(RE)ALLOCATING ROAD SPACE – THE CONSTANT DILEMMA

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Abstract

Most, if not all, transport projects involve deciding how road space is allocated for different uses within a defined width. What we decide is unlikely to satisfy all of the people who use that space. There are a number of issues that can arise; the 'big issue' is the removal of on-street car parking.

This paper examines the various road space uses and the decision making processes used within the industry and then offers strategies for practitioners dealing with this complex task. The strategies range from useful decision making tools to consultation approaches that aim to gain better consensus amongst the practitioners' and the community.

Two 'main street' upgrade case studies are outlined, both are busy arterials. The common theme is the restricted road reserve width and how to best allocate the space to achieve the desired outcomes. One of the case studies included a debate over footpath width and the other was about loss of on-street car parking. The consultation processes varied with respect to who was involved, and when.

This paper doesn't offer a silver bullet but presents a consolidated set of process and design strategies to assist practitioners as they go through the process of allocating road space.

1. INTRODUCTION

1.1 The issues

Most, if not all, transport projects involve deciding how road space is allocated for different uses within a defined width. The reasons for considering the road space allocation can be improving safety, providing for a cycle route or bus priority, improving the walking environment, increasing capacity or improving amenity (e.g. town centre upgrades).

In a recent survey of the transport planning and design sector for the NZ Transport Agency's National Cycle Network Design Guidance project, the issue of 'road space allocation' was the most commonly raised issue (Ward et al 2015). In particular, the opposition to removal of car parking to improve the cycling environment.

What we decide as part of the road space allocation process is unlikely to satisfy all of the people who use that space or even all of the project team. In the authors' experience, the most commonly encountered issues can be summarised as follows:

- Resistance to loss of on-street parking
- Debate over the balance of amenity space vs other uses such as cycling
- Loss of features such as flush medians may create delay to drivers
- Sub-standard facilities for one or two user groups to increase capacity for the majority

This paper examines the various road space uses and the decision making processes used within the industry and then offers process and design strategies for practitioners dealing with this complex task. Two town centre 'main street' case studies are used to illustrate different approaches to design with respect to stakeholder involvement and also two different allocation issues.

1.2 The big issue – removal of on-street parking

The removal of parking is generally the most contentious issue, primarily when in the commercial areas, however it is becoming more common in residential zones as housing evolves to higher density and hence there are often more than two cars per household. For business people it becomes an economic concern as they expect a loss of parking in the direct vicinity of their premises to cause a reduction in trade. This topic has been the subject of several research projects in recent years as discussed below.

Allatt et al (2013) investigated the economic impact of transport choice and road space allocation on retail activity in shopping areas located in central cities and along major road corridors in New Zealand cities. The surveys undertaken in the research showed that the majority of shoppers, especially in arterial shopping areas, intended to visit the centre, i.e. as a primary journey purpose and hence 'passing trade' trips were relatively low, representing less than 30% of total trade. It was also found that many customers used available off-road parking where it was provided nearby, shoppers understand that limited space is available to achieve parking objectives and as a result, the ability to park outside the shop they want to visit is no longer expected by many customers. However, they found that retailers still consider the need for on and off-street parking is a priority. The study indicated that customer parking expectations are significantly different from the need for parking perceived by retailers. Customers understood that the benefits of providing additional space for pedestrians and improving safety were more important than the provision of on-street parking directly outside shops.

Beetham (2014) explored the extent to which road space reallocation from on-street parking to an arterial cycle way may be warranted between Wellington City's southern suburbs and the city centre. For one particular street (Tory Street), Beetham found that contrary to what

might be expected, the contribution of those who use on-street parking to adjacent retail vitality on Tory Street is minor, compared to the contribution of those who do not require parking and those who use off-street parking.

Powell et al (2015) sought to understand the costs and benefits of inner city kerbside parking, versus the opportunity cost of the corridor space being allocated for other uses. One the specific findings was that there is a growing body of overseas evidence for the costs and benefits of kerbside parking reallocation. However, in New Zealand there is limited local evidence in a range of contexts that planners can draw upon when engaging with project stakeholders. These stakeholders, such as business owners, local residents and car drivers, can be sceptical about the relevance of overseas examples and evidence in their local context.

They also concluded that there is a need to develop a local evidence base of the positive and negative effects kerbside parking reallocation has on different groups in New Zealand. This needs to be based on robust pre- and post-project evaluation that is carried out in a consistent manner across New Zealand so that findings can be compared between places. A conceptual framework for evaluating the costs and benefits relating to kerbside parking reallocation projects was developed and includes factors that are important to evaluate for all kerbside parking reallocation projects.

2. STREET SPACE IN NEW ZEALAND

The town planners and surveyors who developed our towns and cities in the 1800's generally created networks of one chain (20.1 metres) wide road reserves. Most streets built within that 20.1 metre road reserve were generally 14 metres wide, enough for a horse and cart to do a U-turn perhaps? Over time as road hierarchies were established and kerb and channel was upgraded, the width was decreased for local streets but was generally maintained for collector and arterial roads. In town centres this usually meant that streets had 3 metre wide footpaths, on-street parking each side and a wide traffic lane in each direction, much like the main street of Kaiapoi shown in Figure 1.

Figure 1: Typical 20m wide road reserve in a New Zealand town (Kaiapoi in 2011)

2.1 Street elements

The 'streetscape' is made up of elements that are contained within the legal road reserve and those adjacent to the road, such as the buildings and landscaping. These elements combined define a street's character. The elements within legal road reserve that reflect how the street is intended to function, acknowledging the interface with adjoining land uses including property access, need to be considered in the street design.

The following urban street elements are discussed below as to how they influence cross section development:

1. Pedestrian movement
2. Bicycle movement
3. Bus movement
4. General traffic movement
5. Median treatments
6. On-street parking
7. Landscaping

1. Pedestrian Movement

The movement of pedestrians is generally provided for by including footpaths within the street cross section, in most cases both sides of the street. Shared spaces are becoming more common and this allows pedestrians to use the entire street width for movement.

The Pedestrian Planning and Design Guide (NZTA, 2007) contains pedestrian levels of service (LOS) and width guidance for footpaths in a range of contexts. Generally, wider street furniture zones are required in areas with high adjacent vehicle speeds and volumes and wider "through route" zones are required in areas with higher pedestrian volumes or with a high number of pedestrians stopping on the footpath. A 'through route' is the footpath space where pedestrians normally choose to travel and should be kept clear of obstructions such as sandwich boards at all times (see Figure 2). This clear space is particularly important for visually impaired people, a meandering clear space is not appropriate for this reason.

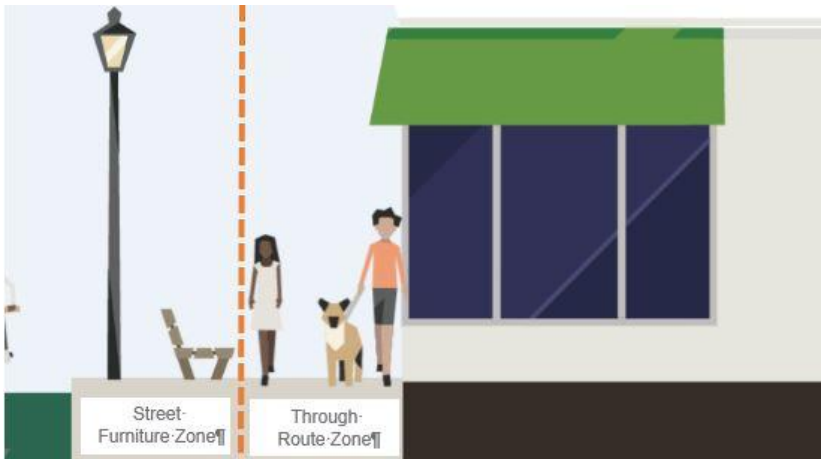


Figure 2: Footpath 'through route'

The overall footpath width is also a function of the adjacent land use, for example if there is outdoor dining anticipated a wider footpath would be desirable. On street parking can also be removed in some sections of the street in order to accommodate localised footpath widening, either temporarily (e.g. a wooden deck/platform) or permanently such as implemented throughout the Nelson central city (Figure 3).

The provision of pedestrian crossing points is also an important aspect of the road space allocation as reducing the width of the crossing will require space from the cross section.

Figure 3: Substituting on-street parking with dining space (Nelson)

2. Bicycle Movement

There are four main ways to cater for cycling within the road reserve:

a) Sharing the traffic lane with other traffic

b) On road cycle lanes

c) Physically separated (protected) cycle facilities

d) Off road paths.

Understanding cycle facility types is important as the cross section design often hinges on selecting the appropriate cycle treatment. When selecting the type of cycle treatment it is important to consider the cyclist type (target audience) expected on the route and also how the facility links to the wider network. This was particularly the case for the Lincoln Town Centre case study in Section 4.

a) Sharing the Traffic Lane with other traffic

This treatment creates a street environment where the cyclist shares the traffic lane with motor vehicles. This can either be when the cyclist and motor vehicles can travel side by side and therefore a lane width of 4.2m or greater is required, or when motor vehicles follow the cyclist in the traffic lane (maximum width of 3.0m) or make a proper overtake manoeuvre. The latter should only be considered appropriate when the motor vehicles are operating at slow speeds (30km/h or less), the traffic volumes are low and the treatment is over short lengths of approximately one or two blocks, longer distances may evoke driver impatience as most cyclists will be travelling at speeds around 20 km/h.

The important aspect of sharing the lane is that traffic lane widths of between 3.0m and 4.2m (when not adjacent to a flush median) should be avoided unless there is an alternative parallel cycle facility. These widths result in an unsafe arrangement where cyclists are ‘squeezed’ due to traffic overtaking within the same lane when there is insufficient width for this to occur safely.

b) On Road Cycle Lanes

This treatment involves the provision of a separate lane for cyclists line-marked between the parking or kerb and general traffic lane; with no physical separation between the lanes. The cycle lane surface can be coloured green to highlight conflict points, for example across side street intersections. Cycle symbols are painted along the lane at regular intervals to legalise and reinforce its use. The cycle lane width is a function of the adjacent activity. For

example, the width needs to be at least 1.8m when there are parked cars adjacent to the cycle lane to allow for car doors opening. When there is no on street parking adjacent the cycle lane can be reduced to 1.6m. Cycle lanes provide cyclists with their own space in the carriageway, however, they can still be too intimidating for inexperienced / less confident cyclists.

The provision of cycle lanes adds to the overall carriageway width and therefore can induce higher traffic speeds; this should be less of an issue in urban areas due to regular intersection spacing and high density traffic conditions.

c) Physically Separated (Protected) Cycle Facilities

A protected cycleway is a facility that is physically separated from the general traffic lane and the footpath. The separation can be kerbs, vertical flexi-posts or landscape treatments such as planter boxes. They can be one-directional one each side of the street or a bi-directional facility on one side of the street.

Protected cycleways separate people on bicycles and motor vehicles to a greater degree than a cycle lane; however they require careful consideration where bicycles and motor vehicles interact, for example at intersections and driveways. Another consideration is the interaction between pedestrians and cyclists at bus stops, pedestrian crossing facilities and between areas of high turnover parking and the footpath.

The width required to accommodate these cycle facilities in a standard 20m wide road reserve will result in the loss of on-street parking on at least one side of the street.

d) Off Road Paths

Off road paths can be cycle only paths or paths where cyclists and pedestrians share the path, known as a 'shared path'. Shared paths require careful consideration as the different speeds of pedestrians and cyclists can lead to inevitable conflicts and higher crash risk at driveways. Some pedestrians, for example older pedestrians, feel insecure walking among faster cyclists. The best tool to address conflict is to provide a shared path of a width that is sufficient for the expected usage (including consideration of future usage).

The key aspects when looking to include these facilities instead of on road cycle facilities is pedestrian environment and the number of and proximity to driveways from a safety perspective.

3. Bus Movement

Buses can travel in the general traffic lanes. Narrow traffic lanes that are intended for cyclists and drivers to share the lane, as discussed above under cycle facilities, and are bus routes should be 3.2m wide rather than 3m. Bus lanes, either operating full time or part time can also cater for bus movements. Bus lanes where buses and bicycles are to travel in line with each other should be 3.2m wide and lanes where that travel side by side at least 4.2m wide.

4. Traffic Lanes

Traffic lanes are the general lanes used by motor vehicles and in some situations also by cycles. The main variables of a traffic lane are its width and whether it is line marked. The width of a lane is generally related to its required capacity and function. Other considerations when determining the width include the situation adjacent to the lane, for example, whether it is next to a cycle lane, parked cars or kerb. Speed is also a consideration in determining the lane width but to a lesser extent in a town centre environment due to the presence of other conditions that will support a low speed environment (side friction created by buildings, on-street parking, close intersection spacing etc.). Overall, the selected lane widths should ensure a safe operating environment for all road users.

The number of traffic lanes is related to the volume of traffic, generally more than one lane in each direction is only considered at very high volumes. Trying to fit four traffic lanes into a

20m road corridor generally involves the use of clearways (space that is parking and cycling space during the off peak and a traffic lane during the peaks). This usually impacts on cycling along the road and parallel routes should be considered and improved if necessary.

5. Median treatments

Medians are generally located in the middle of the road separating the two directions of travel, in the place of a centreline. They can be solid (raised) or flush (paint markings). Solid medians provide space for landscaping and pedestrian crossings facilities and can have gaps for intersection turning movements and U-turns. Flush medians provide some space for right turning vehicles and can feature pedestrian refuge islands.

Deciding on whether to include or retain a median is a function of adjacent access requirements, safety and pedestrian crossing requirements.

6. On-Street Parking

On street parking can either be parallel to the kerb or at an angle. Angle parking generally provides a greater number of parking spaces along a length of road but requires more width than parallel parking. Angle parking can also create issues for cyclists if there is insufficient space provided between the parking and the traffic lane.

7. Landscaping

Landscaping introduces visual amenity into the street environment. It is important to identify generally where trees could be located within the cross section. Matters such as placement to ensure safe road user sightlines, address CPTED principles (e.g. no hiding areas), consideration of underground services and overhead services and structures (e.g. canopies) should be considered.

Street landscaping opportunities can be created by incorporating trees and landscaping in build outs within on-street parking lanes, as shown in Figure 4.

Figure 4: Example of Kerb Build Out between Parking Bays (Wanaka)

Kerb build outs soften the road environment and reduce the carriageway width at regular intervals thereby helping to reduce vehicle speeds. This reduces the overall number of car parking spaces, but provides an avenue effect due to the trees being closer to the traffic lane and this can reduce traffic speeds.

3. DECISION MAKING PROCESSES/FRAMEWORKS

When undertaking a project that involves the reallocation of road space, designers are often operating under the road controlling authority's defined processes. For example when preparing a Corridor Management Plan for Auckland Transport a general process is mapped out for project teams. Likewise in Christchurch there is a Scheme Design process outlined for councils transport projects. However these processes do have a level of flexibility to suit each project.

In broad terms, the design process commences with the definition of project objectives. Background and supporting information is gathered and then cross section options are developed. The options are then assessed against the objectives allowing a preferred option to be identified. The assessment is usually some form of multi-criteria analysis on either, or both, a qualitative and quantitative basis.

The variables are usually who is involved in the project team (which disciplines) and at what point external stakeholders become involved. Multi-disciplinary teams are generally valued and often led by a person who has the most connection with the initiating factor. For example an amenity focused project is usually led by a landscape architect or urban designer, a safety project is usually led by a safety engineer. The external stakeholders can be involved early to gain their views on the options and be part of the assessment team, this generally occurs for large complex transport projects. Another approach is to develop the options, select the preferred option, then consult with the external stakeholders as shown in Figure 5 (Abley, 2015a). This example is one of the case studies discussed in the following section.

Frameworks such as the One Network Road Classification (ONRC) and Network Operating Plans can provide assistance in the development and assessment of options when priorities of modes have been defined. Some authorities have also defined specific space allocation principles for their corridors (WCC, 2015).

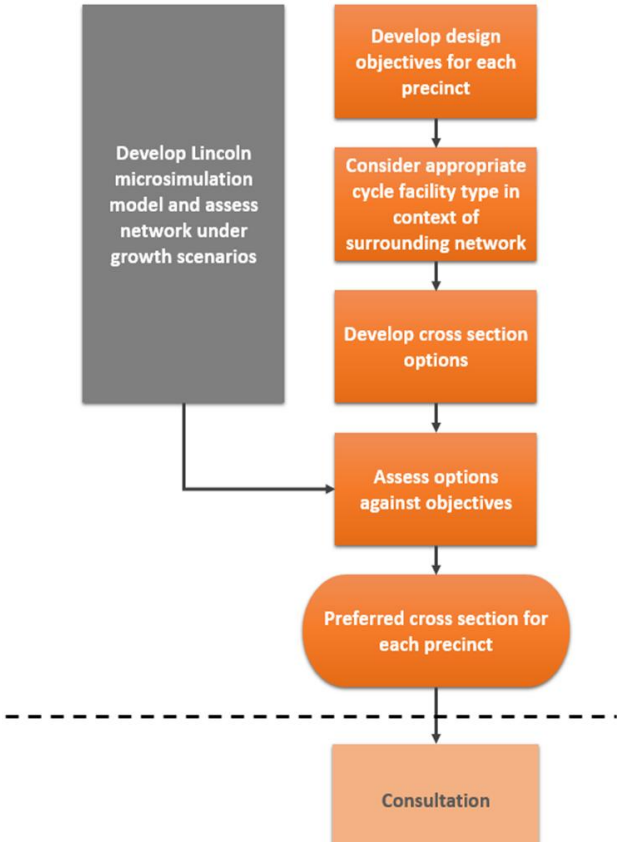


Figure 5: Example of design process (Lincoln Town Centre)

4. CASE STUDIES

Two town centre 'main street' upgrades in Kaiapoi and Lincoln are outlined below. Both of the streets are busy arterial roads and the Kaiapoi main street carries almost three times the traffic volumes of the Lincoln main street as there is no alternative route through Kaiapoi. The common theme for both projects was the 20m wide road reserve and how to best allocate the space within that reserve. The Kaiapoi project included a debate over footpath width where some stakeholders wanted to make room for outdoor dining. The Lincoln project featured protected cycleways in the preferred design and this resulted in an over 50% loss of on-street car parking. The consultation processes also varied with respect to who was involved, and when.

Williams Street - Kaiapoi Town Centre

The design objectives for Williams Street emerged from the Kaiapoi Town Centre (KTC) Plan development that had already been consulted on. From the outset it was concluded that on-street parking should remain on Williams Street, however the space required for parking could be rationalised. The width of the parking lane was reduced from 2.5m to 2m as this is a more efficient use of space and promotes better parking discipline.

A Reference Group of community representatives was established to work alongside the design team and council staff (Figure 6) near the start of the project. The group was made up of about a dozen people representing businesses, mobility impaired users, schools, emergency services and residents. It was decided that this process would be the key consultation process and once the plan was agreed that the Community Board would make the final decision. The wider community would then be informed of the plan. Any negative feedback from the community was considered low risk given the decision to retain on-street parking (albeit of a lesser amount than existing due to intersection treatments).

Figure 6: Reference Group at one of the four workshops (Kaiapoi Town Centre)

Four workshops were held over three months to deliver the street plan. The space allocated for footpaths, how cyclists were accommodated and whether the pedestrian crossings should be one or two stage crossings were aspects the group considered. Providing for cyclists in the town centre was a fundamental issue for the Reference Group to consider. The first aspect made clear to the group was the accepted best practice that if a traffic lane is in the "in-between widths" then cyclists cannot safely share that lane. It is also not best practice for cyclists to share a path with pedestrians in a town centre environment.

Four cross section options were developed for Williams Street. The majority of the Reference Group supported Option 1 (3.2 m wide footpaths but with wider footpath areas created near intersections to allow space for pedestrians, landscaping and seating; two 3 m wide traffic lanes with 1.8 m wide cycle lanes, 2 m wide parking lanes on each side of the street and two stage (median divided) pedestrian crossings. Feedback from the urban designer involved in the KTC Plan development was also supportive of Option 1 and opposed wide (4.5 m) footpaths in several of the other options as they can look too sparse and open, even when there are lots of people about.

Ward et al (2011) found that working with a Reference Group that represented varying sectors of the community was a useful way of gaining community input in the design process and ultimately informing the decision-making. The majority of the group were enthusiastic about their involvement and left the process feeling they had contributed despite having no design or planning expertise. The final design was not what the design team had initially envisaged for the main street. On that basis, they wholly endorsed engaging with representative users of the main street to develop design plans rather than presenting the community with a design for comment.

The full project details are included in the Integrated Transport Plan (ViaStrada, 2011).

Gerald Street – Lincoln Town Centre

The design objectives for Gerald Street were developed based on the vision of the draft Lincoln Town Centre Plan. The design process was undertaken by a consultant team and council staff. Council staff decided to consult with external stakeholders once a preferred option had been established and as part of the wider Lincoln Town Centre Plan consultation. This was a different approach to the Kaiapoi case study.

Because improving cycle movement along the street was one of the key objectives, the preferred type of cycle facility was established prior to developing the cross section options. A protected cycleway on each side of the road was selected to best meet the objectives and therefore it was known that at least one side of the street would lose car parking. A parking survey was undertaken to better understand the parking demand and a parking management plan developed to support the transition to a reduction in on-street parking. The parking loss was considered acceptable by the council as a plan to create shared car park areas to the rear of the businesses in partnership with private land owners has been on the table for some years.

A series of design options were developed and assessed by the consultant team and council (Abley, 2015a). The preferred option was presented to Council in a workshop to gauge their support, this was forthcoming. One of the Councillors for the Lincoln Ward has been actively engaged through the project and was essentially the 'political champion' for the project. The preferred option was developed into scheme plans (Abley, 2015b) and put to Council for approval to proceed to consultation, this was granted. The report recommending the plan to Council was made public prior to the consultation events and the media headline was "*Plans to ditch Lincoln car parks*". This unfortunately created a negative tone before the wider community had seen the plans.

Alongside the scheme plans the consultation material was designed to help people visualise the plan, by including artist's impressions of the street, see Figure 7.

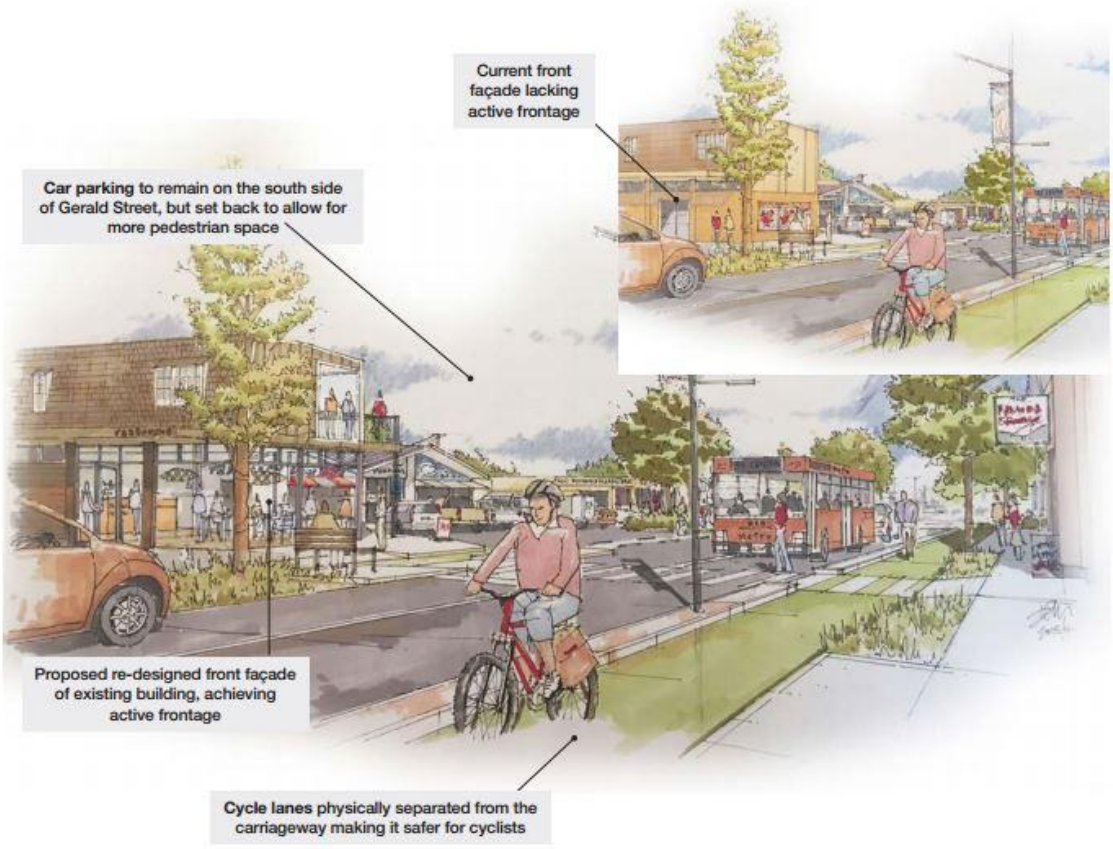


Figure 7: Extract from consultation material (Source: Draft Lincoln Town Centre Plan)

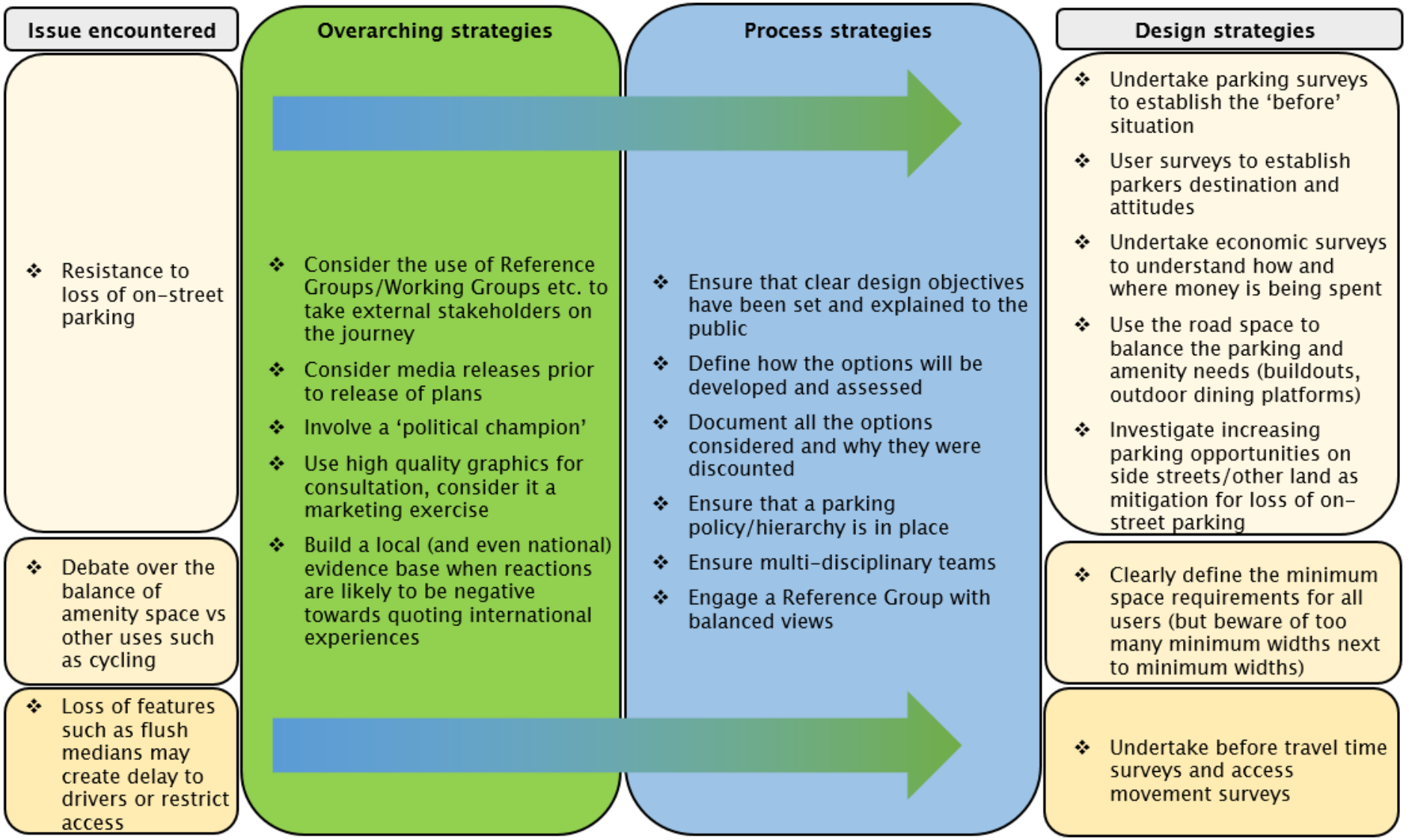
The lead author attended the consultation event targeted at the business owners expecting a backlash regarding the car parking loss. However, the presentation made by council staff was pitched at the big picture and the initial questions from the floor continued to focus on the big picture. There were also residents attending and they were supportive of the cycleway, one elderly gentleman even stated "*build it and they will come*". Those opposed to parking loss outside their businesses did not voice this concern at the meeting, potentially because of the atmosphere of positivity regarding the vision for the town whereas their concerns would be seen as an individual matter.

The feedback on the plan is still being received by council and it is not yet known if the plan will be implemented in its current form. However, based on the robust parking information collected, the 'political champion' approach and atmosphere at the consultation event, the outcome could be positive!

5. TOOLBOX OF STRATEGIES

Based on the case studies, the research outlined in Section 1 and the authors experience, a toolbox of strategies has been compiled to assist practitioners when embarking on the complex task of allocating road space, see Table 1. The strategies are not new but are consolidated into a table as overarching strategies, process strategies and design strategies.

Table 1 – Strategy Toolbox



CONCLUSION

The national level research being undertaken to better understand the positive and negative impacts of reallocating road space from parking to other uses is important for the transport planning and design sector. It provides an evidence base that can be supplemented by local information to better inform stakeholders.

Two case studies involving road space allocation dilemmas in 20m wide road reserves were presented to show how this information can be used in local schemes, and also two different engagement approaches.

The Kaiapoi case study was about the balance between footpath width and how to accommodate cyclists on a busy arterial road. Involving a reference group early allowed the key decision between wider footpaths with cyclists sharing the lane or retaining the footpath width and providing cycle lanes to be made in a collaborative manner.

The Lincoln case study was about the balance between level of cycle provision and parking. The consultant and council staff project team made the key decision between separated cycleways and losing on-street parking on one side of the street versus on-road cycle lanes and retaining on-street parking on both sides of the street. The decision was made on what option best met the project objectives. The plan was then presented to the community for feedback but with supporting information such as parking surveys and ways to increase the overall town centre parking supply over time to meet the demand.

Both case studies took a different approach to community involvement but ultimately used strategies that suited the context.

A series of strategies generally already used by the industry have been compiled into a tool box. The benefit of putting them together is that practitioners can consider the alternatives carefully. The tool box can be added to over time as different approaches are tried.

Each scheme and community has different characteristics and objectives; that is why a tool box has been developed rather than a step by step process. The approach used for individual schemes should be decided at the beginning of a project and be based on what level of information in required and also set out how the community consultation/involvement strategy.

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