Revamping Site Design Specifications to Support Human-Scaled Transport Networks

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Introduction

The last half-century of urban transport planning is defined primarily by accommodating personal cars. This may be changing. New transport technologies and devices that are more human-scaled[1] have developed, particularly over the past few years, and have fueled prospects to dislodge the primacy of cars. The efficacy of these newer and human-scaled vehicles, however, is bounded by the networks that are available—networks which are defined by the rights of way on which they travel (links) and destinations at the terminal location of a trip (nodes). Both are important. The overwhelming majority of planning efforts to better accommodate human scaled vehicles has focused on network links for these new modes. Less attention has been devoted to how site design and planning at nodes impedes or supports human-scaled transport.[2] Efforts to help transport networks evolve, and their corresponding systems, will be compromised if only some parts to the networks adapt while others remain idle. Options to support first and last mile legs of transit are important, but have limited value when the first or last few feet are largely impermeable to anything but driving. We argue that lack of attention to developing human-scale nodes is important and lack of action will eventually bound capacity. We therefore point to opportunities for reforming site development guidelines.

Better sidewalks, more bike lanes, and multi-modal cross-sections of streets present the "much-turned-to" remedy for progressive transport planning efforts. Recent editions of National Association of City Transportation Officials (NACTO) and American Association of State Highway and Transportation Officials (AASHTO) guidelines are evidence of this. These guides largely focus improvements to streets and the emphasis on such links in a transport system come at the expense of focus on nodes. Improvements to terminal locations such as apartment complexes, shopping centers, schools, municipal buildings and more are often not considered. For travelers accessing such sites via foot or bicycle, at issue is that site entrances are generally wired only for automobiles, as is travel within it. Consider auto-only-oriented drop-off zones,

1 By human-scaled we mean vehicles that can safely share operating space with people walking. This includes bicycles, scooters, golf carts, and yet to be invented vehicle types. Required characteristics include being small enough to fit in a bike lane, weighing no more than a few hundred pounds, and limited to slow speeds.

2 While this essay addresses human-scaled transport, an important subfield of human-scaled is for those with disabilities. People with disabilities have additional, and critical, needs for access to nodes that require additional research and consideration.

seas of parking lots, curb cuts long enough to accommodate multiple lanes of traffic and more. These conditions render such nodes as mostly impermeable for these other forms of travel.

The features that make these places impermeable for human-scaled travel are prescribed by the regulations that city officials enact (or have enacted some years ago). Mandated rules in zoning regulations, building codes, and site planning guidelines hold court here. For any substantial change in transport, whether mode choice, congestion or emissions, to have effect, these site characteristics are important. Yet, they have mostly been considered in a peripheral manner against the body of transport and land use scholarship. This essay demonstrates the need for new site design guidelines to steer such developments in ways that allow a human-scaled transport network to develop through design – or more importantly, redesign.

To support our argument that development nodes are important components to an evolving transport system, we present rationales for new site design guidelines that will help steer actions in ways that allow a human-scaled transport network to develop. Site planning elements interface in many ways with the larger transport system and are too often left off the table. Our aim is to help

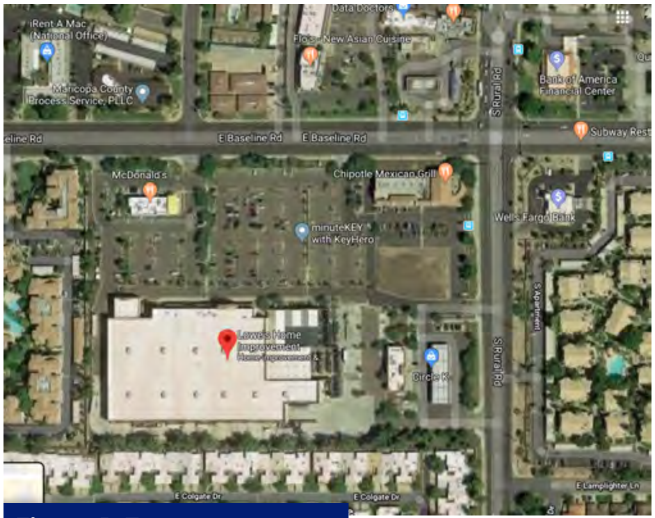

Figure 1: Tempe Intersection

Source: Google Maps, 2019

lay the foundation for a new generation of site design guidelines that will help old standards (e.g., Lynch and Hack, 1984) evolve. A new generation of site planning manuals, supported by new research into these issues, are needed and poised to address human-scaled movement that supports both permeability to sites and comforting travel within them (e.g., how should a half-acre parking lot be transformed to allow safe cycling access?).

Planning Permeable Development

The magnitude of the issue can best be exposed by considering the widespread areas of cities that focus on auto-oriented transport networks. Consider the Phoenix region alone; streets comprise 26 percent of land and parking an additional 10 percent (Hoehne et al. 2019). More than one-third of the total land area is prescribed by a regulation that prioritizes the car. This results in many unintended consequences. The more cities are built for driving, the harder it is for people to get around by other means (King, Smart, and Manville 2019).

In terms of development regulations, travel corridors within development sites are prescribed for fast moving traffic. Buildings are spaced further apart than necessary, or desirable to allow easy walking between destinations. Entrances to buildings are too often oriented away from the street toward parking lots for those arriving by cars. Cumulatively, the standards ardently present a commitment to driving automobiles—a commitment which will continue to persist unless alternative site design guidelines or aggressive retrofit efforts are offered. For many corner sites, such as the Tempe intersection shown in Figure 1, there simply aren't any site entrances at the corners, which is where the crosswalks are.[3] Larger new commercial and residential developments often seal themselves off from the street by using walls and landscaping. Much of this is required by development regulations, and sometimes by developer preference.

Fully mitigating externalities on-site

Communities stipulate that externalities be mitigated on each development site through a variety of development regulations. Accessory parking requirements—a defined number of spaces required based on the size and use of the buildings—are widely accepted as problematic for walking and cycling because of how they place car storage between sidewalks and doors, in addition to promoting free parking for motorists. Yet mode choice effects of parking are just one aspect of required parking. Knock-on effects of such requirements extend to landscaping required to partly mitigate heat and run-off from surface lots. Standards may also require bioswales to collect and clean stormwater before rain can reach the sewer system. Though parking requirements are well intentioned, such stipulations are deleterious because they unnecessarily increase impervious surfaces and the subsequent need for additional infrastructure improvements. These issues start at the site design level and bring increased complexity of having to address other downstream effects of such automobile centered policies. While negative externalities should be accounted for, in terms of site planning for sustainability and human scaled transport, there is need to consider how communal knock-on effects are shared and perhaps mitigated at the street or corridor level rather than individual sites. There is opportunity to remove accessory requirements for everything while acknowledging the trade-offs that must be made to balance traffic, environmental and economic concerns.

Removing accessory requirements may not be an obvious partial solution to access to sites, and storm water management may not appear directly tied to how people get around. The larger point is that site design needs to maximize permeability for people outside of cars in order to make the larger network of transport links work for those same people. When sites are expected to mitigate externalities individually rather than collectively, the result is there is ample land that could be buildings, and places people want to go devoted to minimizing harms caused most often by the very auto infrastructure we argue is problematic. Storm water is a concern, but this concern is amplified by acres of surface parking. Shade is important, but largely because buildings aren't allowed to be built close enough to parcel lot lines and each other to provide shade on their own. Site should maximize the spaces where people want to be, not minimize harm caused by auto-oriented regulations that incrementally expand private vehicle links at the expense of nodes. While site regulations are many, we below highlight two areas of site design that warrant greater attention as to how they affect access by walking, biking and transit.

Curb Cuts

The manner in which curbs are installed and cut defines circulation patterns. Again, most of them are exclusively designed with cars in mind. Any curb that is specified has implications that manifest themselves in both the horizontal and vertical dimensions. Their shape—sharp right angles—aid as bumper rails for cars but largely serve as impediments for other transport modes. They are instrumental in furthering the status quo by making travel by other modes less convenient. Notwithstanding recent advances to modify curb cuts to increase access for disabled travelers

3 Compounding the crosswalk location, people who are hit by drivers when they cross the streets outside of crosswalks are often blamed for crossing the street in the wrong place. The incentives to cross at the crosswalks is diminished if the crosswalks don't lead to where you want to go.

(e.g. Elin 2006; Ferleger 2012)—and some municipalities limiting new ones altogether (e.g., in Manhattan, New York (Delphin 2013)), most cities maintain regimented procedures for their existence.

From a linear (horizontal) perspective, curb cuts define areas of a sidewalk where driving is allowed; meaning the more space dedicated to curb cuts, the less space dedicated to people walking or cycling. They undermine the continuity of the environment, and should be minimized. Yet accessory parking requirements often lead to a new curb cut for each building or business on a street. This reduces safety by inhibiting the overall function of streets and sidewalks so that only by driving are site accessed. The linear problems of curb cuts are compounded by issues in the vertical dimension. In US street design guidelines, most curb cuts are specified to meet 1:12 slope requirements. This complies with disability requirements, but depending on overall sidewalk design, can result in the sidewalk having many undulations.

These types of regulations can be contrasted Dutch curbs. Not only do they prescribe design regulations for sites that prioritize continuous walk and cycle paths, they clearly denote other design principles to designate areas that driving is secondary (A view from the cycle path, 2008). In terms of character of the curbs, rather than an abrupt 90-degree angle, they tend to adopt sloping curbs which can easily tolerate bicycle wheels using a small lip and/or angulated treatment (Figure 2). Retrofitting sites to allow modest and gradual use of differences in height would go a long way in the U.S. Such

Figure 2: Example curbs

Source: Janssen, 2016

treatments for easily mountable curbs are called for in a variety of design manuals which have evolved over the years and been fostered by partnerships between public space advocates, traffic departments and site design efforts (e.g., see pages 54-56 of Puccini methods, City of Amsterdam, 2018).

The turning radius of curb cuts is also of note. Typical new construction will have a turning radius of 30 degrees to ensure fast traffic flow into and out of parking lots. Not only is fast vehicular traffic at odds with human-scaled travel, the space requirements force sidewalks to be pushed back to a safer area where drivers are more likely to see people and pedestrians are less likely to interfere with a driver's right of way. Crossing these curb cuts is fraught for those walking or biking.

Building Setbacks

Building setbacks also contribute to prioritizing auto access over other modes. Most obviously, setting back a business increases the distance that must be traveled from the sidewalk to the front door. While adding a couple hundred meters of distance may not mean much when driving, people cover about 1.4 meters per second walking, so 100m means an additional 71 seconds of walking time. New freeways are built for that kind of time savings for drivers. Whatever is required on development sites to mitigate impacts, such as landscaping, storm water retention or other, usually takes space away from areas where buildings can be constructed and incrementally pushed development further apart.

Setting back buildings has additional impacts, however. Buildings set back can't provide shade to the sidewalk, which is a major concern in a heating world. Businesses oriented to parking lots rather than sidewalks mean that people, whether coming by foot, bike or transit, must walk through a parking lot, likely built with auto flow in mind rather than human-scaled transport. Building setbacks also cater to drivers by eliminating any obstacles to their vision. Arterials with deep setbacks allow drivers to maintain a sight horizon far into the distance rather than focus on the road immediately ahead. This means that where buildings are located, or where trees are planted, affects the speed of travel. The faster cars go, the less likely people will use other modes.

Conclusion

Progressive municipal transport planning efforts largely prioritize efforts to redesign links in the network to better support human-scaled travel. These efforts include bike lanes or better sidewalk space. These are necessary for a system that prioritizes multiple modes. Largely omitted from this suite of actions, however, are efforts to detail site-level characteristics of development nodes (Capasso Da Silva, King and Lemar 2020). The existing design literature is rich with architectural scholars examining how elements of the built environment affect the desirability of an area (e.g., Gehl 2011). These elements might include number of doors that enter onto the street, a tolerable area of blank space on a wall or the size of an awning over a door. Similar ideals are sometimes addressed at a larger such level, such as service metrics for pedestrian areas, with characteristics such as continuity, cohesion and attractiveness as necessary for desirable pedestrian places (Sarkar 1993). More of this thinking should be woven into design regulations.

Given that transport networks are only as good as their weakest link—or in this case, node—this essay argues the importance of retrofitting such sites and points to the type of site planning regulations that could be revamped. Documenting detailed case studies where design solutions have been employed to retrofit such practices—either physical or regulatory—can go a long way here for others to learn from. Unless municipalities change the site design details of development opportunities, a future transport network won't differ from what currently exists.

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