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Seeking Urbane Parking Solutions [The Transect]

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Seeking Urbane Parking Solutions

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> *The automobile as an object has been our industrial civilizations most significant product…. Its side effects in terms of mass consumption are enormous. The infrastructures of the land and the urban environment have suffered from a radical upheaval, the historical city centres have been jeopardized by it, the whole system of transporting goods and people has been revolutionized and even our vision of things has been transformed, both subjectively in our mode of perception and objectively in changes to the landscape.*
> —*Vittorio Gregotti, 1978*

From the moment private automobiles first appeared on city streets, parking has posed a major design problem for the public realm. In the first decades of the twentieth century, the few automobiles that existed were parked curbside, where horses used to be tethered. But as vehicle use became more widespread, the need for parking could not be solely accommodated there, and jurisdictions began to adopt requirements to store vehicles on private land.

As experience now shows, off-street parking alleviated the initial congestion caused by haphazard parking, but has not necessarily improved the quality of public spaces. In residential districts, for example, streets are often marred by repetitive curb cuts, paving for driveways, and monotonous walls of garage doors.

Today automobiles are stored in a variety of ways, each with different costs and impacts. In seeking parking solutions in service of the public realm, the transect allows consideration of appropriate solutions at a variety of levels. With reference to the zones described in the SmartCode, the discussion that follows (condensed in the accompanying chart) consider the place of parking from the lowest levels of density to the highest.

Parking for Natural Areas (T1)

In areas approximating or approaching wilderness conditions, parking will typically be limited to surface lots. Ideally, such parking is located so as to cause minimal impact to the environment—adjacent to access roadways, and in areas with little visual presence.

Casual, or circumstantial parking, say between existing trees, can be designed to virtually disappear when no cars are present. Optimal solutions include permeable paving such as well-drained gravel or decomposed granite, which allows precipitation to be absorbed locally. Buried perforated-pipe drainage systems can assist in minimizing erosion during downpours.

Rural and Sub-Urban (T2 and T3) Parking Solutions

New Urbanists have championed the alley to improve the quality of the public realm. Alleys typically reduce the amount of paving required per block by replacing and consolidating paving dedicated to driveways.

While enclosed garages are demanded by the marketplace, the use of alleys can help keep street frontages free of driveways, curb cuts, and garage doors, making them more hospitable to pedestrians. Meanwhile, curbside parallel parking (unimpeded by curb cuts) can still serve a large percentage of a neighborhood's parking load and provide a safety barrier between moving vehicles and pedestrians.

In those rare cases where alleys are difficult to implement, well-designed stem driveways can access garages or parking areas toward the rear of a lot. In corner or "key" situations, garages are ideally located in an outbuilding, off a secondary street. In such cases, the SmartCode recommends that garages be located at least twenty feet back from the wall established by the facades along the primary street, in an area it calls the "third lot layer."

Building typologies in suburban residential areas typically include single-family houses, and, in more intensive areas, duplexes and two- and three-story townhouses. Alley-accessed parking and parallel parking can serve all these typologies.

General Urban Zone (T4) Parking Solutions

More intensive residential environments may range from townhouses and occasional stacked maisonettes (also called two-over-twos) to a variety of small and medium-sized apartment buildings (from eight-unit walkups to courtyard buildings). While townhomes may rely on an alley-accessed garage or tuck-under arrangements, multifamily buildings demand more intensive parking solutions, occasionally relying on tandem solutions—but often utilizing surface parking lots.

As a parking solution, surface lots often destroy the sense of enclosure within the public realm, allowing "civic rooms" to lose definition. For cost reasons (see sidebar) they are also rarely implemented with a level of detail that befits a public plaza. For this reason, the SmartCode proposes that surface lots be separated from primary frontages by "liner" buildings and be screened from secondary frontages when such buildings are not feasible. Screening devices such as fences, walls or hedges are best built coplanar with adjoining building facades to mask the presence of lots behind them.

Surface parking poses one additional problem for the design of multifamily buildings: the ballooning of block

Smartcode Transect Zone	T2	T3			T4	T5
Type	1/4 A.C. Large Lot	Neighborhood Lot	Small Lot	Duplex	Townhouse	Townhouse
Lot Configuration						
Image						
Building Height	2-Story	2-Story	2-Story	2-Story	2-Story	3-Story
Gross Density	3 D.U. / A.C.	5 D.U. / A.C.	7.5 D.U. / A.C.	9.5 D.U. / A.C.	10.5 D.U. / A.C.	17 D.U. / A.C.
Building Construction	Wood	Wood	Wood	Wood	Wood	Wood
Construction Cost (2002)	$195,000/D.U. $60-75/gsf	$175,000/D.U. $60-75/gsf	$140,000/D.U. $60-75/gsf	$119,000/D.U. $60-75/gsf	$119,000/D.U. $60-75/gsf	$185,000/D.U. $65-80/gsf
Parking Location (Third Layer, Second Layer)						
Parking Type	Driveway accessed Garages	Primarily Alley accessed Garages	Alley accessed Garage	Alley accessed Garage	Alley accessed Tuck Under	Alley accessed Tuck Under/Tandem
Parking Layer	3rd recommended	3rd Layer	3rd Layer	3rd Layer	3rd Layer	3rd Layer
No. Pkng. Spaces/SF (D.U.)	2 Sp./3000 sf (1 D.U.)	2 Sp./2500 sf (1 D.U.)	2 Sp./2000 sf (1 D.U.)	2 Sp./1700 sf (1 D.U.)	2 Sp./1700 sf (1 D.U.)	2 Sp./3000 sf (1 D.U.)
Cost per Space (2002)	$9,000-$15,000/space	$9,000-$15,000/space	$9,000-$15,000/space	$9,000-$15,000/space	$8,000-$14,000/space	$6,000-$12,000/space
Minimum Block Size	N/A	130'x220'	100'x220'	90'x220'	70'x180'	70'x180'

©2006 Torti Gallas and Partners. All Rights Reserved. SMARTCODE ©Duany Plater-Zyberk & Company. Chart compiled by Hyo Jung Kim and Brian O'Looney.
Cost information throughout this article purposely antedated from relatively stable 2002 Washington DC market figures - included for comparison only.

sizes. A typical double-loaded four-story apartment building designed to completely surround the required amount of surface parking would create a block 735 by 835 feet in size! This is unacceptable in well-planned pedestrian-oriented communities, where neighborhood permeability, and therefore, smaller block perimeters are goals.

Given the difficult economies of parking, when building small, surface-parked apartment buildings, it is better to mix them on blocks with less parking-intensive residential building types like townhouses or live-work units.

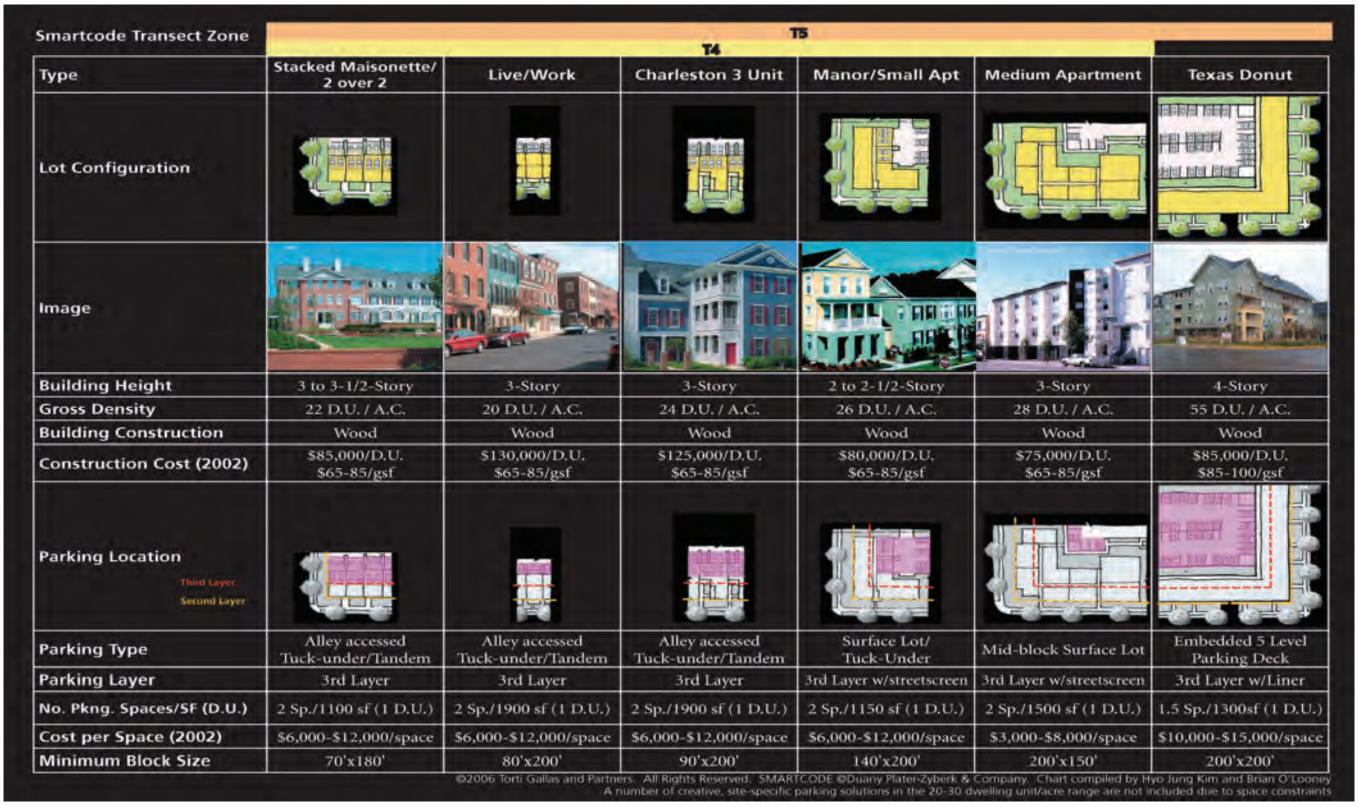
Urban Center, Core and Special District (T5 and T6) Parking Typologies

Parking strategies become increasingly difficult at higher densities of the transect, but solutions based on careful layout and planning can minimize impacts on the public realm.

At the transitional edge between residential and mixed-use/commercial zones, multifamily parking requirements may be managed using what is often referred to as the "Texas Donut." These are unadorned parking decks bordered on two sides by a 10-15 foot zone for open ventilation, and wrapped on all four sides by 35-40 foot deep four-story wood-frame liner residential buildings. Texas donuts as small as 220 by 246 feet have been constructed, but economic efficiencies are gained when the blocks are roughly twice that size (220 by 380 feet), and when double-loaded wings are added to the basic configuration.

To create a pleasant pedestrian realm within commercial environments, the ideal solution is to bury the parking underground. In established communities where land values are high, such as Washington, D.C., this has been done for decades. However, the cost of underground parking is often prohibitive, even in many close-in suburbs.

Structured parking is also rarely an option in the initial phases of a new development—particularly when it must begin life competing with the suburban strip-center paradigm. Local government cooperation can help through tax increment financing (TIF) and public improvement districts (PIDs). But it is often left to the designer to creatively manage parking without financial assistance, and without the initial option of structured parking. Shared parking agreements may also be negotiated between retail and office uses, potentially allowing parking ratios to exceed one space for every 300 square feet.



Smartcode Transect Zone	T4 / T5					
Type	Stacked Maisonette/ 2 over 2	Live/Work	Charleston 3 Unit	Manor/Small Apt	Medium Apartment	Texas Donut
Lot Configuration						
Image						
Building Height	3 to 3-1/2-Story	3-Story	3-Story	2 to 2-1/2-Story	3-Story	4-Story
Gross Density	22 D.U. / A.C.	20 D.U. / A.C.	24 D.U. / A.C.	26 D.U. / A.C.	28 D.U. / A.C.	55 D.U. / A.C.
Building Construction	Wood	Wood	Wood	Wood	Wood	Wood
Construction Cost (2002)	$85,000/D.U. $65-85/gsf	$130,000/D.U. $65-85/gsf	$125,000/D.U. $65-85/gsf	$80,000/D.U. $65-85/gsf	$75,000/D.U. $65-85/gsf	$85,000/D.U. $85-100/gsf
Parking Location (Third Layer; Second Layer)						
Parking Type	Alley accessed Tuck-under/Tandem	Alley accessed Tuck-under/Tandem	Alley accessed Tuck-under/Tandem	Surface Lot/ Tuck-Under	Mid-block Surface Lot	Embedded 5 Level Parking Deck
Parking Layer	3rd Layer	3rd Layer	3rd Layer	3rd Layer w/streetscreen	3rd Layer w/streetscreen	3rd Layer w/Liner
No. Pkng. Spaces/SF (D.U.)	2 Sp./1100 sf (1 D.U.)	2 Sp./1900 sf (1 D.U.)	2 Sp./1900 sf (1 D.U.)	2 Sp./1150 sf (1 D.U.)	2 Sp./1500 sf (1 D.U.)	1.5 Sp./1300sf (1 D.U.)
Cost per Space (2002)	$6,000-$12,000/space	$6,000-$12,000/space	$6,000-$12,000/space	$6,000-$12,000/space	$3,000-$8,000/space	$10,000-$15,000/space
Minimum Block Size	70'x180'	80'x200'	90'x200'	140'x200'	200'x150'	200'x200'

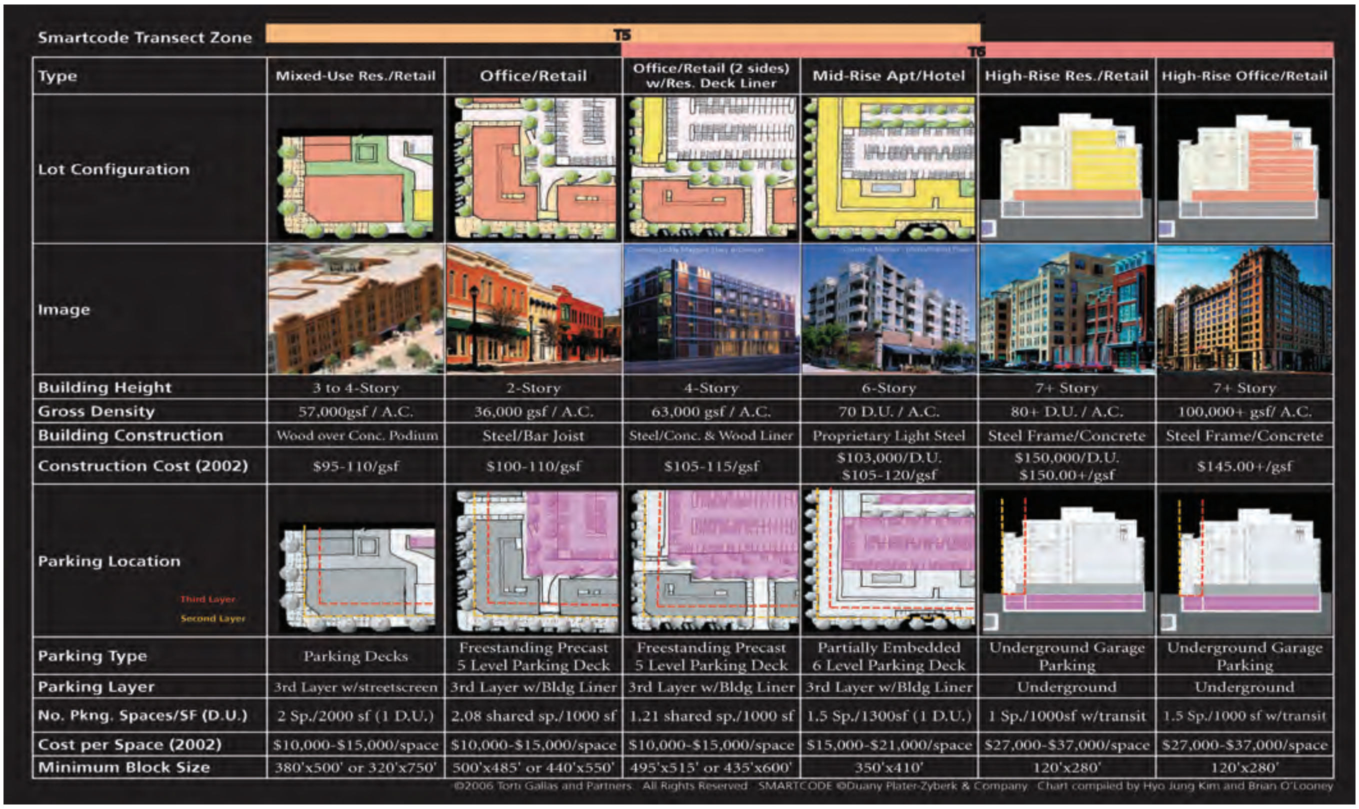
 Chart compiled by Hyo Jung Kim and Brian O'Looney
A number of creative, site-specific parking solutions in the 20-30 dwelling unit/acre range are not included due to space constraints

Today the majority of new pedestrian-oriented single-use commercial districts and "lifestyle centers" relegate parking to large decks at the least desirable border of their sites—a solution that ultimately limits their direction for future growth. The structural economics of parking decks may also have negative impacts on the redevelopment of existing urban centers. For example, Fort Worth's 200x200-foot preautomotive grid is today assailed by economically-sized parking structures that must bridge blocks too small to fit them, and that display large unadorned facades to the public realm.

New pedestrian-oriented districts of entirely commercial space pose great design challenges, since office and retail uses require much more parking per square foot than residential. One model is Southlake Town Square, where the City of Southlake had prohibited residential uses in the plan for its two-story commercial center (although this has recently changed). Cognizant of the parking load this directive imposed, block arrangements were studied by David M. Schwarz/Architectural Services that managed the vehicle demands yet placed the pedestrian first. Ultimately, an alley system was created to access an efficient, unadorned parking deck at the center of each block.

The Southlake design allows individual blocks to accommodate their parking load without sacrificing any prominent public street facade to a garage or parking lot. It also allows the three-quarters of building facades that do not face these streets to be built more economically. Meanwhile, the alley entrances create physical separations between buildings, allowing all offices to have windows, and the buildings to be built without party walls according to the least expensive construction type allowed by the building code (in this case Type III, unsprinklered).

As an incremental plan for urban development, the arrangement has the additional benefit of allowing two sides of each block to be built initially without a parking deck. Two adjacent blocks then create what the architect calls an "attachable urban fragment." A project may thus begin with an urban place, which provides the "critical mass" from which to grow. As that place is extended, the buildings that frame urban additions of streets and squares will also screen the required surface parking load. Eventually structured parking decks can be added, when the project has entered its adolescence and has enough economic energy to pay for them.



Smartcode Transect Zone	T5	T5	T5 / T6	T5 / T6	T6	T6
Type	Mixed-Use Res./Retail	Office/Retail	Office/Retail (2 sides) w/Res. Deck Liner	Mid-Rise Apt/Hotel	High-Rise Res./Retail	High-Rise Office/Retail
Lot Configuration						
Image						
Building Height	3 to 4-Story	2-Story	4-Story	6-Story	7+ Story	7+ Story
Gross Density	57,000gsf / A.C.	36,000 gsf / A.C.	63,000 gsf / A.C.	70 D.U. / A.C.	80+ D.U. / A.C.	100,000+ gsf/ A.C.
Building Construction	Wood over Conc. Podium	Steel/Bar Joist	Steel/Conc. & Wood Liner	Proprietary Light Steel	Steel Frame/Concrete	Steel Frame/Concrete
Construction Cost (2002)	$95-110/gsf	$100-110/gsf	$105-115/gsf	$103,000/D.U. $105-120/gsf	$150,000/D.U. $150.00+/gsf	$145.00+/gsf
Parking Location (Third Layer; Second Layer)						
Parking Type	Parking Decks	Freestanding Precast 5 Level Parking Deck	Freestanding Precast 5 Level Parking Deck	Partially Embedded 6 Level Parking Deck	Underground Garage Parking	Underground Garage Parking
Parking Layer	3rd Layer w/streetscreen	3rd Layer w/Bldg Liner	3rd Layer w/Bldg Liner	3rd Layer w/Bldg Liner	Underground	Underground
No. Pkng. Spaces/SF (D.U.)	2 Sp./2000 sf (1 D.U.)	2.08 shared sp./1000 sf	1.21 shared sp./1000 sf	1.5 Sp./1300sf (1 D.U.)	1 Sp./1000sf w/transit	1.5 Sp./1000 sf w/transit
Cost per Space (2002)	$10,000-$15,000/space	$10,000-$15,000/space	$10,000-$15,000/space	$15,000-$21,000/space	$27,000-$37,000/space	$27,000-$37,000/space
Minimum Block Size	380'x500' or 320'x750'	500'x485' or 440'x550'	495'x515' or 435'x600'	350'x410'	120'x280'	120'x280'

Commercial District Superblocks Containing Structured Parking

While parking is a land hog horizontally, in relation to retail and office occupancies, it is quite efficient vertically. For every two stories of office over retail built to standard market heights, one can build four levels of parking deck.

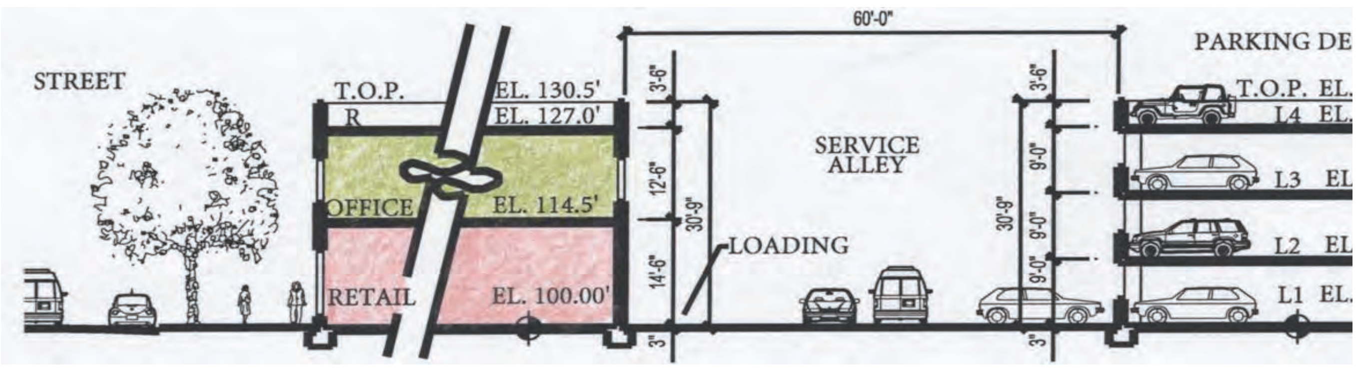
Nonetheless, one criticism of projects with central above-ground structured parking is the size of blocks that result. While the 460x480-foot blocks for the two-story buildings at Southlake are large, suburban commercial district plans with greater densities potentially require giant block sizes.

Another, newer David Schwarz project, Frisco Square, illustrates this point. The area is ultimately envisioned to become the commercial center of a city of 250,000, containing its city hall, library, police station, and other principal buildings. It is further expected that the Dallas Area Rapid Transit rail system will be extended to the site. But for now the area's four-story buildings will start their lives as residential over retail; only later will they be converted entirely to civic and commercial uses.

The goals of the Frisco design are to create blocks of four-story buildings that fully envelope their parking load, avoid expensive building types, phase easily, and create a pleasant pedestrian-oriented environment. However, to meet these goals—and use parking decks that are not more than four stories high (a city requirement) —the blocks in Frisco are enormous: 900 by 500 feet.

At Frisco, as at Southlake, efforts to limit the perceived length of streets have included mid-block vehicular breaks that read as streets and notched corners of the larger blocks to accommodate squares and plazas. Clearly, other criteria could also have allowed smaller block sizes: taller parking decks; underground parking; permanent residential space; and more expensive construction, such as party walls, could have been used. (Indeed, the City of Frisco did recently allow some areas to be broken into smaller blocks by increasing allowable deck heights and exchanging commercial uses for permanent residential.) Nonetheless, the Southlake and Frisco master plans show that one of the biggest challenges facing planners of new commercial districts today is reducing the actual and perceived size of blocks containing structured, above-ground parking.

One solution is the "half-donut," which marries com-



mercial uses on one or two sides of the block with half of a Texas-donut residential design. This model was used at City Place in West Palm Beach by Elkus Manfredi Architects, Ltd., creating blocks of 330 by 360 feet. In this design, full-depth commercial buildings are built on two faces of a block, while an alley serves the back of commercial buildings and ventilates a parking deck, to which liner residential buildings adjoin and face the block's other two sides.

Another option is to use clever tartan grids that intersperse larger (deck-bearing) blocks with smaller ones, as in Jindalee Town Center, by Ecologically Sustainable Design; and in the unrealized Oakhurst Plan for Orlando, Florida, by DPZ. Alternatively, if the financial resources are available, a large deck surrounded with liner buildings can be built at the outset of a project. Located at the center of a project, as in the Mirimar Town Center plan, by Torti Gallas and Partners, it can be used to handle overflow parking from neighboring blocks.

Paradoxically, the inclusion of mass transit often increases the size of blocks in a new urban center. Certainly, the presence of mass transit reduces the vehicular load from adjacent uses; in a transit-oriented design, the parking requirement for nearby residential buildings may, for example, be reduced from two spaces to one. However,

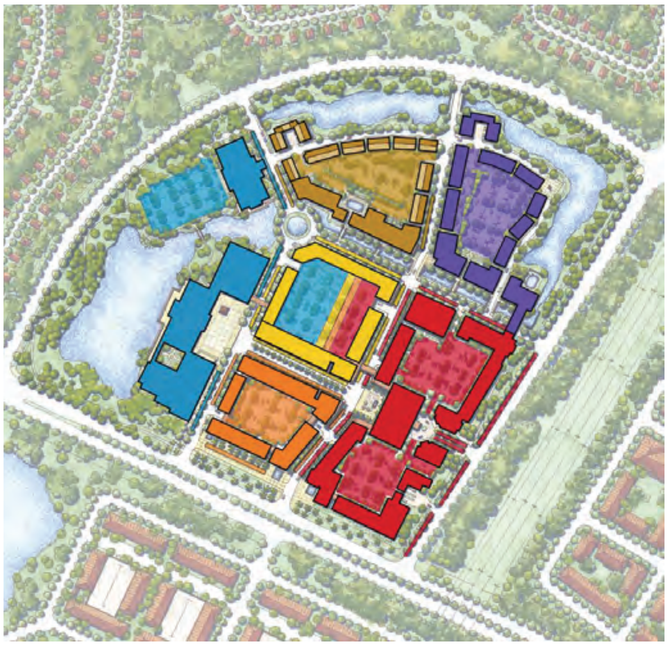
Parking Blight

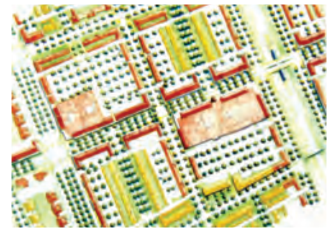
The consequences of commercial parking demand are evident throughout the American landscape, but the causes are less clearly understood.

Historically, one reason for today's parking blight has been overly conservative parking requirements. Convenient when land was cheap, they pocked suburban America with an acne of little- or unused asphalt.

Old formulas for shopping malls, driven by anchor stores, specified one space for every 200 sq.ft. of gross leasible area (5 spaces/1000 sq.ft.). Today ratios are still conservative: retailers often demand one space per 225 sq.ft. (4.5 spaces/1000 sq.ft.). And many municipalities require one space per 75 sq.ft. for restaurants (12 spaces/1000 sq.ft.). By contrast, town-center shared-parking solutions resulting from hard negotiations by transportation consultants may arrive at a ratio of one space for every 325 sq.ft. of general commercial space.

The space needed to park a car also goes far beyond the area needed to store it. In an optimized surface lot, each space requires around 325 sq.ft. of land, after one adds in a prorated portion of the drive aisle needed to access it. This vast paved area then requires that additional land be





mass transit stations, particularly those along rail lines in suburban locations, require huge volumes of parking for commuters who may live only a few miles away. This often results in at least one large parking structure near the entrance to the transit station. One solution to integrating this into an urban plan is to "wrap" or "sleeve" it with buildings, as Torti Gallas has proposed for Harrison Commons' PATH station, across the Passaic River from Newark, New Jersey.

As some optimists have suggested, as urban center master plans mature, dependence on automobiles may decrease. Eventually, portions of the giant parking structures required for today's new urban centers may then be replaced with housing or other uses. Research into parking habits by Donald Shoup and others should also enable more exacting, less conservative assessments of parking requirements.

Mechanized parking systems, like those now incorporated by Panoramic Interests in projects in Berkeley, California, are a third positive development. They can reduce both the size and cost of space required. As terms such as "puzzle lift," "triple lift," and "dependent lift" enter the design vocabulary, parking solutions may be transformed as much by technological innovation as by regulatory, architectural or economic change.

Opposite Above: Embedded parking deck at PATH station, Harrison Commons, Harrison, NJ, Torti Gallas and Partners.
Opposite Below: A section though a commercial block shows how parking can be very efficient a building-height standpoint. Drawings by Torti Gallas and Partners.
Left: Town Center, Mirimar, FL, Torti Gallas and Partners. Colors on center block indicate percentage parking load from adjacent blocks.
Middle: "Half-Donut" block, CityPlace, West Palm Beach, FL, Elkus Manfredi Architects, Ltd.
Right: Jindalee Town Center, Ecologically Sustainable Design.

reserved for stormwater management.

All told, in the best of circumstances, a typical single-story commercial building requires that a minimum one-half to a more typical three-quarters of a site be dedicated to parking and ancillary requirements. For a two-story building, close to 80 percent of a site must be set aside for surface parking.

This vast supply of parking is also expensive to build. Surface spaces can cost from $3,000 for low-end asphalt to $10,000 for cobbles or brick-like concrete pavers.

In a single-family residential setting, parking normally takes the form of attached or detached wood garages on top of a concrete slab, at a cost of around $13-$18,000/space. In conventional multifamily settings, open, undecorated, multistory precast parking decks cost anywhere from $10-$13,000/space.

If a parking deck is exposed to the public realm, the cost of decorating its facades can push the cost of a space to around $14-$20,000. If an above-ground garage is fully enclosed, additional operational costs must be incurred for ever-ready exhaust fans. Finally, underground installations begin at $27,000/space, and can go significantly higher depending on subsurface conditions.