

**BUILDING MODELLING AND
ANALYSIS FOR AMENDMENTS
TO SEPP (Exempt and Complying
Development Codes) 2008
PART 5A INDUSTRIAL**

**FOR THE DEPARTMENT OF
PLANNING, INDUSTRY AND
ENVIRONMENT**

**14/1/21
BENNETT AND TRIMBLE**

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EXECUTIVE SUMMARY

PURPOSE

The Department of Planning, Industry and Environment (DPIE) is undertaking an assessment of proposed amendments to the SEPP (Exempt and Complying Development Codes) 2008, in particular Part 5A Commercial and Industrial Buildings (new Buildings and Additions) Code.

The purpose of this report is to analyse and illustrate potential impacts of particular proposed amendments to the SEPP, and to assist DPIE in determining appropriate amendments to the existing controls.

SOURCES

- State Environmental Planning Policy (Exempt and Complying Development Codes) 2008
- Information Sheet 5.2 New Industrial Buildings and Additions to Commercial and Industrial Buildings Jan 2015
- ePlanning Spatial Viewer <https://www.planningportal.nsw.gov.au>
- Nearmap
- Google Streetview

SCOPE

The Scope of this report is to analyse and assess proposed changes to the following clauses of the SEPP:

5A.7 Maximum gross floor area
5A.9 Maximum height
5A.11 Setbacks of development from side and rear boundaries

Proposed Changes:

5A.7 Maximum gross floor area

- An increase in the maximum permissible GFA from 20,000m² to 30-50,000m²

5A.9 Maximum height

- An increase of the base height limit (where there is no existing LEP height limit) from 15m to 17m
- A new 45m Maximum Height for buildings between 10,000m² - 50,000m² GFA subject to separation controls

5A.11 Setbacks of development from side and rear boundaries

- New separation controls for heights between 17m-45m for buildings between 10,000m² - 50,000m² GFA

STUDY LIMITATIONS

This report is intended to be an objective assessment based on a diagrammatic analysis of the proposed SEPP amendments as described in the Scope. Other changes to the SEPP may be proposed by DPIE but are outside the scope of this report.

Broad and typical scenarios have been tested and are not an exhaustive assessment of possible scenarios. There will likely be cases where

Visual impact assessment requires qualitative (subjective) judgements to be made. The visual assessment process aims to be objective and to describe any differences between options factually.

METHODOLOGY

In order to determine appropriate impacts from the proposed amendments to the SEPP the following methodology has been followed:

1. Establish existing controls
2. Establish methodology for testing amendments
3. Determine Scenarios to be tested
4. Test Scenarios against criteria

1. Establish existing controls
The SEPP clauses and controls relevant to this study have been described and drawn to illustrate the current permissible development envelopes.

2. Establish Methodology
The proposed amendments will have potential impacts on adjoining residential lots primarily through a visual impact and solar access.

The methodology for testing the Visual Impact and overshadowing are is outlined in detail on the "45m Height Control Methodology" page.

3. Determine Scenarios to be tested
Prepare scenarios that demonstrate a range of impacts from zero impact, to greater impact. Prepare Scenarios that capture outlier cases, for example sloping sites, and larger footprints.

4. Test Scenarios against criteria
Test scenarios for their visual and solar impact.

KEY FINDINGS

5A.7 Maximum gross floor area

- An increase in the maximum permissible GFA from 20,000m² to 30-50,000m²

Comment:

- Provided setback and separation controls remain consistent, the visual impact in **terms of height** will be similar regardless of area.
- The visual impact in terms of overall massing will be likely higher as buildings 2.5x larger than currently permissible will most likely grow in width as well as depth. As such it is likely a larger building will present a longer facade to the boundary.

DPIE should consider:

- the likelihood of 30,000- 50,000m² sites without a height limit being located a adjacent a residential zone,
- the relative impact given the large setbacks and separation controls proposed

5A.9 Maximum height (17m)

- An increase of the base height limit (where there is no existing LEP height limit) from 15m to 17m

Comment:

- DPIE should consider the benefits provided by the additional height against the solar and visual impact on residential properties.

5A.9 Maximum height (45m)
5A.11 Setbacks of development from side and rear boundaries

- A new 45m Maximum Height for buildings between 10,000m² - 50,000m² GFA subject to separation controls
- New separation controls for heights between 17m-45m for buildings between 10,000m² - 50,000m² GFA

Comment:

- Scenarios 2 and 3 should be considered as the range of separation from residential lots.
- A Separation of 150m from 45m Envelope to a residential lot boundary (Scenario 2) provides a balance of increased development opportunity with minor visual impacts.
- A Separation of 125m from 45m Envelope to a residential lot boundary (Scenario 3) shows the extent to where the visual impact is becoming more significant.

TYPICAL LOCATIONS

The proposed amendments will be applicable across a range of urban environments, orientations, and boundary conditions across NSW.

Locations from metropolitan Sydney and regional centres have been selected to illustrate a range of situations.

- The locations fulfil the following criteria:
- An Industrial Zone adjoins a Residential Zone along a shared boundary
 - Industrial Lots adjoin Residential Lots
 - There is no height limit on the Industrial Zoned area

ZONING OVERLAY

IN1

IN2

IN3

IN4

INDUSTRIAL ZONING CATEGORIES

R1

R2

R3

R4

R5

RESIDENTIAL ZONING CATEGORIES

ILLUSTRATIVE RELATIONSHIP BETWEEN RESIDENTIAL ZONES AND INDUSTRIAL ZONES

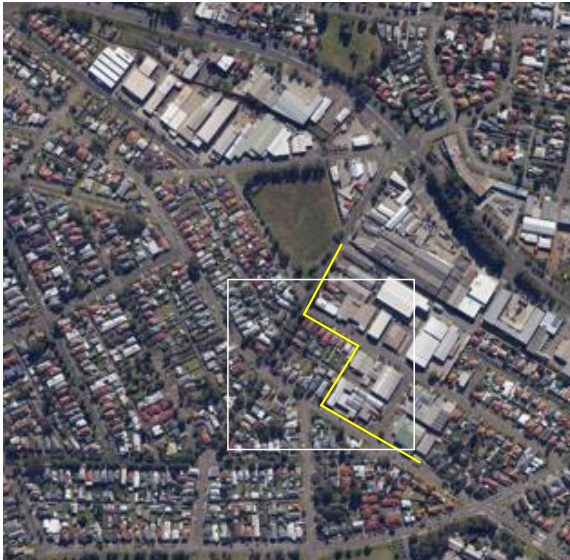
LIDCOMBE, SYDNEY



GREYSTANES, SYDNEY



NEW LAMBTON, NEWCASTLE



BATHURST



MAXIMUM GFA - NEW BUILDING

PART 5A.7
Maximum gross floor area
(1) If the development is a new building, the total gross floor area of the completed buildings on the site must not be more than 20,000m²

An example location (Prestons, Sydney) has been selected to show the relative scale of large footprint industrial buildings relative to other industrial types as well as nearby residential lots.

The maximum permissible GFA for a Complying Industrial building under Part 5A is 20,000m²

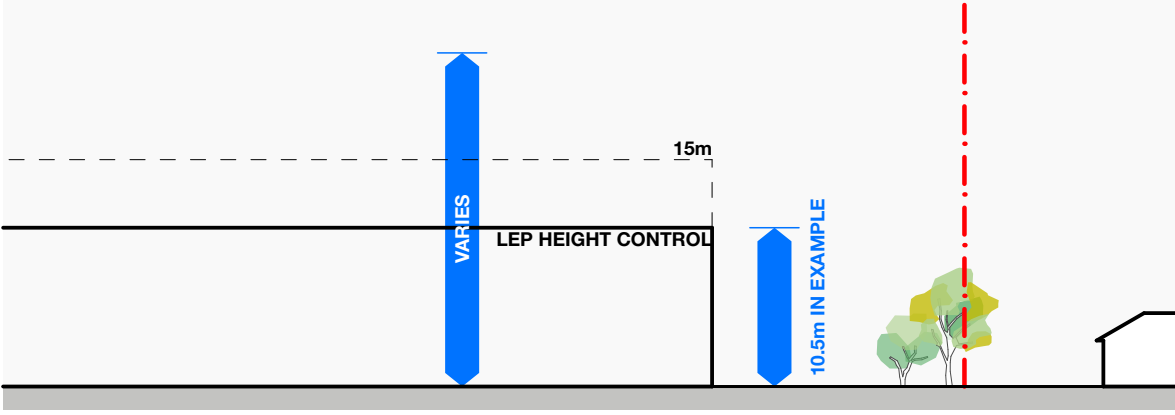


MAXIMUM HEIGHT

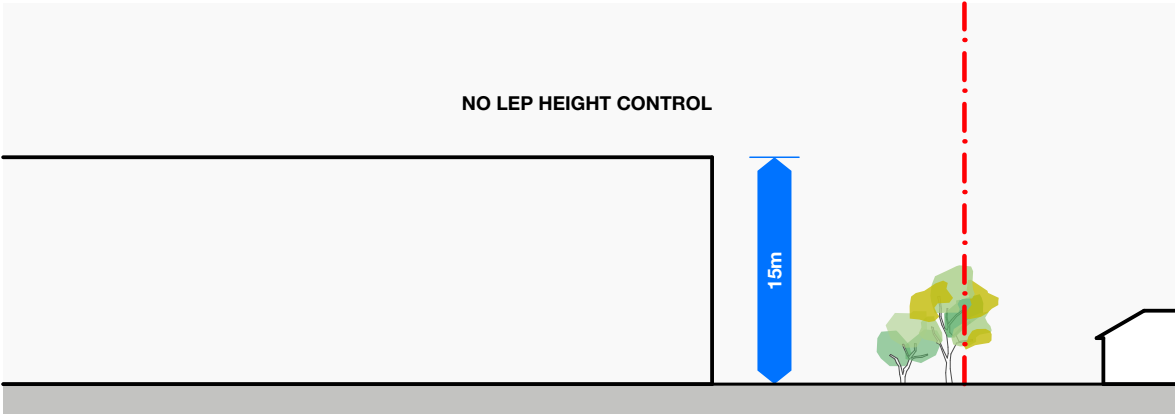

1:500

- PART 5A.9**
MAXIMUM HEIGHT
- (1) *The maximum height of a new building must not be more than—*
- (a) *the maximum height applicable to the land on which the building is erected under another environmental planning instrument applying to the land, or*
 - (b) *if there is no such applicable maximum height—15m.*
- (2) *The maximum height of an existing building that is being altered or added to must not be more than—*
- (a) *the maximum height applicable to the land on which the building is erected under another environmental planning instrument applying to the land, or*
 - (b) *if there is no such applicable maximum height—the height of the existing building or 15m, whichever is the lesser.*

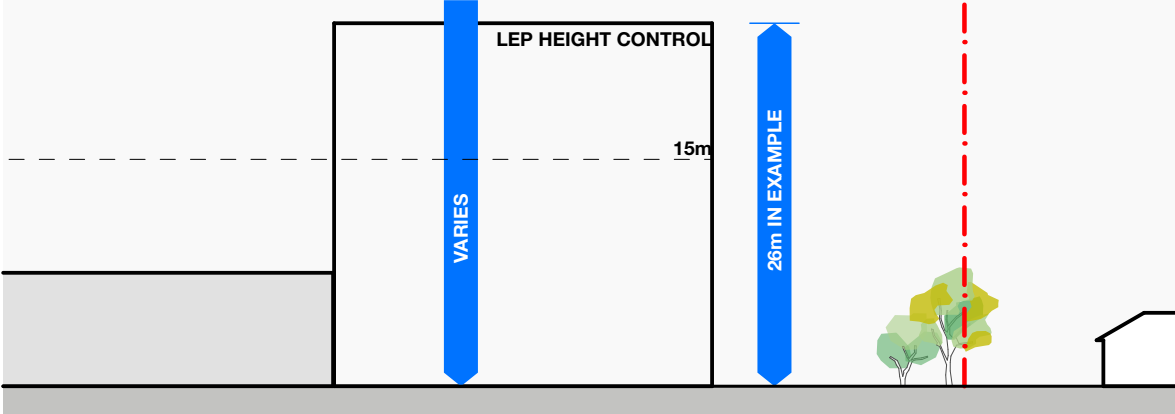

1(a)
EXAMPLE: THORNLEIGH
10.5m EXISTING LEP HEIGHT CONTROL



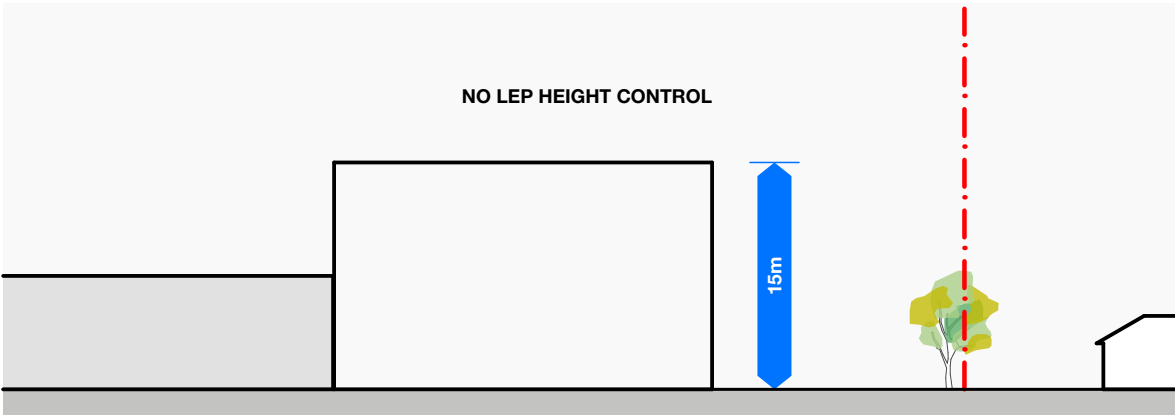

1(b)
EXAMPLE: GREYSTANES
NO LEP HEIGHT CONTROL



2(a)
EXAMPLE: GIRRAWEEEN
26m EXISTING LEP HEIGHT CONTROL



2(b)
EXAMPLE: GREYSTANES
NO LEP HEIGHT CONTROL

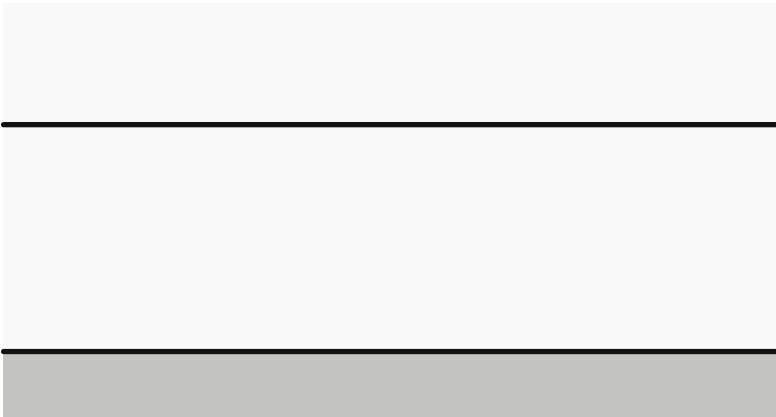
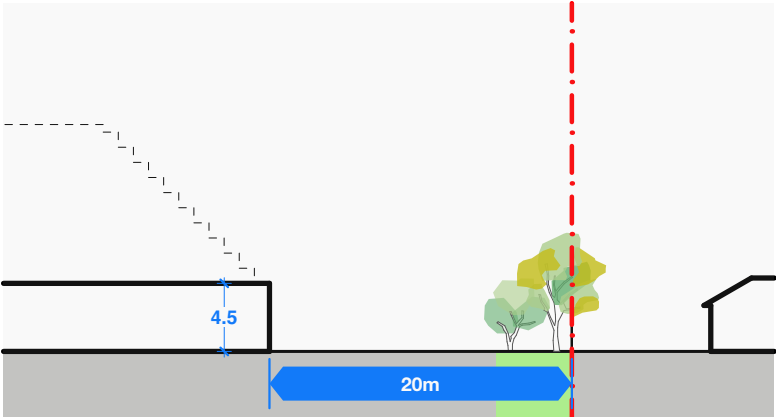
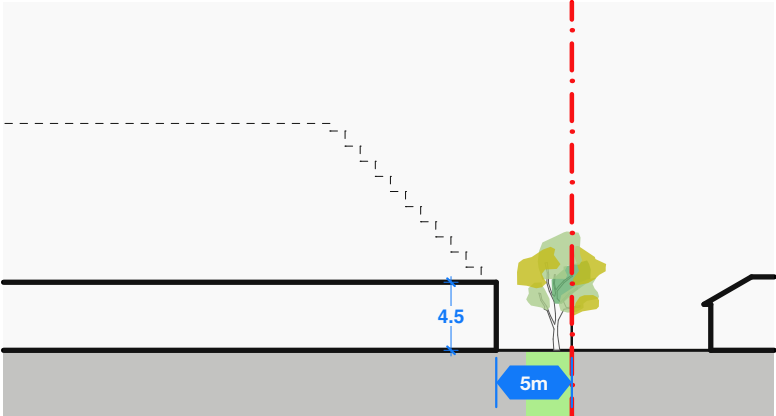
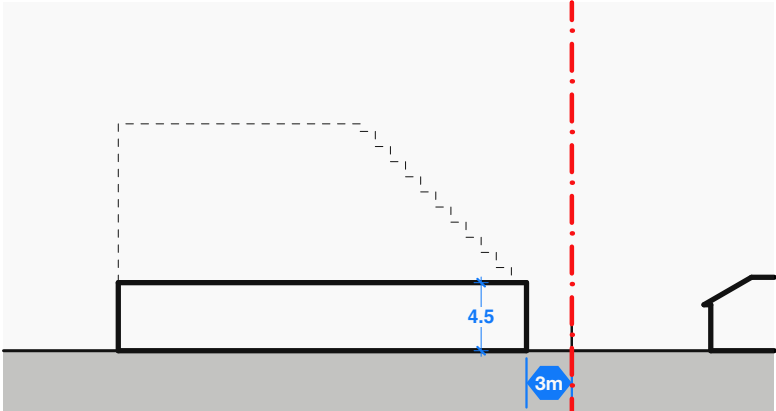


SETBACKS - SIDE AND REAR

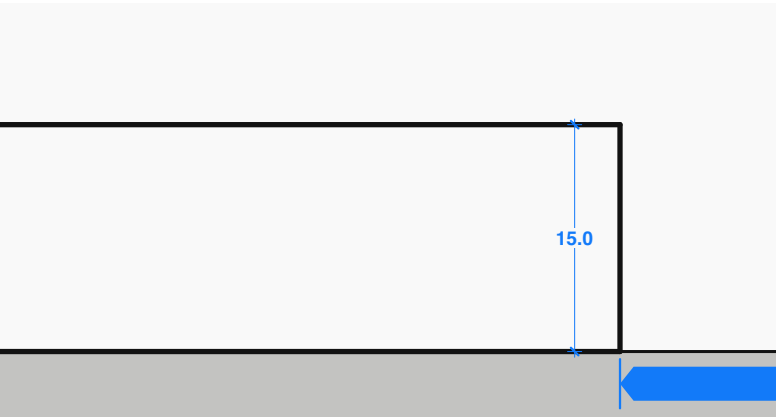
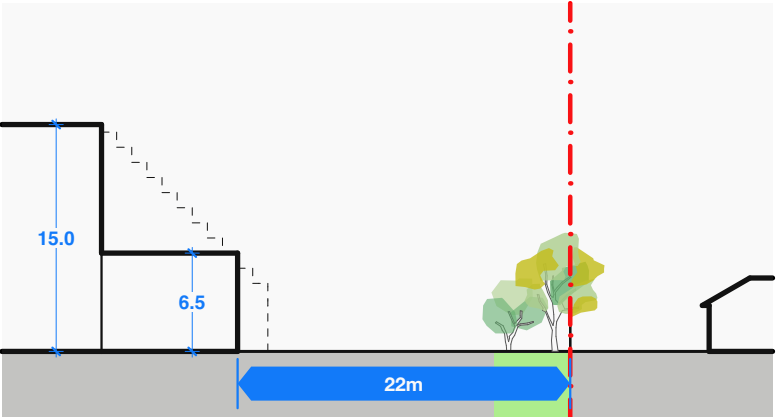
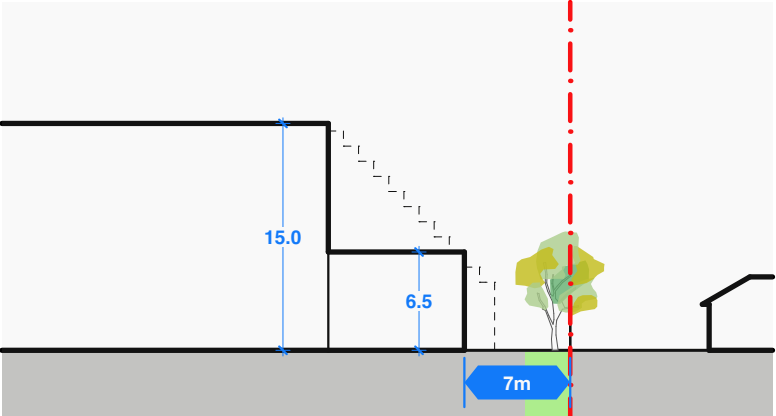
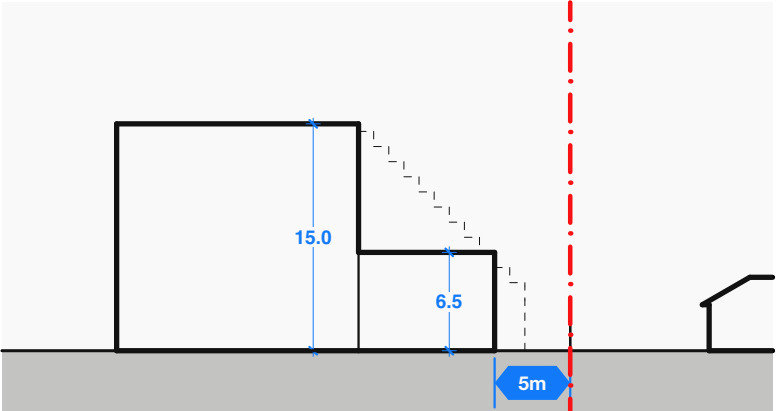
1:500

- PART 5A.11 (1)**
(a) for a building with a gross floor area of not more than 1,000m²—at least 3m, plus an additional metre for every whole metre by which the building exceeds 4.5m in height above ground level (existing),
- (b) for a building with a gross floor area of more than 1,000m² but not more than 5,000m²—at least 5m, plus an additional metre for every whole metre by which the building exceeds 4.5m in height above ground level (existing),*
- (c) for a building with a gross floor area of more than 5,000m² but not more than 10,000m²—at least 20m, plus an additional metre for every whole metre by which the building exceeds 4.5m in height above ground level (existing), or*
- (d) for a building with a floor area of more than 10,000m² but not more than 20,000m²—at least 50m, with a maximum building height of 15m above ground level (existing).*

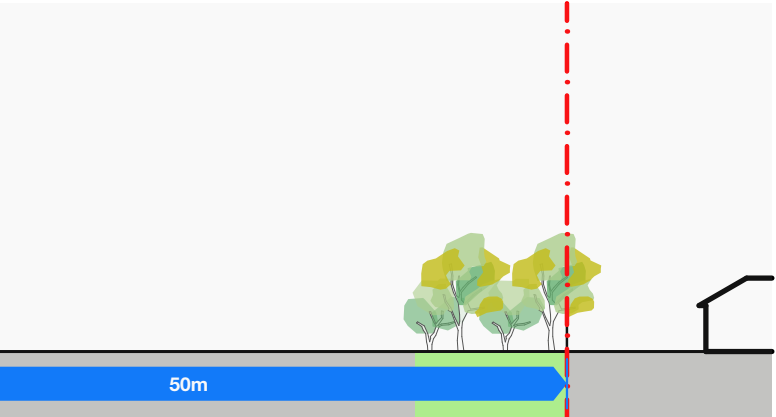
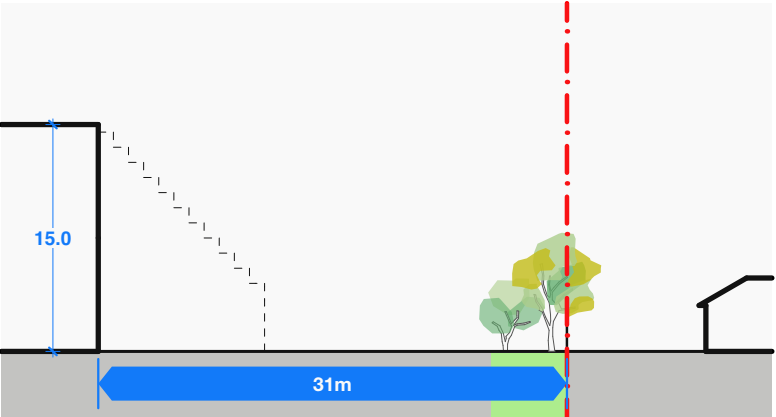
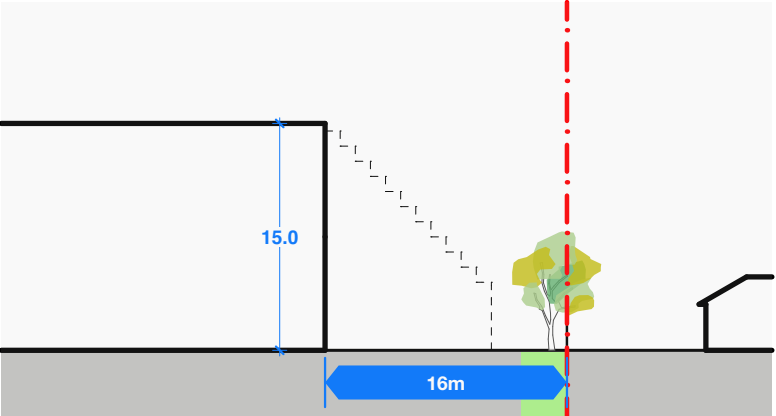
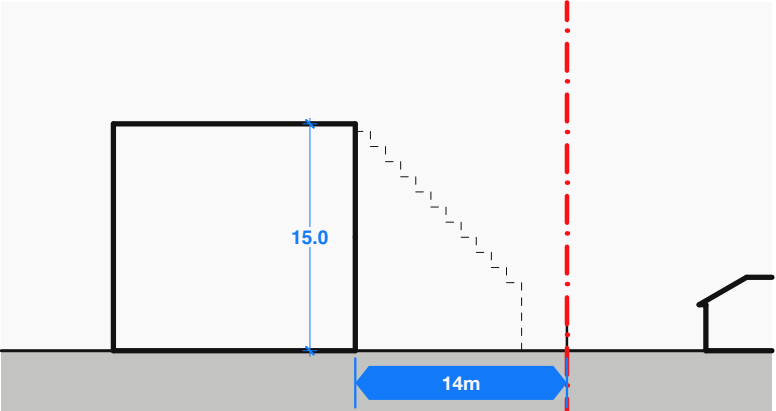
4.5m HIGH BUILDING



BUILDING WITH PARTS OF DIFFERENT HEIGHTS



MAXIMUM 15m HIGH BUILDING

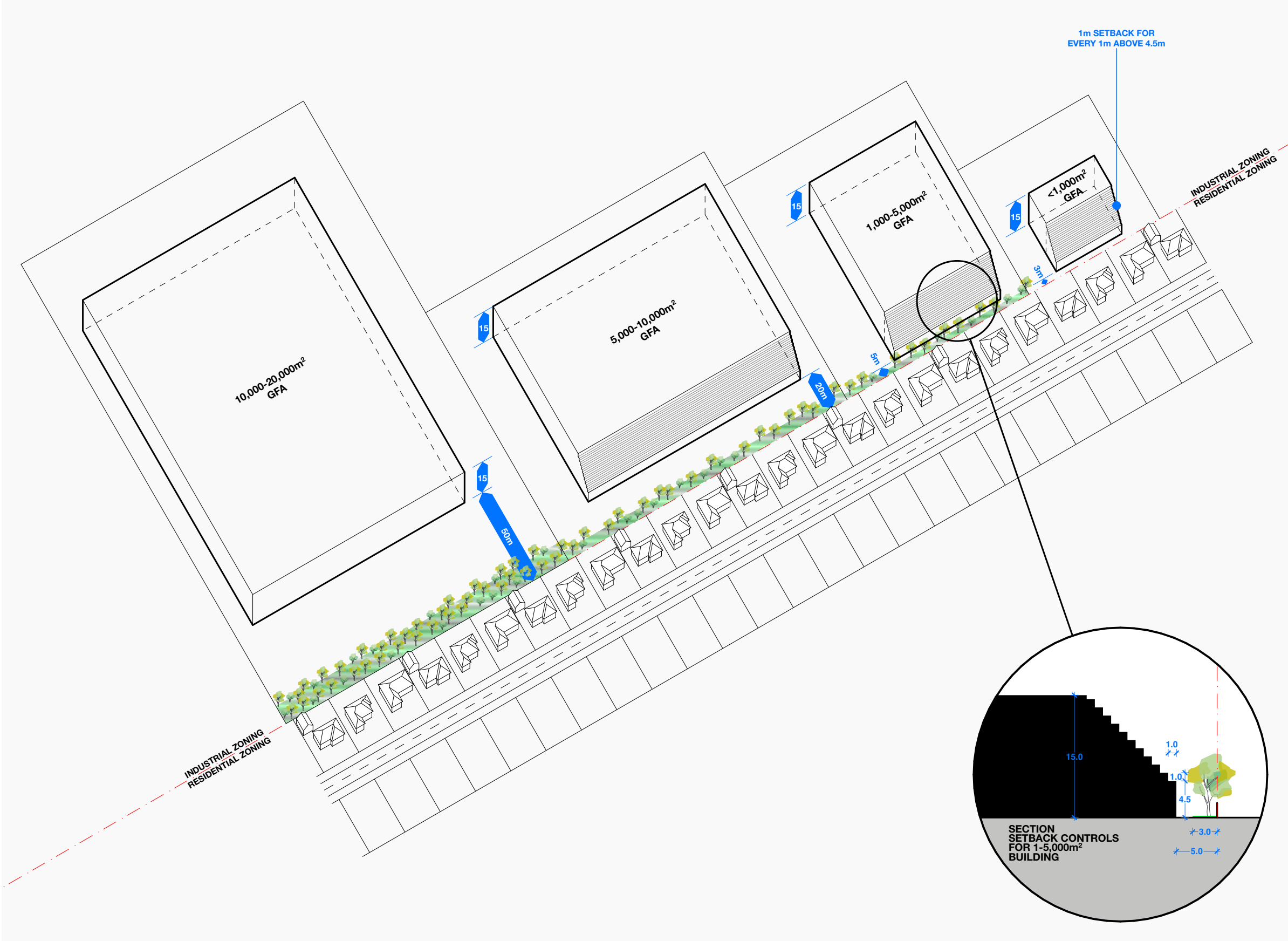


SUMMARY OF CONTROLS

1:2000, 1:500

SUMMARY DIAGRAM ILLUSTRATING COMPLYING DEVELOPMENT ENVELOPES WHERE INDUSTRIAL ZONES LOTS ADJOIN RESIDENTIAL ZONED LOTS, AND THERE IS NO LEP HEIGHT CONTROL:

- INCLUDING:
- Indicative maximum GFA footprint
 - Maximum height
 - Complying setbacks to side and rear boundaries by GFA groupings
 - Landscaped setbacks and plantings
 - Indicative residential building forms



VIEWS - EXISTING CONTROLS

MASSING STUDIES AND VIEWS FROM GROUND LEVEL SHOWING EXISTING COMPLYING DEVELOPMENT ENVELOPES WHERE INDUSTRIAL ZONES LOTS ADJOIN RESIDENTIAL ZONED LOTS:

- INCLUDING:
- Indicative maximum GFA footprint
 - Setbacks to side and rear boundaries by GFA groupings
 - Landscaped setbacks and plantings
 - Indicative residential building forms

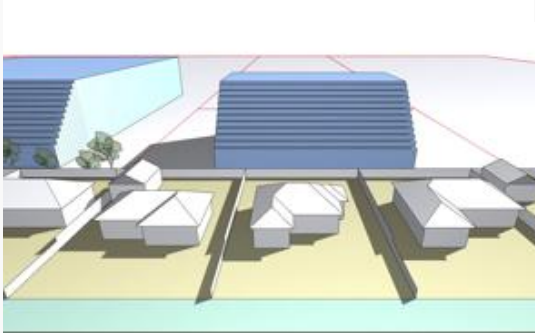
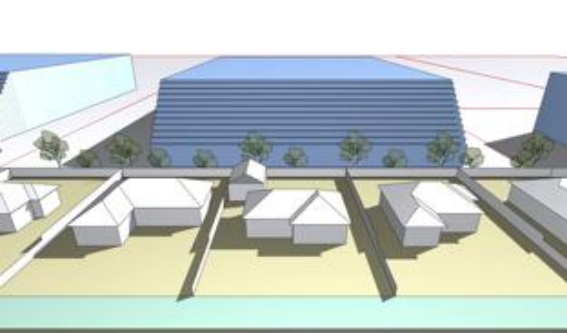
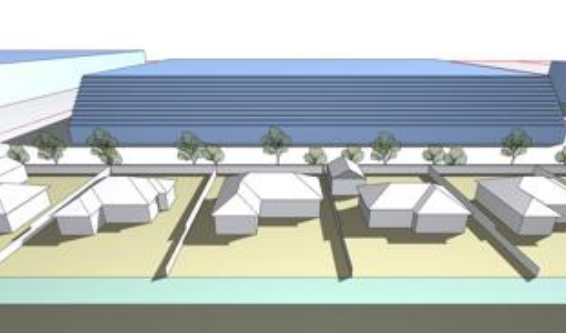
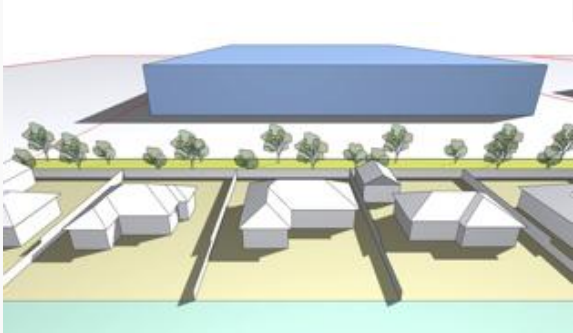
10-20,000m²

5-10,000m²

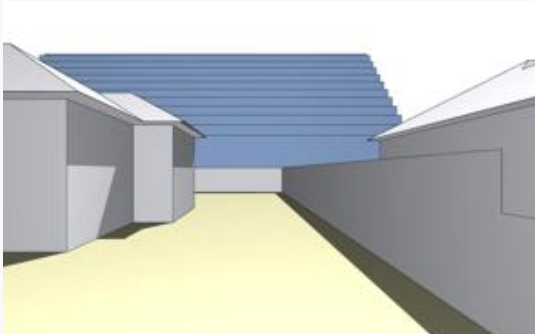
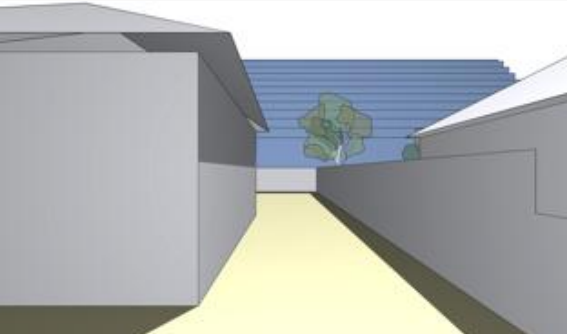
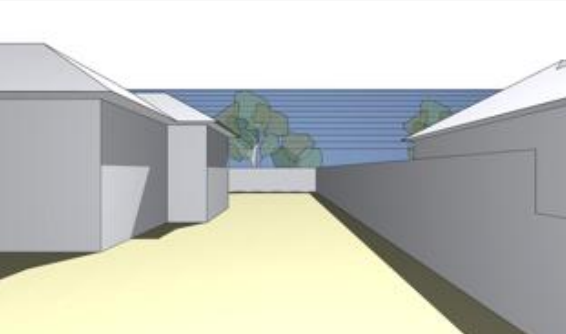
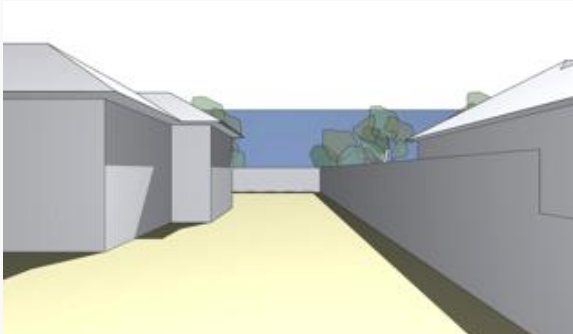
1-5,000m²

0-1,000m²

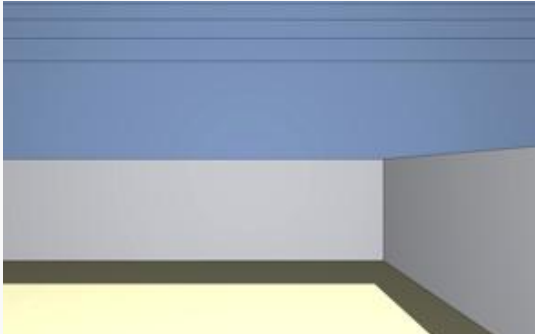
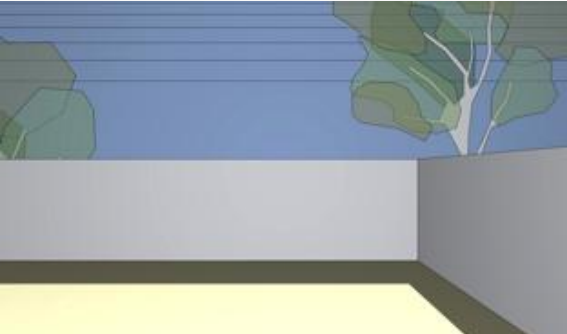
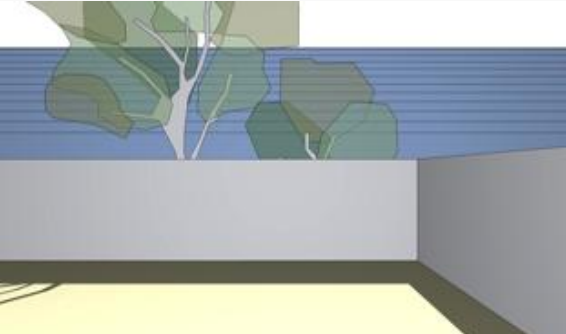
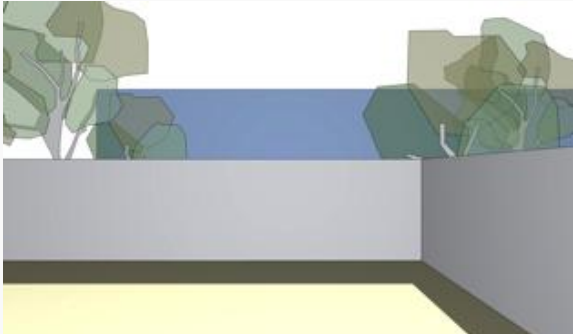
AERIAL VIEW



INDICATIVE VIEW FROM FRONT OF RESIDENTIAL PROPERTY



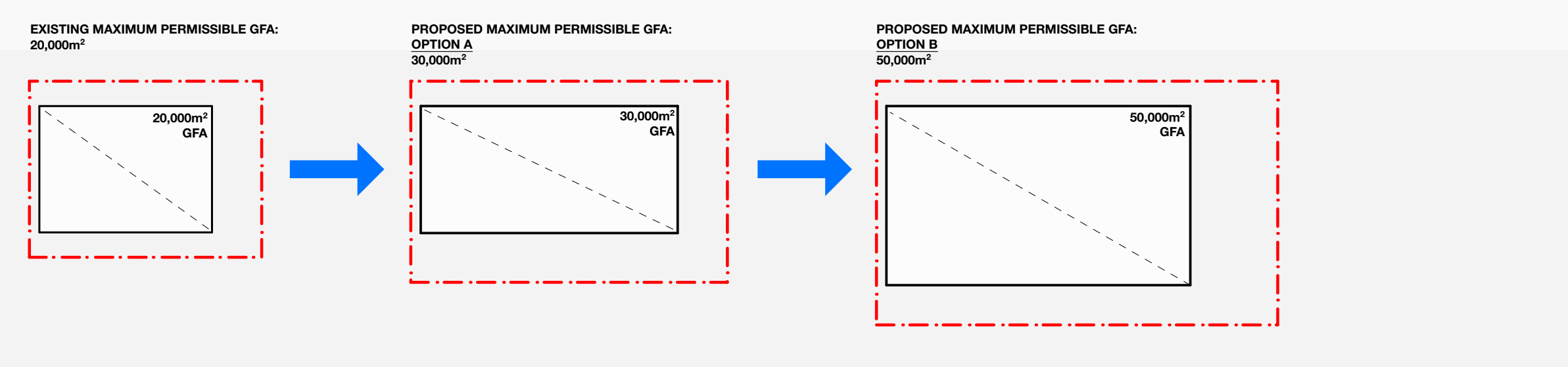
INDICATIVE VIEW FROM REAR YARD OF RESIDENTIAL PROPERTY



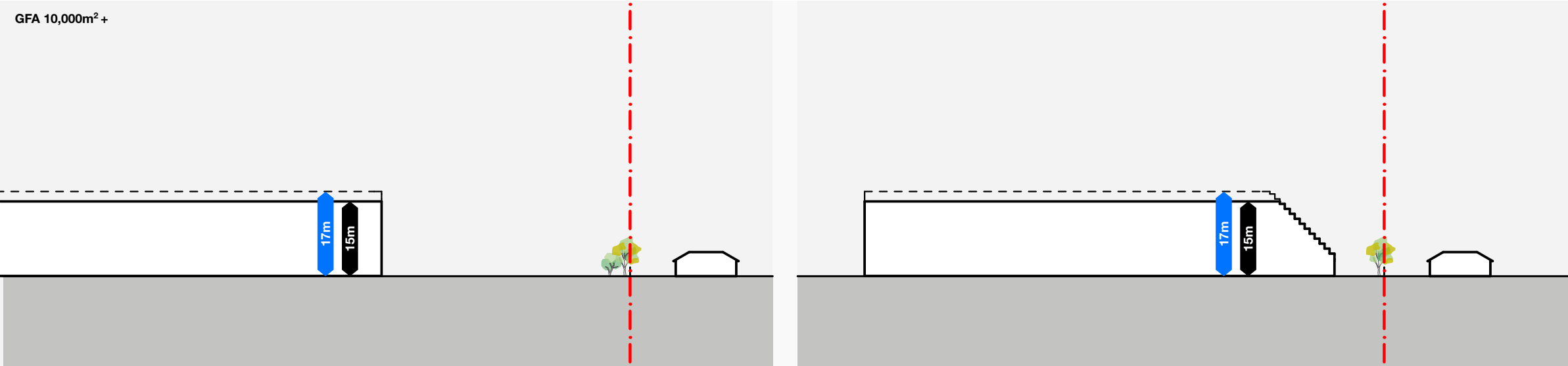
PROPOSED AMENDMENTS - SUMMARY

1:5000, 1:1000

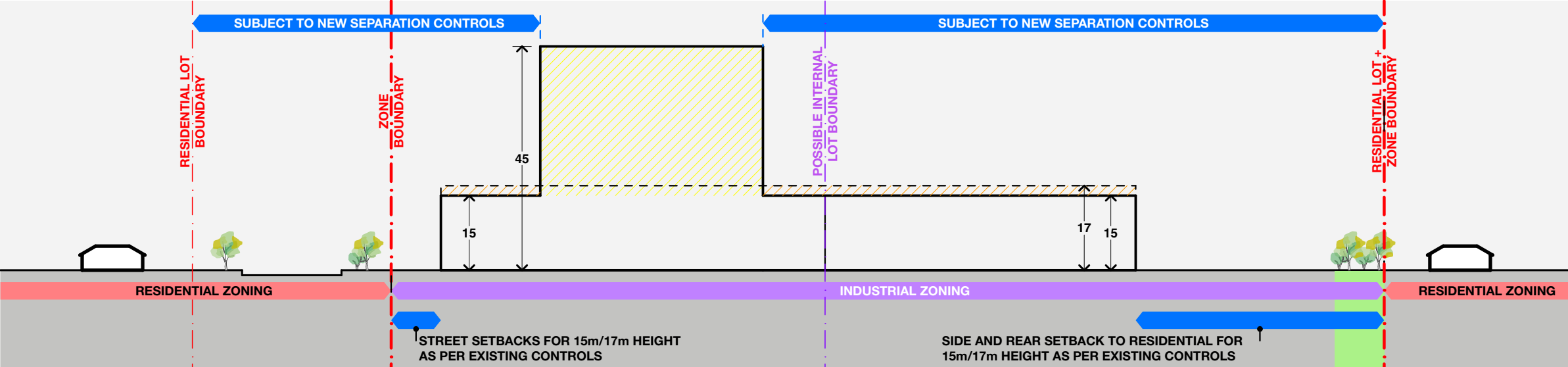
- MAXIMUM GFA**
- An increase in the maximum permissible GFA from 20,000m² to 30-50,000m²
 - Decision on maximum GFA to be determined by DPIE.



- BASE HEIGHT LIMIT**
- An increase of the base height limit (where no LEP height limit) from 15m to 17m



- 45m HEIGHT AND SEPARATION CONTROLS**
- A new 45m Maximum Height for buildings greater than 10,000m² GFA subject to separation controls
 - New separation controls for heights between 17m-45m for buildings greater than 10,000m² GFA



GFA - ASSUMPTIONS

GFA ASSUMPTIONS

In order to illustrate possible massing envelopes for the proposed permissible GFA controls, the following assumptions have been made:

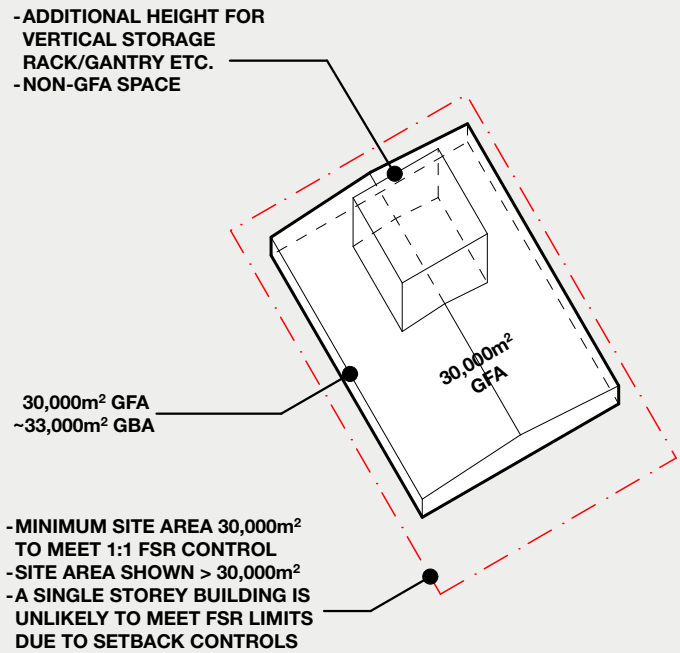
Two industrial typologies have been prepared:

1. A predominately single story warehouse type building with a GFA/GBA efficiency of 90%
2. A multi storey industrial building to the new 45m height with a GBA/GFA efficiency of 80%

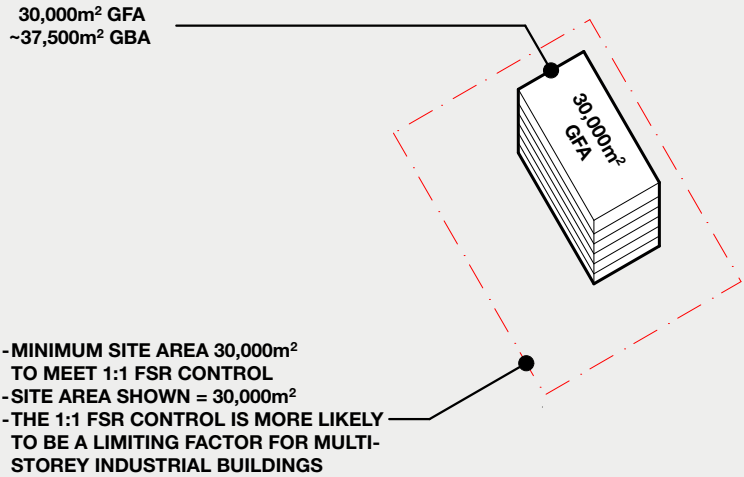
COMMENTS:

- The single storey typology which is prevalent in Sydney/NSW for large scale industrial buildings are unlikely to exceed the 1:1 FSR controls in the SEPP. This is due to the applicable setback and separation controls that reduce the permissible site coverage.
- Emerging multi story industrial buildings will see the 1:1 FSR control as being more of a limiting factor due to the smaller footprints of multi storey buildings.
- The 80% efficiency for multi storey industrial needs to be confirmed as there are few precedents of this typology in the Australian market to date.

30,000m² SINGLE STOREY TYPOLOGY

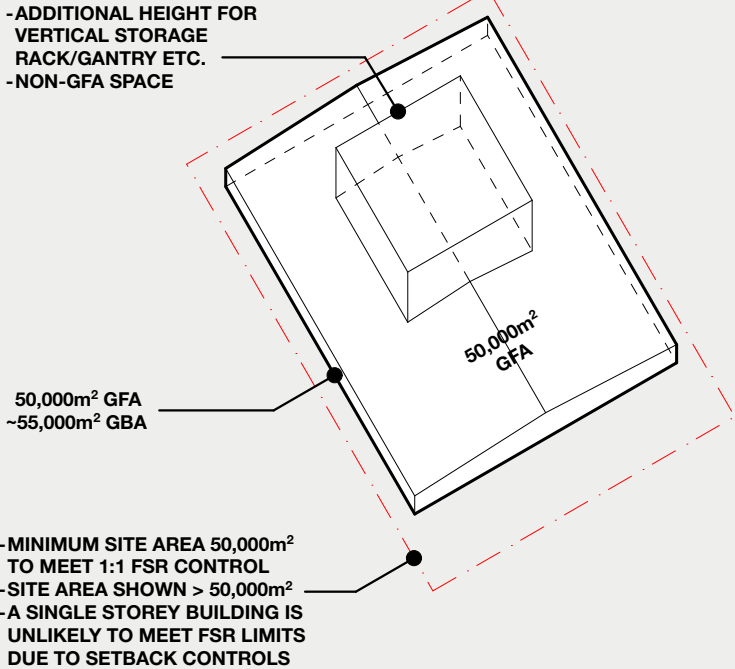


30,000m² MULTI-STOREY TYPOLOGY

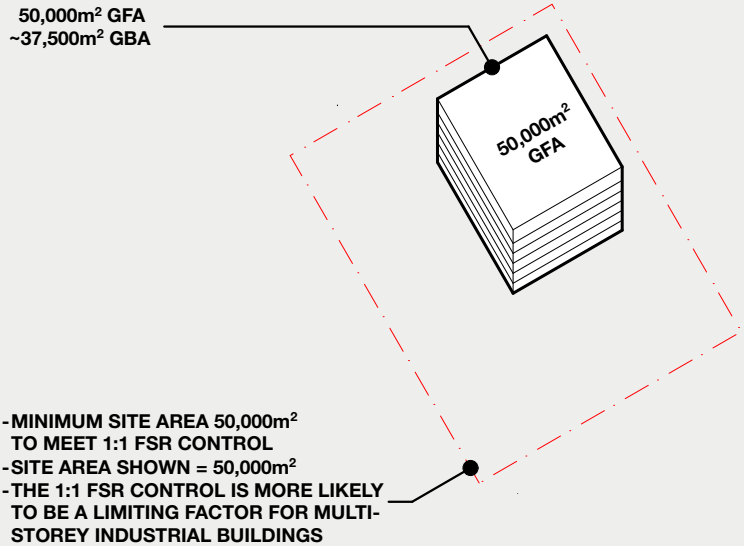


20 YARUNGA STREET, PRESTONS - APPROX 30,000m²

50,000m² SINGLE STOREY TYPOLOGY



50,000m² MULTI-STOREY TYPOLOGY



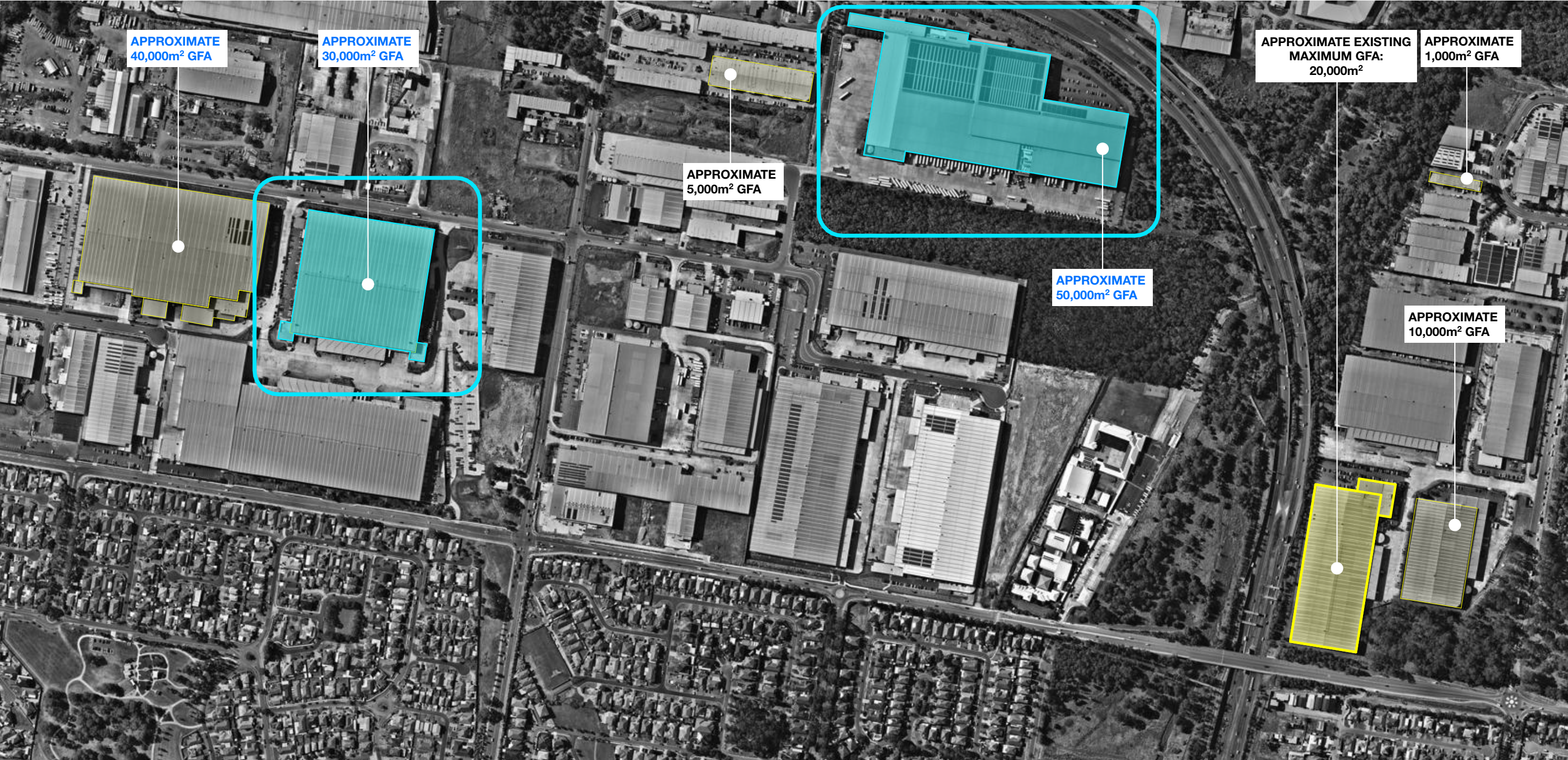
1 AVIATION ROAD, LEN WATERS ESTATE - APPROX 50,000m²

MAXIMUM GFA - PROPOSED

An example location (Prestons, Sydney) has been selected to show the relative scale of large footprint industrial buildings relative to other industrial types as well as nearby residential lots.

Typical Industrial buildings shown with approximate GFA of:
30,000m²
50,000m²

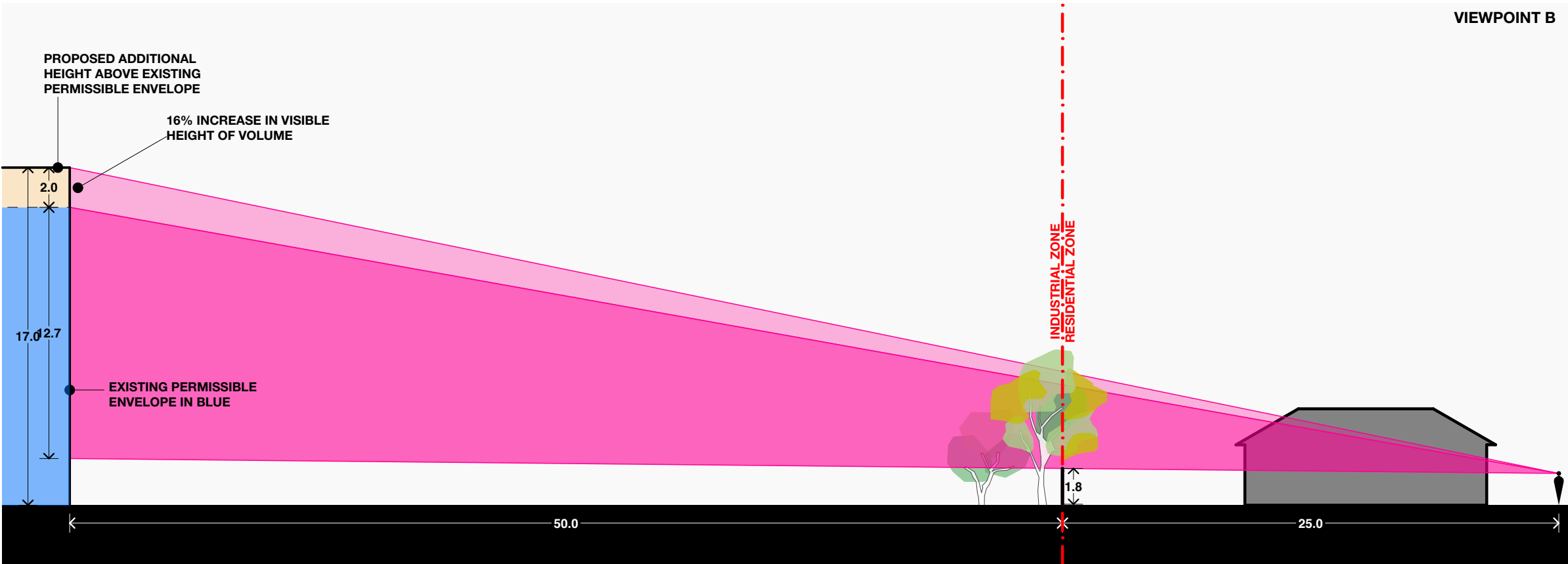
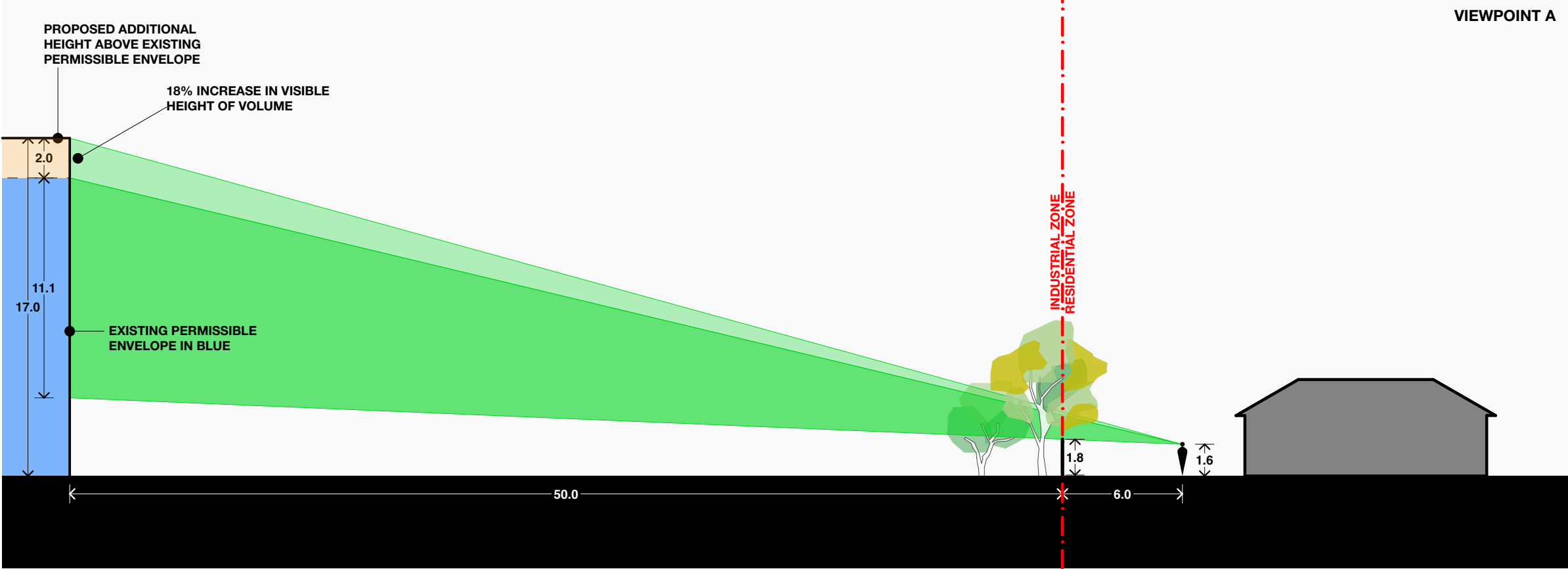
The maximum permissible GFA for a Complying Industrial building under Part 5A is 20,000m²



17m HEIGHT CONTROL

- RATIONALE:**
- The additional 2m of height allows for a wider range of standard industrial building types.
 - The rationale for the increase to 17m is to address changes in the BCA and contemporary building and services technologies eg. fire sprinklers.
 - Refer to documentation prepared by others for detail.

- OBSERVATIONS:**
- The additional 2m of building height represents a 16-18% increase in visible envelope over the existing envelope.



17m HEIGHT - VISUAL IMPACT

- Views showing the additional 2m height increase over the existing permissible envelopes
- The additional height is shown in orange.
- The existing controls are in blue

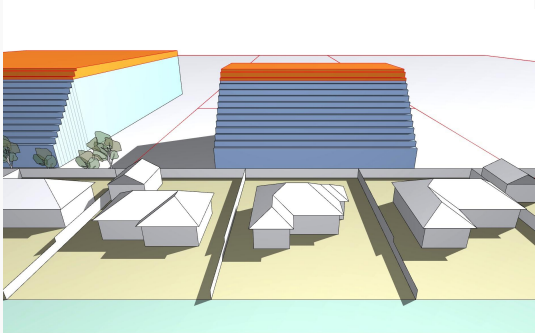
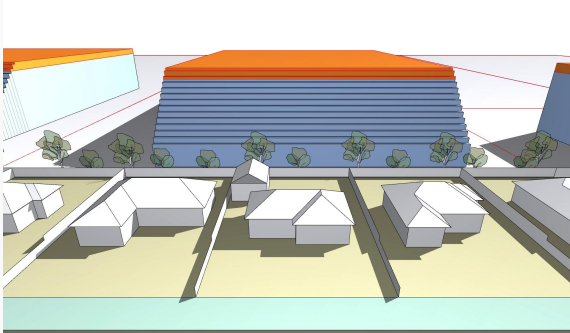
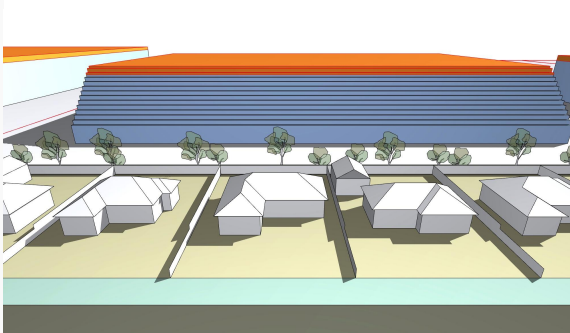
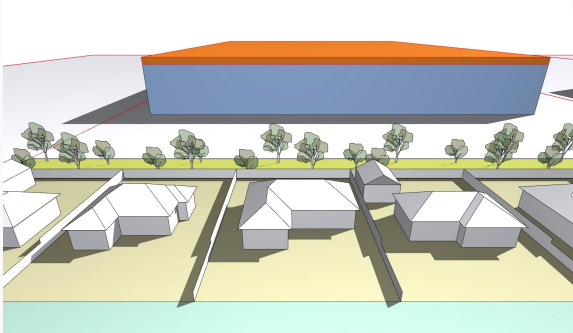
10-20,000m²

5-10,000m²

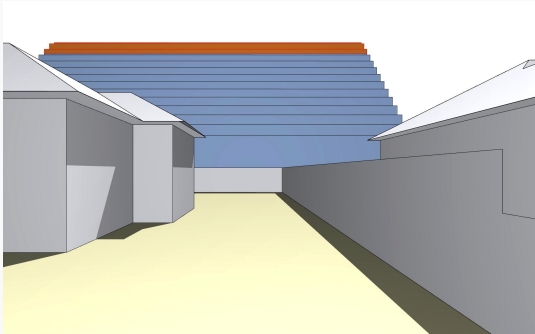
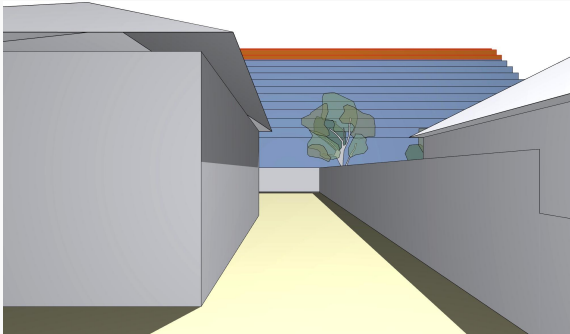
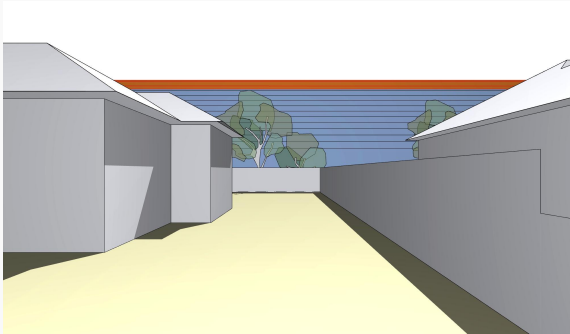
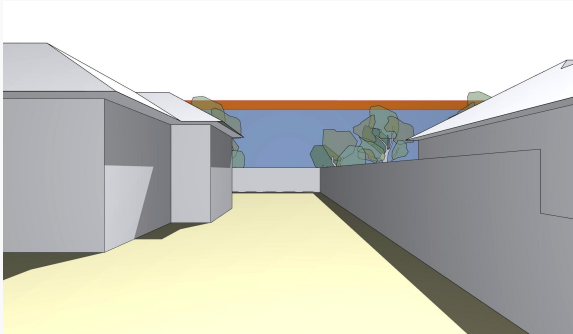
1-5,000m²

0-1,000m²

AERIAL VIEW

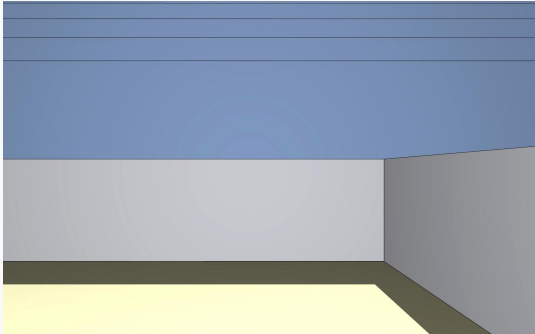
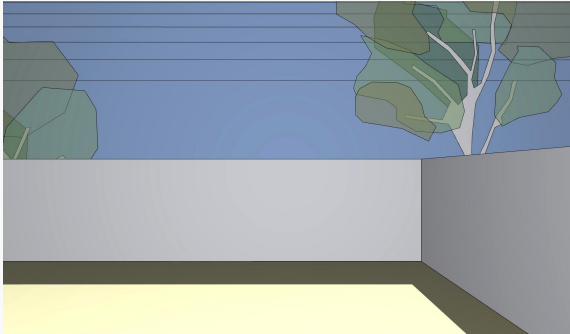
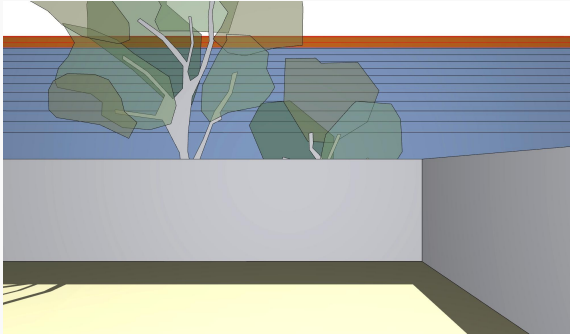
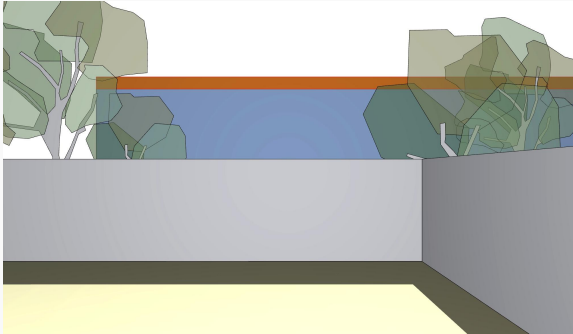


INDICATIVE VIEW
6m FROM BOUNDARY



INDICATIVE VIEW
6m FROM BOUNDARY

NOTE:
For buildings up to 5,000m² the setback already allows for a large visual presence close to the boundary.



17m HEIGHT - SOLAR IMPACT

SOLAR IMPACT TESTING

The impact of the additional 2m of height has been tested for building envelopes <10,000m².

NOTE: For buildings >10,000m² the existing 50m setback means that there is no additional overshadowing affecting adjoining residential at the times tested.

The additional height has been tested for:
June 21 at 9am, 12pm, 3pm

The increased overshadowing is shown in orange.
The existing shadow is in blue.

OBSERVATIONS:

- At the times tested:
- There is an increase in potential overshadowing from the proposed increase in height to 17m for buildings 0-10,000m².
 - The increase is greater for smaller buildings due to the smaller starting setback position.



KEY

SHADOW FROM CURRENT 15m ENVELOPE

ADDITIONAL SHADOW FROM 17m ENVELOPE

45m HEIGHT CONTROL METHODOLOGY

METHODOLOGY

The proposed amendments will have potential impacts on adjoining residential lots primarily through a visual impact and solar access.

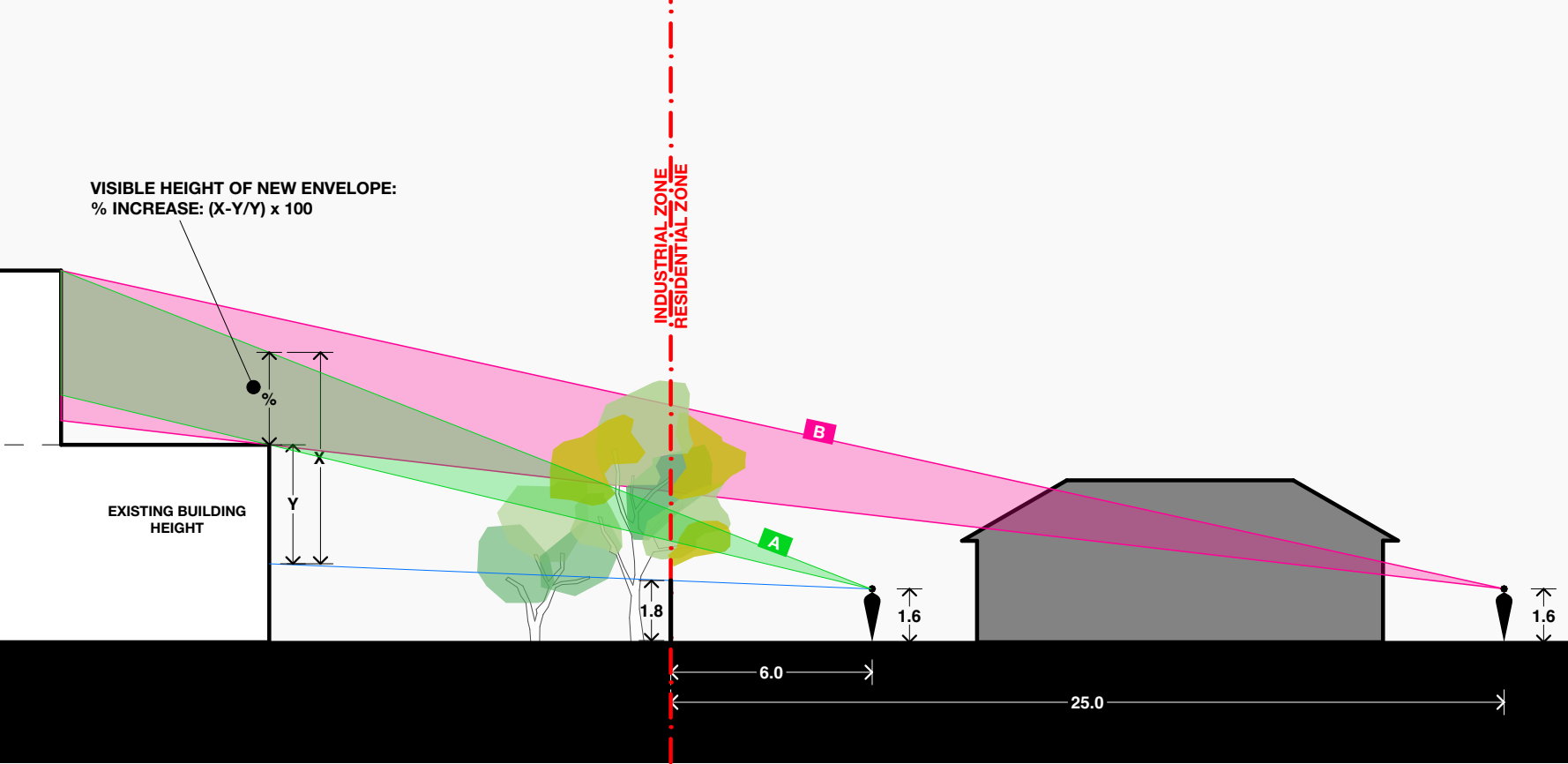
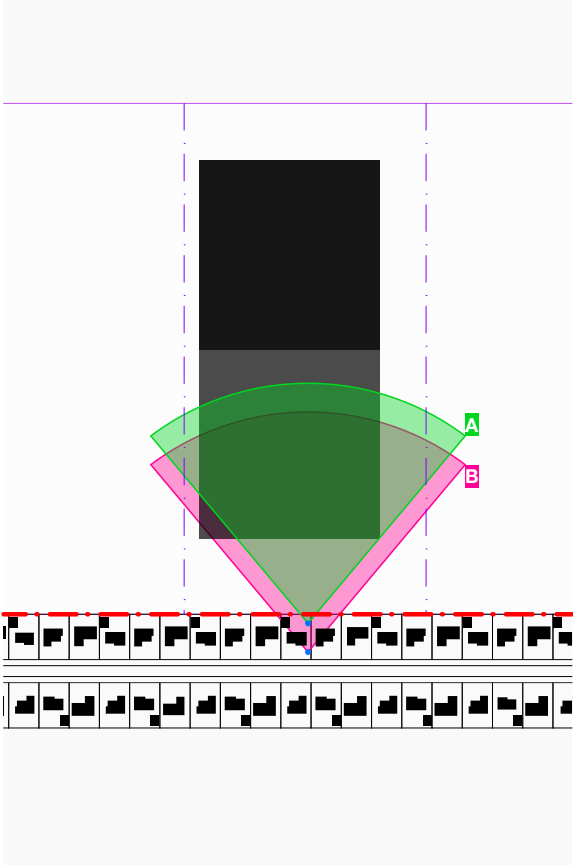
Visual Impact Assessment

For the purposes of this study, the following has been assumed:

- A 1.8m high boundary fence between the residential and industrial lots
- Two viewpoints with an eye height of 1.6m above ground level:
 - Viewpoint A: Set back 6m from boundary.
 - Viewpoint B: Set back 25m from boundary.
- A field of view angle of 80° (approx. 24mm lens / 35mm equivalent)
- A flat site unless noted otherwise

A translucent envelope of the maximum developable area is shown with indicative industrial development types shown within.

The percentage increase of visible height of the industrial development envelope over the existing is measured.



Solar Access

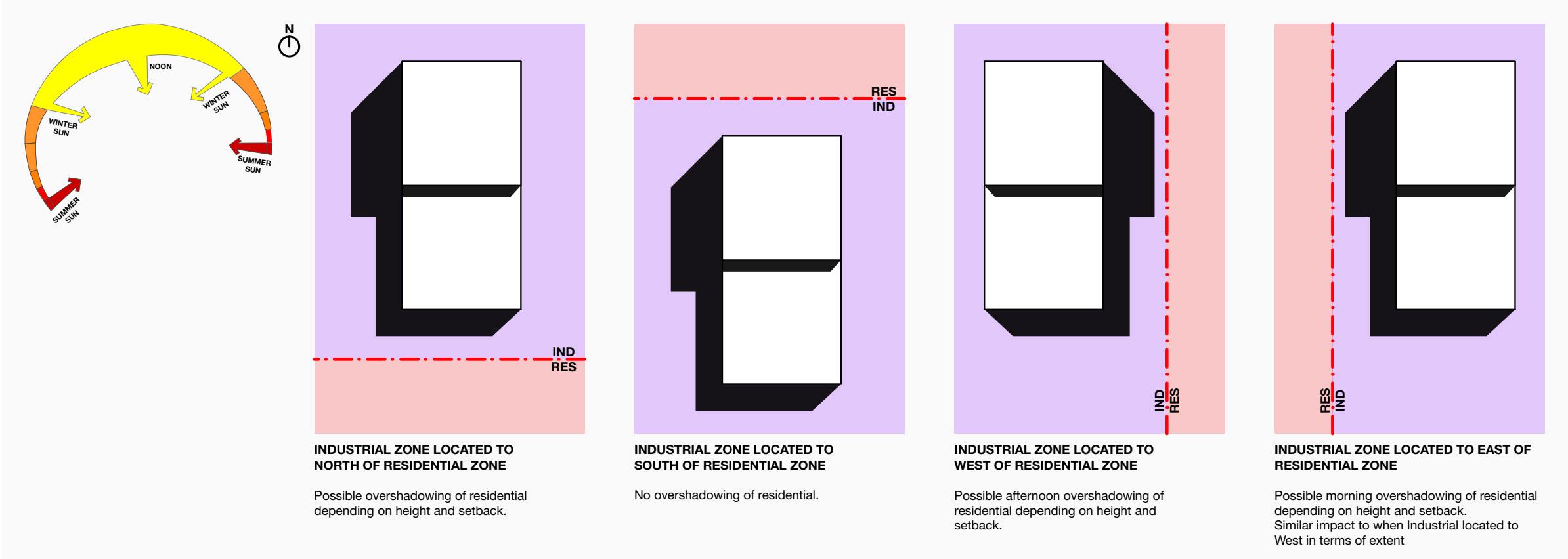
The degree to which solar access will be impacted by the proposed SEPP amendments is contingent on the orientation of the block and the site topography.

The solar impact will differ if the Industrial Zone is located to the North, South, East or West of a Residential Zone.

For the purposes of this study, two orientations have been tested:

1. Where the Industrial Zone is located directly to the north of the Residential Lots
2. Where the Industrial Zone is located directly to the west of the Residential Lots

The following dates and times have been tested:
June 21 (Winter Solstice) Hourly from 9am - 3pm
March 21 (Equinox/DST) Hourly from 9am - 3pm



45m HEIGHT - PROPOSED SCENARIOS

A range of scenarios have been prepared to test the impact of the proposed amendments on adjoining residential zones.

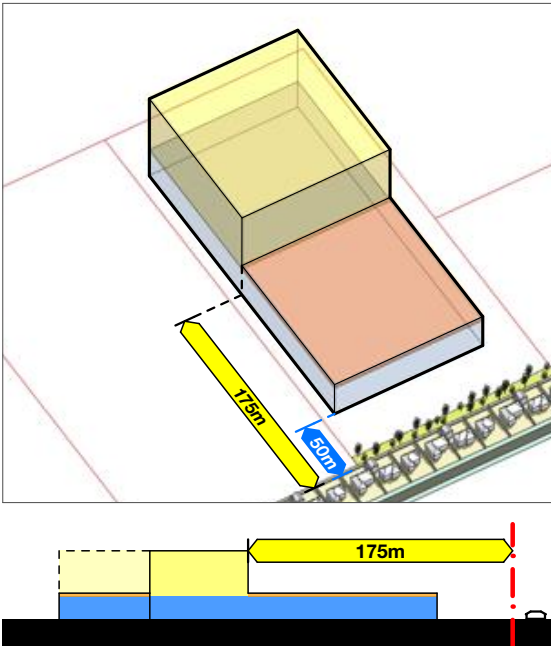
Scenarios 1-4: Testing a range of setbacks for a 45m high volume

Scenarios 5a and 5b: Testing the impact of the height amendments on sloping/stepped sites

Scenario 6: Testing the impact of a larger 50,000m² GFA building in comparison to a 30,000m² building.

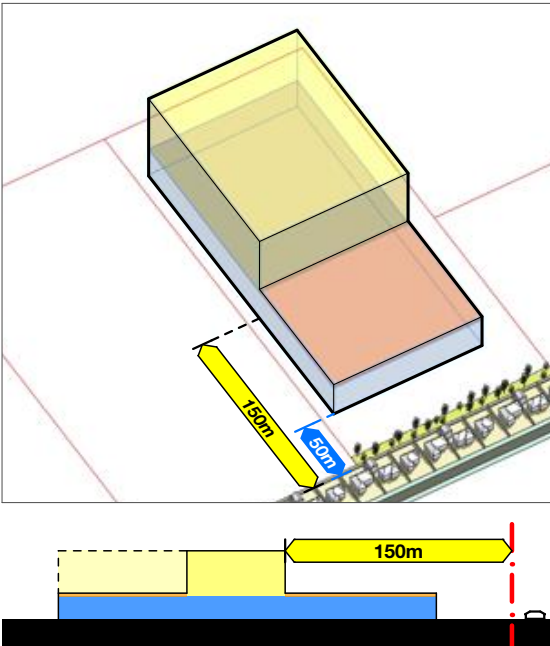
SCENARIO 1
30,000m² BUILDING
45m HEIGHT

NO VISUAL IMPACT FROM REAR OF RESIDENTIAL PROPERTY



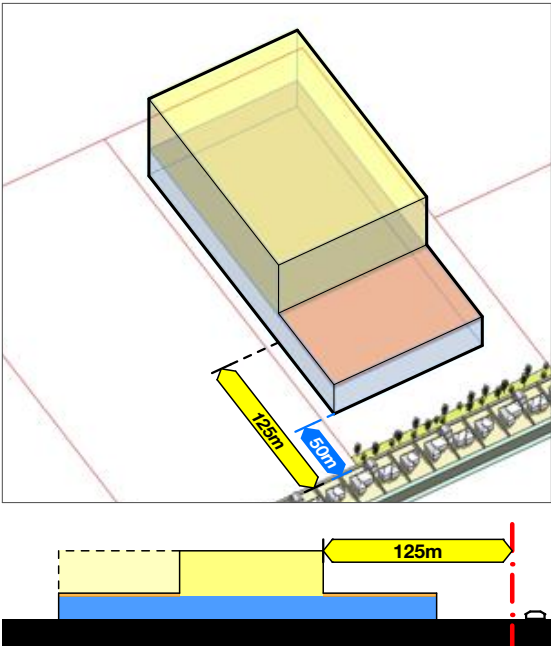
SCENARIO 2
30,000m² BUILDING
45m HEIGHT

MODERATE VISUAL IMPACT FROM REAR OF RESIDENTIAL PROPERTY



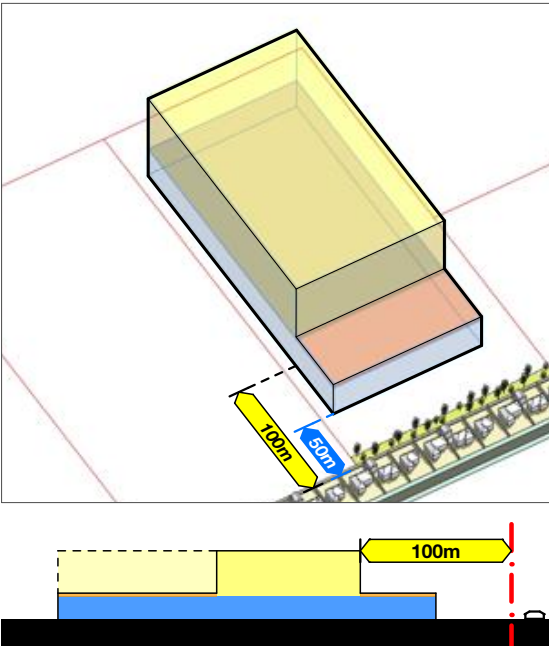
SCENARIO 3
30,000m² BUILDING
45m HEIGHT

MODERATE VISUAL IMPACT FROM REAR OF RESIDENTIAL PROPERTY

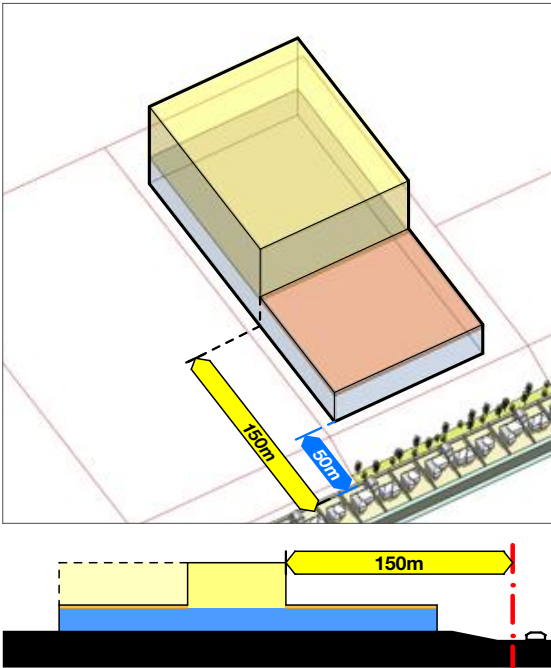


SCENARIO 4
30,000m² BUILDING
45m HEIGHT

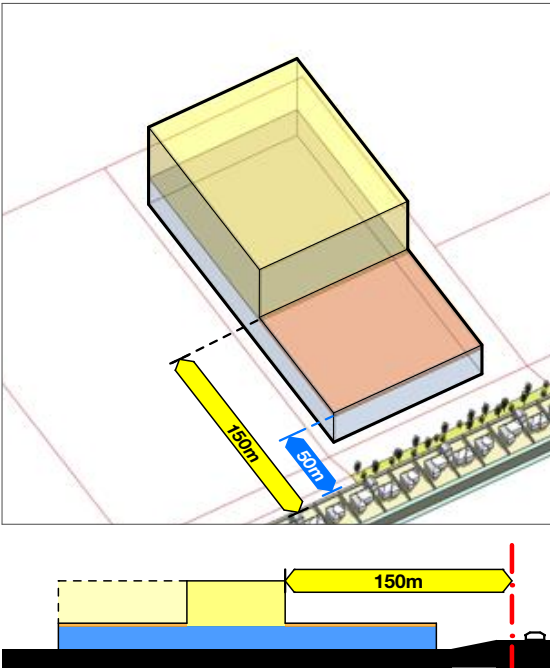
GREATER VISUAL IMPACT FROM REAR OF RESIDENTIAL PROPERTY



SCENARIO 5a
SLOPING/STEPPED SITE
30,000m² BUILDING
45m HEIGHT
150m SEPARATION TO RESIDENTIAL

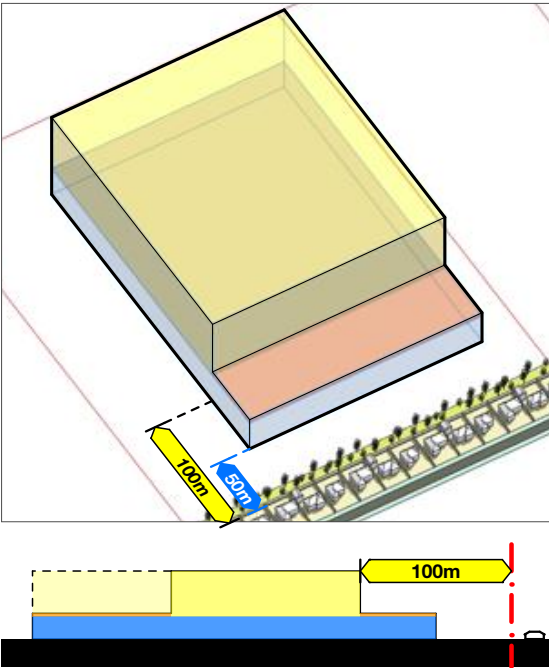


SCENARIO 5b
SLOPING/STEPPED SITE
30,000m² BUILDING
45m HEIGHT
150m SEPARATION TO RESIDENTIAL



SCENARIO 6
50,000m² BUILDING
45m HEIGHT

GREATER VISUAL IMPACT FROM REAR OF RESIDENTIAL PROPERTY



VISUAL IMPACT - SCENARIO 01

SCENARIO 1

- 30,000m² BUILDING GFA
- 15m HEIGHT AS PER EXISTING
- 17m MAX HEIGHT TO EXISTING SETBACKS
- **15-45m MAXIMUM HEIGHT WITH 175m SEPARATION TO RESIDENTIAL ZONE**

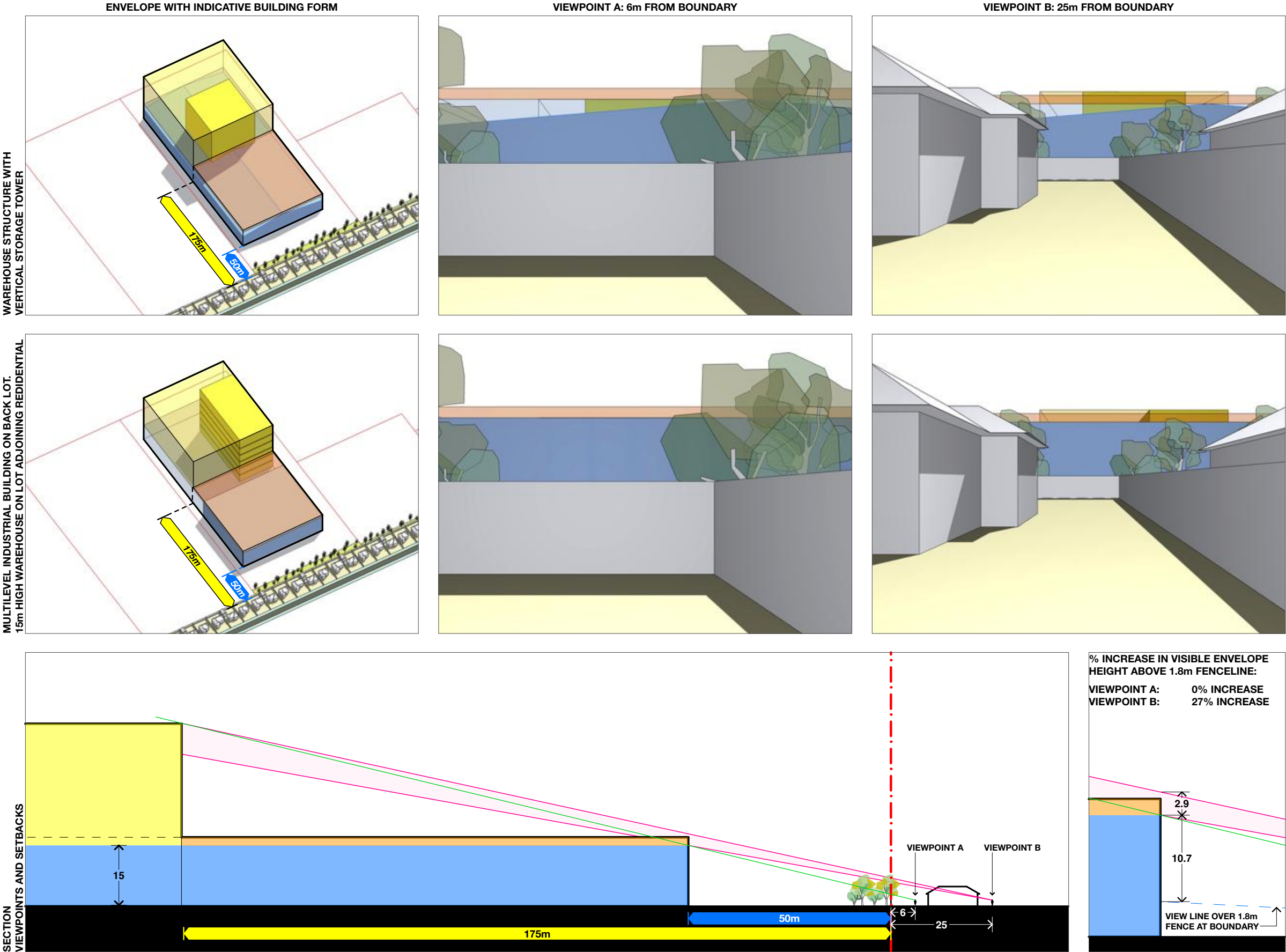
RATIONALE:

- No additional visual impact over existing 15m height control from Viewpoint A
- View line from selected viewpoints extended past leading edge of existing 15m maximum envelope.
- 45m Height set back 175m from boundary to Residential Zone boundary

OBSERVATIONS:

45m Height:

- No visual impact over existing 15m height control from Viewpoint A
- Minor visual impact over 15m and 17m height control from Viewpoint B



VISUAL IMPACT - SCENARIO 02

SCENARIO 2

- 30,000m² BUILDING GFA
- 15m HEIGHT AS PER EXISTING
- 17m MAX HEIGHT TO EXISTING SETBACKS
- **15-45m MAXIMUM HEIGHT WITH 150m SEPARATION TO RESIDENTIAL ZONE**

RATIONALE:

- Testing effect of reduced separation distances for 45m height envelope with respect to the existing Maximum 15m Height Control
- No additional visual impact over **proposed 17m** height control from Viewpoint A
- View line from selected viewpoints extended past leading edge of existing 15m maximum envelope.
- 45m Height set back 150m from boundary to Residential Zone boundary

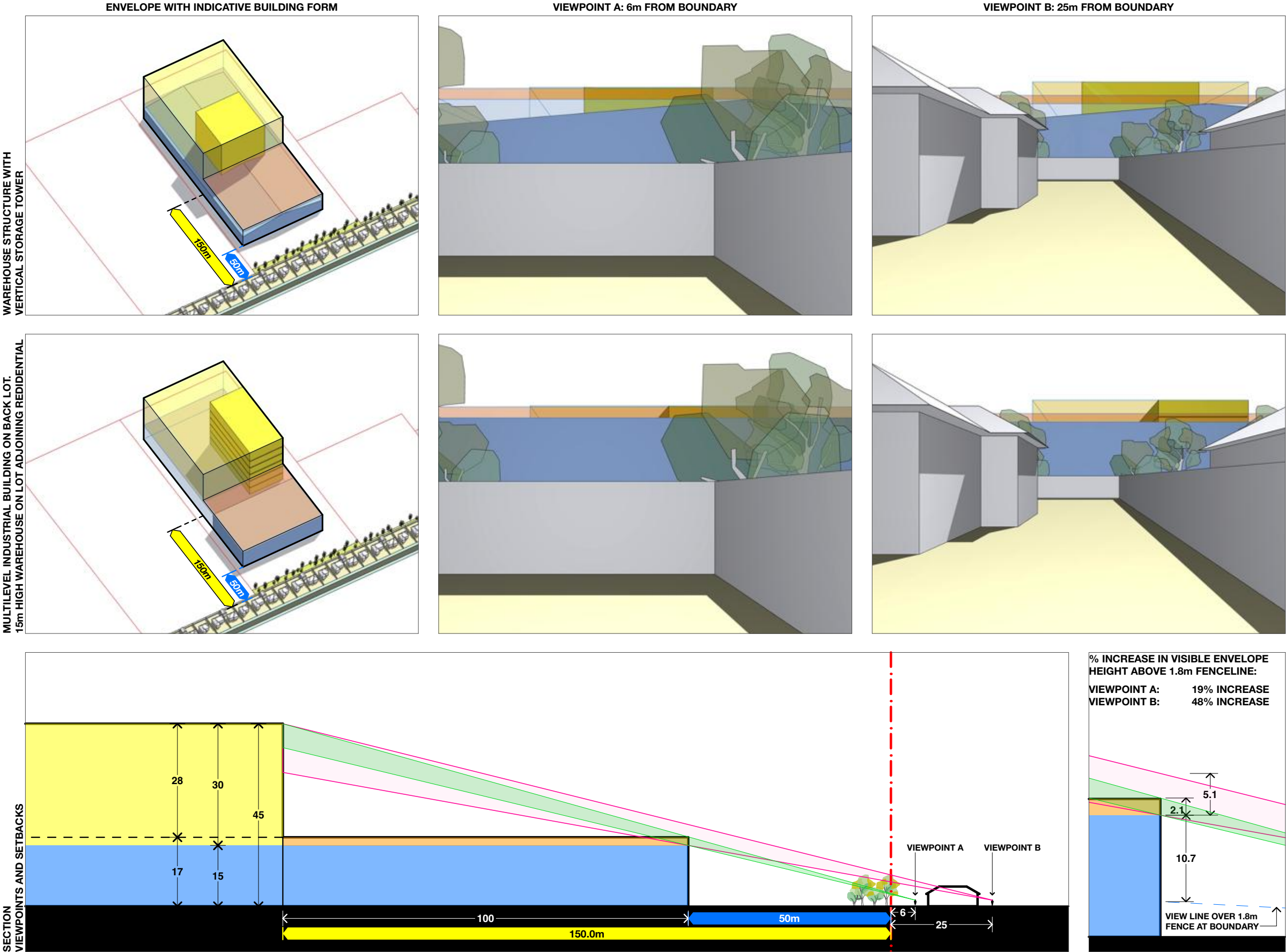
OBSERVATIONS:

45m Height:

- Minor visual impact over existing 15m height control from Viewpoint A
- No visual impact over **proposed 17m** height control from Viewpoint A
- Minor visual impact over 15m and 17m height control from Viewpoint B

KEY

- EXISTING PERMISSIBLE ENVELOPE
- EXISTING PERMISSIBLE INDICATIVE MASSING
- PROPOSED 17m BASE PERMISSIBLE HEIGHT
- PROPOSED 45m HEIGHT ENVELOPE
- PROPOSED 45m HEIGHT INDICATIVE MASSING



VISUAL IMPACT - SCENARIO 03

SCENARIO 3

- 30,000m² BUILDING GFA
- 15m HEIGHT AS PER EXISTING
- 17m MAX HEIGHT TO EXISTING SETBACKS
- **15-45m MAXIMUM HEIGHT WITH 125m SEPARATION TO RESIDENTIAL ZONE**

RATIONALE:

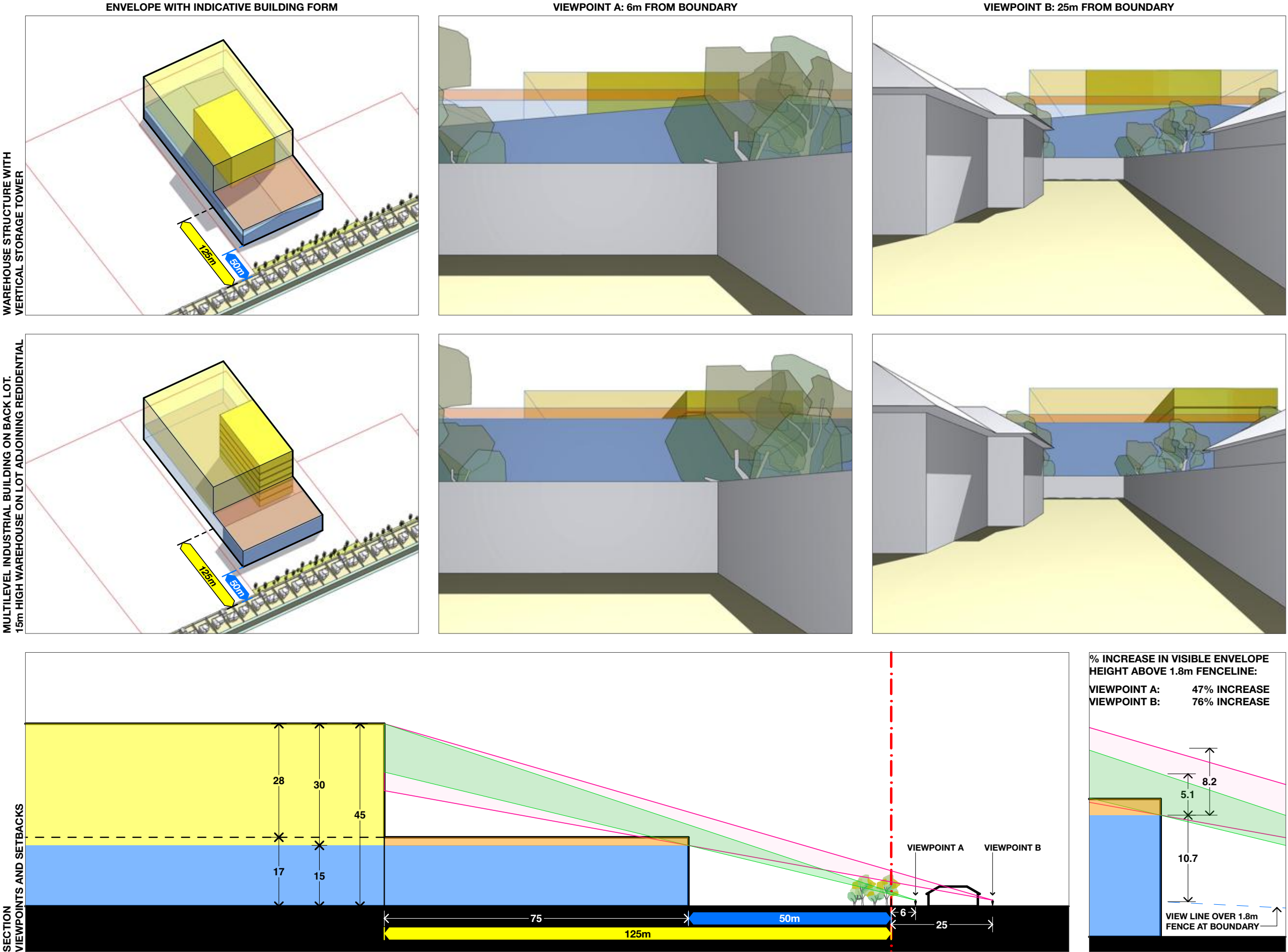
- Testing effect of reduced separation distances for 45m height envelope with respect to the existing 15m and proposed 17m Height Control
- View line from selected viewpoints extended past leading edge of existing 15m maximum envelope.
- 45m Height set back 125m from boundary to Residential Zone boundary

OBSERVATIONS:

- Additional height is becoming more prominent from the Viewpoint A
- Additional height becomes more visible and apparent the further from the boundary the viewpoint is place (Viewpoint B).

KEY

- EXISTING PERMISSIBLE ENVELOPE
- EXISTING PERMISSIBLE INDICATIVE MASSING
- PROPOSED 17m BASE PERMISSIBLE HEIGHT
- PROPOSED 45m HEIGHT ENVELOPE
- PROPOSED 45m HEIGHT INDICATIVE MASSING

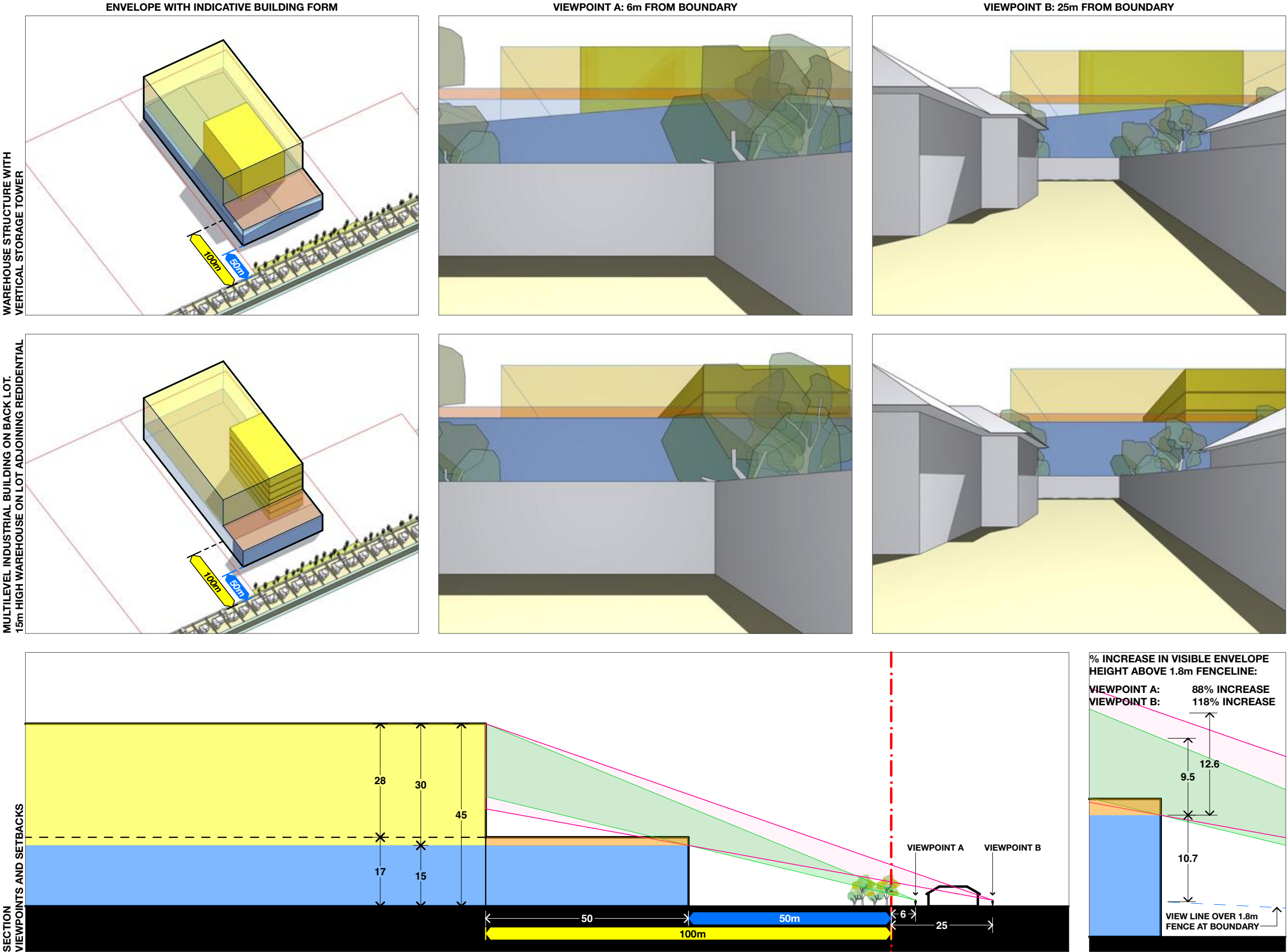


VISUAL IMPACT - SCENARIO 04

- SCENARIO 4**
- 30,000m2 BUILDING GFA
 - 15m HEIGHT AS PER EXISTING
 - 17m MAX HEIGHT TO EXISTING SETBACKS
 - **15-45m MAXIMUM HEIGHT WITH 100m SEPARATION TO RESIDENTIAL ZONE**

- RATIONALE:**
- Testing effect of reduced separation distances for 45m height envelope with respect to the existing Maximum 15m Height Control
 - View line from selected viewpoints extended past leading edge of existing 15m maximum envelope.
 - 45m Height set back 100m from boundary to Residential Zone boundary

- OBSERVATIONS:**
- Additional height is becoming more prominent from the Viewpoint A
 - Additional height becomes more visible and apparent the further from the boundary the viewpoint is place (Viewpoint B).



VISUAL IMPACT - SCENARIO 05a

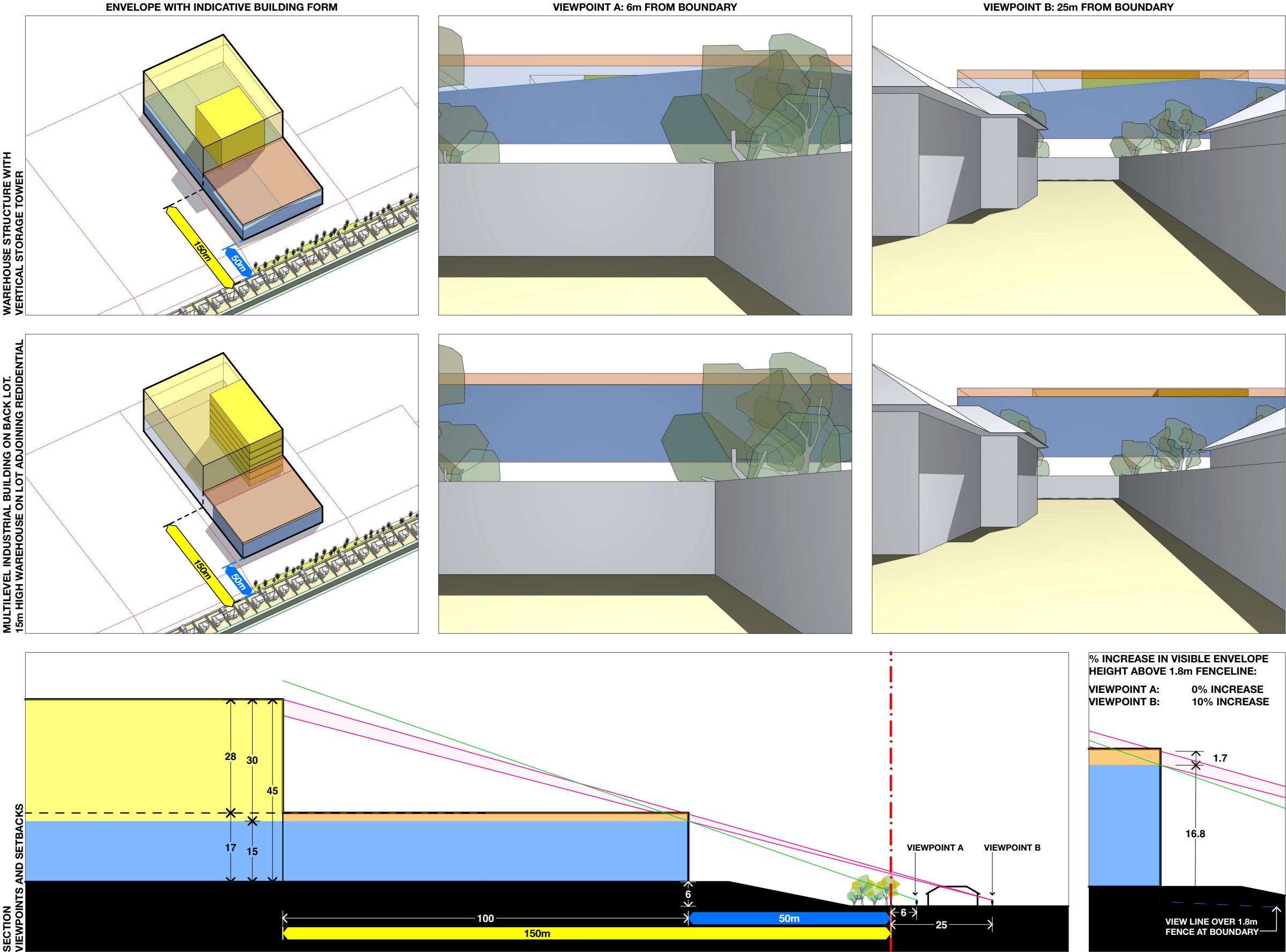
- SCENARIO 5a**
- SLOPING/STEPPED SITE. INDUSTRIAL HIGHER THAN RESIDENTIAL
 - 30,000m² BUILDING GFA
 - 15m HEIGHT AS PER EXISTING
 - 17m MAX HEIGHT TO EXISTING SETBACKS
 - **15-45m MAXIMUM HEIGHT WITH 150m SEPARATION TO RESIDENTIAL ZONE**

RATIONALE:

- Testing the impact of a selected separation distance when there is a level change between zones.

OBSERVATIONS:

- Where the Residential Zone sits lower than the Industrial Zone, the impact of the 45m Height envelope is lessened due to the existing higher volume of the permissible envelope.



VISUAL IMPACT - SCENARIO 05b

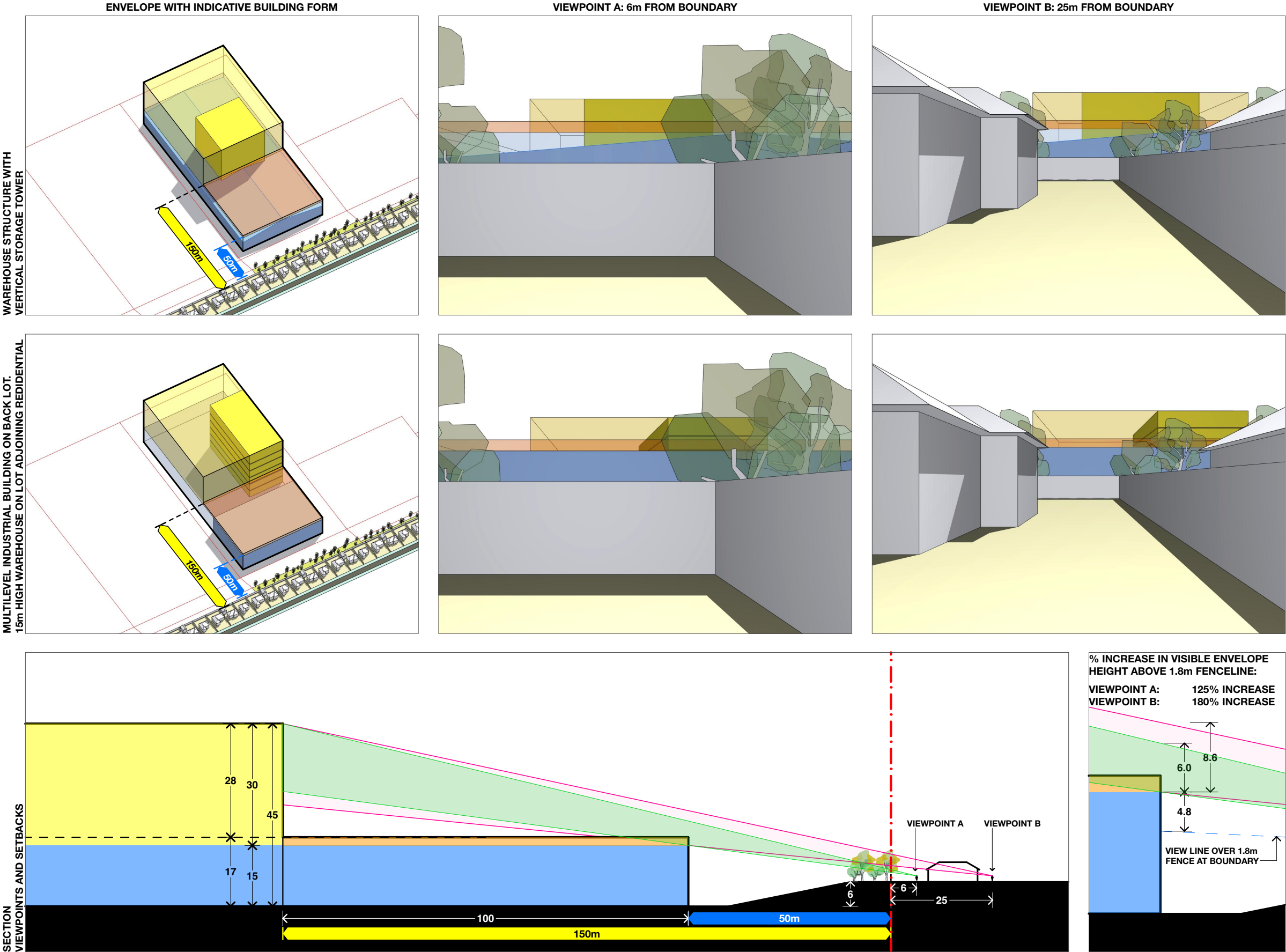
- SCENARIO 5b**
- SLOPING/STEPPED SITE. INDUSTRIAL LOWER THAN RESIDENTIAL
 - 30,000m² BUILDING GFA
 - 15m HEIGHT AS PER EXISTING
 - 17m MAX HEIGHT TO EXISTING SETBACKS
 - **15-45m MAXIMUM HEIGHT WITH 150m SEPARATION TO RESIDENTIAL ZONE**

RATIONALE:

- Testing the impact of a selected separation distance when there is a level change between zones.

OBSERVATIONS:

- Where the Residential Zone sits higher than the Industrial Zone, the impact of the 45m Height envelope is increased due to the existing lower volume of the permissible envelope.



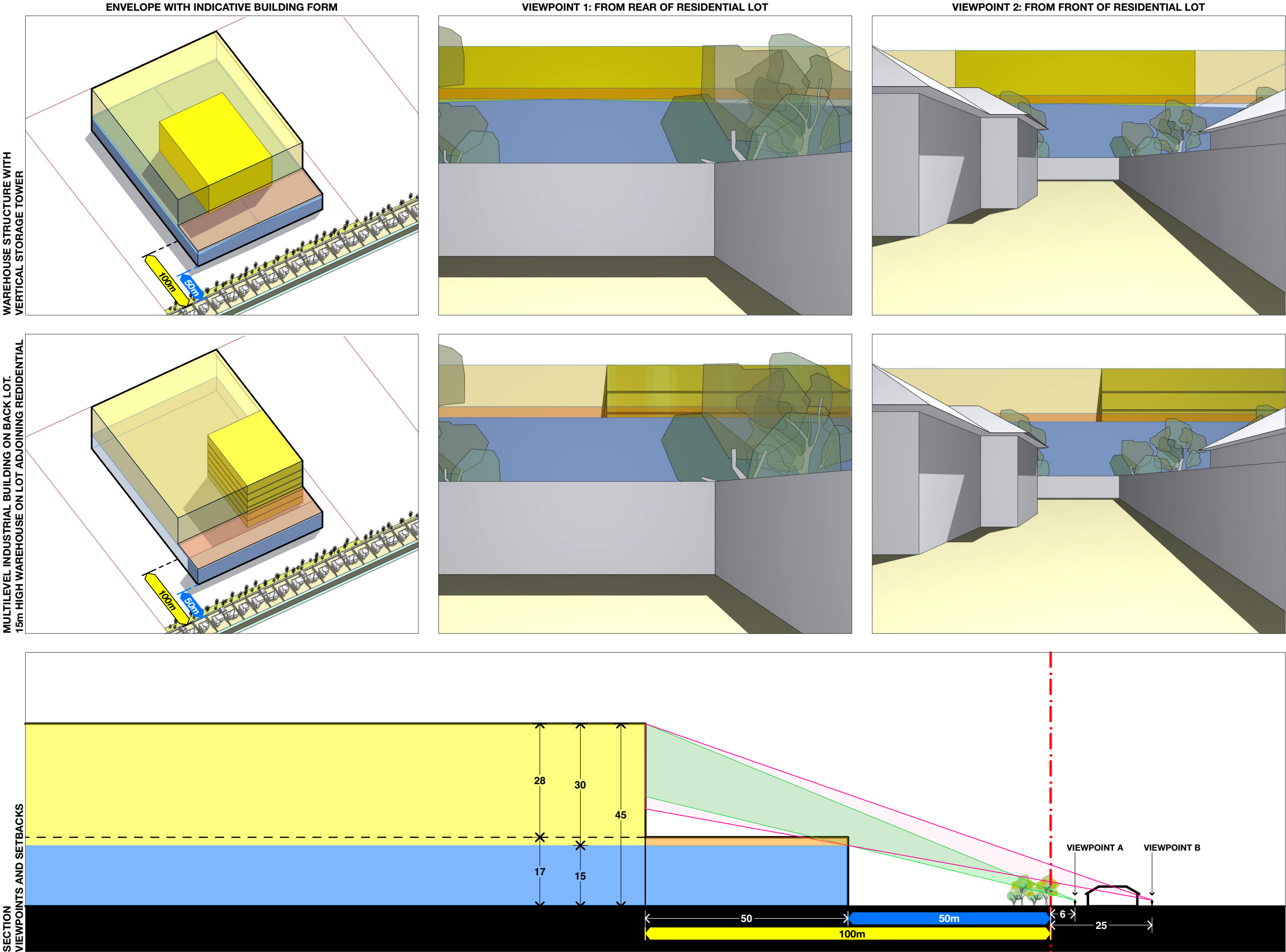
VISUAL IMPACT - SCENARIO 06

- SCENARIO 6**
- 50,000m2 BUILDING GFA
 - 15m MAXIMUM HEIGHT AS PER EXISTING
 - **COMPARISON WITH SCENARIO 4**
 - 15-45m MAXIMUM HEIGHT WITH 100m SEPARATION TO RESIDENTIAL ZONE

RATIONALE:

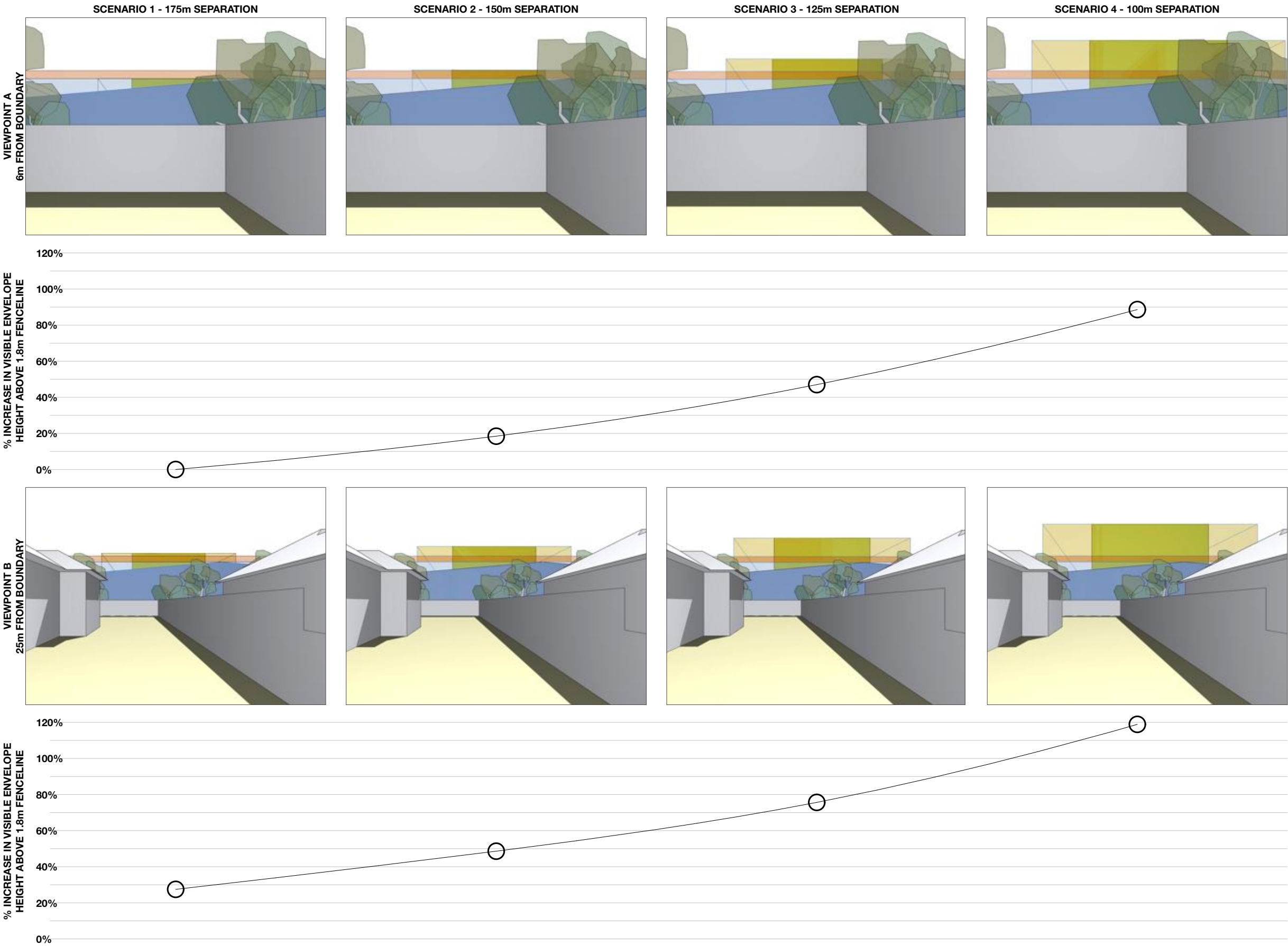
- Testing the impact of larger footprint on visual impact.

- OBSERVATIONS:**
- A larger footprint with the same setback controls has the same visual impact as a smaller footprint in terms of visible height above the existing envelope.
 - There is currently no control over building length or orientation for 10,000-20,000m² buildings, so a very long facade facing a facing a Residential Zone is currently permissible under the SEPP.
 - However a larger footprint building *is* more likely to have a long facade facing a boundary than a smaller footprint building.



VISUAL IMPACT - COMPARISON

- OBSERVATIONS:**
- The visual impact of the proposed 45m Height volume increases exponentially as the separation distance is reduced.
 - The visual impact increases as the viewpoint moves further from the boundary.



SOLAR IMPACT - SCENARIO 01

SCENARIO 1

- 30,000m2 BUILDING GFA
- 15m MAXIMUM HEIGHT AS PER EXISTING
- 15-45m MAXIMUM HEIGHT WITH 175m SEPARATION TO RESIDENTIAL ZONE

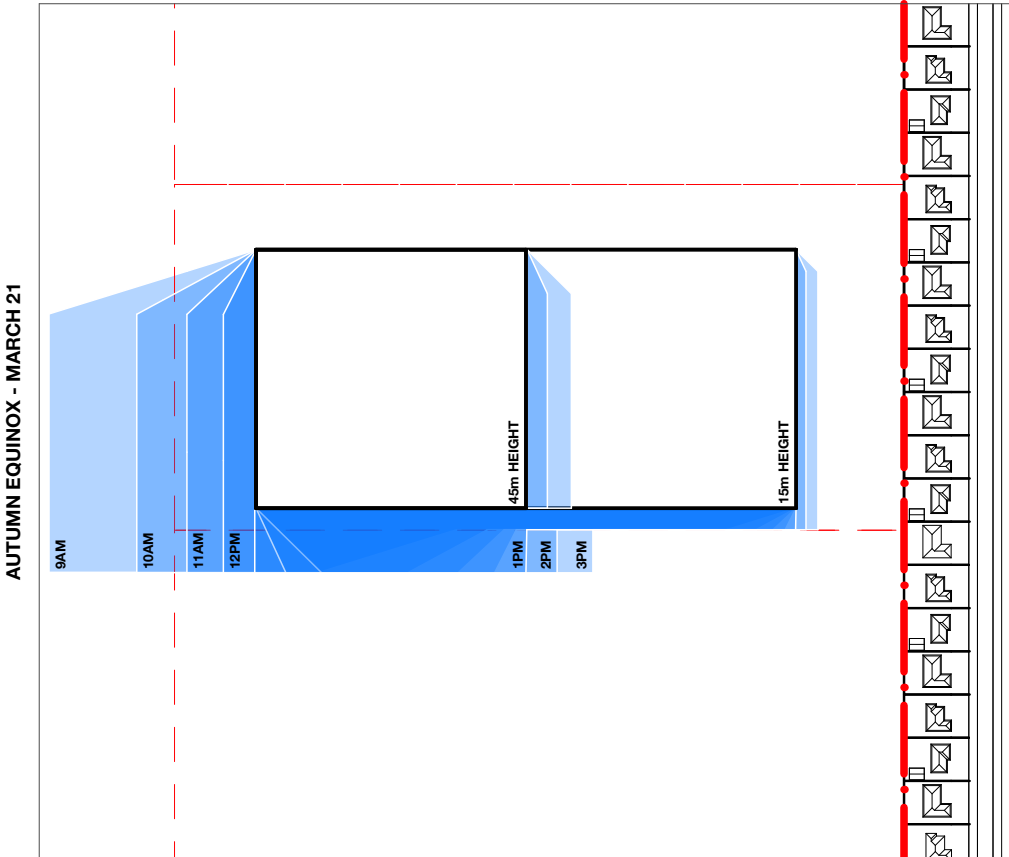
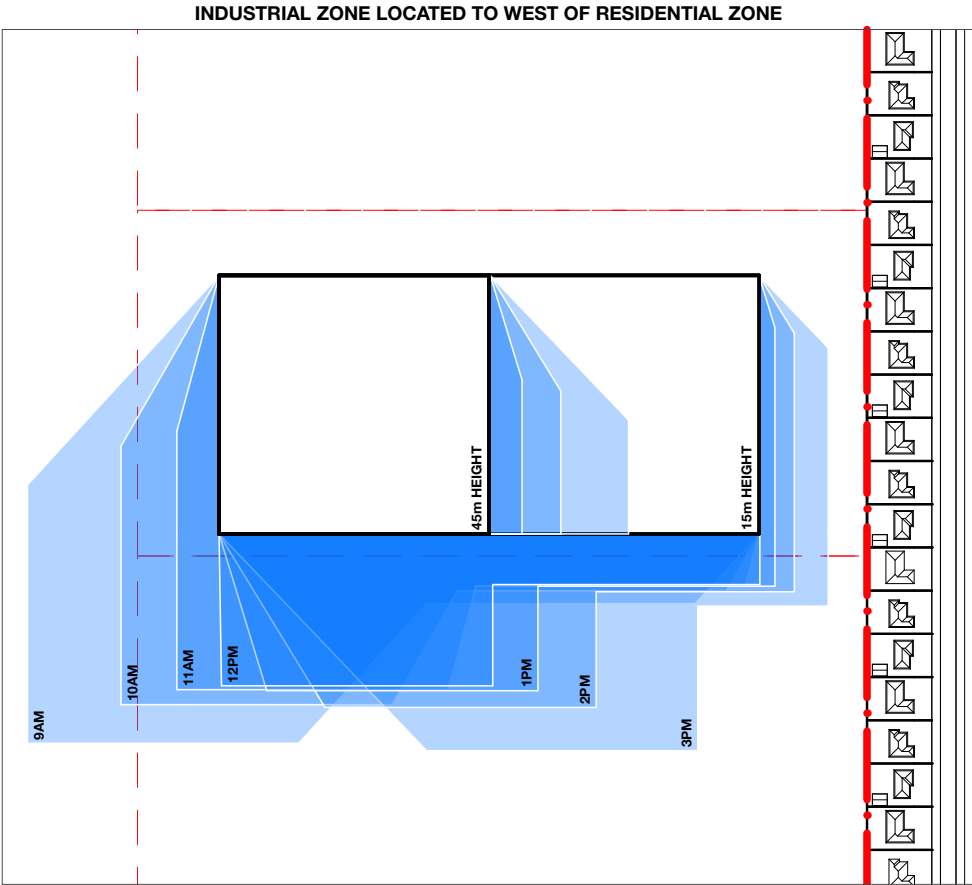
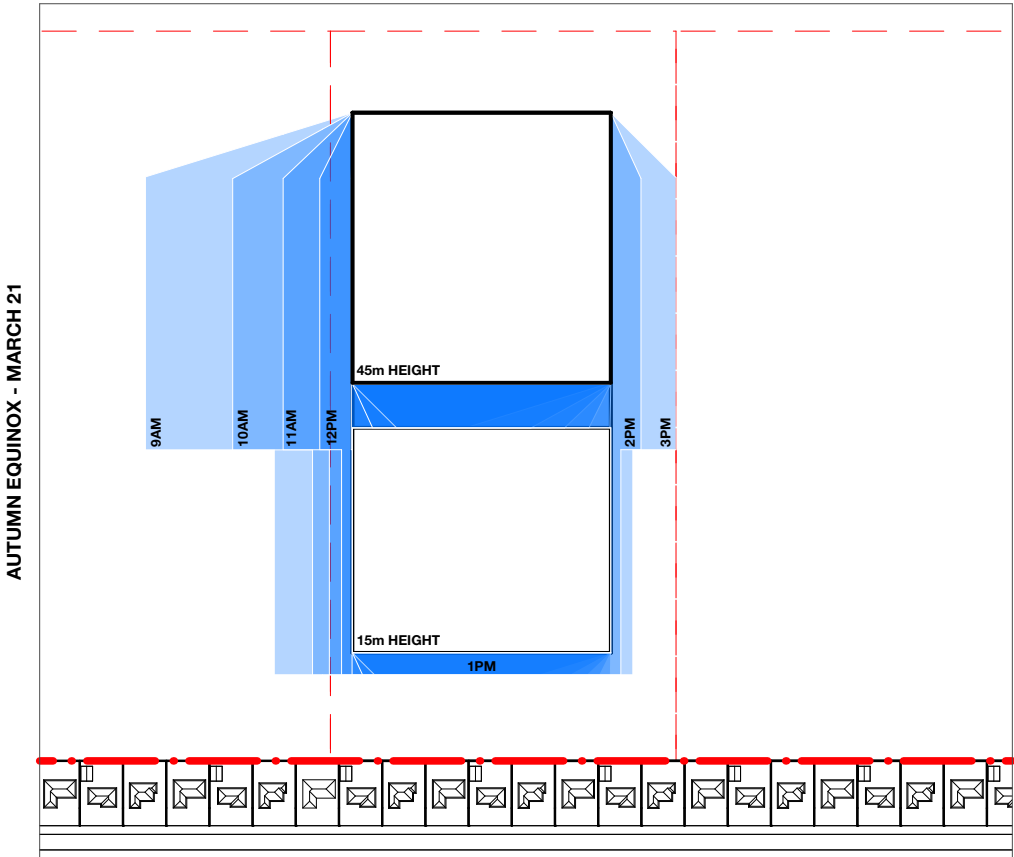
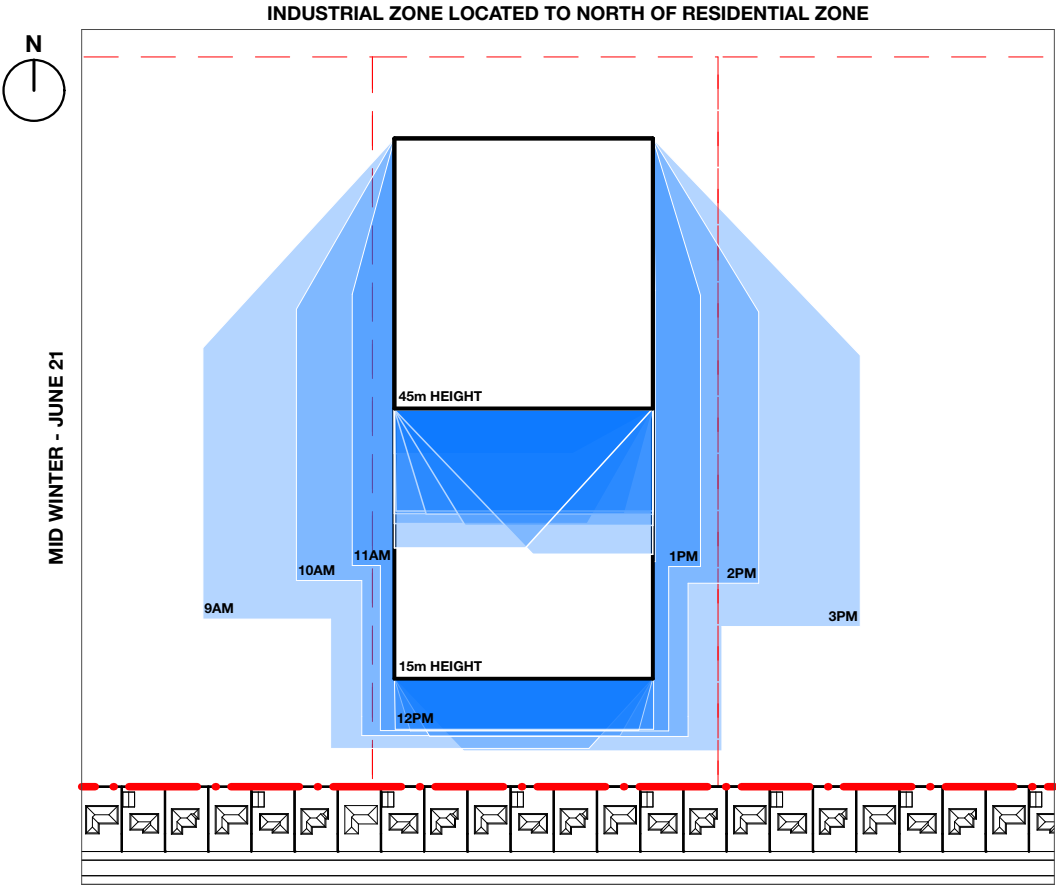
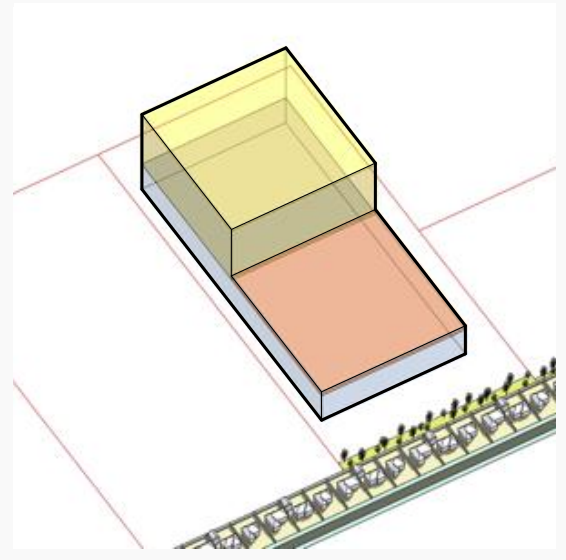
SOLAR IMPACT TESTING

Scenario Tested for the following conditions:

- Located North of Residential
 - 21 June 9am - 3pm
 - 21 March 9am - 3pm
- Located West of Residential
 - 21 June 9am - 3pm
 - 21 March 9am - 3pm

OBSERVATIONS:

- **Located North of Residential**
 - June 21 - No impact
 - March 21 - No impact
- **Located West of Residential**
 - June 21 - No impact
 - March 21 - No impact



SOLAR IMPACT - SCENARIO 02

SCENARIO 2

- 30,000m2 BUILDING GFA
- 15m MAXIMUM HEIGHT AS PER EXISTING
- 15-45m MAXIMUM HEIGHT WITH 150m SEPARATION TO RESIDENTIAL ZONE

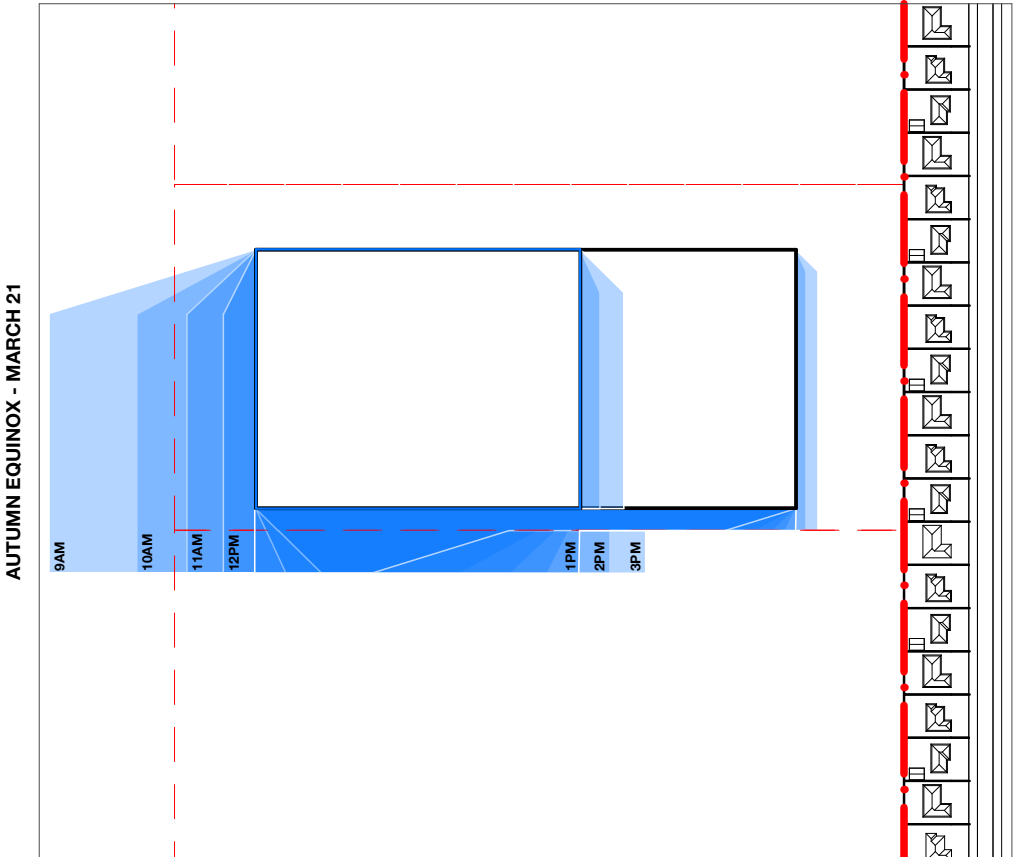
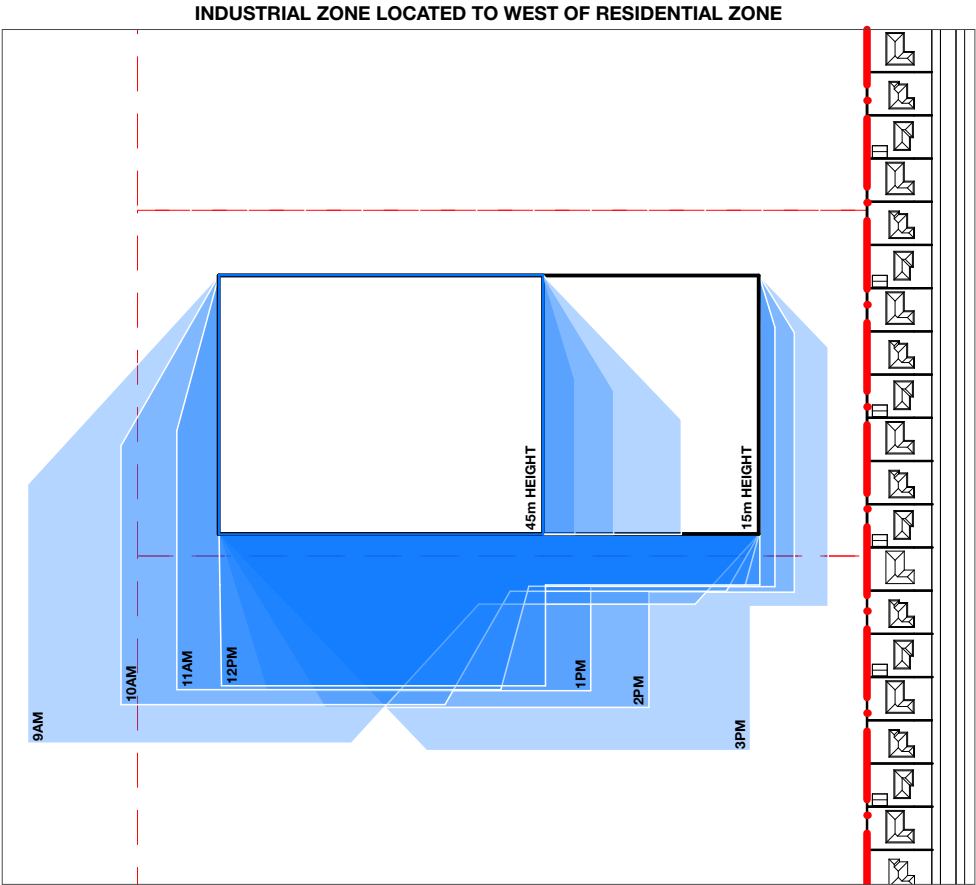
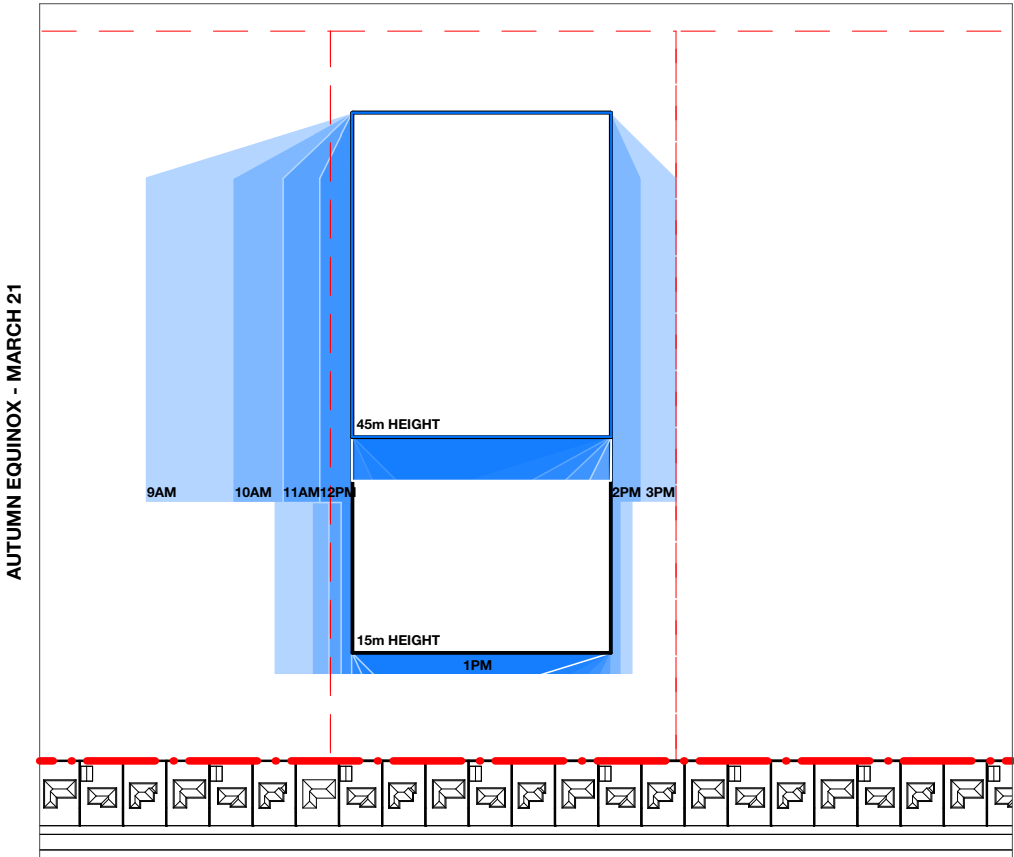
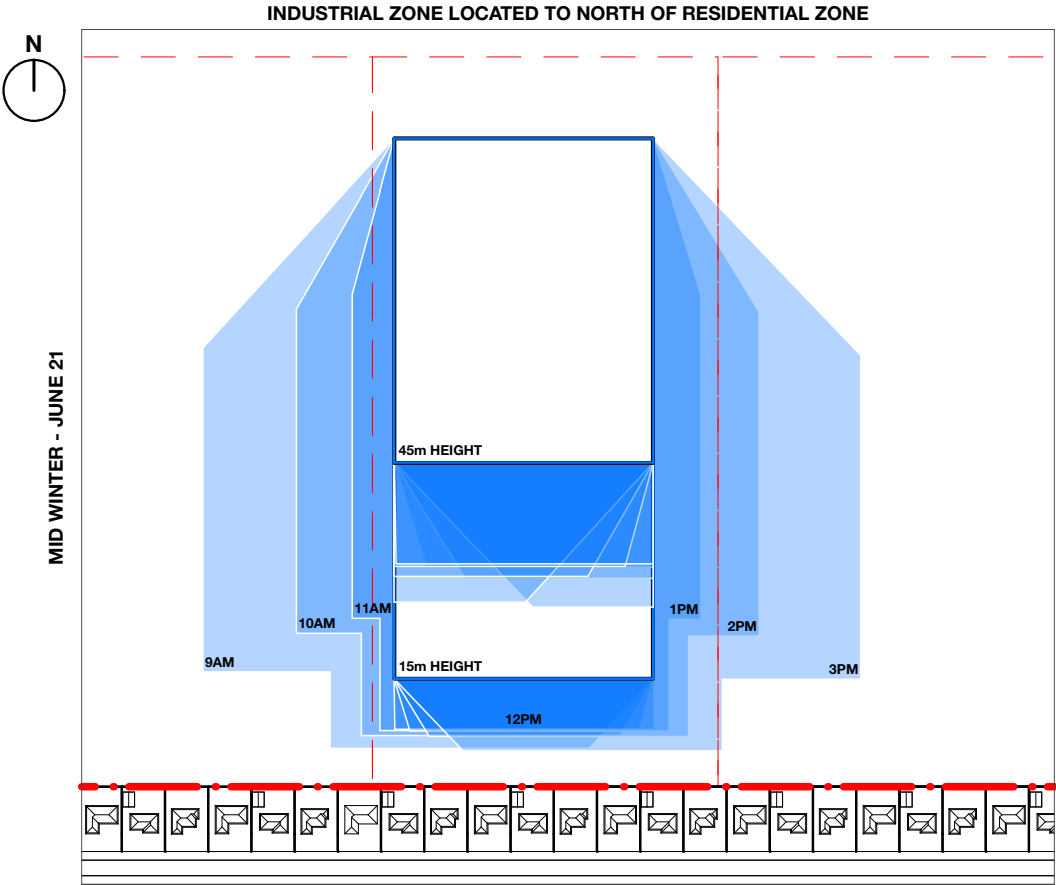
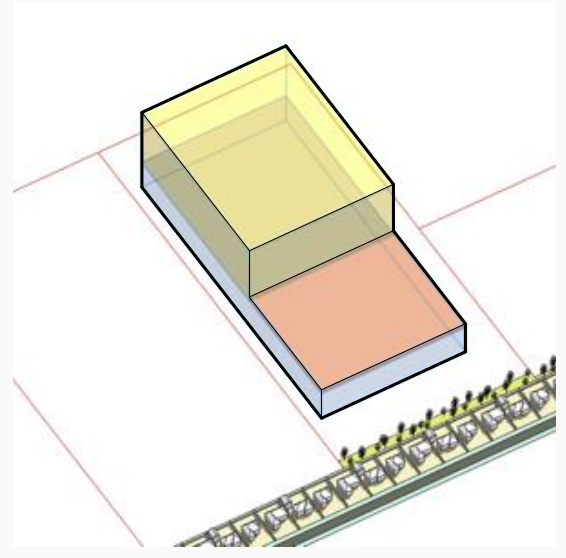
SOLAR IMPACT TESTING

Scenario Tested for the following conditions:

- Located North of Residential
 - 21 June 9am - 3pm
 - 21 March 9am - 3pm
- Located West of Residential
 - 21 June 9am - 3pm
 - 21 March 9am - 3pm

OBSERVATIONS:

- **Located North of Residential**
 - June 21 - No impact
 - March 21 - No impact
- **Located West of Residential**
 - June 21 - No impact
 - March 21 - No impact



SOLAR IMPACT - SCENARIO 03

SCENARIO 3

- 30,000m2 BUILDING GFA
- 15m MAXIMUM HEIGHT AS PER EXISTING
- 15-45m MAXIMUM HEIGHT WITH 125m SEPARATION TO RESIDENTIAL ZONE

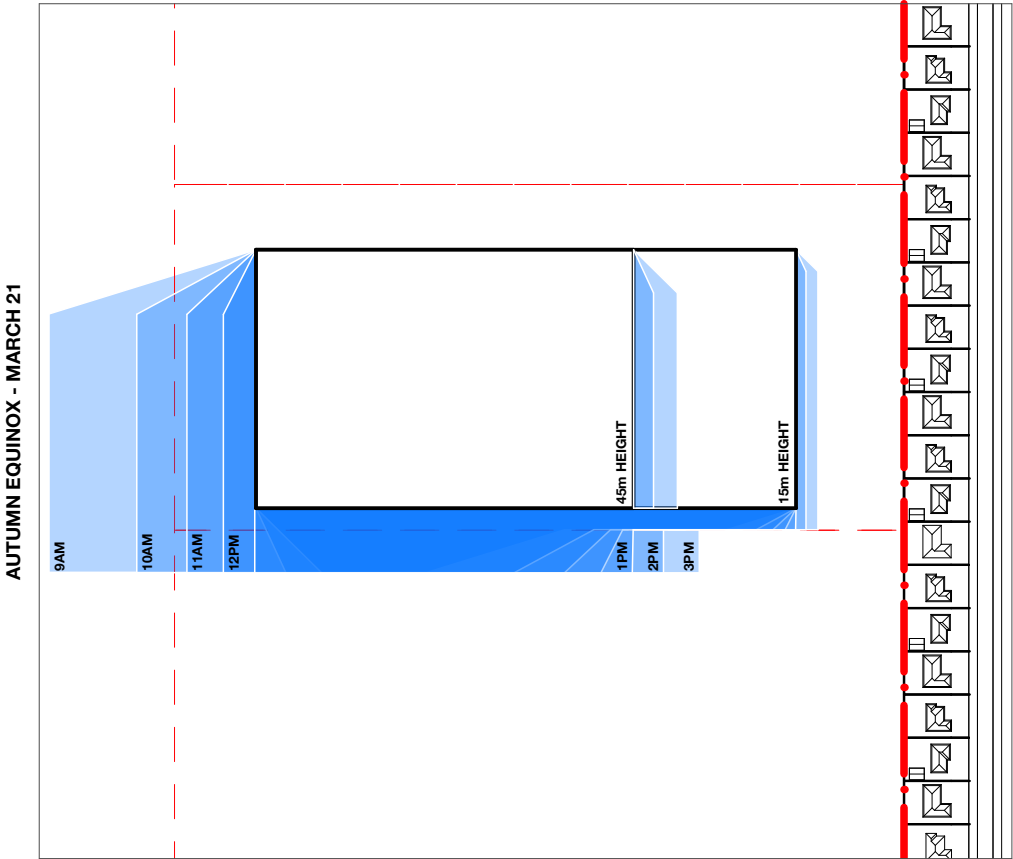
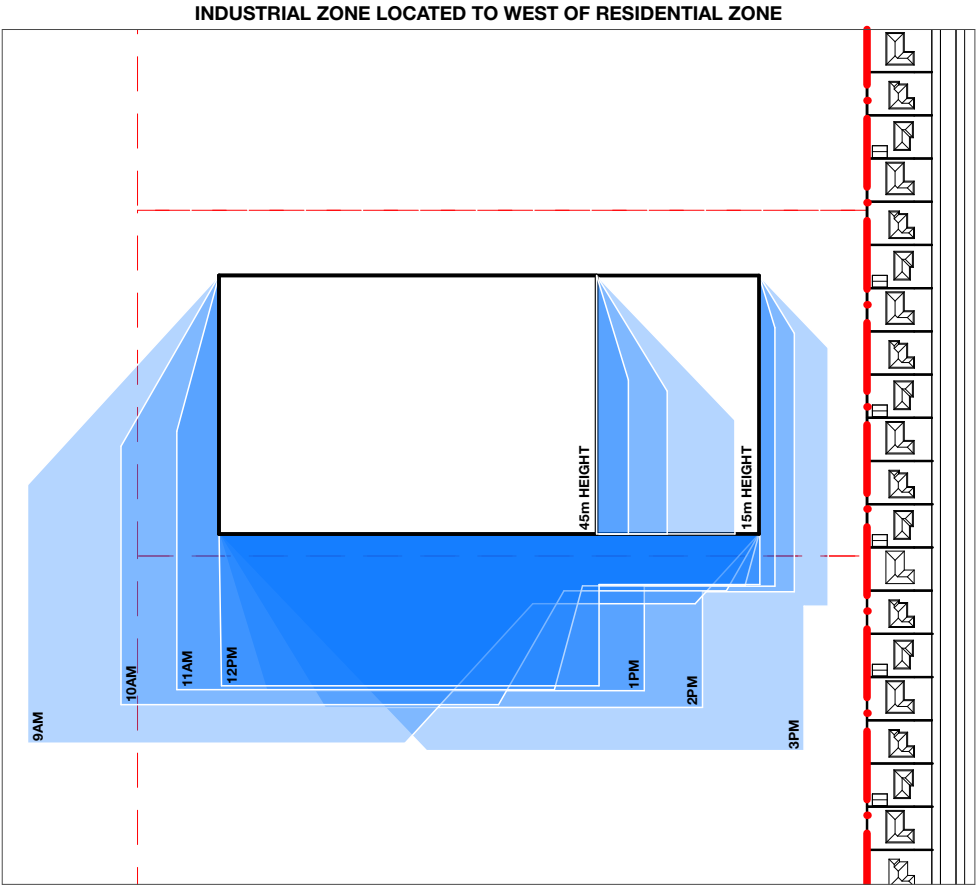
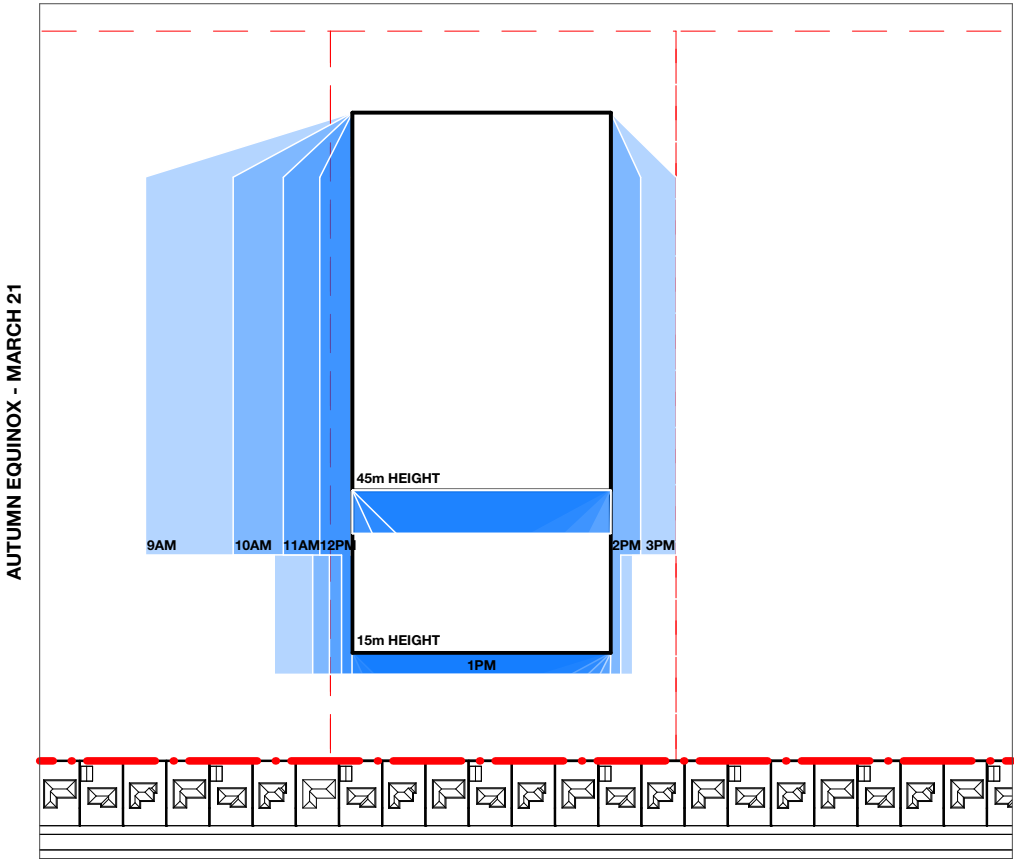
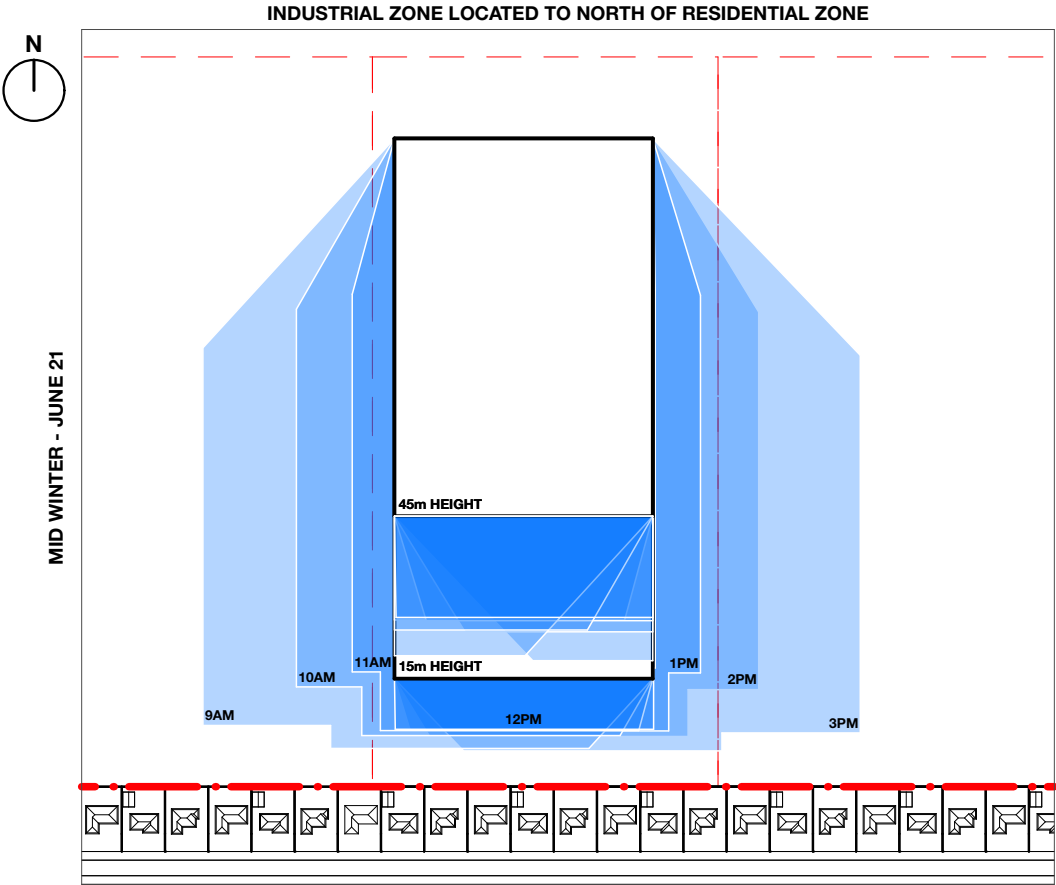
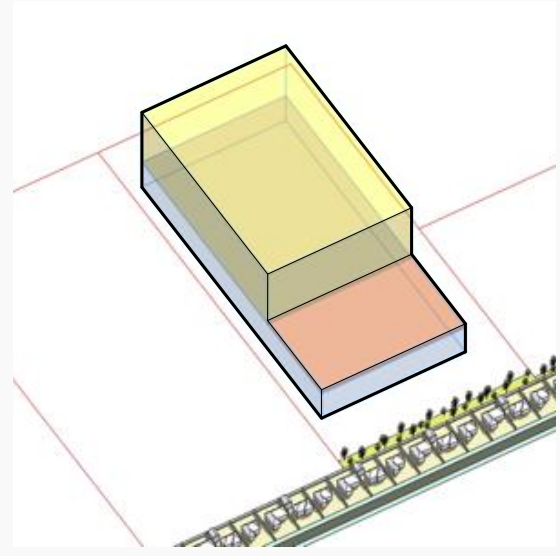
SOLAR IMPACT TESTING

Scenario Tested for the following conditions:

- Located North of Residential
 - 21 June 9am - 3pm
 - 21 March 9am - 3pm
- Located West of Residential
 - 21 June 9am - 3pm
 - 21 March 9am - 3pm

OBSERVATIONS:

- **Located North of Residential**
 - June 21 - No impact
 - March 21 - No impact
- **Located West of Residential**
 - June 21 - No impact
 - March 21 - No impact



SOLAR IMPACT - SCENARIO 04

SCENARIO 4

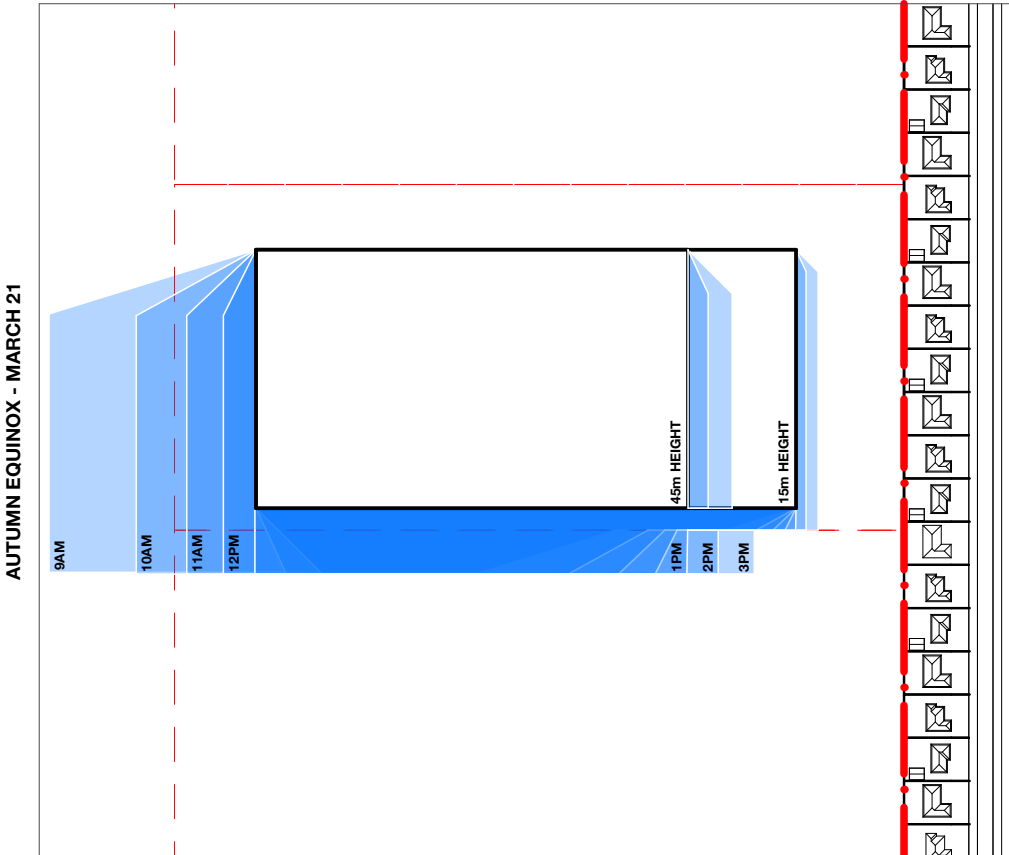
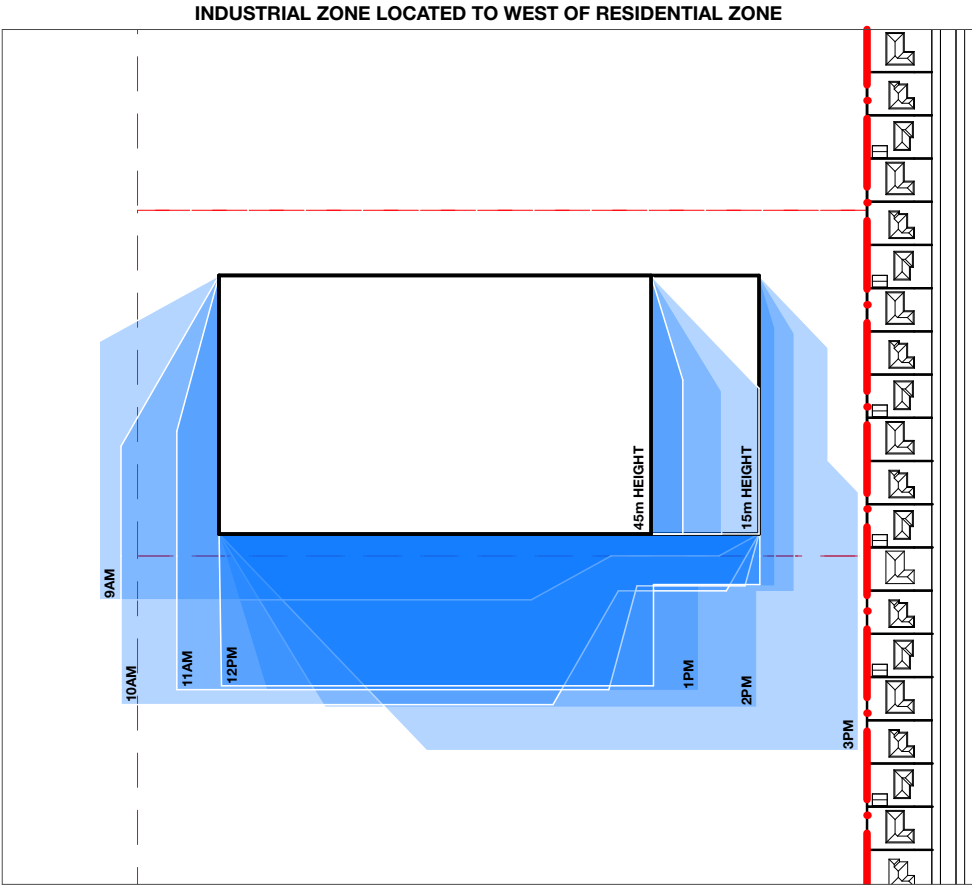
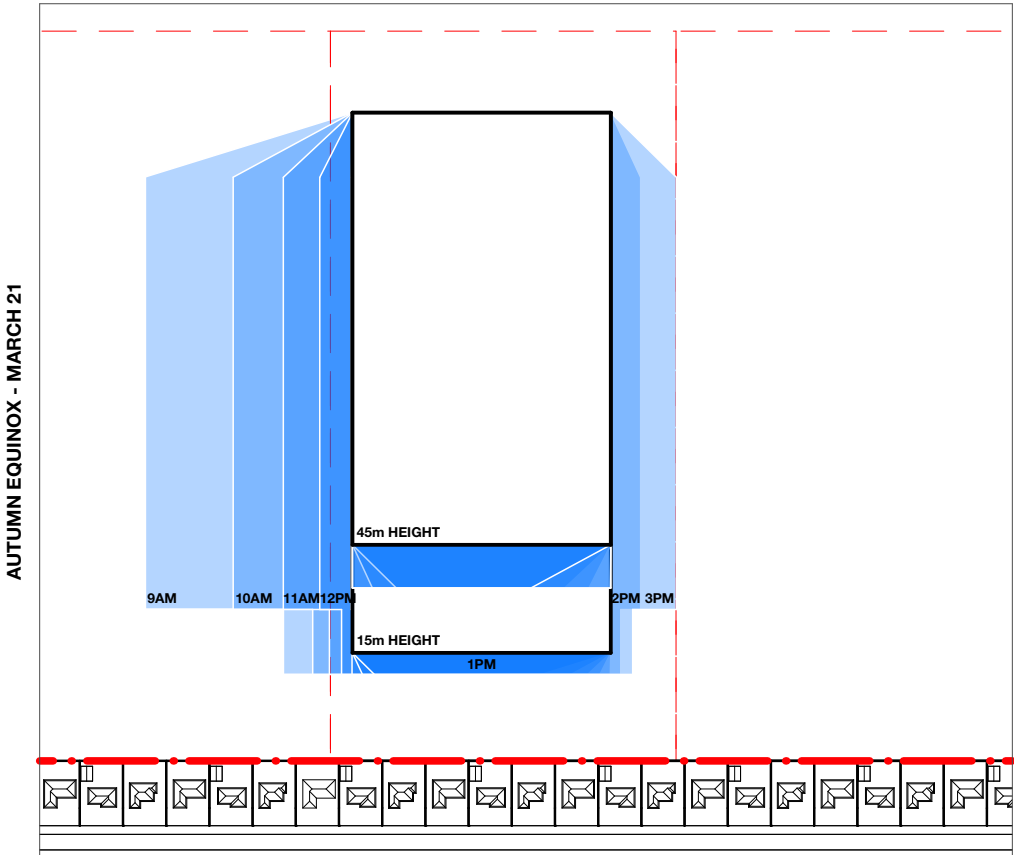
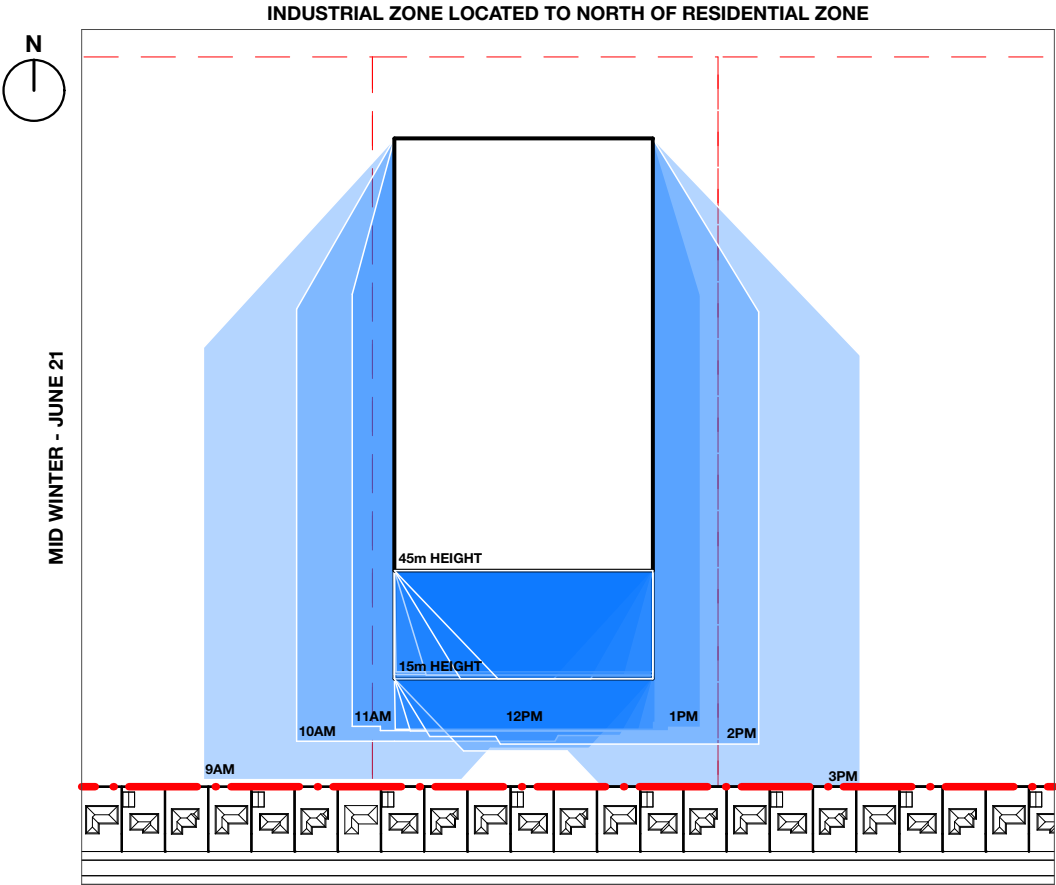
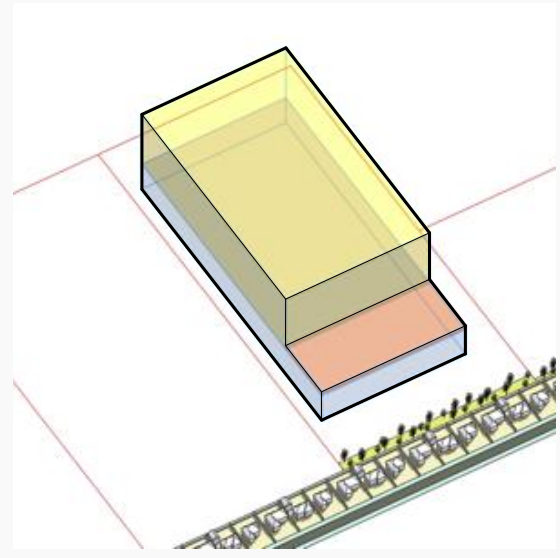
- 30,000m2 BUILDING GFA
- 15m MAXIMUM HEIGHT AS PER EXISTING
- 15-45m MAXIMUM HEIGHT WITH 100m SEPARATION TO RESIDENTIAL ZONE

SOLAR IMPACT TESTING

Scenario Tested for the following conditions:

- Located North of Residential
 - 21 June 9am - 3pm
 - 21 March 9am - 3pm
- Located West of Residential
 - 21 June 9am - 3pm
 - 21 March 9am - 3pm

- OBSERVATIONS:**
- **Located North of Residential**
 - June 21 - No impact
 - Shadow meets boundary at 3pm
 - March 21 - No impact
 - **Located West of Residential**
 - June 21 - No impact
 - Shadow nears boundary at 3pm
 - March 21 - No impact

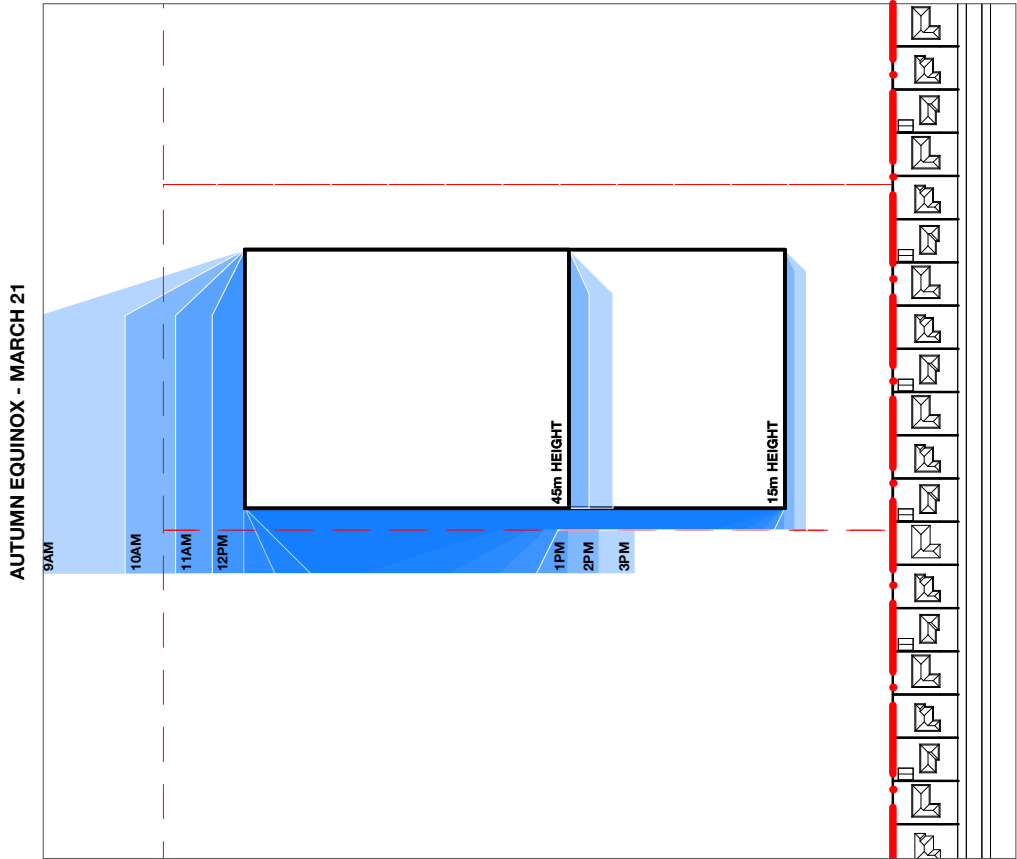
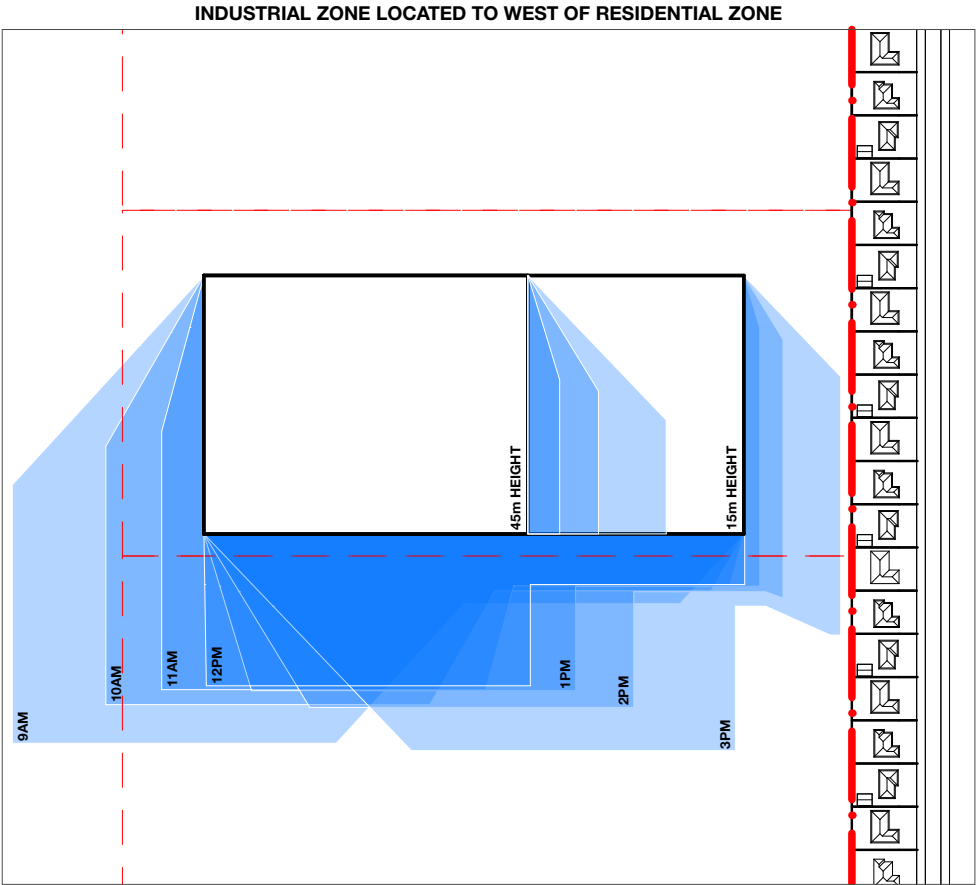
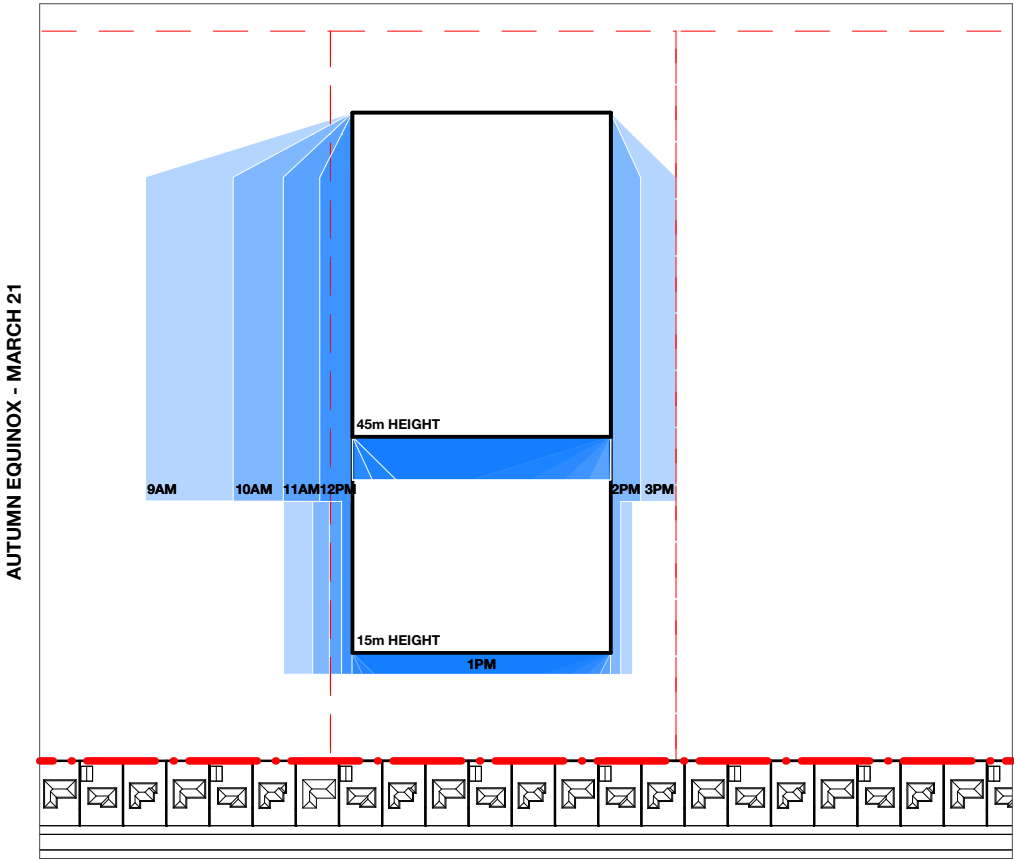
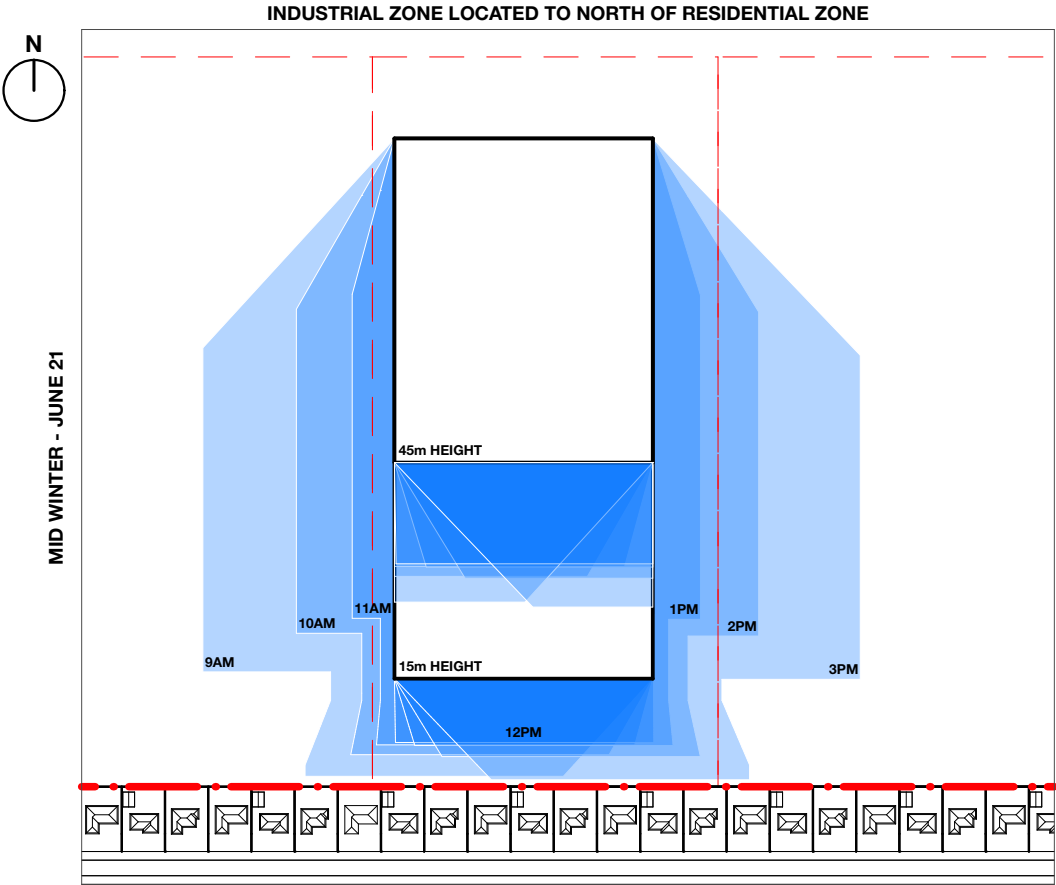
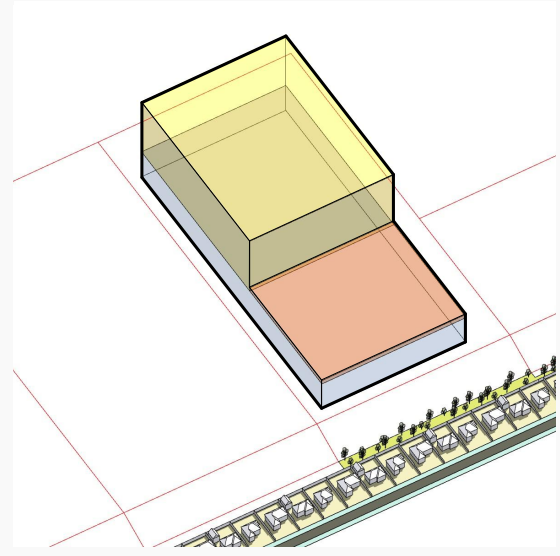


SOLAR IMPACT - SCENARIO 05a

- SCENARIO 5a**
- STEPPED/SLOPING SITE
 - 30,000m2 BUILDING GFA
 - 15m MAXIMUM HEIGHT AS PER EXISTING
 - **15-45m MAXIMUM HEIGHT WITH 150m SEPARATION TO RESIDENTIAL ZONE**

- SOLAR IMPACT TESTING**
- Scenario Tested for the following conditions:
- Located North of Residential
 - 21 June 9am - 3pm
 - 21 March 9am - 3pm
 - Located West of Residential
 - 21 June 9am - 3pm
 - 21 March 9am - 3pm

- OBSERVATIONS:**
- **Located North of Residential**
 - June 21 - No impact
 - Shadow nears boundary at 3pm
 - March 21 - No impact
 - **Located West of Residential**
 - June 21 - No impact
 - Shadow nears boundary at 3pm
 - March 21 - No impact

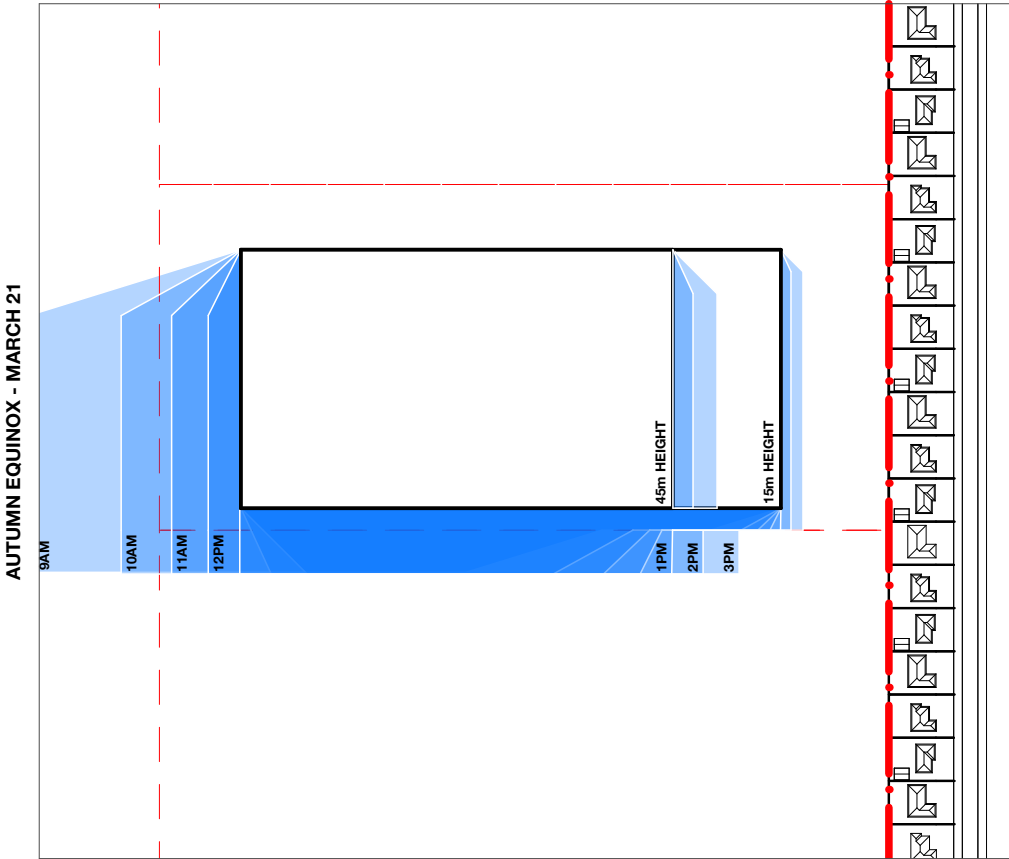
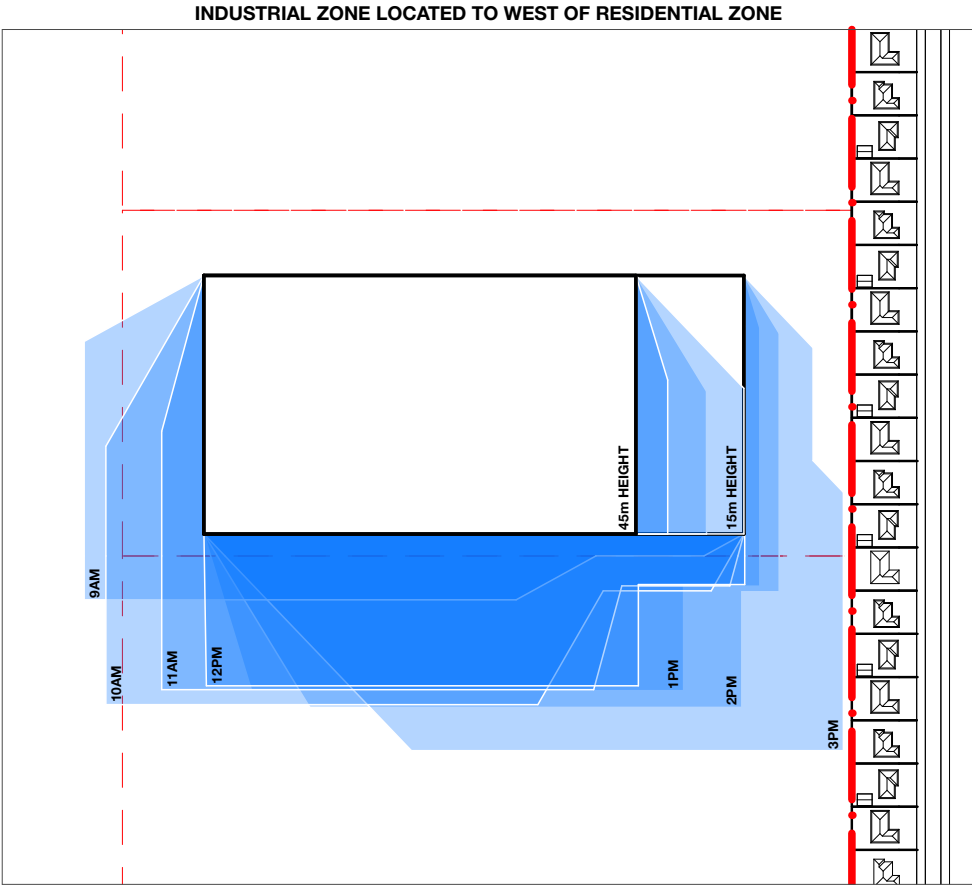
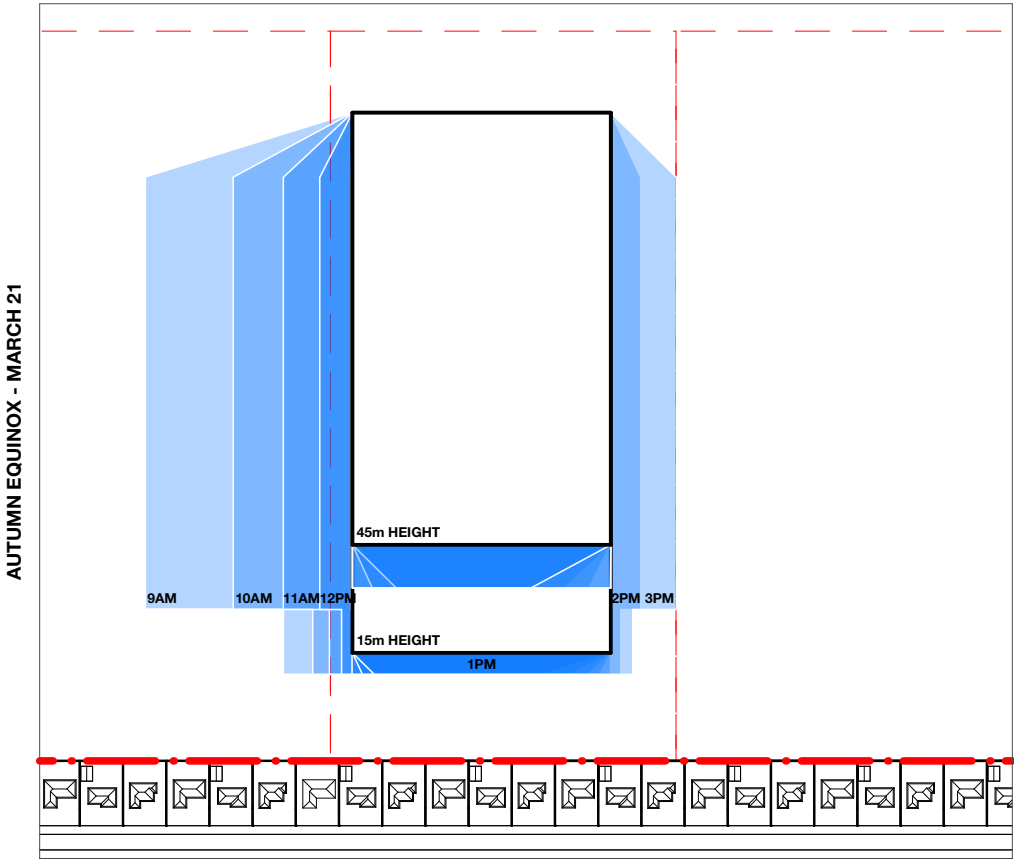
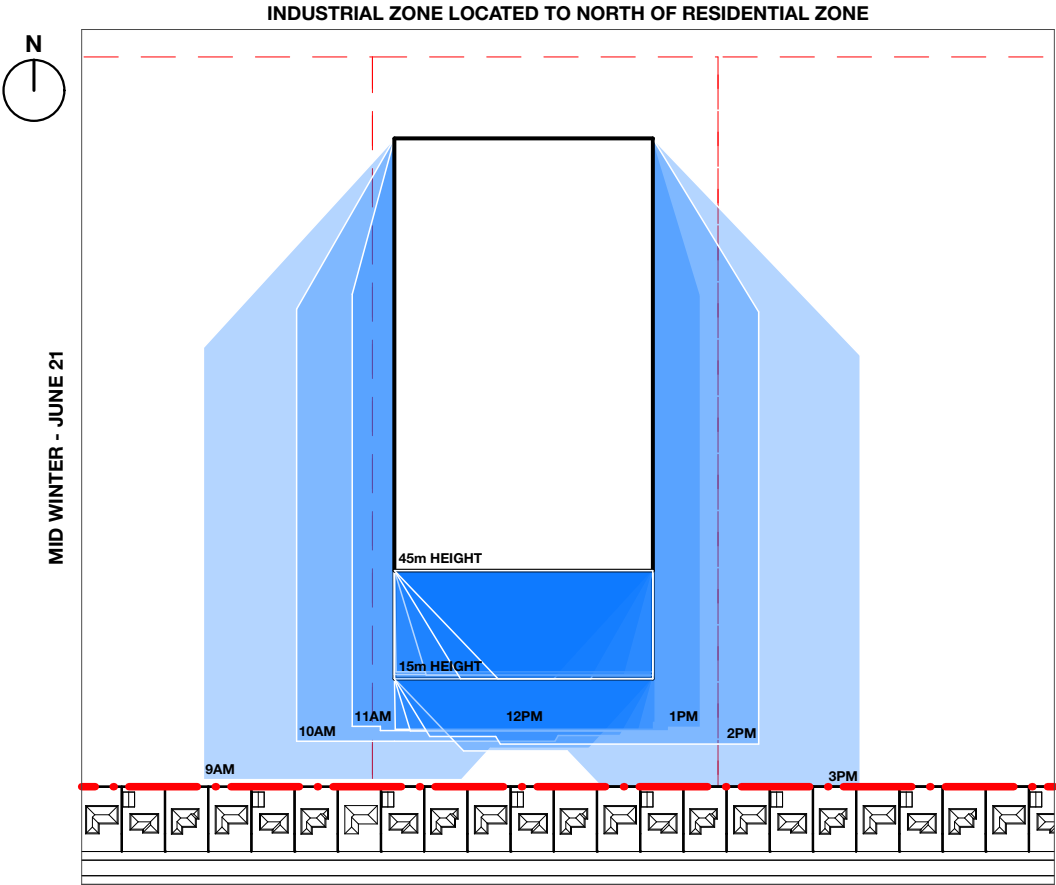
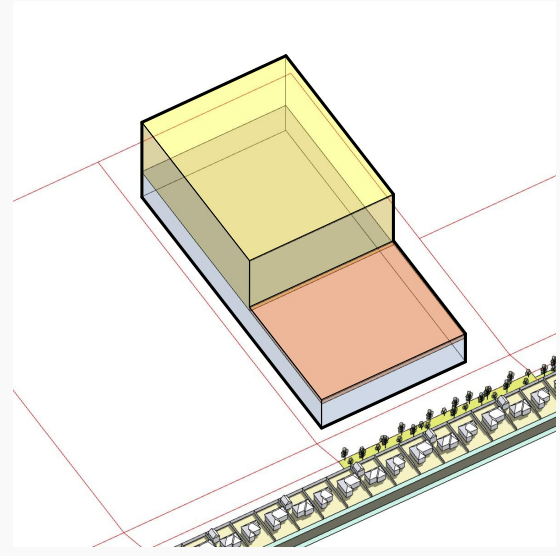


SOLAR IMPACT - SCENARIO 05b

- SCENARIO 5b**
- STEPPED/SLOPING SITE
 - 30,000m2 BUILDING GFA
 - 15m MAXIMUM HEIGHT AS PER EXISTING
 - **15-45m MAXIMUM HEIGHT WITH 150m SEPARATION TO RESIDENTIAL ZONE**

- SOLAR IMPACT TESTING**
- Scenario Tested for the following conditions:
- Located North of Residential
 - 21 June 9am - 3pm
 - 21 March 9am - 3pm
 - Located West of Residential
 - 21 June 9am - 3pm
 - 21 March 9am - 3pm

- OBSERVATIONS:**
- **Located North of Residential**
 - June 21 - No impact
 - March 21 - No impact
 - **Located West of Residential**
 - June 21 - No impact
 - March 21 - Shadow nears boundary at 3pm



SOLAR IMPACT - SCENARIO 06

SCENARIO 5b

- 50,000m² BUILDING GFA
- 15m MAXIMUM HEIGHT AS PER EXISTING
- 15-45m MAXIMUM HEIGHT WITH 100m SEPARATION TO RESIDENTIAL ZONE

SOLAR IMPACT TESTING

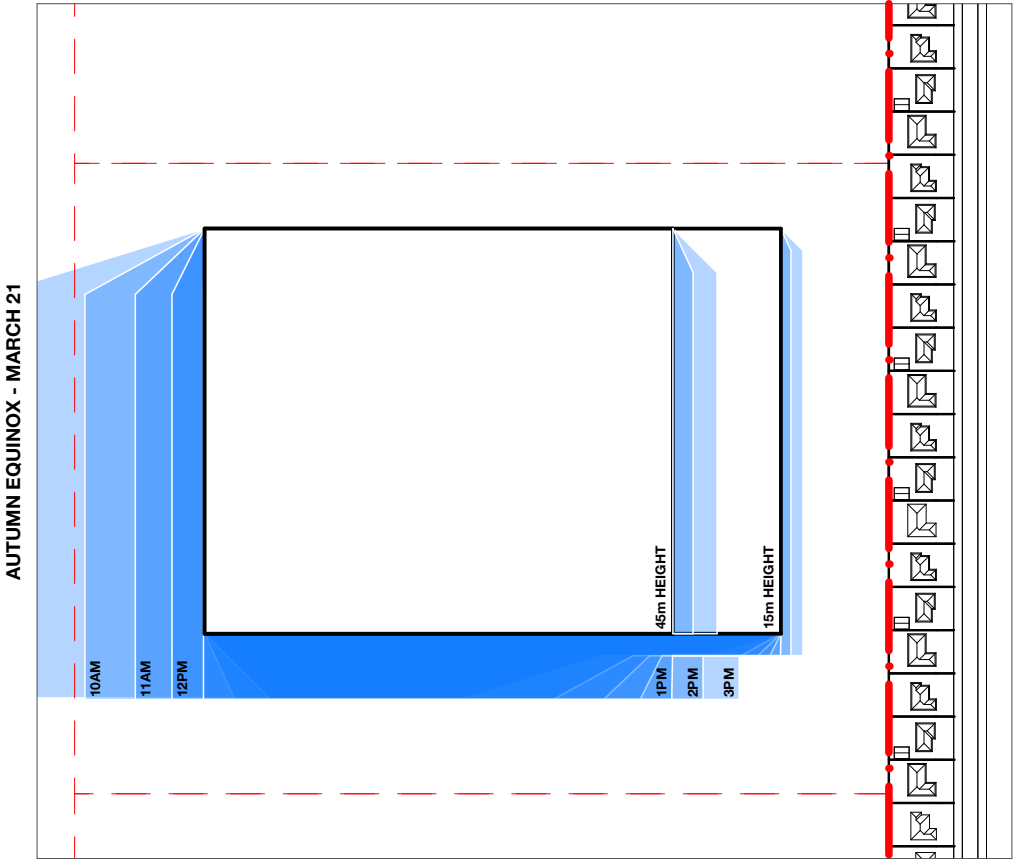
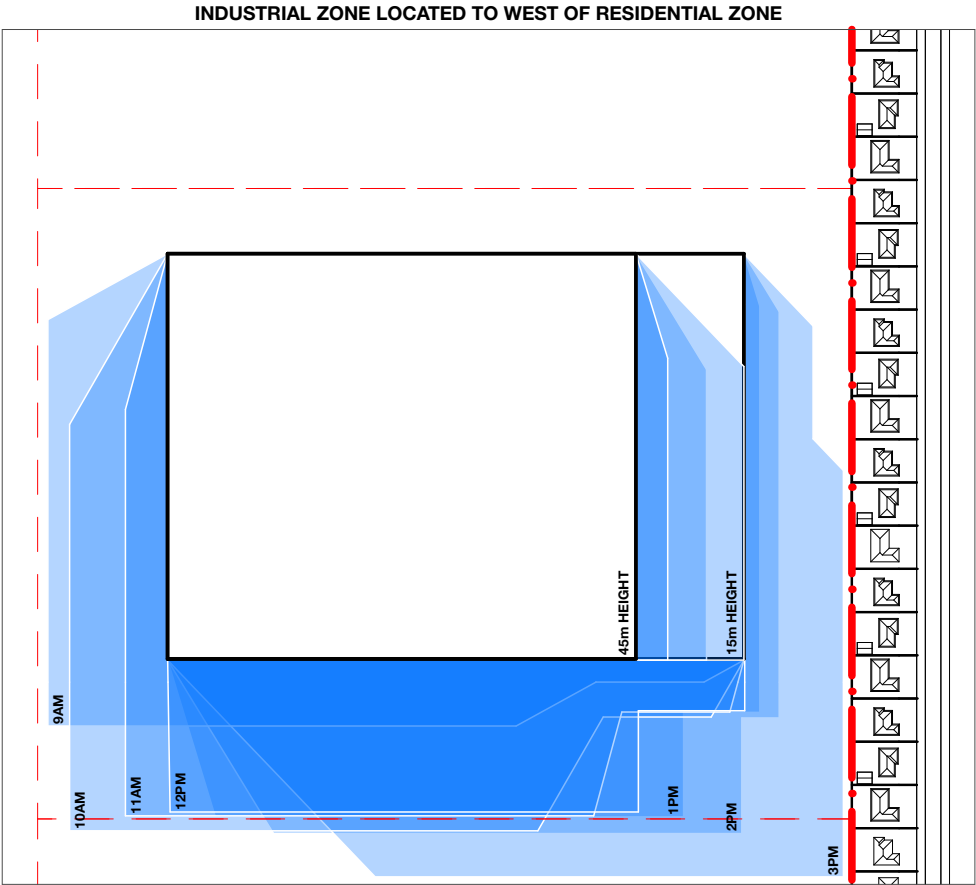
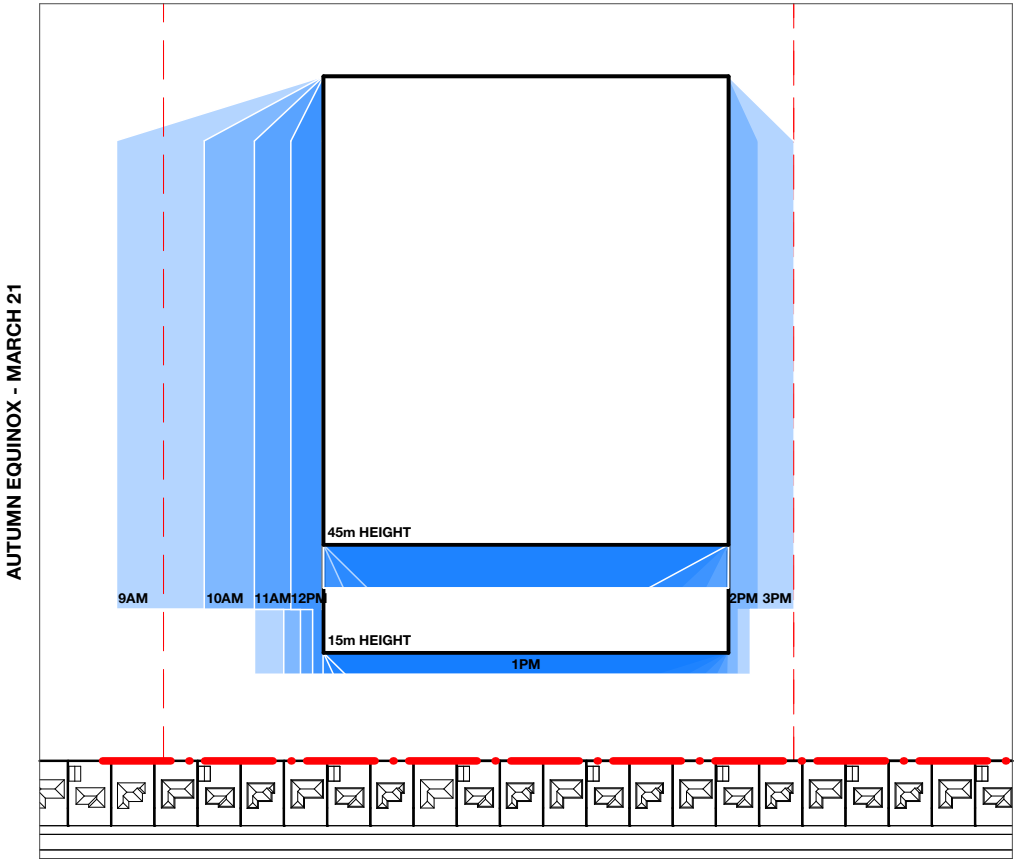
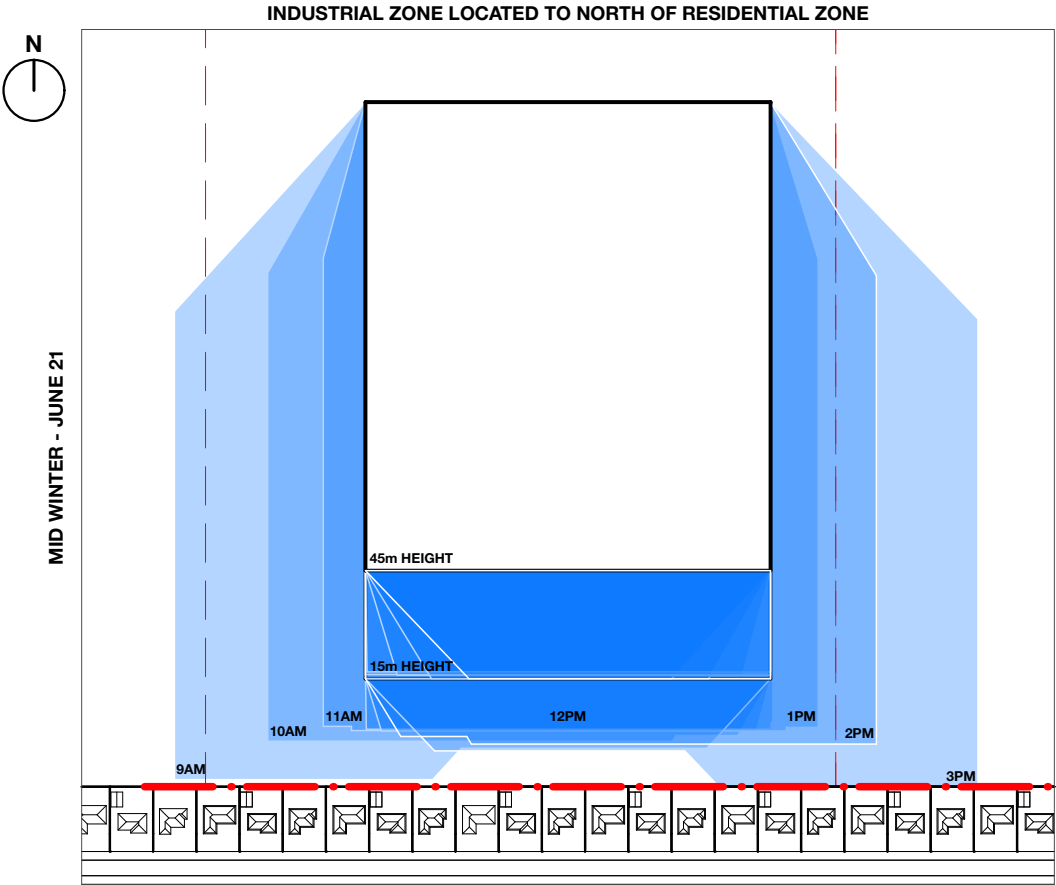
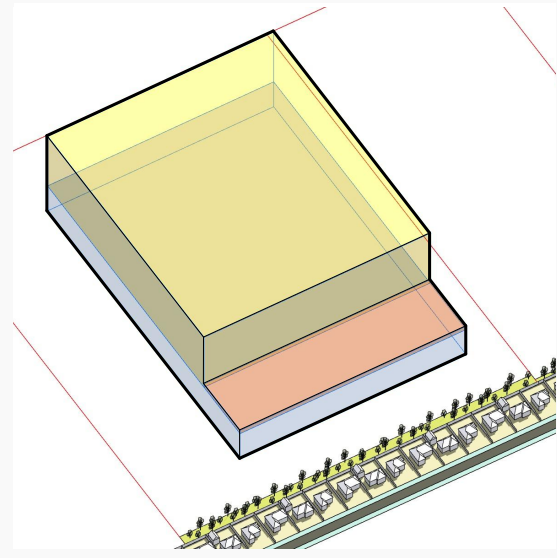
Scenario Tested for the following conditions:

- Located North of Residential
- 21 June 9am - 3pm
- 21 March 9am - 3pm
- Located West of Residential
- 21 June 9am - 3pm
- 21 March 9am - 3pm

OBSERVATIONS:

- **Located North of Residential**
- June 21 - No impact
- Shadow meets boundary at 3pm
- March 21 - No impact
- **Located West of Residential**
- June 21 - No impact
- Shadow nears boundary at 3pm
- March 21 - No impact

As the heights, setback and separation controls are consistent with the 30,000m² Building, the overshadowing impact of a larger footprint on adjoining residential are the same.



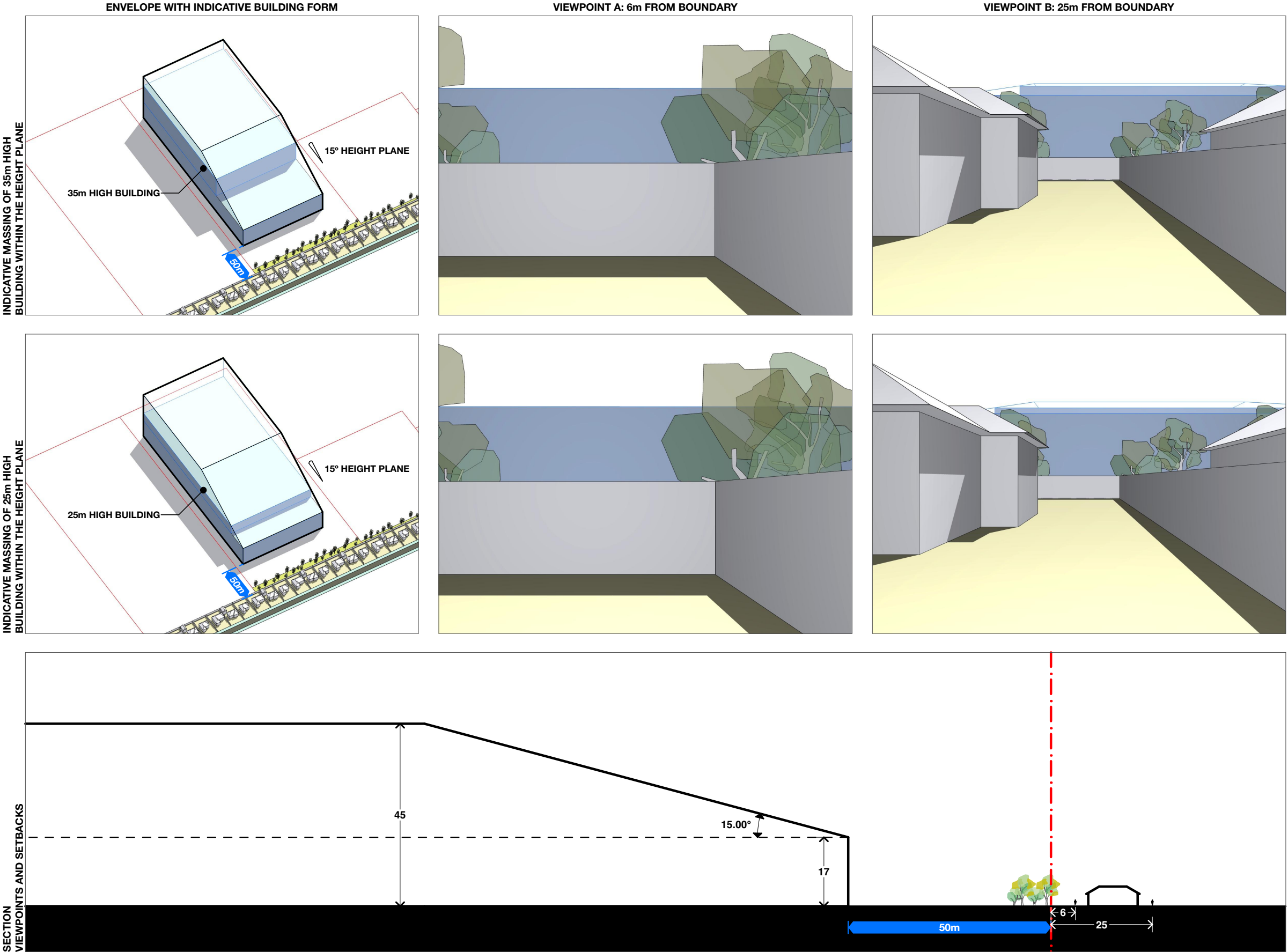
SCENARIO 02 - HEIGHT PLANE

The Scenarios tested prior assume a defined vertical separation control at 17m building height and at 45m building height.

This is consistent with the current setback controls for buildings with a GFA >10,000m²

An alternate control to be considered is an angled height plane starting at the maximum building height at the 50m setback and raking back to the maximum 45m height.

- The diagrams on this page show:
- A height plane of 15° based on the Scenario 2 separation controls,
 - Two possible massings for buildings with heights of 25m and 35m



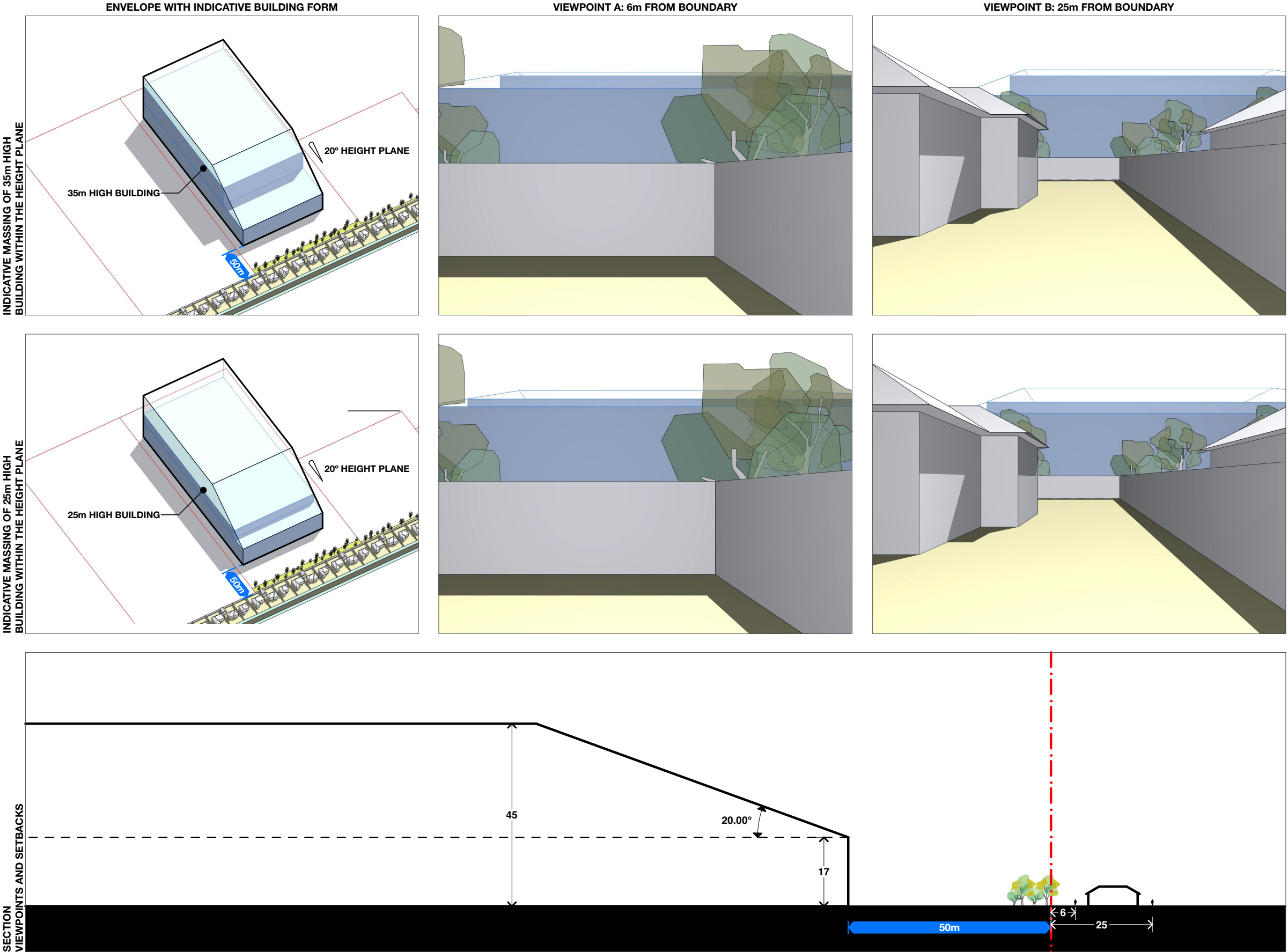
SCENARIO 03 - HEIGHT PLANE

The Scenarios tested prior assume a defined vertical separation control at 17m building height and at 45m building height.

This is consistent with the current setback controls for buildings with a GFA >10,000m²

An alternate control to be considered is an angled height plane starting at the maximum building height at the 50m setback and raking back to the maximum 45m height.

- The diagrams on this page show:
- A height plane of 20° based on the Scenario 3 separation controls,
 - Two possible massings for buildings with heights of 25m and 35m

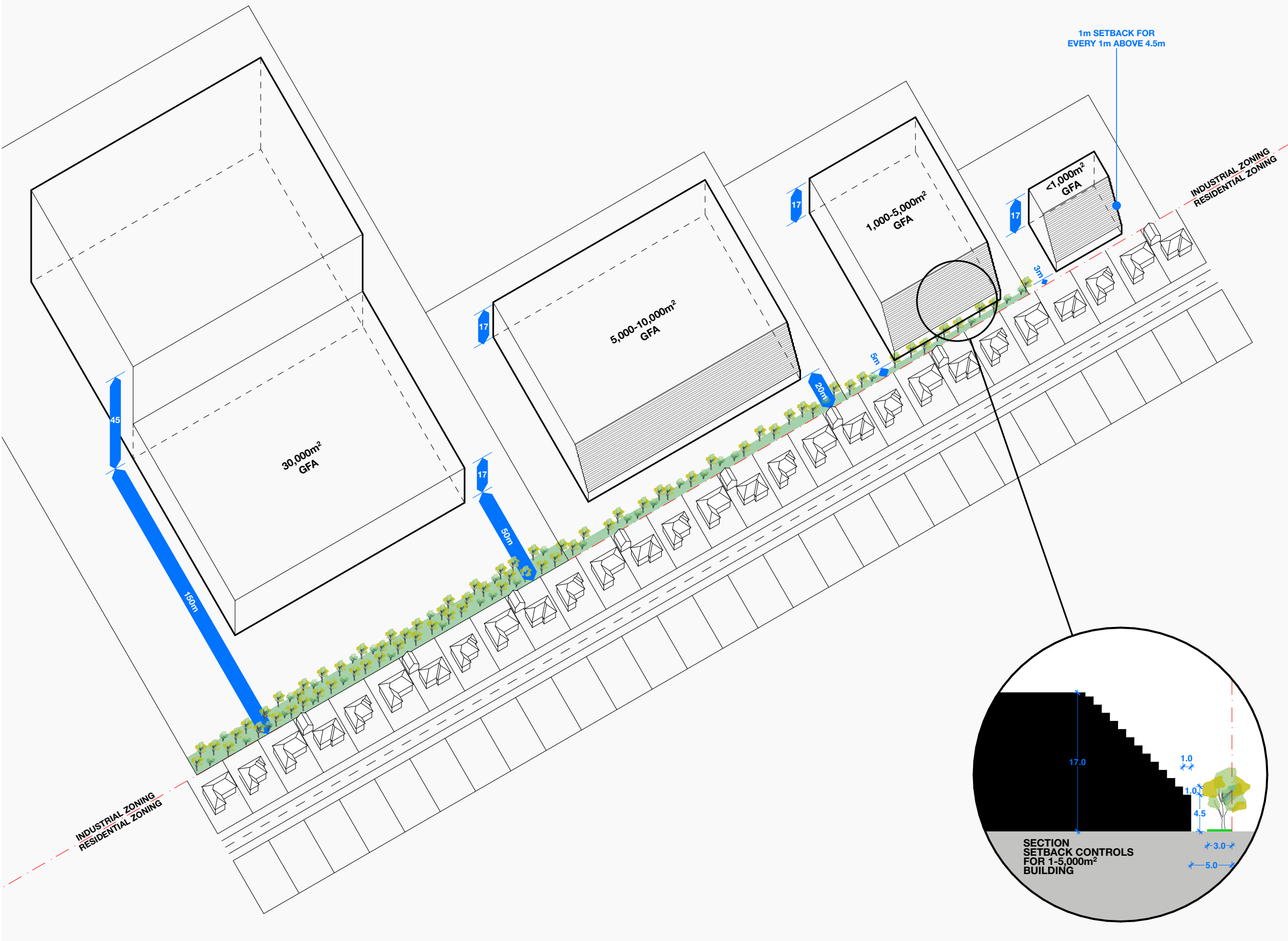


SUMMARY OF CONTROLS - PROPOSED

1:2000, 1:500

SUMMARY DIAGRAM ILLUSTRATING PROPOSED COMPLYING DEVELOPMENT ENVELOPES WHERE INDUSTRIAL ZONES LOTS ADJOIN RESIDENTIAL ZONED LOTS, AND THERE IS NO LEP HEIGHT CONTROL:

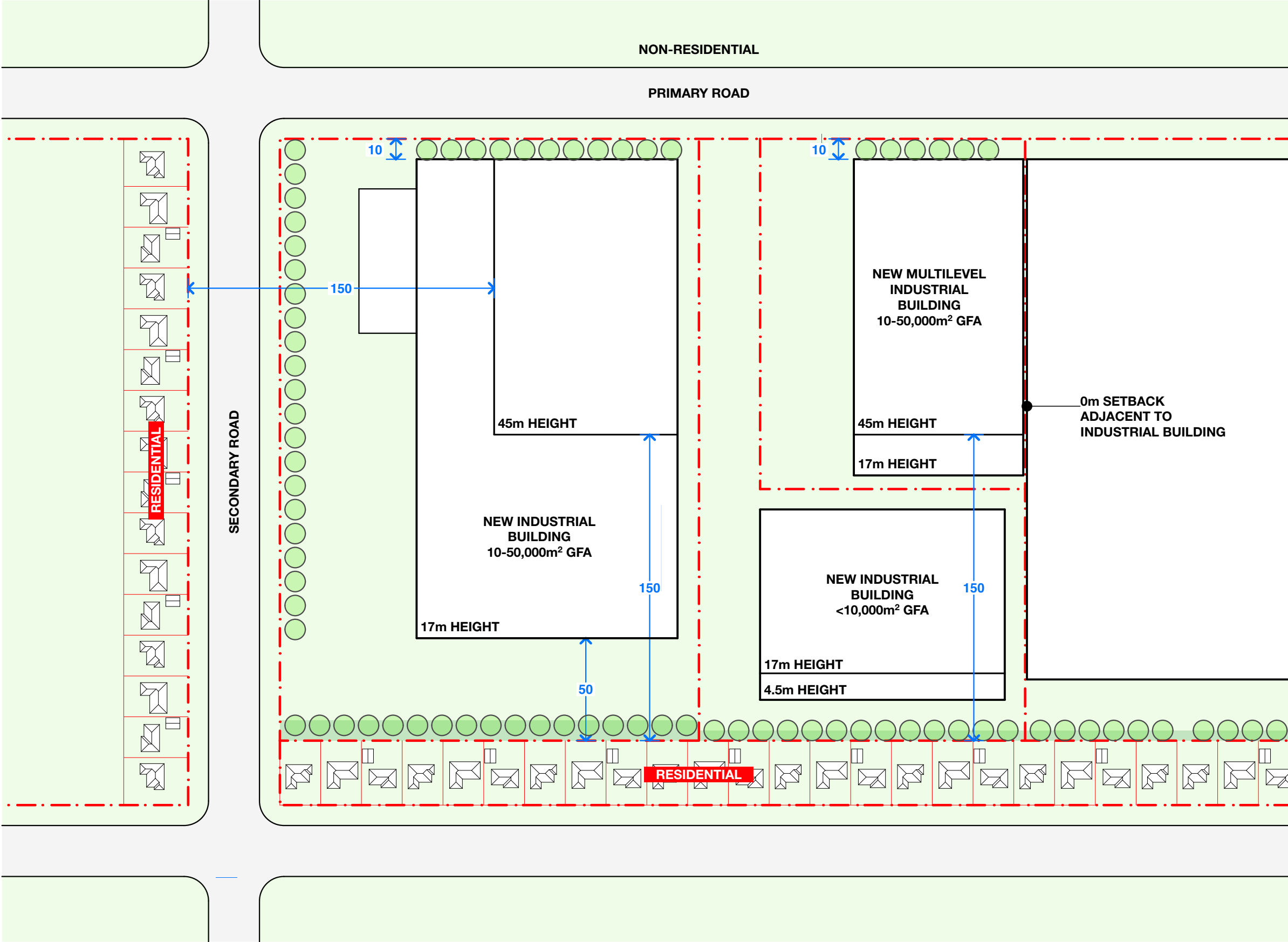
- INCLUDING:
- Indicative maximum GFA footprint
 - Maximum height
 - Complying setbacks to side and rear boundaries by GFA groupings
 - Landscaped setbacks and plantings
 - Indicative residential building forms



ILLUSTRATIVE PLAN DIAGRAM

1:2000

A summary plan showing selected controls similar to the plan provided in the DPIE "Information Sheet 5.2" for the SEPP.



CONCLUSIONS

PROPOSED AMENDMENT	COMMENT	ISSUES FOR CONSIDERATION	RECOMMENDATION
MAXIMUM GFA <ul style="list-style-type: none">- An increase in the maximum permissible GFA from 20,000m² to 30-50,000m²	<ul style="list-style-type: none">- The Visual and Solar Impact due to the increased GFA will be similar to the 20,000m2 buildings provided setback and separation controls are the same.- The Visual Impact is potentially increased due to the larger scale buildings. Note however that there is currently no control over building length or orientation for 10,000-20,000m² buildings, so a very long facade facing a facing a Residential Zone is currently permissilbe under the SEPP.	<ul style="list-style-type: none">- Buildings of 50,000m² GFA may be of a scale that is overwhelming to adjoining residential areas.- While a 20,000m2 building is already large, and permissible, a 50,000m2 building is more than double the size, and the impact of its larger scale should be considered.- A larger footprint building is more likely to have a longer facade facing a boundary than a smaller footprint building.	<ul style="list-style-type: none">- Provided setback and separation controls remain consistent, the visual impact in terms of height will be similar regardless of area.- The visual impact in terms of overall massing will be likely higher as buildings 2.5x larger than currently permissible will most likely grow in width as well as depth. As such it is likely a larger building will present a longer facade to the boundary. <p>DPIE should consider:</p> <ul style="list-style-type: none">- the likelihood of 30,000- 50,000m² sites without a height limit being located a adjacent a residential zone,- the relative impact given the large setbacks and separation controls proposed
BASE HEIGHT LIMIT <ul style="list-style-type: none">- An increase of the base height limit (where no LEP height limit) from 15m to 17m	<ul style="list-style-type: none">- The additional 2m of building height represents a 16-18% increase in visible envelope over the existing envelope.- The rationale for this proposed amendment should be read in conjunction with Urbis' advice provided separately.- The additional height has a solar impact on adjoining residential for the hours tested for buildings <10,000m²- There is no additional overshadowing for the times tested for buildings >10,000m²- The additional overshadowing for smaller site is due to the smaller setbacks for these sites in the current SEPP	<ul style="list-style-type: none">- The additional 2m of building height represents a 16-18% increase in visible envelope over the existing envelope.- The additional overshadowing for buildings <10,000m²- Detail on the rationale for the additional height should be provided to confirm the need for this change.	<ul style="list-style-type: none">- DPIE should consider the benefits provided by the additional height against the solar and visual impact on residential properties.
45m HEIGHT AND SEPARATION CONTROLS <ul style="list-style-type: none">- A new 45m Maximum Height for buildings between 10,000m² - 50,000m² GFA subject to separation controls- New separation controls for heights between 17m-45m for buildings between 10,000m² - 50,000m² GFA	<ul style="list-style-type: none">- The visual impact of the proposed 45m Height volume increases exponentially as the separation distance is reduced.- The visual impact increases as the viewpoint moves further from the boundary.- The Angled Height Plane allows for more variation of buildings heights within the envelope.- The solar impact for the times studied (9am-3pm) is negated by the large dimension of the existing and proposed setback and separation controls.	<ul style="list-style-type: none">- Sloping and stepped sites introduce additional complexities to assessing the visual impact of increased height. Consider seperate controls for sloping sites.- There may be increased overshadowing of adjoining residential zones for times outside of 9am - 3pm in the early morning and late afternoon.- Multi storey resi	<ul style="list-style-type: none">- Scenarios 2 and 3 should be considered as the range of separation from residential.- A Separation of 150m from 45m Envelope to a residential lot boundary (Scenario 2) provides a balance of increased development opportunity with minor visual impacts.- A Separation of 125m from 45m Envelope to a residential lot boundary (Scenario 3) shows the extent to where the visual impact is becoming more significant.