

Plan Change 14

Technical Report - Urban Design

Medium and High Density Residential Zones

Christchurch City Council

Technical Report

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1 Introduction

1.1 Background

New legislation and the National Policy Statement for Urban Development (NPS UD) requires that changes are made to the Christchurch District Plan through an expedited planning process. Further, the Resource Management (Enabling housing and other matters) Amendment Act requires that certain standards are introduced into residential zones to allow for 3 units to be built as-of-right at a permitted height of 12m (11m + 1m for roof).

The NPS UD additionally requires that higher density (mid to high rise) development, of at least 6 storeys, is permitted in key areas around larger centres and additional medium density (low to mid rise) development, between 3 and 6 storeys, is provided for around smaller centres. Further direction is given that residential densities should be maximised within a walkable catchment of the city centre. The Council's response has been to propose high density (high rise) development, with a ten storey height limit in certain areas.

This report is about the form, function and appearance of medium and high density development rather than its extent. It considers appropriate residential development forms for scenarios including:

- Medium density development of 3-4 storeys as envisaged by the Medium Density Residential Standards (MDRS) throughout the residential zone.
- Medium density development of 4 storeys within walking distance of local centres.
- Six storey development as required by the NPS UD around larger centres.
- Ten storey development as proposed by the Council in response to the NPS-UD, around the fringes of the City Centre Zone.

The MDRS control the planning of up to 3 units on a site. The report examines additional provisions for larger developments. The new Medium Density Residential Zone (MRZ) will apply to most of Ōtautahi Christchurch, and will have a scale and character similar to the operative Residential Medium Density Zone. The High Density Residential Zone (HRZ) will have a far more intense and built-up character than is currently experienced in the city, with the exception of parts of the central city and in the Carlton Mill Road area to the north of Hagley Park.

1.2 Research and Analysis

This report has been informed by research and analysis, including built form and wind modelling, which focused on the potential impacts of residential development, whether adverse, neutral or positive, at a range of scales. In addition, a range of alternative approaches were considered to address these impacts, identified through best practice research and literature review. Design related pre-notification submissions were also considered.

Further, the report and responses to issues have been informed by research undertaken by Christchurch City Council and Boffa Miskell Ltd¹, and a subsequent 2021 follow-up study²; referred together as the “Design Outcomes Research”, assessing the quality of design outcomes in

¹ CCC (2020): *Medium and High Density Housing in Christchurch Urban Design Review*

² CCC (2021): *Medium Density Housing Research: Additional Case Studies*

Ōtautahi Christchurch in the medium and high density residential zones of the city. The study was undertaken in the following zones which are referred to throughout this report:

- Residential Suburban Density Transition Zone (RSDT)
- Residential Medium Density Zone (RMD)
- Residential Central City Zone (RCC)
- Commercial Central City Mixed Use Zone (CCMU).

The Design Outcomes Research included a comparative analysis against an earlier study undertaken in 2010, prior to the introduction of urban design assessment in the then City Plan. In short, design outcomes had improved significantly as a result of regulatory interventions.

1.3 Summary of Research Findings and Issues

In respect to the Design Outcomes Research, in general it was found that the RMD Zone provisions resulted in urban design outcomes that are consistently satisfactory, indicating a basic level of design was usually achieved in these areas, but less consistently in other zones.

These results were related to the level and type of regulation in place, with small (permitted) complexes of 4 units in the RSDT Zone having the most inconsistent outcomes. The RMD rules and assessment framework also appears well understood by the development industry.

The main findings of the Design Outcomes Research were:

- Whilst the standard of developments was in most cases of a basic satisfactory quality overall, there was a significant proportion of developments which were poor quality.
- The majority of the issues related to poor site layout which impacted on many aspects of the site and building design, including the street interface.
- More consideration needs to be given to the arrangement of buildings on the site so that buildings and private spaces are designed to function appropriately, without privacy conflicts or the need for prominent fencing.
- Other recurring issues related to Crime Prevention Through Environmental Design (CPTED) were often caused by privacy conflicts that discouraged passive surveillance.
- Central city apartment blocks were often monolithic in appearance.
- Some positive trends were evident. These particularly related to the standard of private amenity on the site, such as good outdoor living space for occupants and good solar access.
- Looking at particular zones, the Residential Medium Density (RMD) Zone produced more consistent outcomes than other zones and had a lower proportion of developments achieving a poor standard of design.

In relation to the District Plan, the 2020 research noted that some matters are well covered (in particular CPTED) but were not achieved to a high standard in respect to the development outcomes. It was considered that changes to design and consenting under the existing District Plan provisions could potentially produce better outcomes. The 2021 study noted improvements overall and in particular with regard to CPTED, which may have been due to changes in consenting practice following the initial advice.

Overall the Design Outcomes Research demonstrates that the RMD Zone has been successful in ensuring that a satisfactory standard of development is achieved, although not necessarily the high standard described in District Plan policy.

Whilst the analysis treats the MDRS as an established baseline for analysis, the operative District Plan provisions have also been considered as context for the proposed revised provisions.

In addition to the research findings relating to design quality, the investigation and analysis indicated a series of potential issues from higher building heights and densities. These issues include:

1. *Visual dominance*. This is related to the overall size of buildings, particularly the impact on people at ground level, as well as how buildings relate to surrounding buildings (for example a larger building form surrounded by two and three storey buildings). It can be managed to some extent through design, including setting taller elements of the building back from the street and from side boundaries, and by breaking up the building form.
2. *Visual prominence*. This is related to how noticeable the building is in the context and is not necessarily a problem provided that the building is well designed. For example 15m high blank fire-walls would likely be detrimental to the visual quality of an area, but a well-designed building can be positive, for instance due to interesting architecture or by enclosing and enlivening the street. Managing prominence is largely a matter of good building design.
3. *Shading and privacy effects* (on neighbour's amenity). These issues can occur at most residential densities, but the impacts can be greater with tall buildings, and reach beyond the immediate neighbour's site. These issues increase with the size of the building and can be managed by orienting the buildings, including windows and outdoor living space, towards the street and the site interior, rather than to side boundaries.
4. *Human scale at street level*. Human scale is a comfortable scale of features and interest necessary to create an environment which is appealing to people. One definition is "dimensions and with details that can offer comfort and well-being to people living in and around the buildings and the spaces in between"³. A height of six storeys is considered a comfortable height that retains human scale. For instance it allows people on the top floor to recognise people at ground level⁴.
5. *Wind effects*. Taller buildings can divert faster flowing air to ground level and affect the comfort and usability of public and private outdoor space. Modelling of the Ōtautahi Christchurch wind environment⁵ demonstrates that buildings over 20m in height in the HRZ may have adverse impacts within a residential setting. These effects are discussed in detail below and can often be managed through building design and planting.
6. *Health and wellbeing*. Living in high rise buildings (and living in the higher levels of such buildings) can be associated with poor mental health, particularly in less suitable

³ Sims, D (2019): *Soft City*

⁴ Gehl, J (2010): *Cities for People*

⁵ Meteorological Solutions (2022): *Technical Advice for Wind Assessments for Christchurch City*

locations⁶ Reasons for these outcomes were social isolation, poor access to nature and the layout of the complexes.

The first three of the issues discussed above are also be associated with lower-rise high density housing, but the increase in height will increase the scale of impact. As implied by the NPS UD and its focus on a structured urban form, high-rise housing may not be suitable everywhere and more consideration of its impacts is appropriate.

The latter three issues are more associated with buildings higher than six storeys. There does appear to be a natural break between the more human-scale six storey typology (which is likely to be more widely appropriate) and taller forms (which may generate greater adverse impacts).

A positive outcome from taller buildings can be increased street enclosure, especially if there is a consistent scale of built form. A more enclosed street scene is common in Europe (and in some parts of North America) but is more unusual in New Zealand. Such a street has a different character and amenity to a suburban street but can be a well-designed environment that people feel comfortable in and appreciate.

1.4 Issue Categories and Report Structure

The key issues are grouped into categories based on the operative District Plan policy, which came into effect in 2016. These policies provide a robust and proven framework for achieving good design. Whilst amended policy has been proposed as part of Plan Change 14, it does not change the basis of this framework, which has been operating in the District Plan for some time, with results that generally result in design outcomes that support a well-functioning urban environment⁷.

Issues are grouped into the following categories and each addressed in this report:

- Context and site layout (section 2)
- Scale, form and appearance (section 3)
- Street scene (section 4)
- Good on-site living conditions (section 5)
- Safe and welcoming access (section 6)
- Servicing and storage (section 7)
- Crime Prevention Through Environmental Design (section 8)
- Building envelope (section 9)
- Landscaped area (section 10)

Issues are inter-dependent and addressing one issue will often mean addressing another issue. For example, the provision of an adequate width for accessways, including planting, also contributes to functionality, residential amenity and CPTED and may assist to avoid privacy conflicts. Achieving a good overall design outcome can therefore be complex and involve trade-offs, but equally individual aspects should not be sacrificed one for the other, but will depend on the circumstance/context.

⁶ Larcombe D; Van Etten, E; Logan A; Precott, L and Horwitz, P (2019): *High Rise Apartments and Urban Mental Health – Historical and Contemporary Views* Challenges 10(2)

⁷ Ministry for the Environment (2020): *NPS UD - Well-functioning Urban Environments Fact Sheet*

While some prioritisation of design elements is expected depending on the context, a balanced approach that achieves effective on-site and neighbourhood design is required.

This report considers design approaches to address these matters. It is recognised that these may potentially impact on the amount of development that could occur on the site, and may reduce flexibility for site planning, or increase regulatory costs. This has been considered in the evaluation of the options, from an urban design perspective.

In addition, there are ancillary issues that are also discussed in respect to the matters listed, and proposed provisions incorporate consideration of this wider context. An example is weather-tightness, where it is desirable to allow for eaves (something that the current plan provides for in some zones) to ensure building longevity.

The recommendation for how to manage more than 3 units in the MUZ is to base it on the existing Residential Medium Density Zone, which is well established in Ōtautahi Christchurch and has resulted in consistent satisfactory outcomes. Some amendments to the regulatory framework for design are recommended based on monitoring and the impact of the MDRS framework.

1.5 Summary of Recommendations

It is recommended to continue with the established regulatory regime for MRZ and HRZ where possible, and apply it more generally to the revised zone framework. In doing so, some consideration will need to be given to higher densities now permitted and encouraged, to ensure the provisions enable and manage this type of development.

Further, recommendations for changes to the District Plan are made in each section. These recommendations are summarised below:

1. More than three units to be subject to an urban design assessment in both the MRZ and HRZ, including implementing a standard assessment framework for multi-unit complexes, based on the Residential Design Principles from the current Christchurch District Plan.
2. The building envelope and assessment framework in the HRZ should enable perimeter block development, managing the building bulk and the impact of larger continuous buildings on the interior boundaries of a site and allowing for a strong street interface.
3. Retain the existing Residential Design Principles, with amendments. In particular revise the first principle (Context and character) to “Context and Site Layout” and include guidance to emphasise site layout as the pre-eminent driver of design outcomes.
4. Retain some built-form standards from the current District Plan in relation to:
 - Ground floor habitable space.
 - Garaging (to be behind the front façade).
 - Bin storage and washing lines.
5. Retain and modify the fencing rule so that tall fencing can occupy no more than 50% of the site frontage in total.
6. For higher density development, require communal space in proportion to the size of the site and the number of upper floor units.
7. Modify the MDRS as follows:

- Allow small eaves (<0.5m wide) to be excluded from site coverage and to protrude into the front setback.
 - Allow inclusion of front doors as part of the 20% glazing, and provide for permitted reductions where glazing to ground floor rooms is provided.
 - Continue to allow some garages and accessory buildings to be built to the interior boundaries (with zero setbacks).
8. In the HRZ, a building envelope as follows:
- A maximum height of 20m.
 - 1m internal boundary setbacks.
 - No recession planes at the front of the site, on internal boundaries within 20m of a street boundary.
 - Elsewhere on the site, MDRS recession planes to a height of 12m, with setbacks applying above 12m.
 - For buildings above 4 storeys, a 1m setback for the top storey.
 - 50% site coverage.
 - A maximum building width or depth of 30m, except where directly adjacent to and parallel the street.
9. In the higher height areas of the HRZ, allow a maximum height of 32m, with 6m-8m setbacks above 12m.

A separate study considers the issue of recession planes, for which a qualifying matter is being considered.

2 Context and Site Layout

Higher density development predominantly takes place in the context of an existing urban environment, and contributes to defining the future form and character of a neighbourhood. The introduction of medium density zoning implies a transition to a new urban character in lower density zones.

Similarly, high density zoning is a further increase in the intensity and scale of development. It is proposed in the context of existing medium density areas and will also be a transformation of the form, appearance and function of those areas.

2.1 Discussion of Issues

Site layout is regarded as the overarching issue that can determine the success of a development in terms of urban design outcomes. With a good site layout, other aspects of the design should fall into place. However, if the site layout is problematic it can be the cause of other issues (which are discussed in the sections that follow), leading to a poor design outcome overall for occupants, neighbours and the neighbourhood.

For the HRZ, with increasing heights and densities, there are increasing challenges in designing a high quality site layout. The current approach, relying on the building envelope to minimise effects on neighbours and surroundings, is not an effective way to manage the impacts of taller buildings. A range of approaches are well-established in other cities where higher height buildings are prevalent and some of these are discussed in this report.

2.1.1 Importance of Site Layout

Site layout is a key determinant of the quality, functionality and contribution of the development to the neighbourhood, and becomes more significant as the scale of development increases. To a large extent, how well a development scheme meets a wide range of design outcomes is driven by the layout of elements on the site, including buildings, landscape, internal space, access, car parking, private outdoor space, and servicing. If these elements are not well laid out on the site this has knock on effect to the whole of the development, with limited opportunity to create good overall development outcomes.

With regard to existing development, the Design Outcomes Research stated that:

The majority of the issues arising are related to poor site layout which impacts on many aspects of the site and building design, including street interface. The root causes are:

- 1. More consideration needs to be given to the arrangement of buildings on the site so that buildings and private spaces are designed to function appropriately, without privacy conflicts or the need for prominent fencing.*
- 2. There has been insufficient space allocated to front gardens and accessway planting and the resulting environment is not as safe or pleasant as anticipated.*

For example, long rows of units, in close proximity to each other, can restrict light access, restrict safe, on-site pedestrian access, create privacy issues between units, and limit the opportunity for on-site amenity such as tree planting.

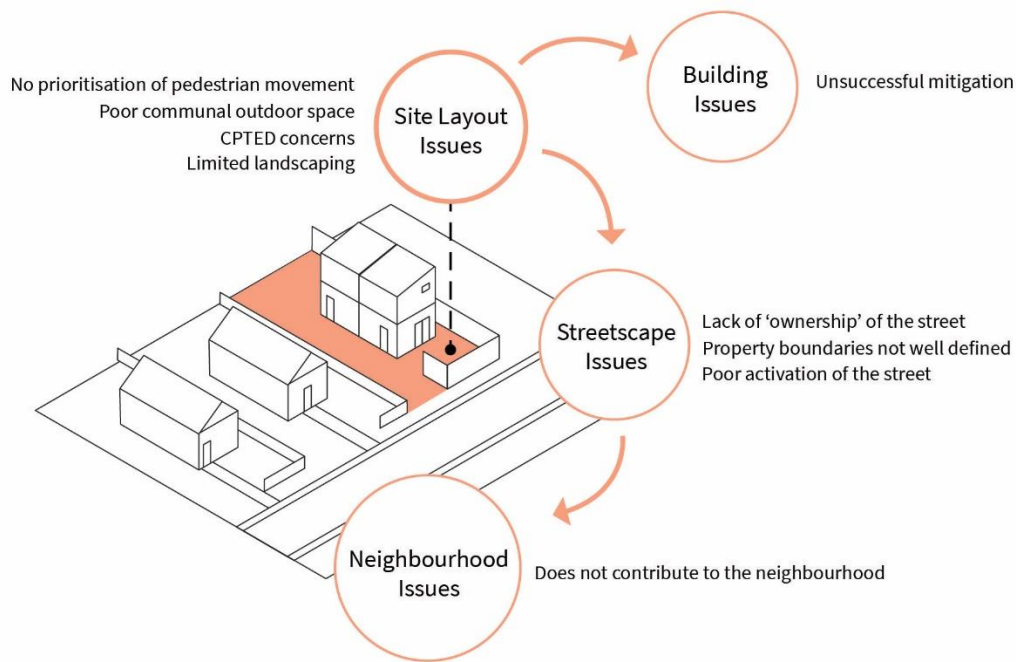


Figure 1: A poor site layout can cause negative flow-on effects to the street and neighbourhood⁸.

The location of private outdoor space at the street front can create privacy impacts for the occupants, or if fenced to prevent this, safety and amenity issues for people on the street, due to the lack of overlooking of the street. Access for visitors (i.e. visible a front door) is also likely to be unclear and overall the design of a development can create an inhospitable street environment.

Some examples of issues caused by poor site layout are set out below. These can sometimes be mitigated, but sometimes the mitigation may cause problems of its own:

1. Poor street engagement (location of outdoor living creates a conflict between desire for privacy and creating street engagement);
2. Poor quality accessways (no space for planting, or services and parking located in prominent positions);
3. Lack of passive surveillance due to interior layout of units (for instance bedrooms or bathrooms located next to accessway);
4. Lack of on-site legibility (for example doors hidden and not visible from the street);
5. Dominance of garages within the site, particularly if no ground floor living space;
6. Safety issues resulting from the layout of pedestrian accessways with inadequate width or tight bends and poor sightlines.

The above are examples of issues that can most easily be resolved through site design, but may sometimes be addressed through other forms of mitigation, which can be variable in the degree of success.

⁸ Design Outcomes Research, pp13



Figure 2: The arrangement and configuration of the units has resulted in a poor interface to the shared driveway which is also the pedestrian journey to the front door. Specifically there is no planting, doors are not visible, and there is no passive surveillance opportunities.

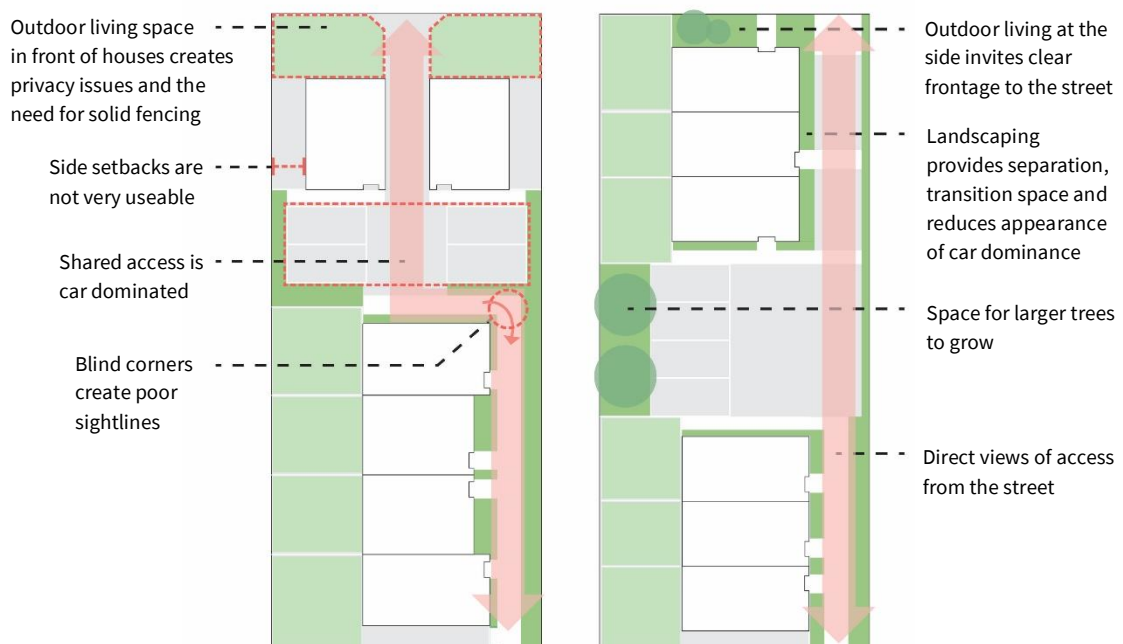


Figure 3: [left] The site layout creates a 'zig-zag' circulation pattern to access the back units which may create safety issues; [right] Site Layout offers direct sight lines between the street and the back unit which maximises the level of safety for residents and visitors.

The Design Outcomes Research noted that the current approach to medium density housing (in the RMDZ) results in many of the issues outlined above. However, the District Plan does not include explicit consideration of site layout as the overarching issue. As a result, issues are often explored individually as mitigations rather than tackling the root cause, which is often the site

layout. The Design Outcomes Research recommendations included more focus needed on the design of accessways.

This is an issue which has a public or communal benefit, rather than strictly accruing to an individual householder and is considered in detail under “A Safe and Welcoming Access” (section 6).

2.1.2 Site Layout for the High Density Residential Zone

Traditional zoning (such as the MDRS) adopts the conventional low density zoning approach of allowing for a building envelope defined by setbacks and recession planes. However, such an approach is largely aimed at managing impacts on individual neighbours, rather than an overall built-form that results in a good quality neighbourhood. The approach becomes progressively less effective as building densities increase. For instance, the MDRS recession planes allow for sun access for only three and a half months of the year at ground level in Ōtautahi Christchurch. With increases in height, the approach is no longer effective. Furthermore, the recession planes result in increasingly odd building forms, particularly roof forms, as designers attempt to use the full development opportunity and fit the building into the envelope.

The current higher-height RMD zone (Carlton Mill Road) takes a slightly different approach. The package of provisions uses recession planes that become vertical (as opposed to angled) at a certain height. This ensures that sunlight can be received at oblique angles, but will not project over the top of the building (which is unrealistic with greater heights). Meanwhile, if lower height buildings are constructed, there will be sun received over the roof.

Buildings that are constructed to a traditional recession plane envelope will generally be long thin buildings built perpendicular to the street. This form of development has a number of disadvantages as density increases:

1. Overlooking from windows and balconies is focussed onto neighbouring sites which creates privacy impacts.
2. The possibilities for breaking the building up in the middle of the site are reduced because the usable space is concentrated in the middle of the site (the only place where height can be achieved).
3. Buildings may have odd pyramidal shapes to meet the recession planes, which can add cost, lead to issues of weather tightness and be visually incongruous within a streetscene.
4. Long buildings will often create more shade on neighbouring sites.
5. It is difficult for consolidated open space to be achieved because the form encourages narrow spaces around the site boundaries.
6. A coherent street scene is less likely to be achieved because the buildings are focussed inward, with front entry points to units off an access rather the street, and only a narrow amount of building facing the street, often reading as the side rather than front of the building.

Whilst the RMD Zone, which is a similar density to the MDRS, generally results in satisfactory outcomes, the increased heights and density proposed for the HRZ creates different challenges which are best addressed through a different approach to site layout.

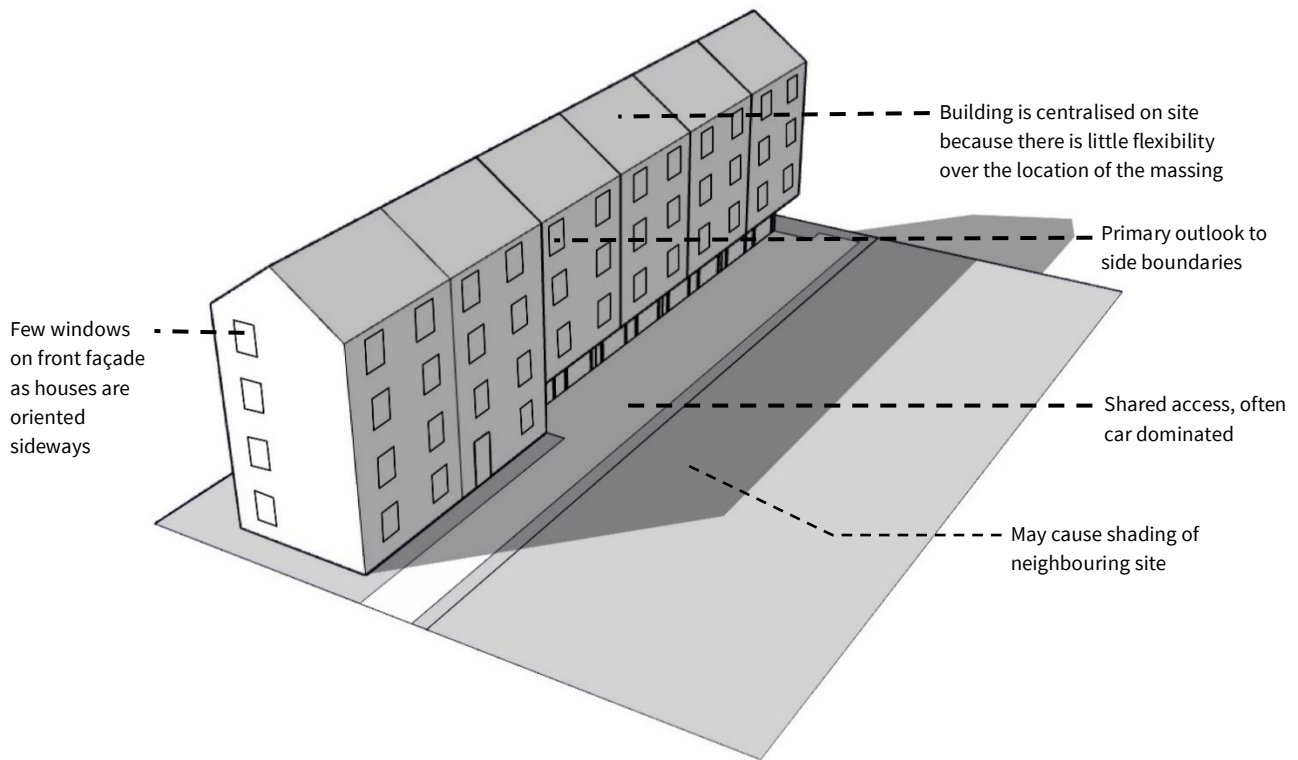


Figure 4: Long blocks perpendicular to the street can result in monotonous and visually dominant building forms

2.1.3 Alternative Site Layouts in the High Density Residential Zone

Some alternative site layouts are evaluated in Appendix 1. These are:

- A traditional approach, defined by setbacks and recession planes, as outlined above.
- A building envelope that allows for a centralised building, which is discussed in more detail in Appendix 1, but is not recommended.
- A perimeter block typology, which is recommended and discussed in more detail below.

A perimeter block approach is recommended for development in the HRZ. The perimeter block approach is a well-proven design response, common in Europe and North America that is suitable for the Ōtautahi Christchurch’s climatic conditions and the design outcomes anticipated through the District Plan policy direction. Perimeter blocks are widely discussed⁹ as a solution in Aotearoa New Zealand in relation to the NPS UD, including by the Parliamentary Select Committee, who advised on the MDRS bill.¹⁰

⁹ See for instance Coalition for More Homes (morehomes.co.nz)

¹⁰ Resource Management (Enabling housing and other matters) Amendment Act 2021.

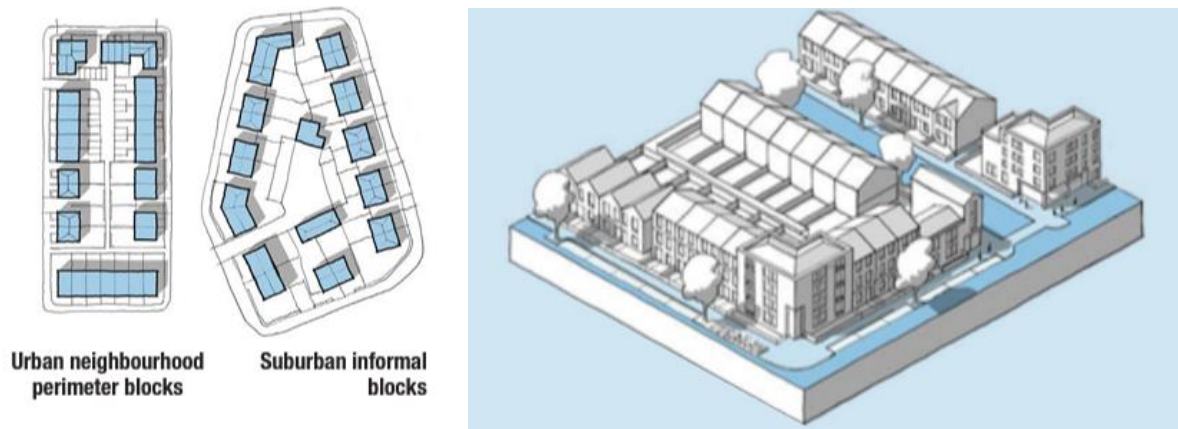


Figure 5: Plan and birds eye view of a perimeter block development, with duplex and multi-unit (including apartment) typologies¹¹.

Some attributes of perimeter blocks are:

1. *Buildings are concentrated at the street edge.* The street is lined with a street wall, which may be continuous or have relatively narrow gaps between the buildings, depending on the context and density. The buildings may be quite high and will strongly frame the street. This creates a formal edge to the street and strong enclosure.
2. *Public fronts.* Buildings have public fronts, with an active and engaging interface with the street. The formal frontage, with windows and entrances to the street, will have a high quality of design and visual interest.
3. *Consistent street setbacks.* There is a consistent building setback from the street, which may be zero or up to several metres.
4. *Open space within the block.* There is a predominance of open space at the rear of sites, usually co-located with neighbours' or communal to create an open central courtyard where sites borrow sunlight access and amenity from each other. There may be a lower level of building in this area, including garages.
5. *Private Backs.* Private uses such as outdoor living space, servicing and parking are located to the side of buildings or at the rear in the central courtyard (separate to outdoor living space).

¹¹ Ministry of Housing, Communities and Local Government (2021) *National Model Design Code*

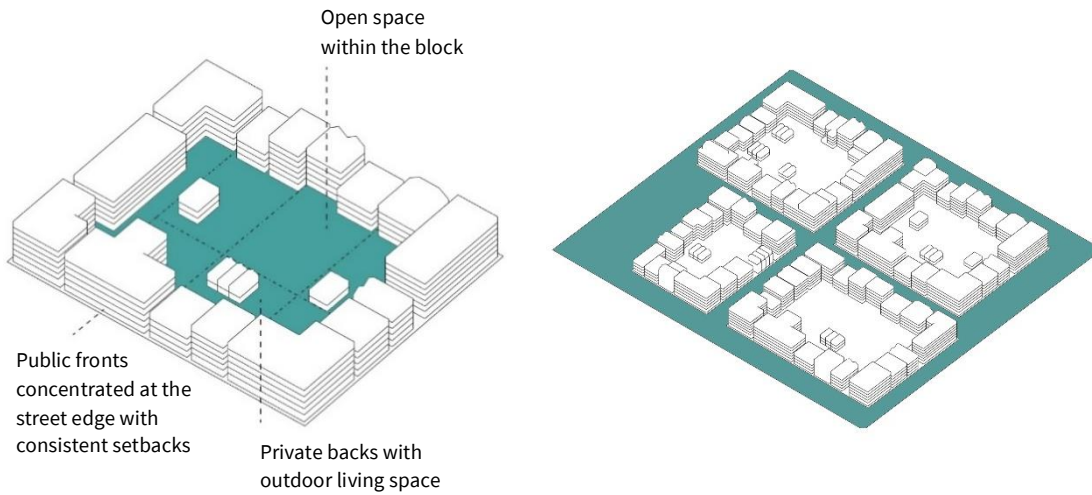


Figure 6: Illustrations of a perimeter block development (left) and the urban pattern at a neighbourhood scale (right)



Figure 7: Street view of a perimeter block development (with zero building setback) in Utrecht, Netherlands, illustrating the good levels of engagement and visual interest provided with the street (Source: Google Streetview)



Figure 8: Birds eye view of a similar perimeter block layout as Figure 7, illustrating the good extent of private green space to the rears (Source: Utrecht, Netherland - Google Earth).

Some of the advantages of a perimeter block layout/building:

- Strengthens the built form relationship with the street, which creates better opportunities for human engagement and passive surveillance. This in turn contributes to creating safe and walkable neighbourhoods.
- Allows for good access to sunlight and open space within the centre of the block.
- Is an efficient use of space, allowing for high yields with modest site coverage (because most or all of the floorplate can be built to the full height).
- Allows narrow sites to be developed to the same height and density at large sites (because of small side setbacks and no recession planes).
- Provides good privacy (as windows are principally focused out to the street or inward into the site, rather than the side boundary).
- Provides space for large trees to be planted to support visual amenity and access to nature.
- Can easily be developed progressively, site by site.

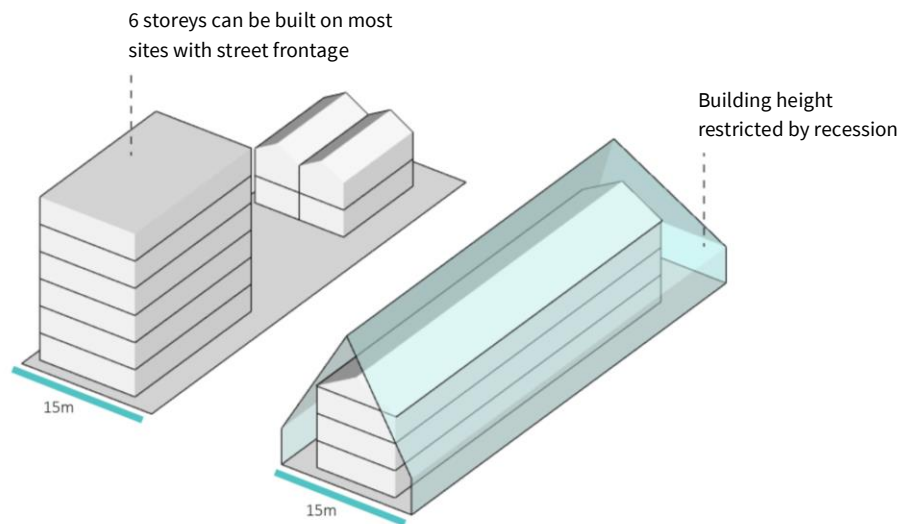


Figure 9: [left] Perimeter block building which strengthens the street edge and provides a suitable gap between building forms for sunlight and trees. [right] a recession plane building which results in a long building form which faces the side boundary (can cause privacy issues) and does not include a break for tree canopy or visual mitigation of the long form.

The main disadvantage of a perimeter block is that it creates more shade for adjacent sites when the building faces to the north. However, there is less shading for sites located to the east or west (as discussed in Appendix 1).

European perimeter blocks are usually created by master-planning rather than being retro-fitted into an established area. The MDRS is based on the principle that effects can be contained within the site, with a permissive baseline, and does not actively promote comprehensive or perimeter block development, or oversight of an area as a whole.

In Ōtautahi Christchurch sites are often long and narrow (for example 15m x 50m) and are developed sporadically, predominantly to 2-3 storey houses, with the buildings perpendicular to the street. Where developed already, land assembly to create a perimeter block will be challenging. As such a full conversion to a perimeter block form is unlikely to occur in the near future. However, if sites are developed within the intention of creating a perimeter block, they could be completed over time.

However, in considering alternative development forms, it is important that they work with the existing paradigm and co-exist with the existing development forms, which will still be enabled. Consideration of effects on neighbours (shading and the impact of enclosure) and the wider area (visual impact of blank side walls) is needed. The perimeter block typology should (and can) complement existing built form as well as the potential future form.

To achieve a perimeter block form, the site layout must be reshaped to achieve the following for taller buildings (above 3 storeys):

1. Allow building across the full width of the site (or close to it), at the front of the site next to the street only.
2. Promote open space and lower-scale buildings only to the rear of the site to promote a degree of shared amenity.
3. Buildings should predominantly face front and back

4. Outdoor living space, parking and servicing located behind the building and not adjoining the street.

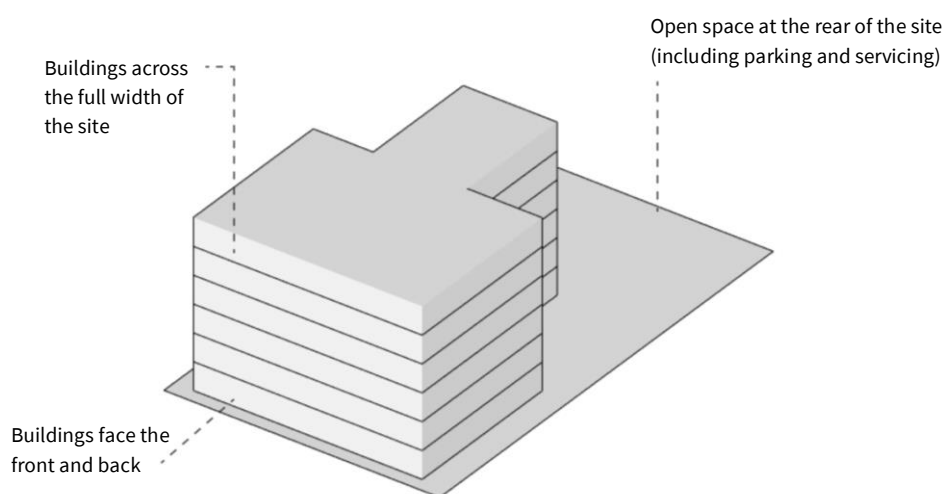


Figure 10: Illustration of a building utilising the full width of the frontage of the site. This offers the greatest potential to create a safe and engaging walkable neighbourhood.

2.2 Recommended Approach - Context and Site Layout

Below is a discussion of some of the options that would address the issues related to context and site layout. These may be implemented individually or as a combination. It is recommended that:

1. More than 3 units are a restricted discretionary activity in MRZ and HRZ.
2. Assessment matters for Site Layout be included in the Residential Design Principles.
3. The Building Envelope for the HRZ is designed to enable perimeter block development.

2.2.1 Restricted Discretionary Assessment for More Than 3 Units

There is an increasing risk of poor outcomes for larger developments, both because they are more complex, and because their size means that any adverse impacts may be greater and affect a wider area (as well as have more on-site impact). The MDRS specifies that up to 3 units is a permitted activity and allows for restricted discretionary consideration of larger proposals (although it does not require it). It is open to the Council to change this threshold (for example to allow up to 6 units as a permitted activity). At present the threshold is 2 units in the RMD Zone and 4 units in the RSDT Zone.

The following points are relevant to the consideration of this threshold:

1. Small sites usually have limited options for development – there is a limited amount of ways to arrange three units on a site and the advantages and disadvantages are well understood. These are to some extent described in the National Medium Density Design Guide. For this reason, the risk of poor outcomes is lower than for larger sites. However, the experience of the Council in the RSDT Zone is that poor outcomes are still likely to sometimes occur on small sites.

2. The impacts of smaller developments are more confined. Although some developments may have poor outcomes, there may be satisfactory results in a neighbourhood overall, when they are considered cumulatively. This indicates a higher level of risk with large developments.
3. Access is usually a simple matter for small developments. There is usually a direct footpath from the site to the front door with a direct line of sight.
4. Servicing issues are also usually simpler. Dominance of bin storage is usually avoided, and the creation of large car parking areas at the street front is unlikely in small development.
5. Privacy is an issue which is directly related to the number and density of units. Whilst some overlooking of private areas is inevitable in medium and high density areas, the impact that it has is related to the intensity and quantity.
6. With regard to site layout, there can be a much greater range of options for larger sites. This can create interesting and innovative developments with a range of spaces including communal spaces. However, it also creates opportunities for poor design outcomes, such as large car dominated spaces, which could be adjacent to the street.
7. Larger buildings on larger sites can have a much greater visual impact (because they are very visible), especially in medium density areas which do not have existing larger buildings. This can include 3 storey buildings in a continuous terrace form, for instance, which can appear monolithic. Longer runs of terraces without a break in the roof will have a greater visual impact, for example.

The Design Outcomes Report indicated that built outcomes were inconsistent for RSDT Zone sites with 4 units, and that satisfactory outcomes were not consistently achieved (and that the good outcomes anticipated by the District Plan policy were rarely achieved). This contrasted with the RMD Zone where there was much more consistency in achieving satisfactory outcomes. It was concluded that the restricted discretionary activity status in the RMD Zone (for developments with more than 2 units) had led to a higher quality of outcomes, aided by built form standards that were aimed at multi-unit complexes rather than individual houses.

Because of the risks identified above, and the quality of outcomes resulting from existing experience using a variety of thresholds, a change in the minimum number of units (currently 3+) is not recommended.

2.2.2 Permitted Number of Units in the High Density Zone

Consideration has been given to whether the same threshold is appropriate in the High Density Residential Zone, where larger scale buildings are anticipated and a greater degree of effect.

The importance of good design is not reduced in a higher density zone. The zone allows for a greater scale of buildings, which can create a different and more intense character, but this is not a reason for a lower standard of design. In some ways design is more important in this environment because:

1. There are more people living in it who are affected by the quality of design.
2. There is greater potential for a greater scale of effects.

3. A faster pace of development is expected in these areas because they are the most suitable and desirable for higher density. There is more potential for cumulative effects to be established in the short term.

Many of the issues discussed above (such as the safety of accessways and the appropriateness of servicing) apply equally in the high density zone. The main point of difference is the scale of buildings in the surroundings; residents would need to accept that they are in a higher density environment which is defined by larger and bulkier buildings that may compromise access to sunlight. People may choose to make this trade-off in exchange for access to services and amenities.

In the short term there is likely to be very little development of taller buildings in the high density zone, because it is not generally favoured in the marketplace or cost-effective to build¹². There is therefore a risk that high density areas establish as lower quality medium density areas. The risk of this is shown by the Design Outcomes Research, which finds that Residential Central City areas have a lower design quality than the RMD areas. It is for this reason that a relaxed threshold is not recommended in the high density zone.

2.2.3 Assessment Matters Relating to Site Layout and Context

The Residential Design Principles in the Christchurch District Plan are considered to be a fairly comprehensive assessment framework for higher density housing. However, a shortcoming has been that site layout is not highlighted as the driver of many (or most) of the issues, leading to a process of post-design mitigation of issues which often creates unsatisfactory outcomes and adds complexity to the consent process.

A new assessment matter is recommended to specifically address site layout. This approach would ensure that site layout could more effectively be considered as the root cause of many design issues and given primacy through the assessment process. This may be implied by making it the first matter, or its importance could be stated specifically. The new matter could replace the existing “character and context” matter as the NPS-UD directs that character is expected to change.

1. It would improve outcomes by reducing the tendency to trade-off one issue against another (without necessarily achieving an overall improvement)
2. It would assist applicants and provide more clarity as to where their focus should be in the design process, rather than the current approach where only small fixes can be made without redesigning the whole site or reducing unit numbers.

¹² The Property Group (2022): *High Density Residential Feasibility Assessment*

3 Scale, Form and Appearance

3.1 Discussion of Issues

Medium and high density development has a different scale to typical established residential areas in Ōtautahi Christchurch. Increasing the scale of development in residential suburban areas will lead to a change in the character of those suburbs over time. This is clearly intended by the NPS UD. However, scale, form and appearance impact on the quality of public and private space and on amenity.

As a result, the consideration of scale, form and appearance is not primarily concerned with fitting new development into an established context, which is generally expected to change over time as the city's population increases. The issues rather are in managing these more intense development forms to create a high quality living environment for residents, neighbours and the wider public, appropriate to the density. This has been a longstanding issue in the city's medium density neighbourhoods¹³.

This includes managing the bulk and scale of buildings, which becomes even more important in higher density, more complex environments, albeit recognising that residents may trade off amenity considerations for other benefits, such as the convenience of proximity to facilities.

This section does not consider permitted height, which is discussed in Section 9 - Building Envelope. The discussion below is concerned with the appropriate management of bulk and scale where it occurs.

Some of the issues relating to bulk and scale are:

1. *Long Blocks in Medium Density Areas:* In medium density environments long blocks, particularly when perpendicular to the street, can result in monotonous and visually dominant building forms, which may be prominent and contrast with existing development patterns. The impacts of these forms affect neighbouring sites and are not necessarily expected in medium density residential areas, even under the MDRS. Please refer to Figure 5.
2. *Monolithic Appearance of Taller Buildings:* Taller buildings can be monolithic in appearance if not well designed, especially if they are also long or broad. This is especially significant if they are widely visible in the neighbourhood (i.e. not obscured by existing buildings or vegetation).
3. *Uniformity:* Larger developments are sometimes proposed with a very uniform appearance. There can be benefits of this (i.e. identity and coherence) but can also be quite monotonous. Management of this issue is possible through variation in form and architectural detailing.
4. *Visual Interest* in articulation and detailed design. Issues of visual interest can be addressed by ensuring that the building includes features and detailing that are visually appealing to people. Such features are well understood and relate to a desire for visual

¹³ inspiring for example the St Albans Neighbourhood Plan

order and meaning, as well as legibility and human scale, rather than any particular architectural style. Concepts that contribute to visual interest are matters such as:

- a. Grouping of features;
- b. Expressing individual units in the façade;
- c. A human scale and a fine grain of detailing and avoidance of areas of blank facades;
- d. Symmetry;
- e. Verticality (breaking down a long building into a series of shorter forms, usually through changes in materials, steps in the building line and clusters of features);
- f. Variation in building outline (for example pitched roofs with hips and gables rather than flat roofs);
- g. Organized Complexity (or variety in a pattern, the development is rich in detail with a coherent structure to organise the complexity). This can take the form of fractal components (repetition of similar shapes at different scales, such as a number of window panes forming a window, then a number of windows grouped together on the facade).



Figure 11: Visual interest is created here through the use of symmetry, good window proportions, balconies and visual hierarchy.



Figure 12: Individual units are clearly expressed through gates leading to the front doors and the modulation of the roofline.

A finding of the Design Outcomes Research is that larger developments used architectural detailing as a mitigation to address site layout issues (for instance changes in cladding to create visual interest in the absence of modulation) and that this could lead to poor quality visual outcomes without necessarily addressing the core issues. Significantly, the areas of poorest performance in the appearance related outcomes were related to detailed design.

5. *Recession Planes.* Buildings that respond to recession planes can appear visually awkward, particularly larger scale buildings if floors are stepped back progressively in response to the angled plane. Recession planes can result in unexpected changes in heights which disrupt the coherence of the street scene, and unbalanced buildings with unusual shapes as designers endeavour to keep the building within the angle of the plane.



Figure 13: Sections of the building adjacent to the boundaries have been shaped by the recession plane angles to maximise buildable area.

6. *Issues of transition.* There can be an awkward juxtaposition between new development and existing suburban houses due to the contrast in styles and the high degree of visibility of the higher density in the existing streetscene. The new buildings can be prominent and break the rhythm of the street, which may have been defined by its coherence due to the uniformity of scale and style of buildings within the street. This is a result of the transition to a higher density form, as distinct to the new buildings being poorly designed or where there is a change in character.

The issue is temporary, albeit that the transition can be lengthy. For example Manchester Street in Edgware, is now a predominantly medium density area, having been substantially redeveloped over a 20 year period. Newer two storey development in this area is not especially prominent and does not contrast with the established streetscape.



Figure 14: Manchester Street, Christchurch where 2-storey medium density development is now predominant after a transition from standalone housing.

As well as the issues described above, positive impacts may be created by higher density developments if they are well designed. These do to a great extent depend on the site layout, for instance that the bulk of the building relates to the street as described in Section 2.

3.2 Recommended Approach – Scale, Form and Appearance

Below is a discussion of some of the options that would address the issues listed in 3.1. These may be implemented individually or as a combination. It is recommended that:

1. In the MRZ, longer buildings are broken into sections of 20m-30m.
2. In the HRZ, a greater degree of bulk is enabled and the building envelope is set to allow for perimeter block development.
3. In both zones the Residential Design Principles are employed to ensure a level of visual interest is achieved (similar to the current approach in the RMD Zone).

3.2.1 Medium Density Residential Zone

With regard to point 1 in the list of issues (Long Blocks in Medium Density Areas), limiting the length of buildings can reduce the potential impact of building bulk for both occupants of the developments and neighbours. This includes splitting up longer forms with a meaningful break between buildings.

The size of this break would need to relate to the location and scale of buildings. In MRZ, a break of 4m every 20-30m (roughly every 4-5 units) would break the built form into blocks of a coherent residential scale that would allow views of sky and light penetration between buildings and provide for a break in the potential length of roof form.

Points 3 and 4 (Uniformity *and* Visual Interest) can also be helped by breaking up the buildings in shorter sections, or with a degree of modulation and adding features such as gables to the roofline. These matters have been managed successfully through the Residential Design Principles and it is recommended that this approach should continue. Point 4 lists a number of ways to manage the level of visual interest provided by a building. There is no fixed way to achieve the right level of detail, and flexibility is appropriate to create variety.

In the MRZ, the more relaxed recession plane angles of the MDRS (or the proposed alternative to it) should reduce the incidence of recession plane buildings discussed in point 5.

With regard to point 6 (Issues of Transition) this is regarded as being addressed in the NPS UD Policy 6, which makes it clear that this transition should not be considered an adverse effect.

3.2.2 High Density Residential Zone

In relation to points 1 and 2 (Long Blocks in Medium Density Areas and Monolithic Appearance of Taller Buildings), in a high density environment, there is more expectation of larger buildings.

However, there is also more scope for height which will create the potential for more dominant monolithic buildings. A 30m building dimension is still recommended, with a requirement for greater separation between taller buildings.

Regarding points 3 and 4, and similar for the MRZ, a discretionary approach is recommended to manage issues of uniformity and visual interest.

In view of the above, some amendments to the MDRS have been suggested to allow for buildings at the front of the site in the HRZ, adjacent to a public street, to be exempt from recession planes. This would encourage taller buildings to be built next to the street and shape the building envelope to enable perimeter block buildings and reduce the incidence of building bulk deep within the site. It would also help to reduce the impacts of recession planes on built form described under (5).

4 Street Scene

4.1 Discussion of Issues

A key urban design principle is that development should be engaging from the street. This means that there should be a sense of activation and interest from the street edge to the building and its interior.

Aspects of establishing this relationship include the front façade of the building and its windows and doors, but also important is what happens both behind the façade (that there is an active part of the house or unit at ground floor) and in front of it (that there is a clear view from the street to the façade and that the area in front of the building is unobstructed and includes attractive elements, such as planting).

A traditional approach to managing a street scene is for developments to have a public front and private back. The front of the building is a transition space which allows for a welcoming public interface and forms a defined boundary between the public and private realms. Meanwhile, the side and back of the development is a more private and informal space which may be used for outdoor space, parking and servicing. This is the model that is used to create perimeter blocks and is widely recognised in local and international design guidance.

An integrated approach is needed to the management of street scene issues. A successful street interface is functional – it provides for privacy - whilst also animating the street with doors and windows. As such, the primary driver of a good street interface is a site layout, which for instance,



Figure 15: A successful site layout approach, which includes public faces to the street and private gardens to the rear of buildings (MfE, 2002)

avoids too much outdoor living space and garaging next to the street.

Street engagement must be considered in conjunction with internal privacy. A building setback is helpful because it creates some separation, noting that this is controlled through MDRS density standards. As well as streets, the relationship of housing with internal accessways is important because these also present a public front to a development and should be similarly considered.

There is a difference in scale that occurs with density. Higher density building forms will usually be both taller and occupy a higher proportion of the site frontage. They may in some cases be built boundary to boundary. This can re-inforce a strong urban street appearance, but can create adverse impacts in terms of visual dominance, if not well designed.

4.1.1 Façade Treatment

Once site layout issues are resolved, the street interface components can be resolved. The most important of these is the presence of windows and a front door.

A front door is important as it increases the sense of ownership of the street boundary and activation more generally of the street, encouraging active transport (walking). Passers-by know that the occupant may come out at any moment; occupants must also walk past any landscaping and have an incentive to maintain and personalise it. It also contributes legibility (the intuitive understanding of the environment), and to safety in the form of activity on the street i.e. greater oversight of and presence on the street.

Windows establish a clear relationship between the inside and outside of the unit – again, the space will sometimes be occupied and there will be glimpses of the interior, lights will sometimes be on and the view changes all the time. This also contributes to the safety of the people on the street via overlooking of the street.

The MDRS standards require a minimum of 20% glazing to be provided on the front facade. This is a relatively crude control but is sufficient to provide for a level of interest and engagement. However, although the amount of glazing is large, it need not be grouped in a cohesive manner or evenly distributed (which provides for visual interest), and is not allocated to any particular part of the façade i.e. the ground floor, where it would have most impact.



Figure 16: A sense of ownership is provided by the direct front access, and safety by the windows onto the street and shared driveway / access to back terraces.

20% glazing may also be higher than typically provided, particularly on south facing facades. Higher rates of glazing on the southern aspect could reduce the energy efficiency of the building, if the glazing is ineffective. More extensive glazing can create perverse outcomes, disrupting the

coherence of the façade, without necessarily leading to an improvement in the visual appearance of the development or the extent of oversight of adjacent public or semi-public space.

In some circumstances, better outcomes would be achieved through a lower proportion of glazing, if that glazing was functionally useful (for instance if it was from ground floor living areas), and if a front door was included. The MDRS is drafted such that there is an incentive to locate the front door on the side façade (to allow space for more glazing), which is a perverse outcome.

The example below has 17% glazing, plus a front door. It provides sufficient visual interest and engagement with the street, exhibiting many of the design attributes discussed under section 3.1. However, it would not meet the MDRS rule.



Figure 17: A multi-unit development, which provides only 17% glazing, while providing a sufficient level of engagement and visual interest.

4.1.2 Ground Floor Uses

In providing for meaningful engagement with the public space of the street, the presence of ground floor living adjacent to the street is especially important.

The RMD and RCC Zones were found to provide for good street engagement and this is in part due to the current rules around ground floor habitable space. The RMD Zone provisions require ground floor space for half the units (in association with location of garaging away from the front of the site). It ensures that the front unit will have habitable space at the street front, and any windows provided will have a function.

In contrast, a common typology in the RSDT Zone has a garage located at the street front, side on. This typology typically does not provide meaningful street engagement because any windows will result in only superficial dressing of an inactive façade as people are not usually present in garages spaces for long, or the garage is likely mostly used for storage.

Whilst often valued by occupiers, garages usually lack architectural detail or visual interest, as well as being associated with extensive paved surface at the street front. The location of garages and

car parking in front of residential buildings can disrupt the street interface in a similar way to fencing, by blocking views of the positive features of a building, in particular doors and windows. A succession of garages along a street can also become a dominant visual element.

For larger complexes, parking can be visually dominant if it is concentrated at the street front. This is currently managed by the residential design principles relating to *Street Scene* and *Access, Parking and Servicing* and it is recommended these are applied throughout the residential zones.



Figure 18: A parking area adjacent to the street reduces the potential for engagement and safety of the street, as well as negatively impacting on the overall amenity and coherence of the streetscene.

4.1.3 Treatment of Site Frontages

Fences

Tall fencing can have a significant impact on the way a building looks and engages with the street, including impacts for the potential safety of pedestrians. It can block views of the building (and its occupants) and obscure the appearance of landscaping and the transition between the public and private realms, as well as prevent sightlines to moving vehicles exiting a site. A fence in itself is also not in itself engaging.

The current rule in the RMD Zone for fencing (14.5.2.10) is that it should be limited to 1m; or else be 50% transparent. This is intended to ensure that there is some street engagement, whilst allowing for some privacy and security. A diagram is provided as follows:

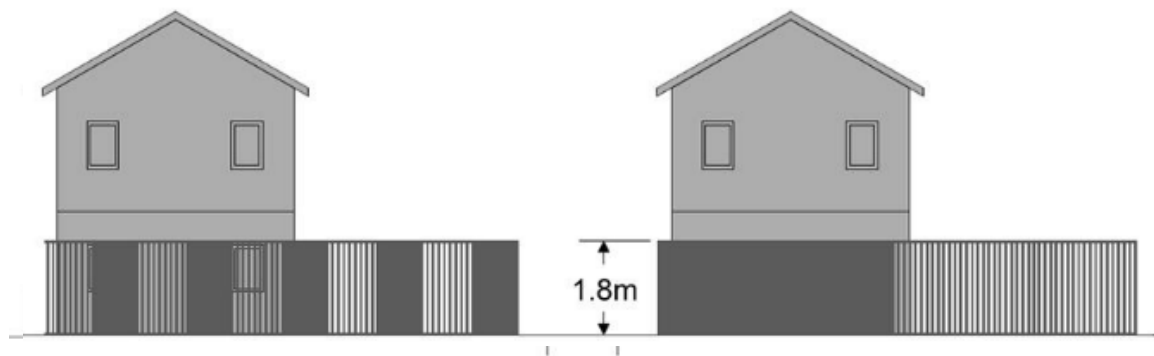


Figure 19: Illustration of current 50% transparency fencing rule in the RMD Zone.

The Design Outcomes Research found that the fencing rule was not always successful, in particular where there are site layout issues such as outdoor living areas located at the street front. Whilst the transparent fencing would in theory allow for street engagement from the unit and garden, in practice it was often screened, with bamboo or plastic screening, to create privacy in the outdoor spaces. The result was often that there is much less street engagement than expected.

Solid fencing is permitted in the RSDT and RS Zones. The report found that street frontages were of a poor quality in this zone and fencing was regarded as a specific reason for this.

There are some circumstances where site planning becomes more difficult to combine with an engaging frontage – principally where narrow units are positioned to the south of the street and sun access for outdoor living is easiest to obtain at the front of the site. This is an instance of a site layout issue, rather than something that should be addressed through changes to fencing alone.

Many developments include fencing on one half of the site frontage, with the other unfenced. Existing practice is to encourage areas that are clearly “public” – for instance around front doors (refer to Figure 15), and areas that are clearly private which may have at least some solid fencing. This creates legibility on the site and activation and visual interest on the street whilst allowing for some privacy. This arrangement is commonly agreed in consenting processes.

It is recommended that fencing rules should aim to facilitate this scenario (of a public threshold space over half of the frontage and private space over the remainder) rather than focussing on transparency.



Figure 20: A development with open frontage facing the street (includes a 1m high solid fence with bin storage).

4.2 Recommended Approach – Street Scene

The above analysis identifies three areas in relation to street scene. Potential management of these is addressed for each in turn below.

Recommendations are:

- Requirements for ground floor habitable space are retained as they are in the existing RMD Zone.
- Tall fencing (max. 1.5m) is restricted to half the width of the site.
- Garaging (including internal garaging) located 1.2m behind the front façade of the building.
- The MDRS glazing rule is amended to allow inclusion of front doors in the 20%, with a glazing reduction where there are ground floor windows to living rooms. The area of the façade is reduced through the exclusion of gable ends.
- The Residential Design Principles are retained to ensure continued consideration of the street scene more holistically.

4.2.1 Façade Treatment

Approaches to ensure that building facades are visually interesting, as described in Section 3, would also create a more positive street scene by ensuring that buildings have an engaging appearance. Otherwise, the key matter is to ensure that there are windows and doors that face the street and that this relates to habitable space.

This should be achieved through a mixture of rules and assessment matters, including retention of the Residential Design Principle relating to street engagement.

Glazing Rules

The MDRS specifies a minimum of 20% glazing. Disadvantages of this are:

- It is often more than needed for a high quality frontage;
- It may discourage front doors facing the street (which are not usually glazed);
- The glazing may not be functionally useful and may reduce thermal efficiency.

Alternative amounts of glazing have been considered in Appendix 2. There is no exact threshold where the percentage of glazing becomes appropriate in every case because it depends on the distribution of the glazing and the width of the façade. The conclusion reached is that 15% is usually not sufficient to ensure good street engagement, and that 20% is in some cases more than necessary. The more important consideration was that glazing was provided meaningfully. From this it is concluded that 17.5% is sufficient, provided there is plenty of glazing on the ground floor, and that this could include the front door (even if it is not glazed).

Reductions in the level of glazing would be available by consent. However, noting that it is desirable to avoid excessive consent processes for simple matters an alternative is that a reduction in glazing could be a permitted activity where certain conditions are met. These are:

- That there is a front door in the façade;
- That there is a high proportion of glazing on the ground floor (20% including the door, even if not glazed); and
- That there is at least one window facing the street from a living area.

A minor change has been suggested so that gable ends are not discouraged. Gables are often desirable features because they can add variety and interest to a street scene. As the rule is framed, it would require more glazing on gable fronted units than hip roof forms, because 20% of the whole front façade is needed (including the gable). The amendment would exclude gables from this calculation, so that such units are not disadvantaged.

4.2.2 Ground Floor Uses

Living Space on the Ground Floor

The current RMD Zone rule requiring ground floor living space contributes to ensuring a meaningful and engaging street interface. However, it is a bit inflexible and does not allow a mix of typologies to be provided over the site, or for low-rise apartments of up to 3 storeys which may be built one above another.

As a result, a less stringent standard, requiring 50% of the ground floor to be habitable space is recommended. This allows for areas of parking and garaging on site, but still requires that there is some ground floor accommodation to provide activation and opportunity for engagement.

The current RCC Zone rule is that 30% of the ground floor should be habitable space. However, the Design Outcomes Research identified that the RCC Zone provisions resulted in a lower quality of site layout than the RMD Zone, one reason for which was the lower quality of the interface with accessways.

A 30% standard would be appropriate for taller apartments of above three storeys, both because it is more challenging to find space for ground floor amenities and servicing for these typologies, and because it is often logical to separate the pedestrian access from the servicing. However, given the low proportion of developments that include apartments at present, retention of this blanket standard is not considered appropriate. Rather, reductions should be considered as part of assessment matters.

Garaging

The current RMD Zone requires garaging to be located 1.2m behind the front façade of the building, which ensures that there is some living accommodation fronting the street. Retaining this rule would ensure that this high quality street scene is replicated throughout the city as it redevelops.

A rule has also been proposed that would apply to detached garaging, which has a more intrusive impact on the street scene because it usually sits in front of an existing unit (and its fenestration). Detached garages can obstruct the positive aspects of street engagement that a residential building (often an established house) provides.

4.2.3 Site Frontages

The current rules have been only partially successful at creating engaging street frontages because of the conflict in use and desire for privacy in outdoor living spaces, discussed under Site Layout. This issue should be resolved through changes to site layout, to ensure that there is a good proportion of the site front that does not need to be screened for privacy.

The current fencing rules have been partially successful. They often ensure a high quality frontage, but they have often been undermined by post-occupancy screening, which indicates occupants don't find the balance is working well between openness and privacy. This is in part a site layout issue and the solution is to ensure that there is a separation between private space and the more public transition space on the site.

As a result, it is recommended that the fencing rules are amended to provide for this split between areas of the frontage which are fully public (and should not be fenced) and areas of the site which are private (and can be fenced). It is recommended that the fencing rule is amended to allow for 50% of the frontage to be fenced to a height of 1.5m and for fencing for the remainder of the frontage to be restricted to 1m (to allow clear views over). This creates a balance of fencing and openness along the street boundary, whilst allowing for some privacy to be created at the front of the site. This rule complements the changes to the site layout assessment matter.

5 Good On-Site Living Conditions

5.1 Discussion of Issues

These issues fall into two categories: Occupier Amenity; and Communal and Neighbours Amenity.

5.1.1 Occupier Amenity

Matters of occupant-focussed internal and external amenity are derived from the site layout and orientation, as well as ensuring there is adequate space for aspects such as outdoor living.

Issues include ensuring that

- There is good outlook from living space;
- Internal and external privacy is managed especially between adjacent developments; and
- Outdoor space is adequate and usable.

The functionality of internal space would also come under this heading (which was previously managed through the minimum unit sizes specified in the District Plan).

The Design Outcomes Research identified that these matters are usually well provided for in Ōtautahi Christchurch developments. This is most likely because there is a good market incentive for it, although results relating to outdoor living space may be in part due to the current requirement in the District Plan for 30m² minimum in the medium density zones.

Outdoor Living Spaces

Outdoor Living Spaces requirements in the MDRS (20m²) are a reduction to the requirements in the RMD Zone under the operative District Plan (30m²).

Generally a 20m² space allows for day-to-day activities such as outdoor dining (which usually requires around 3m x 3m to accommodate a table and chairs), and some planting. However, outdoor spaces are often used for other domestic activities, for example drying clothes and for storage. This can reduce the usable space and lead to a loss of amenity and functionality. There would also be limited space for other activities that might be expected including children's play, the keeping of pets, and vegetable growing. A 20m² outdoor space is therefore substantially less practical than a 30m² space. Furthermore, at 20m² there is also limited opportunity for larger scale planting such as trees, especially if these are to avoid compromising the interior or exterior space, for instance through shading.

It is likely that the forthcoming reduction in the size of required outdoor living space will result in a subsequent reduction in the quality of outdoor space compared to the Design Outcomes Research sample.

The current RMD Zone allows for one-bed units to have an outdoor living space of 16m² or 6m² for balconies. This has also been often permitted in the Residential Central City Zone and allows for higher densities, or sometimes to fit an additional unit on a site. It is a useful incentive for a typology that is not well provided for, and does reflect reduced usage of the space. It is noted that the reduction from 20m² is relatively small and that the incentive provided by this is likely to be marginal in future.

5.1.2 Communal and Neighbours Amenity

These are issues where benefits accrue only partially to the occupier, which the Design Outcomes Research identified as not always meeting a high standard; or where adverse effects were accrued to neighbours, but not to the occupier (for instance where upper floor windows from the new unit overlooked private outdoor space of neighbours).

Landscaping and design of accessways

This issue is also discussed in section 6. Communal access areas are experienced by occupiers and visitors as they enter the site and contribute to amenity in a number of ways. If well designed, and including planting and well-designed building frontages, they create a sense of legibility and distinctiveness to the development. Higher levels of landscaping, particularly including trees, create visual benefits and can also contribute some access to nature.

These benefits are undermined by dominance of hard-surface or prominent bin storage, for instance.



Figure 21: A well planted accessway with tree and shrub planting (left) and paved, car dominated access with minimal planting (right).

The importance of accessway design was highlighted by the Design Outcomes Research, while noting they were generally not of satisfactory quality in the original sample in 2020. The report noted that “very little space was given to landscape beyond that of the hardstand that formed the vehicle access”.

There is a collective benefit in providing a high standard of access generally, and a community benefit because accesses are visible from the street (and potentially contribute to biodiversity). However, the benefits do not accrue to the individual landowner and there is therefore not a market incentive to provide for a high level of planting.

Communal Spaces

Communal spaces are especially beneficial for larger sites and for taller buildings where a high proportion of the residents will not have access to their own ground floor space. Communal space, if of a sufficient size and designed well, can allow access to space with larger planting and trees, as well as more formal and usable space which can supplement balconies and greatly improve the amenity of the site and shared spaces (and more widely the block and neighbourhood). If centrally located, communal spaces create opportunity to meet and greet neighbours, in more conducive surroundings than lifts and corridors, and provide incidental

amenity for residents passing through them on the way in and out of the site. They also create safe spaces for children and pets, which may otherwise be lacking in apartments.

Small communal areas which are large enough for trees to grow with some landscaping will provide some visual amenity for the site, but larger spaces will allow for a wider range of uses. A space of 100m² is comparable to a good size garden area and if well designed, would support a variety of activities. A size of 50m² would support a planting and seating area, the likely minimum usable communal space. Such spaces need to have a usable dimension (around 8m) to provide separation from paths and buildings and allow for more than one group to use the space.

Overlooking

Even in a low density residential environment, it is not unusual or unexpected that there may be some windows overlooking from neighbouring sites, but a small number of balconies and windows facing an outdoor or interior living space has less impact than a larger number.

One reason is that where overlooking is limited it is possible to introduce screening (for example from trees). Overlooking is also related to the use of the interior space. Living rooms are used more intensively than bedrooms during the day so a larger amount of overlooking would be expected. Balconies can be quite intrusive because when people are out on them, they can be seen from next door. Multiple floors of living rooms and balconies would be especially intrusive. As a result, the impact from overlooking increases with the number of units.

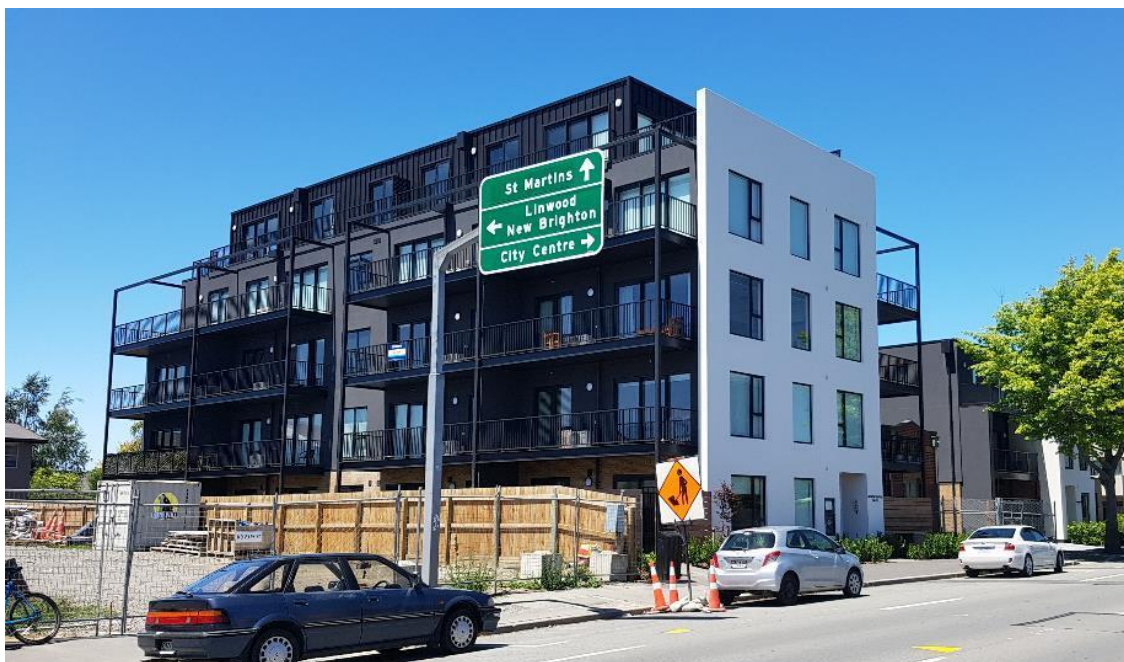


Figure 22: Balconies facing side boundaries creating potential overlooking of neighbouring sites and loss of privacy.

5.2 Recommended Approach

The Design Outcomes Research has generally found that the internal amenity of developments is good, and there is a market incentive for this to be maintained. Meanwhile, Communal and Neighbours Amenity represents an externality which may need to be managed by regulation.

It is recommended that the existing operative District Plan approach is retained, with a focus on communal and neighbour amenity. This entails:

- Retaining the Residential Design Principle for Residential Amenity;
- Including MDRS outdoor living space standards but including a permitted standard for reduced size spaces in the HRZ only; and
- Requiring a communal space of a minimum size and dimension for higher density residential sites.

The issue of good quality access has emerged as being of importance in the monitoring work carried out for the Council, and this is explored under section 6 below.

5.2.1 Outdoor Living Spaces

Although the outdoor living space standards have generally been satisfactory under the operative District Plan, the MDRS is expected to result in a reduction in the quality of spaces, in association with reduced requirements. This is only partially a matter of occupier amenity as these spaces contribute more generally to amenity through open space and planting.

In the MRZ, where there is expected to be a reduction in the standard of overall site amenity compared to the RMD Zone, it is not considered appropriate to retain the reduction in outdoor living space size for 1 bed units. However, in the HRZ, where a different balance is sought, the reduction (to 15m²) could be introduced.

The MDRS allow for communal outdoor living spaces. These can be successful and make a substantial contribution to collective amenity. However, the design of the spaces is important to their success – that they include usable space with a usable dimension and space for larger planting and separation from pathways and frontages

5.2.2 Communal Areas

The operative District Plan requires that a discretionary development “*includes tree and garden planting particularly relating to the street frontage, boundaries, access ways, and parking areas*”.

Changes to site layout are often needed to prioritise some space for planting alongside accessways and in communal areas. The assessment matter should be retained, and consideration of these matters also included in the overarching site layout matter, to ensure that sufficient space is provided for planting at an early stage in the design process.

5.2.3 Overlooking

The operative District Plan provides for a 4m setback from windows to neighbouring boundaries to limit overlooking into neighbouring private space. For larger developments, there is also an assessment matter in the Residential Design Principles.

The MDRS does not include the 4m setback for 3 units or less and will result in a reduced expectation of privacy, compared to the existing situation. However, there still is an increased impact from larger buildings such as apartments or longer terraces, compared to the MDRS expectation. To address this impact from larger developments it is recommended that privacy is retained in the Residential Design Principles, to recognise that there is an increase in the level of privacy intrusion resulting from a larger development.

6 Safe and Welcoming Access

6.1 Description of Issues

This issue primarily concerns the quality of access from the street to the front door of a unit - ensuring that this semi-public environment is safe and welcoming for residents and visitors. This is an issue of safety and amenity and is an important element in the creation of high quality housing. The importance of this issue was highlighted by the Design Outcomes Research, which identified it as an area for improvement. .

A shared access is used by residents and visitors alike and has many of the same requirements and attributes as a street. It is visible from public space and provides a transition to the public environment. It projects a sense of the quality and uniqueness of the development and the extent to which it is cared for. In the absence of direct street interface, the accessway is the public environment from which people will experience their homes. The functional design, appearance and maintenance of this area is important in the way that people interact with the shared environment of the city.

The Design Outcomes Research indicated that a particular issue for some medium density developments in Christchurch (in the RSDT Zone in particular) is that the main access, leading to front doors of units within the site, is treated like a service lane and designed only around engineering requirements, without consideration of the quality of environment.

From a design perspective, the issue is distinct from whether appropriate vehicle access is provided that allows for easy manoeuvring, for instance (which is a transport issue). However if there is a vehicle access, then it access should not compromise the quality of the pedestrian access

Issues that arise with accessways include:

1. *Narrow pedestrian accesses*, which may lead to these being unsafe or unpleasant for users. A total width of around 3m is required to allow for evasion of intruders or other parties and a reasonable width is also required for comfortable passing, to avoid touching and being forced into close proximity, especially if the access is also used for bikes and bins.¹⁴

It is not necessary to form the whole width and a formed width of 1.5m is usually sufficient. The remainder would usually be a landscaped buffer which provides for additional space at upper body level and for emergency escape.

2. *Wide vehicle accesses*, dominated by hardsurfaces. This often occurs next to collector and arterial roads (where a wide access is required to avoid queuing on the road). It may also occur when separate pedestrian access is provided. Whilst this is desirable in some ways, it often results in an increase in effective width of access, for example from 5.5m to 7m. If not carefully designed (for example with kerb separation) the resulting space is often colonised by informal parking or servicing. A more effective strategy is often to use patterned paving to indicate a shared space, and increase the amount of landscaping instead.

¹⁴ Secured By Design (2019)



Figure 23: This driveway from a collector road to 8 units has adjacent planting but is wide, with the pedestrian access at the same grade (un-dedicated) making it appear wider and providing the opportunity for parking over pedestrian access.

3. *Access is dominated by parking or bin storage.* This was a particular problem in the RSĐT Zone where landscaping is not required and no urban design assessment applies. This results in a back of house appearance, which reduces legibility and the sense of ownership over the space, as well as the more obvious issues of poor amenity both for residents and for the immediate street environment. It is not apparent that the area is cared for and that someone is taking responsibility for managing the space.
4. *Accessways dominated by garaging.* Whilst garages are an expected component of access, if they are the dominant element in the built form, it can prevent a safe and welcoming access from being established. In many developments they are recessed (because this makes the best use of the site), which emphasises the units and reduces the degree of garage domination.
5. *A lack of visual interest* where fronted by fenced areas or the blank side walls of housing. As for a street, the quality of an accessway is determined by the quality of the buildings that front it.
6. *Accesses with little or no landscaping.* This results in a reduction in the quality of the environment and territoriality as discussed above. Planting improves the appearance of an accessway, creating amenity benefits and increased opportunities for personalisation of threshold spaces in front of units and the increased projection of ownership over the space.
7. *Safety and fear of crime issues* due to little meaningful passive surveillance, poor lighting and a lack of territorial control of space. These issues are discussed in detail in section 8.
8. *Issues of privacy* due to lack of separation with units or intrusive views into the private areas of units. Where windows are provided without adequate separation from accessways, they can create privacy conflicts because people find the ability of passers-by

to see in intrusive. This results in screening (by curtains or blinds) and a consequent reduction in engagement and passive surveillance.



Figure 24: The development has a wide planting strip which also creates an opportunity for a porch, creating a safe stepping out place for pedestrians and transition between communal and private space.

9. *Unsuitable Housing Typologies.* Some unit typologies create accessway issues because of their design and layout.

Where there is a continuous row of garages, or where garages are flush with the front of the units, they are more prominent and can become visually dominant. Continuous garaging can also result in increased hard-surface, to allow for reversing space which can create quite a harsh visual environment. In some unit types, there is only garaging and doors on the ground floor, meaning there is no ground floor interaction between the access and the unit.

Apartment buildings where the ground floor includes a high proportion of parking are also a problematic typology. This can often be managed by separating the pedestrian access from the parking areas, and ensuring that parking does not take place at the street front.



Figure 26: Ground floor living with garaging consolidated in between units minimises the visual and experiential impact of on site carparking.



Figure 25: No ground floor living with garaging dominating the ground floor reduces any opportunity for passive surveillance over the journey between the street to the front door.

The key to avoiding these issues is to provide an access with an appropriate width and elements of higher quality, including planting, lighting, and sense of address from the adjoining units. This starts with the site layout and for the unsuitable typologies, may involve changing the typology, or by mixing in a variety of housing.

6.2 Recommended Approach – Safe and Welcoming Access

The quality of accessways is the result of a combination of rules and assessment matters and traverses all the residential design principles. The aim should be to create a street-like environment that is high quality for residents and visitors, creating a transition space to the street over which there is a sense of ownership.

Some aspects of a good quality access have already been discussed in previous sections, notably site layout, and residential amenity matters, and the Residential Design Principles that relate to them. These will collectively contribute to creating a safe and welcoming access by ensuring that there is space set aside for the accessway, landscaping and that there is ground floor space that overlooks it.

A minimum width for pedestrian accessways (likely through the Transport Chapter) would ensure that they were not too narrow (addressing issue 1).

Wide accessways (issue 2) are sometimes encouraged by the transport chapter, but there is flexibility to reduce the width in some situations (for instance by implementing a shared surface). Mechanisms to encourage this outcome are supported and in particular a reduction in required width in relation to collector roads may be appropriate and would lead to improved outcomes.

Issues 3-6 are concerned with visual amenity or vehicle dominance. 3 and 4 are addressed by the existing *Access parking and servicing* assessment matter in the Residential Design Principles, whilst 5 and 6 are related to *Built form and appearance* and *Residential amenity*. This illustrates the way the principles work collectively to achieve good outcomes. Issues 8 and 9 are *Site layout* issues which manifest as accessway issues.

The existing assessment matter is concerned with the accessway itself rather than the access environment. It has been quite effective in ensuring higher quality outcomes, especially in the RMD Zone where it is backed up by rule 14.5.2.13 (ground floor habitable space). The rule is aimed at ensuring pedestrians are prioritised in design and that parking, garaging and other vehicle infrastructure is not visually dominant. It is recommended that this rule and design principle be adopted in all zones.

The MDRS rule for landscaped area will ensure there is space allocated for planting on the site. For larger sites, this should be associated with the public areas of the site, including the accessway, and the Residential Design Principle can be used as a method to achieve this outcome.

7 Servicing and Storage

7.1 Description of Issues

This issue is about essential servicing such as bin storage, as well as bike storage and general storage. These aspects take up space on the site and it is important to consider how they will be provided. If dedicated bin storage is not present, bins can be visible and unsightly both from public areas and within the site. Bike storage is important in encouraging active transport and reducing carbon emissions. Bike storage must be secure and accessible for it to be usable by residents. General storage is often not well provided in current developments.

7.1.1 Waste Storage and Washing Lines

Servicing is an aspect of housing that is often neglected in the design process, with the result that space must be found for it at the end of the construction process.

Unless a carefully considered bin storage area is provided, bins may end up being stored in prominent areas or in landscaping strips, or compromise access and safety, and undermine other aspects of the site layout and design. This includes creating nuisance effects and/or compromising overall site amenity for occupants and neighbours.

In larger complexes, the location of waste storage areas can be a significant issue in respect to the allocation of space, as well as functionality for occupants utilising them, and for ease of collection by providers, whether shared or individual bins. Where sites are long, with only pedestrian access to the street, bin storage and the distance to the street, as well as the impact on pickup days for the function of the street space (pedestrian and cycle ways included) can be very problematic with increased unit numbers.

For smaller outdoor living areas washing lines can occupy a significant proportion of the area of the outdoor living space and can compromise its usability.

7.1.2 General Storage

Storage areas, both internal and external, are often not provided or not well provided for in multi-unit complexes. This includes space for larger items such as sports equipment, gardening needs, luggage or linen storage etc. With smaller unit and garden sizes, it is usually not possible to provide for extra storage post-development in a way that does not compromise the function and amenity of the dwelling.

7.2 Recommended Approach – Servicing and Storage

The above issues are often neglected in site planning which can lead to difficulty in finding appropriate space for them later on in the design process. Including clear district plan rules indicates the importance of considering matters at an early stage. It is therefore recommended to retain rules for bin storage and washing line areas, as well as bike storage (noting that this is part of the transport framework in the District Plan). It is furthermore recommended that minimum areas for internal storage are introduced.

The matters are supplemented by a design principle that aims to ensure the areas are well located and do not have adverse impacts on neighbours. This should be retained.

7.2.1 Bin Storage and Washing Lines

Including rules for bin storage ensures that it is considered at an early stage of the development and not left to the end when there is no space available. The Design Outcomes Research shows that in the RSDT Zone bin storage was often not provided and as a result bins were stored on the shared access, with no dedicated space or screening, which undermined the quality and safety of the access.

The current District Plan requires space be allocated for washing lines in addition to the 30m² outdoor living space requirement. This is to be reduced in line with the MDRS, meaning that there will be less usable outdoor living space for each unit. In order that the expected level of amenity and functionality is delivered, it is important to ensure that this space is not reduced by encroachments from servicing including washing lines.

The application of rules has been flexible in practice. Where applicants have proposed communal bin collection (which is more space efficient), this can and is routinely consented (larger units where this is viable would need to go through a consent process in any case), provided there is a viable rubbish collection proposal in place.

7.2.2 General storage

In order to address a shortfall of storage in residential dwellings, a minimum storage area could be required for each unit.

The proposed storage areas are derived from the New South Wales Apartment Design Guide (NSW Department for Environment and Planning, 2015, pp101), which is well regarded as a source of design guidance, and are consistent with other guidance:

1. New Zealand Guidance (eg North Shore City Council's Apartment Design Guide, which implements the NSW standard).
2. UK guidance¹⁵ which includes similar requirements.

The volumes specified may be combined with outdoor storage, including bike storage, provided that the totals are met and half the total is indoor storage. For example, in a one bedroom unit, a 3m³ storage cupboard may be combined with a 3m³ shed. A cupboard of this size is equivalent in size to a typical wardrobe (0.7m*1.8m, with a height of 2.5m).

The volumes are as follows:

1. 6m³ for studio or one-bed units.
2. 8m³ for two-bedroom units.
3. 10m³ for three-bedroom units, or greater.

Experience with existing rules (in the Central City Mixed Use Zone) is that indoor storage space is often only comprised of wardrobe space. This meets the existing rule, but does not provide for general storage and has not been effective in ensuring good levels of storage are provided. For

¹⁵ MHCLG, 2015, Technical housing standards – nationally described space standard

this reason, it is recommended that storage which is accessed from bedrooms is not included in the above storage areas.

The storage areas would ensure that there was some general storage available in each unit. The amount is in proportion to the size of the unit and would be provided in combination with outdoor storage. This would allow some flexibility on the type of storage.

A less onerous alternative would be to provide for half the recommended amounts as internal storage and allow the issue of bike storage to continue to be managed as it is now, through rules in the transport chapter. This would provide for a basic level of storage for each unit, but would not provide for outdoor equipment.

8 Safety

8.1 Description of Issues

8.1.1 CPTED Principles

Crime Prevention Through Environmental Design (CPTED) principles are used to ensure that developments contribute to a safe city, where both crime and the fear of crime is reduced. CPTED principles are described in *Seven Qualities of Safer Places*¹⁶, and there is an extensive academic literature as to the efficacy of CPTED. Although there is not necessarily a universal set of principles, there is wide agreement on what contributes to a safe environment and that poor urban design results in increased perception of and opportunities for crime.

Principles listed in the *Seven Qualities of Safer Places* document are:

- Safe movement and connections
- Surveillance and sightlines
- Layout – Clear and logical orientation
- Activity – Eyes on the street
- Sense of Ownership - Showing a place is cared for
- Quality Environments
- Physical Protection.

The Design Outcomes Research discusses CPTED in relation to the similar design principles from Cozens (2016) and these are the primary reference in this analysis. A similar set of principles was used in the earlier Safer Canterbury guidance prepared for Christchurch and neighbouring Councils:

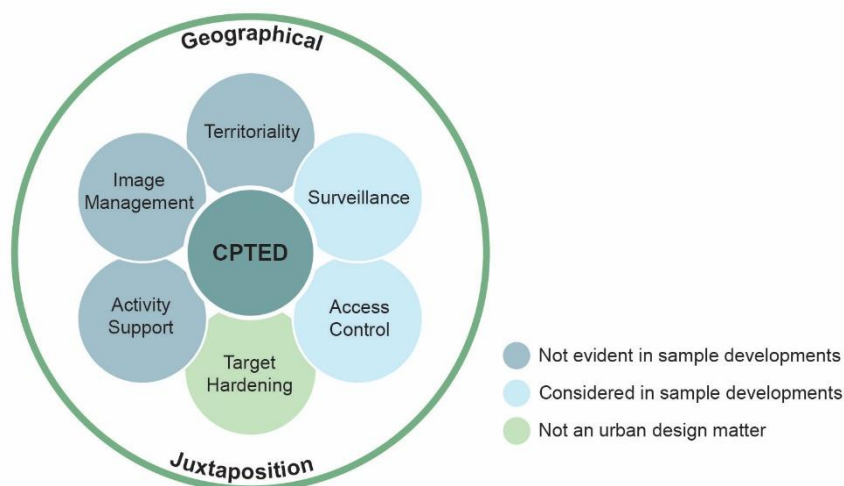


Figure 27: CPTED Strategies (extract from Design Outcomes Research, adapted by Couzins 2005)

¹⁶ National Guidelines for Crime Prevention through Environmental Design in New Zealand, Parts 1 & 2, Ministry of Justice (2005)

Safety in this respect relates predominately to personal safety and in respect to property crime, rather than for example, getting hit by a car. Safety is particularly important because the potential costs of crime are high and the most affected people are those who are least able to recover from it, more specifically impacts people from lower socio economic groups. Fear of crime is equally recognised as a problem, because it affects the way people feel about and use public space.

To a large extent, CPTED measures re-inforce other urban design strategies – for example an engaging street scene creates opportunities for passive surveillance and high quality design in general and promotes a sense of ownership over streets and spaces.

The concept of passive surveillance is well understood, but this is only one of a suite of principles that contribute to a safer place (and is not sufficient in itself). A criticism of District Plan practice identified through the 2020 Design Outcomes Research was that it was too focussed on passive surveillance rather than a more broad based set of principles.

Layout has been discussed under section 2 and a good, logical site layout will support CPTED principles. This includes reducing entrapment and concealment spaces, including fenced areas next to the street and providing clear paths to unit entrances. Similarly image management / quality environments is supported by good design and layout and provision of planting and quality materials. Other CPTED principles are discussed below.

8.1.2 Safe Movement and Connections

Indirect pathways with blind corners, potential for entrapment and poor visibility are a common issue in the processing of resource consents, on larger developments. The usual response is to ensure that pathways are quite wide with a minimum recommended safe width of 3m¹⁷ and well lit at these key points. The present assessment framework has been relatively successful in managing this issue in the RMD zone.

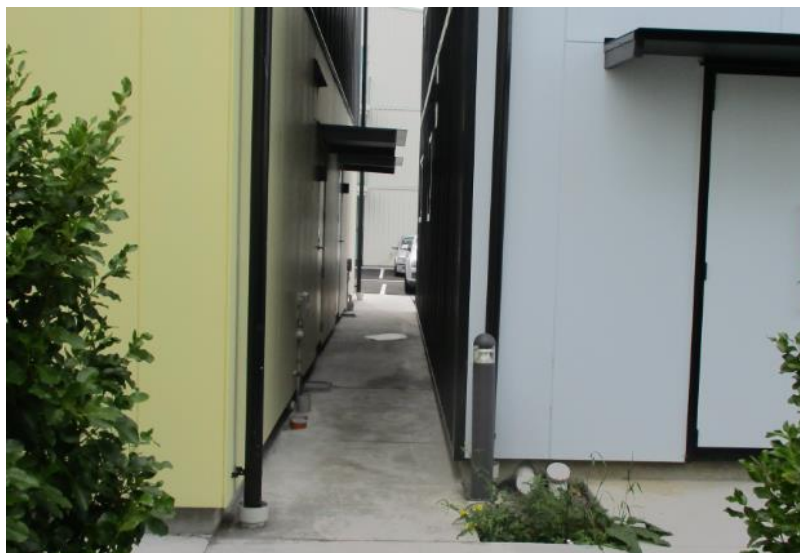


Figure 28: The 1m wide passageway between front doors and parking areas does not provide a welcome, safe or functional access to the four residential units in the building.

¹⁷ Secured by Design

Lighting is an existing requirement but has been lacking in proposals or is provided only through condition of consent. Lighting is a key aspect of ensuring safety, particularly in larger development proposals that have more extensive shared space.

The Council has been developing guidance for the level of lighting required in different situations based on AS/NZS 1158:2020 (Standards Australia Ltd, 2020). The issue is complex because there is a need to ensure that systems are switched on and maintained in the long term, as well as providing an appropriate amount of light. This usually requires a cabled system with a landlords supply, with ducting located in a landscape strip.

It would be useful to reference this standard in the District Plan for larger developments, so that it was clearer how lighting standards should be complied with.

8.1.3 Surveillance

Passive surveillance is as much about the relationship between the inside and outside space as it is about the provision of windows. To achieve it, there need to be views from a living space (ideally a kitchen or living room), but views into this space from the path should not be intrusive. The research found that whilst there were usually windows overlooking, these were often from bedrooms (which are not usually occupied in the day and are more privacy sensitive). As a result curtains were closed and there was no real passive surveillance, even though glazing was provided. This points to the earlier conclusion in section 2, that site layout is the key to resolving many urban design issues.

Having windows next to the street provides opportunity for passive surveillance, but it is very beneficial to also include a door, which allows for the projection of a sense of ownership, as well as increases the extent of activation of the street. Measures are discussed under street scene (section 3) to encourage front doors facing the street, rather than being internal to the site.

Similarly, ensuring there is only limited fencing at the street boundary assists with the opportunity for good surveillance and provides a transition space over which the occupant has stewardship. High fencing also provides opportunities for criminals to hide behind and surfaces for tagging and is discouraged in CPTED literature. Tall fencing is usually associated with outdoor living space being located by the street and there may sometimes be reasons this is beneficial (such as solar access), but these should be balanced against the implications for safety and security. Carrying out this type of nuanced analysis implies that an assessment regime with the ability to use some discretion is required.



Figure 29: Solid and tall fencing and garaging located adjacent to the street lacks opportunities for passive surveillance over the street, as well as an engaging and visually interesting street experience.

8.1.4 Territoriality and Target Hardening

An important concept is *Territoriality (or Sense of Ownership)*, which is concerned with the ownership and use of space, where people are motivated to manage and control space – people have a proprietary interest in their own property. This creates a sense of ownership over public and private space, with a level of implied responsibility for the care of that space. An important aspect of creating territoriality is defensible space (such as a planting strip) immediately outside the unit, to separate it from public areas and accessways.

Developments that are shut off from public and communal space do not create this sense of ownership and become more vulnerable to crime (with graffiti being the most obvious example).

Target hardening (managing risk through gating and CCTV, for instance) is often a response to security issues, but is not a CPTED strategy in itself because it can undermine other CPTED measures. Developers may implement target hardening strategies if they wish, but these are not in the public interest as such.

8.1.5 Larger Developments

Larger developments, such as apartment blocks, may have some increased CPTED risks compared to smaller complexes, if not thoughtfully designed. There are more complex design issues to consider and higher density is associated with higher rates of crime in any case. Issues noted in the Design Outcomes Research were:

1. The creation of isolated and unobserved spaces for parking and servicing. These are typically at the ground floor, with apartments above them. Areas such as this can create entrapment spaces and be intimidating for users, especially if there is no ground floor activity to increase the numbers of legitimate users of the space.
2. The creation of entrapment spaces relating to communal bin and storage areas. For instance there is a tension between screening bin areas and ensuring that they are safe.
3. Gallery access (sometimes known as breezeways) often precludes passive surveillance and territorial control because the access is directly adjacent to the unit. As well as privacy issues, there are often fire-suppression issues with installing glazing in this situation. A preferable solution is to include separation by means of a void.

4. Reduced space on the ground plane can reduce opportunities for planting and reduce the quality of communal areas and the sense of ownership projected over them.
5. There can be a reduced sense of ownership in streets in high density areas. This can result from housing that has fewer entrances onto the street or more fencing; and also because such areas can be more anonymous, with strangers routinely present.



Figure 30: Open gallery access is separated from apartments to allow for glazing and privacy (Source: WAPC, 2019)

Crime can be associated with communal areas (entranceways, corridors and elevators). These may be narrow with tight turns and can include access to parking areas, which creates further opportunities for entrapment. These areas are also usually poorly observed. Access control is one way to reduce this risk, for instance where an accessway can be fully enclosed and restricted to one entry with an automated door.

Where communal space is provided, it should be accessible and inviting for all residents, ideally with incidental use (for instance some people must pass through it on entering the complex) to increase the legitimate use of the space. This can reduce the risk of it being a venue for anti-social behaviour.



Figure 31: Vehicle access and parking dominates the ground floor, with overhangs creating CPTED issues due to a lack of overlooking and creation of entrapment spaces. There is a lack of stewardship of the space as a result.

For medium-size developments, the resolution of many of these issues is to focus on the space between the front door of each unit and the street. This is to ensure there is safe and high quality passage (refer to section 7). Lighting and access control is important, but should not be the only response.

8.2 Recommended Approach - Safety

CPTED matters will sometimes need to be considered in the round with a variety of other issues, with the use of fencing next to the street being one example. There is not a single best solution that can be codified into a rule.

The suite of measures listed below collectively contribute to a safe environment. They ensure that views of the street are available from units and that they would not usually be obstructed.

Measures previously discussed to encourage front doors facing the street would also have CPTED benefits by encouraging a connection/activity to the street:

- Windows to street – ensures there will be some passive surveillance of streets.
- Landscaped Area – encourages a sense of ownership; may provide for separation and encourage passive surveillance.
- Fencing – management of extent of fencing ensures that views are not blocked.
- Ground Floor Habitable Space – ensures there is a living room adjacent to the street from which there will be views of the public space.

In addition, there is an existing Residential Design Principle for safety. This has been effective in the RMD zone in obtaining good outcomes in larger developments, with the changes to practice following the Design Outcomes Research appearing to result in improving practice through the resource consent process. This illustrates the value of the assessment matter. An additional clause is recommended to reinforce the concept of a sense of ownership, which is not currently referenced explicitly in the Residential design principles. A final clause to address quality

environments was also considered, but is not thought necessary as it is covered by the Residential Design Principles as a whole.

9 Landscaped Area

Landscaping, and more specifically planting is used to soften the appearance of buildings in the street setting and also provides access to nature. It is associated with reduced levels of crime and improved mental wellbeing.

Landscaping contributes to:

- Street Scene
- Built Form and Appearance
- Safe and Welcoming Access
- CPTED
- Good On-site Amenity

Access to nature is inherently beneficial for its own sake, and also induces more use of space and as a result can deter crime.

There is a lot of evidence for the benefits of biophilic design as a concept. This includes well-known studies in Chicago that show lower levels of violent crime were correlated with views of greenery, with residents in low-income neighbourhoods with outlook over trees experiencing half the incidence of assault, robbery and murder¹⁸. The same study found evidence of reductions in stress associated with natural environments in residential settings.

The Design Outcomes Research found that whilst landscaping was usually provided, it was often insubstantial or located behind fencing where it was not visible from public areas. The provision of effective landscaping was a weakness in all the zones, but particularly in the RSDT zone, indicating that the current assessment framework is contributing to improved outcomes in the other zones. A conclusion of the research was that the RMD Zone did contain good assessment matters but (as for CPTED) they needed to be more consistently applied. The amount of landscaping (20%) was sufficient, but it was not always well distributed around the site.

For landscaping to be effective it needs to be provided in areas which are large enough for it to thrive and reach a substantial enough size to have a significant visual impact, in planting beds which are large enough to support plant growth with minimal maintenance so that it survives into the long term. In residential areas, this is usually considered to be 0.6m width planting strips, planted with shrubs (with a woody stem) which will grow to a height of 1m. These should be supported by trees in key locations such as at the end of driveways (to terminate views) or in parking areas (to offset the impact of hardsurface and taking advantage of the airspace). Where landscaping is needed to offset adverse effects (such as the visual impact of large parking areas or garages) it needs to be more substantial.

¹⁸ Montgomery, C (2013): *Happy City - Transforming Our Lives through Urban Design*, pp102

9.1 Recommended Approach - Landscaping

The required landscaped area required under the MDRS is the same as that currently required in the RMD and RSDT zones. It is noted that in the operative District Plan RMD Zone that provisions relating to landscaping included the specific provision of trees, both in the landscape definition and in respect to minimum number of trees planted. This has contributed positively to the overall quality of landscaping across the site. However, with the exception of a reference to canopy cover and landscaping, there is no requirement for trees under MDRS.

The cost of landscaping is not high and is less than alternative surface treatments like concrete.

Where four or more units are planned, a restricted discretionary assessment (against the Residential Design Principles) will allow consideration of the location and extent of planting and whether it relates to public areas. Whilst 20% is a sufficient amount of landscaping, it is important that it is used in a way that it will contribute to outcomes. Although a naturalistic environment will rarely result, it will soften the appearance of buildings and engage people's senses.

The proposed rule limiting the amount of fencing in relation to the street (to only 50% of the frontage being over 1m high) will increase the visibility of planting at the front of the site.

The use of the residential design principle for residential amenity to ensure there is planting in relation to accessways is also important in achieving good landscaping. In addition, where there is communal space provided, this is a beneficial place for tree planting to both thrive and be appreciated by residents.

10 Building Envelope

A building envelope is the allowable built form on a site, given the combination of planning rules such as height and setbacks.

This section considers the MDRS building envelope (and alternatives) and the contribution the building envelope makes towards management of the issues identified in the previous sections. It includes recommendations for:

- Fine tuning of the MDRS standards in the MRZ.
- A building envelope based on setbacks and moderate site coverage for the HRZ.

10.1 Managing the Building Envelope

In the RMD Zone, the building envelope is comprised of a number of standards in the MDRS, which control the scale of development on the site. These are:

- Building Height
- Height in Relation to Boundary
- Setbacks
- Site Coverage

These standards relate to a number of the Residential Design Principles discussed above. This section provides a comprehensive assessment of their impact.

In the HRZ, the management of the building envelope is more complex, because it is not possible to prevent the establishment of adverse impacts in the same way. With taller buildings, an approach of using setbacks and height in relation to boundary rules does not encourage either good design or the optimum management of effects, as discussed in section 2 Site Layout. For this reason, a different approach is recommended to enable perimeter block typologies.

10.1.1 Management of Height in the District Plan

In the Christchurch District Plan, residential height is generally calculated as being 3m per storey plus 2m for a roof. This allows for a generous floor to ceiling height of 2.7m (with 2.4m being typical and 2.7m considered desirable for improved light access). The MDRS, by contrast allows 11m (+1m roof) for a 3 storey building and a sloping roof of 15 degrees or more. This approach does not reflect building or planning practice in Christchurch and has not been adopted more widely in the proposed District Plan change. The established Christchurch practice is considered to provide for building heights which are more directly related to floor heights. This methodology is clear and does not appear to have created any confusion or unintended consequences.

For this reason, heights in the plan change are usually specified as total heights, without a roof allowance, and are as follows

No of Storeys Intended	Height	Composition
4	14m	4 storeys + Roof (12m+2m)
6	20m	6 storeys + Roof (18m + 2m)
10	32m	10 storeys + Roof (30m + 2m)

10.2 Medium Density Zone

The implementation of the MDRS requires a height limit of 12m be included across most of the residential zones of the city, which will be rezoned to MRZ in accordance with the National Planning Standards. This will allow for 3 storeys to be built in most areas (with some scope for an extra storey as described above).

The NPS UD also requires increased height to be provided around centres (in addition to at least six storeys within at least a walkable catchment from large centres and rapid transport stops). Additionally, it is open to the Council to specify an increased height in the medium density zones.

At present the height of houses and buildings is partly driven by building costs, which increase with additional floors. Three storey buildings are more expensive to build than two storeys but have proved to be feasible in the central city and in some inner suburban areas. In time, the 3 storey townhouse typology may be more wide used, which would provide for more residential density throughout the city than is currently built, especially in Residential Suburban zoned areas.

There may also be more desire for taller buildings (particularly in central areas). However, this is likely to involve a transition to an apartment typology that incurs a further increase in cost (because of the need to provide communal areas and in particular to the additional cost associated with fire suppression). The Council's economic analysis identifies that there is very little demand for apartments in the city in the foreseeable future¹⁹. Where these have been proposed to date, it has usually been in areas with a particularly high amenity, such as around Hagley Park.

A height relaxation has been considered for the MRZ zone at 14m to allow for 4 storeys more easily. However, it is not considered there is a strong case for increasing heights beyond the MDRS level. The high construction costs and lack of demand means that any taller apartments in the MRZ would likely be highly unusual. If there was a more general demand, then it would be desirable that it be focussed on nodes as outlined in the NPS UD, or within the high density zone.

Meanwhile, additional height would impact on the expected quality of the environment in suburban areas, which includes a level of solar access and management of enclosure and privacy. Where additional density occurs, it is most suitable in areas where there is a trade-off for the reduced amenity, such as access to services. This is not the case generally in the city.

For these reasons above, an increase in height over the MDRS requirement is not considered necessary or appropriate.

10.2.1 Increased Building Heights around Commercial Centres

The NPS UD requires additional density to be provided around local and neighbourhood centres. As a consequence the proposed approach is to provide for a city form that integrates commercial and adjacent residential development, with commensurate building heights for residential activity around commercial centres, appropriate to the scale of the centre. In practice this means that for larger centres the surrounding area may be zoned for high density (6 storeys), but for smaller centres an intermediate height of 4 storeys is considered appropriate.

¹⁹ The Property Group (2022): *High Density Residential Feasibility Assessment*

In making this recommendation, heights of 4 or 5 storeys were considered as options (14m or 17m). A height of 14m is recommended because of the potential for greater impacts on the surrounding area from five storey buildings, combined with the lack of demand for apartments, which could result in taller developments being visually isolated and dominant, in addition to effects they may have on amenity such as overlooking and shading.

The Local Centre Zone is proposed to have heights of 14m to allow options for 4 storeys as a step up from the surrounding residential areas. These are smaller centres and tall buildings are not usually constructed in these areas at present (although the height limit is 8m). As for residential zones, there is limited demand for apartments, and there is also limited demand for commercial uses because larger offices prefer more accessible locations.

Whilst it would be possible to enact a higher height in the adjoining residential area than the commercial centre, it does not make sense from an urban form perspective, which suggests locating the greatest density where it is most accessible. Local centres do not necessarily provide access to a wide range of facilities, and as such the emphasis is on higher amenity. Five storey forms are also more dominant in relation to the typical two storey houses that are likely to be built in the MRZ in Ōtautahi Christchurch – being more than twice as tall and likely to be seen in isolation.

10.2.2 Height in Relation to Boundary

Recession planes traditionally manage the level of solar access received by neighbouring properties in respect to a development. In Christchurch the recession planes were set to maximise solar gain for neighbouring properties to the south i.e. to receive north sun, with steepening recession planes to the east and west and north to compensate.

The space provided by the recession planes can also contribute to a sense of openness by increasing the separation distance between buildings. This is in itself an important component of a medium density environment, for example to improve privacy and avoid an oppressive sense of enclosure to outdoor living space.

Owing to the impact of Christchurch latitude and relatively low sun angles, a qualifying matter has been proposed for height in relation to boundary. This is discussed in a separation report.

10.2.3 Side Boundary Setbacks

Side boundary setbacks provide some separation between adjacent sites to prevent a sense of enclosure and help to manage privacy. The MDRS allows for buildings to join where a common wall is to be built, but otherwise buildings are required to be set back 1m from the boundary.

Whilst having no setbacks can increase flexibility, this does come with risks of:

1. Impacts of neighbours for solar access and of enclosure.
2. Adverse visual impacts. Building built to boundaries must be fire rated, which means that many types of cladding cannot be used and few windows can be included. This can affect the residential amenity for neighbours as buildings can appear stark in the environment, as well as the general appearance of the neighbourhood.
3. Space less than 1m wide can become difficult to access. Reductions below 1m are not recommend except where zero setbacks are considered appropriate.

As a result, reductions in the MDRS setbacks are not generally proposed, apart from for single storey garages and accessory buildings at up to 10m in length per boundary. This is a carry-over from the operative District Plan which allows a limited intrusion, which has limited visual and privacy impacts, in exchange for more flexible use of the site. It is especially beneficial for narrow sites with garages as it allows for manoeuvring on the access (a typical garage and reversing space require 13.5m width in total) and makes site planning simpler and more flexible.

10.2.4 Front Boundary Setbacks

Front boundary setbacks provide some separation from the street. This aids privacy in the dwelling, which is desirable in its own right. They also provide some space for planting, which improves the appearance of the street and allows access to nature, and has CPTED benefits (encourages passive surveillance and territorial control), in particular where adequate glazing is incorporated to living areas.

Larger setbacks would provide space for trees to be planted, including space for canopy growth, which is especially beneficial on older streets where it can be impractical (or prohibitively expensive) to plant trees in the street corridor due to underground services. However, these are not an option given the MDRS.

Setbacks can have some impact on residential density. However, the MDRS front setback is very small and the main constraint on site utilisation will be site coverage in most cases.

Only one reduction in the standard is proposed. This is an allowance for eaves to project into the front boundary setback. This will not affect the benefits of setbacks (space for planting, privacy and consequent safety benefits), but would help to make it easier to install eaves, which are beneficial for weather-tightness and can add visual interest to a building. Note that this exception is not proposed on side boundaries because of the visual impact of eaves so close to neighbouring boundaries.

10.2.5 Building Coverage

The MDRS provides for 50% building coverage, which is similar to the present RMD Zone. Other residential zones currently have more restrictive site coverage and there will be an increase in site coverage across most of the city (for instance from the current 40% in the Residential Suburban zone).

Site coverage is a way to manage the amount of building on the site. It is not the only means but it is quite flexible because it leaves the developer with options around how to lay out and apportion building across the site. The MDRS prescribes the use of site coverage and prevents alternative approaches that manage the intensity of building such as larger rear setbacks or outdoor living spaces. Site coverage is also a conventional mechanism in use in the District Plan.

Site coverage limits ensure that there will be some separation between buildings somewhere on the site, potential space for planting and views of the sky and help to manage the dominance of built form across a site and neighbourhood. It also helps to manage overlooking and maintain space on the site for other uses, such as outdoor living and servicing. These matters are important components of a residential living environment.

The existing RMD Zone is built in quite an intense fashion compared to other parts of the city. Site coverage is typically below 50% but this depends on the building typology. Where internal

garages are used, or car-parking is not provided, site coverage is more likely to reach 50%. Where separate parking is provided, it is more likely to be below 40%.



Figure 32: An example of low (36%) site coverage.



Figure 33: An example of moderate to high (50%) site coverage.

An increase in site-coverage to 50% in the lower density residential zones will represent a noticeable increase in density, which may have significant effects including on neighbourhood character and the amenity of neighbouring sites. However this is clearly expected by the MDRS.

In a medium density environment, the separation and visual relief provided by a moderate-to-high site coverage such as 50% contributes to the residential appearance of the neighbourhood as well

as to a level of openness and sunlight access. It will also help to manage the bulk and dominance of buildings.

Site coverage is likely to be the limiting factor on site development capacity in some cases. It is worth noting that many current developments have quite low site coverage, especially where developers choose to provide car parking. This means that in many cases, the main constraint on site utilisation is not the site coverage, but the desire for parking (or the requirement that was in force until recently).

Where site coverage does exceed 50%, sites can have quite a cramped appearance, with relatively dominant buildings with little separation, limited access to the sky and little openness on outdoor areas, including living spaces. Because buildings are usually centralised on the site for practical reasons, there is relatively little opportunity for consolidated open space. Higher site coverage is therefore usually not consistent with a medium density environment.

10.2.6 Building Length

Where units are built parallel to the street, they can frame the street in a positive manner, presenting a well-defined and interesting frontage and creating street enclosure. However, when built along internal boundaries, the impact of buildings will be concentrated on neighbouring sites. The effects of this can include:

- Privacy impacts from multiple separate dwellings
- Shading and loss of outlook
- Visual effects including the impact of bulk and enclosure and a lack of variety and interest

Units are typically between 4 and 10m in width, depending on size and orientation. A length of 30m (applying where there are more than 3 units) would be a reasonable way to ensure that longer developments were broken into a series of smaller buildings, generally equivalent to what is permitted under the MDRS.

A maximum length is recommended as opposed to a step in a building. This provides for a break in the building line, including through views of sky. Assessment matters will also anticipate that the roof form is modulated and that there is variety and interest in the façade.

10.3 High Density Zone

The NPS UD requires the Council to include areas enabling up to 6 storey buildings around large commercial centres and rapid transport stops²⁰. This is a high density form of development which is different in scale, form and character from medium density as permitted by MDRS. Current zoning allows for taller buildings up to 30m in the Carlton Mill north of Hagley Park, but the extent of land zoned for high density is quite limited.

Some residential buildings of four and five storeys have recently been constructed in the central city and examples were reviewed in the Design Outcomes Research. The NPS UD direction would involve a significant increase in the amount of land which has higher-density zoning, to encompass a wider area than the current zoning pattern and the creation of a new HRZ.

The zone must allow for MDRS developments in the same way as the RMD Zone (since this is a relevant residential zone), and also enable for at least six storey residential buildings, which will be multi-unit apartment complexes of some type.

It is further understood that the MDRS development envelope (60 degree recession planes from 4m height at the boundary) must be allowed for. However there is flexibility to apply alternative standards above this level, and to allow for relaxations in the envelope if considered appropriate.

10.3.1 Building Envelopes

Section 2 on site layout (and Appendix 1) discuss different typologies and recommend that perimeter blocks are encouraged and enabled. These are well proven in climates similar to New Zealand's and provide both the best outcomes and capacity. It is recommended that this typology is encouraged, alongside some support for centre blocks typologies on wider sites.

As such, a building envelop with the following characteristics is recommended:

- A maximum height of 20m.
- 1m internal boundary setbacks.
- No recession planes at the front of the site, on internal boundaries within 20m of a street boundary.
- MDRS recession planes elsewhere to a height of 12m, with a 6m setback applying above this level.
- For buildings above 4 storeys, a 1m setback for the top storey.
- 50% site coverage.
- A maximum building width or depth of 30m, except where directly adjacent to and parallel the street.

This building envelope is shown below, for wide and narrow sites:

²⁰ Policy 3(c) NPS-UD

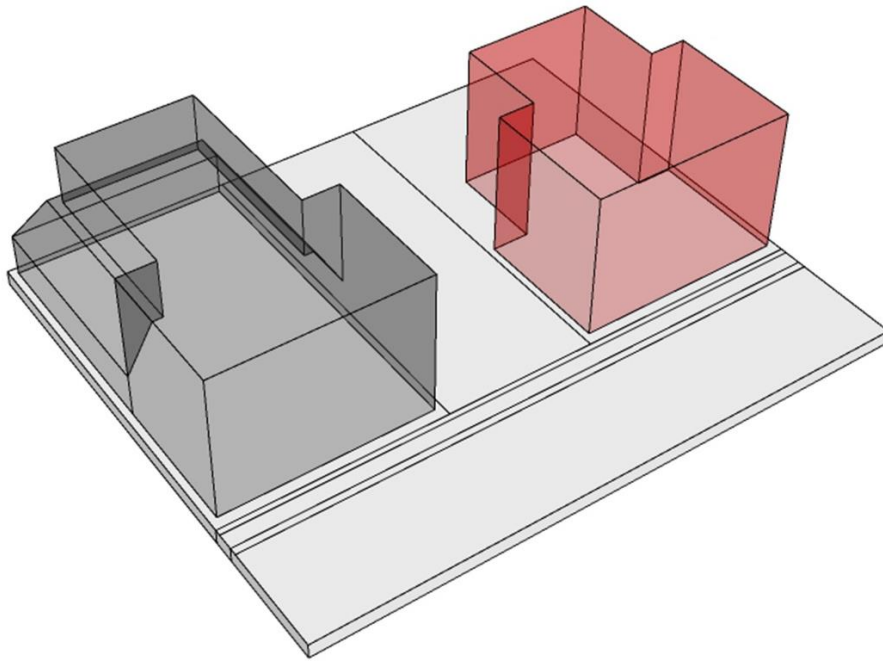


Figure 34: Recommended building envelope wide site – not limited by site coverage (left) and limited by 50% site coverage (right).

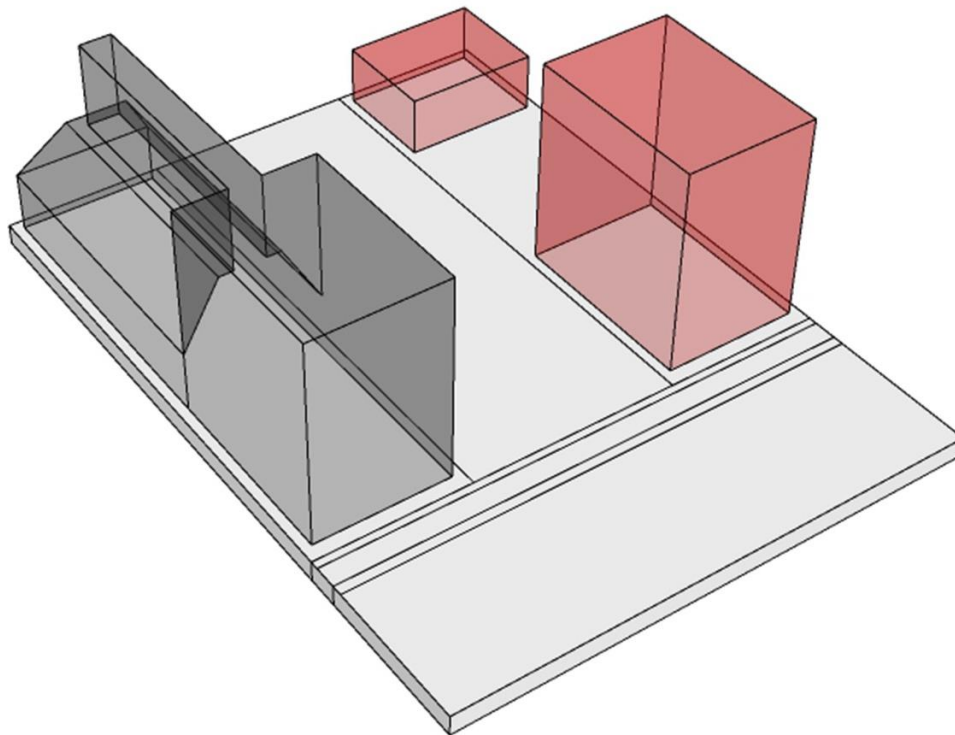


Figure 35: Recommended building envelope narrow site – not limited by site coverage (left) and limited by 50% site coverage (right).

The above illustration demonstrates the importance of site coverage as a way to ensure open space around the site and views of sky.

The illustration below also shows 50% site coverage. This is not a perimeter block typology but would fit within the development envelope. It may have a predominantly sideways orientation and some impacts on neighbours would result (privacy and shading). These could be managed by

a rule (such as a continuous length of building above 12m) or by assessment matters that looked at the impact of shading and privacy.

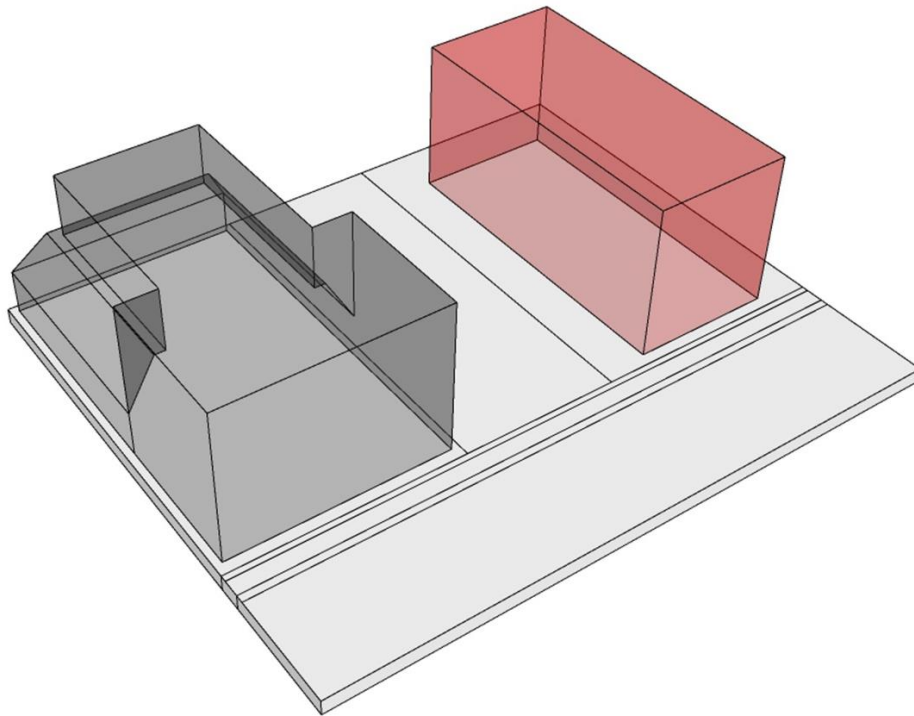


Figure 36: Potential building envelope – 50% site coverage, without using recession plane exemptions.

Due to the fragmented nature of Ōtautahi Christchurch city blocks, it is unlikely that a perimeter block would result from redevelopment, simply because the presence of rear blocks means there is sometimes no opportunity to orient development to the street. A potential development mix is shown below.

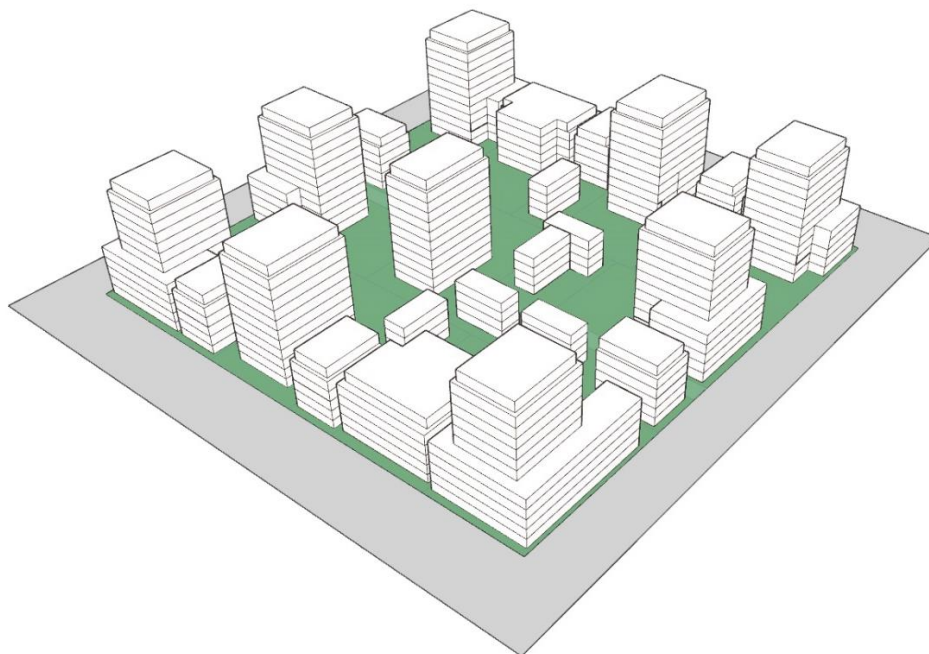


Figure 37: Potential variety of buildings within an Ōtautahi Christchurch street block as a result of the recommended provisions.

10.3.2 Height

It is recommended that the height limit for the high density zone be set at six storeys (20m), in line with the NPS-UD and that higher heights are not generally enabled in the zone. The reasons for this are detailed above and include:

1. Increasing impacts of dominance, prominence and on surrounding residents, which increase with the scale of building.
2. Lack of human scale and connection to the street for taller buildings.
3. The increased risk of poor mental health outcomes where tall buildings are not well located.
4. Potential for increased wind effects, which may become problematic above 20m.

However, in areas that are particularly well located, such as the central city or potentially some areas around Hagley Park (including Carlton Mill), higher heights may be considered. Heights of ten and twelve storeys were considered, and an increased limit of ten storeys is recommended in these areas. Reasons for this are:

1. Ten storeys is a substantial increase over six storeys, allowing for a significant increase in floor area.
2. Ten storey buildings would relate better to six storeys (than 12 storey buildings would) because the height differential is more comfortable (being less than a 100% increase in height, which risks being visually dominant over a relatively wide area).
3. It is still expected that a substantial proportion of development would be 3-6 storeys and a building of less than ten storeys would sit more comfortably (visually) in this context.

The increase in height to 10 storeys will have more impact on the street and public space, and the scale of enclosure may be excessive. For this reason, the recession plane exemption is not proposed to apply above 6 storeys and buildings must be set back above this height. This will create separation between towers and preserve views of the sky along streets.

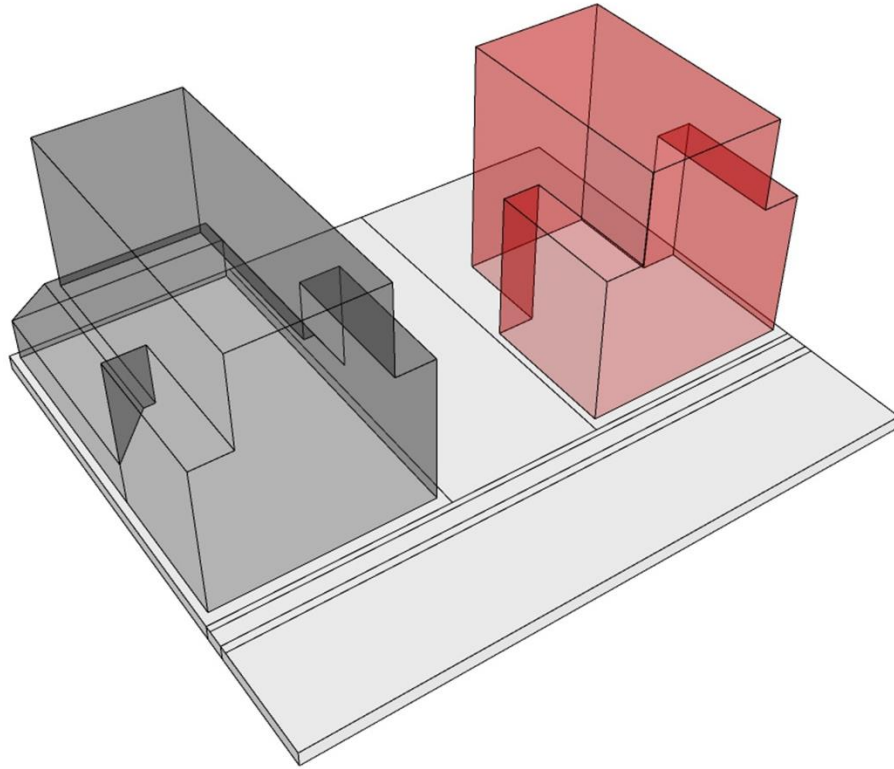


Figure 38: Recession plane envelope and complying building form for a 10 storey building.

10.3.3 Setbacks and Recession Planes

For tall buildings, recession planes can become a significant constraint as designers often attempt to fit the building within the permitted envelope. These can have the impact of creating buildings with odd pyramidal shapes. These can:

1. Appear incongruous in the street scene.
2. May add cost to the build.
3. The shape of the envelope encourages “sausage blocks” built perpendicular to the street (which can focus adverse impacts on neighbours rather than the street).



Figure 39: Stepped building form in response to recession plane angles.

Relying on recession planes for taller buildings is not an effective way to manage shading, because the angle of the sun is below the height of the building for much of the year.

For taller buildings on narrow sites, as is the case for most sites in Ōtautahi Christchurch, most sun access will be received via the gaps in the built form rather than over the top of buildings.

It is for this reason that recession planes are not proposed for tall buildings above 12m. Instead it is recommended that the façade is set back from the boundary to create a degree of separation between buildings and a balance of openness and built form within a street block.

To facilitate this, the recession planes are proposed to be vertical above 12m in height, with the façade set back at least as far as it would be at the top of the recession plane. This creates variable setbacks for upper floors, as shown in the diagram below.:

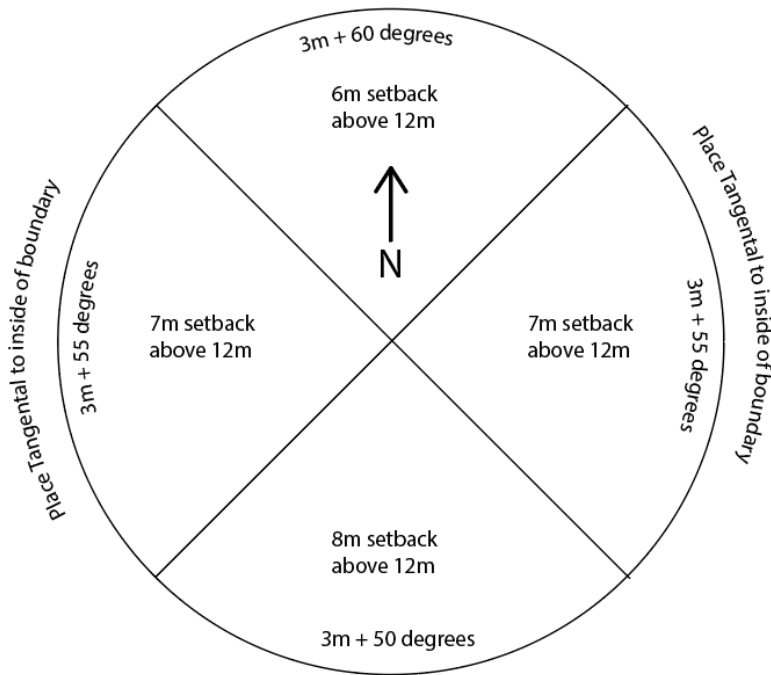


Figure 43: High Density Zone Recession plane and setback diagram

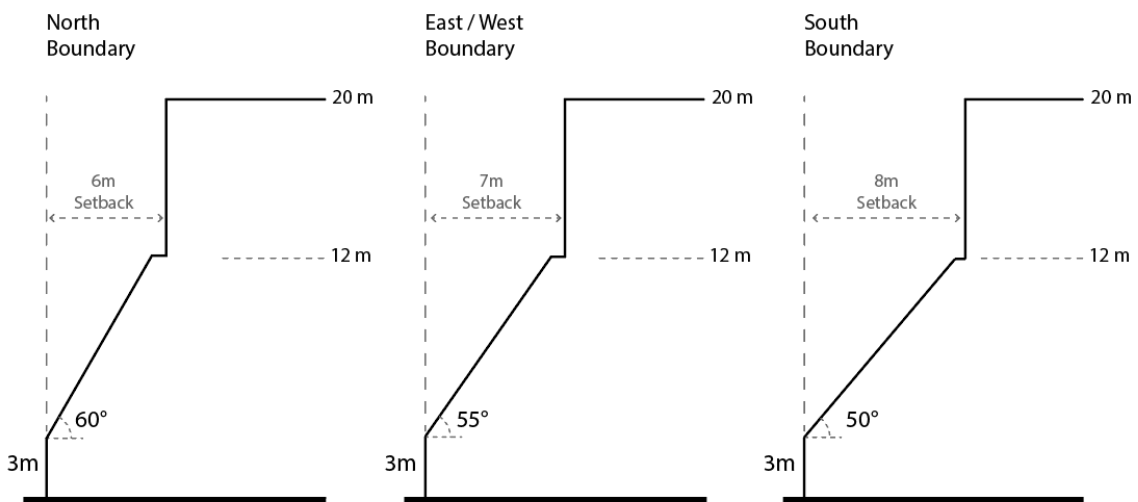


Figure 404: Cross section through proposed recession planes.

For sites with street frontage (ie those not accessed via a right of way), recession planes would not apply within 20m of the boundary, up to a height of 14m. This is intended to allow for 4 storey development to be built across the frontage to achieve a perimeter block layout. By comparison, MDRS would require a setback of approximately 4m (at a typical four storey eaves height of 11m).

10.3.4 Site Coverage

The approach recommended for the high density zone is to facilitate the building of density at the front of the site next to the street, and to promote greater open space at the rear, to ensure some certainty around shared amenity and sunlight access within the block. This is a different approach to the current RCC Zone which does not have a site coverage standard, but instead limits capacity through recession planes and a stricter height limit.

Perimeter block building typologies would typically occupy less than half the site (usually a third). It is reasonably common for some of the interior of the block to be filled in with extensions and small scale buildings. 50% site coverage allows for the main perimeter building and some additional built form, which could take the form of garaging, rear extensions to the main building or some additional housing in a separate low scale building (e.g. some townhouses).



Figure 415: A 6 storey perimeter block in Berlin, Germany with a site coverage of approx. 33% across the entire block. (Source: Google Maps)

A moderate-high site coverage of 50% would allow for building at the front of the site, to fill the expected 6 storey envelope, and additional form within the site, but would not allow the site to be filled. If the developer takes advantage of the recession plane exemptions, it would allow a generous development envelope at the front of the site.

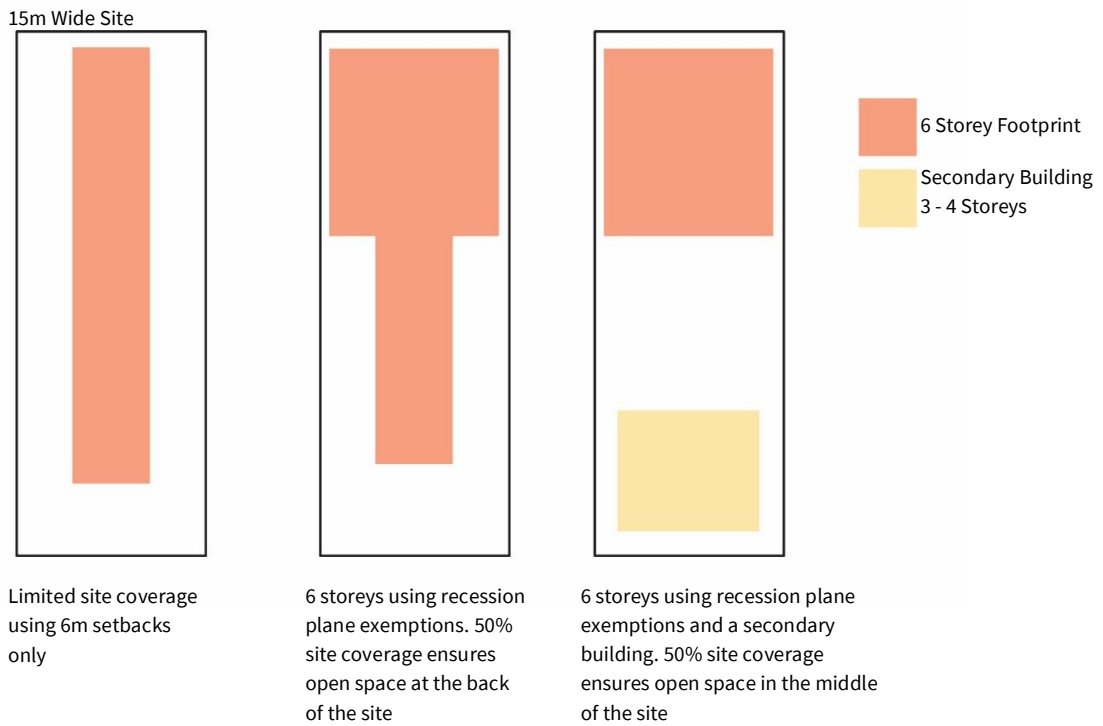


Figure 6: Limiting site coverage on a narrow site to 50% ensures there is some openness within and around the site. The recession plane exemption encourages this to be at the rear of the site and the two rules together facilitate perimeter block development.

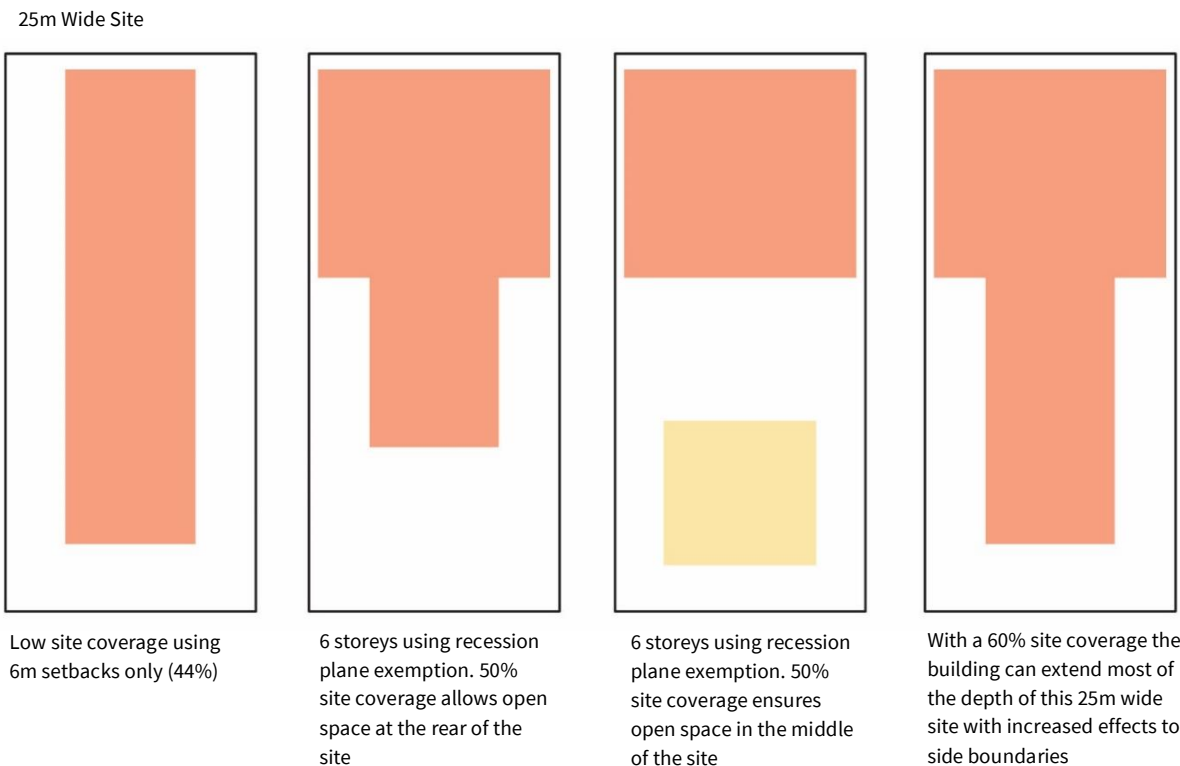


Figure 427: Limiting site coverage on a wider site to 50% ensures there is some openness within and around the site. The recession plane exemption encourages this to be at the rear of the site and the two rules together facilitate perimeter block development.

It would also allow for townhouse typologies, which make up the majority of development. For these houses, the ground space is required for outdoor living, access and servicing and these typologies almost never exceed the site coverage limit.



Figure 438: This high density townhouse development has a site coverage of 45%

Higher site coverages were considered in the HRZ. In this area, the maintenance of a degree of open space may be a lower priority than elsewhere and a greater proportion of built form may be acceptable provided that environmental quality is maintained.

As shown in figure 45 and 46, site coverage is a significant determinant of the building bulk, in combination with setbacks and limits in building length. The proposed 50% site coverage will help to shape the building envelope to manage the overall bulk of the buildings.

However, building site coverage is not the only determinant of site quality. Other elements usually take up space on the ground plane of a site and contribute to its appearance and functionality. Parking and servicing will often detract from the site, whilst planting and communal space would make a positive contribution.

In recent development in Christchurch, site coverage has rarely exceeded 50% even where there is no district plan limit. Examples of high site coverage are usually apartments. Outcomes have not always been high quality, and it was observed that this was due to the need to accommodate parking and servicing for the units, as much as building coverage. Parking typically occupies a third of the site, a proportion that increases with density and in apartment buildings this can start to reduce the space for other uses which have a more positive design impact, including ground floor apartments, gardens and pedestrian access. This is one reason why a general increase in site coverage is not recommended.

10.3.5 Proposed Exception to site coverage limits

In general, it is considered that the proposed 50% site coverage limit is reasonable and necessary to manage the impact of apartment buildings in most circumstances. However, there has been a

trend towards car-free development in the central city. This form of development does not have the same demand for space at ground level. Without the need to accommodate parking, there are fewer conflicting demands for space and more space for trees and planting.

Where car free development is proposed, it is more likely that higher site coverage can be accommodated. However, there remains the potential for adverse effects from the building itself, notably from bulky buildings close to the boundary, which result in high levels of privacy intrusion as well as visual and shading effects.

These issues are more likely on a long thin site where built form will be concentrated on the internal boundaries. Figure 46 below shows that it is difficult to achieve high site coverage on sites like these and comply with other district plan envelope rules. This does suggest that such a building would have a number of adverse effects.

In addition, any positive impacts are less likely to be visible if the space is used for private outdoor space, because this is usually fenced and not visible. A communal space provides more widespread benefits and better promotes tree growth because the impacts of shading are not concentrated over one resident's small outdoor space. Including a communal space provides more certainty that the high site coverage will be balanced by high quality open space.

Figure 47 shows a wide site, where there are more options for the placement of buildings, because less land is used up in setbacks. These examples show that there are good options for the management of building bulk and the location of communal space on the site.

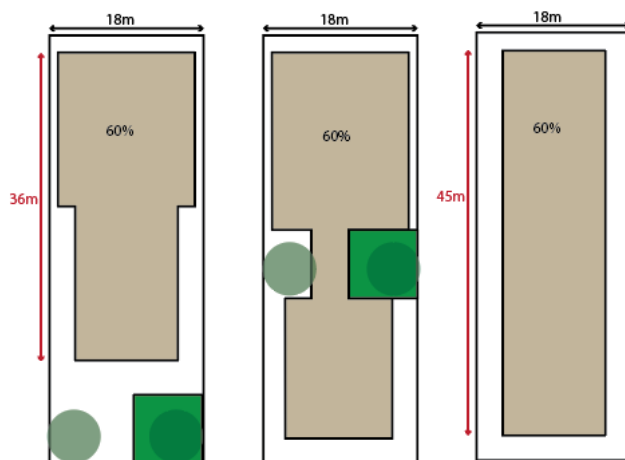


Figure 49: On a narrow site it is difficult to achieve 60% site coverage given other District Plan constraints.

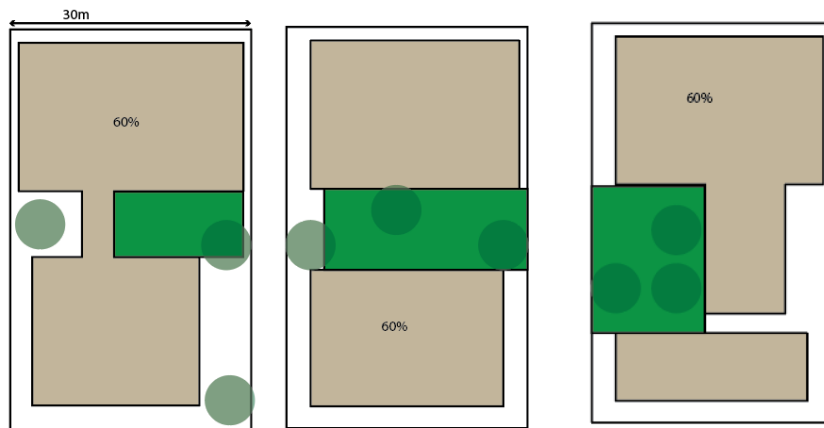


Figure 50: A wide site better allows for higher site coverage because there are more options for building placement

In summary it is considered that the 50% site coverage limit is reasonable in most situations, but that higher site coverage may be possible in more limited circumstances, for larger sites with communal amenity and without the adverse impacts from car-parking on the site.

It is recommended that higher site coverage is permitted in the following circumstances:

- Where there is no on-site car parking
- Where there is a substantial communal space (at least 50m² and with an 8m dimension)
- Where the site is at least 25m wide

10.3.6 Building Length

For taller buildings, such as apartments, the impact of a long and bulky building form can be very significant:

- Privacy impacts can be quite intense. As well as there being more windows overlooking, apartments will likely place some living space on internal boundaries, including balconies. These spaces are used more intensively than bedrooms and a 6 storey building may have many windows facing neighbours.
- Shading can be more extreme because of the height of the building above the sun altitude angle for most of the year.
- Visual effects are also much greater due to the scale of buildings.

Regarding solar access, the most effective way to manage shading for taller buildings is to ensure that there are gaps between the buildings, because the winter sun is so low. A 30m building length would ensure that there was adequate separation to allow for sunlight to reach neighbouring buildings for most of the year. Combined with separation between the buildings, this would be sufficient to allow a basic level of solar access for most orientations, and also help manage privacy impacts on neighbours.

A 30m building length would likely limit a 50m deep parcel to one six-storey building. Over the course of the redevelopment of a block, this would result in a relatively high proportion of open skies, which would then provide for some solar access.

10.4 Recommended Approach

The proposed building envelopes for the two zones are summarised below:

10.4.1 Medium Density Residential Zone

It is recommended to retain the MDRS envelope with the following amendments:

- A height limit of 14m around Neighbourhood Centres.
- Continuing the existing allowance for garages to be built on internal boundaries (for 10m of the boundary).
- Some relaxations to allow for eaves, within the front building setback and to breach site coverage.
- A 30m maximum building length where more than 3 units are proposed.
- A 10m building separation over 12m in height.

10.4.2 High Density Residential Zone

In the High Density Residential Zone, it is recommended that a building envelope is adopted that supports a perimeter block model of development, as well as allowing for some flexibility to use the depth of the site. This would be created by:

- A maximum height of 20m
- 1m setbacks
- No recession planes on internal boundaries at the front of the site
- A 6m-8m internal boundary setback above 12m (recession plane applies below this level)
- 50% site coverage (with 60% for certain car-free developments)
- A maximum building width or depth of 30m, except where directly adjacent to the street.

11 References

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Appendices

Appendix 1: Potential Building Typologies in the High Density Zone

Introduction

The potential outcomes generated by different building typologies have been considered, using various criteria. Three typologies have been assessed in terms of how they will impact on current residents of typical developments (as many of these will be in place for 50 years or more) as well as how well the ultimate environment created will function.

Each typology was modelled and assessed on the basis of the quality of environment they would provide, assessed against the matters largely denoted through the Design Outcomes Research, and identified below.

The typologies assessed were:

1. A perimeter block typology.
2. A centre block typology (with an apartment block located centrally on the site).
3. A sideways block typology (derived from recession planes).

The various options each distribute massing differently on the site and so are not mutually compatible. For instance, a perimeter block aims to facilitate shared amenity between sites in the block through an open centre, whereas a sideways block keeps the side boundaries of each site free.

The following criteria have been used to assess the appropriateness of each typology:

1. Privacy and Overlooking

Tall buildings can overlook neighbours intrusively if there are a lot of windows or balconies facing an internal boundary.

2. Solar Access

The shape of development affects the amount of sunlight received on neighbouring sites, and in particular within adjacent buildings. Existing houses are designed to take advantage of the existing provisions and the impact of different building shapes on these sites may be significant.

3. Appearance and Street Scene

Appearance matters concern the scale of the building, and measures taken to break down the bulk into a more visually appealing scale (such as modulation, articulation and detailing). They also concern the degree of interaction with the street, particularly on the ground floor. To a large extent, these factors are influenced by the shape and form of the building.

4. Capacity, flexibility and outdoor space

The proposals have also been tested using a single site (15m wide) and two sites (30m in total).

The floor space has been estimated for each, as well as the number of apartments possible under each scenario. A Floor Space Ratio has been calculated as a way to show yield from each of the typologies. An FSR is a way to express the amount of development considered appropriate on a site, usually to indicate to developers what yield they can expect. An FSR of 1:1 indicates that a

site can be redeveloped with its size in some form (e.g. a gross floor area of 1000m² on a 1,000m² site). This may take the form of 2 floors of 500m² each, or 4 floors of 250m²). In New South Wales planning guidance, an FSR of 2:1 is considered usual for a 6 storey building²¹.

Some site layouts lend themselves to outdoor living space better, creating a consolidated space with a good dimension (e.g. 8m), that will be more usable and lend itself to the growing of trees.

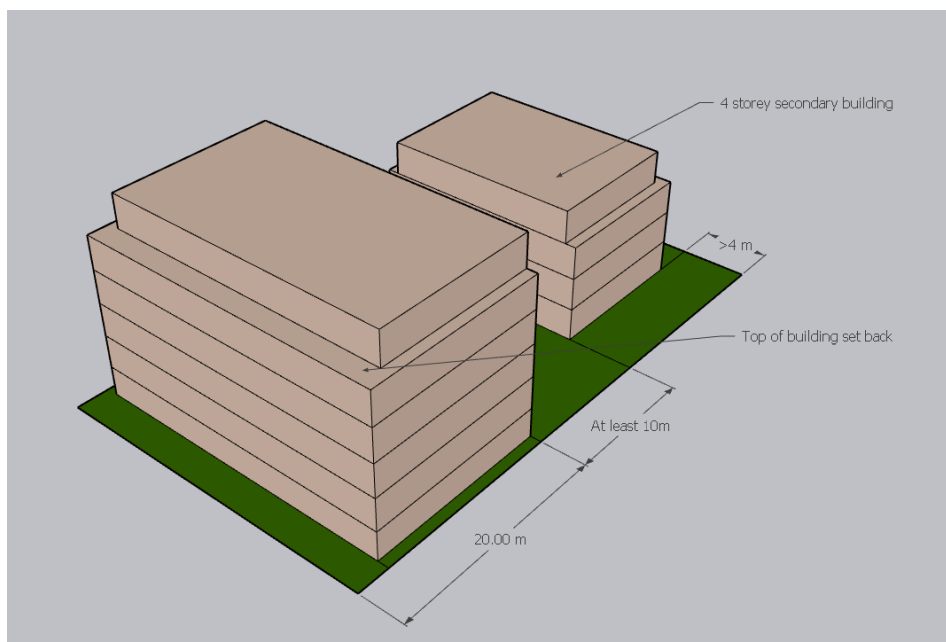
5. Safety

A broad level assessment has been carried out to ensure that there are not fundamental flaws with each typology, but much of the quality will be created by detailed design.

Typologies

1. Perimeter block typologies

Perimeter block typologies could be enabled on standard Christchurch sections (e.g. with dimensions of 15* 50). Because they would be building almost boundary to boundary, the width of the site is much less significant than for other typologies and sites would not need to be amalgamated to be used efficiently.



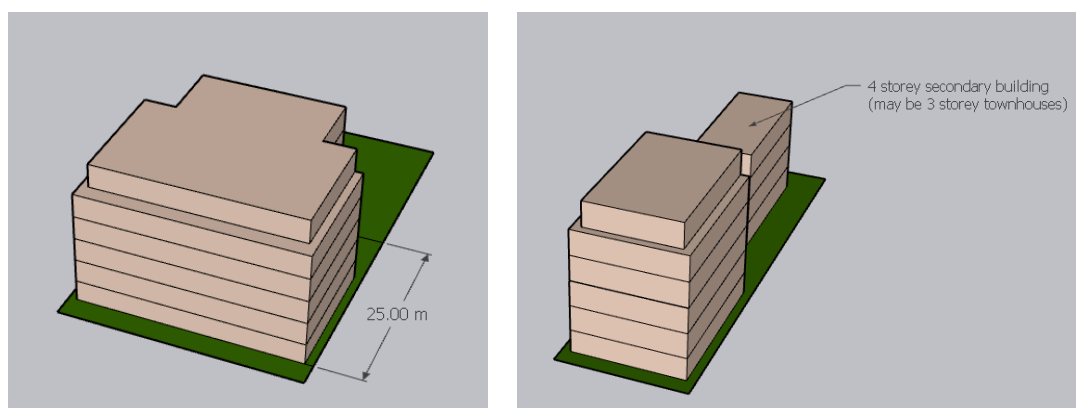
Above: Block model of perimeter block apartment building with a secondary building located to the rear

The above building shape would use the majority of the site coverage limit and would allow for a viable building depth of 18.5m. There would be options for how to use this depth, including

²¹ NSW Department of Planning and Environment (2015) *Apartment Design Guide* pp32

double loaded (central) corridors with apartment depths of 6-8m, or deeper single loaded apartments accessed from the rear. The depth would need to include balconies.

On wider sites, the building could project further to the rear, as long as 6m setbacks were met, or remaining site coverage could be used for a secondary building, which could take the form of townhouses, for instance. The use of moderate site coverage (50%) ensures there is a degree of openness somewhere on the site, most likely at the front, and this compensates for the lack of recession planes.



Above: Larger 6 storey envelope (left) or narrow site configuration (right)

The perimeter block typology manages privacy very well; has good solar access from most orientations; and creates an urban form with good solar access. It allows sun to reach the rear of sites, which will allow some outdoor space with solar access for all orientations and good interior sun access from the front and back of the building. It also supports a strong urban streetscape and provides good capacity on any site width. However, the perimeter block will cause some shading from some orientations (where it faces north towards a street).

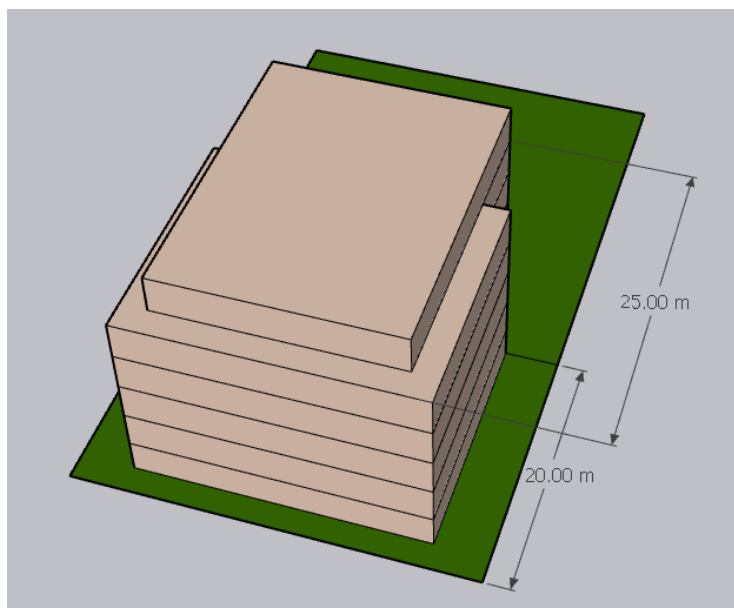
Criteria	Notes
Privacy and Overlooking	Strong. Naturally manages privacy through Orientating windows to front and rear rather than side boundaries
Solar Access	Variable. Good access for when developed as a block but may have some impacts on neighbours which are not developed with perimeter block typologies: there will be good solar access for these sites when oriented to the south, medium for east and west but poor for north where bulk of the building will shade them.
Appearance and Street scene	Strong. Building is concentrated next to street and encourages visually interesting buildings.
Capacity, flexibility and Outdoor Space	Strong. High capacity, flexible typology that can be built on a variety of sites and suits re-use. High capacity on narrow sites. Focussing built form at the street front creates consolidated open space at rear, usable and large enough to achieve solar access.
Safety	Strong. Creates a strong street wall with clear delineation between public and private space, and overlooking of the street.

2. Centre block typologies

A centre block would be set back from side boundaries (potentially by 4m) with a larger rear setback, but would not create a near continuous street wall.



Centre Block in Brisbane



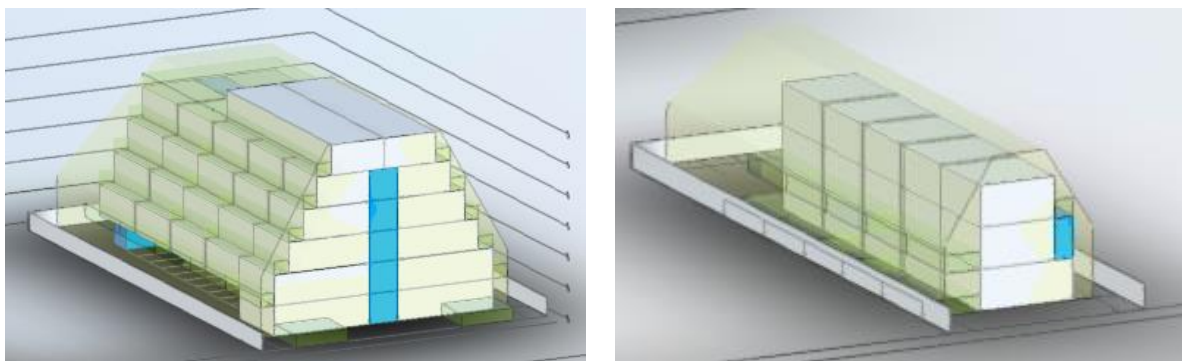
Above: Example of a Centre Block typology on a 30m wide site

The Centre Building generally has medium outcomes. It would have less impact in respect to shading of immediate neighbours than the perimeter block. It may also contribute quite positively to the current street form. However, it is less well suited to narrow sites because of the side setbacks and would not create a strong street scene over time (although it would fit more easily in an existing street scene). It also does not necessarily provide consolidated open space at the rear of the site.

Criteria	Notes
Privacy and Overlooking	Medium. Squarer floor plan will allow windows to face any direction and this may be determined by sun direction. Likely to be some privacy issues but less than sideways typology (because the buildings are not as long).
Solar Access	Good. The side setbacks allow solar access to neighbours at the side of the building and a rear setback creates space between buildings for light access within the street block.
Appearance and Street scene	Medium. Creates an inconsistent street scene with prominent side walls (although these may have some visual interest, they are less well articulated than street walls). Front facades will usually have good design attributes.
Capacity, flexibility and Outdoor Space	Medium. High Capacity typology on wider sites, but side setbacks mead capacity is limited on narrow sites.
Safety	Medium. There is usually a good street frontage with passive surveillance and clear entranceways, but may be poorly defined side access which provides opportunity for crime.

3. Sideways Buildings (Recession plane buildings)

A Sideways Building is a variation on the existing typology (sometimes known as a sausage block), with more relaxed recession planes to attempt to fulfil the intent of the NPS-UD.



Sideways Building Models 30m wide site (left) and 15m wide site (right)



Existing Sideways building typology

Development would be expected to run from the front of the site to the back, with windows primarily oriented to the side to take advantage of the best solar orientation. Buildings may step in as levels increase due to the recession plane, so the building may have a triangular form.

These typologies are often oriented to primarily face internal boundaries, which increases the amount of overlooking. It would be expected that under most scenarios, there would be windows and balconies from each apartment facing at least one internal boundary. This typology creates significant privacy issues.

Any open space is primarily at the sides, in long thin slivers, as the utilisation of the site is determined by the recession planes. These spaces are likely to be shaded and are less usable and flexible than more consolidated open space.

Shading analysis indicates that the Sideways Building performs well in winter for north and south oriented sites, but poorly for east and west oriented sites.

This typology often results in poor CPTED outcomes. The typology does not encourage passive surveillance of the street or that entrances are direct from the units to the street. The lack of a central staircore means that pedestrian access is often from within the car park rather than the street.

This typology has generally poor outcomes, with the main advantage being that it may have good solar access for residents, depending on the orientation. It also has low capacity for narrow sites.

Criteria	Notes
Privacy and Overlooking	Poor. Overlooking and outlook is focussed on side boundaries and neighbouring sites.
Solar Access	Variable. Good for north-south orientations but poor for east-west.
Appearance and Street scene	Poor. Buildings designed to face sideways and often have superficial and bland front facades.
Capacity, flexibility and Outdoor Space	Poor. High capacity on wide sites, but height is constrained on narrow sites. Little consolidated outdoor space as is open space is located in narrow side setbacks.
Safety	Poor. Little overlooking of streets, from limited number of units and typology and site layout encourages vehicle dominated pedestrian access.

Appendix 2 Glazing Study

Introduction

This paper describes a study into the amount of glazing on the front façade of houses. It is aimed at demonstrating whether there is a set amount of glazing that would ensure good quality outcomes for the front facade of a development. To do this, a number of model scenarios were tested, as well as some real built examples.

It is concluded that there is a relationship between the amount of glazing provided and the quality of the outcome, but only at a lower level of glazing. Once the proportion is increased beyond a certain level there is not necessarily any benefit. It also found that none of the built examples achieved a 20% glazing.

It is recommended that a front door should be included in the calculation whether glazed or not, provided that there is some other ground floor glazing. Including a front door in the front façade is regarded as beneficial for its own sake, and requiring a high level of glazing (and not including a solid door) may dis-incentivise this outcome. There is a stronger relationship between the quality of outcome with a door, than using glazing alone.

The recommendation is that the requirement should be that 17.5% of the frontage should be glazed, including a solid door if provided, as long as there is at least 1m² of additional ground floor glazing.

Method

The study consists of two parts.

Part 1 is a desktop study, looking at a wide range of potential window sizes and arrangements on typical façades and house orientations. These are:

- A house with the kitchen at the front. This typology supports good passive surveillance and allows good internal privacy, but windows are smaller than where living rooms are at the front of the house
- A house with a living room at the front. This typology usually has larger windows facing the front (potentially ranch-sliders).
- A house facing sideways to the street with a kitchen at one and living area at the rear.
- A sideways facing house with a garage positioned in front.

In almost all examples, a door faces the street because this is considered to be a desirable design feature, that should be able to be accommodate within the required proportion of glazing. This affects the amount of glazing that can be achieved. Whilst doors can be glazed, this is not usual for front doors and would be a somewhat artificial outcome.

No examples using ranch-sliders have been considered. This outcome is associated with outdoor living space at the front of the site, which is associated with front fencing. This arrangement usually results in reduced engagement and surveillance because the ground floor is not visible, even though the level of glazing may be high.

The houses were rated for three attributes considered to indicate aspects of frontage quality. These were:

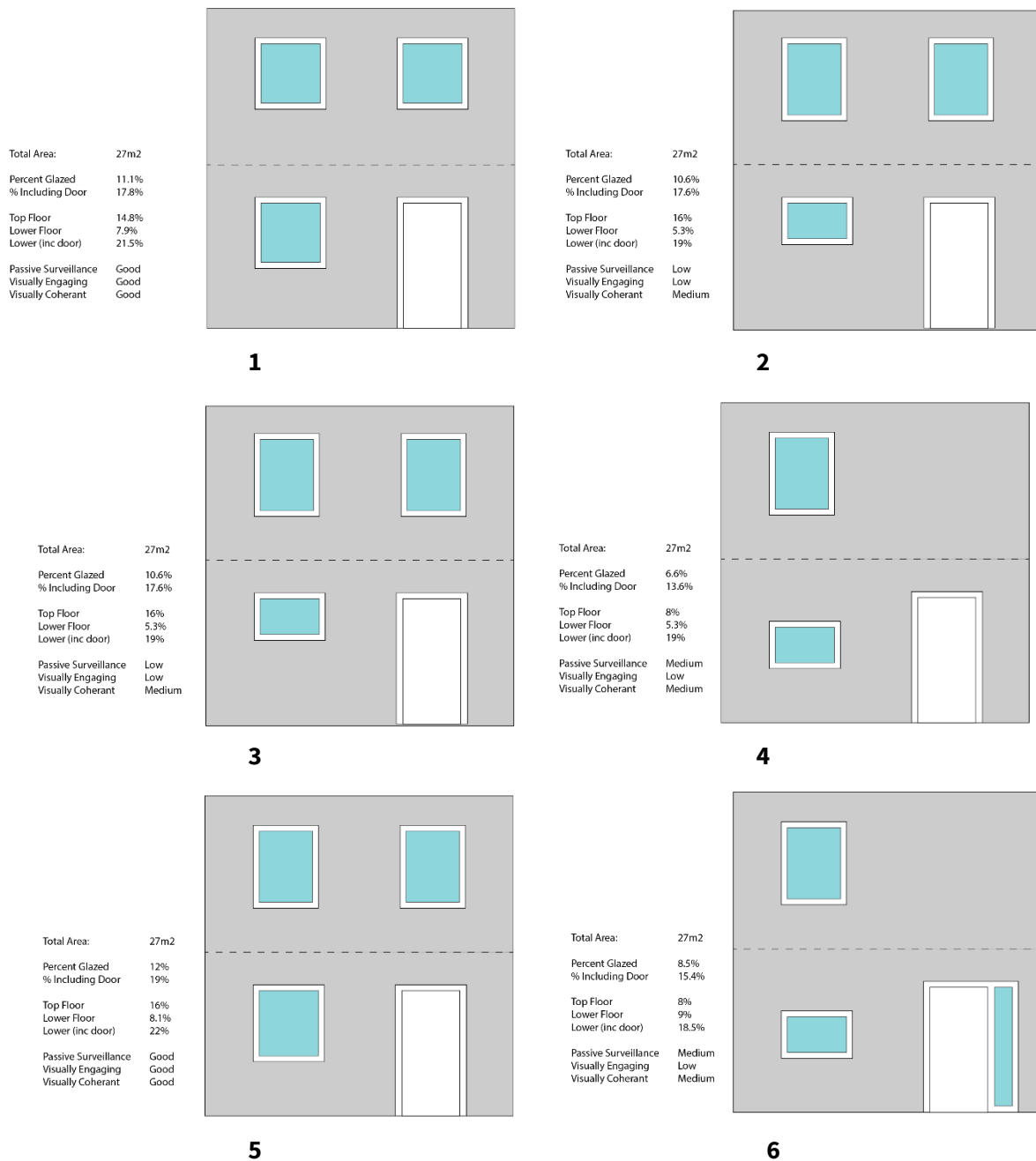
- Passive Surveillance (that it would provide for views from inside the house)
- Visual Engagement (would be a visually interesting frontage, including allowing views of windows and the interior).
- Visual Coherence (a frontage that is appealing through conventional means such as grouping, symmetry, organised complexity). These may be facilitated or disrupted by too much / not enough glazing on the façade.

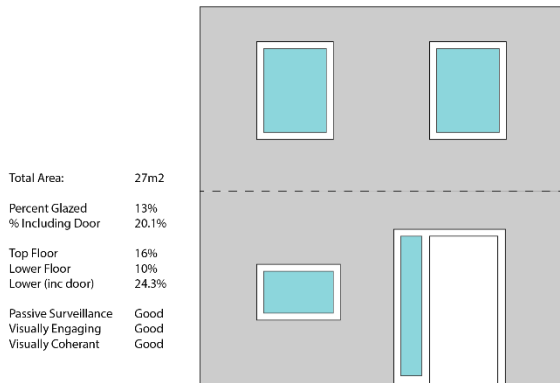
Part 2 looks at some examples that have been built and the proportion of glazing on these. Each has an assessment of whether the frontage allows for passive surveillance and supports a visually interesting and engaging façade, similar to Part 1. This provides an indication of the types of outcomes being achieved at present, the proportion of glazing used and how successful they have been.

For the calculation of glazing, fine grain details like mullions have been included in the percentage, but external frames have not.

Part 1 Desktop Examples

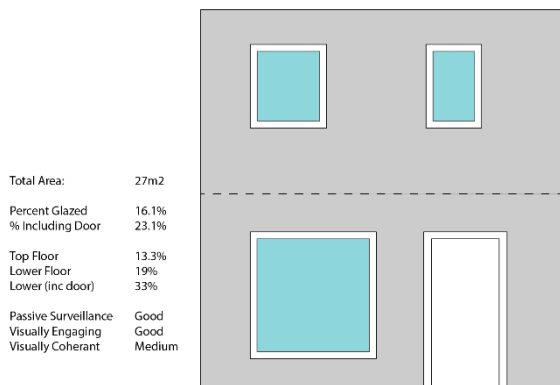
Type 1: Narrow House with a Kitchen at the Front



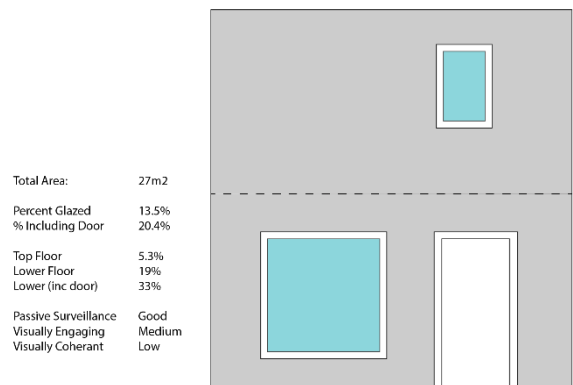


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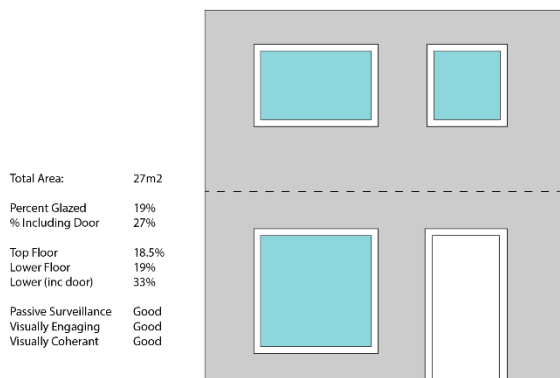
Type 2: Narrow House with a Living Room at Front



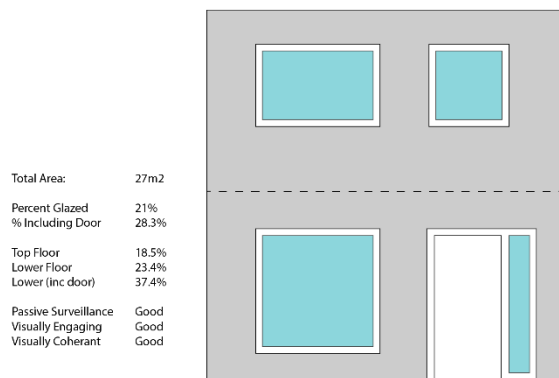
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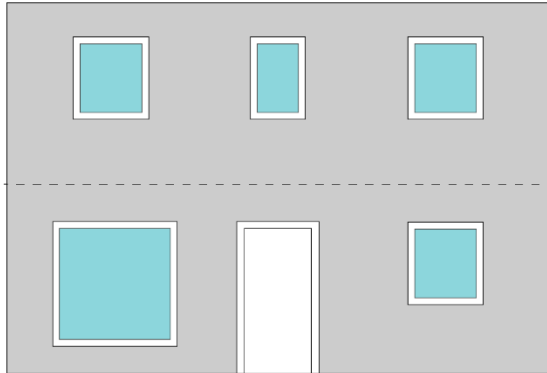


11

Type 3: Wide House

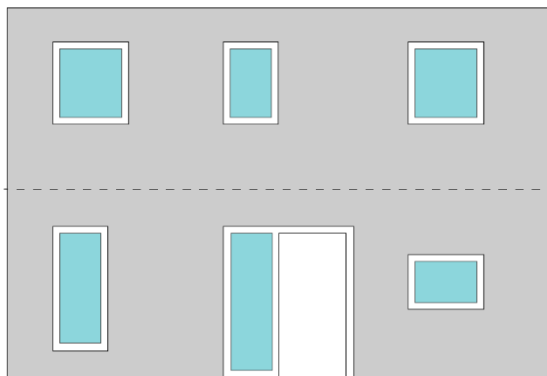
12

Total Area:	43m2
Percent Glazed	13.6%
% Including Door	18%
Top Floor	11.1%
Lower Floor	16%
Lower (inc door)	24.8%
Passive Surveillance	Good
Visually Engaging	Good
Visually Coherent	Good



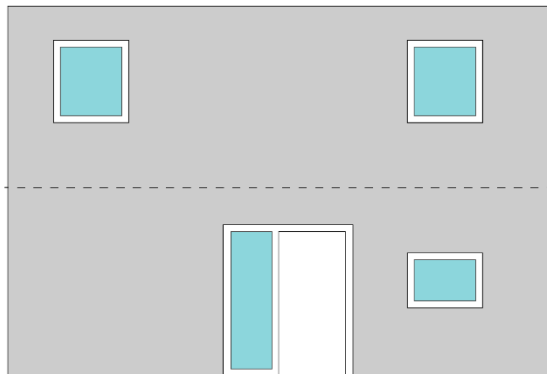
13

Total Area:	43m2
Percent Glazed	12.3%
% Including Door	16.7%
Top Floor	11.1%
Lower Floor	13.4%
Lower (inc door)	22.2%
Passive Surveillance	Good
Visually Engaging	Good
Visually Coherent	Good



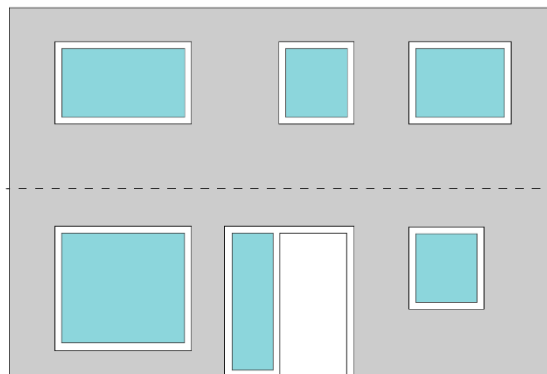
14

Total Area:	43m2
Percent Glazed	8.3%
% Including Door	12.7%
Top Floor	8.3%
Lower Floor	8.3%
Lower (inc door)	17.1%
Passive Surveillance	Medium
Visually Engaging	Low
Visually Coherent	Low



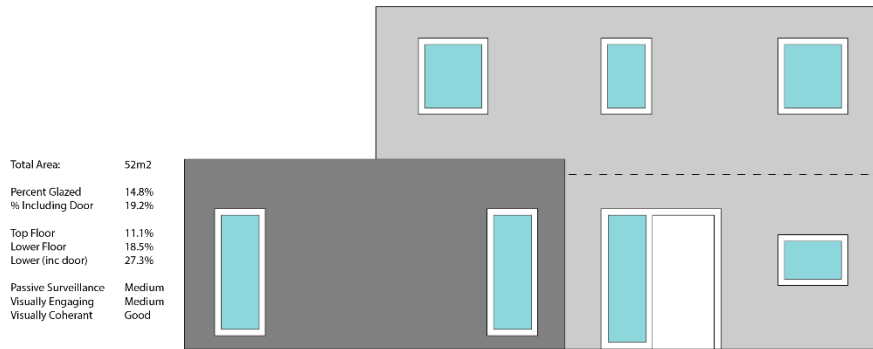
15

Total Area:	43m2
Percent Glazed	20.1%
% Including Door	24.5%
Top Floor	18.5%
Lower Floor	21.8%
Lower (inc door)	30.6%
Passive Surveillance	Good
Visually Engaging	Good
Visually Coherent	Medium

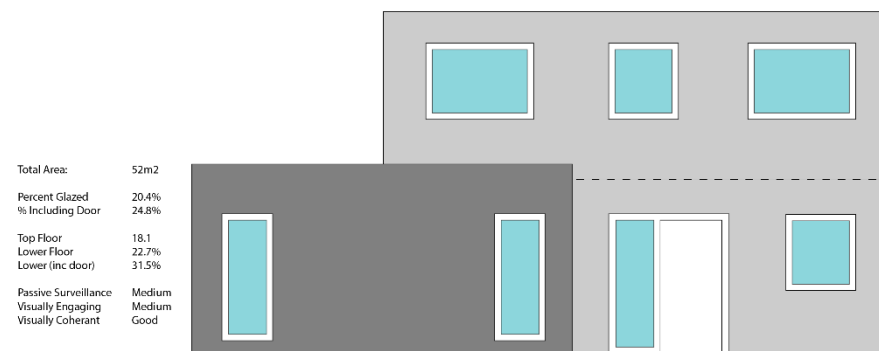


Type 4: Wide House with Garage

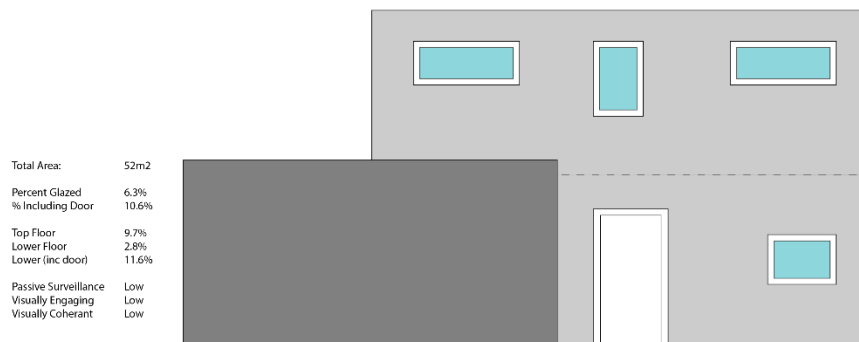
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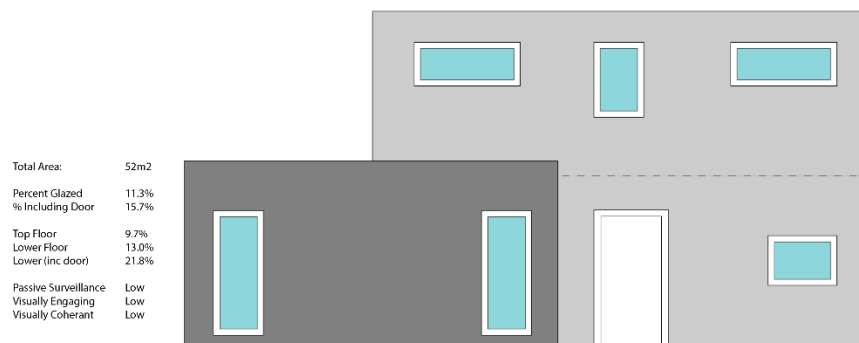
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18



19



Results Table

Type	Diag	% Glazed	% inc Door	First (m ²)	Ground (m ²)	Ground with door	Passive Surveillance	Visually Engaging	Visually Coherent
1	1	11.1	17.8	14.8	7.9	21.5	3	3	3
	2	10.6	17.6	16	5.3	19	1	1	2
	3	10.6	17.6	16	5.3	19	2	2	3
	4	6.6	13.6	8	5.3	19	2	1	2
	5	12	19	16	8.1	22	3	3	3
	6	8.5	15.4	8	9	18.5	2	1	2
	7	13	20.1	16	10	24.3	3	3	3
2	8	16.1	23.1	13.3	19	33	3	3	2
	9	13.5	20.4	5.3	19	33	3	2	1
	10	19	27	18.5	19	33	3	3	3
	11	21	28.3	18.5	23.4	37.4	3	3	3
3	12	13.6	18	11.1	16	24.8	3	3	3
	13	12.3	16.7	11.1	13.4	22.2	3	3	3
	14	8.3	12.7	8.3	8.3	17.1	2	1	1
	15	20.1	24.5	18.5	21.8	30.6	3	3	2
4	16	14.8	19.2	11.1	18.5	27.3	2	2	3
	17	20.4	24.8	18.1	22.7	31.5	2	2	3
	18	6.3	10.6	9.7	2.8	11.6	1	1	1
	19	11.3	15.7	9.7	13	21.8	1	1	1

Part 2: Examples

Example 1 – RMA/2021/750



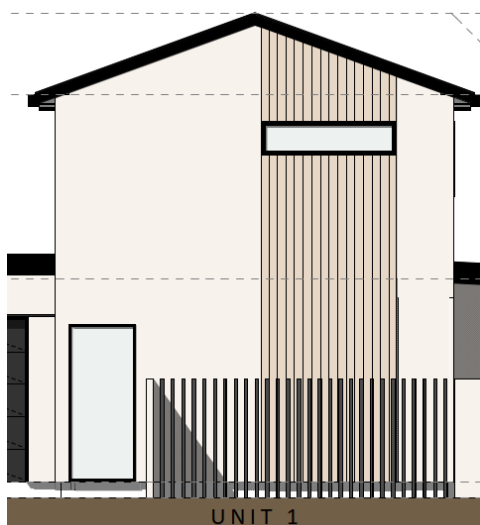
Total Area of Front Facade: 36.5m²

Percent Glazed 15.1%
% Including Door 20%

Top Floor 18.1%
Lower Floor 12.1%
Lower (inc door) 21.9%

Passive Surveillance Good
Visually Engaging Good
Visually Coherent Good

Example 2– RMA/2021/525



Total Area of Front Facade: 28.1m²

Percent Glazed	7.5%
% Including Door	7.5%
Top Floor	3.6%
Lower Floor	11.4%
Lower (inc door)	11.4%
Passive Surveillance	Medium
Visually Engaging	Low
Visually Coherent	Low

Example 3 – RMA/2021/236

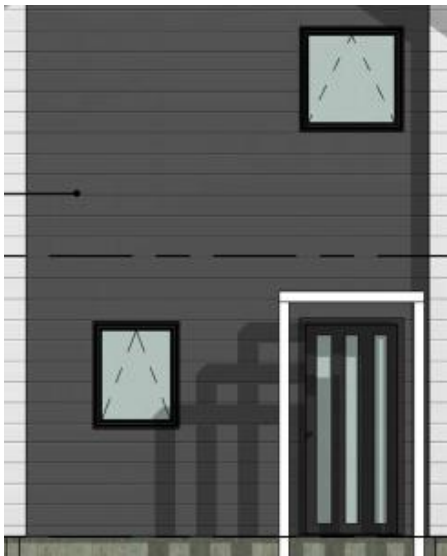


Total Area of Front Facade: 28.1m²

Percent Glazed	17.8%
% Including Door	19.6%
Top Floor	15.5%
Lower Floor	18.8%
Lower (inc door)	23.9%
Passive Surveillance	Medium
Visually Engaging	Medium
Visually Coherent	Good

Note this example has glazing within the door which is included in the calculations.

Example 4 – RMA/2019/2928



Total Area of Front Facade: 22.5m²

Percent Glazed 10.7%

% Including Door 15.1%

Top Floor 7.1%

Lower Floor 14.2%

Lower (inc door) 23.1%

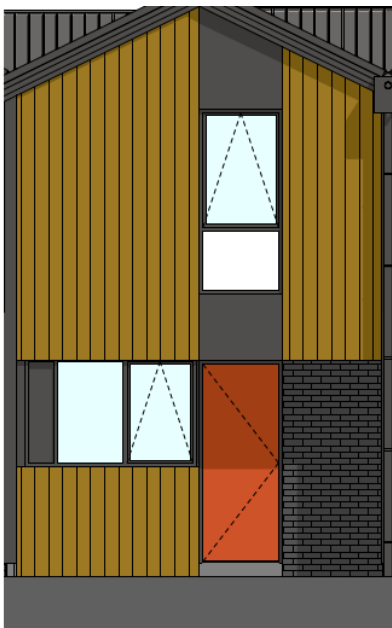
Passive Surveillance Medium

Visually Engaging Low

Visually Coherent Medium

Note this example has glazing within the door which is included in the calculations.

Example 5 – RMA/2020/1696



Total Area of Front Facade: 22.7m2

Percent Glazed 14%
% Including Door 21.9%

Top Floor 13.4%
Lower Floor 14.6%
Lower (inc door) 30.4%

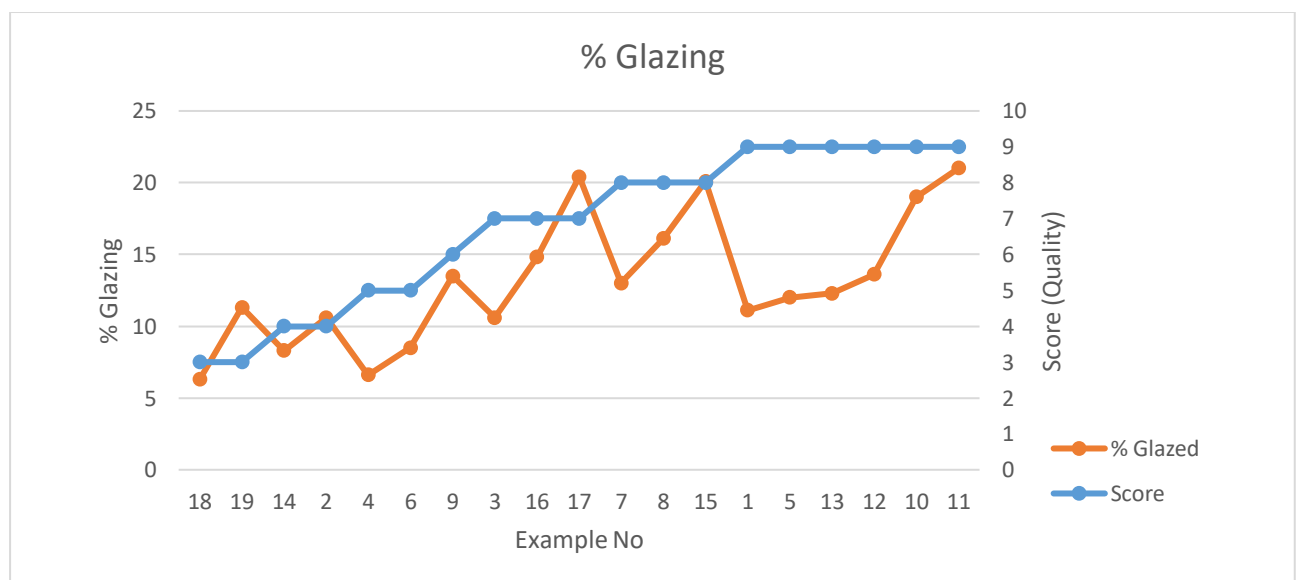
Passive Surveillance Good
Visually Engaging Good
Visually Coherent Good

Discussion

Whilst Part 1 is not an exhaustive survey, it does indicate the types of facades that are established and indicates how well they perform. There is a correlation between the percentage of glazed frontage and outcomes as shown below.

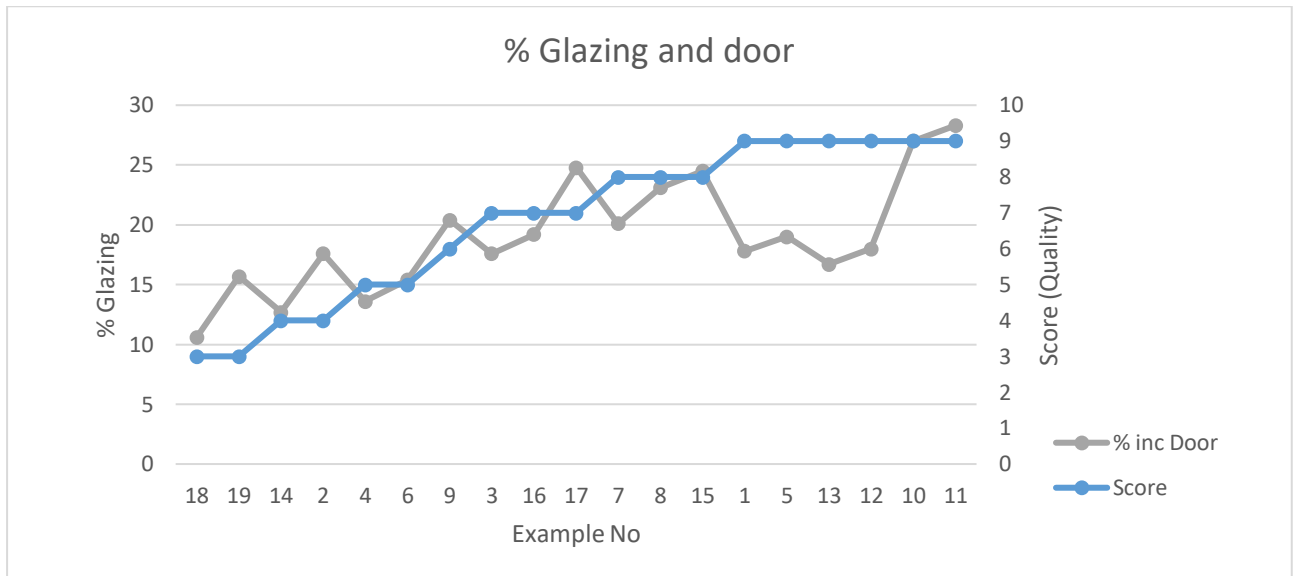
The three indicators used tend to be closely related and scores generally track each other to some extent. A basic standard of design would be achieved by a medium rating (or 2/3) on each indicator – translating into a score of 6/9.

It is also clear that whilst there is some correlation between the level of glazing and the quality of outcome, it breaks down after a certain point. Above a certain level of glazing (around 12%), there is only a weak relationship with quality. It appears that a moderate amount of glazing will ensure that the facade reaches a certain level (5/9) but that improved outcomes are not associated with higher rates of glazing than this.



If the door is included in the level of glazing (as shown below), then there is a stronger relationship. Good outcomes (6+) were always achieved where the level of glazing was above 17.5%. This is likely to be because these have a higher proportion of ground floor activation. This

view explains the dip in the graph at the top end. These facades (examples 1,5,12 and 13) are ones that have large ground floor windows despite a lower level of glazing overall. The windows relate to the position of rooms, they are at least quite large and do not have unusually high sills or low heads. This shows the importance of glazing that is well placed and allows clear views. Above a certain level of glazing, it is more important that it is well located and useful than to increase the overall amount of glazing.



Part 2 shows that there is a wide range of glazed frontage constructed in Christchurch. The highest proportion is 17.8%. As for the desktop sample, there is a link between the proportion of glazing and the standard of outcomes assessed. However, none of the sample reached the 20% standard required by the MDRS, including the examples that were assessed as good. This reinforces the trend of the desktop sample, that high rates of glazing are not needed to obtain good outcomes. It also shows that they are not usually built at present, meaning that that developers would have to increase the proportion of glazing to meet the rule, but that this would not lead to improved outcomes.

When considering the impact of including a front door, the higher scoring built examples did have a combined “glazing” of 20% or more, indicating that this is a more realistic requirement that would not result in unexpected outcomes to meet the rule.

However, one risk was identified. This was a single storey house with a garage at the front, where there was little room for effective glazing. Advice received into the correct interpretation of the rule states that the garage should be included in any calculation of façade area, and that glazing on the garage can be included in the glazed area. This leads to a risk that the glazing may be provided only to the garage (with little functional benefit). To mitigate this risk, it is suggested that there should be at least 1m² of glazing to habitable space (for units to qualify for reduced glazed area).

Total Area:	24m ²
Percent Glazed	10.8%
% Including Door	19%
Passive Surveillance	Low
Visually Engaging	Low
Visually Coherent	Low



Above: Example of a façade where most of the glazing is to the garage

Conclusion

Between them, the studies indicate that there is a link between a moderate level of glazing and higher quality outcomes. At higher levels of glazing, the placement of windows is likely to be more important than the total amount of glazing. Beyond a certain level, ensuring that a door can be placed on the front façade is regarded as more important than increasing the level of glazing, as is ensuring that the glazing is connected to living areas.

It is therefore recommended that a lower level of glazing than 20% is required, and priority is given to ensuring that high quality ground floor glazing is provided. This should comprise a door and a useful size window at an appropriate height for passive surveillance (eg not a high level window).

To achieve this, it is recommended that the door be included in the calculation of the level of glazing, and that if a door is provided, a total of 17.5% glazing is sufficient, provided that there is a good proportion of ground floor fenestration. It is recommended that the rule should be:

- 20% glazing, including a front door (even if not glazed); or
- 17.5% glazing including a front door and a separate ground floor (non-high-level) window.