Maximum Efficiency, Minimal Footprint:

Satisfying Stakeholder Requirements with Semi-Automatic Car Park Systems

HLS EQUIPMENT

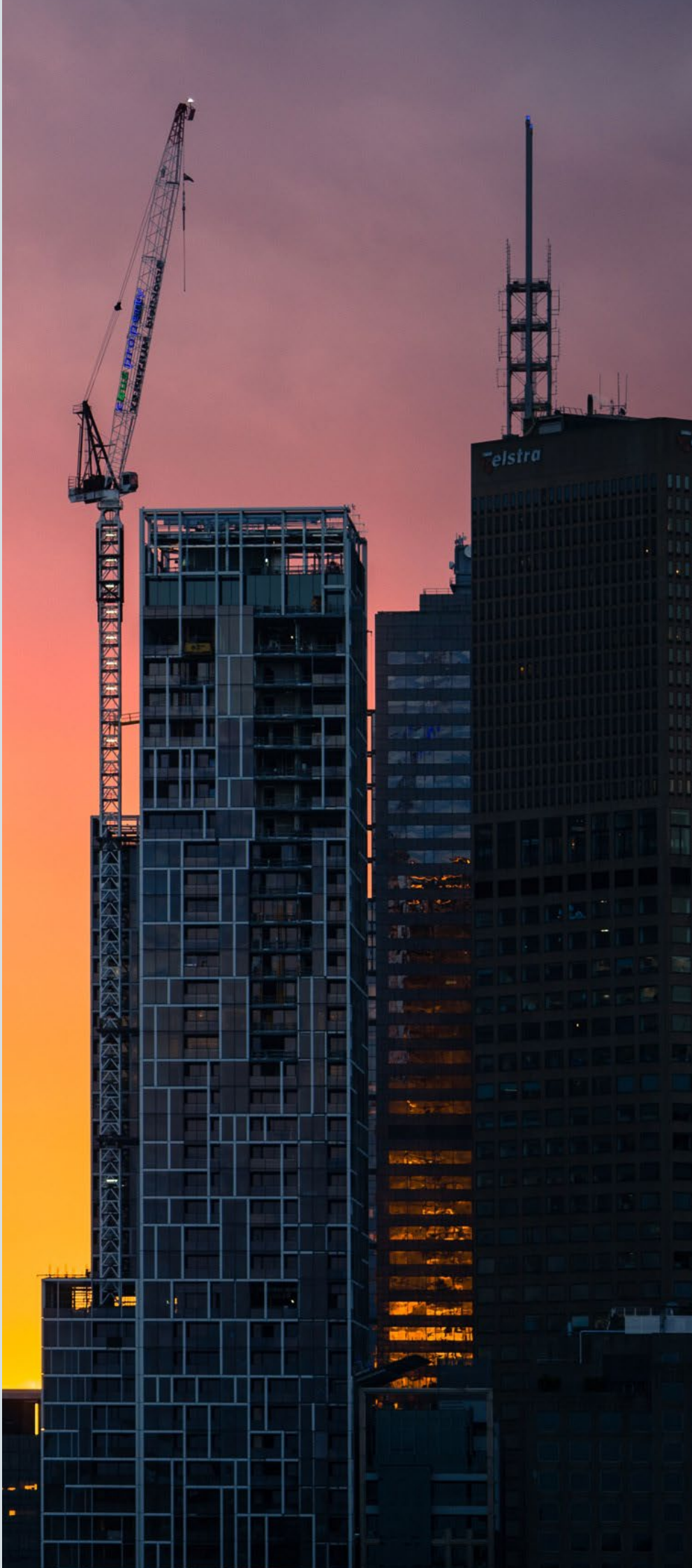
Introduction

Across Australia, construction activity continues at a rapid rate. While the housing construction sector begins to stabilise,1 non-residential development activity is expanding. In 2019, the Australian Bureau of Statistics (ABS) reported a general upward trend in the value of work done in this sector. In the first quarter of 2019, the total value of work done with respect to non-residential building was over $11,100 million2 – a 3.2% increase from the previous year.

While high levels of construction activity have brought economic benefits and driven competition and innovation, increased development within the commercial, mixed-use and industrial sectors presents design and construction practitioners with several challenges. A greater number of users in urban areas has resulted in an increased demand for services like car parking spaces. There are also difficulties inherent in fitting the necessary functional elements and amenities within shrinking building envelopes as the available space in Australian cities continues to shrink. In addition, there are complex development approval (DA) processes required by local governments that closely scrutinise building elements such as car parks.

When designing car parking spaces, practitioners need to satisfy the requirements of multiple stakeholders including developers, councils and end users. Semi-automatic car park systems are a safe and efficient solution that enables practitioners to manage this complexity and address all user needs in spite of the time, cost and spaces constraints typical of modern building developments.

In this whitepaper, we take a closer look at the design challenges impacting contemporary car parks and explore how semi-automatic car park systems can be leveraged to maximise functionality and satisfy stakeholder requirements.



Understanding the Growing Demand for Car Spaces

In Australia, car ownership is on the rise. The ABS reported in July 2019 that the total number of motor vehicles in the country increased by 1.7% between 2018 and 20193. Combined with consistent population growth in the Australian capital cities,[4] this trend translates directly to an increased demand for car parking spaces in all urban environments – from commercial and mixed-use buildings to residential developments.

Meeting the demand for car spaces is complicated by space constraints in modern cities. Population growth and density is putting increased pressure on the amount of available space in urban areas. Government reports indicated that over the next 15 years from 2016, the amount of total open space per person in the city of Sydney is expected to shrink by more than 20 per cent and population numbers are expected to swell by approximately 80,000 people.[5] As a consequence of these trends, developers must work within increasingly smaller building envelopes without sacrificing usability and amenity.

In response to this, developers are now "building up"[6] and using multi-storey developments to exploit the full potential of small sites. Against this backdrop, there is a growing need for car parking solutions that maximise usable floor space, are suitable for installation in multi-storey buildings and provide easy and practical access for users.

Meeting Council Requirements

In addition to space and accessibility considerations, developers need to meet the requirements applicable to car parks set out in the relevant Local Environmental Plan and other planning instruments. For example, in New South Wales, buildings sited on, or within 400m of, land zoned B3 Commercial Core, B4 Mixed or the regional equivalents of these classifications must meet the minimum car parking requirements set out in the Roads & Maritime Services document "Guide to Traffic Generating Developments."[7] These requirements vary depending on development type – for commercial premises with a Gross Floor Area (GFA) of less than 20, 0000m^2, one car space must be provided per 4,000m^2 of GFA, whereas retail premises with a GFA of less than 2,000m^2 must provide one space per 400m^2 of GFA.[8] Other States and Territories have similar documentation, and the requirements contained in those documents must be considered in line with the DA process of the relevant consent authority.

Exploring Current Car Parking Solutions and Their Shortcomings

Several car parking solutions are in common use, including basement parking and car stackers. While offering numerous benefits, these existing solutions have their own shortcomings that need to be considered when developing car parks for new commercial or residential sites.

Basement Car Parking

Basement car parking refers to the provision of subterranean car parking facilities beneath the building itself. Due to the need to excavate and construct, basement car parks are typically expensive and labour intensive. For example, in Perth, the construction cost of basement car parking can be as much as $2,475 per square metre.9 Furthermore, excavation can have structural implications, making it a difficult solution to implement for existing buildings.

The primary advantages of basement car parks are that they are a viable solution for high density urban areas where street level space is limited, and they are also hidden from view, providing additional security and weather protection.[10] However, basement facilities require incorporation of elements such as ramps and vehicle turning circles which can take up valuable floor space. Lighting and ventilation services may also be more costly to install underground and security measures to prevent unauthorised access must be considered.[11] Access to and from basement car parks must be carefully planned, including provisions to facilitate escape in case of an emergency.[12] On some sites, there may also be a risk of flooding.

Car Stackers

Car stackers are automatic parking systems that enable cars to be parked on top of one another. Eliminating the need for ramps and turning circles, and other access provisions, car stackers allow more efficient space usage than basement car parking and can be retrofitted into existing buildings with no need for excavation.

While offering a cost-effective way to increase parking capacity, the key issue with car stackers relates to access: most conventional car stacking systems arrange parked cars in such a way as to require multiple cars to be moved in order to access one. This can be impractical and time-consuming, significantly detracting from the overall user experience. As such, car stackers are better suited to low-density residential projects rather than commercial or high traffic residential developments.

Semi-Automatic Car Park Systems: The Ideal Solution for High Traffic Environments

When designing car parking facilities for high traffic environments, easy and fast access to parked vehicles is vital. In this regard, semi-automatic car park systems offer an ideal solution. Using a series of automated platforms that move horizontally as well as vertically, semi-automatic parking systems utilise a highly efficient “shuffle motion” to enhance car accessibility. Vehicles are lifted from the ground floor to an elevated row, then slid horizontally into the designated gate or parking spot. This process can take as little as 30-90 seconds, depending on the parking spot in which the car was located.

Semi-automatic car park systems are also space efficient. Such systems can increase usable space by nearly 50% in comparison to traditional car stackers. This increase comes from the ability to accommodate an additional full layer of cars that are stored at the same usable height. Designers should note that these systems are not constrained by maximum height but rather minimum height and can be installed in spaces with ceilings as low as 1,500mm while still accommodating sedans and smaller cars.

Ease-of-use and safety are key concerns for any automatic or semi-automate car park system. Semi-automatic systems provide a user interface via remote control that enables safe and easy user operation without the risk of becoming trapped between or beneath shifting platforms. Additional security features can be added, including swipe-card security access.

HLS Equipment

As a leading Australian designer, manufacturer and distributor of innovative parking solutions, HLS Equipment understands the challenges faced by today's developers, designers and end users. Committed to quality and efficiency, the company offers a wide range of car parking solutions to meet the requirements of virtually any environment, from multi-residential and commercial developments to industrial facilities requiring the handling of bulky goods and heavy vehicles.

HLS Equipment offers a comprehensive service, assisting customers find the ideal parking solution for their situation. The company's broad product offering is bolstered by a passionate and experienced team of inhouse technical specialists with the ability to provide design and product advice and a nationwide network of warehouses and offices that make post-installation service and maintenance rapid, easy and convenient.

HLS Equipment also offers quality servicing packages for car park stackers and vehicle lifts and an extended warranty on new vehicle lifts purchased from the company that are serviced and maintained with their service packages.

StorePark
Available from HLS Equipment, OMER's StorePark semi-automatic parking system is an efficient and accessible carpark solution that meets the needs of contemporary building design, especially high traffic residential and commercial environments. Offering superior parking capacity when compared to other traditional parking solutions, this solution utilises both vertical and horizontal movement to park and store the maximum number of vehicles across two or three levels.

StorePark's parking bays are accessible from the ground level. The upper and lower level platforms move vertically, while the ground level platform moves horizontally. One free space is included at ground level to enable the platforms to slide left and right to create the necessary space to lower the upper platforms or raise the lower platforms. This configuration means that a unit of three or five parking bays (spread over two or three levels, respectively) are the smallest StorePark systems available. This system can be customised to accommodate a wide variety of design requirements, with optional add-ons such as car dimension controls available.

StorePark is a safe and user-friendly parking system. A touch screen or remote control, connected to a control panel, enables users to easily select a parking space. Once selected, the system moves the platforms so as to position the required platform in front of the correct door.

Parking and retrieving cars with StorePark is simple and straightforward. When parking a vehicle, the door is opened and, when the vehicle is positioned correctly on the platform, the door closes after which the system is ready to perform another operation. StorePark doors can be electrically or remotely opened and adjustable wheel stops are included to assist drivers position their car correctly. Retrieving a car utilises this sequence in reverse, with access provided via dialed code or a remote controller used by the operator.

StorePark offers complete safety for users as the platforms will only move when the doors are locked. This system uses electrical sensors to monitor when the door is in the closed position. Upper level platforms also feature additional mechanical safety locks that activate in the event of a chain failure.

Other features and benefits of StorePark include:

- platforms made of hot-dipped galvanised steel ensuring a smooth, user-friendly surface;
- a completely self-standing structure that does not require structural walls for support;
- easy installation and low maintenance costs due to the placement of the motor and all cables on the upper beams;
- platforms that rise at an even rate regardless of where the weight is positioned thanks to the use of torsion bars; and
- gates manufactured from anodised aluminium to ensure light weight, long life, and quiet movement.

REFERENCES

1 Heaton, Andrew. “Housing Construction Starts to Stabilise at 20 Percent Below Peak.” Sourceable. https://sourceable.net/housing-construction-starts-to-stabilise-at-20-percent-below-peak (accessed on 28 August 2019).

2 Australian Government. “8752.0 - Building Activity, Australia, Mar 2019.” Australian Bureau of Statistics. https://www.abs.gov.au/ausstats/abs@.nsf/0/4FB5ACFC0074529ECA2576B00017C434?Opendocument (accessed on 28 August 2019).

3 Australian Government. “9309.0 - Motor Vehicle Census, Australia, 31 Jan 2019.” Australian Bureau of Statistics. https://www.abs.gov.au/ausstats/abs@.nsf/mf/9309.0 (accessed on 28 August 2019).

4 Australian Government. “3218.0 - Regional Population Growth, Australia, 2017-18.” Australian Bureau of Statistics. https://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/3218.0 (accessed on 28 August 2019).

5 McKenna, Leesha. “Sydney’s green spaces to get squeezed as city’s population swells.” Sydney Morning Herald. https://www.smh.com.au/national/nsw/sydneys-green-spaces-to-get-squeezed-as-citys-population-swells-20160505-gomxdv.html (accessed on 28 August 2019).

6 Savills Australia. “Shrinking Sydney drives changes in industrial warehousing developments.” Savills. https://www.savills.com.au/blog/article/172634/australia-articles/Shrinking-Sydney-drives-changes-in-industrial-warehousing-developments.aspx (accessed on 28 August 2019).

7 New South Wales Government. “Guide to Traffic Generating Developments.” Roads & Maritime Services. https://www.rms.nsw.gov.au/business-industry/partners-suppliers/documents/guides-manuals/guide-to-generating-traffic-developments.pdf (accessed on 28 August 2019).

8 Ibid.

9 PTC. “Car Park Costs – how much did you say??” PTC Consultants. https://www.ptcconsultants.co/construction-costs-car-parks-2017 (accessed on 28 August 2019).

10 Designing Buildings Ltd. “Underground car park.” Designing Buildings Wiki. https://www.designingbuildings.co.uk/wiki/Underground_car_park (accessed on 28 August 2019).

11 Ibid.

12 Ibid.

HLS EQUIPMENT