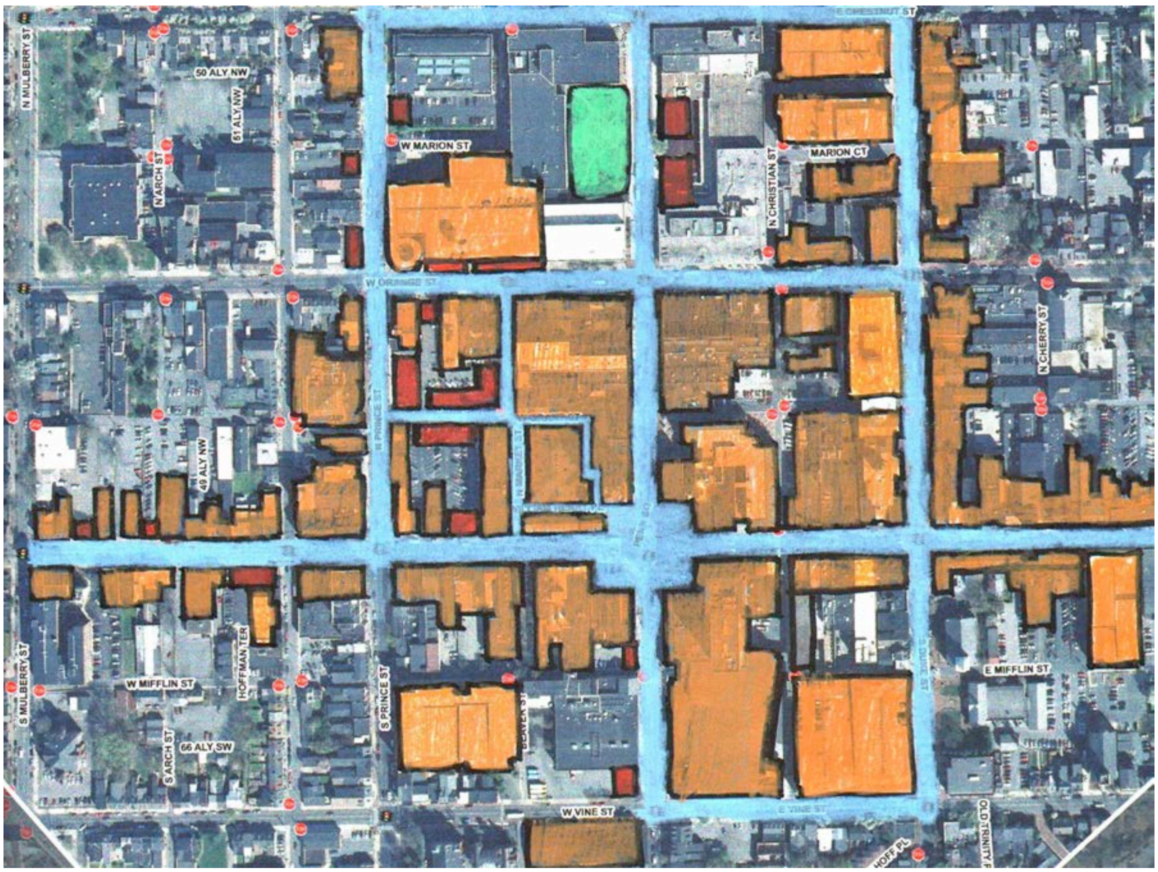
LANCASTER, PENNSYLVANIA
DOWNTOWN WALKABILITY ANALYSIS



SUBMITTED APRIL 21, 2015

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TABLE OF CONTENTS

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OVERVIEW

Approach

By applying a design strategy centered on walkability, this study asserts and attempts to demonstrate how a limited number of relatively small planning interventions can exert a profound influence on the livability and vitality of downtown Lancaster.

This document begins with a discussion of the four components of walkability, describing how most people will only make the choice to walk if that walk is simultaneously useful, safe, comfortable, and interesting. Those four criteria are then used as a basis for the recommendations that follow.

These recommendations are organized into three sections. The first, *A Safe Walk,* establishes a strategy for striping streets within the downtown, and then demonstrates how that strategy could be used to improve almost every downtown street. In most cases, suggested street improvements make use of restriping and revised signalization rather than reconstruction, in order to conserve funds. Additionally, four downtown locations in need of special attention receive proposed redesigns. Finally, as the City and County embark on a cycling plan, this document offers a foundation of bike facilities that this plan will ideally include.

The next section, *A Useful Walk,* makes recommendations in terms of four areas in which the City, principally through its policies, can make walking more useful: housing, parking, transit, and wayfinding.

A final section, *A Comfortable, and Interesting Walk,* applies an anchors and paths methodology to determine where the fewest investments are likely to have the greatest impact on people's choice to walk. Two of these locations—the Bulova block and the Prince Street Garage—receive specific design proposals for their improvement. Finally, because it has such great unrealized potential, the Central Market is considered in depth, and a design is proposed for its completion.

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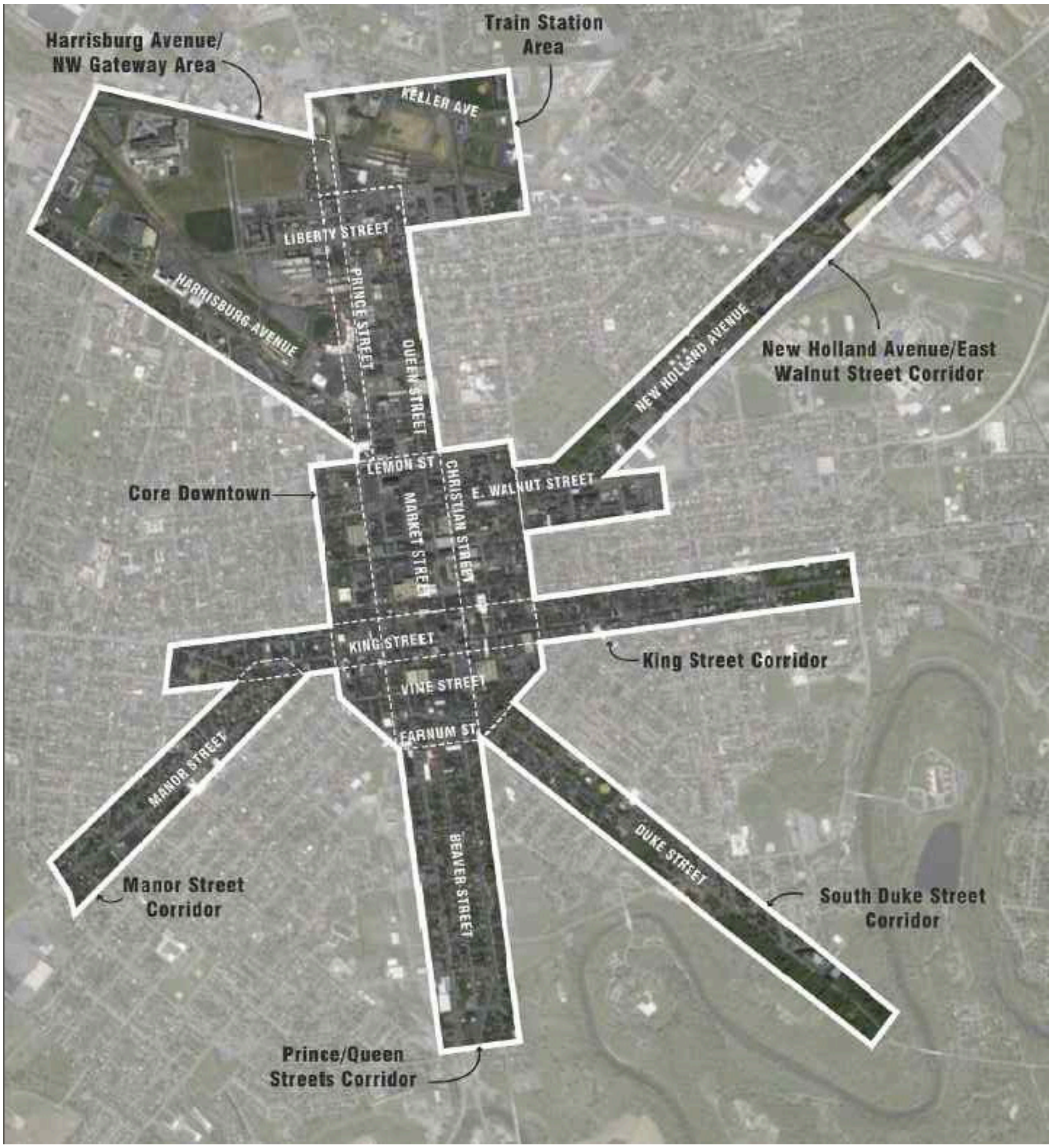
The Purpose of This Document

This is a downtown walkability analysis, not a downtown master plan. It is not comprehensive, and does not try to be visionary. But, like a master plan, it hopes to have a profoundly positive impact on the physical form, economic success, and social vitality of the city. Specifically, this report, asks this question: *What changes can be made, in the least amount of time, and for the least cost, that will have the largest measurable impact on the amount of walking and biking in Lancaster City?*



The study area includes the core of the downtown, extending west along Manor Street, south along the Prince and Duke Street corridors, east along King Street, and north to the Amtrak Station and the Northwest Gateway Area.

Downtown Lancaster is the center of a metropolitan region of more than half a million people. Historically a vibrant hub of commercial and cultural activity, Lancaster was not immune to the suburban migration experienced by so many of our cities during the latter half of the 20th century. But today, after a decade of ongoing revitalization and growing private investment, there is every reason to believe that Lancaster City is poised for a true transformation.

National trends, to which Lancaster is certainly not immune, show the beginnings of what is understood to be a tremendous shift of populations back to city centers. With 88 percent of the next 100 million American households expected to be childless, and with 77 percent of millennials saying that they want to live in America's urban cores, demand for downtown housing in Lancaster is about to skyrocket—but only if downtown can provide a truly urban lifestyle that distinguishes it from its surrounding suburbs. And central to that lifestyle—its very essence—is walkability. Polling among both millennials an empty nesters indicates a strong preference for mixed-use neighborhoods in which automobile use is an option rather than a universal mandate.

Based on these indicators, the question is not whether people and businesses will be moving downtown, but whether they will be moving to downtown Lancaster. The answer to that question will depend in part on whether Lancaster provides a downtown environment that welcomes and supports walking.

It can be said with some objectivity that there is still much work to be done in this regard. While downtown boasts an incredible collection of historic buildings and worthwhile destinations, it simply does not feel safe to walk around. This condition results principally from the fact that cars are moving too quickly and people are not adequately protected from them. Most streets in downtown Lancaster are engineered to invite driving speeds considerably higher than those posted. Many curbs have been robbed of their parallel parking, to the detriment of business viability and sidewalk safety. Bicycle facilities are almost entirely lacking. Unlike many cities with far less to offer, Lancaster suffers from traffic patterns and behaviors that almost certainly impede its development of a robust street life.

Acknowledging these circumstances, Lancaster's elected officials and business leaders have asked the question of how their downtown can become more walkable and livable, and—by extension—more safe, healthy, and sustainable. This report attempts to answer that question in a manner that both directs and motivates real change in the short term.

Few people will dispute whether its recommendations will make Lancaster safer. But some may ask whether these recommendations, which have lead quickly to more walking, biking, and vitality in every region of the United States, somehow won't achieve similar results in Lancaster. It is hoped that the evidence gathered in this report will quell those fears, and overcome the attachment to business as usual that is generally the greatest impediment to the revitalization of American downtowns.

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PROLOGUE

The section that follows is a synopsis of the first three chapters of the book *Walkable City: How Downtown Can Save America, One Step at a Time,* (Jeff Speck, NY: Farrar Straus & Giroux, 2012). Full footnotes for all data and quotations can be found in the book. The book's full text is recommended as background reading for those who wish to better understand the theory and experience behind the recommendations in this report.

THREE ARGUMENTS FOR THE WALKABLE CITY

After several decades arguing for more walkable cities as a designer, this city planner has found that it is more useful to do so as an economist, an epidemiologist, and an environmentalist. What follows is a discussion of why these three groups are all independently fighting for the same thing, which is to redesign our cities around the pedestrian.

The Economic Argument

Many cities ask the same question: How can we attract corporations, citizens, and especially young, entrepreneurial talent? In some cities, they ask it differently: "How can we keep our children from leaving?"

The obvious answer is that cities need to provide the sort of environment that these people want. Surveys—as if we needed them—show how creative class citizens, especially millennials, vastly favor communities with *street life,* the pedestrian culture that can only come from walkability.

The number of 19-year-olds who have opted out of earning driver's licenses has almost tripled since the late seventies, from 1 in 12 to 1 in 4. This driving trend is only a small part of a larger picture that has less to do with cars and more to do with cities, and specifically with how young professionals today view themselves in relation to the city, especially in comparison to previous generations.

The economist Christopher Leinberger compares the experience of today's young professionals with the previous generation. He notes that most 50-year-olds grew up watching *The Brady Bunch, The Partridge Family, and Happy Days,* shows that idealized the late-mid-20th-century suburban standard of low-slung houses on leafy lots, surrounded by more of the same. The millennials in contrast, grew up watching *Seinfeld, Friends,* and, eventually, *Sex and the City.* They matured in a mass culture—of which TV was only one part—that has predisposed them to look favorably upon cities, indeed, to aspire to live in them.

This group represents the biggest population bubble in fifty years. 64 percent of college-educated millennials choose first where they want to live, and only then do they look for a job. According to surveys, fully 77 percent of them plan to live in America's urban cores.

Meanwhile, the generation raised on *Friends* is not the only major cohort looking for new places to live. There's a larger one: the millennials' parents, the front-end boomers. They are citizens that every city wants—significant personal savings, no schoolkids.

And according to Christopher Leinberger, empty nesters want walkability:

> "This group is finding that their suburban houses are too big. . . All those empty rooms have to be heated, cooled, and cleaned, and the unused backyard maintained. Suburban houses can be socially isolating, especially as aging eyes and slower reflexes make driving everywhere less comfortable."

In the 1980s, city planners began hearing from sociologists about something called a NORC: a Naturally Occurring Retirement Community. Over the past decade, a growing number of retirees have been abandoning their large-lot houses to resettle in mixed-use urban centers. For many of them, that increased walkability means all the difference between an essentially housebound existence and several decades of continued independence.

Of the 100 million new households expected to take shape between now and 2025, fully 88 million are projected to be childless. This is a dramatic change from 1970, when almost half of all households included children. These new adults-only households won't be concerned about the quality of local schools or the size of their backyards. This fact will favor cities over suburbs, but only those cities that can offer the true urbanism and true walkability that these groups desire.

This growing demand for pedestrian-friendly places is reflected in the runaway success of Walk Score, the website that calculates neighborhood walkability. In this website, which gets millions of hits a day, addresses are ranked in five categories, with a score of 50 needed to cross the *Somewhat Walkable* threshold. 70 points earns a *Very Walkable* ranking, and anything above 90 qualifies as a *Walker's Paradise.* San Francisco's Chinatown earns a 100, while Los Angeles' Mulholland Drive ranks a 9. (Downtown Lancaster earns an 87, good overall, but about average for a mid-sized downtown.)

If Walk Score is so useful in helping people decide where to live, then it can also help us determine how much they value walkability. Now that it has been around for a few years, some resourceful economists have had the opportunity to study the relationship between Walk Score and real estate value, and they have put a price on it: $500 to $3000 *per point.* In a very typical city, Charlotte, North Carolina, the economist Joe Cortright. found that each Walk Score point was worth $2000—that's $200,000 across the full scale.

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That is the value that houses get for being walkable. But what about cities themselves? Does being more walkable make a whole city worth more?

In 2007, Joe Cortright, the economist responsible for the Walk Score value study cited above, published a report called "Portland's Green Dividend," in which he asked the question: what does Portland get for being walkable?

To set the stage, it is useful to describe what makes Portland different. Beginning in the 1970s, Portland made a series of decisions that fundamentally altered the way the city was to grow. While most American cities were building more highways, Portland invested in transit and biking. While most cities were reaming out their roadways to speed traffic, Portland implemented a Skinny Streets program. While most American cities were amassing a spare tire of undifferentiated sprawl, Portland instituted an urban growth boundary. These efforts and others like them, over several decades—a blink of the eye in planner time—have changed the way that Portlanders live.

This change is not dramatic—were it not for the roving hordes of bicyclists, it might be invisible—but it is significant. While almost every other American city saw its residents drive farther and farther every year, and spend more and more of their time stuck in traffic, Portland's vehicle miles traveled per person peaked in 1996. Now, compared to other major metropolitan areas, Portlanders on average drive 20 percent less.

According to Cortright, this 20 percent (4 miles per citizen per day) adds up to $1.1 billion of savings each year, which equals fully 1.5 percent of all personal income earned in the region. And that number ignores time not wasted in traffic: peak travel times have actually dropped 11 minutes per day. Cortright calculates this improvement at another $1.5 billion.

What happens to these savings? Portland is reputed to have the most independent bookstores per capita and the most roof racks per capita. These claims are slight exaggerations, but they reflect a documented above-average consumption of recreation of all kinds. Portland has more restaurants per capita than all other large cities except Seattle and San Francisco.

More significantly, whatever they are used for, these savings are considerably more likely to stay local than if spent on driving. Almost 85 percent of money expended on cars and gas leaves the local economy—much of it, of course, bound for the Middle-East. A significant amount of the money saved probably goes into housing, since that is a national tendency: families that spend less on transportation spend more on their homes, which is as local as investments get.

That's the good news about Portland. Meanwhile, what's happened to the rest of the country? While transportation used to absorb only one tenth of a typical family's budget (1960), it now consumes more than one in five dollars spent. The typical "working-class" family, remarkably, pays more for transportation than for housing.

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This circumstance exists because the typical American working family now lives in suburbia, where the practice of "drive-'til-you-qualify" reigns supreme. Families of limited means move further and further away from city centers in order to find housing that is cheap enough to meet bank lending requirements. Unfortunately, in so doing, they often find that driving costs outweigh any savings, and their total household expenses escalate.

No surprise, then, that as gasoline broke $4.00 per gallon and the housing bubble burst, the epicenter of foreclosures occurred at the urban periphery, places that required families to have a fleet of cars in order to participate in society, draining their mortgage carrying capacity. These are the neighborhoods that were not hurt by the housing bubble bursting; they were ruined by it.

This is bad news for Orlando and Phoenix, but it's good news for New York, Chicago, and Portland. But the real Portland story is perhaps not its transportation but something else: young, smart people are moving to Portland in droves. Over the decade of the 1990s, the number of college-educated 25 to 34 year-olds increased 50 percent in the Portland metropolitan area—five times faster than in the nation as a whole.

There is another kind of walkability dividend, aside from resources saved and resources reinvested: resources attracted by being a place where people want to live. The conventional wisdom used to be that creating a strong economy came first, and that increased population and a higher quality of life would follow. The converse now seems more likely: creating a higher quality of life is the first step to attracting new residents and jobs. This is why Chris Leinberger believes that "all the fancy economic development strategies, such as developing a biomedical cluster, an aerospace cluster, or whatever the current economic development 'flavor of the month' might be, do not hold a candle to the power of a great walkable urban place."

The Epidemiological Argument

On July 9, 2004, three epidemiologists published a book called *Urban Sprawl and Public Health.* Until that day, the main arguments for building walkable cities were principally aesthetic and social. More significantly, almost nobody but the planners was making them. But it turns out that while the planners were shouting into the wilderness about the frustrations, anomie, and sheer waste of suburban sprawl, a small platoon of physicians were quietly doing something much more useful: they were documenting how our built environment was killing us, in at least three different ways: obesity, asthma, and car crashes.

The numbers are compelling. According to the U.S. Centers for Disease Control, fully one-third of American children born after 2000 will become diabetics. For the first time in history, the current generation of youth are expected to live shorter lives than their parents. This is due partly to diet, but partly to planning: the methodical eradication from our communities of *the useful walk* has helped to create the least-active generation in

American history.

In any discussion about American health, obesity has to be front and center. In the mid-1970s, only about one in ten Americans was obese, which put us where much of Europe is right now. What has happened in the intervening thirty years is astonishing: by 2007, that rate had risen to one in three, with a second third of the population "clearly overweight." According to the rules of the U.S. military, twenty-five percent of young men and forty percent of young women are too fat to enlist.

Much has been written about the absurdity of the American corn-based diet and its contribution to our national girth. But our body weight is a function of calories in and calories out, and the latest data suggests that diet is actually the smaller factor. One recent study, published in the *British Medical Journal*, called "Gluttony or Sloth?" found that obesity correlated much more strongly with inactivity than with diet. Meanwhile, at the Mayo Clinic, Dr. James Levine put test subjects in motion-detecting underwear, placed them all on the same diet, and then began to stuff them with additional calories. As anticipated, some subjects gained weight while others didn't. Expecting to find a metabolic factor at work, he learned instead that the outcome was entirely attributable to physical activity. The people who got fatter made fewer unconscious motions and, indeed, spent on average two more hours per day sitting down.

Over the past decade, there has been a series of studies that attribute obesity to the automotive lifestyle and, better yet, to the automotive landscape. One study, in San Diego, reported that 60 percent of residents in a "low-walkable" neighborhood were overweight, compared to only 35 percent in a "high-walkable" neighborhood. Another, a six-year analysis of 100,000 Massachusetts residents found that the lowest Body Mass Index averages were located in Boston and its inner ring suburbs, while the highest could be found in the "car-dependent" outer ring surrounding Interstate 495.

Now, let's turn to asthma. About fourteen Americans die each day from asthma attacks. That number does not seem particularly high, but it is three times the rate of 1990. Now, 7 percent of American's suffer from Asthma in some form.

Pollution isn't what it used to be. American smog now comes principally from tailpipes, not factories. It is considerably worse than it was a generation ago, and it is unsurprisingly worst in our most auto-dependent cities, like Los Angeles and Houston. In 2007, Phoenix recorded three full months of days in which it was deemed unhealthy for the general public to leave their homes.

Finally, for most healthy Americans, the greatest threat to that health is car crashes. Most people take the risks of driving for granted, as if they were some inevitable natural phenomenon—but they aren't. While the U.S. suffers 12 traffic fatalities annually per 100,000 population, Germany, with its no-speed-limit Autobahn, has only 7, and Japan rates a 4. New York City beats them all, with a rate of 3. If our entire country shared New York City's traffic statistics, we would prevent more than 24,000 deaths a year.

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San Francisco and Portland both compete with New York, with rates below 3 deaths per 100,000 population, respectively. Meanwhile, Tulsa comes in at 14 and Orlando at 20. Clearly, it's not just how much you drive, but where you drive, and more accurately how those places were designed. Older, denser cities have much lower automobile fatality rates than newer, sprawling ones. Ironically, it is the places shaped around automobiles that seem most effective at smashing them into each other.

In search of some good news, we can turn to Dan Buettner, the National Geographic host and bestselling author responsible for *The Blue Zones: Lessons for Living Longer from the People Who've Lived the Longest.* After a tour of the world's longevity hot spots, Buettner takes his readers through the "*Power Nine:* the lessons from the Blue Zones, a cross cultural distillation of the world's best practices in health and longevity." Lesson One is "Move Naturally":

"Longevity all-stars don't run marathons or compete in triathlons; they don't transform themselves into weekend warriors on Saturday morning. Instead, they engage in regular, low-intensity physical activity, often as a part of a daily work routine. Rather than exercising for the sake of exercising, try to make changes to your lifestyle. Ride a bicycle instead of driving. Walk to the store instead of driving. . ."

Like most writers on the subject, Buettner and his sources neglect to discuss how these "lifestyle" choices are inevitably a function of the design of the built environment. They may be powerfully linked to place—the Blue Zones are zones, after all—but there is scant admission that walking to the store is more possible, more enjoyable, and more likely to become habit in some places than in others. It is those places that hold the most promise for the physical and social health of our society.

The Environmental Argument

In 2001, Scott Bernstein, at the Center for Neighborhood Technology in inner-city Chicago, produced a set of maps that are still changing the way Americans think about their country. In these maps, remarkably, the red and the green switched places. This reversal, perhaps even more than the health discussion, threatens to make walkability relevant again.

On typical carbon maps, areas with the greatest amounts of carbon output are shown in bright red, and those with the least are shown in green, with areas in between shown in orange and yellow. The hotter the color, the greater the contribution to climate change.

Historically, these maps looked like the night-sky satellite photos of the United States: hot around the cities, cooler in the suburbs, and coolest in the country. Wherever there are lots of people, there is lots of pollution. A typical carbon map, such as that produced in 2002 by the Vulcan Project at Purdue University, sends a very clear signal: countryside good, cities bad.

These maps are well in keeping with the history of the environmental movement in the United States, which has traditionally been anti-city, as has so much American thought. This strain traces its roots back to Thomas Jefferson, who described large cities as "pestilential to the morals, the health, and the liberties of man." Not without a sense of humor, he went on: "When we get piled up upon one another in large cities, as in Europe, we shall become as corrupt as in Europe, and go to eating one another as they do there."

For a long time, these were the only type of carbon map, and there is certainly a logic in looking at pollution from a location-by-location perspective. But this logic was based on an unconsidered assumption, which is that the most meaningful way to measure carbon is by the square mile.

This assumption is false. The best way to measure carbon is per person. Places should be judged not by how much carbon they emit, but by how much carbon they cause us to emit. There are only so many people in the United States at any given time, and they can be encouraged to live where they have the smallest environmental footprint. That place turns out to be the city—the denser the better.

Or, as the economist Ed Glaser puts it: "We are a destructive species, and if you love nature, stay away from it. The best means of protecting the environment is to live in the heart of a city."

No American city performs quite like New York. The average New Yorker consumes roughly one third the electricity of the average Dallas resident, and ultimately generates less than one third the greenhouse gases of the average American. The average resident of Manhattan consumes gasoline "at a rate that the country as a whole hasn't matched since the mid-1920s."

New York is America's densest big city and, not coincidentally, the greenest. But why stop there?: New York consumes half the gasoline of Atlanta. But Toronto cuts that number in half, as does Sydney—and most European cities use only half as much as those places.

This condition exists not because our buildings or cars are less efficient, or our buildings are less green, but because our cities are not as well organized around walking. This point was made clear in a recent EPA study, "Location Efficiency and Building Type—Boiling it Down to BTUs," that compared four factors: drivable vs. walkable ("transit-oriented") location; conventional construction vs. green building; single-family vs. multifamily housing; and conventional vs. hybrid automobiles. The study demonstrated that, while every factor counts, none counts nearly as much as walkability. Specifically, it showed how, in drivable locations, transportation energy use consistently tops household energy use, in some cases by more than 2.4 to 1. As a result, the most green home (with Prius) in sprawl still loses out to the least green home in a walkable neighborhood.

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It turns out that trading all of your incandescent light bulbs for energy-savers conserves as much carbon per year as living in a walkable neighborhood does each week. Why, then, is the vast majority of our national conversation on sustainability about the former and not the latter? Witold Rybczynski puts it this way:

> Rather than trying to change behavior to reduce carbon emissions, politicians and entrepreneurs have sold greening to the public as a kind of accessorizing. "Keep doing what you're doing," is the message, just add another solar panel, a wind turbine, a bamboo floor, whatever. But a solar-heated house in the suburbs is still a house in the suburbs, and if you have to drive to it—even in a Prius—it's hardly green.

This accessorizing message has been an easy sell in America, where it is considered politically unwise to ask consumers to *sacrifice,* to alter their quality of life in service of some larger national goal, such as keeping a dozen of our largest cities above sea level. But what if there were a more positive quality-of-life discussion, one that allowed us to satisfy consumer demands that have not been met by a real estate industry centered on suburban sprawl.

The gold standard of quality-of-life rankings is the Mercer Survey, which carefully compares global cities in the ten categories including political stability, economics, social quality, health, education, recreation, housing, and even climate. Its rankings shift slightly from year to year, but the top ten cities always seem to include a number of places where they speak German (Vienna, Zurich, Dusseldorf, etc.) along with Vancouver, Auckland, and Sydney. These are all places with compact settlement patterns, good transit, and principally walkable neighborhoods. Indeed, there isn't a single auto-oriented city in the top 50. The highest rated American cities in 2010, which don't appear until number 31, are Honolulu, San Francisco, Boston, Chicago, Washington, New York, and Seattle.

Looking at this ranking, the message is clear. America's cities, which are twice as efficient as its suburbs, burn twice the fuel of European, Canadian, and Aussie/Kiwi places. Yet the quality of life in these foreign cities deemed considerably higher. This is not to say that quality of life is inversely related to sustainability, but merely that many Americans, by striving for a better life, might find themselves moving to places that are more like the winners. . . or better yet, might try transforming their cities to resemble the winners. This sort of transformation could include many things, but one of them would certainly be walkability.

Vancouver, always a top contender, proves a useful model. By the mid-20th century, it was fairly indistinguishable from a typical U.S. city. Then, beginning in the late 50s, when most American cities were building highways, planners in Vancouver began advocating for high-rise housing downtown. This strategy, which included stringent measures for green space and transit, really hit its stride in the 1990s, and the change has been profound. Over the past fifteen years, the amount of walking and biking citywide has doubled, from fifteen percent to thirty percent of all trips. Vancouver is not ranked #1

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for livability because it is so sustainable; the things that make it sustainable also make it livable.

Quality of life—which includes both health and wealth—may not be a function of our ecological footprint, but the two are deeply interrelated. To wit, if we pollute so much because we are throwing away time, money, and lives on the highway, then both problems would seem to share a single solution, and that solution is to make our cities more walkable.

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PART I. WHAT CAUSES PEOPLE TO WALK?

The pedestrian is a delicate creature. While there are many harsh environments in which people are physically able to walk, there are few in which they actively choose to walk, especially when the option of driving is available. The following four sections describe a hierarchy of conditions that must be met if the average person is going to make that choice. Each is necessary but not alone sufficient. They are:

- A safe walk;
- A reason to walk;
- A comfortable walk; and
- An interesting walk.

Reviewing and understanding this criteria is a prerequisite to properly considering the recommendations made in this report.

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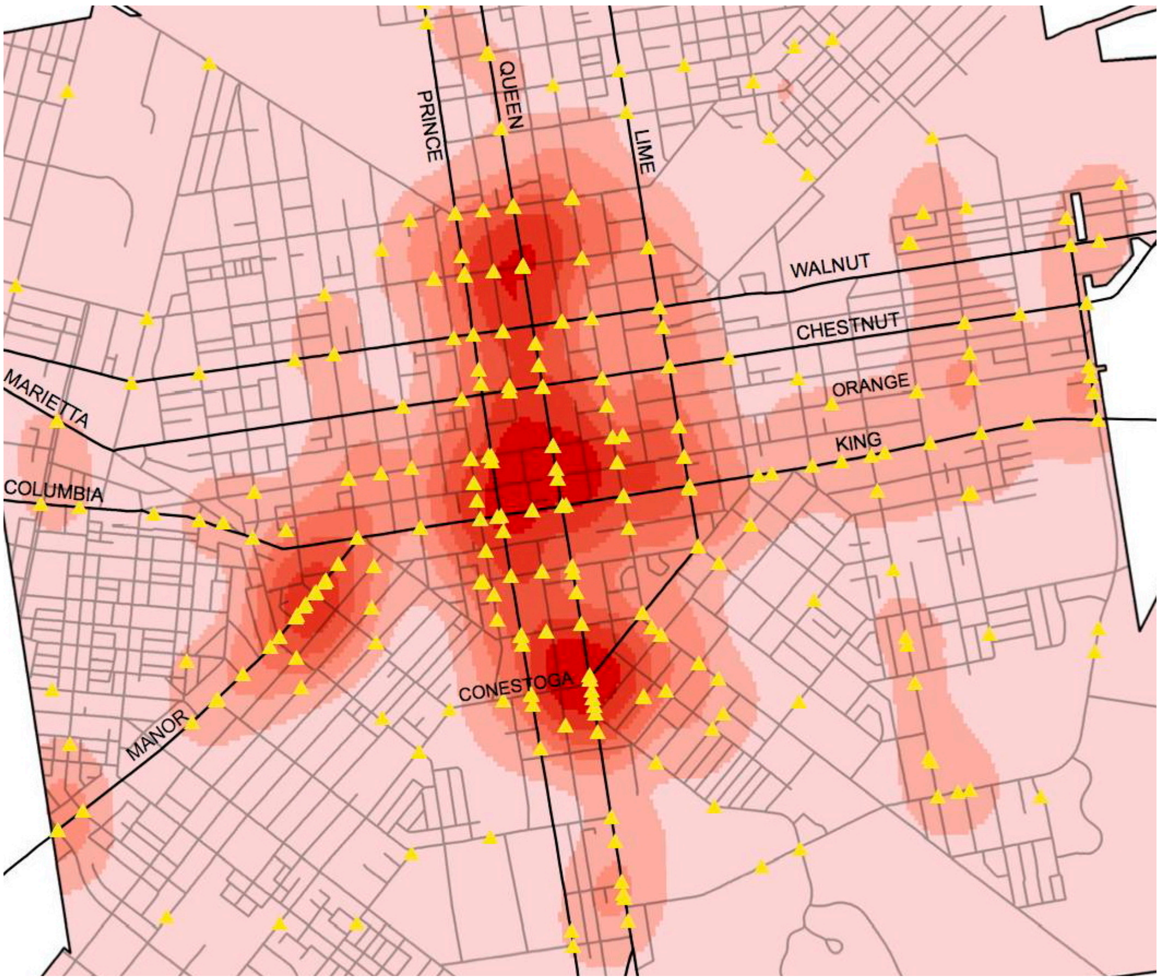
A Safe Walk

While crime is sometimes a concern, most people who avoid walking do so because the walk feels dangerous due to the very real threat of vehicles moving at high speed near the sidewalk. Statistically, automobiles are much more dangerous to people walking than is crime, as attested by the 5-year record of car/pedestrian collisions in Lancaster City, shown here.

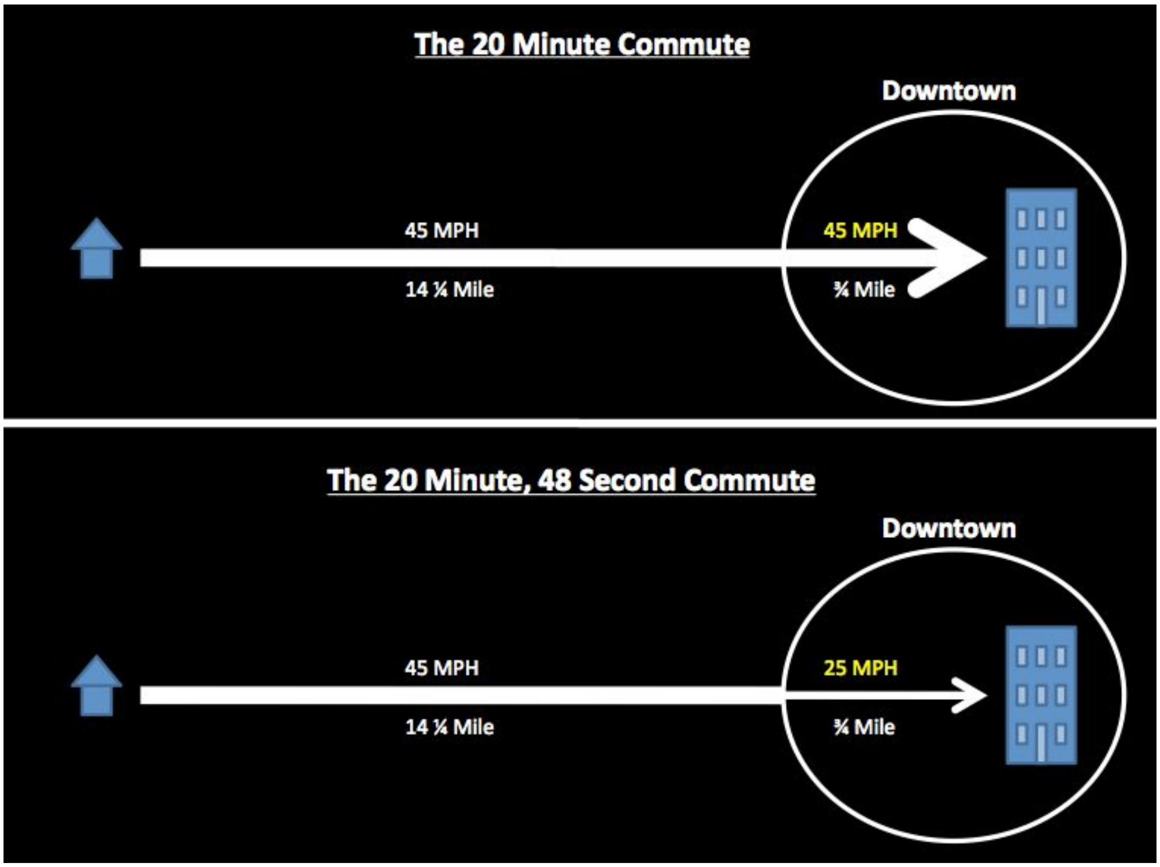


Car/pedestrian collisions in Lancaster, 2008- 2012. (Lancaster County map of PennDOT data.)

Street life is dramatically impacted by the speed of vehicles. Whether they know it or not, most pedestrians understand in their bones that a person hit by a car traveling at 30 mph is roughly eight times as likely to die than if the car is traveling at 20 mph. Any community that is interested in street life—or human lives—must carefully consider the speed at which it allows cars to drive in places where people are walking.

And in most American cities, the place where people are most likely to walk is the downtown. Acknowledging this fact opens up real possibilities, as it allows us to have dramatic impact on walking while impacting driving only minimally. By focusing on vehicle speeds in downtown, we can make walking safer for the most pedestrians with the least amount of driver inconvenience.

The illustration below tries to make this point clear. It shows how the difference between an attractive and a repellant downtown may be less than a minute of drive time. Would most people be willing to spare 48 seconds each day if it meant that their city was a place worth arriving at? Probably.



This diagram from the engineering firm Nelson/Nygaard describes how a significant change in downtown speeds typically results in a minimal change to commute times.

The above logic explains why a growing number of cities have instituted "20 is Plenty" ordinances in their downtowns, and a few have even settled on 18 mph as the target speed. Wisely, Lancaster has already adopted a 25 mph speed limit citywide. But, as discussed, lowering speed limits is only the half of it. The more important step is to engineer the streets for the desired speed, which means outlawing wider lanes and other inducements to speeding.

If the key to making a street safe is to keep automobiles at reasonable speeds—and to protect pedestrians from them—we must address the principal factors that determine driver speed and pedestrian exposure. In Lancaster, there are ten:

1.The number of driving lanes;
2. Lane width;
3. One-way vs. two-way travel;
4. The number and length of turn lanes;
5. The presence of swooping geometries;
6. Cycle facilities;
7. On-street parking;
8. Street tree provision;
9. The presence of unwarranted signals; and
10. The provision and design of crosswalks, signals, and streetlights.

The understanding of how each of these factors impacts both driver and pedestrian behavior has evolved tremendously over the past few decades. Much of what many traffic engineers were taught in school has been invalidated, and many of the lessons learned are counterintuitive. In the pages that follow, each of these ten criteria is discussed at length, in order that current best practices can direct the redesign of Lancaster's streets.

Interlude: What Traffic Means

Before analyzing traffic behavior further, it is worth stepping back to address the consequences of increased traffic in American downtowns, because all is not negative. Downtowns need traffic to survive. Indeed, cars, moving slowly, are the lifeblood of the American City. If given a chance, each driver is a potential shopper or diner. However, the rush hour driver is not an ideal shopper. The impression among local merchants interviewed is that most customers are either locals or people who have come to Lancaster as a destination, and that most commuters are simply using Lancaster as a conduit, without stopping.

This sort of behavior, is of course influenced by the nature of the streets that the commuters are on. The more that a street feels like a highway, with multiple lanes in a single direction and timed traffic lights enabling non-stop flow, the less likely a driver is to stop and shop or dine. This factor presents an additional incentive to modify Lancaster's roadways so that they better resemble downtown streets.

Two other aspects of traffic also deserve our attention: pollution and property value. In terms of air pollution, the more cars that Lancaster invites into its downtown, the lower its downtown air quality will be. This is a concern for many reasons, but the most compelling is probably asthma. The single greatest contributor to localized air pollution in cities is cars, and asthma in cities is unsurprisingly highest near major roadways. The greater the capacity of Lancaster's roadways, the more its residents and workers will suffer from air-quality related illnesses.

In terms of property value, we must remain mindful of the clear inverse correlation that has been shown to exist in North American cities between an inner city's land values and that city's investment in roadways. Generally, the more highways a city builds through its downtown, the less valuable that downtown's real estate becomes. (A longer discussion of this history can be found in Speck, *Walkable City*.) While this correlation applies principally to the construction of elevated highways, it is relevant to the construction of surface streets as well, to the degree that those streets invite multiple lanes of brisk travel. Cars speeding past properties make them less attractive, as does large quantities of traffic. And, as documented by Donald Appleyard in 1981 in *Livable Streets*, the wider and more trafficked a person's street, the less sense of community they are likely to report.

In sum, traffic can be a boon to a downtown and, indeed, most downtowns need significant traffic to survive. But the traffic will only benefit the city if it is does not overwhelm the city with its speed or its volume. Many of Lancaster's downtown streets already invite speeds which are not beneficial to the city, and many also are capable of handling volumes far in excess of the current flow, a circumstance that must be modified if a future of much greater traffic is to be avoided.

1. The Proper Number of Driving Lanes

The more lanes a street has, the faster traffic tends to go, and the further pedestrians have to cross. Some of Lancaster's downtown streets clearly have more lanes than they need to satisfy the demand upon them, as will be demonstrated ahead. Removing these wasted driving lanes frees up valuable pavement for more valuable uses, such as parallel parking and bike lanes.

Here the City is faced with a choice: should these streets be kept in their oversized state, in order to meet a potential future demand, or should they be limited to a size that is closer to (but still above) the current demand?

Before reaching specific conclusions, it may be useful to quickly lay out three ways that our current understanding of traffic behavior differs from what was understood a few decades ago, and differ also from how traffic is understood by most citizens. These can be described as *Induced Demand, Peak VMT, and The Network.*

<u>Induced Demand</u>

While entire books now explain and document the phenomenon, few public works departments or State DOTs make daily decisions as if they understand Induced Demand. As explained by the First Law of Traffic Congestion, efforts to combat traffic congestion by increasing roadway capacity almost always fail, because, in congested systems, the principal constraint to driving is the very congestion that road-builders hope to eliminate. Studies nationwide document how "metro areas that invested heavily in road capacity expansion fared no better in easing congestion than those that did not. . . areas that exhibited greater growth in lane capacity. . . ended up with slightly higher congestion. . ." despite paying more to relieve it (Surface Transportation Policy Project, Washington, DC).

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Because road-building does not typically decrease congestion, cities that wish to cut traffic are told to invest not in wider streets, but in providing alternatives to driving. In places like Lancaster, achieving that goal means principally making downtown more attractive to people walking and biking, a goal that would mandate more walkable streets, not wider ones. This report does not try to be ambitious in this regard. With only one exception—Chestnut Street—it does not reduce the capacity of any street to anywhere near what that street is currently holding on a peak-hour basis. But it insists that at no point should preserving the opportunity for increased capacity be considered a viable strategy for avoiding future congestion.

Peak VMT

The mandate to avoid investments in increased capacity is only strengthened by the discovery that, in most American metro areas, the amount of driving is on the decline. While figures are not available specifically for Lancaster, the data for Pennsylvania shows that total Vehicle Miles Traveled (VMT) on public roads actually peaked in 2007, and has declined more than 8 percent since. Cultural shifts, such as a decline in car ownership among young adults, suggest that this condition is not temporary. The experience of Peak VMT makes it clear that any traffic study that includes a "background growth" factor in its assumptions must be rejected.

Sometimes, people's response to the above logic is to say, "yes, VMT is shrinking, but we expect more development downtown, so we need to assume more traffic." This reasoning fails to apprehend that an increase in downtown development is one of the factors contributing to the national decline in VMT. As more residential units come downtown, and as city neighborhoods become more walkable through redevelopment, more people make the choice to walk, bike or take transit. In this case, growth reduces VMT rather than contributing to it. Such a situation should be the expected outcome of the recommendations included in this report.

Washington DC provides an instructive example. Between 2005 to 2009, as the District's population grew by 15,862 people, car registrations fell by almost 15,000 vehicles.

The Network

For roughly forty years, the dominant ideology of roadway planning was to eschew street networks in favor of *dendritic* (branching) systems. In such systems, which characterize suburban sprawl, parking lots and cul-de-sacs lead to collectors, which lead to arterials, which lead to highways, and there is typically only one efficient path from any one destination to any other. We now know that these systems present many disadvantages to the traditional network alternative, principal among them their inflexibility. A single engine fire on an arterial can bring an entire community to a halt.

The inflexibility of these dendritic systems has led to a general tendency within the traffic engineering profession to think of networked systems as being considerably less flexible

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than they truly are. Often, each street is considered individually, with little attention paid to the fact that, within a grid, traffic can easily switch from street to street in response to congestion. Remembering this fact—that each car within a grid is an "intelligent atomic actor" maximizing its utility at every corner—allows us to manipulate networked street systems with much greater freedom than we would have in dendritic sprawl. Gridded streets can and do absorb each other's traffic every day, something we see clearly when one street is narrowed or closed for repairs.

The analysis and recommendations that follow, for simplicity's sake, do their best to ensure that each street, individually, will continue to meet the travel demand on it. But, in considering these recommendations and any others that arise from this report, it will be important to not forget that parallel streets are typically available to ease the pressure on busy streets.

2. ***Lanes of Proper Width***

Different-width traffic lanes correspond to different travel speeds. A typical American urban lane is 10 feet wide, which comfortably supports speeds of 35 mph. A typical American highway lane is 12 feet wide, which comfortably supports speeds of 70 mph. Drivers instinctively understand the connection between lane width and driving speed, and speed up when presented with wider lanes, even in urban locations. For this reason, any urban lane width in excess of 10 feet encourages speeds that can increase risk to people walking.

Many streets in downtown Lancaster contain lanes that are 12 feet wide or more, and drivers can be observed approaching highway speeds when using them. Indeed, many downtown lanes are 15 feet wide, which may be some sort of national record. On a few streets, highway-style shoulders also contribute effectively to lane width and thus to drivers' comfort while speeding. Such shoulders are not appropriate to urban environments, which is why few cities have them.

Having a fully informed discussion comparing 10-foot and 12-foot driving lanes will be central to achieving safer streets in Lancaster, for several reasons. First, 12 feet is the lane width mandated for collector roads by current City Subdivision and Land Development Ordinance—happily about to undergo an update. Second, most downtown streets belong not to the City, but to PennDOT, who seems to apply a 12-foot standard to their design. Convincing the City and the State that 10-foot lanes are safer than 12-foot lanes—and no less efficient at handling traffic—is the purpose of the paragraphs that follow.

A review of all available literature on the topic produces the following findings:

- While hardly beyond questioning, the AASHTO *Policy on Geometric Design of Highways and Streets* is considered the Bible of conventional traffic engineering, and is useful in protecting engineers against lawsuits. Theodore Petrisch P.E. PTOE, an expert on lane widths, summarizes the Green Book as follows: "For rural and urban arterials, lane widths may vary from 10 to 12 feet. 12-foot lanes should be used where practical on higher-speed, free-flowing, principal arterials. However, under interrupted-flow [signalized] conditions operating at lower speeds [35 MPH or less], narrower lane widths are normally quite adequate and have some advantages."

- According to the conservative Midwest Research Institute's NCHRP Project 3-72, *Relationship of Lane Width to Safety for Urban and Suburban Arterials,* "A safety evaluation of lane widths for arterial roadway segments found no indication, except in limited cases, that the use of narrower lanes [10 to 11 feet rather than 12] increases crash frequencies. The lane widths in the analyses conducted were generally either not statistically significant or indicated that narrower lanes were associated with lower rather than higher crash frequencies."

- According to NCHRP 330, *Effective Utilization of Street Width on Urban Arterials,* "…all projects evaluated during the course of the study that consisted of lane widths exclusively of 10 feet of more [vs. 12 feet] resulted in accident rates that were either reduced or unchanged."

- According to the conservative Texas Transportation Institute, "On suburban arterial straight sections away from a traffic signal, higher speeds should be expected with greater lane widths." (This is the only available study that seems to have tested what most engineers (and drivers) believe, which is that wider lanes invite higher speeds.)

According to a collection of studies, a pedestrian hit by a car traveling 30 MPH at the time of impact is between seven and nine times as likely to be killed as one hit by a car travelling 20 MPH. (UK Dept. of Transportation, *Killing Speed and Saving Lives;* and Australian Federal Office of Road Safety, *Vehicle Speeds and the Incidence of Fatal Pedestrian Collisions.*)

Taken cumulatively, these findings could be summarized as follows: 10-foot lanes generally experience no more crashes that 12-foot lanes, and may experience fewer; crashes in 10-foot lanes are likely to occur at a lower speed than crashes in 12-foot lanes; and, therefore, 10-foot lanes can be expected to experience fewer injuries and deaths than 12-foot lanes. Given that 10-foot lanes handle no less traffic than 12-foot lanes (FDOT *Conserve by Bike Program Study,* 2007), there is no justification for 12-foot lanes in urban locations.

In terms of discussing the downtown's many 12- to 15-foot wide lanes, it is difficult to know where to begin. It is clear that they were laid out without any concern that such wide lanes might encourage speeding; this is understandable, as the research discussed above has only slowly come to light. While non-traffic-engineers might find it surprising, traffic engineers have until recently been trained that wider lanes are safer, because they provide broader recovery zones. Only in the past decade have mainstream

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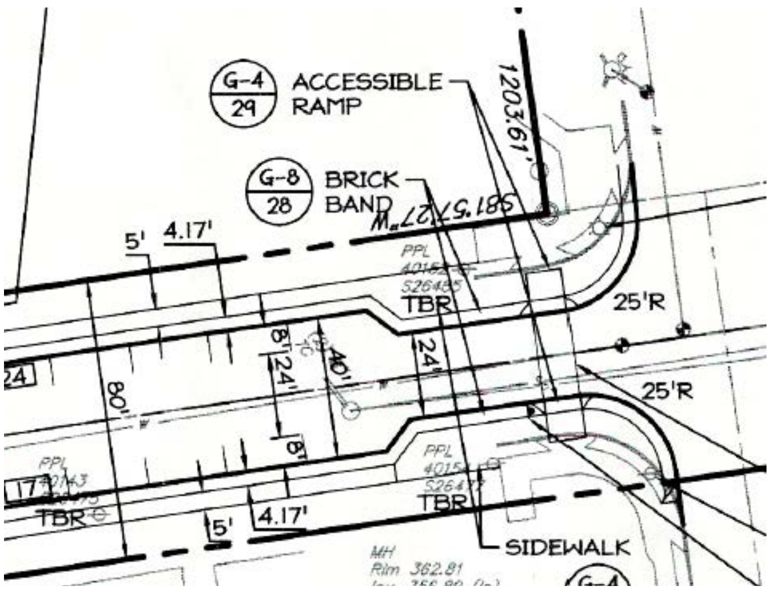
engineers begun to concur with the public that broader streets encourage faster speeds and thus experience more deadly crashes.

Applying this newfound understanding to downtown Lancaster results in a compelling mandate for change. Like removing extra lanes, replacing the 12- to 15-foot standard (sometimes exceeded) with a 10 foot standard creates a tremendous opportunity to reallocate pavement to better use.



West Liberty Street is about to be built according to 12-foot rather than a 10-foot lane-width standard.

This conversation demands immediate attention as it applies to West Liberty Street, about to be constructed with 12-foot lanes, as shown here. If turning motions are a concern, the curb extensions within the parking lanes should be eliminated. These do not significantly improve the safety of streets that are already narrow.

A comment is needed about the demands of buses. Red Rose Transit buses are 8'-6" wide, plus another foot for mirrors. The mirrors are rarely below 7 feet tall, so they do not pose a threat to people walking. When a bus in a 10-foot lane passes a car in a 10-foot lane, there is no conflict. When a bus passes another bus under similar circumstances, both vehicles fit, but it can be a tight squeeze. This squeeze requires the bus to slow down slightly, for a moment that is too short to impact bus schedules, but has a positive impact on the street's safety to all users.

Finally, as pertains to driver behavior, a lane is only as narrow as it appears to be. When an unstriped parking lane is not full of cars, it effectively becomes a part of the adjacent driving lane, widening it perceptually by 7 feet or more, encouraging higher speeds. For this reason, Lancaster should change its practice of not marking the outside edges of its parking lanes.

Shared and Consolidated Lanes

It must also be noted that principally residential streets handling considerably less traffic may make use of a standard that is yet smaller. Across America, many historic neighborhoods contain narrow streets that contain two-way traffic in shared lanes as narrow as 12 feet wide. Generally, 16 – 20 feet is considered "slow flow," while 12 – 16 feet is considered "yield flow," or a "queuing street." Slow-flow geometry is appropriate for low volume, non-regional streets, and yield-flow geometry is used only on local streets serving principally freestanding houses. These streets are found in some of America's wealthiest historic neighborhoods, where the need for drivers to slow down as another car approaches—or even pull slightly into a parking lane—results in as extremely safe environment.

Such streets can be found throughout historic Lancaster, and they are among the safest streets in the City. Unsurprisingly, they are illegal. The Lancaster Subdivision and Land Development Ordinance calls for 10-foot driving lanes and 7.5-foot parking lanes on all local roads. Applying this rule would add a good 8 feet to the width of streets like Beaver and Andrew.

WHAT ARE SKINNY STREETS?

The City of Portland requires most newly constructed residential streets to be 20 or 26 feet wide, depending on neighborhood on-street parking needs. In the past, residential streets were required to be as wide as 32 feet. To achieve the benefits described below, the City reduced residential street widths.

Why create skinny streets in neighborhoods?

Allowing newly-paved residential streets to be narrower provides many benefits to area residents. Skinny streets help preserve neighborhood livability, while improving access to homes. Some benefits are:

Maintain neighborhood character.

Construction of a wide paved street to replace a narrow unimproved road can change a neighborhood's atmosphere. Skinny streets reduce the impact on slopes and contours, on yards and on neighborhood self-image.

Lower construction costs.

Construction of narrower streets costs less. This means that residents who want to improve existing streets are able to do so for less money and developers can create new neighborhood streets less expensively.

Save vegetation & trees.

In existing neighborhoods, narrower paving widths reduce the need to cut trees and shrubs along the street.

20 feet

26 feet

Reduce stormwater runoff.

Paved streets are a major source of stormwater runoff. Pollutants from autos, as well as fertilizer, pesticides and other contaminants, are collected in stormwater, which flows into storm sewers. Eventually, this dirty water reaches area streams and rivers. Reducing pavement reduces stormwater runoff and allows more water to soak directly into the ground.

Encourage traffic safety.

Narrower streets discourages non-neighborhood traffic and force drivers to slow down.

Encourage better land-use.

As stewards of our natural resources, we know that streets aren't the best use of existing undeveloped land. With skinny streets, in new developments we have more room to house our growing population while reducing the amount of land reserved for traffic use.

Who decides on a street's width?

If you live on an unimproved street, you may be considering forming a Local Improvement District (LID) to complete your street. With an LID, you and the other property owners on your street would pay for improvements, and the City would be responsible for future maintenance.

In that case, you and other participating property owners can help design what your street will look like. Collectively, you can decide if you want parking on one or both sides of the street. This will determine how wide the street will be.

In new neighborhoods, developers will select the street width they believe to be most appropriate within the city guidelines.

Can emergency vehicles reach my home?

The Fire Bureau participated in exercises in older neighborhoods with narrow streets. The Bureau found that street widths based on skinny street guidelines will provide adequate access for emergency vehicles.

How Can I Learn More About SKINNY STREETS?

The City of Portland's Office of Transportation has set up the Local Streets Outreach Program. If you would like more information, or if you're interested in a presentation about skinny streets, please contact

(503) 823-7046

Portland, Oregon's Skinny Streets program makes explicit that city's support of 12-foot two-way travel on low-volume residential streets.

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As noted, these streets share a lane, with no centerline. The absence of a centerline on wider streets has produced positive results as well. On streets with standard-width lanes, one recent study found that a removed centerline effectively lowered driving speeds by 7 MPH. This solution, too, is most appropriate to streets with limited traffic, and not principal thoroughfares. Many smaller streets in Lancaster already demonstrate this condition, and it is applicable to many others.

3. Avoiding One-Ways

Like in many American cities, Lancaster had much of its downtown converted to one-way traffic by the state DOT in the 1970s, most notably Prince, Queen, Duke, Lime, Walnut, Chestnut, Orange, and King. This transformation, by eliminating left turns across traffic and by allowing for synchronized signals, helped to speed the motion of cars through downtown. Unfortunately, it did so at the expense of pedestrian comfort and business vitality.

How One-Ways Work

People driving tend to speed on multiple-lane one-way streets, because there is less friction from opposing traffic, and due to the temptation to jockey from lane to lane. In contrast, when two-way traffic makes passing impossible, the driver is less likely to slip into the "road racer" frame of mind. Also, drivers turning onto one-ways from side streets have learned that, if they hit the gas, they can catch the tail end of the "green wave" of synchronized signals, and avoid waiting at a light. (This practice was referred to in meetings as "Take the turn and floor it," and is not mitigated by the current below-30-mph timing of the "green wave.") People driving also don't look both ways before turning onto the one-way street, since all traffic is coming from over only one shoulder. This means that people entering the crosswalk from the opposite direction are not seen until a conflict is imminent.

One-ways also have a history of damaging downtown retail districts, principally because they distribute vitality unevenly, and often in unexpected ways. They have been known to harm stores consigned to the morning path to work, since people do most of their shopping on the evening path home. They can also intimidate out-of-towners, who are afraid of becoming lost, and they frustrate locals, who are annoyed by all the circular motions and additional traffic lights they must pass through to reach their destinations.

Learning from the damage wrought by the one-way conversion, dozens of American cities are reverting these streets back to two-way. Lancaster is currently making this change to Mulberry Street, with Charlotte Street next on deck. A more comprehensive reversion is made difficult by the fact that six of the eight streets named above are controlled by PennDOT, which has historically shown little desire to dismantle its one-way systems.

The current one-way configuration provides the advantage of allowing people driving to ride a wave of green lights through downtown and to take left turns unimpeded by oncoming traffic. It provides the disadvantages of increasing danger to people walking and biking, undermining retail viability, lengthening trips, and confusing visitors. Each of these advantages and disadvantages effects different populations, so the choice between solutions is a political one, and must ultimately be made by weighing the interests of drivers passing through downtown against the interests of downtown residents, workers, and business-owners.

Potential Outcomes

To be intelligent, this political discussion must be informed by a consideration of Lancaster's urban vitality. Few people will argue that, in the heart of a city, the desires of commuters just passing through should trump the safety of people walking and the success of businesses. However, there are many people who reasonably fear that slowing down traffic might create such congestion that the city fails to function properly, and that all residents and businesses will suffer as a result. While this fear is reasonable, it is not based in fact. The experience of many dozens of cities all across America has been consistent: there is not a single record in the extensive annals of urban planning of a city's vitality suffering in any way from a one-way to two-way conversion. To the contrary: there are many reports of business success and a rebirth of street life, but never has the additional traffic friction presented by two-way streets caused a city to perform less well socially or economically.
One such success story, Vancouver, Washington, was famously covered in *Governing* magazine in 2009. Merchants credit a two-way reversion of their one-way main street with the revitalization of a struggling downtown. A similar experience was documented in Savannah, Georgia, where a conversion to one-way traffic on East Broad Street in 1968 resulted in a loss of almost two-thirds of all businesses. When the street was reverted to two-way in 1990, the number of businesses quickly rose by 50 percent.

If downtown is reverted back to its original two-way grid, several things will happen differently. First, the distribution of these drivers among two-way streets, with fewer opportunities for lane-jockeying, will result in a safer environment for all. Second, the more comforting "main street" experience offered to these drivers, and the time spent lingering at intersections, will make them more likely to shop or dine. Experiencing Lancaster as a place, and not just a conduit, they will be more inclined to spend a little time.

To be sure, there are some issues to be resolved. Trucks sometimes load and unload on these streets and the removal of the second lane will make this act impossible. Before any two-way conversions, the City must work with business owners to identify alternative loading zones within a reasonable distance. One hopes that merchants will be incited to support this effort by the data surrounding two-way conversion and retail success.

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The Return of the Two-Way Street

Why the double-yellow stripe is making a comeback in downtowns.

BY ALAN EHRENHALT | DECEMBER 2009

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Over the past couple of decades, Vancouver, Washington, has spent millions of dollars trying to revitalize its downtown, and especially the area around Main Street that used to be the primary commercial center. Just how much the city has spent isn't easy to determine. But it's been an ambitious program. Vancouver has totally refurbished a downtown park, subsidized condos and apartment buildings overlooking it and built a new downtown Hilton hotel.

Some of these investments have been successful, but they did next to nothing for Main Street itself. Through most of this decade, the street remained about as dreary as ever. Then, a year ago, the city council tried a new strategy. Rather than wait for the $14 million more in state and federal money it was planning to spend on projects on and around Main Street, it opted for something much simpler. It painted yellow lines in the middle of the road, took down some signs and put up others, and installed some new traffic lights. In other words, it took a one-way street and opened it up to two-way traffic.

The merchants on Main Street had high hopes for this change. But none of them were prepared for what actually happened following the changeover on November 16, 2008. In the midst of a severe recession, Main Street in Vancouver seemed to come back to life almost overnight.

In 2009, Governing Magazine documented some of the benefits of two-way reversion.

A similar challenge was faced by the City of Lowell, Massachusetts, population 108,000, when the two-way reversion of its downtown streets was proposed four years ago. At that time, it was said that the main retail corridor, Merrimack Street, could not accept eastbound traffic because its second westbound lane was needed for truck deliveries. Eventually, a servicing plan was completed, and just this past summer the full downtown two-way reversion took place—including Merrimack Street. Deliveries now occur in certain designated locations, and the entire transformation came off without a hitch.

<u>Recent Experience</u>

The most recently published report on this topic comes from Louisville, Kentucky, and is outlined in a report titled "One Way to Fix Louisville's Declining Neighborhoods," by Professor John Gilderbloom. This paper covers the experience of two Louisville Streets, Brook and First, that were reverted to two-way traffic a few years ago, and compares them to nearby streets (Second and Third) that remain one-way.

Here are some of the findings: along the reverted streets, a "significant reduction in crime, accidents, and an increase in property values, business profits, and bike and pedestrian traffic." Specifically, Brook Street saw a 36 percent reduction in car crashes and a 39 percent increase in property value. Car crashes on First Street dropped 60 percent. Meanwhile, on one-way Second and Third Streets, car crashes increased an average of 15 percent. And while crime increased 36 percent on Second and Third Streets, it dropped 23 percent on Brook and First.

Revenues to businesses on the converted streets have also risen significantly, with one restaurant doubling its table space. It is likely that the merchants of Lancaster, when presented with this information, will consider it worthwhile to relocate their deliveries. But convincing PennDOT to modify its roads will be another matter.

4. Limited Use and Length of Turn Lanes

As streets are restriped in Lancaster, they are sometimes marked with left-hand-turn lanes, which increase the efficiency of intersections. But left-hand turn lanes are by no means the standard approach to intersection design. They should be used only at intersections where congestion is caused by cars turning left.

In Bethlehem, PA, an unnecessary and overlong turn-lane has eliminated a block of curb parking severely impacting adjacent businesses.

Unlike left-hand turn lanes, exclusive right-hand turns lanes are rarely justified, and only make occasional sense where heavy pedestrian activity causes queuing right-hand turners to dramatically impede through-traffic. When unnecessary turn lanes are provided, the extra pavement width encourages speeding, lengthens crossing distances, and takes up roadway that could otherwise be used for on-street parking or bike lanes. When justified, turn lanes should be just long enough to hold the number of cars that stack in them in standard rush-hour conditions, and no longer, for the same reasons.

When one-way streets are reverted back to two-way, there is often a compulsion to insert many new left-hand turn lanes in fear of the congestion that may result from drivers having to turn across newly-opposing traffic. There will be certain intersections, where many drivers turn left, where such turn lanes are mandated. Many other intersections, however, present an uncertain scenario, and will have to be studied. The way to study these intersections is to stripe them *without* turn lanes and observe their performance; they can always be restriped to include turn lanes later if undue congestion arises.

5. Avoiding Swooping Geometries

Pedestrian-centric environments can be characterized by their rectilinear and angled geometries and tight curb radii. Wherever suburban swooping geometries are introduced, cars speed up, and pedestrians feel unsafe. The road network of any urban area should never be shaped around a minimum design speed, but rather should be designed to accommodate the turning motions of only the largest vehicles that will be using it on a daily basis.

The emblematic example of the application of highway-style swooping geometry to urban areas is the *slip lane,* as can be observed at both ends of McGovern Avenue, where many people are trying to walk from the Amtrak station. Rather than forming a T intersection with Prince Street or the Lilitz pike, the Avenue splits in a Y shape around a triangular "pork chop" in each location. The curving Y, appropriate to a highway on-ramp, tells drivers that they are not in a pedestrian environment, and forces people walking to cross the street in front of cars that are accelerating around a curve. Happily, this intersection is already planned to be rebuilt without slip lanes.

A less obvious example of swooping geometrics that has impacted Lancaster is the high-speed left-hand turn lane. There are two ways to stripe turn lanes: an urban way, in which the turn lane simply appears in the roadway, and a high-speed way, in which the principal through lane swoops right around a striped "no drive" zone before the turn lane begins.

This highway-style left-hand turn lane can be observed at the intersection of south Duke Street and Chesapeake, and also at the northern terminus of Mulberry Street. This latter facility seems flawed in both its configuration and its very existence. Since the intersection is a T, there is no opposing southbound traffic across the Harrisburg Pike which would cause left-turning cars to wait, delaying cars turning right. True, having two lanes to access the Pike allows a greater flow of vehicles than having just one lane.

But extremely light traffic volumes in this location make that increased volume completely unnecessary. The principal impact of this turn lane is to eliminate 150 feet of curb parking and encourage speeding.

On the left, an urban left-hand turn lane, created by eliminating about 50 feet of curb parking. On the right, a highway-style left-hand turn lane on Mulberry Street, where 150 feet of parking is eliminated thanks to a mid-street no-drive zone.

The presence of this type of turn lane is this location suggests that the process of intersection design at the City is essentially broken. Highway geometrics are being used in urban locations, and left-hand turn lanes are being inserted where they do not belong.

6. Including Bike Lanes

Cycling is the largest planning revolution currently underway. . . in only some American cities. The news is full of American cities that have created significant cycling populations by investing in downtown bike networks. Among the reasons to institute such a network is pedestrian safety: bikes help to slow cars down, and new bike lanes are a great way to use up excess road width currently dedicated to oversized driving lanes. When properly designed, bike lanes make streets safer for people who are biking, walking—*and driving.*

Safety—for All

This was the experience when a cycle track (protected two-way bike lane) was introduced on Prospect Park West in Brooklyn, NY. A 3-lane one-way street was converted to 2-lanes, parked cars were pulled 12 feet off the curb, and a cycle track was inserted in the space created. As a result, the number of weekday cyclists tripled, and the percentage of speeders dropped from about 75 percent of all cars to less than 17 percent. Injury crashes to all road users went down by 63 percent from prior years. Interestingly, car volume and travel times stayed almost exactly the same—the typical southbound trip became 5 seconds faster—and there were no negative impacts on streets nearby.

Experience in a large number of cities is making it clear that the key to bicycle safety is the establishment of a large biking population—so that drivers expect to see them—and, in turn, the key to establishing a large biking population is the provision of buffered lanes, broad lanes separated from traffic, ideally by a lane of parked cars. In one study, the insertion of buffered bike lanes in city streets was found generally to reduce injuries to all users (not just bicyclists) by 40 percent. Of course, buffered lanes need not be inserted everywhere. Often, in smaller cities, the insertion of just one prominent buffered facility can have a tremendous impact on cycling population.

The insertion of a cycle track on this Brooklyn street dramatically improved safety for all road users without reducing daily car through-put.

Economic Impacts

Additionally, bike lanes are good for business. A study in Portland, OR, found that customers arriving by bike buy 24 percent more at local businesses than those who drive. And merchants along 9th Avenue in New York City showed a 49 percent increase in retail sales after buffered bike lanes were inserted.

New York has dominated the biking headlines in recent years because of their recent investment under Mayor Bloomberg in a tremendous amount of cycle infrastructure. But many smaller and less "progressive" cities are making significant cycling investments, with the goals of reducing car dependence, achieving higher mobility at lower cost, and especially attracting young entrepreneurial talent. More than half of the states in the US already have buffered bike lanes as part of larger downtown networks. But Pennsylvania is well behind, especially Lancaster County, which has only one short bike lane to its credit, installed recently over the Fruitville Pike bridge.

The Vehicular Cycling Trap

This situation has not been helped by the fact that the biking conversation in Lancaster County was for many years dominated by groups advocating for a "vehicular cycling" approach to bicycle safety. Now becoming marginalized, the vehicular cycling philosophy, favored by athletic, experienced cyclists, advocates that bikes should mix with traffic, claiming the full lane when necessary, and not be relegated to separate facilities. The problem with vehicular cycling is not its relative safety—which has not been discredited—but whom it serves. John Pucher and Ralph Buehler summed up the predicament in their important paper, "Cycling for Few or for Everyone:"

> In the vehicular cycling model, cyclists must constantly evaluate traffic, looking back, signaling, adjusting lateral position and speed, sometimes blocking a lane and sometimes yielding, always trying to fit into the 'dance' that is traffic. Research shows that most people feel very unsafe engaging in this kind of dance, in which a single mistake could be fatal. Children as well as many women and elders are excluded. While some people, especially young men, may find the challenge stimulating, it is stressful and unpleasant for the vast majority. It is no wonder that the model of vehicular cycling, which the USA has followed de facto for the past forty years, has led to extremely low levels of bicycling use.

Low ridership is no guarantee of a low accident rate, as this five-year Lancaster County GIS Map of cycle collisions can attest. (Based on 2008 – 2012 PennDOT data.)

This conversation helps explain why, in a recent county survey, only 12 percent of cyclists counted were women. Fortunately, the City and County are together embarking this year on a comprehensive cycling plan. One can expect that any plan based on current best practices will advocate for a robust network of dedicated cycle facilities, including buffered lanes.

While a City/County cycling plan will be based on more thorough research, this Report does not shy away from making recommendations for specific facilities, for two reasons: first, because certain key challenges and opportunities surrounding cycling corridors became quickly apparent during the study; and second, because a central strategy of this effort is to identify excess street pavement that needs to be put to other use lest it encourage speeding. As already noted, bike lanes should often be inserted in streets just to narrow oversized driving lanes, whether or not they contribute to a comprehensive cycling strategy.

7. Continuous On-Street Parking

Whether parallel or angled, on-street parking provides a barrier of steel between the roadway and the sidewalk that is necessary if people walking are to feel fully at ease. It also causes people driving to slow down out of concern for possible conflicts with cars parking or pulling out. On-street parking also provides much-needed life to city sidewalks, which are occupied in large part by people walking to and from cars that have been parked a short distance from their destinations.

On-street parking is also essential to successful shopping districts. According to the consultant Robert Gibbs, author of *Urban Retail,* each on-street parking space in a vital shopping area produces between $150,000 and $200,000 in sales.

Most of the streets in downtown Lancaster have lost a significant amount of their parallel parking due to driving lanes that are either too wide or too many in number—that is, more than traffic counts would suggest are needed. Some of these streets have no parallel parking at all. On many other streets, parking spaces are missing due to what appears to be overzealous enforcement of a sight triangle requirement—ensuring that cars can see clearly around (and thus speed around) corners—or for no discernable reason at all.

Among the ten categories discussed in this section, each City has certain topics that are more or less relevant to its downtown, and more or less fixable. It is clear that, in Lancaster, the removal of curb parking spaces is the greatest easily reparable detriment to downtown walkability. In most cases, this parking has been eliminated because a two-lane one-way has lost half a block of parallel parking due to the addition of a very long turn lane. This condition occurs repeatedly on Prince, Queen, Orange, and King Streets, and results in long stretches of roadway in which the injury of one-way travel is made doubly detrimental through the insult of exposed sidewalk edges.

Bringing this parking back will contribute markedly to the safety and success of downtown. It is in recognition of the value of downtown parking that cities, including

Lancaster, regularly invest tens of millions of dollars in parking structures. Yet there is literally a parking structure's worth of missing curb spaces in downtown Lancaster. This unrealized asset—and the need for safer sidewalks—should compel the city to quickly make an inventory of all the places in the downtown where curb parking has been disallowed, to determine where it can be reinstated. The individual street redesigns that follow discuss some, but not all, of these many locations.

8. Continuous Street Trees

In the context of pedestrian safety, street trees are similar to parked cars in the way that they protect the sidewalks from the moving cars beyond them. They also create a perceptual narrowing of the street that lowers driving speeds. But they only perform this role when they are sturdy, and planted tightly enough to register in drivers' vision.

Recent studies show that, far from posing a hazard to motorists, trees along streets can actually result in fewer injury crashes. One such study, of Orlando's Colonial Drive, found that a section without trees and other vertical objects near the roadway experienced 12 percent more midblock crashes, 45 percent more injurious crashes, and a dramatically higher number of fatal crashes: six vs. zero.

While much of Lancaster has good canopy, many downtown streets lack adequate tree cover. This is not surprising given the cost of planting and maintaining them. These costs are easier to justify when one enumerates the many hidden benefits of shade trees, which include the absorption of storm-water, tailpipe emissions, and UV rays; the lowering of urban heat islands and air-conditioning costs; increased income streams to businesses; and dramatically higher real-estate values (and property tax revenue) on tree-lined streets.

This final item could perhaps provide the motivation necessary for a greater investment in tree planting and maintenance, as the data is compelling. A comprehensive study of the east side of Portland, OR found that an adjacent tree added 3.0 percent to the median sale price of a house, an increase of $8,870. Since there are more houses than street trees, each individual tree was deemed responsible for almost $20,000 in increased real estate value. Extrapolating to the city as a whole, the study's authors found that the presence of healthy street trees likely adds $15.3 million to annual property tax revenues. Meanwhile, the City pays $1.28 million each year for tree planting and maintenance, resulting in a payoff of twelve to one.

This twelve-to-one return on investment ignores all the other benefits provided by street trees including their contribution to pedestrian safety. It is hoped that a similar analysis conducted in Lancaster might be used to mandate an enlarged commitment to street trees.

When locating trees along Lancaster Streets, the City should approach the sight triangle requirement with the same skepticism already encouraged in the prior section on curb parking. First, it can be argued that reduced visibility around corners at intersections, far from increasing safety, can instead increase driver confidence and vehicle speeds.

Second, it should be noted that tree trunks, especially young ones, are narrow and do not obstruct views in a meaningful way. If obstruction remains a concern, then corner trees should be planted with their understory trimmed to a height of 5 feet, so that branches are above drivers' eyes. Meeting this objective may require that corner trees be planted at a slightly greater maturity than is the standard.

The general lack of consistent tree cover in the heart of downtown speaks to a recent history in which street trees were not afforded a high priority. Current City codes suggest that these days are behind us. However, an ideal spacing distance of no greater than 40 feet on-center is a more stringent requirement than the 50-foot standard currently contained in the City's development ordinance.

Finally, if the significant investment in the planting and maintenance of street trees is going to have the desired impact on the perceived and actual safety of pedestrians, it goes without saying that the trees need to be planted between the place where people walk and the place where people drive. One would think that this fact does not need mentioning, as the outer edge of the sidewalk has been the standard location for street trees throughout their entire history. Sadly, like so many traditional techniques that have been forgotten, the proper location of trees must be required by City ordinances, or someone will get it wrong.

That is the precise case in the new sidewalk alongside the Hospital's new parking garage on North Queen Street. Seven trees have been placed in expensive new grates on the wrong side of the sidewalk, where they force pedestrians around them in the direction of traffic. While probably too costly to replace with a proper design, such a strange and unprecedented layout should not be allowed to happen again.

New street trees along North Queen Street have been expensively planted in the wrong location.

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9. Replacing Unwarranted Signals with Mostly-All-Way Stop Signs

For many years, cities inserted traffic signals at their intersections as a matter of pride, with the understanding that a larger number of signals meant that a place was more modern and cosmopolitan. Recently, that dynamic has begun to change, as concerns about road safety have caused many to question whether signals are the appropriate solution for intersections experiencing moderate traffic. Research now suggests that four-way stop signs, which require motorists to approach each intersection as a negotiation, turn out to be much safer than signals. Unlike at signalized intersections, there is considerable eye-contact among users. People driving slow down, but never have to wait for more than a few seconds, and people walking and biking are generally waved through first.

While it would be useful to have more research, the one study on this subject is compelling. It is described in Persaud *et. al.:* "Crash Reductions related to Traffic Signal Removal in Philadelphia" (1997). This study recounts the 1978 removal of 462 traffic signals due to a 1977 state ruling stating that signals were not warranted on intersections with an annual average daily traffic of less than 9000 on the major street or less than 2500 on the minor street. 199 of these signals had adequate data to make it into the study, and 71 non-converted intersections were identified as a control group.

In almost all cases, the signals were replaced by all-way stop signs. The overall reduction in crashes was 24 percent. Severe injury crashes were reduced 62.5 percent overall. Severe pedestrian injury crashes were reduced by 68 percent. While some pedestrians and drivers prefer signalized intersections, this data is too conclusive to ignore. Until a contradicting study is completed, cities should be compelled to conduct an audit of current signalization regimes to determine which signals may be eliminated.

When converting signals to stop signs, the City is faced with the choice of two-way and all-way stops. Clearly, if one street contains tremendously more traffic than the other, a two-way stop makes more sense. However, there is no doubt that all-way stops should be used wherever they do not pose an undue burden, as they are considerably safer. In studying the conversion of two-way stops to 4-way, "the collective results of numerous published studies of such conversions established that crashes are reduced by approximately 40 – 60%, and injury crashes are reduced by 50-80%." (Hauer, 1985)

One great byproduct of converting signals to stops is money saved: stop signs are much cheaper to install and maintain than signals. This fact is important to keep in mind as one considers the conversion of downtown streets from one-way to two-way. The principal cost of these reversions is signal reorientation. However, while signals are almost always required where multilane one-ways intersect, they are often not required where two-lane two-ways intersect. Moreover, when two-lane two-ways cross at a 4-way stop sign, there is no need or use for a left-hand turn lanes, and that pavement can be used instead for parking or cycling.

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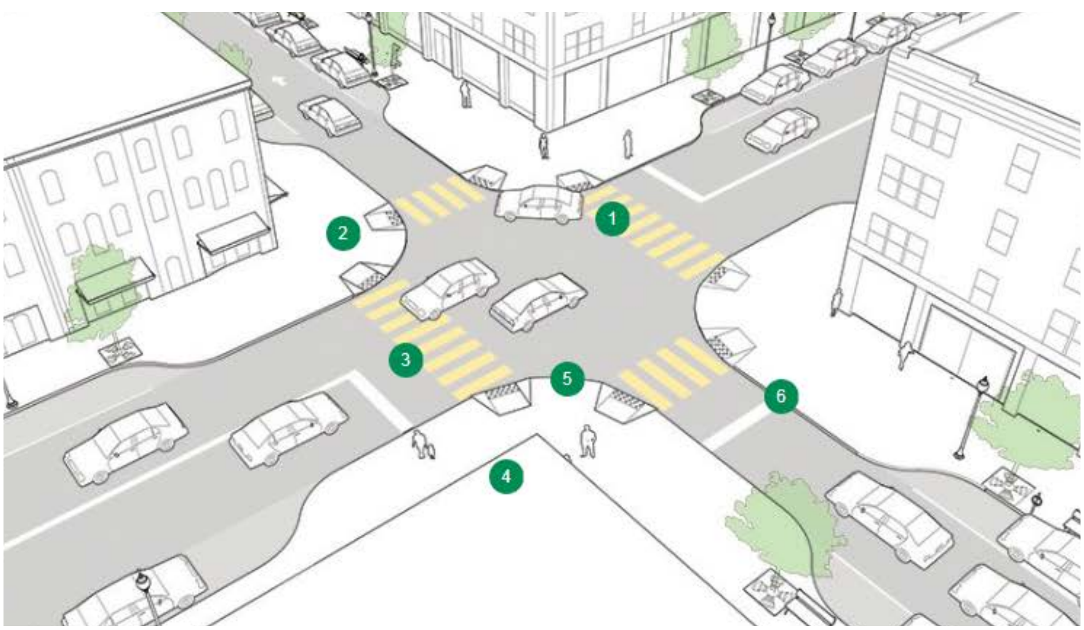
The savings that accrue from replacing signals with stop signs are a factor that advocates for making two-way reversions in a more comprehensive way, rather than piecemeal. It is only when intersecting multilane one-ways are *both* converted to two-way that signals can be eliminated.

10. Proper Crosswalks, Signals, and Lighting

One does not need to commission a walkability study to understand the need for proper crosswalks at all intersections. Yet, as in many cities, crosswalks in Lancaster are not consistently well marked, and are mostly not up to the current best-practice standard of striping. Established and illustrated by the National Association of County Transportation Officials, that standard includes the following (Source: *NACTO Urban Street Design Manual):*

1. Stripe all signalized crossings to reinforce yielding of vehicles turning during a green signal phase. The majority of vehicle--pedestrian incidents involve a driver who is turning.
2. Stripe the crosswalk as wide as or wider than the walkway it connects to. This will ensure that when two groups of people meet in the crosswalk, they can comfortably pass one another. Crosswalks should be aligned as closely as possible with the pedestrian through zone. Inconvenient deviations create an unfriendly pedestrian environment.
3. High-visibility ladder, zebra, and continental crosswalk markings are preferable to standard parallel or dashed pavement markings. These are more visible to approaching vehicles and have been shown to improve yielding behavior.



The numbers above correspond to the recommendations here.

4. Accessible curb ramps are required by the Americans with Disabilities Act (ADA) at all crosswalks.
5. Keep crossing distances as short as possible using tight corner radii, curb extensions, and medians. Interim curb extensions may be incorporated using flexible posts and epoxied gravel.
6. An advanced stop bar should be located at least 8 feet in advance of the crosswalk to reinforce yielding to people walking. In cases where bicycles frequently queue in the crosswalk or may benefit from an advanced queue, a bike box should be utilized in place of or in addition to an advanced stop bar. Stop bars should be perpendicular to the travel lane, not parallel to the adjacent street or crosswalk.

Additionally, Street lighting should be provided at all intersections, with additional care and emphasis taken at and near crosswalks. Independent of safety, proper street lighting is also important for pedestrian comfort. While darkness increases danger and fears of crime, an excess of lighting, especially harsh-spectrum lighting from tall fixtures *(a.k.a Scorched Earth Policy)* can also deter walking. The use of store-window lights, wall-lights, and human-scaled streetlights is a welcome improvement to conventional large-fixture lighting schemes. The East King Improvement District provides a successful example of the benefits of investment in appropriate lighting.

One practice seen occasionally in Lancaster that bears modification is the limiting of crosswalks to only one side of an intersection. As seen above, every sidewalk approaching an intersection should lead directly to a crosswalk, so that people walking do not have to cross one street in order to cross another. The goal of reducing opportunities for conflict has led to crosswalk segments being eliminated in segments of a number of oddly-shaped intersections, such as where Conestoga meets Church and Queen, south of downtown. While this approach makes sense in theory, it creates an environment in which a lot of people jaywalk in front of drivers who are not prepared to encounter them. In contrast, an intersection in which every pedestrian desire-line receives a crosswalk is one in which people driving are better alerted to the presence of people walking.

Also worth noting is that, on one-way streets, the street signs at intersections must reflect that street names are relevant to pedestrians as well as drivers. Currently, people walking “the wrong way” along one-way streets are kept in the dark by street-name signs that face only oncoming traffic. Whatever the future of street direction downtown, all intersections must receive street-name signs that face in both directions.

Finally, one source of confusion for both pedestrians and drivers is the sporadic use of “midblock” crossings downtown. In Lancaster’s case, these are not truly mid-block, since they occur at the smaller streets that make up half of the City’s downtown grid. Since they are not provided consistently, drivers and pedestrians are not certain about how to behave in those midblock locations where they are missing. Many drivers actually are not aware that the state law requiring them to yield applies to all intersections, not just those with bold signage.

The proper solution to this confusion would seem to be the consistent use of the same midblock markings and mid-street signage on all such crossings in the heart of the downtown. This heart should probably be defined as from Mulberry to Lime Street and from Chestnut to Vine Street, in which case such markings and signage should be located wherever water Market, Christian, Cherry, Fulton, Marion, Grant, or Mifflin Street cross Prince, Queen, Duke, Orange, or King Street.

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A Useful Walk

As Jane Jacobs noted, "Almost nobody travels willingly from sameness to sameness. . . even if the physical effort required is trivial." For people to choose to walk, the walk must serve some purpose. In planning terms, that goal is achieved through mixed use. Or, more accurately, placing the proper balance of the greatest number of uses all within walking distance of each other.

An essential step towards achieving better walkability, therefore, is to consider all of the uses present in the heart of your city, and to see which uses are lacking or in short supply. These uses include office, housing, retail, dining, entertainment, hospitality, schools, recreation, worship, and others. The better these uses can be balanced in your downtown, the more walkable it will be. In most downtowns, the use that is most underrepresented is housing.

Ample Housing

Lancaster must attain a larger supply of housing to achieve a proper balance of activities downtown. Achieving this outcome is already a priority of the City, but many impediments exist, foremost among them cost. Given all the friction associated with downtown development—from tight sites to historic structures to concerned neighbors—it is simply more expensive to build in dense, historic areas. This is not a great barrier to creating luxury housing, but there is a very small market for luxury housing in downtown Lancaster; the people most ready to live downtown are recent college graduates and empty nesters of moderate income, and they seek comfortable apartments at an attainable cost.

Also ideal candidates for downtown living are students at the Pennsylvania College of Art and Design (PCAD) and Millersville University. With 225 full-time students, PCAD has already successfully built some housing in the Steinman Lofts on W. King Street, and hopes to provide more. Millersville University, planning to build its downtown presence, offers an even greater potential. More than a 3400 of its 8400 students live on or around campus, and many could be expected to chose downtown living if it could be provided affordably. Right now, that is difficult. Some recommendations for improving this situation are provided ahead.

Market-Rate Parking

Parking provision can contribute to the usefulness of the city in many ways. On-street parking is cherished by merchants, who understand that many people need to be enticed by curb parking in order to shop and dine. As noted above, each on-street parking space in a vital shopping area produces between $150,000 and $200,000 in sales. With this number in mind, it is concerning that the study area includes room several hundred additional parking spaces that are currently missing. These can be achieved mostly by right-sizing streets and driving lanes so that they properly invite their current volume of drivers to travel at the desired speeds, a focus of this report.

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Also central to the usefulness of parking is avoiding overcrowding at curbs and the circling traffic that results from the most desired parking spaces being underpriced. The parking expert Don Shoup, in *The High Cost of Free Parking,* documents how fully 30 percent of traffic in many downtowns consists of people circling for parking, and how merchants suffer when underpriced parking results in a lack of curb vacancies. A pro-business approach to the hourly pricing of parking downtown suggests some significant changes to the City's current policies and practices, as will be discussed ahead.

Useful Transit

Transit service can play a large role in a downtown's usefulness, as it grants pedestrians access to a much larger proportion of their daily needs and destinations, freeing them from the burden of car ownership. In Lancaster, most transit service exists to serve those who are not able to own or operate a car—*transit by need.* These buses are essential, but can be made much more robust with the addition of a useful route that actually provides an experience that is competitive to driving, thus attracting a broader ridership—*transit by choice.* The Downtown Circulator, now being put to pasture after a less than successful run, was created to provide that option, but was not managed in a way that allowed it to thrive. A downtown trolley has also been suggested in its place. How this discussion is resolved will have considerable impact on the future walkability of downtown.

Wayfinding

Finally, even the most mixed-use, well-managed, and well-connected downtown will fall short of its potential utility if it is not clearly legible; locals and visitors alike need to be able to find their way in and out of downtown. If arriving by vehicle, they must be directed clearly to key destinations and to public parking. If moving around on foot, they must be directed clearly among prime pedestrian activity centers. Lancaster could perform somewhat better in both of these categories.

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A Comfortable Walk

The need for comfortable walk is perhaps the least intuitive part of this discussion, because it insists that people like to be *spatially contained* by the walls of buildings. Most people enjoy open spaces, long views, and the great outdoors. But people also enjoy – and need – a sense of enclosure to feel comfortable walking.

Evolutionary biologists tell us how all animals simultaneously seek two things: prospect and refuge. The first allows you to see your predators and prey. The second allows you to know that your flanks are protected from attack. That need for refuge, deep in our DNA from millennia of survival, has led us to feel most comfortable in spaces with well defined edges. This issue has been discussed from before the Renaissance, in which it was argued that the ideal street space has a height-to width ratio of 1:1. More recently, it has been suggested that any ratio beyond 1:6 fails to provide people with an adequate sense of enclosure, creating a *sociofugal* space: an environment which people want to flee.

Therefore, in addition to feeling safe from automobiles, humans are not likely to become pedestrians unless they feel enclosed by firm street edges. This is accomplished in several ways:

Streets Shaped by Buildings

The typical way in which cities shape streets is with the edges of buildings that pull up to the sidewalk. These buildings need to be of adequate height so that the 1:6 rule is not violated, ideally approaching 1:1. Gaps between buildings should not be very wide. If a street is intended to be walkable, then no building along it should be allowed to sit behind a parking lot.

No Exposed Surface Parking Lots

Most American cities suffer from the windswept spaces created where historic buildings have been torn down to provide ample surface parking. These parking lots are often the single greatest detriment to pedestrian comfort, and city codes and private land-use practices must be reviewed in order to fundamentally alter the conditions that lead to their proliferation. Among these are the on-site parking requirement, which should ideally be replaced by a regime that treats parking as a public good, provided strategically in the proper locations to encourage more productive land use.

Some streets in the study area contain only one or two parking lots that mar an important and otherwise viable pedestrian trajectory; these lots should be made high-priority development targets. Conveniently, it is not necessary to eliminate such parking lots fully; rather, only the front edge needs to be replaced by a building against the sidewalk. Since 60 feet is the typical thickness of a center-corridor residential building, this typically means that only a single bay of parking must be eliminated.

Street Trees

Already mentioned under Safety, street trees are also essential to pedestrian comfort in a number of ways. They reduce ambient temperatures in warm weather and reduce the effects of wind on cold days. Trees also improve the sense of enclosure by "necking down" the street space with their canopies. A consistent cover of trees can go a long way towards mitigating the impacts of an otherwise uncomfortable street, but the trees must be substantial. The City's tree list should be reviewed and purged of any species that is merely decorative and/or fails to offer the microclimate impact of a large shade canopy.

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An Interesting Walk

Finally, even if a walk is useful, safe, and comfortable, people will not chose to go on foot unless it is also at least moderately entertaining. There needs to be something interesting to look at.

Humans are among the social primates, and nothing interests us more than other people. The goal of all of the designers who make up the city must be to create urban environments that communicate the presence, or likely presence, of human activity. This is accomplished by placing "eyes on the street," windows and doors that open, and avoiding all forms of blank walls. Lancaster's Bulova building is a prime example of how designers, for a while, forgot this rule.

As bad as blank walls are the edges of structured parking lots, which must be shielded by a habitable building edge, at least at ground level. Cities that support walkability do not allow any new parking structures to break this rule in their designated walkable corridors. Lancaster's biggest challenge is that regard is the south façade of the Prince Street Garage, which deadens almost an entire block of Orange Street. New parking decks like the one on North Queen Street show that, while the City may require high-quality facades, it has no rule in place to ensure that parking structures receive active uses at the street edge—a standard practice in other cities.

The activity that is placed against the sidewalk is also important. Retail use is much more interesting than office or residential use. Moreover, successful retail desires connectivity, so the goal of continuous retail against designated streets needs to inform planning decisions. The gap in this connectivity that exists between the two key commercial segments of Queen Street is one of the biggest challenges to walkability downtown Lancaster. Again, the Bulova building is the culprit.

A final enemy of pedestrian interest is repetition. The era of the multi-block mega-project is fortunately over, but cities must take pains not to allow any single architectural solution to occupy more than a few hundred feet of sidewalk edge. Boredom is another reason why "almost nobody travels willingly from sameness to sameness," and multi-building developments should be asked to distribute schematic design responsibility to multiple architects (even within the same firm), to avoid a city-as-project outcome. Many hands at work is another way to suggest human activity, especially when the number of humans on the sidewalk is less than ideal.

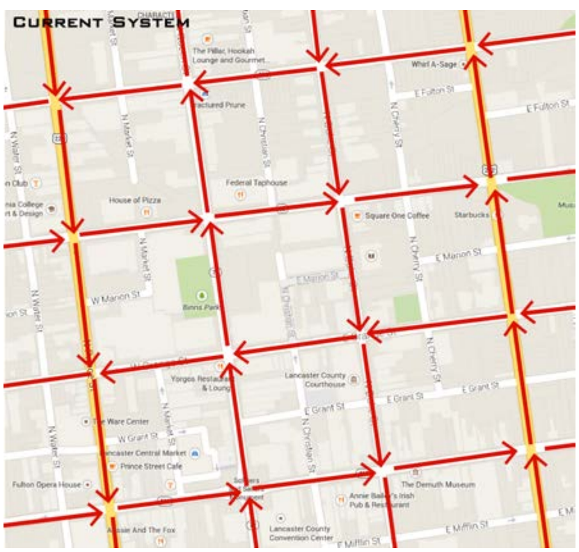
PART II. A SAFE WALK

A Strategy for Street Redesign

By the reasoning already put forward in this document, the majority of the streets in downtown Lancaster are in need of a redesign. This assessment is presented with an understanding that changes to streets often come slowly and sometimes at considerable expense. But they do come—routine deterioration demands resurfacing, which offers the opportunity to restripe—and sometimes a proper understanding of the value of safer streets causes them to come more quickly. Furthermore, a protocol which focuses on restriping rather than rebuilding, like the one that follows, can allow for dramatic change to occur at a reasonable cost.

One-Ways

The biggest question surrounding the future of traffic in downtown Lancaster remains the potential reversion of its one-way pairs back to two-way traffic. Evidence already presented makes it clear that such a reversion would have a dramatically positive impact on the safety and success of the downtown, with only limited and ultimately negligible impacts on traffic. Unfortunately, most of Lancaster's downtown one-way streets are not controlled by the City. They are, rather, the property of the Pennsylvania DOT, the organization that introduced one-way traffic to many Pennsylvania downtowns in the 1970s, and which has shown only a limited willingness to revert these one-way systems back to two way.

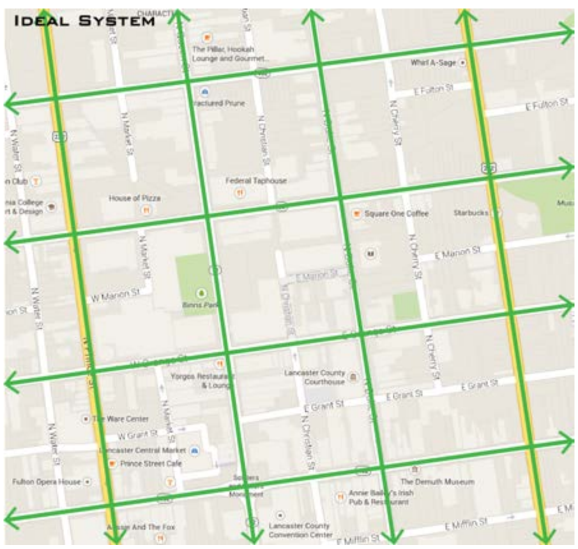


Currently, all significant downtown streets hold one-way traffic.

Since PennDOT wishes to limit traffic congestion, and since it believes that any reduction in capacity will result in increased congestion, it is easy to understand why it would tend to question any request to make its highways handle less traffic. For this reason, it is difficult to be hopeful about the success of an effort to revert many of Lancaster's one-way streets back to two-way travel, as beneficial as this would be.

Additionally, one must be wary of the law of unintended consequences. In this case, the greatest risk to two-way reversion is probably that PennDOT, in order to preserve as much capacity as possible, would insist on long left-hand turn lanes at every intersection, and perhaps right-hand turn lanes as well. These extra lanes would jeopardize the provision of curb parking, already limited, and essential to downtown success. It is important that any proposal to DOT for two-way reversion, in the short or long term, include as a provision that all left-hand turn lanes be kept very short and that no right-hand turn lanes be provided.

Acknowledging that a significant reversion of PennDOT streets to two-way traffic is both unlikely and fraught with risk, it is nonetheless useful to discuss what the proper outcome should be. Here the discussion is fairly simple. The diagram above shows the configuration of the streets in the downtown core. All are one-way. Based on experience in other cities, there can be little doubt that the ideal reconfiguration, from a safety and vitality perspective, would be a complete reversion to two way travel, as shown below.

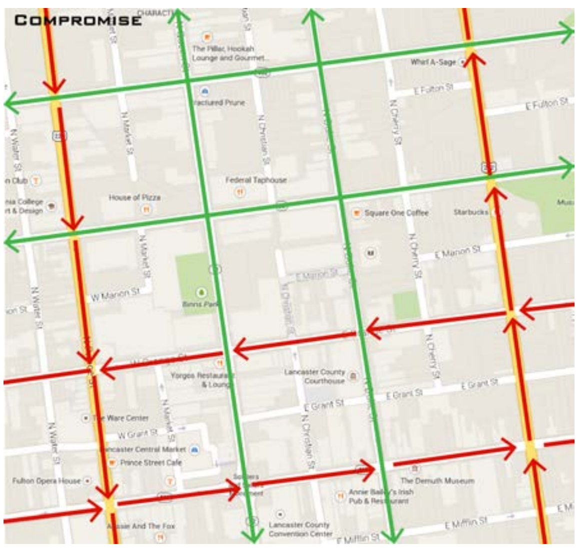


Evidence from other cities suggests that the ideal configuration, from a safety and walkability perspective, would be a complete reversion to two-way traffic.

Of these streets, Walnut and Chestnut have the good fortune of not belonging to PennDOT, and are thus more easily reverted to two-way traffic. We will discuss these further under *Cycle Facilities,* ahead. Among the remaining streets, it is useful to establish a priority, so that a compromise with PennDOT might be accomplished in the future.

Considering the two one-way north-south pairs, Prince & Queen, and Dike & Lime, a look at the map reveals something that is often forgotten: the real partner of Prince is not Queen but Lime, which shares its designation as Pennsylvania 272. Thanks to the northeast trajectory of Church Street, northbound traffic on the Willow Street Pike has the option of continuing north on either Queen or Lime Street, and Lime is the official route.

This fact is important, because Queen St. is more centrally located and more commercially active than Lime Street, and would benefit much more from a two-way reversion. For this reason, the first pair of streets to be submitted to PennDOT for reversion should be Queen and Prince, as suggested in the diagram below.



Walnut and Chestnut, City-owned, are the prime candidates for conversion after Mulberry and Charlotte. Among the PennDOT-owned thoroughfares, the lowest-hanging fruit is the Queen/Duke couplet.

Next, acknowledging that—due to the train track to the north and the river to the south—east-west travel has fewer bottlenecks than north-south travel, we can see that the next reversion should be the east-west pair of King and Orange, as shown below.

Since east-west traffic is less constrained then north south, the next pair to revert would be King and Orange.

Often, when such reversions are proposed, people point to the fork where the two one-ways diverge from their two way source as an impediment to a two-way reversion. “How will we resolve traffic motions at the fork?” they ask. The answer is that such motions are almost always easily resolved one of two blocks back from the divergence. In the case of the Colombia/King/Orange fork, traffic patterns could be rerouted as shown here, by changing the direction of Marietta and introducing two-way travel to its east.

Current Condition

Proposed Resolution

The above Before and After diagrams demonstrate one way to resolve the western end of a two-way King/Orange couplet.

Describing this priority of reversion—Chestnut & Walnut; Queen & Duke; King & Orange; and then finally Prince & Lime—is not meant to imply that reversion should be accomplished piecemeal in this fashion, for a good reason. One of the largest costs in reverting one-ways to two-ways is the reconfiguration of traffic signals. If a north-south pair is reverted in a first phase, and an east-west pair is reverted in a second phase, then the four intersections where they meet will need to be *re-signalized* twice, a real waste of public funds.

Additionally, if an intersection is designated as a good location for a four-way stop sign instead of a signal, this conversion cannot occur until *both* streets entering the intersection are reverted to two-way. Therefore, to avoid waste and maximize savings,

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the hierarchy described above should be applied in reaching a determination of which streets should be reverted to one way, to be accomplished in one fell swoop.

All of that said, this is a short term study. As such, it has to be realistic about what can be accomplished in the next three to five years, and that limits its ambition. It would seem that a realistic assessment of the willingness of PennDOT to revert its streets to two-way leads us to look elsewhere for a short-term win. Hopefully, this study will provide fodder to restart the conversation with PennDOT in earnest, with the goal of a long-term reversion of some or all of these one-way pairs. As that conversation proceeds, there are other, less contentious requests to be made of PennDOT that may yield major positive impacts in the short term.

The Strategy

So, as we plan a strategy for a long term two-way reversion, we have to look for the low-hanging fruit: what is a winning plan for improving the walkability of downtown Lancaster's PennDOT streets in the short run? It would seem that the answer lies in the difference in walkability—including perceived safety and commercial viability—that can be easily spotted on different segments of most DOT streets. This distinction can be found along many blocks, but is perhaps more easily noticed on Queen Street north of the monument.

Here, between King and Orange Streets, we are presented with two environments that could not be more different. On the southern two-thirds of the block, two driving lanes are flanked by two parking lanes, resulting in relatively low-speed traffic, protected sidewalk edges, and a good place for walking, shopping, and potentially dining. On the northern third of the block—for almost 200 feet—the addition of a long right-hand turn lane has eliminated all curb parking, completely exposing pedestrians to three wide lanes of high-speed traffic. It is hard to imagine a worse environment for walking, shopping or dining. What a difference a line makes!

The ideal reconfiguration of these long segments of three-lane travel, is the complete reversion to two-lane traffic, accomplished by eliminating all extra turn lanes. This change is more easily argued on some streets than others, based on traffic volumes. The leading transportation planning firm Nelson/Nygaard estimates that each lane in a non-hierarchical downtown grid such as Lancaster's (in which no one direction of flow dominates) is a bit over 500 cars per peak hour. This number suggests that additional turn lanes are only needed in streets experiencing significantly more than 1000 peak-hour trips.

Looking at the most congested blocks of the principal downtown streets, we see the following peak-hour vehicle counts:

Prince	1261
Queen	1052
Lime	876
Walnut	1093

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Chestnut	651
Orange	984
King	798

This tally suggests that, if optimally signaled, only Prince Street is likely to depend heavily on turn lanes to function properly at current volumes. Queen, Walnut, and Orange are borderline, while Lime, Chestnut, and King are well below the 1000-car threshold. Indeed, King Street's number is surprisingly low, given that so much of it has been made three-lanes wide, at the expense of parking, comfort, and safety.

But making short-term progress is all about compromise, so this report does not suggest the removal of any turn lanes. Rather, what it recommends is simply the *shortening* of turn lanes, which are in most cases remarkably long. Understanding that the perfect is the enemy of the good, and that every foot of protected curb counts, it would seem both reasonable and proper to make a standardized request to PennDOT across the full downtown, that no turn lane facility be longer then 80 feet long.

This 80-foot number is somewhat arbitrary, but it is a fairly common measure, and is offered as a compromise between something shorter and something longer. It should consist of about 40 feet of car storage and about 40 feet of taper zone, beyond which parallel parking could be reintroduced along the curb. Requiring no new signalization, it could be accomplished piecemeal over time, as streets are normally restriped and resurfaced, at essentially no additional cost. That said, there are many places, like along King Street, where it would make sense to invest in this change immediately.

This simple request—for shorter turn lanes throughout downtown—is here introduced under the title of *The Strategy,* in the hope that it can be understood as simple, meaningful, and achievable in the short term. Its very conservative nature—some would call it unambitious—does not mean that PennDOT will not resist it energetically. Inevitably, the agency will call for a full traffic study, and that study will inevitably show a diminished Level of Service (LOS) downtown. LOS is a simple measure of the free flow of traffic, which will naturally be lowered by any reduction in capacity. It is also a measure of the crippling stress which surface highways place upon urban centers. We must remember that, among experienced city planners, LOS stands for *Lack of Success.* No thriving downtown has a high LOS, so the first step in achieving a more vital downtown core will be rejecting that measure as the principal determinant of what is possible.

How *The Strategy* impacts the design of each street in the downtown in detailed in the street-by-street recommendations that follow. These recommendations are summarized in the diagram above, which can be used as a basis for discussions with PennDOT.

Shortening turn lanes downtown, so that the street segments shown above are two (rather than three) lanes wide, will have a minimal impact on traffic flow and a significant impact on downtown success.

Other Easy Fixes

As unambitious as it may be, *The* Strategy is likely to incite a traffic study, and opposition. It is hoped and expected that the people of Lancaster will prevail upon PennDOT to welcome a very slight Level of Service reduction in order to make the downtown less dangerous and more successful. However, it is comforting to acknowledge that there are many other significant street reconfigurations that will improve walkability without the slightest sacrifice in LOS. These opportunities exist as a result of four conditions: streets with too many lanes; lanes that are too wide; curbs missing parking; and high-speed geometries.

<u>Streets with Too Many Lanes</u>

When a street's capacity for traffic far exceeds its traffic volumes, that street's extra lanes accomplish nothing but to encourage speeding and endanger pedestrians. There are some streets, already discussed, where capacity exceeds volume by only a limited amount.

Other streets, however, have a capacity (i.e. number of lanes) that seems to bear no relationship to that street's limited role in moving vehicles. On these streets, a lane of traffic an be converted to other uses—typically biking or parking—without creating any congestion whatsoever.

The prime such thoroughfare in downtown is Church Street, which, at 494 peak-hour vehicles, could properly be one lane wide, rather than its current three. An additional lanes can also be found on Chesapeake and South Broad Streets, whose traffic volume falls far short of demanding the current three-lane configuration.

Lanes That Are Too Wide

As already discussed, lanes of excessive width encourage speeding and endanger pedestrians while doing nothing to increase capacity. They represent a lose-lose-lose proposition, and provide a similar opportunity to put asphalt to better use, typically biking or parking. Understanding that a ten-foot lane is ideal, and narrower is possible, we can see how many Lancaster streets need to be restriped for safety. These include: Mulberry, Charlotte, Prince, Queen, S. Duke, Church, N. Broad, James, Lemon, Walnut, Chestnut, Orange, King, Chesapeake, Hershey, and the Harrisburg Pike—almost every street in the study area, and several beyond.

Detailed ahead, these thoroughfares fall into several categories. The typical downtown street holds in 40 to 42 feet what most American streets hold in approximately 35 feet: two lanes of driving and two of parking. Mulberry, Charlotte, James, Lemon, Walnut, and Chestnut, for example, could all sacrifice 6 feet to a bike lane while still providing ample 10-foot driving lanes. This fact is already acknowledged in the City's redesign for Mulberry, which inserts a cycle lane.

Other streets, like Broad, S. Duke, Chesapeake, and Hershey, simply include inexplicably gargantuan lanes—15 to 20 feet wide—that also demand restriping to be safe. Finally, many of the PennDOT streets already discussed under *The Strategy* also commit the sin of over-wide lanes. A typical example would be Prince Street north of Lemon, where a roadway more than 34 feet wide holds one 7-foot parking lane instead of two, resulting in lanes wider than 13 feet. This condition exists, here and elsewhere, most likely because PennDOT's current standard for a parking space is 8 feet, rather than the 7 feet that can be found throughout downtown Lancaster.

How can we convince PennDOT that a 34-foot wide street can have parking on both sides? Here's an idea: bring them to Lime Street (at Grant Street), also known as PA 222, where two driving and two parking lanes fit into a mere 33 feet of pavement. If you count the driving lanes as 10 feet wide, then this street has parking lanes of only 6.5 feet. Conversely, applying a more standard parking lane width of 7.5 feet results in a street with 9-foot driving lanes. Any way you slice it, this location demonstrates that any street wider than 33 feet can hold parking on both sides without providing a standard inferior to a major PennDOT thoroughfare.

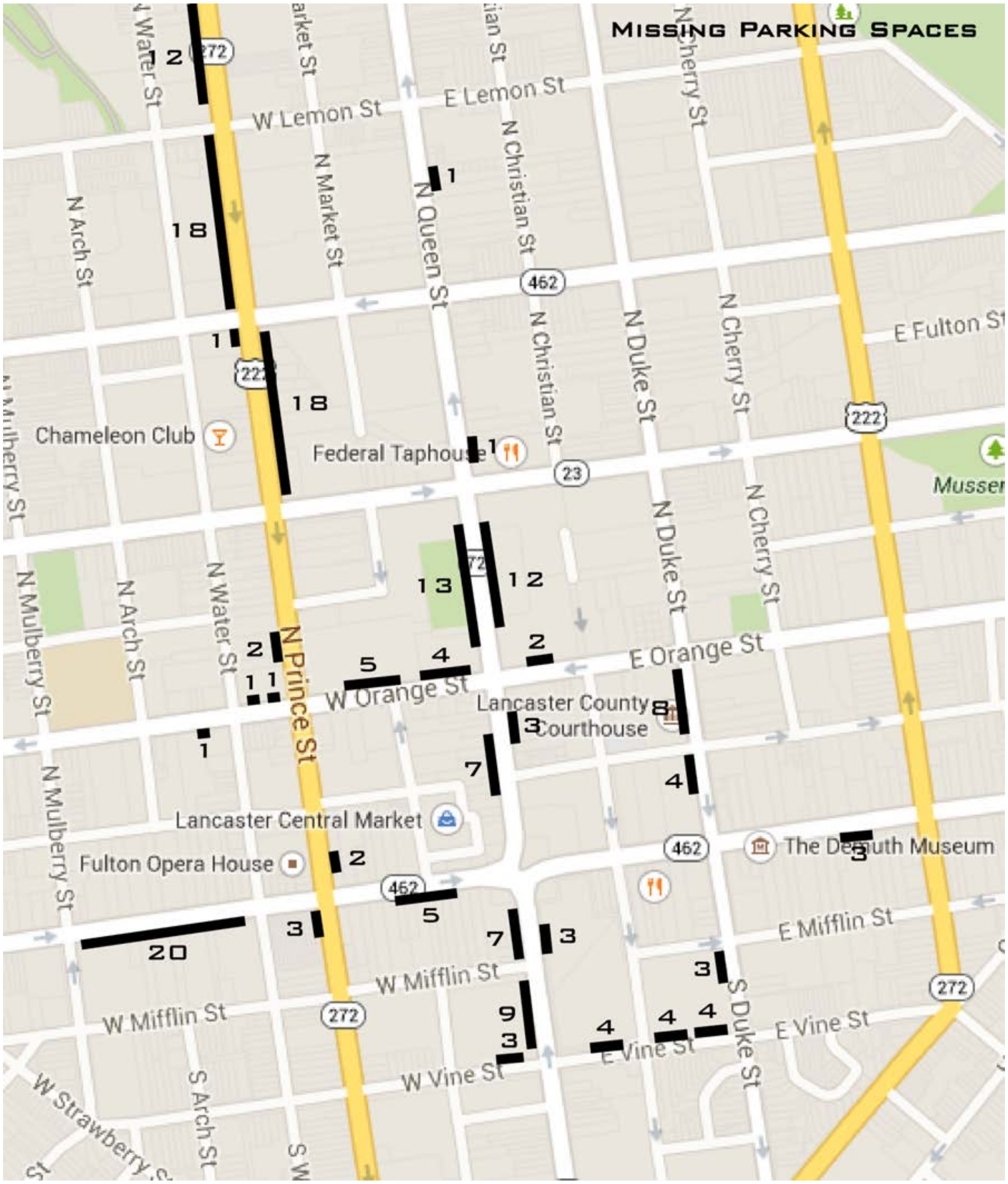
Expanding this standard to a more conventional 10-foot driving and 7-foot parking leads to the conclusion that many PennDOT streets have room for missing parking, biking, or other uses.

Curbs Missing Parking

Additionally, many streets in Lancaster do have proper parking lanes, but parking is prohibited in those lanes for a variety of reasons. Foremost among these is the sight triangle requirement, which seems to be enforced excessively. For example, on King Street between Duke and Lime, two small parking lot driveways have eliminated parallel parking from the south curb for a stretch of more than 120 feet, resulting in what functions as a double-wide driving lane. The same circumstances can be found on Vine Street and elsewhere.

Similarly, there seem to be some locations where bus stops are over-long or perhaps unnecessary. It is worth investigating whether bus stops make sense on Queen Street within a block of the central bus station, and whether three bus stops in a row are needed on Duke Street by the Lancaster County Courthouse, resulting in 200 feet of unprotected curb. Adequate bus stops are essential to walkability, but they undermine walkability—and thus bus ridership—if they eliminate more curb parking than necessary.

All told, supplementing the parking spaces liberated by *The Strategy* with those enabled by proper lane widths, and those that just seem to be missing unnecessarily, results in the diagram on the next page. This diagram should be a starting point for a more comprehensive and careful inventory of where curb parking can be reintroduced in downtown Lancaster.



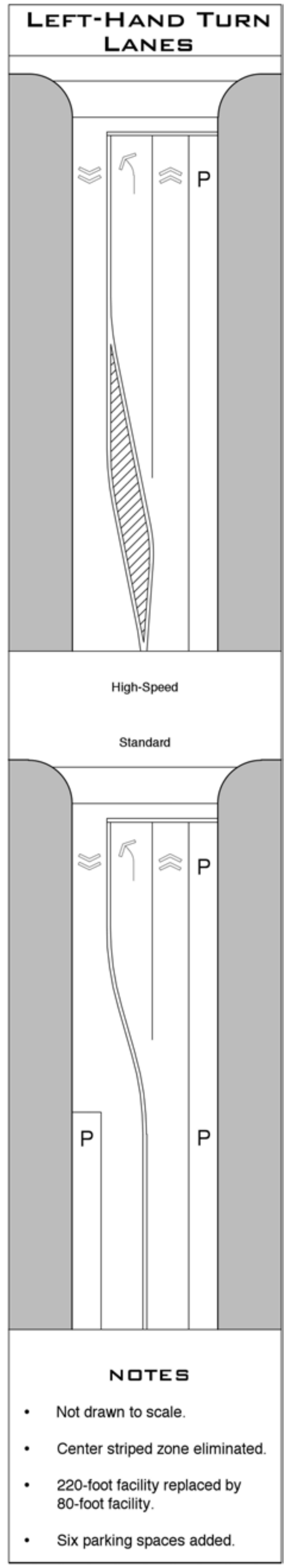
A quick count of potentially missing parking spaces in the downtown adds up to more than 160. Building these parking spaces into a new structure would cost more that $3 million.

High-Speed Geometries

Already discussed under *Avoiding Swooping Geometries,* slip lanes have no place in urban centers, and can be put to better use, typically as curb extensions. Right-hand turn lanes, similarly, add only marginal increased capacity on two-way streets like the Harrisburg Pike, to the tremendous detriment of pedestrian safety and comfort. Right-sizing the Pike's oversize lanes, and eliminating its right-hand turn lanes, will allow that street to finally perform like the retail heart of a campus, and not a dangerous highway.

Finally, also discussed, swooping, high-speed left-hand turn lanes should be replaced by the urban standard, which does not include the pre-swoop center stripe zone. This Stripe zone does nothing but tell drivers that that they are on a highway, encouraging higher speeds. This condition can be observed at the north end of Mulberry Street and on S. Duke Street at Chesapeake.

The difference between these two turn facilities is illustrated at right. The drawing is not to scale, and under-represents the length of the center striped zone and the amount of parking that it steals from the curb.



Proposed Changes to North-South Thoroughfares

Mulberry Street

Currently one-way, Mulberry is being reverted to two-way traffic.

Current Condition

Mulberry Street currently contains two northbound lanes flanked by two lanes of parking (unstriped) in a cartpath approximately 42 feet wide. The City has completed plans to revert it back to two-way traffic. These plans contain 10.5-foot driving lanes, parking lanes that vary from 6.8 to 8.3 feet in width, and a single northbound bike lane that varies from 4.5 to 5.1 feet in width. The southbound lane is marked with sharrows.

Funded largely by a PennDOT Smart Transportation Grant, the project also includes new curb and gutter details and streetscaping, and is to be rebuilt at an estimated cost of $1.9 million. The project has already been engineered, so it would be costly to propose an alternative plan, with the exception of changes to striping.

Also, just south of the Harrisburg Pike, Charlotte Street contains a left-hand turn lane that is striped in a high-speed configuration, with a swoop before the turn lane.

Analysis

As already discussed, this reversion is to be applauded, and is well designed. The only conversation worth having about its construction surrounds whether rebuilding one-way streets as two-ways, rather than merely restriping them, is the most economical use of public funds. As long as those funds come from State or Federal sources, there is a good reason to elect to rebuild, since the rebuilt solution is superior and provides additional advantages, such as stormwater treatment. However, to the degree that waiting for outside funds delays the process, it is worth considering simple restripes for subsequent projects.

Where this project has clear room for improvement is in its striping, the one aspect of the design that is easy to change. The driving lanes are 10.5 feet wide, which is 6 inches larger than the current standard, inviting speeding. Meanwhile, the bike lane is, in some places, 6 inches narrower than the 5-foot standard, and well shy of the 6-foot ideal. Meanwhile, parking lanes, which can comfortably be 7 feet wide, sometimes reach more than 8 feet, even in places where the bike lane is inadequate.

The striping design should be changed to hold 10-foot driving lanes and a 6-foot bike lane, with parking lanes varying as needed. Given the data surrounding centerline removal (as discussed), it would also seem wise to eliminate the centerline as well. However, the parking lanes should be striped to perceptually narrow the cartpath.

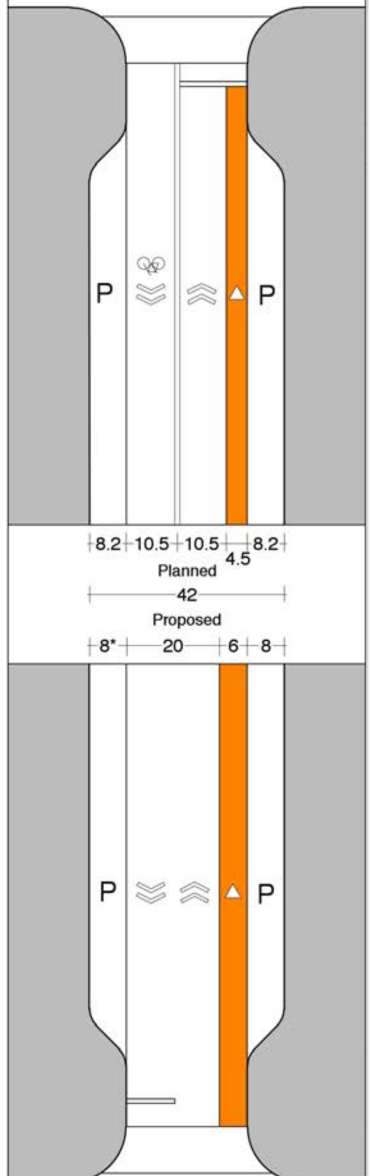
As discussed on pages 29 – 30, the high-speed turn lane south of the Harrisburg Pike should be eliminated, and replaced by parking on the west curb, as there is no adequate justification for a left-hand turn lane on a low-volume street approaching a T intersection.

<u>Recommendation</u>

Rebuild Mulberry Street as planned, but limit driving lanes to 10 feet, combining both if possible into a single 20-foot facility. Make the bike lane 6 feet wide in all locations. Make the parking lane adjacent to the bike lane 8 feet wide in all locations. Vary the width of the other parking lane to absorb the remainder of the cartpath, and stripe its edge. Once Charlotte receives its southbound bike lane, the sharrow decals on Mulberry should be allowed to disappear.

Eliminate the left-hand turn lane south of the Harrisburg Pike. This change allows perhaps 8 additional parking spaces to be placed on the west curb.

MULBERRY ST.



NOTES

- 10-foot driving lanes.
- Consistent 6-foot bike lane.
- No centerline.
- Southbound sharrow removed when reverted to 2-way.
- Western parking lane narrows if necessary.

Charlotte Street

Charlotte Street is next in line for two-way reversion, to create a pair with Mulberry.

Current Condition

Charlotte Street currently contains two southbound lanes flanked by two lanes of parking (unstriped) in a cartpath approximately 42 feet wide. It is slated to be reverted to two-way when finds become available.

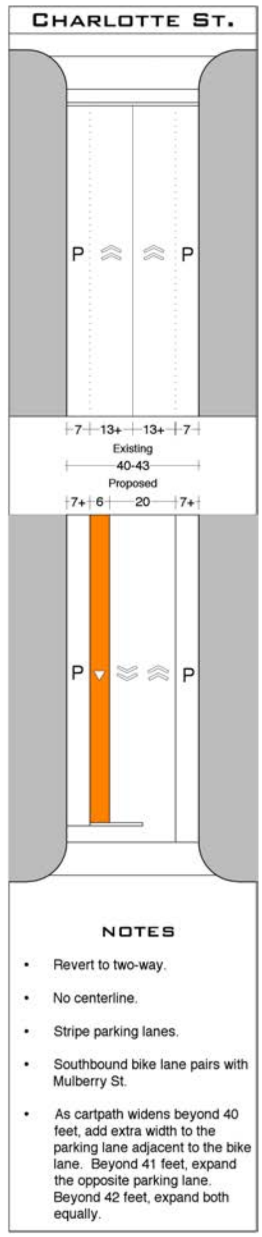
Analysis

The biggest question surrounding Charlotte Street is whether it should be wait to be rebuilt with outside funds, or restriped more quickly. When it is remade—in either fashion—it should mimic Mulberry Street, with 10-foot driving lanes (or one 20-foot lane), a 6-foot bike lane, and the remainder going to parking.

In some locations, Charlotte street narrows to 40 feet, in which both parking lanes must narrow to 7 feet wide. In wider segments, the parking lane against the bike lane should widen to 8 feet before the other begins to widen as well.

Recommendation

Rebuild or restripe Charlotte Street with 10-foot driving lanes (combining both if possible into a single 20-foot facility), a 6-foot bike lane, and two striped parking lanes. Make the parking lanes 7-feet minimum. As cartpath widens beyond 40 feet, add extra width to the parking lane adjacent to the bike lane. Beyond 41 feet, expand the opposite parking lane. Beyond 42 feet, expand both equally.



Water Street

Many crosswalks across Water street are faded to the point of invisibility.

Current Condition

Water Street is often cited as a dangerous street for pedestrians to cross.

Analysis

While its driving geometrics are slow, with driving lanes about 8.5 feet wide, Water Street is the site of many car-pedestrian conflicts, because of the way that cars exit from it onto its one-way cross streets. When a pedestrian is walking along any of the major one-ways downtown, cars turning onto these streets often nudge towards—or into—them. This happens principally because of three conditions characteristic of one-way streets: the fact that traffic only comes from on direction, so drivers don't look both ways; the high speed of oncoming traffic, requiring quick acceleration; and the opportunity to leap into a green wave of signals if one speeds around the corner.

The real solution to this dangerous problem is the elimination of the one-way street system. The stopgap measure, deserving immediate attention, is the restriping of all crosswalks, and the addition of prominent signage to warn drivers about the possibility of pedestrian conflicts.

Recommendation

Consistently at its intersections with King, Orange, Chestnut, and Walnut Streets, restripe the crosswalks across Water street with bold in-pavement markings. Add a yellow Ped Xing sign in each of these locations.

Prince Street

The intersection of Prince and Walnut Streets is one of the worst locations for walking in downtown .

Current Condition

The width and configuration of Prince Street varies throughout its downtown trajectory. In some locations, it contains driving lanes in excess of 13 feet. In others, it is missing parallel parking in places where there is room for it. In yet others, it contains turn lanes that are very long, eliminating curb parking, especially at King Street. Finally, at Walnut Street, the roadway expands for a right-hand turn lane that invites speeding and increases crossing distances.

Peak-hour traffic counts were just measured as 1261 vehicles on the block just north of King Street.

Analysis

Right-sizing Prince Street's driving lanes to the 10-foot standard allows for the addition of a second flank of parking wherever the cartpath exceeds 34 feet. (This includes the area south of 450 Prince Street, where the roadway narrows slightly.) The bus stop south of Lemon Street seems longer than needed, and should be shortened to allow more parking.

Prince Street contains two driving lanes supplemented by turn lanes at major intersections, often very long. The peak-hour car count of 1261 is above the 1000 vehicles that can be handled by a two-lane one-way street in a network of this type, in which cross streets are also heavily trafficked. Therefore, these turn lanes are needed at current volumes, but it is unlikely that they need to be so long. Limiting these additional turn lanes to a more reasonable length allows for the addition of parking spaces in several locations, as previously discussed under "The Strategy."

All parking lanes should be striped, to perceptually narrow the roadway.

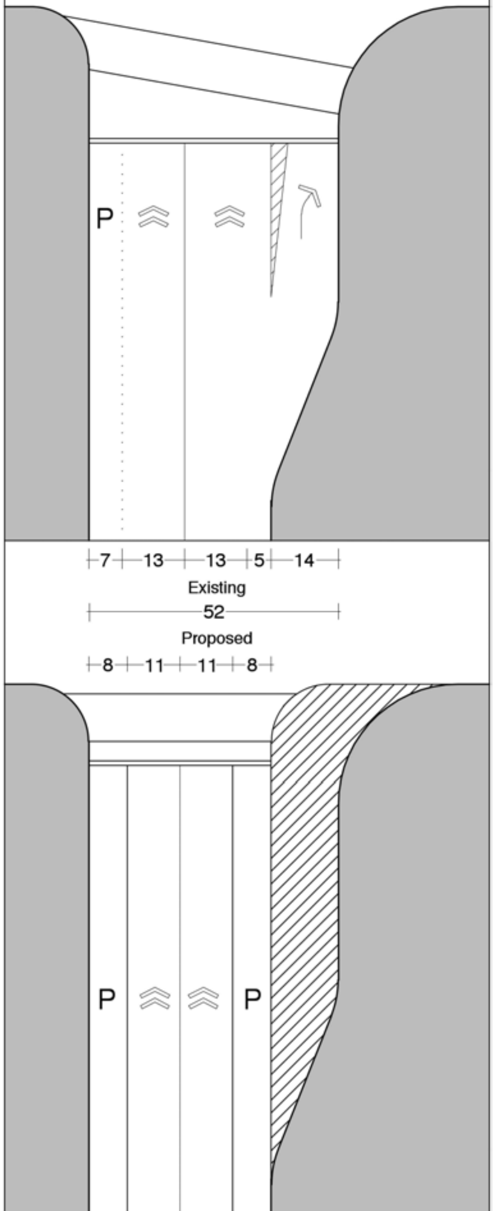
The intersection of Prince and Walnut was cited by many as a perilous place to walk, due to its extra right-hand turn lane. While the northwest curb at this intersection should eventually be rebuilt without this lane, it should be restriped as soon as possible in the proper configuration, with the lane eliminated and parking reinstated.

Recommendation

North of Chestnut Street, restripe to reinstate both sides of parking wherever the cartpath exceeds 34 feet, with parking lanes striped. Restripe and then rebuild the Prince/Walnut intersection to eliminate the extra turn lane. Limit the turn lanes at Orange and King to a shorter length—approx. 40 feet of storage and 40 feet of taper—reinstating parking wherever possible.

Stripe all parking spaces.

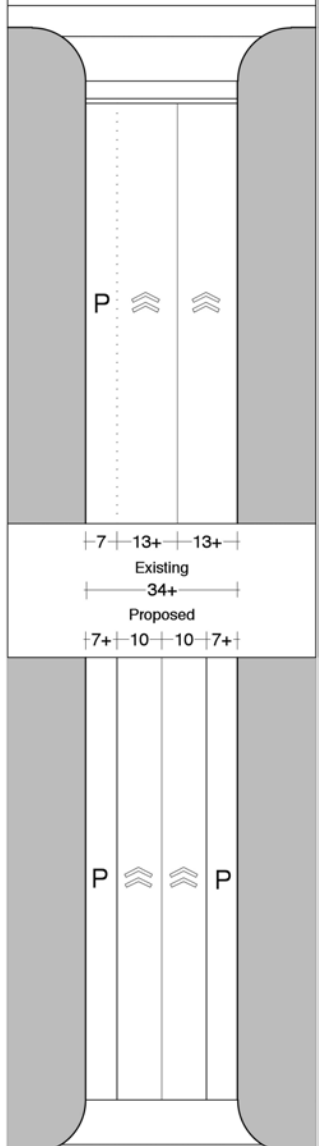
PRINCE ST. AT WALNUT



NOTES

- Stripe cut and eventually rebuild NW corner with 15-foot curb radius.
- Insert western parking lane wherever cartpath exceeds 34 feet.
- Stripe existing parking lane.
- Straighten crosswalk to match desire lines.

PRINCE ST.



NOTES

- Insert missing parking lane wherever cartpath exceeds 34 feet.
- Stripe existing parking lane.
- Parking lanes may be as narrow as 7 feet, but 8 is ideal.
- Apply this approach in all similar circumstances.
- Shorten turn lanes where possible.

Queen Street

Alongside the Convention Center, Queen street's driving lanes average 15 feet wide.

Current Condition

The width and configuration of Queen Street varies throughout its downtown trajectory. North of Vine Street, it contains driving lanes in excess of 14 feet. South of King, Orange, and Chestnut Streets, it contains turn lanes that are very long, eliminating curb parking. Parking is also lost in several locations for bus stops in close proximity to the Transit Center.

Peak-hour traffic counts were just measured as 1052 vehicles on the block just south of Orange Street.

Analysis

Right-sizing Queen Street's driving lanes to the 10-foot standard allows for the addition of a second flank of parking wherever the cartpath exceeds 34 feet. This is particularly the case from Vine to Queen, where the lanes are excessively wide.

At Vine Street, the closing of the eastern entrance to the Intelligencer Journal parking lot should also be pursued, as it seems redundant and removes curb parking.

Queen Street contains two driving lanes supplemented by extremely long turn lanes at major intersections. The peak-hour car count of 1052 is barely above the 1000 vehicles that can be handled by a two-lane one-way street in a network of this type, in which cross streets are also heavily trafficked. Therefore, these turn lanes are barely needed at current volumes, and they certainly do not need to be so long. Limiting these additional turn lanes to a more reasonable length allows for the addition of parking spaces in several locations, as previously discussed under "The Strategy." This will have a strong positive impact on downtown, by increasing parking supply, limiting speeding, and better protecting the sidewalk.

The two bus stops just south of the Transit Center–one on the same block, the other by the Bulova Building—must be reconsidered. One purpose of transit centers is to free curbs from bus stops, so one has to ask why these stops still exist. They are ideally replaced by additional curb parking.

All parking lanes should be striped, to perceptually narrow the roadway.

Recommendation

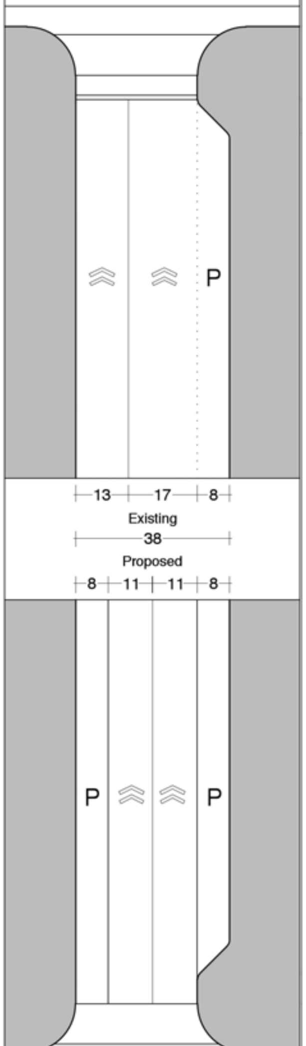
North of Vine, restripe Queen to include standard-width driving lanes and a left flank of parking. Close the eastern access to the Intelligencer lot if possible.

Limit the turn lanes at Orange, King, and Chestnut to a shorter length—approx. 40 feet of storage and 40 feet of taper—resulting in a large increase in the supply of curb parking on both flanks.

Stripe all parking spaces.

If possible relocate bus stops north of Chestnut to the Transit Center.

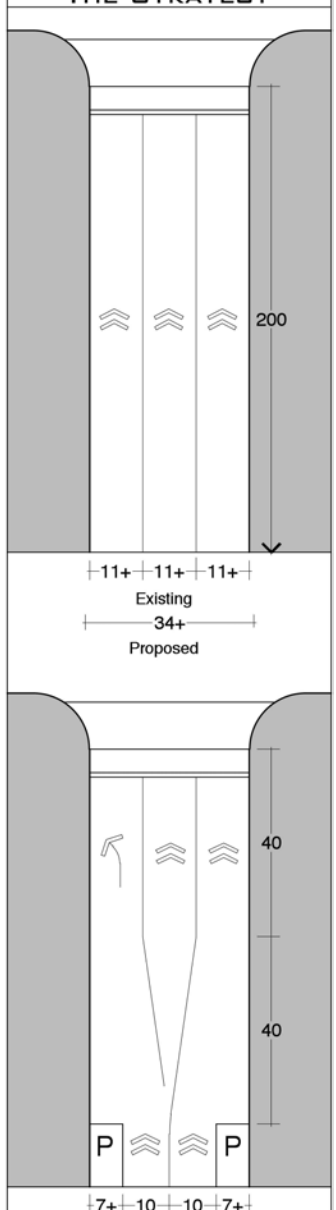
QUEEN ST.
NEAR CONVENTION CENTER



NOTES

- Insert missing parking lane where cartpath exceeds 34 feet.
- Stripe existing parking lane.
- Parking may be as narrow as 7-feet, but 8 is ideal.
- Apply this approach in all similar circumstances.
- Shorten turn lanes were possible.

QUEEN ST.
AT ORANGE
'THE STRATEGY'



NOTES

- Shorten turn lane to an approximately 80-foot facility.
- Extend flank-parked section into reclaimed area.
- Apply this approach in all similar circumstances, especially on next block.

Christian Street

If it is to become a useful bike corridor, Christian street (here crossing Orange Street, right to left) needs pronounced markings at each such intersection.

Current Condition

With one interruption that is likely to be remedied shortly, Christian street runs the full length of the downtown, and offers promise as a cycling corridor. It currently functions primarily as an alley, and is quite narrow, handling limited traffic at low speeds. It is two-way in all locations except from James to Frederick Streets, where it passes through the hospital grounds. As it crosses major east-west streets, Christian street generally lacks prominent markings that would call attention to its presence.

Analysis

As discussed under Including Bike Lanes, the only apparent hope for an attractive north-south cycling corridor in the heart of downtown is Christian Street. For this reason, the modification of the Christian Street trajectory to play this role is perhaps the single largest investment suggested in this document.

This modification would consist of limited changes to the roadway itself, as the greater challenges exist at intersections. Between intersections, the roadway should be repaved smoothly, with prominent sharrow markings, but there is no need to eliminate motorized vehicles from it. As contemplated, the barrier currently presented by the Hotel utility space should be removed, and the street brought straight through.

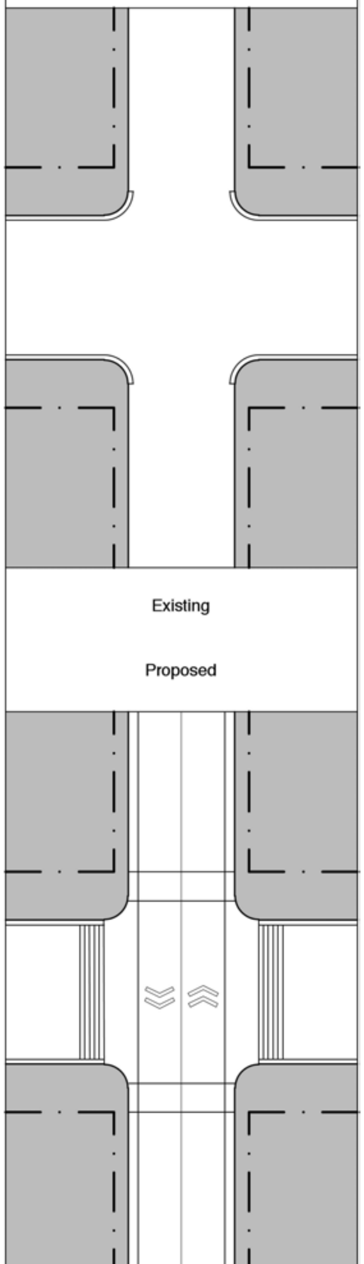
At intersections, however, bold changes are needed to allow the flow of cyclists to be smooth and safe. While other solutions may be workable, the ideal solution places Christian Street on a raised speed table as it crosses all major streets from the Amtrak Station through Church Street, supplemented by prominent signage warning drivers of the cycle corridor. Ideally, all crossings of major streets should receive HAWK (High-Intensity Crosswalk) beacons as well, but such beacons are not essential if their funding presents a barrier.

The one-way segment of the street should receive a northbound counterflow bike lane.

Recommendation

Repave the entire length of Christian Street, inserting prominent sharrow markings north and south of each intersection, and a northbound counterflow lane between James and Frederick Streets. Build speed tables at all major intersections, prominently signed, including mid-street pylon signage on all multilane streets. Provide all major intersections with HAWK beacons if possible.

CHRISTIAN ST.
INTERSECTIONS



NOTES

- Add speed table to keep Christian Street at sidewalk height as it crosses streets.
- Add cycle markings to street and prominent signage with HAWK signals if possible.
- Mark sidewalk crossings on Christian.

Duke Street

South of downtown, Duke Street contains 17-foot driving lanes, inviting speeding.

<u>Current Condition</u>

For most of its downtown trajectory, Duke Street contains two southbound driving lanes. The exception is a very long turn lane added north of the intersection with Vine Street.

South of Church Street, Duke Street has been rebuilt to include a median flanked by very wide driving lanes, one measuring 16 feet. South of the median, both lanes widen to 16 feet. As it approaches Chesapeake Street (from both north and south), Duke Street contains a left-hand turn lane that is striped in a high-speed configuration, with a swoop before the turn lane.

Peak-hour traffic counts were just measured as 782 vehicles on the block between Juaniata and Susquehanna streets.

At the Duke/Church intersection the southeast corner has a curb radius well in excess of 50 feet.

<u>Analysis</u>

Aside from some places where curb parking should be reconsidered, as already discussed, Duke Street is not in need of a major reconfiguration in the heart of downtown. The one exception is north of Vine Street, where application of "The Strategy" would shorten the additional turn lane considerably, resulting in additional curb parking.

Additionally, speeding on Duke Street is invited by the fact that the eastern curb is usually empty for the full distance from Orange to King Streets, creating the visual impression of a third driving lane. Alongside the courthouse, the daytime parking ban seems to come from the desire to preserve space for official vehicles, but few were observed during the period of study. South of Grant Street, parking is prohibited so that three or more buses may sit on the curb simultaneously, another condition that was not observed. If, indeed, this curb represents a bus transfer zone, it is worth investigating how much space is actually needed, and whether slight schedule shifts might limit the amount of curb space dedicated to buses.

There seems to be space for one additional parking space just north of Chestnut Street, and another just south.

South of Church Street, the very wide driving lanes are best remedied through the insertion of bike lanes. There is ample curb-to-curb distance for 6-foot bike lanes throughout.

As discussed on page 29, the high-speed turn lanes surrounding Chesapeake Street should be restriped to a standard urban configuration. The peak-hour car count of 782 is well below 1000, the capacity of a typical two-lane two-way, so these turn lanes are not even needed. At the very least, they should be shorter.

Because it eases the turn from Duke onto Church Street, the southeastern curb of the Duke/Church intersection invites speeding around that corner. It should be restriped to a tighter radius and eventually rebuilt.

Finally, Duke Street is being considered for 2-way reversion, despite being PennDOT controlled, because it already welcomes two-way travel north of McGovern Avenue. Such a reversion is to be encouraged, as it should be for all downtown streets. However, the selection of this particular street for this particular reason threatens to confuse the discussion, because it belies the great ease with which *all* one-way streets may be reverted to two-way traffic. The fact that part of a street is already two-way does not significantly impact the great ease of such reversions. Given that the greatest positive impacts to two-way reversion can be increased revenues to businesses, there is likely a much greater benefit to making Queen Street two-way than Duke, given Duke's limited number of retail properties. However, since one-way streets should be reverted to two-way in pairs, to keep traffic flow balanced, the proper campaign for reversion should include *both* Queen Street *and* Duke Street.

<u>Recommendation</u>

Investigate the daytime civilian parking ban alongside the County Courthouse, and perhaps remove. Investigate the need for a continuous bus stop from Grant to King Street, and perhaps shorten the bus zone to provide curb parking.

Add back the two missing parking spaces north and south of Chestnut Street.

Limit the turn lanes at Vine Street to a shorter length—approx. 40 feet of storage and 40 feet of taper—resulting in a greater supply of curb parking.

Restripe and eventually rebuild the southeast corner of the Duke/Vine intersection to a 15-foot curb return radius.

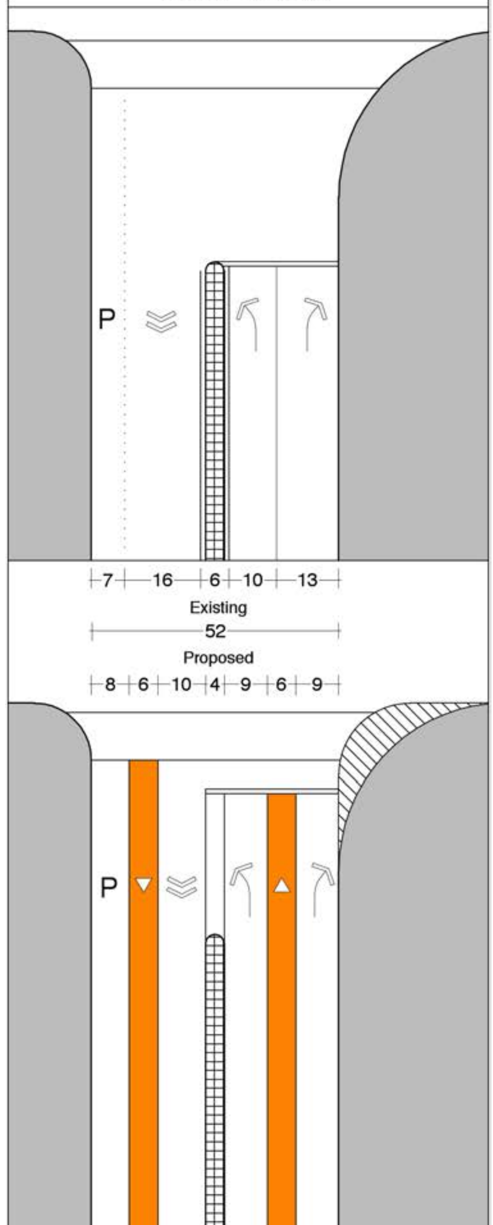
South of Church Street, stripe 6-foot bike lanes into the roadway. When the right-hand turn lane is introduced south of church, place it on the right flank of the bike lane, and reduce each driving lane to 9 feet in width. (The effective width is greater, due to the bike lane.)

South of the median, place the bike lanes 9 feet from the curb so that the driving lanes are not too wide.

Restripe the left-hand turn lanes approaching Chesapeake Street to include about 50 feet of car storage beyond an approx. 40-foot taper zone, with no striped “swoop” area before the taper. This change allows for many more curb parking spaces.

Expand the effort to make Duke Street two-way to include Queen Street as its partner.

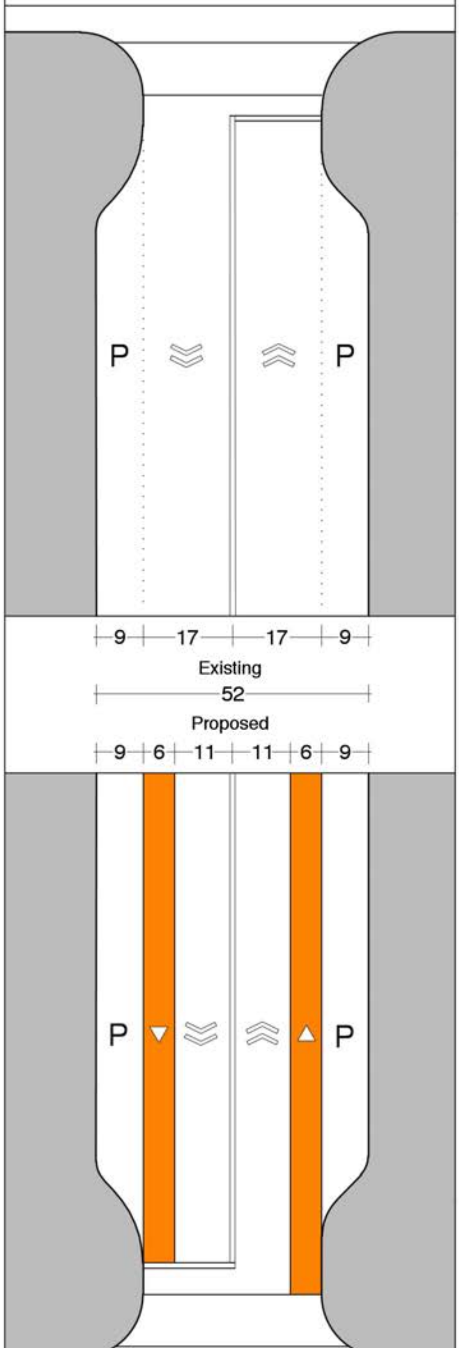
S. Duke St.
300 Block



Notes

- Stripe out and eventually rebuild NE corner with 15-foot curb radius.
- Move stop bar closer to crosswalk.
- Insert bike lanes as noted, eliminating stripes along median.
- Continue 6-foot bike lanes and 10-foot driving lanes through 400 block.

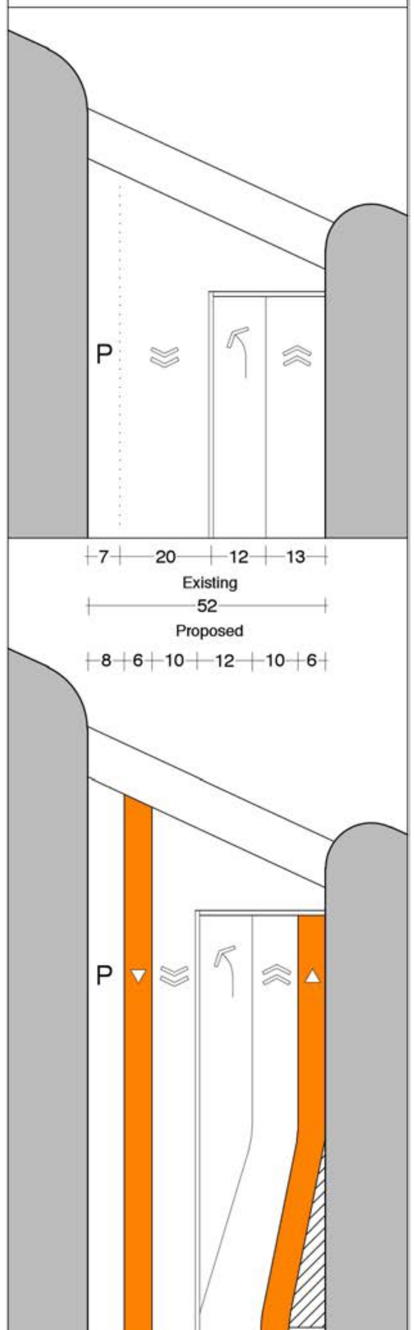
S. Duke St. to Chesapeake



Notes

- Insert 6-foot bike lanes within oversized driving lanes.

S. Duke St. at Chesapeake

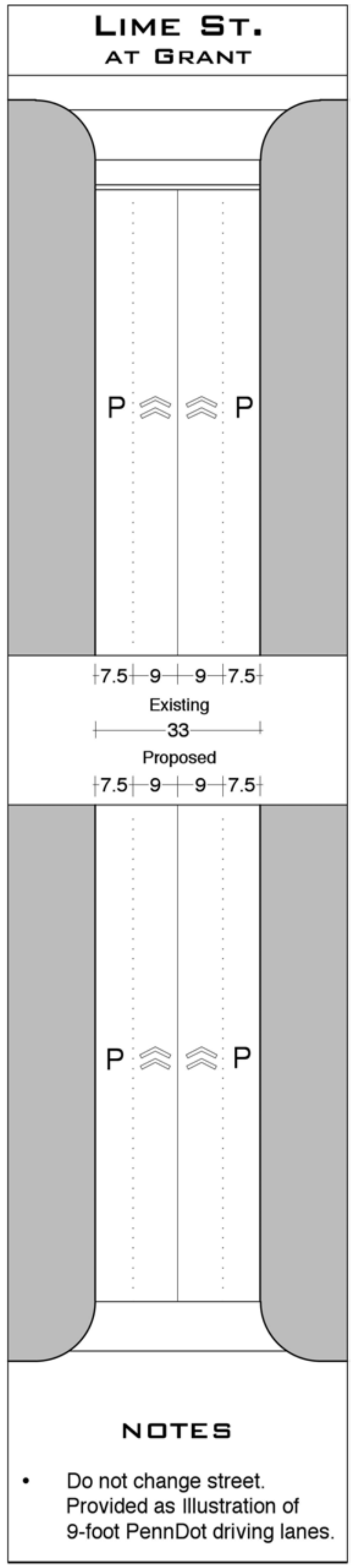


Notes

- Remove swoop before left-hand turn lane, and reduce left-hand turn lane length to match rush-hour queues.
- Insert 6-foot bike lanes in oversized driving lanes.

Lime Street

This segment of Lime Street functions perfectly well with approx 9-foot-wide driving lanes.



<u>Current Condition</u>

At Grant Street, Lime Street contains two driving lanes and two parking lanes in a cartpath of 33 feet.

Peak-hour traffic counts were just measured as 876 vehicles in this location.

<u>Analysis</u>

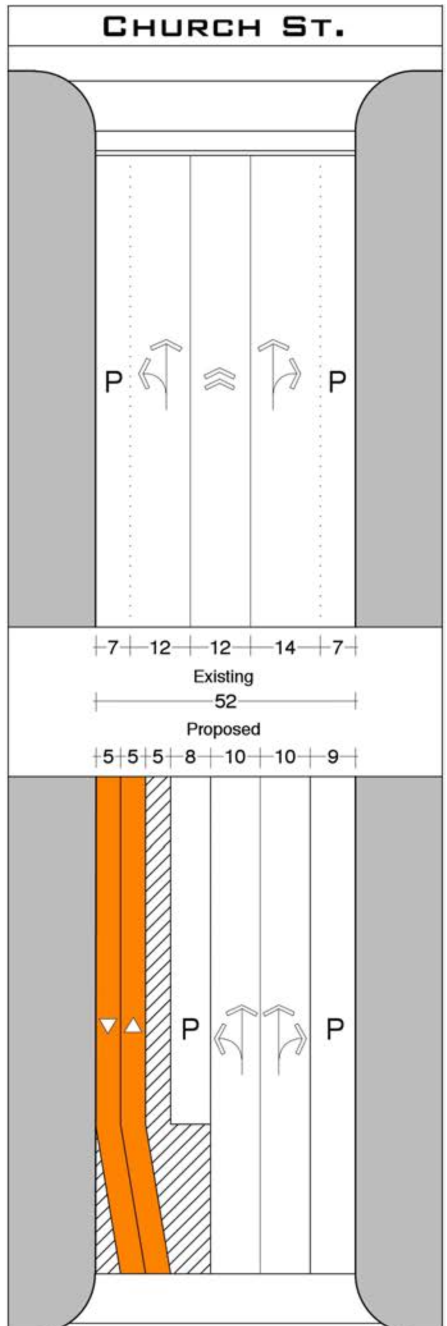
It is enlightening that Lime Street, also known as PA 222, handles significant traffic through this section, even though it is supposedly dimensionally inadequate. This segment of Lime Street should be visited whenever PennDOT argues against 10-foot driving lanes. Depending on how you measure parking lanes (7 to 8 feet is the standard), the driving lanes here are between 8.5 and 9.5 feet wide.

<u>Recommendation</u>

Do not change Lime Street, but ask PennDOT to learn from its example.

Church Street

Church street is the widest street in the downtown, despite its low traffic counts.



NOTES

- Traffic volumes do not demand third lane.
- Insert two-way cycle track along west curb.
- Stripe parking lanes.

<u>Current Condition</u>

Church Street currently contains three northeast-bound lanes flanked by two lanes of parking (unstriped) in a cartpath approximately 52 feet wide

Peak-hour traffic counts were just measured as 494 vehicles at Rockland Street.

<u>Analysis</u>

With Church Street, PennDOT inherited one of the widest streets in the region, and naturally designed it for maximum capacity and speed, with three full travel lanes averaging over 12 feet wide. Drivers and pedestrians respond to this configuration by speeding and fleeing, respectively.

Low traffic counts on Church Street suggest that a two-lane section is much more than adequate here, since a one-lane one-way with significant cross-traffic should be able to handle 500 trips at peak-hour. This circumstance leads to the question of what to do with the unwanted lane. A cycle track would seem to be the most reasonable answer.

While it does not connect well to other proposed lanes, it would still be useful to have a protected bike facility for the roughly 1500 feet between Queen and Lime Streets. Whether or not it attracted many cyclists, it would result in street geometrics that led to calmer and safer driving.

Recommendation

Eliminate the left driving lane of Church Street and pull the left lane of parallel parking off the curb. Insert two 5-foot cycle lanes and a 5-foot car-door buffer between the curb and the moved parking lane. Stripe the parking lane on the east flank.

Chesapeake and South Broad Streets

Chesapeake/South Broad Street's center lane and shoulders invite highway-style driving.

Current Condition

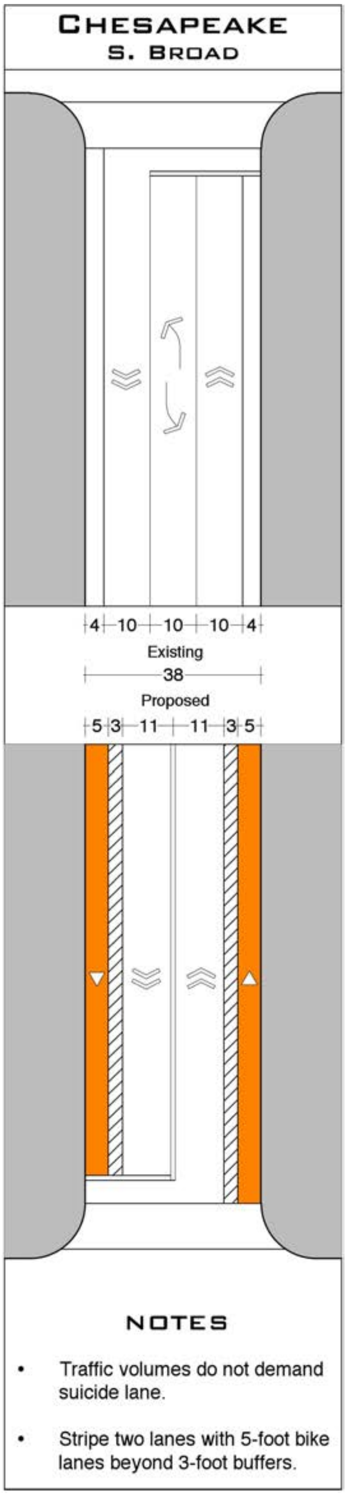
From South Franklin Street north to King Street, Chesapeake/South Broad Street contains three driving lanes, typically flanked by shoulders. This highway-style configuration encourages drivers to travel well above the marked speed—25 MPH in places—especially because there is limited congestion on the street.

Analysis

Given its moderate traffic volumes, there is no need for a center turn lane on this street. It should be eliminated, and replaced by two ample bike lanes, since there is no real demand for parallel parking in this location. While each bike lane can be 8 feet wide, a brightly striped buffer zone is needed within this area so that it does not appear to be a driving lane.

Recommendation

Remove the center lane and restripe this segment of Chesapeake/South Broad Street to contain two driving lanes flanked by two 8-foot bike lanes, each consisting of a 5 foot lane and a 3-foot traffic-side striped buffer.



North Broad Street

North of King Street, Broad street holds in 50 feet what many streets hold in 36.

Current Condition

From King Street to its termination at Lehigh Avenue, North Broad Street contains two 18-foot driving lanes flanked by two 7-foot (unmarked) parking lanes. Left-hand turn lanes are inserted into the roadway at Orange Street. Between King and Clark Streets, the parallel parking is eliminated, resulting in a configuration of four wide driving lanes.

Analysis

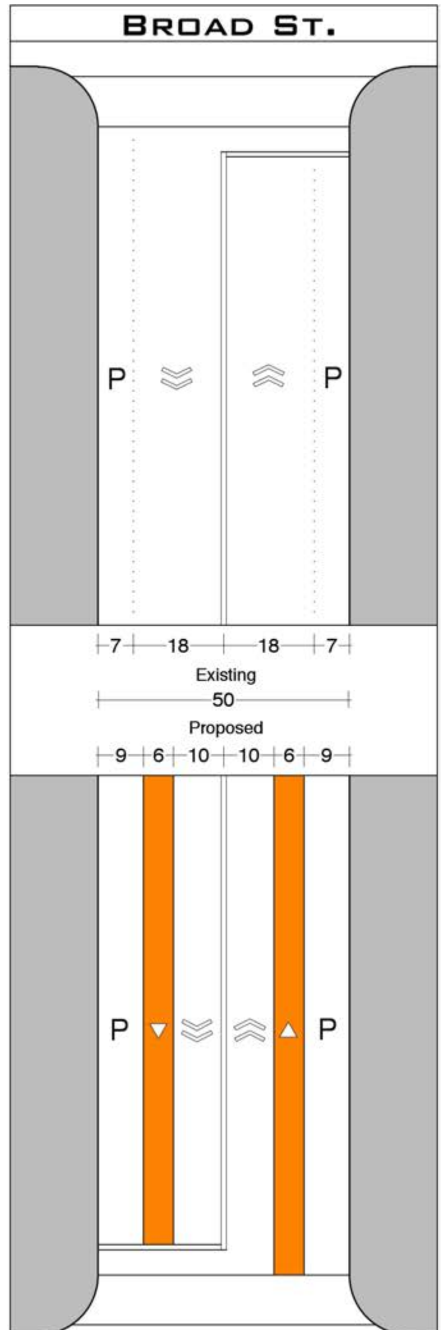
North Broad Street is not a regionally significant thoroughfare, and its moderate traffic volumes do not demand center turn lanes (and certainly not a 4-lane configuration). Moreover, there are no urban circumstances in which high-speed 18-foot driving lanes make sense.

The proper way to use up all the excess pavement is to make North Broad a "complete street," with two parking lanes and two bike lanes stretching all the way from King to Lehigh.

Recommendation

Make North Broad Street a continuous 2-lane facility by inserting a 6-foot bike lanes 9 feet from each curb.

In the unlikely event that traffic congestion mandates a left-hand turn lane, any such facility should be provided by narrowing one parking lane to 8 feet and removing the other, resulting in a configuration of 8 park – 6 bike – 10 drive – 10 turn – 10 drive – 6 bike.. This facility should be very short, approx. 60 feet total including taper zone.



NOTES

- Insert 6-foot bike lanes 9 feet from curb.
- Where short left-had turn lanes are needed, remove one parking lane and narrow the other by 1 foot, resulting in a section measuring 8-6-10-10-10-6.

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Proposed Changes to East-West Thoroughfares

Harrisburg Pike

At the heart of Franklin & Marshall College, the high-speed geometrics of the Harrisburg Pike make crossing perilous.

<u>Current Condition</u>

Just west of Prince Street, Harrisburg Pike contains three driving lanes averaging more than 13 feet wide. New construction across from Sponaugle-Williamson field includes 5 curb parking spaces, broad sidewalks, and a brief median, but driving lanes remain wide, and right-hand turn lanes further broaden the roadway. Further west, wide lanes (averaging 12 feet) and additional right-hand turn lanes continue to Race street and beyond. No curb parking is provided between Prince and Race Streets except for the 5 spaces mentioned above.

Peak-hour traffic counts were just measured as 1621 vehicles between College Avenue and Race Street.

<u>Analysis</u>

This section of roadway deserves special attention, as it presents a particularly dangerous and unwelcoming environment to Franklin & Marshall students. Correction of the streets two main problems—its wide (high speed) lanes and its unnecessary (speed inducing) right-hand turn lanes provide the collateral benefit of creating room for parallel parking, which will calm traffic, protect the sidewalk, benefit local businesses, and provide a more hospitable campus environment.

From Prince Street to campus, restriping the driving lanes to 10 feet (with an 11-foot center lane) leaves room for a continuous curb of parking, which should probably be provided on the south side. Doing so properly will mean replacing the current parking bay in front of Cox Evans Architects with a widened sidewalk, to create a consistent curb line.

In the campus area, the goal of limiting costs leads to a solution which eliminates the right-hand turn lanes and right-sizes the driving lanes, using only paint.

As noted, right-hand turn lanes are particularly dangerous for pedestrians, as they encourage drivers to speed around corners where people may be crossing. They are appropriate to highways, not urban environments where people walk and bike. Similarly, any lanes wider than 10 feet invite speeds above the 35-mph posted limit.

In addition to the typical street sections provided, the two Before-and-After plans ahead show how this key segment of roadway can be restriped to encourage safe driving.

First, the right-hand turn lanes are converted into wide parking lanes. These lanes do little to improve flow, and are also simply not needed: the peak-hour car count of 1621 is comfortably handled by a 3-lane roadway, without additional turn lanes. (3-lane roadways around North America have typical peak-hour counts in the 1500 – 1800 range.)

Second, driving lanes are narrowed to the safe 10-foot standard, freeing up about 8 feet of additional roadway for curb parking. The result is a new roadway configuration that provides parallel parking on both sides of the street in most locations.

A shown in the plans, this design is accomplished without moving any of the current curbs, but requires some lateral shifts in the travel path, most notably in front of the College Corner Café. It is important that these shifts are engineered at the desired design speed—35 mph or less, and no faster—or the resulting swoops will encourage the very high speeds that they are intended to protect against. Note how the shift in travel path is accomplished in about 60 feet, which corresponds to moderate-speed travel.

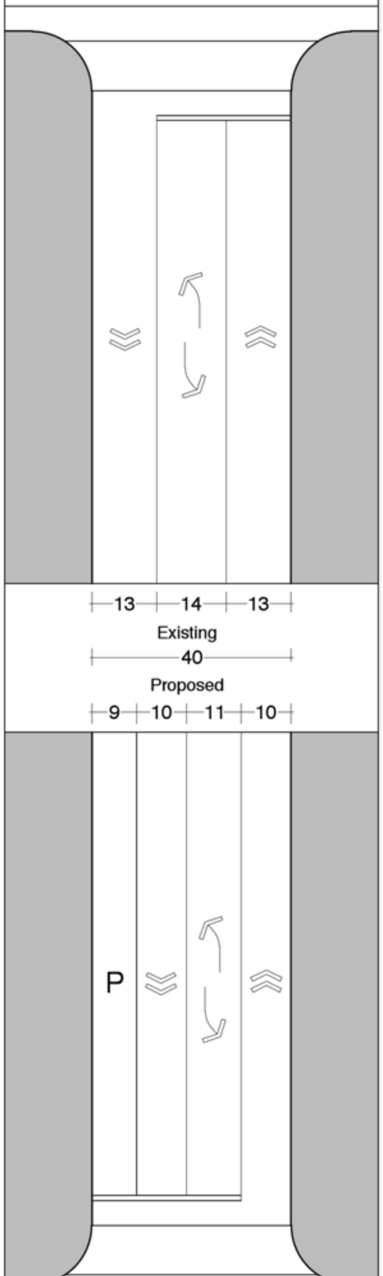
This effort looks a bit unorthodox, but it is not as difficult as it is necessary, if Franklin & Marshall is to enjoy a safe and welcoming main street.

<u>Recommendation</u>

Restripe Harrisburg Pike from Prince Street to Race street with 10 foot driving lanes, dedicating the space gained to parallel parking. Convert right-hand turn lanes to parallel parking as well. The above two mandates, applied within the existing curbs, will produce an outcome that is shown in more detail in the next section of this report.

Placing parking on the south side of the street, as is recommended near the YMCA, will require the infill of the parking bay in front of Cox and Evans Architects.

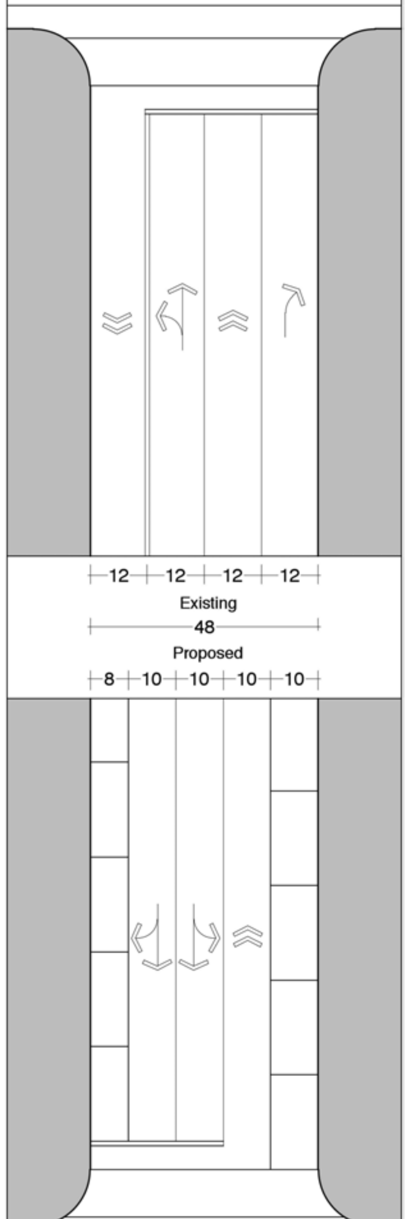
Harrisburg Pike
Prince to Pine



Notes

- Replace 13 to 14-foot lanes with 10 to 11-foot lanes.
- Add 9-foot parking lane on South curb, filling in parking pocket in front of Cox Evans Architects.

Harrisburg Pike
Typical College Section



Notes

- See detailed plans for this section.
- Right-hand turn lanes converted to 10-foot parking lanes.
- 12-foot driving lanes narrowed to 10 feet.
- 8-foot parking lanes added on opposite curb.

James Street

James Street is configured nicely, but contains between 6 and 9 feet of excess pavement.

<u>Current Condition</u>

James street consists of two-way travel and curbside parking within a cartpath that varies from 40 to 43 feet, resulting in typical lane measurements of 13 feet or more. Left hand turn lanes are provided at Prince and Queen Streets, and a right-hand turn lane is provided at Queen and Lime. In these locations, one curb of parallel parking is lost to make room for the turn lane.

Peak-hour traffic counts were just measured as 898 vehicles on the block between Queen and Market.

<u>Analysis</u>

Right-hand turn lanes are never recommended, as they invite speeding and increase crossing distances with little gain in capacity. Left hand turn lanes can be justified if traffic counts are significant. In this case, the peak-hour car count of 898 is well below 1000, the capacity of a typical two-lane two-way, so these turn lanes are hardly needed. However, a short left-turn facility has a very small impact on parking provision, so the current such lanes can be kept—if shortened.

The principal place for improvement in this street is the 13-foot driving lanes. Narrowing them to 10 feet creates room for a single bike lane, which can be provided westbound, as a partner to an eastbound lane on Lemon Street.

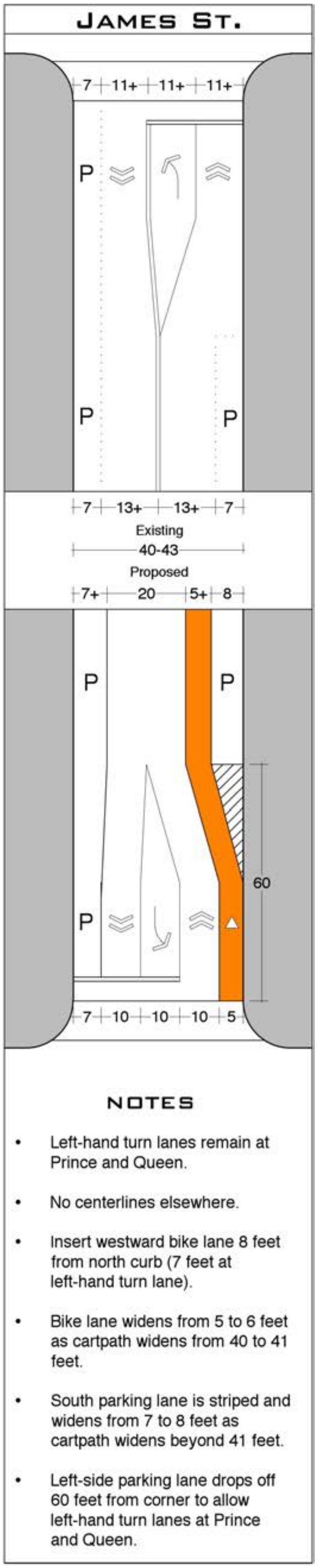
Given the data surrounding centerline removal (as discussed), it would also seem wise to eliminate the centerline as well. However, the parking lanes should be striped to perceptually narrow the cartpath.

<u>Recommendation</u>

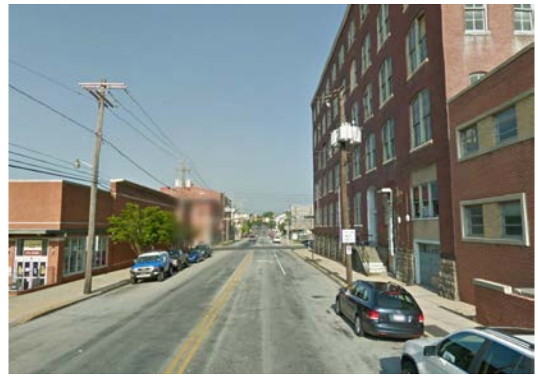
Eliminate right-hand turn lanes at Queen and Lime. Shorten left-hand turn lanes at Prince and Queen, such that curb parking can be reinstated to within 60 feet of the crosswalk. Insert westbound bike lane.

Restripe the driving lanes to 10 feet, combining both if possible into a single 20-foot facility. Dimensions of the additional street components vary as a function of the cartpath width. At its narrowest dimension, the street includes a 7-foot parking lane, and an 8-foot parking lane along a 5-foot bike lane. As the street widens, the bike lane first widens to 6 feet. Beyond that, the 7-foot parking lane widens to 8 feet. Any subsequent increase in width occurs in the bike-side parking lane.

At the left-hand turn lanes, the remaining parking lane may have to narrow to 7 feet. If space is still tight, the bike lane can narrow to 5 feet.



Lemon Street



Like James street, Lemon Street contains between 8 and 10 feet of excess pavement.

Lemon street is very similar to James street. The discussion that follows is therefore almost identical to the one above, with only the relevant details changed.

<u>Current Condition</u>

The site of a recent tragic hit-and-run, Lemon Street is another roadway in which excess lane widths invite high-speed driving. The street consists of two-way travel and curbside parking within a cartpath that varies from 42 to 44 feet, resulting in typical lane measurements of 14 feet or more. Left hand turn lanes are provided at Prince and Queen Streets. In these locations, one curb of parallel parking is lost to make room for the turn lane.

Peak-hour traffic counts were just measured as 816 vehicles on the block between Queen and Market.

<u>Analysis</u>

Left hand turn lanes can be justified if traffic counts are significant. In this case, the peak-hour car count of 816 is below 1000, the capacity of a typical two-lane two-way, so these turn lanes are probably not needed. However, a short left-turn facility has a very small impact on parking provision, so the current such lanes can be kept—if shortened.

The principal place for improvement in this street is the 14-foot driving lanes. Narrowing them to 10 feet creates room for a single bike lane, which can be provided eastbound, as a partner to a westbound lane on James Street.

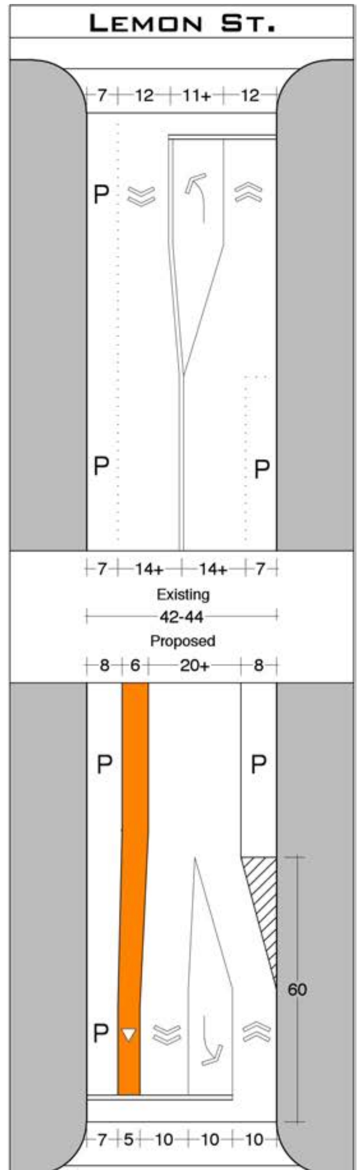
Given the data surrounding centerline removal (as discussed), it would also seem wise to eliminate the centerline as well. However, the parking lanes should be striped to perceptually narrow the cartpath.

<u>Recommendation</u>

Shorten left-hand turn lanes at Prince and Queen, such that curb parking can be reinstated to within 60 feet of the crosswalk. Insert eastbound bike lane.

Restripe the driving lanes to 10 feet, combining both if possible into a single 20-foot facility. Dimensions of the additional street components vary as a function of the cartpath width. At its narrowest dimension, the street includes a 7-foot parking lane (always striped), and an 8-foot parking lane along a 6-foot bike lane. As the street widens, the 7-foot parking lane widens to 8 feet. Any subsequent increase in width occurs in the bike-side parking lane.

At the left-hand turn lanes, the remaining parking lane may have to narrow to 7 feet. If space is still tight, the bike lane can narrow to 5 feet.



NOTES

- Left-hand turn lanes remain at Prince and Queen.
- No centerlines elsewhere.
- Insert eastbound 6-foot bike lane 8 feet from south curb (7 feet at left-hand turn lane).
- North parking lane is striped 8 feet from curb.
- Left-side parking lane drops off 60 feet from corner to allow left-hand turn lanes at Prince and Queen.

Walnut Street

Walnut Street (here) and Chestnut Street are the only two east-west downtown one-ways under City control.

Current Condition

Walnut Street currently contains two westbound lanes flanked by two lanes of parking (unstriped) in a cartpath approximately 43 feet wide. It receives an additional lane (for turning) and loses one flank of parking approaching Duke, Queen, and Prince Streets.

Peak-hour traffic counts were just measured as 1093 vehicles on the block between Market and Prince.

Analysis

Because they are not under PennDOT control, Walnut Street and Chestnut Street are under consideration for two-way reversion. This is wise, as the current configuration invites speeding with its wide one-way lanes.

Because they function as a pair, Walnut and Chestnut Streets need to be considered collectively. Currently, Chestnut Street (sort of) balances Walnut Street's 1093 peak-hour westbound trips with 651 peak-hour eastbound trips. The combined total of 1744 is an amount that theoretically can be handled on a single three-lane street (two lanes plus center turn lane), as such streets are routinely seen to carry peak hour traffic in the 1500 – 1800 range.

This situation leaves us with many options. The obvious choice would be to convert both streets to two-way, like Mulberry and Charlotte, and that is a good solution. However, another factor weighs heavily here, and that is the desire to create a protected east-west bicycle facility through the downtown. Given that it is closer to King Street and handles many fewer cars, Chestnut Street would seem to be a better location for that facility.

As will be described ahead, inserting protected bike lanes into Chestnut Street would result in it remaining one-way, but losing one of its lanes. Paired with a two-way Walnut Street, this results in an imbalance (two lanes east and one lane west), but this is not a problem, since there is excess capacity in the current system. It is also worth stressing that, thanks to the inherent flexibility of the street network, westbound trips would also naturally shift to Lemon and Orange Streets if there were congestion on Walnut.

Instead of a protected cycle track on Chestnut, the alternative is to provide one bike lane each on Walnut and Chestnut, as is being accomplished on Mulberry and Charlotte. However, exposed in-street bike lanes are not very effective at increasing the cycling population, so a cycle track should be much preferred.

A cycle track on Chestnut takes the pressure off of Walnut to provide a bike lane. However, given its excessively wide lanes, a two-way Walnut Street would function like the current Lemon and James Streets, inviting speeding. For that reason, even though it is redundant and would rarely be used, a one-way westbound bike lane makes sense here, as its presence would narrow the driving lanes to the 10-foot standard.

This bike lane has another advantage: if proposals for a cycle track on Chestnut fail, then that street can simply be converted to the two-way partner to this two-way Walnut, with a single eastbound bike lane.

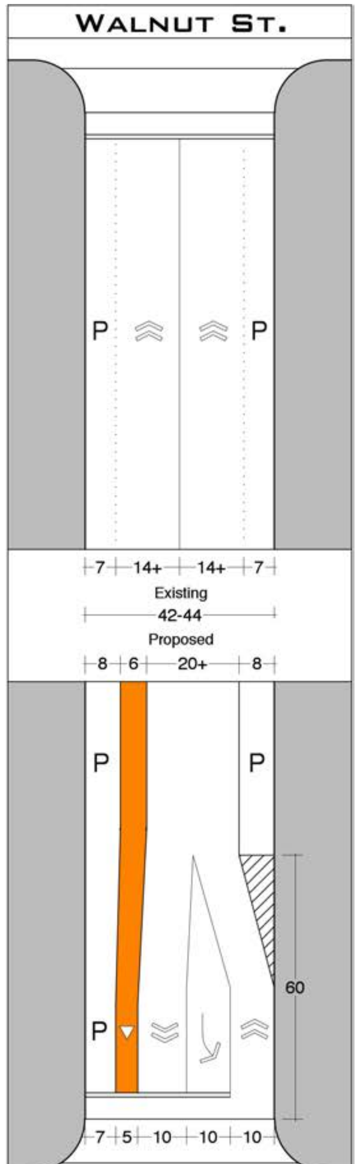
Because it has the same curb-to-curb dimensional range as Lemon Street, the recommendations for striping are identical to what has been proposed above for Lemon.

<u>Recommendation</u>

Revert to two-way travel. Include short left-hand turn lanes (approx 60 foot total facility, including taper) at Lime, Duke, Queen and Prince. Insert westbound bike lane.

Stripe the driving lanes to 10 feet, combining both if possible into a single 20-foot facility. Dimensions of the additional street components vary as a function of the cartpath width. At its narrowest dimension, the street includes a 7-foot parking lane, and an 8-foot parking lane (always striped) along a 6-foot bike lane. As the street widens, the 7-foot parking lane widens to 8 feet. Any subsequent increase in width occurs in the bike-side parking lane.

At the left-hand turn lanes, the remaining parking lane may have to narrow to 7 feet. If space is still tight, the bike lane can narrow to 5 feet.



NOTES

- Revert to two-way.
- Insert westbound 6-foot bike lane 8 feet from south curb (7 feet at left-hand turn lane).
- North parking lane is striped 8 feet from curb.
- Left-side parking lane drops off 60 feet from corner to allow left-hand turn lanes at Prince and Queen.

Chestnut Street

Chestnut street may offer downtown its best opportunity for an east-west cycle track.

Current Condition

Chestnut Street currently contains two eastbound lanes flanked by two lanes of parking (unstriped) in a cartpath approximately 40 feet wide. It receives an additional lane (for turning) and loses one flank of parking approaching Queen Street.

Peak-hour traffic counts were just measured as 651 vehicles on the block between Market and Prince and Market.

Between Prince and Market Street, curb extensions embrace the parking spaces on the north flank of the street.

Between Market and Queen Streets, a few parking spaces are lost on the north flank due to a loading area. On the south flank, all the parking is sacrificed to a taxi stand and a bus stop.

Analysis

This discussion will only make sense after reading the prior discussion of Walnut Street, which addresses the decision to place a cycle track on Chestnut Street.

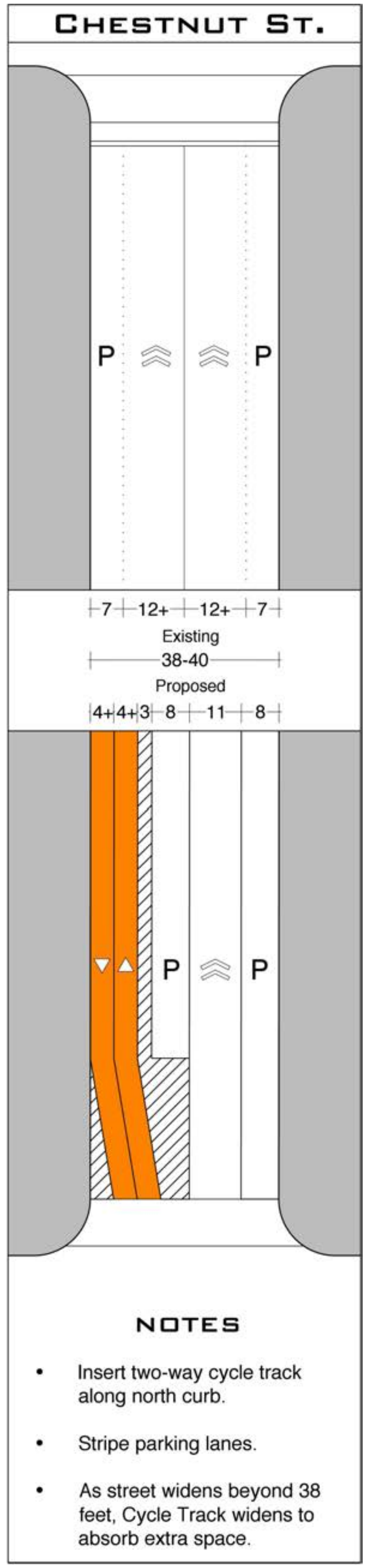
Converting Walnut Street to be the two-way partner to a two-way Chestnut Street is a reasonable solution, but misses the opportunity to provide downtown with a single east-west cycle facility that is in keeping with current best practices. Such a facility, a cycle track, is a two-way double bike lane that is protected from traffic by a row of parked cars. It is most easily placed on the left flank of one-way streets like Chestnut.

Such a facility, in partnership with an east-west facility on Christian Street, has the potential to spur a cycling renaissance in . For that reason, while simply restriping Chestnut as a two-way partner to Walnut is a reasonable solution, it is not the optimal one.

The proposed one-car-lane solution is one that makes Chestnut Street less effective as a fire-response corridor. When the parking lanes are full, cars will not be able to pull out of the way of fire trucks. This change will properly result in fire crews favoring Walnut and Orange Streets for east-west travel. When a fire crew needs to use Chestnut street to reach an emergency, this response will be slowed slightly.

It is important to acknowledge this impact, because street changes that would improve pedestrian safety and bolster public health (by creating a cycling culture) are often rejected on the grounds that they will slow fire response times. Such a response is appropriate when a fire department measures its performance based upon response time as the sole criteria.

However, when fire chiefs are able to broaden their perspective to focus on life safety and public health, they acknowledge that that quickest accident to respond to is the one that has not happened at all. When people are driving more safely, there are fewer car crashes, and when populations are biking more frequently, there are fewer medical emergencies. The vast majority of fire department calls are for car crashes and medical emergencies. Reducing both of these through street design can be expected to have a life safety impact that outpaces a limited increase in response time.

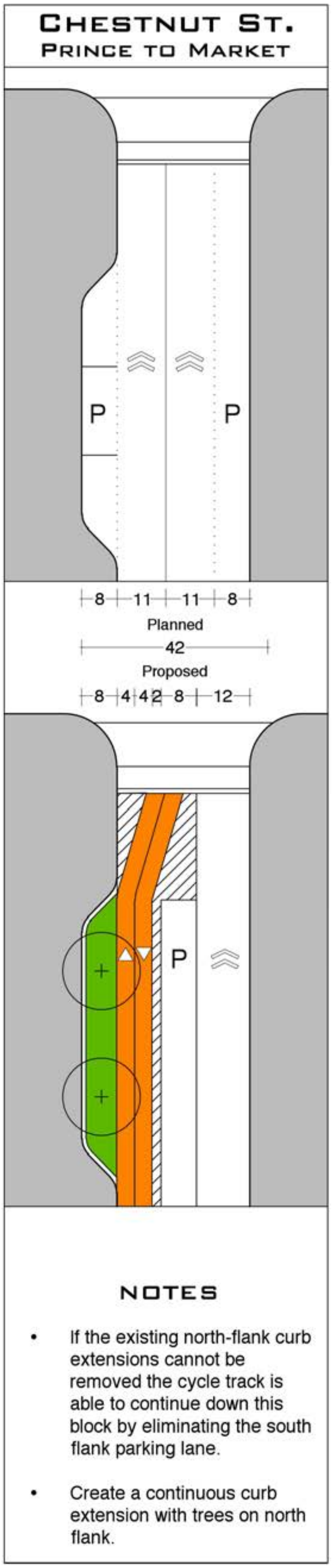


Recommendation

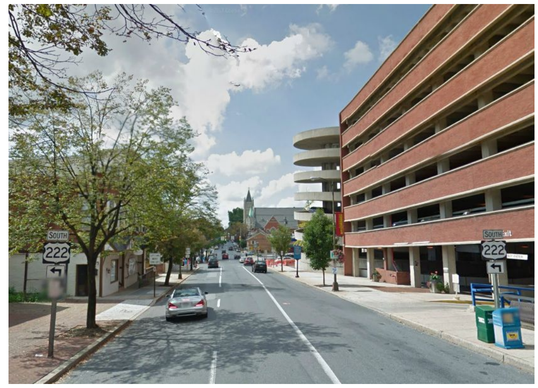
Eliminate the left driving lane of Chestnut Street and pull the left lane of parallel parking off the curb. Insert two cycle lanes and a 3-foot car-door buffer between the curb and the moved parking lane. Stripe the parking lane on the south flank, investigating whether there is room for any spaces in the taxi stand / bus stop segment between Market and Queen.

For the one segment between Prince and Market, where curb extensions surround parking spaces on the north curb, make the curb extensions continuous, and provide a similar cycle track facility by eliminating the parking on the south curb.

If the effort to create a cycle track fails, revert the street to two-way as a partner to Walnut Street, with an eastbound bike lane. In this condition, if the cartpath narrows below 42 feet in a left-hand turn lane location, the bike lane must briefly become a well-marked sharrow within the adjacent driving lane.



Orange Street



Orange Streets viability as a commercial corridor is deeply undermined by its lack of curb parking.

<u>Current Condition</u>

The width and configuration of Orange Street varies throughout its downtown trajectory. In some locations, it contains driving lanes in excess of 12 feet. In others, it is missing parallel parking in places where there is room for it. In yet others, it contains turn lanes that are very long, eliminating curb parking, especially at Queen and Prince Streets.

Peak-hour traffic counts were just measured as 984 vehicles on the block between Market and Prince.

West of Prince Street, there are several locations large enough to hold one parallel parking spot, where none is allowed. West of Arch Street, the on-street parking seems seldom used, resulting in wide driving lanes that invite speeding.

<u>Analysis</u>

Like ’s other PennDOT streets, Orange Street suffers tremendously from its wide-lane one-way configuration and paucity of parallel parking. While two-way conversion seems an unlikely short-term achievement, a reasonable ask to PennDOT would be to narrow the lanes to standard width and to shorten turn lanes to a more reasonable length, as already discussed under "The Strategy," adding back parallel parking where it fits.

Indeed, Orange Street's peak-hour car count of 984 is below the 1000 vehicles that can be handled by a two-lane one-way street. Therefore, these turn lanes are not needed, and could be eliminated. However, given PennDOT's reluctance to remove excess capacity from roadways, this reasonable compromise is suggested.

The above approach results in different outcomes from block to block, as the cartpath width varies. East of Queen and east of Prince, it results in shorter turn lanes, yielding additional on-street parking. (As with the other PennDOT streets downtown, current travel volumes suggest that these turn lanes are not needed at all, so shortening them should be a struggle.) Between Queen and Market Streets, it results in an 18-foot right lane being subdivided to include a parking lane on the north curb.

Finally, as everywhere, strangely absent parking spaces where there is room for them effectively creates super-wide, high-speed lanes. Missing parking spaces should be replaced, and undersubscribed curb parking needs to be priced in a way that causes it to be used.

<u>Recommendation</u>

East of Queen Street, apply "The Strategy, limiting the turn lane to a shorter length—approx. 40 feet of storage and 40 feet of taper—reinstating parallel parking on the north flank as a result.

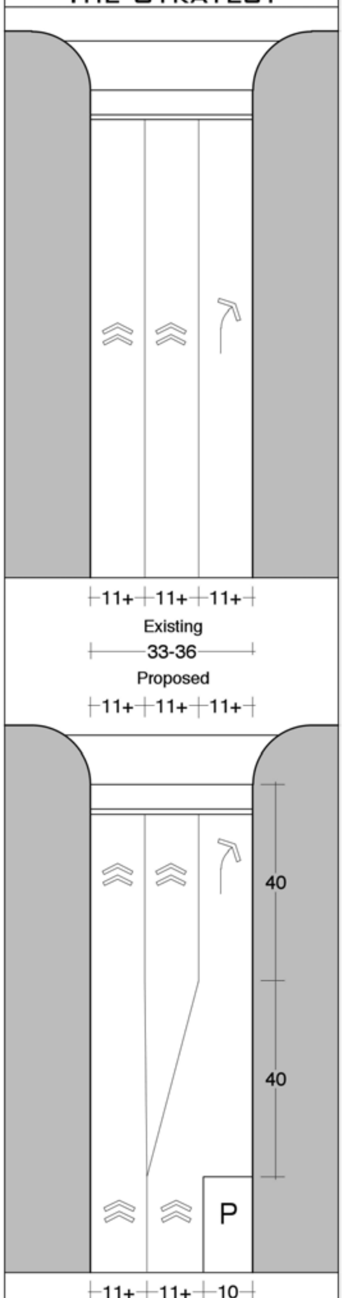
From Queen to Market streets, reduce north driving lane to 10 feet in width, and stripe parking back on the north curb.

East of Prince Street, apply "The Strategy, limiting the turn lane to a shorter length—approx. 40 feet of storage and 40 feet of taper—reinstating parallel parking on both flanks as a result.

West of Prince Street, stripe one parallel parking spot in front of the Sunoco, and another in front of the Firestone parking lot.

West of Arch Street, as elsewhere, use market-based pricing to determine a proper cost for the parking meters, so that these parking spaces are used.

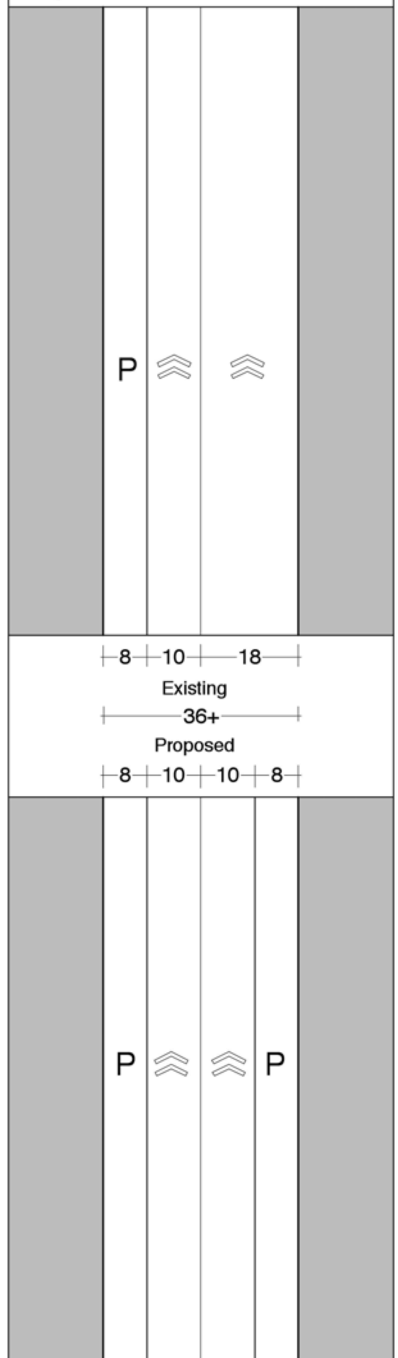
Orange St.
Approaching Queen
'The Strategy'



Notes

- Shorten turn lane to an approx. 80-foot facility.
- Extend flank-parked section into reclaimed area.

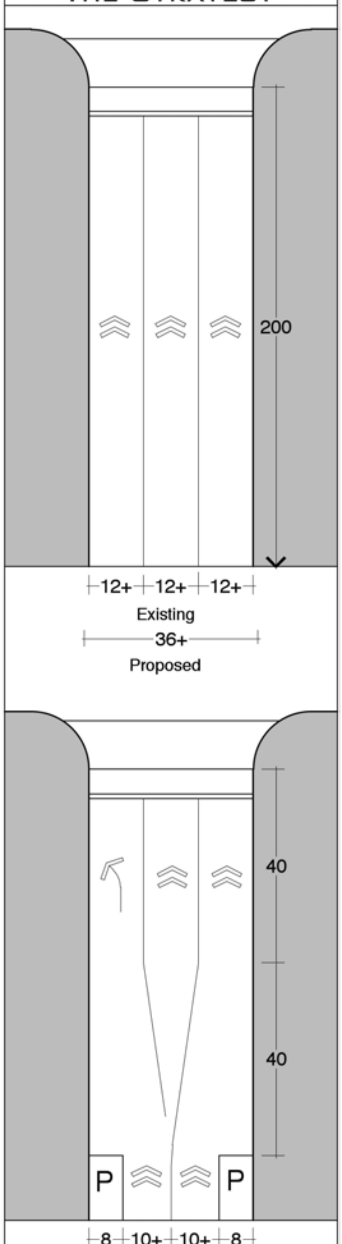
Orange St.
Queen to Market



Notes

- Stripe parking on north curb.

ORANGE ST.
AT PRINCE
'THE STRATEGY'



NOTES

- Shorten turn lane to an approx. 80-foot facility.
- Extend flank-parked section into reclaimed area.
- Apply this approach in all similar circumstances, especially on next block.

King Street

From Mulberry to Prince, King Street gains an extra lane at the expense of curb parking.

<u>Current Condition</u>

The width and configuration of King Street varies throughout its downtown trajectory. In some locations, it contains driving lanes in excess of 12 feet. In others, it is missing parallel parking in places where there is room for it. In yet others, it contains turn lanes that are very long, eliminating curb parking, especially at Prince and Queen Streets.

Peak-hour traffic counts were just measured as 798 vehicles on the block between Mulberry and Water Streets.

Between Duke and Lime Street, two small parking lot driveways have eliminated parallel parking from the south curb for a stretch of more than 120 feet, effectively doubling the width of the driving lane.

<u>Analysis</u>

The absence of parallel parking on King Street east of Mulberry Street is one reason why cars speed and shops struggle in that location. Parking should be restriped to the southern curb all the way to the Prince Street approach, where a turn lane should be introduced according to “The Strategy.” The Strategy should also be applied west of Queen Street, allowing curb parking to extend beyond Market Street.

Indeed, in recommending “The Strategy” along this corridor, it should be noted that King Street’s peak-hour car count of 798 is well below the 1000 vehicles that can be handled by a two-lane one-way street in a network of this type, in which cross streets are also heavily trafficked. Therefore, these turn lanes are not needed at current volumes, and they certainly do not need to be so long.

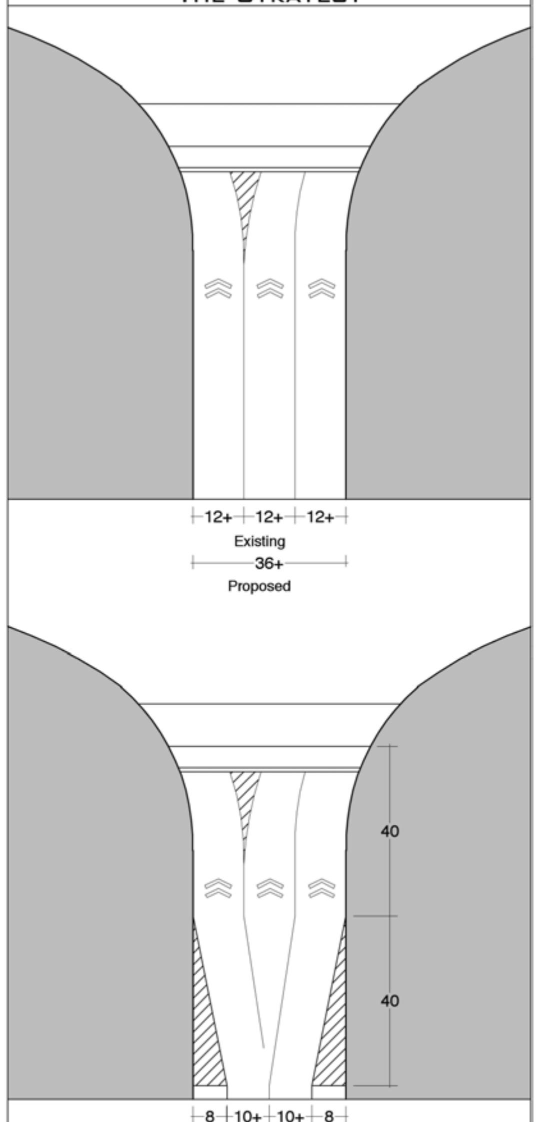
The sight-triangle restrictions that limit parking around the East King Street garage should be relaxed to a distance of 10 feet from each driveway, allowing more parking spaces on the south curb.

Recommendation

Add parking back to the south curb east of Mulberry Street, leading to an approx. 80-foot turn lane facility (approx. 40 feet of storage and 40 feet of taper) approaching Prince Street. Shorten the turn lane approaching Queen Street to the same length, regaining parallel parking on both flanks as a result.

Add back 3 parking spaces to the south curb in the vicinity of the East King Street Garage.

KING ST.
AT QUEEN
'THE STRATEGY'



NOTES

- Shorten turn lane to an approximately 80-foot facility.
- Extend flank-parked section into reclaimed area.
- Apply this approach in all similar circumstances.

Chesapeake Street West of Duke

The 25 MPH speed limit posting belies the highway design of Chesapeake Street.

Current Conditions

West of Duke Street, Chesapeake Street consists of two 19-foot driving lanes, inviting speeding.

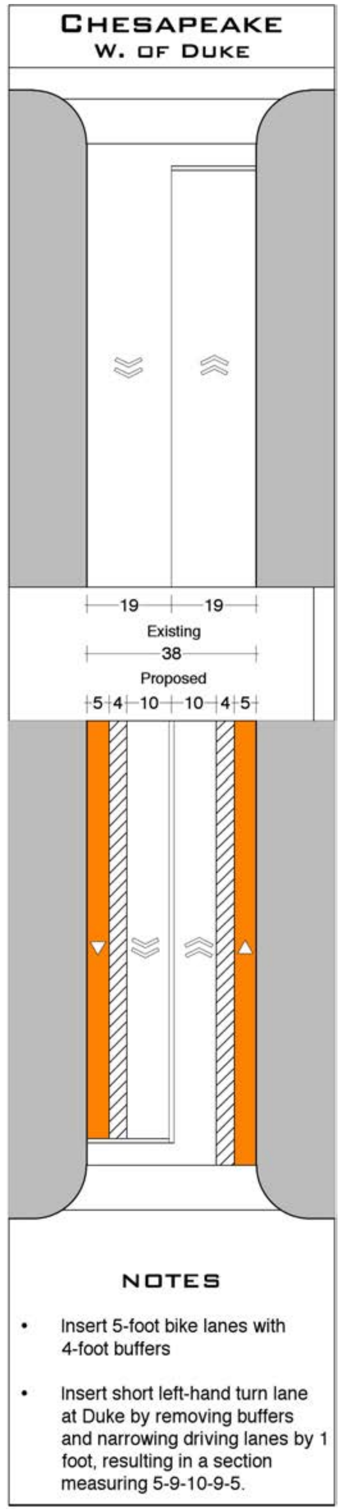
Analysis

The excess pavement along this trajectory should be replaced by two ample bike lanes, since there is no real demand for parallel parking in this location. While each bike lane can be 9 feet wide, a brightly striped buffer zone is needed within this area so that it does not appear to be a driving lane.

Recommendation

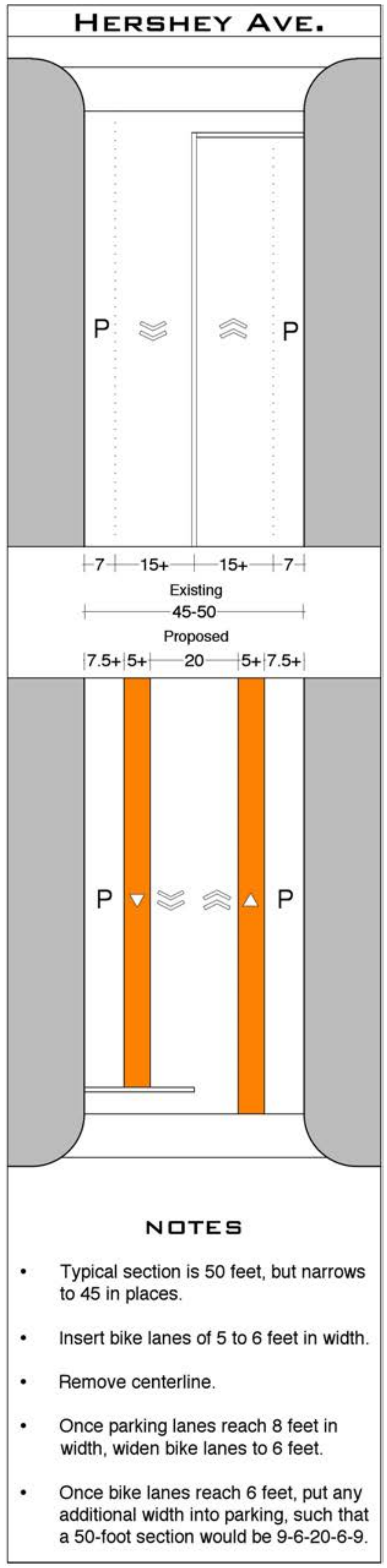
Restripe this segment of Chesapeake Street to contain two 10-foot driving lanes flanked by two 9-foot bike lanes, each consisting of a 5-foot lane and a 4-foot traffic-side striped buffer.

If a left-hand turn lane is desired at Duke Street, such a facility should be provided by briefly narrowing the driving lanes to 9 feet and the bike lanes to 5 feet, resulting in a configuration of 5 bike – 9 drive – 10 turn – 9 drive – 5 bike. This facility should be very short, approx. 60 feet total including taper zone.



Hershey Avenue

Hershey is another street in which excess pavement can be put to better use.



<u>Current Conditions</u>

For all but its easternmost 500 feet, Hershey Avenue consists of two 15- to 18-foot driving lanes flanked by two unmarked parking lanes, inviting speeding.

<u>Analysis</u>

The excess pavement along this trajectory should be replaced by two bike lanes.

<u>Recommendation</u>

Restripe Hershey Avenue to contain two bike lanes alongside curb parking. The width of the parking and bike lanes varies based upon the width of the street, as follows:

45 feet: 7.5 park – 5 bike – 10 drive – 10 drive – 5 bike – 7.5 park.

47 feet: 7.5 park – 6 bike – 10 drive – 10 drive – 6 bike – 7.5 park.

50 feet: 9 park – 6 bike – 10 drive – 10 drive – 6 bike – 9 park.

This moderate-volume street should not contain any left-hand turn lanes.

Other East-West Streets:

The following streets provide opportunities for less significant modifications:

Vine Street

Vine Street suffers principally from the absence of parallel parking in a number of places where it seems viable:

- The vast driveway to the intelligencer Journal parking lot begs the question of whether such a broad curb break is needed to facilitate truck motions. Narrowing this opening, as well as moving the current bus stop closer to that opening, would create places for curb parking.
- From Duke to Christian, parking has been removed from the entire northern curb cue to one small garage opening. Limiting to the parking ban to within 10 feet of the driveway allows for many more spaces.
- From Christian Street to the Convention Center awning, there is room for three parking spaces to be inserted before the bus loading zone begins.

Manor Street

The parking ban on Manor Street just south of 3rd Street is a prime example of how the sight triangle requirement is resulting in the removal of too many parking spaces. Far from improving safety, the resulting over-wide driving lanes invite dangerous speeds while leaving the sidewalk unprotected. There seems to be no good reason why the 50-foot curb between 3rd Street and the Kunzler parking lot should not contain one 22-foot parking space.

Wabank Street to Hazel Street to Beaver Street

Given Manor Street's non-viability as a cycling corridor, there is a mandate to locate an alternative bike route from Millersville University to downtown. The most promising corridor seems to be Wabank Street (peak-hour car count: 460), which connects via Hazel Street and Beaver Street to downtown.

Pending further study, it would seem that these streets should be prominently marked, with sharrows and bold signs to create a single high-visibility cycling route from Millersville to downtown and back.

This effort must also be applied to Wabank Road, beyond the city limits. In town, at Conestoga Street and elsewhere, it must be made obvious that two-way bike travel is welcome in Beaver's one-way alley segments.

West Liberty Street

As noted earlier, West Liberty Street is about to be constructed with 12-foot lanes, which will invite speeding. Two feet should be removed from each driving lane and added to each sidewalk. If turning motions are a concern, the curb extensions should be eliminated. These do not significantly improve the safety of streets that are already narrow.

Four Problem Locations

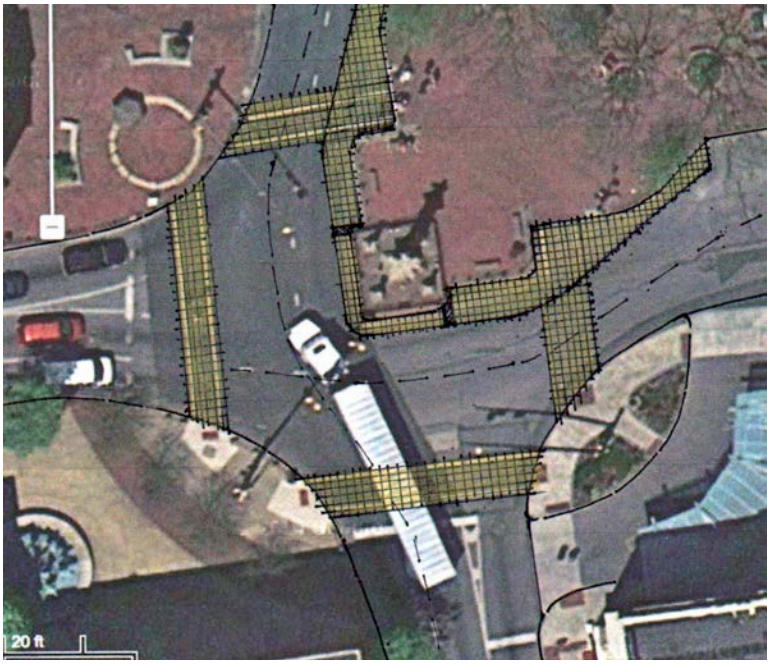
While other sites in the study area present challenges to pedestrian safety, four were called out as especially challenging and worthy of modification.

Penn Square

Given how the most prominent intersection in was redesigned, and by whom, Penn Square could be a lot worse. It is hoped that some day soon, perhaps in conjunction to the two-way reversion of King and Queen Streets, this intersection can be properly reconfigured as a proper square, with narrow lanes of one-way traffic once again moving counterclockwise around the monument. Such an intersection would function like a modern roundabout, but with a square rather than a circle in the center, encouraging slower speeds.

The current configuration of Penn Square causes the monument to block views of people crossing west or south.

While such a solution is imagined for the long term, a safety crisis demands our immediate attention. Pedestrians crossing in the southward or westward direction cannot see around the monument, and therefore are in danger of being hit by approaching vehicles. Additionally, the broadly swooping curves of the corner curbs encourage speeding, as do the exceptionally wide driving lanes of King and Queen Street. As they pass through the square, these lanes are effectively 15 feet wide. Faded crosswalks complete the menacing tableau.



Extended curbs and more prominent crosswalks remedy a dangerous geometry.

The simple solution, relatively low cost, is to reduce the travel lanes to something closer to 10 feet, by extending sidewalks south and west from the monument. Given the large radius of curvature of the surrounding corners, these extensions can be quite large without presenting an impediment to truck turning movements. The additional improvement of constructed crosswalks, ideally slightly raised as speed tables, would further improve safety, but is less essential than the curb extensions.

These improvements are shown above. Because both of the intersecting streets belong to PennDOT, we can expect resistance—both ideological and bureaucratic—to this proposed remedy. PennDOT engineers are likely to claim that 10-foot lanes are too narrow in this heavily-trafficked location. This assertion, while perhaps correct in theory, is happily contradicted by reality, and by the a fortunate occurrence on the final day of this project's site study: A Public Works cherry-picker parked in the roadway for most of the day, in order to decorate the City Christmas Tree, claiming a full 9 feet of pavement. This unintentional traffic-calming device served to moderate driver speeds somewhat—as recorded on video—but did nothing to impede the rush-hour commute. Those looking for reasons to scuttle this very important correction to 's central crossroads will have to look elsewhere for evidence.

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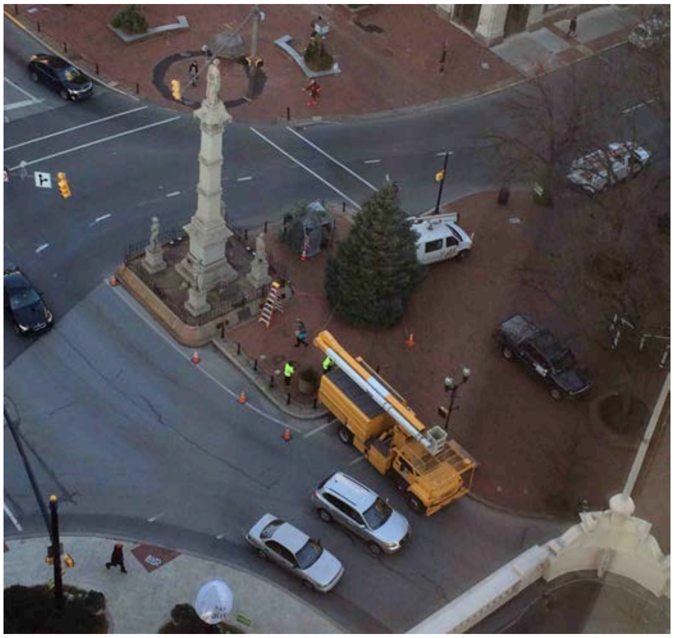

The proposed curb extension, accidentally modeled by a Public Works truck, proves no impediment to rush-hour traffic at Penn Square.

McGovern and Prince

Another important intersection that presents both a real and a perceived danger to pedestrians is located just west of the train station, where McGovern and Prince Streets meet. Given its proximity to transit, a lot of people walk here, and many complain about the speed of vehicles as they round the corners, accelerated by a "pork chop" that creates two slip lanes at the intersection. The pork chop also limits vehicular movements, disallowing eastbound traffic on Lincoln to continue east on McGovern. Such highway-like restrictions further communicate a high-speed environment. Additionally, all pedestrian movement is confined to one faded path, meaning that most people walking must detour from their desired path to make the crossing, resulting in a lot of jaywalking. Finally, front-angle parking along both streets has led to the elimination of sidewalks, such that people are forced to walk in the path of vehicles entering and backing out of parking spaces.

In locations such as these, the way to encourage safer behaviors among people both driving and walking is to configure intersections in the most urban manor, with each sidewalk leading to a bright crosswalk, and with no driving paths eliminated or channeled into slip lanes. This is accomplished by constructing simple rectilinear curb configurations at corners, with tight curb radii, proper-width driving lanes, and the insertion of parallel parking in any places where lanes are too wide.

Current: The double-slip-lane configuration at McGovern and Prince encourages both jaywalking and speeding.

Proposed: Rectilinear corners with tight curb radii turn this back into an urban intersection. Note the two parking spaces added to the west curb.

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As can be seen in the "after" image above, this approach results in a multiplicity of crossing options. Eliminating any of them would invite both jaywalking and higher driving speeds.

The good news is that this intersection is currently being redesigned around the conversion of McGovern Street to two-way traffic. The proposed design should be compared to the design above, and their relative merits discussed in light of the arguments here.

Queen, Church, and Conestoga

Another location that illustrates, more simply, the difference between highway thinking and urban thinking is the intersection of Queen, Conestoga, and Church Streets. As evidenced in the diagram on page 16, this site is a frequent site of car/pedestrian crashes, for a number of reasons. First, it is the center of a neighborhood that includes a corner store, a Laundromat, a salon, and a grocery, so people are often crossing the street, including many children. Second, Queen Street's pair of wide one-way lanes encourages speeding—as do Church's three wide lanes—and people can routinely be seen driving over 45 MPH through the area. Finally, the walk signal allowing people to cross Queen Street is exceptionally short, stranding many people in the middle of traffic.

Wide lanes and a paucity of marked crossing locations endanger pedestrians at this complex intersection.

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Signal timing is the easiest fix, and requires only for PennDOT to acknowledge the sanctity of life and respond appropriately. However, the real problem here is not the signal, but the fact that—like at McGovern and Prince—the elimination of legal crossing locations has led to both speeding and jaywalking, a deadly combination.

Signalized crosswalks are needed in all locations indicated.

The buffered bike lane proposed for Church Street will further calm traffic.

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The proposed redesign of this intersection relies only on paint, and places bold, signalized crosswalks along all desire lines. These crossing signals would need to be coordinated for efficiency but, so timed, would not present a traffic problem. The further reduction of Church Street to two lanes—already discussed—through the insertion of a two-way cycle track, would also bring traffic closer to the marked speed.

The Campus Center that Isn't

In terms of its safety, function, attractiveness, and success, the Franklin & Marshall "College Strip" along the Harrisburg Pike is a far cry from what it could be—and from what it will be soon if PennDOT is willing to redesign that stretch of road around a broader set of criteria than traffic volume and speed. As currently striped, that roadway's over-wide driving lanes only encourage speeding and increase crossing distances, while its unnecessary right-hand turn lanes marginally increase the vehicular through-put while severely increasing the danger to people walking along it.

As already discussed, that street's right-hand turn lanes should be eliminated, as they are not appropriate to an urban condition. Similarly, its lanes should be narrowed to a standard free-flow width of 10 feet, as befits a non-highway thoroughfare. Making both of these changes allows for a large increase in the amount of parallel parking along the street, essential to business success and pedestrian comfort.

These changes are easy to imagine in the context of a street reconstruction, something that makes sense and should perhaps be pursued. However, rebuilding this street, which has recently been remade in its current highway-like form, seems extremely unlikely to win PennDOT funding. This circumstance does not present an impediment, because most of the necessary modifications to the Harrisburg Pike can be achieved simply with paint, not concrete. As usual, restriping offers 90 percent of the benefits of rebuilding, at less than 10 percent of the cost.

For this study, we have separated the area of intervention into three segments. The first, from campus east to Prince Street, has already been addressed in the Proposed Changes to Individual Thoroughfares above, in which a right-sizing of the street's three lanes allows for a continuous southern curb of parallel parking. The other segments, shown ahead, consist of the two stretches on either side of the short median that has been built along the new mixed-use buildings across from campus. These buildings, and the older ones to their east, that contain businesses and apartments that entice students across the Harrisburg Pike. As the school locates more of its facilities, especially its sports fields, north of the former train tracks, the number of students crossing the Pike will increase significantly. This dramatic increase in pedestrian traffic should compel PennDOT to revisit the design of this street, which already exposes too many students to traffic that has been enticed to travel at dangerous speeds.

Because the goal is a re-striping and not a reconstruction, the result is somewhat unconventional, but it is perfectly within the realm of standard driving conditions, albeit ones that correspond to the posted speed limit. Narrowing the 12- to 14-foot-wide driving lanes to 10 feet, and placing parallel parking in the space gained, as well as in the right-hand turn pockets, results in a street that is mostly lined by parallel parking on both sides. The parking spaces vary in width—a condition that is mitigated by striping along the curb—and the roadway shifts laterally along its length. These lateral shifts, similar to the traffic-calming measures that are often used on dangerous streets, help to keep driver speeds in check.

If it has the wisdom to embrace this redesign, PennDOT must be sure that it the street is designed to match the desired driver speed. To the surprise of most people who hear it, traffic engineers tend to design streets for higher speeds than those posted, based on the assumption that faster streets make speeding drivers safer. This assumption is perhaps correct, but it is to be faulted for ignoring the safety of other road users, and, frankly, to be ridiculed for failing to understand that higher-speed designs encourage speeding. This misconception—that speed-inducing roadways make drivers safer—quickly becoming one of the greatest embarrassments of the engineering profession—must not be allowed to impact the redesign of this street.

This point is worth making because the design speed of the street will determine the angle of all lateral motion on the street, whether the taper of a turn lane or the shift that allows parallel parking to exist on most curbs. It is essential that these lateral shifts correspond to the speeds desired from drivers, or drivers will speed, and the amount of curb parking—also important for safety—will drop significantly.

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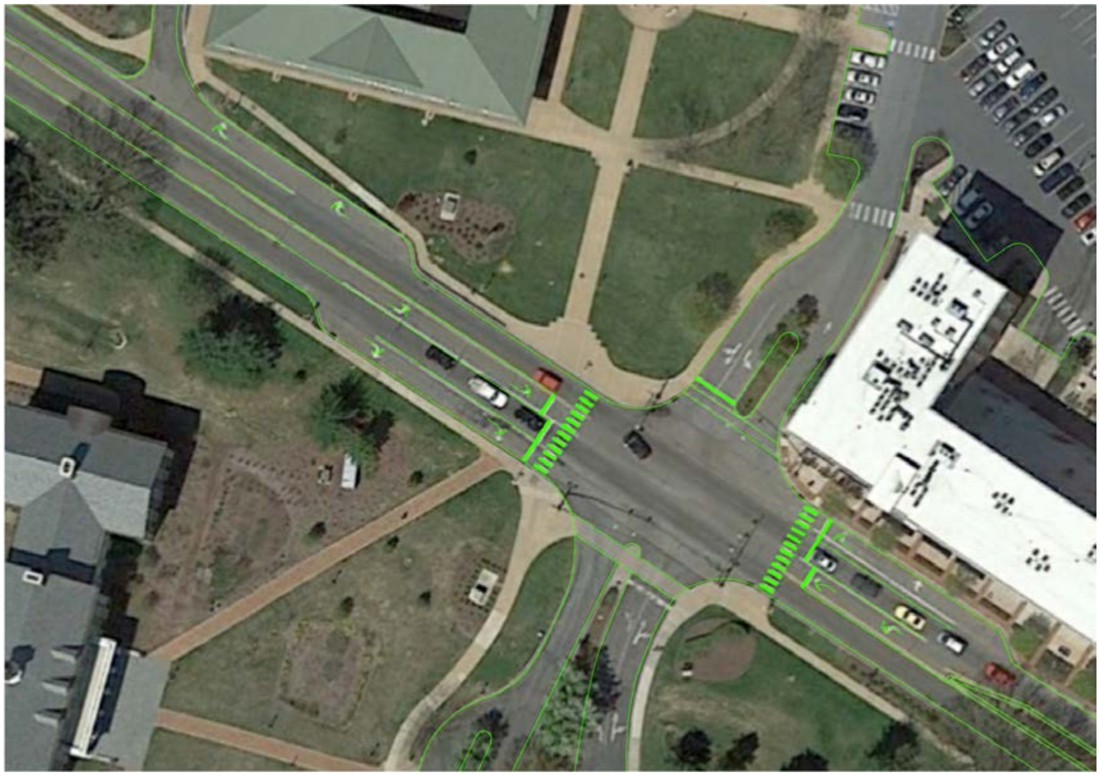
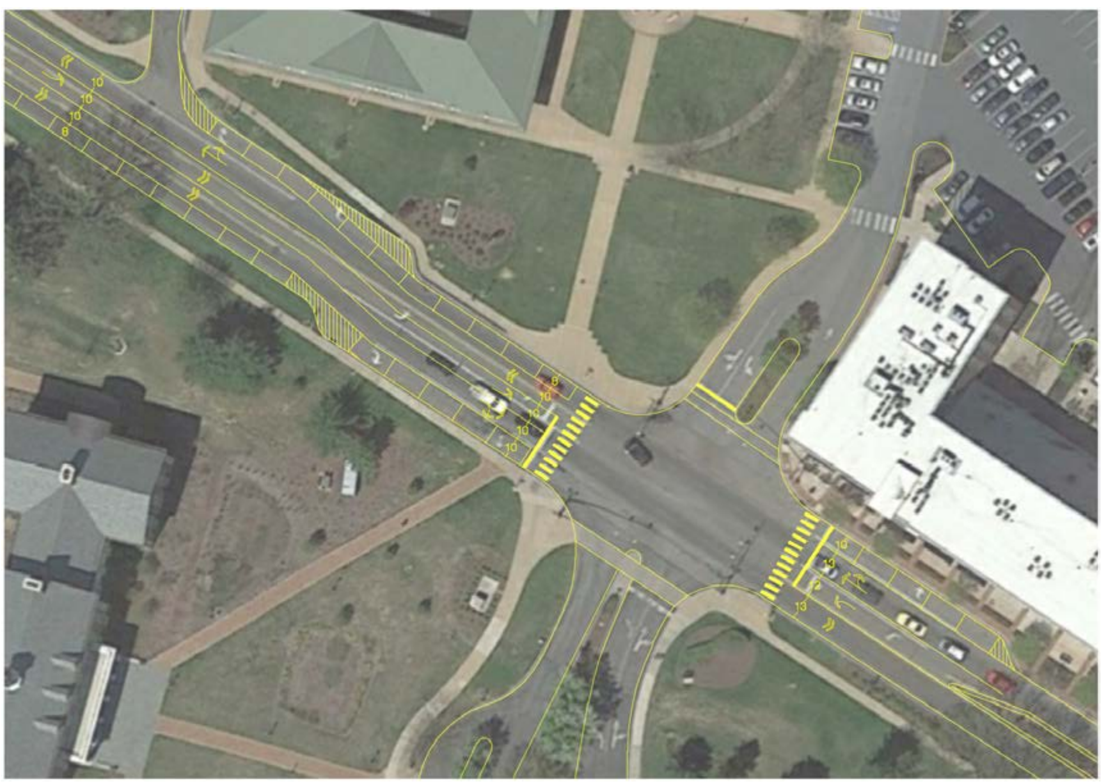
Central segment of Harrisburg Pike: Existing Conditions

The proposed restriping right-sizes driving lanes and eliminates right-hand turn lanes, and uses the area gained to place parallel parking against curbs.



Western segment of Harrisburg Pike: existing conditions



The proposed restriping right-sizes driving lanes and eliminates right-hand turn lanes, and uses the area gained to place parallel parking against curbs

Cycle Facilities

A Strategy for Bike Lanes

In terms of health, safety, livability, competitiveness, and economic impact, there is little that could be done to the streets of that would be more beneficial than the introduction of a useful and comprehensive cycling network. In recognition of this fact, the City and County have commissioned a cycling plan, to begin shortly. To be effective and implementable, this plan must do two things: it must properly connect key destinations, and it must be realistic about where new cycling facilities can easily be located, from both a practical and a political point of view.

Because most cycling plans tend to err on the side of the former, this report attempts to err on the side of the latter: while it takes pains to create two dominant useful corridors—one north-south and one east-west—it pays most attention to where such facilities actually fit, and where they can be achieved with the least negotiation. Also, in contrast to most cycling plans, is uses an additional key criterion for locating bike lanes: identifying excess pavement. Because bike lanes in overly wide streets help to slow traffic down, this proposal begins with a search for streets where bike lanes are needed just to take up space. These bike lanes may not connect to meaningful destinations nor to each other, but they are sorely needed to create a safer environment for people walking and driving, as well as biking.

For that reason, the proposals shown ahead are properly understood not as a cycling plan, but as the foundation for a cycling plan. The bike facilities recommended are alone not enough to connect key destinations, but they are still mostly essential for calming traffic, so they should be a part of whatever plan is eventually created.

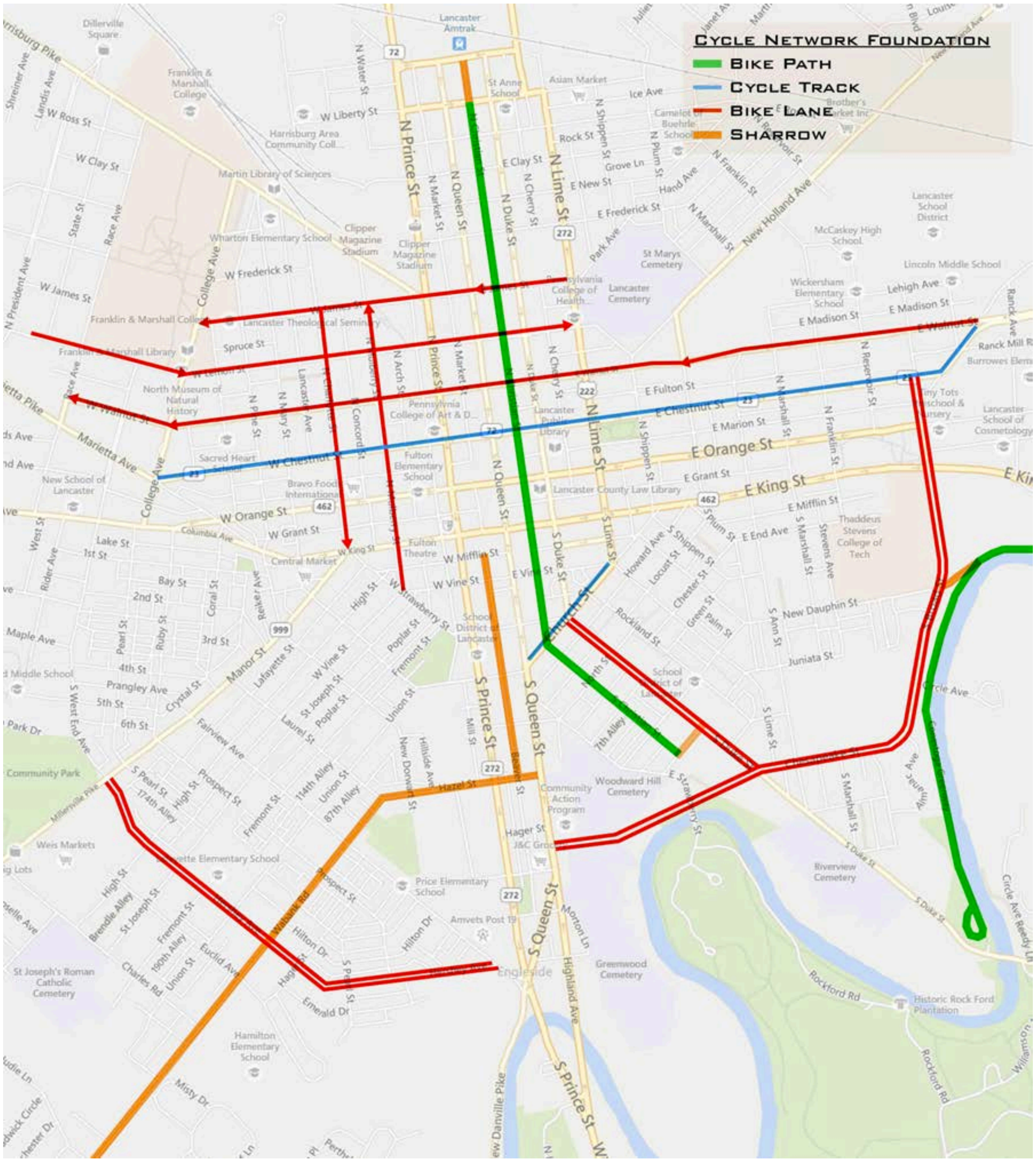
The Facilities

Currently, drawing a map of ’s cycling facilities does not require much colored ink. Aside from the Conestoga Greenway, there is only one bike lane in the whole County, on a brief stretch of the Fruitville Pike. The proposal that follows below is not thought of as a proper plan, but rather constitutes an accumulation of the individual street redesigns already enumerated.

While readers are encouraged to turn back for a more thorough description of the changes proposed for each thoroughfare, the diagram below can be summarized as follows:

- As they are reverted to two-way traffic, Mulberry and Charlotte Street each receive a one-way bike lane, to use up excess pavement, comprising a north-south pair.

- James and Lemon Streets also each receive a one-way bike lane, to use up excess pavement, comprising a north-south pair.



It is recommended that the above facilities be included in the City/County cycle plan.

- As it is reverted to two-way traffic Walnut Street receives a westbound bike lane to use up extra pavement.

- If it were also reverted to two-way traffic, Chestnut Street would also receive a cycle lane, in this case eastbound. However, in order to create a single high-quality east-west bikeway, Chestnut Street is recommended to remain one-way, lose one lane of traffic, and insert a two-way cycle track along its north flank.

- In order to create a single high-quality north-south bikeway, Christian Street is designated to become a shared-space bike facility, and repaved and signed as such. Since it contains so little traffic, the principal impediment to this facility is its intersections with major east-west streets, which must be carefully designed to provide safety, visibility, and appropriate priority to cyclists. Because no other workable north-south corridor exists, given the PennDOT ownership of all these streets, this major investment is deemed worthy.

- Because it contains much more capacity than traffic, Church Street trades one driving lane for a two-way cycle track on its north flank from Prince to Lime Streets.

- Because they contain lanes that are too wide, the following streets each receive a pair of bike lanes: Broad, S. Duke, Chesapeake, and Hershey.

- Because they comprise a key connection to Millersville University, Wabank, Hazel, and Beaver Streets are designated as a cycling corridor and prominently marked with sharrows and other signage.

The above recommendations are properly understood, not as a cycling plan, but as a foundation for a cycling plan, and it is hoped that they are reproduced verbatim in the upcoming City/County effort. Among these, the biggest question mark would seem to be the cycle track along Chestnut Street. While such facilities are clearly superior to standard bike lanes, there is a clear logic to simply applying the more obvious and consistent solution, already recommended for the Mulberry/Charlotte and James/Lemon pairs, of a bike lane pair split between Walnut and Chestnut Streets, both of which would also be reverted to two-way. Such an outcome, while imperfect, would be a great improvement to the current condition, particularly if integrated with a high-priority north-south bikeway along Christian Street. It is shown on the following page.

Bike Lanes in General

NACTO provides specific instruction on the design of a variety of cycling facilities, too lengthy to repeat here, and worthy of direct consultation. One question cities often raise, given the cost, is to what degree the lane needs to be fully “painted” rather than merely striped. Given that less-expensive bike lanes allow a city to install a greater number of bike lanes, there is no one right answer to that question. However, a good compromise selected by many cities is to only color the full bike lanes in locations where conflict is likely, or where people driving need a reminder about the presence of the facility. Such a mandate results in bike lanes being fully colored as they approach intersections and in other areas where they are likely to encounter cross-traffic, such as alley openings.

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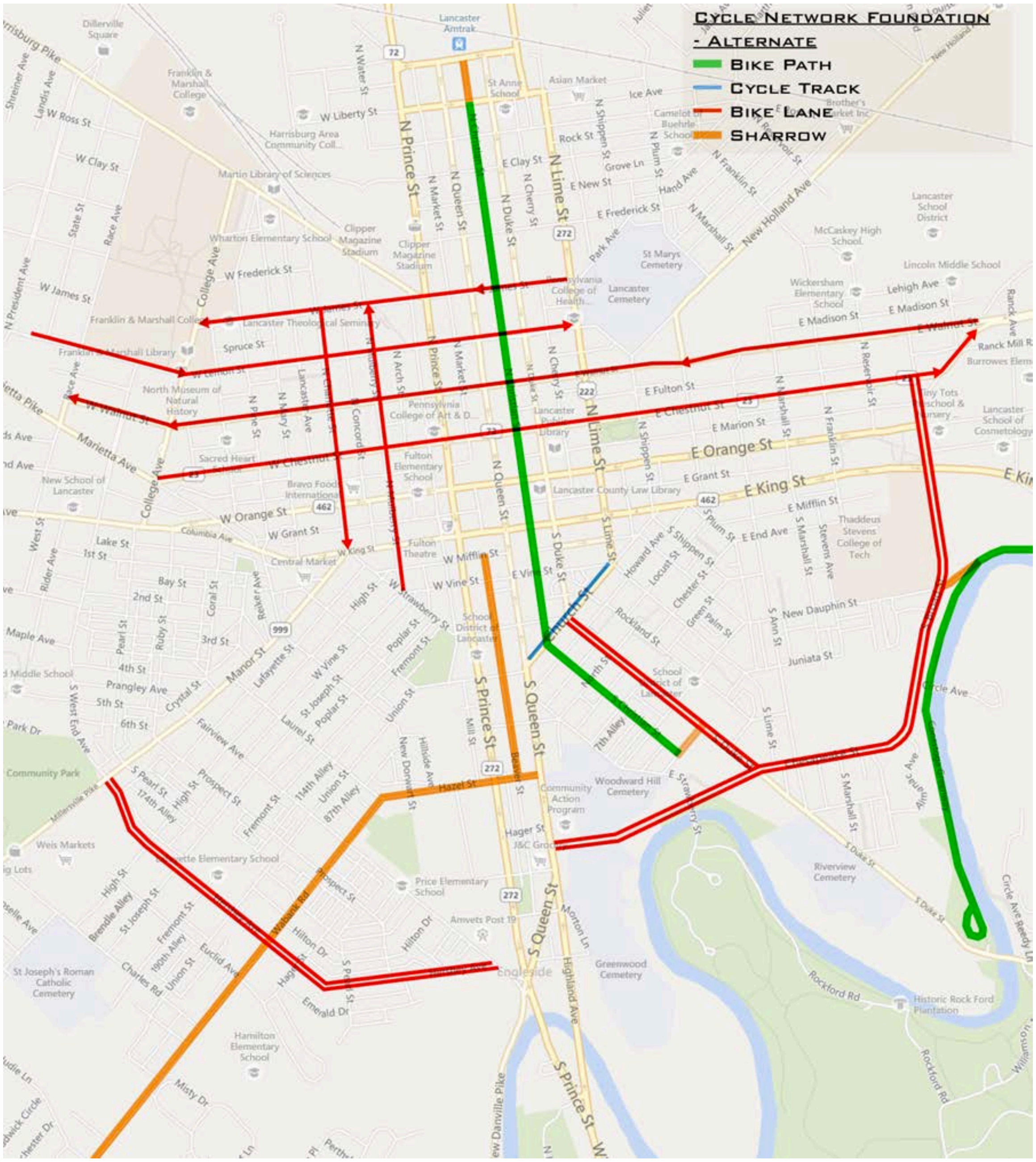

This alternate plan replaces the cycle track on Chestnut with an in-street lane.

Selection of the proper bike lane materials has a major impact on installation cost, maintenance cost, and longevity, and the technology is evolving constantly. While a more comprehensive investigation is recommended, one material worth considering is methacrylate, a new generation resin. It provides high durability on both asphalt and concrete, is skid-resistant with good traction, low VOC, highly reflective with high chromaticity

Methacrylate can be sourced from several companies. The bike lanes created by the City of Syracuse, which have lasted two winters without significant damage, were made of

Color-Safe TM Color Pavement Marking, manufactured by Transpo inductries of New Rochelle, NY. (Speck & Associates has no relationship with this company.)

This methacrylate cycle track in Syracuse, NY, has held up well to weather.

PART III. A USEFUL WALK

Housing Policy

As noted, downtown will be considerably more useful—and therefore more walkable—when it achieves a better balance between housing and workplace. To achieve this will require a commitment from the City to reorient its policies and practices around the stated goal of creating more housing downtown, and providing direct support in this regard.

City Support

What does such support look like? A good example is Lowell, Massachusetts, which is quickly transforming its downtown through a focus on new housing. As recently as 2000, the heart of the city held only about 1700 housing units, of which 79 percent were subsidized and income-restricted. Eleven years later, the number of units has almost doubled and almost 85 percent of the new housing is market rate. That means that the number of non-income-restricted homes has more than quadrupled.

According to Adam Baacke, Lowell's Assistant City Manager for Planning and Development, achieving this transformation was essentially a three-step process that could perhaps be best described as *politics, permitting,* and *path-finding.* *Politics* refers to changing attitudes on the City Council, where most members had historically shunned downtown housing because "only commercial development was considered good." Eventually, the City's new outlook motivated it to sell one of its underutilized parcels for the express purpose of creating artists' housing downtown.

Permitting refers to sidestepping the City's conventional zoning code, which, for example, caused this new artists' housing to require 14 distinct variances just to get built. In its place, the City treated each new residential proposal as a "special permit," and then these permits were "given out like candy" to qualified applicants. Next, the City replaced its stringent requirements for parking with the new rule that developers needed only to identify one parking space per unit, anywhere nearby, that could be leased to their residents. Most of these were spaces in municipal garages that were busy from nine to five but empty at night.

Finally, *Path-finding* refers to setting up an extensive regime of hand-holding from city staff, to walk developers through the tricky process of winning every available federal and state subsidy, including Historic Preservation Tax Credits and Community Renewal block grants. Some of these awards are quite competitive, and the City went so far as to package all of the required letters of support from the community. Finally, this help even included cash, with the City finding ways to put money into some of the projects.

In , one key factor in past successes seems to have been evoking the Historic District Designation, which allows developers to sidestep some of the onerous requirements in the current code surrounding upper floor housing. The City should work to disseminate this technique and others like it to the builder community.

Granny Flats

Another good strategy for would be the creation of a Granny Flat Ordinance. Called "accessory dwelling units (ADUs)" by planners, and "backyard cottages" by clever marketers, granny flats are small apartments placed in the back yard of single-family houses—often atop a garage on a rear lane—that can be rented in the free market.

Granny flats are typically opposed by neighbors who are worried about property values. Happily, there is no evidence that granny flats lower property values, for a number of reasons. First, they are almost invisible. Second, they provide the homeowners with an income stream that allows them to live in their own home more comfortably. Third, they are of course carefully regulated to avoid tenement-style use. (Indeed, the tenant is often the homeowners' parent or college-age child.) Fourth, they introduce affordability in a dispersed, rather than a concentrated way, avoiding the pathologies that are sometimes associated with the latter. Finally, they are inevitably well supervised by their landlords, who live just a few feet away.

Granny flats are great for walkability, as they increase neighborhood density, putting more feet on the sidewalks, and making transit service and local shopping more viable. They are ideal in those older single-family neighborhoods that can often be found on the edges of downtown, where bungalows and larger homes line walkable streets. Indeed, that's where they can still be found in places like Charleston, SC, and West Hollywood, CA. Granny flats are also popular in Canada, where NIMBYs generally hold less influence over local planning matters. Vancouver decriminalized them in 2008 as part of the city's "EcoDensity" initiative, and hundreds have already been placed in service.

Despite all this positive experience, even some of America's most progressive city councils have found it a struggle to make granny flats legal again. Seattle finally succeeded after a lengthy fight, with critics claiming that the cottages would double the city's density. Currently, more than forty granny flats are being built in Seattle each year, mirroring the experience in Santa Cruz. As of 2011, the cottages had been legalized in Portland, Miami, Berkeley, Denver, and Burlington, Vermont. A first step in making them legal in would be for the City to study the Granny Flat Ordinances of those places.

Once such an ordinance is established, and well publicized by the City, it should encourage a small but significant number of homeowners to provide more housing within proximity to downtown.

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Parking Policy

Parking covers more acres of urban America than any other one thing, yet until about a decade ago, there was very little discussion about how parking could be managed for the benefit of a city. Thankfully, due to the work of Donald Shoup, PhD, the author of *The High Cost of Free Parking,* there is now a comprehensive set of practices that cities can undertake to ensure that downtown parking works to make downtown more attractive, more convenient, and more successful.

These practices, which Shoup organizes as a three-legged stool, consist of the following: eliminating the on-site parking requirement (and addressing downtown parking supply collectively); charging market-based prices for parking; and reinvesting increases in parking revenue in the very districts where that revenue is raised. We will address each of these concepts briefly.

The On-Site Parking Requirement

Abolishing the off-street parking requirement for all downtown uses is one of the three cornerstones of Shoup's theory, because it allows the market to determine how much parking is needed. He notes that "removing off-street parking requirements will not eliminate off-street parking, but will instead stimulate an active commercial market for it."

This is what already happens in America's most walkable communities, and also in 's Central Business District (CB and CB1 zones). Eliminating parking minimums in this way simply allows developers to give their customers what they want. But, as discussed ahead, it can only be expanded into surrounding mixed-use neighborhoods if it is combined with a safety net that protects current residents' status quo.

Shoup is correct when he calls the on-site parking requirement "a fertility drug for cars." When developers are required to provide one or two parking spaces per residential unit, they tend to sell or rent apartments with parking attached. This effectively subsidizes driving: often, non-driving residents unwittingly pay for the parking of those who drive, making car ownership more affordable and therefore more likely. Simultaneously, it makes housing more expensive for everyone, typically by about 20 percent.

Cities are often reluctant to lower the on-site parking requirement in mixed-use areas because current residents who park on the curb are worried about new residents creating increased competition for these spaces. That is why it is essential, before lowering or eliminating the on-site parking requirement for residential development, to complete a "Parking Preservation Plan" that guarantees existing residents their current curb-parking circumstances will not be worsened. This is typically achieved through a parking permit program—well enforced—that is only available to residents of currently existing addresses.

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Interestingly, anecdotal evidence from new developments in American cities—most recently Washington, DC and Somerville, MA—suggests that residents should think twice before fighting against reduced residential parking ratios in their neighborhoods. In both cities, new buildings with ample on-site parking rented up principally with tenants who brought cars with them, while new buildings without parking filled up with car-free tenants who principally walked, biked, or took transit. Needless to say, the buildings with ample parking ultimately placed a much greater strain on the roadways and parking spaces of their neighborhoods.

The simple fact is, many developers themselves insist upon high parking ratios and, if they don't, their lenders do. The typical downtown residential developer is not willing or able to provide a significant reduction in parking supply; therefore, those that choose to do so are aiming precisely towards those renters and buyers who own fewer cars.

The path to the goal line may be unclear, but the goal is not. Reducing or eliminating the on-site parking requirement for all mixed-use districts, if done properly, will make a more successful city.

Additionally, the City should consider instituting parking maximums as well. One development currently being planned in the City proposes providing 125 parking spaces for a building of approx 25,000 square feet. This 5-per-thousand ratio is multiples of the City requirement, and well in excess of standard practice. Since excess parking results in excess stormwater burdens, as well as encouraging driving and undermining sidewalk quality, the City has ample justifications for putting maximums in place.

The Right Price

One place where falls behind some other cities is in the pricing of its parking. The current regime seems to be working against the success of downtown, in that it encourages overcrowding at curbs and driver circling during times of peak demand. This outcome is the result of curb parking that is priced at $2 per hour, which is not exceptionally low, but is no higher than the less-desirable parking in the public structures. This artificially low price drives up demand for the type of parking that is already hardest to find, short-circuiting the free-market functionality that would otherwise allow people to make smart choices about where to park. The result is a scarcity of the underpriced good (curb parking), perceptions of inconvenience among potential shoppers, and an underutilization of the City's investment in its parking structures.

As described by Shoup, the proper price for curb parking is the price that results in a steady availability of one empty parking space per curb face at all times, an occupancy rate of approximately 85 percent. At times, this occupancy can be achieved with a price of $0, but at other times the price must rise significantly to assure that "Daddy Warbucks can always find a spot near the furrier." This outcome can be often be achieved without elaborate or expensive congestion pricing devices, such as the system recently installed in San Francisco: often, the price need only change once or twice a day.

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The same economics also work in reverse when parking costs too much. As already noted, cars speed on Orange Street west of Prince, where metered parking spaces are often empty. If these meters were priced in better relation to demand, cars would return to these curbs, making the street safer. The right price for parking is not always a higher price. Rather, it is a price that reflects value, as indicated by demand.

Once the role of parking meters is better understood—not as a revenue source but as a means of ensuring proper availability—then the current downtown parking regime in begins to look a bit wanting. With much of the demand in the evenings and on weekends, it seems odd that meters become free at 6PM—"unofficially 4.30 PM"—and on Sundays. The laws of economics are not suspended at those times, so nor should a demand-based price for parking.

Surprisingly, it is sometimes the downtown merchants who fight most ardently against increased meter rates or expanded hours. Their opposition is based on an instinctive fear that shoppers will be scared away, and their sales will suffer. Fortunately, this fear has no theoretical basis and no evidence to support it. In city after city, the business-owners who fought the loudest against market-based pricing were among the first to admit that, once instituted, it increased their sales dramatically. The parking meter was invented, after all, to help businesses—by increasing shopper turnover—and an underpriced parking meter is not being allowed to do its job.

The merchant's in seem to be a bit ahead of the curve in this regard. When presented with the option of free parking on Saturdays, they elected to maintain the metering regime. This suggests that they should embrace a more consistently demand-based program.

Parking Benefits Districts

In other cities, third leg of Shoup's stool, the Parking Benefits District, has been essential to winning over reluctant merchants. It is only fair, and beneficial, to take the extra meter money raised in a popular shopping district and reinvest it in that district itself. In addition to improving sidewalks, trees, lighting, and street furniture, these districts can renovate storefronts, hire public service officers, and of course keep everything clean. As has been demonstrated in Pasadena and elsewhere, these districts can initiate a virtuous cycle where parking demand begets an improved public realm, which in turn begets even greater demand.

If the supply and management of parking in downtown is going to work to the benefit of downtown , then a commitment to the above three basic principles of parking policy should explicitly guide City efforts

Transit Facilities

Moving beyond the concerns already stated regarding potentially redundant bus stops, it can be said that the Red Rose Transit Authority does a good job connecting downtown to its surrounding region. Its hub is perfectly located—close to, but not right at, the very center of town, and is one of the best-designed facilities of its type in the U.S. Unfortunately, when it comes to providing local service with its Downtown Trolley Circulator, the Authority has been more challenged. The Circulator has never achieved meaningful ridership, and is about to be cancelled, due to an annual loss of about $150,000.

Right Route, Wrong Service

By connecting key anchors efficiently, streetcars and circulators make walking more useful. Their success depends upon them providing a significant acceleration of the pedestrian, which means that the ride time plus the wait time must be considerably shorter than the walk time. Running down Prince Street and up Queen Street from the Amtrak station to the Convention Center, the Down Trolley Circulator properly connects two anchors, with many other meaningful destinations along the way. But, since the two anchors are less than 25 minutes away from each other on foot, and an almost 10-minute ride by bus, this suggests that headways—the gap between vehicles—should not exceed 10 minutes if the Circulator is to actually accelerate the pedestrian. Ten minutes is an important measure for another reason, which is that it allows people to take transit without consulting a schedule.

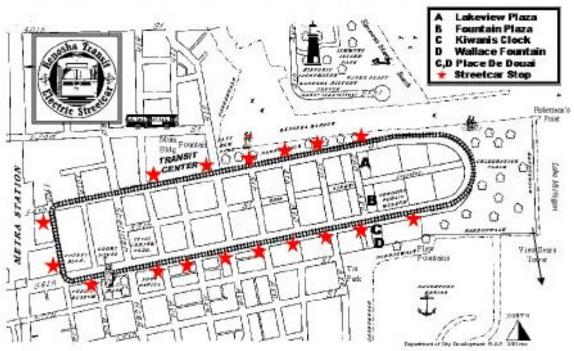
The Circulator currently owns two vehicles, but it runs them only one at a time, to limit costs. Such an approach may seem to make sense when a system is losing money. But reducing frequency in the face of limited ridership is well known in the industry as a "transit death spiral," since short headways are needed to make they system useful. The Circulator also stops running in the early evening, making it useless to those who might take it to a downtown dinner. Most successful transit routes provide roughly 18-hour service.

Finally, the Circulator suffers from poor marketing, not just by the Transit Authority, but by downtown itself. When asked for a lift to the Amtrak station, the staff at the Marriott recommends a taxi, which averages $10 to and from the station. While the vehicles themselves are attractive (for buses), there is not much signage directing potential riders to them. One of the reasons that real trolleys do so much better than bus circulators is that their high-visibility infrastructure calls them to the attention of people walking.

A Real Trolley?

For this reason and others, national experts like Chris Leinberger—a preeminent real estate guru who also knows well—have suggested building a downtown trolley along the current Circulator route. There is no doubt that such a investment would benefit tremendously. The Amtrak station is the 22nd busiest train station in America, and the 3rd

busiest in Pennsylvania, with trains arriving 16 times per day. The distance from that station to downtown is about a mile, further than most people like to walk. A modern streetcar on the current Circulator route could provide roughly 7-minute headways—a dream.



The 1.7-mile Kenosha, WI, streetcar loop connects the train station to downtown.

But this streetcar is estimated at costing at least $20 million dollars to build—and therefore likely to cost considerably more. It is because of this high cost that almost no cities of ’s size have recently built one. The closest comparison is probably Kenosha, Wisconsin, (population 100,000) whose streetcar is deemed successful, but costs over $4.00 per passenger mile to operate, in contrast to $0.87 for Kenosha’s buses. Over time, these operational costs, which are fairly impossible to fund from State or Federal sources, threaten to outpace a City’s initial investment in construction.

Given these funding challenges, and the further challenge of convincing PennDOT to accept trains in its streets, the pursuit of a modern streetcar in seems likely to result in disappointment. Moreover, such an effort will serve as a distraction from what the City really needs, which is an appealing, well run, well publicized circulator that runs from 6 AM to 12 AM on principally 10-minute headways.

A Path Forward

Because it benefits the City and its businesses more than the region, and is expected to be revenue-negative, a new downtown circulator does not fit comfortably within the mission of the Red Rose Transit Authority, and should become someone else’s responsibility. While local institutions and merchants should want to fund it, it seems proper that the City should own and run it. City ownership makes particular sense in light of the infrastructure investment that it requires to succeed, which includes attractive “trolley” stops and signage along the route. (Note: trolley stops should be placed at corners just beyond crosswalks, to limit their impact on parallel parking provision.) Generating interest and excitement around this new and improved circulator, rather than a modern streetcar, seems a much more fruitful path for the City.

A more modest alternative, however, also presents itself in the short run. The people who enter with the greatest need of a downtown circulator are those who make use of the 16 Amtrak trains that arrive each day. Yet even the current downtown circulator is not timed to meet arriving trains. As soon as it is possible, the City should establish a jitney service that runs from and to downtown before and after each Amtrak arrival.

As with more comprehensive service, this jitney must be widely publicized and celebrated. Ideally, it will be free: the Downtown Train Van. And why not paint it to look like a train? In addition to providing a real service, this vehicle will help promote as a rail-connected city.

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Wayfinding

For drivers entering downtown, wayfinding seems acceptable in general, but there does not seem to be adequate signage directing cars to public parking garages. Given the many benefits of convincing more of its visitors to park in these structures, such signage merits a concerted investment.

As The City considers new signage, it would be wise to investigate the concept called "Walk Your City," which replaces or supplements conventional downtown tourist maps with destination-specific signs that identify walking direction and time.

A "Walk Your City Campaign" would call attention to the many walkable destinations in downtown West Palm Beach.

One of the things that makes *Walk Your City* so exciting is that the signs are inexpensive and understood as temporary; if they are popular and effective, they can be made permanent with more elegant materials. Because they celebrate walking—a typical sign might say, "It's a 5-minute walk to the Demuth Museum"—they help to create a pedestrian culture. Some *Walk Your City* campaigns begin as "guerilla wayfinding," with signs posted without City participation or permission, but there is no reason why an officially condoned or even City-sponsored effort would not be more effective than one launched underground.

It is easy to make a first recommendation as to what destinations would be best connected by *Walk Your City* signage. These would include, roughly from north to south, the train station, the ballpark, the North Queen Street shopping district, the Pennsylvania College of Art and Design, Gallery Row; the Ware Center, the Fulton Opera House, the Central Market, the Demuth Museum, and the Convention Center.

Deciding where and in what number to place the signs is a trickier matter, and will require some careful planning in order to avoid overkill. Too many signs will cause them to be ignored. The highest priority would seem to be connecting the train station and the ballpark to the heart of downtown by way of the North Queen Street shopping district.

The City has a lot to juggle at it moves forward with the implementation of this study's recommendations, but when it turns its attention to wayfinding, it is hoped that an unconventional, pedestrian-centric approach of this nature will receive full consideration.

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IV: A COMFORTABLE AND INTERESTING WALK

A High-Impact Development Strategy

Most mayors, city managers, municipal planners, and other public servants feel a responsibility to their entire city. This is proper, but it can be counterproductive, because by trying to be universally good, most cities end up universally mediocre. This is particularly the case when it comes to pedestrian activity. Every city has many areas that would benefit from concerted public investment, but only a few where such investment can be expected to have a significant impact on the number of people walking and biking.

The reason for this circumstance can be found in our earlier discussion about the conditions that are needed to welcome pedestrians: the useful, safe, comfortable, and interesting walk. Unless a walk can simultaneously satisfy all four criteria, it cannot be expected to get people out of their cars. Yet, even in American cities known for their walkability, only a limited percentage of the metropolis provides a tight-grained mix of uses, let alone a collection of well-shaped streets that provide comfort and interest. It is for this reason that most walkability studies focus on downtowns; that's where walking can most easily serve a purpose.

And even within an urban downtown, all is not equal. Generally, there are two types of areas within a downtown where public investment will have a greater impact on walkability than in others:

First, only certain street segments in the downtown are framed by buildings that have the potential to attract and sustain pedestrian life. There is little to be gained in livability by improving the sidewalks along a street that is lined by muffler shops and fast-food drive-thrus. These locations should not be allowed to go to seed; the trash must be collected and the potholes filled. But investments in walkability should be made first in those places where an improved public realm is given comfort and interest by an accommodating private realm—or a private realm that can be improved in short order.

Second, there are street segments of lower quality than those above, but which are essential pathways between downtown anchors, for example from a restaurant row to a baseball stadium. These streets may require greater investment to become walkable, but that investment is justified by their importance to the downtown pedestrian network.

By studying existing conditions, we can see where streets are most ready, or most needed, to support pedestrian life, and focus there. In addition for being a tool for prioritizing the improvement of city streets, the Anchors and Paths diagram is also a tool for prioritizing investment *along* streets.

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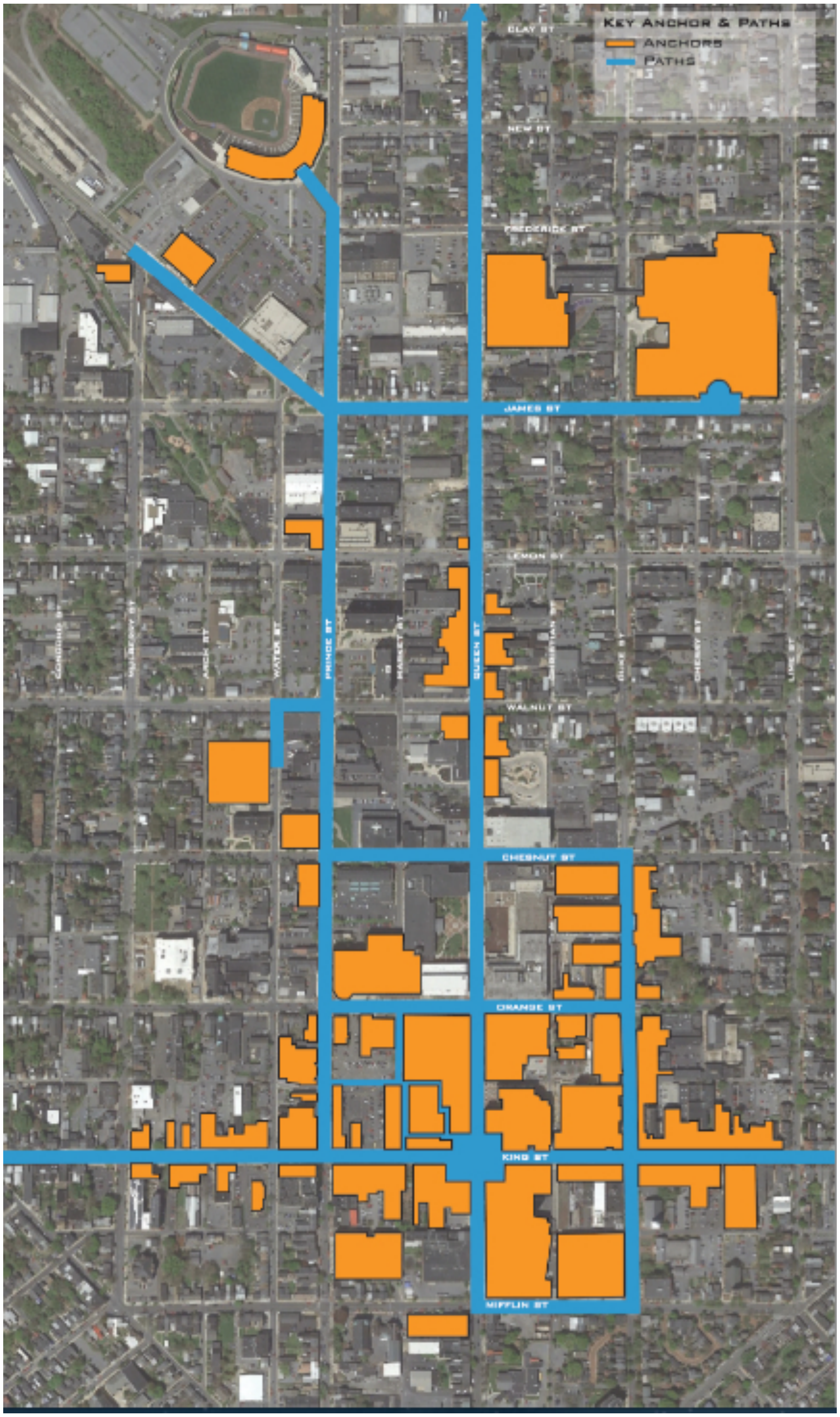
Anchors and Paths



The key generators and receivers of pedestrian activity in the downtown, and the paths that connect them.

The drawing above identifies the key anchors in the downtown, and the paths among them. These anchors are chosen for practical purposes—like connecting a convention center to restaurants—and for social purposes—like connecting a transit hub to a hospital. It is important to remember, in this work, that some people do not have the luxury of automobile use and, while they may not be many in number, they rely more heavily on walkability than others do.

Key downtown anchors highlighted above include the following:

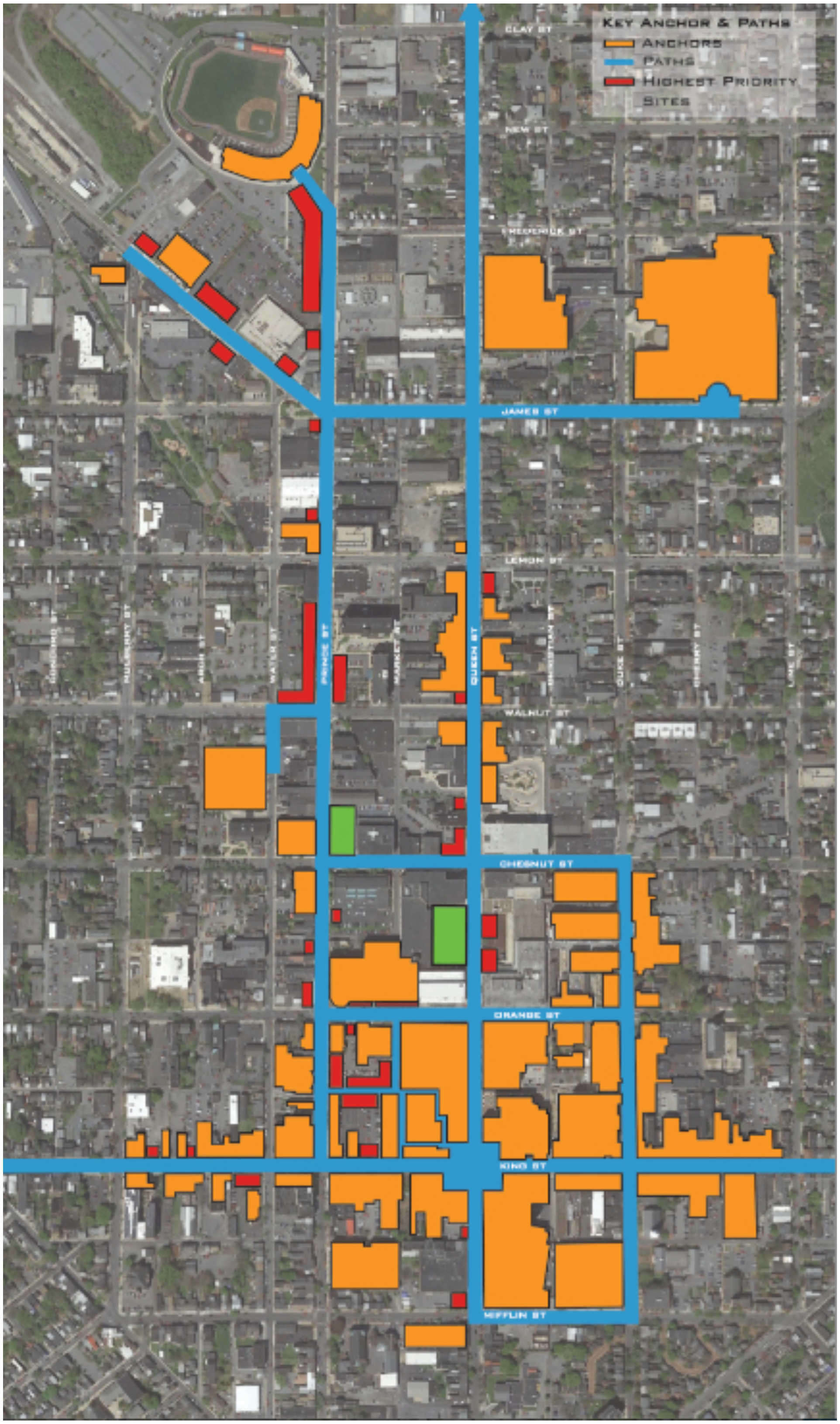
- The Amtrak Station;
- The YMCA;
- The Arts Hotel and Hotel Lancaster;
- Clipper Magazine Stadium;
- The North Queen Street shopping district;
- The Red Rose Transit hub;
- Pennsylvania College of Art and Design;
- Gallery Row;
- The downtown shopping district;
- The Lancaster County Courthouse;
- The Ware Center and the Palace Theatre;
- The Central Market; and
- The Convention Center and Hotel.

This diagram also highlights the City's parking structures, since these, too serve as pedestrian anchors.

As can be seen in the diagram, properly connecting these anchors to each other relies upon excellent pedestrian trajectories along major segments of Prince, Queen, Duke, Chestnut, Orange, and King Streets. Because of their connections north to the baseball stadium and the train station, Prince and Queen Streets contain the longest highlighted trajectories.

In terms of private investment—and public investment in vertical construction—the next diagram takes the Anchors and Paths diagram one step further, to indicate the non-roadway construction that is necessary to make the key downtown paths truly walkable. This construction fills in missing teeth, hides parking lots, and otherwise turns unfriendly street edges into friendly ones. When combined with the thoroughfare redesigns already outlined, these changes will add comfort and interest to these streets' planned improvements in safety.

Creating this diagram, titled Highest Priority Sites, is a simple mechanical exercise, in which all missing teeth are replaced by buildings. Shown in red below are the seventeen buildings—some quite small—that are needed to perfect the make the Primary Network of Walkability complete. The specific footprint of each building shown in the Infill Sites diagram can be somewhat flexible, with the understanding that buildings should sit directly against the sidewalk along the majority of their frontages, and that those frontages should receive active, open facades.



Based on their location along key downtown paths, the 30 highest-priority development sites are shown in bright red.

Also visible in this drawing is the PCAD green and Binn's Park, two open spaces that also serve as anchors.

A couple of technical issues merit discussion. First, there is no reason why each red rectangle in the drawing below must be a building; in some cases a public green or other amenity may make more sense. However, any public open space must be well shaped, with buildings at its edges, if it is to be successful. Second, while the street segments marked in blue are the most important for walkability, a focus on bike-ability would suggest that key cycling corridors be improved beyond just the segments shown here, since bike lanes are only useful when they reach a significant distance.

Key among the seventeen building sites highlighted above are the following:

- The three long stretches along North Prince Street that are blighted by exposed parking lots against the sidewalk, discouraging strolls to baseball;
- The abandoned rubber-paved plaza across from Binn's Park on Queen Street; and
- The heart and key edges of the Central Market block.

To the degree that the City or other organizations are able to sponsor or incentivize building construction in downtown, the 30 sites shown above are the ones to build first, as they perfect the downtown's key pedestrian corridors. Investments elsewhere, while perhaps justifiable for other reasons, will not contribute as meaningfully to downtown walkability.

The Bulova Block

While not a missing tooth, the Bulova building deadens a full block of downtown.

Among these sites, several deserve special attention. First is the notorious Bulova block. In addition to its unpleasant black-rubber plaza, this large complex blights the a key location in downtown with its blank walls along the sidewalk edge. This building has long been slated for removal and replacement, and must remain a priority. Presuming that it is to be removed or reconstructed dramatically, it is useful to consider what form its replacement should take. The sketch below presents one of many good solutions, in which the replacement buildings take a form that will support a large infusion of apartments into the heart of the downtown. The roughly 60-foot-thick floorplates surrounding courtyards shown represent a normative layout for residential construction. The northern courtyard would also provide a valuable amenity to the Hotel Lancaster.

The best solution for the Bulova block would perhaps be two new residential blocks surrounding internal courtyards.

Whatever the ultimate use of the buildings, this drawing suggests a few things that should probably find their way into any eventual solution:

- Marion Street is brought through the block, resuscitating the original porous street grid. A proper crosswalk is included at the Marion/Queen intersection;

- The buildings line the edges of their blocks, placing firm edges against the sidewalk on Queen, Christian, Orange, and Marion Streets. These edges should contain retail use on Queen and Orange;

- The reciprocal green across from Binns Park has been eliminated. This change allows the resulting street space on Queen to be adequately shaped by buildings that are not inordinately high.

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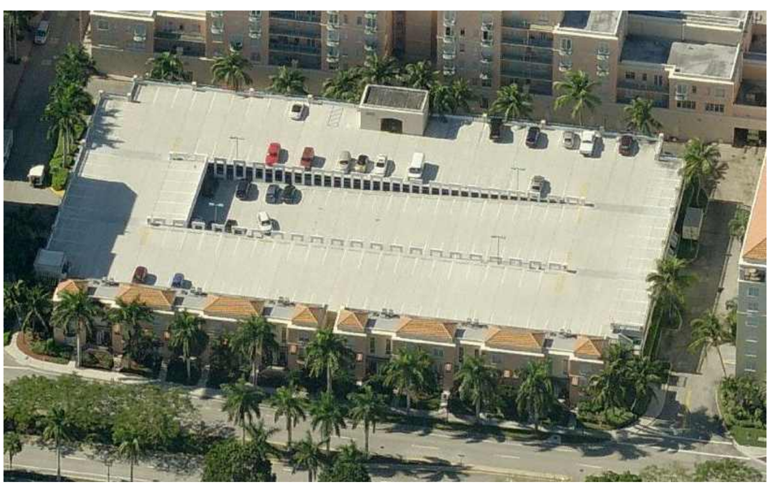
It is hoped that the future developers of the block will consider these criteria fully.

The Prince Street Garage

Another site marked in red above deserves special attention: the southern edge of the Prince Street Parking Garage, which presents an unpleasant—or at least *dull*—face along more than 300 feet of Orange Street.

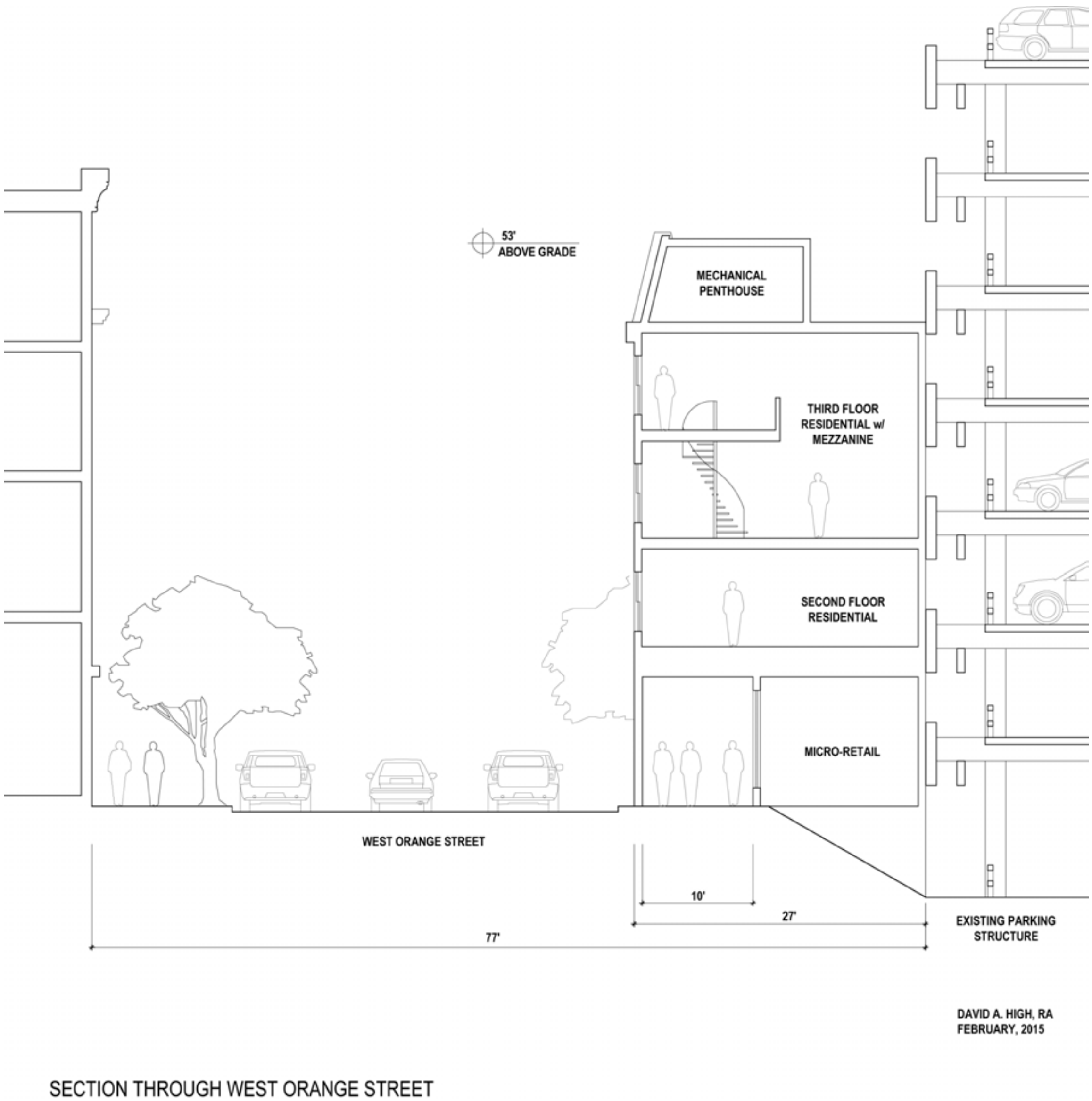
The Prince Street Garage blights Orange Street with an unwelcoming and boring façade.

As already noted, a very common enemy of the interesting walk is the exposed wall of a parking structure. Many of these exist in Lancaster, but the one that impacts walkability the most is the Prince Street Garage, which is located along a key pedestrian corridor in the heart of downtown.



Residential apartments line the face of a parking structure in Boca Raton, FL.

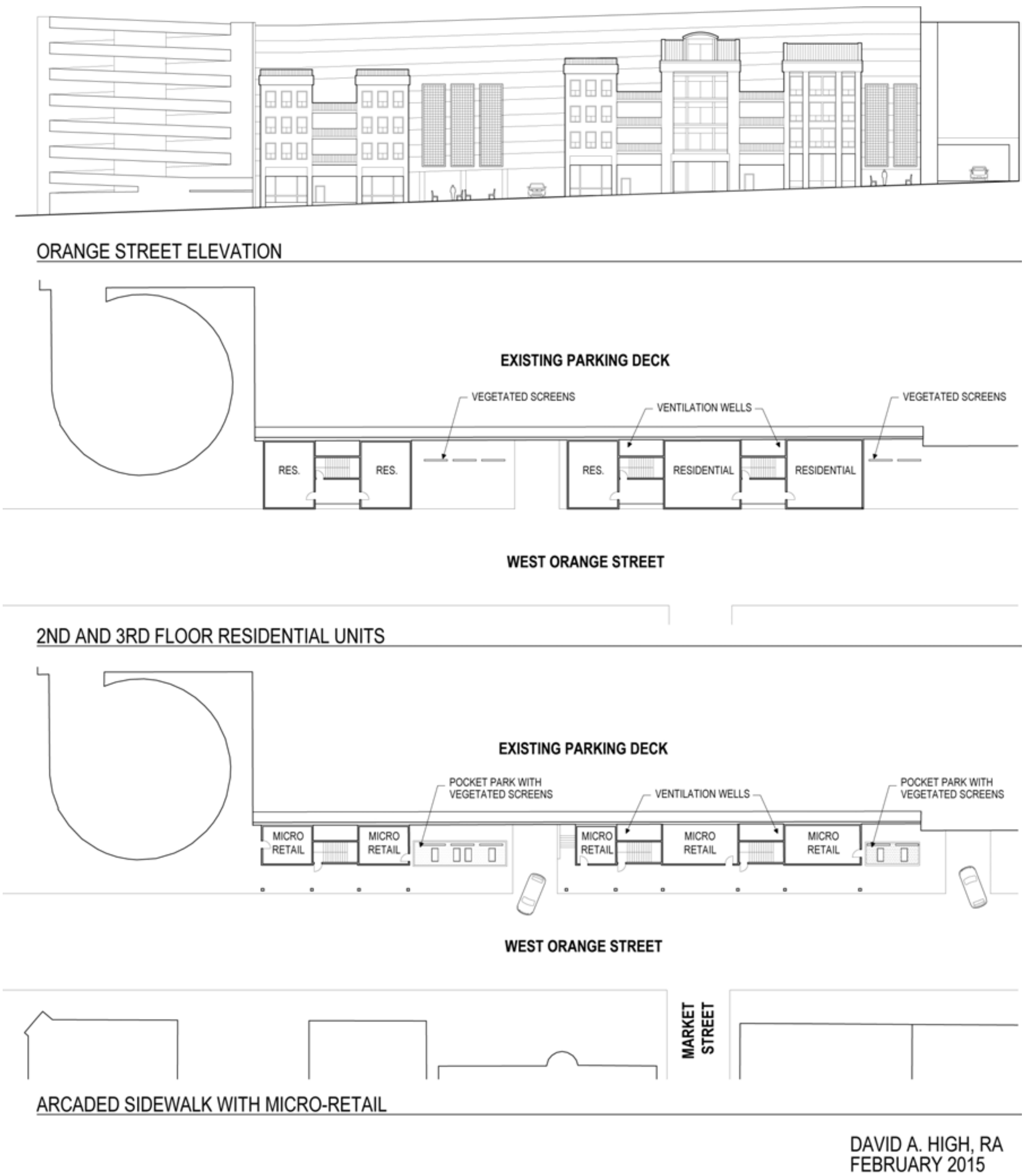
Fortunately, this parking structure is set back about 15 feet from its property line, which presents an opportunity for it to be lined by a building that presents a friendlier edge to the sidewalk. Moreover, because this edge faces south, where shade is appreciated, it creates an opportunity for the use of an arcade over the sidewalk, which allows for upstairs construction to be more than 25 feet deep.



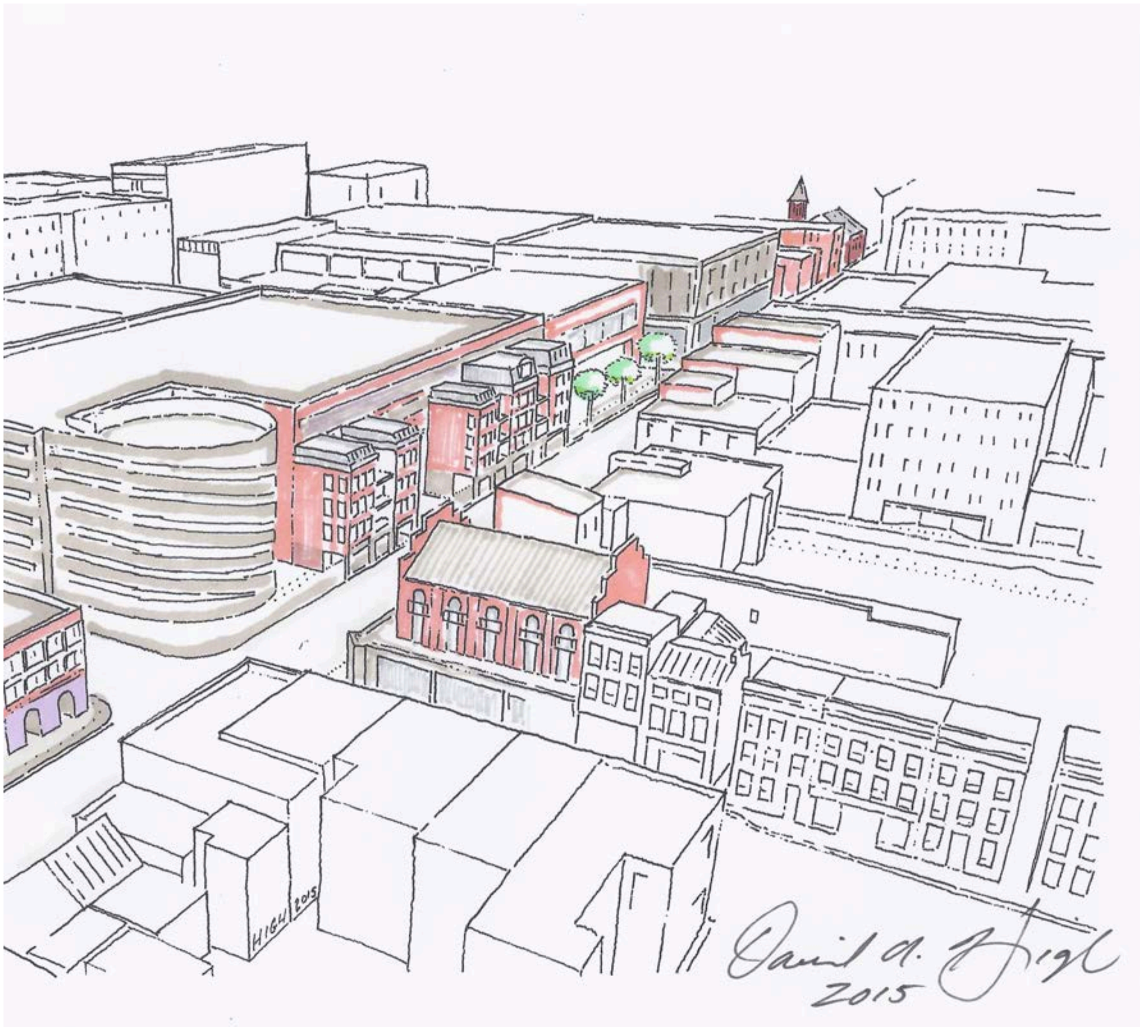
The sectional drawing shows how embracing the sidewalk in an arcade creates standard-depth upstairs apartments.

As shown in the above section, it is not especially difficult to create a slim building, independent of the Prince Street Garage, which provides three floors of residential living above ground-floor retail, giving a proper active edge to Orange Street.

These drawing were completed by Lancaster architect David High, as a part of this study, in order to demonstrate how the addition of five incubator retail locations—in close proximity to the Central Market—and ten small apartments could enliven this currently dead corridor. The design shown here preserves the garage's current naturally ventilated status, so that investment could be limited to the new liner building. If it was deemed affordable to ventilate the garage, a much larger building could be added.



Plans and elevation of the proposed "lot liner" buildings along the Prince Street Garage.

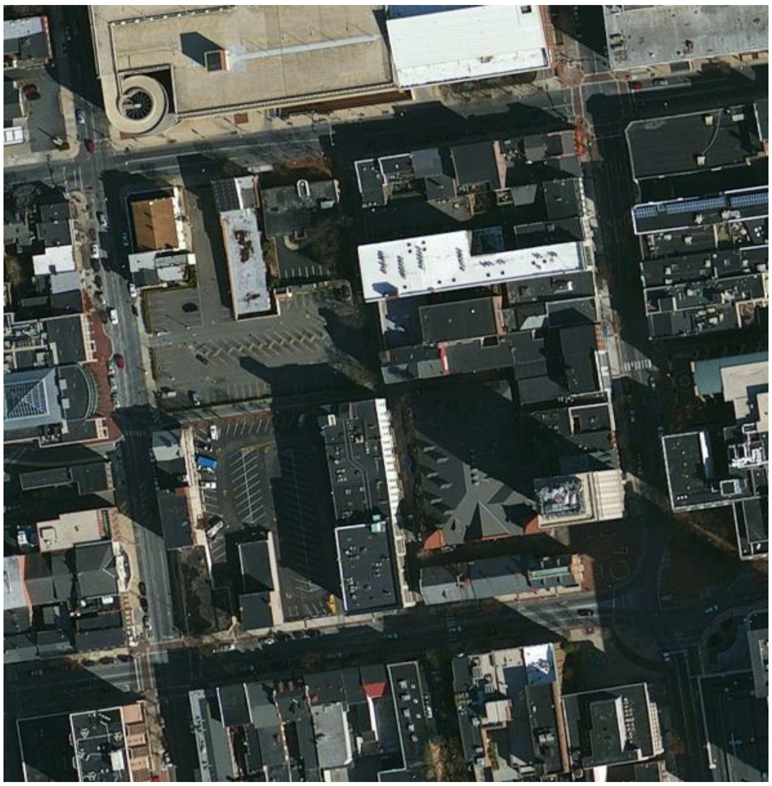


By taking advantage of wasted space, this proposal gives a human edge to Orange Street.

It is unlikely that a narrow building of this nature could pay for itself. However, a limited City subsidy, including the donation of the property and the delivery of utilities to the site, could make it possible.

The Central Market

The largest development opportunity in Lancaster, deserving of its own study, is the downtown Central Market and its surrounding area. Here, the biggest draw in the entire city—for locals and tourists alike—is also the site of the biggest parking field in the Central Business District, and as such is only half the amenity that it could be.



The parking lots on the Central Market block keep the market and its surrounding streets from achieving true greatness.

If it were developed to its full potential, Lancaster's Farmer's Market block would literally transform the fate of downtown and the City. Because some locals may take it for granted, it is important to note that, both in the quality of the Market itself and in the quality of the urbanism that surrounds it, this part of Lancaster is poised to become a much larger magnet than it currently is. While shopping inside the beautiful market hall is a pleasure, the site's greatest potential lies in the intimate midblock network of walkable streets, which offer a truly European quality of space.

For seasoned travelers, this circuit is reminiscent of the famous Hackesher Hof, one of Berlin's largest tourist draws. Unfortunately, there just isn't enough of it: thanks to its parking lots, the block only offers a very short segment of truly walkable space. Most of it bleeds into parking, which fails to provide a proper edge to the pedestrian trajectory.

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If properly amenitized and connected into a larger network, the intimate spaces of the Central Market could provide an experience unlike any in the region.

The lively courtyards of Berlin's Heckesher Hof provide a hint of the Central Market site's potential.

If it is to reach its potential, the block must be developed in a way that gives firm edges to narrow walkable corridors along the full length of Market and Grant Streets, as well as properly shaping Orange, Prince, and King Streets. The quick proposal that follows shows what such a plan might look like, and contains the following features:

- A continuous intimate promenade connects Orange Street, Prince Street, King Street, and Penn Square;

- Proper building edges fill missing teeth along surrounding streets; a 30-foot setback across from the Ware Center creates a small civic plaza;

- Parking is provided underground and/or elsewhere. A significant grade shift across the site makes underground especially promising;

- The unfortunate exposed southern edge of the Prince Street parking garage is lined with a thin building that provides incubator retail space under apartments, improving northward views along Market Street, as already discussed;

- Dramatic gateways are placed at all four Market entries. These could take many forms, but are imagined as triumphal arches with fire pots and other theatrical architecture/lighting celebrating the procession into the block.

A complete Central Market fills its block and surrounds a lengthy pedestrian circuit.

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Completing the block in this way need not mean shutting if off entirely to the vehicles that serve the market. As in Europe, simple brick or stone surfaces would welcome pedestrians while also allowing the small trucks of merchants.

It is not the role of this report to discuss the economics of this transformation, beyond stressing that the potential upside of this proposal, if executed properly, is likely to justify a large City investment. This scenario imagines a Farmer's Market that becomes a more prominent daily feature in the life of the downtown and the region, with expanded hours and types of merchants—but all local.

Many cities have farmers' markets. Only Lancaster is the heart of Pennsylvania Dutch country, and surrounded by some of the most beautiful, bountiful farms in the world. It's high time for the Market, and the City, to act upon this fact.

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Sincerely,

Jeff Speck, AICP

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