TECHNICAL NOTE

NEW URBANISM – IS IT REALLY APPLICABLE TO NEW ZEALAND DEVELOPMENTS?

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ABSTRACT

New Urbanism is a design movement that originated in the 1980's in response to the 1960's futurism and the large scale mono-dimensional developments that were typified in North America around that time. Urbanists often refer to the disbenefits of these developments, including transportation disbenefits and refer to them as Planned Unit Developments (PUD). Urbanists suggest the alternative and better solution is Traditional Neighbourhood Developments (TND) that are typified by grid like transportation networks, a large number of access points and residential neighbourhoods in close proximity to non residential land uses.

In New Zealand TND is often touted as a winning formula for changing travel behaviour and improving the quality of our neighbourhoods and communities. The proximity of non residential land uses is intended to promote walking, bicycle and shorter internal vehicle trips and reduced parking demand. Often technical arguments are framed around a key characteristic that trips among the various land uses can be made within the development and these internal trips are not made on the external roadway system outside the boundary of the TND. Some new urbanists think it is possible to internalise up to almost two thirds of existing trips. It all sounds good and maybe it's too good to be true?

Abley Transportation Consultants have recently completed a detailed analysis into some of the underlying American research that informs the TND versus PUD debate and well as an examination of the Duany Plater-Zyberk (DPZ) Smart Code that is occasionally applied in New Zealand. This analysis has involved liaising with some of the authors of the original research and identifying some concerning evidence that New Zealand practitioners may be misinterpreting and/or potentially misapplying this research in a New Zealand context. This may have consequences for developments that have relied on this data to show the transportation effects of the development will be acceptable.

INTRODUCTION

New Urbanism is an urban design movement that started in the United States in the early 1980's in response to the negative effects of the 1960's futurism movement. New Urbanism can include (neo) traditional neighbourhood design, transit orientated development and New Pedestrianism. It is generally considered that New Urbanism began crystallising in approximately 1991 when the Local Government Commission in Sacramento California held a brain storming meeting to develop a set of community principals for land use planning. The outputs from this meeting were the 'Ahwahnee Principals' that are expected to provide for resource efficient communities. In 1993 the Congress for New Urbanism (CNU) was founded and hence the familiarisation and promotion of the term 'New Urbanism'.

The CNU was conceptualised by Peter Calthorpe, Andres Duany, Elizabeth Moule, Elizabeth Plater-Zyberk and Stefanos Polyzoides (all architects). The CNU Charter states New Urbanism provides for; a diverse population, pedestrian and public transport as well as the car, is accessible, framed by architecture and landscape design and celebrates local history, climate, ecology and building practice. New Zealand's Urban Design Protocol provides for similar outcomes based around the 7 C's; content, character, choice, connections, creativity, custodianship, and collaboration.

New Urbanists often refer to the disbenefits of 1960's futurism developments, including transportation disbenefits and refer to these developments as Planned Unit Developments (PUD). Urbanists suggest the alternative and better solution is Traditional Neighbourhood Developments (TND) that are typified by grid like transportation networks, a large number of access points and residential neighbourhoods in close proximity to non residential land uses.

In New Zealand TND is often touted as a winning formula for changing travel behaviour and improving the quality of our neighbourhoods and communities. The proximity of non residential land uses within a TND is intended to promote walking, bicycle and shorter internal vehicle trips and reduced parking demands i.e. the 'work-live-play' approach. Often technical arguments are framed around a key characteristic of a TND that trips among the various land uses can be made within the development and these internal trips are not made on the external roadway system outside the boundary of the TND. Some new urbanists consider it is possible to internalise up to almost two thirds of existing PUD trips.

Recently a Private Plan Change was proposed in a suburb in Christchurch. The Christchurch City Council requested Abley Transportation Consultants undertake a review of the proposal. The plan change proposed a mix of land uses that the applicant considered as a TND and hence the proposed plan change would provide a number of benefits, including substantial transportation benefits.

As part of the review a detailed analysis of some of the underlying American research that informs the TND versus PUD debate was considered and well as an examination of the Duany Plater-Zyberk (DPZ) Smart Code that is occasionally applied in New Zealand. This analysis has involved liaising with some of the authors of the original research and identifying some concerning evidence that New Zealand practitioners may be misinterpreting and/or potentially misapplying this research in a New Zealand context.

BACKGROUND

The proposed plan change site is located in St Albans, approximately 1.5 kilometres north of the Christchurch Central Business District. The site is bounded by Madras Street, Canon Street, Packe Street and Purchas Street. The total land area is about 4.326 hectares.

The plan change site is currently zoned Living 3 within the Christchurch City Plan (CCP). The applicant proposed to develop the majority of the site for residential purposes and the balance of the site was to be developed for non-residential activities and zones Business 1.

The original elements of the plan change site included about:

- 237 residential units, each with two parking spaces;
- 3335m^2 of retail floor space on the site; and
- 1950m^2 of office floor space

Parking provision for the plan change site included 474 spaces for the residential units and 166 spaces for the combined parking demand of residential visitors and non-residential activities.

ASSESSMENT OF TND INTERNAL CAPTURE RATE

The applicant considered the plan change would reflect the characteristics of a TND. A key characteristic of a TND is that trips among the various land uses can be made within the developments and these internal trips are not made on the external roadway system outside the boundary of the TND. The proximity of non residential land uses for a TND is intended to promote walking, bicycle and shorter internal vehicle trips.

The plan change transport assessment assumed an internal capture rate of 30% that relied heavily on overseas research undertaken in the USA by the by the Florida Section of the Institute of Transportation Engineers (FLITE). The FLITE research is based on 20 TNDs ranging in size from about 280Ha to 6,300Ha and retail areas from 6,100m^2 to 16,000m^2 and households from about 900 to 4,000.

Given the nature of a TND, internal trips must occur within the development. The proportion of these internal trips therefore equates to a internal capture rate. It is important to mention that internal trips for a TND are defined as *"those that have both trip ends within the development project… [and] there is no net increase in the traffic volume on the external roadway system outside the boundary of the project"*.

Overall Abley Transportation Consultants considered the FLITE research was difficult to apply to the private plan site given the limited number of 'mixed uses' within the site and the site was only 4.3Ha. To illustrate the difference between the sample research sites within the FLITE research and the plan change site the graph shown in **Figure 1** was prepared. The plan change site is so small in comparison that it cannot be seen on the graph. To offer a different perspective, one of the research sample locations 'Sabel Chase' is the smallest development of the sample sites, at 132 Ha. In comparison the plan change site is only 4.3 Ha. In simple terms the application site was only 3% of the size of the smallest study site in the FLITE research.

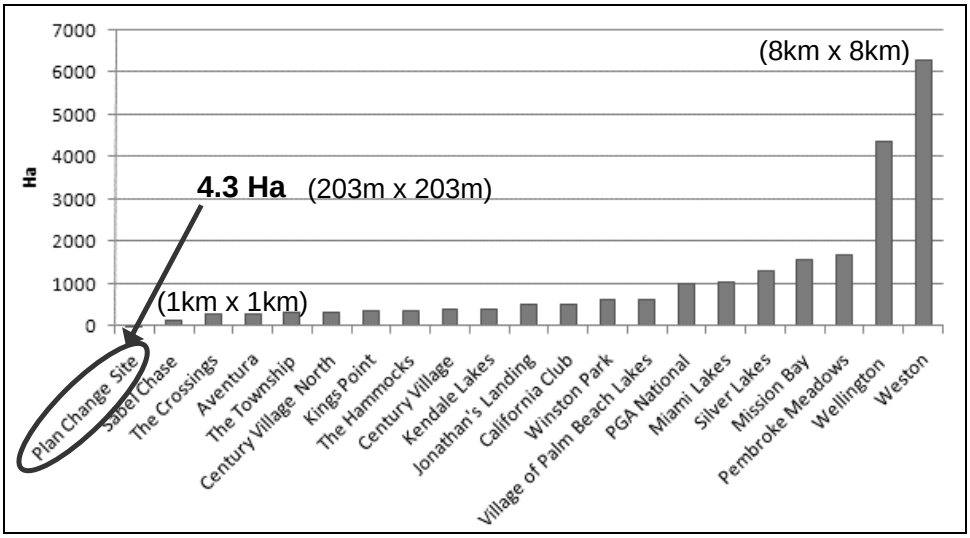


Figure 1 Comparison of the Size of the Plan Change Site with FLITE Research

The FLITE research showed that each of the sample sites exhibits a different internal capture rate. Generally the largest TNDs have the largest internal capture rates as shown in **Figure 2**.

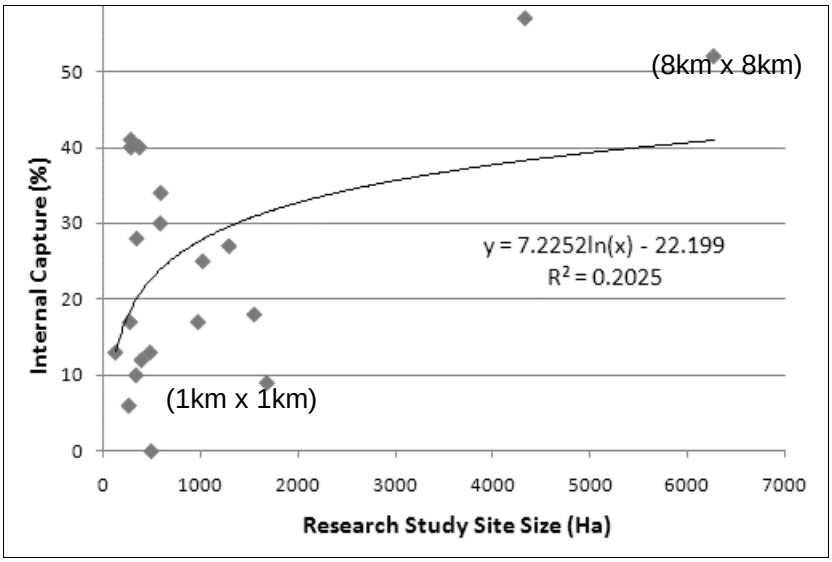


Figure 2 Correlation Between Research Study Site Size and Internal Capture

The best fit natural logarithm regression line has an R^2 value of 0.2 indicating that 20% of the internal capture rate output can be explained by the research study site size variable input. The other 80% will be explained by other variables such as population density, the exact land use mixes, the spatial road network and other variables. The FLITE study concludes that *"internal capture rates increases with increasing size and diversity of land uses"*. This is because the availability of different land uses within the TND encourages people to travel less long distance trips.

The FLITE study uses TND that vary in size and internal capture. None of the developments are directly comparable to the plan change site. Therefore, the FLITE research is not a good basis to determine the plan change site's travel behaviour and internal capture rate. Nevertheless, the size and the scale of land uses within the plan change site suggest some small internalisation of trips is probable.

There is only one well known practitioner methodology that calculates internal capture rates for TND. The methodology is contained in Chapter 7 of the Institute of Transportation Engineers' (ITE) Trip Generation Handbook. The application of this methodology in Christchurch, New Zealand requires close examination.

The ITE suggests that *"…multi-use developments [TND] are commonly found ranging in size from 9,290m^2 to 185,800m^2"*[1] and multi-use developments [TND] do not include *"…suburban activity centre, or existing ITE land use classification with potential for a mix of land uses, such as shopping centre,…office building with retail…"*[2]. Additionally the ITE also warn practitioners that *"the estimated typical internal capture rates…rely directly on data collected at a limited number of multi-use sites in Florida."*[3] It was the reference to Florida that raised concerns with Abley Transportation Consultants and contact was made with the main researcher that developed the internal capture rate methodology contained in the ITE Trip Generation Handbook to further investigate these sites.

Abley Transportation Consultants were provided with the details of the TND sites that were used to develop the internal capture rate methodology. The details for these sites are also

[1] ITE (2004) Trip Generation Handbook, p.85
[2] ITE (2004) Trip Generation Handbook, p.85
[3] ITE (2004) Trip Generation Handbook, p.93

found in Appendix C of the ITE Trip Generation Handbook. The details for these sites are summarised in **Table 1**.

Table 1 Characteristics of TND Sites Surveyed in Florida

TND Site	Site Size (Ha)	Office (m^2 GFA)	Retail (m^2 GFA)	Residential (units)	Internal Capture Rate (%)
Country Isles	25	5,481	16,322	368	33
Village Commons	29	27,220	16,707	317	28
Boca Del Mar	102	28,149	19,304	1,144	33

The plan change has a site area of 4.3Ha and Office, Retail and Residential land use of 1,760m^2 GFA, 3,240 m^2 GFA and 237 units respectively. Again, in terms of the size of the land uses, it is evident that none of the TND sites surveyed in Florida are directly comparable to the plan change site. This suggests it is also inappropriate to use the ITE methodology for application to the plan change site.

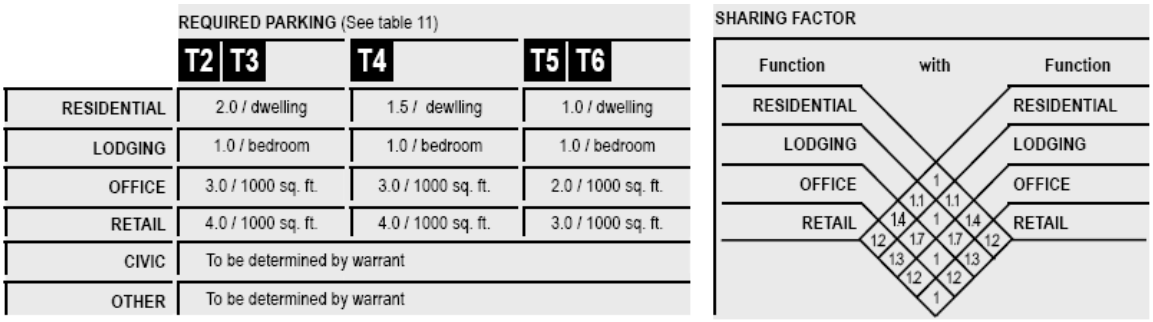
Even though there is an acknowledgment that multiple land uses will provide benefits associated with 'work-live-play'; the quantum of internal capture can not be derived from the FLITE or ITE research unless the application site was within the research data range. In this particular example the application site where the research was applied was significantly dissimilar to the research sites.

ASSESSMENT OF TND PARKING PROVISION

Initially the plan change also proposed to reduce the parking provision stated in the CCP. The plan change proposed reducing residential visitor parking from 1 car park per 5 units to nil (100% reduction), the retail visitor car parking from 4.6 per 100m^2 GLFA to 2.5 per 100m^2 GLFA (45% reduction), and the office visitor parking from 2 per 100m^2 GFA to nil (100% reduction). Again the reasoning for the reduction in parking supply was because of the significant benefits provided by the New Urbanism concept.

The plan change transport assessment quoted the Duany Plater-Zyberk (DPZ) Smart Code methodology that applies the TND philosophy (Duany and Plater-Zyberk were two of the founding members of the CNU). The methodology employs a parking 'sharing factor' to TND where the parking provision for the various activities on the site are calculated separately, and then reduced by the sharing factor in recognition of different peak parking demands by different land use activities.

The parking sharing factors for different combinations of land use activities are shown in **Figure 3**. The Figure shows that the Smart Code sharing factor ranges between 1.2 and 1.7 or reductions between 17% and 41%.



REQUIRED PARKING (See table 11)

	T2 T3	T4	T5 T6
RESIDENTIAL	2.0 / dwelling	1.5 / dewlling	1.0 / dwelling
LODGING	1.0 / bedroom	1.0 / bedroom	1.0 / bedroom
OFFICE	3.0 / 1000 sq. ft.	3.0 / 1000 sq. ft.	2.0 / 1000 sq. ft.
RETAIL	4.0 / 1000 sq. ft.	4.0 / 1000 sq. ft.	3.0 / 1000 sq. ft.
CIVIC	To be determined by warrant		
OTHER	To be determined by warrant		

Figure 3 Smart Code Parking Sharing Factors

Putting aside the specific DPZ recommendations for the moment, the application of the US Smart Code methodology in Christchurch New Zealand needs careful examination. The concept of shared parking is valid although the Smart Code application does not provide any references to the studies used to determine the specific sharing factor or validation of those

studies in the New Zealand context. New Zealand research regarding shared parking is included in Transfund Research Report 209, although the concept only relates to 'shopping centres'.

The concept of sharing residential parking with retail parking has not been extensively studied in New Zealand although the philosophical concept is in the opinion of Abley Transportation Consultants valid and a good use of parking resources. This is because the times when retailing parking demand is typically high are unlikely to be the same times that residential visitor parking will also be high. For the concept to work in practice though, the attractiveness of the parking locations need to be similar i.e. the residential visitor and retail visitor parking areas need to be located close to both activities, not just one or the other.

The DPZ TND philosophy is based on a minimum pedestrian shed of *"about the distance of a five minute walk at a leisurely pace"* or about 400m. Therefore for any car park sharing to be successful, the Smart Code methodology suggests both land uses must be within a maximum 400m of the shared car park. If not, the shared parking may not eventuate and potentially create on street parking effects given on street parking may be much closer to the motorists intended destination.

Applying this approach to the plan change site means the shared retail visitor and residential visitor parking may have to be within some 200m walking distance from the intended destination of motorists yet these locations would have to compete with on street parking that might be some 50m from the same destination. It would therefore appear unlikely the proposed shared parking would operate as envisaged. The shared parking approach was deleted from the private plan change application.

CONCLUSIONS

Abley Transportation Consultants has completed a detailed analysis into some of the underlying American research that informs the TND versus PUD debate and well as an examination of the DPZ Smart Code that is occasionally applied in New Zealand.

The US methodology for estimating an internal capture rate for a TND may not suitable in the New Zealand context unless the size of the TND in NZ is a similar size to say the average size of TNDs used in the US study. Additionally it is important to recognise a significant portion of New Zealand's measured vehicle trip rates originate from TND sites and hence reduction and comparison to the equivalent US PUD may also not be appropriate.

The application of the DPZ US Smart Code methodology for estimating parking sharing factors for different land use activities within a TND may also not be suitable in NZ. This is because the Smart Code methodology has not provided reference to the studies used to determine the specific sharing factor relationships. Furthermore, there is no research undertaken to validate the specific discount rates in the New Zealand context.

Overall this technical paper has shown there is a significant need in New Zealand for ongoing transportation research in the area of 'work-live-play' developments. Additionally there is also significant care required when considering application of overseas research directly to the New Zealand content.

REFERENCES

Duany et al. (2004). *SmartCode & Manua Version 8.0*. New Urban Publications Inc.

FLITE (2005). *Traditional Development Trip Generation Characteristics*. FSITE/District 10 Annual Meeting.

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