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Planning for urban freight through loading dock provision in new developments

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Abstract

For freight and servicing movements entering a city, parking provides access enabling service to customers. This will invariably occur on the street in parking spots or in off-street facilities that are part of the building to be serviced. In light of declining on-street loading zone spaces, this paper explores the provision of off-street loading docks to support freight and servicing task activity in major urban centres.

While it may not be fully appreciated, provisions to adequately accommodate a city's generated freight task is highly important to urban planner's objectives. Many cities are pursuing objectives to reduce car-centric planning approaches and become more attractive people-centric places with large amounts of pedestrianised streets and space. While there are other alternatives, trucks are likely to continue to be the efficient mainstay of the freight task going forward. As a non-discretionary transport task, freight vehicles will continue to enter cities. If good off-street loading dock facilities are not provided, vehicles will seek out legitimate or illegal on-street parking, and urban planner's place making objectives are likely to be compromised.

The paper focuses on Sydney but draws on comparisons primarily to the City of London. The paper first considers the planning approaches that govern the provision of loading docks. It then considers various stakeholder perspectives towards loading dock provision and use. Finally, it discusses approaches of how a transport authority may seek better outcomes.

The author is directly involved in urban freight and transport planning and evaluation of loading dock provision in Sydney, Australia.

1 Introduction

Major CBD buildings generate significant amounts of daily freight movements (Dalla Chiara, 2017); (Jaller, 2015). With the development of each new building in a Central Business District (CBD), there is an opportunity for an improved ability to accommodate the urban freight task and with it, urban planning objectives with the provision of new loading dock facilities.
Responsibility for the critical planning approaches typically lies with local government through land use, environmental, and transport policies. In CBDs planning authorities will provide kerbside parking as part of road infrastructure and/or have planning policies that require new developments to provide loading dock freight management facilities; typically to meet self-sufficiency. Within current trends of cities development, the ability to provide any type of kerbside parking is often secondary to other urban design objectives recognizing that cities are places for people (NATCO, 2014). The ability to create loading dock capacity within a building is typically constrained to the time the building is being designed and constructed. After this opportunity has passed, the die is cast for perhaps 50 to 100 years; the life of the building with city streets needing to accommodate the inconvenient consequence and economic burden of inadequate facilities in buildings.

1.1 Modern loading dock genesis as a city serving capability

The concept for provision of 'forward in, forward out' loading docks to minimize the impact of freight and congestion in a city is not new. In a 1965 short film of a vehicle driving around central Sydney (NSW Roads, 1965), filmed by a forerunner to the current Transport for New South Wales (TfNSW), the video commentary states:
"*The main cause of this congestion appears to be the number of commercial vehicles using the streets … These commercial vehicles are using not only loading zones but are double-parked at various places. These vehicles cannot be classed as through traffic as they are delivering or collecting goods in the heart of the city … Again, how many of the buildings in the city have provided proper loading facilities? That is, docks that allow trucks to drive in, turn around inside the building and drive out.*"

It may be noted from this 1965 film that the concern over commercial vehicles is not about impacts on people, but focuses more towards congestion impacts on other cars and general vehicular traffic movement.

2 Loading dock requirements in government planning policies

To understand the provision of loading docks, it is first necessary to consider the planning codes that require them and a city's development strategy (Kiba-Janiak, 2019). Many cities have policies to address on-street provision and provision of urban logistics spaces (Dablanc, 2007); (Quak, 2015). Given heritage buildings and street conservation, many cities must rely on the provision of street parking for freight and servicing activity. As a younger city, Sydney and other Australian cities are less constrained and have a greater opportunity to encourage the development of off-street loading docks as buildings are renewed.

2.1 Sydney Planning regime

In the Australian planning system, Local Environmental Plans (LEPs) and Development Control Plans (DCPs) are prepared by local authorities to regulate development and land use within a particular local government area. These are positioned below the Environmental Planning and Assessment Act 1979 (EPA Act) and a state's Environmental Planning Policies (EPI).

The DCP provides detailed planning and design guidelines in support of the planning controls stated in the LEP and the aims of the EPA Act. The DCP may incorporate expectations related to the provision of loading docks. It should be emphasised that the DCP is a set of guidelines the proponent is requested to adhere to, the LEP addresses the actual planning controls of what must be adhered to. The EPA itself states the purpose of the DCP is to provide guidance on various objectives of the EPI. Consequentially, during a Development Application (DA) for a new building, requirements within a DCP may be interpreted with flexibility; so state lawyers (PDC, 2020) in website advice to clients. This "*flexible interpretation of requirements*" is consistently demonstrated in DA's concerning loading docks.

In New South Wales (NSW), the planning documents are supported, by the Guide to Traffic Generating Developments (RTA, 2002). This document was created by a predecessor to the current TfNSW. This information is provided for traffic engineers, town planners, architects, council officials, developers, and any other personnel involved in the approval process of Development Applications. Somewhat rarely, local authorities may also provide trip generation rates within their DCPs. Regardless of the source, this information provides limited insight into freight activity profiles.

The advice in DCPs for loading docks is often qualitative. The loading and servicing objectives of North Sydney's Development Control Plan (North Sydney Council, 2013) reads:

- To ensure that adequate off-street loading, delivery, and servicing facilities are provided
- To minimise the impacts of loading, delivery, and servicing operations on the safety and efficiency of the surrounding road system.

The North Sydney DCP is typical of most local authorities qualitative design plans. In total it is a 683-page document covering all aspects of local planning and design requirements.

Since, 1996, the central Sydney DCP (City of Sydney, 1996) states a quantitative series of dock space requirements for different types of new buildings. Examples of the main land use in the CBD are covered by:

- Commercial premises: 1 dock space/3,300 sqm Floor Space Area (FSA/GFA) or part
- Retail: 1 dock space/350 sqm FSA or part
- Residential buildings: 1 dock space for first 50 dwellings/and Serviced Apartments, 0.5 spaces for every 50 dwellings/apartments thereafter.
- Hotels: 1 dock space/50 hotel bedrooms

As commercial and hotel developments increase in size, incremental requirements reduce for the space exceeding a certain threshold.

These calculations date from 1996 or earlier. It is reasonable to consider that logistics has gone through at least two major transformations since (Rodrigue, 2020) with the increasing scale of operations and greater supply chain consolidation, and then the advent of the e-commerce era which has ongoing significance (Schulz, 2018).

In the absence of a local authority having a quantitative DCP requirement, the state planning convention dictates development proponents should revert to the TfNSW *Guide to Traffic Generating Developments* which has metrics similar to those stated above for City of Sydney. However, a lack of faith in old data is often stated as a reason for development controls being challenged.

Loading dock design is also supported by Australian Design Standard AS2890.2 Parking facilities part 2: Off-street commercial vehicle facilities (Standards Australia, 2002). This document sets out the design, geometry, and engineering standards for loading docks. While it is adhered to for the safe design of facilities, it does not quantify the requirements (dock capacity) to service a building.

2.2 City of London planning regime

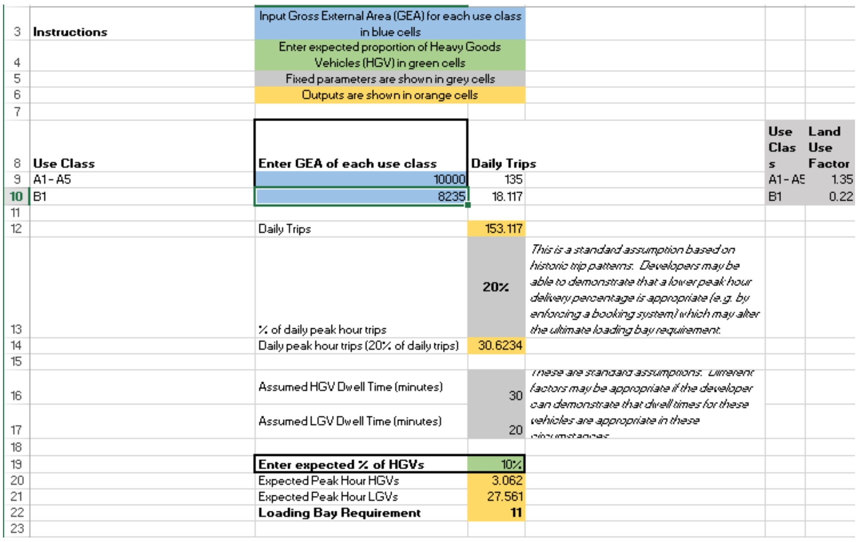
The most comparable City of London planning document to Sydney's LEP is the Local Plan (City of London, 2015). It states in Policy DM 16.5 Parking and servicing standards:

'On-site servicing areas should be provided to allow all goods and refuse collection vehicles likely to service the development at the same time to be conveniently loaded and unloaded. Such servicing areas should provide sufficient space or facilities for all vehicles to enter and exit the site in a forward gear...'

In similarities to the objectives of Sydney local authorities DCPs, the Local Plan is supported by various Supplementary Planning Documents (SPDs) providing further detail on specific subjects including a Freight and Servicing SPD (City of London, 2018). This does not directly give quantitative guidance but provides access to a 'ready reckoner' (Figure 1). The Ready Reckoner (City of London, 2018) provides some quantitative guidance on loading docks but clearly states it is indications only and is not a definitive quantum. Notes accompanying it state:

'This ready reckoner should be used in conjunction with the guidance in the Freight and Servicing SPD, and developers are encouraged to use the tool to test how measures to minimise the numbers of delivery and servicing trips might affect the number of loading bays that are likely to be required.'

Figure 1 Screenshot City of London - Ready Reckoner



3	**Instructions**	Input Gross External Area (GEA) for each use class in blue cells				
4		Enter expected proportion of Heavy Goods Vehicles (HGV) in green cells				
5		Fixed parameters are shown in grey cells				
6		Outputs are shown in orange cells				
7						
8	**Use Class**	**Enter GEA of each use class**	**Daily Trips**		**Use Class**	**Land Use Factor**
9	A1 - A5	10000	135		A1 - A5	1.35
10	B1	8235	18.117		B1	0.22
11						
12		Daily Trips	153.117			
13		% of daily peak hour trips	**20%**	*This is a standard assumption based on historic trip patterns. Developers may be able to demonstrate that a lower peak hour delivery percentage is appropriate (e.g. by enforcing a booking system) which may alter the ultimate loading bay requirement.*		
14		Daily peak hour trips (20% of daily trips)	30.6234			
15						
16		Assumed HGV Dwell Time (minutes)	30	*These are standard assumptions. Different factors may be appropriate if the developer can demonstrate that dwell times for these vehicles are appropriate in these*		
17		Assumed LGV Dwell Time (minutes)	20			
18						
19		**Enter expected % of HGVs**	10%			
20		Expected Peak Hour HGVs	3.062			
21		Expected Peak Hour LGVs	27.561			
22		**Loading Bay Requirement**	**11**			
23						

3 Perspectives towards loading dock provision

Loading docks are typically not the most attractive feature of a building that either planning managers or developers prioritise around. Nor do they evoke as much emotion as parking provision for cars with prospective building tenants. These perspectives are understandable. Indeed, large unaesthetic entrances to loading docks (and car parks) under buildings that inevitably cross pavements and impacting pedestrian flows in city streets may be seen as undesirable but inescapable to the cityscape.

3.1 Information for building servicing

Current trip generation data for the movement of people are typically well maintained and understood by government, consultants and developers. This will cover pedestrians, cars, use of public transport and bicycle use. Regardless of modal choices of how people arrive at a building, they will generate non-discretionary freight activity. In contrast to data and evaluation of options about the movement of people, limited information is collated and provided for this non-discretionary activity. A failure to identify and understand this transport activity could undermine the plans that cities may wish to pursue.

3.2 Observations on planners perspective to loading docks

An area's development objectives may be pursued without an appreciation of the related traffic implications. This seems especially true of freight activity. It is recognised in various cities that freight management is not understood or not considered a priority (Ballantyne, et al., 2013). There is a lesser appreciation of the role of freight and servicing vehicle activity and understanding the implications that changed network access will have on their task.

Planning processes and flexible DCP requirements may mean that potential shortcomings of a development submission, which are not prioritised by planning approval authorities, are allowed to pass and the development is built. Response from some planning authorities is "*new developments do not get rejected for inadequate loading dock capacity*". In so doing the broader environmental plans for the city's spaces can be compromised.

Some urban planners are prepared to accept a constrained dock capacity, ideally visualising it is accompanied by a comprehensive management plan that will lead to reduced vehicle movements in the locality. This could be the case if the building manager is compelled to actively manage freight activity but more common, the managerial approach is laissez-faire, with freight and servicing operators expected to solve the issues. The result invariably is a reliance on competitive on-street parking over any significant innovative orgsanised approach.

3.3 Observations on developers perspective towards loading dock provision

From various global cities examined, it is evident that developers relatively consistently approach self-sufficient loading dock provision as a non-essential feature of new developments. AS part of this research, as well as London and Sydney, urban planners in Singapore also acknowledge the difficulty of committing developers to provide good loading dock facilities. While the developer's view may be of a constrained site with full requirements requiring significant engineering costs to achieve, an underlying sentiment appears to centre on a loading dock not being a saleable space or generating expressed emotion from prospective tenants.

Developers may also consider the logistics operator making the deliveries will find a way and adapt to constrained space provisions; that kerbside space on the street is a viable alternative should the dock not have sufficient capacity, or that the service provider will always have the flexibility to change the timing of their operation or buy different types of (smaller) vehicles capable of accessing the dock.

While developers may contend that there are on-street loading zones in the vicinity of the building at the time of its development, this assumption will rarely hold for the 50-100 year life of the building. Road and kerbside space changes with some regularity; cities are constantly evolving. Regarding the 1965 film mentioned in the introduction, of the route taken, entire streets have been pedestrianised and closed, others have had their one-way direction changed.

Buildings with a reputation of being "unserviceable" can necessitate discounting their rent to attract tenants with economic impacts felt by the landlord. By providing loading docks developers are making significant contributions to the city's broader urban plan and economy by internalising the management of freight and servicing activity, easing congestion, and enabling environment development to be pursued.

3.4 Observations on Development Approval evaluations of freight activity

While authorities published trip generation rates may be contended or even rejected by a developer and their consultants, an alternate demonstration of freight and servicing trip generation is seldom illustrated in a proposal from a developer. Whether it is from lack of understanding or deliberate gaming of planning systems, expected commercial vehicle volumes are often understated; hence the proposed loading dock requirements will already be constrained at go-live. It is clear from conversations with planners in other cities (Melbourne, London, Singapore) that this is common across many cities.

As part of DA submissions, developers will typically employ transport consultants to develop a Traffic Impact Assessment (TIA) report as part of an Environmental Impact Assessment (EIA). Concerning freight and servicing traffic assessments for loading dock provision, these typically demonstrate one or more of the following characteristics:

- While modes for people's movement are comprehensively analysed, there is limited understanding of generated freight activity with little supporting activity assessment provided. The proposed loading dock may have little analytical evidence to support

what is being provided and may simply copy off a nearby building of a similar size. In such a manner, capacity issues are perpetuated.
- Proposals assign capability from a designed supply perspective without considering operational conditions. For example, three spaces can be developed providing capacity for 45 vehicles per operational day. A demand assessment of the building could reveal the building would generate freight and servicing trips two or three times this capacity during peak demand hours.
- Proposals that smooth demand across 24 hours of the day and assume complete ability for compliance with precision arrival timing from freight operators to fit into a constrained loading dock supply.
- Satisfactory/compliant proposals are made in an initial development submission but are revised in a later stage to the detriment of dock space provision.
- A new development proposal provides less dock space than is necessary to be self-sufficient but points out that the net impact (of parking) on the street, is the same or less than the current building being replaced. This is without considering broader urban planning objectives to reduce reliance on local kerbside parking provision.
- The dock capacity is adequate however access via vehicle lifts and turntables will prove time-consuming and hence highly unpopular with vehicles, such as couriers, expecting a quick turnaround. As a result, the dock does not get used.
- Previous examples of non-compliance and local authority's acceptance of non-compliant loading docks are used as an argument for new developments to be accepted in a consistent non-compliant manner.
- Assessment of an example building's demands only captures vehicles entering the loading dock. Additional freight and servicing activity that occurs from on-street parking is not recorded. The reason for on-street activity may be due to constrained access in the example building. In so doing, the justifications for a loading dock capacity become self-justifying.

Insufficient loading dock capacity leaves buildings dependent, particularly during peak times, on on-street loading zone space.

3.5 Drivers use of loading docks

Even when a loading dock has good facilities, it does not guarantee its utilisation. Logistics decisions will be made, primarily by the driver, on the most cost-effective way to get goods delivered to the customers. Several reasons why drivers don’t use a provided loading dock may include:
- Your customer (the tenant) doesn’t manage access to the dock. They must request this from the property manager. The customer cannot easily guarantee access
- Your truck doesn’t fit (height, length)
- The process to enter a dock (use of a vehicle lift and/or use of a turntable) is cumbersome and time-consuming
- You have deliveries to make to 151 and 155 *High Street*. Both buildings have docks that are for the exclusive use of the respective building. Parking in the street means you can deliver to both customers consecutively from one parking spot without repositioning the vehicle
- Getting to or leaving the dock requires going into a congested one-way street system that is not conducive to your delivery route and productivity
- You need a booking that your transport managers did not create. Or, a fixed time booking window doesn’t suit your work schedule
- You missed your booking window, the dock manager will not let you in
- You know a dock is congested at this time of day; it’s easier to park elsewhere

- The dock is closed or inaccessible at a time you could make a delivery
- At this time of day, spots on the street are easy to find.

3.6 Ongoing self-sufficiency in loading dock provision

Demand considerations should not only look at the past or present situation but also consider market trends. With increasing choices for consumers in both the variety of goods and the service levels on offer, without intervening management approaches, the number of vehicles delivering to a location will increase. The World Economic Forum currently forecasts a 78 per cent increase in last-mile freight deliveries to occur in the next decade to 2030 (WEF, 2020). As a result of COVID and subsequent behavioural change, indications are that this has already been surpassed within two years. While it is difficult to forecast all future permutations, planners and developers could consider how loading dock facilities will perform over the lifetime of a development and implications for the future urban environment if a dock is constrained on present ‘day one’ capacities.

3.7 Loading dock provision in a city’s placemaking objectives

Both planners and developers have common goals for a development to contribute to the attractiveness of an area. Successful placemaking generates freight and servicing activities, such as food and beverage deliveries, retail demands, waste services, and utility maintenance into and out of the area, and much more. Early consideration in planning processes of how servicing will be achieved assists in creating a successful place. Failure to address this can lead to negative impacts on the local environment of a development from competition for parking spaces and idling vehicles impacting air quality.

Barangaroo in Sydney and the Emporium in Melbourne are stand-out examples of precincts with good loading dock infrastructure and management. Barangaroo receives approximately 10,000 freight bookings per month to service the 308,000m2 precinct centred on commercial activity along with considerable retail, hospitality, and some residential. Because these exemplary freight and servicing facilities are discreet, it is easy to forget the role they play in servicing the precinct's needs and their contribution to overall placemaking.

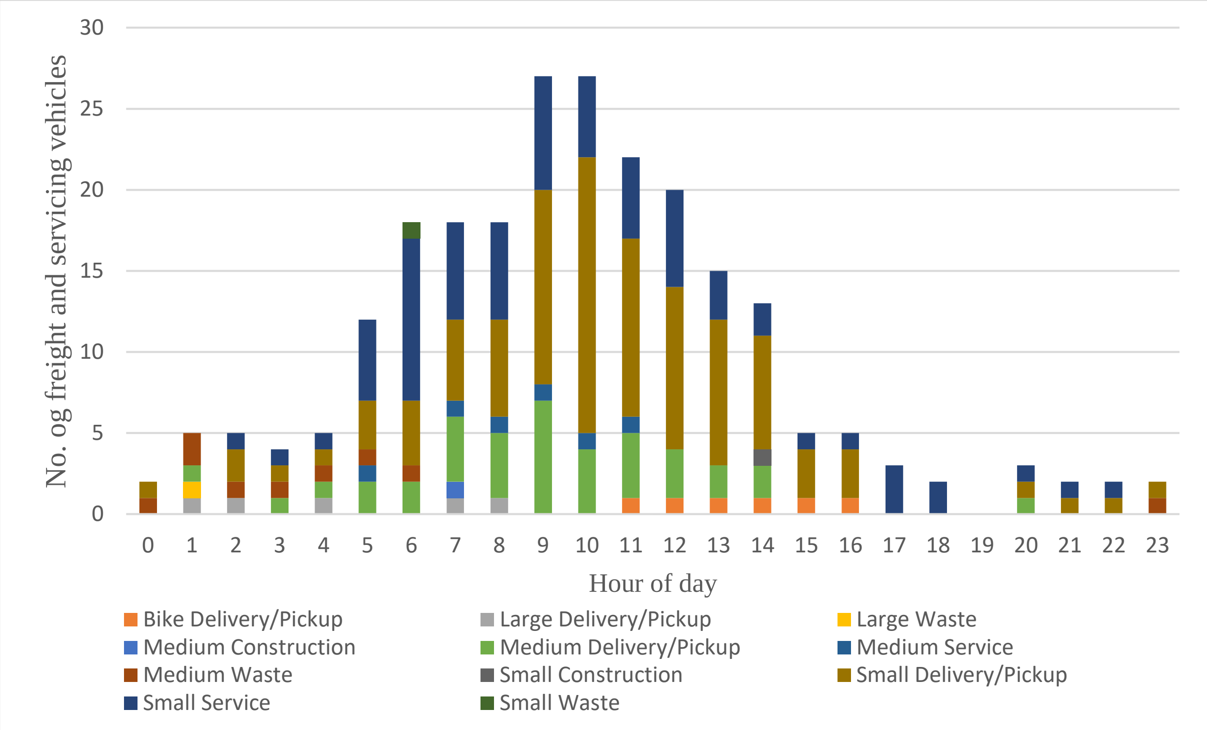
4 Key criteria in assessing loading dock capacity

As highlighted above, it is observed that traffic assessments in DA submissions rarely demonstrate a good understanding of freight and servicing task activity they need to accommodate. Consideration of the following trip generation criteria is necessary to evaluate the servicing capability of a loading dock. The metrics described below assume there is no orchestrated managerial approach occurring that modifies the profile. The criteria are discussed from the context of a profile of an existing Sydney CBD large commercial building’s freight and servicing activity illustrated in Figure 2. This profile captures trips entering the loading dock and vehicles parking on the street to service the building.

4.1 The overall freight task the development will generate

Figure 2 illustrates a freight and servicing profile for an approximate 50,000 square metre commercial tower including some retail. The key results demonstrated earlier from the City of Sydney or City of London dock space calculations focus primarily on dock spaces to accommodate peak activity. The City of Sydney forecast does not explicitly indicate the number or type of vehicle trips generated. The City of London ready reckoner states a number and highlights the fleet mix and daily peak period. In all cases, the approach is to use a series of coefficients that offer guidance into the loading dock requirement. Knowing only the number of required dock spaces oversimplifies requirements, providing limited insight for the development of alternate managerial approaches. More information is necessary.

Figure 2 Large CBD commercial building freight and servicing daily profile (TfNSW survey, 2021)



4.2 The time of day profile and plan to accommodate the peaks

Figure 2 is the weekday profile of vehicle arrivals with a peak occurring between 9 am to midday and the dock constantly busy between 6am and 2pm. Similar profiles are also noted in research in other cities (Thompson & Flores, 2016). This is driven by customer requirements as well as freight carrier's daily shifts and servicing structure. To meet customer expectations, most organisations and supply chains are inherently structured to complete activities during the morning period, for example, deliveries are made after fresh produce is bought early that morning at wholesale vegetable or fish markets. Traffic conditions, delivery schedules, and operational delays may occur almost daily however profiles rarely stray far from that illustrated.

4.3 Number and type of tenants

A building with a high quantity of tenants will generate more freight movements than a similar-sized building with fewer tenants. This variable can often be overlooked in transport planning when an average rate is utilised for any type of commercial or retail space. This fact can be difficult to ascertain for a future building. Both the City of Sydney and City of London methods identify different land-use types, but only at an overall level. Similarly, a retail space food court with multiple tenants will generate more movements than a similar sized clothing retail store. Two nearby tenants both selling coffees are almost certain to source produce from different suppliers to differentiate themselves. This will hence generate separate freight movements.

4.4 The fleet mix (vehicle size)

Figure 2 illustrates a profile of vehicle types arriving at a CBD building. Small Rigid Vehicles (SRV, expressed in the graph as medium vehicles) and courier vans (small vehicles) have become the mainstay of city last mile logistics while a utility vehicle (Ute – the same length as a courier van) is the main vehicle for trades and services activity.

4.5 Purpose of the vehicle entering the building and their dwell time profile

Understanding the purpose of the vehicle servicing a building will provide insight into dwell times (Kawamura, 2015). Various research identifies average delivery dwell times of approximately 20 minutes (Takahashi, et al., 1997). While TfNSW research finds this consistent for deliveries, service vehicles (plumbers, shopfitters, electricians, etc.) have a longer average dwell time with frequent parking events of over 3 hours in loading docks. The implication of this is that one service vehicle in a loading dock for an all-day maintenance or renovation task could occupy the same amount of space as 20 or more delivery vehicles making short stops throughout the day.

Based on surveys of 17 commercial and residential developments conducted in Sydney in October 2020 the following dwell times were observed.

Table 1 Average freight and servicing vehicle dwell times (TfNSW Sydney surveys, October 2020)

	Vehicle Size			Activity Type		
	Small	Medium	Large	Service	Delivery	Waste
Average dwell time (min.sec)	38.41	33.07	35.18	45.24	11.21	17.48

5 Ways forward

Planning requirements described by City of Sydney and City of London prescribe a required number of loading dock spaces for a building to be self-sufficient in accommodating the freight task it will generate. While this requirement is valid to accommodate peak activity, the justification is not so transparent to the development proponent.

The existing methods can be described as a 'predict and provide' and problematically does not encourage limited understanding of the building's freight task. An alternate approach could be based on a 'vision and validate' (Jones, 2016) method. This approach would first necessitate good understanding of the size and shape of a freight task as described in section 4 above. From this base understanding and managerial methods can be developed and tested. The remainder of this section describes ways to achieve this.

The core scenario in this discussion is that of a developer proposing to construct a building with a smaller loading dock than planning documents specify. Meanwhile, the city's planners aim to maintain the objective of a building being self-sufficient in fully accommodating its freight and servicing tasks off the street.

5.1 Appreciating trip generation rates and profiles

The assessment methodology of a building's freight and servicing task, as outlined in section 4, aims to present a profile that demonstrates good understanding of activity to support a planning proposal. In the context of assessing developments, local authority planning and transport teams must understand whether the proposed loading dock space, plus the accompanying management plan, will meet requirements and mitigate local environment risks or generate negative externalities through a continuing reliance and impact on the public domain. To aid understanding and overcome the problems of old data highlighted in section 2.1, TfNSW regularly share the information describe in section 4 with proponents to assist their solution development while also highlighting local authorities still desire compliance as DCP conditions.

5.2 Hard versus soft engineered solutions

Hard engineered solutions, stipulating quantitative measures for loading dock provision in new developments, could successfully mean all traffic is accommodated to park off the street. However, this still means the full traffic profile for the building is entering the city with little further incentive to improve freight traffic management. Ironically, compliance with planning codes may not encourage innovation for better freight management, such as reducing overall trips entering the CBD. Healthy tension within a system can lead to innovation.

From a soft solutions perspective, urban planners may be prepared to accept a well-considered and visionary freight management approach that accompanies an otherwise constrained loading dock proposal. The risk however is that visionary plans may just become “paper exercises” to support planning phases and are then not implemented into business as usual approaches.

Developers with surplus hard capacity could still be encouraged to implement freight traffic improvement approaches. In so doing, they could consider Voluntary Planning Agreements (VPA) to commercialise their surplus space to support other local buildings with shortages. Local authorities could encourage and facilitate this as a means to achieve their objectives for the street environment.

5.3 Changing perspective to planning codes

Required planning codes align to ‘predict and provide’ methods for loading dock provision. In a ‘vision and validate’ approach, planning codes may need to change to assess the quality of ongoing freight management approaches being proposed. This approach would also necessitate the application of planning codes that extends beyond the design period of the building and into its ongoing operational phase asking the question: *is the freight task being managed to the proposed plan and are external impacts managed and minimal?* This approach would be a substantial change, necessitating long-term commitments from both sets of stakeholders to manage, assess, potentially penalise/restrict and resolve unrequited planning phase proposals. Market awareness of non-compliant buildings, resulting in negative perspectives, may be sufficient incentive for building managers to be pay attention to freight and servicing management outcomes.

5.4 Freight Consolidation

Consolidation centres, based outside of CBDs, can mean fewer vehicles arriving at a building’s loading dock, reduce a loading dock requirement, and reduced traffic entering the CBD.

In planning for 22 Bishopsgate, London, it was evaluated that the building of this size would typically expect to receive 398 trips per day. Proposals highlighted that “*the innovative nature of this (consolidation) system means it does not fit neatly into the normally applicable assessments found in a planning application*" (Wilson James, 2015). The consolidation approach, developed in conjunction with City of London local authority, expects to reduce vehicle emissions by 96 per cent by consolidating hundreds of smaller deliveries into two large drops (22 Bishopsgate, 2021). The approach described for 22 Bishopsgate is now commonly advocated for larger developments within the City of London. The City of London Freight and Servicing SPD also aims to promote the development of micro-consolidation centres, even within the highly valued land of the "square mile" of the City of London, that support last-mile deliveries by foot, cycle, or zero-emission vans to buildings in this highly constrained area.

It should be noted that a consolidation service will still require loading dock geometric access for larger vehicles to make consolidated deliveries to a building. Restricting access to smaller vehicles only, would preclude the capability of a consolidation service.

5.5 Delivery Service Plans

The consolidation plan for 22 Bishopsgate demonstrates coordinated aspects that can be included in a Delivery Service Plan (DSP). DSPs as described as the single most effective way of proactively managing delivery and service arrangements (City of London, 2018).

As a planning condition, the Local Plan (City of London, 2015) requires a DSP to be submitted for all new development applications for space over 1000sqm or where the development is likely to cause significant impacts on the network. The DSP should include various measures to both reduce freight activity and minimise the impacts of freight movements. This can propose procurement strategies, measures to reduce (personal) deliveries, freight consolidation schemes, alternate modes, off-peak deliveries, waste management schemes, and the adoption of vehicles and travel paths that are clean and low emission.

For the City of London, they suggest the inclusion of measures to:

- Minimise Freight and Servicing Trips
- Match demand to network capacity
- Mitigate the impact of freight trips
- Monitoring of air quality, noise, road safety, and traffic impacts of operations is required as part of the DSP and should be reported to the City Corporation.

For 22 Bishopsgate, the level of loading dock capacity under-provision and lack of nearby on-street loading capacity means it is essential to incorporate a range of hard and soft engineered approaches into their DSP. Buildings of this nature risk unserviceability and notoriety without ongoing adherence to a robust managerial approach.

5.6 Freight management as part of sustainable building accreditation

Building accreditation schemes focus on the aspects within the building and its managed environment. If transport impacts are conducted outside of this envelope then they are not measured and assessed. For example, a building could achieve a six star rating for sustainability and still have an inadequate loading dock or managerial approach that negatively impacts on the local environment. Management of a buildings generated freight traffic and assessment of its impact should be incorporated into sustainable building rating schemes.

5.7 Provision of loading docks as social infrastructure

Developers may seek to avoid developing their own off-street loading dock infrastructure and instead assumedly rely on accessible kerbside space as public infrastructure. This approach presumes the city’s local authorities will retain this kerbside social infrastructure capacity in the longer term and, no other uses will replace it and, as a publicly accessible asset, it will have availability at the desired time. This perspective places the burden of responsibility on logistics operators and economic costs incurred by local authorities.

Off-street social infrastructure may provide options to individual buildings loading docks. Such facilities could provide alternate precinct loading dock or micro-consolidation capabilities for the local area. By their broader nature, they would drive the consolidation of freight trips. Creating municipally backed precinct-based approaches could release the developer from the majority of their infrastructure commitment and instead obligate them to provide ongoing funding towards a shared asset (Matsumoto, 2009). The approach may ultimately enable orchestrated approaches to achieving precinct social and environmental benefits in parts of urban centres. The master-planned Msheireb Downtown Doha, Qatar is an example of this.

6 Concluding Remarks

A good urban freight movement entails a vehicle purposefully driven to a destination and then disappearing into a discreet loading dock. A poor scenario sees a driver entering the CBD not knowing where to park, resulting in arbitrary circling around city blocks to find a parking spot.

Without improving consideration to how and where freight and servicing are conducted, cities risk impairing their urban planning objectives. Local authorities are pivotal to the outcome and key to seeking either conformity to codes or demanding more visionary outcomes.

It is worth noting that achievements with the provision of loading docks in Sydney CBD owe to a policy initiated in 1996. Even forward in/forward out policies discussed in 1965 maintain beneficial and safety relevance today. The benefits of these approaches are clearly long-term.

The first step for planners and developers is a better appreciation of the freight task from which approaches, be it infrastructure provision or logistics management practices, can be developed.

Without action, the opportunity for stepped change in a cities freight task does not eventuate. The suppliers and logistics operators can be left stranded, circling the block, and challenged to make deliveries, incurring the displeasure of their customers and the local authorities.

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