradle stops)*
  40kN - Dead load from framing

* Instantaneous loading to framing caused by accidental collision of cradle with system end stops (bump stops)

- Load applied by architectural side masking
  6kN per side masking

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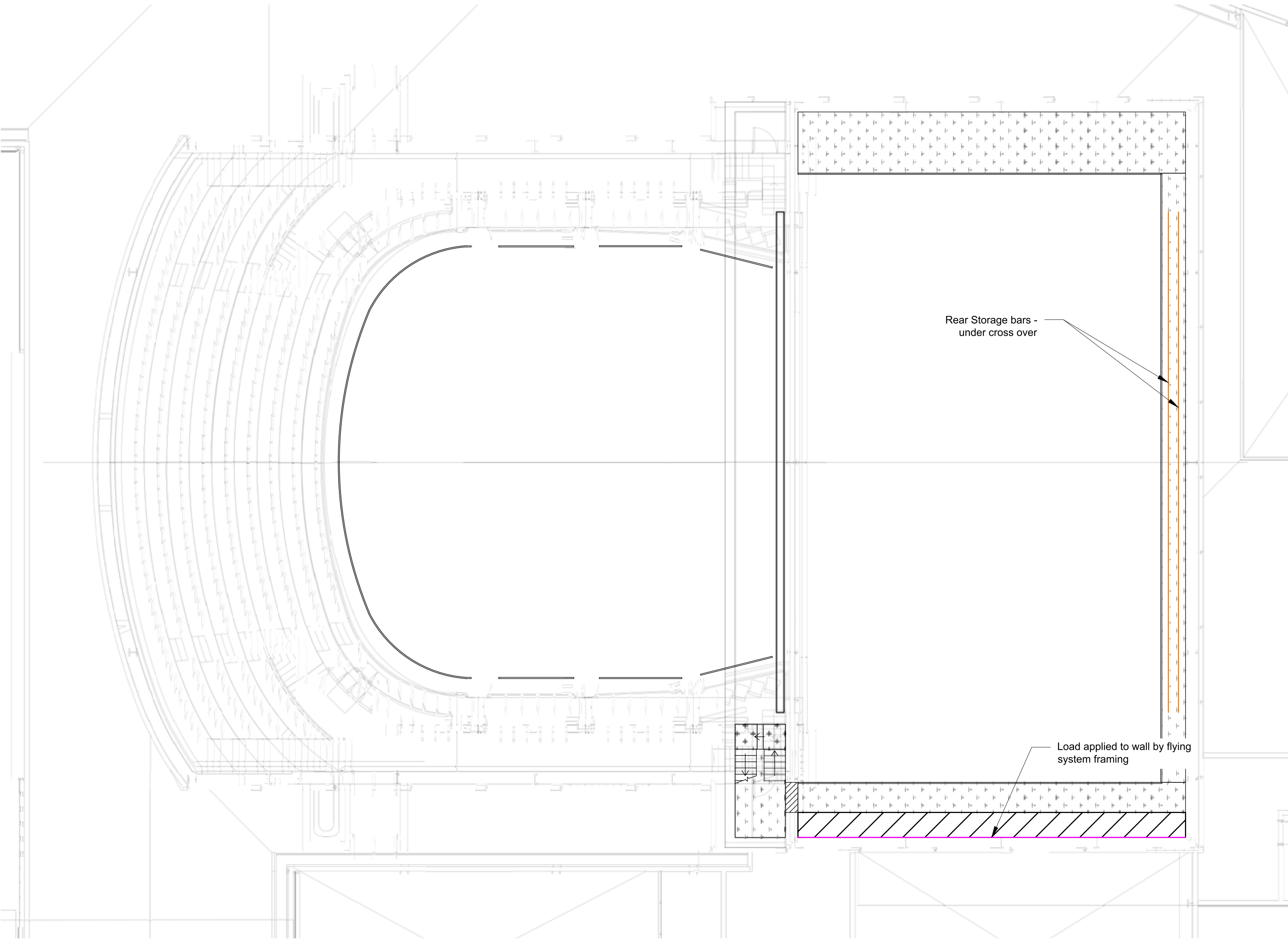
Project	Scale	Size
WAIKATO REGIONAL THEATRE, NEW ZEALAND	1:150	A3
Drawing Title	Date	Drawn/Checked
Plan - Stage engineering systems preliminary loading information - Level -1 Stalls	24/07/18	SG/ CLA
Status	Sketch Number	Rev
FOR INFORMATION	16125-SE-LD-101	-



NOTES:

Do not scale from this drawing.

Figures show indicative, unfactored, static loads. Allowance must be made for all dynamic, consequential & resultant loads.

This drawing is issued for information only.

Fixed lighting bars are not included in the Stage Engineering package

Structural / secondary steelwork is not included as part of the Stage Engineering package. Structural Engineer to size all required steelwork.

LOADING KEY

- 12kN - Storage bars
  5.0kN Live load
  7.0kN Dead load

- Load distributed across wall by flying system
  12kN - Live load (impact on top or bottom cradle stops)*
  40kN - Dead load from framing

* Instantaneous loading to framing caused by accidental collision of cradle with system end stops (bump stops)

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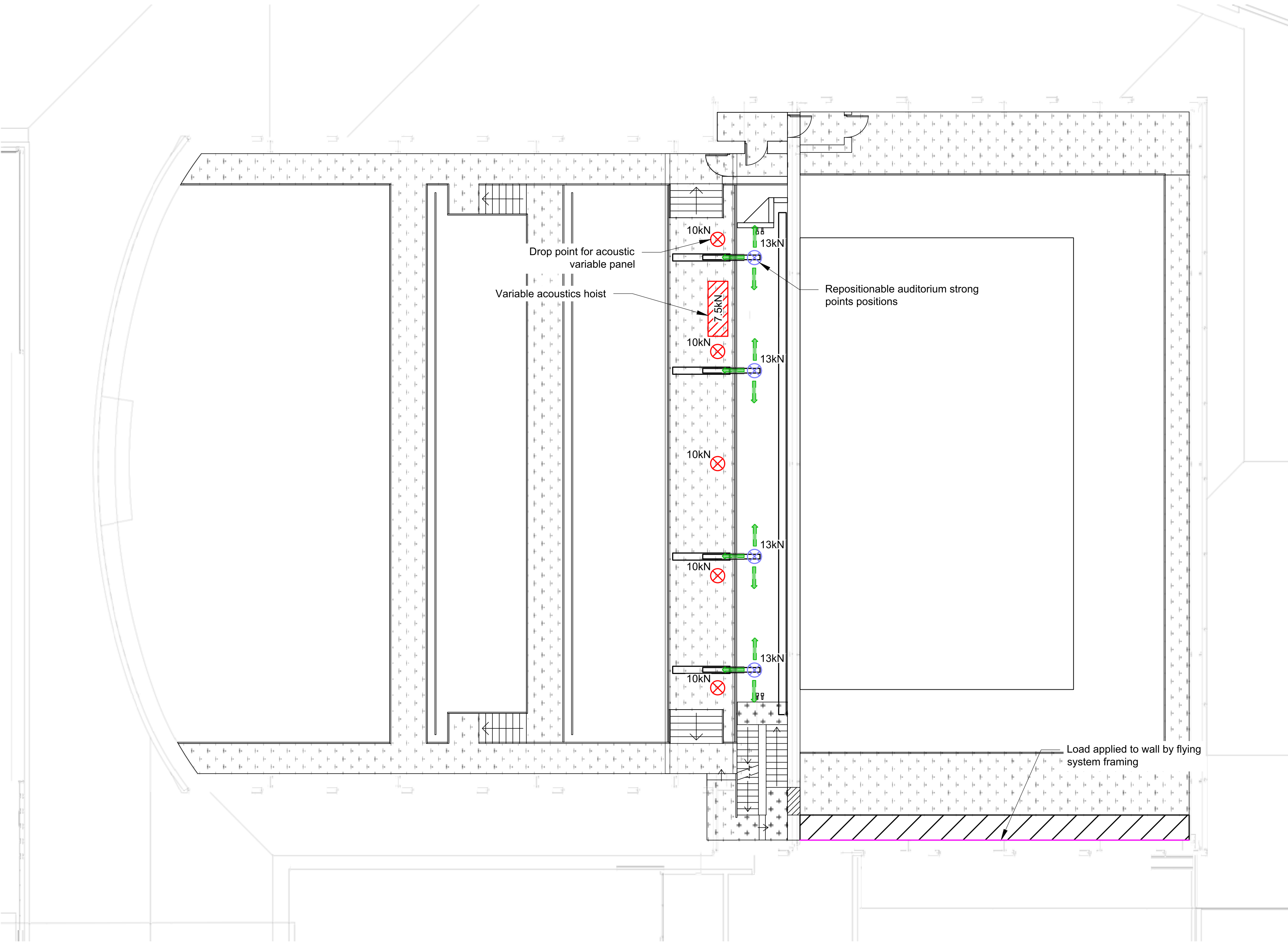
Project	Scale	Size
WAIKATO REGIONAL THEATRE, NEW ZEALAND	1:150	A3
Drawing Title	Date	Drawn/Checked
Plan - Stage engineering systems preliminary loading information - Level 3 Terrace	24/07/18	SG/ CLA
Status	Sketch Number	Rev
FOR INFORMATION	16125-SE-LD-102	-



NOTES:

Do not scale from this drawing.

Figures show indicative, unfactored, static loads. Allowance must be made for all dynamic, consequential & resultant loads.

This drawing is issued for information only.

Fixed lighting bars are not included in the Stage Engineering package

Structural / secondary steelwork is not included as part of the Stage Engineering package. Structural Engineer to size all required steelwork.

LOADING KEY

- 13kN - Vertical point load for FOH truss
  10.0kN Live load
  3.0N Dead Load

- 10kN - Vertical and horizontal load at point
  10.0kN Live load

- 7.5kN - Powered hoist
  7.5kN Dead load
  50kN Horizontal live load

- Load distributed across wall by flying system
  12kN - Live load (impact on top or bottom cradle stops)*
  40kN - Dead load from framing

* Instantaneous loading to framing caused by accidental collision of cradle with system end stops (bump stops)

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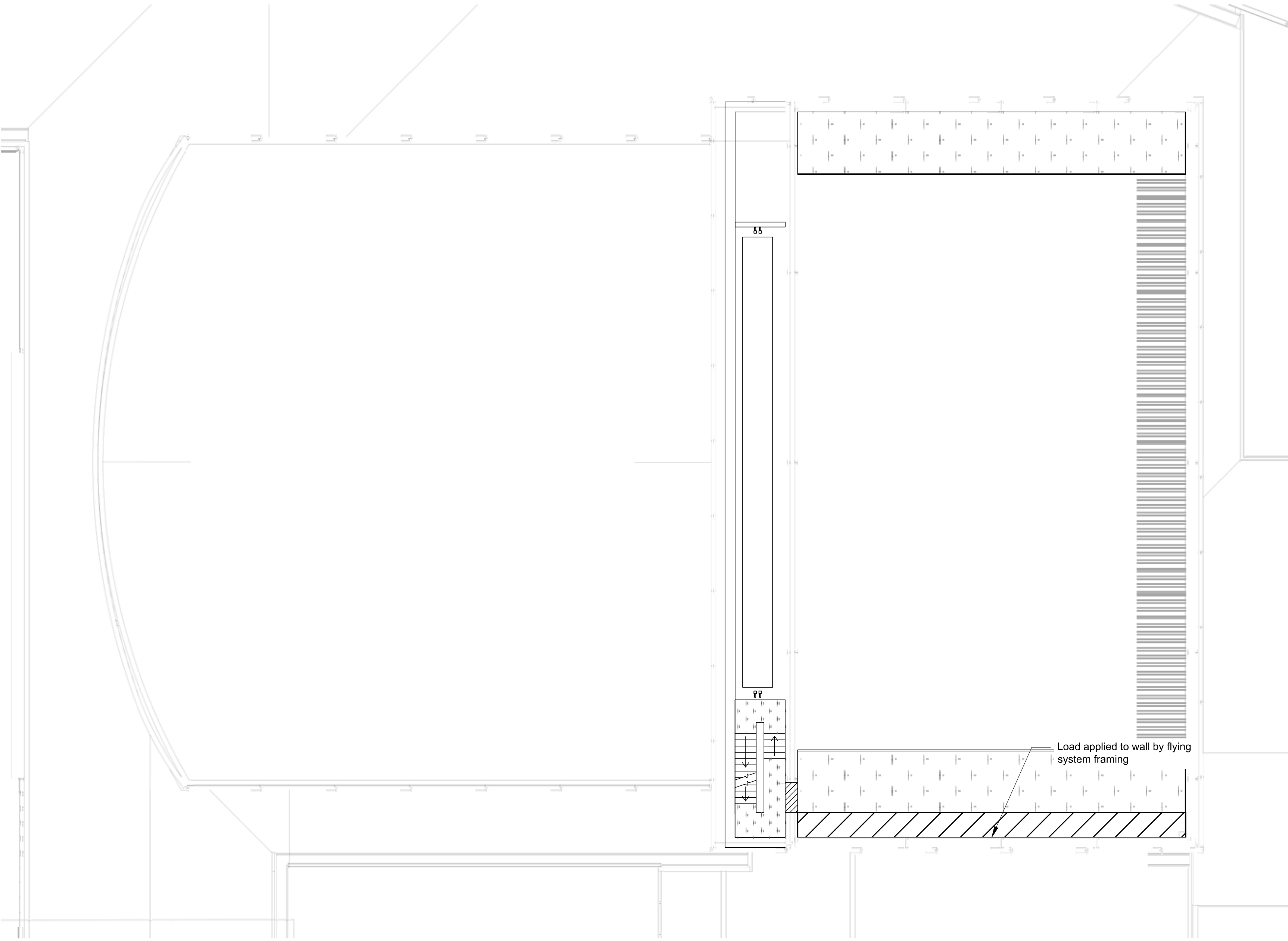
Project	Scale	Size
WAIKATO REGIONAL THEATRE, NEW ZEALAND	1:150	A3
Drawing Title	Date	Drawn/Checked
Plan - Stage engineering systems preliminary loading information - Level 4 Bridge	24/07/18	SG/ CLA
Status	Sketch Number	Rev
FOR INFORMATION	16125-SE-LD-103	-



NOTES:

Do not scale from this drawing.

Figures show indicative, unfactored, static loads. Allowance must be made for all dynamic, consequential & resultant loads.

This drawing is issued for information only.

Fixed lighting bars are not included in the Stage Engineering package

Structural / secondary steelwork is not included as part of the Stage Engineering package. Structural Engineer to size all required steelwork.

LOADING KEY

- Load applied to wall by flying system
12kN - Live load (impact on top or bottom cradle stops)*
40kN - Dead load from framing

* Instantaneous loading to framing caused by accidental collision of cradle with system end stops (bump stops)

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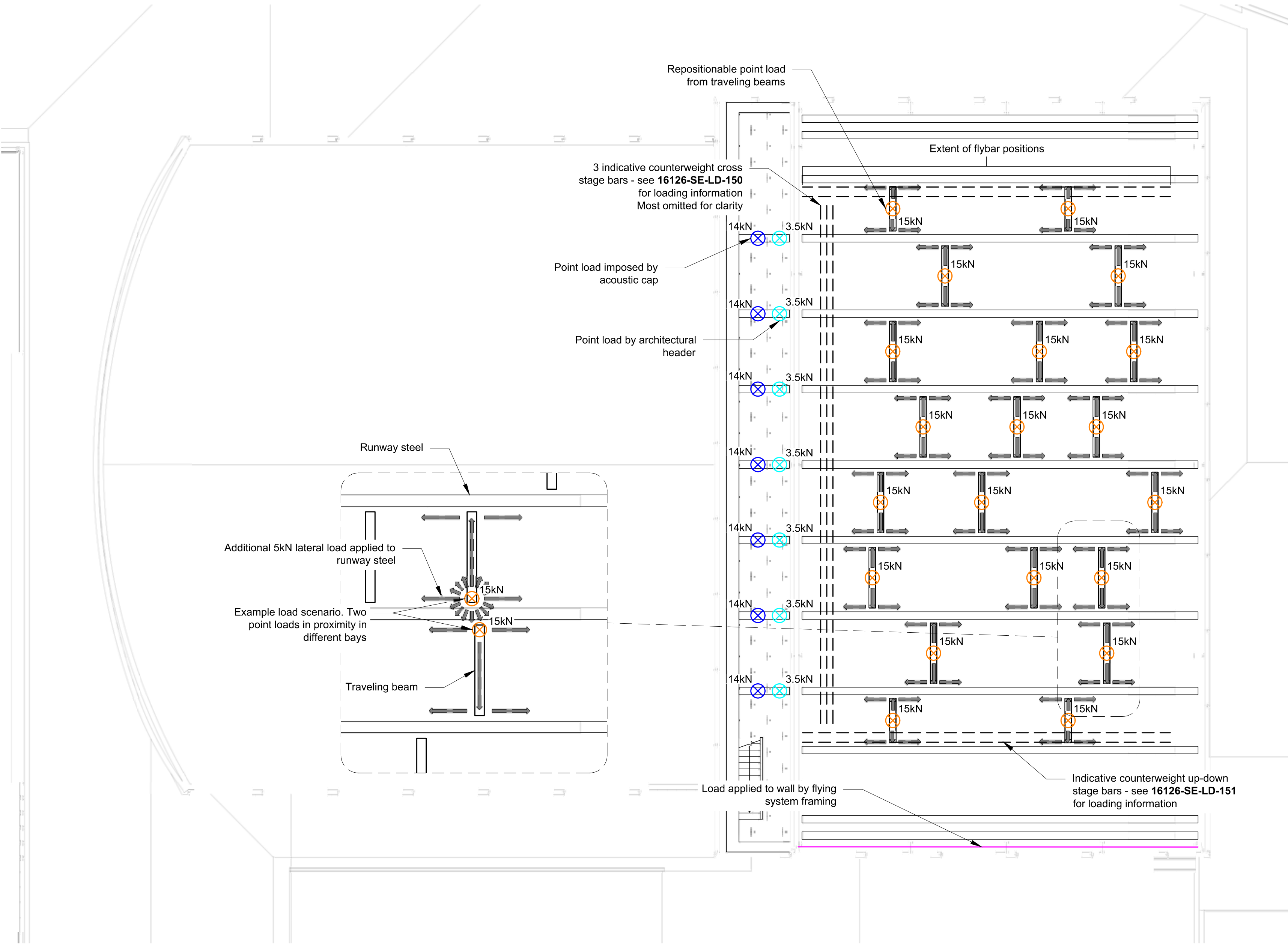
Project WAIKATO REGIONAL THEATRE, NEW ZEALAND	Scale 1:150	Size A3
Drawing Title Plan - Stage engineering systems preliminary loading information - Level 5 Auditorium Roof	Date 24/07/18	Drawn/Checked SG/ CLA
Status FOR INFORMATION	Sketch Number 16125-SE-LD-104	Rev -



NOTES:

Do not scale from this drawing.

Figures show indicative, unfactored, static loads. Allowance must be made for all dynamic, consequential & resultant loads.

This drawing is issued for information only.

Fixed lighting bars are not included in the Stage Engineering package

Structural / secondary steelwork is not included as part of the Stage Engineering package. Structural Engineer to size all required steelwork.

LOADING KEY

- 15kN - Load from traveling beam
  12kN Live load
  3.0kN Dead load
- 5.0kN - Additional live load applied in any lateral direction

Setting out of beams is indicative and is not representative of a typical configuration. Positions can be reconfigured to suit performance requirements

- 14kN - Load applied by acoustic cap
- 3.5kN - Load applied by architectural header

Diversification will apply to live loads - refer to drg. **16125-SE-LD-106** for information

- Load applied to wall by flying system
  12kN - Live load (impact on top or bottom cradle stops)*
  40kN - Dead load from framing

* Instantaneous loading to framing caused by accidental collision of cradle with system end stops (bump stops)

- Indicative counterweight bars - see **16125-SE-LD-150&151** for loading information

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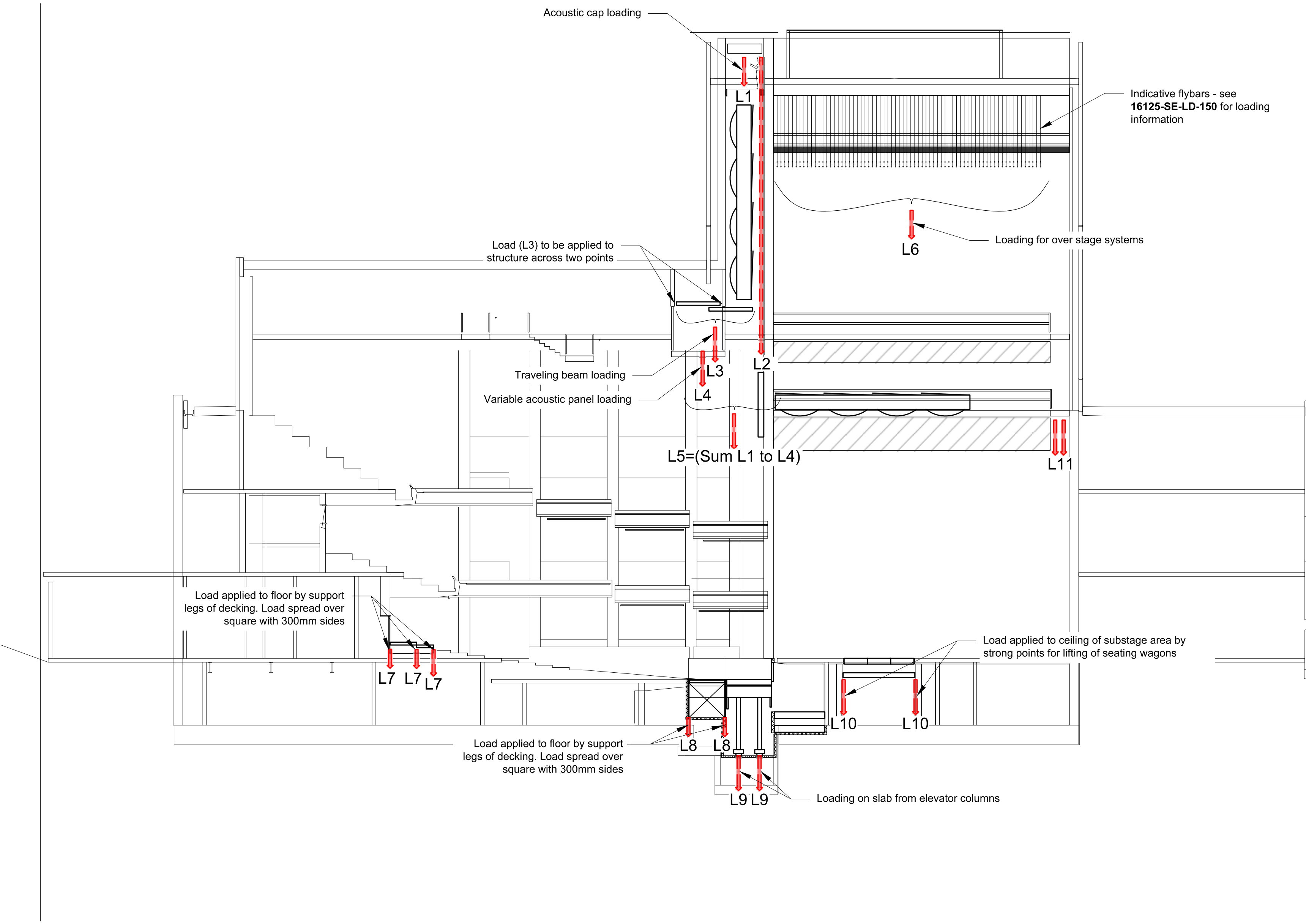
Project WAIKATO REGIONAL THEATRE, NEW ZEALAND	Scale 1:150 / Size A3
Drawing Title Plan - Stage engineering systems preliminary loading information - Level 7 Fly Tower Grid	Date 24/07/18 / Drawn/Checked SG/ CLA
Status FOR INFORMATION	Sketch Number 16125-SE-LD-105 / Rev -



NOTES:

Do not scale from this drawing.

Figures show indicative, unfactored, static loads. Allowance must be made for all dynamic, consequential & resultant loads.

This drawing is issued for information only.

Fixed lighting bars are not included in the Stage Engineering package

Structural / secondary steelwork is not included as part of the Stage Engineering package. Structural Engineer to size all required steelwork.

LOADING KEY

- Load arrow

L1 - 70kN - Acoustic cap
70kN Semi permanent live load

L2 - 18kN - Adjustable architectural header
18kN Dead load

L3 - 52kN - Bridge #1 Traveling beams
10kN Live load x 4
3kN Dead Load x 4

L4 - 50kN - Variable acoustic panel
50kN Dead load

L5 - 190kN - L5=L1+L2+L3+L4

L11 - 24kN - Storage bars
5.0kN Live load x 2
7.0kN Dead load x 2

L6- 845kN - Diversity load from over stage systems imposed to roof and grid*
250kN Live load (equipment)
~~150kN Live load (counterweights)~~
215kN Dead load (Single purchase)
60kN Dead Load (Traveling beams)
320kN Dead Load (Future winches)
(Counterweights load can be offset again future winches load)

* System does not include self weight of grid and associated steelwork

L7- 7kN - Load over square with 300mm sides
6.0kN Live load
1.0kN Dead Load

L8- 14kN - Load over square with 300mm sides
13.0kN Live load
1.0kN Dead Load

L9- 70kN - Elevator load per column

L10- 37kN - Trapped room load per column
35.0kN Live Load
2.0kN Dead Load

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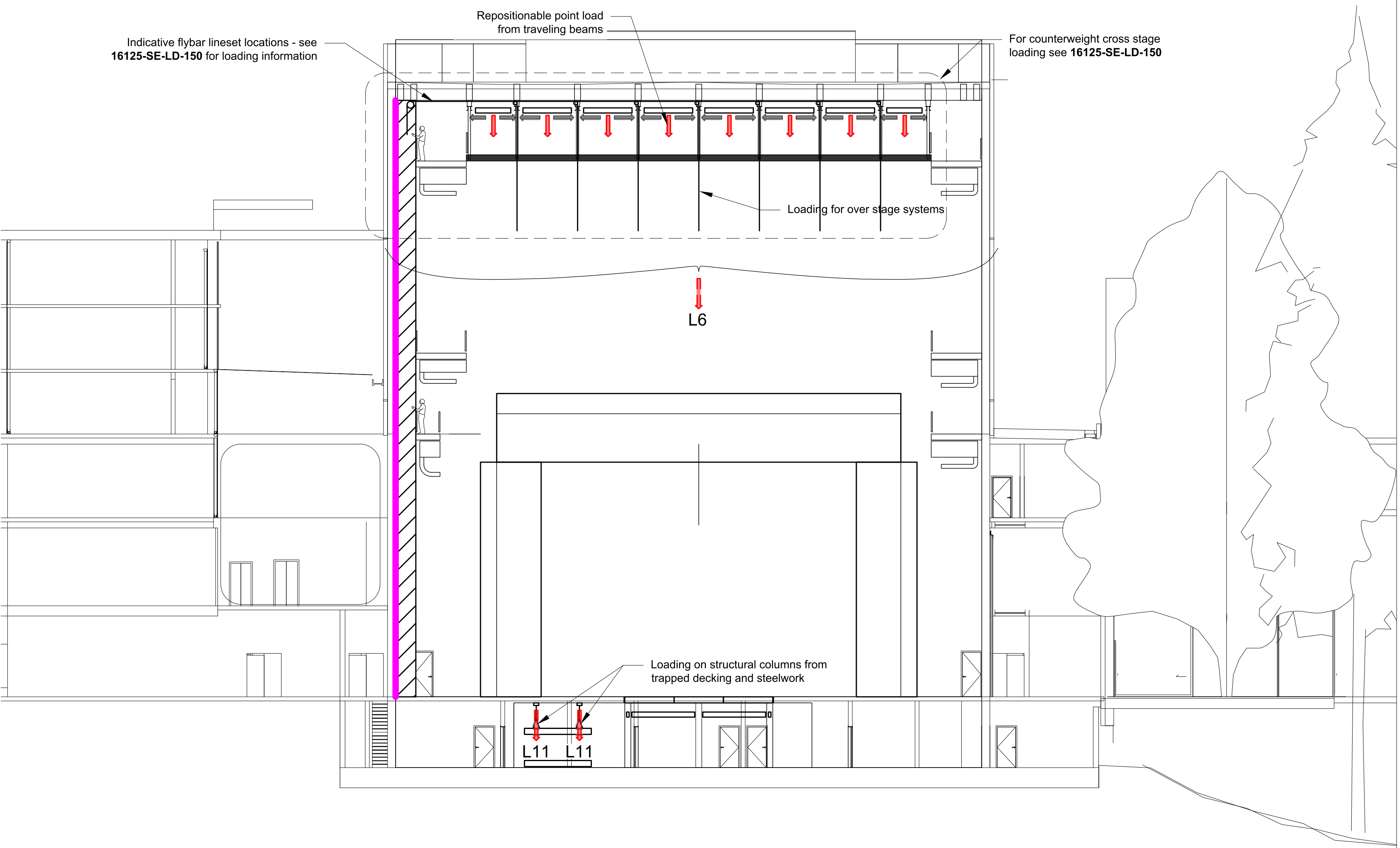
Project	Scale	Size
WAIKATO REGIONAL THEATRE, NEW ZEALAND	1:200	A3
Drawing Title	Date	Drawn/Checked
Long Section - Stage engineering systems preliminary loading information - Centreline	24/07/18	SG/ CLA
Status	Sketch Number	Rev
FOR INFORMATION	16125-SE-LD-106	-



NOTES:

Do not scale from this drawing.

Figures show indicative, unfactored, static loads. Allowance must be made for all dynamic, consequential & resultant loads.

This drawing is issued for information only.

Fixed lighting bars are not included in the Stage Engineering package

Structural / secondary steelwork is not included as part of the Stage Engineering package. Structural Engineer to size all required steelwork.

LOADING KEY

- Load arrow

L1 - 70kN - Acoustic cap
70kN Semi permanent live load

L2 - 18kN - Adjustable architectural header
18kN Dead load

L3 - 52kN - Bridge #1 Traveling beams
10kN Live load
3kN Dead Load

L4 - 50kN - Variable acoustic panel
50kN Dead load

L5 - 190kN - L5=L1+L2+L3+L4

L6- 845kN - Diversity load from over stage systems imposed to roof and grid*
250kN Live load (equipment)
~~150kN Live load (counterweights)~~
215kN Dead load (Single purchase)
60kN Dead Load (Traveling beams)
320kN Dead Load (Future winches)
(Counterweights load can be offset again future winches load)

* System does not include self weight of grid and associated steelwork

L7- 7kN - Load over square with 300mm sides
6.0kN Live load
1.0kN Dead Load

L8- 14kN - Load over square with 300mm sides
13.0kN Live load
1.0kN Dead Load

L9- 70N - Elevator load per column

L10 - 37kN - Trapped room load per column
35.0kN Live Load
2.0kN Dead Load

L11 - 3.0kN - Point load on ceiling for seating wagons
2.5kN Live Load
0.5kN Dead Load

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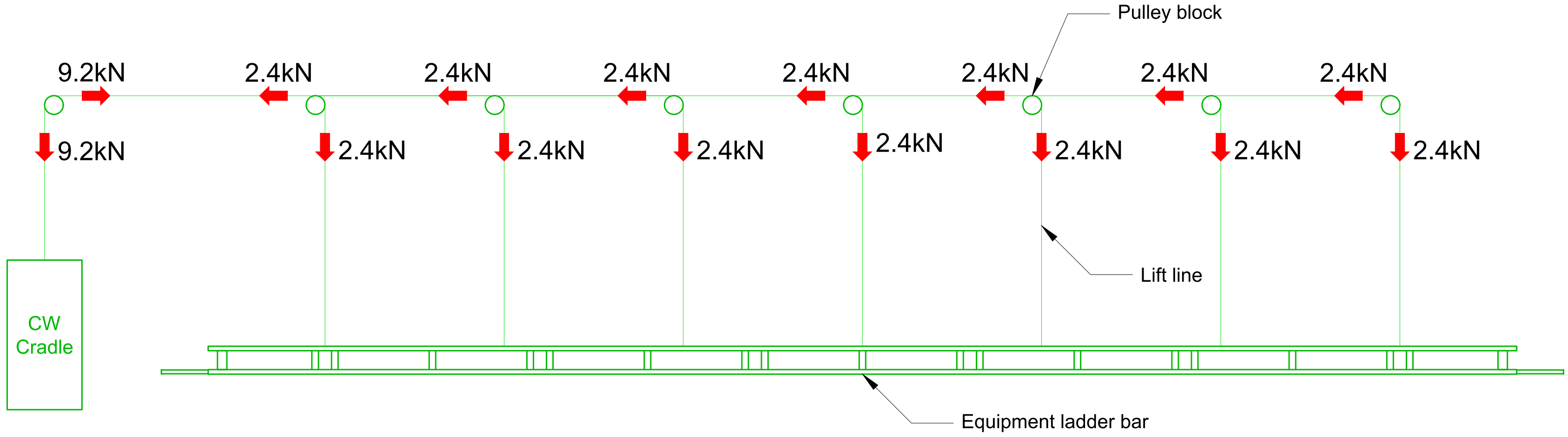
Project	Scale	Size
WAIKATO REGIONAL THEATRE, NEW ZEALAND	1:200	A3
Drawing Title	Date	Drawn/Checked
Short Section - Stage engineering systems preliminary loading information - Through Auditorium	24/07/18	SG/ CLA
Status	Sketch Number	Rev
FOR INFORMATION	16125-SE-LD-107	-



Notes:-

- The Sum of the loads shown at the drop pulleys may be greater than the total load of the fully loaded bar, this is to account for an un-evenly loaded bar.
- Loads are shown for the bar at the full SWL, Bars will be loaded at 125% of the SWL for load testing
- Figures show indicative static loads. Allowance must be made for all dynamic, consequential & resultant loads

LOADING DETAILS

Bar description	
Quantity	
SWL available on the bar (kg)	750
Maximum point load at suspension point (kg)	200
Number of lines	7
Distance detween lines (m)	3
Length of bar (m)	20
Extensions (m)	0.50
Estimated self weight of hoist (kg)	400

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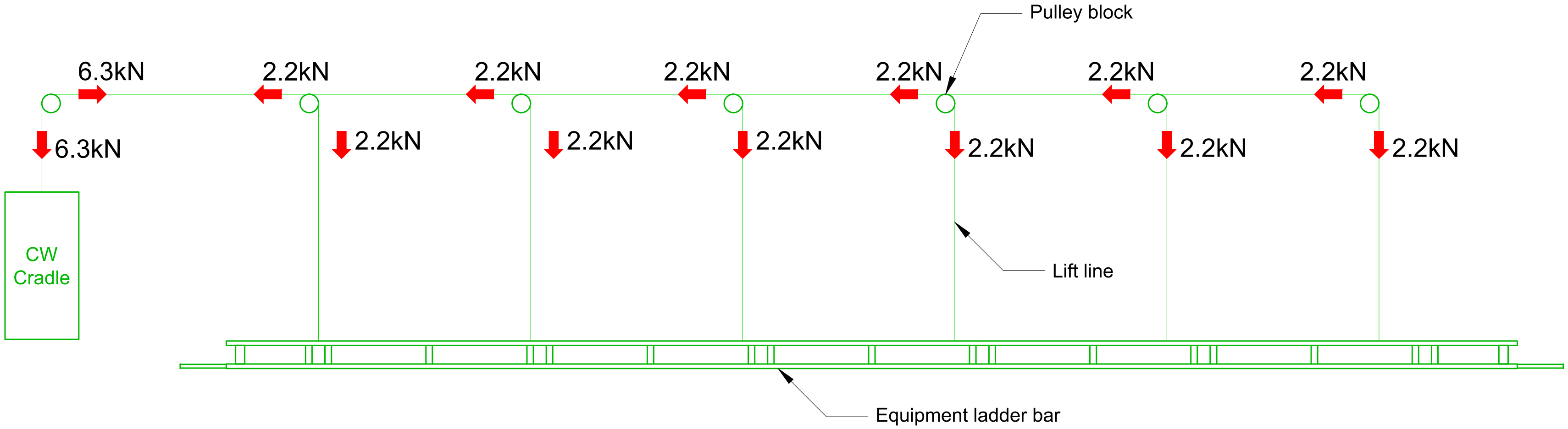
Project	Scale	Size
WAIKATO REGIONAL THEATRE, NEW ZEALAND	NTS	A3
Drawing Title	Date	Drawn/Checked
Stage Engineering - Single counterweight loading diagram - cross stage bars	20/07/2018	SG/CLA
Status	Sketch Number	Rev
FOR INFORMATION	16125-SE-LD-150	-



Notes:-

- The Sum of the loads shown at the drop pulleys may be greater than the total load of the fully loaded bar, this is to account for an un-evenly loaded bar.
- Loads are shown for the bar at the full SWL, Bars will be loaded at 125% of the SWL for load testing
- Figures show indicative static loads. Allowance must be made for all dynamic, consequential & resultant loads

LOADING DETAILS	
Bar description	
Quantity	
SWL available on the bar (kg)	500
Maximum point load at suspension point (kg)	200
Number of lines	6
Distance detween lines (m)	2.40
Length of bar (m)	14.00
Extensions (m)	0.50
Estimated self weight of hoist (kg)	400

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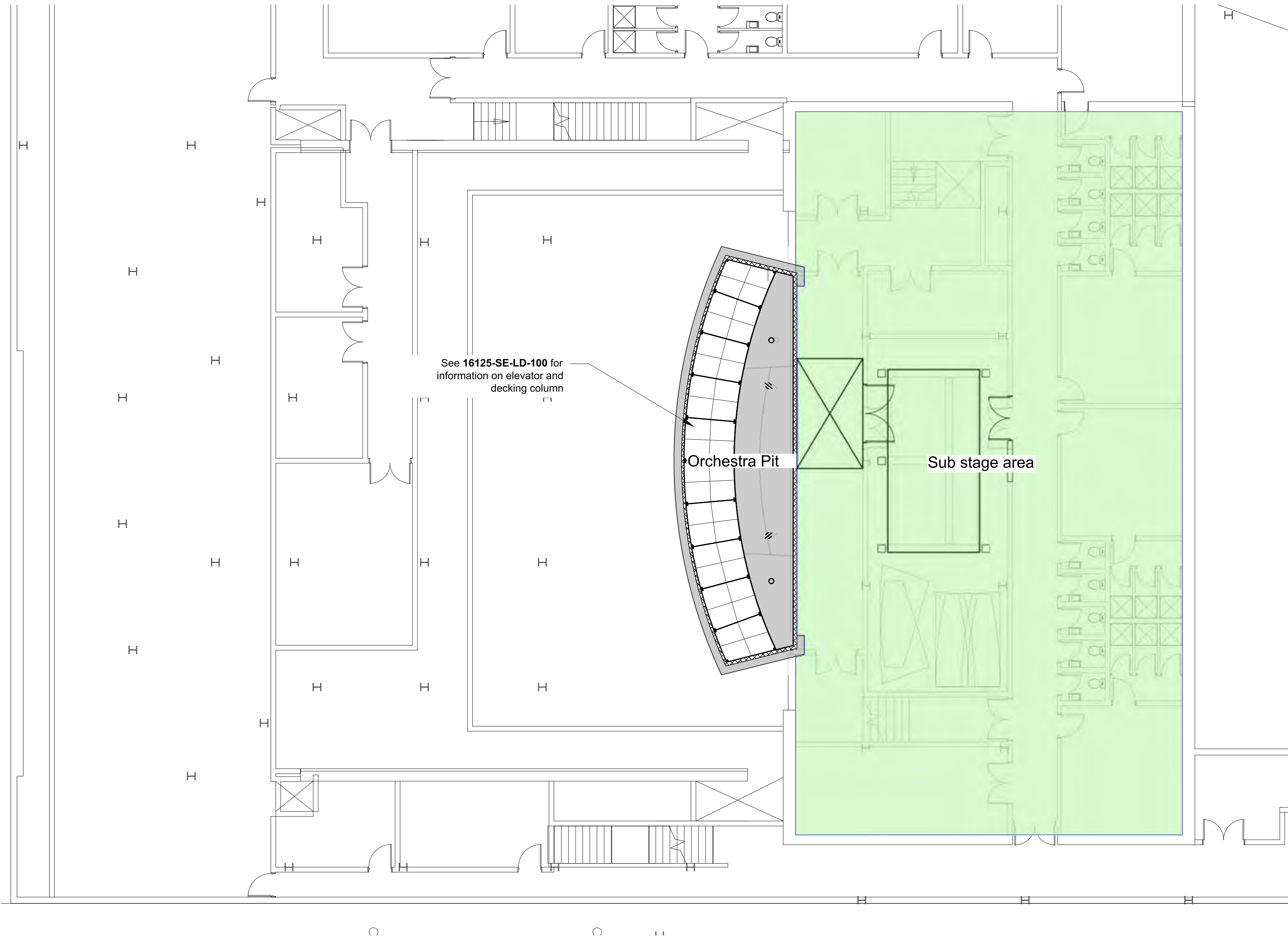
4A/104 JOHNSTON STREET FITZROY, VIC 3065 MELBOURNE TEL: +61 (03) 9417 6524 W WWW.CHARCOALBLUE.COM	Drawing Title Stage Engineering - Single counterweight loading diagram - up-down stage bars	Date 20/07/2018 / Drawn/Checked SG/CLA
	Status FOR INFORMATION	Sketch Number 16125-SE-LD-151 / Rev -



NOTES:

Do not scale from this drawing.

Figures show indicative static loads. Allowance must be made for all dynamic, consequential & resultant loads.

This drawing is issued for information only.

Fixed lighting bars are not included in the Stage Engineering package

LOADING KEY

- FLOOR LOADING 2.5kN/m²
- Excluding any loads designed to be applied by the permanently installed flying system.
- FLOOR LOADING 4kN/m run uniformly distributed over the width of the gallery
- FLOOR LOADING 5kN/m²
- FLOOR LOADING 7.5kN/m²
- Loading gallery - Floor loading to carry the counterweight capacity uniformly distributed along the length of the gallery Total Load = 150kN
- Winch gallery - Floor loading= 9kN/m and winch uplift load of 19kN/m

TECHNICAL BAR LOADING

- FIXED LIGHTING BARS 0.5kN/m vertical load (L1), fixings every 2 - 2.5m

TECHNICAL HANDRAIL LOADING

- 3kN/m vertical (upward) load 2kN/m horizontal load
- 1kN/m vertical (upward) load 2kN/m horizontal load
- 1kN/m vertical (upward) load 1kN/m horizontal load
- 1kN/m vertical (upward) load 3kN/m horizontal load
- DRAPE BARS / TRACKS 0.25kN/m Vertical linear load

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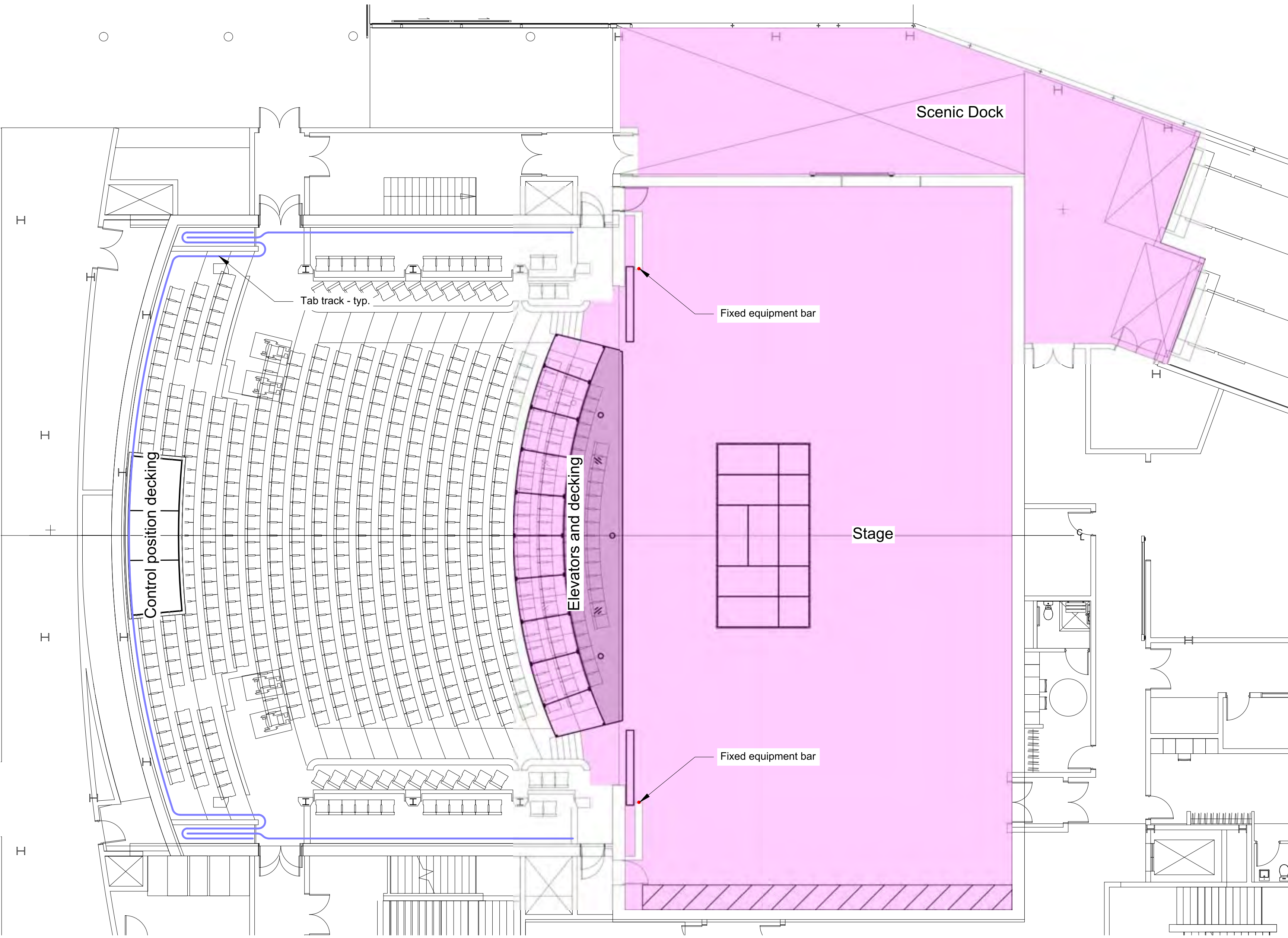
Project WAIKATO REGIONAL THEATRE, NEW ZEALAND	Scale 1:150	Size A3
Drawing Title Plan - Preliminary architectural live loading information - Level -2 Substage	Date 24/07/18	Drawn/Checked SG/ CLA
Status FOR INFORMATION	Sketch Number 16125-SE-LD-300	Rev -



NOTES:

Do not scale from this drawing.

Figures show indicative static loads.
Allowance must be made for all dynamic, consequential & resultant loads.

This drawing is issued for information only.

Fixed lighting bars are not included in the Stage Engineering package

LOADING KEY

- FLOOR LOADING 2.5kN/m²
- Excluding any loads designed to be applied by the permanently installed flying system.

- FLOOR LOADING 4kN/m run uniformly distributed over the width of the gallery

- FLOOR LOADING 5kN/m²

- FLOOR LOADING 7.5kN/m²

- Loading gallery - Floor loading to carry the counterweight capacity uniformly distributed along the length of the gallery
Total Load = 150kN

- Winch gallery - Floor loading= 9kN/m and winch uplift load of 19kN/m

TECHNICAL BAR LOADING

- FIXED LIGHTING BARS
0.5kN/m vertical load (L1), fixings every 2 - 2.5m

TECHNICAL HANDRAIL LOADING

- 3kN/m vertical (upward) load
2kN/m horizontal load

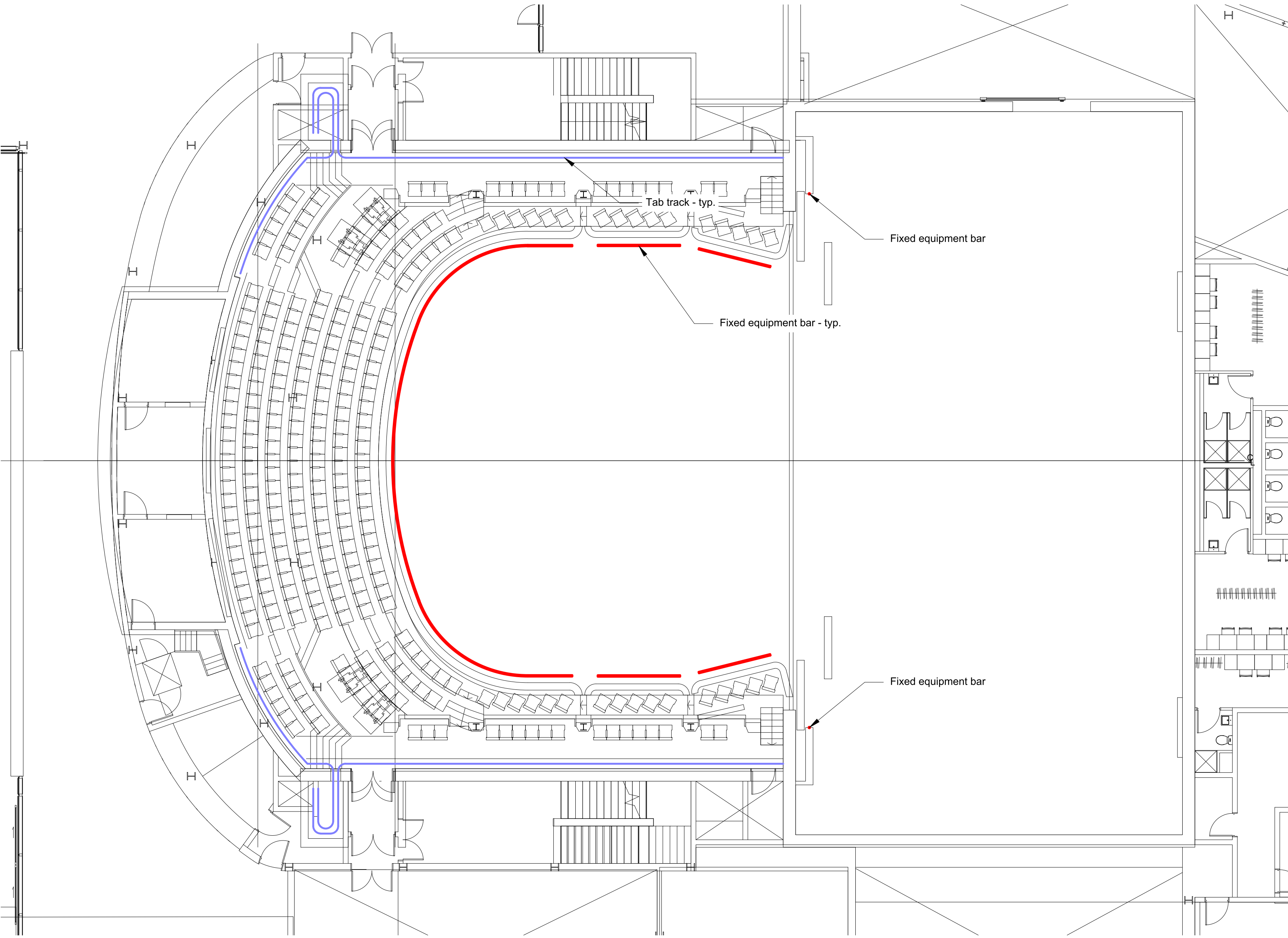
- 1kN/m vertical (upward) load
2kN/m horizontal load

- 1kN/m vertical (upward) load
1kN/m horizontal load

- 1kN/m vertical (upward) load
3kN/m horizontal load

- DRAPE BARS / TRACKS
0.25kN/m Vertical linear load

CHARCOALBLUE THEATRICAL INNOVATION ESTD 2004 4A/104 JOHNSTON STREET FITZROY, VIC 3065 MELBOURNE TEL: +61 (03) 9417 6524 W WWW.CHARCOALBLUE.COM	Project WAIKATO REGIONAL THEATRE, NEW ZEALAND	Scale 1:150	Size A3
	Drawing Title Plan - Preliminary architectural live loading information - Level -1 Stalls	Date 24/07/18	Drawn/Checked SG/ CLA
	Status FOR INFORMATION	Sketch Number 16125-SE-LD-301	Rev -



NOTES:

Do not scale from this drawing.

Figures show indicative static loads.
Allowance must be made for all dynamic, consequential & resultant loads.

This drawing is issued for information only.

Fixed lighting bars are not included in the Stage Engineering package

LOADING KEY

- FLOOR LOADING 2.5kN/m²
- Excluding any loads designed to be applied by the permanently installed flying system.

- FLOOR LOADING 4kN/m run uniformly distributed over the width of the gallery

- FLOOR LOADING 5kN/m²

- FLOOR LOADING 7.5kN/m²

- Loading gallery - Floor loading to carry the counterweight capacity uniformly distributed along the length of the gallery
Total Load = 150kN

- Winch gallery - Floor loading= 9kN/m and winch uplift load of 19kN/m

TECHNICAL BAR LOADING

- FIXED LIGHTING BARS
0.5kN/m vertical load (L1), fixings every 2 - 2.5m

TECHNICAL HANDRAIL LOADING

- 3kN/m vertical (upward) load
2kN/m horizontal load

- 1kN/m vertical (upward) load
2kN/m horizontal load

- 1kN/m vertical (upward) load
1kN/m horizontal load

- 1kN/m vertical (upward) load
3kN/m horizontal load

- DRAPE BARS / TRACKS
0.25kN/m Vertical linear load

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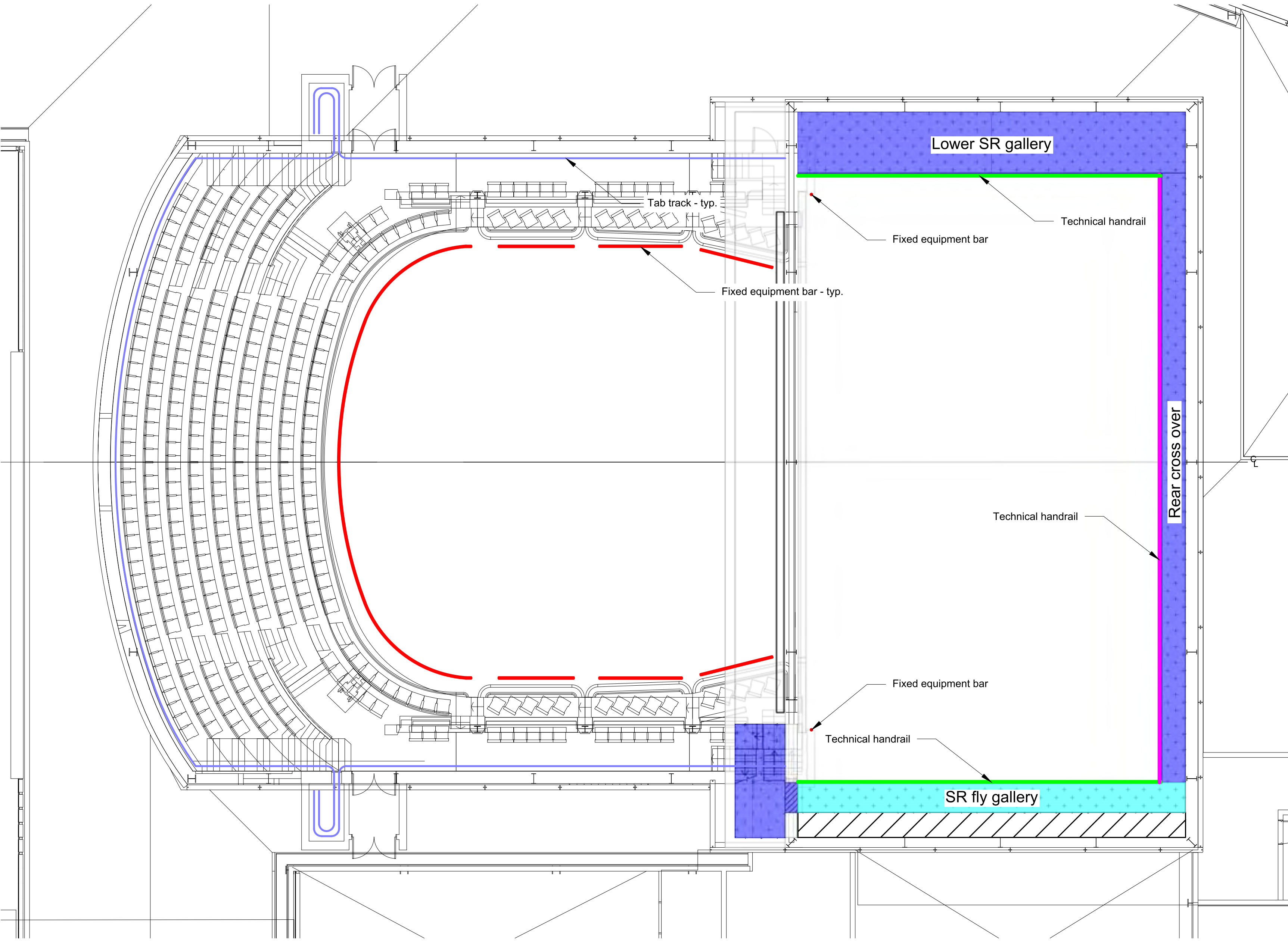
Project WAIKATO REGIONAL THEATRE, NEW ZEALAND	Scale 1:150 / Size A3
Drawing Title Plan - Preliminary architectural live loading information - Level 2 circle	Date 24/07/18 / Drawn/Checked SG/ CLA
Status FOR INFORMATION	Sketch Number 16125-SE-LD-302 / Rev -



NOTES:

Do not scale from this drawing.

Figures show indicative static loads.
Allowance must be made for all dynamic, consequential & resultant loads.

This drawing is issued for information only.

Fixed lighting bars are not included in the Stage Engineering package

LOADING KEY

- FLOOR LOADING 2.5kN/m²
- Excluding any loads designed to be applied by the permanently installed flying system.
- FLOOR LOADING 4kN/m run uniformly distributed over the width of the gallery
- FLOOR LOADING 5kN/m²
- FLOOR LOADING 7.5kN/m²
- Loading gallery - Floor loading to carry the counterweight capacity uniformly distributed along the length of the gallery Total Load = 150kN
- Winch gallery - Floor loading= 9kN/m and winch uplift load of 19kN/m

TECHNICAL BAR LOADING

- FIXED LIGHTING BARS 0.5kN/m vertical load (L1), fixings every 2 - 2.5m

TECHNICAL HANDRAIL LOADING

- 3kN/m vertical (upward) load 2kN/m horizontal load
- 1kN/m vertical (upward) load 2kN/m horizontal load
- 1kN/m vertical (upward) load 1kN/m horizontal load
- 1kN/m vertical (upward) load 3kN/m horizontal load
- DRAPE BARS / TRACKS 0.25kN/m Vertical linear load

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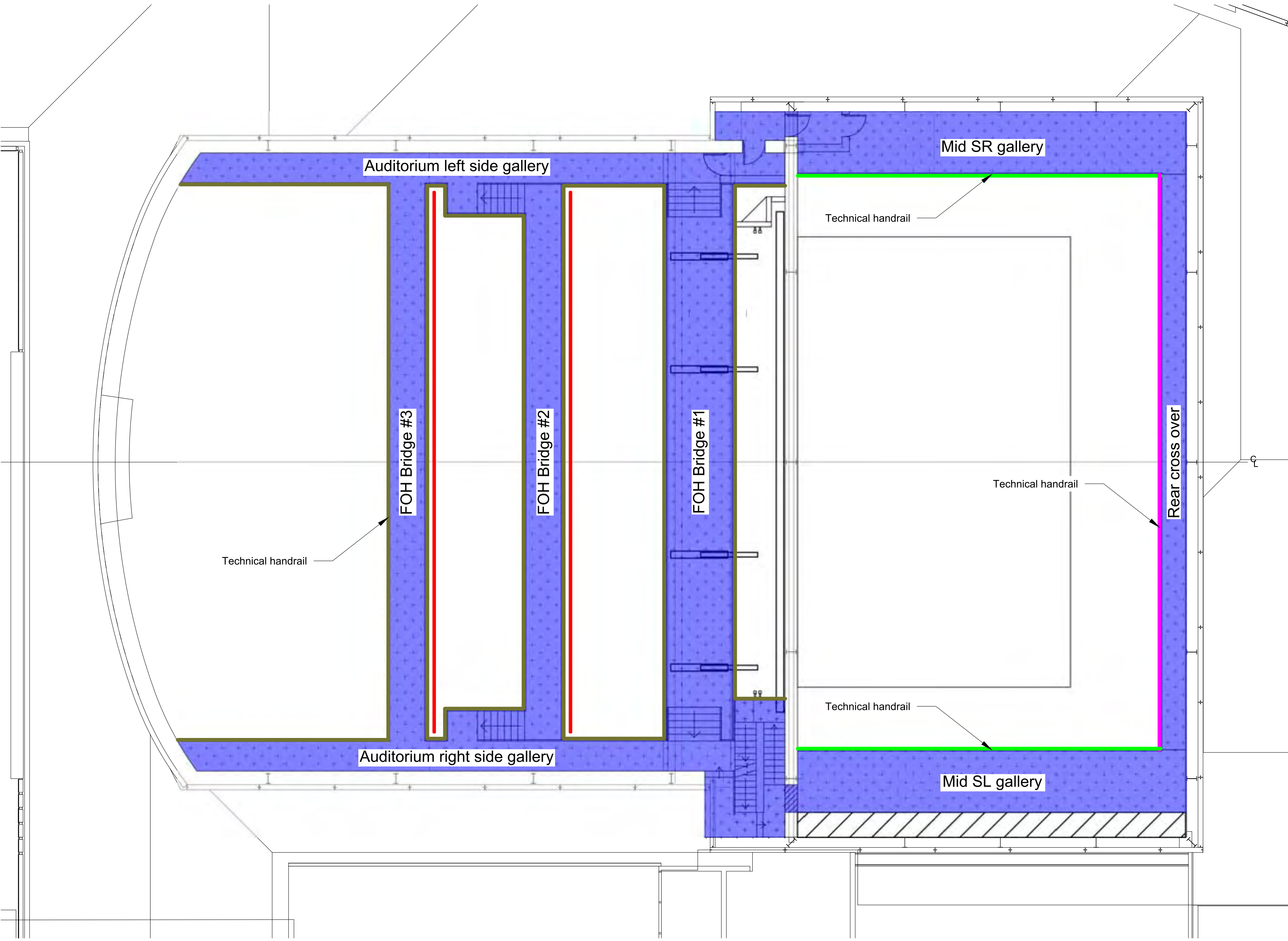
Project WAIKATO REGIONAL THEATRE, NEW ZEALAND	Scale 1:150 / Size A3
Drawing Title Plan - Preliminary architectural live loading information - Level 3 terrace	Date 24/07/18 / Drawn/Checked SG/ CLA
Status FOR INFORMATION	Sketch Number 16125-SE-LD-303 / Rev -



NOTES:

Do not scale from this drawing.

Figures show indicative static loads.
Allowance must be made for all dynamic, consequential & resultant loads.

This drawing is issued for information only.

Fixed lighting bars are not included in the Stage Engineering package

LOADING KEY

- FLOOR LOADING 2.5kN/m²
- Excluding any loads designed to be applied by the permanently installed flying system.

- FLOOR LOADING 4kN/m run uniformly distributed over the width of the gallery

- FLOOR LOADING 5kN/m²

- FLOOR LOADING 7.5kN/m²

- Loading gallery - Floor loading to carry the counterweight capacity uniformly distributed along the length of the gallery
Total Load = 150kN

- Winch gallery - Floor loading= 9kN/m and winch uplift load of 19kN/m

TECHNICAL BAR LOADING

- FIXED LIGHTING BARS
0.5kN/m vertical load (L1), fixings every 2 - 2.5m

TECHNICAL HANDRAIL LOADING

- 3kN/m vertical (upward) load
2kN/m horizontal load

- 1kN/m vertical (upward) load
2kN/m horizontal load

- 1kN/m vertical (upward) load
1kN/m horizontal load

- 1kN/m vertical (upward) load
3kN/m horizontal load

- DRAPE BARS / TRACKS
0.25kN/m Vertical linear load

CHARCOALBLUE THEATRICAL INNOVATION ESTD 2004 4A/104 JOHNSTON STREET FITZROY, VIC 3065 MELBOURNE TEL: +61 (03) 9417 6524 W WWW.CHARCOALBLUE.COM	Project WAIKATO REGIONAL THEATRE, NEW ZEALAND	Scale 1:150 / Size A3
	Drawing Title Plan - Preliminary architectural live loading information - Level 4 Bridge	Date 24/07/18 / Drawn/Checked SG/ CLA
	Status FOR INFORMATION	Sketch Number 16125-SE-LD-304 / Rev -

NOTES:

Do not scale from this drawing.

Figures show indicative static loads.
Allowance must be made for all dynamic, consequential & resultant loads.

This drawing is issued for information only.

Fixed lighting bars are not included in the Stage Engineering package

LOADING KEY

- FLOOR LOADING 2.5kN/m²
- Excluding any loads designed to be applied by the permanently installed flying system.

- FLOOR LOADING 4kN/m run uniformly distributed over the width of the gallery

- FLOOR LOADING 5kN/m²

- FLOOR LOADING 7.5kN/m²

- Loading gallery - Floor loading to carry the counterweight capacity uniformly distributed along the length of the gallery
Total Load = 150kN

- Winch gallery - Floor loading= 9kN/m and winch uplift load of 19kN/m

TECHNICAL BAR LOADING

- FIXED LIGHTING BARS
0.5kN/m vertical load (L1), fixings every 2 - 2.5m

TECHNICAL HANDRAIL LOADING

- 3kN/m vertical (upward) load
2kN/m horizontal load

- 1kN/m vertical (upward) load
2kN/m horizontal load

- 1kN/m vertical (upward) load
1kN/m horizontal load

- 1kN/m vertical (upward) load
3kN/m horizontal load

- DRAPE BARS / TRACKS
0.25kN/m Vertical linear load

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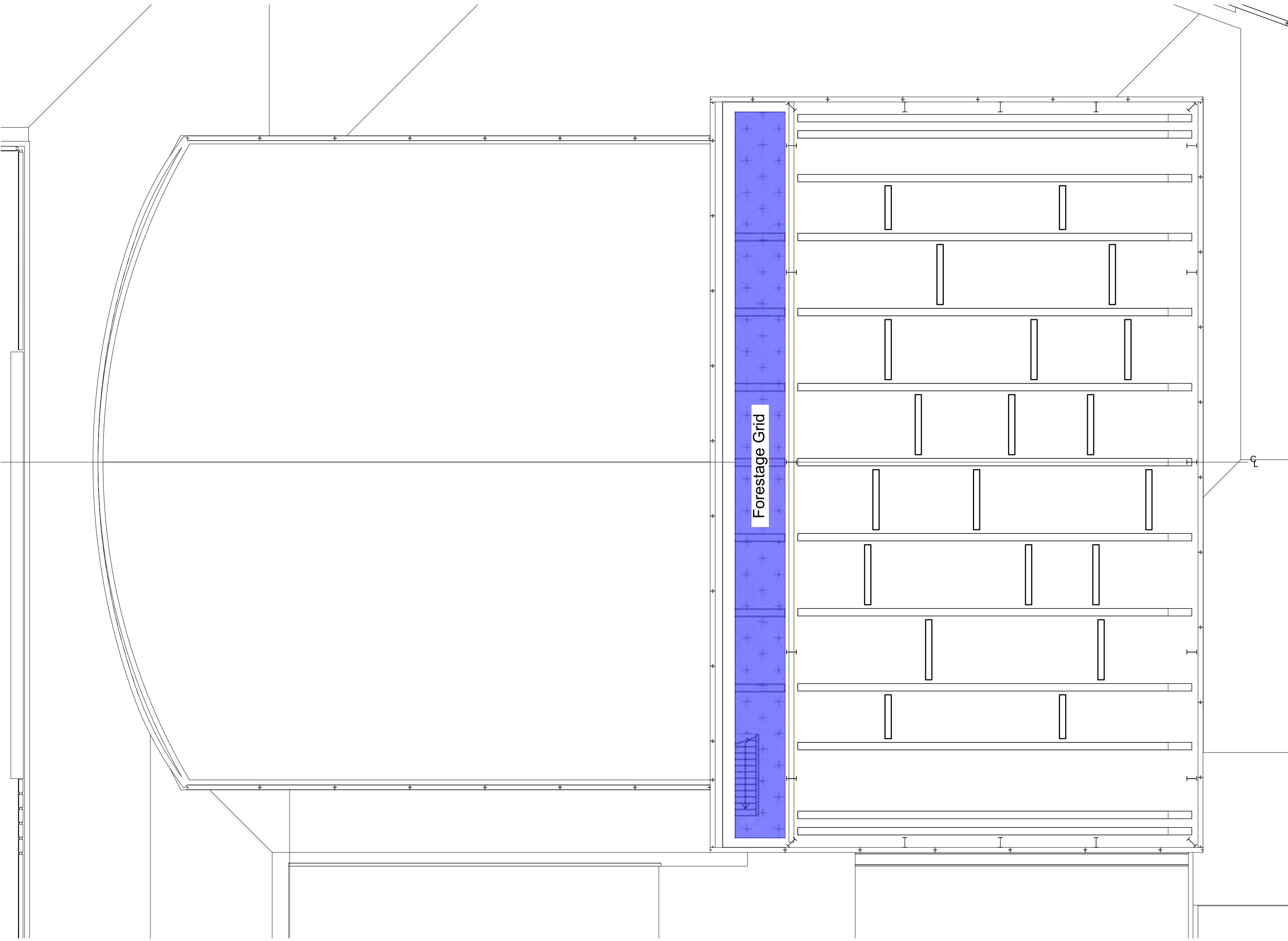
Project	Scale	Size
WAIKATO REGIONAL THEATRE, NEW ZEALAND	1:150	A3
Drawing Title	Date	Drawn/Checked
Plan - Preliminary architectural live loading information - Level 5 Auditorium Roof	24/07/18	SG/ CLA
Status	Sketch Number	Rev
FOR INFORMATION	16125-SE-LD-305	-



NOTES:

Do not scale from this drawing.

Figures show indicative static loads.
Allowance must be made for all dynamic, consequential & resultant loads.

This drawing is issued for information only.

Fixed lighting bars are not included in the Stage Engineering package

LOADING KEY

- FLOOR LOADING 2.5kN/m²
- Excluding any loads designed to be applied by the permanently installed flying system.

- FLOOR LOADING 4kN/m run uniformly distributed over the width of the gallery

- FLOOR LOADING 5kN/m²

- FLOOR LOADING 7.5kN/m²

- Loading gallery - Floor loading to carry the counterweight capacity uniformly distributed along the length of the gallery
Total Load = 150kN

- Winch gallery - Floor loading= 9kN/m and winch uplift load of 19kN/m

TECHNICAL BAR LOADING

- FIXED LIGHTING BARS
0.5kN/m vertical load (L1), fixings every 2 - 2.5m

TECHNICAL HANDRAIL LOADING

- 3kN/m vertical (upward) load
2kN/m horizontal load

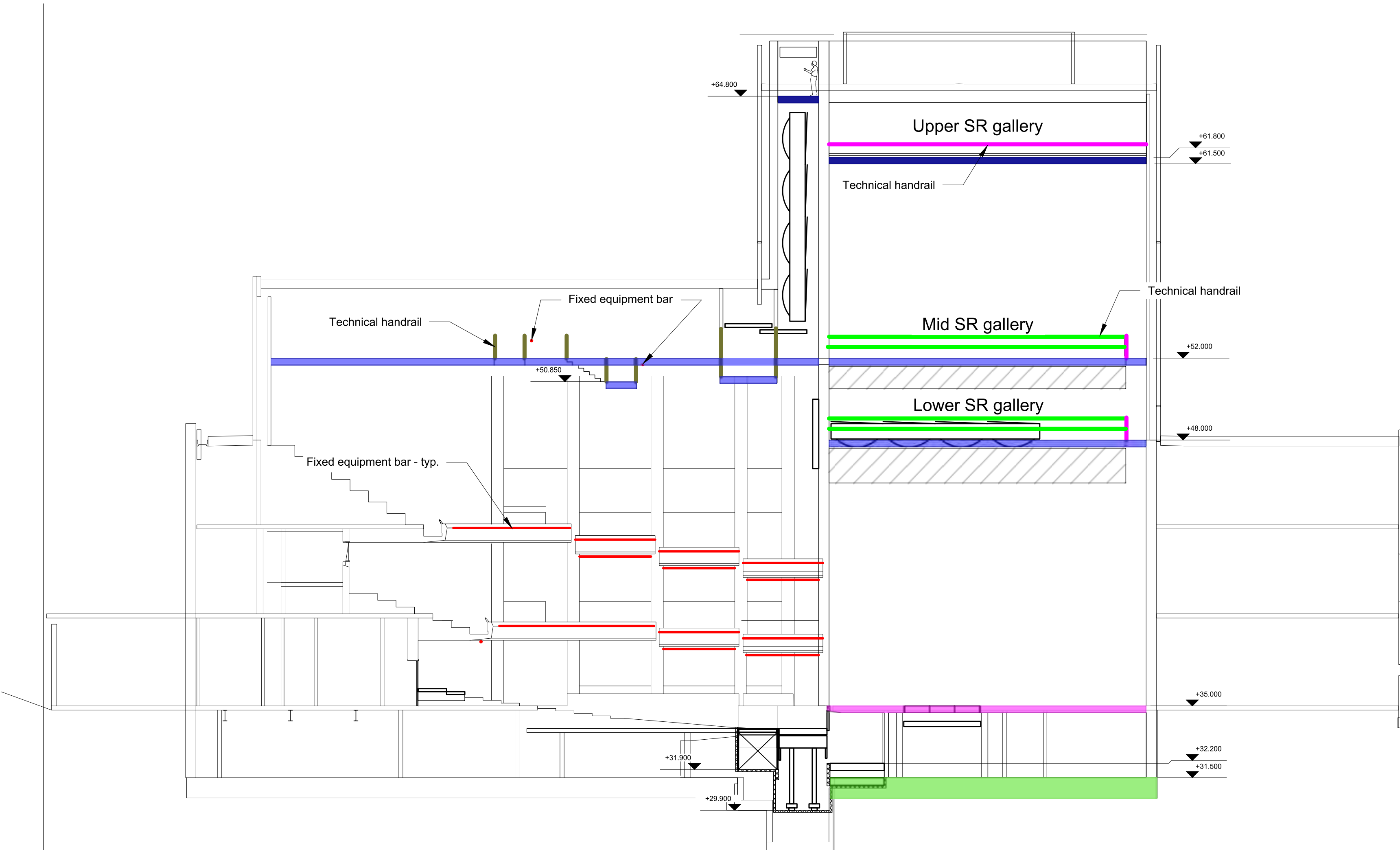
- 1kN/m vertical (upward) load
2kN/m horizontal load

- 1kN/m vertical (upward) load
1kN/m horizontal load

- 1kN/m vertical (upward) load
3kN/m horizontal load

- DRAPE BARS / TRACKS
0.25kN/m Vertical linear load

CHARCOALBLUE THEATRICAL INNOVATION ESTD 2004 4A/104 JOHNSTON STREET FITZROY, VIC 3065 MELBOURNE TEL: +61 (03) 9417 6524 W WWW.CHARCOALBLUE.COM	Project WAIKATO REGIONAL THEATRE, NEW ZEALAND	Scale 1:150 / Size A3
	Drawing Title Plan - Preliminary architectural live loading information - Level 7 Fly Tower Grid	Date 24/07/18 / Drawn/Checked SG/ CLA
	Status FOR INFORMATION	Sketch Number 16125-SE-LD-306 / Rev -



NOTES:

Do not scale from this drawing.

Figures show indicative static loads.
Allowance must be made for all dynamic, consequential & resultant loads.

This drawing is issued for information only.

Fixed lighting bars are not included in the Stage Engineering package

LOADING KEY

- FLOOR LOADING 2.5kN/m²
- Excluding any loads designed to be applied by the permanently installed flying system.

- FLOOR LOADING 4kN/m run uniformly distributed over the width of the gallery

- FLOOR LOADING 5kN/m²

- FLOOR LOADING 7.5kN/m²

- Loading gallery - Floor loading to carry the counterweight capacity uniformly distributed along the length of the gallery
Total Load = 150kN

- Winch gallery - Floor loading= 9kN/m and winch uplift load of 19kN/m

TECHNICAL BAR LOADING

- FIXED LIGHTING BARS
0.5kN/m vertical load (L1), fixings every 2 - 2.5m

TECHNICAL HANDRAIL LOADING

- 3kN/m vertical (upward) load
2kN/m horizontal load

- 1kN/m vertical (upward) load
2kN/m horizontal load

- 1kN/m vertical (upward) load
1kN/m horizontal load

- 1kN/m vertical (upward) load
3kN/m horizontal load

- DRAPE BARS / TRACKS
0.25kN/m Vertical linear load

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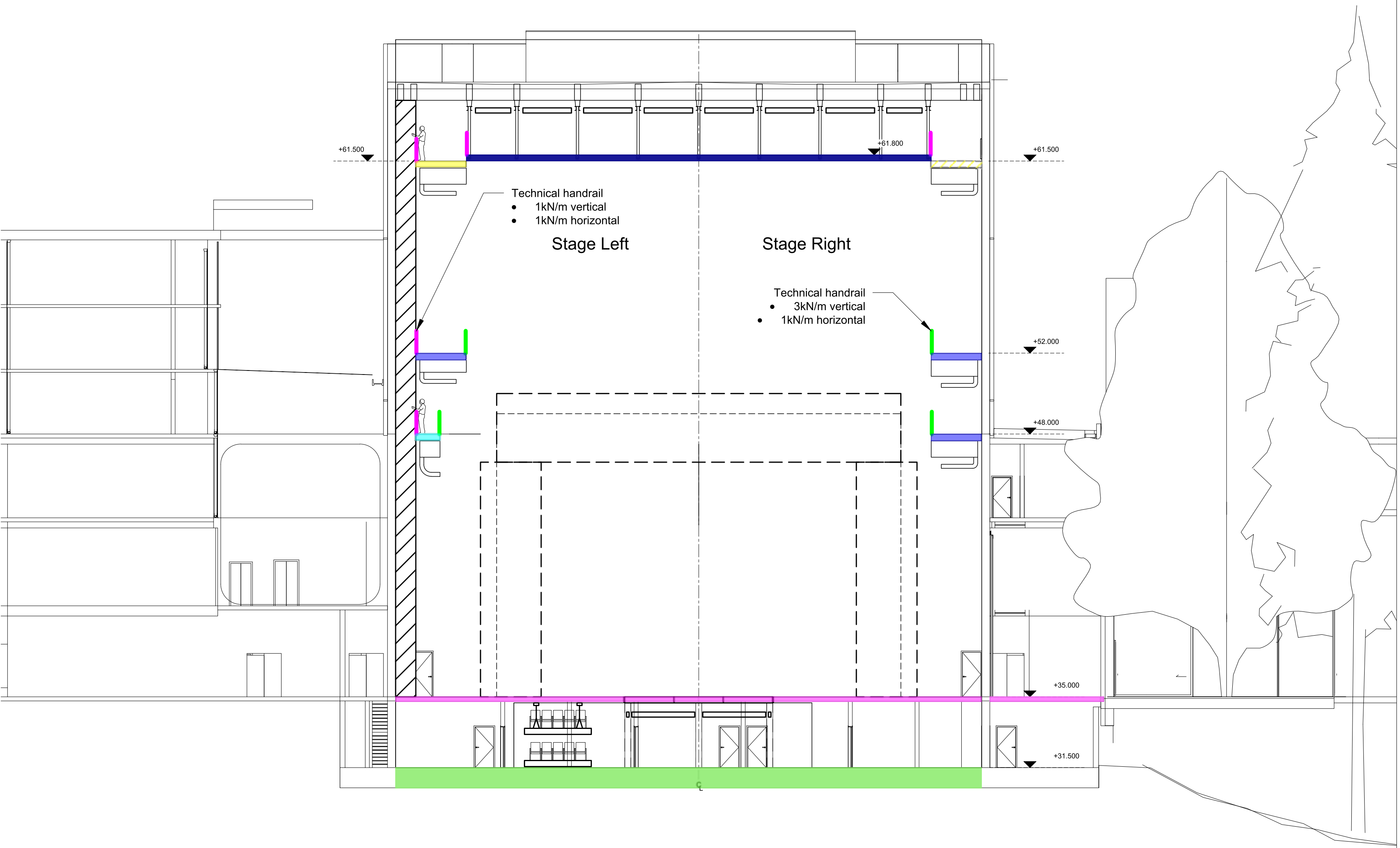
Project	Scale 1:200 / Size A3
WAIKATO REGIONAL THEATRE, NEW ZEALAND	
Drawing Title	Date 24/07/18 / Drawn/Checked SG/ CLA
Long Section - Preliminary architectural live loading information - Centreline	
Status FOR INFORMATION	Sketch Number 16125-SE-LD-307 / Rev -
SR fly gallery	



NOTES:

Do not scale from this drawing.

Figures show indicative static loads.
Allowance must be made for all dynamic, consequential & resultant loads.

This drawing is issued for information only.

Fixed lighting bars are not included in the Stage Engineering package

LOADING KEY

- FLOOR LOADING 2.5kN/m²
- Excluding any loads designed to be applied by the permanently installed flying system.

- FLOOR LOADING 4kN/m run uniformly distributed over the width of the gallery

- FLOOR LOADING 5kN/m²

- FLOOR LOADING 7.5kN/m²

- Loading gallery - Floor loading to carry the counterweight capacity uniformly distributed along the length of the gallery
Total Load = 150kN

- Winch gallery - Floor loading= 9kN/m and winch uplift load of 19kN/m

TECHNICAL BAR LOADING

- FIXED LIGHTING BARS
0.5kN/m vertical load (L1), fixings every 2 - 2.5m

TECHNICAL HANDRAIL LOADING

- 3kN/m vertical (upward) load
2kN/m horizontal load

- 1kN/m vertical (upward) load
2kN/m horizontal load

- 1kN/m vertical (upward) load
1kN/m horizontal load

- 1kN/m vertical (upward) load
3kN/m horizontal load

- DRAPE BARS / TRACKS
0.25kN/m Vertical linear load

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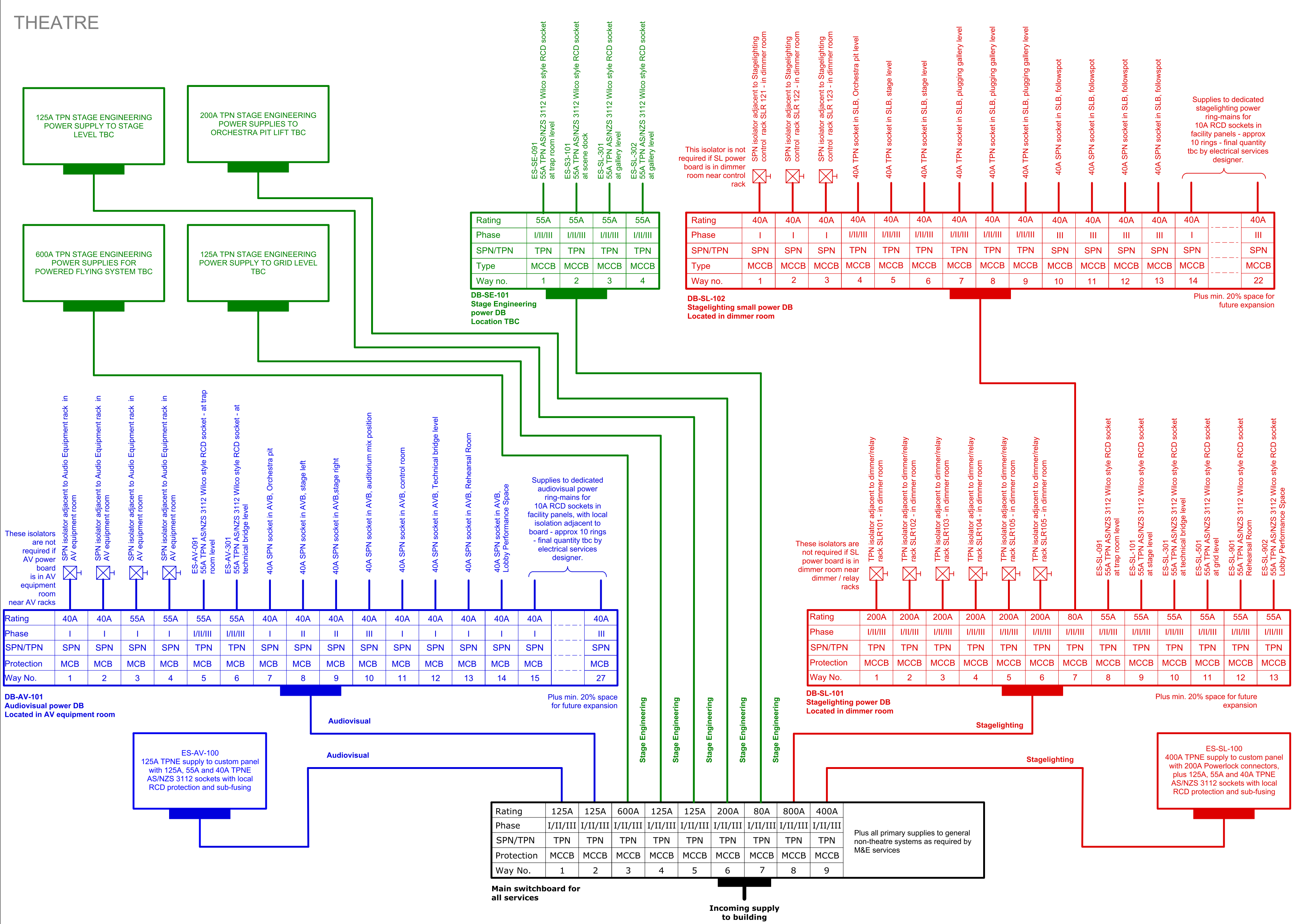
Project WAIKATO REGIONAL THEATRE, NEW ZEALAND	Scale 1:200 / Size A3
Drawing Title Short Section - Preliminary architectural live loading information - Through Auditorium	Date 24/07/18 / Drawn/Checked SG/ CLA
Status FOR INFORMATION	Sketch Number 16125-SE-LD-308 / Rev -



DB-SE-101

Rating	55A	55A	55A	55A
Phase	I/II/III	I/II/III	I/II/III	I/II/III
SPN/TPN	TPN	TPN	TPN	TPN
Type	MCCB	MCCB	MCCB	MCCB
Way no.	1	2	3	4

DB-SL-102

Rating	40A	40A	40A	40A	40A	40A	40A	40A	40A	40A	40A	40A	40A	40A		40A
Phase	I	I	I	I/II/III	I/II/III	I/II/III	I/II/III	I/II/III	I/II/III	III	III	III	III	I		III
SPN/TPN	SPN	SPN	SPN	TPN	TPN	TPN	TPN	TPN	TPN	SPN	SPN	SPN	SPN	SPN		SPN
Type	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB		MCCB
Way no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14		22

DB-AV-101

Rating	40A	40A	55A	55A	55A	55A	40A	40A	40A	40A	40A	40A	40A	40A	40A		40A
Phase	I	I	I	I	I/II/III	I/II/III	I	II	II	III	I	I	I	I	I		III
SPN/TPN	SPN	SPN	SPN	SPN	TPN	TPN	SPN	SPN	SPN	SPN	SPN	SPN	SPN	SPN	SPN		SPN
Protection	MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB	MCB		MCB
Way No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		27

DB-SL-101

Rating	200A	200A	200A	200A	200A	200A	80A	55A	55A	55A	55A	55A	55A
Phase	I/II/III	I/II/III	I/II/III	I/II/III	I/II/III	I/II/III	I/II/III	I/II/III	I/II/III	I/II/III	I/II/III	I/II/III	I/II/III
SPN/TPN	TPN	TPN	TPN	TPN	TPN	TPN	TPN	TPN	TPN	TPN	TPN	TPN	TPN
Protection	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB
Way No.	1	2	3	4	5	6	7	8	9	10	11	12	13

Main switchboard for all services

Rating	125A	125A	600A	125A	125A	200A	80A	800A	400A
Phase	I/II/III	I/II/III	I/II/III	I/II/III	I/II/III	I/II/III	I/II/III	I/II/III	I/II/III
SPN/TPN	TPN	TPN	TPN	TPN	TPN	TPN	TPN	TPN	TPN
Protection	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB	MCCB
Way No.	1	2	3	4	5	6	7	8	9

1. This drawing should be printed in colour.

2. This set of drawings indicates the power supplies required for the performance installations and systems.
These drawings are provided as information to the Electrical Services Designer for inclusion of these power supplies in their drawings and information.

3. All power supplies, switchgear, distribution equipment, panels and sockets shown on this drawing are to be specified by the Electrical Engineer and are to be supplied and installed by the Electrical contractor as part of the general electrical package - except where power outlets are specifically identified as being part of AVB or SLB panels, or where the panels are identified as custom Powerlock panels.

4. AVB & SLB panels are to be specified by Charcoalblue, supplied by the specialist stagelighting and audiovisual contractor, and free-issued to the Electrical Contractor for installation as part of the reticulation system.

5. Custom powerlock panels are to be specified by Charcoalblue, supplied by the specialist stagelighting and audiovisual contractor, and free-issued to the Electrical Contractor for installation.

6. Power supplies to dimmer racks and stage level temporary power panels are to have over-sized neutral supply cables and the wiring infrastructure is to be designed to cope with the harmonics that SCR-based stagelighting dimmers can produce.

7. Distribution/power boards shown are for technical performance equipment only and all should be sized to allow for a minimum 20% expansion in future. Significant additional power, not shown here, will be required for electrical and mechanical services in the building.

8. Supplies detailed here as sockets, both 230V and 400V, will comply with AS/NZS 3112 or equal, with built-in RCD, such as Clipsal by Schneider 56 series range.

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Project 16125 - Waikato Regional Theatre, Hamilton NZ		Scale NTS	Size A1
Drawing Title ELECTRICAL SERVICES - Primary power distribution for performance systems		Date 01/02/2018	Drawn/Checked JB/CLA
Status Preliminary Design		Sketch Number 16125 - ES - SC - 001	Rev 02

STAGELIGHTING CONTAINMENT

The Stagelighting system requires two separate wiring / containment systems:

SL/1 - LV mains supplies, both dimmed and constant (230V or 400V)
SL/2 - ELV lighting data services (<50V)

Note that the dimmed stagelighting circuits in SL/1 emit large amounts of radiated energy, which can adversely interfere with data and other services.

SL/1 can be integrated with the general wiring for normal lighting and power services in the building. In many cases, using the same containment for both is essential to save space.

Temporary equipment outlets and power supplies may be fed from single cables contained within SL/1, or from SWA cable, either mounted on a separate tray system or cleated direct to walls. SWA cables are subject to the same separation criteria.

STAGE ENGINEERING CONTAINMENT

The Stage engineering system will require two separate wiring / containment systems:

SE/1 - LV mains supplies (230V or 400V)
SE/2 - ELV control cabling (<50V)

SE/1 and SE/2 are subject to the same separation criteria from the AV containment as shown here for SL/1 and SL/2.
The stage engineering containment (SE/1 and SE/2) can be combined with the stagelighting containment (SL/1 and SL/2) when both are present.

Temporary equipment outlets and power supplies may be fed from single cables contained within SE/1, or from SWA cable, either mounted on a separate tray system or cleated direct to walls.SWA cables are subject to the same separation criteria.

AUDIOVISUAL CONTAINMENT

The Audiovisual containment systems play an important role in protecting the integrity of sensitive audio equipment from induced noise, especially from the dimmed stagelighting circuits in SL/1. The Audiovisual system will require four separate wiring / containment systems:-

AV/1 - Audiovisual LV mains supplies (230V)
AV/2 - Loudspeakers (<50V)
AV/3 - Data and communication services (<50V)
AV/4 - Audio line signals and microphones

Temporary equipment outlets and power supplies may be fed from single cables contained within AV/1, or from SWA cable, either mounted on a separate tray system or cleated direct to walls. SWA cables are subject to the same separation criteria.

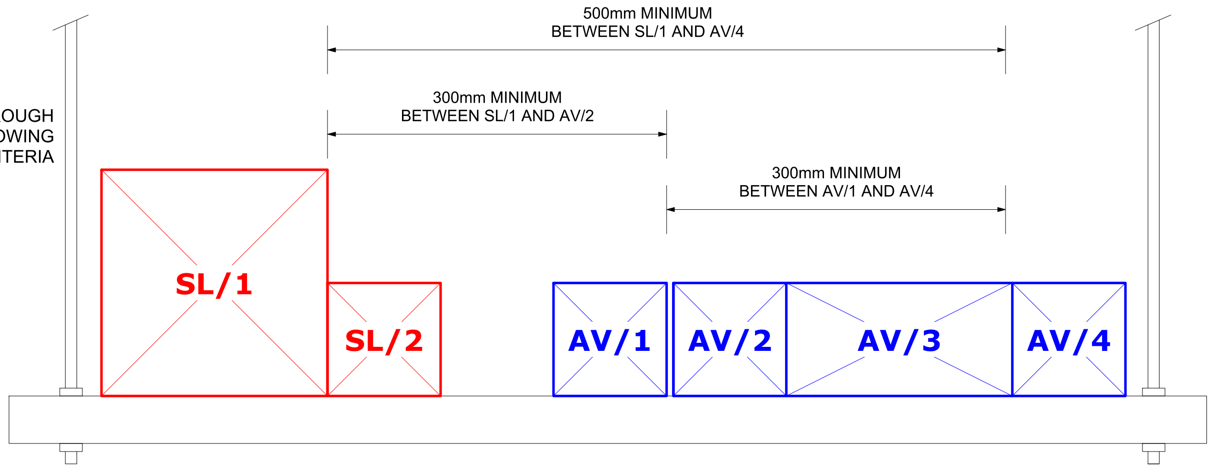
NOTES

This drawing is intended to provide information to the Electrical Services Designer on the containment required for the theatre technical systems.

Although the containment routes are generally specified by the Electrical Services Designer, we have indicated here the basic separation criteria between systems.

Where building design prevents the full separation criteria being achieved, it may be possible to run systems closer for short lengths, but this should be referred to Charcoalblue, who will assess on a case-by-case basis, depending upon the number and type of circuits in each containment system.

TYPICAL SECTION THROUGH CONTAINMENT ROUTE, SHOWING SEPARATION CRITERIA



CONTAINMENT DESIGN

Other than SWA main feed cables, all SL and AV wiring for both mains power and extra low voltage systems should be contained within either **sheet steel trunking or steel conduit**. Cable tray, basket or plastic containment is not suitable.
(The only exceptions to this are the hearing-assistance system induction loop aerial cables, which must be run in plastic conduit throughout).

Charcoalblue will provide general arrangement and layout drawings showing the disposition of equipment and termination points, together with schematic wiring diagrams and details of special cable requirements.

The Electrical Services Designer will co-ordinate this information within the electrical wiring systems documents, and will be responsible for ensuring adherence to regulations, sizing of containment and power cables, compliance with good electrical practice, setting of electrical standards for the project and supervision of electrical tests.

In principle the general electrical contractor should install all containment and as much wiring as possible for all the specialist systems to ensure good co-ordination. An arrangement whereby the specialist sub-contractors each install their own containment should be avoided because it often leads to duplication of containment in congested areas with poor co-ordination.

CONTAINMENT SEPARATION

Long runs of AV system containment parallel with other systems are to be avoided.

Where systems have to cross, this must be done at right angles.

It is also recommended that building IT & data system cabling should be kept separate from AV systems wiring.

Although structured cable is frequently installed on cable tray or basket, the theatre backstage environment means that this type of cable should be installed in steel containment in these areas. Theatre equipment networks will be dedicated performance networks, and will be in addition to any other structured cable systems in the building, e.g. for IT, although there may be links between the systems at the patchbays.

All containment in the technical areas around and above the stage area must be carefully coordinated and designed so as not impede the stage engineering equipment or the operation of those areas in performance conditions.

CONTAINMENT SIZING

Typical containment sizes shown - all containment is to be sized and specified by the Electrical Services Designer, based on circuit information from Charcoalblue.

In calculating containment sizes, due allowance must be made for the probability that systems will be extended during the life expectancy of the wiring. Not less than 25% of additional capacity should be allowed for in all specialist systems containment (if the space factor set for the project is higher than this, the higher figure should be used)

The containment systems are to be accessible for the installation of additional wiring in the future. Where containment is installed above ceilings, behind wall finishes, under floors etc, access hatches should be provided as needed, but at least at every change of direction.

Many of the specialist cables will have multiple cores and sheaths, and may be of limited flexibility; therefore capacity around corners may be less than with normal cabling. It is essential that allowance is made for tight packing on bends in calculations of containment size. Right angle bends must be formed with purpose-made gusset units as far as practicable.

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Project 16125 - Waikato Regional Theatre, Hamilton NZ	Scale: NTS Size: A1
Drawing Title Containment for specialist theatre systems - typical details and arrangement	Date: 01/02/2018 Drawn/Checked: JB/CLA
Status Preliminary Design	Sketch Number: 16125 - ES - ST - 100 Rev: 02

APPENDIX C - HOLMES ENGINEERING DRAWINGS

WAIKATO REGIONAL THEATRE PROJECT
VICTORIA STREET
HAMILTON

APPENDIX A

Preliminary Design
Structural Drawings

Holmes Consulting

July 2018
Project Number: 135713.00

STRUCTURAL PRICING NOTES

It is understood that this design report and the drawings may be used for pricing purposes. These documents represent the design of the project to a Preliminary Design level only, as defined by the Construction Industry Council (CIC) Design guidelines.

The member sizes are representative only and further refinement will be required during the completion of the design.

Suitable allowances should be made for elements not shown in the drawings and include but not limited to the following:

Site Works

- Temporary site works
- Crane base and ties
- Temporary bracing and propping required during construction
- Underpinning of adjacent structures if required
- Bridging of existing services
- Paving, roading and landscaping
- Sanitary and stormwater disposal
- Potable water supply and fire water supply.

General

- Roof cladding and support structure
- Stairs and secondary steelwork supporting stairs
- Cladding/glazing support steelwork and connection hardware
- Lift guide rail support and lifting beams
- Cleaning davits and BMU support structures
- Canopy structures
- Plantrooms and support steelwork for mechanical plant
- Balustrades and cast in connections
- Slab steps, setdowns and nibs
- Architectural precast and veneer support details
- Cast-in connections
- Connection details
- Mechanical, electrical, plumbing, fire penetrations
- High loading areas (store rooms, plantrooms, truck docks etc.)
- Allow to cast plumbing, drainage in raft.
- Additional reinforcement to trim openings in precast panels and insitu walls (services penetrations and windows etc.).
- Steelwork to support stairs, lifts and risers.
- Blockwalls to truck docks, localised steps into building.
- Connections of steel beams in concrete walls.
- Allowance for lift pits;
  - ⇒ 400mm thick base
  - ⇒ 250mm thick walls
- Localised trimming to all slab penetrations.
- Within Stage—allow for timber sprung floor over concrete slab. Refer to Charcoal Blue for specifications.
- Secondary framing for glazing.
- Cantilever to Stage edge.
- Steelwork for cat walks and galleries in flytower.
- Edge beams for supporting balustrades.
- Significant weld plates and connections for flytower steelwork being connected to concrete walls.

Theatre Specific

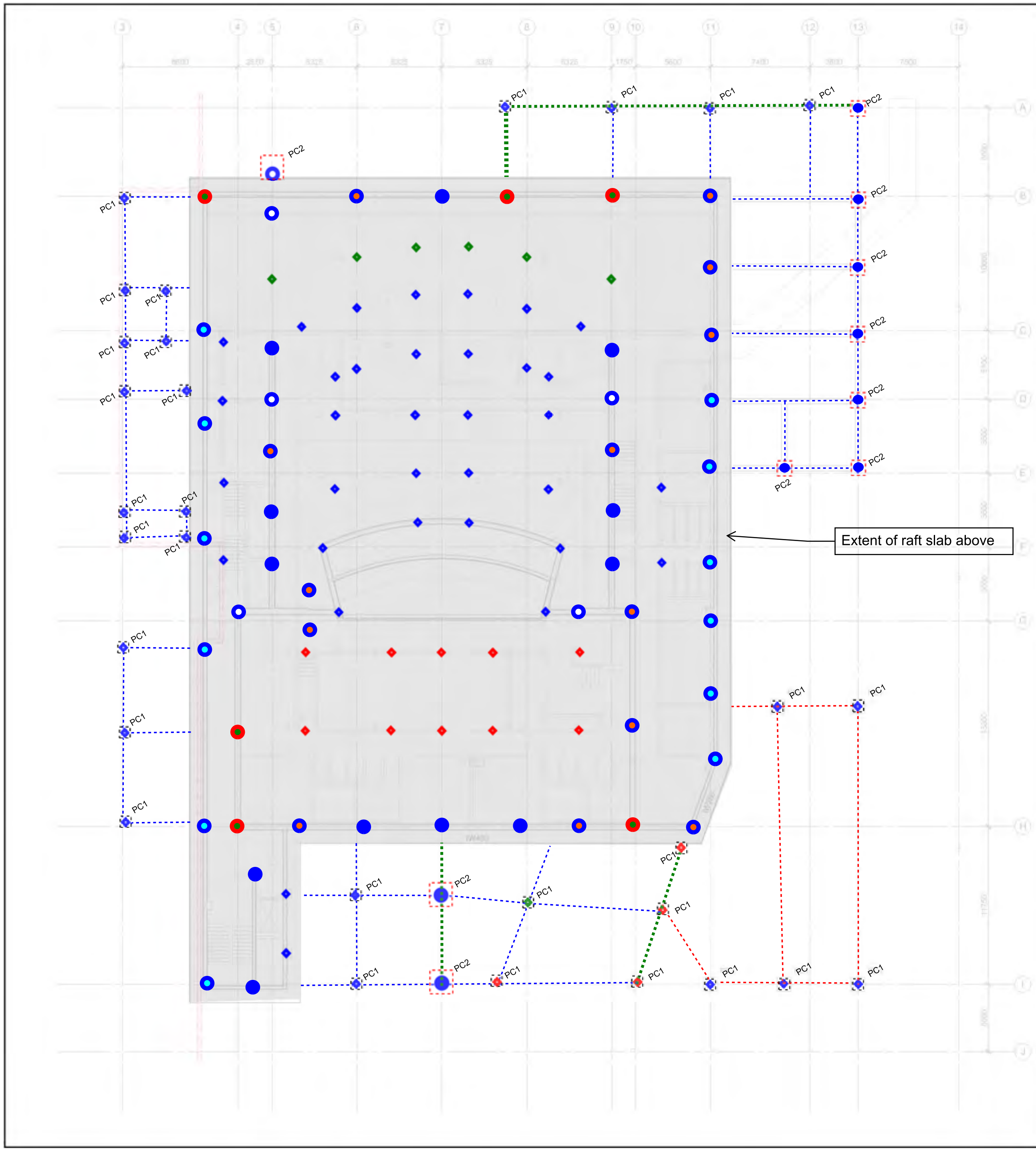
- Support of catwalks, lighting/sound equipment and gantries
- Rigging and flying equipment support
- Fly gallery floor
- Specific flytower rigging support and gallery access
- Orchestra acoustic shell
- Proscenium arch moveable frame
- Proprietary moveable seating and balconies,
- Orchestra pit lifting gear
- Localised framing for service risers and penetrations
- Stage trap area and movable floor
- Bleachers and feature stairs
- Underpinning to existing structures, and localised foundation modifications where required
- Acoustic separations and isolation equipment between structural elements
- Bored pile holes to be supported by bentonite through soft saturated soils to prevent pile hole collapse
- Plinths and steelwork supporting plant include acoustically treated floating floor for suspended plant slabs
- Cladding/glazing support steelwork and connection hardware, louvers and screens
- Lobby façade steelwork, wind lobbies, canopy steelwork
- Temporary works, including propping, bracing and crane bases/ties
- Flexible seismic connections for all services crossing the seismic gaps.

Further Allowances

See also Items Not Fully Resolved section for items requiring a cost allowance at preliminary design stage.

STRUCTURAL DRAWINGS

SSK-PD-01-01	PILING STRUCTURAL PLAN
SSK-PD-01-05	LEVEL –2 SUBSTAGE STRUCTURAL PLAN
SSK-PD-01-07	LEVEL –1 STALLS STRUCTURAL PLAN
SSK-PD-01-09	LEVEL 1 CIRCLE STRUCTURAL PLAN
SSK-PD-01-11	LEVEL 2 BALCONY STRUCTURAL PLAN
SSK-PD-01-13	LEVEL 3 TERRACE STRUCTURAL PLAN
SSK-PD-01-15	LEVEL 4 BRIDGE STRUCTURAL PLAN
SSK-PD-01-17	LEVEL 5 AUDITORIUM ROOF STRUCTURAL PLAN
SSK-PD-01-23	FLYTOWER GRID STRUCTURAL PLAN (RL 61.8)
SSK-PD-01-25	FLYTOWER AND HOTEL ROOF STRUCTURAL PLAN
SSK-PD-02-01	GRID H FLYTOWER STEEL FRAME ELEVATION
SSK-PD-02-02	GRID 12 FLYTOWER STEEL FRAME ELEVATION
SSK-PD-02-10	EXTERNAL SCREEN PRELIMINARY DESIGN



Pile Legend

SP1
Screw pile - Design By others
N^*_{ULS} = +2000kN (C)

SP2
Screw pile - Design By others
N^*_{ULS} = +1500kN (C)

SP3
Screw pile - Design By others
N^*_{ULS} = +4500kN (C)
(Allow 2xscrew piles as needed)

FB1
600x600 concrete foundation beam
reinf: 150kg/m^3.

FB2
200UC60 foundation beam (above ground)

FB3
800x600D concrete foundation beam
reinf: 175kg/m^3

PC1 - 1000x1000x1000 concrete pile cap, reinf: 175kg/m^3

PC2 - 1500x1500x1200 concrete pile cap, reinf: 175kg/m^3

Type 12D
1200dia RC pile
21-XD32 long bars,
XR16 @ 200pitch spiral
Found @ RL-12 ~43m long

Type 9A
900dia RC pile
11-XD25 long bars,
XR12 @ 150pitch spiral
Founding RL=+28 ~4m long

Type 9B
900dia RC pile
13-XD25 long bars,
XR16 @ 150pitch spiral
Founding RL=+12 ~19m long

Type 9C
900dia RC pile
13-XD32 long bars,
XR16 @ 150pitch spiral
Founding RL=-2.00 ~33m long

Type 9D
900dia RC pile
15-XD32 long bars,
XR16 @ 150 pitch spiral
Founding RL=-12.00 ~43m long

notes:

1. All drawings to be read in conjunction with the Holmes Consulting structural specification.
2. Refer to Architects & Services Engineers drawings for all setout dimensions, reduced levels, opening sizes, slab setdowns, falls, rebates & edge details, cast in Architectural items, cast in services fixtures & services penetrations.
3. This drawing set contains colour. All reproduction to be in colour.

Rev	Date	Appd	Reason
1	18/07/18	JGM	Preliminary Design

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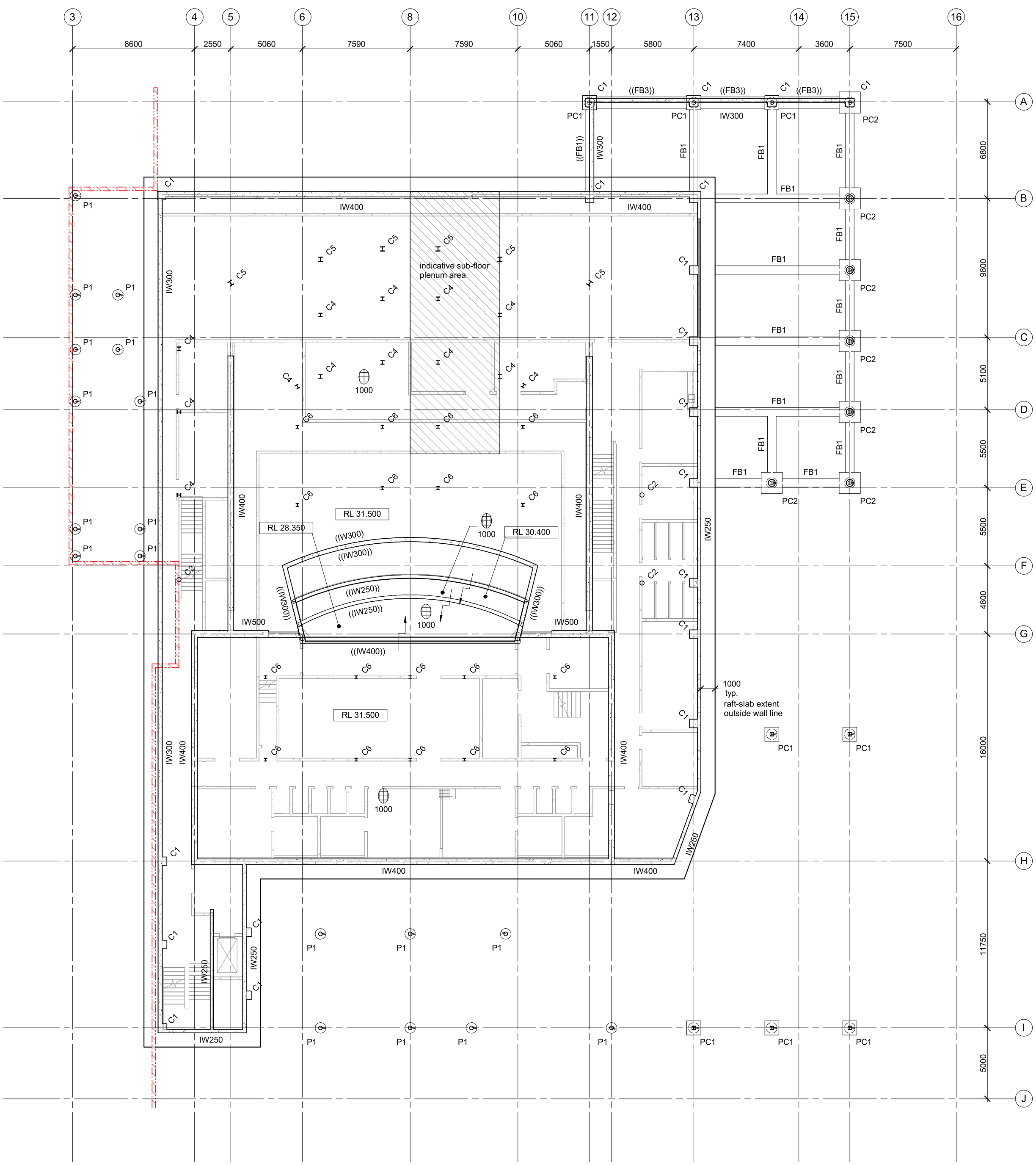
WAIKATO REGIONAL THEATRE
VICTORIA STREET
HAMILTON

Drawn EO Scale 1:150
Filename
Sheet Title
piling plan

Job No 135713-00 Sheet No P01-01 R 1



element legend

Type Mark	Type Comments	Description
Structural Columns		
C1	600x600	Conc. 150 kg/m3 reinf.
C2	Ind. Column	Indicative Column, Allow 90 kg/m
C3	273x12.5CHS*	Concrete filled 30MPa
C4	250UC90	
C5	310UC137	
C6	200UC60	Allow for fixed cantilever beam connections
C7	250UC73	
C8	508x12CHS	or 530UB92
Structural Foundations		
P1	screw pile	by others
PC1	1000x1000x1000 conc. pile cap with screw pile, refer to piling plan	reinf. 175 kg/m³
PC2	1500x1500x1200 conc. pile cap with screw pile, refer to piling plan	reinf. 175 kg/m³
Structural Framing		
FB1	600x600dp	reinf. 150 kg/m³
FB3	800x600d	reinf. 175 kg/m³
Walls		
BW1	Block 20 Series	XD16 at 400 e.w.
IW250	Insitu 250mm	reinf. 150 kg/m
IW300	Insitu 300mm	reinf. 150 kg/m
IW400	Insitu 400mm	reinf. 150 kg/m
IW500	Insitu 500mm	reinf. 150 kg/m
PW175/50	Precast 225mm (175S/50A)	XD20 at 200 e.f. e.w. in 175 structural core
PW200/50	Precast 250mm (200S/50A)	XD16 at 200 e.f. e.w. in 200 structural core
Structural Framing		
PB1	250PFC	
PB2	150x9SHS	Wind girts at 2.25m crs max.
PB3	200x9SHS	Entry Deck Support
PB4	310UB46	Entry Deck Support
PB5	360UB57	
PB6	410UB60	
PB7	460UB74	
PB8a	460UB82*	Flybraces at 2m max. crs
PB8b	460UB82	To follow Floor plane
PB9	530UB92	
PB10a	610UB125	
PB10b	610UB125*	Flybraces at 2m max. crs
PB11	250UC90	
PB12c	700WB150#	Cantilever, No Service penetrations within 2m of GL 9 and 5. Beam to pass through walls T.B.C.
PB13	900WB218	
PB14	1000WB296	Entry Deck Support
PBX	Ind. Beam	Indicative Beam, Allow for 60 kg/m

legend:

200mm COMFLOR flooring system.
COMFLOR 60, 1.0mm base metal thickness.
200mm overall slab depth.
Reinforce with XD16 at 200rs e.w.
Allow XD16 fire steel every second trough
Allow XD16 saddle bars 3m long at 300 crs over Primary beams

BS1 — Secondary Beam System 1
Cellular Beams at 3.2m crs
Precamber +L/300
1-19Ø x125 lg studs at 300 crs
200mm COMFLOR flooring system as above

Span(m)	Section
<5	380 dp x 35kg/m
5-7	470 dp x 45kg/m
7-9	530 dp x 55kg/m
9-11	530 dp x 65kg/m

BS2 — Secondary Beam System 2
460UB74 at 3.2m crs
Precamber +L/300
1-19Ø x125 lg studs at 150 crs
200mm COMFLOR flooring system as above

BS3 — Secondary Beam System 3
610 dp x 110kg/m Cellular Beam at 3.2m crs
Precamber +L/300
1-19Ø x125 lg studs at 150 crs
200mm COMFLOR flooring system as above

280/T — 40mm H3.2 treated timber decking on 250x50 SG8 H3.2 treated timber joists at 450 crs. Allow for full depth timber blocking at 3rd points of joist spans

RF1 — Lightweight metal roofing on 300 DHS purlins at 900 crs max.
2 rows of fastbrace per bay typ.
Bracing to be diagonal cross-braced EA
Allow for acoustic separations

1000 — 1000mm conc slab on grade.
Allow reinf. 125 kg/m³
Slab on DPC, on 20mm nom sand blinding, on 150mm min well compacted hardfill.

200 — 200mm conc slab on grade.
Reinforce with XD16 at 300 crs e.w.
Slab on DPC, on 20mm nom sand blinding, on 150mm min well compacted hardfill.

150 — 150mm conc slab on grade.
Reinforce with XD12 at 300 crs e.w.
Slab on DPC, on 20mm nom sand blinding, on 150mm min well compacted hardfill.

+__ — Beam pre-camber in mm. For example +10 equals 10mm pre-camber.

( ) — Brackets around element call up indicates element is above.

(( )) — Double brackets around element call up indicates element is below.

s.g — Seismic gap.

cant. — Cantilever steel floor support beams

All dimensions to be verified on site before making any shop drawings or commencing any work.

notes:

1. All drawings to be read in conjunction with the Holmes Consulting structural specification.
2. Refer to Architects & Services Engineers drawings for all setout dimensions, reduced levels, opening sizes, slab setdowns, falls, rebates & edge details, cast in Architectural items, cast in services fixtures & services penetrations.
3. This drawing set contains colour. All reproduction to be in colour.
4. COMFLOR layout shown on Holmes drawings is indicative only. Final COMFLOR layout to be confirmed on manufacturers shop drawings.
5. COMFLOR seating to be as per manufacturers specifications and shop drawings.
6. Temporary propping indicated in this drawing set is not exhaustive. Unless specifically noted on the drawings, the design, location and layout of temporary propping is the responsibility of the contractor
7. All beams supporting suspended concrete flooring to have 19Ø x125 lg studs at 150 crs u.n.o.
8. For Precast Cladding Panels with windows reinforcing allowance is to be doubled.
9. Precast Cladding Panel build-up defined as: XXXS/XXXA where XXX is thickness and S/A represent Structural core and Architectural render (average thickness)

Rev	Date	Appd	Reason
1	18/07/2018	JGM	Preliminary Design

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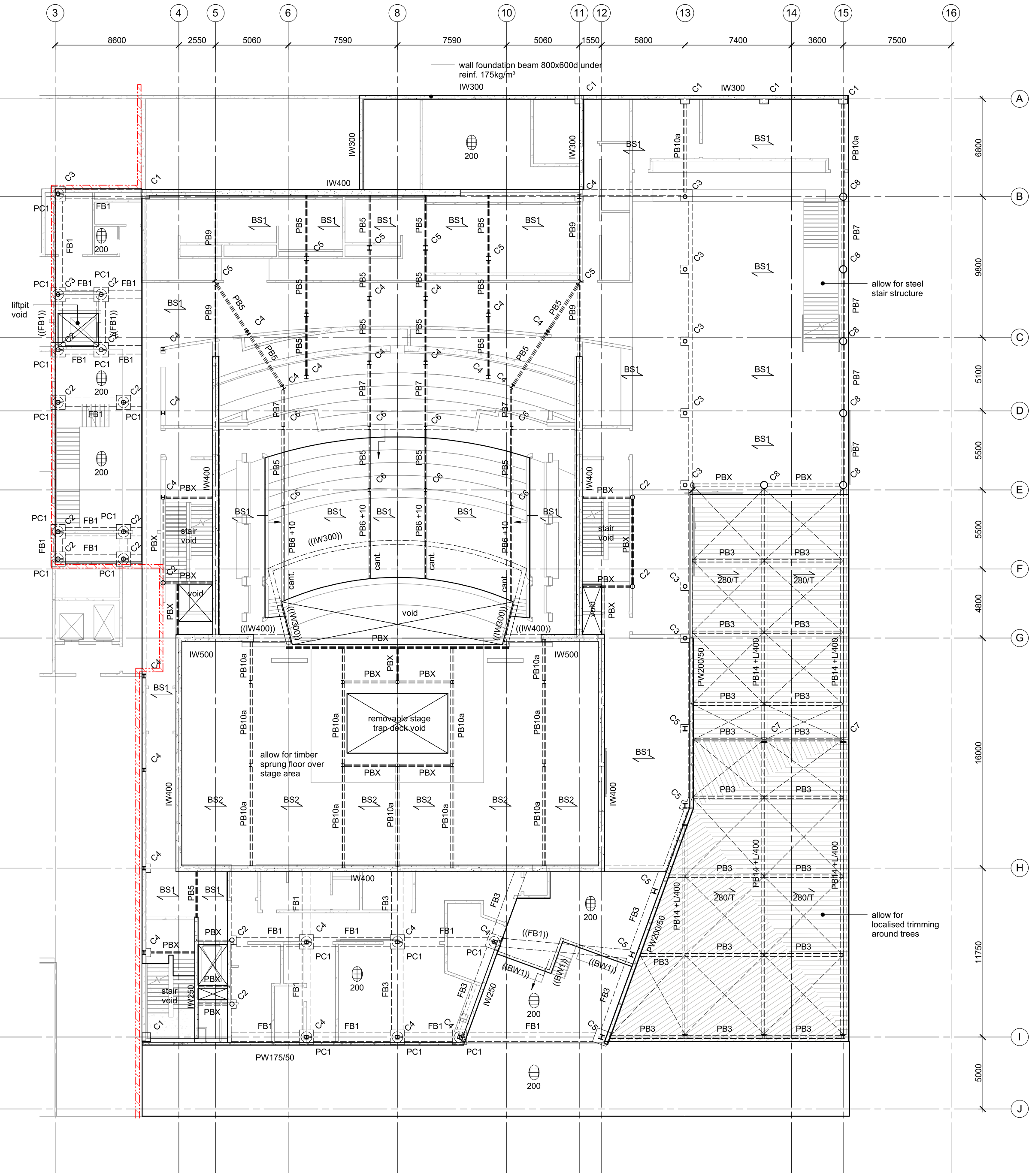
WAIKATO REGIONAL THEATRE VICTORIA STREET HAMILTON

Drawn EO Scale 1:150 (at A1)
Filename S_Holmes_135713-00_R17_Central

Sheet Title
structural plan - level -2 sub-stage

Job No	Sheet No	Rev
135713-00	P01-05	1



element legend

Type Mark	Type Comments	Description
Structural Columns		
C1	600x600	Conc. 150 kg/m3 reinf.
C2	Ind. Column	Indicative Column, Allow 90 kg/m
C3	273x12.5CHS*	Concrete filled 30MPa
C4	250UC90	
C5	310UC137	
C6	200UC60	Allow for fixed cantilever beam connections
C7	250UC73	
C8	508x12CHS	or 530UB92
Structural Foundations		
P1	screw pile	by others
PC1	1000x1000x1000 conc. pile cap with screw pile, refer to piling plan	reinf. 175 kg/m³
PC2	1500x1500x1200 conc. pile cap with screw pile, refer to piling plan	reinf. 175 kg/m³
Structural Framing		
FB1	600x600dp	reinf. 150 kg/m³
FB3	800x600d	reinf. 175 kg/m³
Walls		
BW1	Block 20 Series	XD16 at 400 e.w.
IW250	Insitu 250mm	reinf. 150 kg/m
IW300	Insitu 300mm	reinf. 150 kg/m
IW400	Insitu 400mm	reinf. 150 kg/m
IW500	Insitu 500mm	reinf. 150 kg/m
PW175/50	Precast 225mm (175S/50A)	XD20 at 200 e.f. e.w. in 175 structural core
PW200/50	Precast 250mm (200S/50A)	XD16 at 200 e.f. e.w. in 200 structural core
Structural Framing		
PB1	250PFC	
PB2	150x9SHS	Wind girts at 2.25m crs max.
PB3	200x9SHS	Entry Deck Support
PB4	310UB46	Entry Deck Support
PB5	360UB57	
PB6	410UB60	
PB7	460UB74	
PB8a	460UB82*	Flybraces at 2m max. crs
PB8b	460UB82	To follow Floor plane
PB9	530UB92	
PB10a	610UB125	
PB10b	610UB125*	Flybraces at 2m max. crs
PB11	250UC90	
PB12c	700WB150#	Cantilever, No Service penetrations within 2m of GL 9 and 5. Beam to pass through walls T.B.C.
PB13	900WB218	
PB14	1000WB296	Entry Deck Support
PBX	Ind. Beam	Indicative Beam, Allow for 60 kg/m

legend:

	200mm COMFLOR flooring system. COMFLOR 60, 1.0mm base metal thickness. 200mm overall slab depth. Reinforce with XD16 at 200rs e.w. Allow XD16 fire steel every second trough Allow XD16 saddle bars 3m long at 300 crs over Primary beams
BS1	Secondary Beam System 1 Cellular Beams at 3.2m crs Precamber +L/300 1-19Øx125 lg studs at 300 crs 200mm COMFLOR flooring system as above Span(m) : Section <5 380 dp x 35kg/m 5-7 470 dp x 45kg/m 7-9 530 dp x 55kg/m 9-11 530 dp x 65kg/m
BS2	Secondary Beam System 2 460UB74 at 3.2m crs Precamber +L/300 1-19Øx125 lg studs at 150 crs 200mm COMFLOR flooring system as above
BS3	Secondary Beam System 3 610 dp x 110kg/m Cellular Beam at 3.2m crs Precamber +L/300 1-19Øx125 lg studs at 150 crs 200mm COMFLOR flooring system as above
280/T	40mm H3.2 treated timber decking on 250x50 SG8 H3.2 treated timber joists at 450 crs. Allow for full depth timber blocking at 3rd points of joist spans
RF1	Lightweight metal roofing on 300 DHS purlins at 900 crs max. 2 rows of fastbrace per bay typ. Bracing to be diagonal cross-braced EA Allow for acoustic separations
1000	1000mm conc slab on grade. Allow reinf. 125 kg/m³ Slab on DPC, on 20mm nom sand blinding, on 150mm min well compacted hardfill.
200	200mm conc slab on grade. Reinforce with XD16 at 300 crs e.w. Slab on DPC, on 20mm nom sand blinding, on 150mm min well compacted hardfill.
150	150mm conc slab on grade. Reinforce with XD12 at 300 crs e.w. Slab on DPC, on 20mm nom sand blinding, on 150mm min well compacted hardfill.
+__	Beam pre-camber in mm. For example +10 equals 10mm pre-camber.
( )	Brackets around element call up indicates element is above.
(( ))	Double brackets around element call up indicates element is below.
s.g	Seismic gap.
cant.	Cantilever steel floor support beams

notes:

1. All drawings to be read in conjunction with the Holmes Consulting structural specification.
2. Refer to Architects & Services Engineers drawings for all setout dimensions, reduced levels, opening sizes, slab setdowns, falls, rebates & edge details, cast in Architectural items, cast in services fixtures & services penetrations.
3. This drawing set contains colour. All reproduction to be in colour.
4. COMFLOR layout shown on Holmes drawings is indicative only. Final COMFLOR layout to be confirmed on manufacturers shop drawings.
5. COMFLOR seating to be as per manufacturers specifications and shop drawings.
6. Temporary propping indicated in this drawing set is not exhaustive. Unless specifically noted on the drawings, the design, location and layout of temporary propping is the responsibility of the contractor
7. All beams supporting suspended concrete flooring to have 19Øx125 lg studs at 150 crs u.n.o.
8. For Precast Cladding Panels with windows reinforcing allowance is to be doubled.
9. Precast Cladding Panel build-up defined as: XXXS/XXXA where XXX is thickness and S/A represent Structural core and Architectural render (average thickness)

Rev	Date	Appd	Reason
1	18/07/2018	JGM	Preliminary Design

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WAIKATO REGIONAL THEATRE VICTORIA STREET HAMILTON

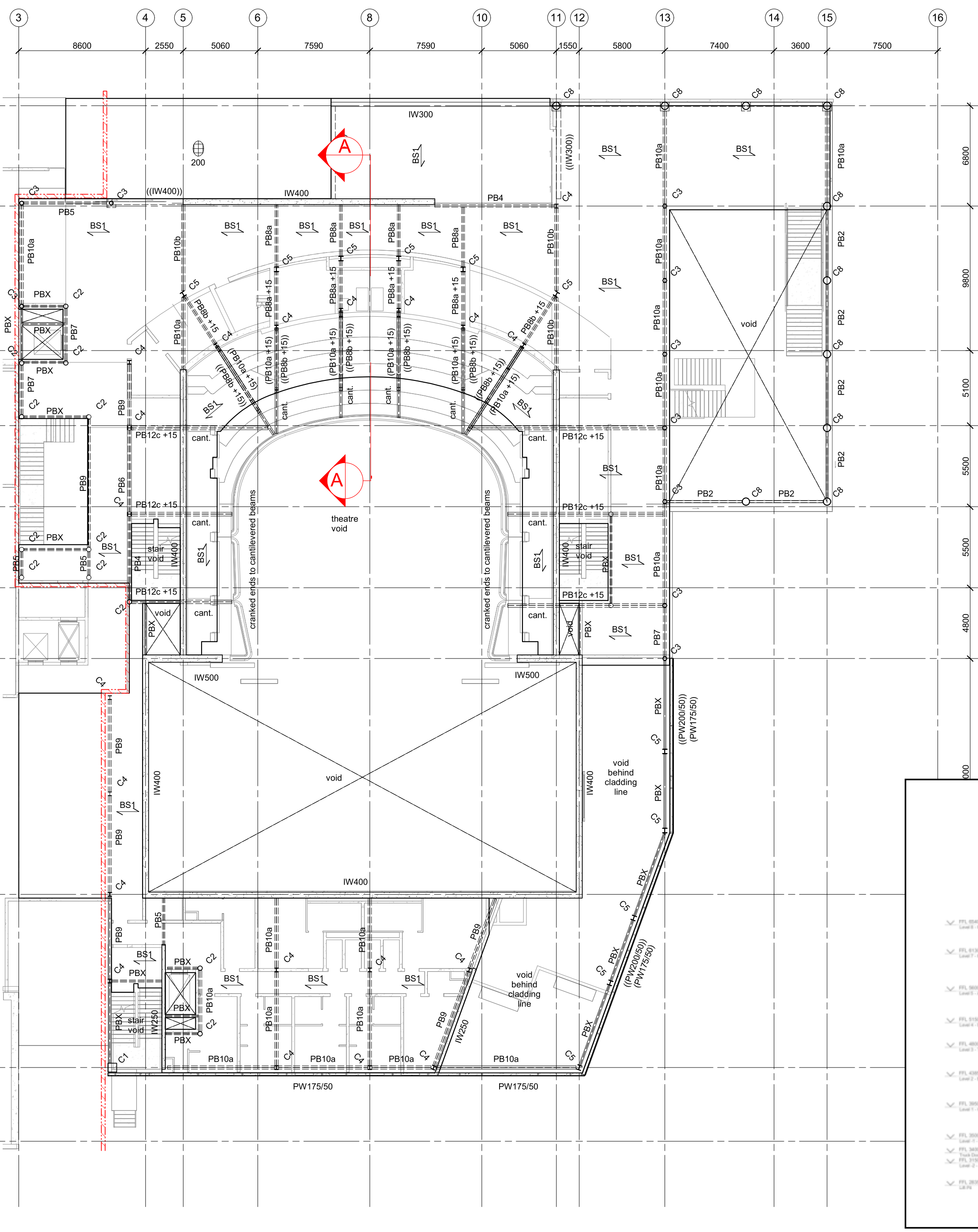
Drawn EO Scale 1:150 (at A1)

Filename S_Holmes_135713-00_R17_Central

Sheet Title

structural plan - level -1 stalls

Job No	Sheet No	Rev
135713-00	P01-07	1



element legend

Type Mark	Type Comments	Description
Structural Columns		
C1	600x600	Conc. 150 kg/m3 reinf.
C2	Ind. Column	Indicative Column, Allow 90 kg/m
C3	273x12.5CHS*	Concrete filled 30MPa
C4	250UC90	
C5	310UC137	
C6	200UC60	Allow for fixed cantilever beam connections
C7	250UC73	
C8	508x12CHS	or 530UB92
Structural Foundations		
P1	screw pile	by others
PC1	1000x1000x1000 conc. pile cap with screw pile, refer to piling plan	reinf. 175 kg/m³
PC2	1500x1500x1200 conc. pile cap with screw pile, refer to piling plan	reinf. 175 kg/m³
Structural Framing		
FB1	600x600dp	reinf. 150 kg/m³
FB3	800x600d	reinf. 175 kg/m³
Walls		
BW1	Block 20 Series	XD16 at 400 e.w.
IW250	Insitu 250mm	reinf. 150 kg/m
IW300	Insitu 300mm	reinf. 150 kg/m
IW400	Insitu 400mm	reinf. 150 kg/m
IW500	Insitu 500mm	reinf. 150 kg/m
PW175/50	Precast 225mm (175S/50A)	XD20 at 200 e.f. e.w. in 175 structural core
PW200/50	Precast 250mm (200S/50A)	XD16 at 200 e.f. e.w. in 200 structural core
Structural Framing		
PB1	250PFC	
PB2	150x9SHS	Wind girts at 2.25m crs max.
PB3	200x9SHS	Entry Deck Support
PB4	310UB46	Entry Deck Support
PB5	360UB57	
PB6	410UB60	
PB7	460UB74	
PB8a	460UB82*	Flybraces at 2m max. crs
PB8b	460UB82	To follow Floor plane
PB9	530UB92	
PB10a	610UB125	
PB10b	610UB125*	Flybraces at 2m max. crs
PB11	250UC90	
PB12c	700WB150#	Cantilever, No Service penetrations within 2m of GL 9 and 5. Beam to pass through walls T.B.C.
PB13	900WB218	
PB14	1000WB296	Entry Deck Support
PBX	Ind. Beam	Indicative Beam, Allow for 60 kg/m

legend:

	200mm COMFLOR flooring system. COMFLOR 60, 1.0mm base metal thickness. 200mm overall slab depth. Reinforce with XD16 at 200rs e.w. Allow XD16 fire steel every second trough Allow XD16 saddle bars 3m long at 300 crs over Primary beams
BS1	Secondary Beam System 1 Cellular Beams at 3.2m crs Precamber +L/300 1-19Øx125 lg studs at 300 crs 200mm COMFLOR flooring system as above Span(m) : Section <5 — 380 dp x 35kg/m 5-7 — 470 dp x 45kg/m 7-9 — 530 dp x 55kg/m 9-11 — 530 dp x 65kg/m
BS2	Secondary Beam System 2 460UB74 at 3.2m crs Precamber +L/300 1-19Øx125 lg studs at 150 crs 200mm COMFLOR flooring system as above
BS3	Secondary Beam System 3 610 dp x 110kg/m Cellular Beam at 3.2m crs Precamber +L/300 1-19Øx125 lg studs at 150 crs 200mm COMFLOR flooring system as above
280/T	40mm H3.2 treated timber decking on 250x50 SG8 H3.2 treated timber joists at 450 crs. Allow for full depth timber blocking at 3rd points of joist spans
RF1	Lightweight metal roofing on 300 DHS purlins at 900 crs max. 2 rows of fastbrace per bay typ. Bracing to be diagonal cross-braced EA Allow for acoustic separations
1000	1000mm conc slab on grade. Allow reinf. 125 kg/m³ Slab on DPC, on 20mm nom sand blinding, on 150mm min well compacted hardfill.
200	200mm conc slab on grade. Reinforce with XD16 at 300 crs e.w. Slab on DPC, on 20mm nom sand blinding, on 150mm min well compacted hardfill.
150	150mm conc slab on grade. Reinforce with XD12 at 300 crs e.w. Slab on DPC, on 20mm nom sand blinding, on 150mm min well compacted hardfill.
+__	Beam pre-camber in mm. For example +10 equals 10mm pre-camber.
( )	Brackets around element call up indicates element is above.
(( ))	Double brackets around element call up indicates element is below.
s.g	Seismic gap.
cant.	Cantilever steel floor support beams

notes:

1. All drawings to be read in conjunction with the Holmes Consulting structural specification.
2. Refer to Architects & Services Engineers drawings for all setout dimensions, reduced levels, opening sizes, slab setdowns, falls, rebates & edge details, cast in Architectural items, cast in services fixtures & services penetrations.
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5. COMFLOR seating to be as per manufacturers specifications and shop drawings.
6. Temporary propping indicated in this drawing set is not exhaustive. Unless specifically noted on the drawings, the design, location and layout of temporary propping is the responsibility of the contractor
7. All beams supporting suspended concrete flooring to have 19Øx125 lg studs at 150 crs u.n.o.
8. For Precast Cladding Panels with windows reinforcing allowance is to be doubled.
9. Precast Cladding Panel build-up defined as: XXXS/XXXA where XXX is thickness and S/A represent Structural core and Architectural render (average thickness)

Rev	Date	Appd	Reason
1	18/07/2018	JGM	Preliminary Design

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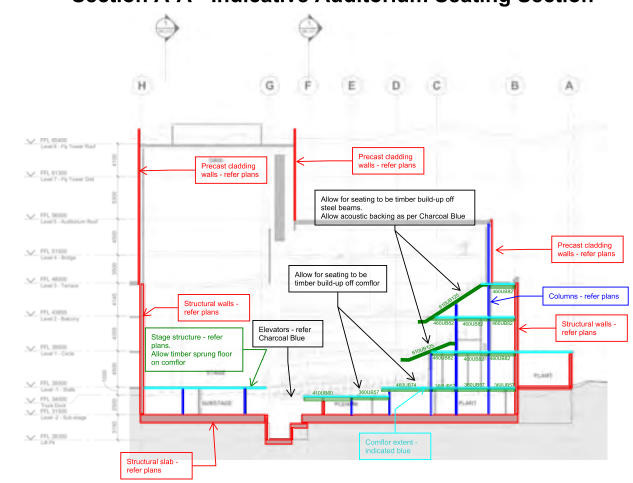
Section A-A - Indicative Auditorium Seating Section



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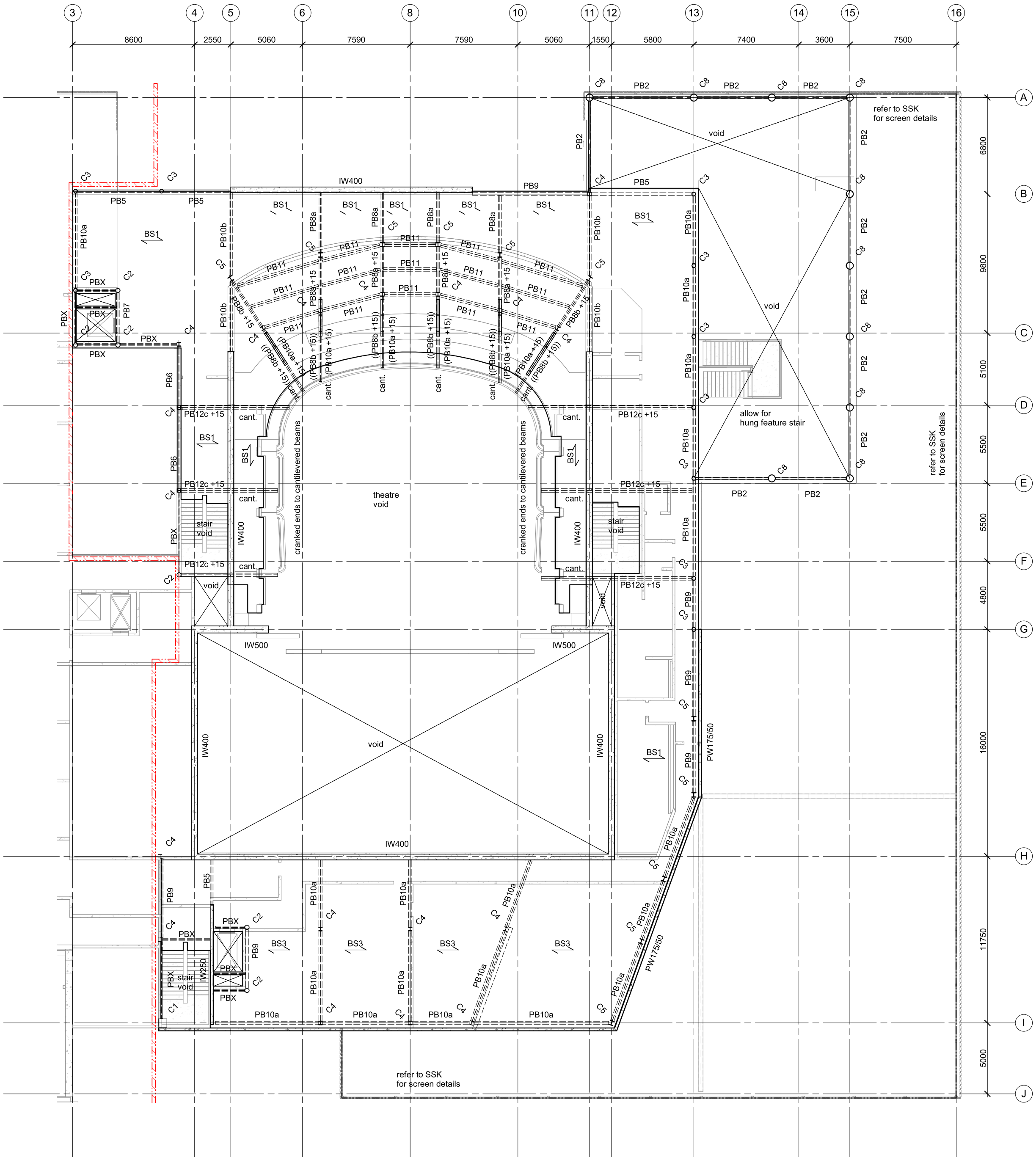
WAIKATO REGIONAL THEATRE VICTORIA STREET HAMILTON

Drawn: EO
Scale: 1:150 (at A1)
Filename: S_Holmes_135713-00_R17_Central

Sheet Title

structural plan - level 1 circle

Job No	Sheet No	Rev
135713-00	P01-09	1



element legend

Type Mark	Type Comments	Description
Structural Columns		
C1	600x600	Conc. 150 kg/m3 reinf.
C2	Ind. Column	Indicative Column, Allow 90 kg/m
C3	273x12.5CHS*	Concrete filled 30MPa
C4	250UC90	
C5	310UC137	
C6	200UC60	Allow for fixed cantilever beam connections
C7	250UC73	
C8	508x12CHS	or 530UB92
Structural Foundations		
P1	screw pile	by others
PC1	1000x1000x1000 conc. pile cap with screw pile, refer to piling plan	reinf. 175 kg/m³
PC2	1500x1500x1200 conc. pile cap with screw pile, refer to piling plan	reinf. 175 kg/m³
Structural Framing		
FB1	600x600dp	reinf. 150 kg/m³
FB3	800x600d	reinf. 175 kg/m³
Walls		
BW1	Block 20 Series	XD16 at 400 e.w.
IW250	Insitu 250mm	reinf. 150 kg/m
IW300	Insitu 300mm	reinf. 150 kg/m
IW400	Insitu 400mm	reinf. 150 kg/m
IW500	Insitu 500mm	reinf. 150 kg/m
PW175/50	Precast 225mm (175S/50A)	XD20 at 200 e.f. e.w. in 175 structural core
PW200/50	Precast 250mm (200S/50A)	XD16 at 200 e.f. e.w. in 200 structural core
Structural Framing		
PB1	250PFC	
PB2	150x9SHS	Wind girts at 2.25m crs max.
PB3	200x9SHS	Entry Deck Support
PB4	310UB46	Entry Deck Support
PB5	360UB57	
PB6	410UB60	
PB7	460UB74	
PB8a	460UB82*	Flybraces at 2m max. crs
PB8b	460UB82	To follow Floor plane
PB9	530UB92	
PB10a	610UB125	
PB10b	610UB125*	Flybraces at 2m max. crs
PB11	250UC90	
PB12c	700WB150#	Cantilever, No Service penetrations within 2m of GL 9 and 5. Beam to pass through walls T.B.C.
PB13	900WB218	
PB14	1000WB296	Entry Deck Support
PBX	Ind. Beam	Indicative Beam, Allow for 60 kg/m

legend:

200mm COMFLOR flooring system.
COMFLOR 60, 1.0mm base metal thickness.
200mm overall slab depth.
Reinforce with XD16 at 200rs e.w.
Allow XD16 fire steel every second trough
Allow XD16 saddle bars 3m long at 300 crs over Primary beams

BS1 — Secondary Beam System 1
Cellular Beams at 3.2m crs
Precamber +L/300
1-19Ø x125 lg studs at 300 crs
200mm COMFLOR flooring system as above

Span(m)	Section
<5	380 dp x 35kg/m
5-7	470 dp x 45kg/m
7-9	530 dp x 55kg/m
9-11	530 dp x 65kg/m

BS2 — Secondary Beam System 2
460UB74 at 3.2m crs
Precamber +L/300
1-19Ø x125 lg studs at 150 crs
200mm COMFLOR flooring system as above

BS3 — Secondary Beam System 3
610 dp x 110kg/m Cellular Beam at 3.2m crs
Precamber +L/300
1-19Ø x125 lg studs at 150 crs
200mm COMFLOR flooring system as above

280/T — 40mm H3.2 treated timber decking on 250x50 SG8 H3.2 treated timber joists at 450 crs. Allow for full depth timber blocking at 3rd points of joist spans

RF1 — Lightweight metal roofing on 300 DHS purlins at 900 crs max.
2 rows of fastbrace per bay typ.
Bracing to be diagonal cross-braced EA
Allow for acoustic separations

1000 — 1000mm conc slab on grade.
Allow reinf. 125 kg/m³
Slab on DPC, on 20mm nom sand blinding, on 150mm min well compacted hardfill.

200 — 200mm conc slab on grade.
Reinforce with XD16 at 300 crs e.w.
Slab on DPC, on 20mm nom sand blinding, on 150mm min well compacted hardfill.

150 — 150mm conc slab on grade.
Reinforce with XD12 at 300 crs e.w.
Slab on DPC, on 20mm nom sand blinding, on 150mm min well compacted hardfill.

+__ — Beam pre-camber in mm. For example +10 equals 10mm pre-camber.

( ) — Brackets around element call up indicates element is above.

(( )) — Double brackets around element call up indicates element is below.

s.g — Seismic gap.

cant. — Cantilever steel floor support beams

notes:

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2. Refer to Architects & Services Engineers drawings for all setout dimensions, reduced levels, opening sizes, slab setdowns, falls, rebates & edge details, cast in Architectural items, cast in services fixtures & services penetrations.
3. This drawing set contains colour. All reproduction to be in colour.
4. COMFLOR layout shown on Holmes drawings is indicative only. Final COMFLOR layout to be confirmed on manufacturers shop drawings.
5. COMFLOR seating to be as per manufacturers specifications and shop drawings.
6. Temporary propping indicated in this drawing set is not exhaustive. Unless specifically noted on the drawings, the design, location and layout of temporary propping is the responsibility of the contractor
7. All beams supporting suspended concrete flooring to have 19Ø x125 lg studs at 150 crs u.n.o.
8. For Precast Cladding Panels with windows reinforcing allowance is to be doubled.
9. Precast Cladding Panel build-up defined as: XXXS/XXXA where XXX is thickness and S/A represent Structural core and Architectural render (average thickness)

Rev	Date	Appd	Reason
1	18/07/2018	JGM	Preliminary Design

Consultants

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Holmesgroup.com
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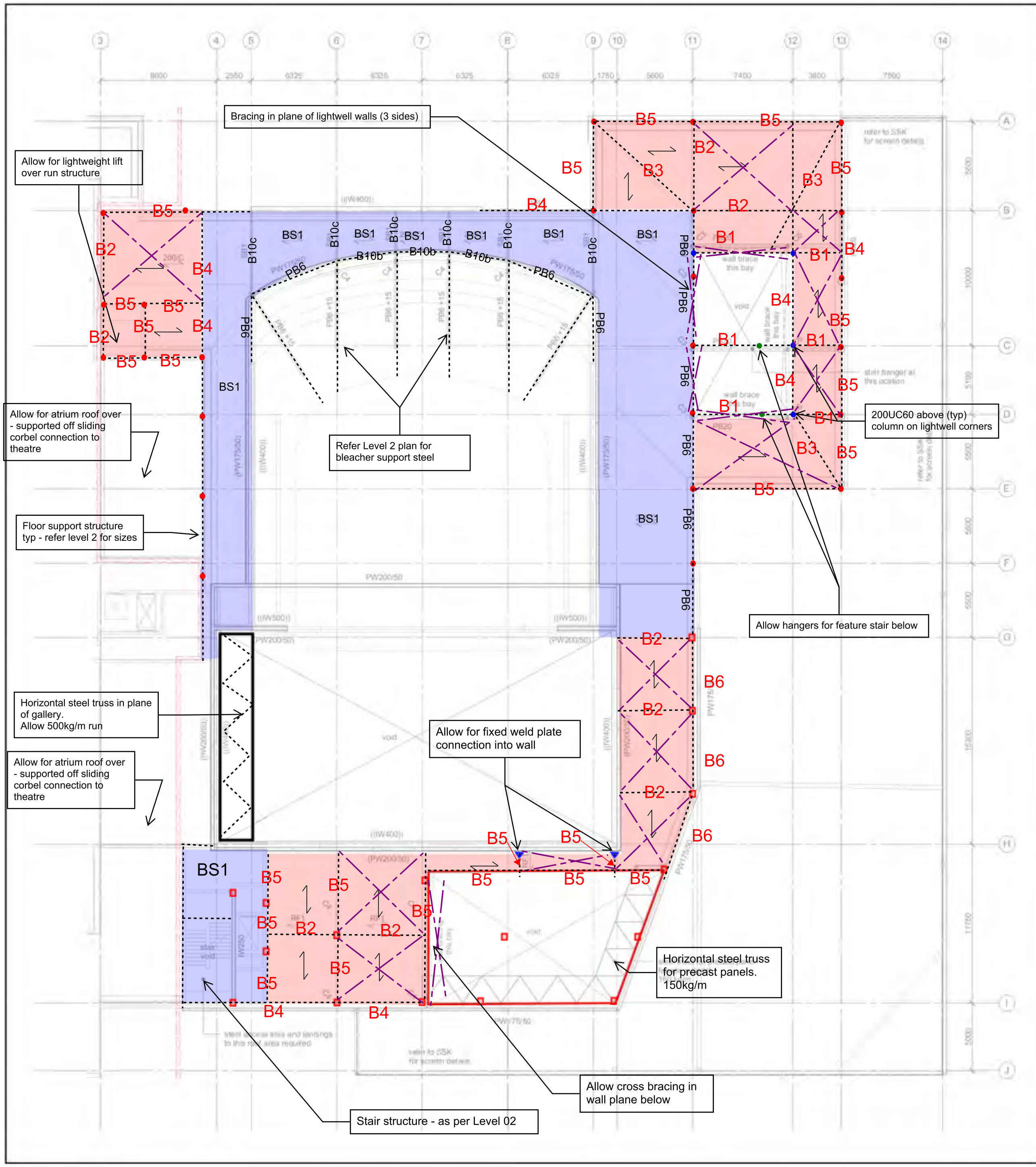
WAIKATO REGIONAL THEATRE VICTORIA STREET HAMILTON

Drawn EO Scale 1:150 (at A1)
Filename S_Holmes_135713-00_R17_Central

Sheet Title
structural plan - level 2 balcony

Job No 135713-00 Sheet No P01-11 Rev 1



Legend specifically for roof areas

Comflor area - structure typically as per levels below u.n.o
Allow for timber build up and roofing over - refer arch for build up

Lightweight Roof.
250/18DHS purlins @ 900crs,
1 brace per bay.
Ref arch for build up.

B1	900WB218
B2	410UB60
B3	410UB60
B4	610UB101
B5	360UB51
B6	200UC60 on flat

100x12EA bracing (typ)
Allow bolted connection each end

BS1 Secondary Beam System 1
Cellular Beams at 3.2m crs
Precamber +L/300
1-19Øx125 lg studs at 300 crs

Span(m) :	Section
<5	380 dp x 35kg/m
5-7	470 dp x 45kg/m
7-9	530 dp x 55kg/m
9-11	530 dp x 65kg/m

Structural Framing

B8	700WB150 CANT	No Service penetrations within 2m of GL 9 and 5. Beam to pass through walls T.B.C.
B10b	460UB82	To follow Floor plane
B10c	460UB82 FB	Flybraces at 2m max. crs
FB1	600x600dp	reinf. 150 kg/m³
PB2	360UB57	
PB3	410UB60	
PB4	460UB74	
PB5	530UB92	
PB6	610UB125	
PB7	700WB150	

Columns:
Locations indicated only, continuous from level 2, refer to level 2 for sizing

Note:
Allow for anchor points and abseil points for building maintenance

notes:

1. All drawings to be read in conjunction with the Holmes Consulting structural specification.
2. Refer to Architects & Services Engineers drawings for all setout dimensions, reduced levels, opening sizes, slab setdowns, falls, rebates & edge details, cast in Architectural items, cast in services fixtures & services penetrations.
3. This drawing set contains colour. All reproduction to be in colour.
4. COMFLOR layout shown on Holmes drawings is indicative only. Final COMFLOR layout to be confirmed on manufacturers shop drawings.
5. COMFLOR seating to be as per manufacturers specifications and shop drawings.
6. Temporary propping indicated in this drawing set is not exhaustive. Unless specifically noted on the drawings, the design, location and layout of temporary propping is the responsibility of the contractor
7. All beams supporting suspended concrete flooring to have 19Øx125 lg studs at 150 crs u.n.o.
8. For Precast Cladding Panels with windows reinforcing allowence is to be doubled.

Rev	Date	Appd	Reason
1	18/07/18	JGM	Preliminary Design

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300 Grey Stre
Hamilton East 32
New Zealan
Holmesgroup.co
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WAIKATO REGIONAL THEATRE
VICTORIA STREET
HAMILTON

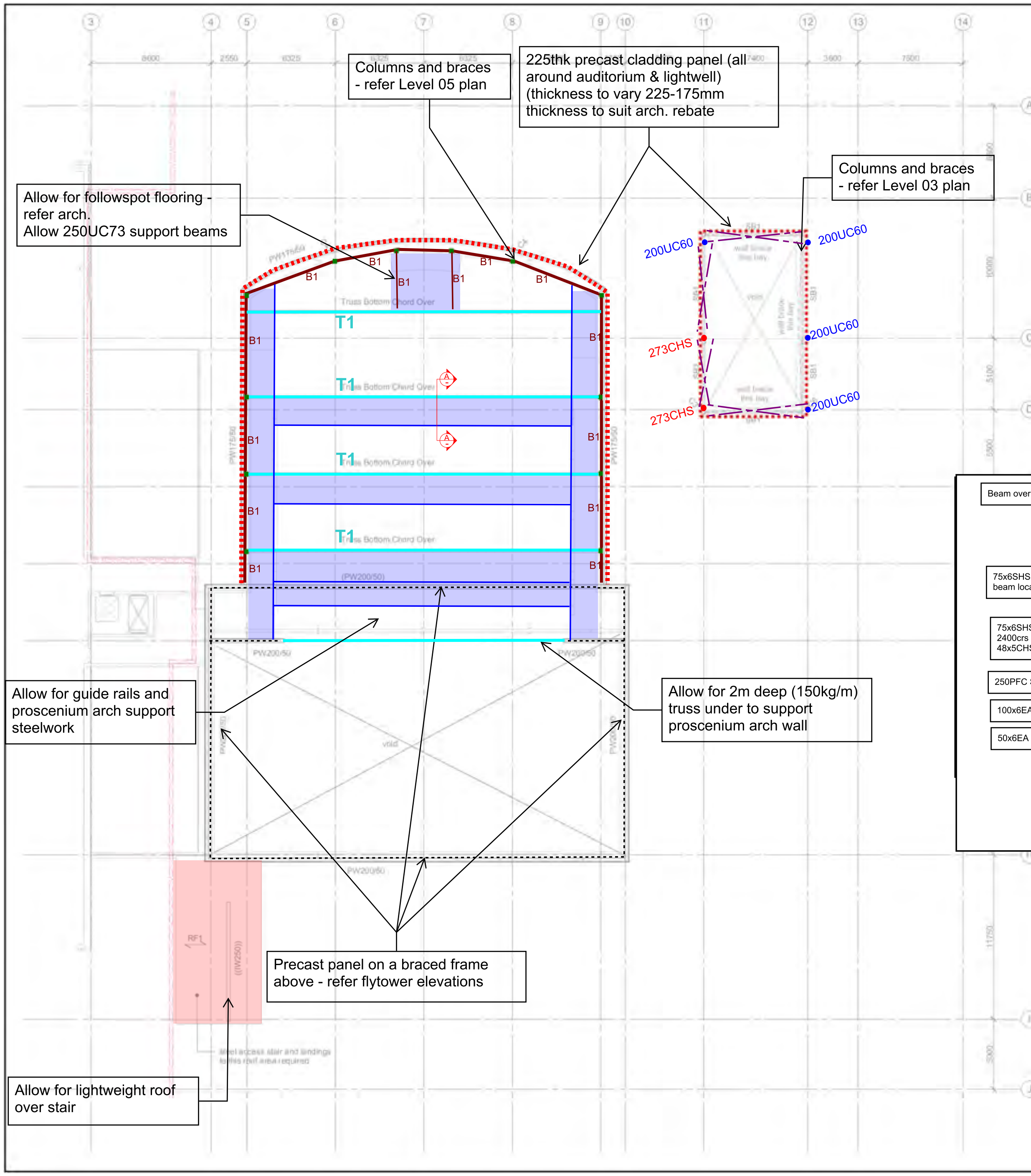
Drawn EO Scale 1:150

Filename

Sheet Title

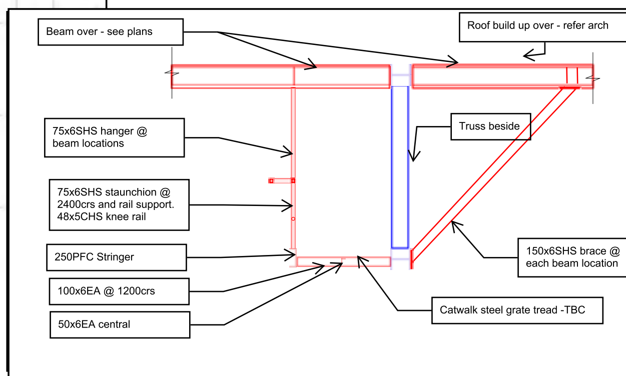
structural plan - level 3 terrace

Job No 135713-00 Sheet No P01-13 1



Legend

(shaded)	Catwalk steel gantry See Section A-A (typ)
T1	Roof Truss. Fully welded UC trusses, depth varies. Allow 200kg/m run
B1	250UC73 header beam Around auditorium



Section A-A - Typical Catwalk Gantry Section

notes:

1. All drawings to be read in conjunction with the Holmes Consulting structural specification.
2. Refer to Architects & Services Engineers drawings for all setout dimensions, reduced levels, opening sizes, slab setdowns, falls, rebates & edge details, cast in Architectural items, cast in services fixtures & services penetrations.
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8. For Precast Cladding Panels with windows reinforcing allowence is to be doubled.

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WAIKATO REGIONAL THEATRE
VICTORIA STREET
HAMILTON

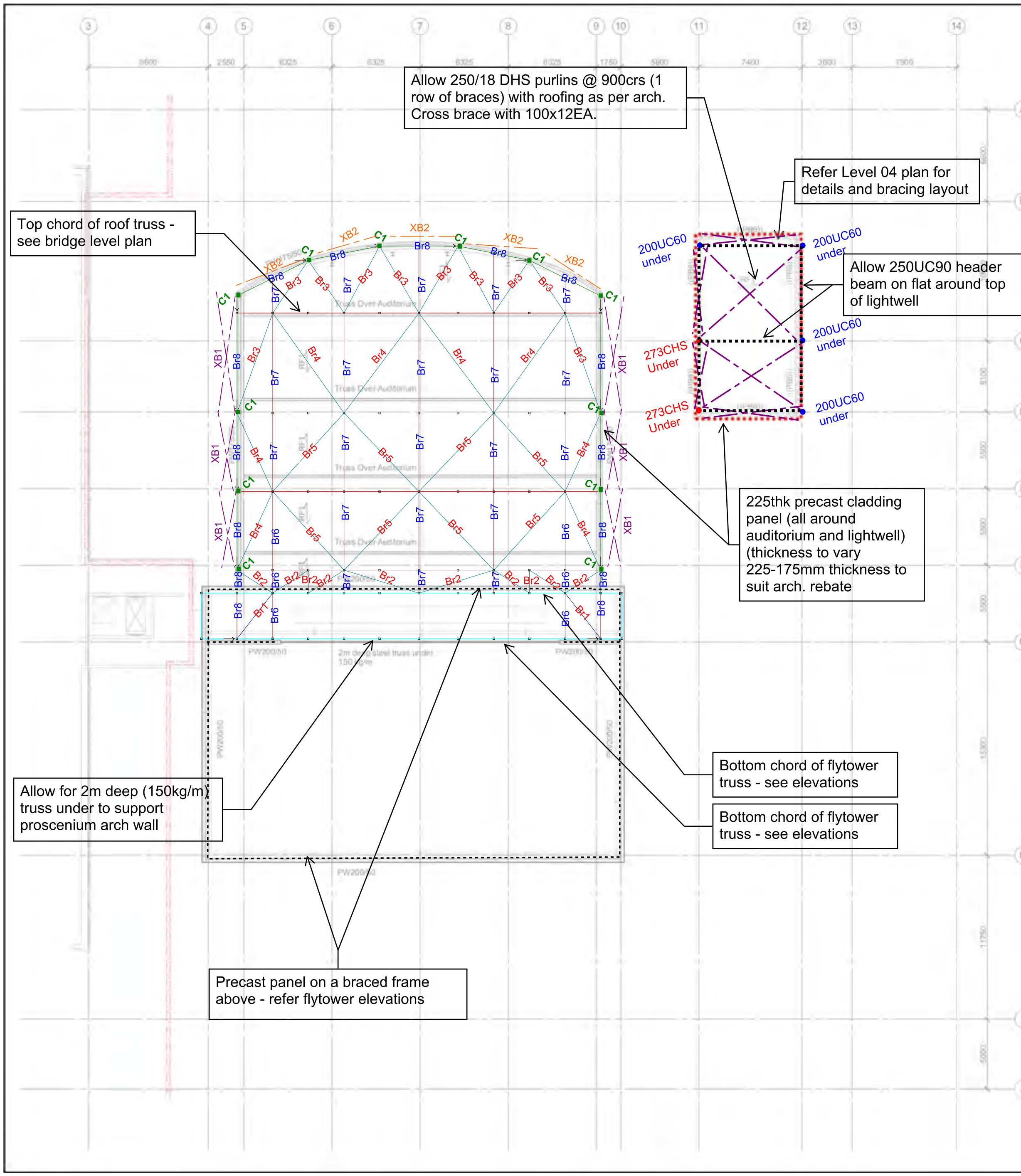
Drawn EO Scale 1:150 (at A1)

Filename

Sheet Title

structural plan - level 4 bridge

Job No 135713-00 Sheet No P01-15 Rev 1



Legend

Br1	310UC118 brace Coordination with access stair TBC
Br2	200UC60 brace
Br3	310UC118 brace
Br4	310UC118 brace
Br5	250UC73 brace
Br6	250UC90 brace
Br7	200UC60 brace
Br8	310UC137 head restraint (on flat)
XB1	150x16EA cross bracing in plane of wall
XB2	310UC158 brace in plane of wall
C1	310UC118 Column

Note:
Allow for anchor points and abseil points for building maintenance

notes:

1. All drawings to be read in conjunction with the Holmes Consulting structural specification.
2. Refer to Architects & Services Engineers drawings for all setout dimensions, reduced levels, opening sizes, slab setdowns, falls, rebates & edge details, cast in Architectural items, cast in services fixtures & services penetrations.
3. This drawing set contains colour. All reproduction to be in colour.
4. COMFLOR layout shown on Holmes drawings is indicative only. Final COMFLOR layout to be confirmed on manufacturers shop drawings.
5. COMFLOR seating to be as per manufacturers specifications and shop drawings.
6. Temporary propping indicated in this drawing set is not exhaustive. Unless specifically noted on the drawings, the design, location and layout of temporary propping is the responsibility of the contractor
7. All beams supporting suspended concrete flooring to have 19Ø x125 lg studs at 150 crs u.n.o.
8. For Precast Cladding Panels with windows reinforcing allowence is to be doubled.

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WAIKATO REGIONAL THEATRE
VICTORIA STREET
HAMILTON

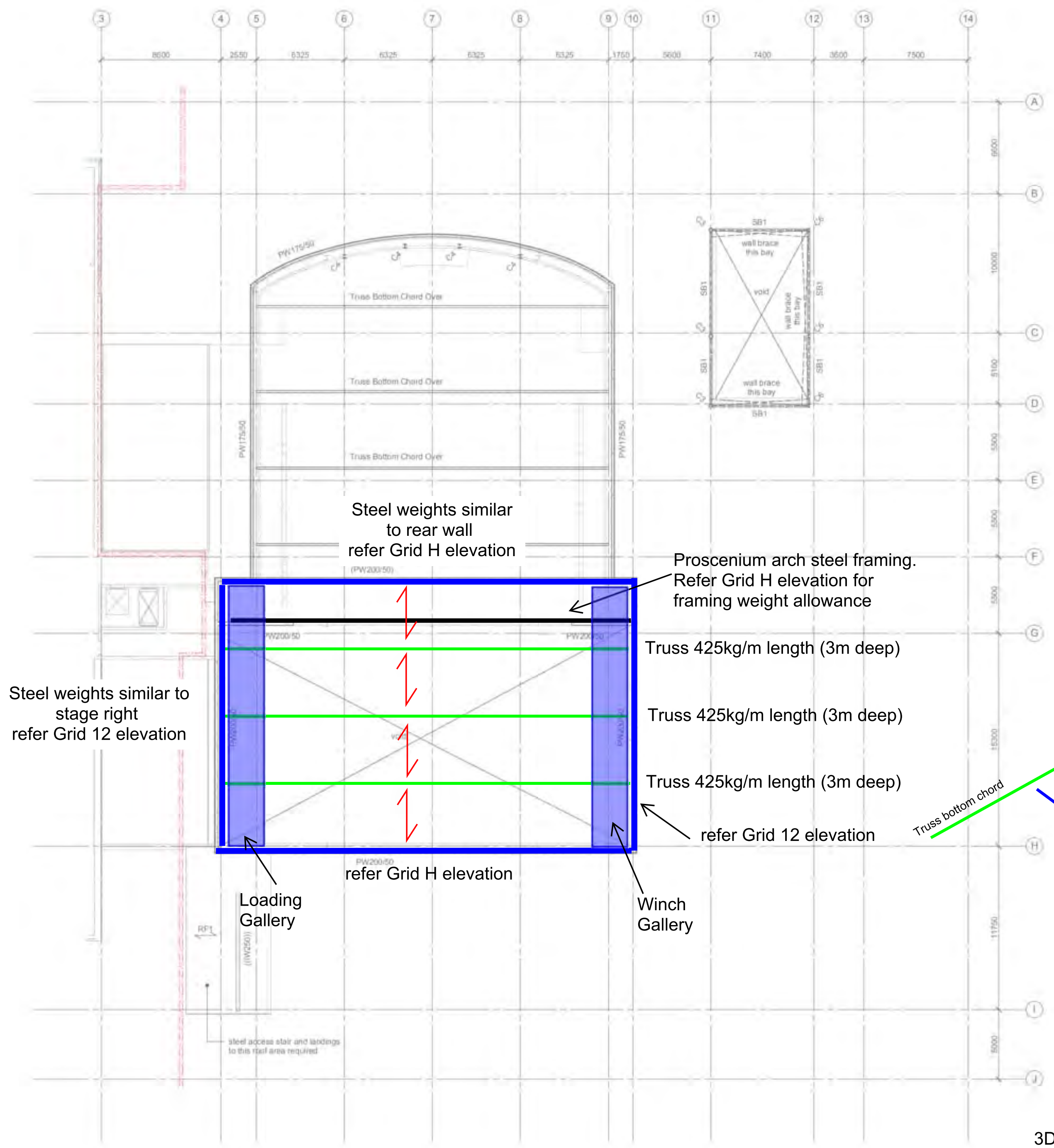
Drawn EO Scale 1:150 (at A1)

Filename

Sheet Title

structural plan - level 5 auditorium roof

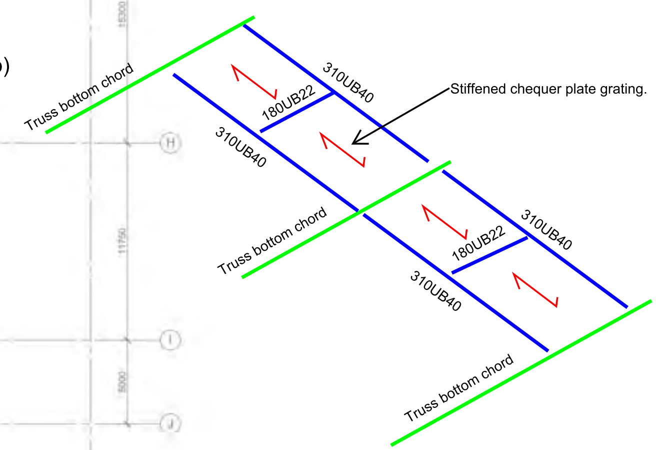
Job No	Sheet No	Rev
135713-00	P01-17	1



Legend:

Grid: 200PFC's at 150 crs

Cat walk framing, refer to Charcoal Blue drawings for extent. Refer to auditorium roof framing plan for steel sizes.



3D schematic of Loading Galley
(winch and trimming galley sim)

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1	18/07/18	JGM	Preliminary Design

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WAIKATO REGIONAL THEATRE
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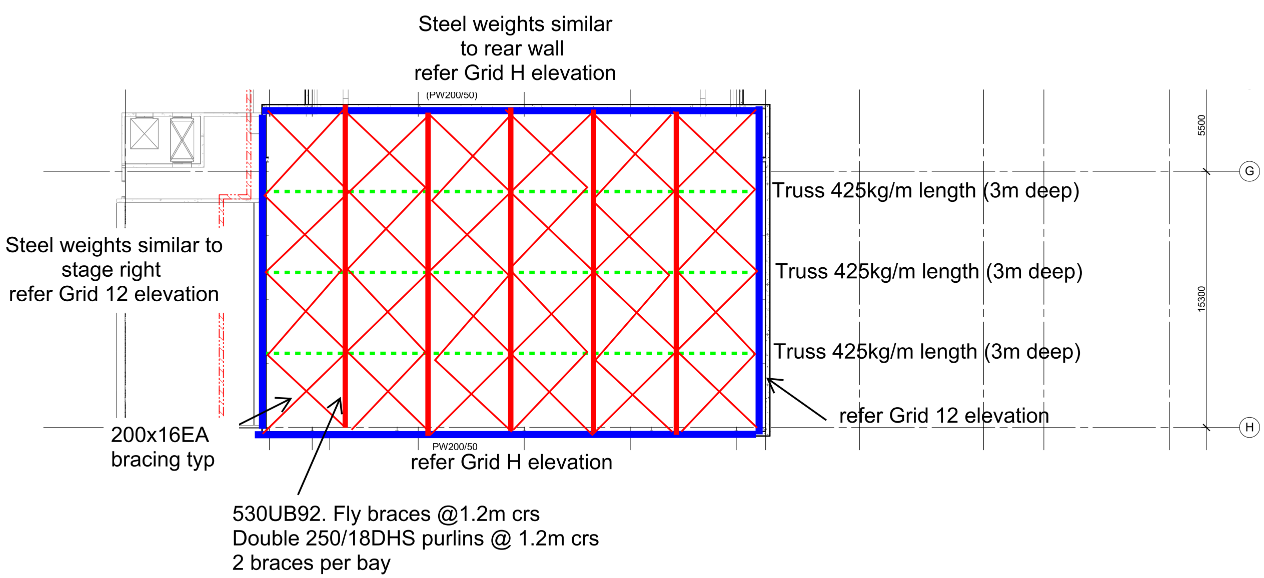
Drawn
Scale
(at A1)
Filename

Sheet Title

Grid (RL 61.8m) Plan
Steel Framing

Job No	Sheet No	Rev
135713-00	PD-01-23	1



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WAIKATO REGIONAL THEATRE
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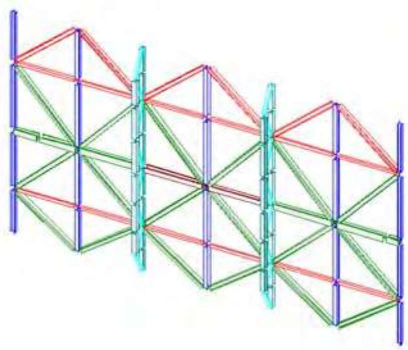
Drawn | Scale | (at A1)

Filename

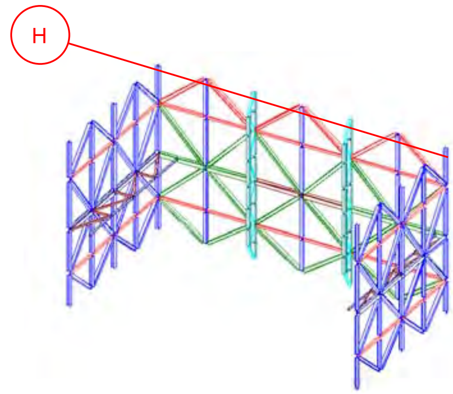
Sheet Title

Fly Tower Roof Plan

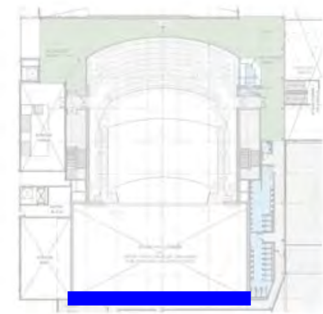
Job No	Sheet No	Rev
135713-00	PD-01-25	1



3D schematic

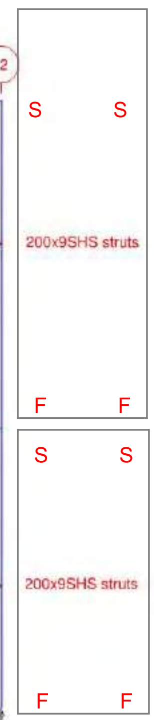


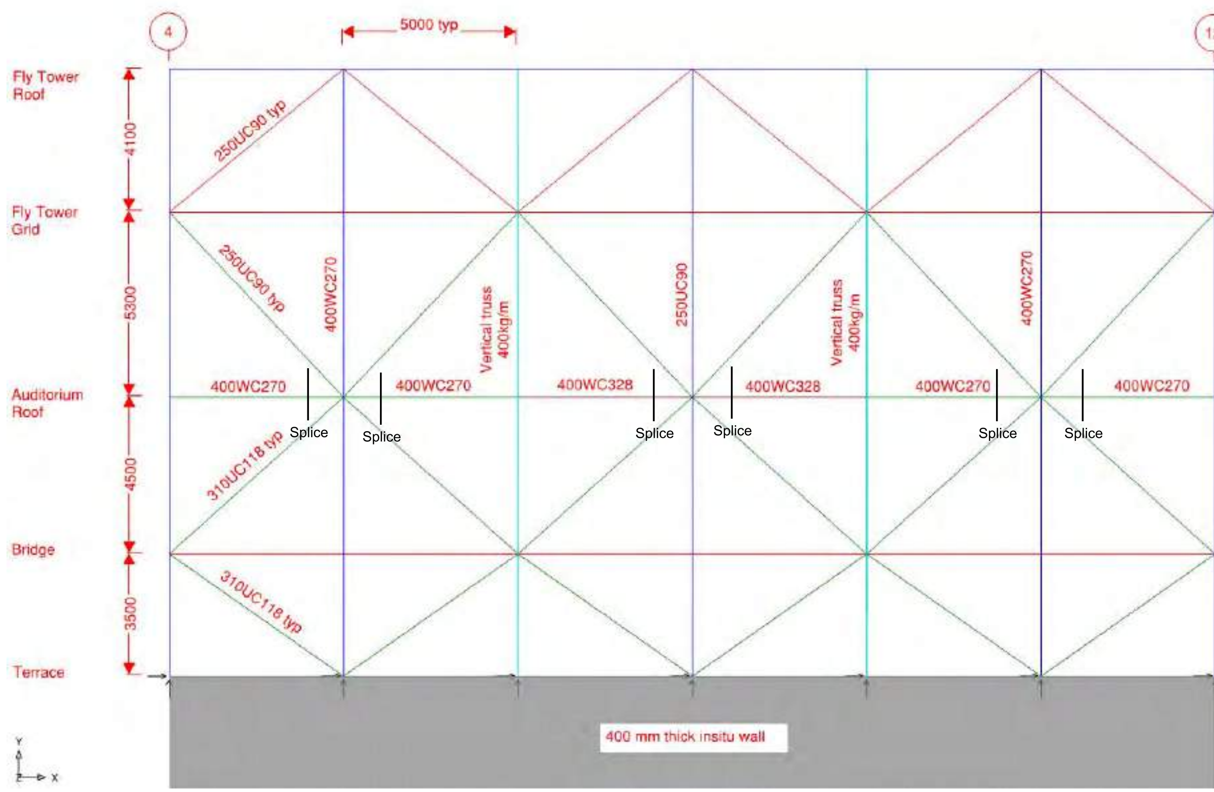
3D Schematic of the Fly Tower Framing
(roof framing, forestage and proscenium steel frames omitted for clarity)



location plan

Precast panel elevation





Legend:

1. Precast cladding panels connect at the following levels:
-Terrace
-Auditorium Roof
-Fly Tower Roof
F-denotes fixed connection
S-denotes sliding connection
2. Refer to roof plan for roof framing and bracing
3. Allow for significant weld plate connections between steel frame and insitu walls.
4. Allow for bolted connections for diagonals and SHS struts
5. Columns and vertical trusses to be continuous, allow for full moment splices for horizontal WC members

Forestage framing will be similar to Grid H

Proscenium Arch support wall (grid G). Requires 2m deep truss (150kg/m). Allow for 250UC columns @ 5m crs above the truss (ie 15m long each) and 150x6SHS struts at each floor above the truss

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Consultants

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WAIKATO REGIONAL THEATRE
VICTORIA STREET
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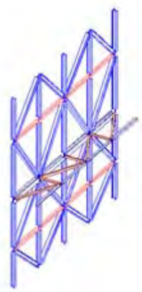
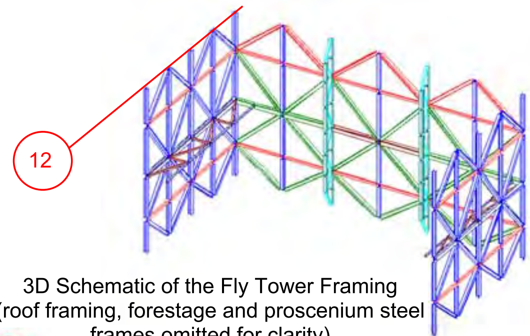
Drawn
Scale (at A1)
Filename
Sheet Title

Grid H Fly Tower Steel Frame Elevation

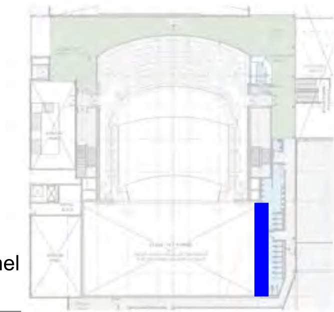
Job No	Sheet No	Rev
135713-00	PD-02-01	1



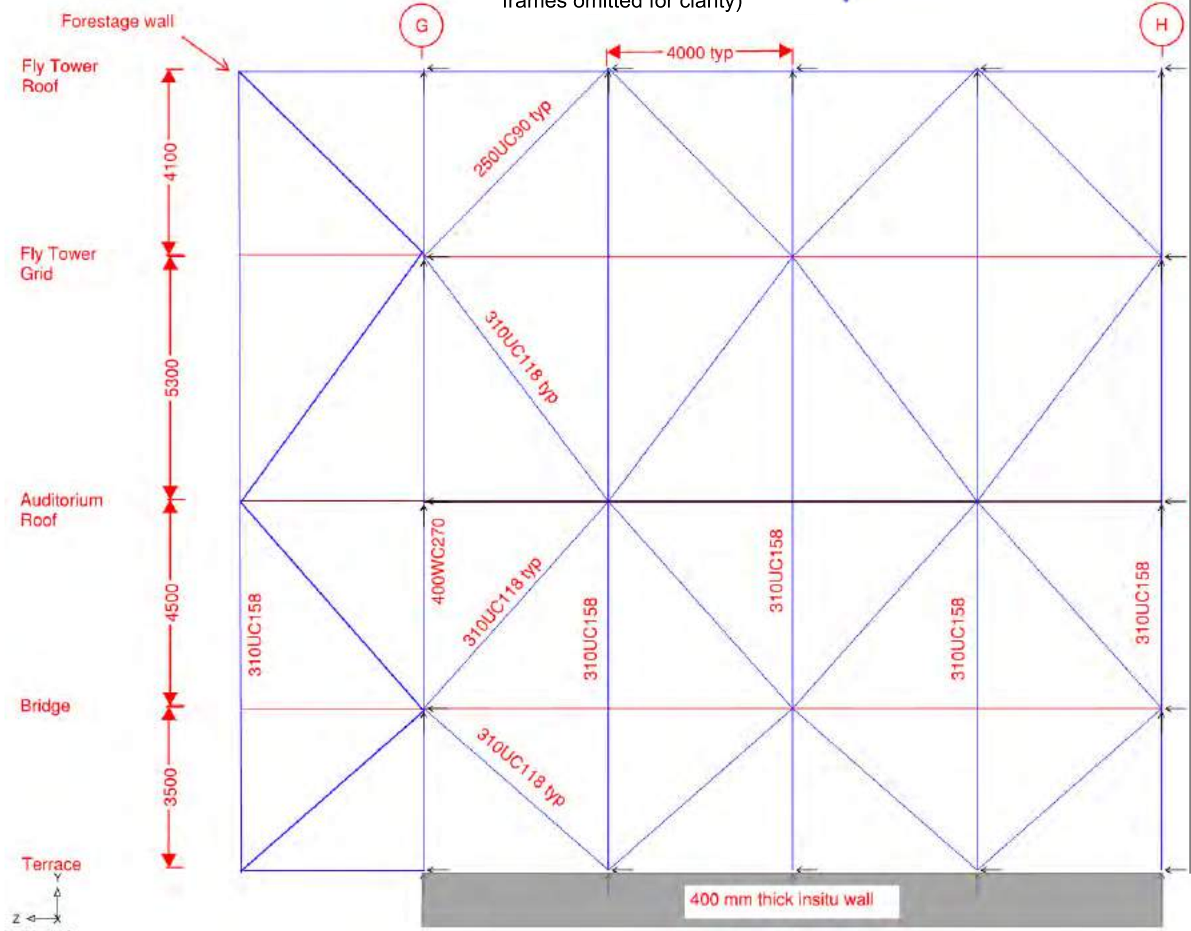
3D schematic



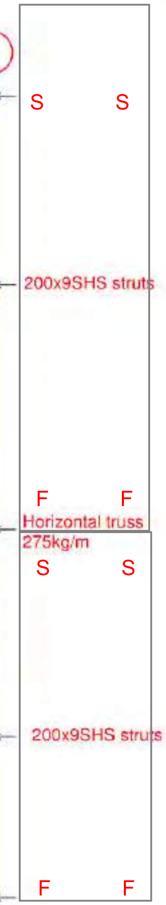
3D Schematic of the Fly Tower Framing
(roof framing, forestage and proscenium steel frames omitted for clarity)



location plan



Precast panel elevation



Legend:

1. Precast cladding panels connect at the following levels:
-Terrace
-Auditorium Roof
-Fly Tower Roof
F-denotes fixed connection
S-denotes sliding connection
2.Refer to roof plan for roof framing and bracing
3. Allow for significant weld plate connections between steel frame and insitu walls.
4. Allow for bolted connections for diagonals and SHS struts
5. Columns to be continuous, allow for bolted splices for horizontal truss

Grid 4 framing similar to grid 12

Rev	Date	Appd	Reason
1	18/07/18	JGM	Preliminary Design

Consultants

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WAIKATO REGIONAL THEATRE
VICTORIA STREET
HAMILTON

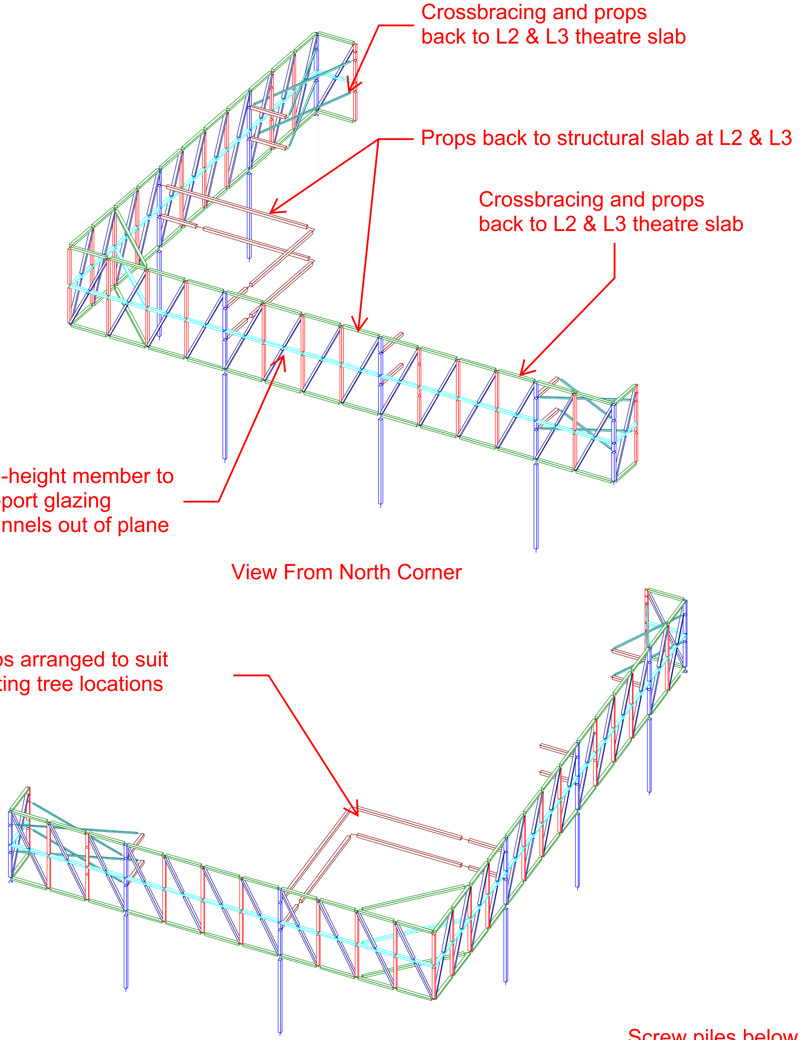
Drawn | Scale | (at A1)

Filename

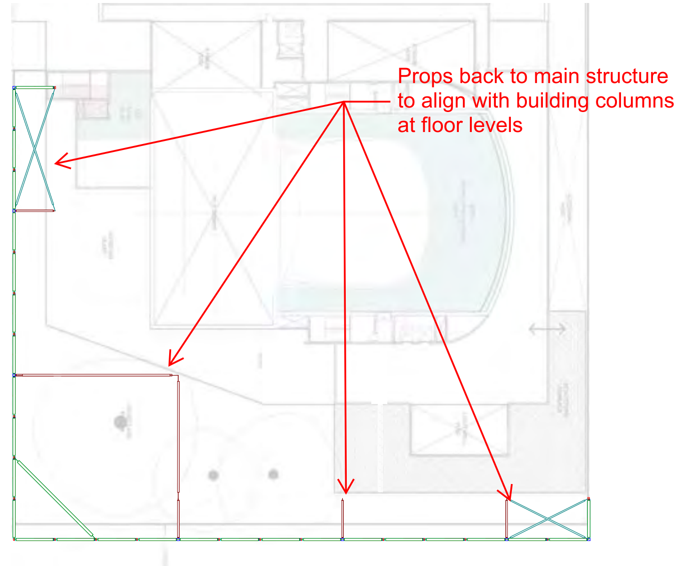
Sheet Title

Grid 12 Fly Tower Steel Frame Elevation

Job No	Sheet No	Rev
135713-00	PD-02-02	1



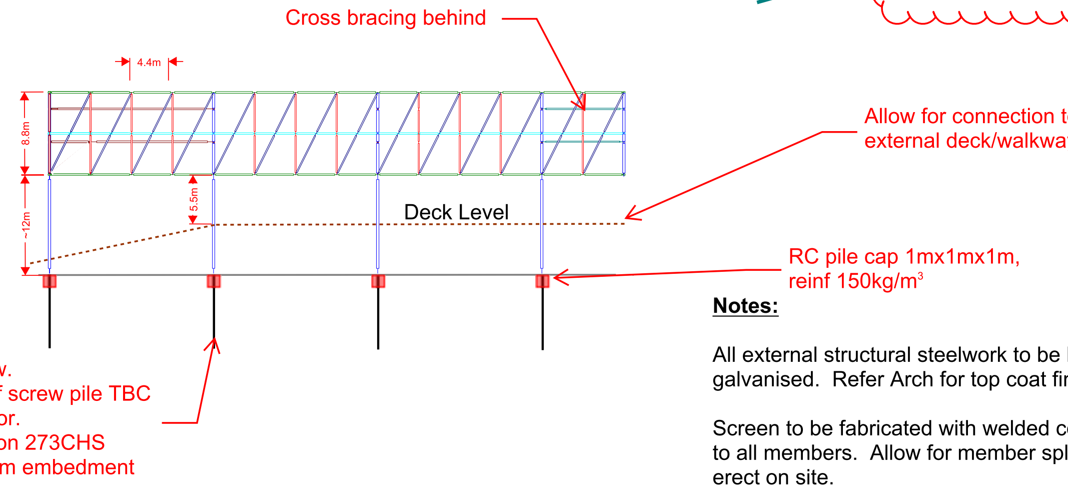
Screen Isometric Views



Screen Plan View L3

Structural Legend

- Primary structural column: 300x10SHS
- Horizontal Member 300x10SHS
- Vertical Member 300x200x8RHS
- Mid-Height Member 300x10SHS
- Diagonal Member 300x200x8RHS
- Screen Prop 300x10SHS
- Screen Brace Stainless Steel Rod Bracing



Screen Elevation - Typical

Notes:

All external structural steelwork to be hot dip galvanised. Refer Arch for top coat finish.

Screen to be fabricated with welded connections to all members. Allow for member splices to erect on site.

Fixings for glazing channels by others

Refer Arch for dimensions, glazing channel details and tree locations

If cladding to be 50% permeable, account for 15% reduction in structural steel weights - Arch to confirm

SSK - PD - 02 - 10
External Screen - Preliminary Design

Holmes

PROJECT: Waikato Regional Theatre
JOB NO: 135713.00 DATE: 18/07/18
SSK: PD-02-10 REV: 1

WAIKATO REGIONAL THEATRE PROJECT
VICTORIA STREET
HAMILTON

APPENDIX B

Preliminary Design
Civil Drawings

Holmes Consulting

July 2018
Project Number: 135713.00

CIVIL PRICING NOTES

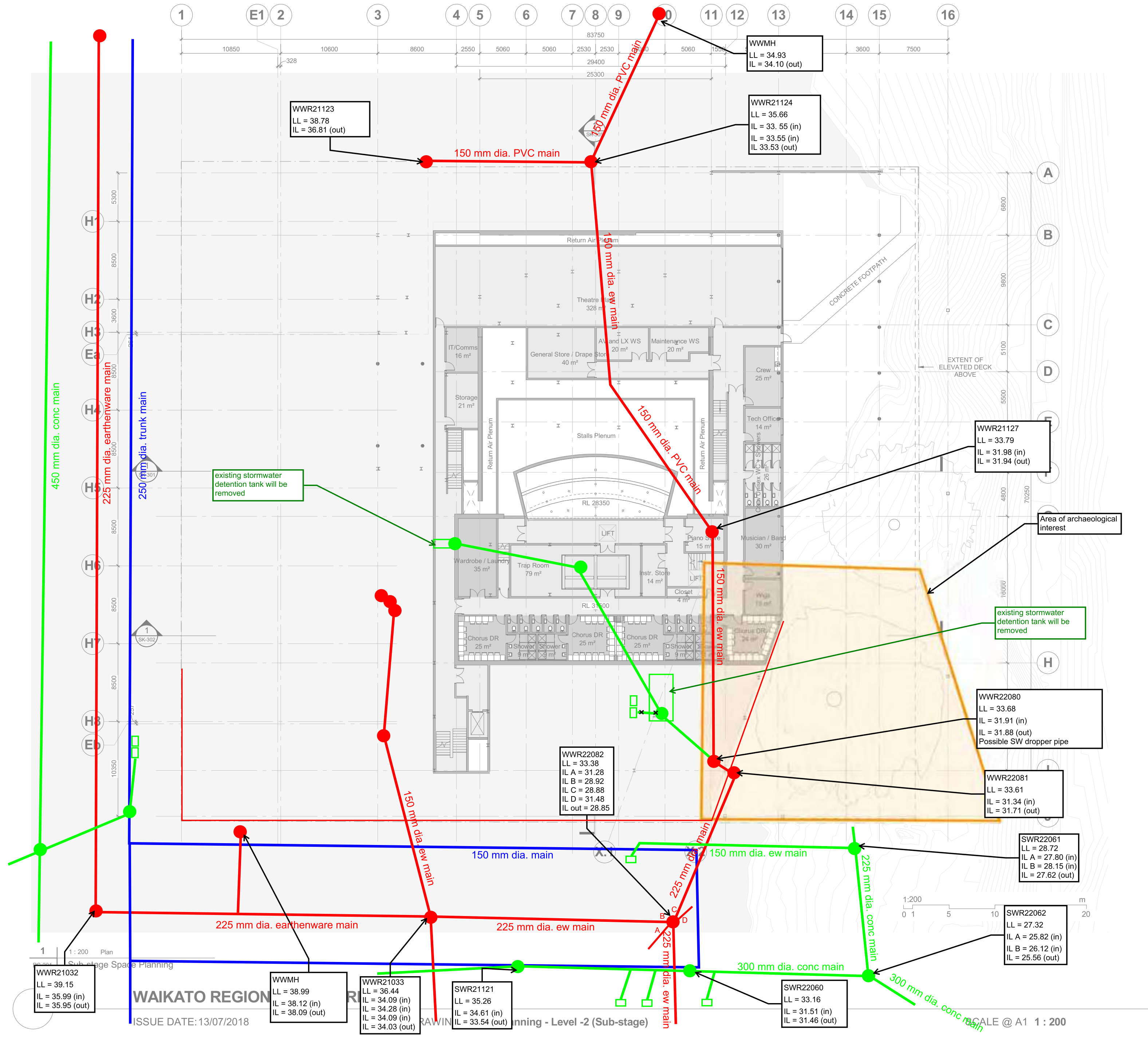
It is understood that this design report and the drawings attached may be used for pricing purposes. These documents represent the design of the project to a Preliminary Design level only as defined by the Construction Industry Council (CIC) design guidelines.

The civil infrastructure design quantities shown are representative only and will be refined during the completion of the design. Suitable allowances should be made for elements not shown in the drawings and include, but not limited, to the following:

- Cost of locating or re-locating existing services.
- Construction associated costs such as trench shoring and dewatering.
- Erosion and sediment control costs during construction.
- Dewatering measures required for bulk earthworks.
- Re-use of existing infrastructure (catchpits, water lines, etc)- condition to be assessed during construction, and replaced with new if found to be unsuitable.
- Cost of cleaning out any drains or structures that can be re-used.
- All testing of drains and manholes.
- Thrust block sizing- will be designed based on bearing capacity of in-situ soils.
- PE pipe weld testing (if required).
- Backflow prevention devices for water supply.
- Any stormwater treatment devices.
- Threshold drains.
- Stormwater detention tanks with primary restricted outlet and emergency overflow outlet.
- CCTV of a minimum 1/3 of pipes at the completion of the project.
- Pavement tie in strips anywhere new pavement is installed next to existing pavement.

CIVIL DRAWINGS

CSK-PD-01-01	EXISTING SERVICES PLAN
CSK-PD-01-02	PROPOSED SERVICES PLAN



Design Notes:

1. All existing services information indicative only. To be confirmed by contractor on site prior to construction.

2. Wastewater and stormwater information obtained from Harrison Grierson site survey 142930-SS02 rev 4.

3. Water supply information obtained from HCC Three Waters GIS.

4. Harrison Grierson was unable to lift the lid of wastewater manhole WWR 22082. HCC carried out a site visit to measure the invert levels of this manhole on request. Information for this manhole is provided by HCC.

Legend

red line	Existing wastewater
green line	Existing stormwater
blue line	Existing water supply
green dot	Existing manhole
green rectangle	Existing sump

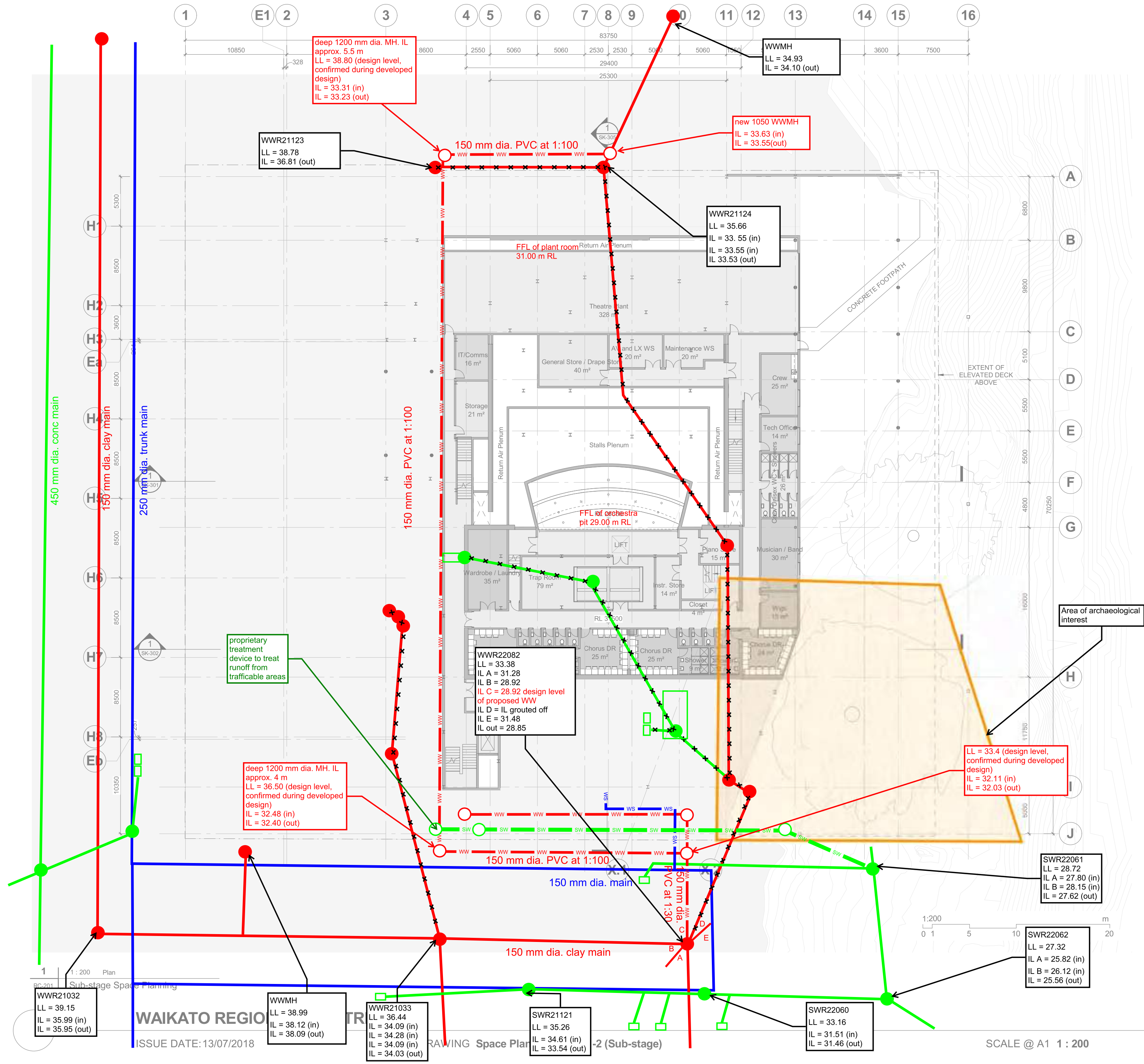
Existing services plan

Holmes

PROJECT: Waikato Regional Theatre

JOB NO: 135713.50 DATE: 18/07/2018

CSK: PD-01-01 REV: 2



Design Notes:

1. All civil works to be in accordance with New Zealand Building Code and Waikato Regional Infrastructure Technical Specification.

2. All existing services information indicative only. To be confirmed by contractor on site prior to construction

3. Wastewater and stormwater information obtained from Harrison Grierson site survey 142930-SS02 rev 1

4. Water supply information obtained from HCC Three Waters GIS

5. Harrison Grierson was unable to lift the lid of wastewater manhole WWR 22082. HCC carried out a site visit to measure the invert levels of this manhole on request. Information for this manhole is provided by HCC.

6. Building services engineer to provide wastewater ILs at building line for civil to pick up.

7. Downpipe design & location to be provided by the architect.

8. In the event that during earthworks on site, any archaeological features , artifacts or human remains are found, the Hamilton City Council's Accidental Discovery Protocol with the District Plan shall be complied with.

9. The proposed carpark for the hotel on sub-surface 1 will require stormwater connection. Treatment of runoff will be required. ie. proprietary device such as Stormwater360 Stormfilter or Hynds Environmental Upflo filter.

10. Deep manholes to meet construction requirements of the RITS 5.2.7.3.

Legend

- Existing wastewater
- Proposed wastewater
- Existing stormwater
- Proposed stormwater
- Existing water supply
- Proposed water supply
- Service to be removed
- Existing manhole
- Existing sump
- Proposed manhole

Proposed services plan

Holmes

PROJECT: Waikato Regional Theatre

JOB NO: 135713.50 DATE: 18/07/2018

CSK: PD-01-02 REV: 2

APPENDIX D - ECUBED DRAWINGS

eCubed

WAIKATO REGIONAL THEATRE

SERVICES MARK-UPS

PRELIMINARY DESIGN

website
www.e3bw.co.nz

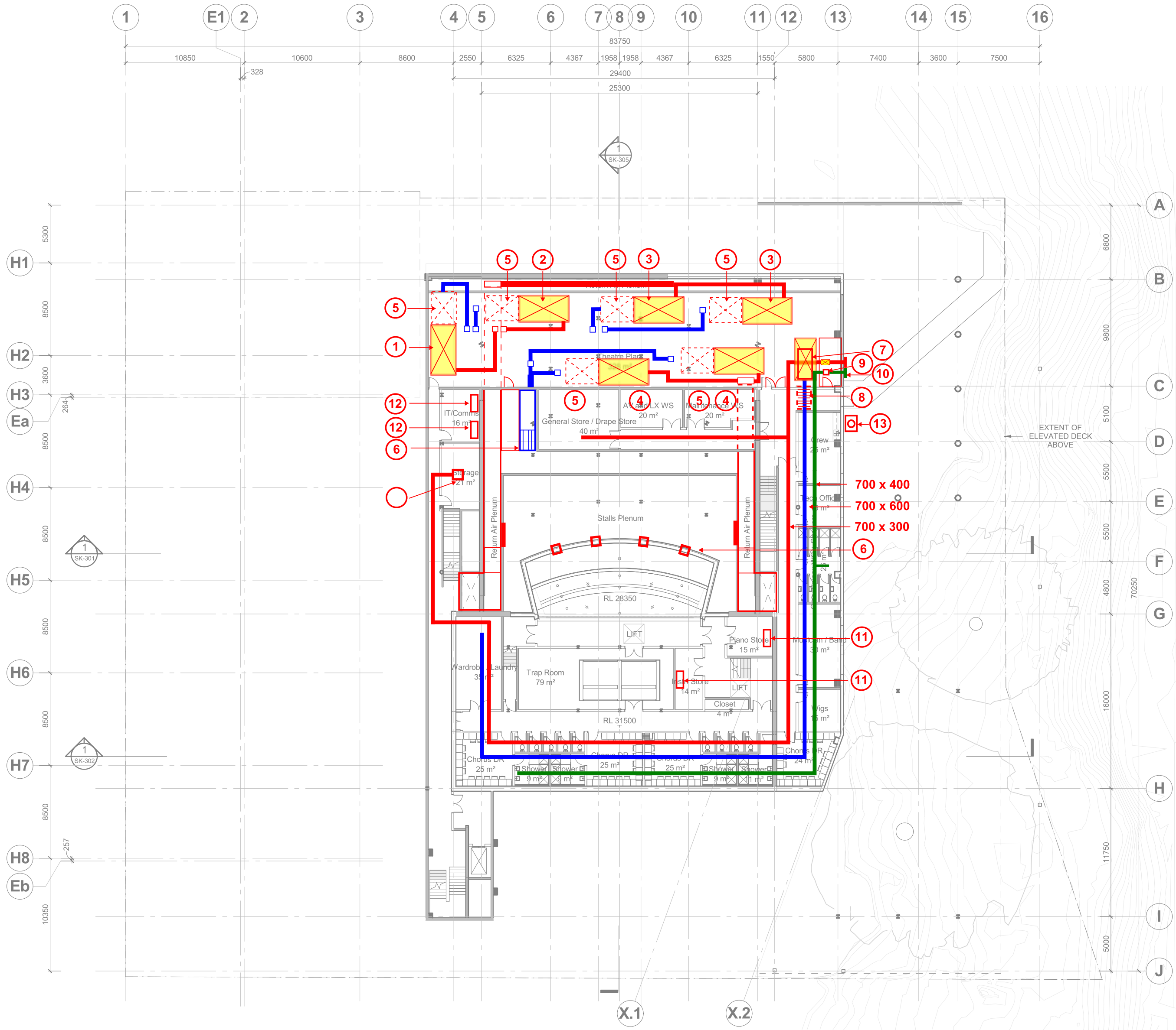
email
enquiries@e3bw.co.nz

address
26 fleet street
eden terrace
auckland 1021

postal
po box 91675
victoria street west
auckland 1142

phone
64 9 30 30 007

fax
64 9 30 30 017



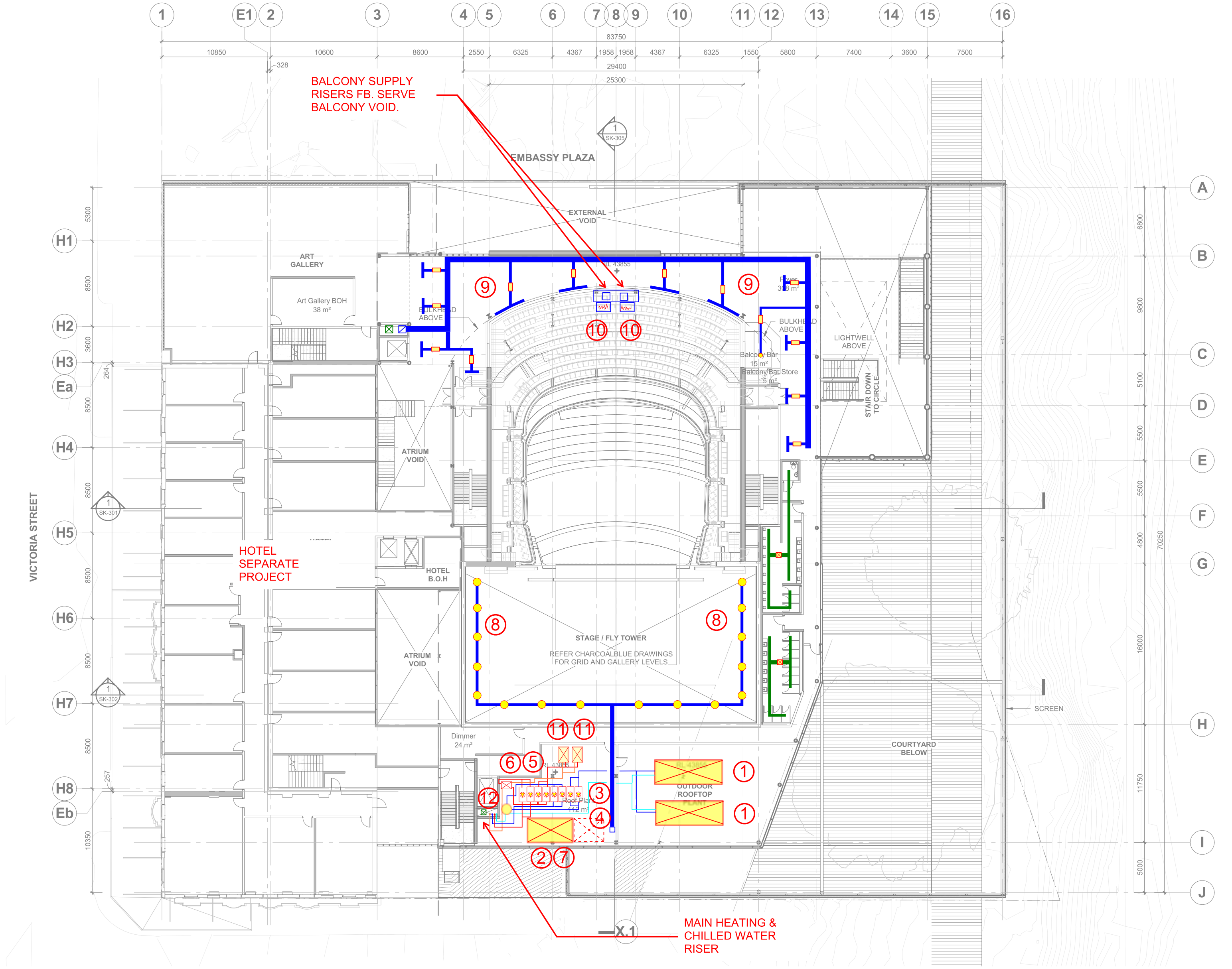
NOTES

ALL THATRE PLANT SUPPLY RETURN DUCTS 1M x 1M INTERNALLY KLINED

1. FRONT OF HOUSE VAV AHU 7.5 M^3/S @ 500Pa COOKE INDUSTRIES MODEL AP 25/N° 300
2. FRONT OF HOUOSE VAV AHU 7.5 M^3/S @ 500Pa COOKE INDUSTRIES MODEL N° AP25/300
3. CIRCLE & BALCONY VAV AHU 7.5 M^3/S @ 500 Pa COOKE INDUSTRIES MODEL N° AP 25 /300
4. STALLS & ORCHESTRA PIT VAV AHU 7.5 M3/S @ 500 Pa COOKE INDUSTRIES MODEL N° AP 25 /300
5. AHU PRIMARY SOUND ATTENUATOR. X 2.3 M. W x 1.7 M. H x 2.4 M. L (x 6)
6. SECONDARY ATTENUATORS 1.7 M. W x 2.3 M. H x 1.5 M. L (x 3)
7. BACK OF HOUSE AHA. 2.2 M^3/S @ 500 Pa COOKE INDUSTRIES AP 25 / 80
8. AHU PRIMARY ATTENUATOR 1.5 M. W x 0.6 M. H x 1.5 M. L
9. TOILET EXTRACT FAN 1.5 M^3/S @ 200 Pa. FANTECH MM 453/S
10. CENTRAL EXTRACT FAN 0.7 M^3/S @200 Pa. FANTECH MM. 354/S
11. VRF INDOOR UNIT MITSUBISHI PKFY-PISVBM-E
12. VRF INDOOR UNIT MITSUBISHI PKFY-P63VKM-E
13. VRF OUTDOOR UNIT MITSUBISHI PURY-P200Y JM-A BS

PRELIMINARY DESIGN

eCubed	PROJECT: **WAIKATO REGIONAL THEATRE**	MECHANICAL SERVICES LEVEL 2 (SUB - STAGE)	SCALE	NTS @ A1
			REV	P1
			DRG. No.	**M-100**



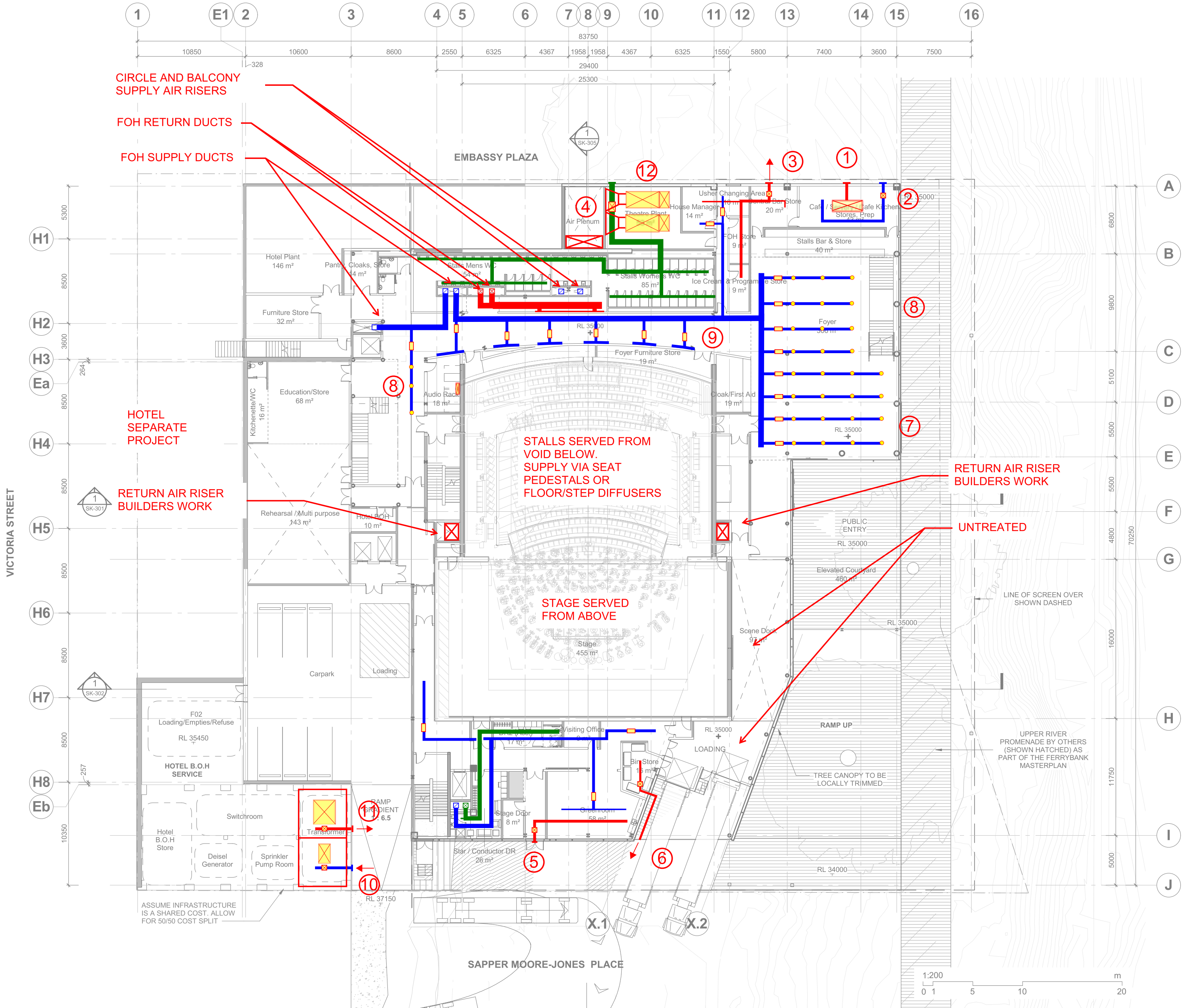
1. AIR COOLED CHILLER 700KW X 2
2. STAGE AHU 5.0 m3/s COOKE INDUSTRIES MODEL AP25 MODEL 220
3. CHILLED WATER PRIMARY PUMPS X 2N GRUNDFOS NK65 -125/1277AI-F-AE-BAQE
4. CHILLED WATER SECONDARY PUMPS X 2N GRUNDFOS NK80 -160/161 AI-F-K-E-BAQE
5. HEATING SYSTEM PRIMARY PUMPS X 2N GRUNDFOS TP40-300/2
6. HEATING SYSTEM SECONDARY PUMPS X 2N GRUNDFOS TP65-250/2
7. BOH OUTDOOR AIR AHU (STACKED) COOKE INDUSTRIES AIRPAK MODEL AP25 SIZE 80
8. DISPLACEMENT DIFFUSER KRANTZ VA-ZD 355
9. VAV BOX 0.25 m3/s
10. BALCONY SUPPLY SECONDARY ATTENUATORS X 2 3.0 m3/s 1.5X1.0X1.5 L FANTECH
11. 2 NO CONDENSING GAS BOILERS UNICAL MODULEX 600 X 2
12. CHILLED WATER SYSTEM BUFFER TANK

* ALL VAV BOXES COMPLETE WITH ELECTRIC REGHEATER & DISCHARGE ATTENUATOR & SERVING CFPP SWIRL DIFFUSER OR CSD-2S SLOT DIFFUSERS COMPLETE WITH PLENUM BOXES.

* ALL TOILET GRILLES 200X150 HOLYOAKE EC TYPE. 1 PER FIXTURE

PRELIMINARY DESIGN

eCubed	PROJECT: **WAIKATO REGIONAL THEATRE**	MECHANICAL SERVICES LEVEL 2 (BALCONY)	SCALE	NTS @ A1
			REV	P1
			DRG. No.	**M-101**



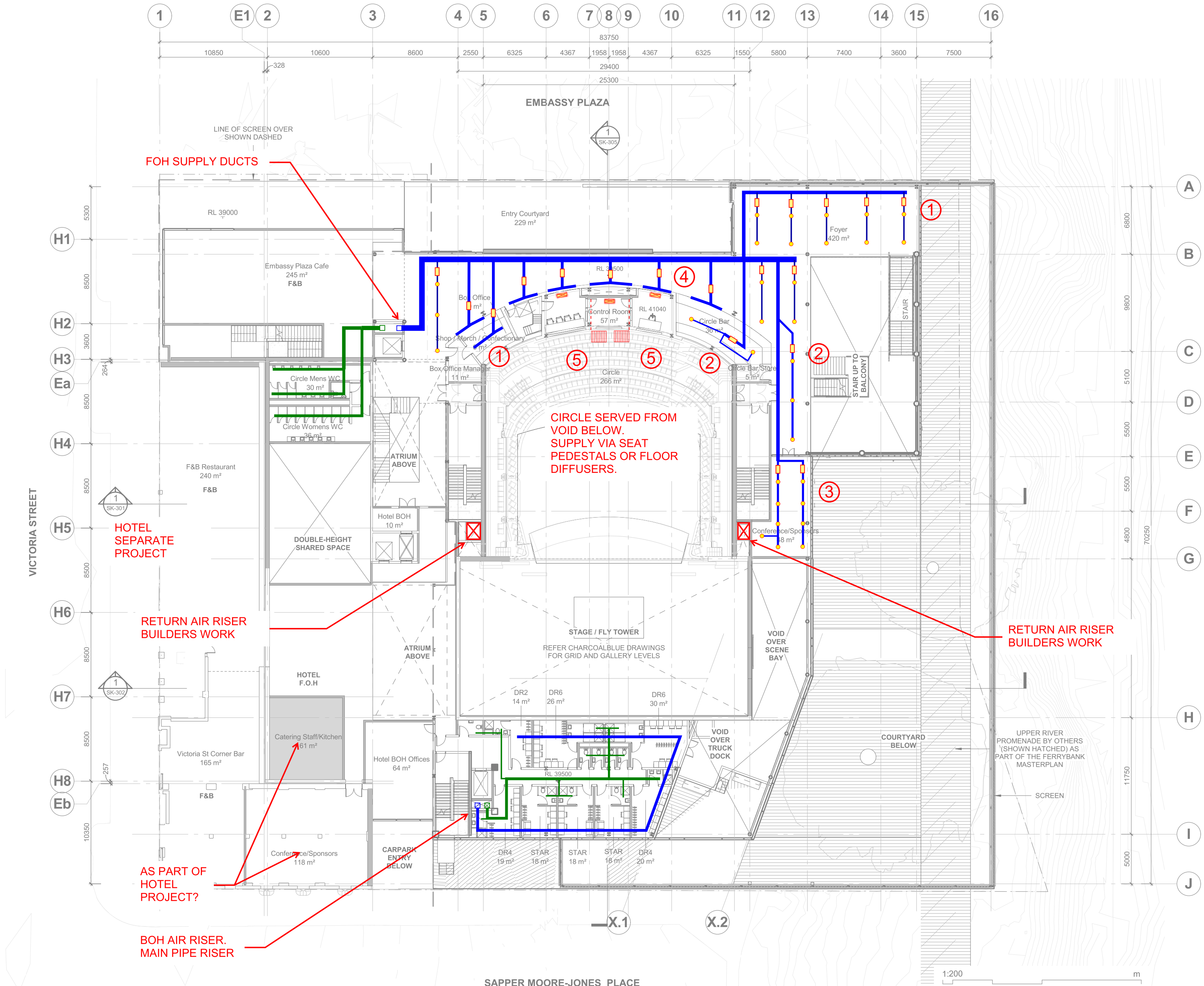
1. KITCHEN UV HOOD WITH H.L. HORIZONTAL DISCHARGE 1.5 m³/s HALTON/RAVENSCROFT
2. KITCHEN MAKE UP AIR FAN 1.0 m³/s FANTECH POWERLINE EC SERIES45
3. GENERAL EXTRACT FAN 2.0 m³/s FANTECH TD-2000/315
4. TOILET EXTRACT FAN 2.0 m3/s FANTECH POERLINE EC SERIES 56
5. GREEN ROOM EXTRACT FAN 0.7 m³/s FANTECH POWERLINE EC SERIES 50
6. WASTE MANAGEMENT FAN 0.25 m³/s FANTECH TD-2000/315
7. VAV BOX 0.6m3/s HOLYOAKE HCV 300
8. VAV BOX 0.5m3/s HOLYOAKE HCV 300
9. VAV BOX 0.2m3/s HOLYOAKE HCV 200
10. SWITCHROOM FILTER SUPPLY FAN &HTR 0.2 m³/s
11. TRANSFORMER ROOM EXTRACT FAN 0.6 m³/s FANTECH POWERLINE PC3EC45
12. AUDITORIUM SMOKE EXTRACT MAKE UP AIR FANS. FANTECH SWSI 73 25 m³/s @ 375 Pa x 2 CENTRIFUGAL FANS.

* ALL VAV BOXES COMPLETE WITH ELECTRIC REGHEATER & DISCHARGE ATTENUATOR & SERVING CFPP SWIRL DIFFUSER OR CSD-2S SLOT DIFFUSERS COMPLETE WITH PLENUM BOXES.

* ALL TOILET GRILLES 200X150 HOLYOAKE EC TYPE. 1 PER FIXTURE

PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	MECHANICAL SERVICES LEVEL 1 (STALLS)	SCALE	NTS @ A1
			REV	P1
			DRG. No.	M-102



1 VAV BOX 0.3 m3/s HOLYOAKE HCV 200

2 VAV BOX 0.4 m3/s HOLYOAKE HCV 300

3 VAV BOX 0.35 m3/s HOLYOAKE HCV 300

4 VAV BOX 0.20 m3/s HOLYOAKE HCV 200

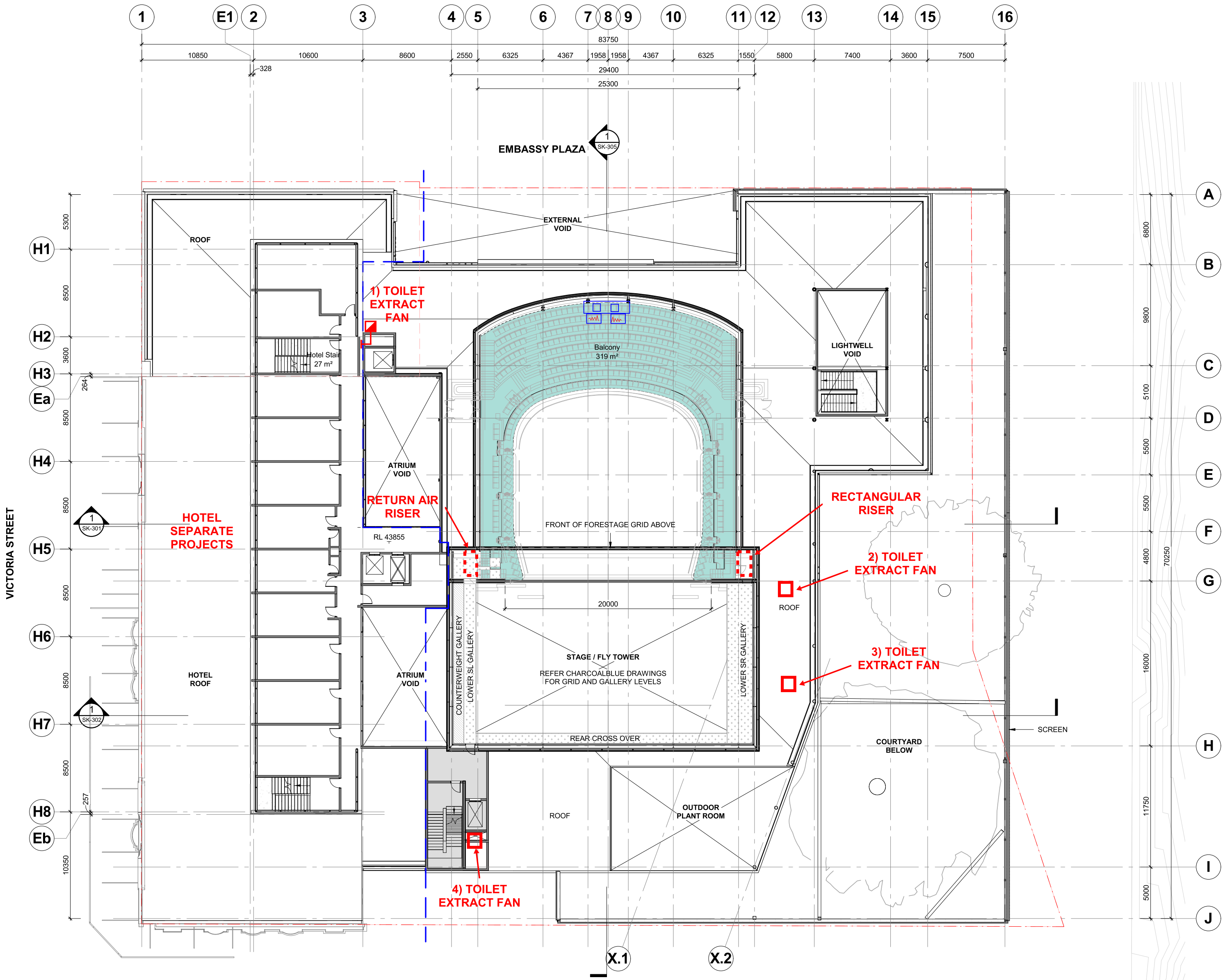
5 CIRCLE SECONDARY ATTENUATORS & SHUT OFF DAMPERS

* ALL VAV BOXES COMPLETE WITH ELECTRIC REHEATER & DISCHARGE ATTENUATOR & SERVING CFPP-2S SWIRL DIFFUSER OR CSD-2S SLOT DIFFUSERS C/W PLENUM BOXES.

* ALL TOILET GRILLES HOLYOAKE EC TYPE 200X150. 1 PER FIXTURE.

PRELIMINARY DESIGN

eCubed	PROJECT: **WAIKATO REGIONAL THEATRE**	MECHANICAL SERVICES LEVEL 1 (CIRCLE)	SCALE	NTS @ A1
			REV	P1
			DRG. No.	**M-103**



NOTES

1) TOILET EXTRACT FAN ON ACOUSTIC KCRB. 0.9 M3/S FANTECH GAMMA 454V

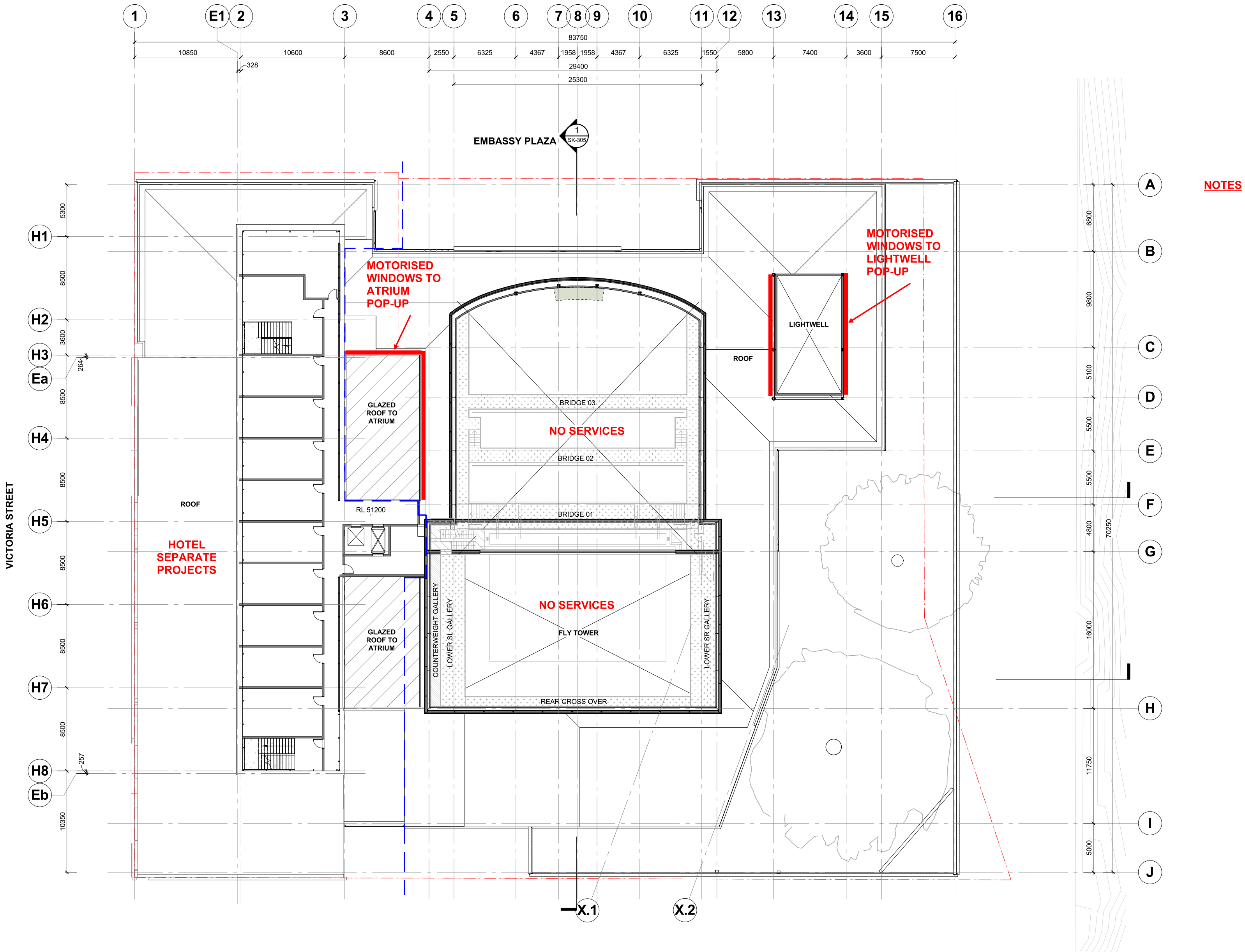
2) TOILET EXTRACT FAN ON ACOUSTIC KERB. 0.75 M3/S FANTECH GAMMA 404V

3) TOILET EXTRACT FAN ON ACOUSTIC KERB. 0.5M3/S FANTECH GAMMA 3S4V.

4)TOILET EXTRACT FAN ON ACOUSTIC KERB. FANTECH GAMMA

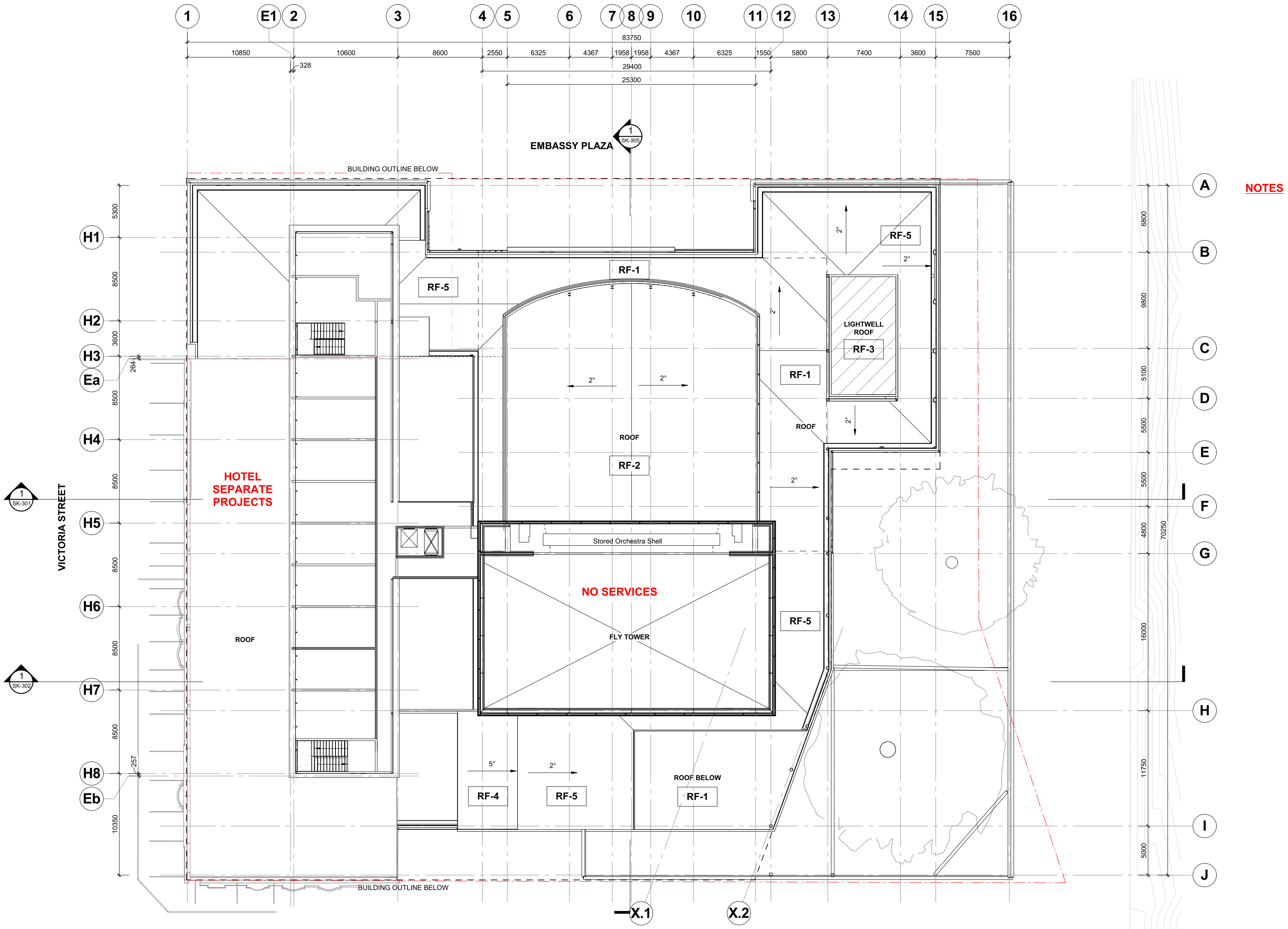
PRELIMINARY DESIGN

eCubed	PROJECT: **WAIKATO REGIONAL THEATRE**	MECHANICAL SERVICES LEVEL 3 (TERRACE) MECHANICAL LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	**M-104**



PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	MECHANICAL SERVICES LEVEL 4 (BRIDGE) MECHANICAL LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	M-105



PRELIMINARY DESIGN

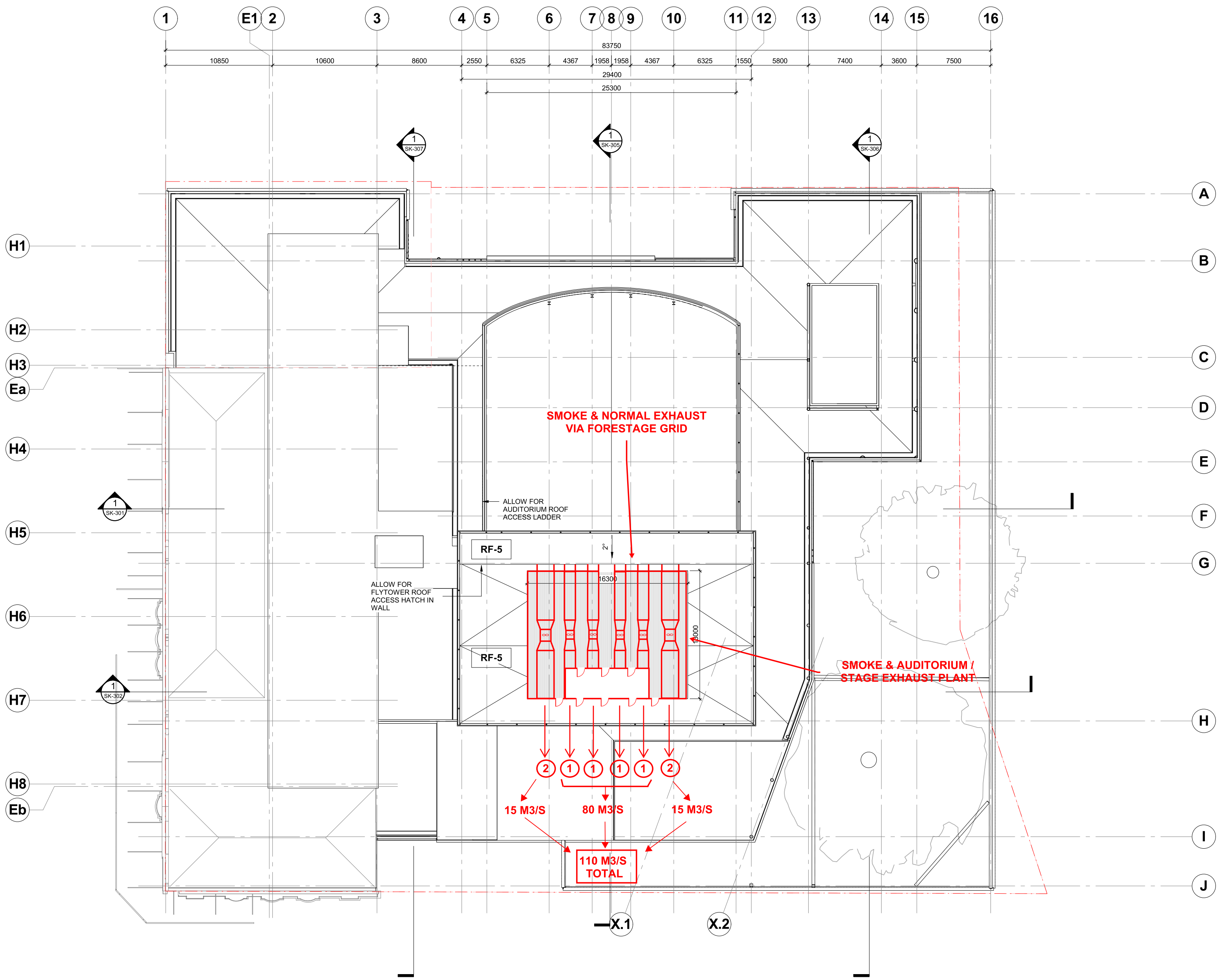
eCubed

PROJECT:

WAIKATO REGIONAL THEATRE

MECHANICAL SERVICES
LEVEL 5 (AUDITORIUM ROOF)
MECHANICAL LAYOUT

SCALE	NTS @ A1
REV	A
DRG. No.	**M-106**

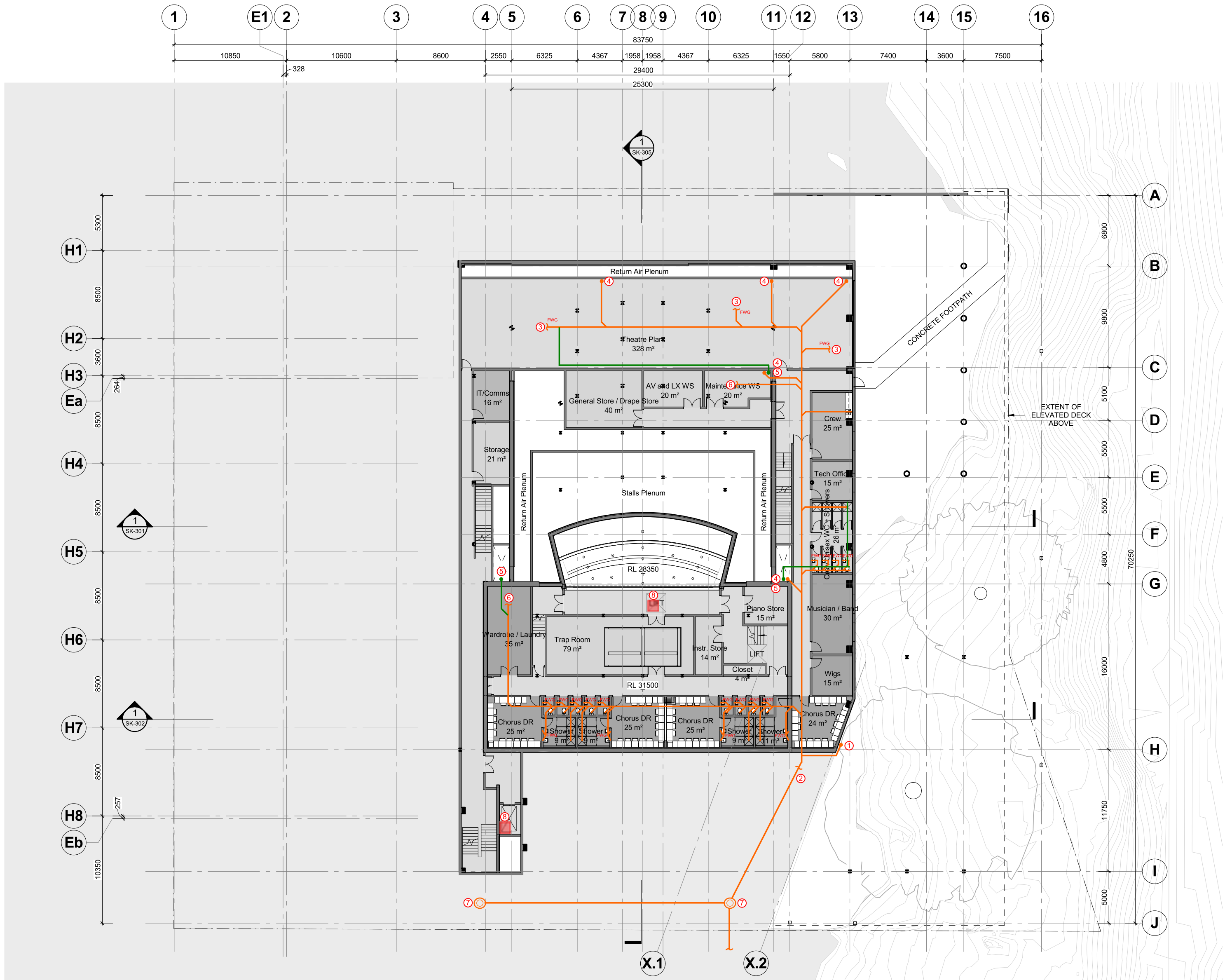


NOTES

1. 4 N° 20M3 FANTECH 1258Ø ASP FANS WITH 2N° 2.3 x 2.2 x 2.4L RECTANJGULAR ATTENUATORS & MOTORIZED DAMPERS ON DISCHARGE
2. 2 N° 15M3/S FANTECH. 1258Ø APS FANS WITH 2N 2.3 x 2.2 x 2.4L ATTENUATORS & MOTORIZED DAMPERS ON DISCHARGE

PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	MECHANICAL SERVICES LEVEL 8 (FLY TOWER ROOF) MECHANICAL LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	M-107



LEGEND

SANITARY DRAIN

VENT PIPE

DRAWING NOTES

1. ORG CHARGED VIA HT ABOVE
2. 225Ø SS CONNECTION TO CIVIL FOR CONTINUATION REFER TO CIVIL
3. MECHANICAL PLANT PROVISION (FWG C/W 2X TD AND TRAP PRIMER
4. SANITARY STACK FA
5. RELIEF VENT TA
6. 100Ø SS CAPPED TO SERVE FITOUT
7. SS MH REFER TO CIVIL
8. LIFT PIT SUMP 400X400X400 C/W MOISTURE SENSOR TO LIFT CART

GENERAL NOTES

1. ALL WHB'S TO BE COMPLETE WITH FLOOR WASTE GULLY
2. SEALED CLEAN OUTS TO BE INSTALLED WITHIN ALL BATHOOM AREAS FOR MAINTENANCE ACCESS
3. ALL WC'S AND UR'S TO HAVE FLUSH VALVES INSTALLED
4. ALL KITCHENS, FOOD AREAS, PLANT ROOMS ETC TO BE COMPLETE WITH GERBERIT HDPE 100°c RATED
5. MAIN KITCHEN AND WASH UP TO BE INCLUDED IN HOTEL DESIGN. (GREASE TRAP)
6. ANY FOOD PREP / WASH UP AREAS IN THE THEATRE TO INCLUDE UB GREASE TRAP AS PART OF THE FITOUT ACCORDINGLY

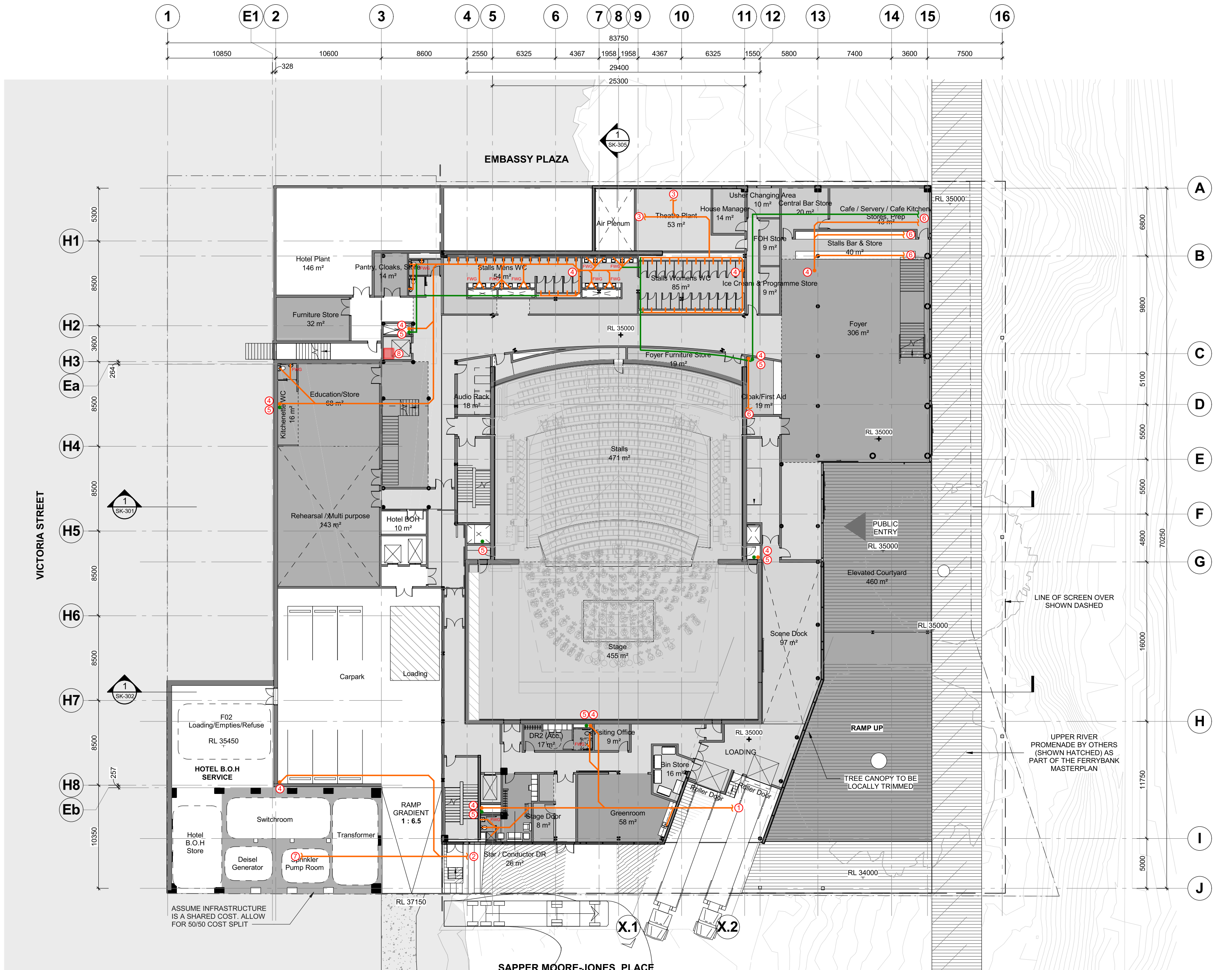
PRELIMINARY DESIGN

eCubed

PROJECT:
WAIKATO REGIONAL THEATRE

HYDRAULIC SERVICES LEVEL -2 (SUB-STAGE) SANITARY PLUMBING LAYOUT

SCALE	NTS @ A1
REV	A
DRG. No.	HY-SK-100



LEGEND

SANITARY DRAIN

VENT PIPE

DRAWING NOTES

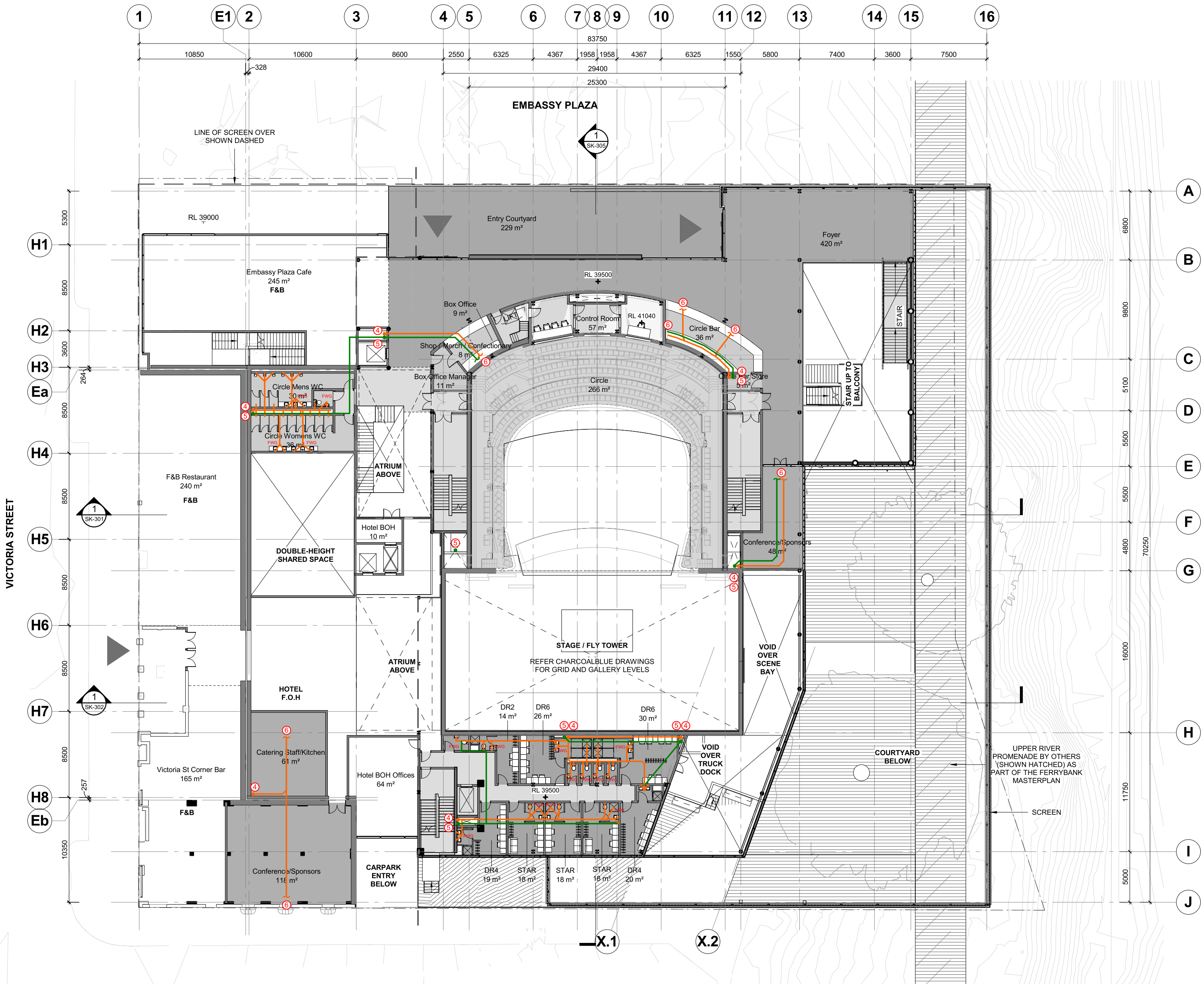
1. CONNECTION TO SANITARY DRAINAGE BELOW
2. 150Ø SS CONNECTION TO CIVIL FOR CONTINUATION REFER TO CIVIL
3. MECHANICAL PLANT PROVISION (FWG C/W 2X TD AND TRAP PRIMER
4. SANITARY STACK FA OR T.B
5. RELIEF VENT TA OR F.B
6. 100Ø SS CAPPED TO SERVE FITOUT
7. 100Ø SS GT IN SPRINKLER VALVE ROOM
8. LIFT PIT SUMP 400X400X400 C/W MOISTURE SENSOR TO LIFT CART

GENERAL NOTES

1. ALL WHB'S TO BE COMPLETE WITH FLOOR WASTE GULLY
2. SEALED CLEAN OUTS TO BE INSTALLED WITHIN ALL BATHOOM AREAS FOR MAINTENANCE ACCESS
3. ALL WC'S AND UR'S TO HAVE FLUSH VALVES INSTALLED
4. ALL KITCHENS, FOOD AREAS, PLANT ROOMS ETC TO BE COMPLETE WITH GERBERIT HDPE 100°c RATED
5. MAIN KITCHEN AND WASH UP TO BE INCLUDED IN HOTEL DESIGN. (GREASE TRAP)
6. ANY FOOD PREP / WASH UP AREAS IN THE THEATRE TO INCLUDE UB GREASE TRAP AS PART OF THE FITOUT ACCORDINGLY

PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	HYDRAULIC SERVICES LEVEL -1 (STALLS) SANITARY PLUMBING LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	HY-SK-101



LEGEND

SANITARY DRAIN

VENT PIPE

DRAWING NOTES

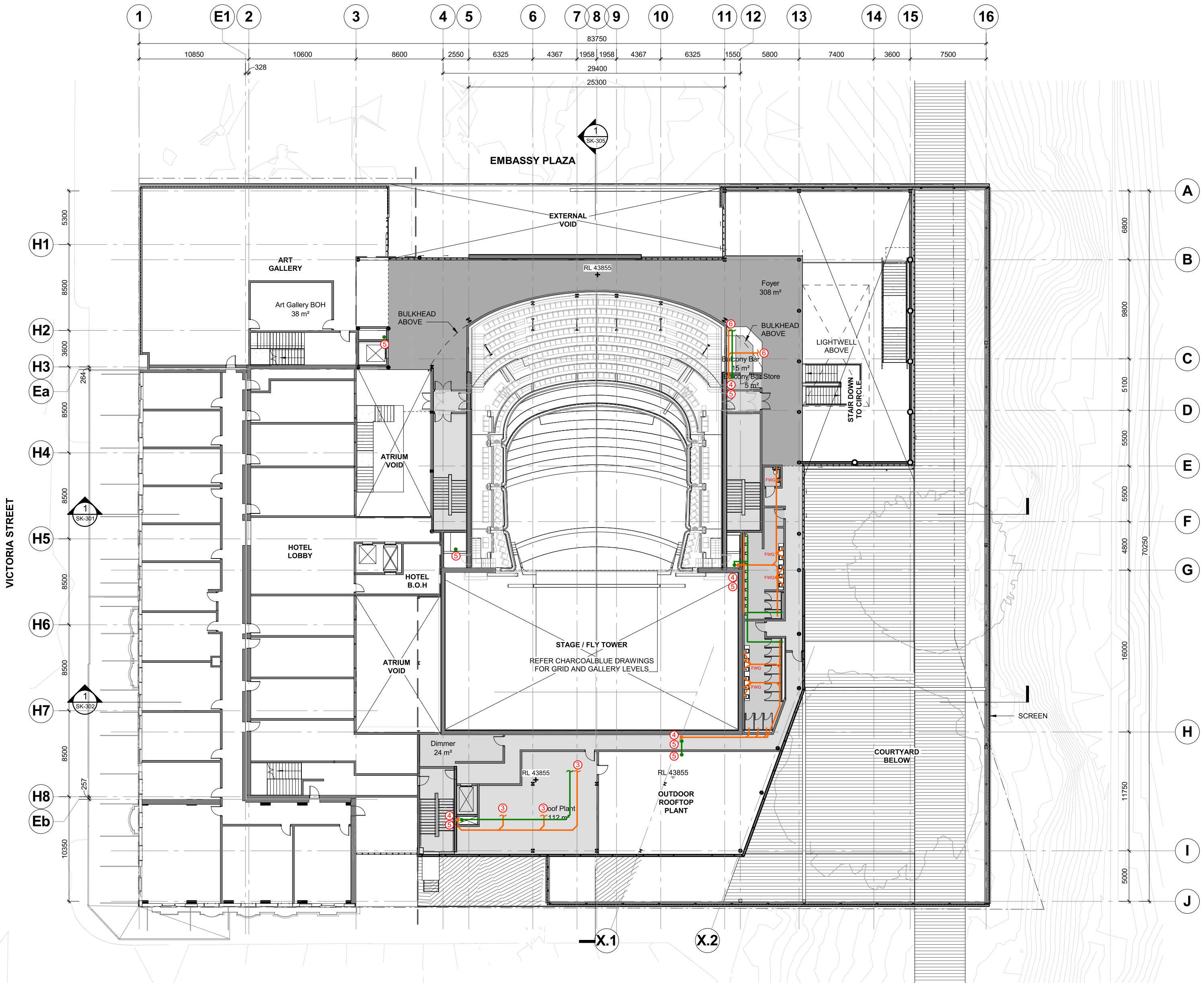
1. SPARE
2. SPARE
3. MECHANICAL PLANT PROVISION (FWG C/W 2X TD AND TRAP PRIMER
4. SANITARY STACK FA OR T.B
5. RELIEF VENT TA OR F.B
6. 100Ø SS CAPPED TO SERVE FITOUT

GENERAL NOTES

1. ALL WHB'S TO BE COMPLETE WITH FLOOR WASTE GULLY
2. SEALED CLEAN OUTS TO BE INSTALLED WITHIN ALL BATHOOM AREAS FOR MAINTENANCE ACCESS
3. ALL WC'S AND UR'S TO HAVE FLUSH VALVES INSTALLED
4. ALL KITCHENS, FOOD AREAS, PLANT ROOMS ETC TO BE COMPLETE WITH GERBERIT HDPE 100°c RATED
5. MAIN KITCHEN AND WASH UP TO BE INCLUDED IN HOTEL DESIGN. (GREASE TRAP)
6. ANY FOOD PREP / WASH UP AREAS IN THE THEATRE TO INCLUDE UB GREASE TRAP AS PART OF THE FITOUT ACCORDINGLY

PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	HYDRAULIC SERVICES LEVEL 1 (CIRCLE) SANITARY PLUMBING LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	HY-SK-102



LEGEND

SANITARY DRAIN

VENT PIPE

DRAWING NOTES

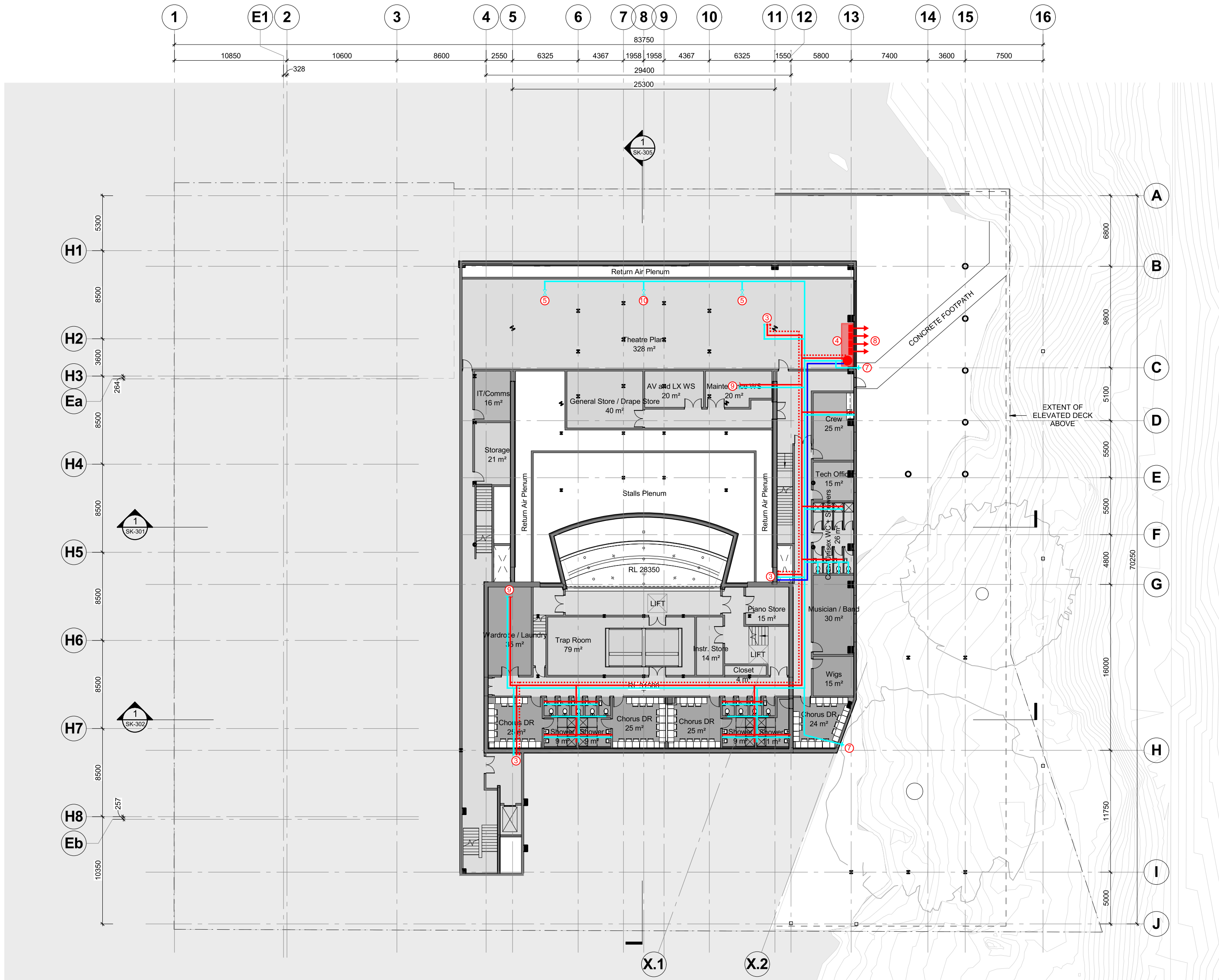
1. SPARE
2. SPARE
3. MECHANICAL PLANT PROVISION (FWG C/W 2X TD AND TRAP PRIMER
4. SANITARY STACK FA OR T.B
5. RELIEF VENT TA OR F.B
6. 100Ø SS CAPPED TO SERVE FITOUT

GENERAL NOTES

1. ALL WHB'S TO BE COMPLETE WITH FLOOR WASTE GULLY
2. SEALED CLEAN OUTS TO BE INSTALLED WITHIN ALL BATHOOM AREAS FOR MAINTENANCE ACCESS
3. ALL WC'S AND UR'S TO HAVE FLUSH VALVES INSTALLED
4. ALL KITCHENS, FOOD AREAS, PLANT ROOMS ETC TO BE COMPLETE WITH GERBERIT HDPE 100°c RATED
5. MAIN KITCHEN AND WASH UP TO BE INCLUDED IN HOTEL DESIGN. (GREASE TRAP)
6. ANY FOOD PREP / WASH UP AREAS IN THE THEATRE TO INCLUDE UB GREASE TRAP AS PART OF THE FITOUT ACCORDINGLY

PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	HYDRAULIC SERVICES LEVEL 2 (BALCONY) SANITARY PLUMBING LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	HY-SK-103



LEGEND

DOMESTIC COLD WATER (DCW) - COPPER	cyan line
HOT WATER FLOW (DHWF) - COPPER	red line
HOT WATER RETURN (DHWR) - COPPER	red dotted line
COLD WATER SUPPLY (CWS) - MDPE	blue line

DRAWING NOTES

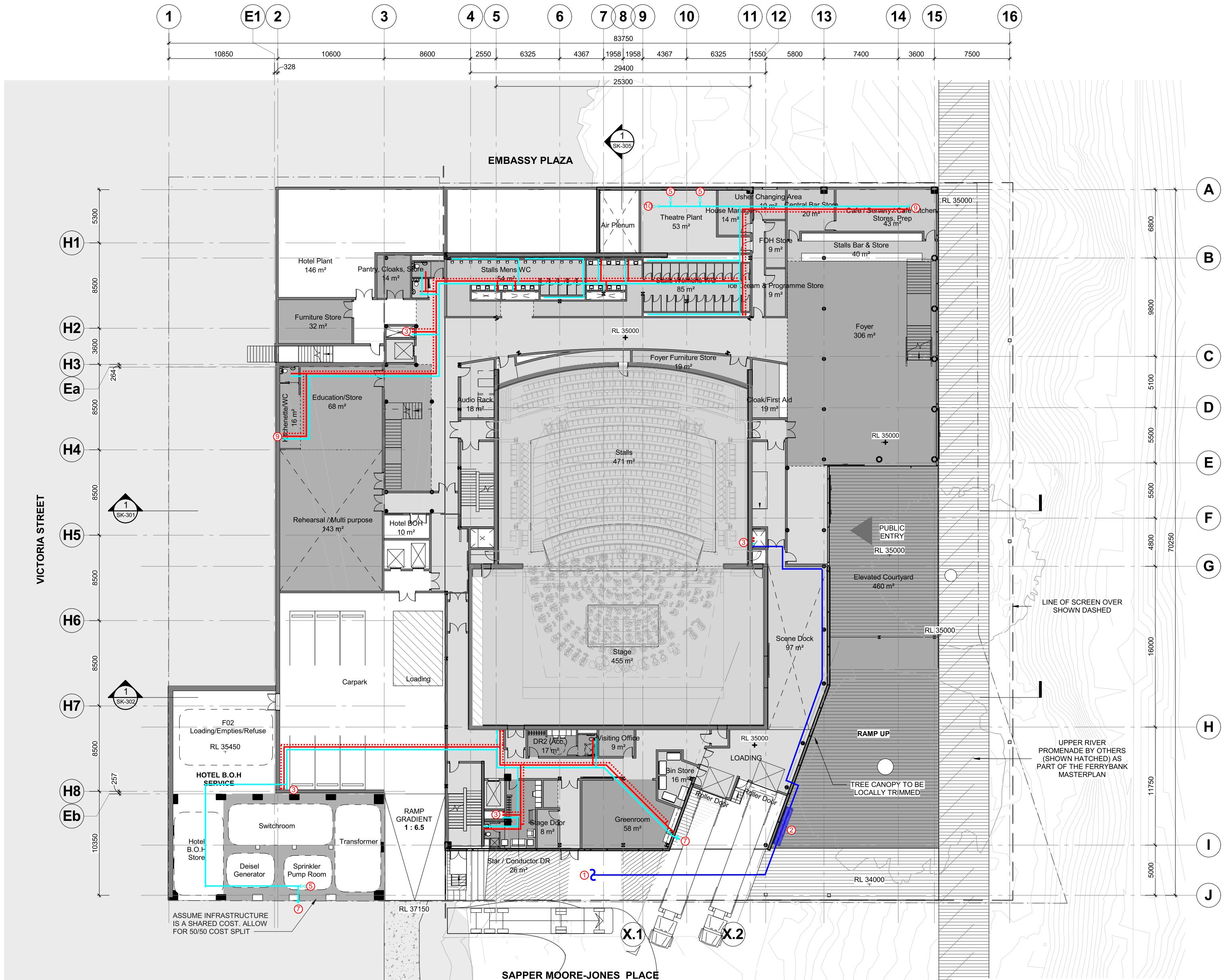
1. SPARE
2. SPARE
3. DCW, DHWF AND DHWR T.A
4. RINNAI DEMAND DUO GAS HOT WATER RIG C/W STORAGE BACK-UP
5. TRAP PRIMER (ELECTRONIC)
6. SPARE
7. HOSE TAP C/W VACUUM BREAKER
8. GAS HOT WATER FLUES TO TERMINATE THOUGH PLANT ROOM WALL
9. CAPPED PROVISION FOR FIT-OUT
10. MAKE UP WATER FOR MECHANICAL SERVICES C/W RPZ

GENERAL NOTES

1. ALL FIXTURES TO BE COMPLETE IV'S
2. ALL BRANCH CONNECTIONS TO FIXTURE GROUPS TO BE COMPLETE WITH ACCESS PANEL, TMV AND IV'S
3. ALL WC'S AND UR'S TO HAVE FLUSH VALVES INSTALLED
4. ALL DHWR BRANCHES TO BE COMPLETE WITH TEMP CONTROLLED REGULATING VALVE
5. INFRASTRUCTURE FLOW TEST TBC
6. M-BUS CHECK METERS FOR ALL MAJOR WATER USES TO BE CONNECTED TO THE BUILDING BMS
7. HOT WATER RETURN PUMPS AND HOT WATER PLANT TO BE CONNECTED TO BMS SYSTEM
8. THERE HAS BEEN NO ALLOWANCE FOR HOTEL PLANT / CONNECTIONS

PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	HYDRAULIC SERVICES LEVEL -2 (SUB-STAGE) WATER SUPPLY LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	HY-SK-200



LEGEND

- DOMESTIC COLD WATER (DCW) - COPPER
- HOT WATER FLOW (DHWF) - COPPER
- HOT WATER RETURN (DHWR) - COPPER
- COLD WATER SUPPLY (CWS) - MDPE

DRAWING NOTES

1. Ø100 INCOMING MAINS COLD WATER C/W TOBY BOX AND IV REFER TO CIVIL DRAWINGS FOR CONTINUATION
2. DUAL TESTABLE DOUBLE CHECK VALVE AND CHECK METER
3. DCW, DHWF AND DHWR T.A
4. SPARE
5. TRAP PRIMER (ELECTRONIC)
6. SPARE
7. HOSE TAP C/W VACUUM BREAKER
8. GAS HOT WATER FLUES TO TERMINATE THOUGH PLANT ROOM WALL
9. CAPPED PROVISION FOR FIT-OUT
10. MAKE UP WATER FOR MECHANICAL SERVICES C/W RPZ

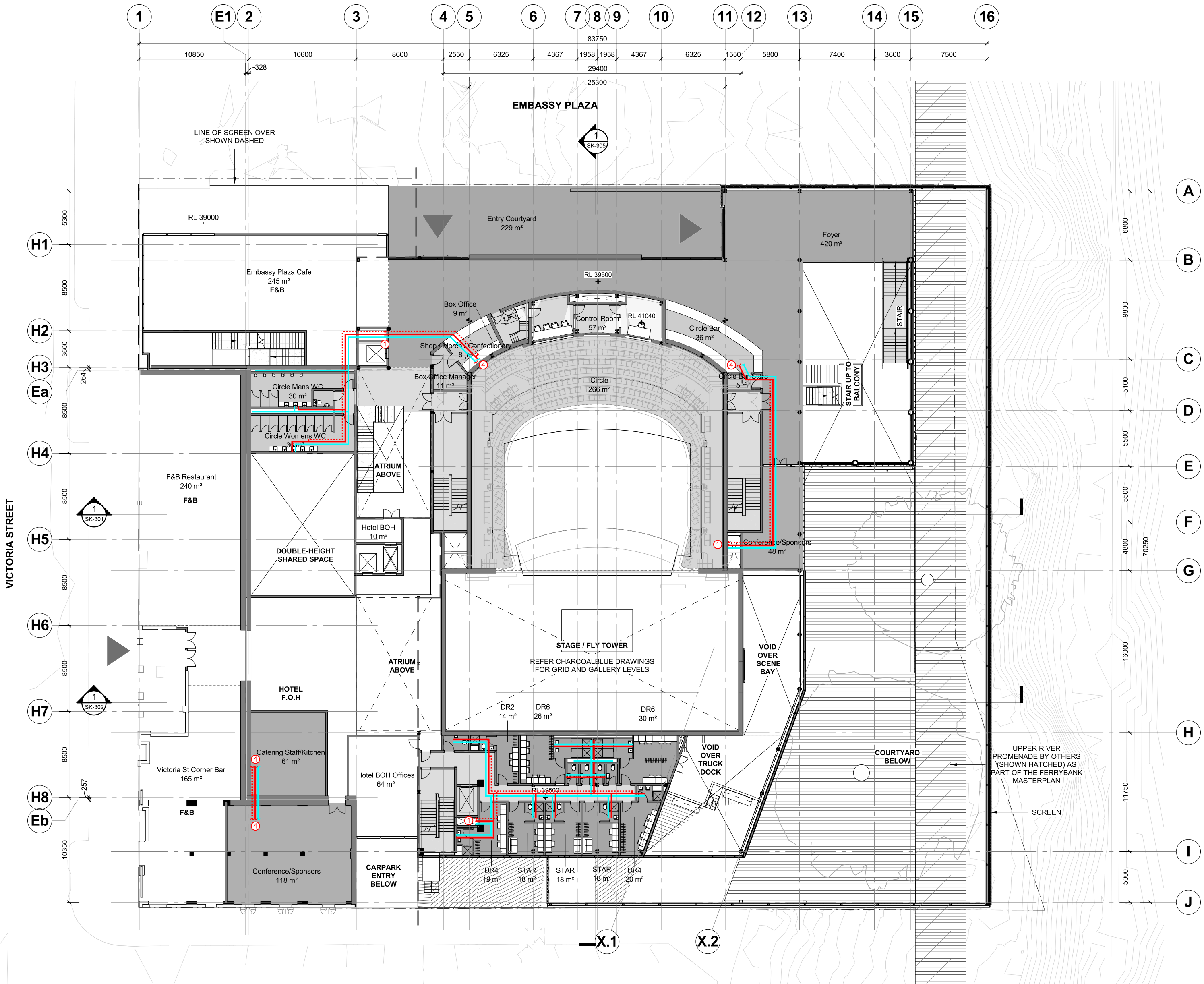
GENERAL NOTES

1. ALL FIXTURES TO BE COMPLETE IV'S
2. ALL BRANCH CONNECTIONS TO FIXTURE GROUPS TO BE COMPLETE WITH ACCESS PANEL, TMV AND IV'S
3. ALL WC'S AND UR'S TO HAVE FLUSH VALVES INSTALLED
4. ALL DHWR BRANCHES TO BE COMPLETE WITH TEMP CONTROLLED REGULATING VALVE
5. INFRASTRUCTURE FLOW TEST TBC
6. M-BUS CHECK METERS FOR ALL MAJOR WATER USES TO BE CONNECTED TO THE BUILDING BMS
7. HOT WATER RETURN PUMPS AND HOT WATER PLANT TO BE CONNECTED TO BMS SYSTEM
8. THERE HAS BEEN NO ALLOWANCE FOR HOTEL PLANT / CONNECTIONS

PRELIMINARY DESIGN

eCubed

PROJECT: WAIKATO REGIONAL THEATRE	HYDRAULIC SERVICES LEVEL -1 (STALLS) WATER SUPPLY LAYOUT	SCALE	NTS @ A1
		REV	A
		DRG. No.	HY-SK-201



LEGEND

DOMESTIC COLD WATER (DCW) - COPPER

HOT WATER FLOW (DHWF) - COPPER

HOT WATER RETURN (DHWR) - COPPER

DRAWING NOTES

1. DCW, DHWF AND DHWR T.A
2. TRAP PRIMER (ELECTRONIC)
3. HOSE TAP C/W VACUUM BREAKER
4. CAPPED PROVISION FOR FIT-OUT
5. MAKE UP WATER FOR MECHANICAL SERVICES C/W RPZ

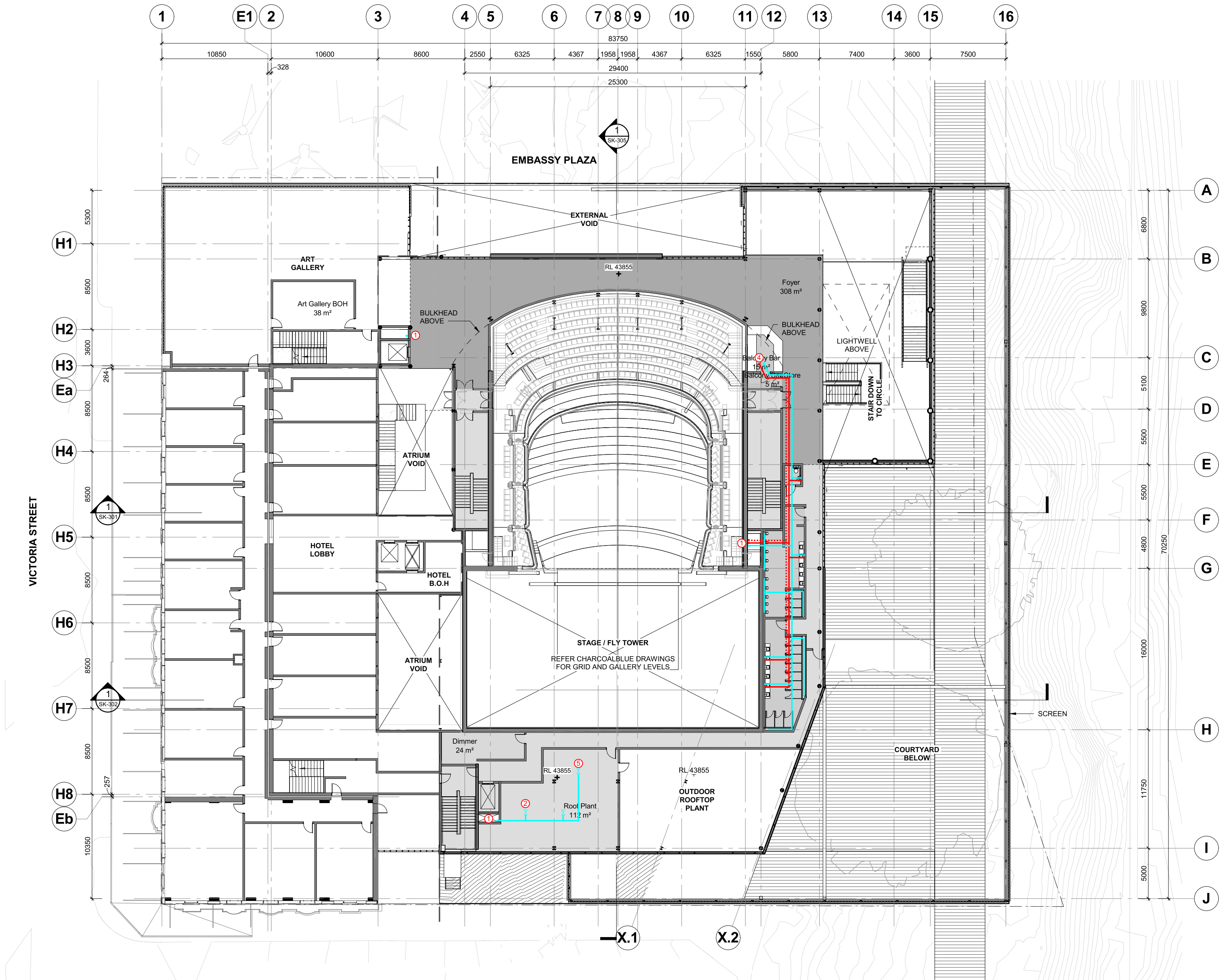
GENERAL NOTES

1. ALL FIXTURES TO BE COMPLETE IV'S
2. ALL BRANCH CONNECTIONS TO FIXTURE GROUPS TO BE COMPLETE WITH ACCESS PANEL, TMV AND IV'S
3. ALL WC'S AND UR'S TO HAVE FLUSH VALVES INSTALLED
4. ALL DHWR BRANCHES TO BE COMPLETE WITH TEMP CONTROLLED REGULATING VALVE
5. INFRASTRUCTURE FLOW TEST TBC
6. M-BUS CHECK METERS FOR ALL MAJOR WATER USES TO BE CONNECTED TO THE BUILDING BMS
7. HOT WATER RETURN PUMPS AND HOT WATER PLANT TO BE CONNECTED TO BMS SYSTEM
8. THERE HAS BEEN NO ALLOWANCE FOR HOTEL PLANT / CONNECTIONS

PRELIMINARY DESIGN

eCubed

PROJECT: WAIKATO REGIONAL THEATRE	HYDRAULIC SERVICES LEVEL 1 (CIRCLE) WATER SUPPLY LAYOUT	SCALE	NTS @ A1
		REV	A
		DRG. No.	HY-SK-202



LEGEND

DOMESTIC COLD WATER (DCW) - COPPER

HOT WATER FLOW (DHWF) - COPPER

HOT WATER RETURN (DHWR) - COPPER

DRAWING NOTES

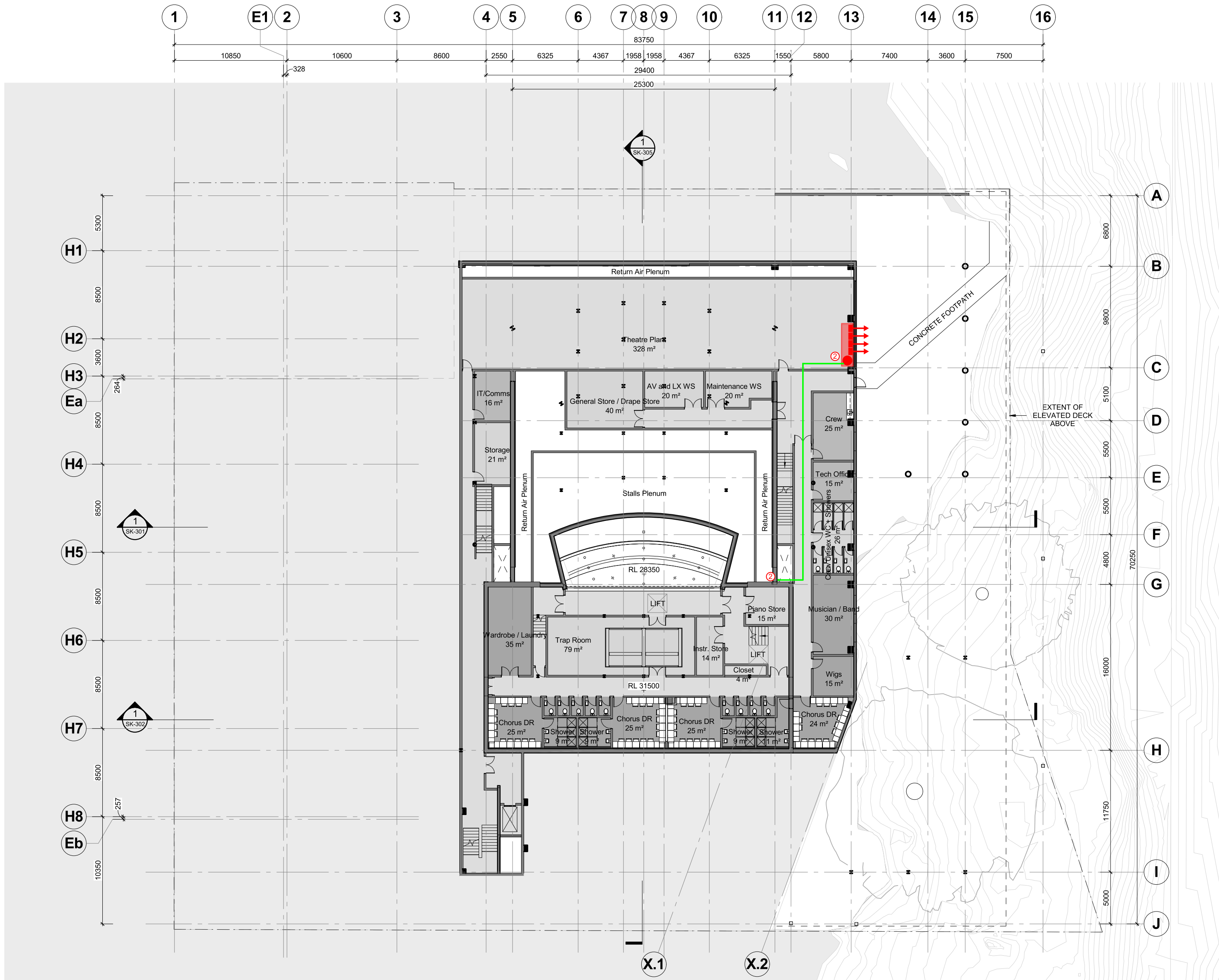
1. DCW T.A (HOSE TAPS TO ROOF)
2. TRAP PRIMER (ELECTRONIC)
3. HOSE TAP C/W VACUUM BREAKER
4. CAPPED PROVISION FOR FIT-OUT
5. MAKE UP WATER FOR MECHANICAL SERVICES C/W RPZ

GENERAL NOTES

1. ALL FIXTURES TO BE COMPLETE IV'S
2. ALL BRANCH CONNECTIONS TO FIXTURE GROUPS TO BE COMPLETE WITH ACCESS PANEL, TMV AND IV'S
3. ALL WC'S AND UR'S TO HAVE FLUSH VALVES INSTALLED
4. ALL DHWR BRANCHES TO BE COMPLETE WITH TEMP CONTROLLED REGULATING VALVE
5. INFRASTRUCTURE FLOW TEST TBC
6. M-BUS CHECK METERS FOR ALL MAJOR WATER USES TO BE CONNECTED TO THE BUILDING BMS
7. HOT WATER RETURN PUMPS AND HOT WATER PLANT TO BE CONNECTED TO BMS SYSTEM
8. THERE HAS BEEN NO ALLOWANCE FOR HOTEL PLANT / CONNECTIONS

PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	HYDRAULIC SERVICES LEVEL 2 (BALCONY) WATER SUPPLY LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	HY-SK-203



LEGEND

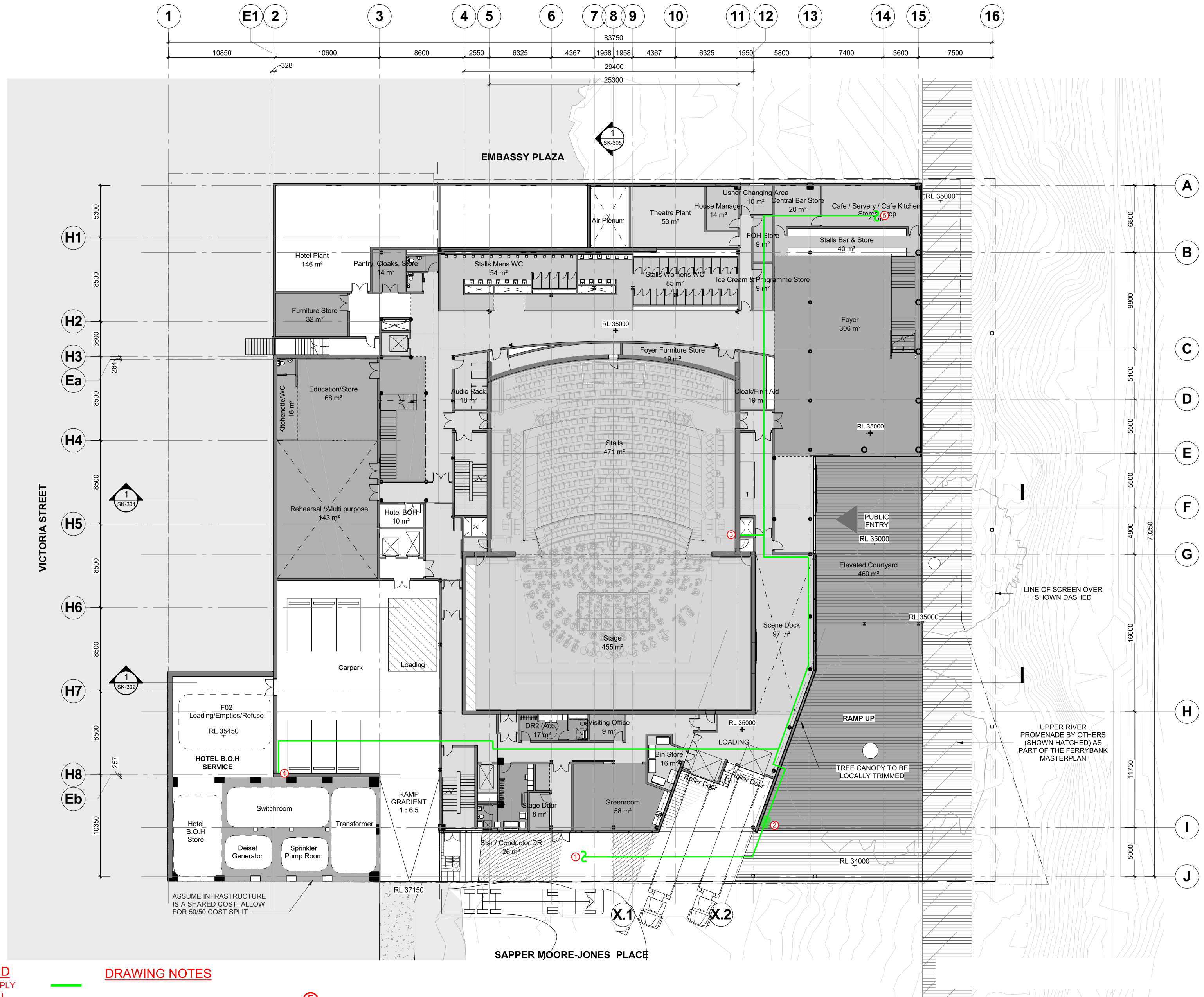
GAS SUPPLY (COPPER)

DRAWING NOTES

1. GAS CONNECTION TO RINNAI HOT WATER HEATING RIG C/W M-BUS CHECK METER TO BMS
2. RISER F.A

PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	HYDRAULIC SERVICES LEVEL -2 (SUB-STAGE) GAS SUPPLY LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	HY-SK-300



LEGEND

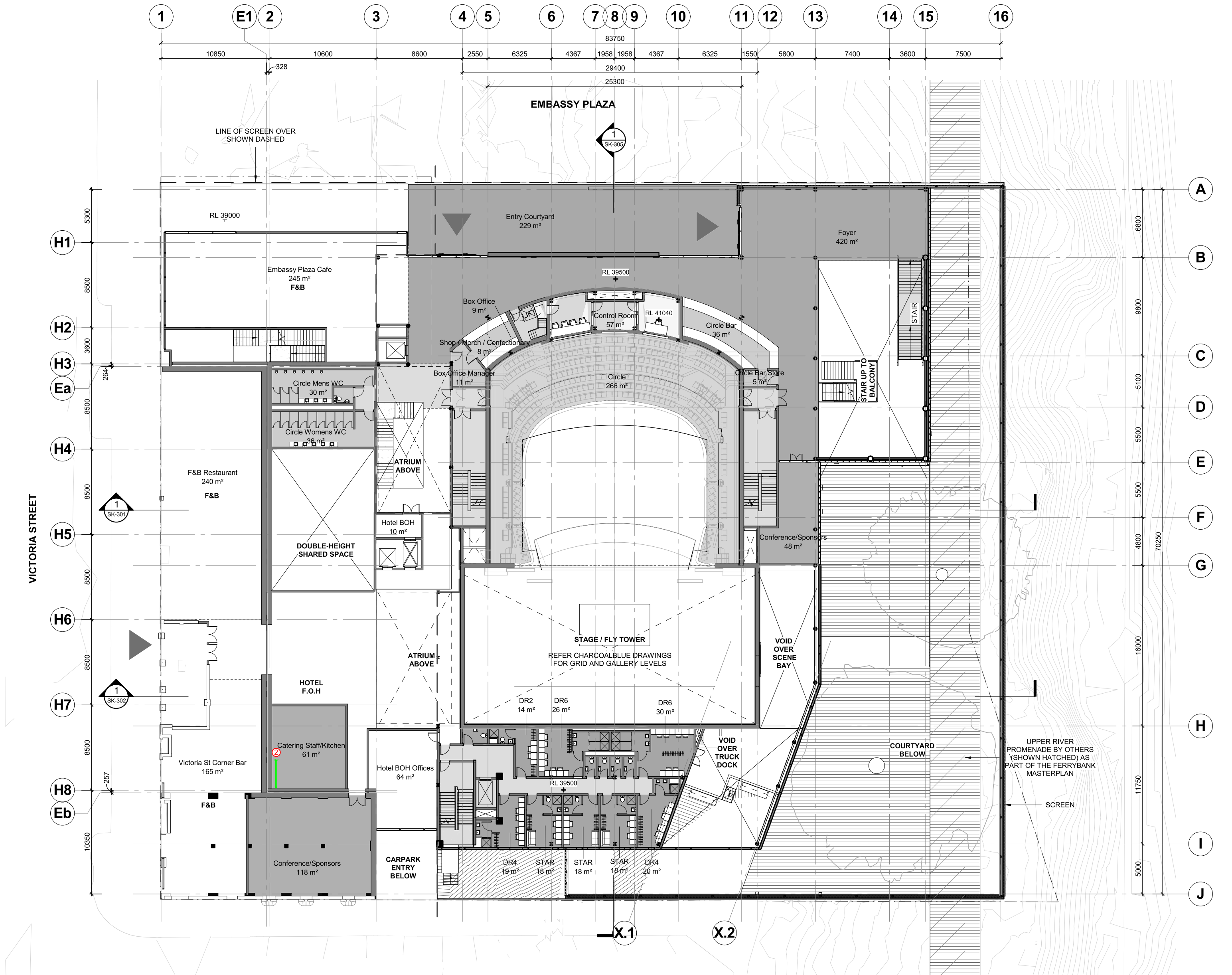
GAS SUPPLY (COPPER)

DRAWING NOTES

1. INCOMING MAINS GAS SUPPLY CONNECTION TO UTILITY PROVIDER
2. UTILITY PROVIDER GMS GAS METER C/W SEISMIC VALVE, REGULATOR, IV AND SOLENOID LINKED TO FIRE ALARM
3. RISER T.B
4. RISER T.A
5. PROVISION FOR KITCHEN FIT-OUT C/W IV, M-BUS CHECK METER TO BMS AND EMERGENCY SHUT OFF SOLENOID VALVE LIKED TO PUSH BUTTON

PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	HYDRAULIC SERVICES LEVEL -1 (STALLS) GAS SUPPLY LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	HY-SK-301



LEGEND

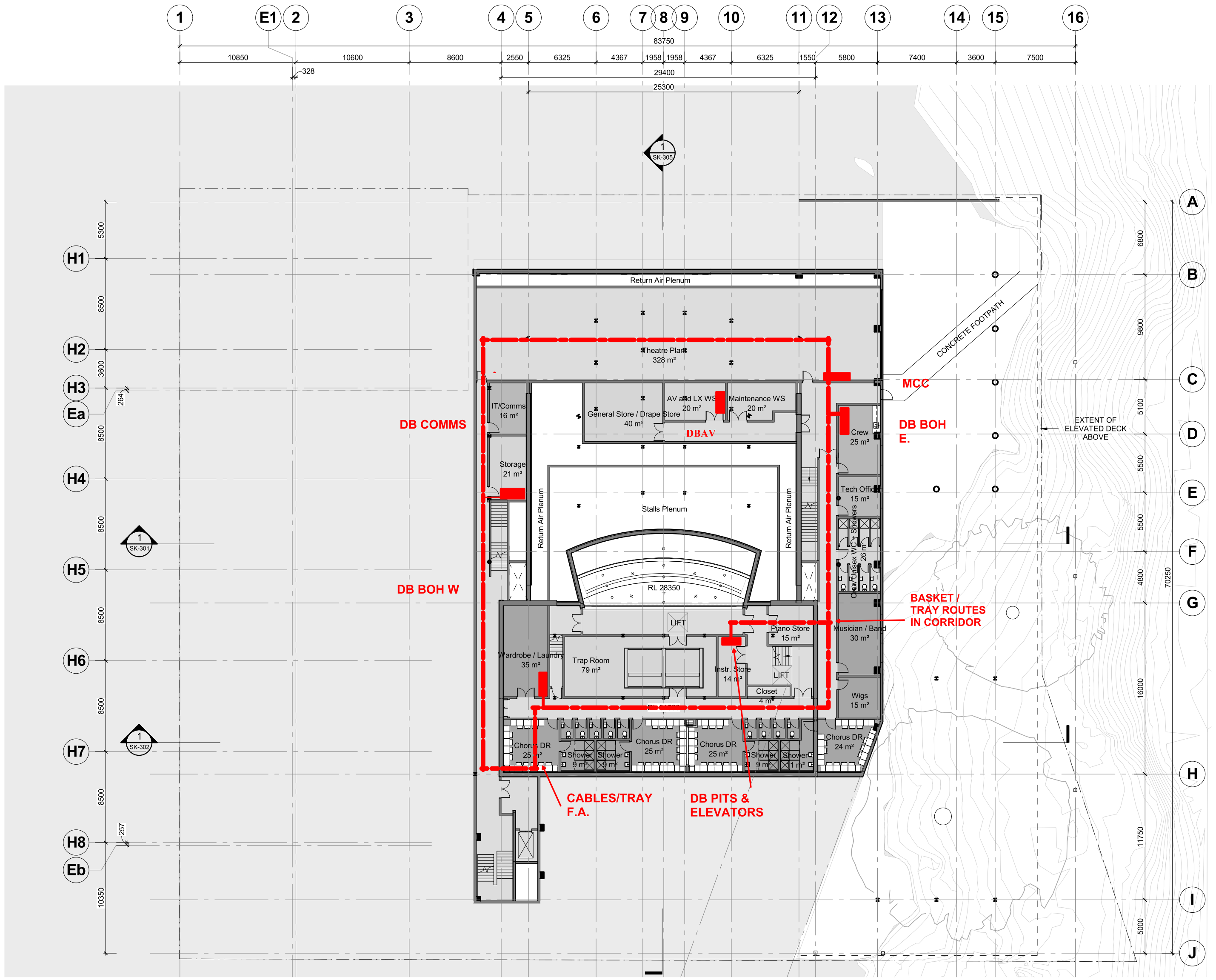
GAS SUPPLY (COPPER)

DRAWING NOTES

1. RISER F.B
2. PROVISION FOR KITCHEN FIT-OUT C/W IV, M-BUS CHECK METER TO BMS AND EMERGENCY SHUT OFF SOLENOID VALVE LIKED TO PUSH BUTTON

PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	HYDRAULIC SERVICES LEVEL 1 (CIRCLE) GAS SUPPLY LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	HY-SK-302



LIGHTING NOTES

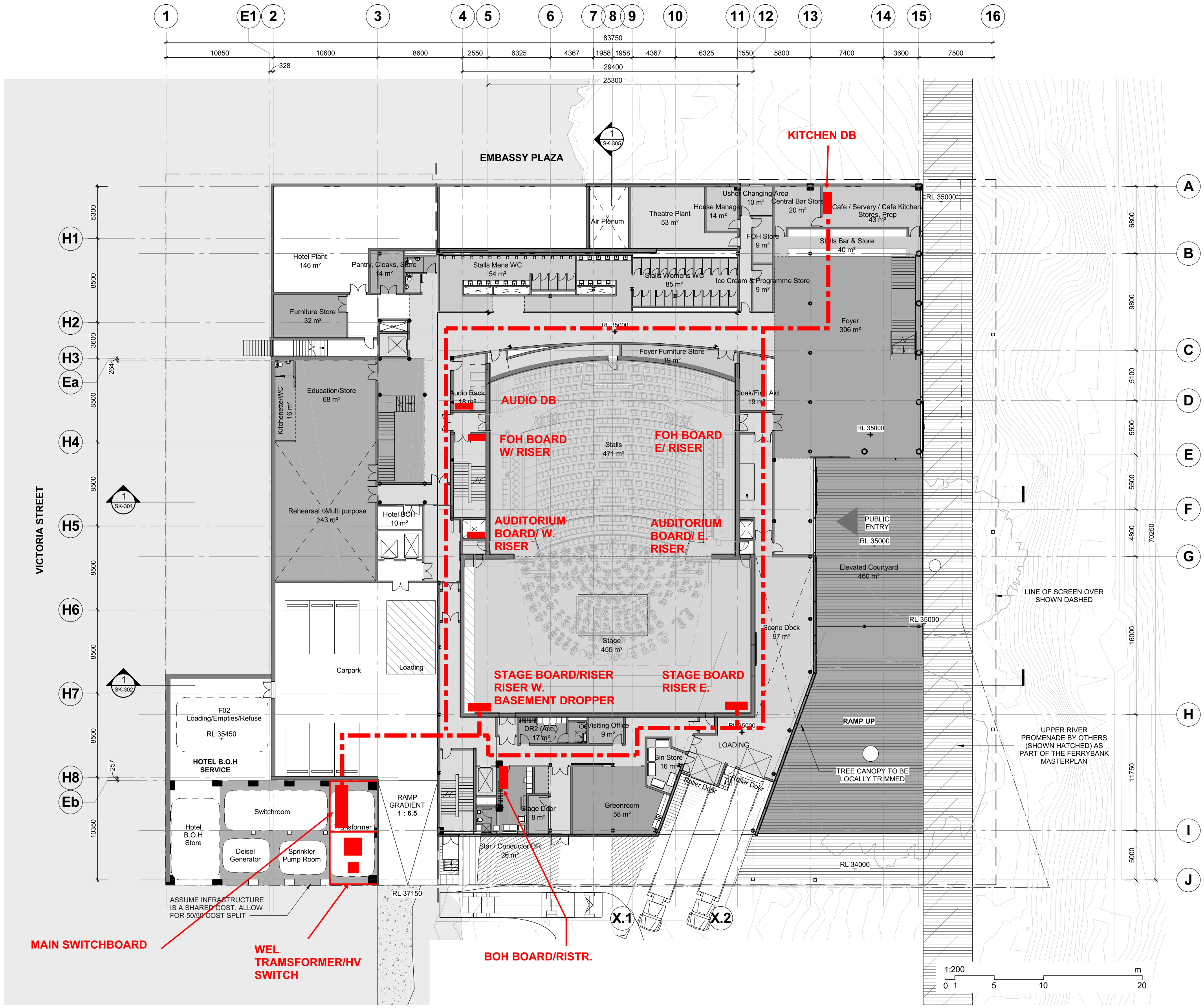
* GENERAL RECESSED LED LIGHTING INDRESSING ROOMS & ALLIED SPACES
* LED DOWN LIGHTS IN TOILETS/SHOWERS
* LED BATTENS IN PLANT AREAS & CIRCULATION AREAS & PLENUM/TRAPS/STORAGE
* SPECIALIST LIGHTING TO ORCHESTRA PITS

SECURITY NOTES

* CARD ACCESS TO ALL PLANT AREAS ONLY
* CCTV LINK FROM STAGE / AUDITORIUM TO DRESSING ROOMS

PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	ELECTRICAL SERVICES LEVEL -2 (SUB-STAGE) ELECTRICAL LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	E-SK-100



LIGHTING NOTES:

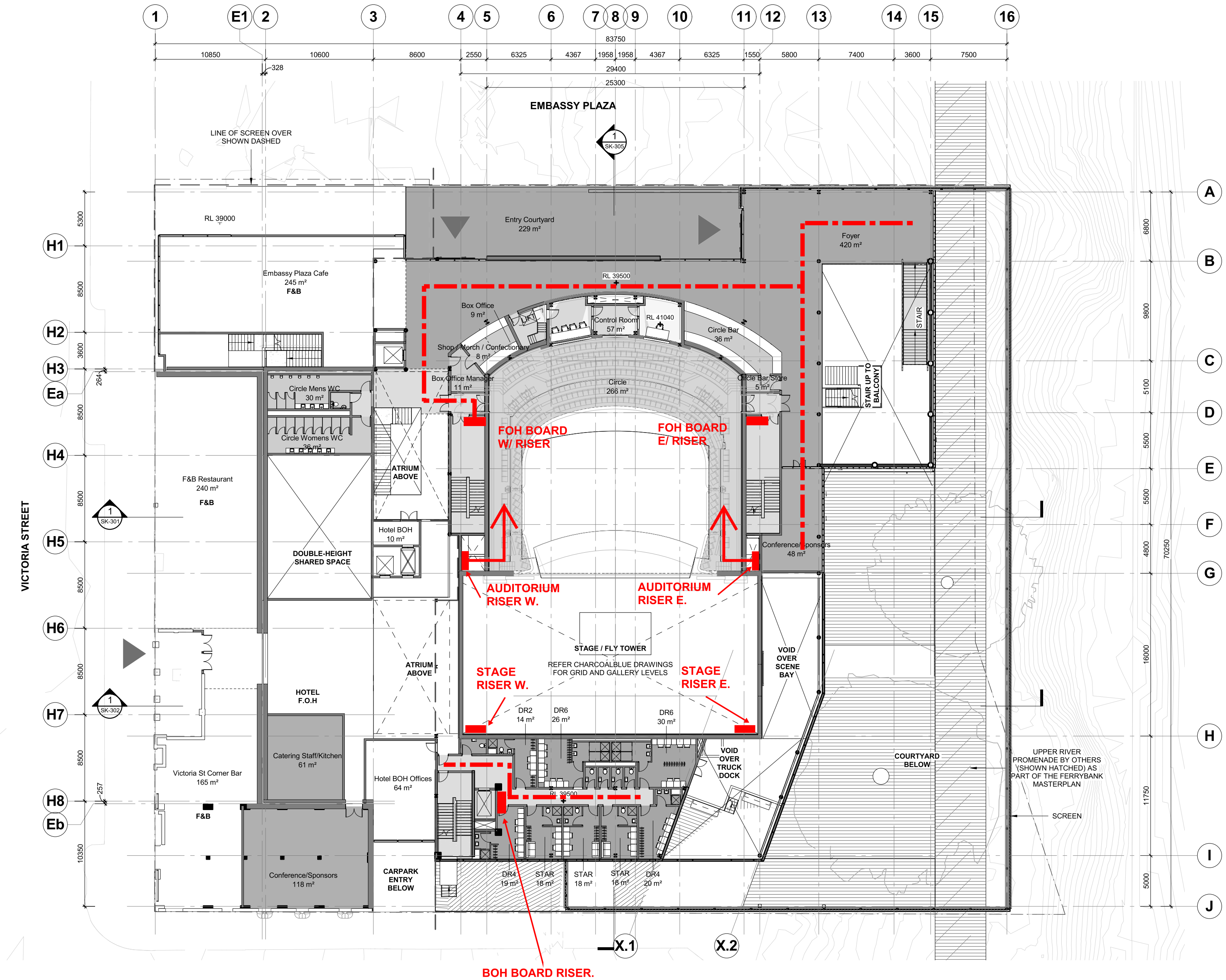
* RECESSED LINEAR LEDS & FEATURE SPOTLIGHTS TRACKS TO FOYER & FOH SPACES & GREEN ROOM
* AISLE LIGHTING & SEAT LIGHTING TO AUDITORIUM.
* BLUE LIGHTING TO STAGE / BASEMENT
* LED DOWN LIGHTS TO TOILETS
* BATTENS TO LOADING / BIN STORE / PLANT SPACES
* RECESSED LED TO CIRCULATION SPACES IN BOH IN CEILING GRID
* FEATURE LIGHTING TO COURTYARDS

SECURITY NOTES

* CARD ACCESS TO AUDITORIUM, ALL LOADING & STAGE DOOR AREAS
* CCTV TO ALL LOADING AREAS/ STAGE DOOR.
* CCTV LINKS STAGE / AUDITORIUM TO STAGE MANAGER & DRESSING ROOMS

PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	ELECTRICAL SERVICES LEVEL -1 (STALLS) ELECTRICAL LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	E-SK- 101



LIGHTING NOTES

AS LEVEL 1

SECURITY NOTES NOTES

* ACCESS CONTROL TO AUDITORIUM. MAIN ENTRYDOORS &TO FOH / BOX OFFICE SPACES

*CCTV COVERAGE TO MAIN ENTRY POINTS

PRELIMINARY DESIGN

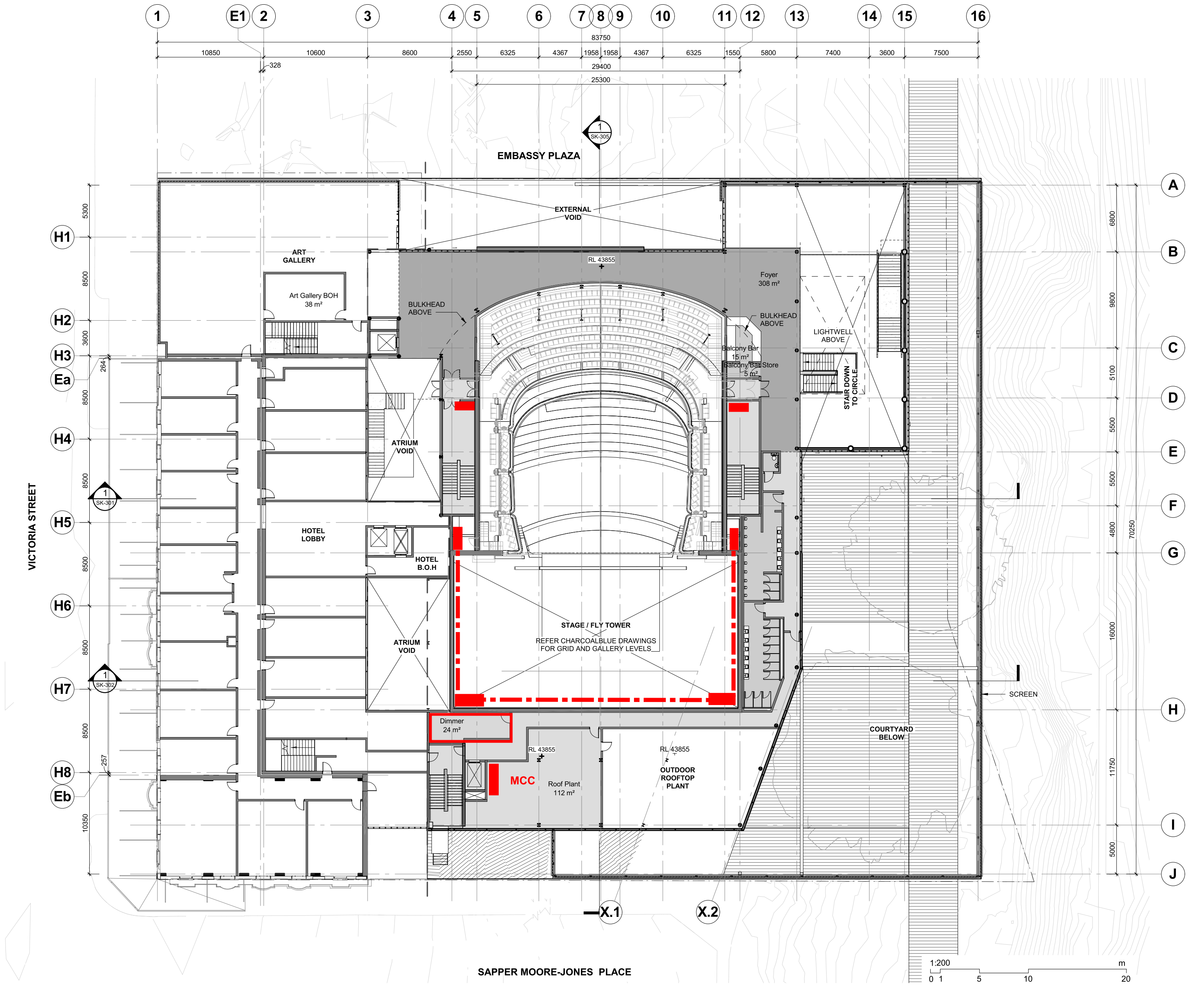
eCubed

PROJECT:

WAIKATO REGIONAL THEATRE

ELECTRICAL SERVICES
LEVEL -1 (CIRCLE)
ELECTRICAL LAYOUT

SCALE	NTS @ A1
REV	A
DRG. No.	E-SK- 102



LIGHTING NOTES

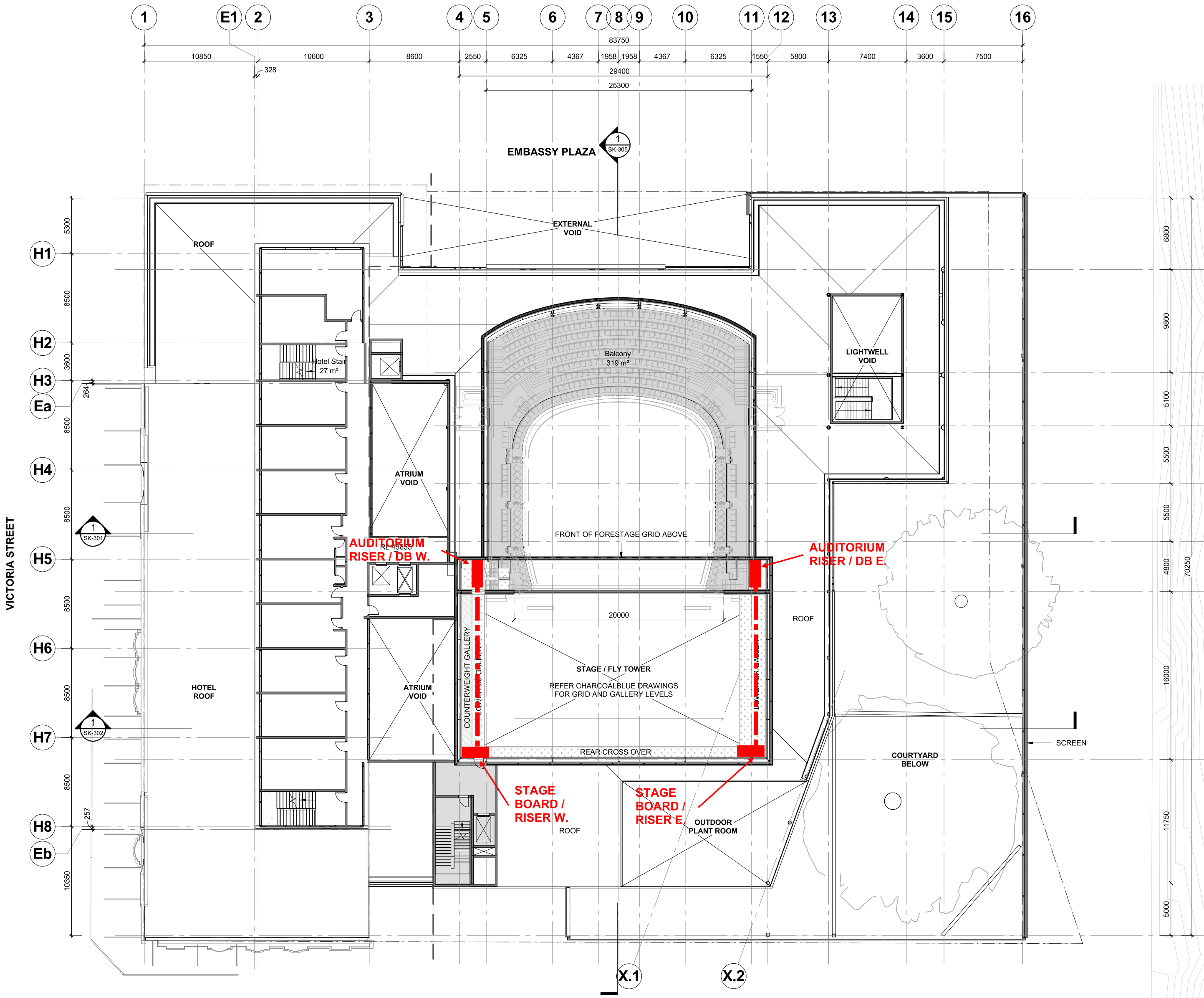
AS LEVEL 1

SECURITY NOTES

* ACCESS CONTROL TO AUDITORIUM, DIMMER ROOM & PLANT AREAS

PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	ELECTRICAL SERVICES LEVEL -2 (BALCONY) ELECTRICAL LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	E-SK- 103



LIGHTING NOTES

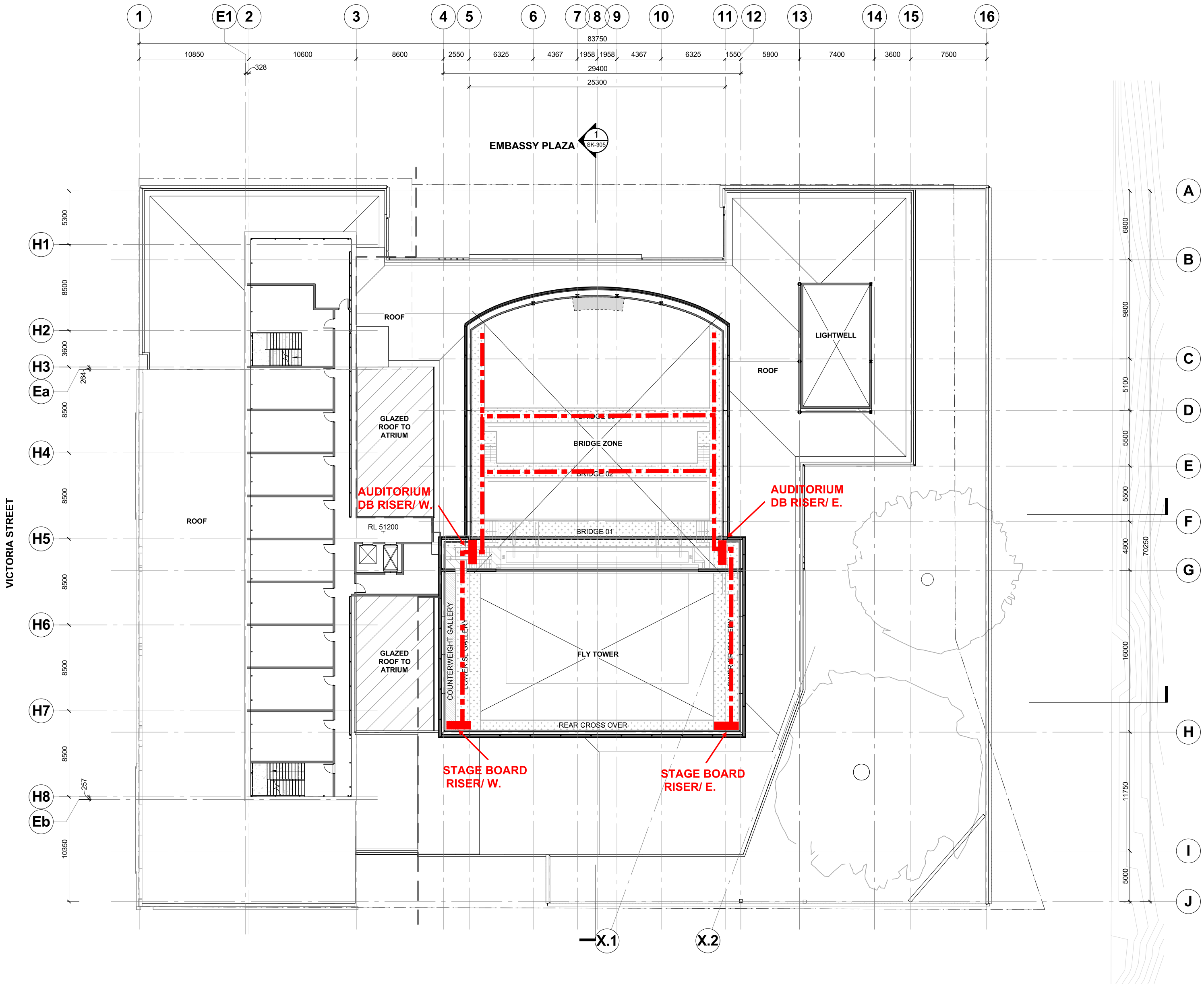
* AS LEVEL 1
* STAGE LIGHTING - REFER CHARCOAL BLUE DWGS.

SECURITY DRAWINGS

NO ACCESS CONTROL OR CCTV

PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	ELECTRICAL SERVICES LEVEL -3 (TERRACE) ELECTRICAL LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	E-SK- 104



LIGHTING NOTES

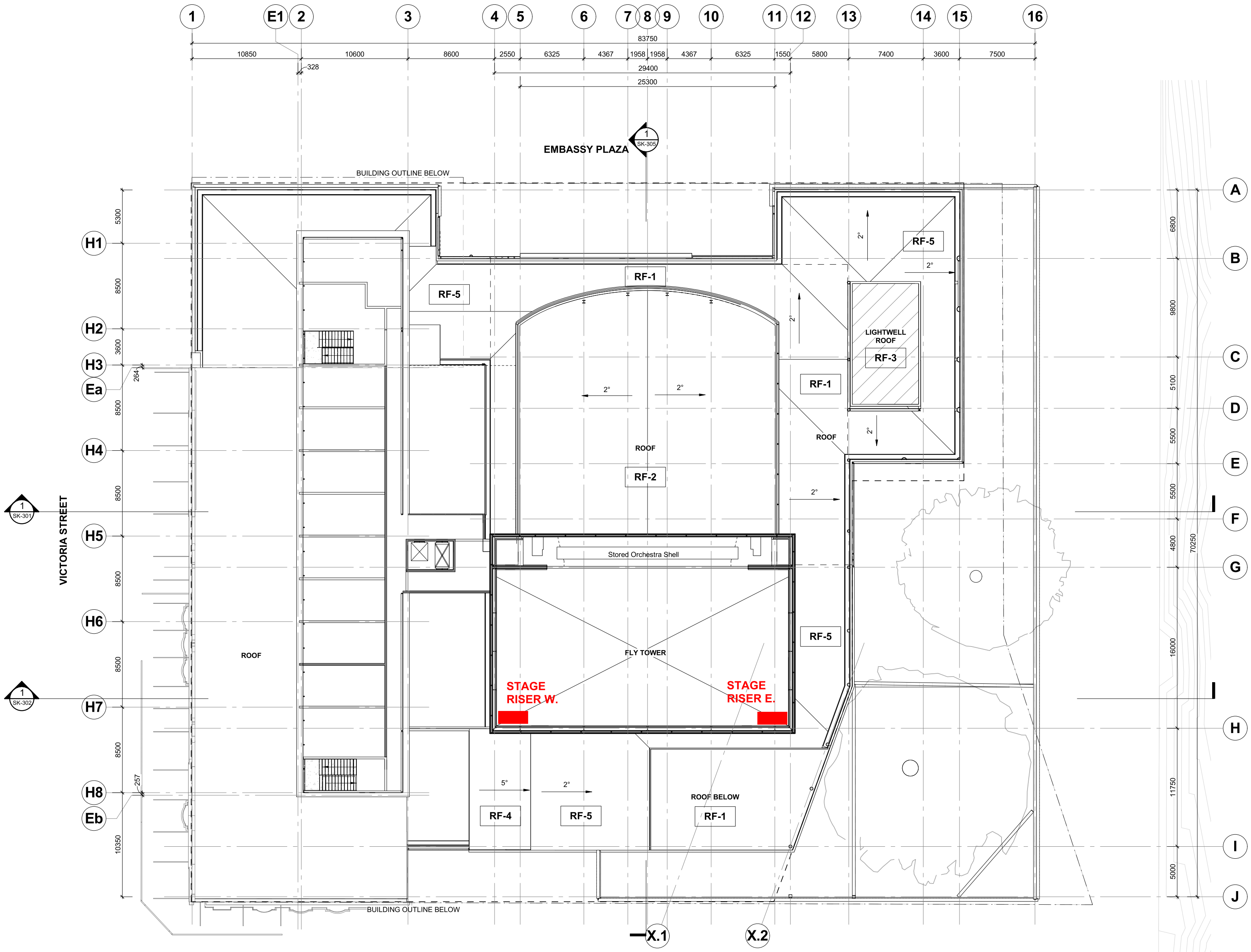
* HOUSE LIGHTING VIA LED DOWNLIGHTS BETWEEN AUDITORIUM CEILING PANELS
* STAGE LIGHTING REFER CHARCOAL BLUE REPORT
* GANTRY LIGHTS - LED BATTENS & BLUE LIGHTS

SECURITY NOTES

NONE AT THIS LEVEL

PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	ELECTRICAL SERVICES LEVEL -4 (BRIDGE) ELECTRICAL LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	E-SK- 105



LIGHTING NOTES

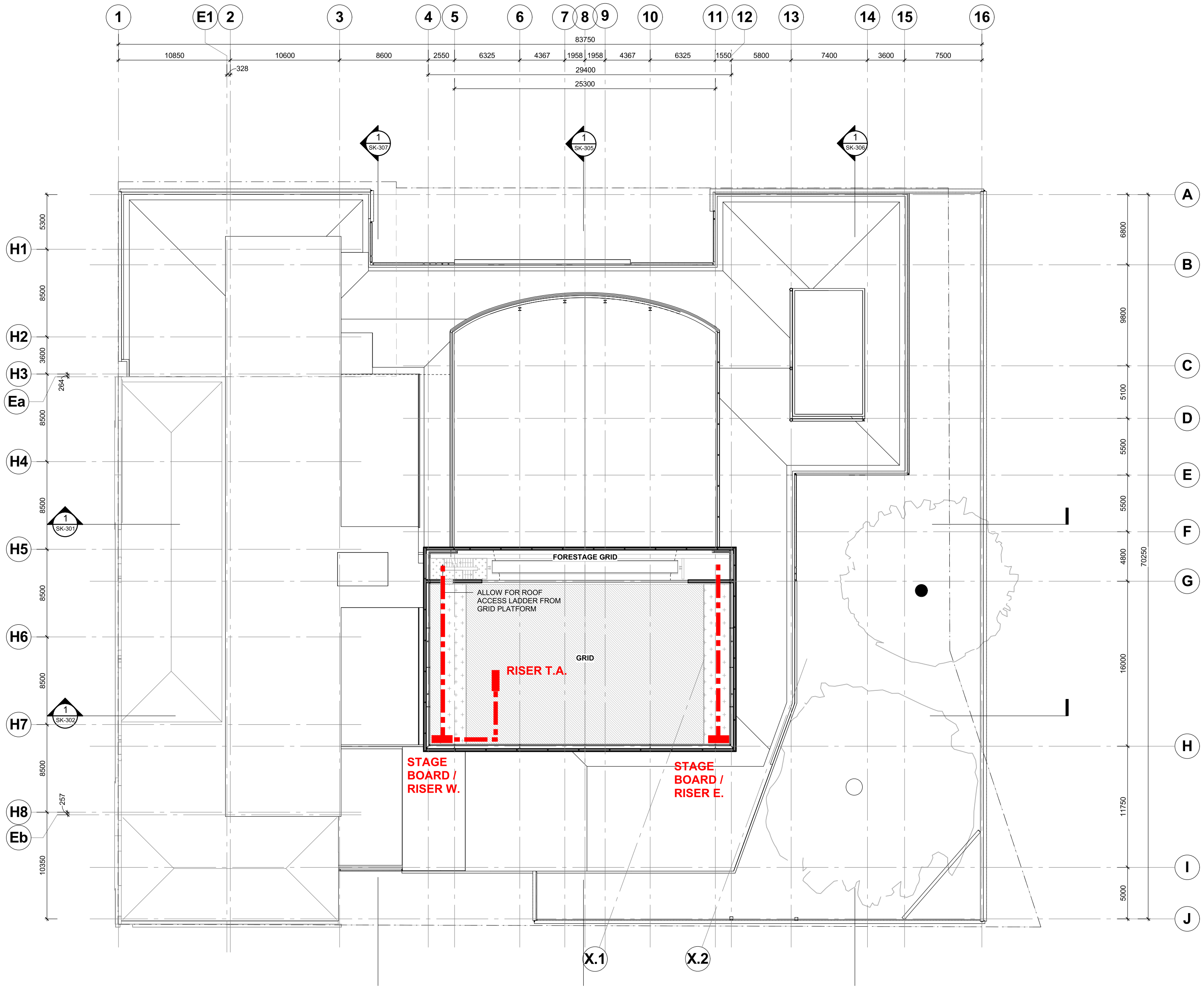
NONE AT THIS LEVEL

SECURITY NOTES

NONE AT THIS LEVEL

PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	ELECTRICAL SERVICES LEVEL -5 (AUDITORIUM ROOF) ELECTRICAL LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	E-SK- 106



LIGHTING NOTES

AS LEVEL 4

SECURITY NOTES

AS LEVEL 4

PRELIMINARY DESIGN

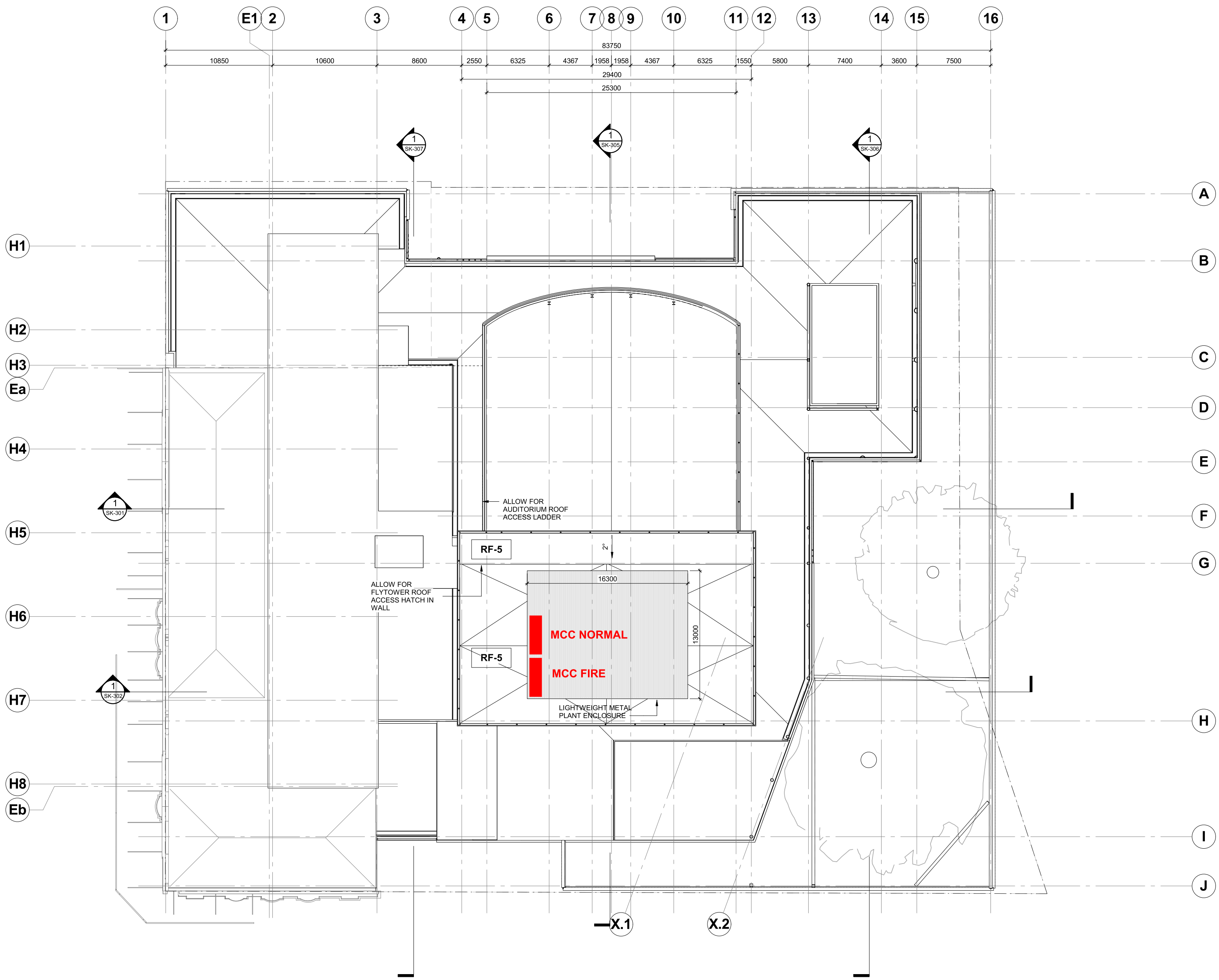
eCubed

PROJECT:

WAIKATO REGIONAL THEATRE

ELECTRICAL SERVICES
LEVEL -7 (FLY TOWER GRID)
ELECTRICAL LAYOUT

SCALE	NTS @ A1
REV	A
DRG. No.	E-SK- 107



LIGHTING NOTES

* LED BATTENS TO PLANT AREA
* EXTERNAL ACCESS LIGHTING TO PLANT ROOM

SECURITY NOTES

ACCESS CONTROL TO PLANT ROOM

PRELIMINARY DESIGN

eCubed	PROJECT: WAIKATO REGIONAL THEATRE	ELECTRICAL SERVICES LEVEL -8 (FLY TOWER ROOF) ELECTRICAL LAYOUT	SCALE	NTS @ A1
			REV	A
			DRG. No.	E-SK- 108

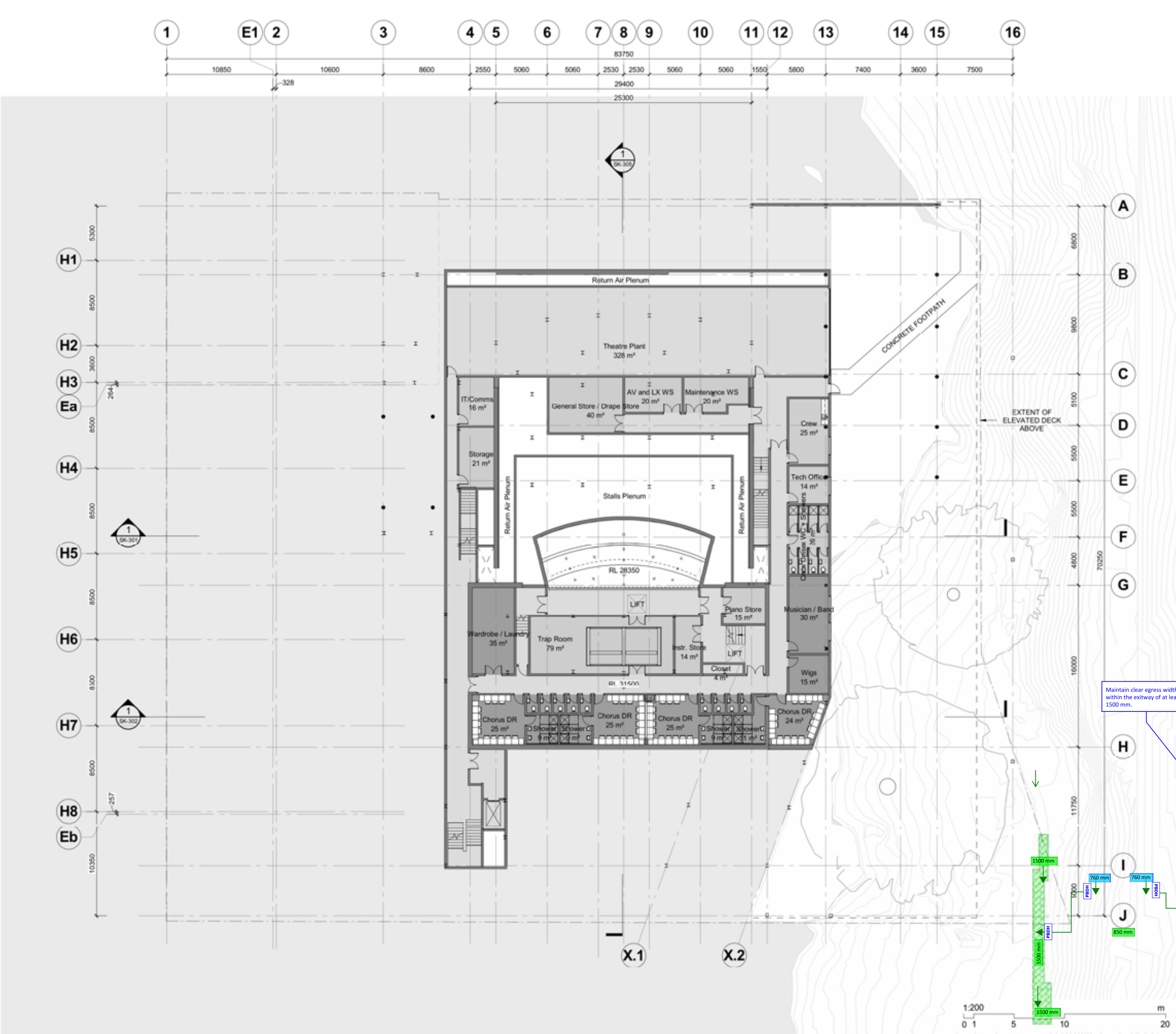
APPENDIX E – FIRE ENGINEERING DRAWINGS

Appendix A Fire Alarm Interface Matrix

	FIP LED locates origin	FAP Fire Mode	Building-wide fire alarm sounds	FENZ call initiated	Services interface (HVAC shutdown, etc.) unless specifically designed for fire safety	Activate Facility Management	Indicate at Mimic Panels (where provided)	Smart addressable exit signage	Interrupt PA system reducing volume (where possible), and bring on lights throughout the Theatre	Scene Dock motorised slider door closing (Automatic)	Release magnetic hold open device local to the detector	Activate visual alert within Theatre	Smoke Curtain (within Theatre)	Fire Curtain
Scene Dock non-latching, non-alerting smoke detector (isolation with countdown timer to be provided at Stage Manager's Panel)	✓					✓	✓			✓				
Non-latching, non-alerting smoke detectors except those within Scene Dock	✓						✓				✓			✓
Specific manual call points (Stage Manager & Control Room)	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓		
General Manual call points, Sprinkler system, Smoke detection (Theatre Zone)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
General Manual call points, Sprinkler system, Smoke detection (Rest of Building Zone)	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓		

NOTES:

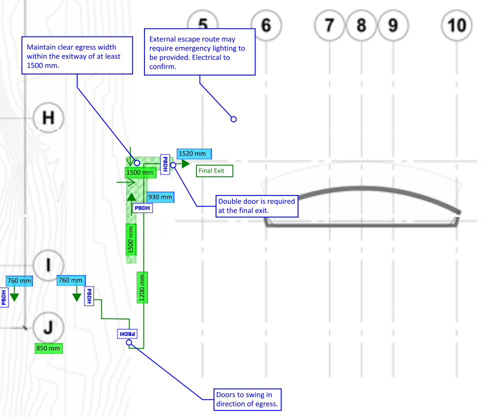
1. Kitchen extract systems are not permitted to shut down on any fire alarm interface.
2. Toilet extract systems are not required to have an interface to the fire alarm system.



1 | 1 : 200 Plan
RC-201 | Sub-stage Space Planning

Area Zoning

- Auditorium / Stage
- Performer Areas
- Admin / Staff
- Theatre Gross



2 | 1 : 200 Part Plan
RC-201 | Orchestra Pit/Seating Wagon

ROOM SCHEDULE - LEVEL -2...

Name	Area	Department
Stalls Plenum	300.71 m²	
	300.71 m²	
Crew	25.17 m²	Admin / Staff
IT/Comms	16.47 m²	Admin / Staff
Tech Office	14.44 m²	Admin / Staff
	56.08 m²	
AV and LX WS	19.69 m²	Auditorium / Stage
Crew Unisex WC + Showers	26.45 m²	Auditorium / Stage
General Store / Drape Store	40.00 m²	Auditorium / Stage
Instr. Store	14.11 m²	Auditorium / Stage
Maintenance WS	20.29 m²	Auditorium / Stage
Piano Store	14.97 m²	Auditorium / Stage
Storage	20.58 m²	Auditorium / Stage
Trap Room	79.22 m²	Auditorium / Stage
	235.31 m²	
Chorus DR	25.23 m²	Performer Areas
Chorus DR	24.74 m²	Performer Areas
Chorus DR	24.74 m²	Performer Areas
Chorus DR	24.36 m²	Performer Areas
Musician / Band	29.69 m²	Performer Areas
Shower	10.80 m²	Performer Areas
Shower	8.62 m²	Performer Areas
Shower	8.62 m²	Performer Areas
Shower	8.62 m²	Performer Areas
Wardrobe / Laundry	35.27 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
Wigs	14.82 m²	Performer Areas
	233.18 m²	
Closet	3.58 m²	Theatre Gross
Theatre Circulation	107.14 m²	Theatre Gross
Theatre Circulation	14.56 m²	Theatre Gross
Theatre Circulation	138.77 m²	Theatre Gross
Theatre Circulation	23.81 m²	Theatre Gross
Theatre Circulation	41.33 m²	Theatre Gross
Theatre Circulation	31.96 m²	Theatre Gross
Theatre Circulation	13.73 m²	Theatre Gross
Theatre Lift	5.97 m²	Theatre Gross
Theatre Plant	328.09 m²	Theatre Gross
	708.94 m²	
Grand total	1534.21 m²	

This sketch does not constitute a complete fire engineering design or detail. Detailed construction drawings are provided by others. Best viewed in colour. Not all fire separations around ducts and shafts are shown.

Drawn: DSP | Date: 17 / 07 / 2018

Project No.	Sheet No.	Rev
117319	FS 1001	B

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Project Title
Waikato Regional Theatre

Sketch Title
Level -2 (Sub-Stage)
Means of Escape

Legend

- 1000 mm — Minimum clear door width
- 1000 mm — Minimum clear egress route width. Handrails are permitted to project no more than 100 mm into the width.
- Egress route (no requirement for direction of door swing)
- Egress route (door to swing in direction of egress)
- Exitway
- PBDH — Panic Bar Door Hardware or demonstrated simple opening. If door power opening - no reference made.

Where doors are not noted with minimum clear width, the minimum clear width shall be 760 mm.

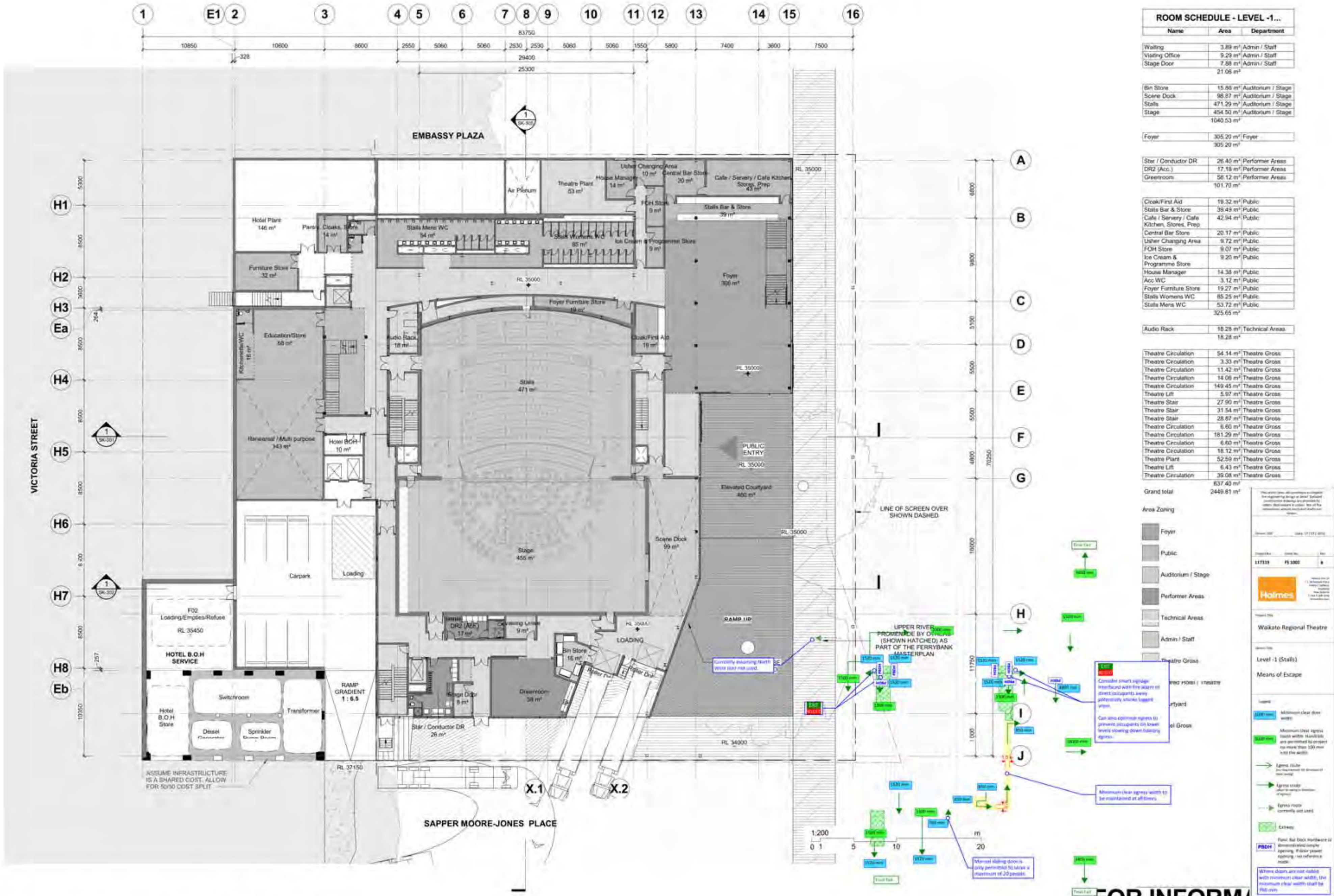
FOR INFORMA

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

ISSUE DATE: 13/07/2018 | DRAWING **Space Planning - Level -2 (Sub-stage)** | SCALE @ A1 **1 : 200** | DRAWING No. **SK-110** | REV. **P**

Jasmax



ROOM SCHEDULE - LEVEL -1...		
Name	Area	Department
Waiting	3.89 m²	Admin / Staff
Visiting Office	9.29 m²	Admin / Staff
Stage Door	7.88 m²	Admin / Staff
	21.06 m²	
Bin Store	15.86 m²	Auditorium / Stage
Scene Dock	98.87 m²	Auditorium / Stage
Stalls	471.29 m²	Auditorium / Stage
Stage	454.50 m²	Auditorium / Stage
	1040.53 m²	
Foyer	305.20 m²	Foyer
	305.20 m²	
Star / Conductor DR	26.40 m²	Performer Areas
DR2 (Acc.)	17.18 m²	Performer Areas
Greenroom	58.12 m²	Performer Areas
	101.70 m²	
Cloak/First Aid	19.32 m²	Public
Stalls Bar & Store	39.49 m²	Public
Cafe / Servery / Cafe Kitchen, Stores, Prep	42.94 m²	Public
Central Bar Store	20.17 m²	Public
Usher Changing Area	9.72 m²	Public
FOH Store	9.07 m²	Public
Ice Cream & Programme Store	9.20 m²	Public
House Manager	14.38 m²	Public
Acc WC	3.12 m²	Public
Foyer Furniture Store	19.27 m²	Public
Stalls Womens WC	85.25 m²	Public
Stalls Mens WC	53.72 m²	Public
	325.65 m²	
Audio Rack	18.28 m²	Technical Areas
	18.28 m²	
Theatre Circulation	54.14 m²	Theatre Gross
Theatre Circulation	3.30 m²	Theatre Gross
Theatre Circulation	11.42 m²	Theatre Gross
Theatre Circulation	14.06 m²	Theatre Gross
Theatre Circulation	149.45 m²	Theatre Gross
Theatre Lift	5.97 m²	Theatre Gross
Theatre Stair	27.90 m²	Theatre Gross
Theatre Stair	31.54 m²	Theatre Gross
Theatre Stair	28.87 m²	Theatre Gross
Theatre Circulation	6.60 m²	Theatre Gross
Theatre Circulation	181.29 m²	Theatre Gross
Theatre Circulation	6.60 m²	Theatre Gross
Theatre Circulation	18.12 m²	Theatre Gross
Theatre Plant	52.59 m²	Theatre Gross
Theatre Lift	6.43 m²	Theatre Gross
Theatre Circulation	39.08 m²	Theatre Gross
	637.40 m²	
Grand total	2449.81 m²	

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

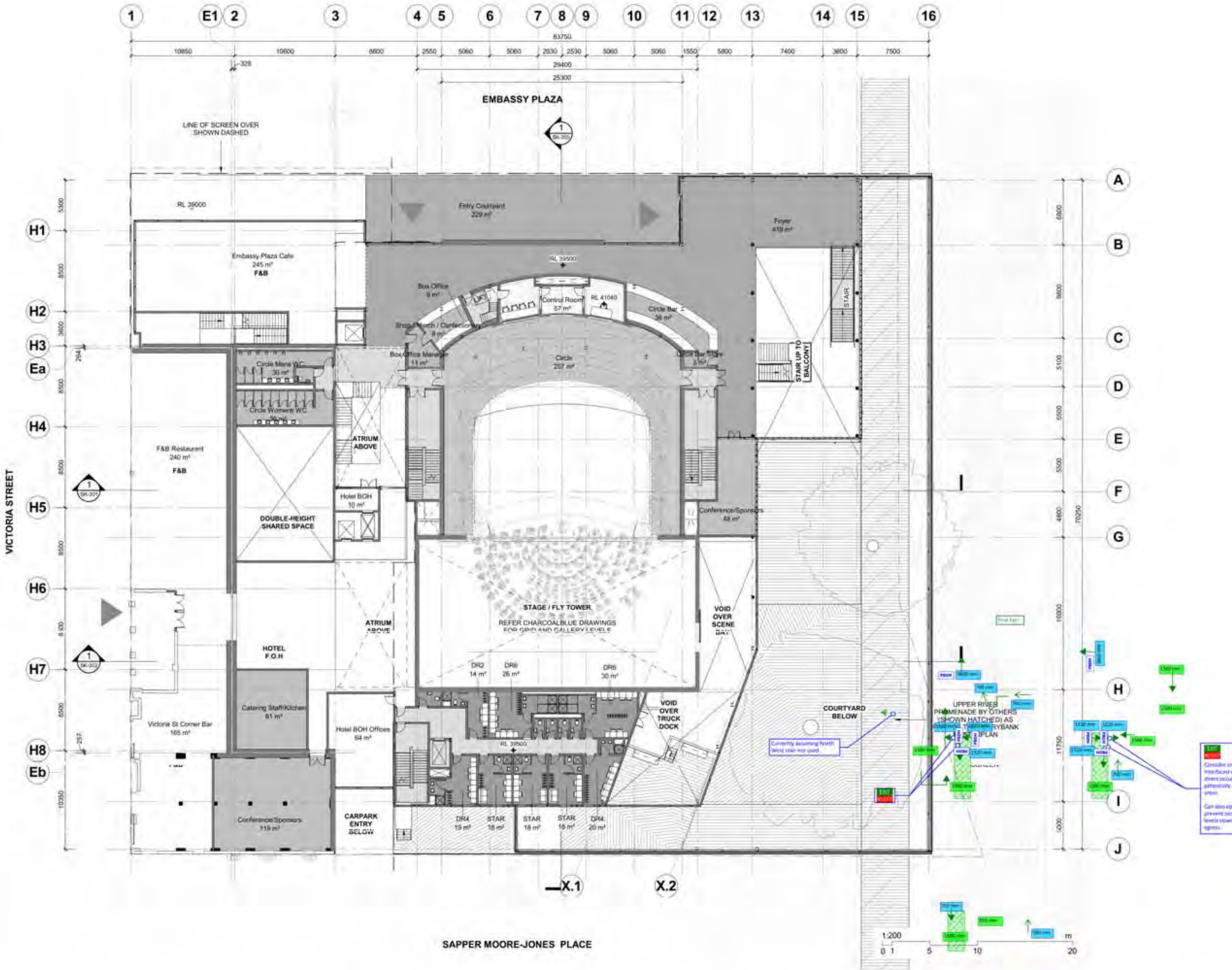
ISSUE DATE: 13/07/2018

DRAWING **Space Planning - Level -1 (Stalls)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-111** REV. **N**

Jasmax



ROOM SCHEDULE - LEVEL 1...		
Name	Area	Department
Circle	256.66 m²	Auditorium / Stage
	256.66 m²	
Foyer	419.34 m²	Foyer
	419.34 m²	
DR2	13.51 m²	Performer Areas
DR4	20.11 m²	Performer Areas
DR4	19.05 m²	Performer Areas
DR6	30.38 m²	Performer Areas
DR6	25.51 m²	Performer Areas
STAR	18.00 m²	Performer Areas
STAR	18.00 m²	Performer Areas
STAR	17.96 m²	Performer Areas
WC	9.66 m²	Performer Areas
WC	3.74 m²	Performer Areas
	175.93 m²	
Box Office	8.79 m²	Public
Box Office Manager	10.78 m²	Public
Circle Bar	36.45 m²	Public
Circle Bar Store	5.09 m²	Public
Circle Mens WC	30.00 m²	Public
Circle Womens WC	35.54 m²	Public
Shop / Merch / Confectionary	8.08 m²	Public
	134.72 m²	
Control Room	56.73 m²	Technical Areas
	56.73 m²	
Foyer Stair	24.12 m²	Theatre Gross
Theatre Circulation	34.42 m²	Theatre Gross
Theatre Circulation	40.39 m²	Theatre Gross
Theatre Circulation	6.79 m²	Theatre Gross
Theatre Circulation	6.60 m²	Theatre Gross
Theatre Lift	6.43 m²	Theatre Gross
Theatre Lift	5.97 m²	Theatre Gross
Theatre Stair	38.06 m²	Theatre Gross
Theatre Stair	38.06 m²	Theatre Gross
Theatre Stair	29.23 m²	Theatre Gross
	230.07 m²	
Grand total	1273.46 m²	

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Waikato Regional Theatre

Level 1 (Circle)

Means of Escape

FOR INFORMA

WAIKATO REGIONAL THEATRE

JOB No. 216365.00

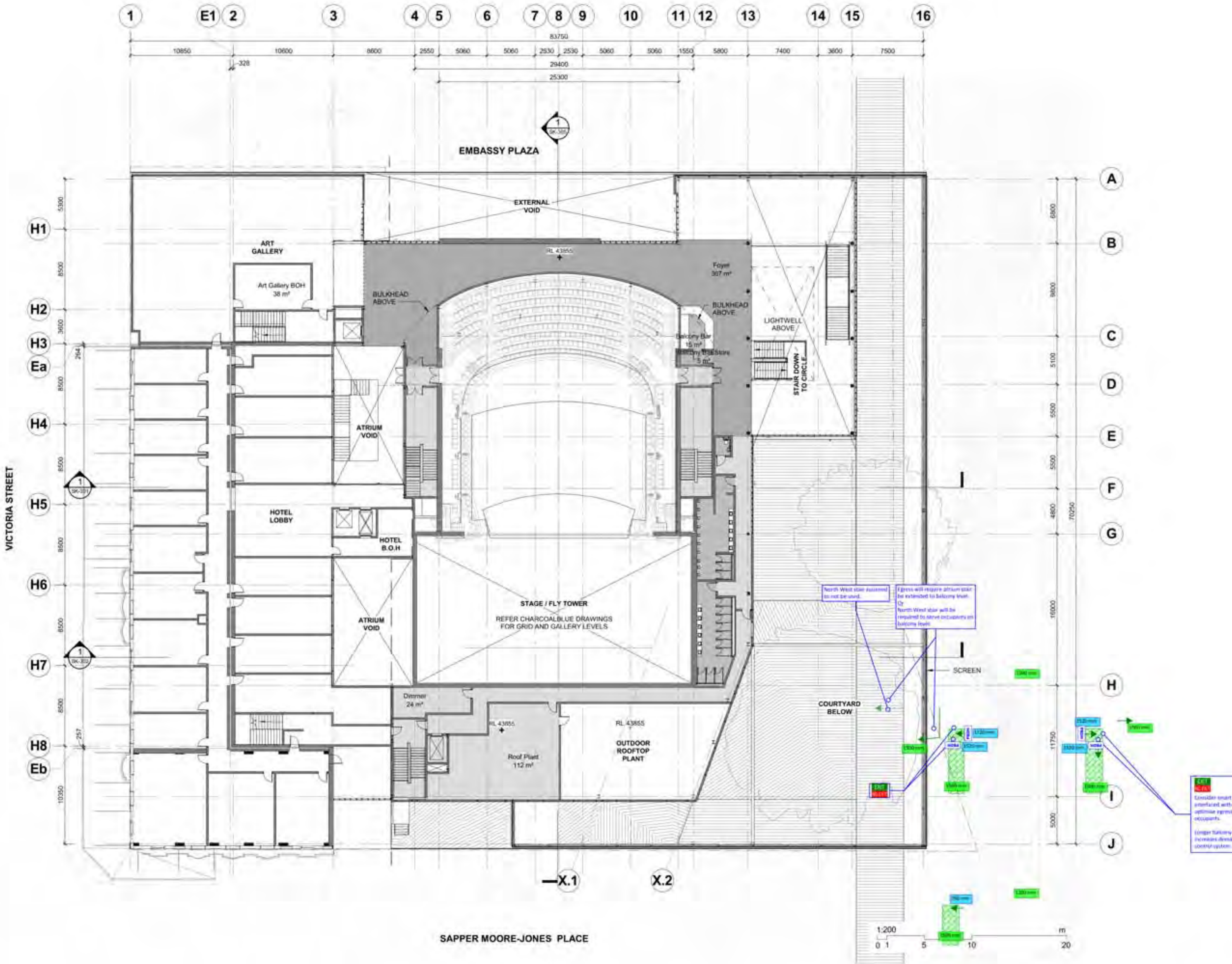
ISSUE DATE: 13/07/2018

DRAWING Space Planning - Level 1 (Circle)

SCALE @ A1 1 : 200

DRAWING No. SK-112 REV. N

Jasmax



ROOM SCHEDULE - LEVEL 2...		
Name	Area	Department
Foyer	307.29 m²	Foyer
	307.29 m²	
Balcony Bar	14.81 m²	Public
Balcony Bar Store	4.76 m²	Public
Balcony Mens WC	Redundant Room	Public
Balcony Mens WC	3.04 m²	Public
Balcony Womens WC	35.23 m²	Public
	57.84 m²	
Dimmer	23.51 m²	Technical Areas
	23.51 m²	
Roof Plant	111.73 m²	Theatre Gross
Theatre Circulation	6.60 m²	Theatre Gross
Theatre Circulation	7.00 m²	Theatre Gross
Theatre Circulation	69.88 m²	Theatre Gross
Theatre Circulation	36.33 m²	Theatre Gross
Theatre Circulation	40.95 m²	Theatre Gross
Theatre Lift	5.97 m²	Theatre Gross
Theatre Lift	6.43 m²	Theatre Gross
Theatre Stair	38.06 m²	Theatre Gross
Theatre Stair	28.93 m²	Theatre Gross
Theatre Stair	40.37 m²	Theatre Gross
	392.25 m²	
Grand total	780.88 m²	

Area Zoning

- Foyer
- Public
- Technical Areas
- Theatre Gross
- Hotel
- Hotel Gross
- Hotel Art Gallery

Waikato Regional Theatre

Level 2 (Balcony)

Means of Escape

FOR INFORMA

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

ISSUE DATE: 13/07/2018 | DRAWING **Space Planning - Level 2 (Balcony)** | SCALE @ A1 **1 : 200** | DRAWING No. **SK-113** | REV. **M**

Jasmax

ROOM SCHEDULE - LEVEL 3...

Name	Area	Department
Balcony	312.58 m²	Auditorium / Stage
	312.58 m²	
Theatre Circulation	20.78 m²	Theatre Gross
Theatre Lift	5.97 m²	Theatre Gross
Theatre Stair	28.25 m²	Theatre Gross
	55.00 m²	
Grand total	367.58 m²	

Area Zoning

- Auditorium / Stage
- Theatre Gross
- Hotel
- Hotel Gross

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Waikato Regional Theatre

Level 3 (Terrace)

Means of Escape

FOR INFORMA

WAIKATO REGIONAL THEATRE

JOB No. 216365.00

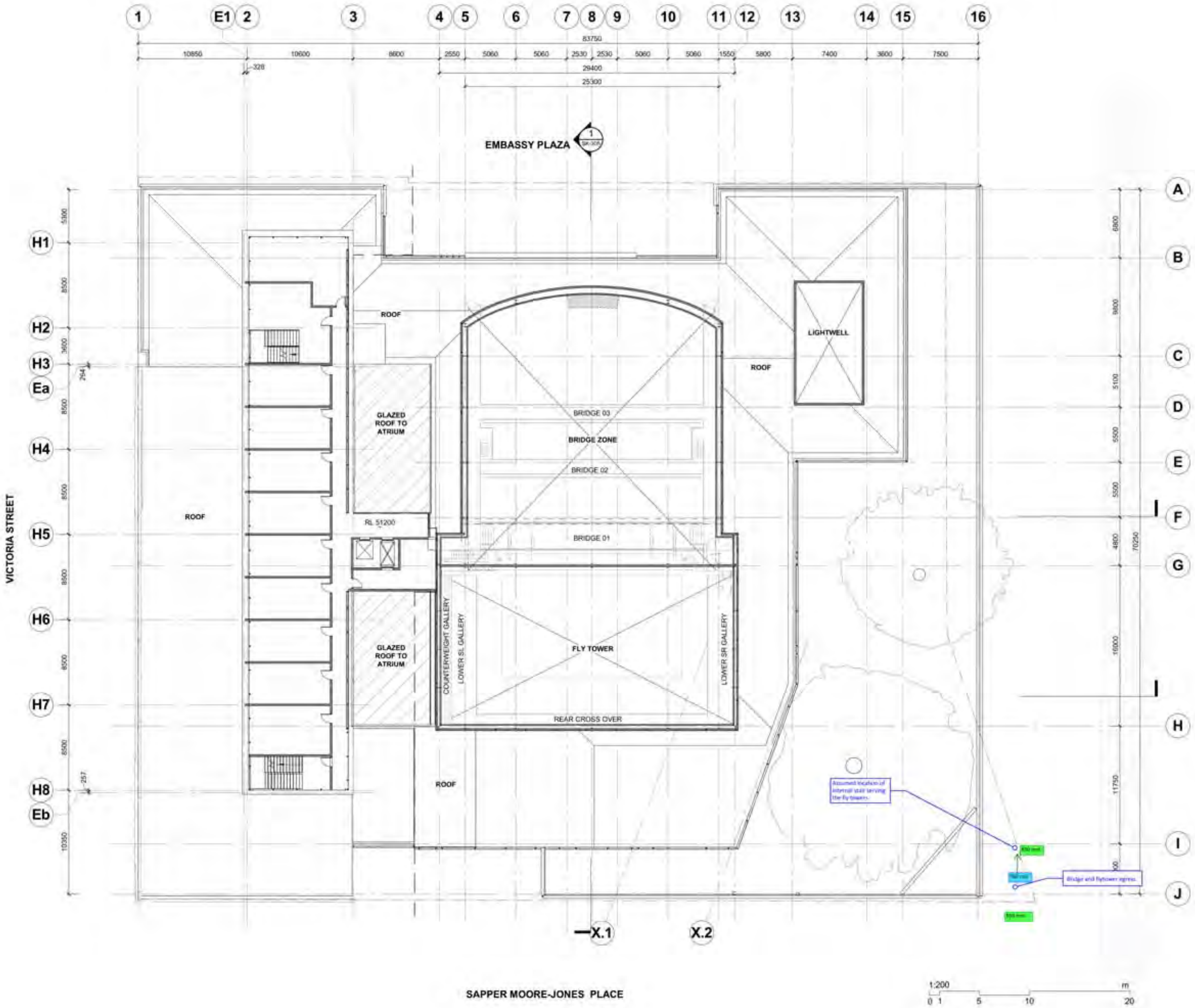
ISSUE DATE:13/07/2018

DRAWING **Space Planning - Level 3 (Terrace)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-114** REV. **M**

Jasmax



ROOM SCHEDULE - LEVEL 4...

Name	Area	Department
Follow Spot	6.22 m²	Technical Areas
	6.22 m²	
Grand total	6.22 m²	

Waikato Regional Theatre

Level 4 (Bridge)

Means of Escape

Holmes

FOR INFORMA

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

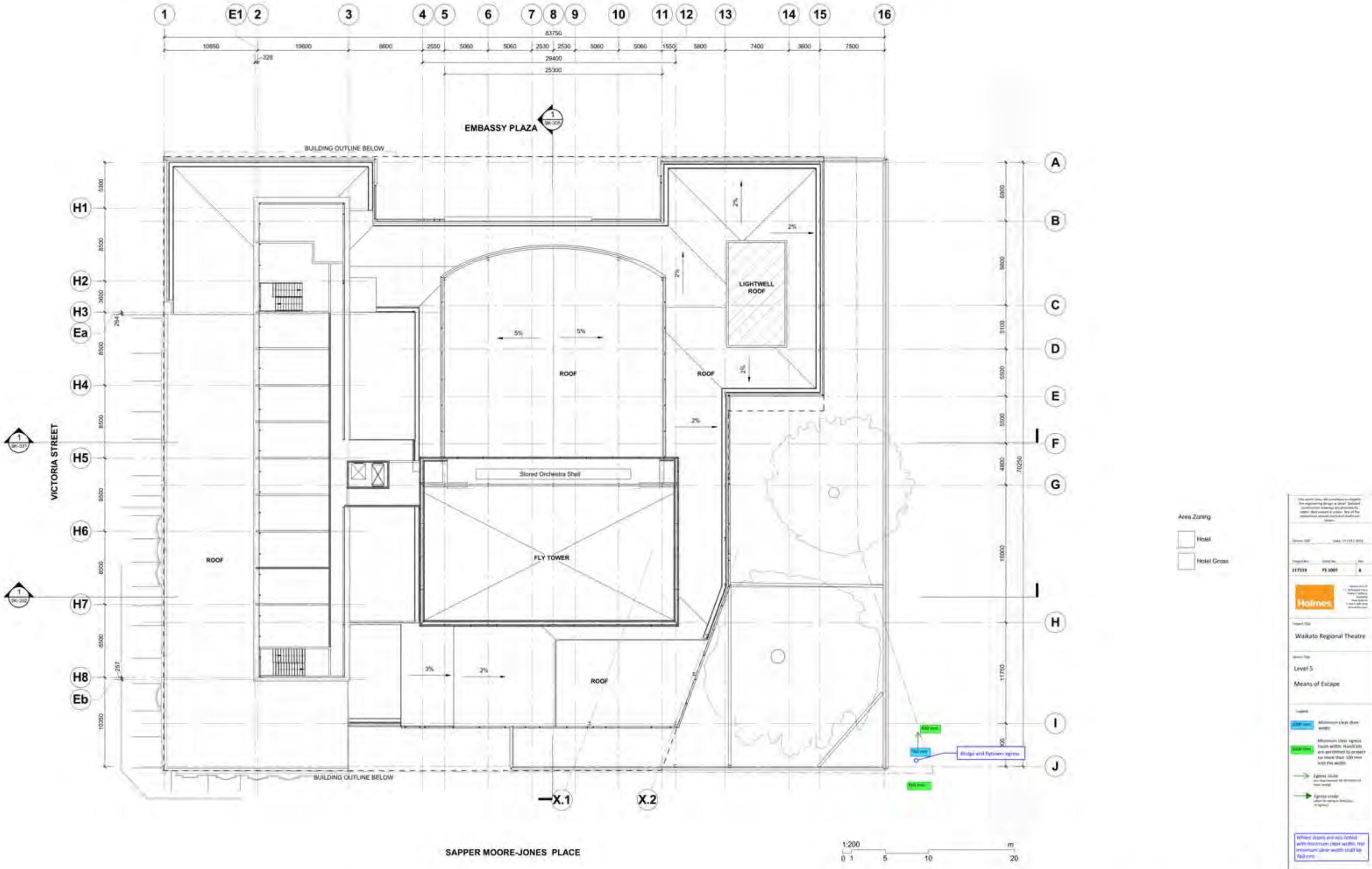
ISSUE DATE: 13/07/2018

DRAWING **Space Planning - Level 4 (Bridge)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-115** REV. **K**

Jasmax



FOR INFORMA

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

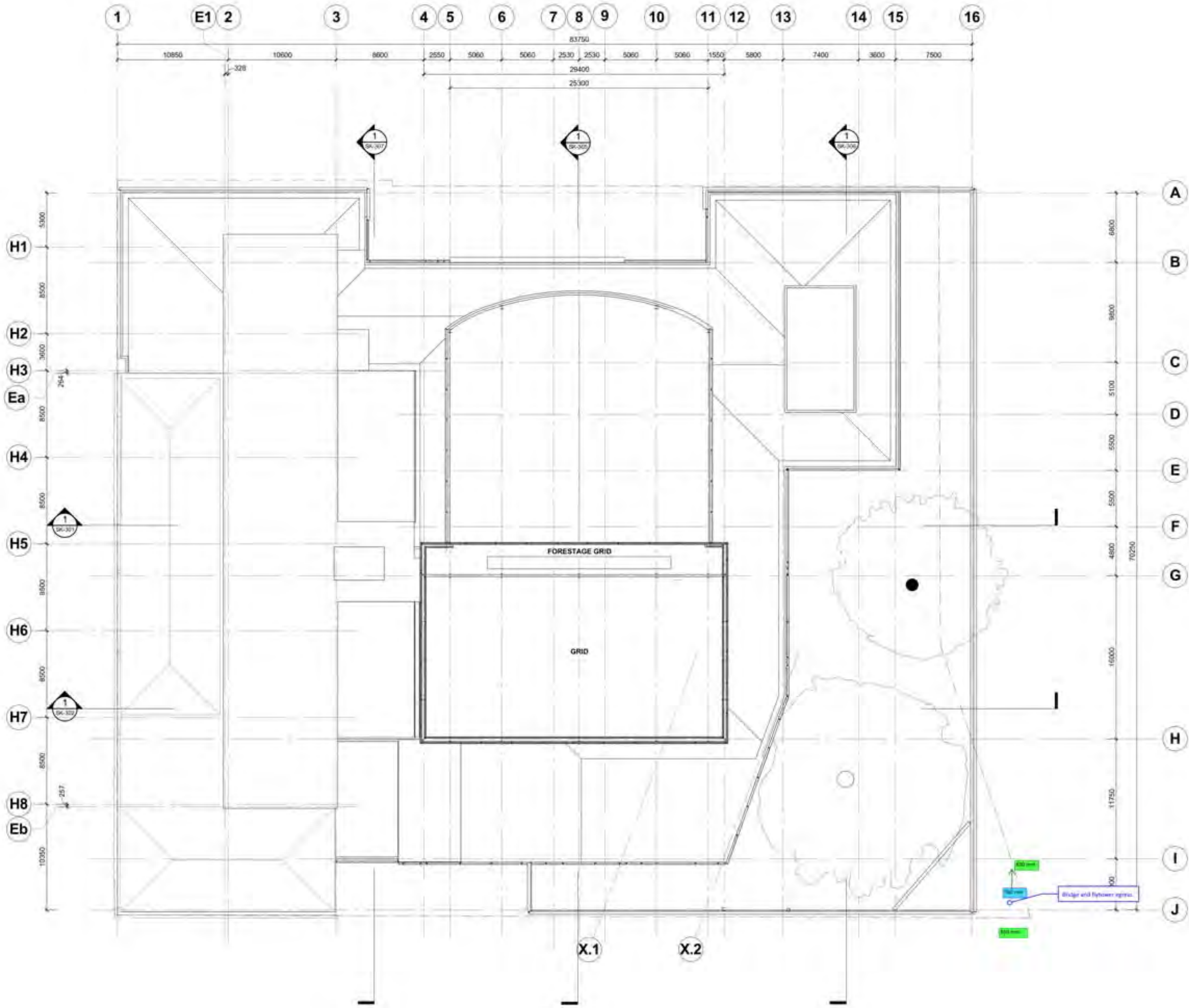
ISSUE DATE: 13/07/2018

DRAWING **Space Planning - Level 5 (Auditorium Roof)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-116** REV. **H**

Jasmax



1 | 1 : 200 Plan Detail
RC-201 | SK-117 - Space Planning - Level 7 (Fly Tower Grid)

Waikato Regional Theatre

Level 7

Means of Escape

Minimum clear door width

Minimum clear egress width. Handrails are permitted to project no more than 100 mm into the width

Egress route

Egress route

Where doors are not noted with minimum clear width, the minimum clear width shall be 760 mm.

WAIKATO REGIONAL THEATRE

ISSUE DATE: 13/07/2018

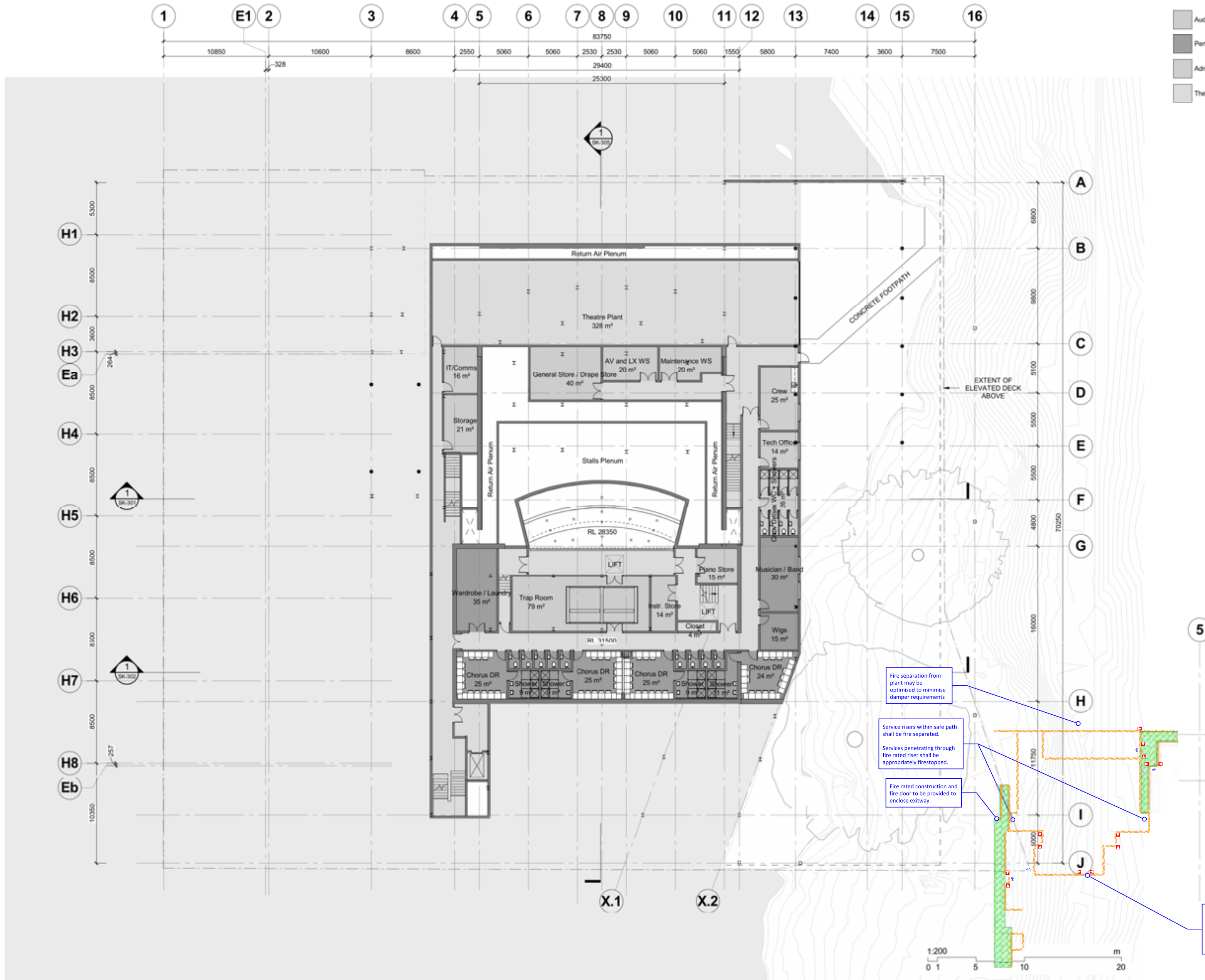
DRAWING **Space Planning - Level 7 (Fly Tower Grid)**

SCALE @ A1 **1 : 200**

JOB No. **216365.00**

DRAWING No. **SK-117** REV. **E**

Jasmax



1 | 1 : 200 Plan

RC-201 | Sub-stage Space Planning

Area Zoning

- Auditorium / Stage
- Performer Areas
- Admin / Staff
- Theatre Gross

ROOM SCHEDULE - LEVEL -2...

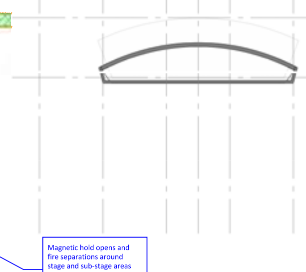
Name	Area	Department
Stalls Plenum	300.71 m²	
	300.71 m²	
Crew	25.17 m²	Admin / Staff
IT/Comms	16.47 m²	Admin / Staff
Tech Office	14.44 m²	Admin / Staff
	56.08 m²	
AV and LX WS	19.69 m²	Auditorium / Stage
Crew Unisex WC + Showers	26.45 m²	Auditorium / Stage
General Store / Drape Store	40.00 m²	Auditorium / Stage
Instr. Store	14.11 m²	Auditorium / Stage
Maintenance WS	20.29 m²	Auditorium / Stage
Piano Store	14.97 m²	Auditorium / Stage
Storage	20.58 m²	Auditorium / Stage
Trap Room	79.22 m²	Auditorium / Stage
	235.31 m²	
Chorus DR	25.23 m²	Performer Areas
Chorus DR	24.74 m²	Performer Areas
Chorus DR	24.74 m²	Performer Areas
Chorus DR	24.36 m²	Performer Areas
Musician / Band	29.69 m²	Performer Areas
Shower	10.80 m²	Performer Areas
Shower	8.62 m²	Performer Areas
Shower	8.62 m²	Performer Areas
Shower	8.62 m²	Performer Areas
Wardrobe / Laundry	35.27 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
Wigs	14.82 m²	Performer Areas
	233.18 m²	
Closet	3.58 m²	Theatre Gross
Theatre Circulation	107.14 m²	Theatre Gross
Theatre Circulation	14.56 m²	Theatre Gross
Theatre Circulation	138.77 m²	Theatre Gross
Theatre Circulation	23.81 m²	Theatre Gross
Theatre Circulation	41.33 m²	Theatre Gross
Theatre Circulation	31.96 m²	Theatre Gross
Theatre Circulation	13.73 m²	Theatre Gross
Theatre Lift	5.97 m²	Theatre Gross
Theatre Plant	328.09 m²	Theatre Gross
	708.94 m²	
Grand total	1534.21 m²	

Surface Finish Requirements

	Fire Protected Escape Route	HVAC Ducts - internal	Crowd Use Spaces ceilings / (walls)	Other Spaces walls / ceilings
Maximum Group Number*	1,2	1,2	1,2 / (3)	1,2 or 3

* Tests in accordance with ISO 9705 or ISO 5660. Refer to C/VM2 Appendix A.

Group number 1 or 2 typically excludes untreated timber on the ceilings.



Part Plan

RC-201 | Orchestra Pit/Seating Wagon

This sketch does not constitute a complete fire engineering design or detail. Detailed construction drawings are provided by others. Best viewed in colour. Not all fire separations around ducts and shafts are shown.

Drawn: DSP Date: 17 / 07 / 2018

Project No.	Sheet No.	Rev
117319	FS 2001	B

Holmes

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holmesfire.com

Project Title

Waikato Regional Theatre

Sketch Title

Level -2

Fire/Smoke Separations

Legend

- 60///// (60)/60/60 Sm
- 120»»»120 (120)/120/120 Sm
- Electromagnetic Hold Open Device
- Fire Protected Egress Route (Exitway)
- VP Vision Panel

FOR INFORMA

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

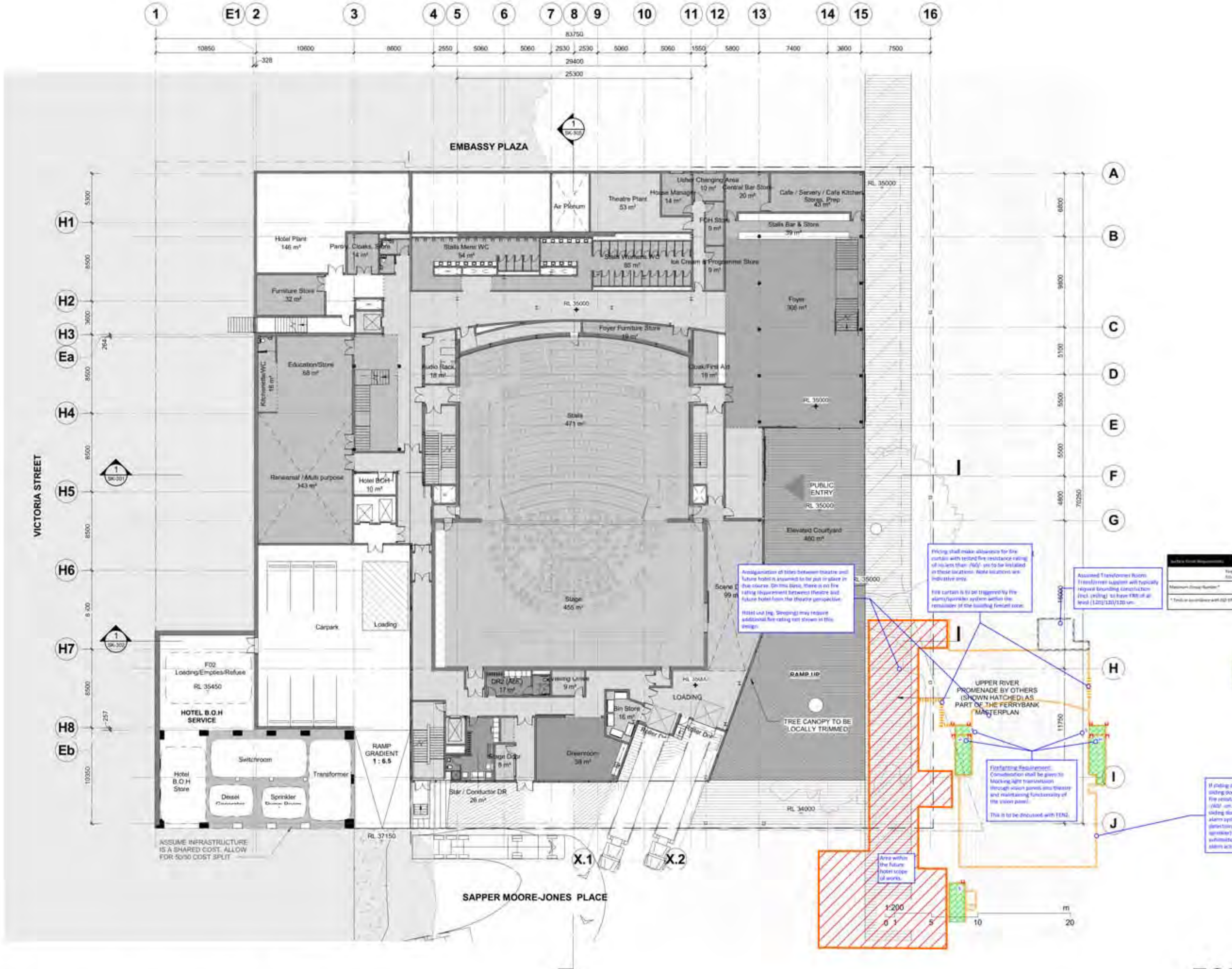
ISSUE DATE: 13/07/2018

DRAWING Space Planning - Level -2 (Sub-stage)

SCALE @ A1 1 : 200

DRAWING No. SK-110 REV. P

Jasmax



ROOM SCHEDULE - LEVEL -1...		
Name	Area	Department
Waiting	3.89 m²	Admin / Staff
Visiting Office	9.29 m²	Admin / Staff
Stage Door	7.88 m²	Admin / Staff
	21.06 m²	
Bin Store	15.86 m²	Auditorium / Stage
Scene Dock	98.87 m²	Auditorium / Stage
Stalls	471.29 m²	Auditorium / Stage
Stage	454.50 m²	Auditorium / Stage
	1040.53 m²	
Foyer	305.20 m²	Foyer
	305.20 m²	
Star / Conductor DR	26.40 m²	Performer Areas
DR2 (Acc.)	17.18 m²	Performer Areas
Greenroom	58.12 m²	Performer Areas
	101.70 m²	
Cloak/First Aid	19.32 m²	Public
Stalls Bar & Store	39.49 m²	Public
Cafe / Servery / Cafe Kitchen, Stores, Prep	42.94 m²	Public
Central Bar Store	20.17 m²	Public
Usher Changing Area	9.72 m²	Public
FOH Store	9.07 m²	Public
Ice Cream & Programme Store	9.20 m²	Public
House Manager	14.38 m²	Public
Acc WC	3.12 m²	Public
Foyer Furniture Store	19.27 m²	Public
Stalls Womens WC	85.25 m²	Public
Stalls Mens WC	53.72 m²	Public
	325.65 m²	
Audio Rack	18.28 m²	Technical Areas
	18.28 m²	
Theatre Circulation	54.14 m²	Theatre Gross
Theatre Circulation	3.30 m²	Theatre Gross
Theatre Circulation	11.42 m²	Theatre Gross
Theatre Circulation	14.06 m²	Theatre Gross
Theatre Circulation	149.45 m²	Theatre Gross
Theatre Lift	5.97 m²	Theatre Gross
Theatre Stair	27.90 m²	Theatre Gross
Theatre Stair	31.54 m²	Theatre Gross
Theatre Stair	28.87 m²	Theatre Gross
Theatre Circulation	6.60 m²	Theatre Gross
Theatre Circulation	181.29 m²	Theatre Gross
Theatre Circulation	6.60 m²	Theatre Gross
Theatre Circulation	18.12 m²	Theatre Gross
Theatre Plant	52.59 m²	Theatre Gross
Theatre Lift	6.43 m²	Theatre Gross
Theatre Circulation	39.08 m²	Theatre Gross
	637.40 m²	
Grand total	2449.81 m²	

FOR INFORMA

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

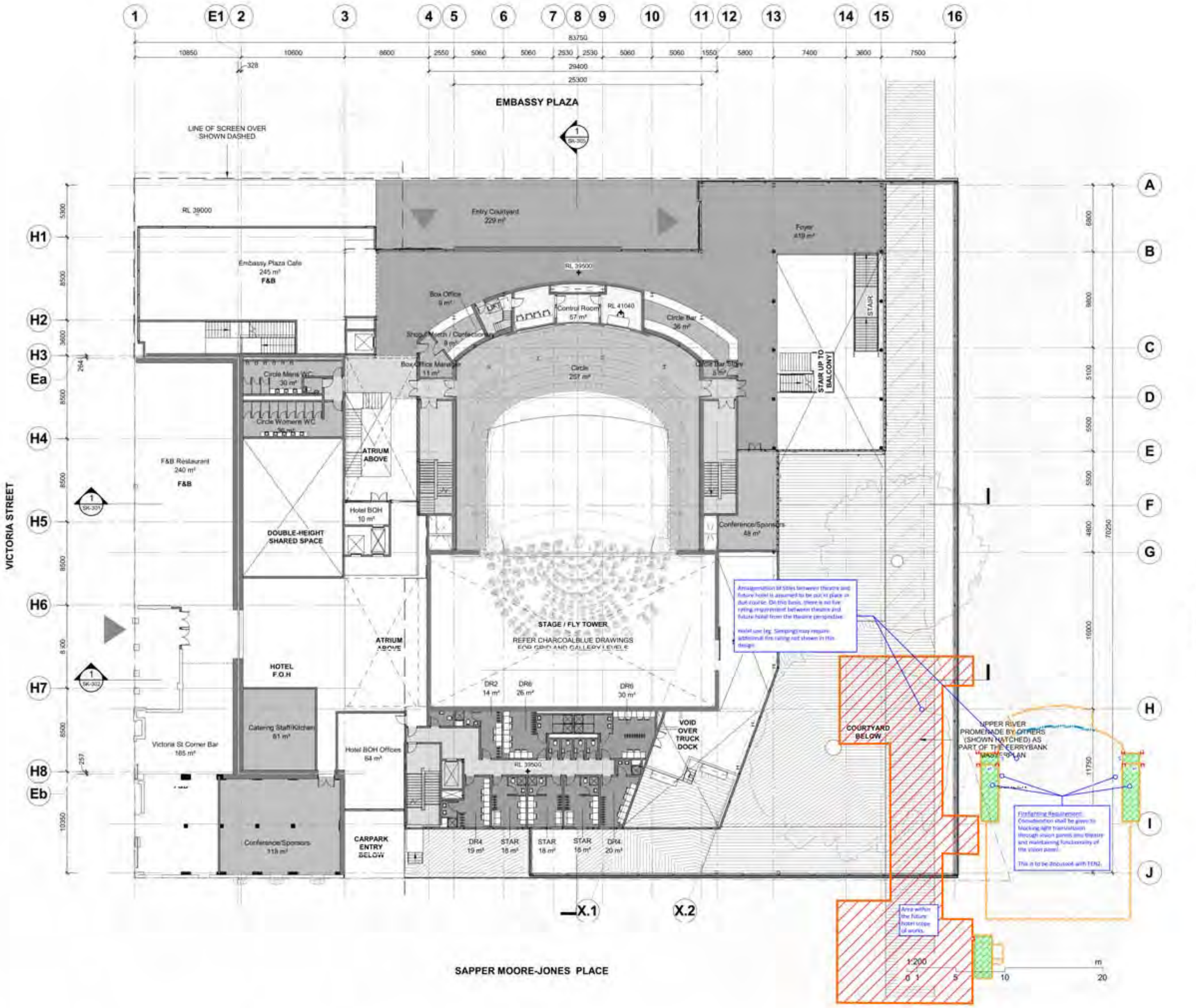
ISSUE DATE: 13/07/2018

DRAWING **Space Planning - Level -1 (Stalls)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-111** REV. **N**

Jasmax



ROOM SCHEDULE - LEVEL 1...		
Name	Area	Department
Circle	256.66 m²	Auditorium / Stage
	256.66 m²	
Foyer	419.34 m²	Foyer
	419.34 m²	
DR2	13.51 m²	Performer Areas
DR4	20.11 m²	Performer Areas
DR4	19.05 m²	Performer Areas
DR6	30.38 m²	Performer Areas
DR6	25.51 m²	Performer Areas
STAR	18.00 m²	Performer Areas
STAR	18.00 m²	Performer Areas
STAR	17.96 m²	Performer Areas
WC	9.66 m²	Performer Areas
WC	3.74 m²	Performer Areas
	175.93 m²	
Box Office	8.79 m²	Public
Box Office Manager	10.78 m²	Public
Circle Bar	36.45 m²	Public
Circle Bar Store	5.09 m²	Public
Circle Mens WC	30.00 m²	Public
Circle Womens WC	35.54 m²	Public
Shop / Merch / Confectionary	8.08 m²	Public
	134.72 m²	
Control Room	56.73 m²	Technical Areas
	56.73 m²	
Foyer Stair	24.12 m²	Theatre Gross
Theatre Circulation	34.42 m²	Theatre Gross
Theatre Circulation	40.39 m²	Theatre Gross
Theatre Circulation	6.79 m²	Theatre Gross
Theatre Circulation	6.60 m²	Theatre Gross
Theatre Lift	6.43 m²	Theatre Gross
Theatre Lift	5.97 m²	Theatre Gross
Theatre Stair	38.06 m²	Theatre Gross
Theatre Stair	38.06 m²	Theatre Gross
Theatre Stair	29.23 m²	Theatre Gross
	230.07 m²	
Grand total	1273.46 m²	

FOR INFORMA

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

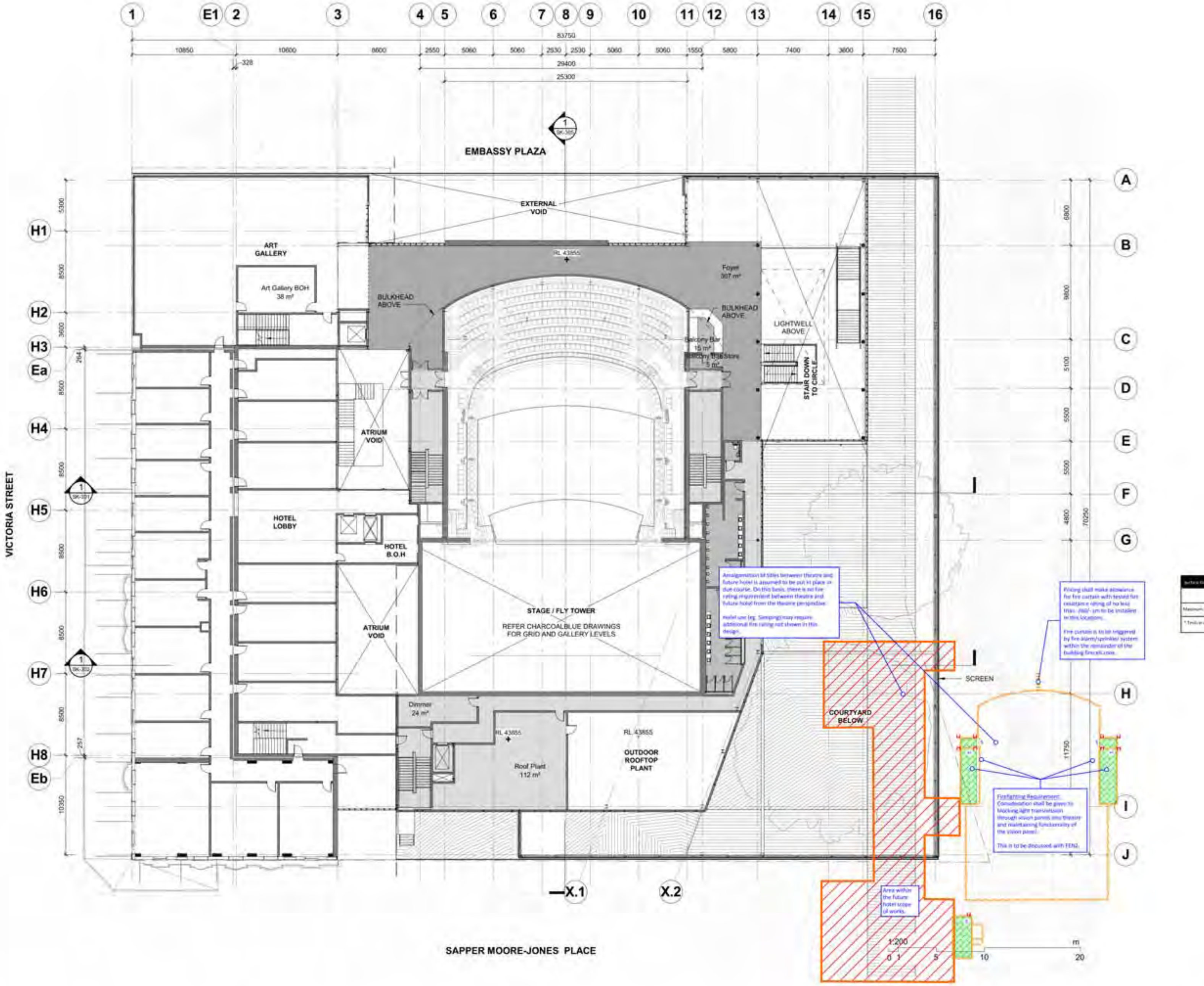
ISSUE DATE: 13/07/2018

DRAWING **Space Planning - Level 1 (Circle)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-112** REV. **N**

Jasmax



ROOM SCHEDULE - LEVEL 2...		
Name	**Area**	**Department**
Foyer	307.29 m²	Foyer
	307.29 m²	
Balcony Bar	14.81 m²	Public
Balcony Bar Store	4.76 m²	Public
Balcony Mens WC	Redundant Room	Public
Balcony Mens WC	3.04 m²	Public
Balcony Womens WC	35.23 m²	Public
	57.84 m²	
Dimmer	23.51 m²	Technical Areas
	23.51 m²	
Roof Plant	111.73 m²	Theatre Gross
Theatre Circulation	8.60 m²	Theatre Gross
Theatre Circulation	7.00 m²	Theatre Gross
Theatre Circulation	69.88 m²	Theatre Gross
Theatre Circulation	36.33 m²	Theatre Gross
Theatre Circulation	40.95 m²	Theatre Gross
Theatre Lift	5.97 m²	Theatre Gross
Theatre Lift	6.43 m²	Theatre Gross
Theatre Stair	38.06 m²	Theatre Gross
Theatre Stair	28.93 m²	Theatre Gross
Theatre Stair	40.37 m²	Theatre Gross
	392.25 m²	
Grand total	780.88 m²	

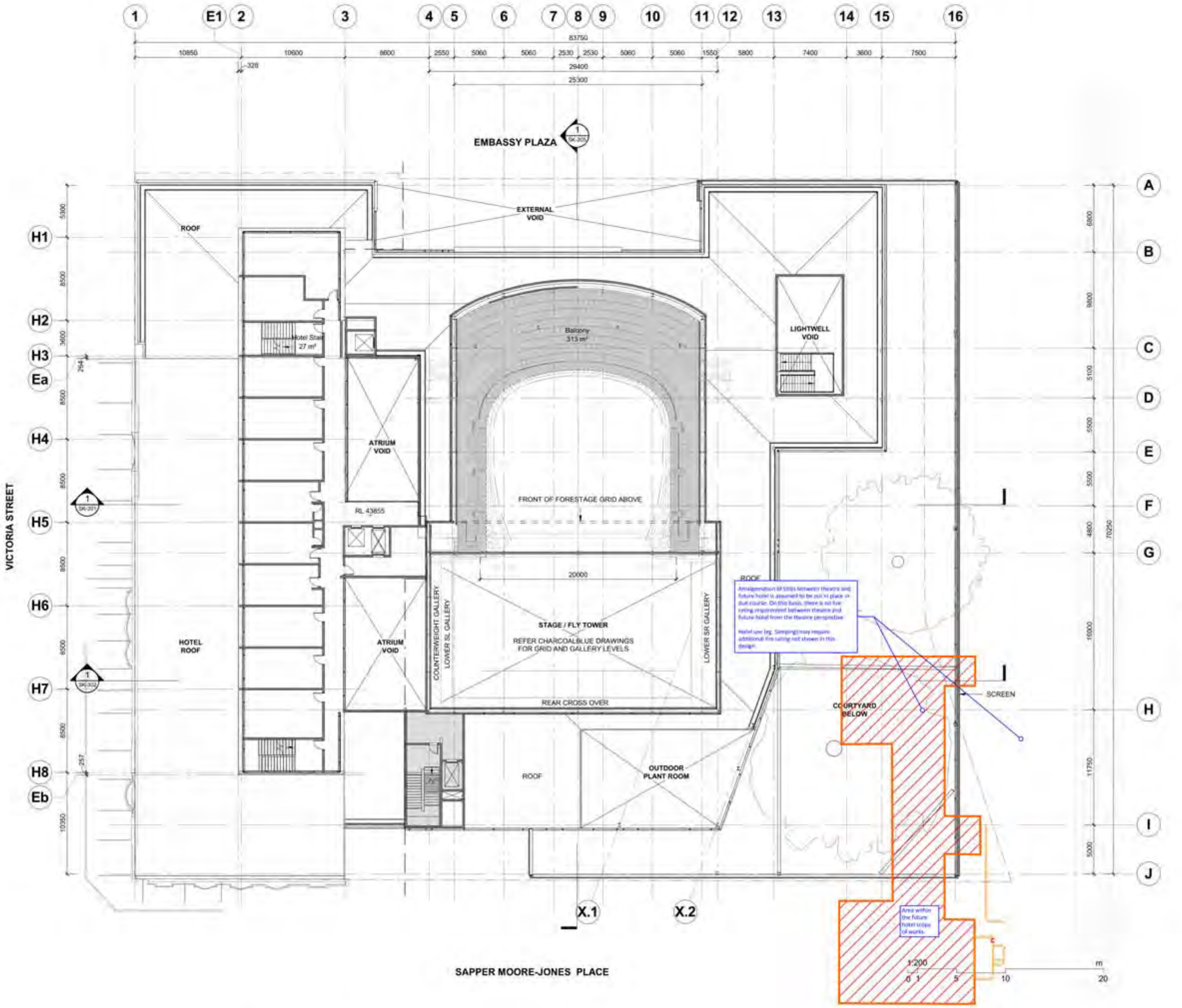
FOR INFORMA

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

ISSUE DATE: 13/07/2018 DRAWING **Space Planning - Level 2 (Balcony)** SCALE @ A1 **1 : 200** DRAWING No. **SK-113** REV. **M**

Jasmax



ROOM SCHEDULE - LEVEL 3...		
Name	Area	Department
Balcony	312.58 m²	Auditorium / Stage
	312.58 m²	
Theatre Circulation	20.78 m²	Theatre Gross
Theatre Lift	5.97 m²	Theatre Gross
Theatre Stair	28.25 m²	Theatre Gross
	55.00 m²	
Grand total	367.58 m²	

FOR INFORMA

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

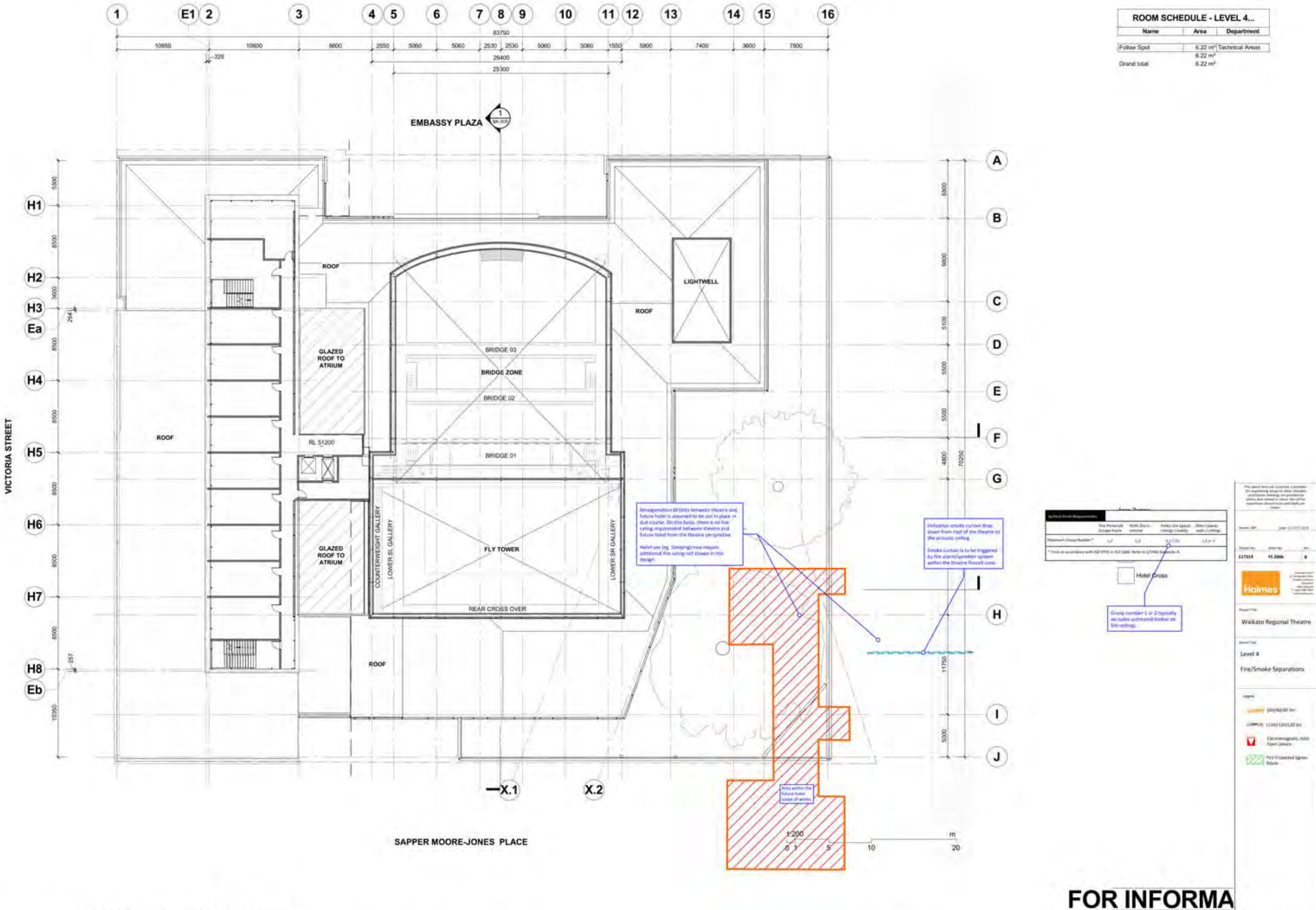
ISSUE DATE: 13/07/2018

DRAWING Space Planning - Level 3 (Terrace)

SCALE @ A1 1 : 200

DRAWING No. SK-114 REV. M

Jasmax



WAIKATO REGIONAL THEATRE

JOB No. 216365.00

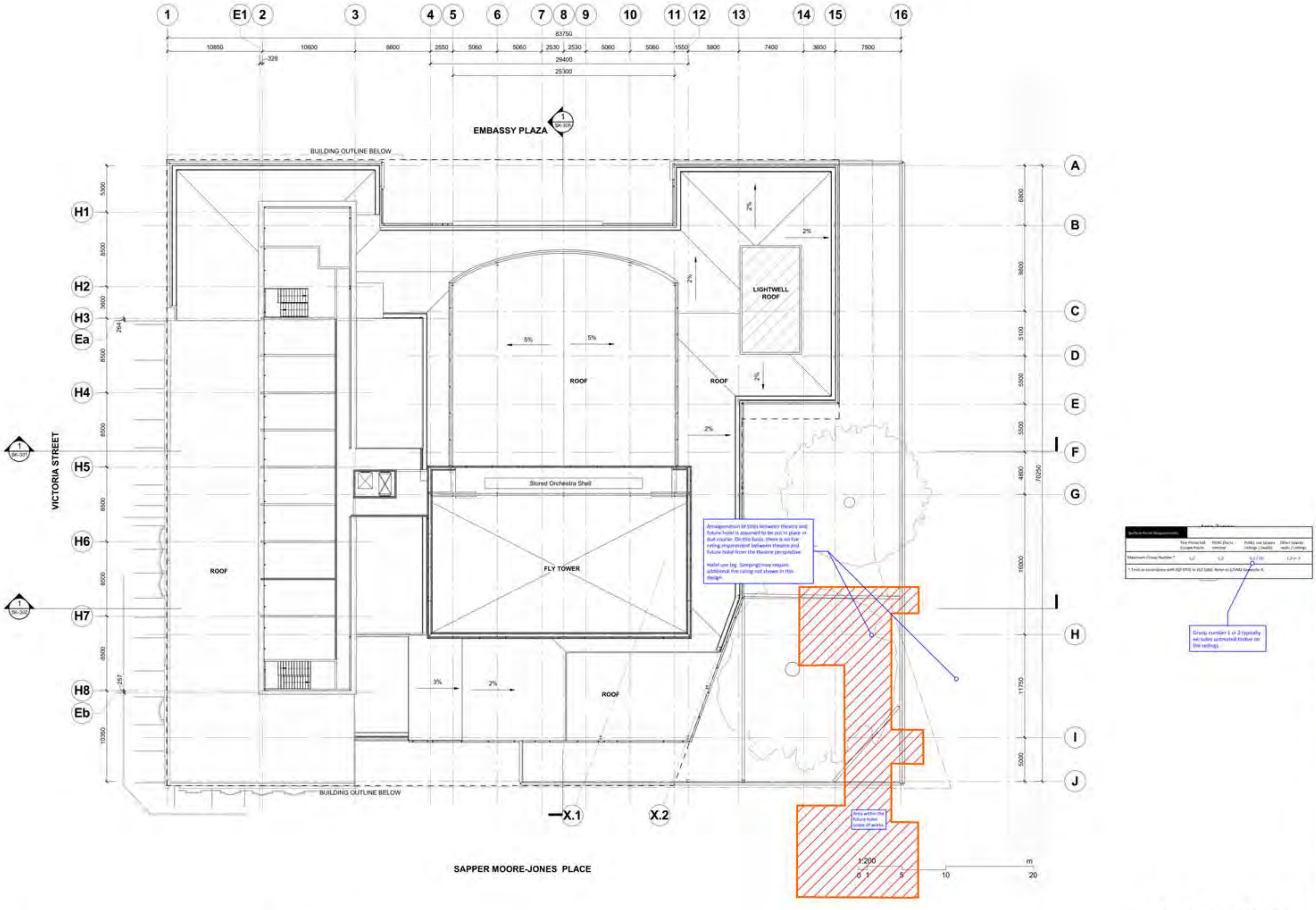
ISSUE DATE: 13/07/2018

DRAWING **Space Planning - Level 4 (Bridge)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-115** REV. **K**

Jasmax



Waikato Regional Theatre

Level 5

Fire/Smoke Separations

Holmes

FOR INFORMA

JOB No. **216365.00**

WAIKATO REGIONAL THEATRE

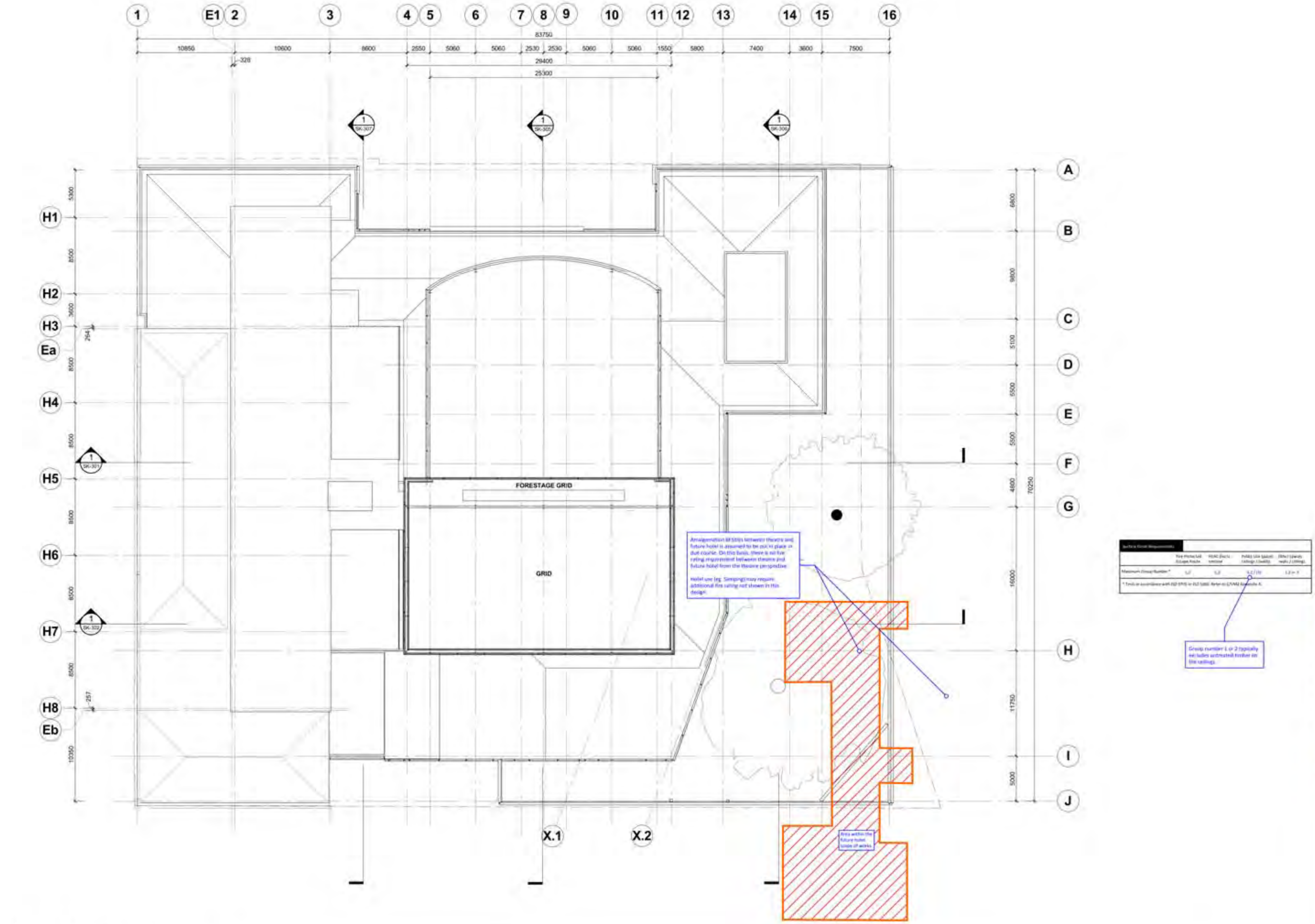
ISSUE DATE: 13/07/2018

DRAWING **Space Planning - Level 5 (Auditorium Roof)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-116** REV. **H**

Jasmax



Waikato Regional Theatre

Level 7

Fire/Smoke Separations

1 1 : 200 Plan Detail

RC-201 SK-117 - Space Planning - Level 7 (Fly Tower Grid)

WAIKATO REGIONAL THEATRE

JOB No. **216365.00**

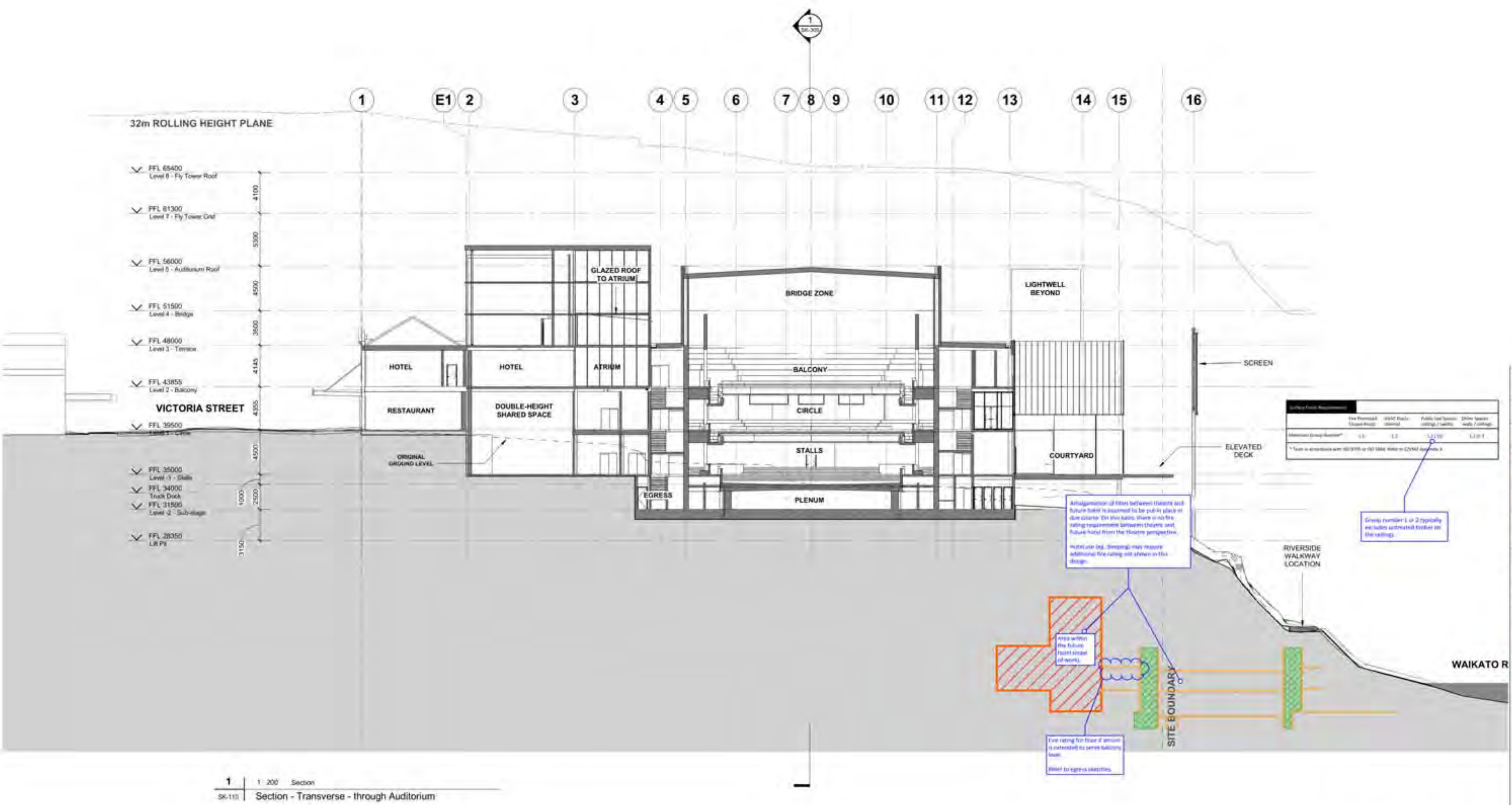
ISSUE DATE: 13/07/2018

DRAWING **Space Planning - Level 7 (Fly Tower Grid)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-117** REV. **E**

Jasmax



1 | 1 : 200 Section
SK-110 | Section - Transverse - through Auditorium

Waikato Regional Theatre

Section 1

Fire/Smoke Separations

Holmes

FOR INFORMA

JOB No. **216365.00**

WAIKATO REGIONAL THEATRE

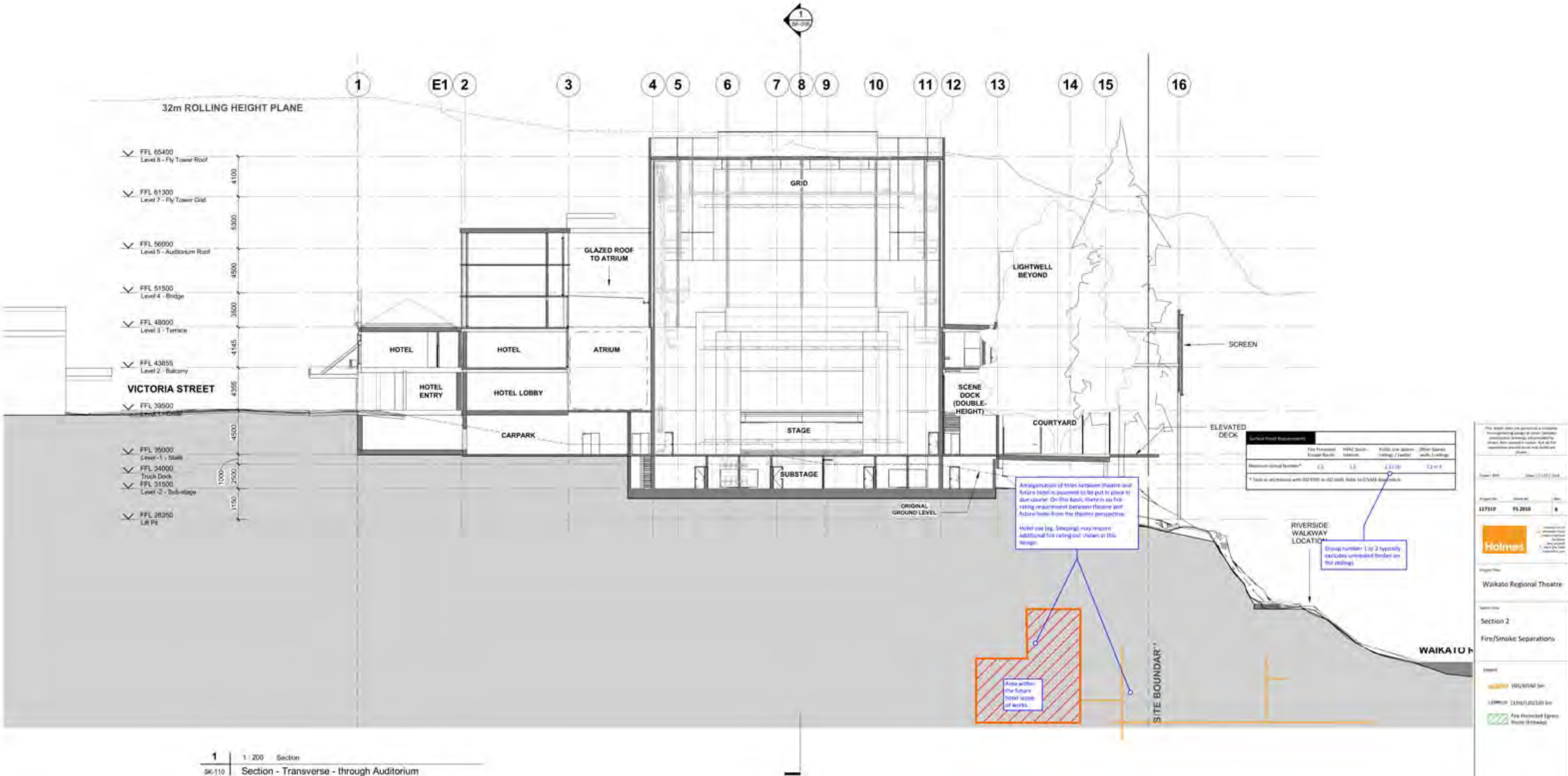
ISSUE DATE:13/07/2018

DRAWING **Section - Transverse - through Atrium**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-301** REV. **N**

Jasmax



FOR INFORMA

WAIKATO REGIONAL THEATRE

JOB No. 216365.00

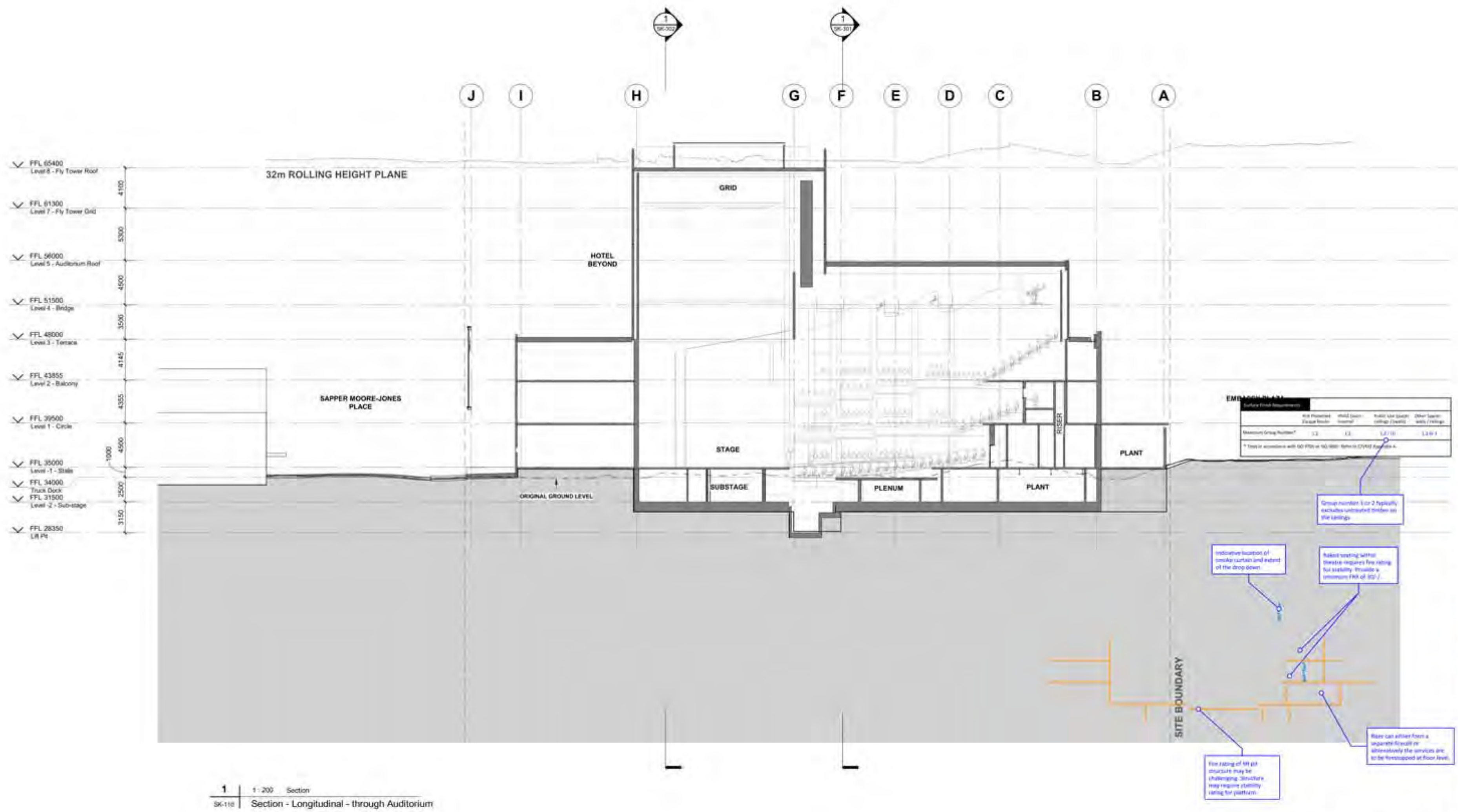
ISSUE DATE: 13/07/2018

DRAWING **Section - Transverse - through Auditorium**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-302** REV. **K**

Jasmax



1 | 1 : 200 Section
SK-110 | Section - Longitudinal - through Auditorium

Waikato Regional Theatre

Section 3

Fire/Smoke Separations

FOR INFORMA

JOB No. **216365.00**

WAIKATO REGIONAL THEATRE

ISSUE DATE: 13/07/2018

DRAWING **Section - Longitudinal - through Auditorium**

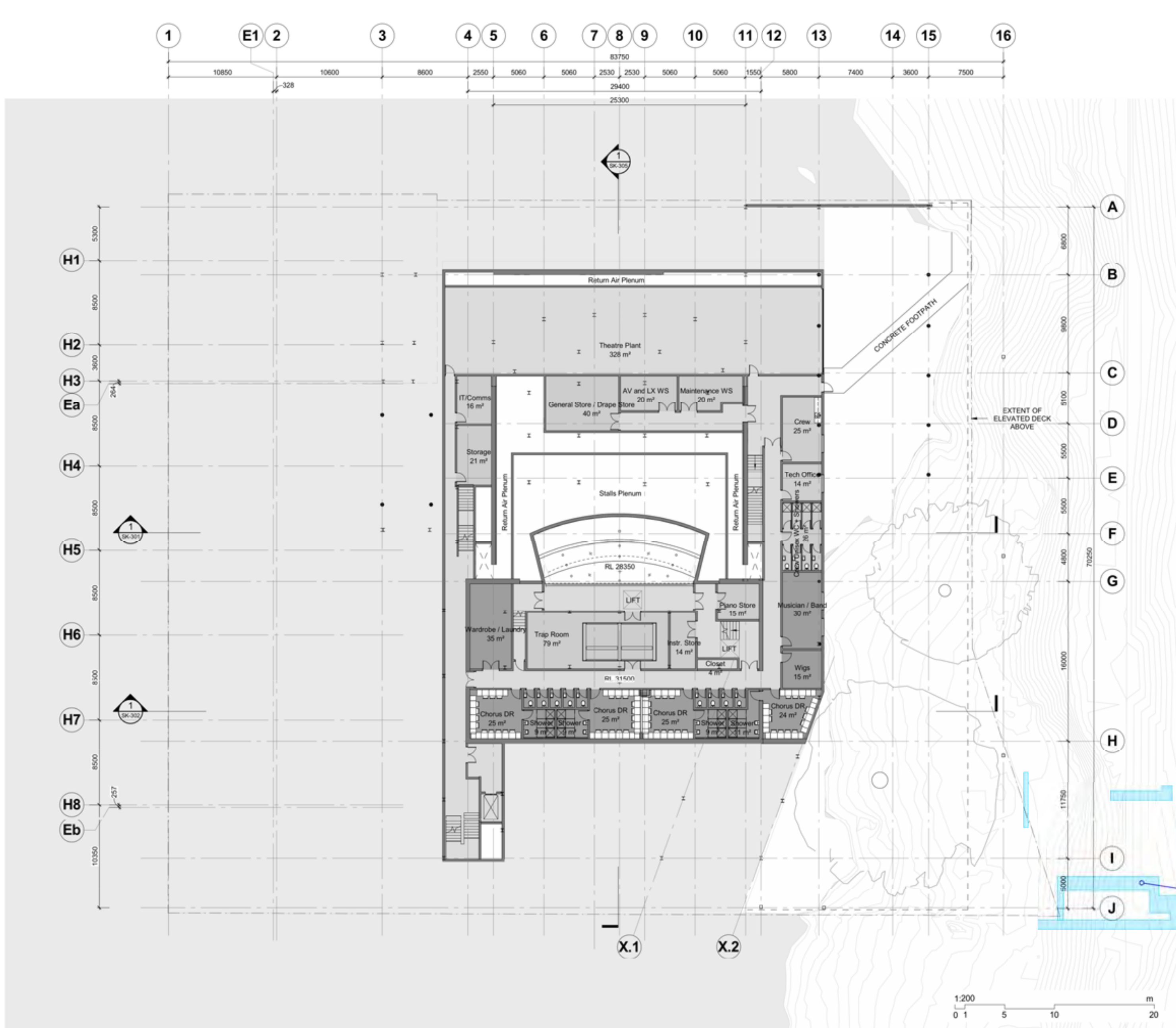
SCALE @ A1 **1 : 200**

DRAWING No. **SK-305** REV. **L**

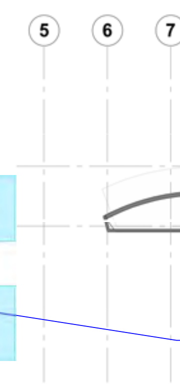
Jasmax

Area Zoning

- Auditorium / Stage
- Performer Areas
- Admin / Staff
- Theatre Gross



1 | 1 : 200 Plan
RC-201 | Sub-stage Space Planning



2 | 1 : 200 Part Plan
RC-201 | Orchestra Pit/Seating Wagon

1:200 m
0 1 5 10 20

ROOM SCHEDULE - LEVEL -2...

Name	Area	Department
Stalls Plenum	300.71 m²	
	300.71 m²	
Crew	25.17 m²	Admin / Staff
IT/Comms	16.47 m²	Admin / Staff
Tech Office	14.44 m²	Admin / Staff
	56.08 m²	
AV and LX WS	19.69 m²	Auditorium / Stage
Crew Unisex WC + Showers	26.45 m²	Auditorium / Stage
General Store / Drape Store	40.00 m²	Auditorium / Stage
Instr. Store	14.11 m²	Auditorium / Stage
Maintenance WS	20.29 m²	Auditorium / Stage
Piano Store	14.97 m²	Auditorium / Stage
Storage	20.58 m²	Auditorium / Stage
Trap Room	79.22 m²	Auditorium / Stage
	235.31 m²	
Chorus DR	25.23 m²	Performer Areas
Chorus DR	24.74 m²	Performer Areas
Chorus DR	24.74 m²	Performer Areas
Chorus DR	24.36 m²	Performer Areas
Musician / Band	29.69 m²	Performer Areas
Shower	10.80 m²	Performer Areas
Shower	8.62 m²	Performer Areas
Shower	8.62 m²	Performer Areas
Shower	8.62 m²	Performer Areas
Wardrobe / Laundry	35.27 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
WC	1.96 m²	Performer Areas
Wigs	14.82 m²	Performer Areas
	233.18 m²	
Closet	3.58 m²	Theatre Gross
Theatre Circulation	107.14 m²	Theatre Gross
Theatre Circulation	14.56 m²	Theatre Gross
Theatre Circulation	138.77 m²	Theatre Gross
Theatre Circulation	23.81 m²	Theatre Gross
Theatre Circulation	41.33 m²	Theatre Gross
Theatre Circulation	31.96 m²	Theatre Gross
Theatre Circulation	13.73 m²	Theatre Gross
Theatre Lift	5.97 m²	Theatre Gross
Theatre Plant	328.09 m²	Theatre Gross
	708.94 m²	
Grand total	1534.21 m²	

Fire Alarm and Suppression Systems Requirements

1. Automatic fire sprinkler system throughout to NZS 4541.

2. Fire alarm interface to HVAC system to activate or deactivate as required by the Fire Engineering design.

3. Activation of any fire safety systems (i.e. sprinklers, detectors and manual call points) within the theatre zone shall interface with house lighting and volume of the event sound system such that the house lights are switched to full illumination and volume reduced to less than 30 dBA.

4. Automatic smoke detection system within the theatre firecell shall be programmable such that it can be configured to operate under different modes depending on the use of the space to avoid nuisance alarm. The different modes of operation for the smoke detection system in the theatre shall be provided within the Stage Manager's panel.

5. For areas where automatic smoke detection system is required, this may be achieved by means of point type smoke detector, multi-criteria detector, beam detector or aspirating smoke detector. To be designed by Fire Protection Engineer.

Fire alarm system to be capable of of zoning. At least two zones, one for the stage and auditorium, and one of the remainder of the building.

This sketch does not constitute a complete fire engineering design or detail. Detailed construction drawings are provided by others. Best viewed in colour. Not all fire separations around ducts and shafts are shown.

Drawn: DSP Date: 17 / 07 / 2018

Project No.	Sheet No.	Rev
117319	FS 3001	B

Holmes
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holmesfire.com

Project Title
Waikato Regional Theatre

Sketch Title
Level -2 (Sub-stage)
Fire Alarm/Suppression System

Legend
- Manual Call Point
- Visual alerting device
- Area coverage of automatic smoke detection system

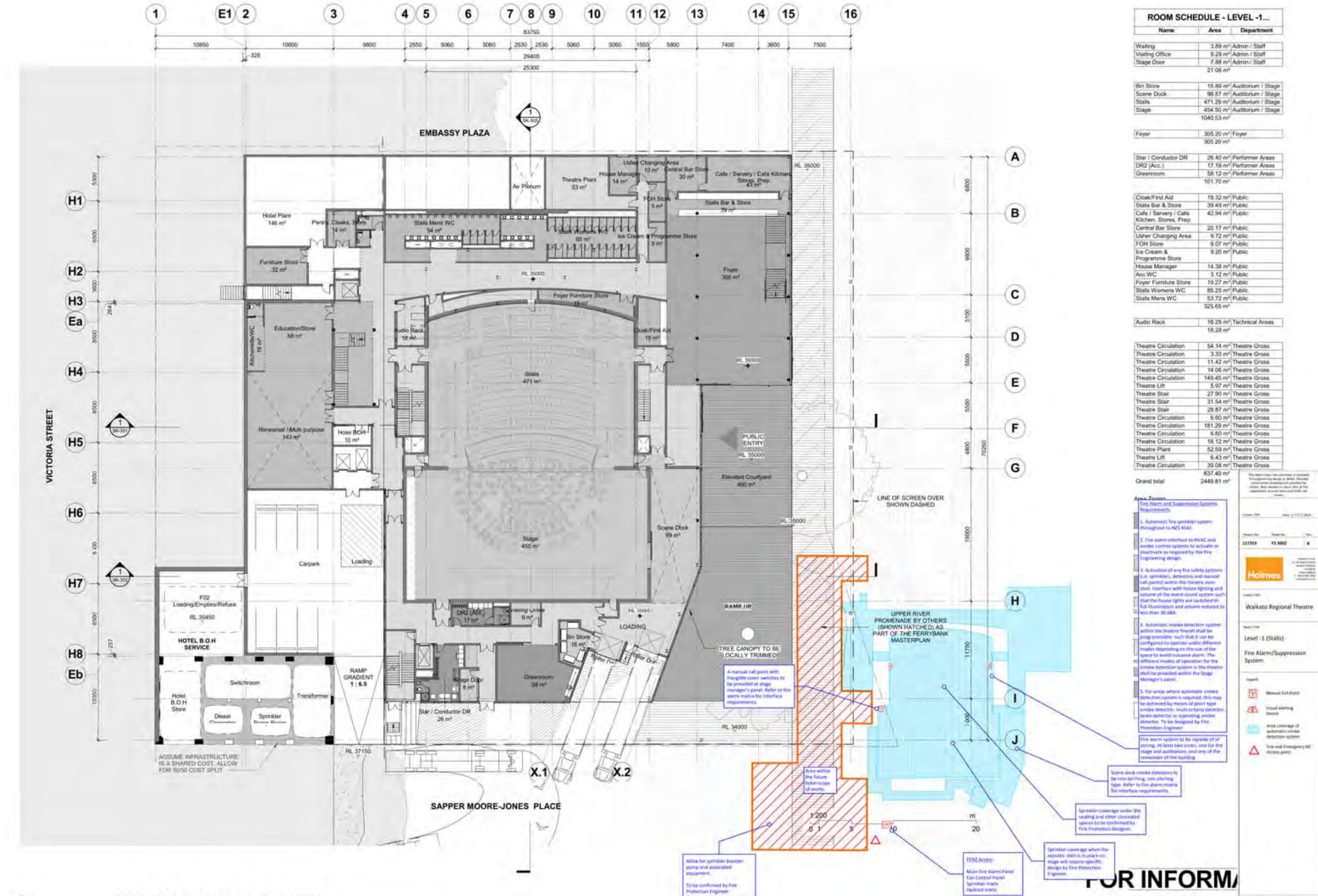
FOR INFORMA

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

ISSUE DATE: 13/07/2018 | DRAWING **Space Planning - Level -2 (Sub-stage)** | SCALE @ A1 **1 : 200** | DRAWING No. **SK-110** | REV. **P**

Jasmax



ROOM SCHEDULE - LEVEL -1...

Name	Area	Department
Waiting	3.89 m²	Admin / Staff
Visiting Office	9.29 m²	Admin / Staff
Stage Door	7.88 m²	Admin / Staff
	21.06 m²	
Bin Store	15.86 m²	Auditorium / Stage
Scene Dock	98.87 m²	Auditorium / Stage
Stalls	471.29 m²	Auditorium / Stage
Stage	454.50 m²	Auditorium / Stage
	1040.53 m²	
Foyer	305.20 m²	Foyer
	305.20 m²	
Star / Conductor DR	26.40 m²	Performer Areas
DR2 (Acc.)	17.18 m²	Performer Areas
Greenroom	58.12 m²	Performer Areas
	101.70 m²	
Cloak/First Aid	19.32 m²	Public
Stalls Bar & Store	39.49 m²	Public
Cafe / Servery / Cafe Kitchen, Stores, Prep	42.94 m²	Public
Central Bar Store	20.17 m²	Public
Usher Changing Area	9.72 m²	Public
FOH Store	9.07 m²	Public
Ice Cream & Programme Store	9.20 m²	Public
House Manager	14.38 m²	Public
Acc WC	3.12 m²	Public
Foyer Furniture Store	19.27 m²	Public
Stalls Womens WC	85.25 m²	Public
Stalls Mens WC	53.72 m²	Public
	325.65 m²	
Audio Rack	18.28 m²	Technical Areas
	18.28 m²	
Theatre Circulation	54.14 m²	Theatre Gross
Theatre Circulation	3.30 m²	Theatre Gross
Theatre Circulation	11.42 m²	Theatre Gross
Theatre Circulation	14.06 m²	Theatre Gross
Theatre Circulation	149.45 m²	Theatre Gross
Theatre Lift	5.97 m²	Theatre Gross
Theatre Stair	27.90 m²	Theatre Gross
Theatre Stair	31.54 m²	Theatre Gross
Theatre Stair	28.87 m²	Theatre Gross
Theatre Circulation	6.60 m²	Theatre Gross
Theatre Circulation	181.29 m²	Theatre Gross
Theatre Circulation	6.60 m²	Theatre Gross
Theatre Circulation	18.12 m²	Theatre Gross
Theatre Plant	52.59 m²	Theatre Gross
Theatre Lift	6.43 m²	Theatre Gross
Theatre Circulation	39.08 m²	Theatre Gross
	637.40 m²	
Grand total	2449.81 m²	

FOR INFORMA

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

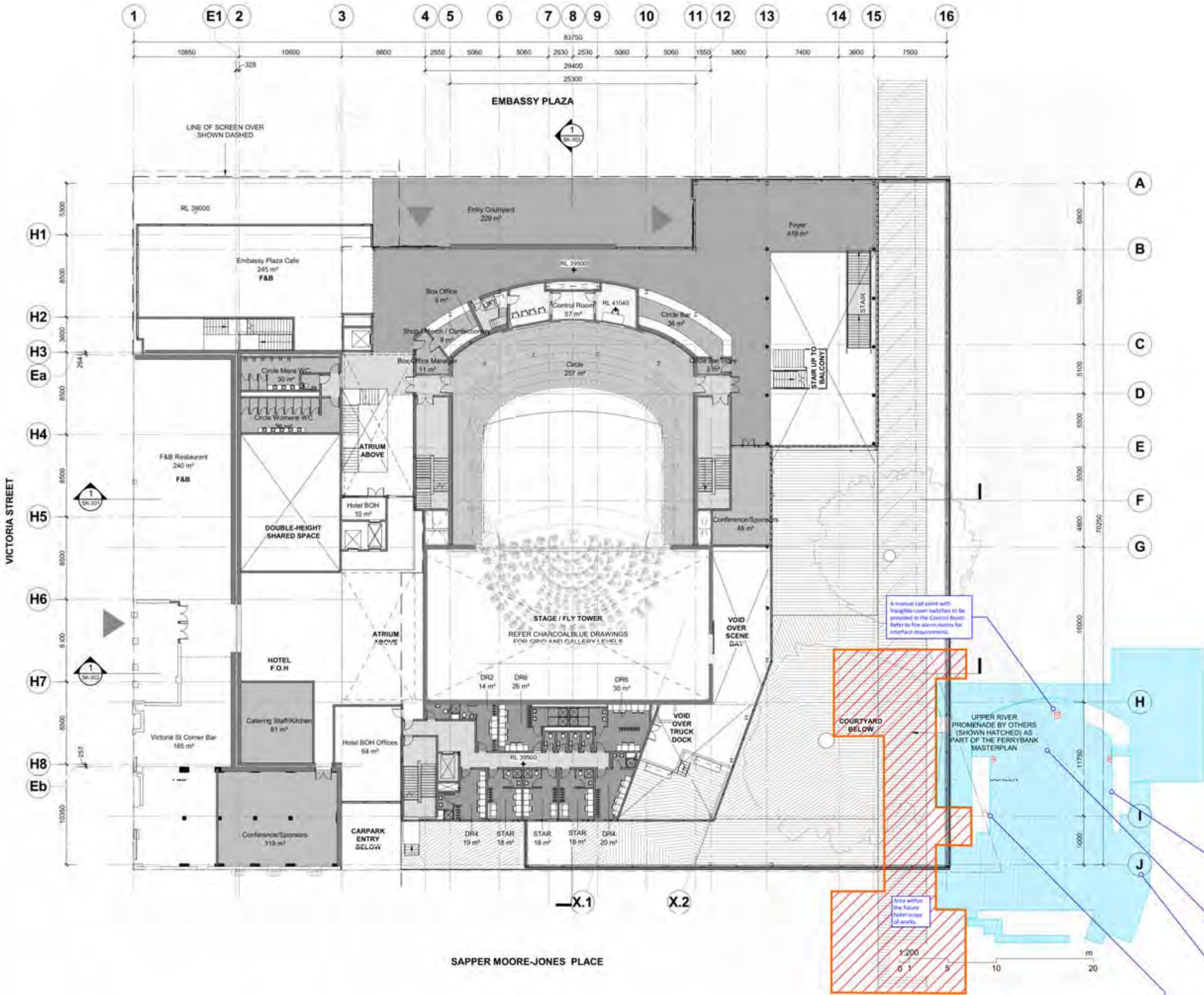
ISSUE DATE: 13/07/2018

DRAWING Space Planning - Level -1 (Stalls)

SCALE @ A1 1 : 200

DRAWING No. SK-111 REV. N

Jasmax



ROOM SCHEDULE - LEVEL 1...		
Name	**Area**	**Department**
Circle	256.66 m²	Auditorium / Stage
	256.66 m²	
Foyer	419.34 m²	Foyer
	419.34 m²	
DR2	13.51 m²	Performer Areas
DR4	20.11 m²	Performer Areas
DR4	19.05 m²	Performer Areas
DR6	30.38 m²	Performer Areas
DR6	25.51 m²	Performer Areas
STAR	18.00 m²	Performer Areas
STAR	18.00 m²	Performer Areas
STAR	17.96 m²	Performer Areas
WC	9.66 m²	Performer Areas
WC	3.74 m²	Performer Areas
	175.93 m²	
Box Office	8.79 m²	Public
Box Office Manager	10.78 m²	Public
Circle Bar	36.45 m²	Public
Circle Bar Store	5.09 m²	Public
Circle Mens WC	30.00 m²	Public
Circle Womens WC	35.54 m²	Public
Shop / Merch / Confectionary	8.08 m²	Public
	134.72 m²	
Control Room	56.73 m²	Technical Areas
	56.73 m²	
Foyer Stair	24.12 m²	Theatre Gross
Theatre Circulation	34.42 m²	Theatre Gross
Theatre Circulation	40.39 m²	Theatre Gross
Theatre Circulation	6.79 m²	Theatre Gross
Theatre Circulation	6.60 m²	Theatre Gross
Theatre Lift	6.43 m²	Theatre Gross
Theatre Lift	5.97 m²	Theatre Gross
Theatre Stair	38.06 m²	Theatre Gross
Theatre Stair	38.06 m²	Theatre Gross
Theatre Stair	29.23 m²	Theatre Gross
	230.07 m²	
Grand total	1273.46 m²	

Holmes

Waikato Regional Theatre

Level 1 (Circle)

Fire Alarm/Suppression System

FOR INFORMA

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

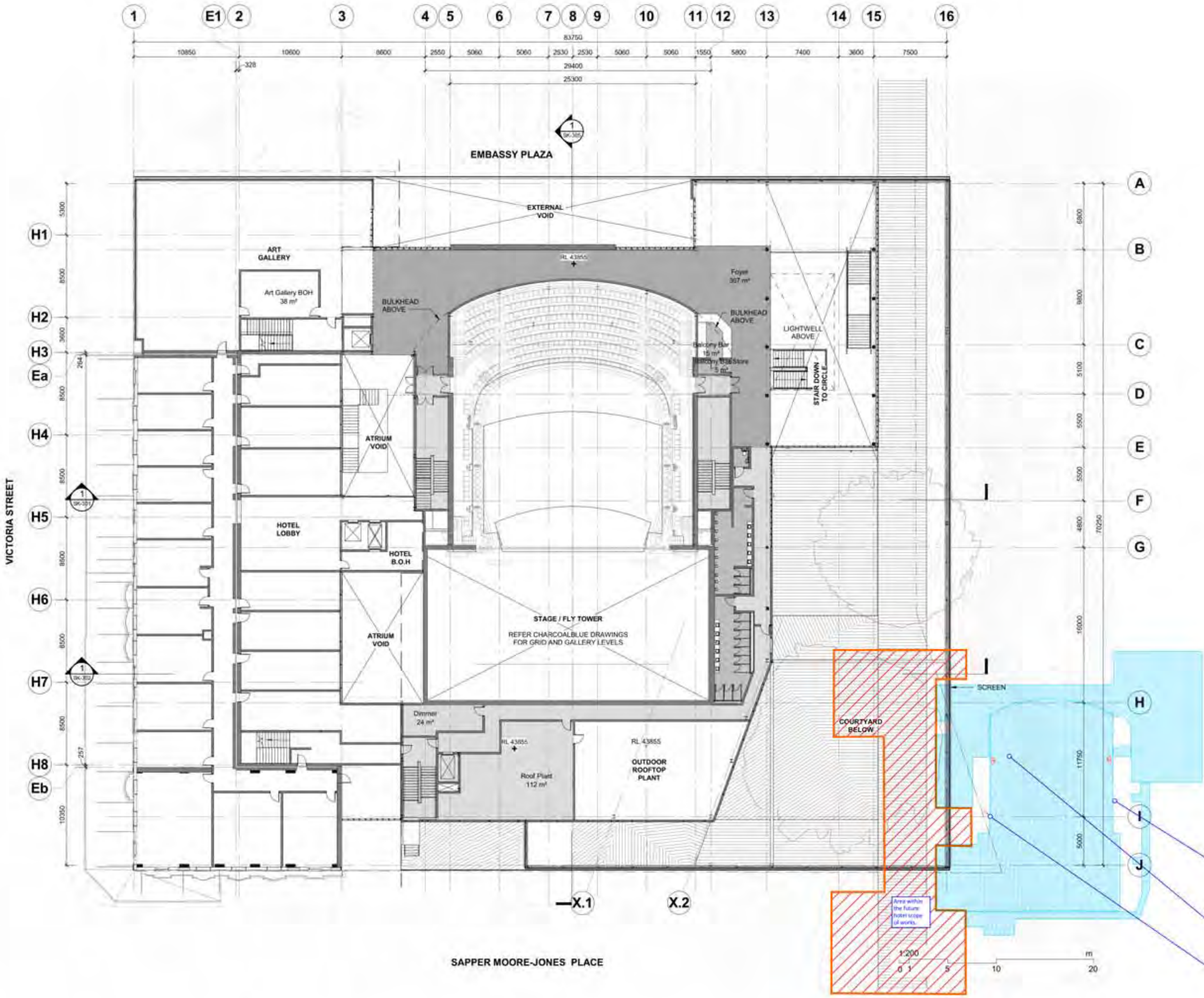
ISSUE DATE: 13/07/2018

DRAWING **Space Planning - Level 1 (Circle)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-112** REV. **N**

Jasmax



ROOM SCHEDULE - LEVEL 2...

Name	Area	Department
Foyer	307.29 m²	Foyer
	307.29 m²	
Balcony Bar	14.81 m²	Public
Balcony Bar Store	4.76 m²	Public
Balcony Mens WC	Redundant Room	Public
Balcony Mens WC	3.04 m²	Public
Balcony Womens WC	35.23 m²	Public
	57.84 m²	
Dimmer	23.51 m²	Technical Areas
	23.51 m²	
Roof Plant	111.73 m²	Theatre Gross
Theatre Circulation	8.60 m²	Theatre Gross
Theatre Circulation	7.00 m²	Theatre Gross
Theatre Circulation	69.88 m²	Theatre Gross
Theatre Circulation	36.33 m²	Theatre Gross
Theatre Circulation	40.95 m²	Theatre Gross
Theatre Lift	5.97 m²	Theatre Gross
Theatre Lift	6.43 m²	Theatre Gross
Theatre Stair	38.06 m²	Theatre Gross
Theatre Stair	28.93 m²	Theatre Gross
Theatre Stair	40.37 m²	Theatre Gross
	392.25 m²	
Grand total	780.88 m²	

Area Zoning

Fire Alarm and Suppression Systems Requirements

1. Automatic fire sprinkler system throughout to NZS 4541.

2. Fire alarm interface to HVAC and smoke control systems to activate or deactivate as required by the Fire Engineering design.

3. Activation of any fire safety systems (i.e. sprinklers, detectors and manual call points) within the theatre zone shall: Interface with house lighting and volume of the event sound system such that the house lights are switched to full illumination and volume reduced to less than 30 dBA.

4. Automatic smoke detection system within the theatre firecell shall be programmable such that it can be configured to operate under different modes depending on the use of the space to avoid nuisance alarm. The different modes of operation for the smoke detection system in the theatre shall be provided within the Stage Manager's panel.

5. For areas where automatic smoke detection system is required, this may be achieved by means of point type smoke detector, muti-criteria detector, beam detector or aspirating smoke detector. To be designed by Fire Protection Engineer.

Fire alarm system to be capable of of zoning. At least two zones, one for the stage and auditorium, and one of the remainder of the building.

Sprinkler coverage under the seating and other concealed spaces to be confirmed by Fire Protection designer.

Hydrant riser outlet located on landing to allow refuge area.

To be confirmed with CFNZ.

Holmes

Waikato Regional Theatre

Level 2 (Balcony)

Fire Alarm/Suppression System

Manual Call Point

Visual alerting device

Area coverage of automatic smoke detection system

FOR INFORM

WAIKATO REGIONAL THEATRE

JOB No. 216365.00

ISSUE DATE: 13/07/2018

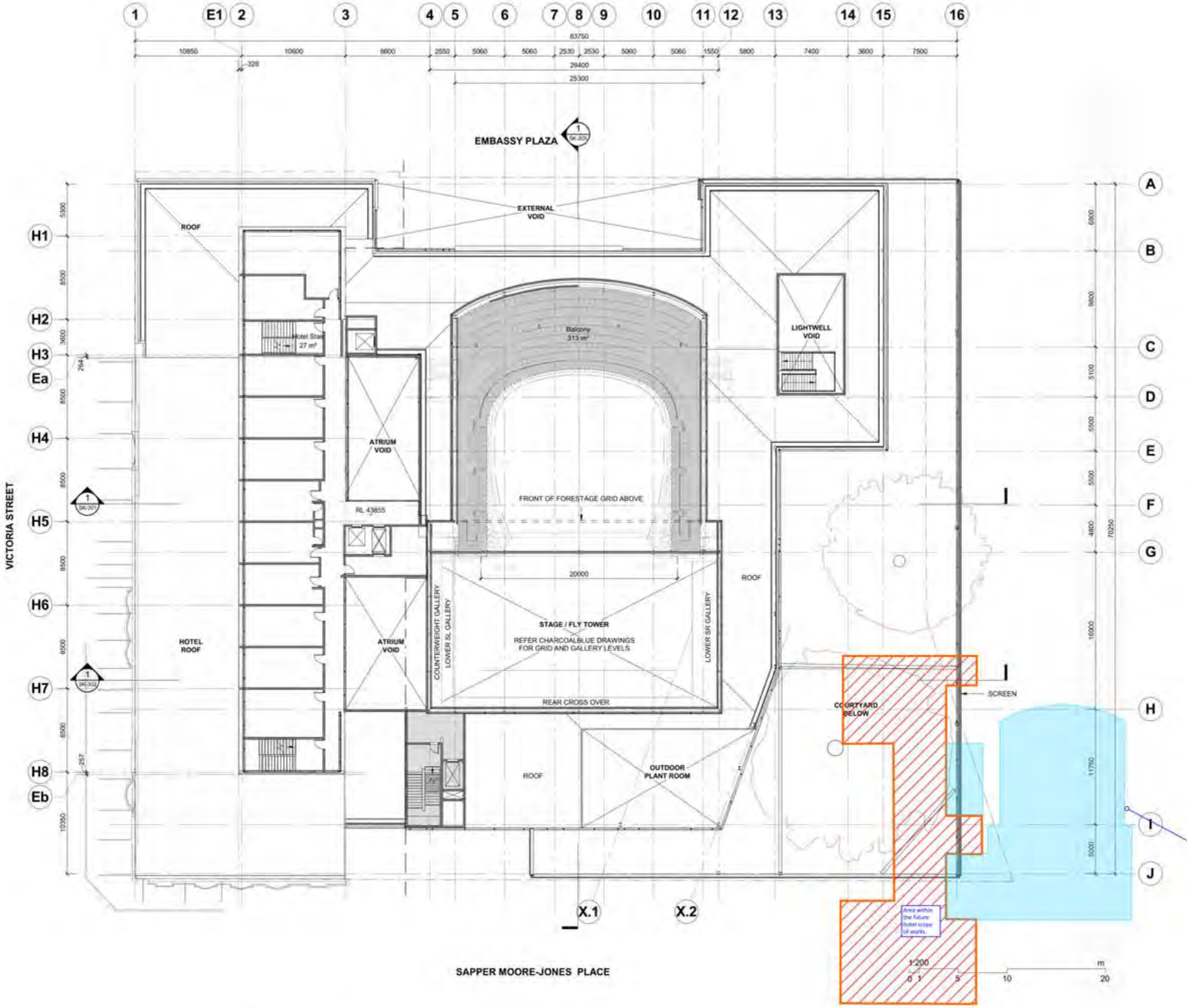
DRAWING **Space Planning - Level 2 (Balcony)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-113**

REV. **M**

Jasmax



ROOM SCHEDULE - LEVEL 3...

Name	Area	Department
Balcony	312.58 m²	Auditorium / Stage
	312.58 m²	
Theatre Circulation	20.78 m²	Theatre Gross
Theatre Lift	5.97 m²	Theatre Gross
Theatre Stair	28.25 m²	Theatre Gross
	55.00 m²	
Grand total	367.58 m²	

Area Zoning

Fire Alarm and Suppression Systems Requirements

1. Automatic fire sprinkler system throughout to NZS 4541.

2. Fire alarm interface to HVAC and smoke control systems to activate or deactivate as required by the Fire Engineering design.

3. Activation of any fire safety systems (i.e. sprinklers, detectors and manual call points) within the theatre zone shall interface with house lighting and volume of the event sound system such that the house lights are switched to full illumination and volume reduced to less than 30 dBA.

4. Automatic smoke detection system within the theatre firecell shall be programmable such that it can be configured to operate under different modes depending on the use of the space to avoid nuisance alarm. The different modes of operation for the smoke detection system in the theatre shall be provided within the Stage Manager's panel.

5. For areas where automatic smoke detection system is required, this may be achieved by means of point type smoke detector, multi-criteria detector, beam detector or aspirating smoke detector. To be designed by Fire Protection Engineer.

Fire alarm system to be capable of of zoning. At least two zones, one for the stage and auditorium, and one of the remainder of the building.

117359 FS 3005

Holmes

Waikato Regional Theatre

Level 3 (Terrace)

Fire Alarm/Suppression System

Manual Call Point

Visual alerting device

Area coverage of automatic smoke detection system

FOR INFORM

JOB No. 216365.00

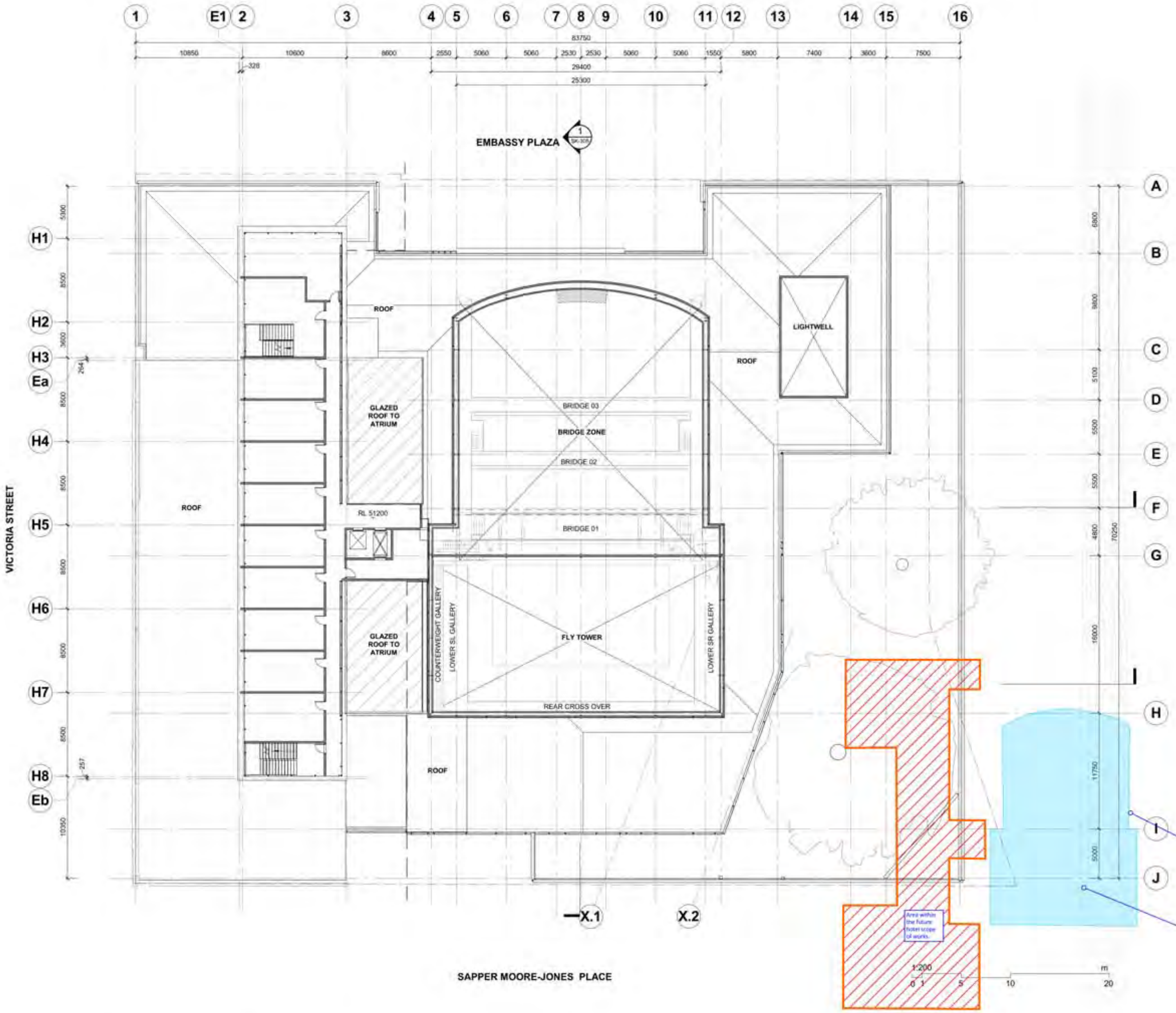
WAIKATO REGIONAL THEATRE

ISSUE DATE: 13/07/2018 | DRAWING **Space Planning - Level 3 (Terrace)** | SCALE @ A1 **1 : 200** | DRAWING No. **SK-114** | REV. **M**

Jasmax

ROOM SCHEDULE - LEVEL 4...

Name	Area	Department
Follow Spot	6.22 m²	Technical Areas
	6.22 m²	
Grand total	6.22 m²	



117359 | FS 3006 | A

Holmes

Waikato Regional Theatre

Level 4 (Bridge)

Fire Alarm/Suppression System

Manual Call Point

Visual alerting device

Area coverage of automatic smoke detection system

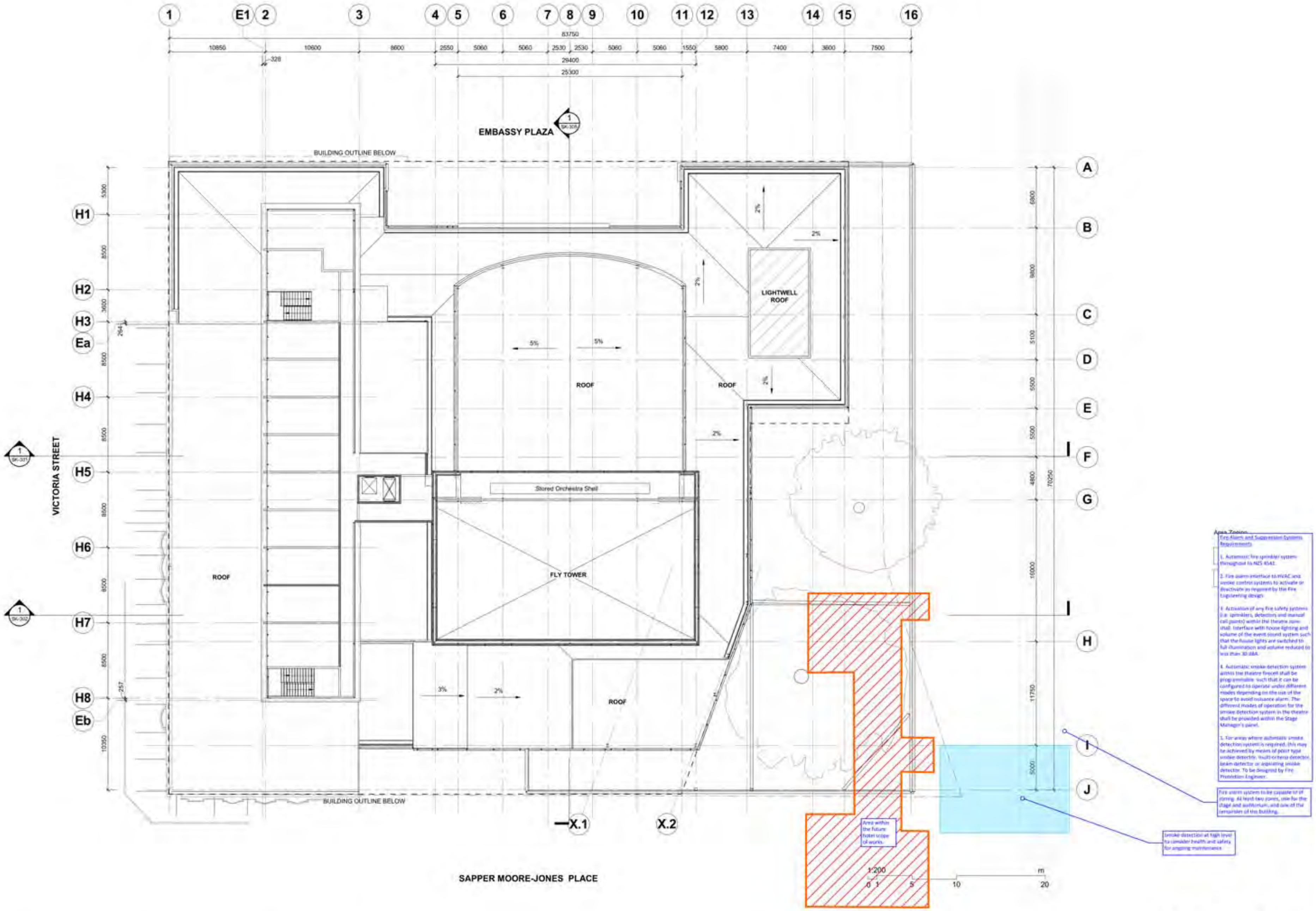
FOR INFORM/

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

ISSUE DATE: 13/07/2018 | DRAWING **Space Planning - Level 4 (Bridge)** | SCALE @ A1 **1 : 200** | DRAWING No. **SK-115** | REV. **K**

Jasmax



Holmes

Waikato Regional Theatre

Level 5 (Auditorium Roof)

Fire Alarm/Suppression System

Manual Call Point

Visual alerting device

Area coverage of automatic smoke detection system

FOR INFORMA

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

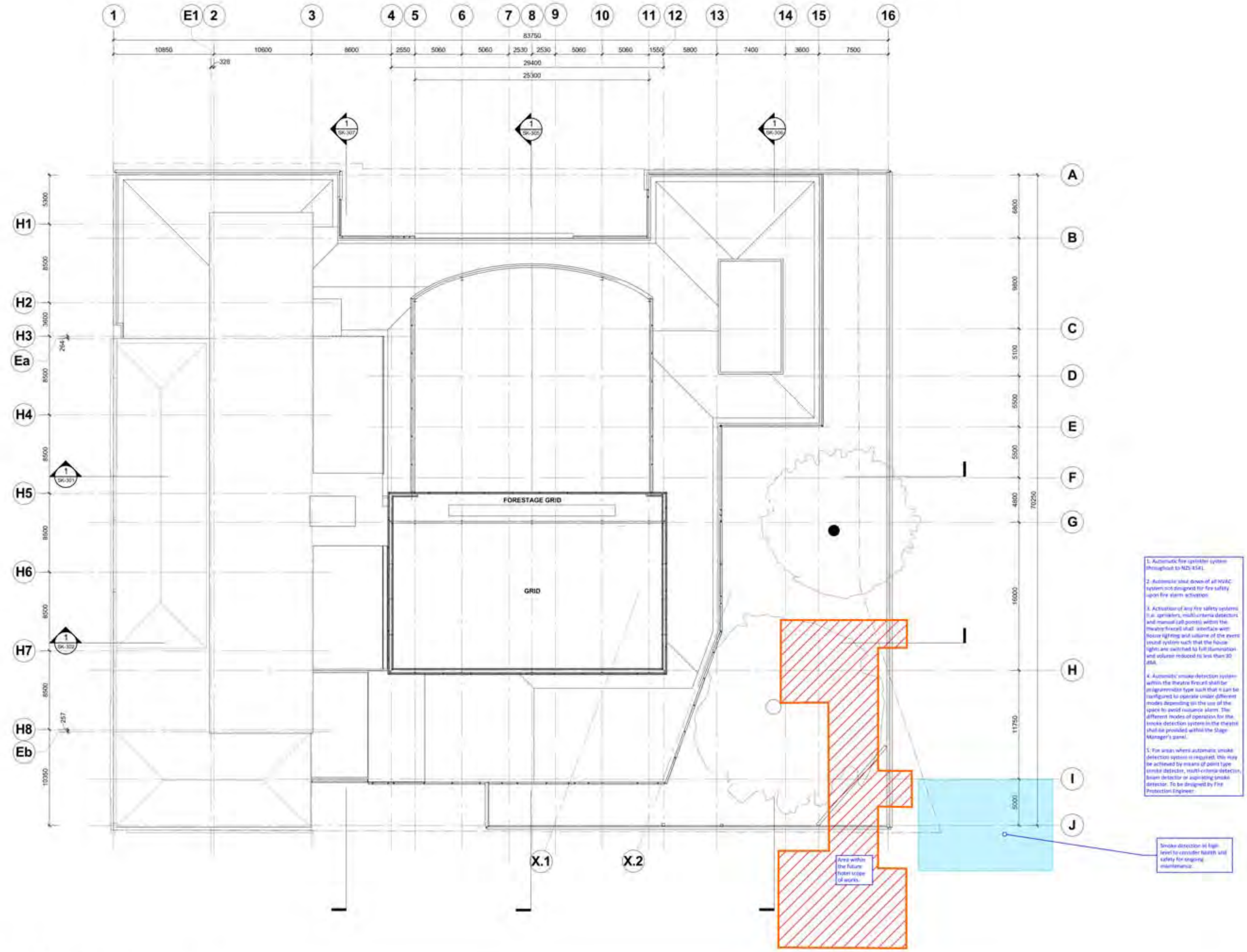
ISSUE DATE: 13/07/2018

DRAWING **Space Planning - Level 5 (Auditorium Roof)**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-116** REV. **H**

Jasmax



1 1 : 200 Plan Detail
RC-201 SK-117 - Space Planning - Level 7 (Fly Tower Grid)

Holmes

Waikato Regional Theatre

Level 7 (Fly Tower Grid)

Fire Alarm/Suppression System

Manual Call Point

Visual alerting device

Area coverage of automatic smoke detection system

WAIKATO REGIONAL THEATRE

ISSUE DATE: 13/07/2018

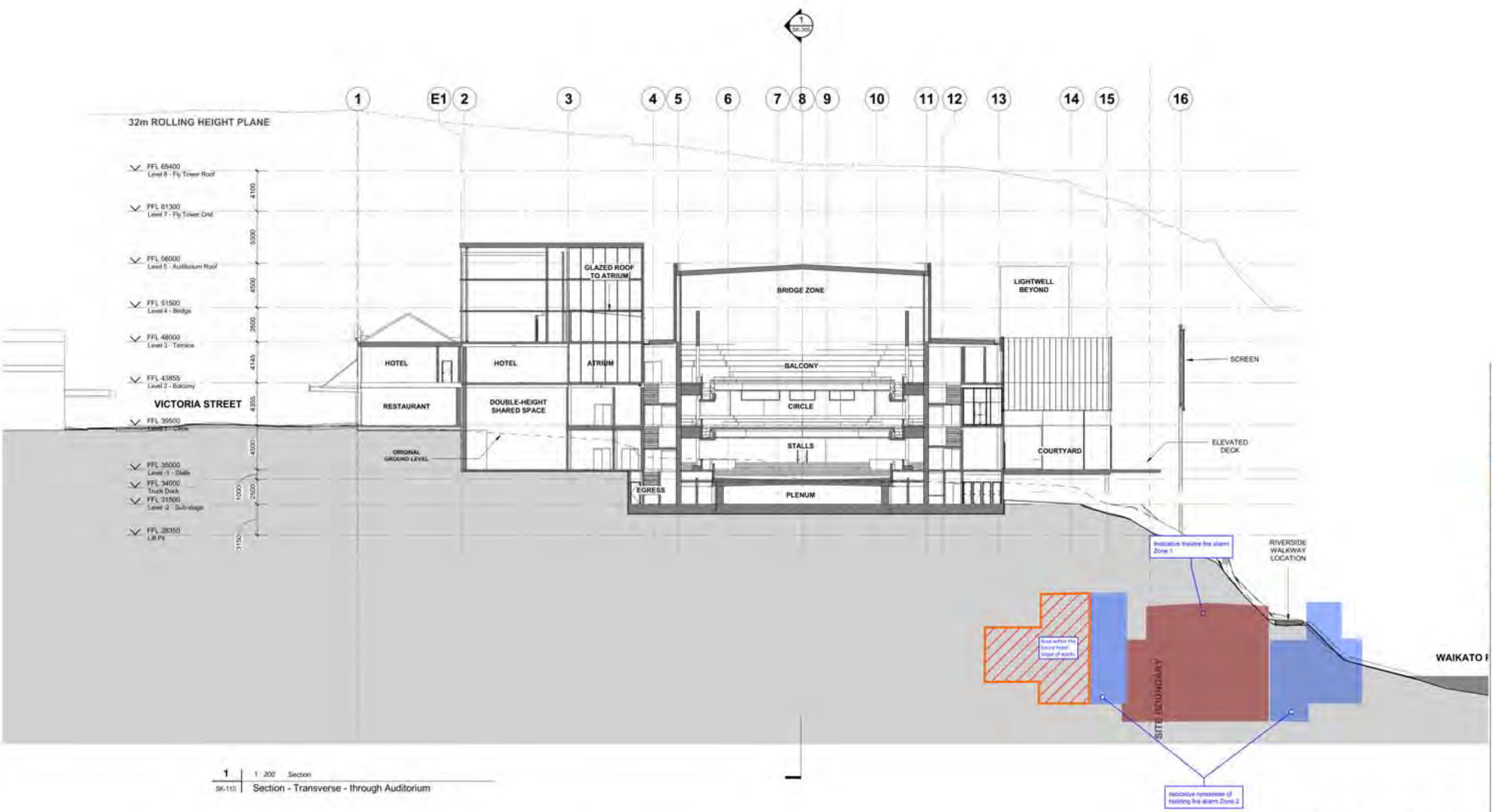
DRAWING **Space Planning - Level 7 (Fly Tower Grid)**

SCALE @ A1 **1 : 200**

JOB No. **216365.00**

DRAWING No. **SK-117** REV. **E**

Jasmax



1 | 1 : 200 Section
SK-110 | Section - Transverse - through Auditorium

Waikato Regional Theatre

Section for Zones

Fire Alarm/Suppression System

Holmes

FOR INFORMA

JOB No. 216365.00

WAIKATO REGIONAL THEATRE

ISSUE DATE:13/07/2018 | DRAWING **Section - Transverse - through Atrium** | SCALE @ A1 **1 : 200** | DRAWING No. **SK-301** | REV. **N**

Jasmax

1 1 : 200 Section
SK-110 Section - Longitudinal - through Auditorium

FOR INFORMA

JOB No. **216365.00**

WAIKATO REGIONAL THEATRE

ISSUE DATE:13/07/2018

DRAWING **Section - Longitudinal - through Auditorium**

SCALE @ A1 **1 : 200**

DRAWING No. **SK-305** REV. **L**

Jasmax

This sketch does not constitute a complete fire engineering design or detail. Detailed construction drawings are provided by others. Best viewed in colour. Not all fire separations around ducts and shafts are shown.

Drawn: DSP | Date: 29 / 06 / 2018

Project No.	Sheet No.	Rev
117319	FS 5002	A

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Project Title

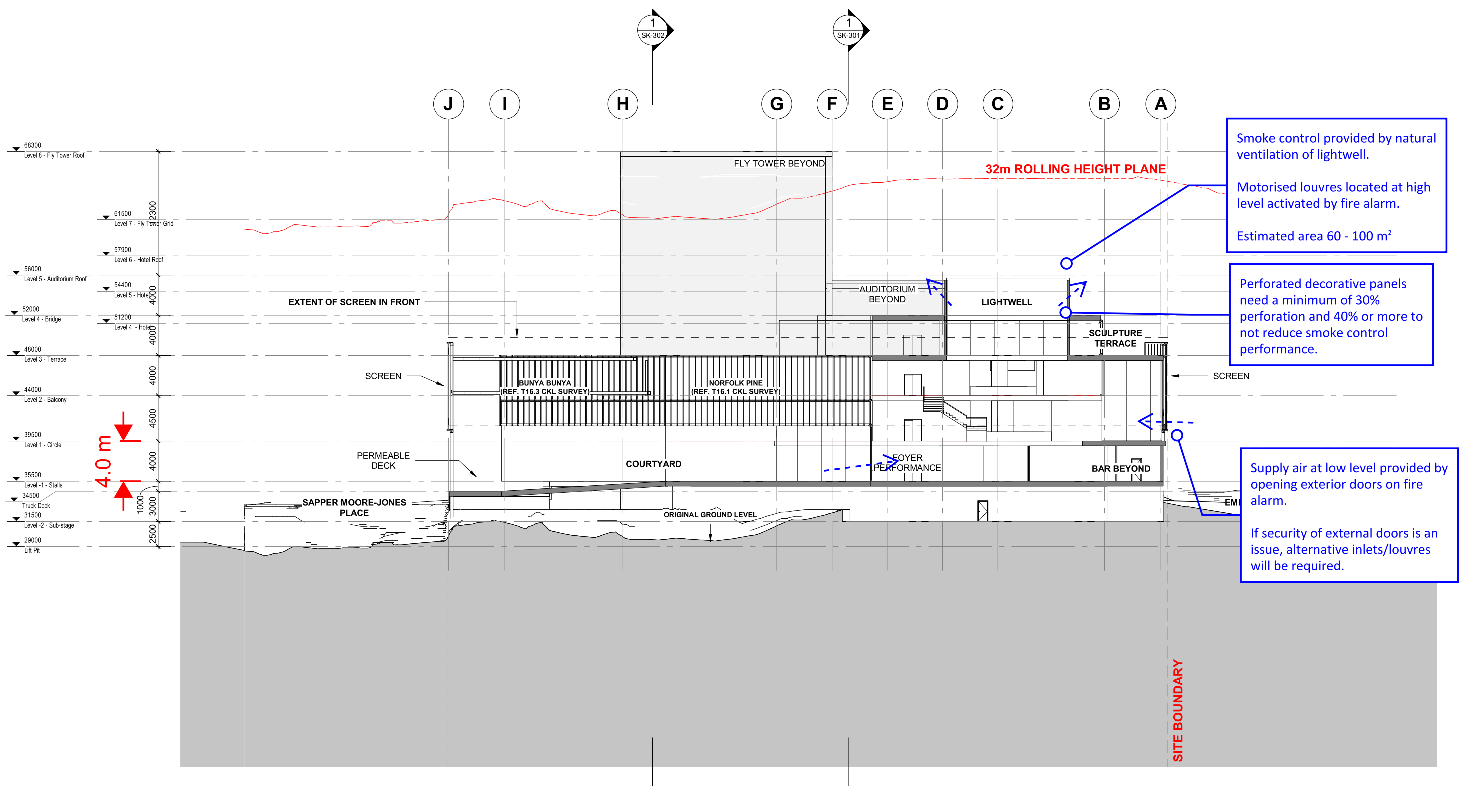
Waikato Regional Theatre

Sketch Title

Theatre F.O.H

Smoke Control

Legend



1 Section - Longitudinal - through Courtyard and Theatre F.O.H.
RC-011 1 : 250 Section

DRAFT

WRT Preliminary Design

JOB No. 216365.00

ISSUE DATE:01/06/2018

DRAWING **Section - Longitudinal - through Courtyard and Theatre F.O.H.**

SCALE @ A1 **1 : 250**

DRAWING No. **SK-306** REV. **D**