Arden Built Form Testing

Prepared for the Victorian Planning Authority

23 April 2021

hayball

0.0 Introduction

0.1 Introduction and Peer Review

This peer review report forms part of the Arden Built Form Testing project commissioned by the VPA.

The following reports were reviewed and informed working assumptions for site testing:

- Draft Structure Plan - June 2020.
- Arden Movement and Parking Study–Final Report by GTA (December 2020).
- Arden Structure Plan: Development Feasibility Assessment (VPA) 12 May 2020–Final Draft by Ernst and Young.
- VPA Arden Urban Renewal Precinct, North Melbourne Microclimate Study GWTS-TPR-10370-2020-3.
- Tunnel Loading Advisory Note DJPR Proposed Development of Arden Precinct DOC/20/63343.
- Arden Macaulay Precinct – Finalising Flood Mitigation Options August 2018 V3000_052.
- Arden North Flooding + Drainage February 2021 by
- Victoria State Government Department of Transport.
- Land Contamination Assessment – Arden Urban
- Renewal Precinct – North Melbourne and West
- Melbourne by Prensa November 2018.

The initial review of documentation and application to the study sites has provided insight into the following elements:

- Proposed FAR and Heights
- Impact of site size and consolidation
- Car parking configurations and carpark ratios
- Tunnel Structural loading and interferences
- Flood levels to fix the minimum habitable floor level above footpath
- Microclimate issues – sun, wind and shadow
- Larger site subdivision options and laneways

The Draft Structure Plan June 2020 outlines the objectives for the three sub-precincts of Arden North, Arden Central and Laurens Street and includes Key Design Recommendations for Arden.

These are summarised and tabulated in the following table with an overarching peer review comment.

Responses to the design recommendations are outlined in further detail in commentary for each test site.

	Summary of Key Design Recommendations (refer p.44 and 45 DSP)	Peer Review Response
1	Delivery of a range of built form typologies. Layered mix of: — Low (up to and including 6 levels) — Mid (7-15 storeys) — High rise (16 + storeys) and — Hybrid Typologies e.g: perimeter blocks with slender towers — Innovation sector (life sciences and research) requiring larger floor plates of 6-7 levels or in towers of 12-14 levels.  **Figure A: Evergreen Apartments Duckett Street, Brunswick Clare Cousins Architects**	Varied site sizes and FARs will promote a range of typologies which is supported. It is noted in the reference projects that a range of mid-level residential typologies are emerging in the surrounding precincts which avoid traditional podium tower forms. NB: Within Arden, perimeter block configurations for mid-rise forms may be constrained by wind requirements requiring setbacks to upper levels. Clause 58 requirements for residential schemes (for example, solar access to communal open space), may promote podium solutions with setback upper tower elements. Mid-rise forms will typically require setbacks to meet public realm criteria for to minimise shadow impacts which may lead to greater use of podium tower solutions. Clarity around requirements for side setbacks above street walls for mid-rise forms will be required to promote varied typologies and support development of narrow sites. NB: Precedents such as Evergreen Apartments refer **Figure A** opposite, demonstrate how low to mid rise street holding forms can successfully 'book end' street frontages without employing consistent street walls and side setbacks. The DSP suggests 'setbacks above 4 storey street walls' for Laurens St precinct which need to be carefully crafted or reconsidered in the built form controls to allow for alternative design solutions which can demonstrate off site amenity impacts are managed.
2	Spacing between taller buildings to create a skyline of separate forms rather than a continuous wall of built form.	Testing indicates that irregular site configurations and orientations require a site-specific approach to tower separation. 10m is an established **minimum** benchmark to address amenity interfaces. (e.g: Central City controls). Additional spacing requirements to achieve sky views is less clearly defined within the DSP. Where tower separation metrics are included in built form controls, it is recommended that these are discretionary to allow for site specific solutions.

0.0 Introduction

0.1 Introduction and Peer Review (cont.)

	Summary of Key Design Recommendations (refer p.44 and 45 DSP)	Peer Review Response
3	Consistent building lines and positive address to key spaces Manage overshadowing of New Neighbourhood Park and Capital City Open Space	Recommended street wall heights of 4-6 levels will achieve this objective and establish baseline shadowing impacts to streets and open spaces. NB: The height of the street wall podium is defined within the DSP as 5m for the ground floor and 3.5m for the upper levels (residential and/or office) above the 'Minimum habitable floor level above the footpath". As floor to floor levels required for different uses will vary considerably, it is recommended that the preferred podium and street wall heights are expressed in meters to achieve the shadowing outcome. Subject to assessing shadow and wind impacts, higher street holding forms may assist in creating streetscape variation, promote mixed typologies and mark key sites e.g: corner sites. It is recommended that the street wall heights and upper setbacks are discretionary but assessed against clear shadow criteria.
4	Minimise impact of taller forms to surrounds and protect important views	Further definition and identification of important views within built form controls would assist in achieving this design recommendation.
5	Create a distinct, varied and architecturally interesting skyline	This recommendation could be clarified to explain if the intent is to promote mixed height of development or promote resolution of tops of buildings including considered concealment of roof plant and services.

	Summary of Key Design Recommendations (refer p.44 and 45 DSP)	Peer Review Response
6	Deliver comfortable wind conditions in public realm.   Figure B: Thompson Street Kensington 8 level breezeway model with approx 15m wide courtyard	Clear wind criteria is required within controls as well as triggers for wind tunnel testing. Preliminary wind advice recommended building separations equal to the width of the building or 25m minimum. NB: tower shaping, setbacks from street walls and elements such as canopies should also be considered as mitigation strategies in addition to building separation. Recent precedent developments suggest that mid-rise development with <20m building separation can promote varied typological models with good levels of internal amenity. e.g: **Assemble Housing** models with dual aspect apartments and open breezeway configurations. Refer **Figure B** opposite.
7	Facilitate transition in scale between Dryburgh Street and Laurens Street.	Low -mid scale forms within this precinct with highly varied lot sizes will achieve this objective. Some discretion to vary the 4 storey street wall would allow for articulation of streetscapes and key sites and facilitate development of very small sites if off site impacts can be addressed (refer to Nightingale Village example).
8	Require respectful and contextually appropriate design abutting heritage built form.  DSP Figure 25	NB: Heritage interventions to industrial structures may support robust contemporary responses. As illustrated in **DSP Figure 25** pictured opposite, significant setbacks to upper forms may not be required to achieve contextually appropriate design and should be assessed on a site-specific basis.

0.0 Introduction

0.1 Introduction and Peer Review (cont.)

	Summary of Key Design Recommendations (refer p.44 and 45 DSP)	Peer Review Response
9	Provide new, direct and convenient pedestrian connections	A fine grain network of laneways is shown throughout Arden which is supported. It is recommended that the hierarchy and function of these lanes is further articulated as these laneways are shown as narrow (nominally 3.5m in some instances) and usually in the centre of the site. The test analysis will propose an optimum width and location within the parcel on a site-specific basis and with consideration of laneway character and function. The aim is to achieve efficient floorplates and car parks while accommodating landscaping and activation for pedestrian priority lanes. In some cases, this requires widening of laneways to address overlooking between sensitive uses at podium level.
10	Ensure development considers amenity impacts on neighbouring development	Can be addressed through site specific analysis which illustrates potential future development scenarios.
11	Ensure a high level of internal amenity	Residential developments will be assessed under Clause 58. Guidance on typical floor to floor heights also assists to achieve these objectives. Built form controls should emphasise need for mixed use/ commercial schemes to achieve commensurate internal amenity which will future proof buildings for changing use over time.
12	Deliver contextually appropriate built form interfaces to streets with regard to street width and lower street wall heights on narrower streets	Street widths are proposed at 25m-30m for the primary street network. Secondary street dimensions are not provided but scale at approx. 15m width. Mid-block lanes are indicated at approx. 3.5m width on the lot plans but are not illustrated on the conceptual street sections. The proposed street wall heights of 4-6 storeys translate to heights of approx 15m to 26m depending on building program. This ratio of approx 0.5:1 to 1:1 street wall to street width, is a scale consistent with many inner city precincts, however, suggests that higher street holding forms could be comfortably accommodated on wider streets if off site wind and shadow impacts can be managed.

	Summary of Key Design Recommendations (refer p.44 and 45 DSP)	Peer Review Response
13	Support equitable development by ensuring primary outlook is secured.	This is supported by separations of minimum 10m between facing building forms and site specific responses to building placement. Design responses should indicate how any proposal will address likely adjoining future development where there is no existing adjacent development.
14	Ensure buildings along Arden Street have a positive address to Arden and Barwise street	Lot depths of 64m suggest that this is readily achievable with full sleeving of above ground carparking.
15	Ensure new development does not cast additional shadow beyond the street wall heights to the Neighbourhood Park in Arden Central 11am-2pm from 21 June-22 September	Refer to shadow analysis in **Appendix A**. Testing indicates this will be achievable within proposed heights where upper forms are well setback above street wall heights.
16	Ensure buildings are setback sufficiently from front, side and rear boundaries to achieve good public realm outcomes.	Primary impacts of overshadowing and wind can be measured and assessed against clear criteria. Refer to shadow testing in **Appendix A** which illustrates preliminary findings for equinox and winter shadows. Equinox sunlight to public realm spaces and streets will be achievable with current street wall heights for most of the study periods. Higher forms setback at least 5m add 'faster moving' shadow beyond the street wall heights which make full protection of footpaths at equinox between 10-3pm difficult to balance with proposed heights and allowable FARs. Winter shadowing criteria for key open spaces is supported, however, will be difficult to achieve to all open space areas as this will generally limit development beyond street walls.
17	Ensure appropriate building separation within a site to delivery high quality amenity within buildings	Refer to Point 2 and 6 responses.
18	Encourage fine grain ground floors	Supported.

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0.1 Introduction and Peer Review (cont.)

	Summary of Key Design Recommendations (refer p.44 and 45 DSP)	Peer Review Response
19	Ensure design of buildings conceal service areas from the street frontage.	Some lot configurations have effectively four frontages as they are bounded by streets and pedestrian priority lanes. In these cases, it is recommended that guidance is provided around preferred service locations with clearer articulation of the purpose of the laneways.
20	Maximise personal safety and security through active ground floors around open spaces and primary street network.	Supported. NB: This requires adequate space in pedestrian priority lanes for ground floor tenancies to accommodate spill out areas (e.g: for external seating/dining) to encourage occupation
21	Require design of services, loading and parking areas adopt best practice approach to create a high quality pedestrian environment.	Supported - refer also to Point 19 response. The carpark ratio suggested of 0.29 for residential and 0.32 for other uses will be adopted in site testing to reflect the precinct target of 10% car modal share. The testing is designed to 'stress test' the option of providing distributed on- site carparking up to the recommended maximum rates. Current feasibility advice suggests limited basement carparking will be possible within Arden in the short term. In a distributed parking scenario, larger sites offer more flexibility to achieve good urban design outcomes such as sleeving podium carpark with active uses (residential or office). This may not be possible for smaller or narrow sites, which limit carpark efficiency. The ability to accommodate carparking while limiting excavation to single level basements at best (due to ground conditions) is considered a primary limitation to development potential for smaller sites within the precinct. In a consolidated precinct carparking model, few blocks have sufficient scale to accommodate the numbers of cars proposed in an above ground configuration without some exposed car park edges at podium level, which impact the activation of the public realm. Within Arden Central, Innovation sector uses with high servicing requirements will need, not only legible and accessible address points for pedestrian access, but significant and carefully designed servicing and loading facilities whose location will be informed by the pedestrian and vehicle movement patterns.

These documents informed a series of working assumptions which were developed with inputs from, and in consultation with the VPA, covering built form parameters, commercial development assumptions and technical considerations.

These assumptions are listed for each site in **Table 1: "Assumptions + Design Criteria for Yield Analysis Calculation".**

Development scenarios were based on a set of agreed assumptions as follows:

Building Efficiency	NLA/ NSA estimated at 85% of GFA for Office and Residential
Residential tower floor plate size	600m2 min (800m2+ preferred)
Commercial tower floor plate size	2000m2 + for Premium/A grade office / 1000m2 + for B grade office
Residential floor plate depths	Typical max depth 20m (to comply with Clause 58 requirements)
Commercial tower floor plate depths	Preferred max depth 30m (assume 15m to windows
Innovation Sector (Life sciences and Research) floor plates size	University research centres and institutes total area ranging from 10,000 – 20,000 sqm Larger Bio-Tech / Medical research buildings of total area approx. 30,000 sqm (2500- 4500m2 typical floor plates)
Innovation Sector Floor plate Depths	Preferred max depth of 35m for typical floor plates or 50m for wide atrium types
Tower slenderness ratio	Assume maximum height to depth ratio of 10:1 to allow for structural efficiency.
Apartment sizes	75 m2 Average based on 30% x 1B/60% , 60% x 2B, 10% x 3B
Car parking ratios	0.32 spaces per 100 m2 GFA 0.29:1 maximum/ dwelling (rate established in GTA Dec 2020 report, consistent with 10% modal share for private vehicles) No visitor parking
Area per carpark	40m2 per carpark (allowing for services/ storage/bike parking)

The working assumptions were used as the basis for architectural testing of ten test sites located within the three precincts of Arden North, Arden Central and Laurens Street.

In order to test the implications of the draft structure plan recommendations within real development conditions, sites were selected to include varied site sizes, street and open space interfaces and included heritage elements likely to be retained as part of future development.

0.0 Introduction

0.2 Summary of Peer Review Findings

— The Draft Structure Plan specifies a range of heights and building typologies throughout, however these should be moderated and simplified to provide clearer guidance in their application.

— FARs are strongly supported as they provide flexibility to accommodate site specific design responses including inclusion of site open space and links.

— Where applied, built form controls will influence envelope outcomes more directly and it is recommended that these are not overly prescriptive.

— The built form outcomes for the 3 precincts will be heavily influenced by lot patterns and microclimatic considerations for example:

Arden North

Sites to the edges and north of major open spaces will be particularly exposed to wind effects. Where mid-rise heights (defined in the DSP as 7-15L) are proposed, mitigating wind and solar impacts and compliance with Clause 58 may drive podium/tower solutions.

Arden Central

Large format typologies within the innovation precinct and solar protection of the central spaces will heavily influence built form solutions.

— Large floor plates will be required within street holding forms (6-7 levels) to accommodate innovation sector functions with opportunities for mid-rise towers (12-14L) on more constrained sites

— Ground level configurations of the buildings will require, not only legible and accessible address points for pedestrian access, but significant and carefully designed servicing and loading facilities.

Laurens Precinct

The edge of Laurens Precinct may not require prescriptive setback controls due to smaller sites and lower FARs.

— Further articulation of lane hierarchy and function is required for each sub precinct to assist in defining how servicing of sites and parking provision can be accommodated without impacting pedestrian zones.

— Further consideration of lot sizes and consolidation is recommended as this directly impacts the ability to achieve other elements such as full sleeving of above ground car parking.

— The limited opportunity for basement car parking is a significant constraint on development (due to ground conditions and construction costs).

— Street wall heights measurements have increased due to raised finished floor levels to respond to inundation.

— Shadow times and periods have been specified in the DSP however, require clarification about whether these are mandatory or discretionary.

— Winter shadow will inevitably limit development potential but can be managed when applied as a criteria for key open spaces only.

0.0 Introduction

0.3 Precedents Review–Current Residential or Mixed use Developments in Adjoining Precincts

A number of significant developments are currently approved or proposed in the adjoining precincts within Kensington, Flemington and North Melbourne.

The sample of developments illustrated are generally residential in focus, lower or mid-rise (8-12 levels) in scale and adopt an interesting range of typologies.

This form of development has been influenced by current built form controls and application of Clause 58 standards, but is also a reflection of emerging market trends and construction cost thresholds i.e. buildings up to 25m in effective height (approx. 8 residential levels) are able to achieve natural ventilation to circulation spaces and fire engineering requirements more cost effectively than higher buildings.

Both before and particularly since Covid, development is increasingly focused on creating sustainable residential communities, often supported by neighbourhood scale mixed use facilities and amenity.

This results in building forms being broken into smaller community sizes and improved access to external space and communal amenity.

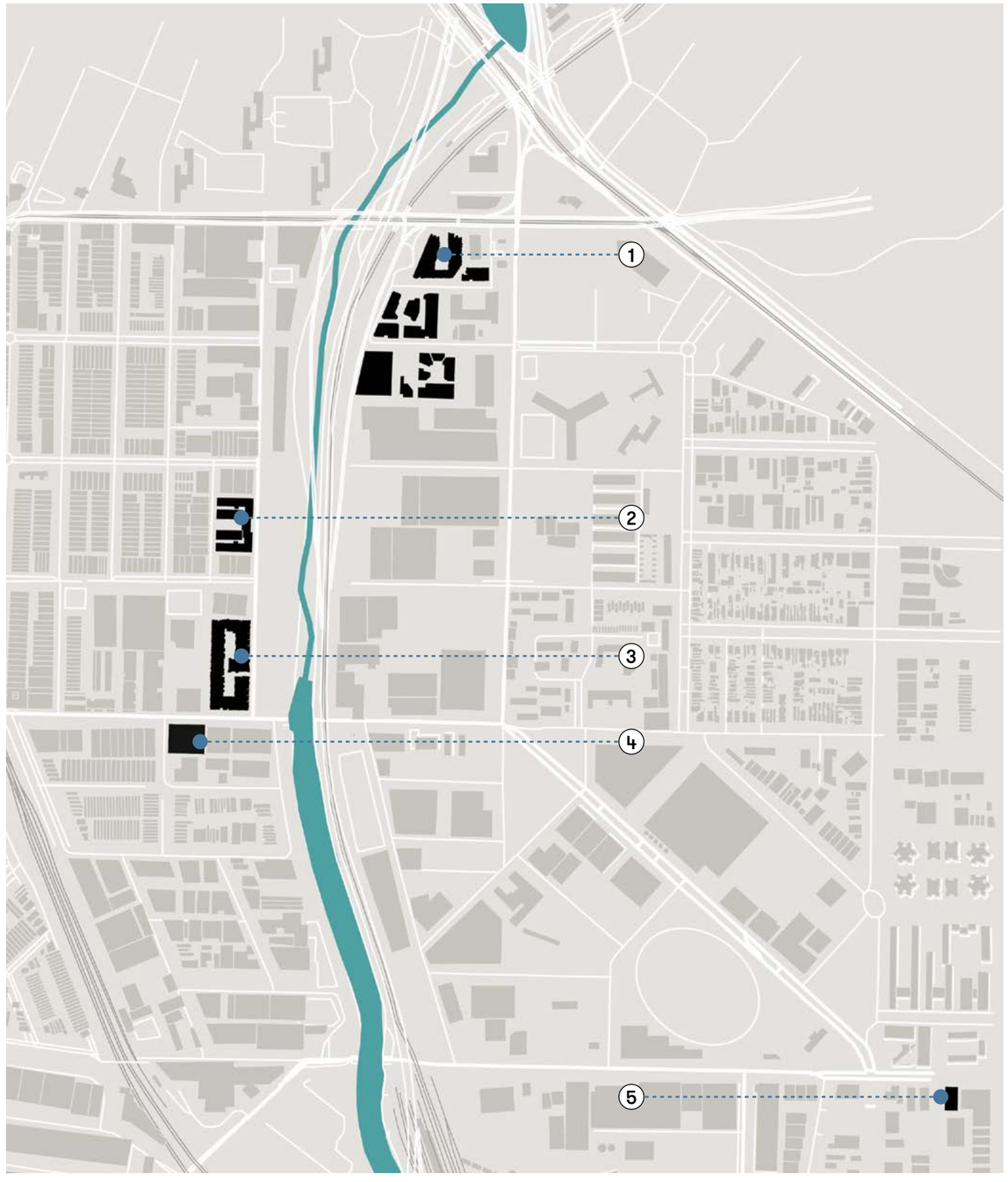
The developments illustrated include typologies such as breezeway circulation models which supports dual aspect apartments, perimeter block courtyard models and mid-rise towers with limited use of podium forms.

Many developments illustrated have feasibly included single basements for carparking or have adopted low parking rates (e.g: in the case of BTR models) to achieve positive ground plane outcomes to street frontages and internal spaces.

Street wall heights and setbacks of upper forms to street edges have generally been established through assessment of off-site impacts such as shadowing of open spaces and footpaths at the equinox.

Building separation distances are often more constrained (i.e.: <20 m between buildings) in these models to achieve feasible density without requiring taller forms.

Development proposals have generally occurred on the larger former industrial sites, which allow for sufficient internal amenity to be created within sites and efficient parking solutions to be accommodated.



1
87–105 RACECOURSE RD (HAYBALL)

2
15 THOMPSON ST (HAYBALL)

3
346–350 MACAULAY RD (HAYBALL)

4
393–399 MACAULAY RD (FIELDWORK)

5
LOTHIAN ST (KENNEDY NOLAN)

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0.4 Analysis of Built Form Requirements - Innovation Sector Life Sciences + Research

Precedent Examples

Peter Doherty Institute - University of Melbourne
Grimshaw – 2014 – 26,000m²
A world-class centre for biomedical research into infection and immunity.

Victorian Comprehensive Cancer Centre
Silver Thomas Hanley, DesignInc and McBride Charles Ryan - 2016 – 130,000m²
A purpose-built building for cancer research, treatment, care and education.

Melbourne Connect – University of Melbourne
Woods Bagot (lead architect) – 2021 – 75,800m² (3 buildings)
Innovation precinct with a connecting 'superfloor'.

Melbourne Brain Centre – Royal Melbourne Hospital
Lyons -2011 – 20,000m²
A centre combining three diverse leading neuroscience research bodies.

0.0 Introduction

0.5 Analysis of Built Form Requirements - Innovation Sector Life Sciences + Research

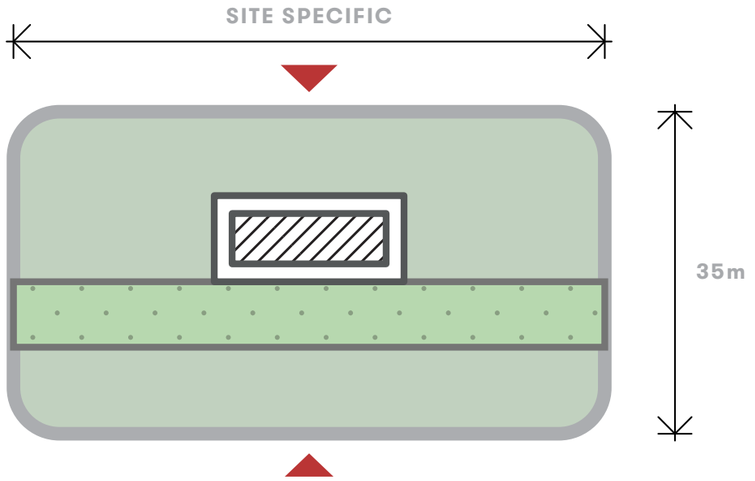
Floor plate configurations

Innovation Sector buildings in the Arden Central area will consist of a range of possible floorplate and built form configurations to suit the urban pattern established from the Draft Structure Plan. Such buildings will be structured around pre-requisites of floorplate formats, sectional floor-to-floor heights, servicing and organisational requirements. Whilst flexibility of floorplate organisation is a key requirement within this typology, a series of 'standard' likely formats can be applied.

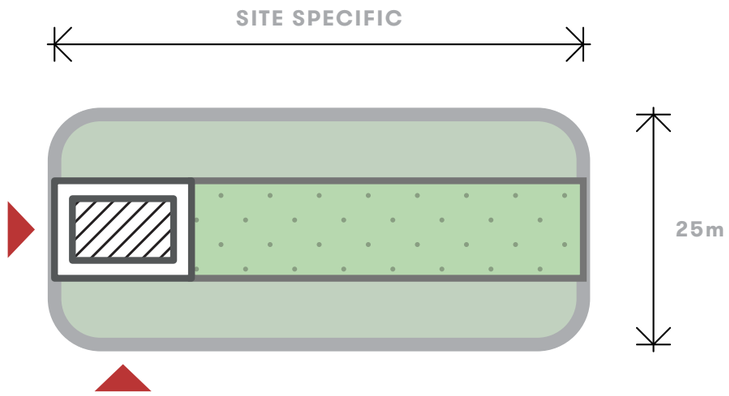
The form and heights of buildings relates to the institutions accommodated and these may consist of University research centres and institutes in the 10,000 – 20,000 sq m range, typically in buildings of 4-7 levels. Larger Bio-Tech / Medical research buildings of approx. 30,000 sq m. are typically contained in large floorplate buildings of 6-7 levels or in towers of 12-14 levels.

A range of typical floorplate configurations are possible containing collaboration + workspaces, technical support spaces and research spaces consisting of wet or dry laboratories. Each configuration will require a specific approx. lot-depth of 25m, 35m or 50m. Floorplates are configured to allow good natural lighting into spaces, either from the perimeter or via atria in larger floorplate buildings.

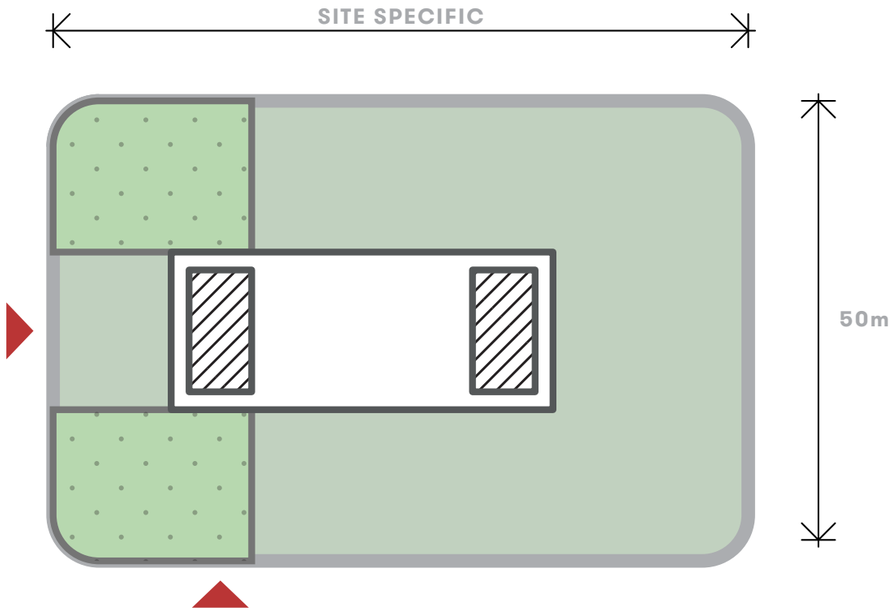
Ground level configurations of the buildings will require, not only legible and accessible address points for pedestrian access, but significant and carefully designed servicing and loading facilities whose location will be informed by the pedestrian and vehicle movement patterns.



MEDIUM



NARROW



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0.0 Introduction
0.6 Testing Objective and Process

Initial testing of the ten sites has been undertaken using site specific working assumptions developed with reference to the FARs and building envelopes identified in the Draft structure Plan June 2020. The testing was undertaken prior to planning controls being finalised.

The working assumptions describe more precise street wall heights and setbacks for each site (established with regard to suitable urban design interfaces and management of shadow and wind) and propose a range of building heights. Each site has been tested to assess if the assumptions of the floor area ratio (FAR) is compatible with the expectation of the number of storeys for each site.

The concept designs test realistic building envelopes against these assumptions, in some cases, testing sub-options for different programmatic uses or street network solutions.

The height of the street wall podium based is defined within the Draft Structure Plan as 5m for the ground floor and 3.5m for the upper levels (residential and/or office) above the 'Minimum habitable floor level above the footpath". This height has been used to define the maximum podium overshadowing for the surrounding streets and open spaces. To achieve more realistic development scenarios, the podium and street wall heights have been recalculated using current construction standards at 5m for Ground floor, 3.2m for residential floors and 4.0m for Commercial Office floors.

Podium Carpark levels have been calculated at 3.2m floor to floor instead of 2.8m to allow for adaptive use for future proofing of the podium carparks noting this is complex where podia are fully sleeved.

The resulting floor area has been used to calculate FARs which have been compared against the proposed FARs in the draft structure plan. NB: within Arden central sites, the VPA working assumption FAR established for site optimisation was adopted.

In each case, the aim has been to 'optimise' the sites to meet or exceed the draft FAR while balancing good urban design outcomes. This is in response to previous feasibility testing which indicated that a number of sites were commercially marginal or unfeasible.

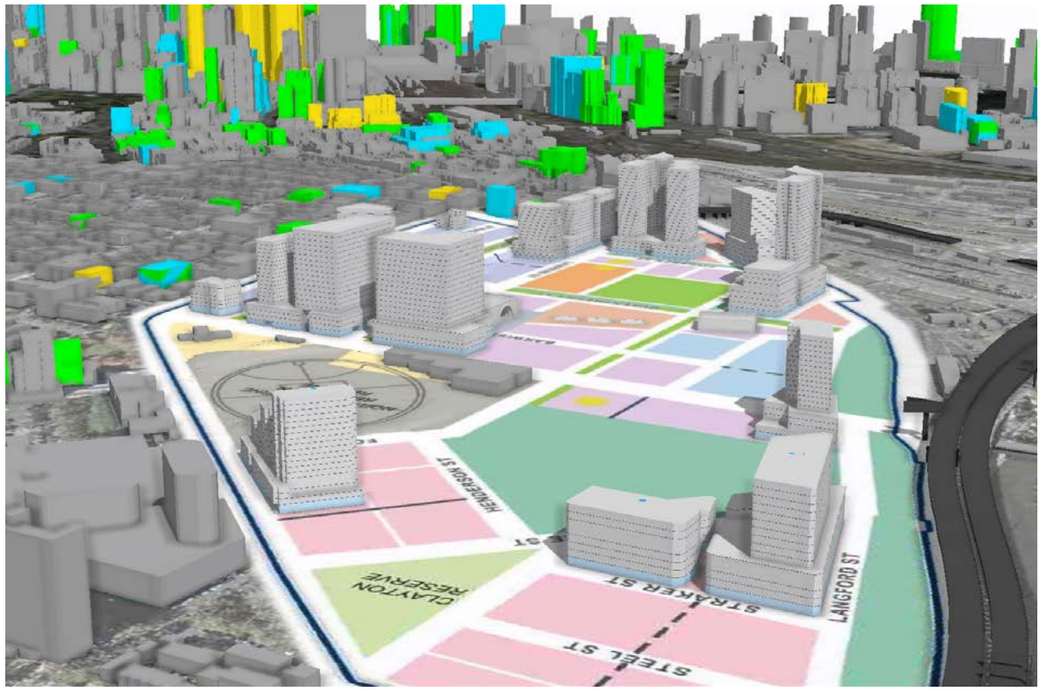
The testing includes equinox and winter shadow analysis where adjacent to open space to assess the suitability of 'fast moving' shadows for the upper tower forms compared with the continuous shadows cast by street walls.

The test sites are intentionally highly variable in size and development opportunity and the initial findings reflect this variability.

The initial concepts were the assessed for commercial feasibility and feedback was received from project stakeholders regarding design outcomes. This informed further refinements of the options as the majority of the sites under-performed in the feasibility testing.

Construction cost, particularly inclusion of basement carparks, was identified as a significant issue in feasibility. Therefore, a number of sites were refined to remove basements and the option of removing precinct car parking on designated sites was explored.

On sites where additional floor area was achieved, the development summaries and three dimensional massing also highlighted the approximate extent of development which exceeded the FARs within the working assumptions.



CAPTION MODEL FROM VPA

Test Site 01

1.0 Test Site 01: 135-173 Macaulay Road, North Melbourne

1.1 Methodology

Site 1 is composed of 6 parcels located in Arden North precinct along Macaulay Street and adjacent to the North Melbourne Recreation Reserve.

The test site for this exercise is composed of the parcels identified in the Draft Structure Plan as Lot D and B. located at the North East part of the site. The total area of 5,058sqm is divided in the middle by a lane of 3.5m wide earmarked in the Draft Structure Plan 2020.

Lot D has an area of 2,469sqm and Lot B has an area of 2,189.6sqm.

Site 1 is also identified for a precinct carpark of 400 car spaces. We assumed the 400 car spaces would be distributed within the 6 parcels composing Site 1.

A number of working assumptions were established to inform site testing:

- 4-8 storeys (Lot B), 12-18 storeys (Lot D)
- 4 storey street walls
- 5m minimum setbacks above street walls,
- 5m minimum side and rear setbacks < 20 storeys
- 10m minimum setbacks > 20 storeys
- FAR 7:1 for Lot D and FAR 5:1 for Lot B
- FFL 0.3 – 1.0m above natural ground (1.0m was used for the testing as worst-case scenario)

The testing was to consider:

- A mixed-use development (Office and Residential)
- Possible consideration of a through block link open to the sky as a preferred option
- If the link cannot be open to the sky as it conflicts with the above carpark, amenities considerations need to be verified to create a safe and viable environment
- What development is achievable with limited and appropriate 'fast moving' additional shadows to the adjacent open space at both the Winter solstice and the equinox (from a time period of 10am to 3pm) beyond shadow cast by the street wall forms?
- 248 car spaces were provided for the precinct carpark on the test site

The following options were explored:

- Individual site development of the existing smaller sites Parcel Lot D and B
- Development of a larger parcel of land to the North to host the carpark and a smaller parcel to the South to host a residential site
- Following initial feasibility testing with precinct carpark included (refer to **Appendix B**), a second option (displayed) was tested without provision for a basement and precinct carpark to assess if this improves feasibility

1.0 Test Site 01: 135-173 Macaulay Road, North Melbourne

1.2 Table 1: Assumptions and Design Criteria for Yield Analysis Calculation

Parcel Size: 5,058m²
LOT D: 2469.1 sqm
LOT B: 2189.6 sqm
DSP2020 Parcel ID Reference #8 + 9

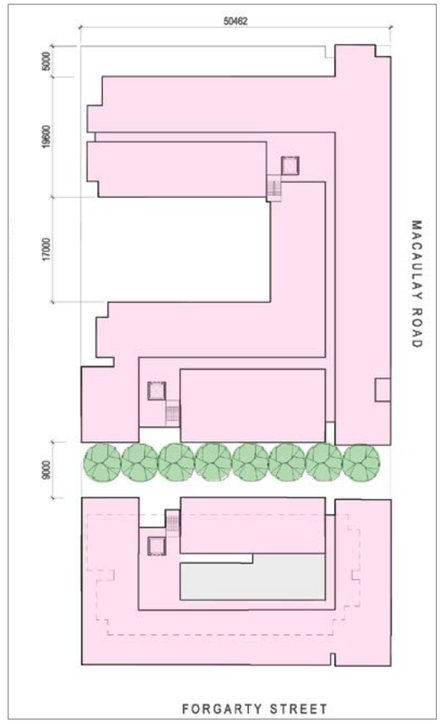
		VICTORIAN PLANNING AUTHORITY ASSUMPTIONS	HAYBALL ASSUMPTIONS PEER REVIEW
DRAFT STRUCTURE PLAN 2020	**FLOOR AREA RATIO(FAR)**		With relocation of the pedestrian link to the South East, Lot D FAR could be increased to 9:1
	LOT D: FAR 7:1, LOT B FAR 5:1		Even with the relocation of the pedestrian link to the South East, Lot B FAR could be increased to 6:1
	SETBACK ABOVE 4 STOREY STREET WALL (LOT B) & FRONT, SIDE & EAR SETBACKS FOR LOT D ONLY	Side and rear setbacks: minimum 5m (separation distance 10m), above 20 storeys: minimum 10m (separation distance 20m)	
Reference: Arden Working Assumptions received from VPA on 11 march 2021	**FLOOR TO FLOOR HEIGHT**	Ground Floor: 5m Upper levels typical (office and residential): 3.5m	Overall building height calculated with floor to floor from Reference *9 but final Yield Study floor to floor consistent with current construction standards at 5m Ground floor, 3.2m for residential floors, 4.0m for Commercial Office floor and 2.8m for carpark levels
	SHADOWS	VPA to define the criterias (height and impact) that would make a slender fast-moving shadow appropriate. Shadow study to consider shadowing cast by the street wall at both Winter solstice and Spring equinox (from a time period of 10 am to 3pm).	Building forms are tested at a height that would be below the VPA carve at Equinox for VPA assessment
	TOWER SETBACK DISTANCE FROM STREET WALL	Minimum 5m	
	STREET WALL HEIGHT	6 storeys	Maximum height calculated by Structure Plan proposed height (5m Ground and 3.5m upper levels but number of levels based on Market standards for floor to floor height (5m Ground and 3.2m residential levels)
	HEIGHT LOT D 12-18 LEVELS, LOT B 4-8 LEVELS	As per DSP heights	
PLANNING	**MATTERS FOR CONSIDERATION DURING TESTING**	Possible consideration of a through block link not open to the sky (quality of space concerns) if conflict with above ground carparking Open to sky link preferred but amenities considerations important if link is enclosed Open Link can potentially conflict with podium car parking layout with open to sky Height and impact of shadow to open space. This is to consider shadowing cast by the street wall at both Winter solstice and spring equinox (from a time period of 10am to 3pm). This is to consider what development constraints exist and whether a slender fast moving shadow is appropriate	Proposal for widening the link to 9m open to the sky allowing activation to podium facades and landscaping and avoid overlooking Proposal to move the link South to allow for a larger parcel allowing for functional carpark layout
	TYPOLOGY	Mixed Commercial / Residential	Proposal for Commercial on Ground and Residential for upper levels
	INTERFACES	Park Interface to the North Melbourne Recreation Reserve to the East Main thoroughfare along Fogarty Street and Henderson Street	
References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**RETAIL ACTIVATION**	The Fogarty Street urban boulevard providing green link and public transport connecting Arden North to Arden Central is ideal retai activation streets	Proposal for activation of Macaulay Street and internal laneway with residential foyer and cafes
PARKING	**TRAFFIC CONFLICT FRONTAGE**	Fogarty Street	
	CAR SPACE SIZE ALLOCATION		Proposal for using a ratio of 40sqm per parking space (including circulation, services, car park space & bike parking) based on previous projects
	EXCAVATION		Minimise Excavation, Allow One basement and podium carpark preferred
References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**PRECINCT CARPARK**	Site earmarked as a Potential Precinct Parking Facility for 400 car spaces (scenario 2b)	Noted. Proposal for the 400 precinct car parking space allocation to be shared with the 6 sites
	CARPARK VISIBILITY		Proposal for active uses along Maucaulay Rd, Fogarty Street and internal link, with natural ventilation along the South lane
	RESIDENTIAL MAXIMUM PARKING RATIO	1BED 0.2 spaces per dwelling 2BED 0.3 spaces per dwelling 3BED 0.5 spaces per dwelling	Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average dwelling carpark ratio of 0.29:1 per average dwelling
	OTHER USES MAXIMUM PARKING RATIO	0.32 spaces per 100sqm GFA	
	VISITOR PARKING RATES	n/a	Proposal for visitor parking to be included as part of the precinct parking allocations (400 spaces)
FEASIBILITY ASSUMPTIONS References: Arden Structure Plan: Development Feasibility Assessment 12 may 2020 - by Ernst & Young	**AVERAGE APARTMENT SIZE**	75sqm of NLA	
	BALCONY SIZE ALLOCATION		Balcony size of 1BED & 2BED 8sqm, 3BED 12sqm as per B.A.D.S. Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average balcony size of 8.4 sqm per average dwelling assuming the A/C condensers are **not** located on balconies.
	EFFICIENCY RATIO	NLA/NSA estimated at 85% of GFA for Office and residential (Assuming 15% of the completed project will be attributable to non-lettable/saleable area)	Proposal for 85% Efficiency for Commercial buildings and 78% Efficiency for Residential buildings
CLIMATE	**FLOOD: HABITABLE LEVEL ABOVE GROUND**	Finished floor levels 0.3 - 1.0m above natural ground	1.0 meter used for yield study modeling (worst case scenario)
Reference: VPA Arden Urban Renewal Precinct, North Melbourne Microclimate Study GWTS-TPR-10370-2020-3	**SUN**	Height & Impact of shadow to Open Space: Understand impact of shadowing cast by street wall at both Winter Solstice and Equino: (between 10am and 3pm) and impact and appropriatness of a slender fast moving shadow Tall tower separation proposed 25m ideal but minimum separation distance should equal the widest dimension of the tower floorplate	COMMUNAL OPEN SPACE: Sunlight testing required for Clause 58.03-3 Standard D8 – min. 50% or 125m2 of primary communal open space to achieve min. 2 hrs of sunlight between 9am-3pm on 21 June. PUBLIC OPEN SPACE: Building height to comply with the solar carve (above the street wall height of 6 storey (23m) And above 4 storeys (16m) as defined by the Draft Arden Structure Plan MODELING June 2020 TOWER SEPARATION: Proposal for minimum tower separation should have ability to vary building separation depending on the height and orientation (i.e. the taller the wider separation)
	WIND	North wind is predominant in all seasons except in summer where the South wind is stronger	
	BUILDING ENTRANCE PREFERED LOCATION	Advised not to face the north or west. Preferable to the East	
TUNNEL INTERFERENCE Reference: Tunnel Loading Advisory Note DJPR Proposed Development of Arden Precinct DOC/20/63343	**ELECTROMAGNETIC INTERFERENCE**	For sensitive instruments within 300m of the tunnels	Not applicable for this site
	INTERNAL GROUND BORNE NOISE & VIBRATION	Guideline Targets: Residential: 35dB(A), Office: 45dB(A) Required mitigation measures required within 13m of the tunnel	Not applicable for this site

1.0 Test Site 01: 135-173 Macaulay Road, North Melbourne

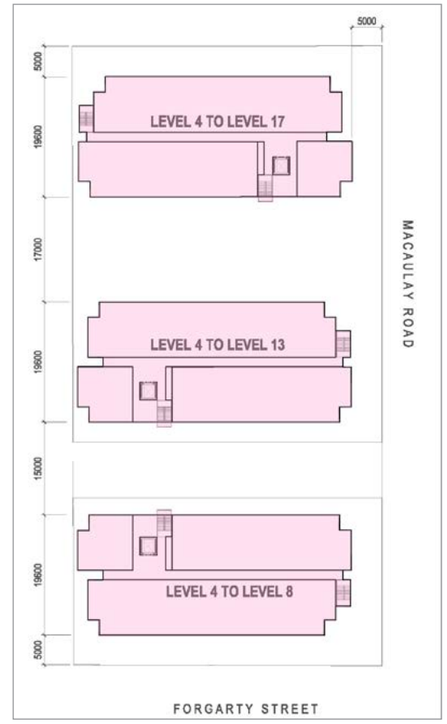
1.3 Plans

GROUND
1:500

LEVEL 1
1:1000



LEVEL 2 + LEVEL 3
1:1000



LEVEL 4 TO UPPER LEVELS
1:1000

1.0 Test Site 01: 135-173 Macaulay Road, North Melbourne

1.4 Development Summary

The information presented herein is preliminary. It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities. Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor. Floor areas shown have generally been measured using the guidelines – published by the Property Council of Australia. All areas and measurements shown are rounded to the nearest whole number. All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only. Further development of this design will require information produced by a number of specialist consultants. This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented. Hayball accepts no legal responsibilities for any decision, commercial or otherwise, made on the basis of the information presented.

ALL SITES PROPOSED DEVELOPMENT SCHEDULE

				Residential					Carpark	
Site	**GBA****		**COMMERCIAL**	**Typical Apartment**	**GFA***	**NSA (inc P.O.S.)**	**NSA**	**Balcony*****	**CARPARK**	**CARPARK**
	m²		**NLA (m²)**	**Number**	**m²***	**m²**	**m²**	**m²**	**GFA (m²)**	**Spaces**
Basement										
Ground	4485.8		1991.1		230.6				2264.1	57
Level 1	4565.0			25	2567.8	2054.2	1847.3	206.9	1997.2	50
Level 2	3761.8			35	3600.8	2880.6	2590.5	290.1		
Level 3	3761.8			35	3600.8	2880.6	2590.5	290.1		
Level 4	2460.00			24	2261.8	1968.0	1769.8	198.2		
Level 5	2460.00			24	2261.8	1968.0	1769.8	198.2		
Level 6	2460.00			24	2261.8	1968.0	1769.8	198.2		
Level 7	2460.00			24	2261.8	1968.0	1769.8	198.2		
Level 8	2460.00			24	2261.8	1968.0	1769.8	198.2		
Level 9	1640.0			16	1507.9	1312.0	1179.9	132.1		
Level 10	1640.0			16	1507.9	1312.0	1179.9	132.1		
Level 11	1640.0			16	1507.9	1312.0	1179.9	132.1		
Level 12	1640.0			16	1507.9	1312.0	1179.9	132.1		
Level 13	1640.0			16	1507.9	1312.0	1179.9	132.1		
Level 14	820.0			8	753.9	656.0	589.9	66.1		
Level 15	820.0			8	753.9	656.0	589.9	66.1		
Level 16	820.0			8	753.9	656.0	589.9	66.1		
Level 17	820.0			8	753.9	656.0	589.9	66.1		
TOTAL	40354.4	0.0	1991.1	**321.8**	31863.9		24136.3	2703.3	4261.3	106.5

		40354.4
Parcel 8 GBA		30902.8
Parcel 9 GBA		9451.6

Total Site Area (sqm):	5073.7	SQM	
Parcel 8 Area (sqm):	3477.1	SQM	(including half laneway width)
Parcel 9 Area (sqm):	1598.7	SQM	(including half laneway width)
Site Coverage (%):	88%		
Carpark Ratio:	0.3		
Carpark spaces for Residential at 0.29 ratio:	93.3	Spaces	
Commercial carpark at 0.32 ratio per 100sqm:	6.4	Spaces	
Parcel 8 Floor Area Ratio:	8.9	(calculated with overall GBA including half laneway)	
Parcel 9 Floor Area Ratio:	5.9	(calculated with overall GBA including half laneway)	

*GFA excludes balcony area

**GBA includes Balcony Area

***Based on 8sqm for 1BED&2BED and 12sqm for 3BED

Approximate extent of Development exceeding the working assumption FAR for Parcel 8

Approximate extent of Development exceeding the working assumption FAR for Parcel 9

(Parcel 8 FAR allowed 7:1)

(Parcel 9 FAR allowed 5:1)

Note:

Floor Area Ratio (FAR) is defined as all gross area above Ground (excluding plant) and voids within the building which are design elements (this does not include voids associated with car stakers which feature above ground).

The FAR excludes all basement structures. It includes covered balconies.

1.0 Test Site 01: 135-173 Macaulay Road, North Melbourne

1.5 Design Response and Findings

Design Response and Findings:

- The draft structure plan proposes a network of 3.5m pedestrian laneways to support permeability through the precinct. In addition, precinct car parks are proposed within these fine grain street networks
- Initial testing proposed 248 cars to serve the precinct to be located within the subject sites as part of a 400 space precinct car park across the whole block
- The testing highlighted that the proposed block sizes makes full sleeving of car parking challenging because an efficient depth (32m) cannot be achieved in addition to two 9m deep zones for active sleeving
- The proposed option shows a relocation of the lane to the South, allowing for a larger parcel of land to the North to accommodate an efficient carpark layout for the residential carpark and a portion of the Precinct carpark.
- The size of the block was also increased to include a sleeved residential activation along the lane. The lane was widened from 3.5 to 9m allowing apartment facing each other and significant landscaping and trees.
- The decision to increase the size of the North parcel allow facilitates a higher FAR, allowing 2 towers on the same parcel with a larger number of storeys. The parcel to the South has a lower FAR and the height is limited by the overshadowing of the North Melbourne Recreation Reserve.
- The laneway accommodates entries for both towers and allows for additional retail along Fogarty Street. This shorter travel distance between the lane and the busy Fogarty Street will create a safer walking environment at night.
- The laneway tower entries will also be protected from the Northerly winds for most of the year.
- The towers project a small section of shadow onto the North West corner of the North Melbourne Recreational Reserve but the shadow is limited to the raised mound on the corner (i.e.: does not protrude into the oval). With the existing configuration of the space, this may be acceptable, however, the future configuration of the open space also needs to be considered.
- The un-sleeved carpark in the middle north South lane is considered acceptable if this section of lane is designated for waste removal and BOH activity within the precinct.

Recommendations:

- It is recommended that further articulation of lane hierarchy and function is provided for this sub precinct as this will assist in defining how servicing of sites and parking provision can be accommodated without impacting on pedestrian zones.

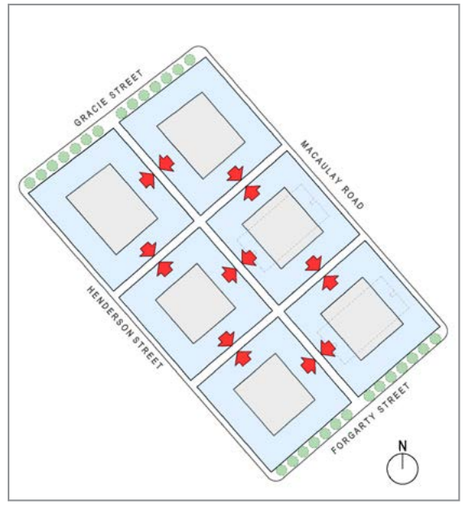
The following sub-precinct block diagrams below summarise the issues associated with block sizes, road and lane networks

Current Draft Structure Plan Block Arrangement

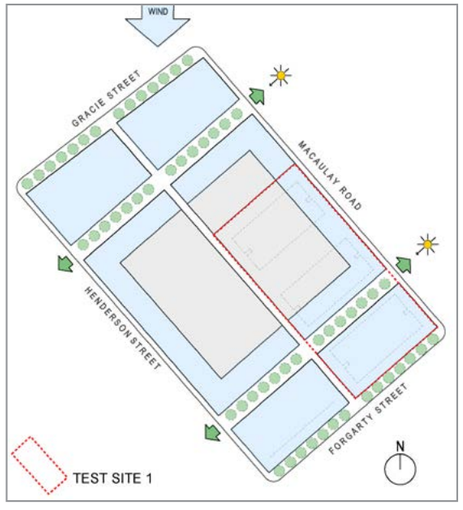
- All 3.5m wide lanes designated as pedestrian priority
- Full sleeving of podium preferred
- Proposed 400 PCPs allocated within sub-precinct
- 3.5m separations of sleeved uses at upper levels reduces daylight and privacy
- Small inefficient carparking areas
- Limited space for landscape or outdoor dining areas within lanes
- Difficult to locate BOH areas

Revised Grid Arrangement

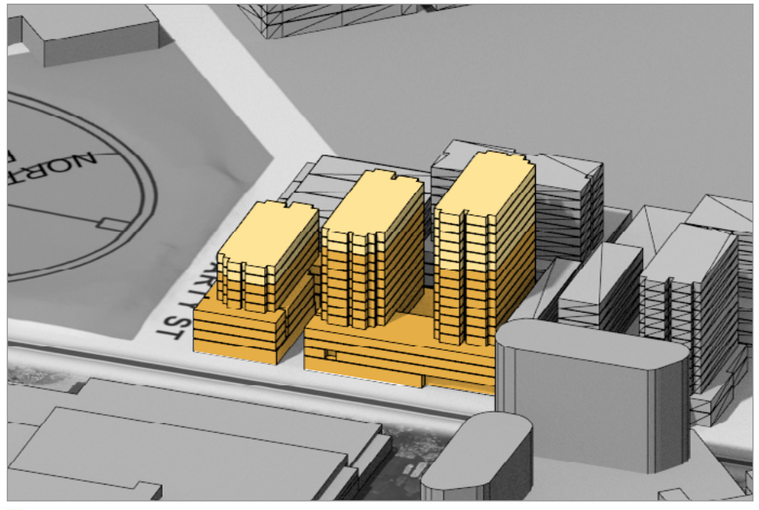
- Width of lanes varied to suit different functional requirements
- Priority given to wider 9m green lanes with service lane centralised in block
- Consolidated PCP in centre of block to limit impacts of car parking and servicing
- If full sleeving is required to above ground car parking, proposed precinct carparking numbers will be difficult to achieve in the current block arrangements and alternative locations should be considered
- Following initial testing with a basement PCP which indicated a poor feasibility outcome, a second option was tested without a basement or PCP provision
- Shadow testing indicated that FARs exceeding the DSP are achievable without extending shadow at the equinox between 11am-2pm into the open space beyond the street wall shadow of lots addressing Henderson St.



STRUCTURE PLAN PODIUM SUBDIVISION
PODIUM SLEEVING CHALLENGES



PROPOSED PODIUM SUBDIVISION
PODIUM SLEEVING HIERARCHY



EXTENT OF DEVELOPMENT REPRESENTING THE WORKING ASSUMPTION FAR
APPROXIMATE EXTENT OF DEVELOPMENT EXCEEDING THE WORKING ASSUMPTION FAR

Test Site 02

2.0 Test Site 02: Business Triangle–11,13, 15-19 Gracie St; 21 Reynolds St; 56-92 and 96 Langford St; 1 Boundary Rd, North Melbourne [including Reynolds St]

2.1 Methodology

Site 2 has been designated as the business triangle and is 10,566sqm in total area. The site did not exist in its current format in the Draft Structure Plan due to a different arrangement of open space in the Arden North sub-precinct.

A number of working assumptions were established to inform site testing:

These assumptions were based on the parcels north of the site.

— 6-15 storey heights
— 6 storey street walls
— 5m minimum setbacks above street walls,
— 5m minimum side and rear setbacks < 20 storeys
— 10m minimum setbacks > 20 storeys
— FAR 6:1
— FFL 1-2m above natural ground

The testing was to consider:

A commercial development:

— When does site consolidation need to occur to intensify development?
— Can parcels be developed separately and if so, what are the resulting interfaces?
— What development is achievable with limited 'fast moving' additional shadows to the adjacent open space at the equinox beyond shadow cast by the street wall forms?

The following options were explored:

— Individual site development of the existing small sites 2 A, B + C (refer to **Appendix B Option 2**)

— Development of the consolidated site triangle but with retention of Reynolds Street (refer to **Appendix B Option 3**)

— Development of the consolidated site triangle but with removal of Reynolds Street and introduction of a north-south laneway link (displayed)

— Development of the consolidated site triangle, removal of Reynolds Street, introduction of a north-south laneway link and additional levels (refer to **Appendix B Option 1**)

2.0 Test Site 02: Business Triangle–11,13, 15-19 Gracie St; 21 Reynolds St; 56-92 and 96 Langford St; 1 Boundary Rd, North Melbourne [including Reynolds St]

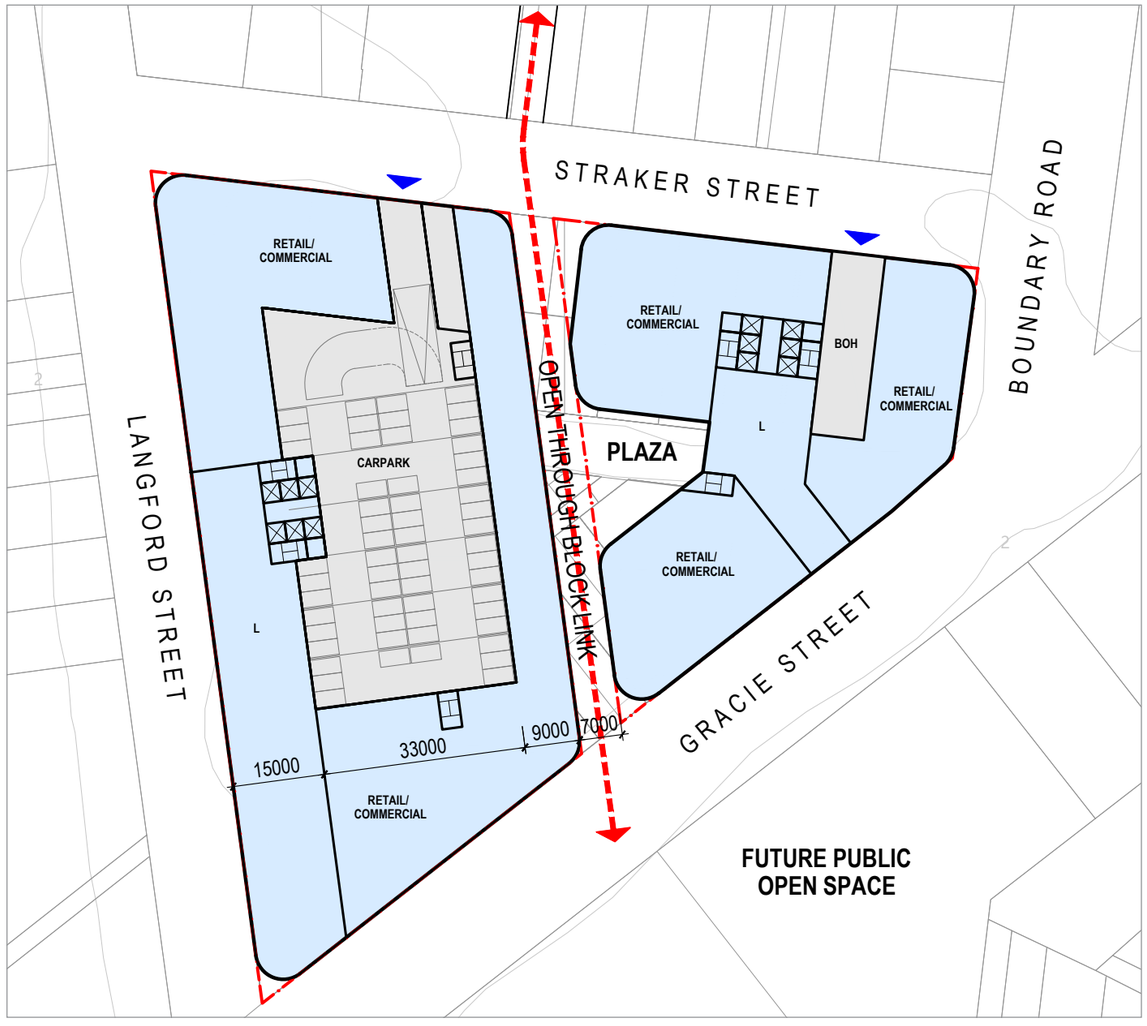
2.2 Table 1: Assumptions and Design Criteria for Yield Analysis Calculation

Parcel Size: 10,566m²
Test on 11 Gracie St: 301sqm, 13 Gracie St: 307sqm, 21 Reynolds St: 497sqm

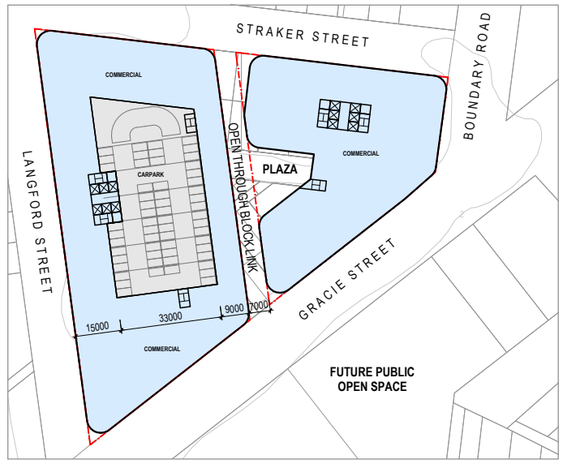
SITE 2		VICTORIAN PLANNING AUTHORITY ASSUMPTIONS	HAYBALL ASSUMPTIONS PEER REVIEW
DRAFT STRUCTURE PLAN 2020 Reference: Arden Working Assumptions received from VPA on 11 march 2021	**FLOOR AREA RATIO(FAR): n/a as site didn't exist**	FAR 6:1	
	SETBACK	Side and rear setbacks: minimum 5m (separation distance 10m), above 20 storeys: minimum 10m (separation distance 20m)	
	FLOOR TO FLOOR HEIGHT	Ground Floor: 5m Upper levels typical (office and residential): 3.5m	Overall building height calculated with floor to floor from Reference *9 but final Yield Study floor to floor consistent with current construction standards at 5m Ground floor, 3.2m for residential floors, 4.0m for Commercial Office floor and 2.8m for carpark levels
	SHADOWS	VPA to define the criterias (height and impact) that would make a slender fast-moving shadow appropriate. Shadow study to consider shadowing cast by the street wall at both Winter solstice and Spring equinox (from a time period of 10 am to 3pm).	Building forms are tested at a height that would be below the VPA carve at Equinox for VPA assessment
	TOWER SETBACK DISTANCE FROM STREET WALL	Minimum 5m	
	STREET WALL HEIGHT	6 storeys	Maximum height calculated by Structure Plan proposed height (5m Ground and 3.5m upper levels but number of levels based on Market standards for floor to floor height (5m Ground and 3.2m residential levels)
	OVERALL HEIGHT	6-15 Storeys	
PLANNING References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**MATTERS FOR CONSIDERATION DURING TESTING**	When does site consolidation need to occur to intensify development? Can the parcels be developed separately? Interface between buildings if developed separately, including relationship to adjoining sites.	Proposal for a North South link in line with the adjacent lane allowing activation to podium facades, office entry and carpark entry Carpark feasibility will be the driver for the testing of individual parcels Consolidation will create a site that will allow development and sharing of carpark amenities whilst allowing sleeving for carpark and better urban design. Parcels to the West are most likely able to support additional yield as overshadowing onto the public open space will be critical
	TYPOLOGY	Commercial	
	INTERFACES		Park Interface across Gracie Street & Creek Reserve to the West Main thoroughfare most likely along Gracie Street
	RETAIL ACTIVATION		Possible retail along Gracie Street or within the paza connected to the laneway for activation (protected from the wind)
PARKING References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**TRAFFIC CONFLICT FRONTAGE**	n/a	
	CAR SPACE SIZE ALLOCATION		Proposal for using a ratio of 40sqm per parking space (including circulation, services, car park space & bike parking) based on previous projects
	EXCAVATION		Minimise Excavation, Allow One basement and podium carpark preferred
	PRECINCT CARPARK		n/a
	CARPARK VISIBILITY		Proposal for sleeved carpark on all sides
	OTHER USES MAXIMUM PARKING RATIO	0.32 spaces per 100sqm GFA	
	VISITOR PARKING RATES	n/a	
FEASIBILITY ASSUMPTIONS References: Arden Structure Plan: Development Feasibility Assessment (VPA) 12 may 2020 - Final Draft by Ernst & Young	**AVERAGE APARTMENT SIZE**	n/a	
	BALCONY SIZE ALLOCATION	n/a	
	EFFICIENCY RATIO	NLA/NSA estimated at 85% of GFA for Office and residential (Assuming 15% of the completed project will be attributable to non-lettable/saleable area)	Proposal for 85% Efficiency for Commercial buildings
CLIMATE Reference: VPA Arden Urban Renewal Precinct, North Melbourne Microclimate Study GWTS-TPR-10370-2020-3	**FLOOD: HABITABLE LEVEL ABOVE GROUND**	Finished floor levels 1.0 - 2.0m above natural ground	2.0 meter used for yield study modeling (worst case scenario)
	SUN	Height & Impact of shadow to Open Space: Understand impact of shadowing cast by street wall at both Winter Solstice and Equinox (between 10am and 3pm) and impact and appropriatness of a slender fast moving shadow	
			PUBLIC OPEN SPACE: Building height to comply with the solar carve (above the street wall height of 6 storey (23m) And above 4 storeys (16m) as defined by the Draft Arden Structure Plan MODELING June 2020
		Tall tower separation proposed 25m ideal but minimum separation distance should equal the widest dimension of the tower floorplate	TOWER SEPARATION: Proposal for minimum tower separation should have ability to vary building separation depending on the height and orientation (i.e. the taller the wider separation)
	WIND	North wind is predominant in all seasons except in summer where the South wind is stronger	
	BUILDING ENTRANCE PREFERED LOCATION	Advised not to face the north or west. Preferable to the East	
TUNNEL INTERFERENCE Reference: Tunnel Loading Advisory Note DJPR Proposed Development of Arden Precinct DOC/20/63343	**ELECTROMAGNETIC INTERFERENCE**	For sensitive instruments within 300m of the tunnels	Not applicable for this site
	INTERNAL GROUND BORNE NOISE & VIBRATION	Guideline Targets: Residential: 35dB(A), Office: 45dB(A) Required mitigation measures required within 13m of the tunnel	Not applicable for this site

2.0 Test Site 02: Business Triangle–11,13, 15-19 Gracie St; 21 Reynolds St; 56-92 and 96 Langford St; 1 Boundary Rd, North Melbourne [including Reynolds St]

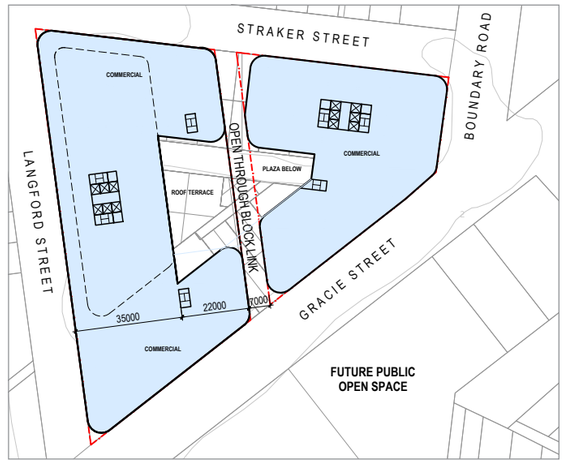
2.3 Plans – Consolidated Sites: North-South Link Option



GROUND
1:1000



LEVEL 1–LEVEL 3
1:2000



LEVEL 4
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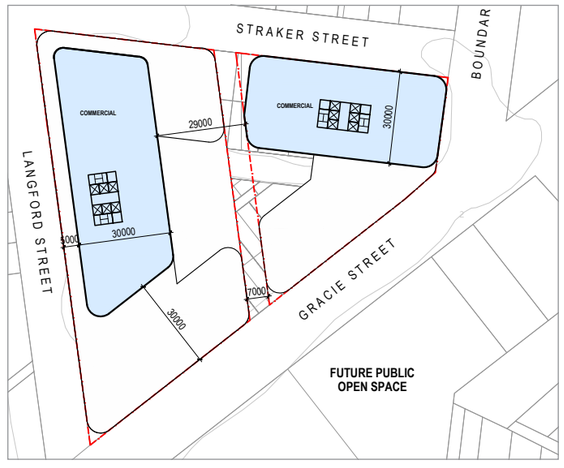

LEVEL 5 TO LEVEL 14
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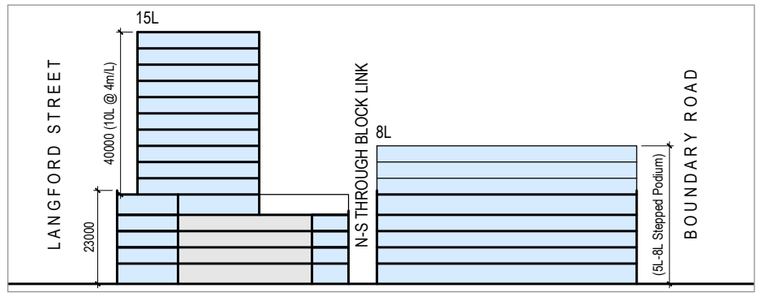

SECTION

2.0 Test Site 02: Business Triangle–11,13, 15-19 Gracie St; 21 Reynolds St; 56-92 and 96 Langford St; 1 Boundary Rd, North Melbourne [including Reynolds St]

2.4 Development Summary

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PROPOSED DEVELOPMENT SCHEDULE

				Residential					Carpark	
Site	**GBA****	**RETAIL**	**OFFICE**	Typical Apartment n/a for Site 02	**GFA***	NSA (inc P.O.S.) n/a for Site 02	NSA n/a for Site 02	Balcony*** n/a for Site 02	**CARPARK**	**CARPARK**
	m²	**NLA (m²)**	**NLA (m²)**	Number	**m²***	m²	m²	m²	**GFA (m²)**	**Spaces**
Basement	n/a								n/a	n/a
Ground	9500	6375			9500				2000	50
Level 1	9500		6375		9500				2000	50
Level 2	9500		6375		9500				2000	50
Level 3	9500		6375		9500				2000	50
Level 4	8600		7310		8600					
Level 5	4250		3613		4250					
Level 6	4250		3613		4250					
Level 7	4250		3613		4250					
Level 8	2350		1998		2350					
Level 9	2350		1998		2350					
Level 10	2350		1998		2350					
Level 11	2350		1998		2350					
Level 12	2350		1998		2350					
Level 13	2350		1998		2350					
Level 14	2350		1998		2350					
TOTAL	75800	6375	51255	0	75800		0	0	8000	200

Total Site Area (sqm):	10566	SQM	
Site Coverage (%):	90%		
Carpark spaces for Commercial at 0.32 ratio:	184	Spaces	
Carpark Ratio Provided	0.35		
Floor Area Ratio:	7.2	(calculated with overall GBA including laneway)	(New Site N/A but DRAFT SP 2020 adjacent sites FAR allowed 6:1)
			Approximate extent of Development exceeding the working assumption FAR

*GFA excludes balcony area

**GBA includes Balcony Area

***Based on 8sqm for 1BED&2BED and 12sqm for 3BED

Note:

Floor Area Ratio (FAR) is defined as all gross area above Ground (excluding plant) and voids within the building which are design elements (this does not include voids associated with car stakers which feature above ground).

The FAR excludes all basement structures. It includes covered balconies.

2.0 Test Site 02: Business Triangle–11,13, 15-19 Gracie St; 21 Reynolds St; 56-92 and 96 Langford St; 1 Boundary Rd, North Melbourne [including Reynolds St]

2.5 Design Response and Findings

Design Response and Findings:

— **Individual site development** is constrained to lower podium development (4 levels has been adopted) due to inefficient or zero car parking being able to be accommodated on the sites. It is noted that this height of development is lower than the street wall height of the working assumptions. Access to buildings and basement or enclosed at grade carparking is limited by flood mitigation requirements and the very small site sizes. This option was considered an under utilisation of the sites and was not tested for feasibility purposes (refer to **Appendix B**).

— **Development which retains Reynolds Street** (refer to **Appendix B**) creates a large triangle of land to the south with limited potential for development beyond the street wall due to overshadowing impacts. Optimised development to the north of Reynolds St creates a fully shadowed streetscape. The limited potential for upper level commercial floor plates on the southern land parcel was considered an underutilisation of the site and this option was not tested for feasibility purposes.

— **Removal of Reynolds Street** allowed east and west development parcels to be configured and the proposed laneway pedestrian priority zones north of Straker Street to be extended through the site and to connect to the open space. The large western parcel is able to accommodate sleeved podium parking and a significant tower floor plate (> 2000 sqm) together with generous outdoor podium space above the street wall, if some shadow encroachment of the open space is considered acceptable at the equinox. These shadow impacts of this form have been tested and illustrated (refer to **Appendix A**).

— If no shadow at the equinox is considered acceptable, then the tower floor plate needs to be setback a further 16.5m from the southern boundary.

— The eastern parcel is more constrained due to potential shadowing to the south and is considered more suitable for development as a consistent podium form with potential for 3 upper levels to the north if wind conditions can be adequately managed.

— The proposed north south link is considered a better public realm outcome as it has better potential for sunlight in the middle of the day and provides internal amenity to the centre of the block. However, it may create poor wind conditions at the street level due to the north south orientation.

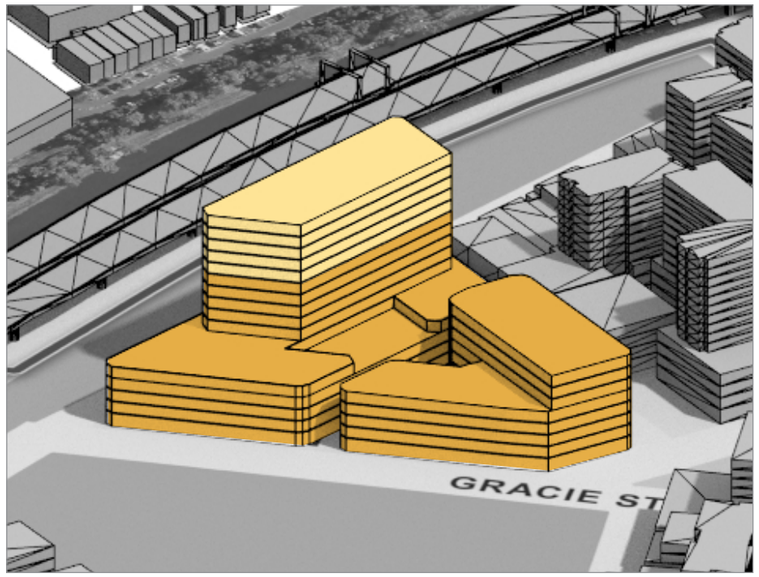
Recommendations:

— Greater clarification of the network function of the north –south link to the blocks north of Straker St is required to assess whether the extension of this connection through the study site is desirable as part of the broader pedestrian network.

— Marginal encroachment onto the adjoining open space of shadows from upper tower forms at 2pm at the equinox may need to be considered to avoid significant under development of this large site.

— Higher FAR then 6:1 (as proposed for sites north of Straker St) can be applied to the site within the proposed heights.

— Site offers good opportunity for hybrid typologies, however, the suitability of street holding forms will be heavily influenced by wind assessments.



EXTENT OF DEVELOPMENT REPRESENTING THE WORKING ASSUMPTION FAR
APPROXIMATE EXTENT OF DEVELOPMENT EXCEEDING THE WORKING ASSUMPTION FAR

Test Site 03

3.0 Test Site 03: 302-308 Arden Street, North Melbourne

3.1 Methodology

Site 3 is located at 302-308 Arden Street in North Melbourne and sits at the intersection of Arden Street and Langford Street. For the purpose of this exercise, the side boundary has been extended to the North West corner to allow for a straight continuation of a New Lane at the North of the site. The area across the new lane is earmarked for a future Public Open Space. The resultant site area is around 2,143sqm (from an initial 2,288sqm).

Site 3 is located in Arden North precinct, the site to the West of Langford Street will be Public Open space following the City Link freeway.

A number of working assumptions were established to inform site testing:

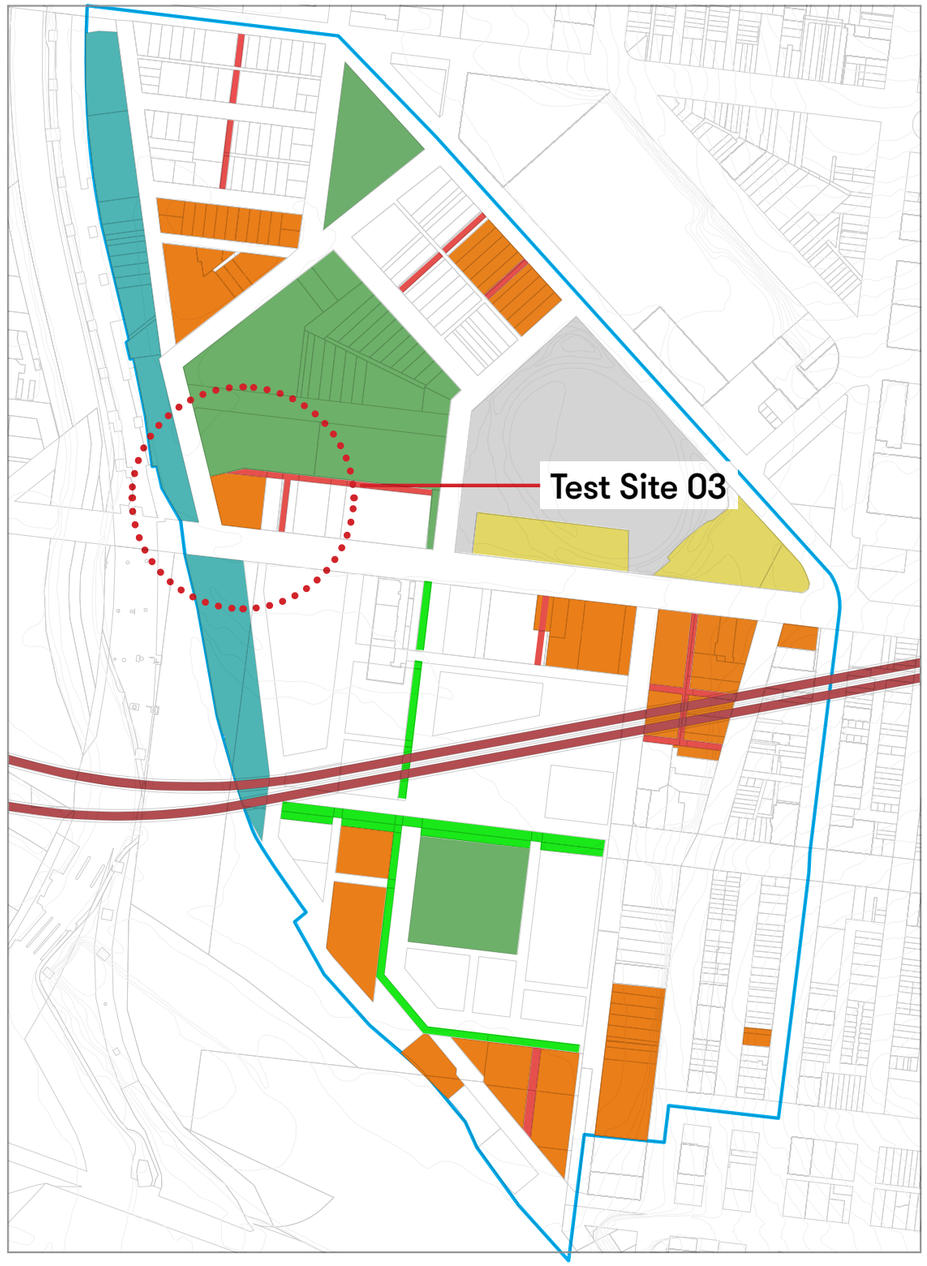
— 12-20 storeys (DSP2020)
— 6 storey street walls
— 5m minimum setbacks above street walls,
— 5m minimum side and rear setbacks < 20 storeys
— 10m minimum setbacks > 20 storeys
— FAR 9:1
— Finished floor levels 0.3–1.0m above natural ground; 1.0m used for the feasibility

The testing was to consider:

— A mixed-use development (Office and Residential)
— Response to the wind effect with Northerly exposure and to the West
— Potential gateway and relationship to be defined with the hospital across the road
— Whether a through block link or laneway should be provided to deliver a link at 70m intervals from Arden Street to the Open space to the North

The following options were tested:

— Commercial Ground floor, four levels of Commercial Podium with 15 levels of Residential tower above



3.0 Test Site 03: 302-308 Arden Street, North Melbourne

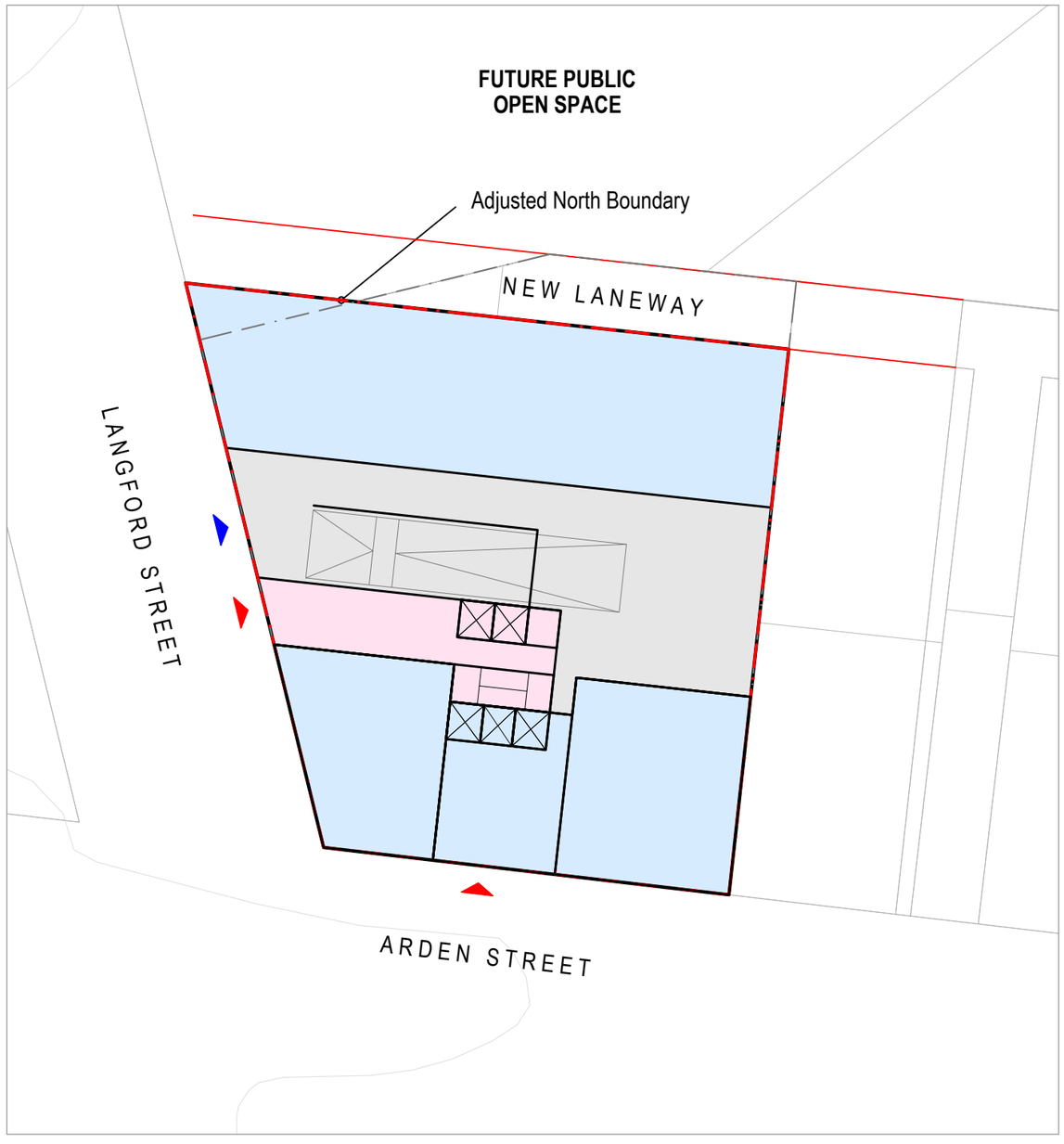
3.2 Table 1: Assumptions and Design Criteria for Yield Analysis Calculation

Parcel Size: 2,288m²

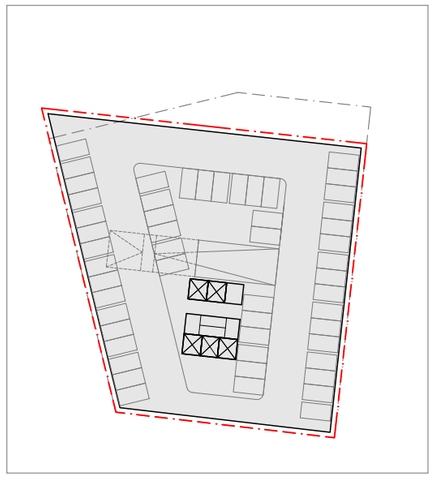
		VICTORIAN PLANNING AUTHORITY ASSUMPTIONS	HAYBALL ASSUMPTIONS PEER REVIEW
DRAFT STRUCTURE PLAN 2020 Reference: Arden Working Assumptions received from VPA on 11 march 2021	**FLOOR AREA RATIO(FAR): 9:1**		
	SETBACK above 6 Storey Street Wall along Arden Street, Front, Side &Rear	Side and rear setbacks: minimum 5m (separation distance 10m), above 20 storeys: minimum 10m (separation distance 20m)	
	FLOOR TO FLOOR HEIGHT	Ground Floor: 5m Upper levels typical (office and residential): 3.5m	Overall building height calculated with floor to floor from Reference *9 but final Yield Study floor to floor consistent with current construction standards at 5m Ground floor, 3.2m for residential floors, 4.0m for Commercial Office floor and 2.8m for carpark levels
	SHADOWS		Building forms are tested at a height that would be below the VPA carve at Equinox for VPA assessment
	TOWER SETBACK DISTANCE FROM STREET WALL	Minimum 5m	
	STREET WALL HEIGHT: 6 Storeys	As per DSP	Maximum height calculated by Structure Plan proposed height (5m Ground and 3.5m upper levels but number of levels based on Market standards for floor to floor height (5m Ground and 3.2m residential levels)
	OVERALL HEIGHT: 12-20 Storeys	As per DSP	
PLANNING References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**MATTERS FOR CONSIDERATION DURING TESTING**	Response to wind effects with Northerly exposure and to the West Potential gateway / relationship to hospital across the road Whether a through block link or laneway should be provided to deliver a link at 70m intervals from Arden Street to the open space to the North	
	TYPOLOGY	Mixed Commercial / Residential	Proposal for Commercial on Ground and Residential for upper levels
	INTERFACES		Park Interface to the North Main thoroughfare along Langford and Arden Street
	RETAIL ACTIVATION		Along Arden Street & Langford Street
PARKING Reterences: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**TRAFFIC CONFLICT FRONTAGE**	Paper road to the North of the site	
	CAR SPACE SIZE ALLOCATION		Proposal for using a ratio of 40sqm per parking space (including circulation, services, car park space & bike parking) based on previous projects
	EXCAVATION		Minimise Excavation, Allow One basement and podium carpark preferred
	PRECINCT CARPARK	n/a	
	CARPARK VISIBILITY		Proposal for carpark basement only with carpark access along Langford Street
	RESIDENTIAL MAXIMUM PARKING RATIO	1BED 0.2 spaces per dwelling 2BED 0.3 spaces per dwelling 3BED 0.5 spaces per dwelling	Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average dwelling carpark ratio of 0.29:1 per average dwelling
	OTHER USES MAXIMUM PARKING RATIO	0.32 spaces per 100sqm GFA	
	VISITOR PARKING RATES	n/a	Proposal for visitor parking to be included as part of the precinct parking allocations (400 spaces)
FEASIBILITY ASSUMPTIONS References: Arden Structure Plan: Development Feasibility Assessment (VPA) 12 may 2020 - Final Draft by Ernst & Young	**AVERAGE APARTMENT SIZE**	75sqm of NLA	
	BALCONY SIZE ALLOCATION		Balcony size of 1BED & 2BED 8sqm, 3BED 12sqm as per B.A.D.S. Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average balcony size of 8.4 sqm per average dwelling assuming the A/C condensers are **not** located on balconies.
	EFFICIENCY RATIO	NLA/NSA estimated at 85% of GFA for Office and residential (Assuming 15% of the completed project will be attributable to non-lettable/saleable area)	Proposal for 85% Efficiency for Commercial buildings and 78% Efficiency for Residential buildings
CLIMATE Reference: VPA Arden Urban Renewal Precinct, North Melbourne Microclimate Study GWTS-TPR-10370-2020-3	**FLOOD: HABITABLE LEVEL ABOVE GROUND**	Finished floor levels 0.3 - 1.0m above natural ground	1.0 meter used for yield study modeling (worst case scenario)
	SUN	Tall tower separation proposed 25m ideal but minimum separation distance should equal the widest dimension of the tower floorplate	COMMUNAL OPEN SPACE: Sunlight testing required for Clause 58.03-3 Standard D8 – min. 50% or 125m2 of primary communal open space to achieve min. 2 hrs of sunlight between 9am-3pm on 21 June. PUBLIC OPEN SPACE: Building height to comply with the solar carve (above the street wall height of 6 storey (23m) And above 4 storeys (16m) as defined by the Draft Arden Structure Plan MODELING June 2020 TOWER SEPARATION: Proposal for minimum tower separation should have ability to vary building separation depending on the height and orientation (i.e. the taller the wider separation)
	WIND	North wind is predominant in all seasons except in summer where the South wind is stronger	
	BUILDING ENTRANCE PREFERED LOCATION	Advised not to face the north or west. Preferable to the East	
TUNNEL **INTERFERENCE** Reference: Tunnel Loading Advisory Note DJPR Proposed Development of Arden Precinct DOC/20/63343	**ELECTROMAGNETIC INTERFERENCE**	For sensitive instruments within 300m of the tunnels	Not applicable for this site
	INTERNAL GROUND BORNE NOISE & VIBRATION	Guideline Targets: Residential: 35dB(A), Office: 45dB(A) Required mitigation measures required within 13m of the tunnel	Not applicable for this site

3.0 Test Site 03: 302-308 Arden Street, North Melbourne

3.3 Plans



GROUND
1:1000



BASEMENT (1L)
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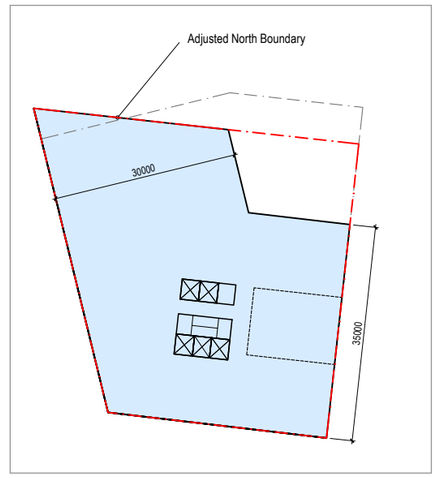

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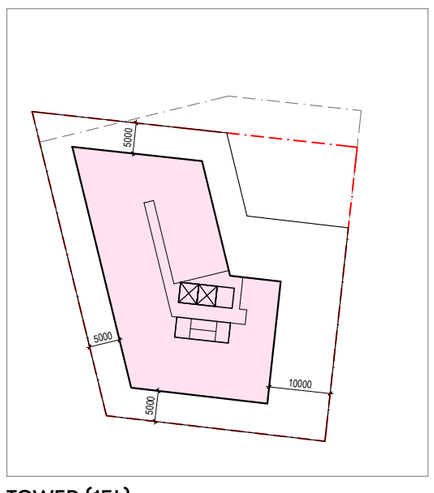

TOWER (15L)
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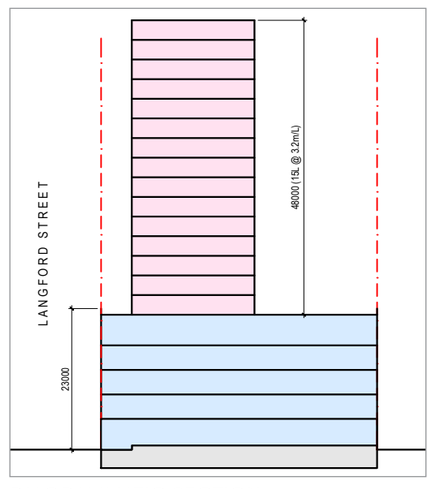


DIAGRAMMATIC SECTION

3.0 Test Site 03: 302-308 Arden Street, North Melbourne

3.4 Development Summary

The information presented herein is preliminary. It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities. Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor. Floor areas shown have generally been measured using the guidelines – published by the Property Council of Australia. All areas and measurements shown are rounded to the nearest whole number. All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only. Further development of this design will require information produced by a number of specialist consultants. This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented. Hayball accepts no legal responsibilities for any decision, commercial or otherwise, made on the basis of the information presented.

ALL SITES PROPOSED DEVELOPMENT SCHEDULE

				Residential					Carpark	
Site	**GBA****	**RETAIL**	**OFFICE**	**Typical Apartment**	**GFA***	**NSA (inc P.O.S.)**	**NSA**	**Balcony*****	**CARPARK**	**CARPARK**
	m²	**NLA (m²)**	**NLA (m²)**	**Number**	**m²***	**m²**	**m²**	**m²**	**GFA (m²)**	**Spaces**
Basement	2100								2100	53
Ground	2100	1242								
Level 1	1900		1615							
Level 2	1900		1615							
Level 3	1900		1615							
Level 4	1900		1615							
Level 5	900			9	827	720	647	73		
Level 6	900			9	827	720	647	73		
Level 7	900			9	827	720	647	73		
Level 8	900			9	827	720	647	73		
Level 9	900			9	827	720	647	73		
Level 10	900			9	827	720	647	73		
Level 11	900			9	827	720	647	73		
Level 12	900			9	827	720	647	73		
Level 13	900			9	827	720	647	73		
Level 14	900			9	827	720	647	73		
Level 15	900			9	827	720	647	73		
Level 16	900			9	827	720	647	73		
Level 17	900			9	827	720	647	73		
Level 18	900			9	827	720	647	73		
Level 19	900			9	827	720	647	73		
TOTAL	23200	1242	6460	**135**	12405		9705	1095	2100	53
	Excl Basement									Shortfall 11

Total Site Area (sqm):	2143.0	SQM	Based on North Boudary adjustment due to proposed laneway
Site Coverage (%):	98%		
Carpark Ratio:	0.29 Residential; 0.14 Commercial		
Carpark spaces for Residential at 0.29 ratio:	39	Required Spaces	
Carpark spaces for Commercial at 0.32 ratio:	25	Required Spaces	
Floor Area Ratio:	10.8	(FAR allowed 9:1 - DRAFT SP 2020)	Approximate extent of Development exceeding the working assumption FAR

*GFA excludes balcony area

**GBA includes Balcony Area

***Based on 8sqm for 1BED&2BED and 12sqm for 3BED

Note:

Floor Area Ratio (FAR) is defined as all gross area above Ground (excluding plant) and voids within the building which are design elements (this does not include voids associated with car stakers which feature above ground).

The FAR excludes all basement structures. It includes covered balconies.

3.0 Test Site 03: 302-308 Arden Street, North Melbourne

3.5 Design Response and Findings

Design Response and Findings:

— The size of the site allows for an efficient basement carpark that provides enough cars for the 20 storey development.

— The depth of the site is quite large and a commercial use podium would require an indent to allow sufficient light penetration within the floorplate.

— The overall site dimension does not allow for a fully sleeved podium carpark.

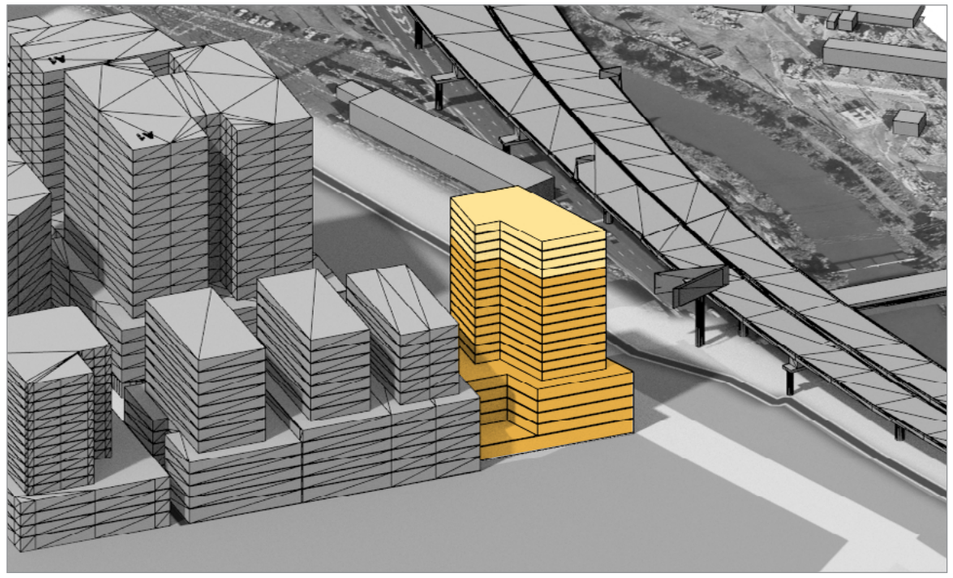
— A 10m tower setback has been allowed to the adjacent property to facilitate a future 20m separation if the sites to the east are consolidated and also developed to a similar scale. If the individual adjacent site is too small for redevelopment, the tower form could be extended further.

— This mixed use option with a single residential tower yields an FAR of 10.8:1 The proposal meets the preferred 20 level building height and setback requirements but illustrates that this exceeds the working assumption of 9:1 FAR.

Recommendations:

— Shadow analysis illustrates that the upper form casts fast moving shadow across Arden street at the Equinox, but street wall heights relative to the wide street avoids continuous shadow to the southern footpath.

— Testing indicates that the FAR for this site could be increased to 11:1 while maintaining the preferred 20 level building height.



EXTENT OF DEVELOPMENT REPRESENTING THE WORKING ASSUMPTION FAR
APPROXIMATE EXTENT OF DEVELOPMENT EXCEEDING THE WORKING ASSUMPTION FAR

Test Site 04

4.0 Test Site 04: 171-185 Arden St, 189-203 Arden St and 91–109 Munster Terrace, North Melbourne

4.1 Methodology

Site 4 is composed of 5 parcels: Lot 23, 24, 25, 30 and 31. The overall area is around 15,919sqm and includes the following parcels: 171-185 Arden Street, 189-203 Arden Street and 90-109 Munster Terrace in North Melbourne.

The Lots are located in Arden Central precinct adjacent to the new proposed Arden Station and South of the North Melbourne Recreation Reserve.

The South part of the sites are located above the train corridor tunnel. There is a provision in the DSP2020 for a North South lane to the West of Lot 23, a North South lane and the extension of Barwise Street to the east of the station.

Site 24, 25 30 and 31 are identified for a precinct carpark of 850 car spaces (scenario 2b – Arden Movement and Parking Study Version B, 17 December 2020, by GTA Consultants) because of its proximity to the train station.

A number of working assumptions were established to inform site testing:

- Lot 23:12-17 storeys, Lot 24, 25, 30 and 31: not specified
- 6 storey street walls
- 5m minimum setbacks above street walls,
- Lot 24, 25, 30 and 31: 5m minimum side and rear setbacks < 20 storeys
- Lot 24, 25, 30 and 31: 10m minimum setbacks > 20 storeys
- Lot 23 FAR 12:1 – 15:1
- Lot 23: Finished floor levels 0–1.0m above natural ground, Lot 24, 25, 30 and 31: Finished floor levels 0.3–0.5m above Ground Level; 1.0m used for the feasibility

The testing was to consider:

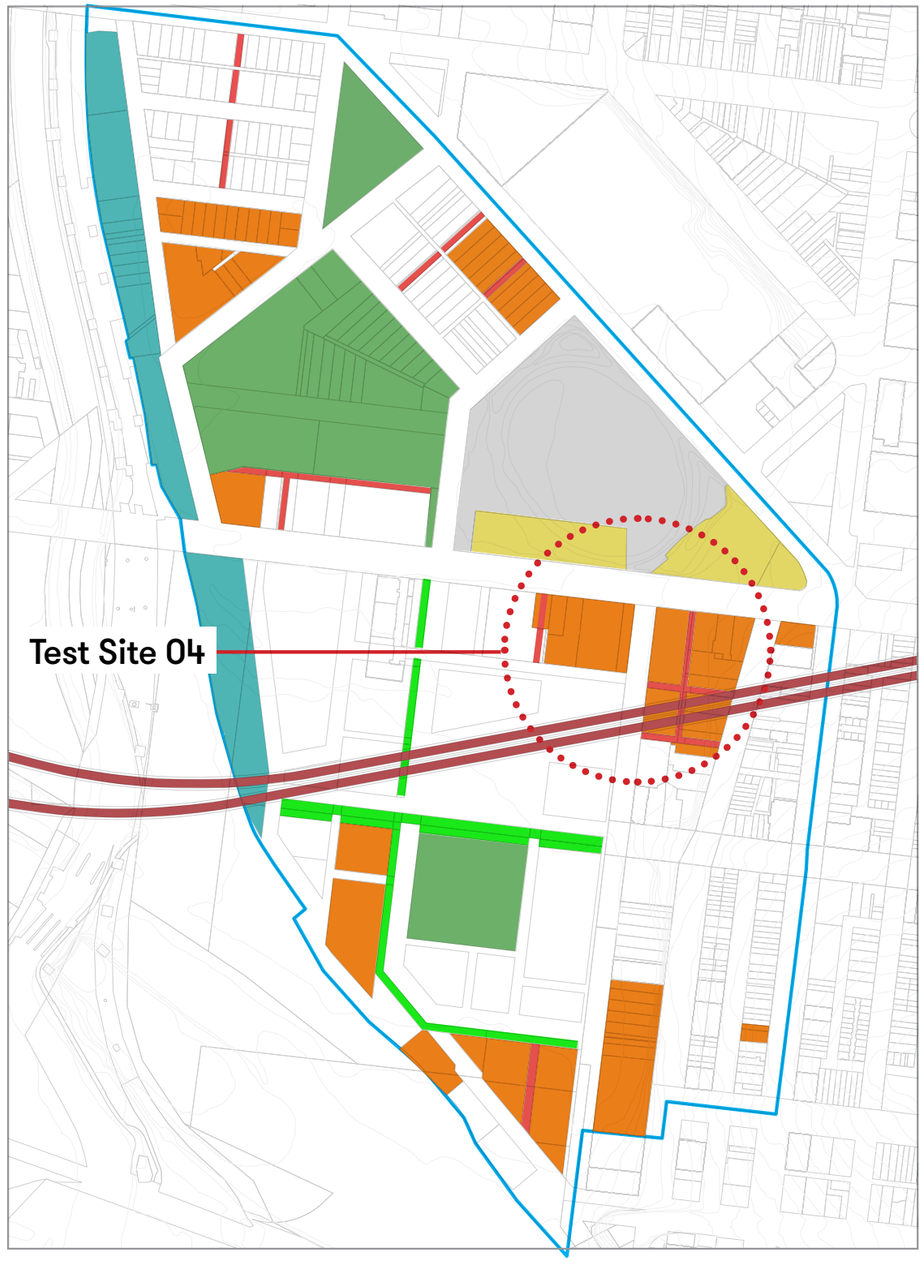
- A Mixed-use development (Office and Residential)
- Creation of an Open space (3 storey high) along Laurens Street on Lot 23 (10m wide from existing title boundary
- Minimise wind effect to street and to train station entrance
- Consideration for the form of the buildings and relationship to open space opposite
- Tunnel Overloading (structural capacity)
- Gateway into Arden Central and Appropriateness of transition to Lauren Street Precinct
- Interaction with Royal Melbourne flight path
- Basement carparking (corner of Arden and Lauren Street)
- Cantilever over open space to Lauren Street to ensure views to the station plaza entry from Arden street is achieved (and supports future pedestrian volumes)

The following options were explored for Lot 23:

- Maintaining the proposed laneway to the West of the site, open to the sky
- Removing the laneway to the West of the site to allow for services and a more efficient carpark layout
- Option 1 (refer to **Appendix B**) include Retail / Commercial on Ground and podium and two residential towers above for a total of 18 storeys (overall height between 12 and 17 storey in working assumptions, overall height between 8 and 25 storeys listed in the DSP2020).
- Option 2 (displayed) include Retail / Commercial on Ground and podium and one commercial tower above for a total of 18 storeys (overall height between 12 and 17 storey in working assumptions, overall height between 8 and 25 storeys listed in the DSP2020).

The following options were explored for Lot 24, 25, 30 and 31:

- Maintaining the layout of the DSP2020 with the extension of Barwise Street and the north South Lane connecting Barwise Street to Arden Street.
- Removal of Barwise Street extension to be replaced by a pedestrian landscaped street over the train tunnel corridor further to the South.
- Removal of North South lane from Arden Street to Barwise Street to host the precinct carpark
- Option 1 (refer to **Appendix B**) upper levels layout include two residential towers on the podium
- Option 2 (displayed) upper levels layout include one Office / Commercial tower to the West and a residential tower to the East part of the site.



4.0 Test Site 04: 171-185 Arden St, 189-203 Arden St and 91–109 Munster Terrace, North Melbourne

4.2 Table 1: Assumptions and Design Criteria for Yield Analysis Calculation

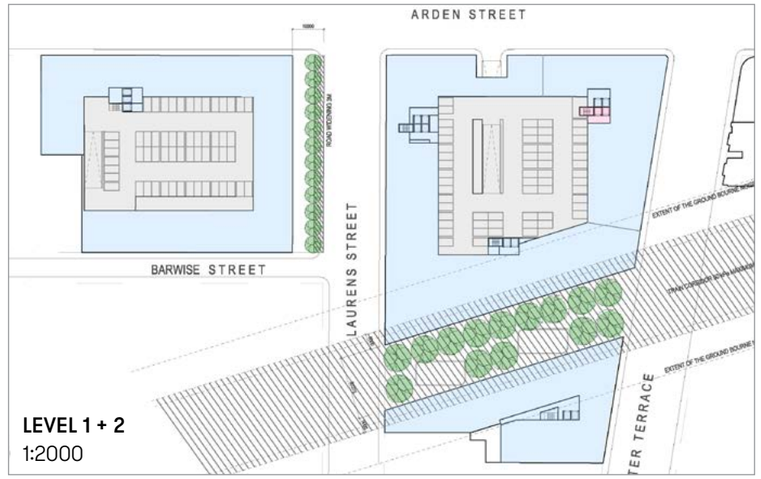
Parcel Size: 15,919m²

		VICTORIAN PLANNING AUTHORITY ASSUMPTIONS	HAYBALL ASSUMPTIONS PEER REVIEW
DRAFT STRUCTURE PLAN 2020 Reference: Arden Working Assumptions received from VPA on 11 march 2021	**FLOOR AREA RATIO(FAR) Lot 23: 10:1, Lot 24, 25, 30 & 31: 9:1**	Lot 23 FAR 12:1 - 15:1, Lot 24, 25, 30 & 31: FRA not specified	
	SETBACK above 6 Storey Stret Wall along Arden St, Front, Side & Rear	Lot 24, 25, 30 & 31: Side and rear setbacks: minimum 5m (separation distance 10m), above 20 storeys: minimum 10m (separation distance 20m)	
	FLOOR TO FLOOR HEIGHT	Ground Floor: 5m Upper levels typical (office and residential): 3.5m	Overall building height calculated with floor to floor from Reference *9 but final Yield Study floor to floor consistent with current construction standards at 5m Ground floor, 3.2m for residential floors, 4.0m for Commercial Office floor and 2.8m for carpark levels
	SHADOWS		Building forms are tested at a height that would be below the VPA carve at Equinox for VPA assessment
	TOWER SETBACK DISTANCE FROM STREET WALL	Minimum 5m	
	STREET WALL HEIGHT: 6 Storeys	As per DSP	Maximum height calculated by Structure Plan proposed height (5m Ground and 3.5m upper levels but number of levels based or Market standards for floor to floor height (5m Ground and 3.2m residential levels)
	OVERALL HEIGHT: Lot 23: 8-25 Storeys, Lot 24, 25, 30 &31: 12-20 Storeys	Lot 23: 12-17 storeys, Lot 24, 25, 30 & 31: not specified	
PLANNING References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**MATTERS FOR CONSIDERATION DURING TESTING**	Lot 23: Open space to Laurens Street at Ground (10m deep from existing title boundary) shown volumetrically as 3 storeys in height Wind effect to street and to station entrance Form of the buildings and relationship to open space offsite (not framed) Tunnel overloading Gatewayinto Arden Central and Appropriateness of transition to Lauren Street precinct Interaction with Royal Melbourne flight path Basement carparking (corner of Arden and Lauren Street) Cantilever over open space to Lauren Street to ensure views to station plaza entry from Arden street is achieved (and supports future pedestrian volumes)	
	TYPOLOGY	Mixed Commercial / Residential	Proposal for Commercial on Ground and Residential for upper levels
	INTERFACES		Park Interface to the North Melbourne Recreation Reserve to the North Main thoroughfare along Laurens Street and to the station from all sides
	RETAIL ACTIVATION		Proposal for retail activation around all Ground interface and along the retail plaza above the tunnel
PARKING References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**TRAFFIC CONFLICT FRONTAGE**	Lot 23: Barwise Street & Laurens Street; Lot 24, 25, 30 & 31: Lauren Street and Munster Terrace	
	CAR SPACE SIZE ALLOCATION		Proposal for using a ratio of 40sqm per parking space (including circulation, services, car park space & bike parking) based on previous projects
	EXCAVATION		Minimise Excavation, Allow One basement and podium carpark preferred
	PRECINCT CARPARK	Identified for 800 cars	
	CARPARK VISIBILITY		Proposal for active uses all around the carparks
	RESIDENTIAL MAXIMUM PARKING RATIO	1BED 0.2 spaces per dwelling 2BED 0.3 spaces per dwelling 3BED 0.5 spaces per dwelling	Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average dwelling carpark ratio of 0.29:1 per average dwelling
	OTHER USES MAXIMUM PARKING RATIO	0.32 spaces per 100sqm GFA	
	VISITOR PARKING RATES	n/a	Proposal for visitor parking to be included as part of the precinct parking allocations (400 spaces)
FEASIBILITY ASSUMPTIONS References: Arden Structure Plan: Development Feasibility Assessment (VPA) 12 may 2020 - Final Draft by Ernst & Young	**AVERAGE APARTMENT SIZE**	75sqm of NLA	
	BALCONY SIZE ALLOCATION		Balcony size of 1BED & 2BED 8sqm, 3BED 12sqm as per B.A.D.S. Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average balcony size of 8.4 sqm per average dwelling assuming the A/C condensers are**not** located on balconies.
	EFFICIENCY RATIO	NLA/NSA estimated at 85% of GFA for Office and residential (Assuming 15% of the completed project will be attributable to non-lettable/saleable area)	Proposal for 85% Efficiency for Commercial buildings and 78% Efficiency for Residential buildings
CLIMATE Reference: VPA Arden Urban Renewal Precinct, North Melbourne Microclimate Study GWTS-TPR-10370-2020-3	**FLOOD: MIN FLOOR ABOVE GROUND**	Lot 23: Finished floor levels 0 - 1.0m above natural ground, Lot 24, 25, 30 & 31: Finished floor levels 0.3 - 0.5m above natural ground	1.0 meter used for yield study modeling (worst case scenario)
	SUN	Height & Impact of shadow to Open Space: Understand impact of shadowing cast by street wall at both Winter Solstice and Equino (between 10am and 3pm) and impact and appropriatness of a slender fast moving shadow	COMMUNAL OPEN SPACE: Sunlight testing required for Clause 58.03-3 Standard D8 – min. 50% or 125m2 of primary communal open space to achieve min. 2 hrs of sunlight between 9am-3pm on 21 June.
			PUBLIC OPEN SPACE: Building height to comply with the solar carve (above the street wall height of 6 storey (23m) And above 4 storeys (16m) as defined by the Draft Arden Structure Plan MODELING June 2020
		Tall tower separation proposed 25m ideal but minimum separation distance should equal the widest dimension of the tower floorplate	TOWER SEPARATION: Proposal for minimum tower separation should have ability to vary building separation depending on the height and orientation (i.e. the taller the wider separation)
	WIND	North wind is predominant in all seasons except in summer where the South wind is stronger	
	BUILDING ENTRANCE PREFERED LOCATION	Advised not to face the north or west. Preferable to the East	
TUNNEL INTERFERENCE Reference: Tunnel Loading Advisory Note DJPR Proposed Development of Arden Precinct DOC/20/63343	**ELECTROMAGNETIC INTERFERENCE**	For sensitive instruments within 300m of the tunnels	Applicable for this site
	INTERNAL GROUND BORNE NOISE & VIBRATION	Guideline Targets: Residential: 35dB(A), Office: 45dB(A) Required mitigation measures required within 13m of the tunnel	Mitigation measure required for the South of the East site Structural overloading over 50kPa not allowed over the tunnel, no pile within 2m of the train corridor zone

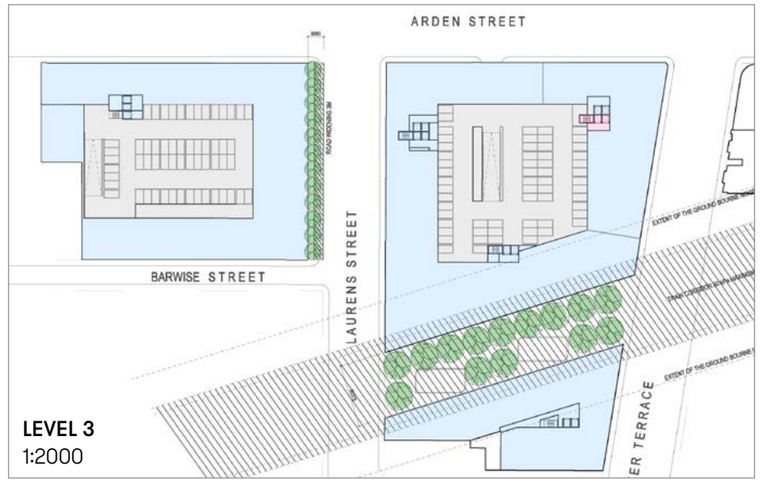
4.0 Test Site 04: 171-185 Arden St, 189-203 Arden St and 91–109 Munster Terrace, North Melbourne

4.3 Plans

GROUND
1:1000



LEVEL 1 + 2
1:2000



LEVEL 3
1:2000

LEVEL 4 TO 9
1:2000

4.0 Test Site 04: 171-185 Arden St, 189-203 Arden St and 91–109 Munster Terrace, North Melbourne

4.4 Development Summary

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SITE 4 171-185 Arden St, 189-203 Arden St & 91-109 Munster Terrace, North Melbourne

				Residential					Carpark	
Site	**GBA****	**COMMUNAL**	**OFFICE**	**Typical Apartment**	**GFA***	**NSA (inc P.O.S.)**	**NSA**	**Balcony*****	**CARPARK**	**CARPARK**
	m²	**NLA (m²)**	**NLA (m²)**	**Number**	**m²***	**m²**	**m²**	**m²**	**GFA (m²)**	**Spaces**
Basement										
Ground	12699.4		5794.6						5882.2	147
Level 1	13469.0		7835.0						4251.4	106
Level 2	13469.0		7835.0						4251.4	106
Level 3	13469.0		8105.9						4251.4	106
Level 4	7360.6	200.0	6128.7	10	1031.9	825.5	742.4	83.1		
Level 5	7360.6		6128.7	12	1231.9	985.5	886.3	99.3		
Level 6	7360.6		6128.7	12	1231.9	985.5	886.3	99.3		
Level 7	7360.6		6128.7	12	1231.9	985.5	886.3	99.3		
Level 8	7360.6		6128.7	12	1231.9	985.5	886.3	99.3		
Level 9	7360.6		6128.7	12	1231.9	985.5	886.3	99.3		
Level 10	7360.6		6128.7	12	1231.9	985.5	886.3	99.3		
Level 11	7360.6		6128.7	12	1231.9	985.5	886.3	99.3		
Level 12	7360.6		6128.7	12	1231.9	985.5	886.3	99.3		
Level 13	7360.6		6128.7	12	1231.9	985.5	886.3	99.3		
Level 14	7360.6		6128.7	12	1231.9	985.5	886.3	99.3		
Level 15	7360.6		6128.7	12	1231.9	985.5	886.3	99.3		
Level 16	7360.6		6128.7	12	1231.9	985.5	886.3	99.3		
Level 17	7360.6		6128.7	12	1231.9	985.5	886.3	99.3		
Level 18	7360.6		6128.7	12	1231.9	985.5	886.3	99.3		
Level 19	7360.6		6128.7	12	1231.9	985.5	886.3	99.3		
TOTAL	170876.0	200.0	127629.6	**187.2**	19510.4		14036.3	1572.1	18636.4	465.9

Total Site Area (sqm):	15764.7	SQM	
Lot 23 Site Area (sqm):	5272.6	SQM	
Lot 24, 25, 30 & 31 Site Area (sqm):	10492.1	SQM	
Site Coverage (%):	81%		
Carpark Ratio:	2.5		
Carpark spaces for Residential at 0.29 ratio:	54.3	Spaces	
Carpark commercial (0.32 ratio per 100sqm):	408.4	Spaces	
Floor Area Ratio (all parcels):	**10.8**	(Working assumption FAR 12:1 to 15:1)	
Floor Area Ratio (Lot 23):	**11.7**	Draft Structure Plan 2020 FAR 10:1	Lot 23 GBA above Ground: 61591.4 sqm
Floor Area Ratio (Lot 24, 25, 30 & 31):	**10.4**	Draft Structure Plan 2020 FAR 9:1	Lot 24,25, 30 & 31 GBA above Ground: 109611.5 sqm

*GFA excludes balcony area

**GBA includes Balcony Area

***Based on 8sqm for 1BED&2BED and 12sqm for 3BED

Approximate extent of Development exceeding the working assumption FAR for Lot 23

Approximate extent of Development exceeding the working assumption FAR for all sites

Note: Floor Area Ratio (FAR) is defined as all gross area above Ground (excluding plant) and voids within the building which are design elements (this does not include voids associated with car stakers which feature above ground).
The FAR excludes all basement structures. It includes covered balconies.

4.0 Test Site 04: 171-185 Arden St, 189-203 Arden St and 91–109 Munster Terrace, North Melbourne

4.5 Design Response and Findings

Design Response and Findings for Lot 23 (West of Laurens St):

— As carparking is required within the podium of Lot 23, creating a North South laneway between Arden Street and Barwise Street is challenging. We anticipate the laneway will be affected by wind and offer reduced amenity. The block length of Lot 23 (82m x 64m) is <100m which suggests reducing the street block size further may not be required.

— The irregular western edge of the site is suitable for ancillary elements such as bike stores without interfering with the internal carpark layout and office layout at upper levels.

— **Option 1** (shown in **Appendix B**) shows two residential towers with 20m separation, and allows for a 9.5m side setback to the South West for equal development opportunity. This option allows for sun penetration between the towers to the station at mid-day. The two towers GBA totals 2050sqm per floor. The residential Option yields a smaller floorplate to the Commercial Office tower and is not preferred.

— **Option 2** (displayed option) allows for a single 'L' shaped commercial office tower on site with the podium courtyard facing the station to limit the overshadowing along Laurens Street and the Train Station plaza. This option for a single tower yields a GBA of 2,632sqm per floor.

— Within Option 2 Lot 23 has been tested with 3 additional floors from 17 to 20 levels (as outlined in the DSP) and yields an FAR of 11.7:1. At a maximum of 17 storeys (working assumption), Lot 23 would yield a FAR of 10.2:1, still exceeding the 10:1 FAR proposed in the DSP.

Design Response and Findings for Lot 24, 25, 30 and 31:

— The lot configuration proposed by the DSP 2020 is challenging for the following reasons:

— The North South laneway linking Arden Street to Barwise Street prevents the creation of the precinct carpark within the podium.

— The extension of Barwise Street between Laurens Street and Munster Terrace creates two smaller parcels to the South that are located over the Train corridor and can't be developed because of the maximum loading capacity above the Tunnel (50kPa). We anticipate the cost of a structural deck to support any development over the tunnel corridor (similar to Fed Square) would be prohibitive.

— The land on each side of the tunnel corridor is not wide enough to allow for the piling for a development located along Munster Terrace with the extension of Barwise Street.

— The layout tested proposes a relocation of Barwise Street over the train corridor as a pedestrian landscaped retail street linking the Laurens Street precinct to the station (30m wide). It allows for Activated Ground floor to both sides with possible light weight retail pods over the tunnel corridor. This configuration allows for a cantilevered office podium (5m to both sides) over the train corridor to both sides, reducing the open space to 20m wide) and maximising the podium development potential.

— The North South lane was removed to enable the precinct carpark of 850 cars within the podium space and one level basement. The basement would also cater for the smaller development at the South end of the site.

— If no basement is provided, the Southern parcel needs to access the carpark of the Northern parcel as the podium size does not allow for a sleeved carpark.

— Option 1 scheme (refer to Appendix B) with two residential towers shows that the diagonal shape of the site is less compatible with the maximum depth of the towers and there is a large undeveloped area in the centre. This Option generates 3161sqm of GBA per floor.

— Option 2 scheme (displayed) with a commercial tower and a residential tower utilizes the irregular diagonal shape of the tower in the office building and allows for a simple residential tower configuration to the East. Tower separation shown is 20m. This scheme generates a typical GBA per floor of 3916sqm.

— The results show that Option 2 yields significantly more floor area.DSP

Recommendations:

— The Tunnel corridor structural limitations have direct impact on the built form above. Consideration should be given to a revised laneway and public space network above the tunnel.

— Including North- South lanes for both Lot 23 and 24, 25, 30 and 31 will impede in the ability to provide a large precinct carpark for the area as identified in the precinct parking strategy.

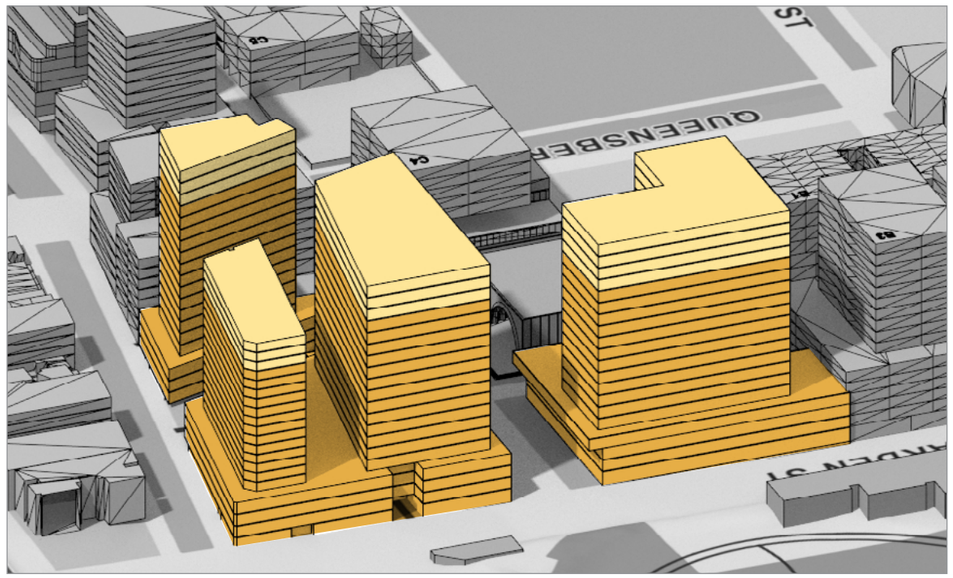
— The extension of Barwise Street needs further consideration as it limits the development of the Southern parcel due to its location over the tunnel corridor.

— If the precinct carpark is not built, the podium for Lot 23 may be reduced to 4 levels. The resulting built form outcome of 1 level cantilevered above the 3 storey Lauren St widening of the public space may require re-consideration.

— Testing of both sites showed potential for higher FARs than the DSP, within the preferred DSP height limits, with an FAR of approx. 11.7:1 (for Lot 23) and at 10.4:1 (for lot 24, 25, 30 and 31).

— The larger footprints adopted above podium, indicates morning and afternoon shadow impacts at the equinox onto the street network, however, the commercial option improves sunlight to the station plaza.

— Both residential and commercial options do not impact the Central City open space at the equinox.



EXTENT OF DEVELOPMENT REPRESENTING THE WORKING ASSUMPTION FAR
APPROXIMATE EXTENT OF DEVELOPMENT EXCEEDING THE WORKING ASSUMPTION FAR

Test Site 05

5.0 Test Site 05: 17-27, 29-47 and 49-63 Laurens Street, North Melbourne

5.1 Methodology

Site 5 represents an area of 8,672sqm and includes the following parcels: 17-27, 29-47 and 49-63 Laurens Street, North Melbourne.

The Lots are located in Arden Central precinct and borders Laurens Street to the East, Fogarty Street South to the North and Langford Street to the South.

The site is triangular in shape and a public park / plaza is earmarked to the West section of the triangle.

A laneway is dividing the site in the North South Axis, parallel to Laurens Street.

A number of working assumptions were established to inform site testing:

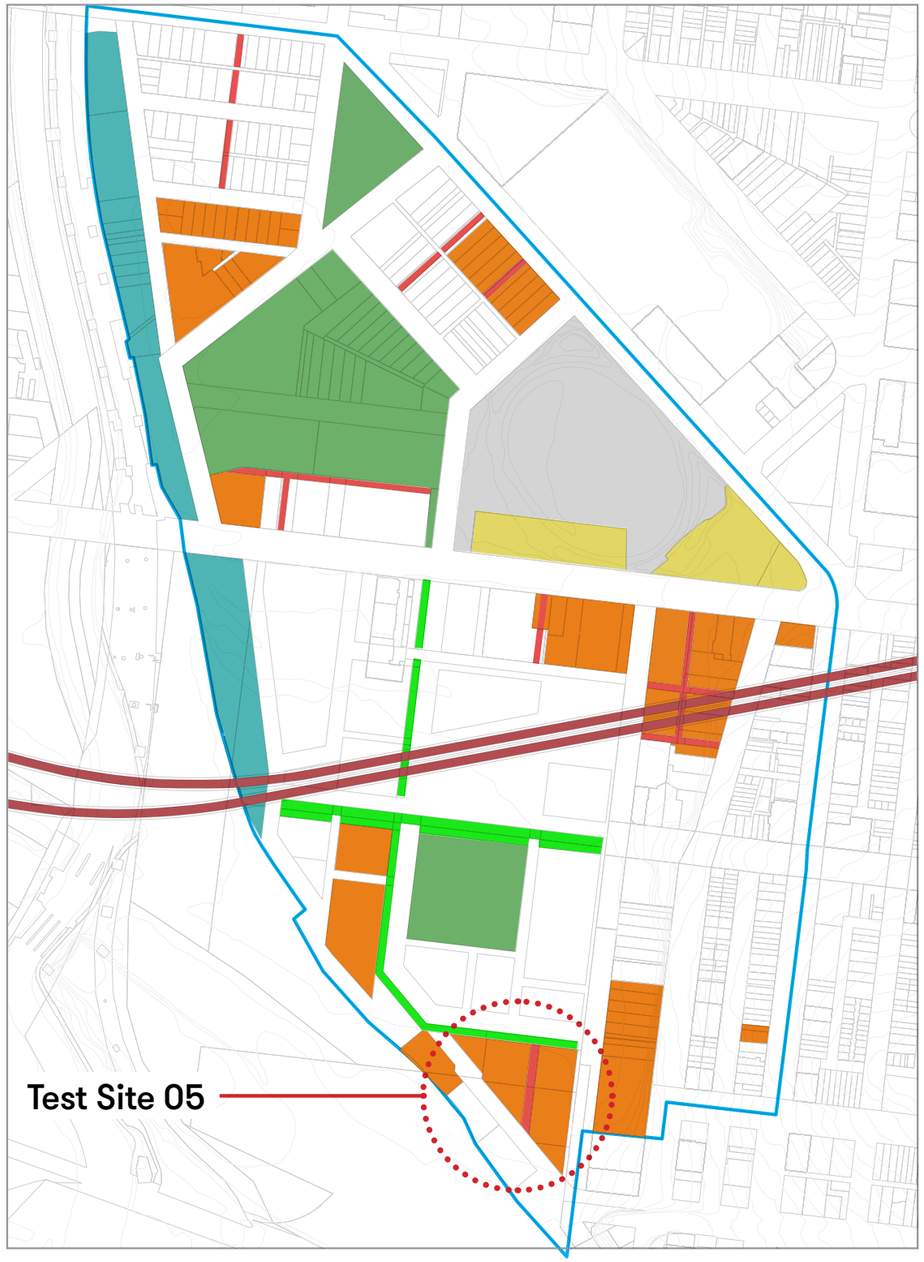
- 13-29 storeys
- Front, side and rear setbacks are specified in the DSP2020
- FAR 10-11:1 for working assumptions (FAR 12:1 listed in the DSP2020).
- Finished floor levels 0.5–1.5m above natural ground; 1.5m used for the feasibility as worst case scenario

The testing was to consider:

- Preferred typology is residential
- Creation of a plaza / Public open space at the West corner of the site
- Typology and form to be tested if developed into separate parcels with consideration for amenities and separation distances
- Above ground parking preferred
- Possible North South street allowing vehicles through the street network
- Minimise wind effect to prevailing Southerly winds

The following options were explored:

- Proposal for a consolidated one level basement carpark below the lane
- Proposal for widening the lane to 9m to avoid overlooking and providing residential sleeving to the West building
- Ground floor Commercial and upper levels residential
- Proposal without basement carpark but a consolidated podium carpark above the lane



5.0 Test Site 05: 17-27, 29-47 and 49-63 Laurens Street, North Melbourne

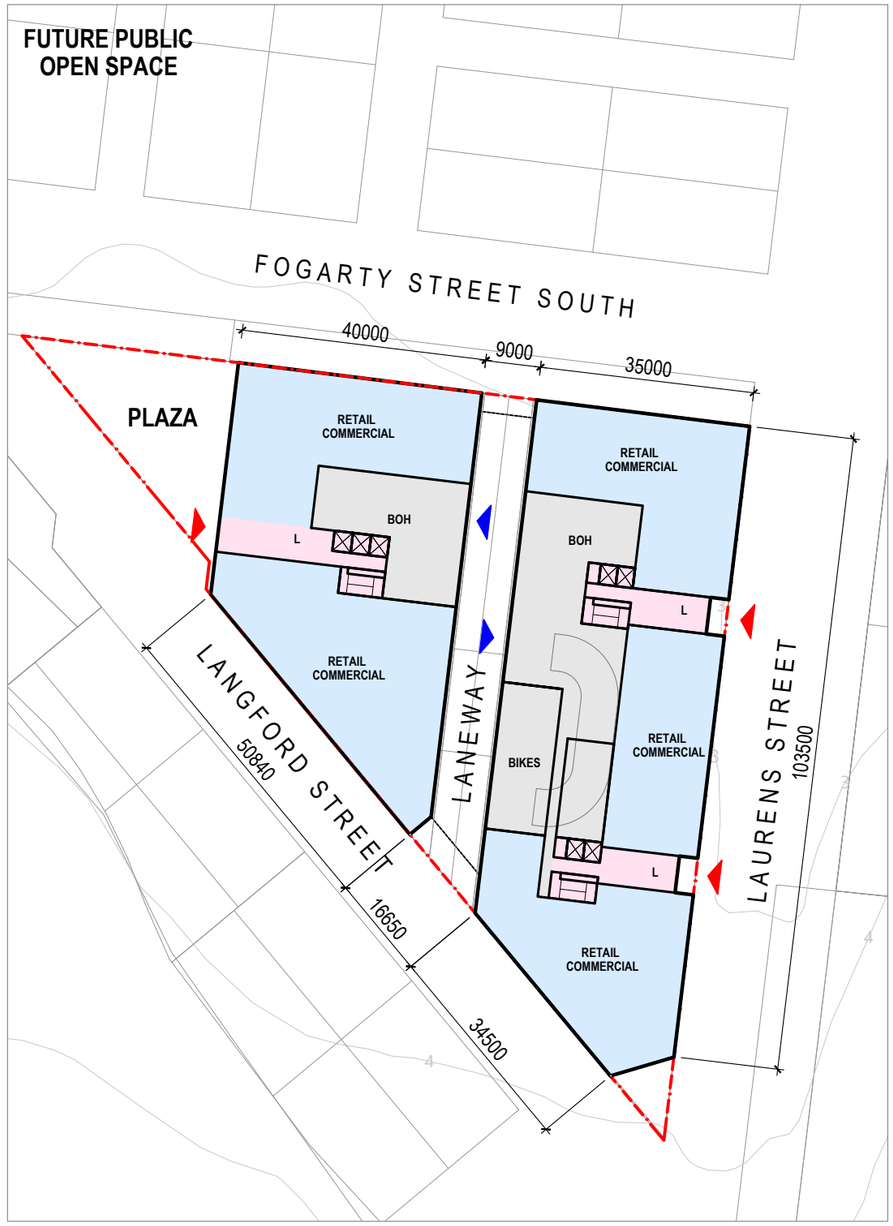
5.2 Table 1: Assumptions and Design Criteria for Yield Analysis Calculation

Parcel Size: 8,672m²

		VICTORIAN PLANNING AUTHORITY ASSUMPTIONS	HAYBALL ASSUMPTIONS PEER REVIEW
DRAFT STRUCTURE PLAN 2020 Reference: Arden Working Assumptions received from VPA on 11 march 2021	**FLOOR AREA RATIO(FAR): Lot 62:12:1**	FAR 10-11:1	
	SETBACK: Front, Side & Rear		
	FLOOR TO FLOOR HEIGHT	Ground Floor: 5m Upper levels typical (office and residential): 3.5m	Overall building height calculated with floor to floor from Reference *9 but final Yield Study floor to floor consistent with current construction standards at 5m Ground floor, 3.2m for residential floors, 4.0m for Commercial Office floor and 2.8m for carpark levels
	SHADOWS	VPA to define the criterias (height and impact) that would make a slender fast-moving shadow appropriate. Shadow study to consider shadowing cast by the street wall at both Winter solstice and Spring equinox (from a time period of 10 am to 3pm).	Building forms are tested at a height that would be below the VPA carve at Equinox for VPA assessment
	TOWER SETBACK DISTANCE FROM STREET WALL	Not specified	
	STREET WALL HEIGHT	Not specified	Maximum height calculated by Structure Plan proposed height (5m Ground and 3.5m upper levels but number of levels based on Market standards for floor to floor height (5m Ground and 3.2m residential levels)
	OVERALL HEIGHT Lot 62: 20-35 Storeys	13-29 storeys	
PLANNING References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**MATTERS FOR CONSIDERATION DURING TESTING**	Typology and Form If developd into several parcels, separation distances and amenity control Above Ground car parking North South street to allow vehicles to book through the street network Prevailing Southerly winds	Consideration of a through block link open to the sky
	TYPOLOGY	Residential	Proposal for Commercial on Ground and Residential for upper levels
	INTERFACES		Main interface to Langford Street and Laurens Street with potential park on the corner of Langford and Fogarty South
	RETAIL ACTIVATION		Proposal for activation of all ground floor with retail or commercial
PARKING References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**TRAFFIC CONFLICT FRONTAGE**		n/a
	CAR SPACE SIZE ALLOCATION		Proposal for using a ratio of 40sqm per parking space (including circulation, services, car park space & bike parking) based on previous projects
	EXCAVATION		Minimise Excavation, Allow One basement and podium carpark preferred
	PRECINCT CARPARK	n/a	
	CARPARK VISIBILITY		Proposal for active uses on all sides except the proposed North side lane above Ground
	RESIDENTIAL MAXIMUM PARKING RATIO	1BED 0.2 spaces per dwelling 2BED 0.3 spaces per dwelling 3BED 0.5 spaces per dwelling	Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average dwelling carpark ratio of 0.29:1 per average dwelling
	OTHER USES MAXIMUM PARKING RATIO	0.32 spaces per 100sqm GFA	
	VISITOR PARKING RATES	n/a	Proposal for visitor parking to be included as part of the precinct parking allocations (400 spaces)
FEASIBILITY ASSUMPTIONS References: Arden Structure Plan: Development Feasibility Assessment (VPA) 12 may 2020 - Final Draft by Ernst & Young	**AVERAGE APARTMENT SIZE**	75sqm of NLA	Noted
	BALCONY SIZE ALLOCATION		Balcony size of 1BED & 2BED 8sqm, 3BED 12sqm as per B.A.D.S. Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average balcony size of 8.4 sqm per average dwelling assuming the A/C condensers are**not** located on balconies.
	EFFICIENCY RATIO	NLA/NSA estimated at 85% of GFA for Office and residential (Assuming 15% of the completed project will be attributable to non-lettable/saleable area)	Proposal for 85% Efficiency for Commercial buildings and 78% Efficiency for Residential buildings
CLIMATE Reference: VPA Arden Urban Renewal Precinct, North Melbourne Microclimate Study GWTS-TPR-10370-2020-3	**FLOOD: MIN FLOOR ABOVE GROUND**	Finished floor levels 0.5 - 1.5m above natural ground	1.5 meter used for yield study modeling (worst case scenario)
	SUN	Height & Impact of shadow to Open Space: Understand impact of shadowing cast by street wall at both Winter Solstice and Equino: (between 10am and 3pm) and impact and appropriatness of a slender fast moving shadow	COMMUNAL OPEN SPACE: Sunlight testing required for Clause 58.03-3 Standard D8 – min. 50% or 125m2 of primary communal open space to achieve min. 2 hrs of sunlight between 9am-3pm on 21 June.
			PUBLIC OPEN SPACE: Building height to comply with the solar carve (above the street wall height of 6 storey (23m) And above 4 storeys (16m) as defined by the Draft Arden Structure Plan MODELING June 2020
		Tall tower separation proposed 25m ideal but minimum separation distance should equal the widest dimension of the tower floorplate	TOWER SEPARATION: Proposal for minimum tower separation should have ability to vary building separation depending on the height and orientation (i.e. the taller the wider separation)
	WIND	North wind is predominant in all seasons except in summer where the South wind is stronger	
	BUILDING ENTRANCE PREFERED LOCATION	Advised not to face the north or west. Preferable to the East	
TUNNEL **INTERFERENCE** Reference: Tunnel Loading Advisory Note DJPR Proposed Development of Arden Precinct DOC/20/83343	**ELECTROMAGNETIC INTERFERENCE**	For sensitive instruments within 300m of the tunnels	Not applicable for this site
	INTERNAL GROUND BORNE NOISE & VIBRATION	Guideline Targets: Residential: 35dB(A), Office: 45dB(A) Required mitigation measures required within 13m of the tunnel	Not applicable for this site

5.0 Test Site 05: 17-27, 29-47 and 49-63 Laurens Street, North Melbourne

5.3 Plans



GROUND
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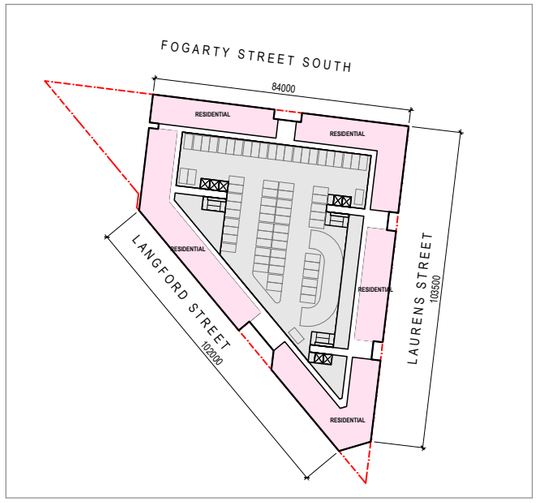

PODIUM
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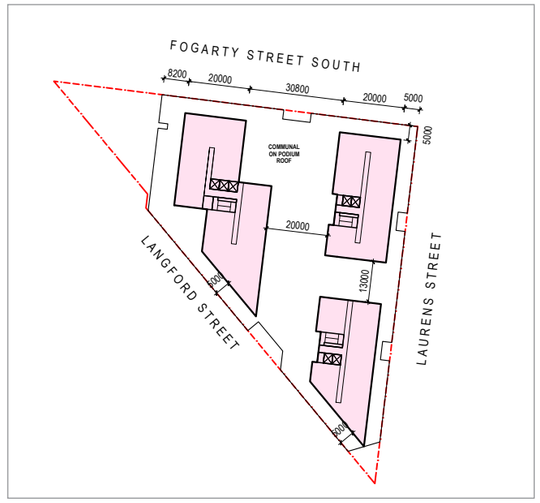

TOWER
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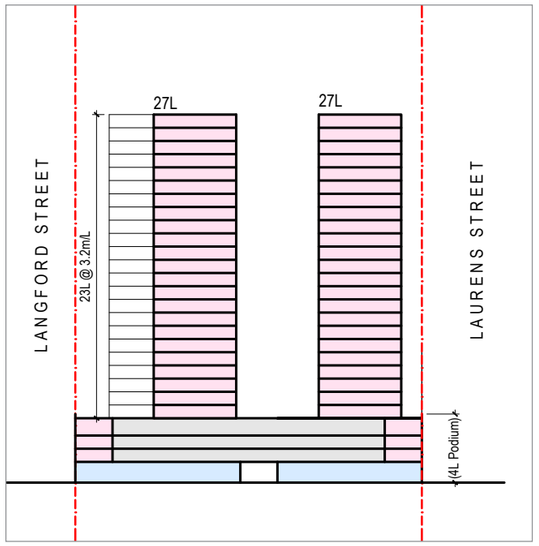


DIAGRAMMATIC SECTION

5.0 Test Site 05: 17-27, 29-47 and 49-63 Laurens Street, North Melbourne

5.4 Development Summary

The information presented herein is preliminary. It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities. Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor. Floor areas shown have generally been measured using the guidelines – published by the Property Council of Australia. All areas and measurements shown are rounded to the nearest whole number. All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only. Further development of this design will require information produced by a number of specialist consultants. This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented. Hayball accepts no legal responsibilities for any decision, commercial or otherwise, made on the basis of the information presented.

ALL SITES PROPOSED DEVELOPMENT SCHEDULE

				Residential					Carpark	
Site	**GBA****	**RETAIL**	**OFFICE**	**Typical Apartment**	**GFA***	**NSA (inc P.O.S.)**	**NSA**	**Balcony*****	**CARPARK**	**CARPARK**
	m²	**NLA (m²)**	**NLA (m²)**	**Number**	**m²***	**m²**	**m²**	**m²**	**GFA (m²)**	**Spaces**
Basement	n/a								n/a	n/a
Ground	5680	3496								
Level 1	6300			30	3251	2470	2221	249	2800	70
Level 2	6300			30	3251	2470	2221	249	2800	70
Level 3	6300			30	3251	2470	2221	249	2800	70
Level 4	2700			26	2482	2160	1942	218		
Level 5	2700			26	2482	2160	1942	218		
Level 6	2700			26	2482	2160	1942	218		
Level 7	2700			26	2482	2160	1942	218		
Level 8	2700			26	2482	2160	1942	218		
Level 9	2700			26	2482	2160	1942	218		
Level 10	2700			26	2482	2160	1942	218		
Level 11	2700			26	2482	2160	1942	218		
Level 12	2700			26	2482	2160	1942	218		
Level 13	2700			26	2482	2160	1942	218		
Level 14	2700			26	2482	2160	1942	218		
Level 15	2700			26	2482	2160	1942	218		
Level 16	2700			26	2482	2160	1942	218		
Level 17	2700			26	2482	2160	1942	218		
Level 18	2700			26	2482	2160	1942	218		
Level 19	2700			26	2482	2160	1942	218		
Level 20	2700			26	2482	2160	1942	218		
Level 21	2700			26	2482	2160	1942	218		
Level 22	2700			26	2482	2160	1942	218		
Level 23	2700			26	2482	2160	1942	218		
Level 24	2700			26	2482	2160	1942	218		
Level 25	2700			26	2482	2160	1942	218		
Level 26	2700			26	2482	2160	1942	218		
TOTAL	86680	3496	0	**685**	66850		51340	5750	8400	210
	Excl Basement									

Total Site Area (sqm):	7122.0	SQM
Site Coverage (%):	80%	
Carpark Ratio:	0.29 Residential; 0.32 Commercial	
Carpark spaces for Residential at 0.29 ratio:	199	Required Spaces
Carpark spaces for Commercial at 0.32 ratio	11	Required Spaces
Floor Area Ratio:	12.2	(FAR allowed 12:1 DRAFT SP 2020; 10-11:1 - VPA Working Assumption for Optimisation

*GFA excludes balcony area

**GBA includes Balcony Area

***Based on 8sqm for 1BED&2BED and 12sqm for 3BED

Approximate extent of Development exceeding the working assumption FAR

Note:

Floor Area Ratio (FAR) is defined as all gross area above Ground (excluding plant) and voids within the building which are design elements (this does not include voids associated with car stakers which feature above ground).

The FAR excludes all basement structures. It includes covered balconies.

5.0 Test Site 05: 17-27, 29-47 and 49-63 Laurens Street, North Melbourne

5.5 Design Response and Findings

Design Response and Findings:

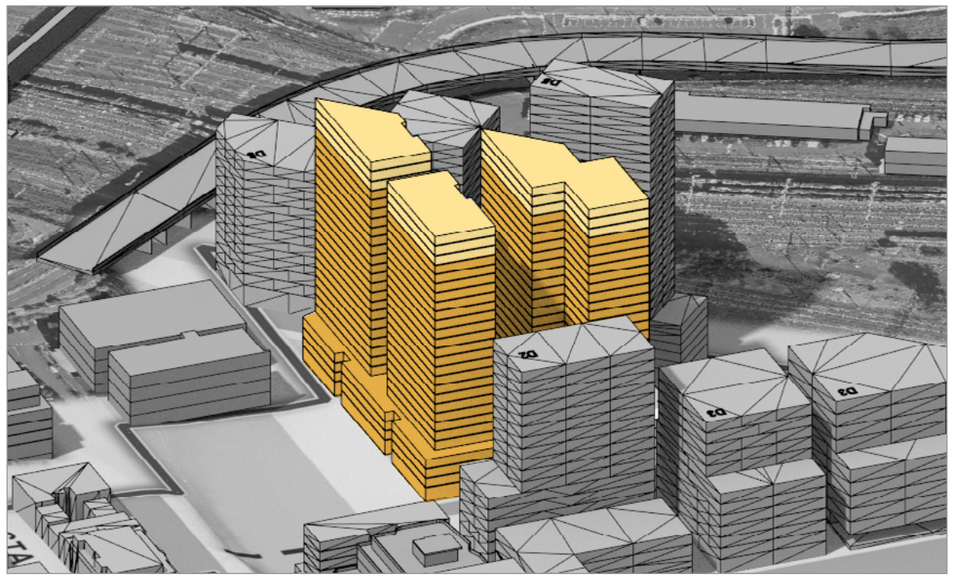
Option 1 (Refer to Appendix B)

The size of the consolidated basement carpark is quite large and provides 124 cars in surplus to the needs of the residential building and its commercial ground floor and would be used to service smaller surrounding sites as a sub-precinct carpark.

- Handover of the lane to Council with basement car parking under the street would need special consideration.
- Where the lane is maintained centrally in the block, podium carpark is only possible in the Eastern parcel. The depth of this block results in an un-sleeved façade facing the lane above ground which would require special screening treatments to help address the public realm edge but is not an optimal design outcome.
- A podium carpark is not possible in the Western portion of the podium when the lane is centrally located.
- The West side podium is inefficient and has a large internal space that can only be used for storage as it doesn't allow for a carpark layout.

Option 2 (Displayed Option)

- Eliminates the basement carpark to reduce cost and cater only for the Site 5 development requirements.
- The layout allows for full sleeving of the podium and a height of 27 levels to be adopted (with carpark ratio of 0.29), below the preferred maximum height of 29 levels. However, the resulting 12:1 FAR figure exceeds the working assumptions of FAR 10-11:1.



EXTENT OF DEVELOPMENT REPRESENTING THE WORKING ASSUMPTION FAR
APPROXIMATE EXTENT OF DEVELOPMENT EXCEEDING THE WORKING ASSUMPTION FAR

5.0 Test Site 05: 17-27, 29-47 and 49-63 Laurens Street, North Melbourne

5.5 Design Response and Findings (cont.)

Recommendations:

— The diagrams opposite illustrate the implications of different parking and podium arrangements

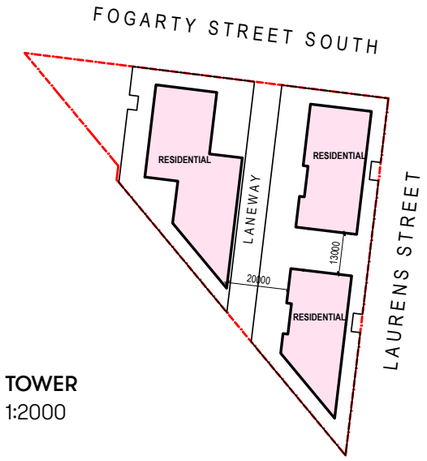
— A consolidated podium would assist to meet carparking requirements for the sub-precinct

— Reconsideration of the local road network would be required to remove the mid-block link and downgrade this accessway to private site access only

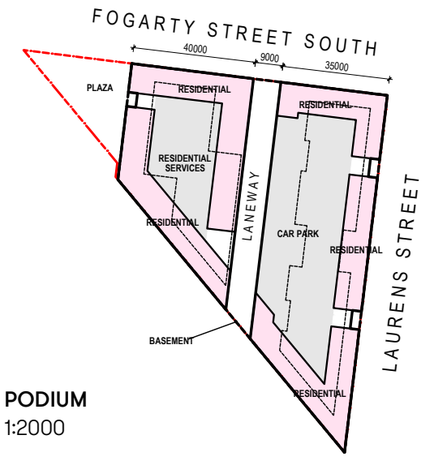
— Alternatively, repositioning of the laneway to the west and reduction of the plaza could allow for a more efficient and fully sleeved podium carpark and open to the sky laneway

— Testing indicates an FAR of 12:1 may be reasonably accommodated within preferred height limits

SITE 5 PODIUM STUDIES



TOWER
1:2000



PODIUM
1:2000

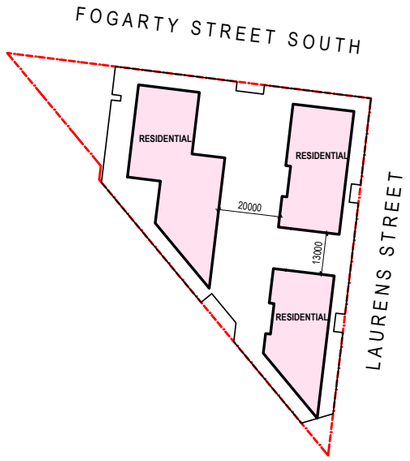
VPA WORKING ASSUMPTION FOR OPTIMISATION MP LANEWAY (OPEN)

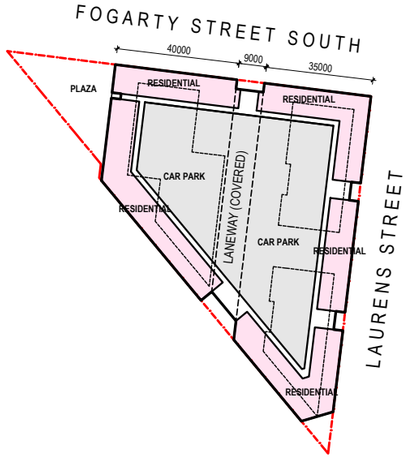
— Plaza Retained

— Basement Parking–Increases Construction Costs

— Podium Car Parking to East Parcel–Unsleeved to Laneway Frontage ONLY

— Wind Mitigation Not Addressed





VPA WORKING ASSUMPTION FOR OPTIMISATION MP (COVERED)

— Plaza Retained

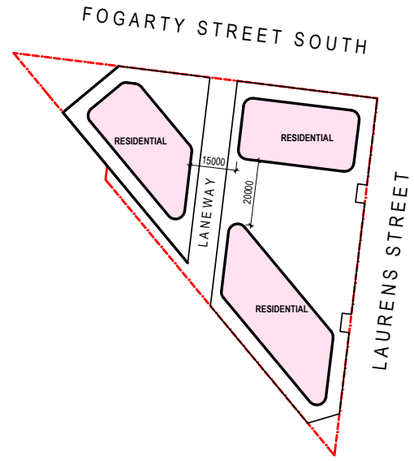
— No Basement

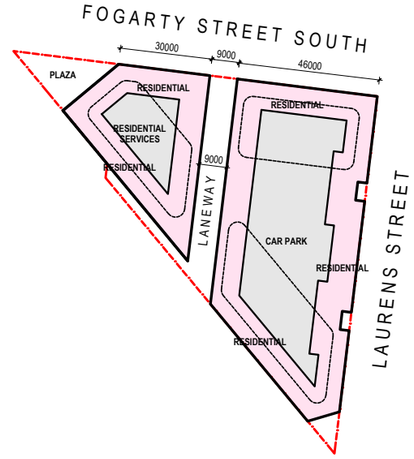
— Consolidated Podium over Laneway–Fully Sleeved

— Requires Local Road Network to be reconsidered as

— Covered Laneway doesn't function well as a Public Link

— Wind Mitigation Not Addressed





RELOCATED LANEWAY (OPEN)

— Reduced Plaza

— No Basement

— Podium Parking to East Parcel–Fully Sleeved

— Improved Street and Laneways as offset to Plaza Reduction

— Maintains Function of Proposed Local Road Network

— Wind Mitigation Considered in Building Forms

Test Site 06

6.0 Test Site 06: Lots 38 and 47 (Spatial Plan Update 2021) near to Queensberry Street and Langford Street, North Melbourne

6.1 Methodology

Site 6 is identified as Lots 38 and Lot 47 in the Spatial Plan Update 2021.

The site is located near to Queensberry Street and Langford Street in North Melbourne.

The overall site covers an area of around 7,340sqm and composed of Lot 38 with an area of 2,156sqm and Lot 47 with an area of 4,127sqm.

The test site is surrounded by Fogarty Street to the East, Langford Street to the West and Fogarty Street South to the South.

The Lots are located in Arden Central precinct adjacent to the new future Public Open Space to the East.

A lane is currently running East West direction between the two lots.

A number of working assumptions were established to inform site testing:

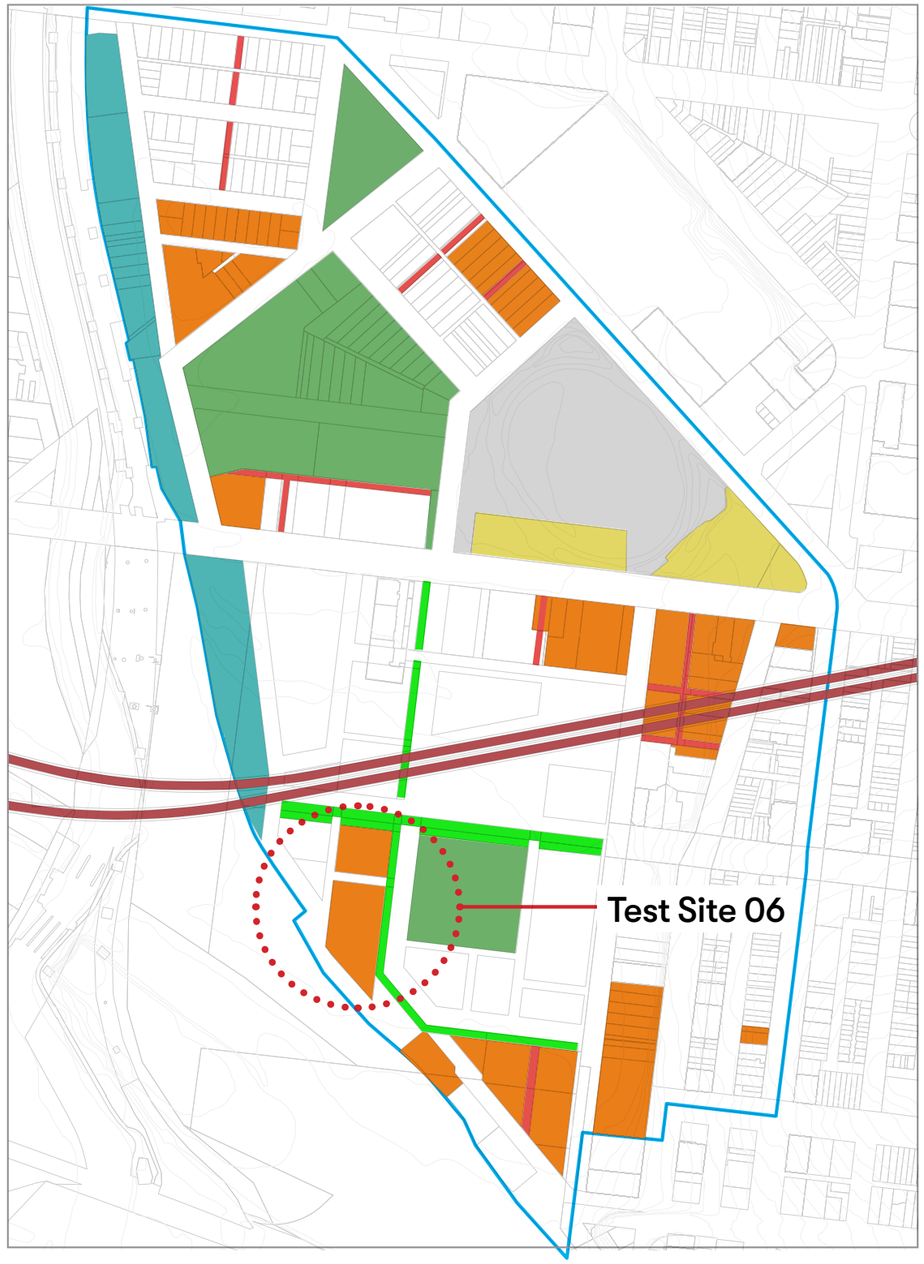
- Lot 38: 8 storeys, Lot 47: 20-30 storeys
- 6 storey street walls (DSP2020)
- Front, side and rear setbacks (DSP2020)
- Lot 38 FAR 7:1, Lot 47 FAR 15:1
- Finished floor levels 1.0–1.5m above natural ground; 1.5m used for the feasibility

The testing was to consider:

- A mixed-use development (Office and Residential)
- Long distant views to the site given the expanse of the rail corridor (uninterrupted)
- Shadowing impact to the neighbourhood open space (22 June 11am to 2pm)
- Typology and form resulting from the overshadowing limitations
- Basement carparking as an option
- through block link, open to the sky or covered, if an open air link prevents a workable carpark layout being incorporated. Consideration for lane amenities if enclosed.

The following options were explored:

- Maintaining the proposed laneway open to the sky as it provides better public realm qualities for the neighbourhood, more building frontage and enabling the lots to comprise of different developments
- Proposal to locate an efficient carpark to the Southern parcel catering for both parcels
- Proposal to maintain the whole of Lot 38 Commercial and propose a Commercial sleeved podium and a residential tower above for Lot 47
- Option 1 (refer to **Appendix B**) includes connected towers and 8 levels in Lot 38
- Option 2 (displayed) shows 9 levels for Lot 38 and separated towers for Lot 47
- No basement carpark was tested for this site because of the high flood zone level and the capability of hosting the carpark in the podium



6.0 Test Site 06: Lots 38 and 47 (Spatial Plan Update 2021) near to Queensberry Street and Langford Street, North Melbourne

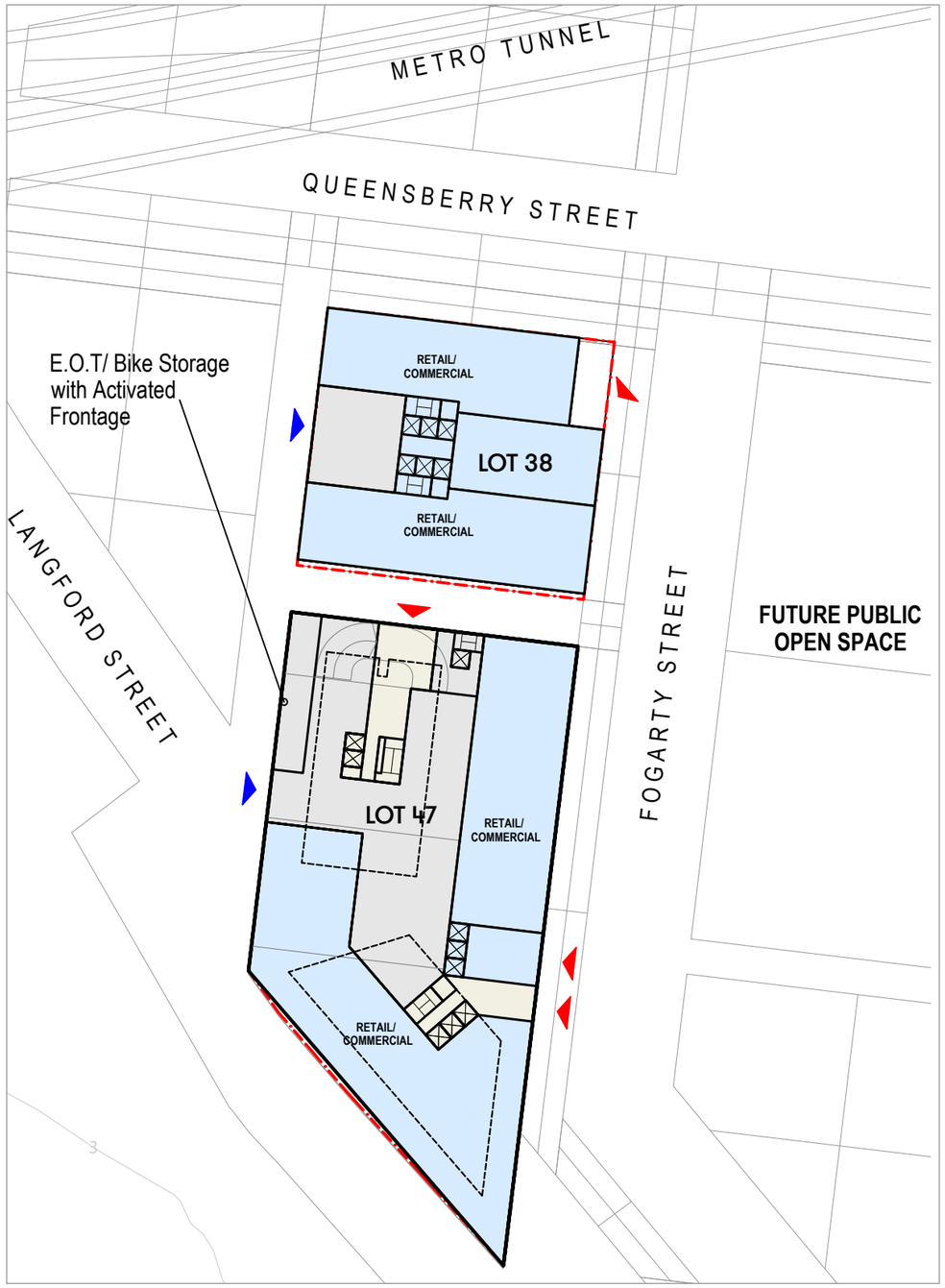
6.2 Table 1: Assumptions and Design Criteria for Yield Analysis Calculation

Parcel Size: 7,340m²

		VICTORIAN PLANNING AUTHORITY ASSUMPTIONS	HAYBALL ASSUMPTIONS PEER REVIEW
DRAFT STRUCTURE Reference: Arden Working Assumptions received from VPA on 11 march 2021	**FLOOR AREA RATIO(FAR) Lot 38 & 47 FAR 15:1**	Lot 38 FAR 7:1 and Lot 47 FAR 15:1	
	SETBACK above 6 storey street wall, Front, Side & Rear **FLOOR TO FLOOR HEIGHT**	Ground Floor: 5m, Upper levels typical (office and residential): 3.5m	Overall building height calculated with floor to floor from Reference *9 but final Yield Study floor to floor consistent with current construction standards at 5m Ground floor, 3.2m for residential floors, 4.0m for Commercial Office floor and 2.8m for carpark levels
	SHADOWS	VPA to define the criterias (height and impact) that would make a slender fast-moving shadow appropriate. Shadow study to consider shadowing cast by the street wall at both Winter solstice and Spring equinox (from a time period of 10 am to 3pm).	Building forms are tested at a height that would be below the VPA carve at Equinox for VPA assessment
	TOWER SETBACK DISTANCE FROM STREET WALL	not specified	
	STREET WALL HEIGHT 6 Storeys	As per DSP	Maximum height calculated by Structure Plan proposed height (5m Ground and 3.5m upper levels but number of levels based on Market standards for floor to floor height (5m Ground and 3.2m residential levels)
	OVERALL HEIGHT 30-40 Storeys	8 storeys (Lot 38), 20-30 storeys (Lot 47)	
	MATTERS FOR CONSIDERATION DURING TESTING	Long distant views to the site given the expanse of the rail corridor (uninterrupted views) Shadowing impact to neighbourhood open space (22 June 11am-2pm) Typology and form Through block link, enclosed or open to sky? Interaction with car parking if provided above Ground (in part) Basement carparking	
PLANNING References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**TYPOLOGY**	Mixed Commercial / Residential	Proposal for Commercial on Ground and Residential for upper levels
	INTERFACES		Park Interface to the East, rail corridor to the West Main thoroughfare along Fogarty Street
	RETAIL ACTIVATION	The Fogarty Street urban boulevard providing green link and public transport connecting Arden North to Arden Central is ideal retail activation streets	Proposal for activation of Fogarty Street along the park
PARKING References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**TRAFFIC CONFLICT FRONTAGE**	none specified	
	CAR SPACE SIZE ALLOCATION		Proposal for using a ratio of 40sqm per parking space (including circulation, services, car park space & bike parking) based on previous projects
	EXCAVATION		Minimise Excavation, Allow One basement and podium carpark preferred
	PRECINCT CARPARK	n/a	
	CARPARK VISIBILITY		Proposal for active uses along all sides except Langford Street to the West
	RESIDENTIAL MAXIMUM PARKING RATIO	1BED 0.2 spaces per dwelling 2BED 0.3 spaces per dwelling 3BED 0.5 spaces per dwelling	Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average dwelling carpark ratio of 0.29:1 per average dwelling
	OTHER USES MAXIMUM PARKING RATIO	0.32 spaces per 100sqm GFA	
	VISITOR PARKING RATES	n/a	Proposal for visitor parking to be included as part of the precinct parking allocations (400 spaces)
FEASIBILITY ASSUMPTIONS References: Arden Structure Plan: Development Feasibility Assessment (VPA) 12 may 2020 - Final Draft by Ernst & Young	**AVERAGE APARTMENT SIZE**	75sqm of NLA	
	BALCONY SIZE ALLOCATION		Balcony size of 1BED & 2BED 8sqm, 3BED 12sqm as per B.A.D.S. Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average balcony size of 8.4 sqm per average dwelling assuming the A/C condensers are **not** located on balconies.
	EFFICIENCY RATIO	NLA/NSA estimated at 85% of GFA for Office and residential (Assuming 15% of the completed project will be attributable to non-lettable/saleable area)	Proposal for 85% Efficiency for Commercial buildings and 78% Efficiency for Residential buildings
CLIMATE Reference: VPA Arden Urban Renewal Precinct, North Melbourne Microclimate Study GWTS-TPR-10370-2020-3	**FLOOD: MIN FLOOR ABOVE GROUND**	Finished floor levels 1.0 - 1.5m above natural ground	1.5 meter used for yield study modeling (worst case scenario)
	SUN	Height & Impact of shadow to Open Space: Understand impact of shadowing cast by street wall at both Winter Solstice and Equinox (between 10am and 3pm) and impact and appropriatness of a slender fast moving shadow	COMMUNAL OPEN SPACE: Sunlight testing required for Clause 58.03-3 Standard D8 – min. 50% or 125m2 of primary communal open space to achieve min. 2 hrs of sunlight between 9am-3pm on 21 June.
			PUBLIC OPEN SPACE: Building height to comply with the solar carve (above the street wall height of 6 storey (23m) And above 4 storeys (16m) as defined by the Draft Arden Structure Plan MODELING June 2020
		Tall tower separation proposed 25m ideal but minimum separation distance should equal the widest dimension of the tower floorplate	TOWER SEPARATION: Proposal for minimum tower separation should have ability to vary building separation depending on the height and orientation (i.e. the taller the wider separation)
	WIND	North wind is predominant in all seasons except in summer where the South wind is stronger	
	BUILDING ENTRANCE PREFERED LOCATION	Advised not to face the north or west. Preferable to the East	
TUNNEL INTERFERENCE Reference: Tunnel Loading Advisory Note DJPR Proposed Development of Arden Precinct DOC/20/63343	**ELECTROMAGNETIC INTERFERENCE**	For sensitive instruments within 300m of the tunnels	Not applicable for this site
	INTERNAL GROUND BORNE NOISE & VIBRATION	Guideline Targets: Residential: 35dB(A), Office: 45dB(A) Required mitigation measures required within 13m of the tunnel	Not applicable for this site

6.0 Test Site 06: Lots 38 and 47 (Spatial Plan Update 2021) near to Queensberry Street and Langford Street, North Melbourne

6.3 Plans



GROUND
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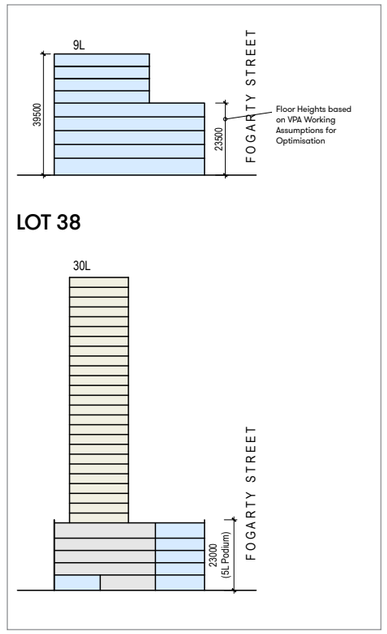

LOT 47
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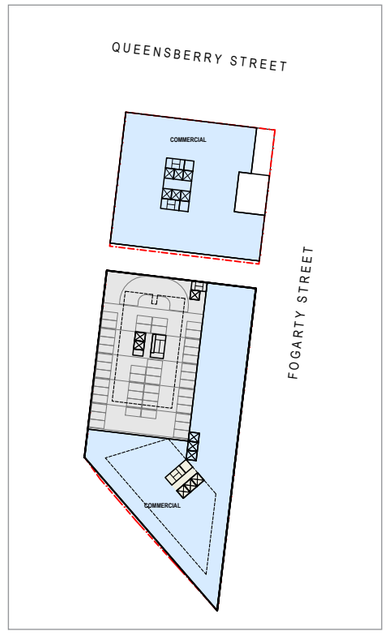

PODIUM
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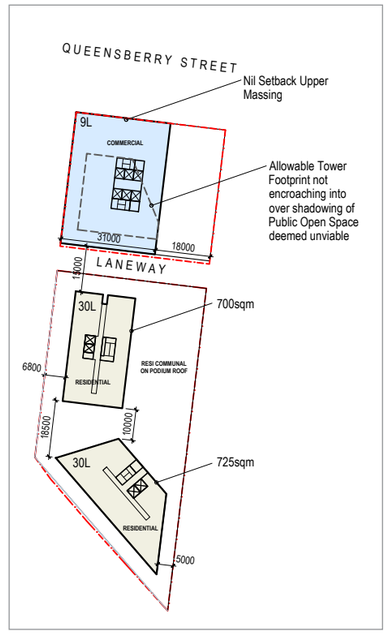


TOWER
1:2000

6.0 Test Site 06: Lots 38 and 47 (Spatial Plan Update 2021) near to Queensberry Street and Langford Street, North Melbourne

6.4 Development Summary Lot 38

The information presented herein is preliminary. It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities. Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor. Floor areas shown have generally been measured using the guidelines – published by the Property Council of Australia. All areas and measurements shown are rounded to the nearest whole number. All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only. Further development of this design will require information produced by a number of specialist consultants. This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented. Hayball accepts no legal responsibilities for any decision, commercial or otherwise, made on the basis of the information presented.

ALL SITES PROPOSED DEVELOPMENT SCHEDULE

				Residential					Carpark	
Site	**GBA****	**RETAIL**	**OFFICE**	**Typical Apartment**	**GFA***	**NSA (inc P.O.S.)**	**NSA**	**Balcony*****	**CARPARK**	**CARPARK**
	m²	**NLA (m²)**	**NLA (m²)**	**Number**	**m²***	**m²**	**m²**	**m²**	**GFA (m²)**	**Spaces**
Basement	n/a								n/a	
Ground	2000	1150								
Level 1	1850		1573							
Level 2	1850		1573							
Level 3	1850		1573							
Level 4	1850		1573							
Level 5	1300		1105							
Level 6	1300		1105							
Level 7	1300		1105							
Level 8	1300		1105							
TOTAL	14600	1150	10710						0	0
	Excl Basement								Shortfall 38	> Use Site 06 Lot 47

Total Site Area (sqm):	2156	SQM
Site Coverage (%):	93%	
Carpark Ratio:	0.32 Commercial	
Carpark spaces for Residential at 0.29 ratio:	0	Spaces
Carpark spaces for Commercial at 0.32 ratio	38	Shared with Lot 47
Floor Area Ratio:	6.8	(FAR allowed 7:1 working assumptions)

*GFA excludes balcony area

**GBA includes Balcony Area

***Based on 8sqm for 1BED&2BED and 12sqm for 3BED

Note:

Floor Area Ratio (FAR) is defined as all gross area above Ground (excluding plant) and voids within the building which are design elements (this does not include voids associated with car stakers which feature above ground).

The FAR excludes all basement structures. It includes covered balconies.

6.0 Test Site 06: Lots 38 and 47 (Spatial Plan Update 2021) near to Queensberry Street and Langford Street, North Melbourne

6.4 Development Summary Lot 47

The information presented herein is preliminary. It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities. Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor. Floor areas shown have generally been measured using the guidelines – published by the Property Council of Australia. All areas and measurements shown are rounded to the nearest whole number. All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only. Further development of this design will require information produced by a number of specialist consultants. This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented. Hayball accepts no legal responsibilities for any decision, commercial or otherwise, made on the basis of the information presented.

ALL SITES PROPOSED DEVELOPMENT SCHEDULE

				Residential					Carpark	
Site	**GBA****	**RETAIL**	**OFFICE**	**Typical Apartment**	**GFA***	**NSA (inc P.O.S.)**	**NSA**	**Balcony*****	**CARPARK**	**CARPARK**
	m²	**NLA (m²)**	**NLA (m²)**	**Number**	**m²***	**m²**	**m²**	**m²**	**GFA (m²)**	**Spaces**
Basement	n/a								n/a	
Ground	4000	3496								
Level 1	4000		1785						1900	50
Level 2	4000		1785						1900	50
Level 3	4000		1785						1900	50
Level 4 - 29 (@740sqm & 810sqm/ level)	40300			387	37053	32240	28993	3247		
TOTAL	56300	3496	5355	**387**	37053		28993	3247	5700	150
	Excl Basement								Shorfall 28	
Total Site Area (sqm):	4127.0	SQM							38 for Lot 38	
Site Coverage (%):	97%									
Carpark Ratio:	0.29 Residential; 0.32 Commercial									
Carpark spaces for Residential at 0.29 ratio:	112	Required Spaces								
Carpark spaces for Commercial at 0.32 ratio	28	Required Spaces								
Floor Area Ratio:	13.6	(FAR allowed 15:1 DRAFT SP 2020)								

*GFA excludes balcony area

**GBA includes Balcony Area

***Based on 8sqm for 1BED&2BED and 12sqm for 3BED

Note:

Floor Area Ratio (FAR) is defined as all gross area above Ground (excluding plant) and voids within the building which are design elements (this does not include voids associated with car stakers which feature above ground).

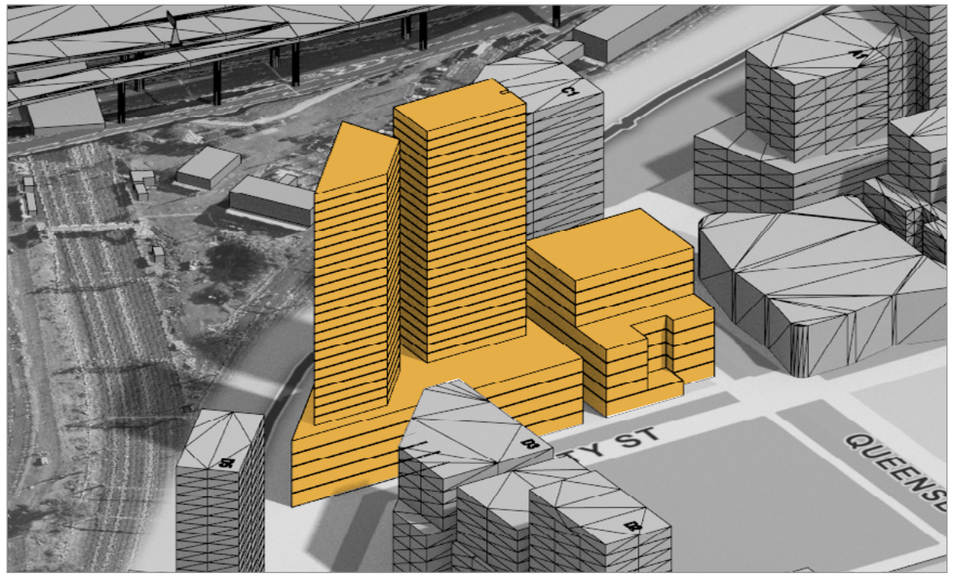
The FAR excludes all basement structures. It includes covered balconies.

6.0 Test Site 06: Lots 38 and 47 (Spatial Plan Update 2021) near to Queensberry Street and Langford Street, North Melbourne

6.5 Design Response and Findings

Design Response and Findings:

- Lot 38 is too small to accommodate sleeved carparking within the podium.
- Carparks for Lot 38 are located adjacent to the office building in Lot 47.
- 71 surplus car spaces can be accommodated in the Southern Lot 47 carpark. There is potential to remove Level 4A to reduce the overall number of car spaces and save cost.
- The proposed 8 level built form does not overshadow the adjacent future public open Space and produces a FAR for Lot 38 of 6.8:1 consistent with the 7:1 working assumption.
- The built form for Lot 47 has been maximised at 30 storeys and produces an FAR of 13.6:1 for the site, but falls below the 15:1 FAR proposed for the working assumptions.
- There may be the potential of Lot 47 to accommodate a taller south tower with a lower north tower (for example 36L and 24L) to allow a transitioning of heights towards the 8 storey built form in Lot 38.
- Two towers on Lot 47 have been configured to avoid long unbroken building forms.



EXTENT OF DEVELOPMENT REPRESENTING THE WORKING ASSUMPTION FAR
APPROXIMATE EXTENT OF DEVELOPMENT EXCEEDING THE WORKING ASSUMPTION FAR

6.0 Test Site 06: Lots 38 and 47 (Spatial Plan Update 2021) near to Queensberry Street and Langford Street, North Melbourne

6.5 Design Response and Findings (cont.)

Recommendations:

— Further guidance on required building separations between towers within a single site is required.

— The building separation between the tower ends is proposed at 10m -18.5m to balance viable floor plates while providing sky views and addressing direct interfaces between towers.

— **Tower study diagrams opposite** illustrate options to address amenity between towers and appropriate building separations.

— Optimal building orientation and separations would need to be refined following detailed wind assessments.

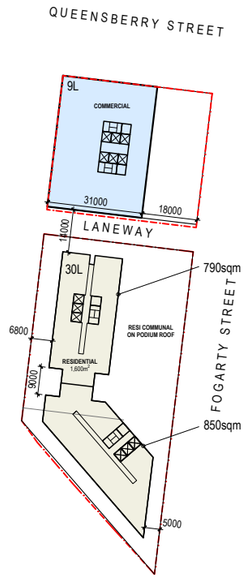
— Further guidance relating to the function of the laneway between blocks and to the western boundary is required to establish if partially unsleeved parking at ground and podium is acceptable.

— It is acknowledged that these carpark edges would require careful screening treatment to provide an acceptable urban design outcome.

— Due to the proximity to the Neighbourhood park and potential overshadowing, the development potential is more constrained on these lots

— The DSP FAR appears appropriate as an upper limit for development where a 30 level maximum height is preferred.

SITE 6 LOT 47 TOWER STUDIES



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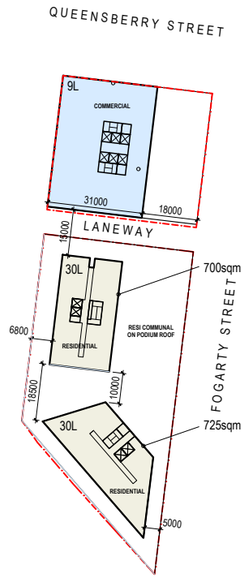
SINGLE TOWER

— Creates a Continuous Wall of Building

— Continuous Tower with facade breakup

— Potential Cross Ventilation Limitation

— Wind Mitigation Not Addressed



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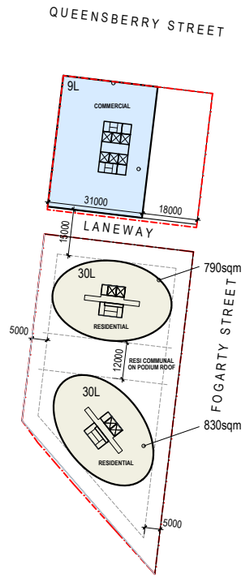
SEPARATE TOWERS

— Further Tower Separation.

— Pinch point of 10m (Consistent with Central City Minimum Tower Separation)

— Cross Ventilation Enabled

— Wind Mitigation Not Addressed



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SEPARATE TOWERS

— Non Rectilinear Forms.

— Pinch point of 12m provides improved access to sky views

— Cross Ventilation Enabled

— Wind Mitigation Considered in Building Forms

— Higher GFA but Potentially Inefficient Apartment Layouts

Test Site 07

7.0 Test Site 07: Near Langford Street and Fogarty Street South, North Melbourne

7.1 Methodology

Site 7 is located near Langford Street and Fogarty Street South in North Melbourne.

The site has an area of 1594sqm. Site 7 is adjacent to the rail corridor leading to North Melbourne Station.

A number of working assumptions were established to inform site testing:

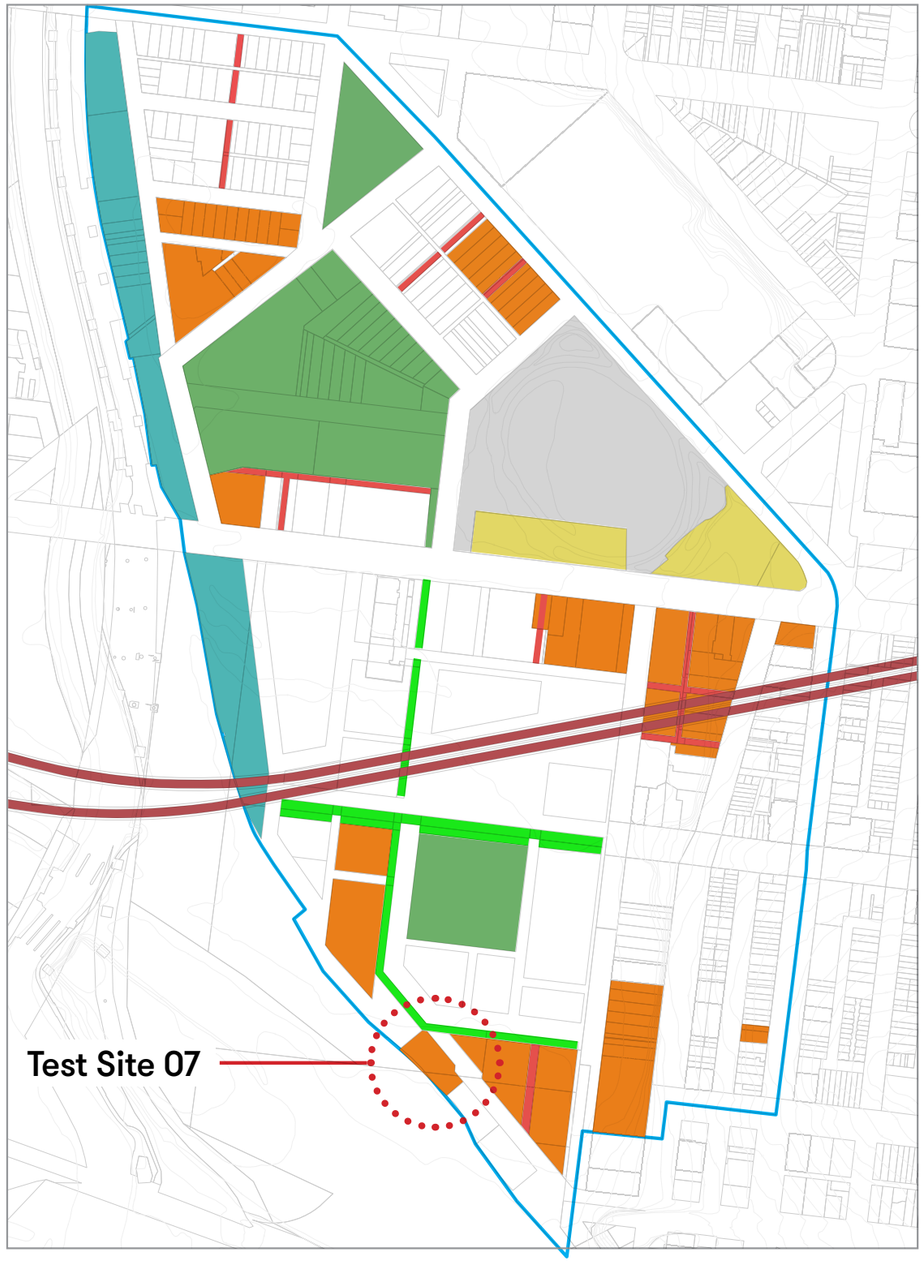
— Overall Height assumption between 21 – 36 storeys
— 6 storey street walls
— Setbacks above street wall mentioned in the DSP2020
— FAR 17:1 – 22:1
— Finished floor levels above natural ground not specified

The testing was to consider:

— A mixed-use development (Office and Residential)
— Long distance uninterrupted views to the site given the expanse of the rail corridor
— Typology and form
— Wind, passive cooling in summer with southerly breeze
— Basement carpark

The following options were explored:

— Option 1 (displayed) single Basement carpark to cater for the whole tower carpark requirements, retail on Ground, office levels in podium and residential tower above.
— Option 2 (refer to **Appendix B**) shows no basement with retail on Ground, a podium carpark un-sleeved and a residential tower above. While this scheme performed better from a feasibility perspective, this was considered an unacceptable urban design outcome.



7.0 Test Site 07: Near Langford Street and Fogarty Street South, North Melbourne

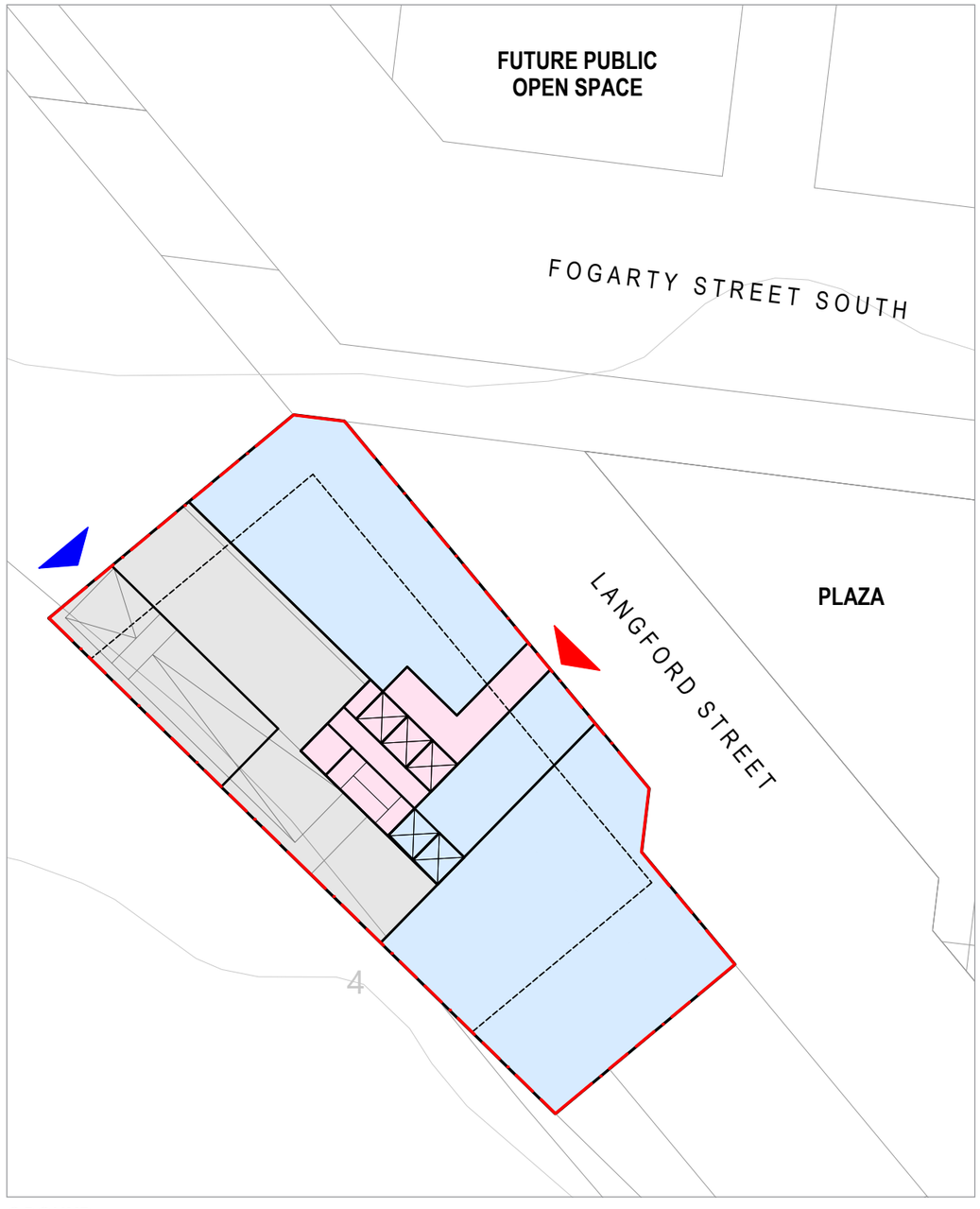
7.2 Table 1: Assumptions and Design Criteria for Yield Analysis Calculation

Parcel Size: 1,540m²

		VICTORIAN PLANNING AUTHORITY ASSUMPTIONS	HAYBALL ASSUMPTIONS PEER REVIEW
DRAFT STRUCTURE PLAN 2020 Reference: Arden Working Assumptions received from VPA on 11 march 2021	**FLOOR AREA RATIO(FAR) 15:1**	FAR 17-22:1	
	SETBACK above 6 storey street wall, Front, Side & Rear		
	FLOOR TO FLOOR HEIGHT	Ground Floor: 5m Upper levels typical (office and residential): 3.5m	Overall building height calculated with floor to floor from Reference *9 but final Yield Study floor to floor consistent with current construction standards at 5m Ground floor, 3.2m for residential floors, 4.0m for Commercial Office floor and 2.8m for carpark levels
	SHADOWS		Building forms are tested at a height that would be below the VPA carve at Equinox for VPA assessment
	TOWER SETBACK DISTANCE FROM STREET WALL	not specified	
	STREET WALL HEIGHT: 6 Storeys	As per DSP	Maximum height calculated by Structure Plan proposed height (5m Ground and 3.5m upper levels but number of levels based on Market standards for floor to floor height (5m Ground and 3.2m residential levels)
	OVERALL HEIGHT: 30-40 Storeys	21-36 storeys	
PLANNING References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**MATTERS FOR CONSIDERATION DURING TESTING**	Long distant views to the site given the expanse of the rail corridor (uninterrupted views) Typology and form Wind, passive cooling in summer with Southerly breeze Basement car parking	
	TYPOLOGY	Mixed Commercial / Residential	Different option to test for small footprint podium and tower
	INTERFACES		Park Interface to the North Great views to the South and West
	RETAIL ACTIVATION		Along Langford Street possible
PARKING References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**TRAFFIC CONFLICT FRONTAGE**	none specified	
	CAR SPACE SIZE ALLOCATION		Proposal for using a ratio of 40sqm per parking space (including circulation, services, car park space & bike parking) based on previous projects
	EXCAVATION		Minimise Excavation, Allow One basement and podium carpark preferred
	PRECINCT CARPARK	n/a	Not applicable for this site
	CARPARK VISIBILITY		The small footprint of the site will make it impossible to sleeve the carpark from the street
	RESIDENTIAL MAXIMUM PARKING RATIO	1BED 0.2 spaces per dwelling 2BED 0.3 spaces per dwelling 3BED 0.5 spaces per dwelling	Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average dwelling carpark ratio of 0.29:1 per average dwelling
	OTHER USES MAXIMUM PARKING RATIO	0.32 spaces per 100sqm GFA	Noted
	VISITOR PARKING RATES	n/a	Proposal for visitor parking to be included as part of the precinct parking allocations (400 spaces)
FEASIBILITY ASSUMPTIONS References: Arden Structure Plan: Development Feasibility Assessment (VPA) 12 may 2020 Final Draft by Ernst & Young	**AVERAGE APARTMENT SIZE**	75sqm of NLA	Noted
	BALCONY SIZE ALLOCATION		Balcony size of 1BED & 2BED 8sqm, 3BED 12sqm as per B.A.D.S. Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average balcony size of 8.4 sqm per average dwelling assuming the A/C condensers are**not** located on balconies.
	EFFICIENCY RATIO	NLA/NSA estimated at 85% of GFA for Office and residential (Assuming 15% of the completed project will be attributable to non-lettable/saleable area)	Proposal for 85% Efficiency for Commercial buildings and 78% Efficiency for Residential buildings
CLIMATE Reference: VPA Arden Urban Renewal Precinct, North Melbourne Microclimate Study GWTS-TPR-10370-2020-3	**MIN HABITABLE FLOOR LEVEL ABOVE GROUND**	not specified	0.3 meter used for yield study modeling
	SUN	Height & Impact of shadow to Open Space: Understand impact of shadowing cast by street wall at both Winter Solstice and Equinox (between 10am and 3pm) and impact and appropriatness of a slender fast moving shadow	COMMUNAL OPEN SPACE: Sunlight testing required for Clause 58.03-3 Standard D8 – min. 50% or 125m2 of primary communal open space to achieve min. 2 hrs of sunlight between 9am-3pm on 21 June.
			PUBLIC OPEN SPACE: Building height to comply with the solar carve (above the street wall height of 6 storey (23m) And above 4 storeys (16m) as defined by the Draft Arden Structure Plan MODELING June 2020
		Tall tower separation proposed 25m ideal but minimum separation distance should equal the widest dimension of the tower floorplate	TOWER SEPARATION: Proposal for minimum tower separation should have ability to vary building separation depending on the height and orientation (i.e. the taller the wider separation)
	WIND	North wind is predominant in all seasons except in summer where the South wind is stronger	Noted
	BUILDING ENTRANCE PREFERED LOCATION	Advised not to face the north or west. Preferable to the East	Noted
TUNNEL INTERFERENCE Reference: Tunnel Loading Advisory Note DJPR Proposed Development of Arden Precinct DOC/20/63343	**ELECTROMAGNETIC INTERFERENCE**	For sensitive instruments within 300m of the tunnels	Not applicable for this site
	INTERNAL GROUND BORNE NOISE & VIBRATION	Guideline Targets: Residential: 35dB(A), Office: 45dB(A) Required mitigation measures required within 13m of the tunnel	Not applicable for this site

7.0 Test Site 07: Near Langford Street and Fogarty Street South, North Melbourne

7.3 Plans



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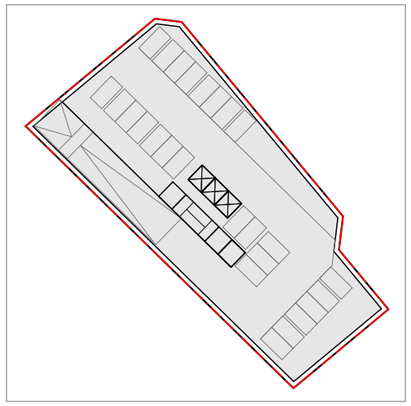

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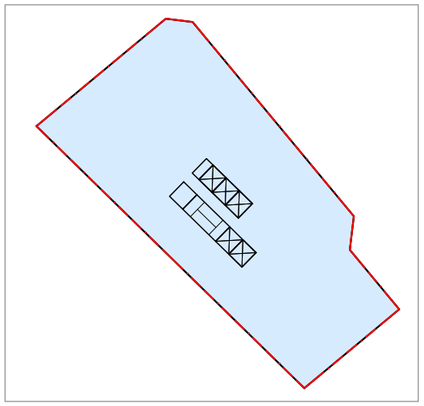

PODIUM
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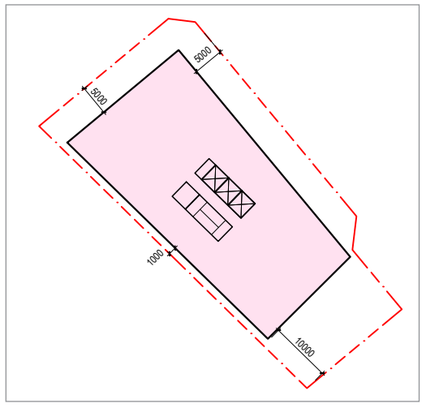
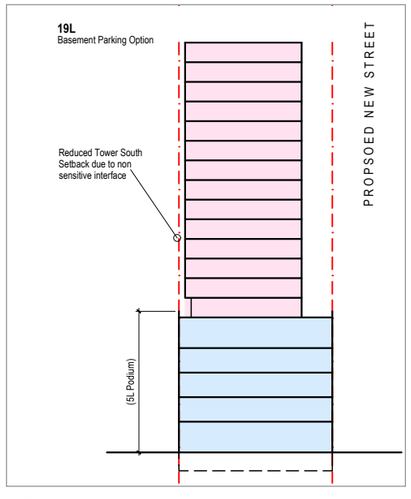


TOWER
1:1000



SECTION

7.0 Test Site 07: Near Langford Street and Fogarty Street South, North Melbourne

7.4 Development Summary (Basement Carparking Option)

The information presented herein is preliminary. It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities. Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor. Floor areas shown have generally been measured using the guidelines – published by the Property Council of Australia. All areas and measurements shown are rounded to the nearest whole number. All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only. Further development of this design will require information produced by a number of specialist consultants. This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented. Hayball accepts no legal responsibilities for any decision, commercial or otherwise, made on the basis of the information presented.

ALL SITES PROPOSED DEVELOPMENT SCHEDULE

				Residential					Carpark	
Site	**GBA****	**RETAIL**	**OFFICE**	**Typical Apartment**	**GFA***	**NSA (inc P.O.S.)**	**NSA**	**Balcony*****	**CARPARK**	**CARPARK**
	m²	**NLA (m²)**	**NLA (m²)**	**Number**	**m²***	**m²**	**m²**	**m²**	**GFA (m²)**	**Spaces**
Basement	1590								1590	26
Ground	1590	460								
Level 1	1590		1352							
Level 2	1590		1352							
Level 3	1590		1352							
Level 4	1590		1352							
Level 5 - 18 (@ 950sqm/ L)	13300			128	12228	10640	9568	1072		
TOTAL	21250	460	5406	**128**	12228		9568	1072	1590	26
	Excl Basement									Shortfall 30 nos.

Total Site Area (sqm):	1594.0	SQM
Site Coverage (%):	100%	
Carpark Ratio:	0.2 Residential; 0 Retail/ Commercial	
Carpark spaces for Residential at 0.29 ratio:	37	Required Spaces
Carpark spaces for Commercial at 0.32 ratio:	19	Required Spaces
Floor Area Ratio:	13.3	(FAR allowed 15:1 DRAFT SP 2020; 17-22:1 - VPA Working Assumption for Optimisation

*GFA excludes balcony area

**GBA includes Balcony Area

***Based on 8sqm for 1BED&2BED and 12sqm for 3BED

Note:

Floor Area Ratio (FAR) is defined as all gross area above Ground (excluding plant) and voids within the building which are design elements (this does not include voids associated with car stakers which feature above ground).

The FAR excludes all basement structures. It includes covered balconies.

7.0 Test Site 07: Near Langford Street and Fogarty Street South, North Melbourne

7.5 Design Response and Findings

Design Response and Findings:

— The Option 1 scheme, indicates that the basement carpark has very limited area and cannot cater for the carparking requirements of a residential tower with a high FAR and number of floors.

— A second option was tested (refer to **Appendix B** and diagram opposite) with additional podium carparking. This allowed for the maximum FAR and heights to be met, however, the small site prevents carpark sleeving, resulting in poor public realm outcomes.

— Considerations could be given to a combined overall basement car park with the adjacent lots to facilitate a more efficient car park.

— Even when lower parking rates were adopted, this resulted in a 19 level development with an FAR of 13.2:1 which fell well below the maximum heights and the 17-22:1 FAR set within the working assumptions or the DSP.

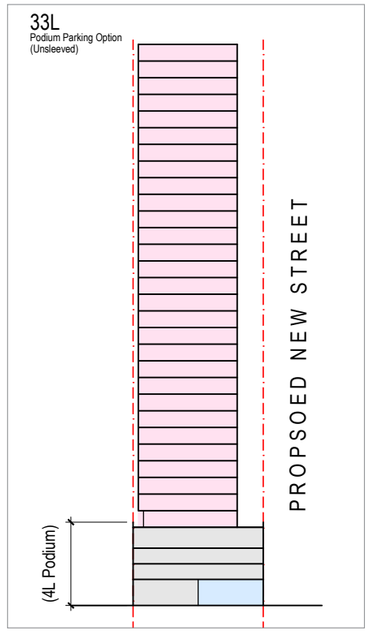
Recommendations:

— Target FARs and heights cannot be achieved with concealed carparking

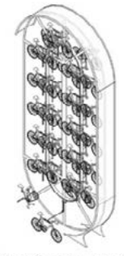
— This limits development potential for these small narrow sites, assuming that residential or mixed use tower development will require the some allocated parking to support project viability.

— Consider an adjacent precinct car parking location to facilitate the preferred higher forms.

— Alternatively, consider limited unsleeved parking to podia where appropriate treatments e.g: feature screening strategies or celebrated bike parking/ end of trip facilities at podium edges can demonstrate high quality presentation to streets.

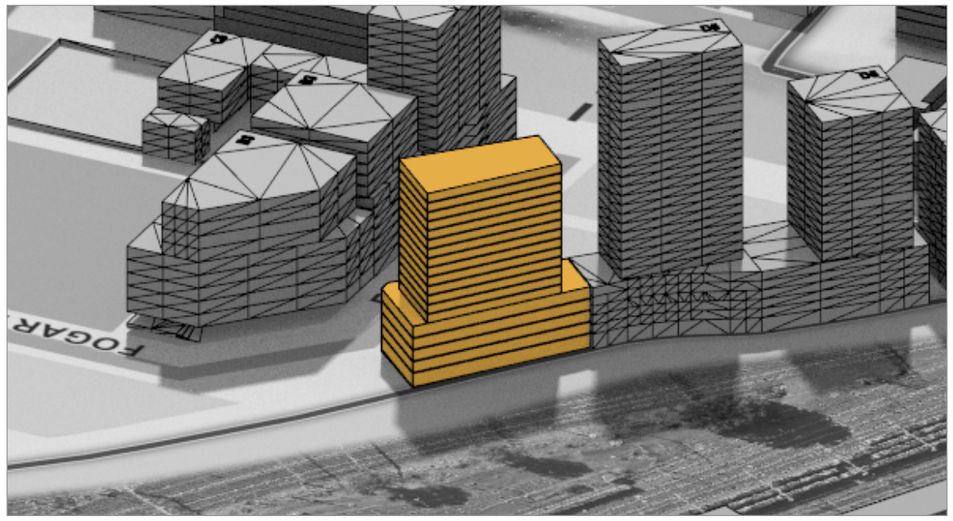


SECTION



Bike Parking Unit 24
Dimension:
H:10000mm
D:1100mm
W:5200mm

CELEBRATED BIKE PARKING TO PODIUM EDGES
Precedent: Manifesto - The Bike Hangar



EXTENT OF DEVELOPMENT REPRESENTING THE WORKING ASSUMPTION FAR
APPROXIMATE EXTENT OF DEVELOPMENT EXCEEDING THE WORKING ASSUMPTION FAR

Test Site 08

8.0 Test Site 08: Weston Milling (24-78 Laurens Street), North Melbourne

8.1 Methodology

Site 8 is located on the site of Weston Milling at 24-78 Laurens Street in North Melbourne. The site has two significant heritage buildings, one along Munster Terrace and one spanning between Laurens Street and Munster Terrace.

The longer, more industrial brick façade along Laurens Street, has architectural merit which illustrates the scale and detailing of the industrial past of the area and is considered worth preserving within future development.

There is approximately 4.5m height difference between Munster Terrace and Laurens Street.

The site has an area of approximately 6,962sqm and has a significant tree to the North West corner along Laurens Street.

A number of working assumptions were established to inform site testing:

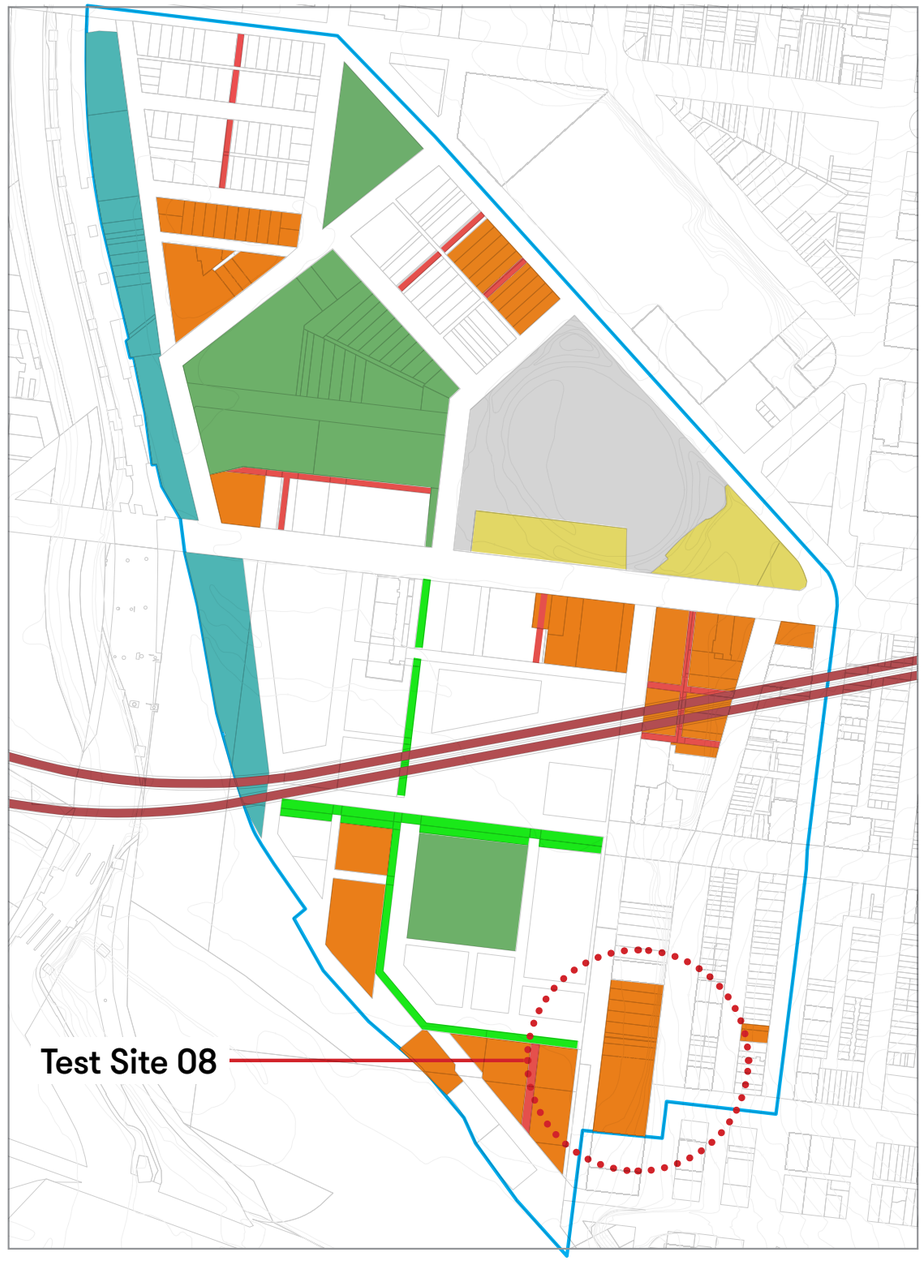
- 8-16 storeys
- 4 storey street walls along Munster Terrace
- 5m minimum setbacks above street walls,
- 5m minimum side and rear setbacks < 20 storeys
- FAR 7:1
- FFL 0.3 – 1.0m above natural ground for habitable floor level (1.0m was used for the testing as worst-case scenario)

The testing was to consider:

- A mixed-use development (office enterprise offer) and residential
- The relationship to retained heritage fabric to maintain the human scale
- Slopes within Laurens Street Precinct and appropriate responses to differing street frontage
- Transition to the stable area of North Melbourne
- Preferred height as a gateway to the precinct

The following options were explored:

- Ground and level 1 carpark accommodated within the height difference between the two streets
- Residential use behind the linear form of the heritage building along Munster Terrace
- Commercial use in the central heritage building with more restricted access to natural light
- Partial excavation of the areas on ground and level 1 noting the existing conditions of heritage building foundations and levels around this area are unknown
- Option 1 (refer to **Appendix B**) includes a larger carpark and no tower separation for the larger southern building
- Option 2 (displayed) shows a reduced carpark area and a 10 metre tower separation to the southern building



8.0 Test Site 08: Weston Milling (24-78 Laurens Street), North Melbourne

8.2 Table 1: Assumptions and Design Criteria for Yield Analysis Calculation

Parcel Size: 6,962m²
LOT D: 2469.1 sqm

		VICTORIAN PLANNING AUTHORITY ASSUMPTIONS	HAYBALL ASSUMPTIONS PEER REVIEW
DRAFT STRUCTURE PLAN 2020 Reference: Arden Working Assumptions received from VPA on 11 march 2021	**FLOOR AREA RATIO(FAR) 7:1**		
	SETBACK above 4 Storey Wall along Munster Terrace, Front Side & Read	Side and rear setbacks: minimum 5m (separation distance 10m)	
	FLOOR TO FLOOR HEIGHT	Ground Floor: 5m Upper levels typical (office and residential): 3.5m	Overall building height calculated with floor to floor from Reference *9 but final Yield Study floor to floor consistent with current construction standards at 5m Ground floor, 3.2m for residential floors, 4.0m for Commercial Office floor and 2.8m for carpark levels
	SHADOWS		Building forms are tested at a height that would be below the VPA carve at Equinox for VPA assessment
	TOWER SETBACK DISTANCE FROM STREET WALL	Minimum 5m	
	STREET WALL HEIGHT	Street wall height of heritage fabric	Maximum height calculated by Structure Plan proposed height (5m Ground and 3.5m upper levels but number of levels based on Market standards for floor to floor height (5m Ground and 3.2m residential levels)
	OVERALL HEIGHT: 8-16 Storeys	As per DSP	
PLANNING References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**MATTERS FOR CONSIDERATION DURING TESTING**	Relationship to retained heritage fabric / humain scale Slopes within Laurens precinct and response to differing street frontage Transition to stable area of north Melbourne Prefered Height	
	TYPOLOGY	Mixed Commercial (office enterprise offer) / Residential	Proposal for Commercial in Heritage building as not suitable for residential (no side windows)
	INTERFACES		Heritage fabric all along Laurens Street & two significant buildings along Munster Terrace
	RETAIL ACTIVATION		None proposed on this site
PARKING References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**TRAFFIC CONFLICT FRONTAGE**	not specified	
	CAR SPACE SIZE ALLOCATION		Proposal for using a ratio of 40sqm per parking space (including circulation, services, car park space & bike parking) based on previous projects
	EXCAVATION		Minimise Excavation, Allow One basement and podium carpark preferred
	PRECINCT CARPARK	not applicable	
	CARPARK VISIBILITY		Proposal to use the heritage deep facia along Laurens Street to conceal the carpark. Carpark entry and Building entry could activate the existing entries
	RESIDENTIAL MAXIMUM PARKING RATIO	1BED 0.2 spaces per dwelling 2BED 0.3 spaces per dwelling 3BED 0.5 spaces per dwelling	Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average dwelling carpark ratio of 0.29:1 per average dwelling
	OTHER USES MAXIMUM PARKING RATIO	0.32 spaces per 100sqm GFA	
	VISITOR PARKING RATES	n/a	Proposal for visitor parking to be included as part of the precinct parking allocations (400 spaces)
FEASIBILITY ASSUMPTIONS References: Arden Structure Plan: Development Feasibility Assessment (VPA) 12 may 2020 - Final Draft by Ernst & Young	**AVERAGE APARTMENT SIZE**	75sqm of NLA	
	BALCONY SIZE ALLOCATION		Balcony size of 1BED & 2BED 8sqm, 3BED 12sqm as per B.A.D.S. Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average balcony size of 8.4 sqm per average dwelling assuming the A/C condensers are **not** located on balconies.
	EFFICIENCY RATIO	NLA/NSA estimated at 85% of GFA for Office and residential (Assuming 15% of the completed project will be attributable to non-lettable/saleable area)	Proposal for 85% Efficiency for Commercial buildings and 78% Efficiency for Residential buildings
CLIMATE	**FLOOD: MIN HABITABLE LEVEL ABOVE GROUND**	Finished floor levels 0.3 - 1.0m above natural ground	1.0 meter used for yield study modeling (worst case scenario)
	SUN	Height & Impact of shadow to Open Space: Understand impact of shadowing cast by street wall at both Winter Solstice and Equinox (between 10am and 3pm) and impact and appropriatness of a slender fast moving shadow Tall tower separation proposed 25m ideal but minimum separation distance should equal the widest dimension of the tower floorplate	COMMUNAL OPEN SPACE: Sunlight testing required for Clause 58.03-3 Standard D8 – min. 50% or 125m2 of primary communal open space to achieve min. 2 hrs of sunlight between 9am-3pm on 21 June. PUBLIC OPEN SPACE: Building height to comply with the solar carve (above the street wall height of 6 storey (23m) And above 4 storeys (16m) as defined by the Draft Arden Structure Plan MODELING June 2020 TOWER SEPARATION: Proposal for minimum tower separation should have ability to vary building separation depending on the height and orientation (i.e. the taller the wider separation)
Reference: VPA Arden Urban Renewal Precinct, North Melbourne Microclimate Study GWTS-TPR-10370-2020-3	**WIND**	North wind is predominant in all seasons except in summer where the South wind is stronger	
	BUILDING ENTRANCE PREFERED LOCATION	Advised not to face the north or west. Preferable to the East	
TUNNEL INTERFERENCE Reference: Tunnel Loading Advisory Note DJPR Proposed Development of Arden Precinct DOC/20/63343	**ELECTROMAGNETIC INTERFERENCE**	For sensitive instruments within 300m of the tunnels	Not applicable for this site
	INTERNAL GROUND BORNE NOISE & VIBRATION	Guideline Targets: Residential: 35dB(A), Office: 45dB(A) Required mitigation measures required within 13m of the tunnel	Not applicable for this site

8.0 Test Site 08: Weston Milling (24-78 Laurens Street), North Melbourne

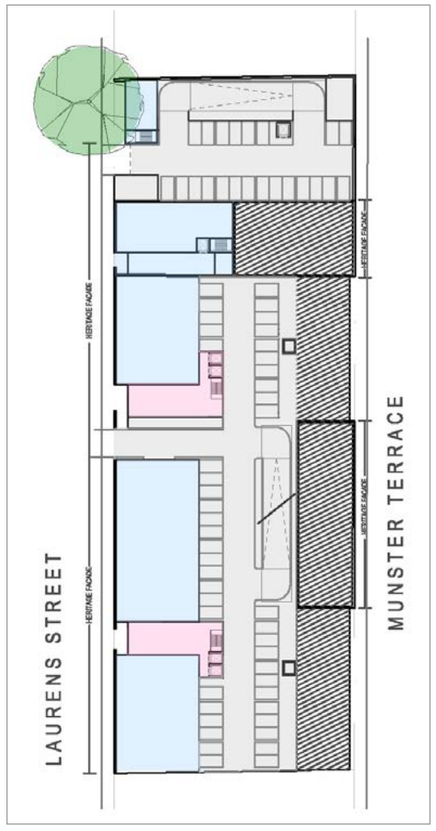
8.3 Heritage Façade – Streetscape

Munster Terrace

Laurens Street

8.0 Test Site 08: Weston Milling (24-78 Laurens Street), North Melbourne

8.4 Plans



GROUND
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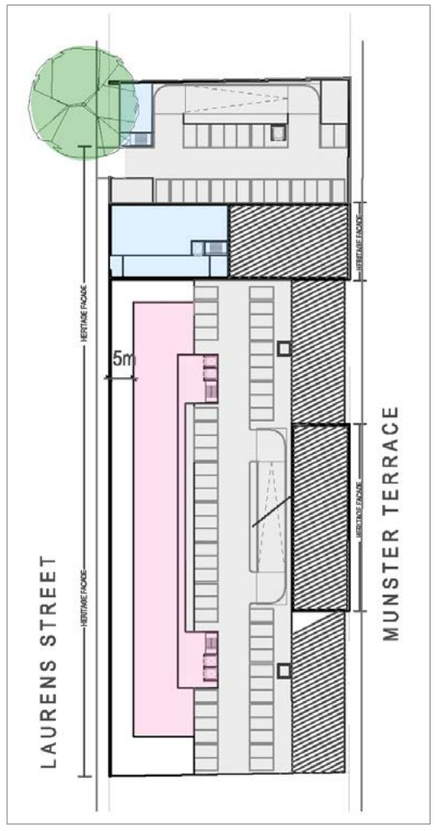

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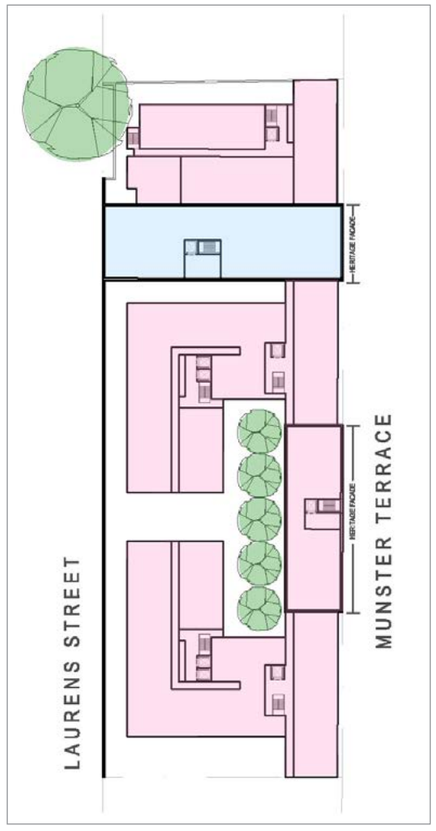

LEVEL 2, 3 + 4
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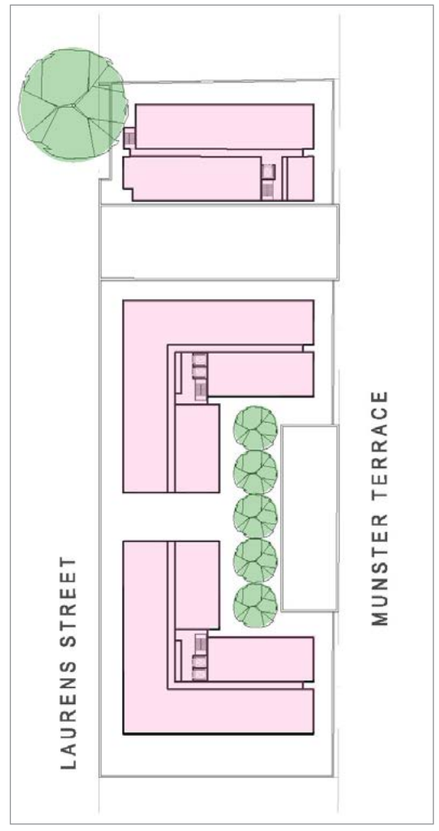

LEVEL 5 TO 13
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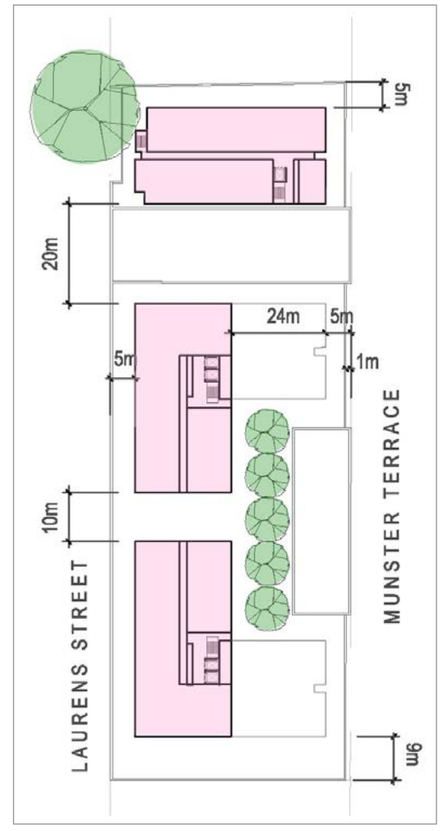

LEVEL 14 + 15
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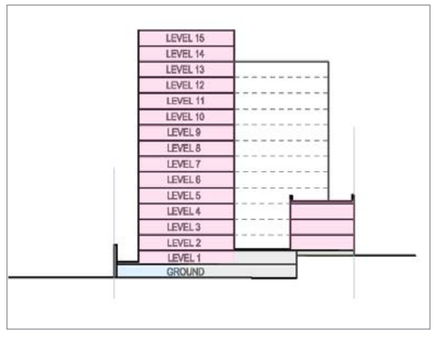


SECTION

8.0 Test Site 08: Weston Milling (24-78 Laurens Street), North Melbourne

8.5 Development Summary

The information presented herein is preliminary. It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities. Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor. Floor areas shown have generally been measured using the guidelines – published by the Property Council of Australia. All areas and measurements shown are rounded to the nearest whole number. All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only. Further development of this design will require information produced by a number of specialist consultants. This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented. Hayball accepts no legal responsibilities for any decision, commercial or otherwise, made on the basis of the information presented.

SITE 8 24-78 Laurens Street, North Melbourne

				Residential					Carpark	
Site	**GBA****	**COMMUNAL**	**OFFICE**	**Typical Apartment**	**GFA***	**NSA (inc P.O.S.)**	**NSA**	**Balcony*****	**CARPARK**	**CARPARK**
	m²	**NLA (m²)**	**NLA (m²)**	**Number**	**m²***	**m²**	**m²**	**m²**	**GFA (m²)**	**Spaces**
Basement										
Ground	5021.7	333.2	1442.8						2899.1	72
Level 1	4418.8		296.7	11	1110.3	888.2	798.8	89.5	2923.9	73
Level 2	4806.3	221.9	637.5	32	3308.0	2646.4	2379.9	266.5		
Level 3	4806.3	221.9	637.5	32	3308.0	2646.4	2379.9	266.5		
Level 4	4806.3	221.9	637.5	46	3308.0	3845.0	3457.8	387.3		
Level 5	2999.5			29	2757.8	2399.6	2157.9	241.7		
Level 6	2999.5			29	2757.8	2399.6	2157.9	241.7		
Level 7	2999.5			29	2757.8	2399.6	2157.9	241.7		
Level 8	2999.5			29	2757.8	2399.6	2157.9	241.7		
Level 9	2999.5			29	2757.8	2399.6	2157.9	241.7		
Level 10	2999.5			29	2757.8	2399.6	2157.9	241.7		
Level 11	2999.5			29	2757.8	2399.6	2157.9	241.7		
Level 12	2999.5			29	2757.8	2399.6	2157.9	241.7		
Level 13	2999.5			29	2757.8	2399.6	2157.9	241.7		
Level 14	2266.5			22	2083.9	1813.2	1630.6	182.6		
Level 15	2266.5			22	2083.9	1813.2	1630.6	182.6		
TOTAL	55387.9	998.9	3651.9	**422.6**	40022.5		31698.7	3550.3	5823.0	145.6

Total Site Area (sqm):	6914.3	SQM	*GFA excludes balcony area	including 12 visitors parking
Site Coverage (%):	73%		**GBA includes Balcony Area	
Carpark Ratio:	0.3		***Based on 8sqm for 1BED&2BED and 12sqm for 3BED	
Carpark spaces for Residential at 0.29 ratio:	122.6	Spaces		
Commercial Carpark at 0.32 ratio per 100sqm:	11.7	Spaces		
Floor Area Ratio:	8.0	(FAR allowed 7:1)		Approximate extent of Development exceeding the working assumption FAR

Note:

Floor Area Ratio (FAR) is defined as all gross area above Ground (excluding plant) and voids within the building which are design elements (this does not include voids associated with car stakers which feature above ground).

The FAR excludes all basement structures. It includes covered balconies.

8.0 Test Site 08: Weston Milling (24-78 Laurens Street), North Melbourne

8.6 Design Response and Findings

Design Response and Findings:

— The location of the two heritage buildings on site determine the location of possible residential towers.

— The street wall along Munster Terrace is recessed 1m from the title boundary to allow for a landscape buffer and to highlight the heritage façades. The landscape buffer also allows privacy and transitions to the raised habitable ground floor for the new street wall buildings.

— The heritage buildings along Munster Terrace are well suited for residential use, as the existing windows provide natural light for dwellings behind.

— The heritage building to the North creates a division across the site and isolates a smaller parcel to the North. This parcel can accommodate a residential building running parallel to the heritage building between Laurens Street and Munster Terrace.

— The width of the parcel allows for a 5m side setback to the North for equal development opportunity but no setback against the lower heritage building.

— The proximity of the new building to the heritage building has been considered acceptable for the following reasons:

- It has been assumed that there are no side windows to the existing building.
- The construction of a street wall of 4 storeys along Munster Terrace will frame the building and integrate it within the built form of the street wall.
- The 5m setback for the new tower from the title boundary along Laurens Street will highlight the existing heritage façade.
- The heritage building will act as the building separation for the new built form to the South.
- The difference in height between Munster Terrace and Laurens Street allows carparking to be concealed.
- The carpark is underground along Munster Terrace but above ground along Laurens Street but sleeved with commercial and residential.
- The heritage brick façade is punctuated by openings at Ground level which work well in locating residential tower and office spaces and entries as well as services and carpark access.

— The height of the solid parapet above ground will conceal the private open spaces of the residential building above.

— The heritage façade along Laurens St creates a human scale with the towers setback above. The 5m setback to the west allows for a landscape podium for the residential tower and creates landscape space above the street wall helping to conceal the higher form and mitigate possible wind issues.

— Preserving the existing heritage building along Munster Terrace allows the new tower to be moved further to the west largely concealing the North South towers from the street wall (24m setback). The setback between the new towers and the heritage building is approx. 12.5m allowing for a landscaped buffer between the two buildings.

— The proposal to reduce the height of the two wings of the larger buildings by 2 storeys reduces the length of shadows to the surrounding neighbourhood and the visual bulk of the new built form.

— The tower separation between the narrow building ‘ends’ of 10m avoids a long unbroken building form and allow views and light between buildings.

— A larger setback of 9m is proposed to the South, instead of the 5m minimum setback of the controls to address amenity interfaces between adjacent developments.

— This proposal yields a total of 422 apartments for an FAR of 8.0:1, higher than the FAR 7:1 proposed by the Structure Plan 2020.

— The resulting carpark ratio of 0.3 is slightly higher than the assumption ratio of 0.29. The carpark area could also be used for Communal areas or additional bike store.

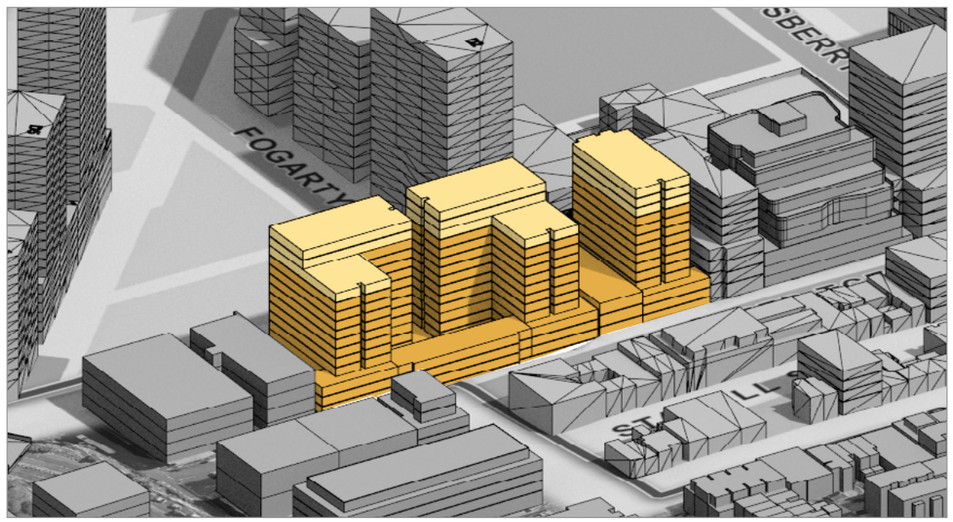
Recommendations:

— Because of the length of the block, there may be potential to introduce a pedestrian walkway between Munster Terrace and Laurens Street.

— The proposed massing allows sunlight at equinox between 11am and 2pm to footpaths opposite the site.

— The 16 level building maximum height produces an FAR of 8:1, higher than the proposed FAR of 7:1 while preserving extensive heritage fabric, suggesting an increase to FAR for this site could be considered.

— Some areas are indicated as non-excavated to reduce cost as the existing conditions and levels around this area are unknown. Further investigation into the foundations of the heritage building would be required to assess if parking can be located immediately adjacent to existing buildings as indicated.



EXTENT OF DEVELOPMENT REPRESENTING THE WORKING ASSUMPTION FAR
APPROXIMATE EXTENT OF DEVELOPMENT EXCEEDING THE WORKING ASSUMPTION FAR

Test Site 09

9.0 Test Site 09: 161 Arden Street, North Melbourne

9.1 Methodology

Site 9 is located within the Laurens Street Precinct at 161 Arden Street, North Melbourne. It is located at the end of the urban block, and has the potential to create a gateway to the Arden precinct.

The site has an area of around 720sqm and the surrounding streets include Munster terrace to the West, Arden Street to the North and Dryburgh Street to the East.

It is located south of the North Melbourne Recreation Reserve.

The adjacent site to the south has a new built form of 4.5 storeys along Dryburgh Street and 5 storeys to Laurens Street and is built to the boundary line.

A number of working assumptions were established to inform site testing:

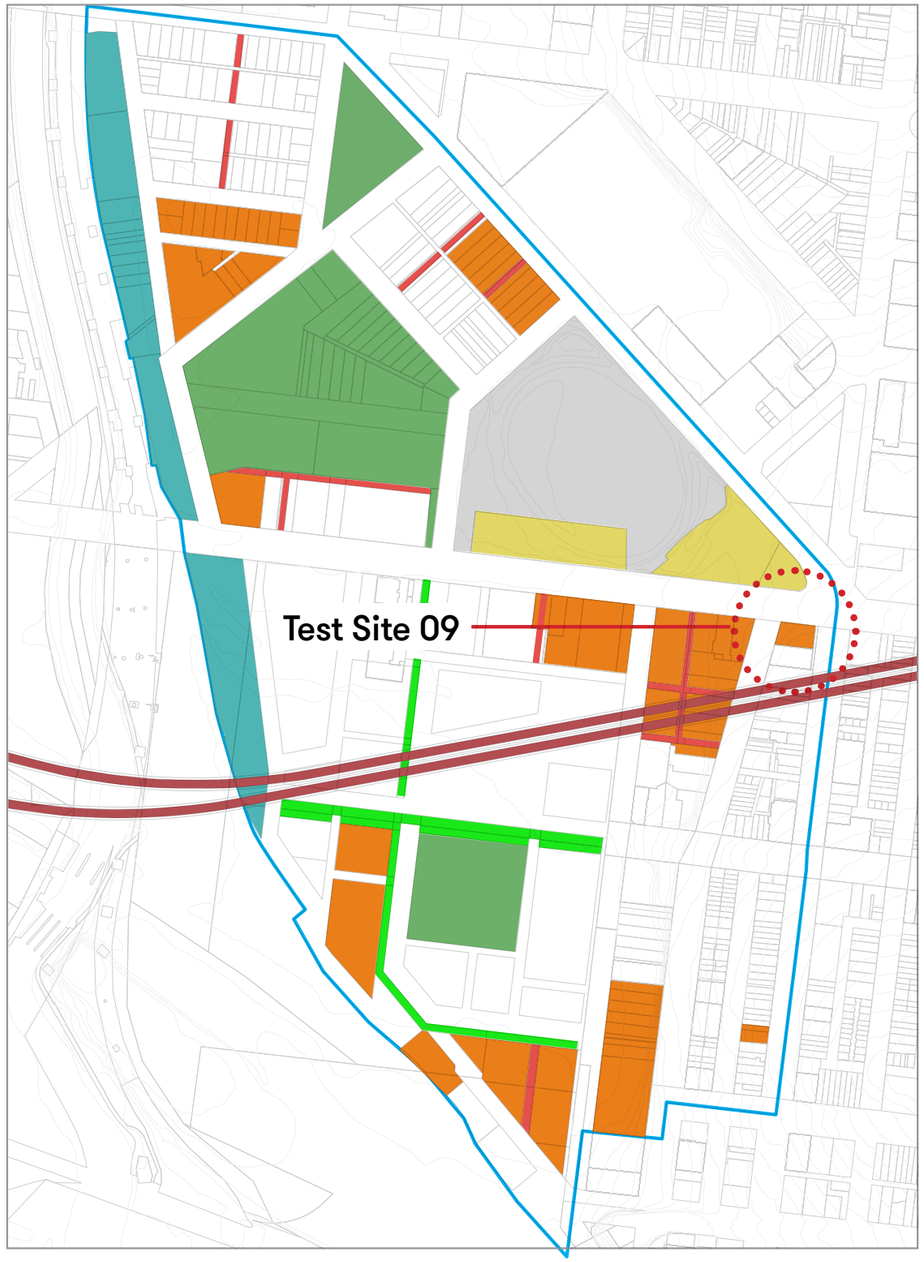
— 6 storeys proposed (DSP2020 lists 3-6 storey for the site)
— 4 storey street wall
— 5m minimum setbacks above street wall,
— 5m minimum side and rear setbacks < 20 storeys
— FAR 4:1 listed in the DSP2020
— FFL 0.3 – 0.5m above natural ground (0.5m was used for the testing as worst-case scenario)

The testing was to consider:

— A residential typology.
— Transitional heights between Lauren Street Precinct to Arden Central Precinct.
— The relationship to existing residential building to the South (amenity interface).
— Potential for a landmark building entering renewal precinct.
— What does this landmark look like when the Charter Hall site adjacent is another gateway?

The following options were explored:

— Maximisation of the yield on the site whilst respecting 5m setback between properties and 5m setback over the street wall on Dryburgh Street for 6 levels.
— Removing the side setback of 5m but allowing a light well adjacent to the neighbour's light well to maintain the light penetration, while maintaining the 5m setback over the street wall along Dryburgh Street for 6 levels.
— Increasing the number of levels and dwellings to balance with the carpark ratio of 0.29.



9.0 Test Site 09: 161 Arden Street, North Melbourne

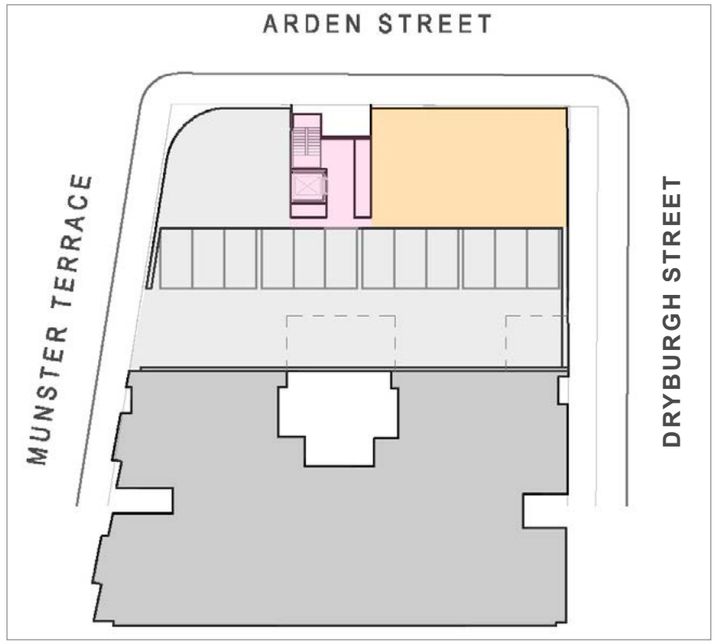
9.2 Table 1: Assumptions and Design Criteria for Yield Analysis Calculation

Parcel Size: 720.3m²

		VICTORIAN PLANNING AUTHORITY ASSUMPTIONS	HAYBALL ASSUMPTIONS PEER REVIEW
DRAFT STRUCTURE PLAN 2020 Reference: Arden Working Assumptions received from VPA on 11 march 2021	**FLOOR AREA RATIO(FAR) 4:1**		
	SETBACK above 4 storey street wall	Side and rear setbacks: minimum 5m (separation distance 10m)	
	FLOOR TO FLOOR HEIGHT	Ground Floor: 5m Upper levels typical (office and residential): 3.5m	Overall building height calculated with floor to floor from Reference *9 but final Yield Study floor to floor consistent with current construction standards at 5m Ground floor, 3.2m for residential floors, 4.0m for Commercial Office floor and 2.8m for carpark levels
	SHADOWS		Building forms are tested at a height that would be below the VPA carve at Equinox for VPA assessment
	TOWER SETBACK DISTANCE FROM STREET WALL	Minimum 5m	
	STREET WALL HEIGHT: 4 Storeys	6 storeys	Maximum height calculated by Structure Plan proposed height (5m Ground and 3.5m upper levels but number of levels based on Market standards for floor to floor height (5m Ground and 3.2m residential levels)
	OVERALL HEIGHT: 3-6 Storeys	As per DSP	
PLANNING References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**MATTERS FOR CONSIDERATION DURING TESTING**	Transitional height, relationship of heights between Arden Central to Laurens Street and to Stable North Melbourne area to the East Relationship to residential building to the South (amenity interface) Landmark building entering renewal precinct What does this landmark look like when Charter Hall site is another potential gateway	
	TYPOLOGY	Residential	Proposal for Retail on Ground and Residential for upper levels
	INTERFACES		Park Interface to the North Melbourne Recreation Reserve to the North Main thoroughfare along Arden Street
	RETAIL ACTIVATION		Proposal for activation of Arden Street
PARKING References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**TRAFFIC CONFLICT FRONTAGE**	none specified	
	CAR SPACE SIZE ALLOCATION		Proposal for using a ratio of 40sqm per parking space (including circulation, services, car park space & bike parking) based on previous projects
	EXCAVATION		Minimise Excavation, Allow One basement and podium carpark preferred
	PRECINCT CARPARK		not applicable for this site
	CARPARK VISIBILITY		Proposal for active uses along Maucaulay Rd, Fogarty Street and internal link, with natural ventilation along the South lane
	RESIDENTIAL MAXIMUM PARKING RATIO	1BED 0.2 spaces per dwelling 2BED 0.3 spaces per dwelling 3BED 0.5 spaces per dwelling	Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average dwelling carpark ratio of 0.29:1 per average dwelling
	OTHER USES MAXIMUM PARKING RATIO	0.32 spaces per 100sqm GFA	
	VISITOR PARKING RATES	n/a	Proposal for visitor parking to be included as part of the precinct parking allocations (400 spaces)
FEASIBILITY ASSUMPTIONS References: Arden Structure Plan: Development Feasibility Assessment (VPA) 12 may 2020 - Final Draft by Ernst & Young	**AVERAGE APARTMENT SIZE**	75sqm of NLA	
	BALCONY SIZE ALLOCATION		Balcony size of 1BED & 2BED 8sqm, 3BED 12sqm as per B.A.D.S. Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average balcony size of 8.4 sqm per average dwelling assuming the A/C condensers are**not** located on balconies.
	EFFICIENCY RATIO	NLA/NSA estimated at 85% of GFA for Office and residential (Assuming 15% of the completed project will be attributable to non-lettable/saleable area)	Proposal for 85% Efficiency for Commercial buildings and 78% Efficiency for Residential buildings
CLIMATE Reference: VPA Arden Urban Renewal Precinct, North Melbourne Microclimate Study GWTS-TPR-10370-2020-3	**FLOOD: MIN HABITABLE LEVEL ABOVE GROUND**	Finished floor levels 0.3 - 0.5m above natural ground	0.5 meter used for yield study modeling (worst case scenario)
	SUN	Height & Impact of shadow to Open Space: Understand impact of shadowing cast by street wall at both Winter Solstice and Equinox (between 10am and 3pm) and impact and appropriatness of a slender fast moving shadow	COMMUNAL OPEN SPACE: Sunlight testing required for Clause 58.03-3 Standard D8 – min. 50% or 125m2 of primary communal open space to achieve min. 2 hrs of sunlight between 9am-3pm on 21 June.
			PUBLIC OPEN SPACE: Building height to comply with the solar carve (above the street wall height of 6 storey (23m) And above 4 storeys (16m) as defined by the Draft Arden Structure Plan MODELING June 2020
		Tall tower separation proposed 25m ideal but minimum separation distance should equal the widest dimension of the tower floorplate	TOWER SEPARATION: Proposal for minimum tower separation should have ability to vary building separation depending on the height and orientation (i.e. the taller the wider separation)
	WIND	North wind is predominant in all seasons except in summer where the South wind is stronger	
	BUILDING ENTRANCE PREFERED LOCATION	Advised not to face the north or west. Preferable to the East	
TUNNEL INTERFERENCE Reference: Tunnel Loading Advisory Note DJPR Proposed Development of Arden Precinct DOC/20/63343	**ELECTROMAGNETIC INTERFERENCE**	For sensitive instruments within 300m of the tunnels	Not applicable for this site
	INTERNAL GROUND BORNE NOISE & VIBRATION	Guideline Targets: Residential: 35dB(A), Office: 45dB(A) Required mitigation measures required within 13m of the tunnel	Not applicable for this site

9.0 Test Site 09: 161 Arden Street, North Melbourne

9.3 Plans



GROUND
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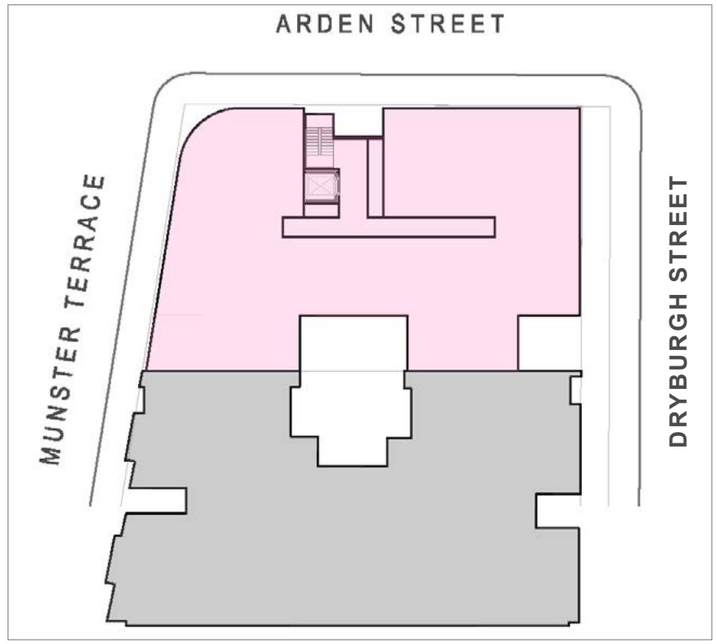

LEVEL 1 TO LEVEL 4
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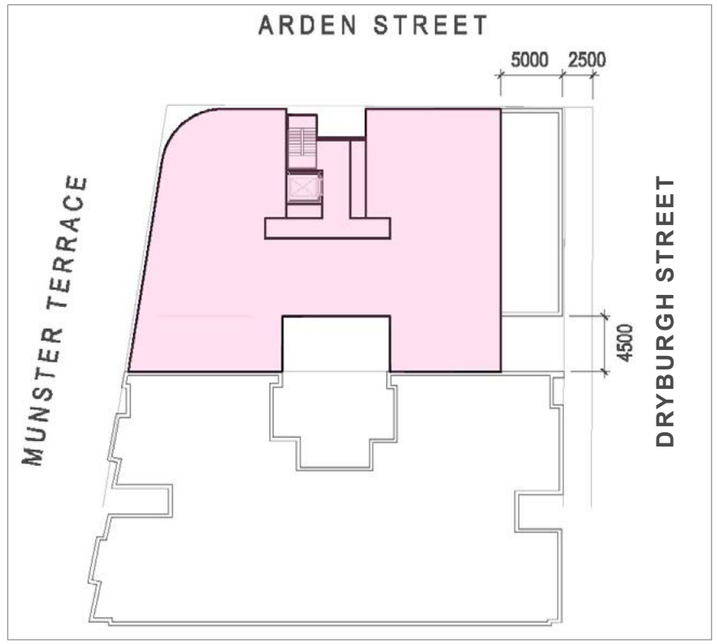

LEVEL 5 + 6
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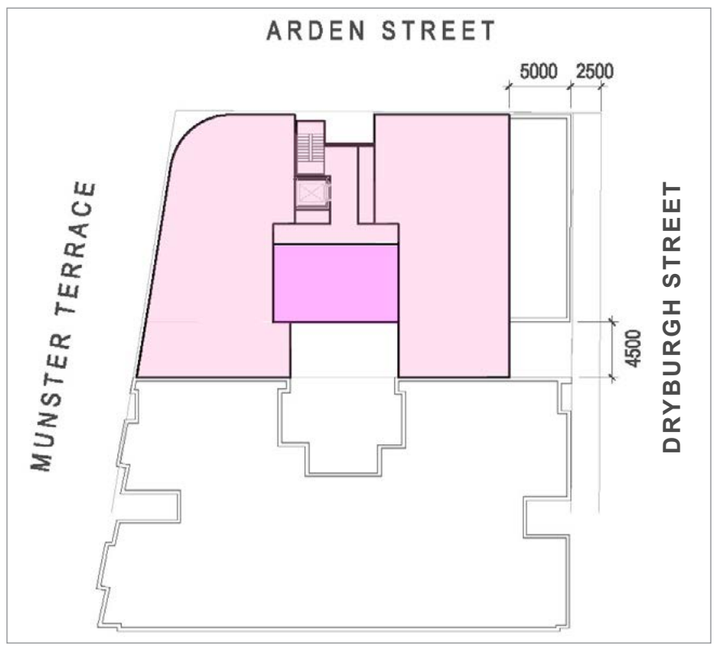


LEVEL 7
1:500

9.0 Test Site 09: 161 Arden Street, North Melbourne

9.4 Development Summary

The information presented herein is preliminary. It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities. Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor. Floor areas shown have generally been measured using the guidelines – published by the Property Council of Australia. All areas and measurements shown are rounded to the nearest whole number. All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only. Further development of this design will require information produced by a number of specialist consultants. This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented. Hayball accepts no legal responsibilities for any decision, commercial or otherwise, made on the basis of the information presented.

SITE 9 161 Arden Street, North Melbourne

				Residential					Carpark	
Site	**GBA****	**RETAIL**	**COMMUNAL**	**Typical Apartment**	**GFA***	**NSA (inc P.O.S.)**	**NSA**	**Balcony*****	**CARPARK**	**CARPARK**
	m²	**NLA (m²)**	**NSA (m²)**	**Number**	**m²***	**m²**	**m²**	**m²**	**GFA (m²)**	**Spaces**
Basement	0								0.0	0
Ground	309.4	156.6							399.0	12
Level 1	642.4			6.2	590.6	513.9	462.2	51.8		
Level 2	642.4			6.2	590.6	513.9	462.2	51.8		
Level 3	642.4			6.2	590.6	513.9	462.2	51.8		
Level 4	642.4			6.2	590.6	513.9	462.2	51.8		
Level 5	557.9			5.4	512.9	446.3	401.4	45.0		
Level 6	557.9			5.4	512.9	446.3	401.4	45.0		
Level 7	557.9		65.0	5.4	447.9	446.3	401.4	45.0		
TOTAL	4552.7	156.6	65.0	**40.7**	3836.4		3052.7	341.9	399.0	12.0

Total Site Area (sqm):	736.8	SQM	*GFA residential excludes balcony area and other uses to residential
Site Coverage (%):	42%		**GBA includes Balcony Area
Carpark Ratio:	0.3		***Based on 8sqm for 1BED&2BED and 12sqm for 3BED
Carpark spaces for Residential at 0.29 ratio:	11.8	Spaces required	
Floor Area Ratio:	6.2	(FAR allowed 4:1)	Approximate extent of Development exceeding the working assumption FAR

Note:

Floor Area Ratio (FAR) is defined as all gross area above Ground (excluding plant) and voids within the building which are design elements (this does not include voids associated with car stakers which feature above ground).

The FAR excludes all basement structures. It includes covered balconies.

9.0 Test Site 09: 161 Arden Street, North Melbourne

9.5 Design Response and Findings

Design Response and Findings:

— With 6 levels and a 5m setback adjacent to the adjacent property, the development has very limited development opportunity. The typology of the adjacent building and the absence of a side setback, made it logical to extend the building to abut the adjacent building for the first 5 levels to create a street wall of 5 levels along Dryburgh Street (consistent with the existing adjacent building height of 4.5 levels).

— The number of car spaces available on site could allow an additional 2 floors to increase the number of apartments and allow for communal space for the apartment (supporting clause 58 objectives).

— With the 8 level option, the number of car spaces balances the number of apartments.

— Given the location at the end of the urban block, this height is still considered a reasonable transitional height from the smaller residential sites of Laurens Street precinct to the Arden Central Precinct.

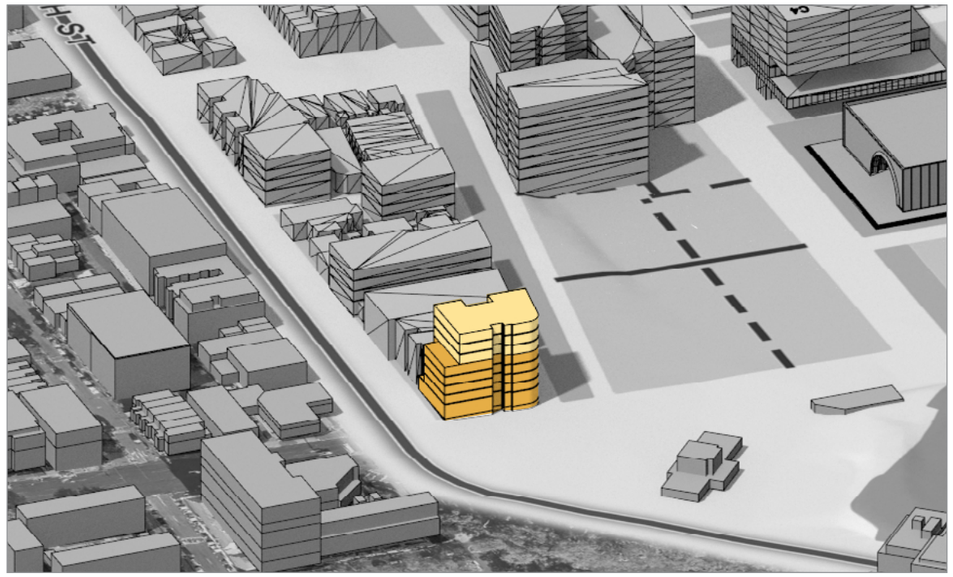
— There is opportunity for retail on ground (café or other) to activate Arden Street as a main thoroughfare instead of locating a residential apartment on the busy street. The development would then become mixed-use.

Recommendations:

— That the preferred maximum height of 6 storeys or maximum FAR (potentially to 6:1) is reconsidered to improve the site viability.

— The current scheme achieves an FAR of 6.2:1, significantly higher than the FAR of the DSP of 4:1 but the preferred maximum height by 2 levels.

— The width of Dryburgh Street may allow for removal of street wall setback controls where development opportunity is already limited by lower FAR and natural constraints of smaller lot sizes. This would provide more design flexibility and avoid tiered building forms.



EXTENT OF DEVELOPMENT REPRESENTING THE WORKING ASSUMPTION FAR
APPROXIMATE EXTENT OF DEVELOPMENT EXCEEDING THE WORKING ASSUMPTION FAR

Test Site 10

10.0 Test Site 10: 113-117 Dryburgh Street, North Melbourne

10.1 Methodology

Site 10 is located at 113-117 Dryburgh Street, North Melbourne. It is an infill mid-block site and features a significant level difference between Dryburgh Street to the East and Stawell Street to the West.

A significant tree is located to the North West of the property on the adjacent lot.

The general site area is around 402sqm.

A number of working assumptions were established to inform site testing:

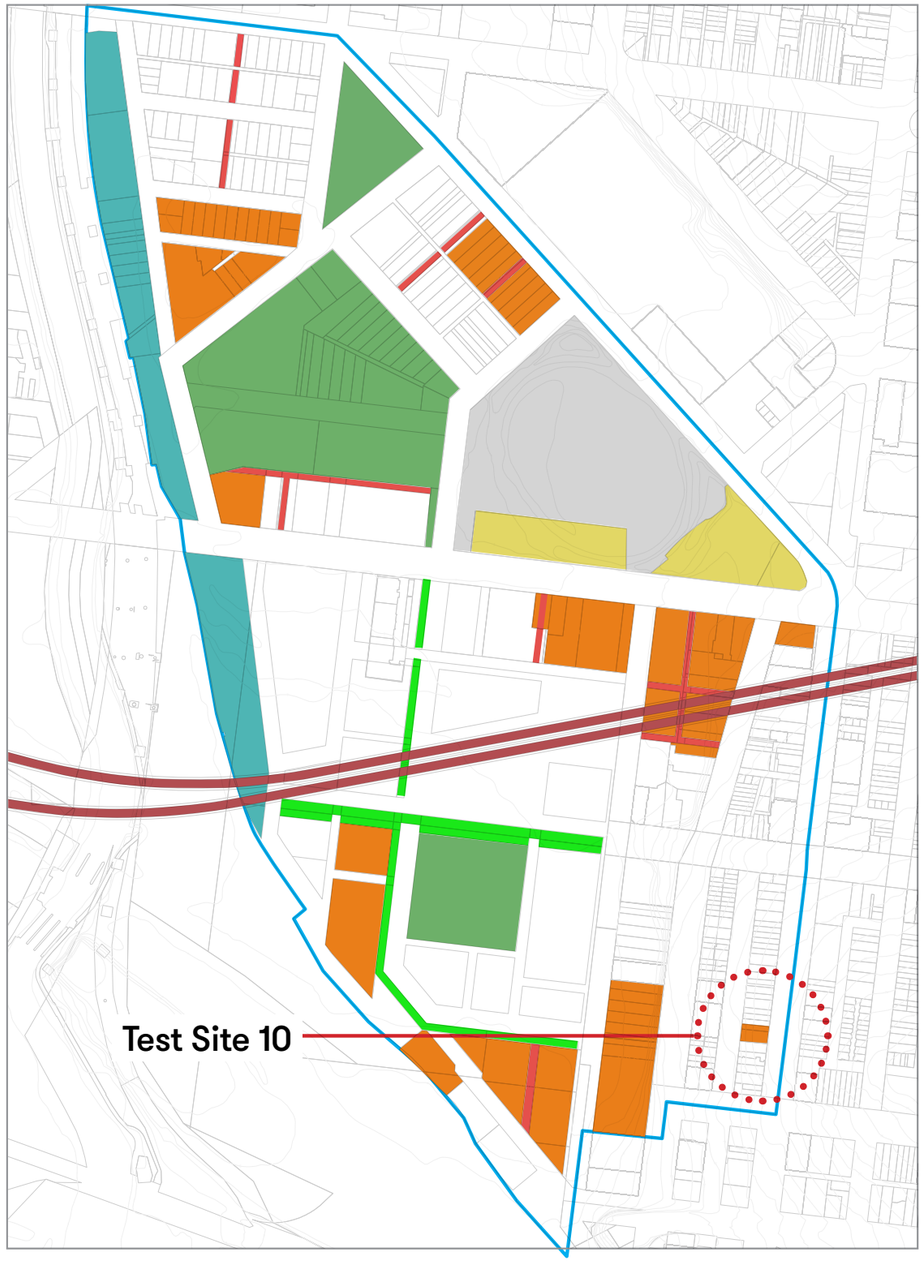
— 3-6 storeys
— 6 storey street walls
— 5m minimum setbacks above street walls,
— 5m minimum side and rear setbacks < 20 storeys
— FAR 4:1 proposed in the DSP2020
— FFL above natural ground has not been specified

The testing was to consider:

— An all residential use
— Setbacks and amenity protection for adjacent properties
— The appropriateness of scale and transition to the stable North Melbourne area to the East
— Access to the site
— Relationship to the adjacent significant tree located at 119 Dryburgh Street

The following option was explored:

— A street wall of 3 storeys along Dryburgh Street with a 5m setback above for a total of 6 storeys along Stawell Street



10.0 Test Site 10: 113-117 Dryburgh Street, North Melbourne

10.2 Table 1: Assumptions and Design Criteria for Yield Analysis Calculation

Parcel Size: 402m²

		VICTORIAN PLANNING AUTHORITY ASSUMPTIONS	HAYBALL ASSUMPTIONS PEER REVIEW
DRAFT STRUCTURE PLAN 2020 Reference: Arden Working Assumptions received from VPA on 11 march 2021	**FLOOR AREA RATIO(FAR): 4:1**		
	SETBACK above 4 storey street wall	Side and rear setbacks min 5metres (separation distance 10 metres)	Proposal for no side setback to create a continuous street wall along Dryburgh Street and Stawell Street
	FLOOR TO FLOOR HEIGHT	Ground Floor: 5m Upper levels typical (office and residential): 3.5m	Overall building height calculated with floor to floor from Reference *9 but final Yield Study floor to floor consistent with current construction standards at 5m Ground floor, 3.2m for residential floors, 4.0m for Commercial Office floor and 2.8m for carpark levels
	SHADOWS		Building forms are tested at a height that would be below the VPA carve at Equinox for VPA assessment
	TOWER SETBACK DISTANCE FROM STREET WALL	Minimum 5m	
	STREET WALL HEIGHT setback above 4 storeys	6 storeys	Maximum height calculated by Structure Plan proposed height (5m Ground and 3.5m upper levels but number of levels based on Market standards for floor to floor height (5m Ground and 3.2m residential levels)
	OVERALL HEIGHT 3-6 storeys		
PLANNING References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**MATTERS FOR CONSIDERATION DURING TESTING**	Mid Block site - Setback / amenity protection The appropriateness of scale, transition to the stable North melbourne area to the East Access Relationship to the adjacent significant tree (119 Dryburgh Street)	
	TYPOLOGY	Residential	Proposal for all residential building with raised apartment on Ground
	INTERFACES		Large height difference between the East side and West side street interface
	RETAIL ACTIVATION		Not appropriate for this site
PARKING References: Arden Movement and Parking Study - Final Report by GTA (December 2020)	**TRAFFIC CONFLICT FRONTAGE**		none specified
	CAR SPACE SIZE ALLOCATION		Proposal for using a ratio of 40sqm per parking space (including circulation, services, car park space & bike parking) based on previous projects
	EXCAVATION		Minimise Excavation, Allow One basement and podium carpark preferred
	PRECINCT CARPARK		Not applicable for this site
	CARPARK VISIBILITY		Proposal to conceal carpark within the height difference within the two streets
	RESIDENTIAL MAXIMUM PARKING RATIO	1BED 0.2 spaces per dwelling 2BED 0.3 spaces per dwelling 3BED 0.5 spaces per dwelling	Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average dwelling carpark ratio of 0.29:1 per average dwelling
	OTHER USES MAXIMUM PARKING RATIO	0.32 spaces per 100sqm GFA	
	VISITOR PARKING RATES	n/a	Proposal for visitor parking to be included as part of the precinct parking allocations (400 spaces)
FEASIBILITY ASSUMPTIONS References: Arden Structure Plan: Development Feasibility Assessment (VPA) 12 may 2020 - Final Draft by Ernst & Young	**AVERAGE APARTMENT SIZE**	75sqm of NLA	
	BALCONY SIZE ALLOCATION		Balcony size of 1BED & 2BED 8sqm, 3BED 12sqm as per B.A.D.S. Mix proposed at 30% 1BED, 60% 2BED, 10% 3BED for Average balcony size of 8.4 sqm per average dwelling assuming the A/C condensers are **not** located on balconies.
	EFFICIENCY RATIO	NLA/NSA estimated at 85% of GFA for Office and residential (Assuming 15% of the completed project will be attributable to non-lettable/saleable area)	Proposal for 85% Efficiency for Commercial buildings and 78% Efficiency for Residential buildings
CLIMATE Reference: VPA Arden Urban Renewal Precinct, North Melbourne Microclimate Study GWTS-TPR-10370-2020-3	**FLOOD: MIN HABITABLE LEVEL ABOVE GROUND**	Not specified	0.5 meter used for yield study modeling (worst case scenario)
	SUN	Height & Impact of shadow to Open Space: Understand impact of shadowing cast by street wall at both Winter Solstice and Equinox (between 10am and 3pm) and impact and appropriatness of a slender fast moving shadow	COMMUNAL OPEN SPACE: Sunlight testing required for Clause 58.03-3 Standard D8 – min. 50% or 125m2 of primary communal open space to achieve min. 2 hrs of sunlight between 9am-3pm on 21 June.
			PUBLIC OPEN SPACE: Building height to comply with the solar carve (above the street wall height of 6 storey (23m) And above 4 storeys (16m) as defined by the Draft Arden Structure Plan MODELING June 2020
		Tall tower separation proposed 25m ideal but minimum separation distance should equal the widest dimension of the tower floorplate	TOWER SEPARATION: Proposal for minimum tower separation should have ability to vary building separation depending on the height and orientation (i.e. the taller the wider separation)
	WIND	North wind is predominant in all seasons except in summer where the South wind is stronger	
	BUILDING ENTRANCE PREFERED LOCATION	Advised not to face the north or west. Preferable to the East	
TUNNEL INTERFERENCE Reference: Tunnel Loading Advisory Note DJPR Proposed Development of Arden Precinct DOC/20/63343	**ELECTROMAGNETIC INTERFERENCE**	For sensitive instruments within 300m of the tunnels	Not applicable for this site
	INTERNAL GROUND BORNE NOISE & VIBRATION	Guideline Targets: Residential: 35dB(A), Office: 45dB(A) Required mitigation measures required within 13m of the tunnel	Not applicable for this site

10.0 Test Site 10: 113-117 Dryburgh Street, North Melbourne

10.3 Plans

GROUND
1:500

LEVEL 1 TO LEVEL 3
1:500

LEVEL 4
1:500

LEVEL 4 + 5
1:500

10.0 Test Site 10: 113-117 Dryburgh Street, North Melbourne

10.4 Development Summary

The information presented herein is preliminary. It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities. Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor. Floor areas shown have generally been measured using the guidelines – published by the Property Council of Australia. All areas and measurements shown are rounded to the nearest whole number. All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only. Further development of this design will require information produced by a number of specialist consultants. This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented. Hayball accepts no legal responsibilities for any decision, commercial or otherwise, made on the basis of the information presented.

SITE 10 113-117 Dryburgh Street, North Melbourne

				Residential					Carpark	
Site	**GBA****	**RETAIL**	**COMMUNAL**	**Typical Apartment**	**GFA***	**NSA (inc P.O.S.)**	**NSA**	**Balcony*****	**CARPARK**	**CARPARK**
	m²	**NLA (m²)**	**NSA (m²)**	**Number**	**m²***	**m²**	**m²**	**m²**	**GFA (m²)**	**Spaces**
Basement	0									
Ground	385.2	0.0		1	94.9	75.9	68.3	7.6	290.3	5
Level 1	363.6			3	334.3	290.9	261.6	29.3		
Level 2	363.6			3	334.3	290.9	261.6	29.3		
Level 3	363.6			3	334.3	290.9	261.6	29.3		
Level 4	264.7		75.2	3	168.2	211.8	190.4	21.3		
Level 5	182.6			2	167.9	146.1	131.4	14.7		
TOTAL	1923.3	0.0	75.2	**15.7**	1433.9		1174.8	131.6	290.3	5.0

Total Site Area (sqm):	406.8	SQM	
Site Coverage (%):	95%		
Carpark Ratio:	0.3		
Carpark spaces for Residential at 0.29 ratio:	4.5	Spaces required	
Floor Area Ratio:	**4.7**	(FAR allowed 4:1)	Approximate extent of Development exceeding the working assumption FAR

*GFA residential excludes balcony area and other uses to residential

**GBA includes Balcony Area

***Based on 8sqm for 1BED&2BED and 12sqm for 3BED

Note:

Floor Area Ratio (FAR) is defined as all gross area above Ground (excluding plant) and voids within the building which are design elements (this does not include voids associated with car stakers which feature above ground).

The FAR excludes all basement structures. It includes covered balconies.

Potential Building Height Range (Draft SP 2020): 3-6 storeys, setback above 4 storey street wall.

10.0 Test Site 10: 113-117 Dryburgh Street, North Melbourne

10.5 Design Response and Findings

Design Response and Findings:

— The configuration of the site allows for a symmetrical apartment arrangement along both streets with an open courtyard allowing natural ventilation within the centre of the site.

— The reduced depth above the street wall due to the 5m setback, make the upper levels less practical for apartment layouts. This zone has been used for communal space as the total number of apartments is greater than 10 (which requires consideration of communal space under the revised Clause 58 standards).

— The proposal achieves 15 dwellings which balances with the car park ratio of 0.29.

— There is potential to raise the street wall to 4 levels along Dryburgh Street and increase the number of dwellings, however, the carpark ratio would be reduced below a rate of 0.29 which may be reduce market viability in the short term.

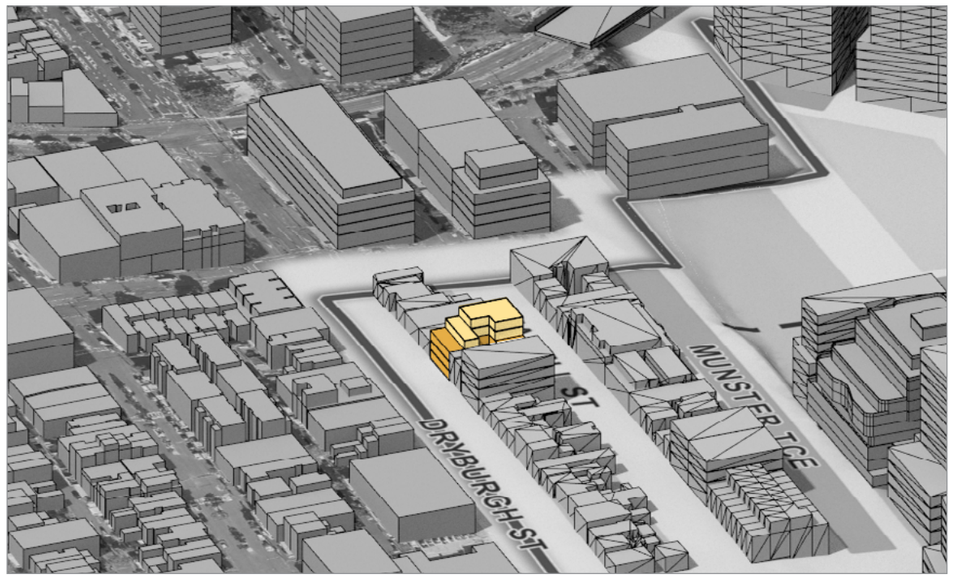
— The current scheme achieves a FAR of 4.7 which is higher than the DSP2020 FAR of 4:1.

— Shadow testing indicates that additional street holding forms could be considered without impacting the Eastern footpath of Dryburgh St at the equinox.

Recommendations:

— That the FAR is reconsidered and increased (potentially to 6:1) to improve viability of smaller lots, particularly in the future where very low or zero carparking may be more commercially feasible.

— The width of Dryburgh Street may allow for removal of street wall setback controls where development opportunity is already limited by lower FAR and natural constraints of smaller lot sizes. This would provide more design flexibility and avoid tiered building forms.



EXTENT OF DEVELOPMENT REPRESENTING THE WORKING ASSUMPTION FAR
APPROXIMATE EXTENT OF DEVELOPMENT EXCEEDING THE WORKING ASSUMPTION FAR

11.0 Conclusion

11.1 Overall Findings and Recommendations

Summary of Findings:

— The site responses were able to meet or exceed the FAR (by up to 2:1) in most instances while still providing appropriate street wall heights, through block links and sleeved car parking to key interfaces when provided above ground.

— Unsurprisingly, the smallest test sites 7, 9 and 10 were the most constrained for development as they had limited opportunity to provide carparking on site.

— The sites tested within Arden Central met or were below the suggested range of FAR of the VPA Working Assumptions for Optimisation

— Site 6 was more constrained due to its adjacency to the sensitive neighbourhood park and fell below DSP maximum FARs.

— While preferred development envelopes (working to setbacks and heights within the working assumptions) were generally achievable on the larger sites, initial feasibility testing indicated that all sites (with the exception of Site 2), were not able to achieve feasibility benchmarks, largely due to high construction costs.

— A significant contributor to high costs was identified as carparking, particularly construction of basements or large carparking areas on sites identified for precinct carparks.

— Further testing to limit basements was undertaken to understand better, the impact on site feasibilities as well as the impact of above ground parking on preferred urban design outcomes.

— The ambition to create fine grain, highly activated street and laneway networks through the precinct is supported. However, testing highlighted that block sizes make full sleeving of car parking challenging due to site depth

— The requirement for full sleeving of podia to all lane networks reduces efficiency of above ground parking and may require more expensive automated parking systems to be employed where distributed parking is required, and basements are commercially unfeasible.

— Individual site development was constrained to lower podium development due to inefficient or zero car parking being able to be accommodated on site (generally reaching a minimum of 4 storeys and averaging at 5 storeys)

— Deep floorplates require refinement to allow for daylight penetration, particularly commercial floorplates

— Most sites could not optimise heights beyond those specified due to the limitations to shadowing adjoining open spaces

The following is a summary of findings for each of the subject sites:

Site 1

The proposals compared the feasibility of developing the site with and without precinct carparking. The testing also demonstrated that some reconfiguration of lot sizes and placement of laneways assisted in improving development efficiency. The test schemes were able to meet the preferred building heights and exceeded the proposed FARs while achieving overshadowing/ solar protection requirements.

Site 2

The proposals tested a consolidated lot arrangement with a mid-block link. A mixed built form typology of mid-rise street holding forms and a higher podium tower was proposed. Subject to wind assessments, this allowed greater flexibility for where higher development could occur on the site while achieving overshadowing/solar protection requirements.

The test schemes were able to meet the working assumption preferred building heights and exceed the proposed FARs however, there was some overshadowing encroachment from the western tower at 2pm Equinox into the open space to achieve this development outcome.

Site 3

The smaller site size required a basement parking solution as the podium was too constrained to provide a sleeved parking solution. The mixed-use proposal met the preferred 20 level building height and setback requirements but illustrated that this would exceed the working assumption of 9:1 FAR and could support an increase in FAR.

Site 4

Two programmatic options and further sub-options to exclude the precinct carpark were tested.

The site's location above the metro tunnel places constraints on commercially feasible development over these assets. For the purpose of initial testing, a conservative approach was taken to avoid building directly above the metro tunnel corridor, which impacted the efficiency and configuration of the development parcels to the east of Laurens Street.

As a result, the test schemes fell marginally below the target FAR working assumption of 12:1-15:1 across the full site. However, the commercial option illustrated greatest development potential and exceeded the DSP proposed FARs of 9:1 and 10:1.

Site 5

Two proposals were tested which compared the impact of an open to sky mid-block lane to a covered link with aconsolidated podium.

The impact of providing a basement to serve surrounding smaller lots was also included in the costing analysis.

The option which provided podium parking only was not able to reach maximum allowable heights when maximum preferred carparking ratios were adopted. However, the resulting 12:1 FAR figure slightly exceeded the working assumptions of FAR 10-11:1.

Site 6

This site is comprised of two separate parcels adjacent to the sensitive neighbourhood park requiring winter solar protection. The mixed-use testing indicated that carparking is difficult to accommodate without some exposed podium to rear service lanes, and that the smaller Lot 38 would require an automated parking system to locate parking on site. The building heights were consistent with the VPA Working Assumption for Optimisation but the FARs (and heights) fell below the DSP maximums due to shadowing constraints.

Site 7

The testing compared adopting a single basement vs. a podium parking solution. The above ground parking solution was problematic due to the very constrained lot site and inability to sleeve parking. Even when lower parking rates were adopted, this resulted in a 19 level development with an FAR of 13:1 which fell below the maximum heights and FARs set within the working assumptions or the DSP.

Site 8

The proposal considered the retention of heritage fabric and a significant tree on a sloping site. Working with these constraints, the development was still able to meet the working assumptions of heights and to exceed the FAR of 7:1.

Carparking was able to be accommodated using the slope of the land and concealed behind existing industrial heritage façades to mitigate impacts to the streets without requiring extensive basement excavation.

Site 9

The proposal for this 737sqm site was able to exceed the 4:1 FAR by proposing an increase in height to 8 levels, 2 levels above the DSP preferred height limit of 6 levels. Given the location at the end of the urban block, this height was still considered a reasonable transitional height that may improve viability of the development.

Site 10

The proposal for this 407sqm site was able to slightly exceed the 4:1 FAR within the preferred height of 6 levels.

Recommendations:

— The methodology of discretionary built form controls and FARs is supported as a flexible tool which allows for site specific design responses.

— It is recommended that further articulation of lane hierarchy and function is provided for each sub-precinct as this will assist in defining how servicing of sites and parking provision can be accommodated without impacting pedestrian zones.

— The preferred parking strategy should be clarified and articulated in the built form controls, as this has a significant influence on future built form and development feasibility.

— Structural limitations over the tunnel have a direct limitation for the form above- laneways should be revised accordingly.

— Further guidance required for separation distances for multiple towers on the same site required.

— Consideration of minimal setbacks to key spaces such as the rail corridor should be incorporated.

— Marginal encroachments of shadowing may need to be considered to avoid significant under development of sites.

— There is potential to remove street setback requirements for midrise buildings (up to approx. 10 storeys) or corner sites providing wind mitigation and overshadowing can be managed.

— The DSP articulates a very broad range of preferred building heights and variable mandatory FARs between individual lots. It may be possible to simplify these controls within each sub-precinct while still achieving desired built form outcomes.

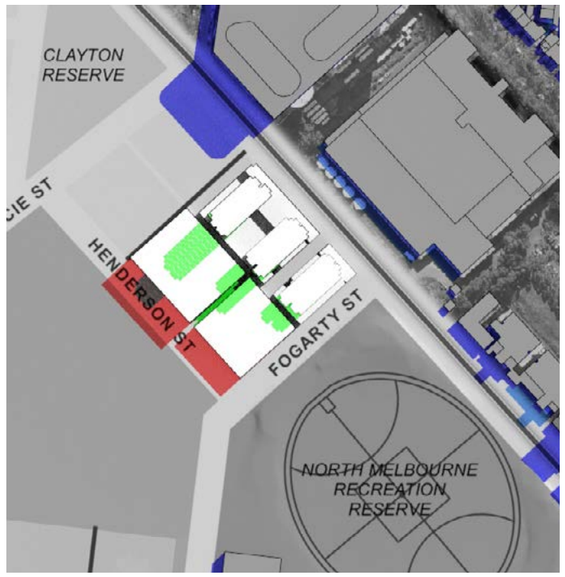
— The preferred built form outcomes for each sub-precinct should be clearly articulated in the controls to better understand the built form typologies being sought in each sub precinct.

Appendix A

MASSING AND SHADOW TESTINGS

1.0 Test Site 01: 135-173 Macaulay Road, North Melbourne

1.1 Massing and Shadow Testings



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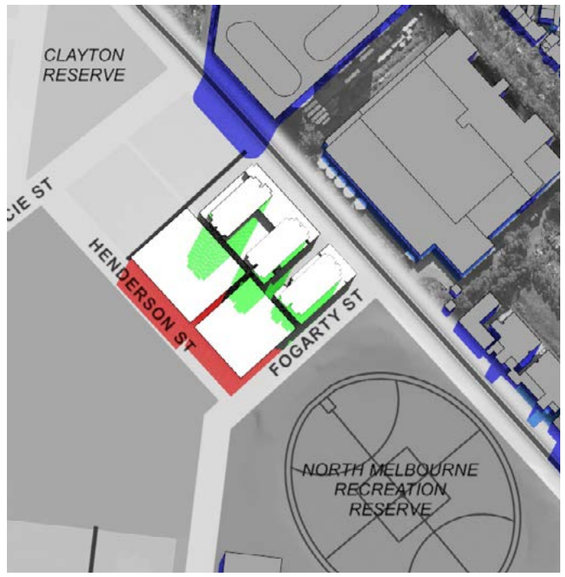

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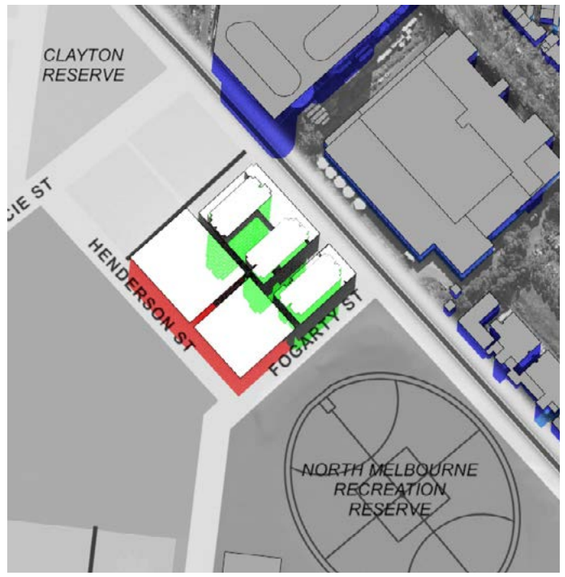

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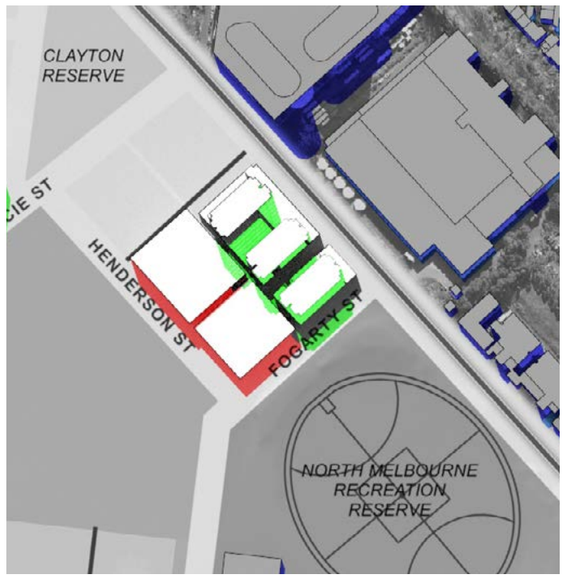

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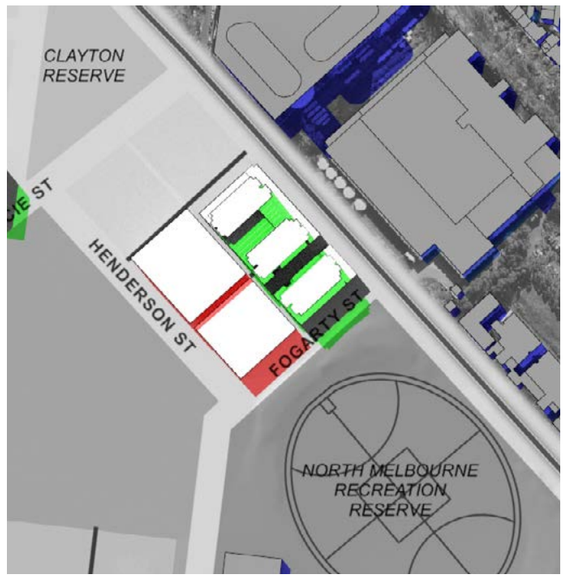

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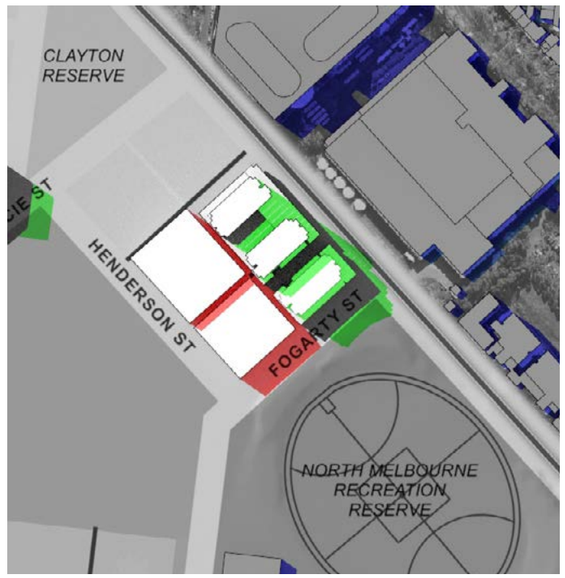


Equinox 3pm

Shadow Testings supplied by VPA

The information presented herein is preliminary.

It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities.

Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor.

Floor areas shown have generally been measured using the guidelines – 'Method of Measurement for Residential Property' – published by the Property Council of Australia.

All areas and measurements shown are rounded to the nearest whole number.

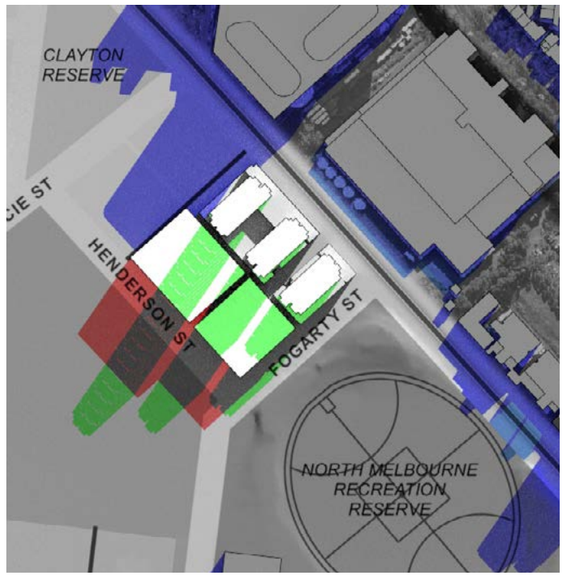
All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only.

Further development of this design will require information produced by a number of specialist consultants.

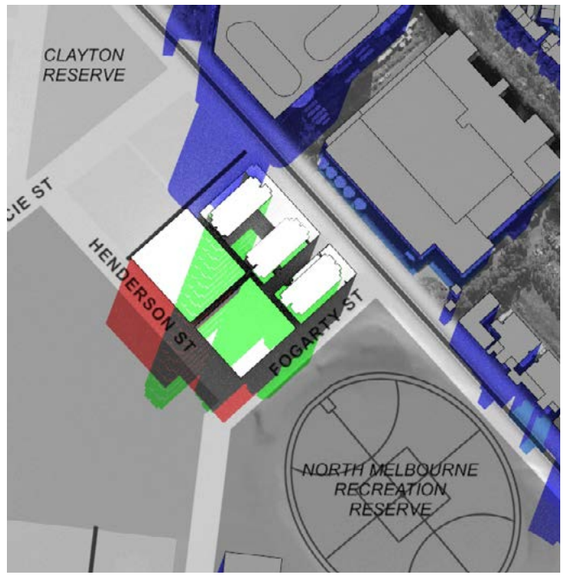
This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented.

1.0 Test Site 01: 135-173 Macaulay Road, North Melbourne

1.2 Massing and Shadow Testings – Winter Solstice Shadows against Neighbourhood Park



Jun Winter Solstice 10am



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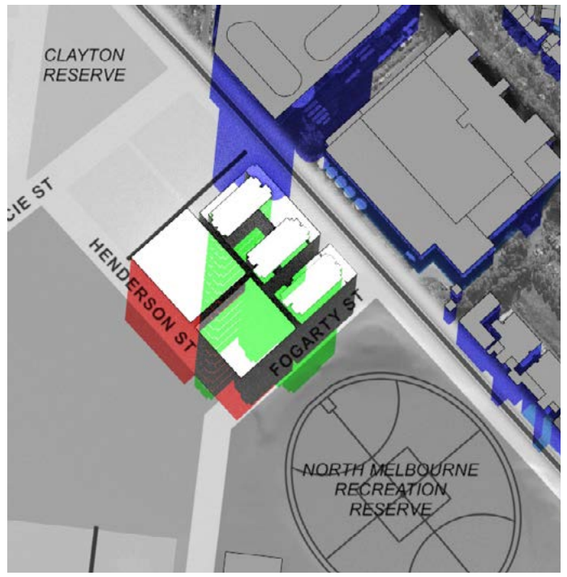

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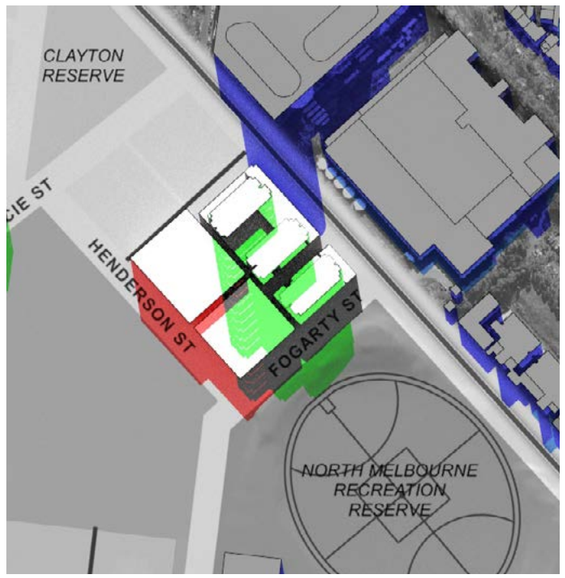

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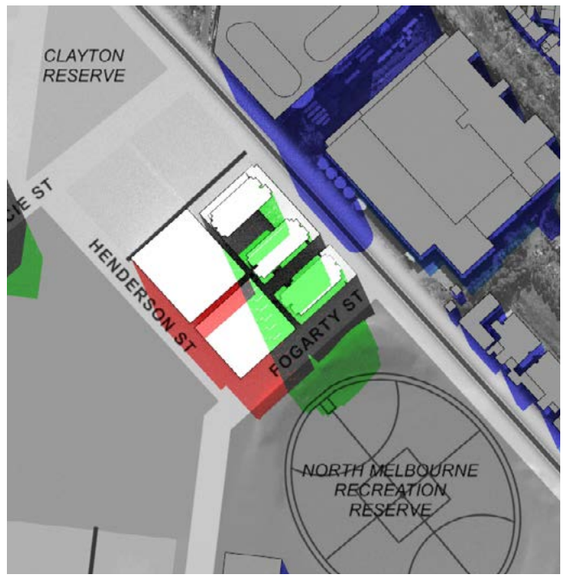

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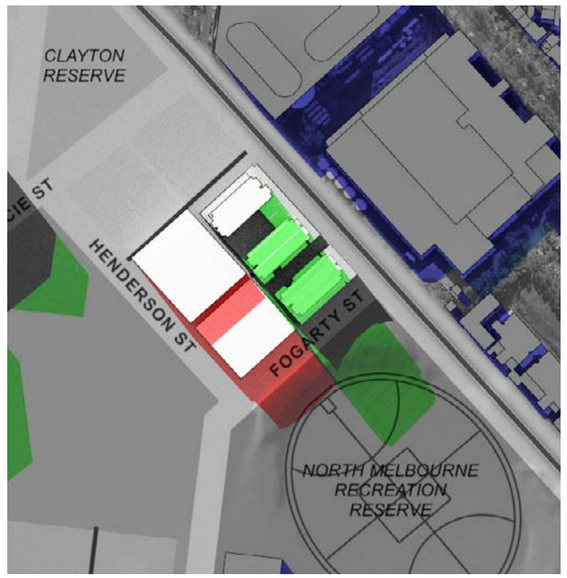


Jun Winter Solstice 3pm

Shadow Testings supplied by VPA

The information presented herein is preliminary.

It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities.

Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor.

Floor areas shown have generally been measured using the guidelines – 'Method of Measurement for Residential Property' – published by the Property Council of Australia.

All areas and measurements shown are rounded to the nearest whole number.

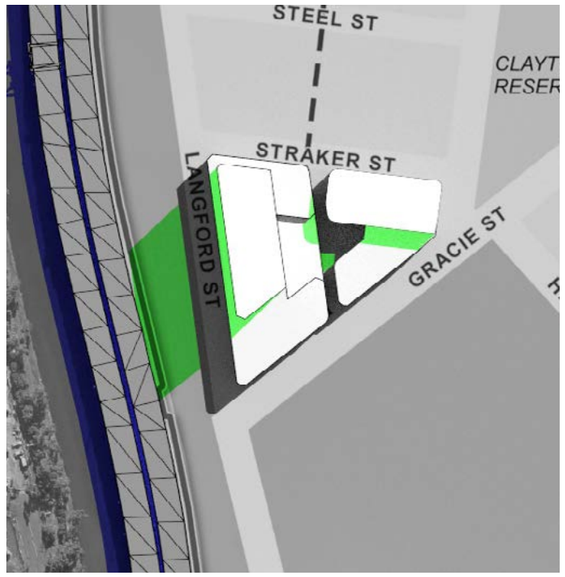
All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only.

Further development of this design will require information produced by a number of specialist consultants.

This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented.

2.0 Test Site 02: Business Triangle–11,13, 15-19 Gracie St; 21 Reynolds St; 56-92 and 96 Langford St; 1 Boundary Rd, North Melbourne [including Reynolds St]

2.1 Massing and Shadow Testings (Preferred)



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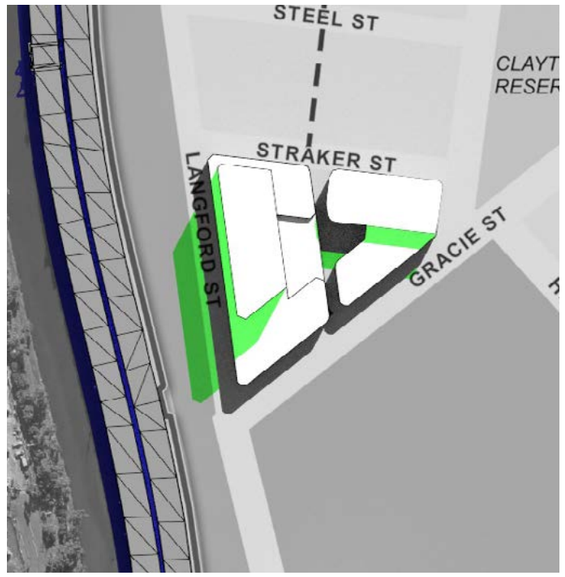

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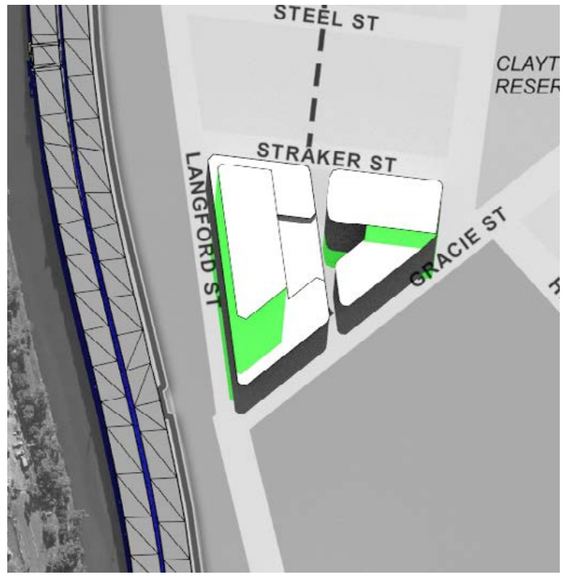

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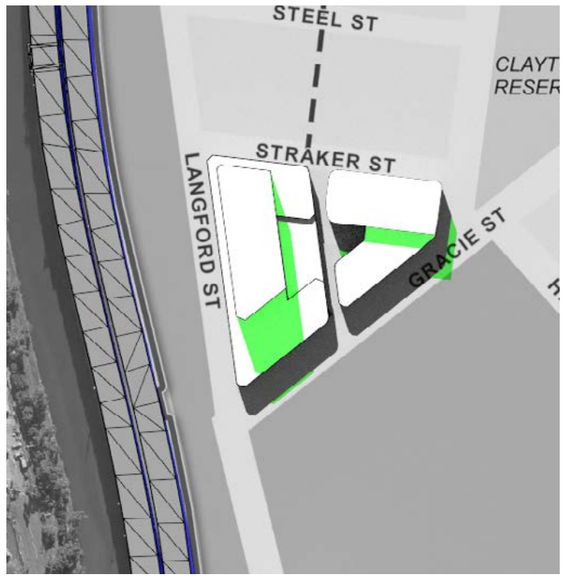

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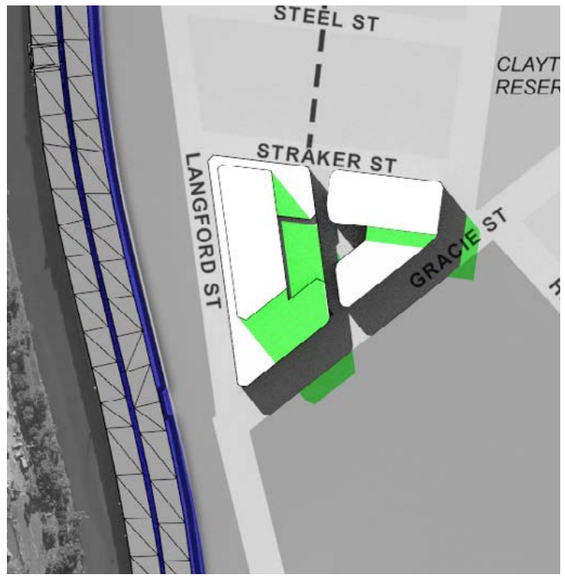

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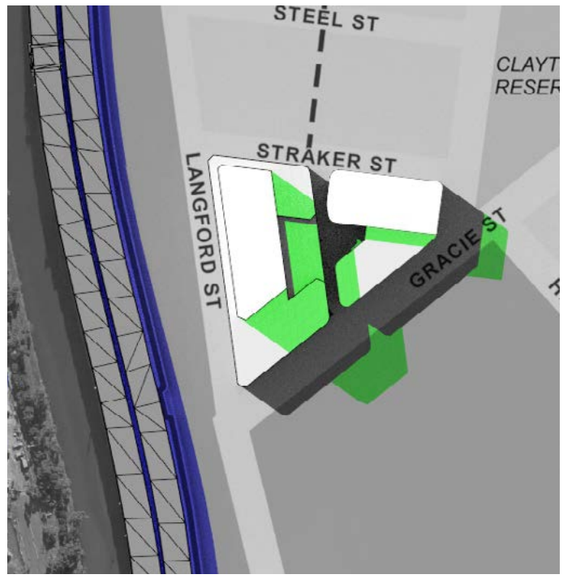
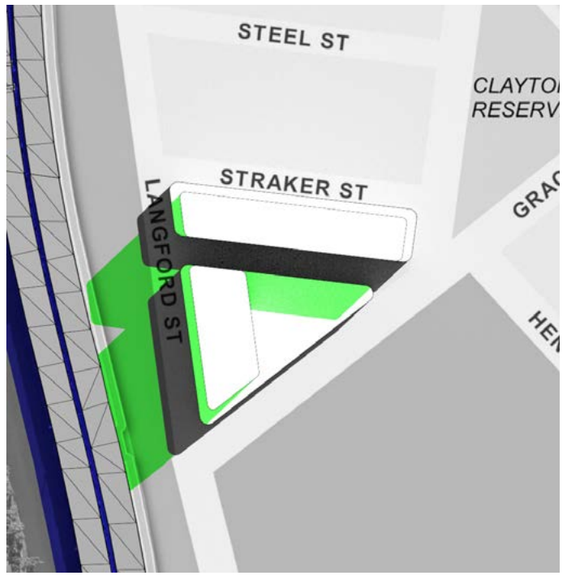


Equinox 3pm

Shadow Testings supplied by VPA

2.0 Test Site 02: Business Triangle–11,13, 15-19 Gracie St; 21 Reynolds St; 56-92 and 96 Langford St; 1 Boundary Rd, North Melbourne [including Reynolds St]

2.2 Massing and Shadow Testings – Reynolds St Retention Scheme (NOT Preferred)



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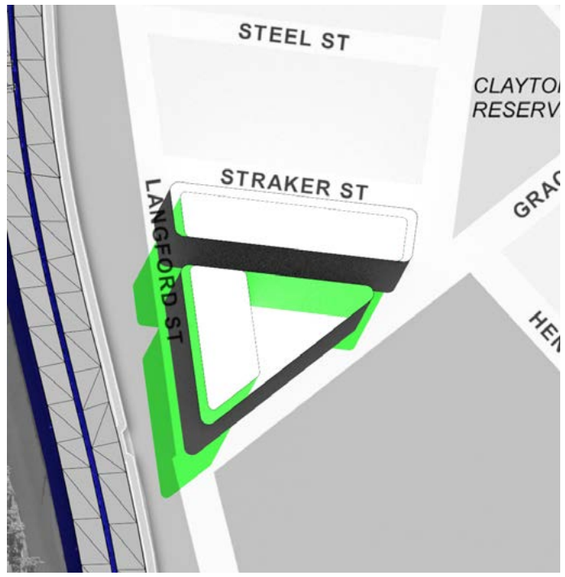

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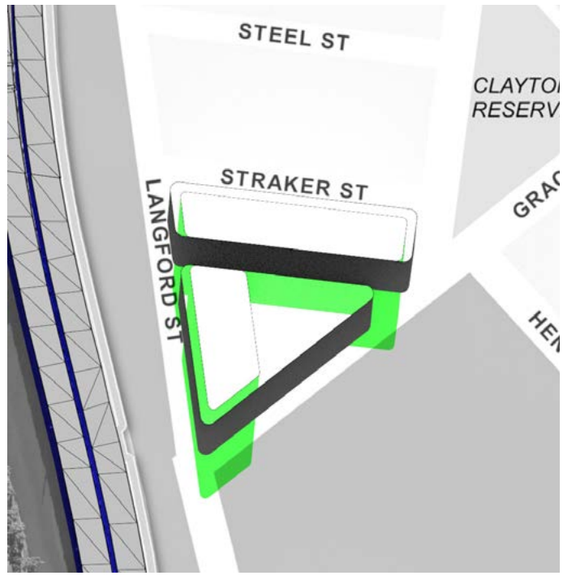

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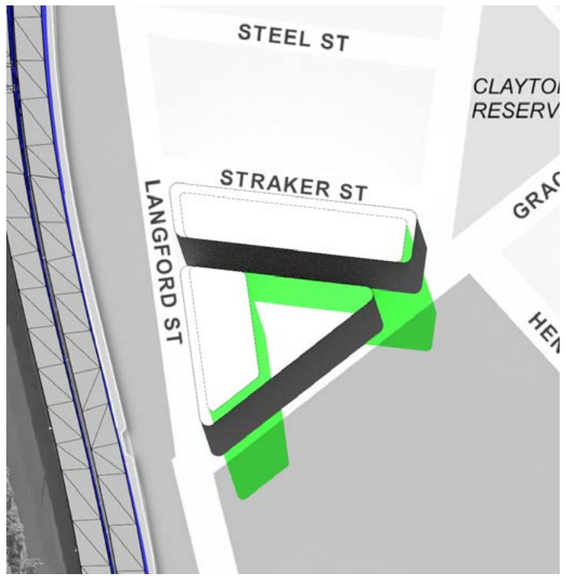

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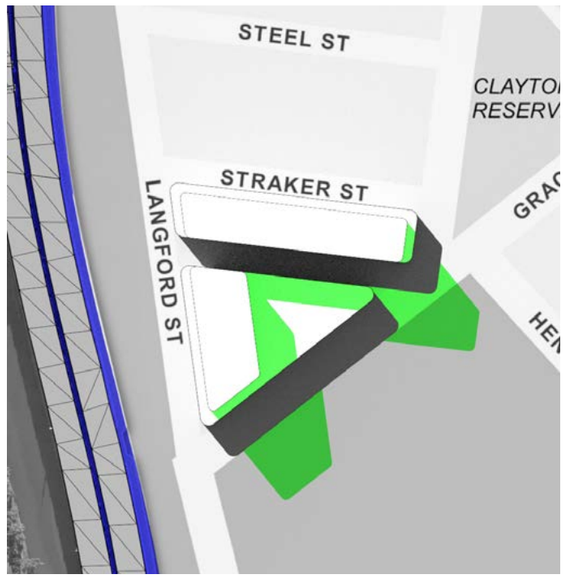

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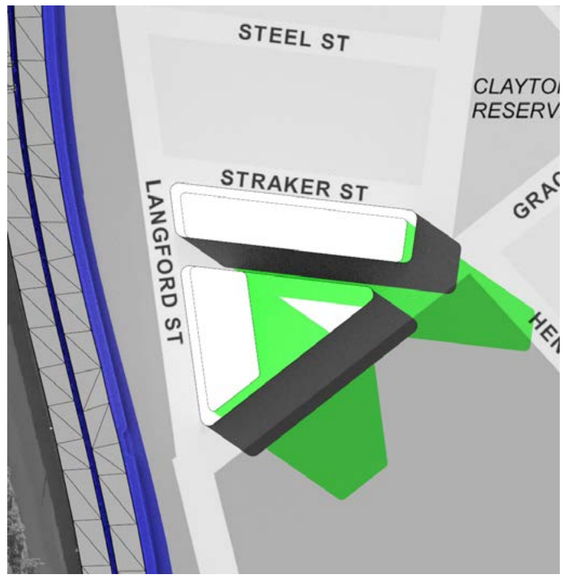
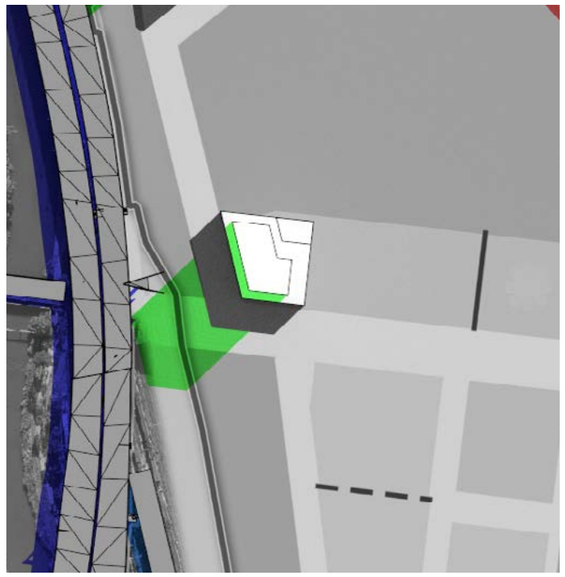


Equinox 3pm

Shadow Testings supplied by VPA

3.0 Test Site 03: 302-308 Arden Street, North Melbourne

3.1 Massing and Shadow Testings



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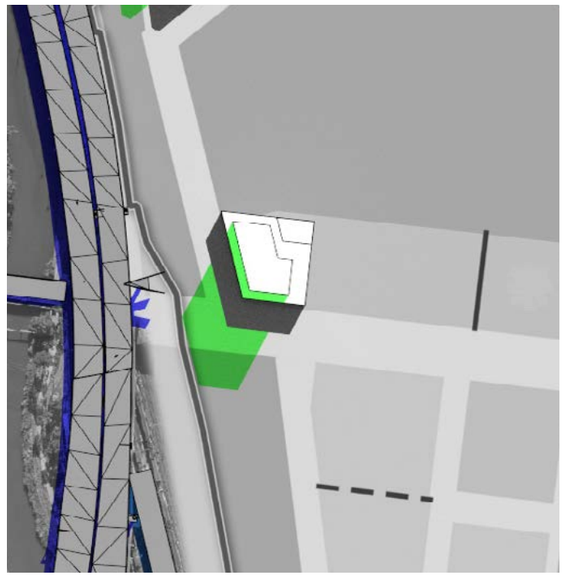

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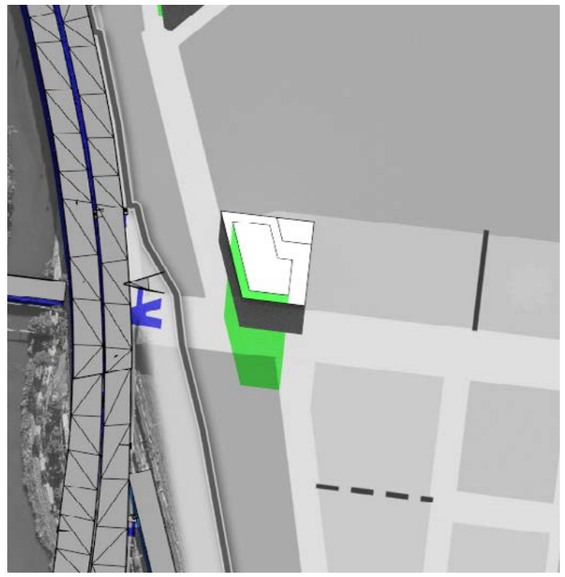

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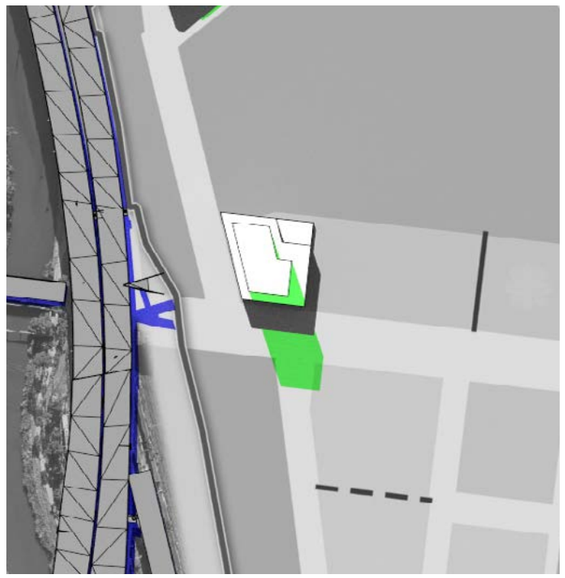

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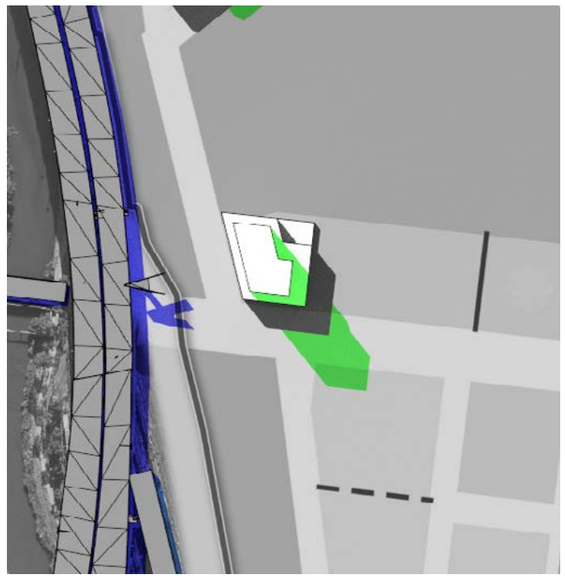

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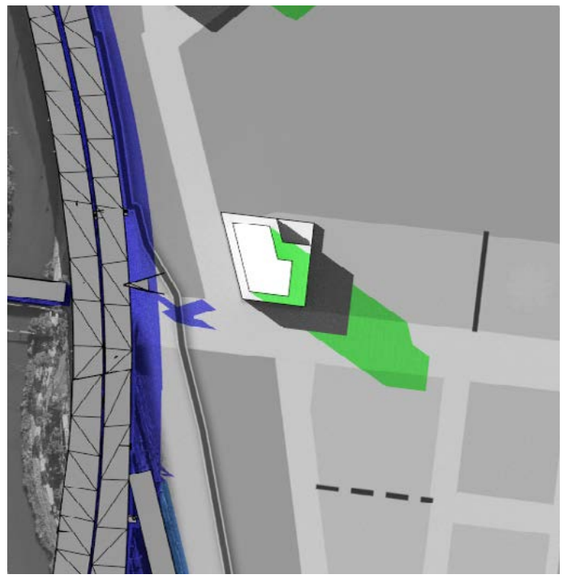
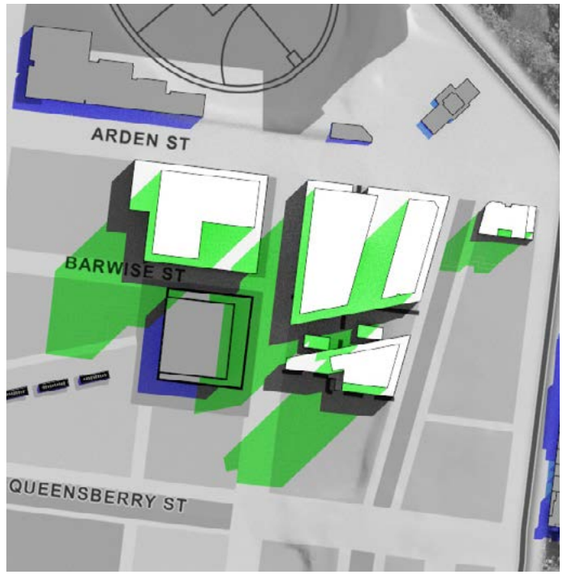


Equinox3 pm

Shadow Testings supplied by VPA

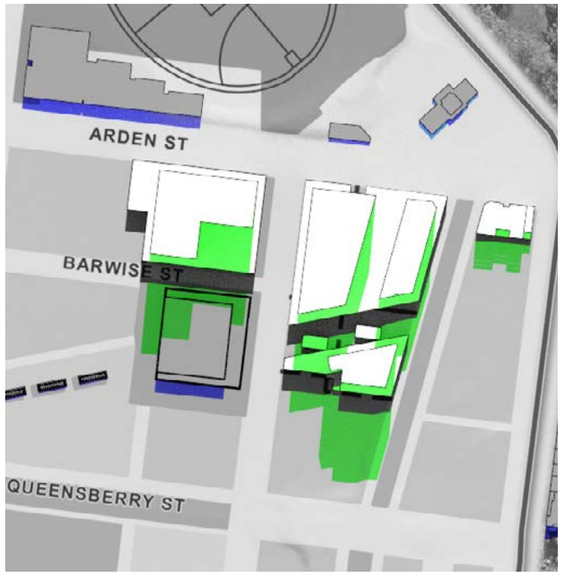
4.0 Test Site 04: 171-185 Arden St, 189-203 Arden St and 91–109 Munster Terrace, North Melbourne

4.1 Massing and Shadow Testings



Equinox 10am

Equinox 11am



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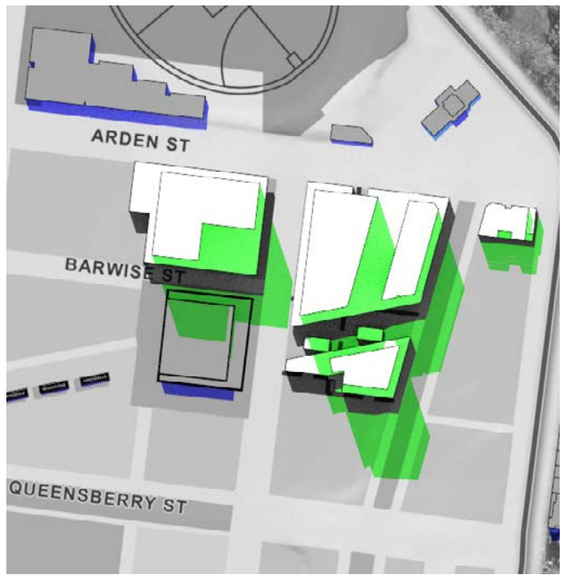

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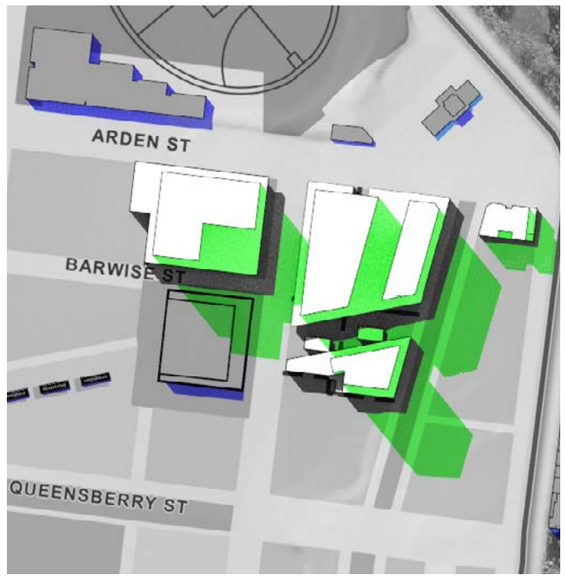

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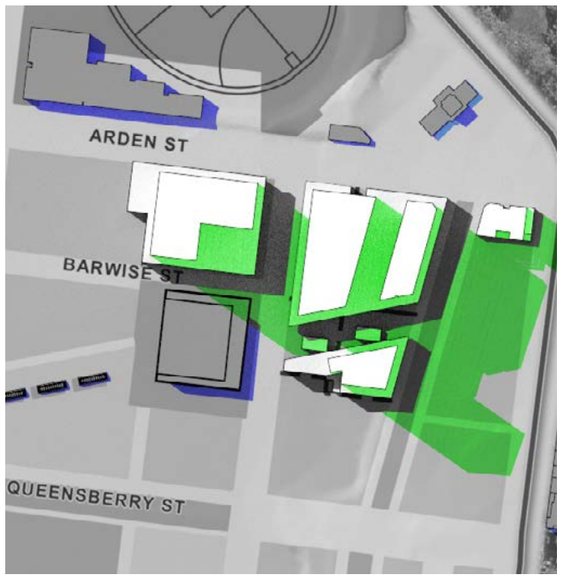
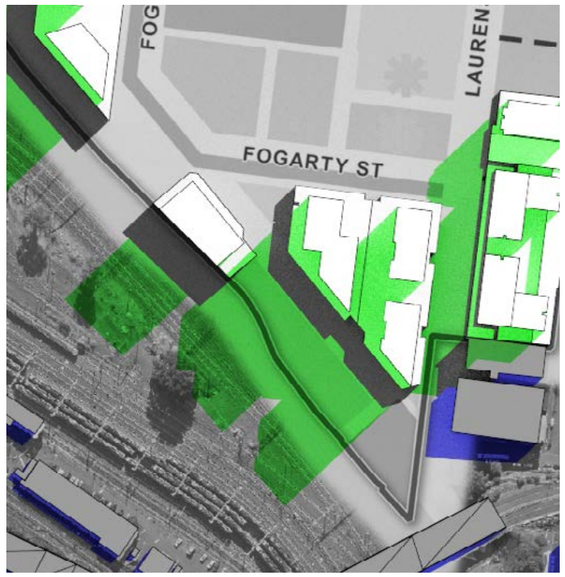


Equinox 3pm

Shadow Testings supplied by VPA

5.0 Test Site 05: 17-27, 29-47 and 49-63 Laurens Street and Test Site 07: Near Langford Street and Fogarty Street South, North Melbourne

5.1 Massing and Shadow Testings



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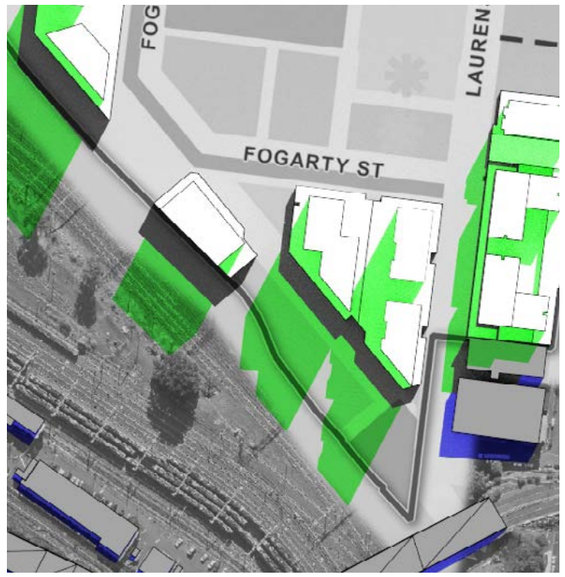
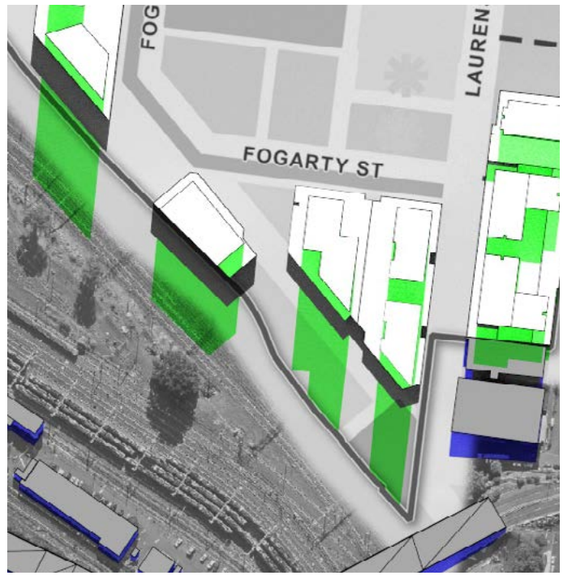


Equinox 11am



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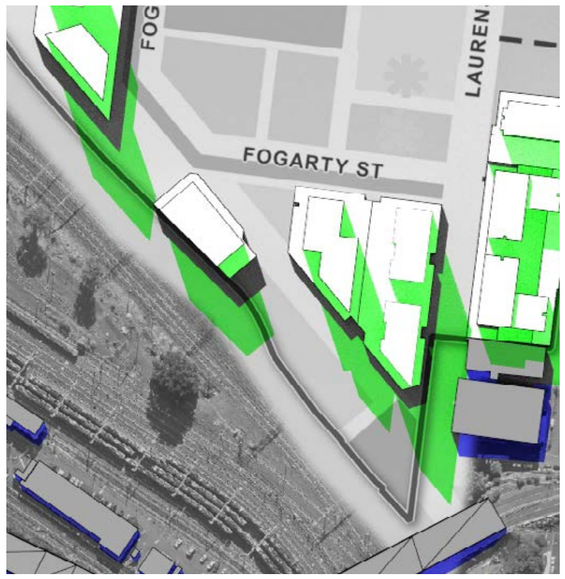

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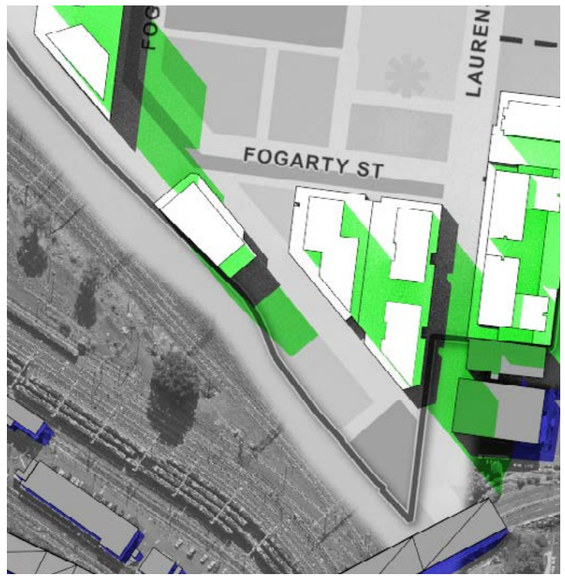

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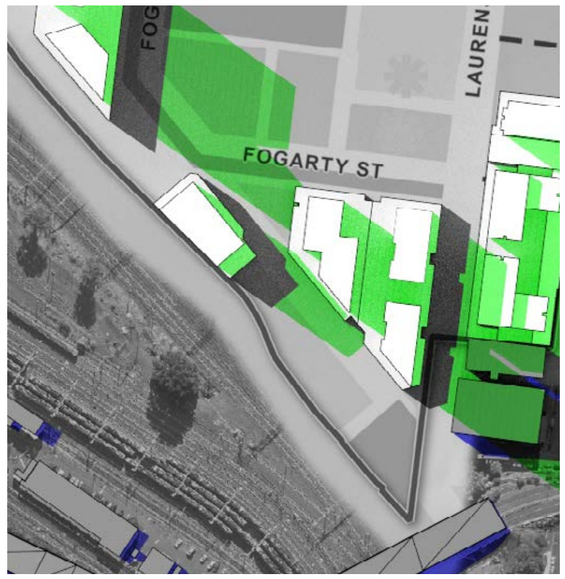
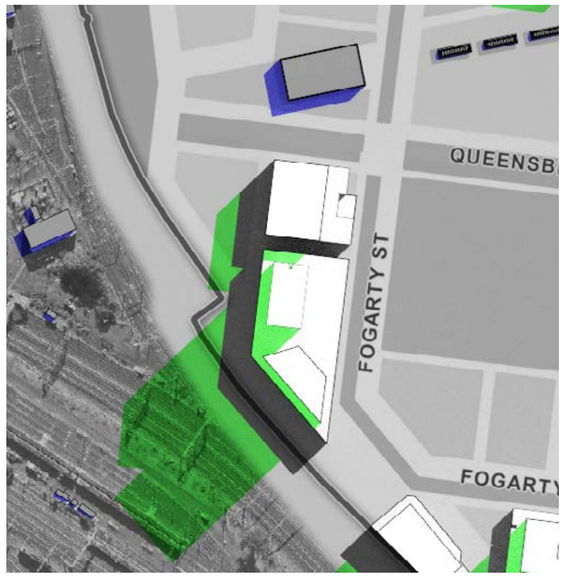


Equinox 3pm

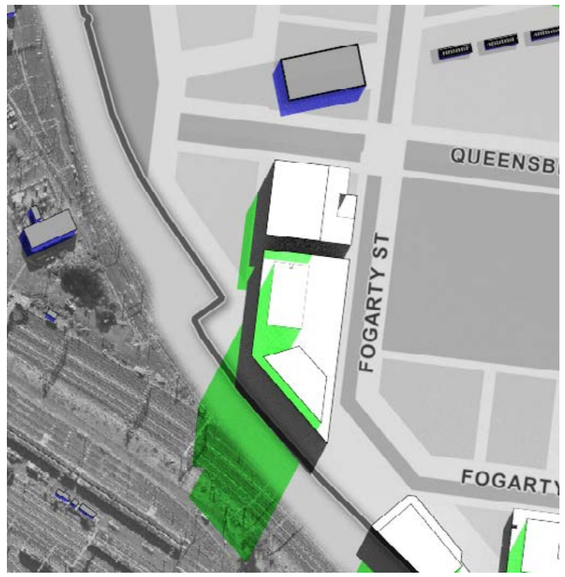
Shadow Testings supplied by VPA

6.0 Test Site 06: Lots 38 and 47 (Spatial Plan Update 2021) Near to Queensberry Street and Langford Street, North Melbourne

6.1 Massing and Shadow Testings – Equinox



Equinox 10am



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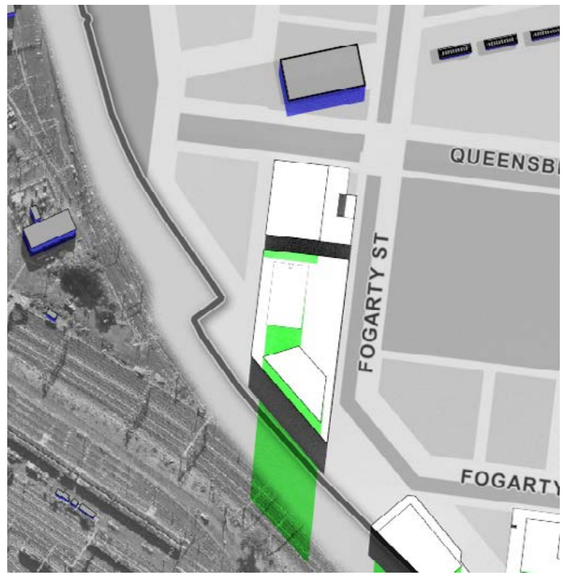
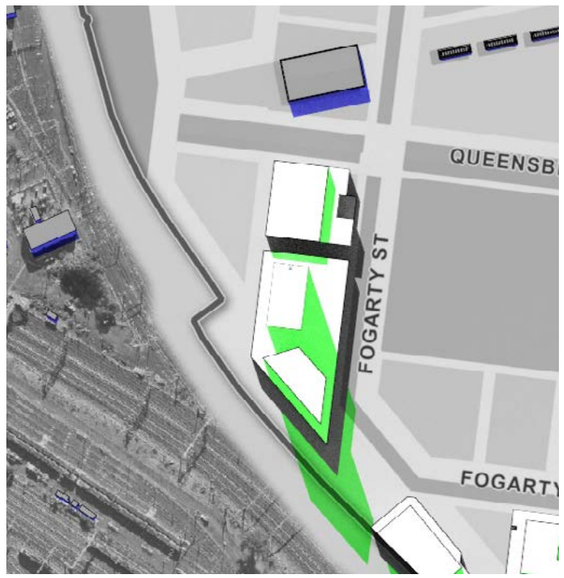
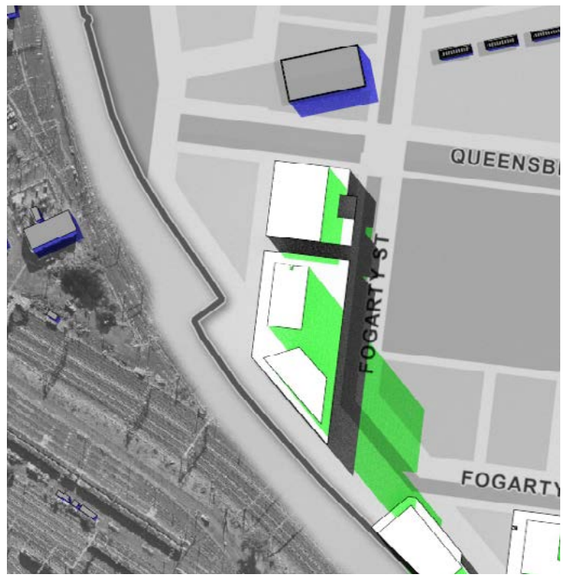


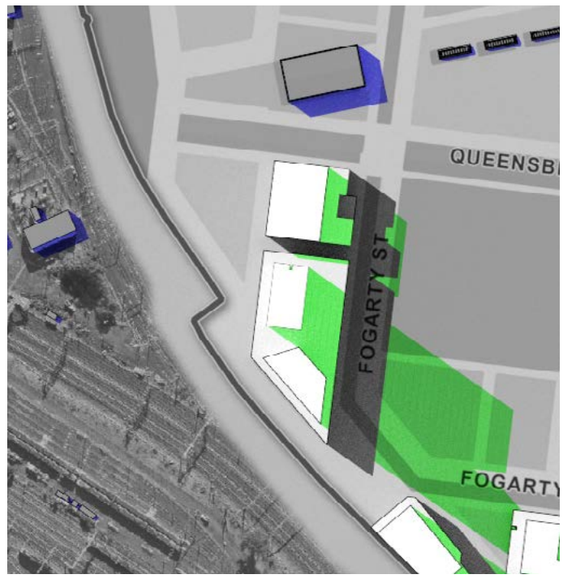
Equinox 12pm



Equinox 1pm



Equinox 2pm

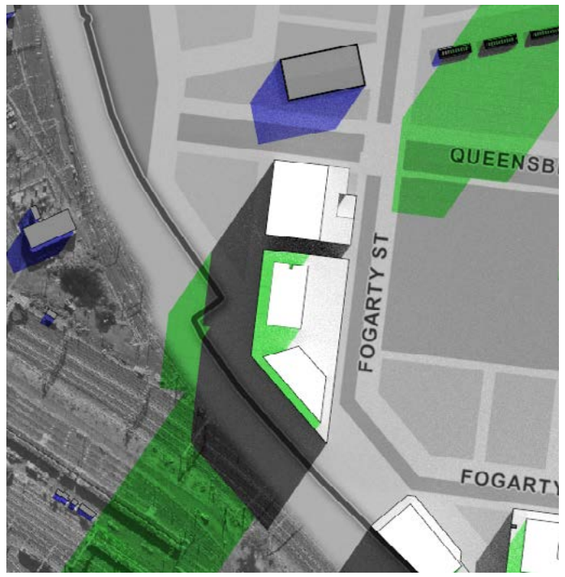


Equinox 3pm

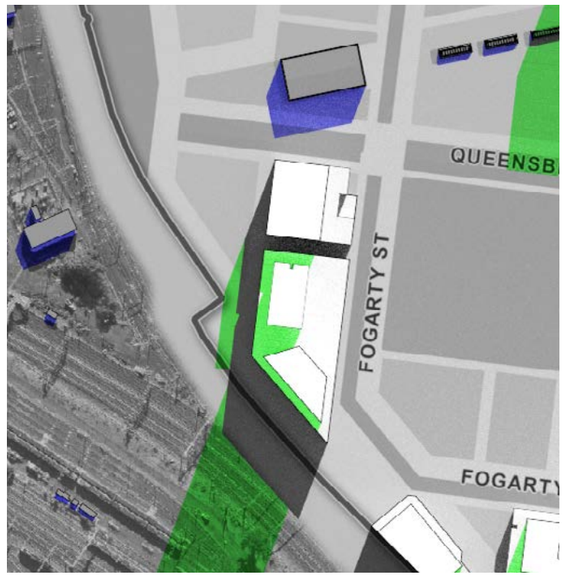
Shadow Testings supplied by VPA

6.0 Test Site 06: Lots 38 and 47 (Spatial Plan Update 2021) Near to Queensberry Street and Langford Street, North Melbourne

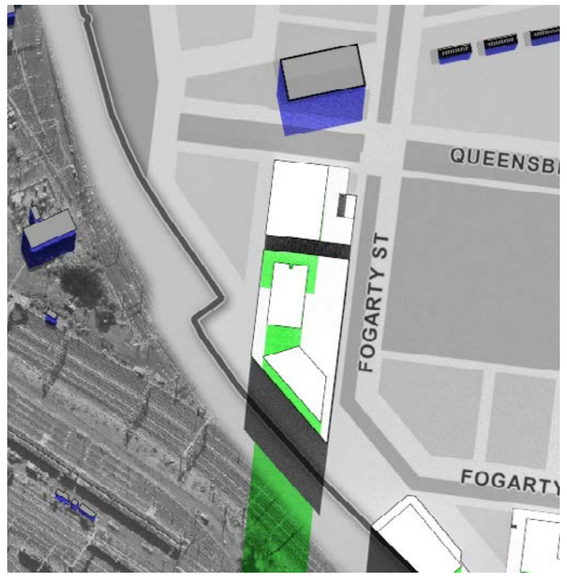
6.2 Massing and Shadow Testings – Winter Solstice Shadows against Neighbourhood Park



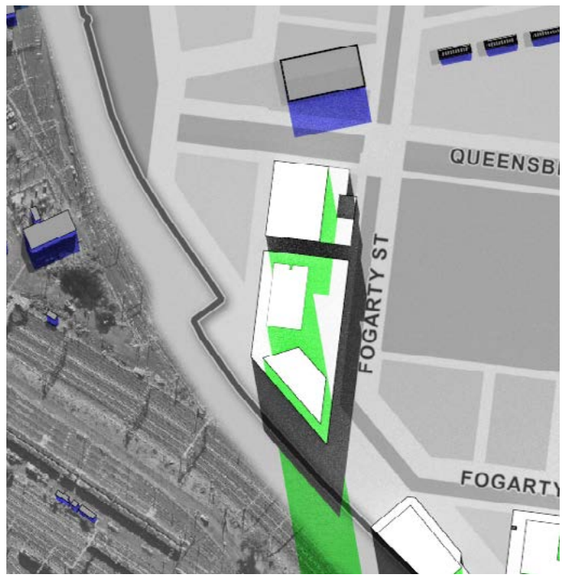
Jun Winter Solstice 10am



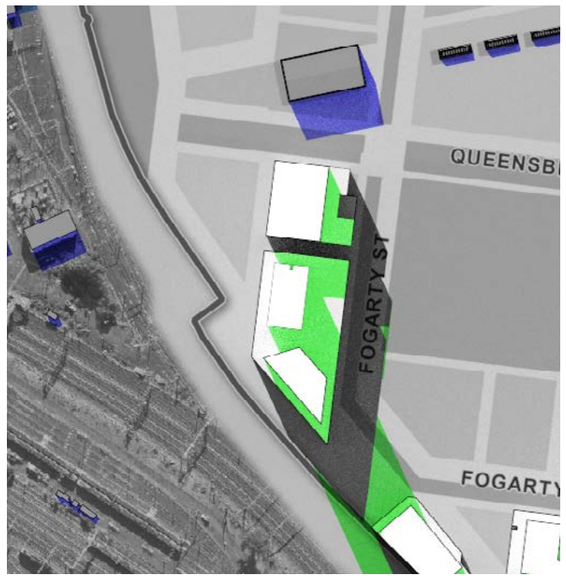
Jun Winter Solstice 11am



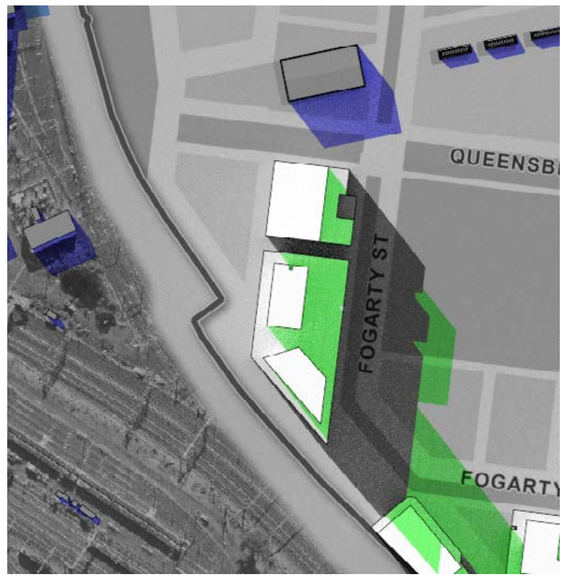
Jun Winter Solstice 12pm



Jun Winter Solstice 1pm



Jun Winter Solstice 2pm



Jun Winter Solstice 3pm

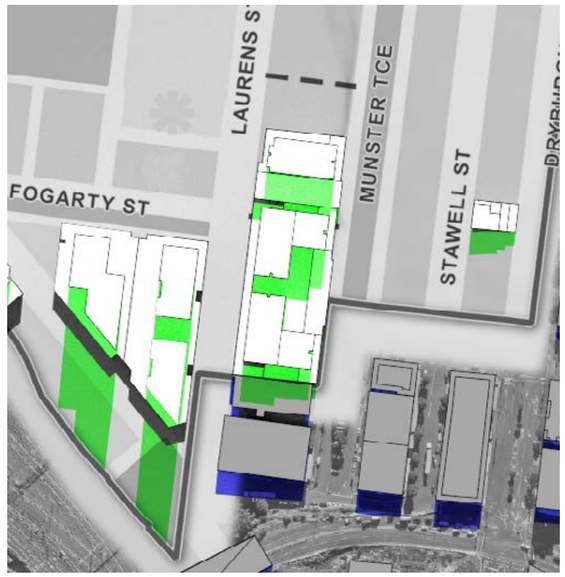
Shadow Testings supplied by VPA

7.0 Test Site 08: Weston Milling (24-78 Laurens Street), North Melbourne

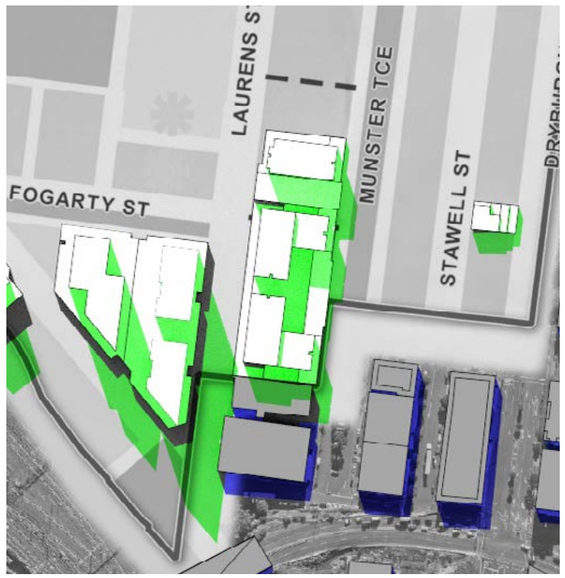
7.1 Massing and Shadow Testings

Equinox 10am

Equinox 11am

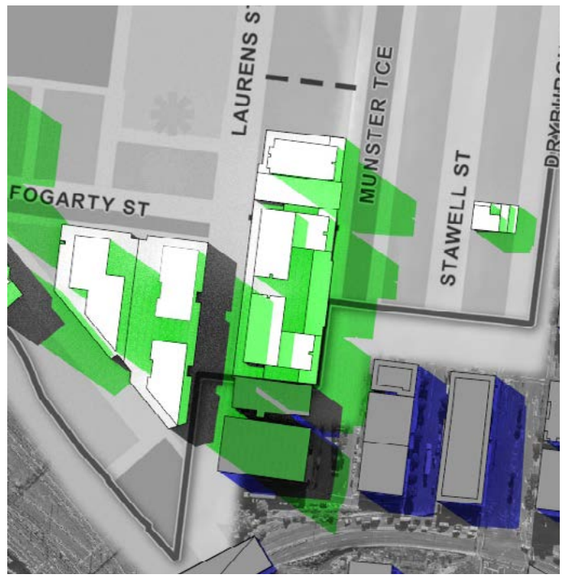


Equinox 12pm



Equinox 1pm

Equinox 2pm

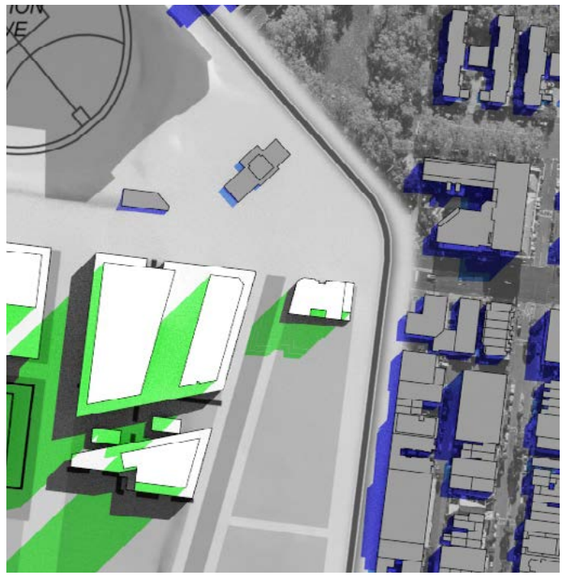


Equinox 3pm

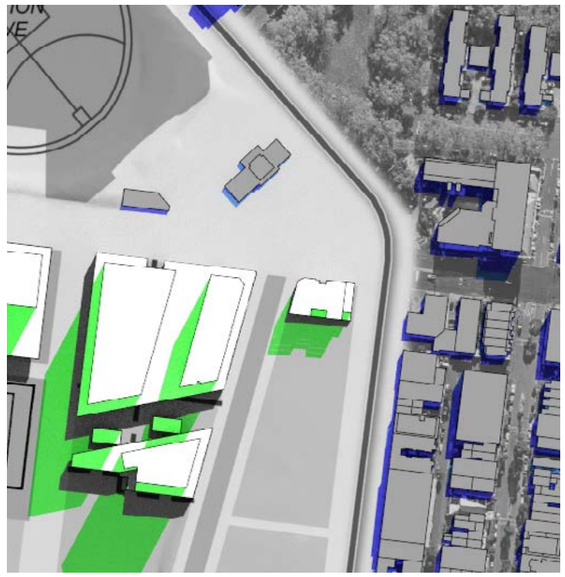
Shadow Testings supplied by VPA

8.0 Test Site 09: 161 Arden Street, North Melbourne

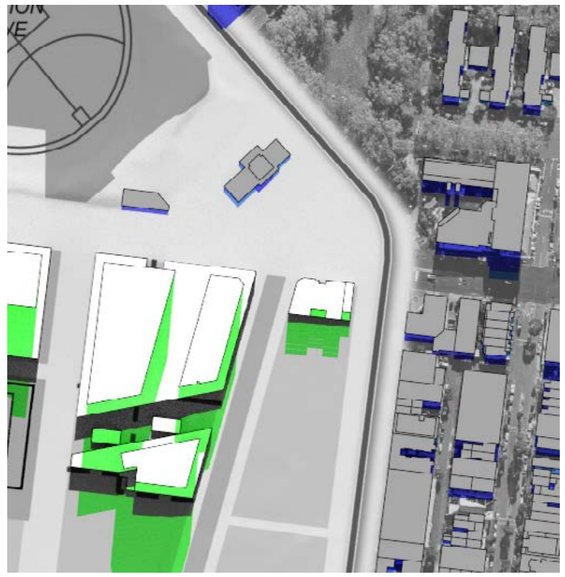
8.1 Massing and Shadow Testings



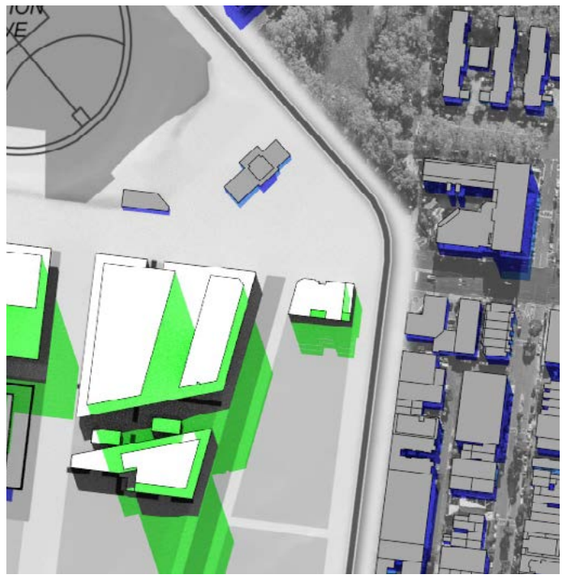
Equinox 10am



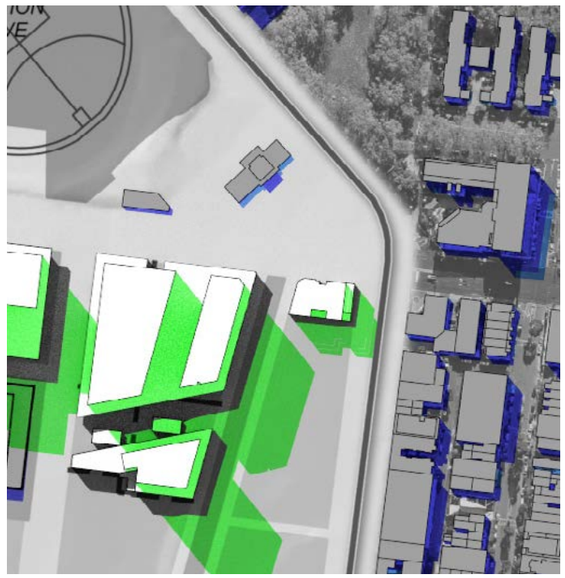
Equinox 11am



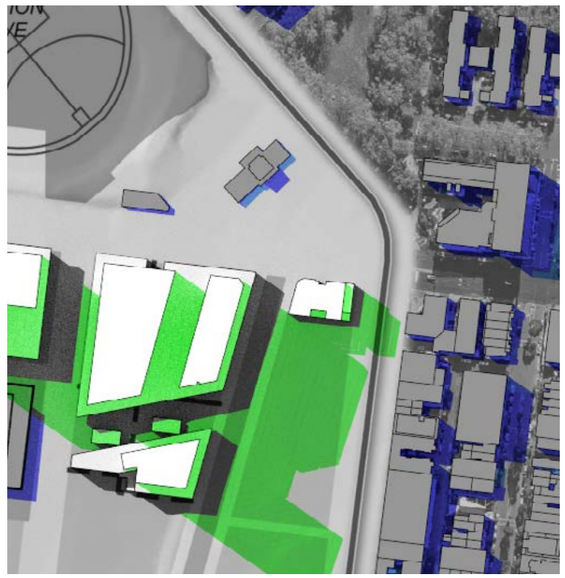
Equinox 12pm



Equinox 1pm



Equinox 2pm

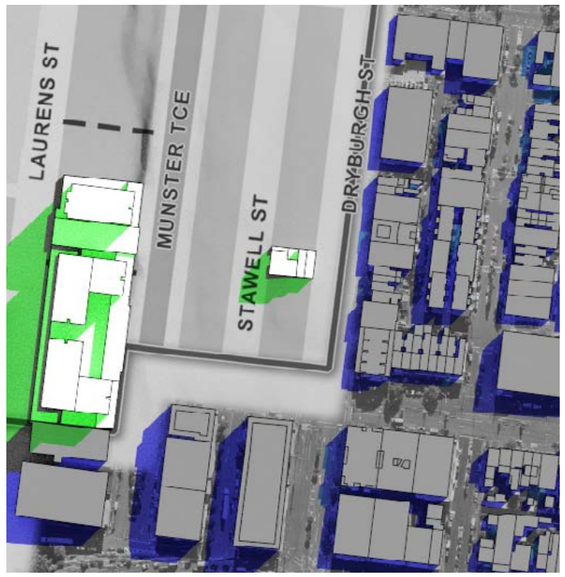


Equinox 3pm

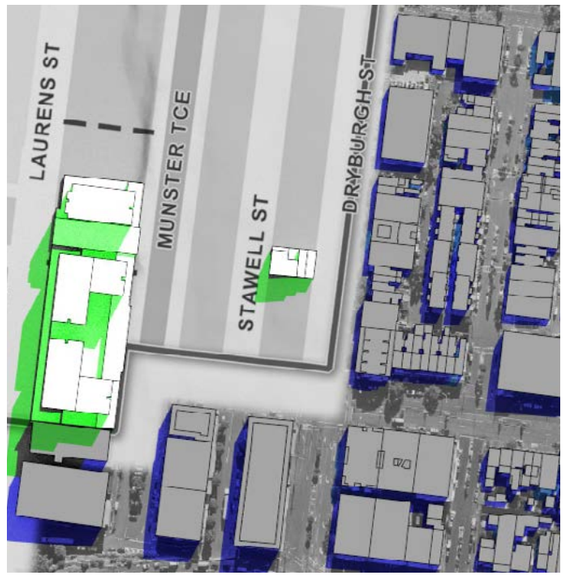
Shadow Testings supplied by VPA

9.0 Test Site 10: 113-117 Dryburgh Street, North Melbourne

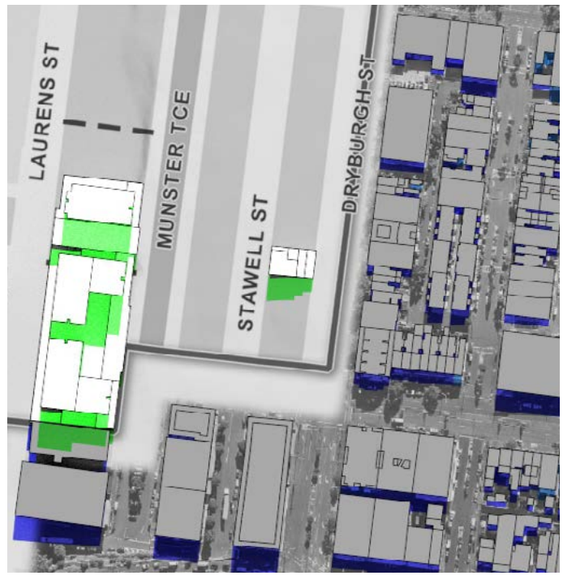
9.1 Massing and Shadow Testings



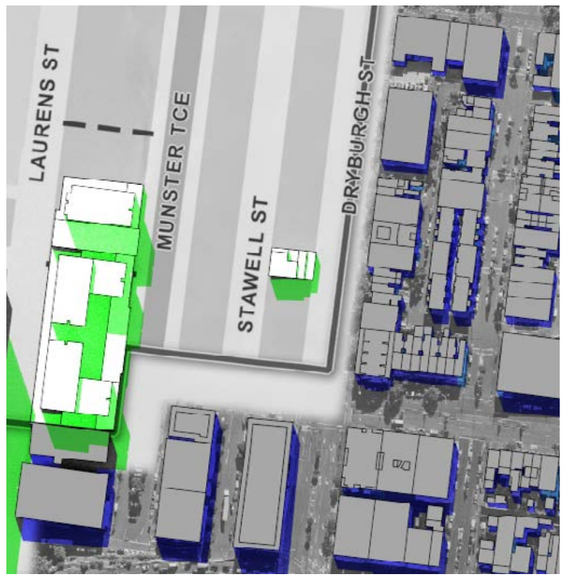
Equinox 10am



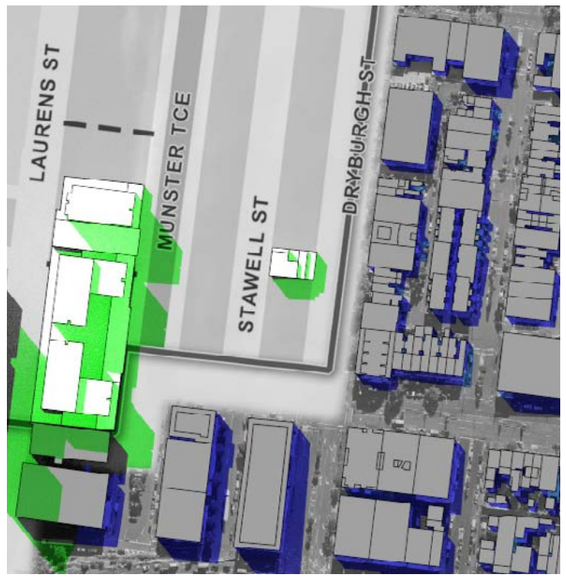
Equinox 11am



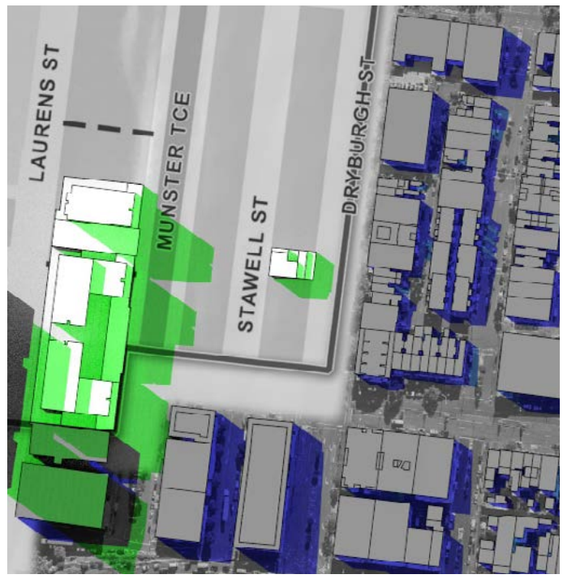
Equinox 12pm



Equinox 1pm



Equinox 2pm



Equinox 3pm

Shadow Testings supplied by VPA

The information presented herein is preliminary.

It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities.

Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor.

Floor areas shown have generally been measured using the guidelines – 'Method of Measurement for Residential Property' – published by the Property Council of Australia.

All areas and measurements shown are rounded to the nearest whole number.

All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only.

Further development of this design will require information produced by a number of specialist consultants.

This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented.

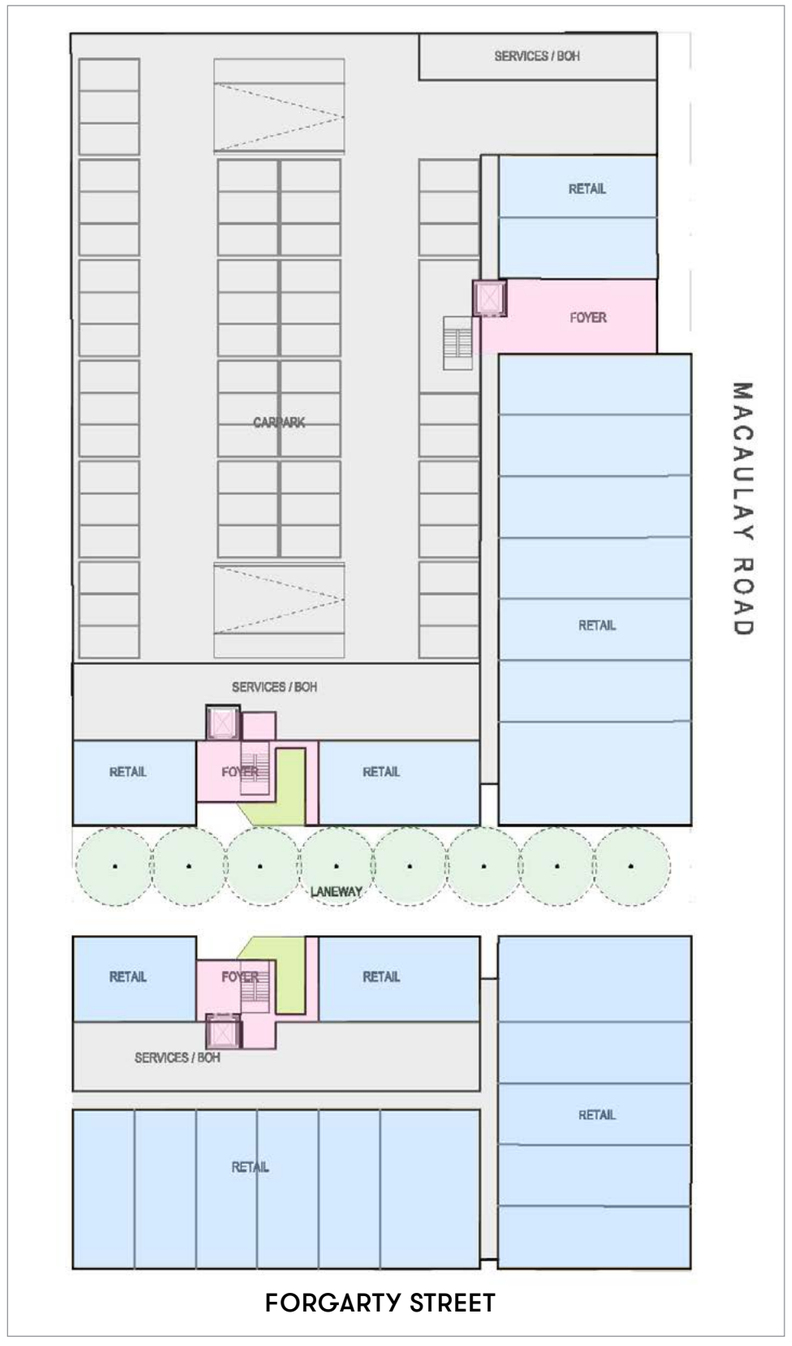
Hayball accepts no legal responsibilities for any decision, commercial or otherwise, made on the basis of the information presented.

Appendix B

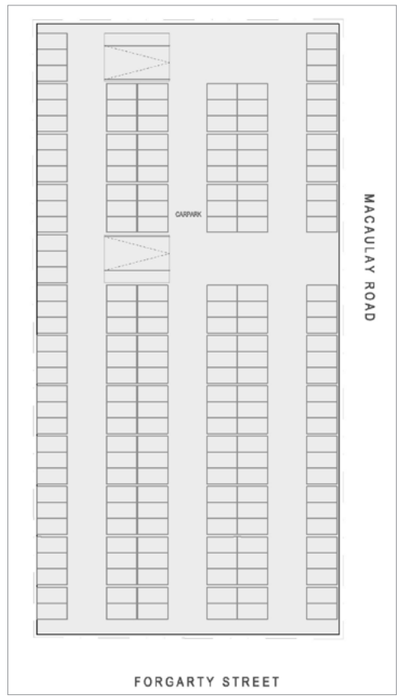
ADDITIONAL OPTIONS TESTED

1.0 Test Site 01: 135-173 Macaulay Road, North Melbourne

1.1 Plans – Option 1 showing basement and 12 storey middle tower

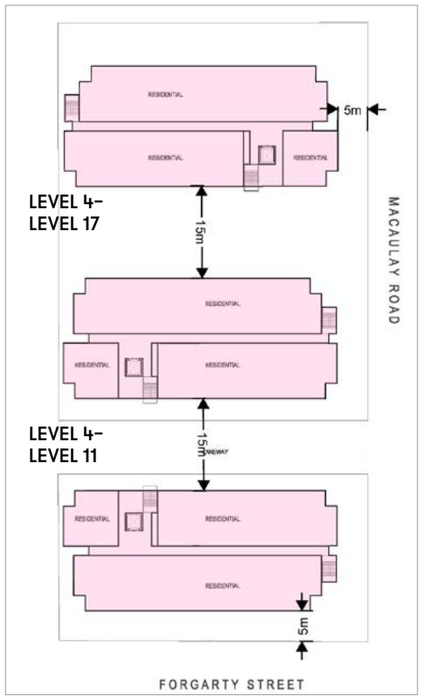


GROUND
1:500



BASEMENT
1:1000

LEVEL 1–LEVEL 3
1:1000



LEVEL 4–LEVEL 8
1:1000

Note: The tower expands further from Level 9 to Level 17

1.0 Test Site 01: 135-173 Macaulay Road, North Melbourne

1.2 Development Summary – Option 1

The information presented herein is preliminary. It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities. Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor. Floor areas shown have generally been measured using the guidelines – published by the Property Council of Australia. All areas and measurements shown are rounded to the nearest whole number. All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only. Further development of this design will require information produced by a number of specialist consultants. This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented. Hayball accepts no legal responsibilities for any decision, commercial or otherwise, made on the basis of the information presented.

ALL SITES PROPOSED DEVELOPMENT SCHEDULE

				Residential					Carpark	
Site	**GBA****	**RETAIL**	**OFFICE**	**Typical Apartment**	**GFA***	**NSA (inc P.O.S.)**	**NSA**	**Balcony*****	**CARPARK**	**CARPARK**
	m²	**NLA (m²)**	**NLA (m²)**	**Number**	**m²***	**m²**	**m²**	**m²**	**GFA (m²)**	**Spaces**
Basement	4877.9								4877.9	122
Ground	4475.0	1909.1							2058.9	51
Level 1	4614.2			23	2367.9	1894.3	1703.5	190.8	2086.9	52
Level 2	4614.2			23	2367.9	1894.3	1703.5	190.8	2086.9	52
Level 3	4614.2			23	2367.9	1894.3	1703.5	190.8	2086.9	52
Level 4	2460.00			24	2261.8	1968.0	1769.8	198.2		
Level 5	2460.00			24	2261.8	1968.0	1769.8	198.2		
Level 6	2460.00			24	2261.8	1968.0	1769.8	198.2		
Level 7	2460.00			24	2261.8	1968.0	1769.8	198.2		
Level 8	2460.00			24	2261.8	1968.0	1769.8	198.2		
Level 9	1640.0			16	1507.9	1312.0	1179.9	132.1		
Level 10	1640.0			16	1507.9	1312.0	1179.9	132.1		
Level 11	1640.0			16	1507.9	1312.0	1179.9	132.1		
Level 12	820.0			8	753.9	656.0	589.9	66.1		
Level 13	820.0			8	753.9	656.0	589.9	66.1		
Level 14	820.0			8	753.9	656.0	589.9	66.1		
Level 15	820.0			8	753.9	656.0	589.9	66.1		
Level 16	820.0			8	753.9	656.0	589.9	66.1		
Level 17	820.0			8	753.9	656.0	589.9	66.1		
TOTAL	45335.5	1909.1	0.0	**280.5**	27459.8		21038.6	2356.3	13197.5	329.9

		Parcel 8 GBA	31049.4
		Parcel 9 GBA	9408.2

Total Site Area (sqm):	5073.7	SQM	
Parcel 8 Area (sqm):	3477.1	SQM	(including half laneway width)
Parcel 9 Area (sqm):	1598.7	SQM	(including half laneway width)
Site Coverage (%):	88%		
Carpark Ratio:	1.2	(including Precinct carpark spaces)	
Carpark spaces for Residential at 0.29 ratio:	81.3	Spaces	
Carpark spaces for Precinct Carpark:	248.6	Spaces (400 earmarked for Site 1 entire block)	
Parcel 8 Floor Area Ratio:	8.9	(calculated with overall GBA including half laneway)	(Parcel 8 FAR allowed 7:1)
Parcel 9 Floor Area Ratio:	5.9	(calculated with overall GBA including half laneway)	(Parcel 9 FAR allowed 5:1)

*GFA excludes balcony area

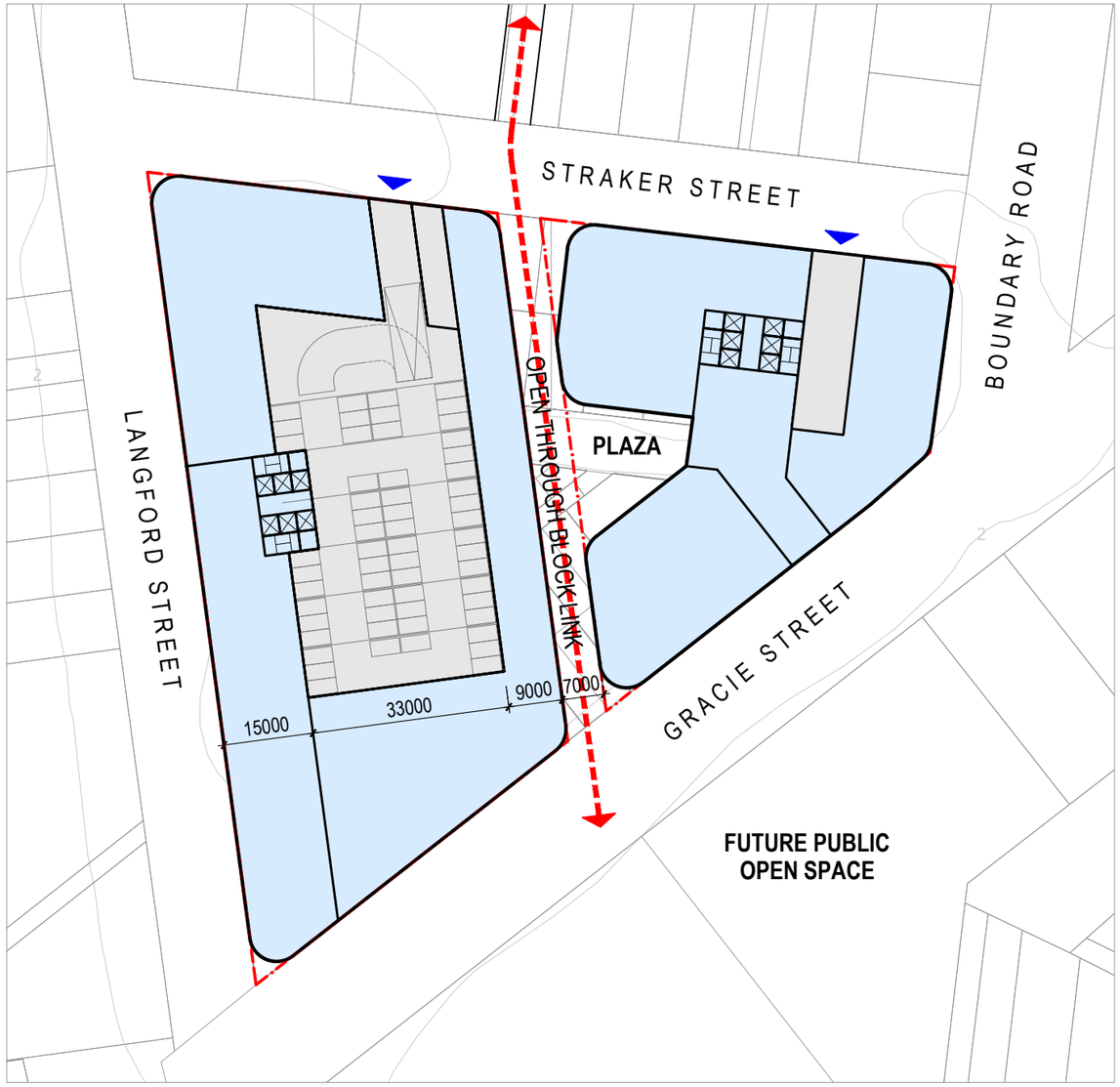
**GBA includes Balcony Area

***Based on 8sqm for 1BED&2BED and 12sqm for 3BED

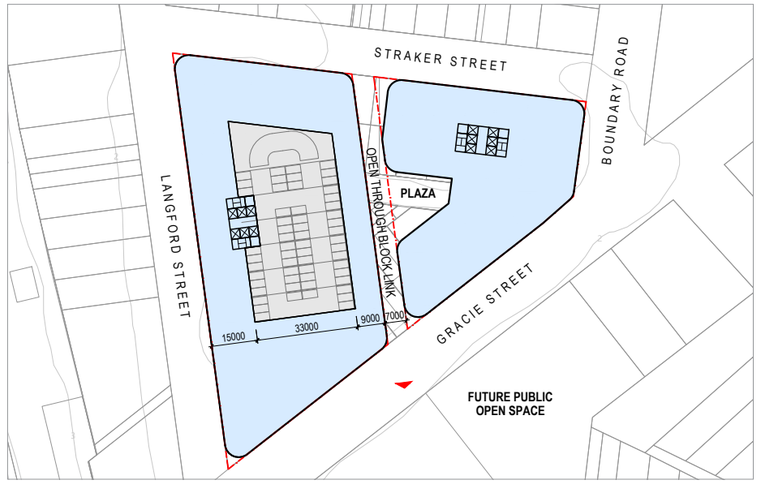
Note:

2.0 Test Site 02: Business Triangle – 11,13, 15-19 Gracie St; 21 Reynolds St; 56-92 and 96 Langford St; 1 Boundary Rd, North Melbourne [including Reynolds St]

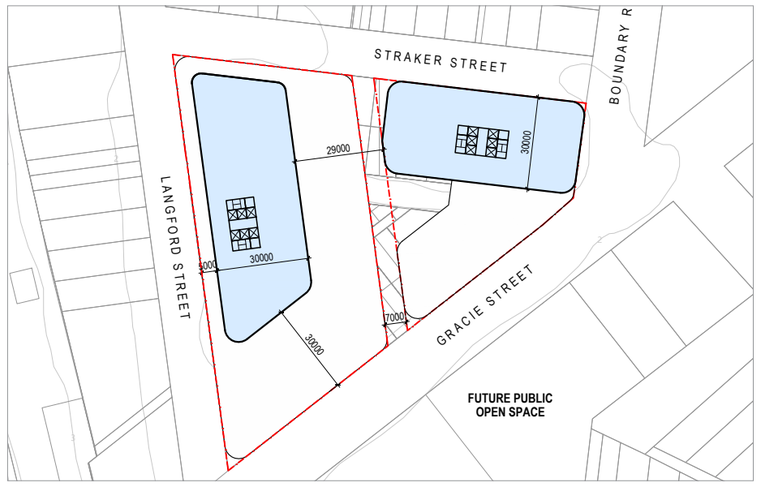
2.1 Plans – Option 1 Consolidated Sites: North-South Link Option with Smaller Eastern Tower



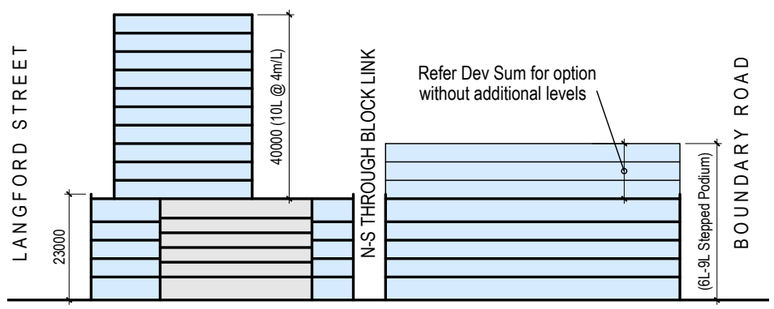
GROUND
1:1000



PODIUM
1:2000



TOWER
1:2000



SECTION

2.0 Test Site 02: Business Triangle – 11,13, 15-19 Gracie St; 21 Reynolds St; 56-92 and 96 Langford St; 1 Boundary Rd, North Melbourne [including Reynolds St]

2.2 Development Summary – Option 1

The information presented herein is preliminary. It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities. Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor. Floor areas shown have generally been measured using the guidelines – published by the Property Council of Australia. All areas and measurements shown are rounded to the nearest whole number. All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only. Further development of this design will require information produced by a number of specialist consultants. This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented. Hayball accepts no legal responsibilities for any decision, commercial or otherwise, made on the basis of the information presented.

PROPOSED DEVELOPMENT SCHEDULE

				Residential					Carpark	
Site	**GBA****	**RETAIL**	**OFFICE**	Typical Apartment n/a for Site 02	**GFA***	NSA (inc P.O.S.) n/a for Site 02	NSA n/a for Site 02	Balcony*** n/a for Site 02	**CARPARK**	**CARPARK**
	m²	**NLA (m²)**	**NLA (m²)**	Number	**m²***	m²	m²	m²	**GFA (m²)**	**Spaces**
Basement	n/a								n/a	n/a
Ground	9400	6290			9400				2000	50
Level 1	9400		6290		9400				2000	50
Level 2	9400		6290		9400				2000	50
Level 3	9400		6290		9400				2000	50
Level 4	9400		6290		9400				2000	50
Level 4a (6L Carpark in 5L Podium)	2000				2000				2000	50
Level 5	4250		3613		4250					
Level 6	4250		3613		4250					
Level 7	4250		3613		4250					
Level 8	4250		3613		4250					
Level 9	2350		1998		2350					
Level 10	2350		1998		2350					
Level 11	2350		1998		2350					
Level 12	2350		1998		2350					
Level 13	2350		1998		2350					
Level 14	2350		1998		2350					
TOTAL	80100	6290	51595	0	80100		0	0	12000	300
6 Storey East Block Option	74400									

Surplus 116 > Omit Level 4a to adopt flat plates OR Supply for other Sites

Total Site Area (sqm):	10566	SQM		
Site Coverage (%):	89%			
Carpark spaces for Commercial at 0.32 ratio:	185	Spaces		
Carpark Ratio Provided	0.52			
Floor Area Ratio:	7.6	(calculated with overall GBA including laneway)	(New Site N/A but DRAFT SP 2020 adjacent sites FAR allowed 6:1)	
Floor Area Ratio: (6 Storey East Block Option)	7.0	(calculated with overall GBA including laneway)	(New Site N/A but DRAFT SP 2020 adjacent sites FAR allowed 6:1)	

*GFA excludes balcony area

**GBA includes Balcony Area

***Based on 8sqm for 1BED&2BED and 12sqm for 3BED

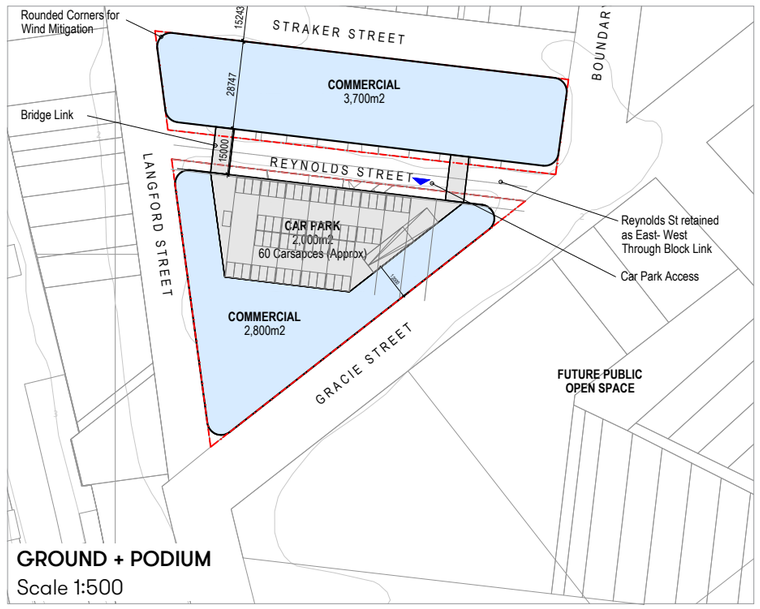
Note:

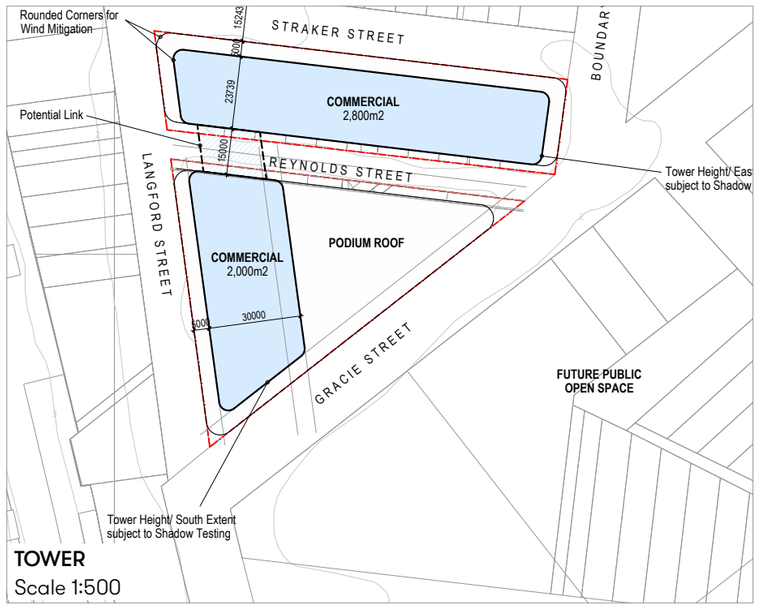
Floor Area Ratio (FAR) is defined as all gross area above Ground (excluding plant) and voids within the building which are design elements (this does not include voids associated with car stakers which feature above ground).

The FAR excludes all basement structures. It includes covered balconies.

2.0 Test Site 02: Business Triangle – 11,13, 15-19 Gracie St; 21 Reynolds St; 56-92 and 96 Langford St; 1 Boundary Rd, North Melbourne [including Reynolds St]

2.3 Plans – Option 2 Consolidated Sites and Option 3 Reynolds St Retention





Two initial options were tested as follows:

- Individual site development which is constrained to lower podium development (4 levels has been adopted) due to inefficient or zero car parking being able to be accommodated on the sites. It is noted that this height of development is lower than the street wall height of the working assumptions. Access to buildings and basement or enclosed at grade carparking is limited by flood mitigation requirements and the very small site sizes. This option was considered an underutilisation of the sites and was not tested for feasibility purposes.
- Development which retains Reynolds Street creates a large triangle of land to the south with limited potential for development beyond the street wall due to overshadowing impacts. Optimised development to the north of Reynolds St creates a fully shadowed streetscape. The limited potential for upper level commercial floor plates on the southern land parcel was considered an underutilisation of the site and this option was not tested for feasibility purposes.

NOT Adopted due to Low Development Potential

Site 2C

- 4L (16m) 'Podium' Typology
- Residential.
- GBA 1,350sqm (Above Ground)
- GFA 1,200sqm (Above Ground, Less Bal)
- NSA 800sqm (Nom 10 Apts)
- 1L Basement (Carparking) Accessed from rear laneway
- Flood Level management of rear laneway may have strong implication on Basement Car Parking. May result in sites unable to be developed.
- Roof Top Communal

Combined Sites 2A + 2B

- 4L (16m) 'Podium' Typology
- Residential.
- GBA 1,900sqm (Above Ground)
- GFA 1,730sqm (Above Ground, Less Bal)
- NSA 1,170sqm (Nom 14 Apts)
- 1L Basement (Carparking) Accessed from rear laneway
- Flood Level management of rear laneway may have strong implication on Basement Car Parking. May result in sites unable to be developed.
- Roof Top Communal

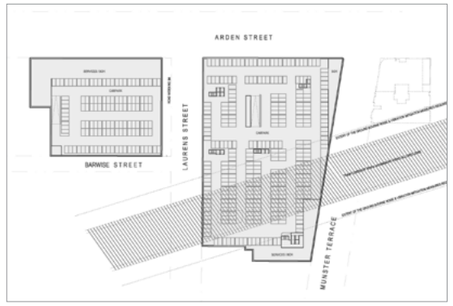
Consolidated Sites (Podium)

- 5L (23m) 5 + 3.5×4L + Transfer and Parapet
- Commercial
- Sleeved Podium Car Parking. Accessed from Reynolds St
- No Basement

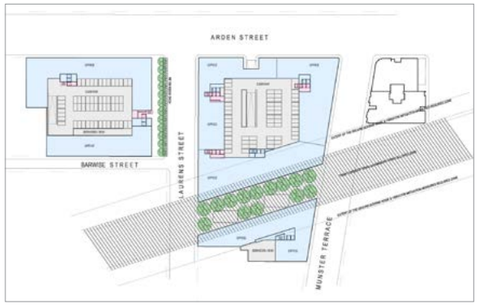
3.0 Test Site 04: 171-185 Arden St, 189-203 Arden St and 91–109 Munster Terrace, North Melbourne

3.1 Plans – Option 1 Carpark and Residential Towers Option

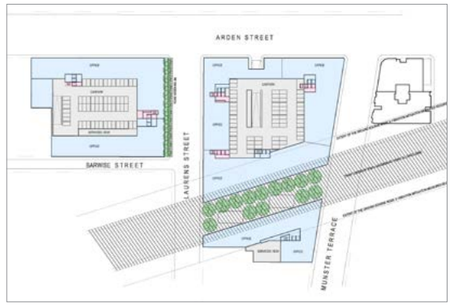
GROUND
1:1000



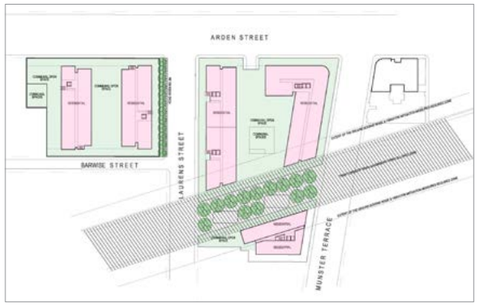
BASEMENT
1:4000



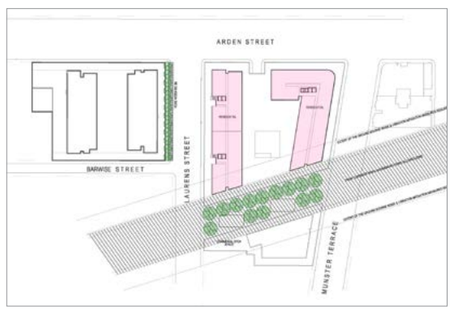
LEVEL 1 + 2
1:4000



LEVEL 3 TO 5
1:4000



LEVEL 6 TO 17
1:4000



LEVEL 18 + 19
1:4000

3.0 Test Site 04: 171-185 Arden St, 189-203 Arden St and 91–109 Munster Terrace, North Melbourne

3.2 Development Summary – Option 1

The information presented herein is preliminary. It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities. Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor. Floor areas shown have generally been measured using the guidelines – published by the Property Council of Australia. All areas and measurements shown are rounded to the nearest whole number. All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only. Further development of this design will require information produced by a number of specialist consultants. This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented. Hayball accepts no legal responsibilities for any decision, commercial or otherwise, made on the basis of the information presented.

SITE 4 171-185 Arden St, 189-203 Arden St & 91-109 Munster Terrace, North Melbourne

					Residential					Carpark	
Site	**GBA****	**COMMUNAL**	**OFFICE**	**RETAIL**	**Typical Apartment**	**GFA***	**NSA (inc P.O.S.)**	**NSA**	**Balcony*****	**CARPARK**	**CARPARK**
	m²	**NLA (m²)**	**NLA (m²)**	**NLA (m²)**	**Number**	**m²***	**m²**	**m²**	**m²**	**GFA (m²)**	**Spaces**
Basement	13740.8									13740.8	344
Ground	12185.3			5307.4						6877.9	172
Level 1	12192.6		7649.9							4542.7	114
Level 2	12192.6		7649.9							4542.7	114
Level 3	12462.8		7920.1							4542.7	114
Level 4	12462.8		7920.1							4542.7	114
Level 5	12462.8		7920.1							4542.7	114
Level 6	5998.0	454.0			58	5514.7	4798.4	4315.1	483.3		
Level 7	5998.0				58	5514.7	4798.4	4315.1	483.3		
Level 8	5998.0				58	5514.7	4798.4	4315.1	483.3		
Level 9	5998.0				58	5514.7	4798.4	4315.1	483.3		
Level 10	5998.0				58	5514.7	4798.4	4315.1	483.3		
Level 11	5998.0				58	5514.7	4798.4	4315.1	483.3		
Level 12	5998.0				58	5514.7	4798.4	4315.1	483.3		
Level 13	5998.0				58	5514.7	4798.4	4315.1	483.3		
Level 14	5998.0				58	5514.7	4798.4	4315.1	483.3		
Level 15	5998.0				58	5514.7	4798.4	4315.1	483.3		
Level 16	5998.0				58	5514.7	4798.4	4315.1	483.3		
Level 17	5998.0				58	5514.7	4798.4	4315.1	483.3		
Level 18	3137.4				30	2884.6	2509.9	2257.1	252.8		
Level 19	3137.4				30	2884.6	2509.9	2257.1	252.8		
TOTAL	165950.6	454.0	39060.2		**750.6**	71945.7		56295.5	6305.1	43332.2	1083.3

Total Site Area (sqm):	15764.7	SQM		
Lot 23 Site Area (sqm):	5272.6	SQM		
Lot 24, 25, 30 & 31 Site Area (sqm):	10492.1	SQM		
Site Coverage (%):	77%			
Carpark Ratio:	1.4			
Carpark spaces for Residential at 0.29 ratio:	217.7	Spaces		
Precinct carpark spaces available:	865.6	Spaces		
Floor Area Ratio (all parcels):	**9.7**	(Working assumption FAR 12:1 to 15:1)		
Floor Area Ratio (Lot 23):	**10.3**	Draft Structure Plan 2020 FAR 10:1	Lot 23 GBA above Ground:	54296.4 sqm
Floor Area Ratio (Lot 24, 25, 30 & 31):	**10.1**	Draft Structure Plan 2020 FAR 9:1	Lot 24,25, 30 & 31 GBA above Ground:	105761.9 sqm

*GFA excludes balcony area

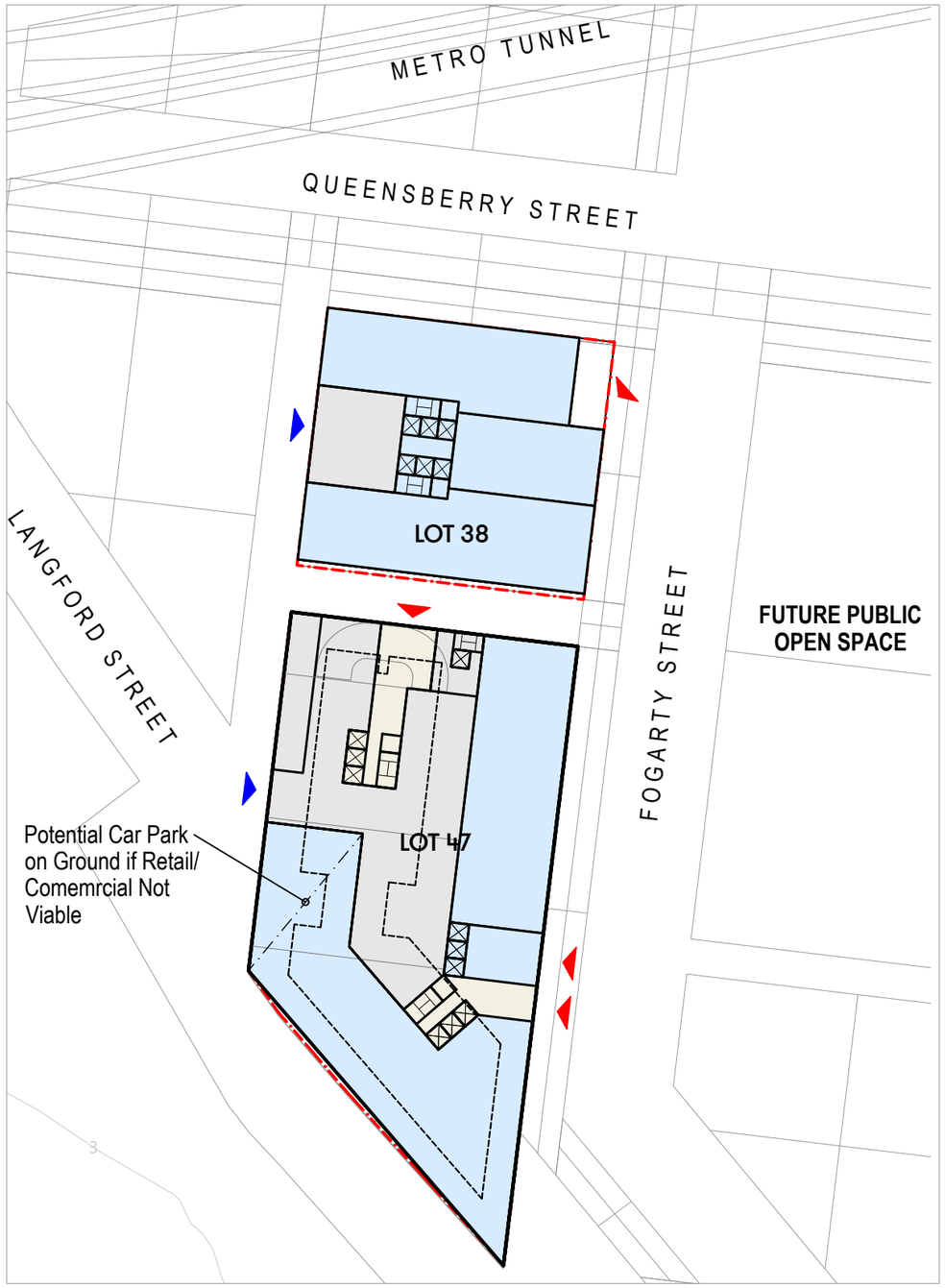
**GBA includes Balcony Area

***Based on 8sqm for 1BED&2BED and 12sqm for 3BED

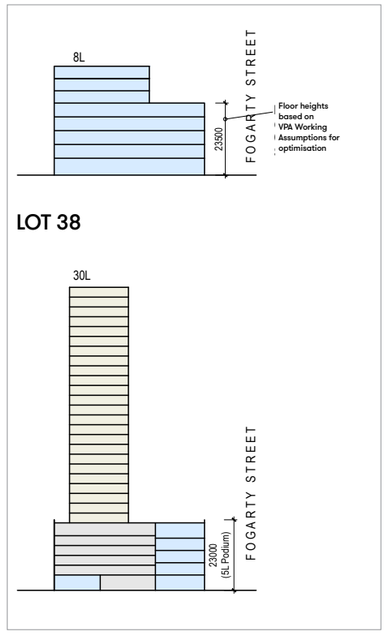
Note: Floor Area Ratio (FAR) is defined as all gross area above Ground (excluding plant) and voids within the building which are design elements (this does not include voids associated with car stakers which feature above ground). The FAR excludes all basement structures. It includes covered balconies.

4.0 Test Site 06: Lots 38 and 47 (Spatial Plan Update 2021) Near to Queensberry Street and Langford Street, North Melbourne

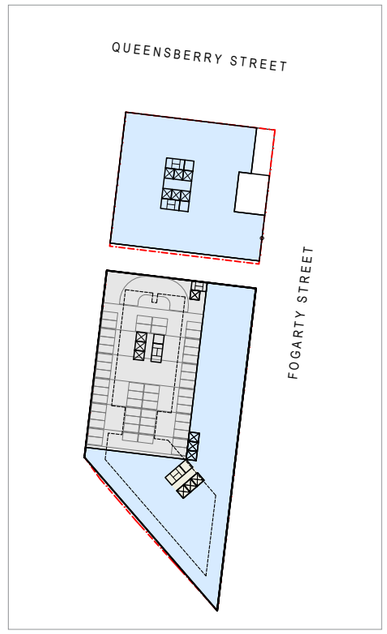
4.1 Plans – Option 1 with Lower Building on Lot 38 and Connected Tower on Lot 47



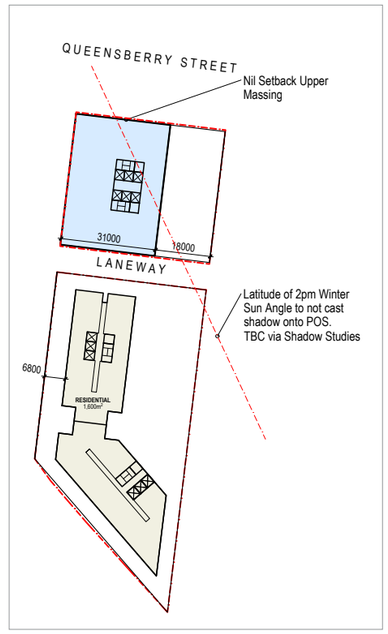
GROUND
1:1000



LOT 47



PODIUM
1:2000



TOWER
1:2000

4.0 Test Site 06: Lots 38 and 47 (Spatial Plan Update 2021) Near to Queensberry Street and Langford Street, North Melbourne

4.2 Development Summary Lot 38 – Option 1

The information presented herein is preliminary. It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities. Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor. Floor areas shown have generally been measured using the guidelines – published by the Property Council of Australia. All areas and measurements shown are rounded to the nearest whole number. All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only. Further development of this design will require information produced by a number of specialist consultants. This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented. Hayball accepts no legal responsibilities for any decision, commercial or otherwise, made on the basis of the information presented.

ALL SITES PROPOSED DEVELOPMENT SCHEDULE

				Residential					Carpark	
Site	**GBA****	**RETAIL**	**OFFICE**	**Typical Apartment**	**GFA***	**NSA (inc P.O.S.)**	**NSA**	**Balcony*****	**CARPARK**	**CARPARK**
	m²	**NLA (m²)**	**NLA (m²)**	**Number**	**m²***	**m²**	**m²**	**m²**	**GFA (m²)**	**Spaces**
Basement	n/a								n/a	
Ground	2000	1150								
Level 1	1850		1573							
Level 2	1850		1573							
Level 3	1850		1573							
Level 4	1850		1573							
Level 5	1300		1105							
Level 6	1300		1105							
Level 7	1300		1105							
TOTAL	13300	1150	9605						0	0
	Excl Basement								Shortfall 34	> May use Site 05

Total Site Area (sqm):	2156	SQM
Site Coverage (%):	93%	
Carpark Ratio:	0.32 Commercial	
Carpark spaces for Residential at 0.29 ratio:	0	Spaces
Carpark spaces for Commercial at 0.32 ratio	34	Shared with Lot 47
Floor Area Ratio:	6.2	(FAR allowed 15:1 DRAFT SP 2020; 8:1 - VPA Working Assumption for Optimisation

*GFA excludes balcony area

**GBA includes Balcony Area

***Based on 8sqm for 1BED&2BED and 12sqm for 3BED

Note:

Floor Area Ratio (FAR) is defined as all gross area above Ground (excluding plant) and voids within the building which are design elements (this does not include voids associated with car stakers which feature above ground).

The FAR excludes all basement structures. It includes covered balconies.

4.0 Test Site 06: Lots 38 and 47 (Spatial Plan Update 2021) Near to Queensberry Street and Langford Street, North Melbourne

4.3 Development Summary Lot 47 – Option 1

The information presented herein is preliminary. It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities. Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor. Floor areas shown have generally been measured using the guidelines – published by the Property Council of Australia. All areas and measurements shown are rounded to the nearest whole number. All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only. Further development of this design will require information produced by a number of specialist consultants. This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented. Hayball accepts no legal responsibilities for any decision, commercial or otherwise, made on the basis of the information presented.

base 2 4 1 5

ALL SITES PROPOSED DEVELOPMENT SCHEDULE

				Residential					Carpark	
Site	**GBA****	**RETAIL**	**OFFICE**	**Typical Apartment**	**GFA***	**NSA (inc P.O.S.)**	**NSA**	**Balcony*****	**CARPARK**	**CARPARK**
	m²	**NLA (m²)**	**NLA (m²)**	**Number**	**m²***	**m²**	**m²**	**m²**	**GFA (m²)**	**Spaces**
Basement	n/a								n/a	
Ground	4000	3496								
Level 1	4000		1785						1900	50
Level 2	4000		1785						1900	50
Level 3	4000		1785						1900	50
Level 4	4000		1785						1900	50
Level 4a (6L Carpark in 5L Podium)	1900								1900	50
Level 5 - 29 (@1,600sqm/ level)	40000			384	36777	32000	28777	3223		
TOTAL	61900	3496	7140	**384**	36777		28777	3223	9500	250
	Excl Basement								Surplus 71	> Omit Level 4a to adopt flat plates OR Supply for other Sites
									34 for Lot 38	

Total Site Area (sqm):	4127.0	SQM
Site Coverage (%):	97%	
Carpark Ratio:	0.29 Residential; 0.32 Commercial	
Carpark spaces for Residential at 0.29 ratio:	111	Required Spaces
Carpark spaces for Commercial at 0.32 ratio	34	Required Spaces
Floor Area Ratio:	15.0	(FAR allowed 15:1 DRAFT SP 2020; 14-15:1 - VPA Working Assumption for Optimisation

*GFA excludes balcony area

**GBA includes Balcony Area

***Based on 8sqm for 1BED&2BED and 12sqm for 3BED

Note:

Floor Area Ratio (FAR) is defined as all gross area above Ground (excluding plant) and voids within the building which are design elements (this does not include voids associated with car stakers which feature above ground).

The FAR excludes all basement structures. It includes covered balconies.

6.0 Test Site 07: Near Langford Street and Fogarty Street South, North Melbourne

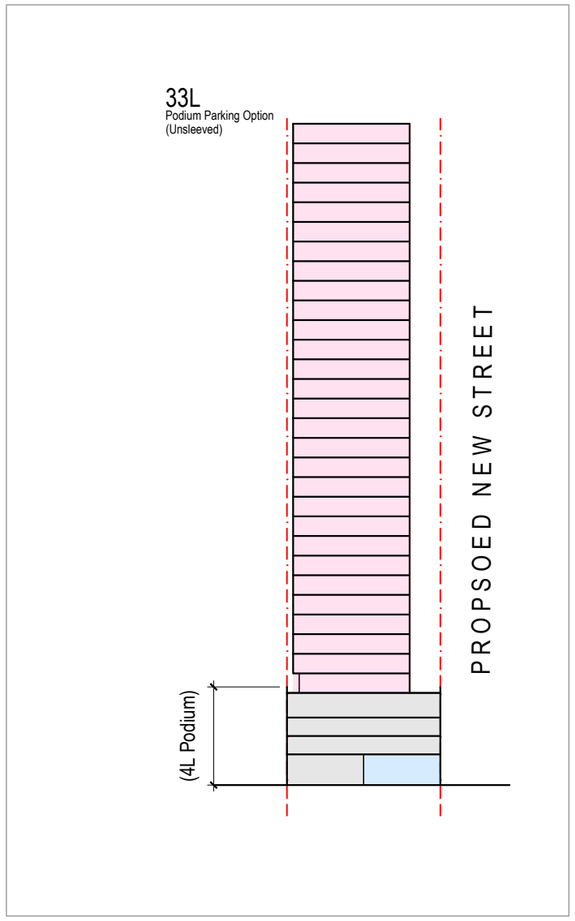
6.1 Plans – Option 2 Unsleeved Podium Carparking

— Due to the inefficiency of Option 1 basement car parking, Option 2 was developed to eliminate the basement carpark and host the required car spaces within the podium over a Commercial / Retail Ground floor.

— The Podium height earmarked in the DSP2020 is 6 levels. Working with the carpark ratio of 0.29, the number of storeys reach the maximum permissible in the working assumption before we can fill the podium 5 levels of carparks.

— Note that the un-sleeved carpark is a planning risk and results in a poor urban design outcome. The width of the site doesn't allow for a sleeved carpark.

— Option 2 yields a total of number of 33 storey residential tower including a 4 storey podium for a FAR of 21.3:1



SECTION

5.0 Test Site 07: Near Langford Street and Fogarty Street South, North Melbourne

5.1 Development Summary – Option 2

The information presented herein is preliminary. It will require further advice from a professional planning consultant and other consultants and is subject to approval from the relevant Statutory Authorities. Accurate survey information will be required from a licensed land surveyor. Any information shown to date shall be subject to confirmation by a licensed land surveyor. Floor areas shown have generally been measured using the guidelines – published by the Property Council of Australia. All areas and measurements shown are rounded to the nearest whole number. All areas shown have generally been measured from drawings produced at the yield study stage and are approximate and for illustrative purposes only. Further development of this design will require information produced by a number of specialist consultants. This information, together with other considerations, such as the requirements of relevant statutory authorities, construction tolerances and the like, and/or changes requested by the client, may result in significant changes to the information presented. Hayball accepts no legal responsibilities for any decision, commercial or otherwise, made on the basis of the information presented.

ALL SITES PROPOSED DEVELOPMENT SCHEDULE

				Residential					Carpark	
Site	**GBA****	**RETAIL**	**OFFICE**	**Typical Apartment**	**GFA***	**NSA (inc P.O.S.)**	**NSA**	**Balcony*****	**CARPARK**	**CARPARK**
	m²	**NLA (m²)**	**NLA (m²)**	**Number**	**m²***	**m²**	**m²**	**m²**	**GFA (m²)**	**Spaces**
Basement										
Ground	1590	460								
Level 1	1590								1590	25
Level 2	1590								1590	25
Level 3	1590								1590	28
Level 4 - 32 (@ 950sqm/ L)	27550			264	25330	22040	19820	2220		
TOTAL Excl Basement	33910	460	0	**264**	25330		19820	2220	4770	78

Total Site Area (sqm):	1594.0	SQM
Site Coverage (%):	100%	
Carpark Ratio:	0.29 Residential; 0.32 Retail	
Carpark spaces for Residential at 0.29 ratio:	77	Required Spaces
Carpark spaces for Commercial at 0.32 ratio:	1	Required Spaces
Floor Area Ratio:	21.3	(FAR allowed 15:1 DRAFT SP 2020; 17-22:1 - VPA Working Assumption for Optimisation

*GFA excludes balcony area

**GBA includes Balcony Area

***Based on 8sqm for 1BED&2BED and 12sqm for 3BED

Note:

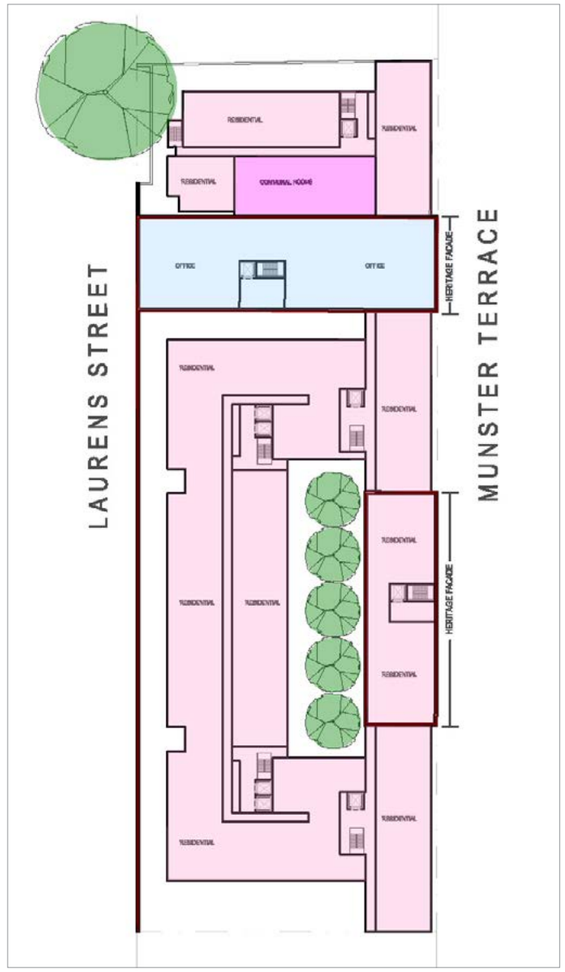
Floor Area Ratio (FAR) is defined as all gross area above Ground (excluding plant) and voids within the building which are design elements (this does not include voids associated with car stakers which feature above ground).

The FAR excludes all basement structures. It includes covered balconies.

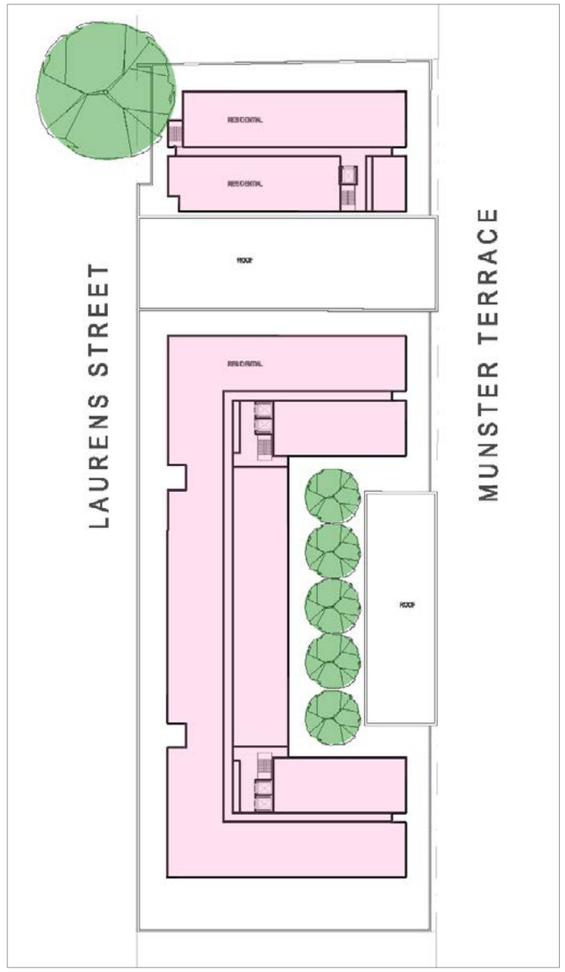
7.0 Test Site 08: Weston Milling (24-78 Laurens Street), North Melbourne

7.1 Plans – Option 1 with Precinct Carpark and Connecting Towers

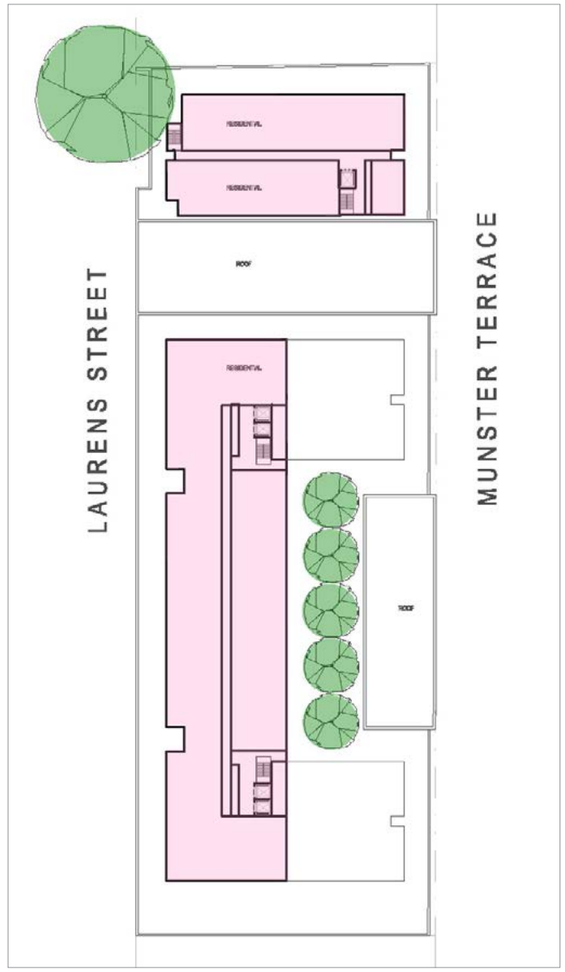
GROUND + LEVEL 1
1:1000



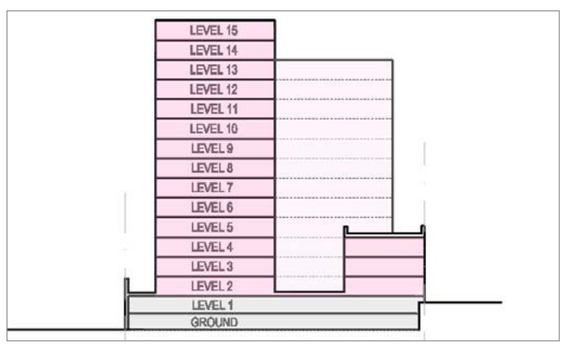
LEVEL 2, 3 + 4
1:1000



LEVEL 5 TO 13
1:1000



LEVEL 14 + 15
1:1000



SECTION

6.0 Test Site 08: Weston Milling (24-78 Laurens Street), North Melbourne

6.2 Development Summary – Option 1

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SITE 8 24-78 Laurens Street, North Melbourne

				Residential					Carpark	
Site	**GBA****	**COMMUNAL**	**OFFICE**	**Typical Apartment**	**GFA***	**NSA (inc P.O.S.)**	**NSA**	**Balcony*****	**CARPARK**	**CARPARK**
	m²	**NLA (m²)**	**NLA (m²)**	**Number**	**m²***	**m²**	**m²**	**m²**	**GFA (m²)**	**Spaces**
Basement										
Ground	4916.2		638.4						4277.8	107
Level 1	4916.2		638.4						4277.8	107
Level 2	4850.1	221.9	646.0	38	3982.2	3185.8	2864.9	320.9		0
Level 3	4850.1	221.9	646.0	38	3982.2	3185.8	2864.9	320.9		0
Level 4	4850.1	221.9	646.0	47	3982.2	3880.1	3489.3	390.8		
Level 5	3179.2			30	2923.0	2543.4	2287.2	256.2		
Level 6	3179.2			30	2923.0	2543.4	2287.2	256.2		
Level 7	3179.2			30	2923.0	2543.4	2287.2	256.2		
Level 8	3179.2			30	2923.0	2543.4	2287.2	256.2		
Level 9	3179.2			30	2923.0	2543.4	2287.2	256.2		
Level 10	3179.2			30	2923.0	2543.4	2287.2	256.2		
Level 11	3179.2			30	2923.0	2543.4	2287.2	256.2		
Level 12	3179.2			30	2923.0	2543.4	2287.2	256.2		
Level 13	3179.2			30	2923.0	2543.4	2287.2	256.2		
Level 14	2438.5			23	2242.0	1950.8	1754.3	196.5		
Level 15	2438.5			23	2242.0	1950.8	1754.3	196.5		
TOTAL	57872.4	665.7	3214.7	**444.2**	42737.9		33312.4	3731.0	8555.6	213.9

Total Site Area (sqm):	6914.3	SQM
Site Coverage (%):	71%	
Carpark Ratio:	0.5	
Carpark spaces for Residential at 0.29 ratio:	128.8	Spaces
Floor Area Ratio:	8.4	(FAR allowed 7:1)

*GFA excludes balcony area

**GBA includes Balcony Area

***Based on 8sqm for 1BED&2BED and 12sqm for 3BED

Note:

Floor Area Ratio (FAR) is defined as all gross area above Ground (excluding plant) and voids within the building which are design elements (this does not include voids associated with car stakers which feature above ground).

The FAR excludes all basement structures. It includes covered balconies.

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