Davenport IN MOTION

BUILDING A 21ST CENTURY TRANSPORTATION SYSTEM

VOLUME 2:ELEMENTS

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Nelson\Nygaard consulting associates

in association with
AECOM and Speck and Associates

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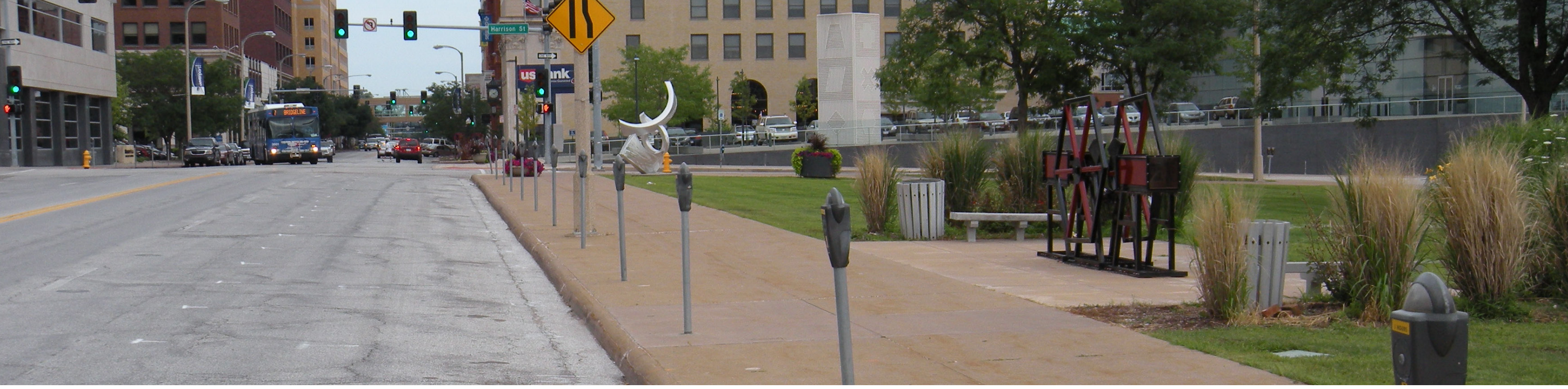

Chapter 6 DIM Downtown Parking Management Element

This chapter provides a comprehensive review of current parking conditions in downtown Davenport, followed by a plan to help Davenport manage this important resource in support of the goals and objectives outlined in *Davenport 2025* as well as the various, ongoing efforts to revitalize the city's central business district. The review focuses primarily on the public parking supply — spaces, whether publicly or privately owned and operated, that are not reserved for tenants or visitors of specific properties, but rather open to the general public.

The City of Davenport is in the enviable position of controlling most of this parking — including all on-street and most off-street spaces. This gives the City tremendous leverage to implement effective parking management practices that both capture the full value of downtown parking resources and improve the downtown parking experience for residents, employees, and visitors. The first step is taking full stock of the City's downtown public parking inventory.

THE DOWNTOWN SUPPLY

Figure 6-2 on the next page identifies the Analysis Zone to be used for the downtown parking review, an area that contains the primary on- and off-street public facilities serving downtown.

Within the Analysis Zone, there are over 4,400 public parking spaces, including 1,675 on-street spaces — 868 of which are metered — and 2,741 off-street spaces.

The off-street supply is anchored by three municipally constructed, owned, and managed parking garages (ramps). Figure 6-1 provides a summary of the supply and some of the management policies in place at the ramps.

In addition, there are a number of city surface lots across downtown owned and managed by the City. The regulation of these lots varies widely, from free, general parking to paid, permit-only parking, though the status of each is not always clearly indicated. Figure 6-3 provides a summary of the supply and some of the management policies in place at these lots.

Figure 6-1 Parking Ramps

Facility Name	Total Spaces	Permits Sold	Monthly Permit	Hourly Rate
RiverCenter Ramp	757	406	$70.00	$0.75
Redstone Ramp	454	330	$60.00	$0.75
Harrison Street Ramp	654	366	$60.00	$0.75
Harrison Street Ramp Meters	64	0	n/a	$1.00
All	1929	1102		

Figure 6-2 Downtown Davenport Parking Analysis Zone

GIS Data Source: City of Davenport, IA

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Figure 6-3 Surface Parking Facilities*

Facility Name	Total Spaces	Permits Only 9-5	Monthly Permit	Daily Permit
CB&Q Lot	84	X	$15.00	$5.00
Union Station	44		$0.00	n/a
5th and Brady Lot	109	X (50 spaces)	$20.00	n/a
5th and Main Lot	52		n/a	n/a
5th and Harrison Lot	63		n/a	n/a
Florian Keen surface lot	422		n/a	n/a
Library Lot *	21	X	$45.00	n/a
Dock Lot	30		n/a	n/a
Police Station Lot	17		n/a	n/a
All	812			

The library lot also provides metered spaces @ $0.75 per hour.

EXISTING DEMAND PATTERNS

Effective downtown parking management should focus on the peak levels of parking demand during a typical week. While not as high as it would be on one of the busiest days of the year (July 4th, Labor Day, or the Bix 7 race), this level of demand represents the most common peak conditions experienced in the area, whether generated by lunch time activity, evening dining, or weekend recreation. In Davenport, like most downtowns, peak conditions are most likely to be found at the following times:

- **Weekdays around Midday:** Commute, shopping, and lunch-driven demand.
- **Friday or Saturday Evenings:** Evening dining, recreation, and nightlife demand.
- **Weekends:** Saturday or Sunday afternoon recreational demand.Weekdays

Weekday utilization rates are very modest for a downtown, particularly for on-street spaces. Among off-street locations, demand is particularly low at surfaces lots compared to more centrally-located ramps. During the early-afternoon peak-hour, nearly 3,000 spaces sit idle, approximately 70% of the total number of parking spaces.

Figure 6-4 Weekday Peak Demand Levels

Downtown Parking

Inventories	Spaces	Weekday Midday Occupancy	Utilization Rate	Empty Spaces
On-Street Parking	1,675	471	28%	1,204
Off-Street Parking	2,771	1,000	36%	1,771
Total Parking	4,446	1,471	33%	2,975

Off-Street Parking

Inventories	Spaces	Weekday Midday Occupancy	Utilization Rate	Empty Spaces
Off-Street - Garages	1,929	840	44%	1,089
Off-Street - Lots	842	160	19%	682
Off-Street - All	2,771	1,000	36%	1,771

Figure 6-5 Vacant Meters Create a Sense of Lost interest in Downtown

Figure 6-8 (next page) provides a geographic summary of demand patterns across downtown during the weekday peak. Off-street facilities are labeled with the number of available spaces found at each.

The most evident influence on parking demand is price. Nearly all blocks that are over 65% full offer free parking. Location is another obvious influence as, price and regulation being equal, blocks and facilities located closer to the downtown core experience higher demand.

Friday Night

Demand patterns on a Friday evening, when neither meter rates nor time limits are in effect, provide useful indication of which streets are most desirable among parking customers. In general, demand shifts slightly toward on-street spaces — less than might be expected given that the on-street spaces are cheaper than those in the City's ramps at this time. To some extent, this may result from employees who, having already paid a daily or monthly parking fee, remain downtown after work.

Figure 6-9 provides a geographic summary of Friday Night parking patterns across downtown. As expected, blocks within the heart of the district appear to be the most popular, with a nexus of highly-occupied blocks forming around the 3rd Street intersections at Brady Street and Main Street. Events also generate significant demand for parking along blocks proximate to area theaters and the RiverCenter, as well as the block nearest the casino and the lot surrounding the baseball stadium.

Figure 6-7 Friday Night Peak Demand Levels

Downtown Parking

Inventories	Spaces	Friday Night Occupancy	Utilization Rate	Empty Spaces
On-Street	1,675	591	35%	1,084
Off-Street	2,771	1,032	37%	1,739
All	4,446	1,623	37%	2,823

Off-Street Parking

Inventories	Spaces	Friday Night Occupancy	Utilization Rate	Empty Spaces
Off-Street - Garages	1,929	549	28%	1,380
Off-Street - Lots	842	483	57%	359
Off-Street - All	2,771	1,032	37%	1,739

Figure 6-8 Weekday Peak Demand Patterns

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Figure 6-9 Friday Night Demand Patterns

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GIS Data Source: City of Davenport, IA

Saturday Afternoon

Of the three peak periods examined, the weekend afternoon period experienced the lowest level of general parking demand. Coupled with the fact that most private, employee lots likely sit idle at these times, the potential for the existing public and private supplies to accommodate seasonal and events-based peaks is considerable — Saturday afternoon surveys found nearly 3,500 available spaces within the public supply alone.

Figure 6-10 Weekend Peak Demand Levels

Downtown Parking

Inventories	Spaces	Saturday Midday Occupancy	Utilization Rate	Empty Spaces
On-Street	1,675	388	23%	1,287
Off-Street - All	2,771	608	22%	2,163
All	4,446	996	22%	3,450

Off-Street Parking

Inventories	Spaces	Saturday Midday Occupancy	Utilization Rate	Empty Spaces
Off-Street - Garages	1,929	150	8%	1,779
Off-Street - Lots	842	458	54%	384
Off-Street - All	2,771	608	22%	2,163

Figure 6-11 provides a geographic summary of Weekend Peak parking patterns across downtown. As shown, there is more activity toward the riverfront at this time, and less around the events and destinations along 3rd Street. Brady and Main streets still appear to be the central north-south corridors attracting the highest levels of parking demand.

Tables containing all occupancy data for all blocks and facilities are provided as an appendix to this report.

Figure 6-11 Weekend Peak Demand Patterns

GIS Data Source: City of Davenport, IA

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MANAGING PARKING

Existing Conditions

RATES

Downtown meters charge either $0.75 per hour (530 spaces, generally along the edge of downtown) or $1.00 per hour (338 spaces clustered within the downtown core).

Parking rates at City ramps are as follows[1]:

- $0.75 per hour;
- $7.50 maximum rate per day;
- $2.00 flat, after 6:00 PM rate at the Redstone Ramp only;
- $60 to $70 per month for non-downtown residents; and
- $30 per month for downtown residents.

On-street meter rates were raised to their current levels in 2006, in response to a lack of availability during peak times. While the low levels of on-street occupancy would indicate that current rates should be lowered somewhat, pressure to pay down ramp-construction debt service has made this option politically difficult. A continued emphasis on the revenue-generation role of parking rates, however, will make it difficult to use price as a means to manage and distribute parking demand strategically.

As shown in Figure 6-12 below, current pricing has created demand patterns that are the opposite of normative patterns for a thriving downtown. Free spaces, which are generally located furthest from the downtown core, are utilized at almost twice the rate as the metered spaces in downtown's center. The impacts on pricing are more modest within the off-street inventory, with roughly equal utilization rates between the centrally-located, fee-based ramps and the more scattered free parking lots.

Figure 6-12 Demand Patterns and Pricing*

Space Type - Hourly Rate Inventory		Weekday Midday		Friday Night		Weekend Midday	
		Utilization	Inventory	Utilization	Inventory	Utilization	Inventory
On-Street	Free	789	38%	1,675	35%	1,675	23%
	$0.75	539	22%	0	N/A	0	N/A
	$1.00 per Hour	347	20%	0	N/A	0	N/A
Off-Street*	Free	176	43%	349	16%	349	10%
	Priced	2,261	42%	2,088	26%	2,088	7%

The Florian Keen lot has been left out for analysis purposes due to its large size and event-based demand patterns.

In addition to price, one of the main factors likely bolstering off-street demand is the capacity of off-street facilities to cater to commuter demand — allowing daylong parking and providing monthly permits, which provide an even deeper discount compared to the $0.75 rate for hourly parking. Assuming twenty, nine-hour work days per month, permit-holders currently pay around $0.40 per hour to park in the ramps. However, since a portion of permit holders will be absent on any given day, there is an opportunity to oversell permits and generate a higher per-hour return. While the City does oversell the ramp supply, the modest occupancy rates suggest the oversell rate could be increased.

The largest problem facing the City in its efforts to pay down the debt-service on the downtown ramps, however, may simply be a lack of non-commuter demand in downtown. Since meter rates were adjusted to draw commuter demand off-street, there has not been sufficient non-commuter demand to fill the newly available, on-street spaces.

1 With the exception of 64 metered spaces ($1.00 per hour) at the Harrison Street Ramp, see Figure 6-1.

BALANCING LONG-TERM AND SHORT-TERM PARKING IN THE RAMPS

The City reserves roughly sixty spaces at each of its ramps for short-term parking. This provides a lower-cost option for customers who find on-street rates prohibitive, or who simply prefer off-street parking. In addition, the first floor of the Harrison ramp is metered to preserve even more spaces for short-term parking. Priced at the same rate as nearby on-street spaces that sit half-empty in the midday peak, however, these spaces fail to regularly attract parking demand and most often remain empty until 5:00 pm. Late on Saturday nights, these spaces are generally fully occupied, due to their proximity to the 3rd and Harrison Street eating and drinking establishments.

WAYFINDING AND SIGNAGE

Wayfinding to guide visitors to parking opportunities is generally absent downtown. A common sentiment expressed regarding City ramps — that their admirably inconspicuous design makes them hard to find — underscores the need for better signage at facility entrances and on major thoroughfares entering downtown. Such wayfinding not only helps the City fill up its ramps, it also can help reduce search traffic and make downtown parking a less stressful undertaking for first-time and infrequent visitors.

Additionally, signage at downtown surface lots is frequently misleading, undoubtedly sending potential customers away from legitimate parking opportunities. Specific signage miscues include:

- Signs that claim that parking is for permit-holders only, when in fact this is not the case at all, at any time (e.g.,Union Station).
- Signs that claim that parking is for permit-holders only, when in fact this only the case for some spaces (e.g., 5th and Brady and Library Lot).
- Permit-lot signs fail to emphasize that lots are free and open to the public after 6:00 PM and on weekends.
- At the CB&Q lot, permit-only signs fail to indicate that $5 daily permits are available to anyone. Such signage should also provide information on where and how such permits could be obtained.

Figure 6-13 Signage often Emphasizes Constraints over Opportunities

Figure 6-13 (previous page) is a good example of the tone and content of signage treatments at most city lots; both of which emphasize restrictions over opportunities. The first line likely gives the impression to many that the lot is reserved for City employees. It is not until the 5th and 6th lines, that the opportunity for public parking is indicated. This too, however, is ambiguously defined by stating only when the permit restrictions are enforced — rather than identifying the hours when public parking is "welcome". Many drivers, especially those less familiar with downtown, find this information too indefinite to park confidently at any time.

ECONOMIC DEVELOPMENT

The City offers developers or residents permits in its off-street ramps to encourage re-development of buildings that lack space for on-site parking. This lack of on-site space is a common barrier to historic re-use development. Even where cities, like Davenport, have removed the barrier of minimum parking requirements, lenders often refuse to finance residential projects without a minimum number of on-site or proximate parking spaces.

The City has been successful in leveraging its off-street supplies to secure lending, by providing developers with bulk, monthly permits. As a result, a number of highly successful residential loft projects have moved forward, filling vacant, historic structures with new downtown residents. Since 2006, the City has also offered discounted ramp permits to businesses that start up in or relocate to downtown.

ZONING

There are no minimum parking requirements in downtown Davenport. Nonetheless, and despite an over-abundance of off-street parking downtown, new development tends to be built with more than ample, reserved, on-site parking.

Recommendations:
Downtown Parking Management Plan (PMP)

Downtown has a more than ample supply of public parking. Isolated conditions of constraints are an indication of management opportunities rather than actual supply shortage. No strategies for generating new supply are therefore included in the PMP. While opportunities to expand on-street parking supplies are identified elsewhere as part of the Davenport in Motion plan, these opportunities are primarily identified for the sake of traffic calming and/ or streetscape enhancement, rather than to address a supply constraint.

Current utilization rates for both on- and off-street supplies are well below optimal levels. This creates a number of problems, beginning with the inability to generate sufficient parking revenues to pay down the maintenance and debt service costs of the City's off-street ramps. Perhaps even more important for downtown's long-term viability, low on-street utilization creates an impression of a "sleepy" downtown that lacks interesting pursuits and attractions. Low curb-occupancy rates also diminish the capacity for parked cars to calm roadway traffic and buffer downtown sidewalks from moving vehicles.

In light of these findings, there are three primary objectives that have guided the development of the PMP outlined below. The first is to recapture the value of downtown's on-street parking supply by increasing curb utilization rates. The second is to provide a long-term plan to capture as much parking activity within the combined public supply — curbs, lots, and ramps — as possible. Finally, the PMP seeks to establish a long-term parking policy that supports the revitalization of downtown Davenport by focusing management on maintaining access and appeal, and directly linking rates and revenue to demand.

Immediate Steps

ON-STREET

Establish a 15% availability rate as the primary objective for on-street management

An on-street parking management program designed to maintain business access should be driven by a primary management objective of maintaining one to two free spaces on every block face. Customer frustration with downtown parking is often driven by conditions on the specific block where the business they try to access is located, and not the overall supply of available parking in the district. If Davenport can keep most downtown blocks mostly full, but ensure that there is always one to two spaces available on any block, the achievement of many other important management objectives will naturally follow, including:

- Ensuring that the most desirable parking spaces are consistently available;
- Virtually eliminating search-traffic (driving in pursuit of available parking);
- Maintaining consistent parking-revenues; and
- Keeping curbs at optimal utilization to provide traffic-calming and pedestrian-buffer benefits.

The first objective is most critical to addressing downtown's current lack of demand. Keeping a few spaces consistently open on all blocks will help revive interest in downtown trips, as drivers realize they can rely on a few spaces being open, wherever they want to park. Even when overall occupancy rates are quite low, if infrequent downtown visitors find that they consistently have a hard time finding open spaces on the one or two blocks where they want to park, they will find downtown unaccommodating.

Focusing downtown parking management policy around this basic objective is also an important first step as it establishes that space-availability is the central aim of all current and future management actions, including price changes. Having a simple, measureable performance target will simplify internal and public debates about management actions, while achieving this target will both increase the appeal of curb parking and create customer- and business-friendly parking conditions.

Establish price as the primary management tool for managing availability

Provide the City's Parking Manager with the discretionary authority to adjust meter rates, based on measured levels of peak-hour demand, in pursuit of the 15% availability target. This authority must empower the Parking Manager to:

- Raise meter rates by $0.25 on any block-face that demonstrates a 3-month average peak-hour availability rate of less than 5%; and
- Lower meter rates by $0.25 on any block-face that demonstrates a 3-month average peak-hour availability rate of more than 25%.

Discretionary authority is necessary to establish parking rates that respond directly to changes in demand patterns in order to keep availability rates in line with the recommended performance target. Examples of the details and limitations commonly established as part of granting this authority are provided in an appendix.

Create a one-year Right-Pricing Program

Current downtown parking meter rates are too high and geographic distribution of meters too expansive relative to parking demand. An iterative, 12-month re-pricing (or Right-Pricing) program is recommended as the most effective option for bringing pricing back in line with demand.

Step 1 – Introduce temporary free on-street parking (including off-street meters)

The first step in the PMP is to introduce temporary free parking throughout downtown. This positions the City to understand true demand for on-street parking by excluding price as a decision-making component for downtown parkers. To save money on the cost of removing and replacing meters as prices are adjusted during this re-pricing program, the City should simply "bag" all meters, preferably accompanied by some kind of notification of the program, its purpose, and what to expect in the ensuing months.

It must be stressed to the public that this is a trial program and pricing will be reintroduced on some blocks.

Step 2 – Establish a 120-minute limit in the downtown core

Establish a universal limit of 120 minutes of parking for all spaces within the following central downtown boundary:

- Scott to Iowa; and
- 5th Street to the River

Eliminate time-limits for parking beyond this zone.[2] Use color-coded bags to distinguish two-hour spaces from unrestricted spaces. This will provide the City with the flexibility to adjust the coverage of two-hour meters to address any constraints and undesirable parking patterns when and where they emerge.

Step 3 – Monitor response

Utilize planning office, parking office, and/or enforcement staff to conduct availability surveys of downtown blocks to measure availability during workday peak hours. For six months, these surveys should be conducted on a weekly basis on Tuesday, Wednesday, or Thursday of each week at around 1:00 PM. The utilization rate for each block face should be recorded and tabulated by the Parking Office.

Step 4 – Price blocks that remain consistently full after three months.[3]

Re-activate meters on blocks averaging 5% availability or lower during the peak-hour surveys, at a rate of $0.75 per hour.

Begin exploring options to accommodate cell phone payment at re-activated meters. Options for providing this payment alternative are expanding rapidly. This option would not only provide added convenience for parkers, but potentially significant cost savings and revenue benefits to the City as well though more effective and efficient payment collection.

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2 With the exception of the City's restriction against parking in the same space for more than 24-hours.

3 Treat the full supply of meters within each off-street facility as one block

Step 5 – Refine pricing after an additional 3 months

Re-activate meters on any remaining un-metered blocks averaging 5% availability or lower during the peak-hour surveys, at a rate of $0.75 per hour.

Step 6 – At the end of the year:

- Establish a final, cohesive pricing zone based on results from the last six-months of surveys. This pricing zone should consist of at least 10 contiguous blocks where meter rates have been reinstituted, without utilization rates falling below 75% during peak-hour surveys. Preferably this zone would be configured to contain blocks with cohesive characteristics — similar land-uses, densities, demand patterns, etc.
- Remove all meters from blocks outside this pricing zone.
- Re-institute practice of reviewing requests for short-term meters (15 or 30 minutes) on individual blocks, placing one or two such meters (depending on the number or size of requesting businesses) on the near-side corner of a successful applicant's block, while requiring that the request be renewed every year to keep the meters in place. Successful applicants should, at a minimum, be able to demonstrate consistent need for high space-turnover near the business.

Step 7 – Continue monitoring utilization.

- Continue conducting on- and off-street surveys at least once each month.
- Continue refining pricing every six months, adjusting rates $0.25 at a time when the average utilization is ten percentage points or more above or below the 15% target.
- Bag meters if rates fall to $0.
- Remove meters from blocks that have been bagged for one year or more.

Review the efficacy of current "No Parking" zones

Expand the on-street parking supply, buffer sidewalks, and moderate downtown vehicle speeds by reducing the excessive number and size of some no-parking zones that have been designated along downtown streets. These zones serve a number of legitimate purposes, including bus storage, loading zones, and driveway visibility, but many appear unnecessary and most are far too large. The conventional wisdom that large pull-in and pull-out areas are needed for safety is confounded by real-life experience, which suggests that excess unused roadway contributes to speeding. Wherever space exists for even one or two additional parking spaces to be reinstituted, they should be.[4]

Increase residential use of on-street spaces

Expand access to Residential Permit Parking options to downtown neighborhoods. In existing or emerging areas of concentrated residential development, the City could extend access to the current permit-parking options to residents. In areas with low commercial parking demand, parking should be restricted to two hours or less for non-permit vehicles. In areas with more significant commercial demand, the City should simply exempt permit-holders from meter-rates and/ or time-limits within their designated zone.

By reducing the amount of on-site parking required for each project, such regulations can promote the City's downtown growth objectives by making historic re-use projects more viable and increasing the number of residential units that can be built on each site. By reducing the amount of curb cuts, and curb cut traffic, and shifting parking demand to downtown streets, permit-parking can help make sidewalks safer and more comfortable for pedestrians.

OFF-STREET

Establish a Park-Once/Shared-Parking management policy

Adopt a formal Park-Once off-street management policy with the explicit objective of maximizing the share of downtown parking accommodated via shared, public parking resources. The intent of this policy is to encourage drivers to park and leave their cars in one place while conducting business, shopping and eating at multiple locations downtown. Park-once systems encourage more

4 The south side of 2nd Street is a case in point. Six angled parking spaces could fit between the motorcycle parking area and the Radisson exit drive. Four more parallel spaces could be created in front of the Radisson's porte-cochere, where space is reserved for loading that should occur elsewhere or be restricted to certain hours. A block west, much more space than is required is kept empty in front of a fire hydrant.

walking between destinations, providing greater exposure for businesses and creating a sense of vitality in downtown.

Improve short-term parking access in City ramps

Create a more “customer friendly” experience in City ramps by restricting access to the first level of parking prior to 10:00 AM. This would ensure that the bulk of commuter parking takes place before these spaces become available, giving short-term customers the first chance at each facility’s preferred spaces.

The current approach for maintaining short-term opportunities in City ramps — reducing the number of potential monthly permits made available for each City ramp by a set number — has two key shortcomings.

1. Permits are undersold when ramps fail to attract parking to fill the set aside spaces; and
2. The “reserved” spaces, in reality, end up being located at the top floors in the ramps due to the fact that commuters tend to arrive before shoppers and diners.

Opening first floor spaces to everyone after 10:00 AM is also a preferable alternative to the meters currently located on the first floor at the Harrison ramp that have greatly reduced the efficacy of those spaces during weekday hours.

Sell more RiverCenter ramp permits

Despite the fact that this ramp is consistently under-utilized on weekdays, the City maintains a wait-list for monthly permits.

Figure 6-14 The Most Popular City Ramp is Under-utilized and Under-sold

Sell monthly permits based solely on weekday peak occupancy rates, as measured during weekly surveys coordinated with the on-street surveys outlined above. The City should begin by selling 50 more monthly permits each month until either the wait list is exhausted or peak hour utilization rates rise above a 75% average for one month.

Adjust rates once a 75% average utilization is achieved, to keep demand in line with supply.

Eliminate the wait list as a management strategy, in favor of market-based pricing. This will increase the appeal of the Redstone and Harrison Street ramps, while capturing more of the revenue potential of this high-demand parking resource.

Manage Impacts from RiverCenter Conventions and Radisson Hotel

Complicating the management of the RiverCenter ramp is the fact that this is the favored location of not only downtown commuters, but also RiverCenter conventioneers and Radisson Hotel patrons. Selling more monthly permits to commuters in an attempt to keep this coveted parking facility more consistently well-utilized will complicate parking expectations and arrangements for these two vital downtown commercial enterprises.

Identify access and accommodation strategies for RiverCenter events that allow the City to expand monthly access to the RiverCenter ramp, while still accommodating conventioneer demand for convenient parking. Recommended strategies include:

- Reserve on-street spaces for loading and drop-off activity – This could include the blocks surrounding the Blackhawk hotel project, along which angled parking is proposed as a part of the *Davenport in Motion* downtown street re-design recommendations. This would represent an expansion of the current practice of bagging meters for RiverCenter events.
- Provide free parking at Redstone and Harrison Street ramps – Conventioneers can be offered free parking at these other City ramps if and when the RiverCenter ramp sells out.
- Offer an on-street day pass in the form of a mirror hang tag, which would allow conventioneers to park at any non-metered space in downtown for up to 24 hours.
- Provide consolidated space at the RiverCenter ramp, or other off-street facilities, for stacking valet-parked cars.

Ensure that the Radisson is paying a fee for reserving spaces that is reflective of market-rates for monthly parking at the RiverCenter ramp, while also promoting cheaper options at the Redstone ramp. This should encourage the hotel to purchase only the amount of parking it consistently needs at the RiverCenter ramp, while relying on ready access to the Redstone Ramp for seasonal and events-based crunches. The City should work with the hotel (which may not realize just how much availability consistently exists at the nearby Redstone ramp) to arrive at a mutually beneficial management strategy that can free up some of the spaces currently set aside at the RiverCenter ramp.

Figure 6-15 Redstone and Harrison Street Ramps

Figure 6-16 Reclaim lot space for visual, informational, and functional amenities

Sell more Redstone and Harrison Street ramp permits

Expand on-going efforts to accommodate demand at new developments in City ramps. Current efforts focused on residential developments at historic-reuse sites should be expanded to all new development to encourage greater reliance upon existing public resources.

Ensure that leases for casino lots mandate that the operators must enforce employee parking restrictions in order to shift demand into City ramps.

Establish a "Land Bank" policy for surface lots

Identify and promote under-performing surface lots as redevelopment opportunities.

Remove surface lot capacity from system

Invest in design, landscaping, and multi-modal improvements at lots for which short-term re-development prospects are lacking. Establish a set of investment objectives, based on City priorities, likely to address such factors as:

- Green space and porosity – pocket parks, public gardens, bioswales, etc.;
- Pedestrian connectivity – creating quality pedestrian through-paths to shorten walking distances and improve safety;
- Bicycle parking – expanding downtown bicycle mobility and access; and
- Aesthetic improvements – underutilized inventories present an opportunity to recapture and improve space along the edge of lots.

Such improvements can, by improving the appearance and functionality of these facilities, mitigate many of the negative aesthetic and psychological impacts of under-utilized downtown surface parking.

Expand surface lot access

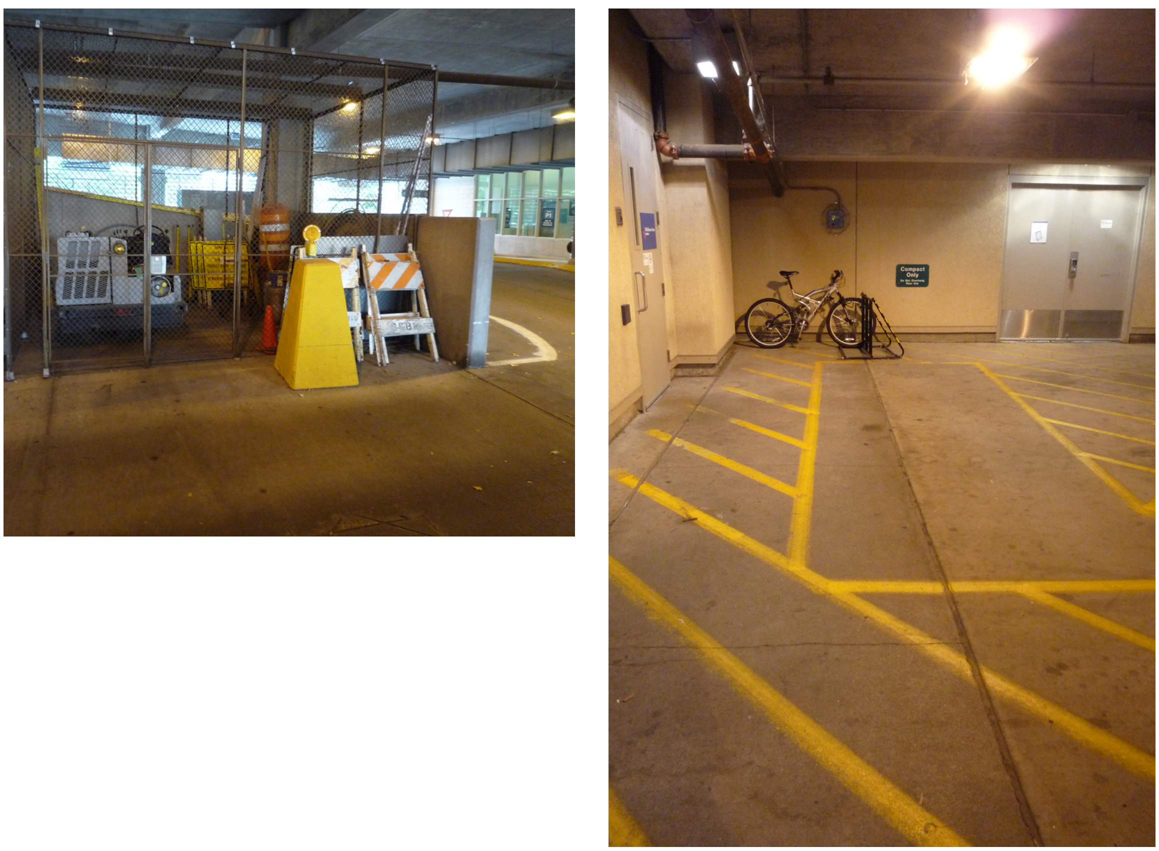
Open all remaining surface lots — including permit-only lots — to public parking after 10:00 AM. The three permit-only lots currently average 35% utilization at the midday peak. None averages higher than 38%. This leaves 139 spaces empty that could accommodate short-term parking. Restricting the lots to permit-holders until 10:00 AM will ensure that permit-holders (likely commuters) have first access to these spaces. Opening these lots up to the public at this time will create more parking opportunities across downtown for visitors.

Accurately promote parking opportunities. Prominently note hours for public parking, rates, and information on permits/ passes (who can acquire them, where and for how much) on lot signage. Current signage over-emphasizes restrictions, and often identifies restrictions that are either not in place or not enforced. Current workday utilization levels indicate that, with the exception of the Union Station lot, there is little reason for signage to emphasize restrictions at these locations. Promote and expand the coverage of day permits. Ensure that day permits are easily accessible. Allow permit-holders to park in any City lot during the course of the day.

Create and promote bicycle parking in off-street facilities

The City's downtown ramps contain a significant amount of under-utilized space that could be converted to house bicycle lockers and/ or racks. Providing safe, secure, and weather protected short-term and daylong storage options can be an effective investment in increasing bicycle mobility downtown — and creating a visible sense of presence and activity within structures that can help increase their appeal to short-term customers

Figure 6-17 Claim under-utilized facility space for bicycle parking



ENFORCEMENT

Make enforcement more customer-friendly

Reinforce public understanding that the purposes and objectives of enforcement are based on the effective management of resources — as well as public health, safety, and welfare — by distinguishing responses to occasional mistakes from responses to serial infractions. Consider the following as a more customer-friendly ticket-fine structure:

- The first ticket in any 12-month period is delivered in the form of a "courtesy" (no fine) ticket, that should contain information on the parking restriction violated, including its purpose;
- The second ticket should be a nominal charge;
- Subsequent tickets should go up substantially.

Ensure that press releases containing information on the Right-Pricing Program and any future changes to parking regulations, pricing, collection and enforcement technology, etcetera, is accompanied by a reminder of this new, friendlier fine structure policy.

REVENUE

Focus on developing the long-term value of parking resources

Managing parking resources based on performance, rather than revenue, will enhance the value of these resources in terms of residual benefits — supporting downtown commercial activity — which, in turn, will enhance their value in terms of direct revenue — more cars at more meters paying market rates to keep a few spaces open. At present, however, taking this long view necessitates some significant losses in terms of short-term revenues.

The unavoidable fact behind the City's current revenue dilemma is that the City overbuilt its off-street supply, primarily in the ramps. The Redstone and Harrison Street ramps, in particular, were built to accommodate future levels of demand that have yet to materialize. As outlined in our Best Practices review, there are essentially only two policy options available to cities for deciding when to construct new off-street facilities:

- A Market Approach – This policy can be summed up as "Parking must pay for itself". Under such a policy, Davenport would not invest in new facilities unless and until demand was sufficient for parking income to cover the added construction and maintenance costs.
- An Economic Development Approach – This policy identifies parking as an economic development resource that is worth subsidizing. Under such a policy, Davenport must be prepared to make up the difference between the costs of a new garage and its revenue, for the life of the garage and its funding bonds.

The City built its most recent ramps to a level of supply that given current market conditions makes it impossible for parking to pay for itself. The current gap between parking revenues and construction debt obligations was thus not only foreseeable, but unavoidable. The level of the current obligation is a serious concern for which the Parking Management Plan can offer no short-term solution. The current practice of pressuring meter revenues to carry the burden of over-built ramps is, however — by diminishing the asset from which it is attempting to extract revenue — unsustainable.

Ironic as it may seem, lowering on-street rates today, and linking rates to performance targets (availability rates), improves the City's position to significantly increase long-term parking revenues. In the short-term, strategic revenue sacrifices can help re-establish the pre-eminent value of downtown's on-street inventory. In the long-term, tying rates to demand and performance targets, will keep this resource highly functional, business-friendly, and maximally remunerative.

Long-Term Management

While demand is currently significantly below optimal levels, a number of existing and recent conditions provide indication that a significant reduction in meter-coverage and/or -rates would be soon followed by a dramatic uptick in demand — and subsequent drop in availability below optimal rates — on many downtown blocks.

As recently as 2006, a general lack of availability spurred price increases to current meter rate levels. While these rates appear to have reduced demand more than anticipated, it is important to keep in consideration the fact that the same spaces were too full at prices not much lower than they are today. Furthermore, Friday night and weekend afternoon utilization rates provide clear indication that, were all spaces to be offered free of time-limits and pricing, many blocks would lack desirable levels of availability.

It is also important to plan for the success of current planning efforts — including the *Davenport in Motion* and *Davenport 2025* efforts — that should be expected to create more demand for downtown parking. The remainder of the PMP, therefore, focuses on establishing long-term management strategies for on-street and off-street spaces, under the assumption that downtown demand will grow significantly under the influence of on-going market trends and City planning efforts.

ON-STREET

Upgrade pricing technology

Replace current meters with state-of-the-art pricing technology once performance-based pricing pushes hourly rates over $1.00 per hour within a pricing zone of 10 or more contiguous blocks. Once rates reach this level, providing credit card and cell phone payment options becomes a significant benefit for parkers, while hourly revenues at this level can help offset the investment costs for new technology.

Work with the Quad City Chamber of Commerce and/ or other business associations to discuss the merits of incremental pricing options that can discourage commuter-demand without raising base rates, or even offer an initial period of free parking to spur short-term demand.

Remove time-limits

Eliminate time limits in conjunction with the installation of multi-space pay stations. The pricing versatility of these machines will complement performance-based pricing strategies to help the City ensure availability without need of time-limits.

Maintain low-cost alternatives

As the cost for downtown's most popular parking spaces increases, it will be important to maintain reduced-cost, off-street alternatives (and to publicize where less expensive on-street spaces are located). As parking demand increases, a range of parking options and price-points will be essential to keeping downtown friendly for those who cannot afford, or choose not to pay for, the convenience of downtown's most sought-after parking spaces.

Ensure that wayfinding, signage, and distribution materials are amply available to make all parking options, and their costs clear.

Invest revenues downtown

Make the current policy of paying down the debt service on the City's downtown ramps part of a formal policy to allocate all downtown parking revenues toward a discreet fund exclusively dedicated to funding investments in downtown access (future off street parking, traffic-calming, bicycle facilities, etc.) and physical amenities (plantings, sidewalk furniture, lighting, etc.).

OFF-STREET

Improve pedestrian and bicycle connections to shared parking

Extend network enhancement projects to key parking resources whenever feasible. Any investment that makes getting around without a car more appealing can help reduce the number of times drivers return to their cars while downtown. *Davenport in Motion*'s vision for a more walkable and bicycle-friendly downtown presents a tremendous opportunity to reduce downtown re-parking rates. The pedestrian-oriented environments envisioned in the plan would greatly reduce the perceived distance between parking and various downtown destinations by improving the walking experience along the way — safer, more comfortable, and interesting.

Direct drivers to shared parking

Ensure that wayfinding, signage, and information investments are in place to support and promote the Park-Once concept, by:

- Clearly marking all public parking opportunities (including off-peak and shared-parking opportunities) along with information on cost and hours;
- Creating a consistent, attractive, and conspicuous signage program to guide visitors efficiently to parking opportunities;
- Create a "Downtown Mobility and Access" map to consolidate geographic information on parking opportunities as well as downtown bicycle, pedestrian, and transit amenities and programs; and
- Create a Getting Downtown page on the City's website to contain the Mobility and Access map as well as detailed information on parking and other access resources.

Figure 6-18 Parking Wayfinding Signage Examples

Vancouver, WA: Park-n-Go Brand

Portland, OR: SmartPark Brand

Expand access to shared supplies

- Identify a Shared Parking Broker to match businesses and property owners with spaces available to share with businesses interested in accessing them.
- Encourage effective valet parking operations that access under-utilized facilities while providing visitors with virtually inexhaustible "front door" access. The most obvious way to do this would be to grant reserved curb space to approved evening and event-based valet operators.

Expand shared-parking at new development

- Establish maximum limits on reserved, on-site parking at new development projects while setting no such cap on shared spaces. To qualify as "shared" parking, the City could require that spaces be made available for general parking for a minimum number of hours per week (perhaps 40), and be clearly signed to indicate this opportunity.

Above images from Rick Williams.

Keep the public supply lean

As demand grows, invest in access, not necessarily parking. Adopt the following 3-step approach to managing the public inventory:

- **Step 1** – Track parking construction costs and existing ramp revenues. Establish a pro forma to track up-to-date, per-space construction and maintenance cost estimates for off-street parking facilities against measures of potential income, based on current ramp revenues and latent-demand levels. Utilize the pro forma to assess the balance between the costs and the likely revenue of potential, new parking facilities. A negative balance indicates the level of subsidy required to fund any proposed new parking. A neutral or positive balance indicates the likelihood that the proposed facility would be self-supporting or revenue-positive.
- **Step 2** – Use cost-benefit analyses, based on Step 1 calculations, to compare the effectiveness of new parking construction with that of investments in other modes of access. As an example, should future ramp capacities become constrained, the City would examine whether it would provide greater access per municipal dollar to build a new ramp or fund evening service for key, commuter bus routes and/or provide more bicycle parking.
- **Step 3** – Continue to use pricing to maintain on-street availability.
- **Step 4** – Use pricing strategies to maintain off-street availability until constructing new parking becomes the most viable option in Step 2.

Push for private efficiencies

Reach out to developers to sell them on the benefits of the City's Park-Once/Shared Parking objectives. Outline the immediate cost-cutting benefits available for each project that builds fewer on-site spaces, as well as the long-term, big picture benefits to be gained from denser land use patterns, busier sidewalks, higher and better ratable uses, calmer vehicle traffic, and a more active, engaged downtown populace. Promote the many means by which the City has made accessing shared, public resources easier and more effective — ramp permits, wayfinding, on-street availability, and valet options — while enhancing drive-park alternatives — walking, cycling, taking the bus, and ridesharing — that can be engaged to reduce tenant-parking demand.

Guide private-facility design

Establish zoning requirements and/or design guidelines to ensure that off-street facilities:

- Minimize curb-cuts and keep them off key pedestrian, bicycle, and transit corridors;
- Keep sidewalks active with, sidewalk-oriented, ground floor uses; and
- Provide secure bicycle parking on-site.

SUMMARY OF RECOMMENDATIONS

The table below summarizes the recommendations of the Downtown Parking Management Plan. The time frames include: Immediate, First-year, Short-term 1-3 years, Medium-term 3-10 years, or Long-term beyond 10 years.

PMP Component	Time Frame	Trigger and/or first steps
15% On-Street Availability Target	Immediate	Immediately establish as formal parking-management policy/ on-street performance target
Repricing Program	Immediate	Begin outlining logistics for bagging, surveying, enforcement, etc.
Bag Downtown Meters	Immediate	Once logistics are settled
Set Time-Limits	Immediate	In-coordination with meter-bagging
Monitor - Weekly Occupancy Surveys	Immediate	Begin first week following bagging of meters
Price (re-meter) Blocks	Immediate	5% or Lower Availability, based on 3 months of surveys
Re-fine Pricing	First-year	After 3 additional months of surveys, and again after another 6 months of surveys
Remove Meters on Blocks not Re-metered	First-year	After a full year of surveys
Park-Once/ Shared-Parking Policy Goal	Immediate	Immediately establish as formal parking-management policy
Improve Short-Term Access to Ramps	First-year	Contact wait listed customers to see how many are still interested in permits
Set-Aside First Floor Spaces	First-year	Work with ramp operators to identify means and methods, and which spaces to set aside
Sell More Ramp Permits	Immediate	50 new permits each month until ramps reach 75% peak occupancy
Expand Surface Lot Access	First-year	Begin working on new signage that both emphasises public parking opportunities, while identifying new hours for permit-enforcement
Customer-Friendly Enforcement	First-year	Begin discussing options for fine levels, information and promotion, etc. with City departments
Maintain Pricing as Primary Management Tool	First-year	Conclusion of Re-Pricing Program
Upgrade Meter Technology	Medium- to Long-term	When and where demand-based rates surpass $1.00
Remove Time-Limits	Medium- to Long-term	When and where meters replaced with pay stations
Maintain Low-Cost Alternatives	Ongoing	Already in place, maintain current approach
Invest Revenues Downtown	Medium- to Long-term	Formalize current approach as policy intended to remain after debt service on ramps is retired
Improve Links to Shared Parking	Medium- to Long-term	Capitalize on improvements identified in the DIM Plan
Signage and Wayfinding	First-year / Ongoing	As funding can be found for key wayfinding, signage, and web-based information investments
Create Mobility and Access Map	First-year / Ongoing	Begin immediately to coordinate with stakeholder about information to be covered, update annually

PMP Component	Time Frame	Trigger and/or first steps
Create Getting Downtown Web Page	First-year / Ongoing	Begin immediately to coordinate with stakeholder about information to be covered, update annually
Shared Parking Broker	First-year	Coordinate with Davenport One and business community to monitor need/ interest
Encourage Valet	First-year	Coordinate with Davenport One and business community to monitor need/ interest
Public Valet	Medium- to –Long-term	Evaluate success and limitations of private valet operations after first year, then annually
Shared-Parking at New Developments	First-year / Ongoing	Begin discussing options with Davenport One and the development community
Keep public supply lean	First-year / Ongoing	Formalize approach and policies when ramps reach 80% average, collective, weekly-peak occupancy
Push for private efficiencies	First-year / Ongoing	Begin discussing options with Davenport One and the development community
Guide private-facility design	First-year / Ongoing	Begin discussions with the downtown Design Review Board on an outline for an approach
Establish Land Bank Policy for Lots	First-year / Ongoing	Identify likely candidates early

PMP Appendix: **Implementation Follow-up**

The announcement of the PMP pilot pricing program was well-received with few exceptions. In many cases, response was extremely positive following years of pricing that was well-ahead of on-street demand. This enthusiasm, however led many supporters to misinterpret the scope and intent, as well as the critical details, of the pilot — most importantly omitting the likelihood that some level of pricing would at some point return in order to manage demand where parking availability became chronically low. City staff worked, with Project Team support and input, to ensure that the critical details of the pilot were communicated to the public to avoid a sense of surprise (and possible claims of reneging on promises) if and when on-street pricing returned.

Following the pilot startup, inevitable questions, concerns, and unanticipated complications arose. The following summarizes several key issues that arose during the pilot and their resolution.

Redevelopment of Surface Lots: The City identified concerns about managing surface lots that are identified, or that become identified, as redevelopment sites. The primary concern was that, unless given information about attractive parking alternatives, the removal of these spaces would have a harmful impact on nearby businesses that rely upon them for customer access. The City felt that having a procedure in place for informing the users of these facilities would help make the implementation of this PMP strategy for reducing excess surface parking more feasible.

The following short sequence of steps can be used to prepare lots (and their users) for reuse development, as follows:

1. Identify lots to be re-developed, based on utilization and/ or perceived demand or opportunity for alternate use
2. Survey lot users to identify parker characteristics, the land uses supported by the lot, and the times of highest demand — this could be a simple windshield survey with forms either mailed back to the city or dropped off at the parker's destination (library for example)
3. Begin looking for opportunities for the City and/or Chamber to broker a shared parking arrangement based on proximities to impacted destinations, peak capacities, and demand-peak offsets
4. Identify any means of expanding or managing on-street supply to meet demand: angled parking opportunities? 30-minute meters?
5. Discuss opportunities with all parties (including any benefits to be gained from up-valuing a nearby property, downtown revitalization, etc.)
6. The ability to identify a feasible transition strategy for impacted users and destinations (or the lack thereof, based on surveys) becomes part of the evaluation process for selecting which sites to move forward with first.

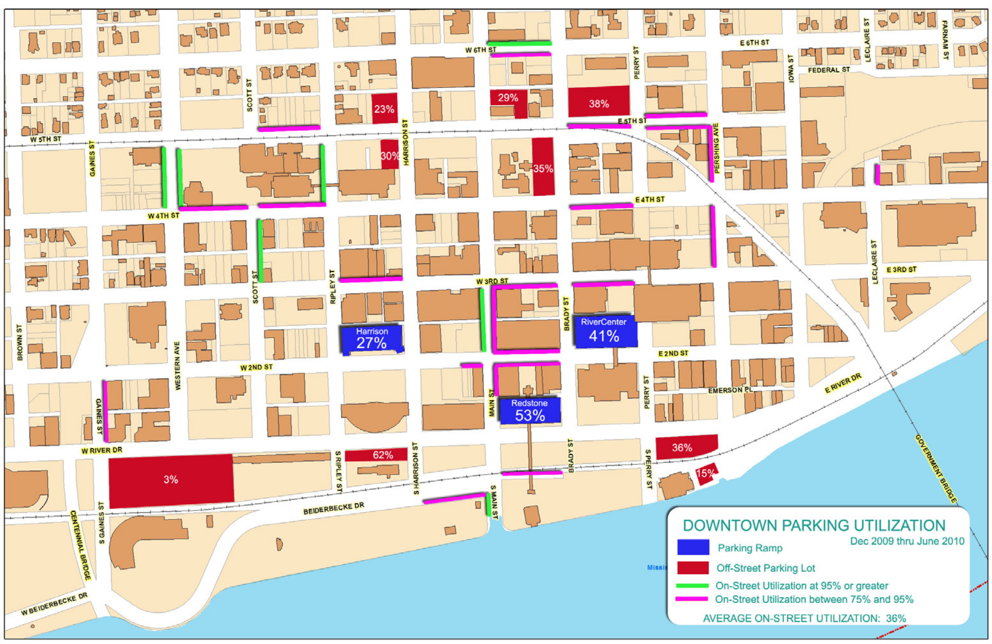
Visual Cues for Handicapped Parking: With the removal (or bagging) of meters, a key visual cue for indicating handicapped parking opportunities was lost. Although regulatory signage remained in place to indicate where curb space was restricted to handicapped parking, the fact that this concern was raised indicates that by themselves these signs may not be sufficient to mitigate unnecessary confusion among disabled drivers. The suggested resolution was for City staff to ensure that the correct signage was indeed in place, and if existing signage was insufficient to properly communicate the handicapped restriction, to remove the bag and simply place a "free parking" sticker over the coin slot.

Boundaries of 2-hour Limit Zone on Iowa Street: The boundaries of the originally proposed 2-hour Limit zone for the pilot included part of Iowa Street where there had never been parking meters, or 2-hour time limits. Unsurprisingly, business owners and customers that rely on these spaces were confused and irritated by the new two-hour limit here. However, the boundaries of the 2-hour limit were proposed to be strategically flexible. That is, that the boundary lines could be adjusted if the 2-hour limit was deemed unnecessary for effective curb management. The original boundaries were proposed for the sake of simplicity in communicating where limits would be in place during the pilot. The boundaries could instead be adjusted to omit these blocks that were not previously subject to time limits from the new 2-hour zone — and that they remain omitted from it as long as availability remained reasonably close to or above 15% during peak-hour surveys.

Decreased Parking Availability on Some Blocks: City staff noted that, since pilot implementation "we are seeing a lot more cars on the street on some blocks." In fact some business owners who had fought to remove the meters now lamented the fact that they no longer consistently had available spaces right outside their storefront. Rather than supporting a return of pricing, some owners suggested that they be able to pay a monthly fee to the City to guarantee those spaces for their customers. Any consideration of the "reserving" spaces suggestion was and is strongly discouraged. Enforcement issues aside, such a strategy would leave these spaces virtually empty most of the time, other than the few peak hours of their "sponsor" businesses. This would undermine a critical objective for removing the meters — attracting more consistent utilization of downtown curb spaces. It would also undermine the park-once management objective by requiring customers to move their cars as soon as they left a business that "bought" their parking. This is a critical parking management strategy in support of a more walkable downtown.

It should be noted that compared to the fair market rate for purchasing rights to a downtown parking space, it would have been far cheaper for these merchants to have purchased parking smart cards for their customers back when meters were still present to keep spaces open.

Parking Utilization during the Pricing Pilot: The graphic below, created by City of Davenport staff, illustrates average parking utilization during the pilot (December 2009 to June 2010), both on-street and off-street-. The analysis excludes the holiday period and handicapped spaces. Overall, on-street spaces were 36% utilized. There are several block faces in different parts of downtown where utilization exceeded 95% and thus would warrant re-metering (and/or increasing rates). A larger number of block faces were between 75% and 95% utilized, which would not necessitate a change in rates if meters were in use. The remaining block faces were less than 75% utilized, which would require a reduction in meter rates (if meters were in use). The graphic also illustrates average utilization at the City's parking ramps and off-street surface parking lots.



Source: City of Davenport

Results of City Council Work Session on Downtown Parking, July 26, 2010: Following discussion of the revenue shortfall resulting from the pilot program and potential solutions, the City Council supported the following package of solutions, with one exception as noted:

- Lease more spaces at the RiverCenter Ramp
- Identify cost-cutting measures in operations
- Increase event parking and include nightly parking at Harrison Ramp
- Increase use of *some* available downtown TIF
- Return to paying for on-street parking – however, with pay stations instead of meters
- Increase fines on tickets (**NOT** supported by Council)
- Positive fund balance until ramps paid off.

PMP Appendix: **Parking Counts**

This appendix presents the results of on-street parking counts conducted between June 3-11, 2009 and off-street parking counts conducted on June 9-10 and July 10-11, 2009.

Off-Street Parking

Facility Name	Total Spaces	Weekday		Friday Night		Weekend	
		Cars	Utilization	Cars	Utilization	Cars	Utilization
RiverCenter Ramp	757	400	52.8%	420	55%	57	8%
Redstone Ramp	454	267	58.8%	88	19%	71	16%
Harrison Street Ramp	654	172	26.3%	22	3%	15	2%
Harrison Street Ramp Meters	64	1	1.6%	19	30%	7	11%
CB&Q Lot	84	31	36.9%	19	23%	4	5%
Union Station	44	40	90.9%	4	9%	8	18%
5th and Brady Lot	109	41	37.6%	9	8%	5	5%
5th and Main Lot	52	20	38.5%	0	0%	1	2%
5th and Harrison Lot	63	10	15.9%	19	30%	10	16%
Florian Keen surface lot	422	4	0.9%	422	100%	422	100%
Library Lot	21	3	14.3%	1	5%	2	10%
Police Station Lot	17	5	29.4%	6	35%	3	18%
Dock Lot	30	6	20.0%	3	10.0%	3	10.0%
All	**2771**	**1000**	**36.1%**	**1032**	**37%**	**608**	**22%**

On-Street Parking

Street	From (Cross Street)	To (Cross Street)	Side	Spaces	Weekday		Friday Night		Weekend	
					Cars	Utilization	Cars	Utilization	Cars	Utilization
South-North Streets										
LeClaire	2nd	3rd	E	10	0	0%	0	0%	0	0%
			W	10	1	10%	0	0%	0	0%
	3rd	4th	E	10	6	60%	1	10%	8	80%
			W	9	5	56%	0	0%	0	0%
	4th	Dead End	E	3	2	67%	2	67%	2	67%
			W	5	4	80%	2	40%	2	40%
Iowa	River Dr	2nd	E	6	0	0%	0	0%	0	0%
			W	4	0	0%	0	0%	0	0%
	2nd	3rd	E	6	5	83%	1	17%	0	0%
			W	14	1	7%	2	14%	0	0%
	3rd	4th	E	8	5	63%	0	0%	0	0%
			W	8	6	75%	0	0%	2	25%
	4th	5th	E	14	3	21%	6	43%	5	36%
			W	11	6	55%	11	100%	6	55%
	5th	Federal	E	10	0	0%	0	0%	0	0%
			W	12	7	58%	1	8%	0	0%
Pershing	River Dr	2nd	E	7	2	29%	4	57%	2	29%
			W	6	5	83%	4	67%	5	83%
	2nd	3rd	E	7	0	0%	7	100%	0	0%
			W	10	0	0%	10	100%	0	0%
	3rd	4th	E	4	0	0%	5	125%	0	0%
			W	16	0	0%	17	106%	1	6%
	4th	5th	E	4	1	25%	0	0%	0	0%

Street	From (Cross Street)	To (Cross Street)	Side	Spaces	Weekday		Friday Night		Weekend	
					Cars	Utilization	Cars	Utilization	Cars	Utilization
			W	14	10	71%	0	0%	0	0%
	5th	6th	E	11	6	55%	0	0%	0	0%
			W	11	4	36%	0	0%	0	0%
Perry	River Dr	2nd	E	7	1	14%	6	86%	6	86%
			W	11	5	45%	10	91%	9	82%
	4th	5th	E	13	1	8%	2	15%	1	8%
			W	12	0	0%	3	25%	0	0%
	5th	6th	E	6	3	50%	3	50%	2	33%
			W	12	7	58%	3	25%	2	17%
Brady	River Dr	2nd	E	13	1	8%	12	92%	3	23%
			W	5	0	0%	6	120%	0	0%
	2nd	3rd	E	6	2	33%	5	83%	4	67%
			W	9	1	11%	7	78%	4	44%
	3rd	4th	E	6	2	33%	6	100%	6	100%
			W	10	1	10%	10	100%	3	30%
	4th	5th	E	10	7	70%	1	10%	2	20%
			W	14	0	0%	0	0%	0	0%
			W	8	2	25%	0	0%	0	0%
Main	Mississippi River	Beider-becke	W	6	5	83%	6	100%	5	83%
	River Dr	2nd	E	3	3	100%	3	100%	3	100%
			W	6	1	17%	4	67%	7	117%
	2nd	3rd	E	8	5	63%	1	13%	3	38%
			W	3	1	33%	3	100%	4	133%
	3rd	4th	E	13	3	23%	2	15%	10	77%
			W	11	1	9%	5	45%	7	64%
	4th	5th	E	8	2	25%	0	0%	8	100%
			W	7	1	14%	5	71%	6	86%
	5th	6th	E	6	0	0%	0	0%	0	0%
			W	7	0	0%	1	14%	0	0%
Harrison	Beider-becke	River Dr	W	2	0	0%	0	0%	1	50%
	River Dr	2nd	E	12	0	0%	0	0%	5	42%
	2nd	3rd	E	6	1	17%	6	100%	1	17%
			W	5	4	80%	5	100%	4	80%
	3rd	4th	E	9	0	0%	9	100%	2	22%
			W	9	0	0%	9	100%	1	11%
	4th	5th	E	8	1	13%	0	0%	0	0%
			W	7	2	29%	0	0%	0	0%
Ripley	Beider-becke	River Dr	E	4	0	0%	0	0%	2	50%
			W	4	0	0%	0	0%	0	0%
			W	11	1	9%	0	0%	7	64%
			W	12	4	33%	8	67%	6	50%
	3rd	4th	E	10	3	30%	5	50%	3	30%
			W	7	4	57%	8	114%	1	14%
			W	14	13	93%	4	29%	5	36%
Scott	River Dr	2nd	E	8	4	50%	6	75%	6	75%
			W	12	4	33%	3	25%	1	8%
	2nd	3rd	E	9	1	11%	1	11%	0	0%
			W	8	2	25%	2	25%	3	38%

Street	From (Cross Street)	To (Cross Street)	Side	Spaces	Weekday		Friday Night		Weekend	
					Cars	Utilization	Cars	Utilization	Cars	Utilization
	3rd	4th	E	3	2	67%	1	33%	1	33%
			W	8	3	38%	0	0%	1	13%
Western	River Dr	3rd	W	7	2	29%	6	86%	2	29%
	2nd	3rd	E	22	15	68%	1	5%	1	5%
			W	21	12	57%	4	19%	1	5%
	3rd	4th	E	23	12	52%	4	17%	2	9%
			W	24	24	100%	5	21%	2	8%
	4th	5th	E	21	20	95%	4	19%	4	19%
			W	24	23	96%	4	17%	0	0%
Gaines	River Dr	2nd	E	3	0	0%	2	67%	0	0%
			W	7	3	43%	6	86%	1	14%
	3rd	4th	E	7	0	0%	0	0%	2	29%
			W	8	0	0%	3	38%	4	50%
East-West Streets										
Beider-becke	Brady	Main	N	14	1	7%	13	93%	11	79%
	Main	Harrison	S	17	13	76%	17	100%	15	88%
			N	14	0	0%	10	71%	10	71%
	Harrison	Ripley	S	24	1	4%	7	29%	0	0%
			N	14	0	0%	0	0%	0	0%
2nd	LeClaire	Iowa	S	7	1	14%	0	0%	0	0%
			N	5	0	0%	1	20%	3	60%
	Iowa	Pershing	S	10	1	10%	2	20%	0	0%
			N	8	0	0%	4	50%	0	0%
	Pershing	Perry	S	15	1	7%	14	93%	9	60%
			N	8	0	0%	10	125%	1	13%
			N	6	2	33%	7	117%	6	100%
	Brady	Main	S	13	6	46%	12	92%	12	92%
			N	7	1	14%	9	129%	5	71%
	Main	Harrison	S	2	2	100%	2	100%	1	50%
			N	13	0	0%	7	54%	5	38%
	Harrison	Ripley	S	14	0	0%	2	14%	8	57%
			N	13	0	0%	2	15%	3	23%
	Ripley	Scott	S	15	1	7%	4	27%	4	27%
			N	8	1	13%	5	63%	1	13%
	Scott	Western	S	12	2	17%	2	17%	0	0%
			N	11	0	0%	3	27%	1	9%
3rd	River	LeClaire	S	8	0	0%	0	0%	0	0%
			N	16	0	0%	0	0%	0	0%
	LeClaire	Iowa	S	7	0	0%	0	0%	0	0%
			N	10	4	40%	0	0%	0	0%
	Iowa	Pershing	S	6	2	33%	2	33%	1	17%
			N	7	0	0%	6	86%	0	0%
	Pershing	Perry	S	12	0	0%	13	108%	0	0%
	Perry	Brady	S	13	6	46%	11	85%	10	77%
			N	4	1	25%	6	150%	6	150%
	Brady	Main	S	9	7	78%	6	67%	5	56%
			N	11	5	45%	11	100%	3	27%
	Main	Harrison	S	11	8	73%	6	55%	5	45%
			N	11	7	64%	9	82%	5	45%
	Harrison	Ripley	S	14	4	29%	13	93%	3	21%
			N	8	2	25%	11	138%	5	63%

Street	From (Cross Street)	To (Cross Street)	Side	Spaces	Weekday		Friday Night		Weekend	
					Cars	Utilization	Cars	Utilization	Cars	Utilization
	Ripley	Scott	S	5	2	40%	0	0%	2	40%
			N	12	2	17%	3	25%	0	0%
	Scott	Western	S	7	2	29%	1	14%	2	29%
			N	9	2	22%	1	11%	1	11%
	Western	Gaines	S	13	0	0%	1	8%	0	0%
			N	13	1	8%	1	8%	1	8%
	Gaines	Brown	S	6	1	17%	2	33%	3	50%
			N	14	3	21%	6	43%	4	29%
4th	River	LeClaire	S	45	2	4%	0	0%	0	0%
			N	48	3	6%	1	2%	0	0%
	LeClaire	Iowa	S	12	0	0%	2	17%	0	0%
			N	9	3	33%	0	0%	0	0%
	Iowa	Pershing	S	7	2	29%	7	100%	6	86%
			N	6	4	67%	7	117%	3	50%
	Pershing	Perry	S	10	0	0%	10	100%	0	0%
			N	13	4	31%	7	54%	0	0%
	Perry	Brady	S	4	1	25%	3	75%	0	0%
			N	10	3	30%	1	10%	1	10%
	Brady	Main	S	10	5	50%	1	10%	2	20%
			N	8	1	13%	1	13%	1	13%
	Main	Harrison	S	8	4	50%	2	25%	5	63%
			N	12	6	50%	6	50%	7	58%
	Harrison	Ripley	S	9	0	0%	0	0%	0	0%
			N	10	5	50%	0	0%	1	10%
	Ripley	Scott	S	8	3	38%	2	25%	2	25%
			N	7	4	57%	0	0%	0	0%
	Scott	Western	S	11	3	27%	0	0%	2	18%
			N	16	4	25%	0	0%	0	0%
	Western	Gaines	S	7	0	0%	0	0%	1	14%
			N	15	0	0%	0	0%	0	0%
	Gaines	Brown	S	9	1	11%	2	22%	2	22%
			N	14	0	0%	0	0%	0	0%
5th	Iowa	Pershing	S	14	0	0%	0	0%	1	7%
			N	3	2	67%	2	67%	2	67%
	Pershing	Perry	S	8	6	75%	0	0%	0	0%
			N	6	4	67%	0	0%	0	0%
	Perry	Brady	S	11	9	82%	2	18%	1	9%
			N	6	0	0%	0	0%	0	0%
	Brady	Main	S	13	3	23%	1	8%	1	8%
			N	3	1	33%	0	0%	0	0%
	Main	Harrison	S	13	2	15%	1	8%	0	0%
			N	8	0	0%	0	0%	0	0%
	Harrison	Ripley	S	13	0	0%	0	0%	0	0%
			N	8	0	0%	0	0%	0	0%
All				**1675**	**471**	**28%**	**583**	**35%**	**386**	**23%**

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF REDWOOD CITY AMENDING CHAPTER 20, ARTICLE VII OF THE REDWOOD CITY MUNICIPAL CODE BY AMENDING SECTIONS 20.96 THROUGH 20.96.21 IN THEIR ENTIRETY AND DIVISIONS 4, 5 AND 9 IN THEIR ENTIRETY

RECITALS

Whereas, planned new development in Downtown Redwood City is likely to increase traffic and parking demand. *(Downtown Mixed Use Retail/Cinema Project Environmental Report, 2000)*; and

Whereas, the City has conducted a substantive review of the literature and the practices of other cities to determine the most effective ways of managing the traffic and parking demand; and

Whereas, based on that review the City has determined that the most effective tool for managing on-street parking is a program of pricing the on-street public parking at a rate so as to achieve a fifteen percent (15%) vacancy rate in the parking spaces on each block. (*See Shoup, Donald. The High Cost of Free Parking. American Planning Association Planners Press. 2005);* and

Whereas, underpriced on-street parking causes "cruising," which adds to traffic congestion. *Shoup, page 291*; and

Whereas, a vacancy rate of about 15% is necessary to avoid cruising-induced traffic, to facilitate easy ingress and egress, and to offer parking opportunities to as many different people as possible. *Shoup, page 297* ; and

Whereas, California Vehicle Code Section 22508 authorizes cities to establish parking meter zones and to fix the rate of fees for such zones; and

Whereas, parking meter rate ordinances "may … justify a fee system intended and calculated to hasten the departure of parked vehicles in congested areas, as well as to defray the cost of installation and supervision." *DeAryan v. City of San Diego*, 75 CA2d 292, 296 (1946); and

Whereas, such parking meter rate ordinances are for the purpose of regulating traffic and the parking of vehicles in the public streets, not a tax for revenue purposes. *Id* at 293; and

Whereas, receipts from such parking meter rate ordinances "may be used not only in defraying the expenses of installation, operation and control of such parking space and parking meters, but also those incurred in the control of traffic which may affect or be affected by the parking of vehicles in the parking meter zones thus created, including those incurred in connection with painting lines and signs, maintaining mechanical traffic signals and other expenses of regulating traffic and enforcing traffic regulations with respect to all traffic which may affect or be affected by the parking of vehicles in parking meter zones." Id at 296; and

Whereas, using parking meter rates to achieve a vacancy rate of about 15% negates the necessity for time restrictions on the use of parking spaces; and

Whereas, certain formerly unmetered off-street parking facilities must be metered in order to meet the demands of changing patterns of use of Downtown parking; and

Whereas, the parking permit program requires modifications in order to meet the demands of changing patterns of use of Downtown parking.

NOW THEREFORE BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF REDWOOD CITY THAT: [*excerpt*]

Sec. 20.120. PERIODIC ADJUSTMENT OF DOWNTOWN METER ZONE METER RATES:

Under the authority of California Vehicle Code section 22508, the City Council hereby adopts the following process for adjusting Downtown Meter Zone meter rates from time to time to manage the use and occupancy of the parking spaces for the public benefit in all parking areas within the Downtown Meter Zone.

A. To accomplish the goal of managing the supply of parking and to make it reasonably available when and where needed, a target occupancy rate of eighty-five percent (85%) is hereby established.

B. At least annually and not more frequently than quarterly, the Parking Manager shall survey the average occupancy for each parking area in the Downtown Meter Zone that has parking meters. Based on the survey results, the Parking Manager shall adjust the rates up or down in twenty-five cent ($0.25) intervals to seek to achieve the target occupancy rate. The base parking meter rate, and any adjustments to that rate made pursuant to this ordinance, shall become effective upon the programming of the parking meter for that rate. A current schedule of meter rates shall be available at the City Clerk’s office.

C. The hourly meter rate shall not exceed one dollar and fifty cents ($1.50) without the express approval of the City Council.

D. This Section does not apply to the parking facilities described in Section 20.119 of this Division during the “peak hours.”

Sec. 20.121. USE OF DOWNTOWN METER ZONE PARKING METER REVENUES:

Revenues generated from on-street and off-street parking within the Downtown Meter Zone boundaries shall be accounted for separately from other City funds and may be used only for the following purposes:

A. All expenses of administration of the parking program

B. All expenses of installation, operation and control of parking equipment and facilities within or designed to serve the Downtown Core Meter Zone

C. All expenses for the control of traffic (including pedestrian and vehicle safety, comfort and convenience) which may affect or be affected by the parking of vehicles in the Downtown Core Meter Zone, including the enforcement of traffic regulations as to such traffic.

D. Such other expenditures within or for the benefit of the Downtown Core Meter Zone as the City Council may, by resolution, determine to be legal and appropriate.

This ordinance shall take effect on February 1, 2006.

Atty/Ord/Ord.242 Page 2
07/20/05

ORDINANCE CODE
City of
SAN BUENAVENTURA, CALIFORNIA

Chapter 16.225 Parking Pay Stations and Parking Meter Zones*

***Editor's note:** Section 8 of Ord. No. 2009-002, adopted Jan. 12, 2009, repealed and reenacted Ch. 16.225 to read as herein set out. Formerly Ch. 16.225 pertained to parking meter zones, consisted of §§ 16.225.010--16.225.050 and derived from the 1971 Code.

Sec. 16.225.010. Generally.

A. Parking pay station and meter zones are those streets or portions of streets established by ordinance of the City Council as zones within which the parking of vehicles may be controlled, regulated, and inspected with the aid of parking pay stations or parking meters.
B. Parking pay stations and meter zones may be established in areas to manage the supply of parking and to make it reasonably available when and where needed. To accomplish this goal, a target on-street occupancy rate of 85 percent is hereby established for pay station and parking meter zones.
C. The city traffic engineer shall cause parking pay stations or meters to be installed and maintained in all parking pay station and meter zones. The maximum rate shall be set by the City Council. During a fiscal year, the City Transportation Manager may adjust pay station and meter rates up or down 50 cents per hour in twenty-five-cent increments based on average occupancy rates in order to achieve a target occupancy rate of 85 percent. Any increase over 50 cents per hour in a fiscal year shall require City Council approval.
(Ord. No. 2009-002, § 8, 1-12-09)

Sec. 16.225.020. Manner of installation.

A. Parking pay stations and meters shall be installed upon the curb or sidewalk area generally adjacent to the parking spaces controlled by such pay station or meter.
(Ord. No. 2009-002, § 8, 1-12-09)

Sec. 16.225.030. Parking pay stations and meters.

A. *Time of operation.* The provisions of this ordinance relating to the operation of parking pay stations or parking meters shall be effective for posted hours and days as determined by the city traffic engineer.
B. *Operational procedure to be followed.* Immediately after occupancy of a paid parking space, the operator of a vehicle shall deposit a coin or paper currency of the United States or use a credit card or other acceptable form of payment in said parking pay station or meter and follow operational procedures in accordance with the instructions posted on the parking pay station or parking meter.
C. *Unlawful to park after pay station or meter time has expired.* No operator of any vehicle shall permit said vehicle to remain parked in any parking space during any time that the pay station or meter is illegally in use other than such time immediately after the original occupancy as is necessary to operate the pay station or meter to show legal parking.
D. *Unlawful to extend time beyond limit.* No person shall allow a vehicle to be parked for a period beyond the maximum legal parking time limit that has been established for the parking space.

E. *Improper use of pay station or meter.* No person shall deposit, attempt to deposit, or cause to be deposited in any parking pay station or meter any defaced or bent coin, or any slug, device or metallic substitute for a coin of the United States, or deface, injure, tamper with, open or willfully break, destroy or attempt in any manner to impair the usefulness of any parking pay station or meter.

F. *Deposit of payment in pay station or meter by unauthorized person.* No person, other than the owner or operator of a vehicle, shall deposit any acceptable form of payment in any parking meter without the knowledge or consent of said owner or operator of the vehicle using the parking space controlled by said meter or pay station.

G. *Parking pay stations, meters and parking meter standards not to be used for certain purposes.* No person shall attach anything to or allow a bicycle, news rack or any other chapter [article] or thing to lean against a parking pay station, parking meter or parking meter standard.

H. *Special reservation of parking pay station or parking meter spaces.* The city traffic engineer is authorized to issue special permits to reserve pay station or parking meter spaces. A pay station space or parking meter space may be reserved for special events or it may be reserved for activities related to construction or maintenance, thereby allowing parking of commercial vehicles for the performance of work. A daily fee will be charged to the permittee.

(Ord. No. 2009-002, § 8, 1-12-09)

Sec. 16.225.040. Rule of evidence.

The parking or standing of any motor vehicle in a parking space, at which space the parking meter displays the sign or signal indicating illegal parking, shall constitute a prima facie presumption that the vehicle has been parked or allowed to stand in such space for a period longer than permitted by this ordinance.

(Ord. No. 2009-002, § 8, 1-12-09)

Sec. 16.225.050. Use of money deposited in parking pay stations and meters.

All moneys collected from parking pay stations, and meters in this city shall be placed in a special fund, which fund shall be devoted exclusively to purposes within the geographic boundaries of the parking district from which the revenue is collected. Such moneys shall be used for the purposes stated in the parking district establishment ordinance.

(Ord. No. 2009-002, § 8, 1-12-09)

Sec. 16.225.060. Application of other chapters.

No section of this chapter shall be construed as permitting any parking in violation of any other provision of this ordinance [Ord. No. 2009-002].

(Ord. No. 2009-002, § 8, 1-12-09)

Ordinance No. 122852

Council Bill No. 116367

AN ORDINANCE related to parking rates; amending Sections 11.16.120 and 11.16.121 of the Seattle Municipal Code and amending Ordinance 121330 to set a new limit on parking rates at parking payment devices.

CF No. ______

Date Introduced: 10.13.08	
Date 1st Referred:	To: (committee) Budget
Date Re - Referred:	To: (committee)
Date Re - Referred:	To: (committee)
Date of Final Passage: 11-24-08	Full Council Vote: 8-1
Date Presented to Mayor: 1-25-08	Date Approved: 12.2.08
Date Returned to City Clerk: 12.4.08	Date Published: 4 — T.O. ___ F.T. ✓
Date Vetoed by Mayor:	Date Veto Published:
Date Passed Over Veto:	Veto Sustained:

The City of Seattle - Legislative Department

Council Bill/Ordinance sponsored by: [signature]
Councilmember

Committee Action:

11-17-08 Pass As Amended 8-1 (No: Drago)

11-24-08 Passed ~~9-0~~ 8-1 (No: Drago)

This file is complete and ready for presentation to Full Council. Committee: ______ (initial/date)

Law Department

Law Dept. Review	OMP Review	City Clerk Review	Electronic Copy Loaded	Indexed

City of Seattle

Gregory J. Nickels, Mayor

Office of the Mayor

September 29, 2008

Honorable Richard Conlin
President
Seattle City Council
City Hall, 2nd Floor

Dear Council President Conlin:

I am transmitting the attached proposed Council Bill that will increase the maximum paid parking rate from $1.50 per hour to $2.00 per hour. The Bill also corrects a technical error and clarifies the Director of Transportation's continued authority to set rates for parking payment devices. If passed, the Seattle Department of Transportation (SDOT) intends to increase Seattle's paid parking rate by $0.50 per hour in most areas, consistent with the City's parking management, economic development and transportation goals. The proposed rate increase is the first in four years, with the previous increase having occurred ten years prior to that.

Most of Seattle's on-street paid parking is set at $1.50 per hour, which is the current maximum rate allowed by ordinance. Effective January 1, 2009, this Bill would allow SDOT to increase the paid parking rate to $2.00 per hour in the downtown Central Business District, Uptown/Lower Queen Anne, Broadway, First Hill, Pike-Pine, U-District and Ballard. Paid parking in the South Lake Union would increase by $0.50, resulting in $1.75 per hour for two-hour parking, and $1.25 per hour for 10-hour parking. Two-hour parking in Roosevelt, Green Lake, 12th Avenue/Seattle University, and around Providence Hospital would be reduced to $1.00 per hour. Paid parking in Westlake Ave North would go from $0.75 to $1.25 per hour.

The changes set forth in this Bill would establish a three-tiered system that would help ensure that parking rates are set according to localized parking demand, land use, and transportation conditions. The proposed rate changes would encourage adequate turnover and reduce congestion caused by drivers seeking lower cost on-street parking compared to the much higher rates often charged for off-street parking.

Increasing the rate limit for on-street parking will help support Seattle's economic vitality and environment. Thank you for your consideration of this legislation. Should you have questions, please contact Mary Catherine Snyder at 684-8110.

Sincerely,

GREG NICKELS
Mayor of Seattle

600 Fourth Avenue, 7th Floor, P.O. Box 94749, Seattle, WA 98124-4749
Tel: (206) 684-4000, TDD: (206) 684-8811 Fax: (206) 684-5360, E:mail: mayors.office@seattle.gov

Mary Catherine Snyder/MCS & Dan Eder/DE
SDOT Paid Parking ORD
November 18, 2008
Version # 5

ORDINANCE 122852

AN ORDINANCE related to parking rates; amending Sections 11.16.120 and 11.16.121 of the Seattle Municipal Code and amending Ordinance 121330 to set a new limit on parking rates at parking payment devices.

WHEREAS, the City's Comprehensive Plan recognizes the importance of paid on-street parking to encourage parking turnover, customer access, and efficient allocation of parking among a diverse group of users; and

WHEREAS, in 2004, the Seattle Department of Transportation (SDOT) began to replace single-space parking meters with parking pay stations to provide improved parking management, revenue benefits, and customer service and streetscape enhancements; and,

WHEREAS, by mid-2008, SDOT had installed approximately 1,850 pay stations and controlled about 13,500 paid parking spaces; and

WHEREAS, Seattle's paid parking pay stations provide convenient payment options for the public, allowing payment to be made by cash, credit card, or debit card; and

WHEREAS, the Seattle Department of Transportation has started implementing a "performance-based pricing" parking management system in certain areas that includes regular monitoring of parking space utilization and potential adjustments of hourly parking rates or time-limits to achieve desired parking occupancy and other policy goals; and

WHEREAS, studies by the Seattle Department of Transportation show that on-street parking in many parts of the city with paid parking is full most of the day and, as such, does not provide appropriate access for customers and visitors to downtown and other neighborhood business districts; and

WHEREAS, Section 11.16.120 of the Seattle Municipal Code was amended in 2003 to allow the Director of Transportation to set parking rates within certain limits and, in 2004, Ordinance 121388 made technical changes to the definition of parking payment devices, but did not intend to alter the authority of the Director to set rates; and

WHEREAS, it is appropriate to clarify the Director's continued authority to set rates to be charged at parking payment devices and change the limits on that authority; **NOW, THEREFORE,**

BE IT ORDAINED BY THE CITY OF SEATTLE AS FOLLOWS:

Section 1. Subsection C of Seattle Municipal Code Section 11.16.120 is amended as follows:

11.16.120 Director of Transportation -- Authority

The Director of Transportation is authorized:

***

C. To ((~~make recommendations to the City Council for~~)) establish parking ((~~[meter]~~)) rates to be charged at parking payment devices, including parking meters, for parking in city-controlled parking areas under <u>the</u> ((~~this~~))jurisdiction of <u>the</u> Seattle <u>Department of</u> Transportation and other city rights-of-way, consistent with Section 11.16.121 ((~~, within parking meter zones~~)) and to make recommendations to the City Council for fees for permits issued pursuant to this subtitle;

***

Section 2. Effective January 1, 2009, Seattle Municipal Code Section 11.16.121 is amended as follows:

11.16.121 Director of Transportation -- Rate setting for parking payment devices.

A. Parking rates to be charged at parking payment devices, including parking meters, for parking in city rights-of-way and other city-controlled parking areas under the jurisdiction of the Seattle Department of Transportation shall be within rate limits established by <u>this section</u>

((~~ordinance~~)). Rates may vary according to location, time of day, maximum parking time allowed, the capabilities of available parking payment devices, and any other factors the Director determines are pertinent. In setting rates, the Director is not subject to Chapter 3.02 of the Seattle Municipal Code.

B. The Director of Transportation is authorized to set parking rates up to $2.50 per hour.

C. In establishing parking rates, the Director shall consider the following objectives:

1. To maintain adequate turnover of on-street parking spaces and reduce incidents of meter feeding in commercial districts;

2. To encourage an adequate amount of on-street parking availability for a variety of parking users, efficient use of off-street parking facilities, and enhanced use of transit and other transportation alternatives; and,

3. To reduce congestion in travel lanes caused by drivers seeking on-street parking.

Section 3. Effective January 1, 2009, Section 3 of Ordinance 121330 is repealed as follows:

((~~Section 3. The Director of Seattle Transportation is authorized to set parking rates, pursuant to Seattle Municipal Code Sections 11.16.120 and 11.16.121, up to the following limits, starting January 1, 2004:~~

Mary Catherine Snyder/MCS & Dan Eder/DE
SDOT Paid Parking ORD
November 18, 2008
Version # 5

~~a. Short term parking spaces with time limits of 30 minutes or less and Commercial Vehicle Load Zones: $2.00 per hour per parking space;~~

~~b. All other parking spaces: $1.50 per hour per parking space.~~))

Section 4. This ordinance shall take effect and be in force thirty (30) days from and after its approval by the Mayor, but if not approved and returned by the Mayor within ten (10) days after presentation, it shall take effect as provided by Municipal Code Section 1.04.020.

Passed by the City Council the 24th day of November 2008, and signed by me in open session in authentication of its passage this 24th day of November, 2008.

President ________of the City Council

Approved by me this 2nd day of December, 2008.

Gregory J. Nickels, Mayor

Filed by me this 4th day of December, 2008.

City Clerk

(Seal)

Form Last Revised on December 16, 2006 4

State of Washington, King County

City of Seattle

ORDINANCE 122852

AN ORDINANCE related to parking rates; amending Sections 11.16.120 and 11.16.121 of the Seattle Municipal Code and amending Ordinance 121330 to set a new limit on parking rates at parking payment devices.

WHEREAS, the City's Comprehensive Plan recognizes the importance of paid on-street parking to encourage parking turnover, customer access, and efficient allocation of parking among a diverse group of users; and

WHEREAS, in 2004, the Seattle Department of Transportation (SDOT) began to replace single-space parking meters with parking pay stations to provide improved parking management, revenue benefits, and customer service and streetscape enhancements; and,

WHEREAS, by mid-2008, SDOT had installed approximately 1,850 pay stations and controlled about 13,500 paid parking spaces; and

WHEREAS, Seattle's paid parking pay stations provide convenient payment options for the public, allowing payment to be made by cash, credit card, or debit card; and

WHEREAS, the Seattle Department of Transportation has started implementing a "performance-based pricing" parking management system in certain areas that includes regular monitoring of parking space utilization and potential adjustments of hourly parking rates or time-limits to achieve desired parking occupancy and other policy goals; and

WHEREAS, studies by the Seattle Department of Transportation show that on-street parking in many parts of the city with paid parking is full most of the day and, as such, does not provide appropriate access for customers and visitors to downtown and other neighborhood business districts; and

WHEREAS, Section 11.16.120 of the Seattle Municipal Code was amended in 2003 to allow the Director of Transportation to set parking rates within certain limits and, in 2004, Ordinance 121388 made technical changes to the definition of parking payment devices, but did not intend to alter the authority of the Director to set rates; and

WHEREAS, it is appropriate to clarify the Director's continued authority to set rates to be charged at parking payment devices and change the limits on that authority; **NOW, THEREFORE,**

BE IT ORDAINED BY THE CITY OF SEATTLE AS FOLLOWS:

Section 1. Subsection C of Seattle Municipal Code Section 11.16.120 is amended as follows:

11.16.120 Director of Transportation -- Authority

The Director of Transportation is authorized:

***

C. To ((~~make recommendations to the City Council for~~)) establish parking ((~~[meter]~~)) rates to be charged at parking payment devices, including parking meters, for parking in city-controlled parking areas under the ((~~this~~))jurisdiction of the Seattle Department of Transportation and other city rights-of-way, consistent with Section 11.16.121 ((~~; within parking meter zones~~)) and to make recommendations to the City Council for fees for permits issued pursuant to this subtitle;

***

Section 2. Effective January 1, 2009, Seattle Municipal Code Section 11.16.121 is amended as follows:

11.16.121 Director of Transportation -- Rate setting for parking payment devices.

A. Parking rates to be charged at parking payment devices, including parking meters, for parking in city rights-of-way and other city-controlled parking areas under the jurisdiction of the Seattle Department of Transportation shall be within rate limits established by this section((~~ordinance~~)). Rates may vary according to location, time of day, maximum parking time allowed, the capabilities of available parking payment devices, and any other factors the Director determines are pertinent. In setting rates, the Director is not subject to Chapter 3.02 of the Seattle Municipal Code.

B. The Director of Transportation is authorized to set parking rates up to $2.50 per hour.

C. In establishing parking rates, the Director shall consider the following objectives:

1. To maintain adequate turnover of on-street parking spaces and reduce incidents of meter feeding in commercial districts;

2. To encourage an adequate amount of on-street parking availability for a variety of parking users, efficient use of off-street parking facilities, and enhanced use of transit and other transportation alternatives; and,

3. To reduce congestion in travel lanes caused by drivers seeking on-street parking.

Section 3. Effective January 1, 2009, Section 3 of Ordinance 121330 is repealed as follows:

((~~Section 3. The Director of Seattle Transportation is authorized to set parking rates, pursuant to Seattle Municipal Code Sections 11.16.120 and 11.16.121, up to the following limits, starting January 1, 2004:~~

~~a. Short-term parking spaces with time limits of 30 minutes or less and Commercial Vehicle Load Zones: $2.00 per hour per parking space;~~

~~b. All other parking spaces: $1.50 per hour per parking space.~~))

Section 4. This ordinance shall take effect and be in force thirty (30) days from and after its approval by the Mayor, but if not approved and returned by the Mayor within ten (10) days after presentation, it shall take effect as provided by Municipal Code Section 1.04.020.

Passed by the City Council the 24th day of November, 2008, and signed by me in open session in authentication of its passage this 24th day of November, 2008.

Richard Conlin

President of the City Council

Approved by me this 2nd day of December, 2008.

Gregory J. Nickels, Mayor

Filed by me this 4th day of December, 2008.

(Seal) Judith Pippin; City Clerk

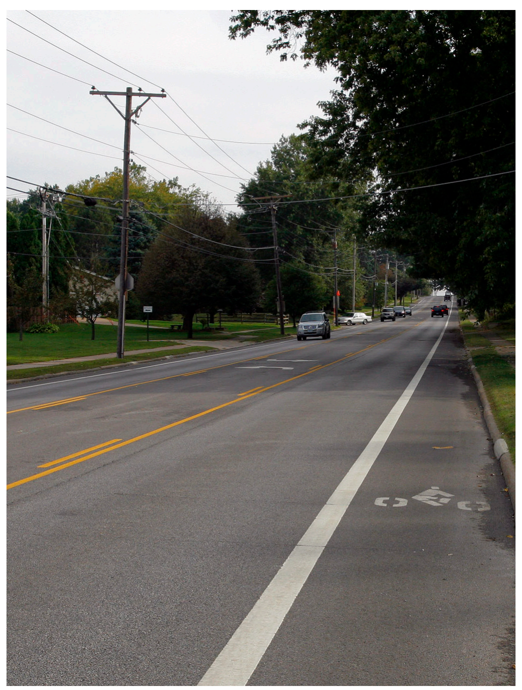
Publication ordered by JUDITH PIPPIN, City Clerk

Date of publication in the Seattle Daily Journal of Commerce, December 11, 2008.

12/11(232344)

Davenport In Motion

BUILDING A 21st CENTURY TRANSPORTATION SYSTEM



CHAPTER 7: STREET DESIGN GUIDE

Davenport IN MOTION

OVERVIEW AND TABLE OF CONTENTS

This Street Design Guide (SDG) is intended to broaden the range of design options for streets in Davenport, recognizing that streets and public rights-of-way comprise a significant portion of the city's area and as such must maximize the public benefit they offer.

Why this guide?

As in other cities, Davenport's streets have always served multiple functions. Early in the twentieth century, they were the primary component of transportation infrastructure, allowing people and goods arriving by rail or riverboat to reach local destinations throughout the city. This led to a variety of street users, and accordingly led to a variety of problems for safety and circulation in the streets. As vehicle ownership and use increased dramatically in the decades that followed, the city had to accommodate the trend within the space for streets that had already been established.

Over time, street design focused primarily on motor vehicle movement, and the emerging discipline of traffic engineering worked to safely integrate cars and trucks into pre–existing urban forms. While there were clear benefits to accommodating automobile movement through the city, the negative effects have become increasingly evident over the last forty years. The focus on automobiles has resulted in a different form of land development patterns, namely emphasizing vehicle access (and not person access) to buildings and property, and has come at the expense of other uses of the street and other transportation choices.

The intent of this guide is to allow Davenport to choose a different direction for its future and recreate a system of streets that balance mobility needs with the community-serving functions that streets have traditionally had.

Davenport In Motion

SECTION 1 BASICS OF THE STREET DESIGN GUIDE

Livable Streets

Streets have come to represent different things throughout the history of cities, and these changes in purpose and meaning have occurred especially rapidly since the beginning of the twentieth century. Streets have always been a means of conveyance, or moving people and goods. They have historically provided a place for social interaction as well, whether for purposes of commerce, neighborly interaction, or leisure.

This richness and complexity of purpose was lost, or at least greatly compromised, after the rise in prominence of the automobile as a form of personal transportation. As driving became the predominant means of commuting, public pressure to accommodate the cars grew. Historic streets, with right-of-way boundaries long defined and relatively unable to expand, were used more and more to move automobile traffic, resulting in less and less space for pedestrians and landscape. This trend toward vehicle accommodation only increased as the twentieth century progressed, with the patterns of traffic flow within the vehicle space of the street right-of-way designated in such a way to increase efficiency of traffic flow

As the twenty-first century has begun, city dwellers have different expectations. Many of the major cities of the United States that suffered from ongoing (and even worsening) traffic congestion, even as they followed ambitious programs of roadway construction and expansion, have begun to see that while vehicle-oriented roads move traffic they often do not help to improve quality of life. This change in thought is not unprecedented or coincidental, either: a renewed interest in urban living at the end of the twentieth century inspired many cities to direct public resources toward improvements to the public realm, of which streets are a major component. By making the basic infrastructural components of the city more responsive to demands for a higher quality of life, cities sought to serve their residents as well as to position themselves for economic prosperity in an increasingly service- and knowledge-based national economy.

The purpose of this guide is to help Davenport in returning to a more balanced approach to streets. As the City seeks to improve quality of life and maximize its opportunities for economic development and prosperity, it will inevitably seek ways to expand what its public infrastructure can offer residents and businesses. This requires using a significant portion of the City that is in dedicated public right-of-way as something that addresses the City's many needs beyond simply moving vehicles.

Taking functional classification further: Balancing user needs

The Federal Highway Administration's (FHWA) definition of functional classification of streets is based on a series of street types serving particular functions. It rests on an underlying recognition that travel, in general or for a particular trip, will not use only one of these types but rather a combination of them. The FHWA Functional Classification Guidelines state that "functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide. Basic to this process is the recognition that individual roads and streets do not serve travel independently in any major way. Rather, most travel involves movement through a network of roads." As such, it is important that each road be understood in terms of what role it serves in this transportation need: whether it is a larger street based on moving larger volumes of traffic long distances, or a more local street that provides property access. To that end, this Street Design Guide uses the FHWA terminology of arterials, collectors, and local streets to describe street types that emphasize mobility, emphasize access, or combine the functions of the two.

However, the guidance provided in this document is based on making street design decisions to best respond to multiple users. This suggests that the traffic- and vehicle-oriented concerns of the conventional functional classification typology can be augmented with other needs to equip the street designer to create livable streets. The reason the guide exists is to provide a basis in thinking for making these decisions appropriately, not simply prescribing sets of dimensions and standards that are expected to apply universally. Emerging thought in street and road design in the last two decades has greatly emphasized *flexibility* as a key to meeting needs while minimizing impact, a concept explored in publications by both FHWA (*Flexibility in Highway Design*) and by AASHTO, the American Association of State Highway and Transportation Officials (*A Guide for Achieving Flexibility in Highway Design*). With this in mind, the Street Design Guide uses functional classification as a basis for street type definition, but introduces a set of *design factors* that help the designer better understand the needs of the street, explained in the following section.

Street Design Factors

The premise of each street cross-section presented in this guide is a balance of three principal design factors, or dimensions of the street that should be responded to in a particular way. Each cross-section's page will explain how this balance should be met, emphasizing the design factor that takes highest priority for that type of street. One should bear in mind that this is intended to be a balance and not a ranking, meaning that all factors must be understood and considered, but in keeping with a system of functional classification it follows that some streets will be more focused on one kind of transportation role. The three principal factors in street design on which this guide focuses are: livability, access/mobility, and safety. Each of these is described in more detail on page 6.

Designing for context

A major compliment to the emerging thought on livable street design is the notion of giving attention to street context, suggesting that it is not only the needs within the right-of-way that shape a street's design but also the needs of the surrounding environment, built or natural. Basic examples of this idea in practice are widely familiar and recognizable: small-town main streets often feature on-street parking so that commercial businesses have a way of accommodating driving customers; city downtown streets feature wide sidewalks to accommodate the many pedestrians making short trips on foot from one destination to another.

For purposes of this Street Design Guide, the three design factors help the designer to develop a typical cross section, but notes on the context and its associated needs help the designer to apply the typical section over an entire corridor. To be sure, needs change from one area of a corridor to another, and the street design should be sufficiently flexible to accommodate them. This includes such considerations as the need for driveway access and how this is coordinated with the placement of medians, the need for on-street parking around more neighborhood-based land uses and when and how to apply transitions involving different numbers of travel lanes.

This guide is intended to be used for any street design efforts in the City of Davenport, whether they are new streets or existing streets being altered or maintained. It is understandable that new street design offers greater freedom, and as such these guidelines should be followed with an understanding of their underlying principles. Based on context and user needs, lane widths, curb radii and other design elements for the cross-section should be selected appropriately. Residential streets do not typically require wide travel lanes, and indeed the higher travel speeds and limitations to driver focus on the surrounding environment that wide lanes tend to cause ate directly in conflict with the contextual nature of residential areas.

The Benefits of Road Diets

At the same time that the document is to be used for new street design, it also provides direction on how to retrofit or modify existing streets to better fit their environments. The concept of road diets represents a particular approach to achieving livable street design objectives, and it focuses on existing infrastructure. The road diet as a planning technique emerged in the 1990s in tandem with a renewed interest in urban living and the consequent focus on making urban infrastructure more responsive to quality-of-life concerns. The phrase itself suggests the idea that some roads carry more 'weight,' or vehicular capacity, than they need to be functional and healthy. The practice of road diets has followed a course of improving vehicular safety and converting unnecessary vehicle space in a fixed right-of-way to space serving other users of the street, such as parking vehicles, bicyclists, and pedestrians.

This change in thinking is rooted in an objective to provide high-quality, livable urban environments, yet there is more benefit to road diets, even from a vehicular perspective. Road and street context are critical factors in making design decisions, not simply because they define the design constraints, but also because they define motorist expectations. In urban areas, motorists have different expectations than in suburban or rural areas. Because of a network of blocks and streets with greater development densities, they understand that there is a need for more frequent turns, that vehicles parking on streets may momentarily slow traffic, and that there is likely to be more traffic in general. In suburban and rural areas, by contrast, lower densities and greater intersection spacing suggest to motorists that there are fewer impediments to freedom of traffic movement; as a result, these motorists are likely to tolerate less congestion and delay.

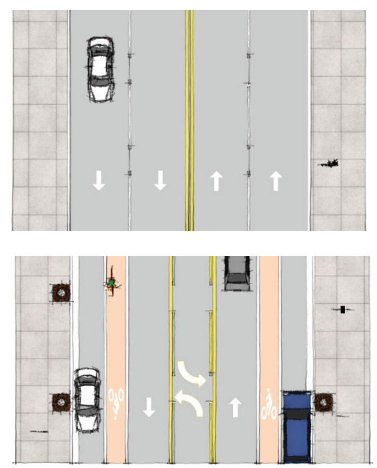
With such an understanding in mind, the design of the street cross-section does not need to be focused on maximizing vehicular capacity if there is not the needed traffic volume to be accommodated. In fact, road diets present multiple functional benefits when they tailor a street's capacity to its need, as presented in the following sections. Given Davenport's existing infrastructure inventory, road diets will typically be a conversion of four-lane undivided sections (i.e. four lanes with no median between the two directions of travel) to three lane sections (one travel lane in each direction with either a two-way left turn lane or a similar amount of space to provide left turn storage lanes as needed).

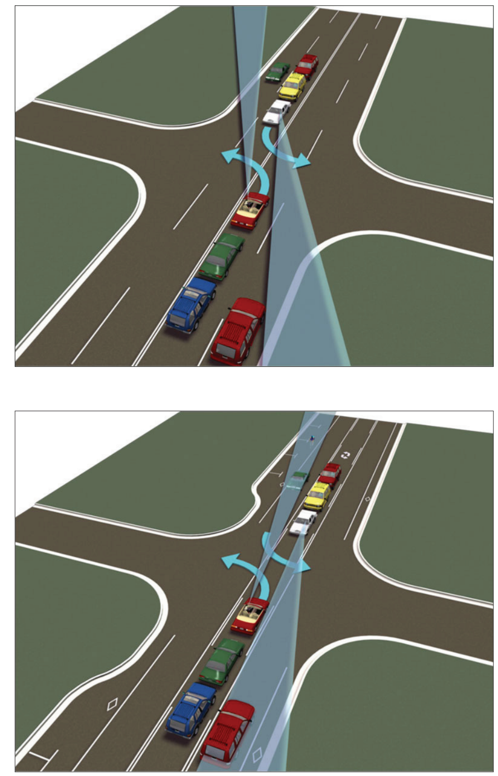
As illustrated in the diagrams to the right, road diets seek to convert the space freed from the removal of one travel lane for other street functions that can benefit quality of life, such as on-street bicycle lanes and on-street parking. The example shown here demonstrates such an arrangement, reducing pre-existing lane widths to fit both on-street bicycle lanes and parking.

Studies suggest that there is actually an increase in roadway capacity, under certain conditions, when four-lane sections are converted to three-lane sections. This is primarily due to the advent of the two-way left turn lane and its ability to preserve flow in the two travel lanes. Four-lane undivided sections are prone to erratic movements when a left-turning vehicle must wait in the inner lane, thus blocking that lane's throughput while the motorists waits for a gap in oncoming traffic to turn, and drivers behind this first motorist rapidly shift into the outer turn lane to continue through. Two-way left turn lanes manage this expectation for through movement, clearly separating through movements from turning movements.

They also provide a clear safety benefit: not only from the reduced tendency for waiting motorists to 'jump' in front of moving vehicles in an adjacent through lane, but also in that they allow turning motorists to see all oncoming traffic. Four lane sections often preclude a turning motorists from clearly seeing both oncoming travel lanes, especially when he or she is attempting to see behind other queued turning vehicles in the oncoming direction.

Section 4.3 (on page 54) provides more detailed guidance on implementing 4-to-3-lane road diets.





In addition to what they restore to the public realm, four-lane to three-lane road diets also present a significant safety benefit: they increase visibility to all oncoming traffic. In a four-lane section (upper image), left-turning vehicles can see oncoming traffic in the immediately adjacent lane, but vehicles queued in that lane may impede the first motorist's view of the outside oncoming lane. In a three lane section (lower image), queuing left turn vehicles are directly offset, affording them a view of all oncoming traffic.

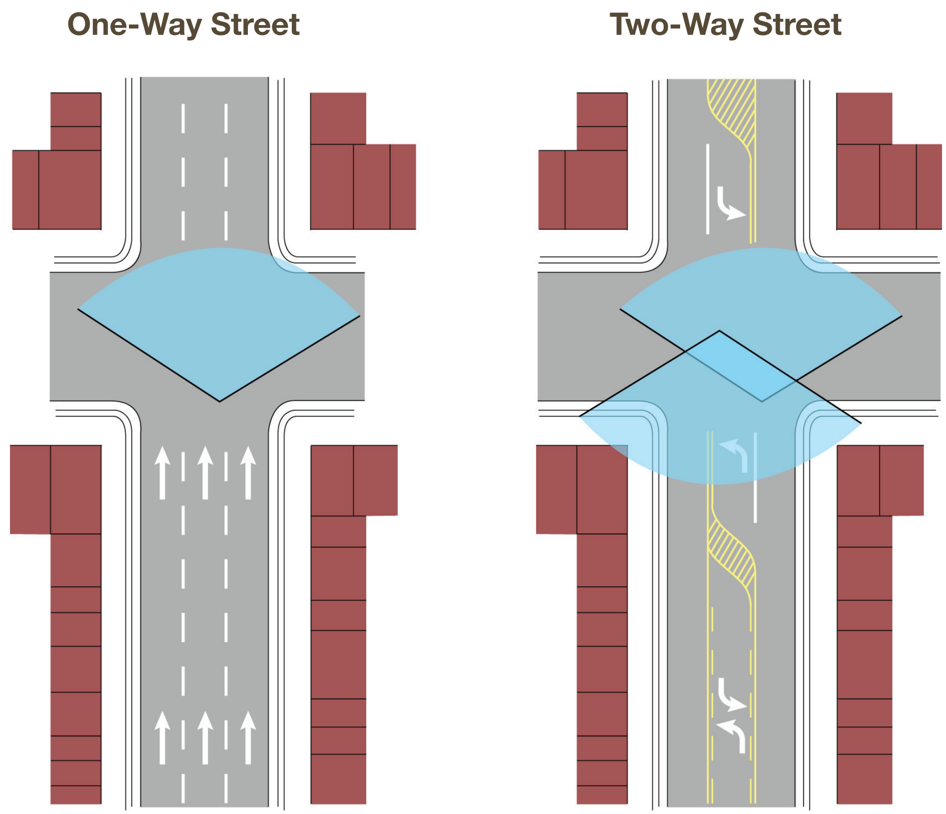
One-Way to Two-Way Conversions

Where road diets are an approach to reconfiguring space in the street in cases of excess vehicle capacity, converting vehicular flow of one-way streets to two-way operations is another method of designing streets to be more livable. In the past, streets were typically designed for two-way flow and converted to one-way to increase efficiency of movement. This came from a perceived need to move motorists quickly in and out of downtowns, giving centers of employment and business easy access to growing urban areas where automobiles were an increasingly dominant mode of transport. And while it is true that a pair of one-way streets does have a slightly greater vehicle-moving capacity than two-way streets, this approach is based on maximizing capacity when it is needed most: the peak travel periods. For the remainder of the day, when the need to move large traffic volumes is not as urgent, one-way streets continue with one-way flow and only allow one direction of visibility, as illustrated in the diagrams to the right.

There are several reasons why one-way streets compromise livability of urban street systems (and thus the urban environments in which they are located). The first of these is how they alter the existing street network to make it less intuitive to visitors. One-way systems often prohibit a visitor from following the most direct or simple path to reach a destination, instead requiring a series of turns and additional distance that adds time and delay to a trip.

Studies have also shown that one-way streets are less conducive to successful business corridors, largely because they limit visibility to a single direction and at a given time of day offer less exposure to businesses. Since one of the primary reasons that (historically two-way) streets were converted to one-way operations was the need to gain additional traffic capacity, many of these one-way streets move the bulk of their traffic in one peak hour or the other, but not both. On such streets, the limitation of business exposure to passing motorists is especially limiting to business potential.

From the perspective of safety, there are other reasons that these conversions are desirable. They help to match speeds to those appropriate for urban areas. One-way streets tend to carry traffic at higher speeds, largely because they facilitate coordination of traffic signals to allow continuous flow and because motorists do not face oncoming traffic.. As the diagrams on the following page demonstrate, this presents safety challenges and increased risk of conflict for pedestrians.



One-way streets allow only one principal direction of visibility for motorists on a street (left), meaning that businesses will not be seen from an opposite direction as they would on two-way streets (right). While one-way streets are designed to have higher vehicle-carrying capacity, meaning that more vehicles in one direction may be able to observe businesses along a corridor, these vehicles will not be able to use this street for return trips, meaning that as many as half of the actual visibility opportunities are lost.

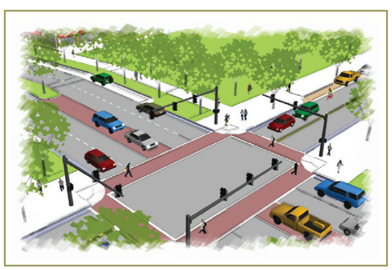
Consider that most one-way streets, including those in Davenport, were converted from two-way operations to allow for higher-capacity traffic corridors. They tend to move commuting traffic into and out of downtowns. Businesses located on these streets may only be seen once during the day by commuting traffic. This is a particularly noteworthy dynamic given that many retail businesses tend not to be open during morning peak commute times.

1.2 STREET DESIGN PRINCIPLES APPLIED

STREET DESIGN FACTORS

LIVABILITY Even though this design factor is the central theme of the Street Design Guide, it has particular implications for function and street design components. Livability suggests that the most extensive array of users are being served: motorists, pedestrians, bicyclists and the auxiliary needs of land uses that may extend into the street right-of-way. This points to street design, choosing dimensions that allow a balance of these different uses to be had, but it also points to aesthetics and furnishings that help to make the street meaningful public space.

ACCESS/MOBILITY As stated previously, the FHWA functional classification typology is based on defining different streets with respect to their general function in the transportation system. This remains important for the street types defined in this guide, and each of the cross-sections should be designed with an understanding of the access and mobility needs. It is important to note that designing for mobility does not necessarily mean designing for high speeds: vehicle travel speeds need to be appropriate to the needs of all users, and a mobility-focused street does not have to mean that the other two design factors are removed from the designer's thinking.



SAFETY Safety should always be a concern that drives design decisions, but some streets in particular feature adjacent uses or have a certain user needs that requires a special accommodation of safety. Schools, hospitals, churches and other community-oriented land uses that generate pedestrian traffic, especially among pedestrians who may not be entirely focused on vehicular travel on the street, often require special treatments or even a cross-section design that emphasizes narrower lanes and elements that cue motorists to move more slowly. Safety is usually a more pronounced concern at intersections, where crossings and conflicts (both among and between vehicles and pedestrians) are more concentrated.

BALANCING THE FACTORS

Each of the cross-sections featured in this guide for non-specific, city-wide application (refer to Chapter 3 of the guide) begins with a description of how the three factors are balanced and which of the three should take priority in guiding design decisions based on its land use context.

This is not to suggest that this is the only factor that should be considered in street design, but it does emphasize this one factor as the reason a given type of street is distinct from others (and therefore why a variety of cross-sections is necessary to respond to the complex land use environments in Davenport). Street designers should always consider that a street that fully serves an urban area represents a balance of these three factors.

GENERAL DESIGN PARAMETERS OF THE STREET DESIGN GUIDE

The following are basic principles used consistently in the cross sections presented on the following pages:

1. Street dimensions are given from face of curb to face of curb.
2. Curb-and-gutter sections are illustrated with 6-inch curb widths and 18-inch gutter widths, though it is not the intent of this Street Design Guide to replace the City's existing design standards for curbs. If a vertical curb without gutter pan is used instead of a curb and gutter, the overall width of a cross section may be adjusted accordingly.
3. The width of any on-street parking areas includes through to the face of curb to avoid confusion between those parts of the section in the street and those parts outside of it. This is likely only to be relevant when curb-and-gutter drainage is used. In header curb sections, the parking area will be composed of the roadway surface material.
4. For all typologies the minimum pedestrian zone dimensions vary, as illustrated in the diagrams to the right. Safety is the underlying design principle in all cases.

FLEXIBILITY OF RECOMMENDATIONS

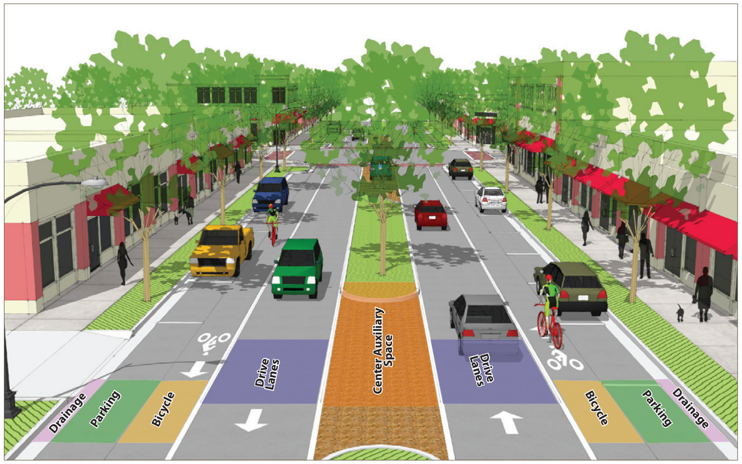
In addition, in applying the recommendations in this guide to actual street design, the street section typologies of the SDG are presented in the context of the following general provisions.

1. Some typologies will require internal discussion within the city for example, coordination with their fire service and parks requirements.
2. Private alleys can be an option to minimize access to boulevard streets; these have not been addressed here as they are generally identified, located and designed through the development application process.
3. Dimensions, number of lanes, medians, speeds etc. shown are "Typical" or "General" and may vary once project specific conditions are determined.

THE CARTWAY

The principal part of the street for vehicles is the cartway, generally consisting of all of the space between the curb lines of the street. It is composed of up to five main elements: the drive lanes, the center auxiliary space, bicycle space, parking and drainage. Not all of these will be used, depending on the function of the street, the needs of the surrounding community and available width. They are all presented here to distinguish the particular role that each plays and to point out primary concerns that a street designer should keep in mind.

1. **Drive lanes** are the primary area for vehicle traffic circulation and refer to the lanes for through movement. Their design should incorporate a consideration of the primary vehicles that will be using a street: if this is larger vehicles, the dimensions of these lanes need to reflect that vehicle type. If the primary user of the street is passenger automobiles, the dimensions of these lanes can be narrowed to allow other components of the cartway and the street in general to serve a greater range of functions.
2. **Center auxiliary space** is the medians separating drive lanes or left-turn lanes



Cartway

*This is an illustrative legend to explain how the cartway is broken down: the colors do **NOT** indicate color-based surface treatments.*

Drainage
Parking
Bicycle Space
Drive Lanes
Center Auxiliary Space

that would allow storage for turning vehicles in place of the median. The general principle used in this guide is that either a median or a turn lane will constitute this space, if it is used, but not both.

3. **Bicycle space** refers to any separate bicycle lanes or area of the cartway where bicycles typically circulate. This is an important element of the street to understand, as not every street will have bicycle lanes.
4. **Parking** is provided for cars to be parked on street. This space is not always provided, but is common in urban areas where direct access to businesses is desirable or where private properties do not provide substantial space for off-street parking.
5. **Drainage** refers to the space immediately against the curb. The curb width itself is elevated above the cartway and makes up part of the sidewalk. Davenport's current engineering standards call for three different curb types, two of which employ a gutter pan where drainage inlets are placed. When straight curb sections are used, as in downtown Davenport, these inlets are placed directly in the parking area or a travel lane. Drainage space should be accounted as a particular dimension because of the implications of its overlap with moving vehicles in drive lanes. This space can overlap with parking, but should not overlap with drive lane space.

THE PEDESTRIAN ZONE

Throughout the Davenport in Motion Plan, emphasis has been made on the importance of a strong pedestrian realm. With this it is important to understand basic fundamentals of the streetside area, or pedestrian zone, and where each is critical to a well-designed street.

1. The **curbside zone** is the portion of the street cross section that accommodates street trees, light posts and, as needed, other utility structures and facilities. In general, a minimum of 1.5 feet of this zone should be reserved for horizontal clearance from the back of curb. Widths should be provided so that pedestrians are also not immediately in contact with tree trunks and other vertical elements, especially when constrained widths mean that walk zones (see next numbered item in this list) may be narrow. Trees should generally be planted in the center of this zone's width.
2. The **walk zone** is the primary passing and circulating area for pedestrians. Widths are suggested in specific cross sections, with particular regard to surrounding land use context and the needs that that land use may suggest for pedestrian activity.
3. The **frontage zone** is useful as a buffer from buildings in more densely developed urban areas, though should be considered part of the right-of-way. In the case of land development regulations where setback are required to accomplish this same function, the frontage zone may be assumed to be part of the walk zone. It should be noted that landscaping against the right of way may impede the true width of the walk zone; if a frontage zone is not to be used landscaping standards for private development should seek to address any encroachment into the sidewalk area.

Pedestrian Zone

*This is an illustrative legend to explain how the pedestrian zone is broken down: the colors do **NOT** indicate color-based surface treatments.*

- Curbside Zone
- Walk Zone

1.4 ACCOMMODATING TRANSIT

The SDG street typologies are ready-made for bus transit, providing for optimum operations without special rights-of-way or unique street design considerations. Certainly there must be careful consideration in the placements of bus stops by optimizing rider convenience and considering vehicular, pedestrian and bicycle traffic along the boulevard and at major intersections.

Depending on the boulevard street typology, bus operations are likely to retain operational right-of-way within the boulevard as it stops to unload and load passengers. Where bike lanes separate the outside travel lane from the curb (top diagram), buses will stop within the outside travel lane and bike lane, and cyclists and motorists will either yield to the stopped bus or swing around the stopped bus (on multi-lane boulevards). For those selective typologies with on-street parking, special curb extensions can be placed at major bus stops to extend the pedestrian access to the bus stopped in the outside lane.

In general, special bus pull-out lanes are not recommended here as they are both expensive (additional right-of-way costs) and inefficient for bus operations. Buses experience greater difficulty and delay re-entering traffic when required to use pull-outs.

Instead, the recommended design uses curb extensions (bulbouts) at intersections (bottom diagram). These should extend far enough along the street to move a bus sufficiently away from the intersection (as not to block cross-street traffic) and to hold a bus stop or shelter location. Use of this option has two main benefits for pedestrians: it allows a shelter or queuing area for bus passengers to be moved out of the walking area of the sidewalk, and the curb extension at the street intersection narrows the street width that pedestrians must cross (thus reducing the likelihood of vehicle conflict).

Placement of stops on the far side of the intersection is also recommended so that street and intersection design can be consistent throughout the city. Far-side stops have the advantage of allowing a bus to be moved out of the intersection, so that turning movements behind them can continue to occur and the intersection approach is not entirely blocked by an idling bus. It also minimizes operational delay for the buses themselves in that it allows a bus accelerating after making a stop to continue moving and not have to wait through a signal cycle.

The street-side pedestrian space and features contained in the SDG typologies provide sufficient space to appropriately accommodate the minimum dimensions required for bus stops and their amenities.

BUS TRANSIT ILLUSTRATIONS. *The street typologies in the SDG reflect the needs of transit vehicles for efficient operations.*

Bus stop with bike lanes.

Bus stop with curb extension and on-street parking.

1.5 GUIDANCE ON TRAFFIC CALMING

Traffic calming programs are being used to re-create safe, slow neighborhood and commercial streets without limiting mobility. These have emerged as important complements to urban transportation systems in that they address driver behavior without significantly changing vehicle capacity on streets, and they serve to mitigate the impacts of traffic on neighborhoods and business districts where a greater balance between safety and mobility is needed. Traffic calming influences driver behavior through physical or psychological means, resulting in lower vehicle speeds or through traffic volumes. Many traffic calming techniques physically alter the width or alignment of the cart way. Physical techniques can generally fall into three categories: narrowing the street, deflecting the vehicle path vertically, or deflecting the vehicle path horizontally. By changing the direction of travel or interrupting a driver's sight line, physical techniques encourage drivers to slow down and widen their vision field thereby making them more aware of pedestrians, bicyclists, and other vehicles. In addition to physical changes to the cartway, visual friction elements can be used to create a sense of enclosure or break up views.

Traffic calming techniques, especially physical means, are most suited for local streets, but can also be used on low-volume collectors and arterials. Physical treatments on arterial streets are best used up to a design speed of approximately 40 mph. Above that speed, calming should be limited to visual friction and mild horizontal shifts. A common tool on arterials is narrowed roadways or narrowed travel lanes.

The type of treatment used is dependent on the context, determined mainly by land use, traffic volumes and desired travel speed. Concerns about emergency vehicle response time and safety for cyclists need to be addressed when developing a traffic calming scheme. While traffic calming is most commonly used in residential neighborhoods, certain techniques can also be applied effectively in commercial areas or other locations that have high levels of pedestrian activity. Traffic calming techniques have the greatest impact when they are employed in districts through coordinated efforts rather than in isolated locations. In fact, installation of a single device may divert traffic to neighboring streets, shifting the problem rather than resolving it. Some calming techniques are incorporated into the SDG, notably landscaping, narrow streets, and pavement treatments, but additional calming schemes can be applied on a case-by-case basis.

Simply requiring development to place buildings and landscaping next to the street can be effective traffic calming by raising driver awareness to an active environment.

Visual Techniques

Visual elements include surface striping or colorization (top), landscaping (middle), building placement, and other changes to the visual field. These tools visually narrow the cartway, which usually makes drivers more aware of their surroundings and drive more slowly. Visual tools, particularly striping and landscaping, are often combined with physical measures to maximize traffic calming.

Physical Techniques – Narrowed Street

Street narrowing can be used both at intersections (curb extensions) and mid-block (chokers). Intersection narrowing helps to reduce pedestrian crossing times and distances and to meet ADA requirements. They are therefore useful near school zones or in areas with high elderly and disabled populations. Mid-block narrowing is used primarily to slow down traffic. Many narrowing techniques require landscaping to give motorists advance warning and to intensify the calming effect.

Median islands can be used to narrow travel lanes. Lanes remain passable but prompt drivers to move more slowly around the median.

Medians or Center Islands slow traffic in three ways: visually tightening the road, slowing turn speeds, and creating narrow channels. They are very pedestrian-friendly, especially when combined with crosswalks and divided to provide a

Bulbouts help to define parking areas as separate from drive lane areas (top) and, when used at intersections, shorten distances that pedestrians must cross (bottom).

crossing entirely at street level (also called Refuge Islands). The minimum preferred width is 8 feet and they should include full width ADA ramps installed at grade or with a light crown. Medians represent one of the most affordable and least intrusive tools.

Curb Extensions (Bulb-outs) are great tools for slowing speeds at intersections and mid-block locations. They can be used mid-block to create chokers or chicanes and to inset on-street parking without disrupting emergency responder access to critical streets. However, without proper treatment they may be dangerous for bicyclists.

Chokers (Neckdowns) reduce traffic speeds by narrowing passageways (10′ width is highly effective) to a one-way entry or exit point, and can be very attractive when properly landscaped.

Speed tables are usually preferable to speed humps in that they are more accommodating to delivery and emergency vehicles, yet they also provide a cue to use lower speeds.

Physical Techniques – Vertical Deflection

Speed Humps are both inexpensive and effective (a 14′ parabolic hump can slow traffic to about 22 mph), but can also be noisy, devalue a neighborhood, and affect emergency response times.

Speed Tables are a special form of speed hump that feature flat tops. They are the best tool for pedestrian and bicyclist crossings, and are typically used on local streets. They are more suitable for avenues than traditional speed humps, but should not be used where volumes exceed 10,000 vehicles per day, on bus routes, or on prime emergency response routes. Speed tables can be placed mid-block (used as raised cross-walks) or at intersections (see "Raised Intersections"). A popular design of the 22′ speed table, developed by Gwinnett County, features 6′ straight ramps and a 10′ table.

Chicanes create one-lane yield conditions. They can be used on both sides to deflect driver paths and further reduce speeds, though streets that are naturally narrow may not need this treatment.

Raised Intersections are flat, raised areas covering an entire intersection, with ramps on all approaches and often with brick or other textured materials on the flat section. They slow traffic in three ways: creating a distinct shape that draws a motorist's attention, creating a vertical deflection that forces a low-speed approach, and highlighting the area as a pedestrian space. Raised intersections can be used with very tight and narrow intersections in commercial areas, but are relatively costly.

Roundabouts (above) and mini-roundabouts (below). Mini-roundabouts do not have the same traffic operations concerns as a larger roundabout, but given their smaller footprint are appropriate primarily on local, low-volume streets only.

Physical – Horizontal Deflection

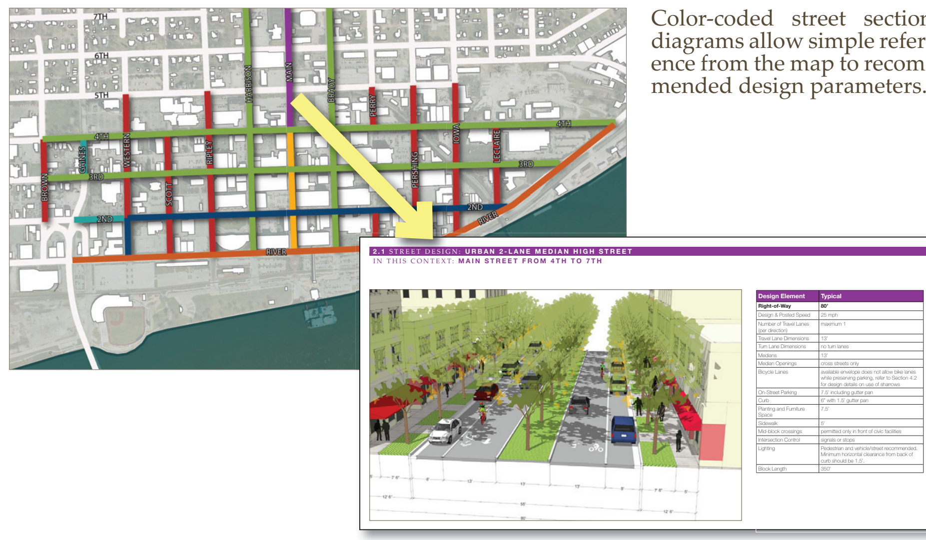
Chicanes are a mid-block treatment that use curb extensions, striping, islands, or even on-street parking to divert traffic from its intended course (and may narrow the roadway). Also called "slow points," chicanes hold speeds to 15 to 20 mph and may result in a volume reduction. On low volume streets no treatments are needed for bicycles, but on higher volume avenues, it may be appropriate to channel bikes along the side of the chicane.

Roundabouts and mini-roundabouts act as both traffic calming devices on higher order streets and as intersection control devices in place of four-way stops or traffic signals. These tools lower speeds to 15-20 mph, shorten pedestrian crossings to 12-14 feet at a time, decrease injury crashes significantly, reduce noise and pollution, and increase area property values. Features like mountable curbs and corner cut-outs can improve navigability by large vehicles (trucks, emergency vehicles). However, roundabouts can create challenging or dangerous conditions on streets with high volumes of both motor vehicle and bicycle traffic and should be carefully evaluated with regard to multimodal users.

Davenport In Motion

SECTION 2 DOWNTOWN STREET DESIGNS

The following section details several specific street extents in downtown Davenport. Because of the established land uses and right-of-way widths in this part of the city, these recommendations are based on modifying space within the right-of-way and usually within existing curb lines. The streets to be modified according to the cross-sections shown are depicted in a map on Page 19 and are detailed in individual section illustrations on pages 20 through 27.



Color-coded street section diagrams allow simple reference from the map to recommended design parameters.

Urban 2-Lane Median High Street
Applied specifically to: Main Street from 4th to 7th

Urban 2-Lane High Street
Applied specifically to: Main Street from River to 4th

Urban 3-Lane Avenue
Applied specifically to: Brady and Harrison; 3rd and 4th

Urban 2-Lane Parking Street
Applied specifically to: Western, Scott, Ripley, Perry, Brown, Pershing, Iowa and Leclaire. These are two-lane local streets designed to maximize parking yield.

Urban 2-Lane Street
Applied specifically to: 2nd Street between Western and River Drive; Western between River and 2nd. This section retains a substantial parking yield but allows sufficient space in the traveled way for left turn lanes at intersections.

Urban 4-Lane Transition Street
Applied specifically to: 2nd between Gaines and Western; Gaines between 3rd and 4th. This section is intended to provide transition from a multi-lane cross section to a two-lane downtown-specific section.

River Drive
This section is defined specifically because of a median design and construction project being implemented by Iowa DOT and the City of Davenport.

2.1 STREET DESIGN: URBAN 2-LANE MEDIAN HIGH STREET

IN THIS CONTEXT: **MAIN STREET FROM 4TH TO 7TH**

Design Element	Typical
Right-of-Way	**80'**
Design & Posted Speed	25 mph
Number of Travel Lanes (per direction)	maximum 1
Travel Lane Dimensions	13'
Turn Lane Dimensions	no turn lanes
Medians	13'
Median Openings	cross streets only
Bicycle Lanes	available envelope does not allow bike lanes while preserving parking, refer to Section 4.2 for design details on use of sharrows
On-Street Parking	8' including gutter pan
Curb	existing dimensions (6" to reflect/replace existing curb types)
Planting and Furniture Space	7.5'
Sidewalk	5'
Mid-block crossings	permitted only in front of civic facilities
Intersection Control	signals or stops. Refer to guidance on Page
Lighting	Pedestrian and vehicle/street recom-mended. Minimum horizontal clearance from back of curb should be 1.5'.
Block Length	350'

2.2 STREET DESIGN: URBAN 2-LANE HIGH STREET

IN THIS CONTEXT: **MAIN STREET FROM RIVER TO 4TH**

Design Element	Typical
Right-of-Way	**80'**
Design & Posted Speed	25 mph
Number of Travel Lanes (per direction)	maximum 1
Travel Lane Dimensions	10'
Turn Lane Dimensions	no turn lanes
Medians	no median
Median Openings	n/a
Bicycle Lanes	available envelope does not allow bike lanes while preserving parking, refer to Section 4.2 for design details on use of sharrows if desired
On-Street Parking	7.5' parallel
Curb	existing dimensions
Sidewalk	**22.5'**
Planting and Furnishing Space	10' recommended
Walk Space	12.5'
Mid-block crossings	not needed
Intersection Control	signals or stops
Lighting	Pedestrian and vehicle/street recommended. Minimum horizontal clearance should be 1.5'.
Block Length	350'

2.3 STREET DESIGN: URBAN THREE-LANE AVENUE (Short Term)

IN THIS CONTEXT: 3RD STREET, 4TH STREET, BRADY STREET, HARRISON STREET - SHORT TERM

Design Element	Typical
Right-of-Way	**80'**
Design & Posted Speed	25 mph
Number of Travel Lanes (per direction)	maximum 1
Travel Lane Dimensions	10'
Turn Lane Dimensions	10' TWLTL
Medians	no median
Median Openings	n/a
Bicycle Lanes	necessary when part of Davenport in Motion Bicycle Map (5' when used). Dimensional constraints on existing streets may require shared lane design. Refer to Section 4.2 for design details and options.
On-Street Parking	7.5' parallel; in rare cases, pinch-points result in loss of parking lane(s)
Curb	existing dimensions
Sidewalk	**12.5'**
Planting and Furnishing Space	incorporated into sidewalk
Sidewalk	12.5' sidewalk with a minimum 8' walk zone
Mid-block crossings	not needed
Intersection Control	signals or stops
Lighting	Pedestrian and vehicle/street required. Minimum horizontal clearance should be 1.5'.
Block Length	350'

2.4 STREET DESIGN: URBAN THREE-LANE AVENUE (Long Term)

IN THIS CONTEXT: **3RD STREET, 4TH STREET, BRADY STREET, HARRISON STREET - LONG TERM**

Design Element	Typical
Right-of-Way	**80'**
Design & Posted Speed	25 mph
Number of Travel Lanes (per direction)	maximum 1
Travel Lane Dimensions	10'
Turn Lane Dimensions	10' TWLTL
Medians	10' at mid-block (to substitute with TWLTL as needed)
Median Openings	none where medians are used; median is sub-stituted with TWLTL for mid-block extents only
Bicycle Lanes	necessary when part of Davenport in Motion Bicycle Map (5' when used). Dimensional constraints on existing streets may require shared lane design. Refer to Section 4.2 for design details and options.
On-Street Parking	7.5' parallel
Curb	existing dimensions
Sidewalk	**12.5'**
Planting and Furnishing Space	incorporated into sidewalk
Walk Space	12.5' sidewalk with a minimum 8' walk zone
Mid-block crossings	not needed
Intersection Control	signals or stops
Lighting	Pedestrian and vehicle/street required. Mini-mum horizontal clearance should be 1.5'.
Block Length	350'

2.5 STREET DESIGN: URBAN 2-LANE PARKING STREET

IN THIS CONTEXT: BROWN STREET, WESTERN AVENUE, SCOTT STREET, RIPLEY STREET, PERRY STREET, PERSHING AVENUE, IOWA STREET, LECLAIRE STREET

Design Element	Typical
Right-of-Way	**80'**
Design & Posted Speed	25 mph
Number of Travel Lanes (per direction)	maximum 1
Travel Lane Dimensions	11'
Turn Lane Dimensions	no turn lanes
Medians	no median
Median Openings	n/a
Bicycle Lanes	necessary when part of Davenport in Motion Bicycle Map (5' when used). Dimensional constraints on existing streets may require shared lane design. Refer to Section 4.2 for design details and options.
On-Street Parking	16.5' angled (45°)
Curb	existing dimensions
Sidewalk	**12.5'**
Planting and Furnishing Space	incorporated into sidewalk
Sidewalk	12.5' sidewalk with a minimum 7.5' walk zone
Mid-block crossings	not needed
Intersection Control	signals or stops
Lighting	Pedestrian and vehicle/street required. Minimum horizontal clearance should be 1.5'.
Block Length	350'

2.6 STREET DESIGN: URBAN 2-LANE STREET

IN THIS CONTEXT: **2ND STREET BETWEEN RIVER AND WESTERN; WESTERN BETWEEN RIVER AND 2ND**

Design Element	Typical
Right-of-Way	**80'**
Design & Posted Speed	25 mph
Number of Travel Lanes (per direction)	maximum 1
Travel Lane Dimensions	10' (15' where no left turn)
Turn Lane Dimensions	10' emerging left turn lane
Medians	no median
Median Openings	n/a
Bicycle Lanes	shared vehicle/bicycle lane per guidelines in Section 4.2
On-Street Parking	7.5' parallel, 17.5' angled
Curb	existing dimensions
Sidewalk	**12.5'**
Planting and Furnishing Space	incorporated into sidewalk
Sidewalk	12.5' sidewalk with a minimum 8' walk zone
Mid-block crossings	not needed
Intersection Control	signals or stops
Lighting	Pedestrian and vehicle/street required. Minimum horizontal clearance should be 1.5'.
Block Length	350'

2.7 STREET DESIGN: URBAN 4-LANE TRANSITION STREET

IN THIS CONTEXT: **2ND STREET FROM GAINES TO WESTERN, GAINES STREET FROM 3RD TO 4TH**

Design Element	Typical
Right-of-Way	**80'**
Design & Posted Speed	25 mph
Number of Travel Lanes (per direction)	maximum 2
Travel Lane Dimensions	10'
Turn Lane Dimensions	no turn lanes
Medians	no median
Median Openings	n/a
Bicycle Lanes	shared vehicle/bicycle lane per guidelines in Section 4.2
On-Street Parking	7.5' parallel
Curb	existing dimensions
Sidewalk	**12.5'**
Planting and Furnishing Space	incorporated into sidewalk
Walk Space	12.5' sidewalk with a minimum 8' walk zone
Mid-block crossings	not needed
Intersection Control	signals or stops
Lighting	Pedestrian and vehicle/street required. Minimum horizontal clearance should be 1.5'.
Block Length	350'

2.8 STREET DESIGN: RIVER DRIVE

Design Element	Typical
Right-of-Way	**80'**
Design & Posted Speed	25 mph
Number of Travel Lanes (per direction)	1
Travel Lane Dimensions	12'
Turn Lane Dimensions	12' to be substituted with medians as needed
Medians	12' raised median with planters per Iowa DOT and City of Davenport design
Median Openings	specified in median design documents
Bicycle Lanes	no dedicated bicycle lanes; River Drive is already served by the parallel Mississippi River Trail. Sharrows, if used, should follow placement guidelines specified in Section 4.2.
On-Street Parking	10' parallel
Curb	existing dimensions
Sidewalk	**12' on north side; 7' on south side**
Planting and Furnishing Space	5' minimum recommended on north side of River Drive, can be partially incorporated into sidewalk. On south side, sidewalk provided only.
Walk Space	7' on both sides.
Mid-block crossings	permitted in front of high pedestrian-traffic areas
Intersection Control	signals or stops
Lighting	Pedestrian and vehicle/street required. Minimum horizontal clearance should be 1.5'.
Block Length	maximum 500'; access to driveways limited

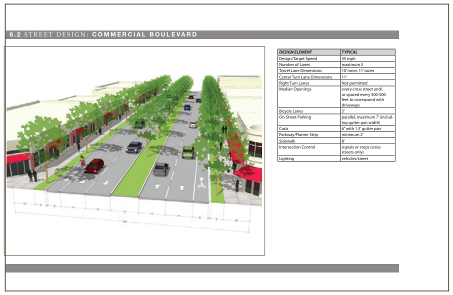
Davenport In Motion

SECTION 3 CITY-WIDE STREET DESIGNS

The following section provides more general guidance for street design throughout Davenport. This guidance should be used for the design of new streets as well as the reconstruction and reconfiguration of existing streets. It is based on a combination of land use contexts and street types, providing an explanation of key priorities the designer needs to consider based on the Design Factors described in section 1.

The street sections of the SDG are organized around two different views: a left-hand page based on an understanding of the implications that context may have on street design needs, and a right-hand page that details the typical section design elements. The figures below display this layout organization in greater detail.

Left Page: Context and Design Needs for the Street



Right Page: Cross Section and Recommended Street Design Dimensions

3.1 STREET DESIGN: TRANSITIONAL COMMERCIAL ARTERIAL

Arterials are designed to move vehicles over long distances. As many such streets in Davenport readily suggest, commercial destinations drawing primarily local trips locate along these facilities, driven by zoning that seeks to locate commercial districts in areas with the greatest visibility and access. These streets, however, were originally designed to provide regional travel. The mixing of local and regional traffic in these corridors frequently dictates the need for wide, multilane regional highways in which traffic operations are complicated by local trips accessing frequently-spaced driveways.

Commercial arterials can be modified within existing right-of-way dimensions to provide a more livable streetscape without foregoing their mobility function. This kind of transition represents first steps that can be taken in transforming streets that bear a double burden of mobility and access (which is contrary to their intended purpose as mobility streets) into livable streets that still move regional traffic.

DESIGN FACTORS

LIVABILITY

These commercial areas have the potential to generate high levels of pedestrian traffic, depending on the exact land use and building orientation present. The cross-section addresses this potential by providing a minimum 10-foot sidewalk on both sides of the road. Generally, the block lengths will be high relative to central-city block lengths. Mid-block crossings can be included in areas that generate a lot of cross-street traffic, such as at schools and civic buildings.

ACCESS/ MOBILITY

Arterial streets are typically built to provide large-scale connections and mobility to several areas of the city. As such, they typically serve higher-speed, higher-volume traffic flows. Naturally commercial land uses are attracted to these arterials because of the exposure given high traffic volumes. In turn, these commercial areas require driveways and cross streets that provide access for potential patrons. Therefore, these commercial arterials must balance the need to provide cross-city mobility with the customer access requisite of neighboring businesses.

Considering these attributes, this type of arterial should be equipped with 11 foot travel lanes, with two travel lanes in each direction, providing ample space for an efficient speed of traffic. The center median can incorporate left-turn lanes where appropriate and provide centralized access points by consolidating median breaks to important intersections.

SAFETY

With motorists, cyclists, and pedestrians all included in this cross-section, there is great potential for interaction between modes. Speed limits are conservatively suggested as 35 miles per hour, especially because of the potential mode interactions. Cyclists are provided a 6-foot bicycle lane in this cross-section, which is wider than the minimum required. Pedestrians and vehicles alike should be given ample lighting relative to the scale of the mode.

CONTEXT & SCALE

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Land Use	Commercial	Commercial land uses that benefit from high exposure (e.g. retail or restaurants), tend to require many access points, but offices are less demanding
Vehicle Access Demand	High	Local traffic tends to drive the demand for access to businesses, and individual properties often expect individual access points
On-site Parking Feasibility	Typical	On-street parking is not necessary in the presence of on-site parking. On-street parking should be coordinated with land use: its benefits are not realized when land development patterns do not provide close pedestrian access from street to building.
Acceptable Driveway Density	Limited	Commercial properties demand and expect access (see 'Vehicle Access Demand' row, although frequent spacing complicates traffic operations and reduces outer lane capacity.
Expected Vehicle Travel Speeds	Moderately high, though congestion is often expected	Frequent signal spacing and mid-block pedestrian crossings are acceptable, and travel speeds should be controlled to ensure safety of the access demand
Multimodal Access Demand	Moderate	Sidewalks in particular should be addressed to allow sufficient room for circulation, and the street should reflect the potential for future transit service

3.1 STREET DESIGN: TRANSITIONAL COMMERCIAL ARTERIAL

In This Context: **KIMBERLY ROAD WEST, 53RD STREET**

Design Element	Typical
Right-of-Way	**100'**
Design & Posted Speed	35 mph
Number of Travel Lanes (per direction)	maximum 2
Travel Lane Dimensions	11'
Turn Lane Dimensions	12' left turn lane when incorporated into median; right turn lanes allowed for heavy turning movements or truck traffic
Medians	12'
Median Openings	cross streets only
Bicycle Lanes	necessary when part of Davenport in Motion Bicycle Map (6' when used). Shared-lane design should not be used on multi-lane arterial streets. Refer to Section 4.2 for design details and options.
On-Street Parking	none
Curb	6" with 1' gutter pan
Planting and Furnishing Space	5'
Sidewalk	10'
Mid-block crossings	when warranted by conditions (blocks longer than 600', unusually high pedestrian activity)
Intersection Control	signals (cross streets only)
Lighting	Pedestrian and vehicle/street required. Minimum horizontal clearance should be 1.5'.
Block Length	dictated by intersecting streets, not to be more than 500', mid-block curb cuts limited

Serving as a 'bridge' between the mobility function of arterials and the access function of local streets, collectors in a commercial context usually connect commercial corridors and nodes of concentration to the residential areas that surround them.

In larger commercial areas, the collectors provide an important access function and allow development to be focused away from arterials. These types of contexts are often found in regional retail centers, usually near malls and other large-scale shopping facilities that are adjacent to commercial outparcels. When they occur in these contexts, they should be the focus streets for driveways and access to development before the arterial streets are.

DESIGN FACTORS

LIVABILITY

These collectors are typically the focus of commercial development and, as a result, of commercial business activity. This requires that the street provide for higher levels of street and sidewalk activity. Sidewalks should be 8 feet wide at a minimum, not including street buffer space, and bicycle lanes should be included, especially in high-frequency destination points. On-street parking is important for business activity, principally where on-site parking is limited. This on-street parking can also help support and encourage street-level and pedestrian activity.

ACCESS/ MOBILITY

In the commercial context, it is important to consider the mobility function of providing access to businesses. Access points should be used for structured or shared parking only and should be consolidated to limit curb cuts and to also make entry points more efficient. In places with frequent access points, a two-way center left turn lane may be needed in place of the median.

SAFETY

As a center for activity, these corridors will elicit a lot of interaction between different modes of travel. The design should therefore be responsive to potential conflicts. Crosswalks should be clearly marked and be present at all intersections. Bicycle lanes should be a minimum of 5 feet wide, and, if possible, should be delineated with color treatment for further visibility. Narrow 10-foot travel lanes help to encourage lower speeds. Finally, the on-street parking and designated buffer area help protect pedestrians from the vehicular travel space.

CONTEXT & SCALE

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Land Use	Commercial	The type of commercial development will dictate the specific cross-section improvements included. Where street-level offices and activities exist, the livability factors will be of particular importance.
Vehicle Access Demand	High	The collector streets generally provide the direct access to businesses, so traffic presence will be high
On-site Parking Feasibility	Limited	Due to high demand for accessing land uses and limited parking on-site, on-street parking is especially important.
Acceptable Driveway Density	Limited	Driveways/curb cuts allowed for shared parking or structured parking only. Relatively frequent driveway spacing may require two-way left turn lane
Expected Vehicle Travel Speeds	Low	Congestion generally expected in commercial contexts. Narrower lanes are acceptable, as well as more frequent signal spacing and smaller intersection curb radii.
Multimodal Access Demand	High (especially pedestrian demand)	Sidewalks should be provided, and special treatments such as mid-block crossings on long blocks (600 feet or longer) are important.

3.2 STREET DESIGN: COMMERCIAL COLLECTOR

In This Context: **NEW CONSTRUCTION - ELMORE (N. OF 60TH), RETROFITS - EASTERN (29TH TO 53RD), 35TH (BRADY to MARQUETTE)**

Design Element	Typical
Right-of-Way	**85'**
Design & Posted Speed	30 mph
Number of Travel Lanes (per direction)	maximum 1
Travel Lane Dimensions	11'
Turn Lane Dimensions	11' left turn lane at intersections
Medians	11'
Median Openings	cross streets and major access points
Bicycle Lanes	necessary when part of Davenport in Motion Bicycle Map (5' when used). Dimensional constraints on existing streets may require shared lane design. Refer to Section 4.2 for design details and options.
On-Street Parking	7' parallel
Curb	6" with 1' gutter pan
Planting and Furnishing Space	6'
Sidewalk	8'
Mid-block crossings	in conjunction with median breaks for access points, when warranted by conditions (blocks longer than 600', unusually high pedestrian activity)
Intersection Control	signals, stops, or roundabouts
Lighting	Pedestrian and vehicle/street recommended. Minimum horizontal clearance should be 1.5'.
Block Length	dictated by intersecting streets, not to be more than 500', mid-block curb cuts limited

The citywide street designs show typical dimensions for each type of street based on application of principles discussed in the first sections of the guide and throughout the Davenport in Motion plan. They are intended to be flexible, with design elements tailored to fit the context and scale of each individual street based on these principles and on the designer's judgment. Particularly in the case of retrofits of existing streets, it is often both desirable and practical to work within existing curb-to-curb dimensions. Accordingly, the descriptions of specific retrofit projects provided in Chapter 8 may be useful guidance in understanding how the general dimensions of the SDG can be modified to fit actual street constraints.

As the city experiences growth, it will be important to maintain a functional hierarchy of streets in conjunction with new development. Many new residential developments focus on the local street, with access to homes being oriented toward the lower-speed, lower-volume streets. This eliminates the driveway conflict on major arterial roadways that typically serve to connect the pockets of housing subdivisions. In a new neighborhood, however, residential development will likely be coupled with local-service commercial land uses. These new arterials would then serve as a connection between housing subdivisions and nodes of neighborhood commercial activity.

Though the decision on new development is in the hands of the land use agency, neighborhood arterials can still be designed to accommodate this role of connecting areas. With limited driveway access, the control of left turns can be centered on cross streets, creating a more efficient traveled way.

DESIGN FACTORS

LIVABILITY

In new planned neighborhoods, establishing a sustainable street network is a key to creating livability. While these neighborhood arterials serve mostly a mobility purpose, they also set up the hierarchy of streets in a livable neighborhood. Street design elements that reflect and facilitate all modes of transportation should be included in the cross-section. Bicyclists should be accommodated with dedicated bike lanes or shared lanes where planned. Sidewalks should be wide enough to facilitate pedestrian traffic.

ACCESS/ MOBILITY

Neighborhood arterials are typically built to facilitate connections and mobility between larger districts. Within districts, neighborhood commercial land uses are naturally drawn to these larger roadways because of the higher volumes of traffic and, therefore, customer exposure. Also, these arterials provide access points for the neighborhood collectors. Therefore, the mobility purpose should be balanced with need for access points for residential and commercial areas.

Specifically, this type of facility tends to be applied most commonly to street retrofits, converting four through lanes to two with a two-way left turn lane. A 10-foot median can beautify the streetscape while allowing for left-turn lanes at major intersections. These medians can also be used to create major access points and concentrate cross-traffic by reducing the number of allowable median breaks for such uses.

SAFETY

Inherently, safety becomes an important factor when accommodating for several modes of travel. If bike lanes are included, they should be at least 6 feet wide. Sidewalk should be set back from the vehicle space by about 10 feet to provide reaction and correction space in the event of an erratic maneuver. Vehicle- and pedestrian-scaled lighting will help improve visibility, especially at intersections where pedestrians may be harder to see in the dark as they cross the street.

CONTEXT & SCALE

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Land Use	Mixed	Most neighborhoods have a commercial node located along the arterial street, which quickly transitions to residential uses. The cross-section should respond to the current or anticipated presence of non-residential uses, while maintaining applicable elements for the residential areas.
Vehicle Access Demand	High	Access is determined by the number of driveways, which relates to the type and number of housing units present. Demand for street use is driven by the size of the neighborhood and the relative draw to and from other neighborhoods
On-Site Parking Feasibility	Typical	On-street parking is preferable for neighborhood commercial areas
Acceptable Driveway Density	Moderate	Dependent on the land use mix - higher for residential uses, lower at commercial nodes
Expected Vehicle Travel Speeds	Moderate	Frequent intersection spacing and mid-block pedestrian crossings are acceptable.
Multimodal Access Demand	Very high	Neighborhood traffic has a higher likelihood to be non-motorized. Sidewalks in particular should be addressed to allow sufficient room for circulation.

3.3 STREET DESIGN: NEIGHBORHOOD ARTERIAL *(Typically a design option for street retrofits)*

In This Context: **NEW CONSTRUCTION - 46TH (TREMONT TO EASTERN).**
RETROFITS - CENTRAL PARK, PINE (N. OF KIMBERLY)

Design Element	Typical
Right-of-Way	**78'**
Design & Posted Speed	30 mph
Number of Travel Lanes (per direction)	1
Travel Lane Dimensions	11'
Turn Lane Dimensions	11' two-way left turn lane
Medians	11' (substitutes with turn lane, as needed or appropriate)
Median Openings	cross streets and high left-turn demand
Bicycle Lanes	necessary when part of Davenport in Motion Bicycle Map (5' when used). Dimensional constraints on existing streets may require shared lane design. Refer to Section 4.2 for design details and options.
On-Street Parking	7' parallel
Curb	6" with 1' gutter pan
Planting and Furnishing Space	5.5' suggested
Sidewalk	5'
Mid-block crossings	not needed
Intersection Control	signals, stops, or roundabouts
Lighting	Pedestrian and vehicle/street required. Minimum horizontal clearance should be 1.5'.
Block Length	dictated by intersecting streets, 500' suggested

The citywide street designs show typical dimensions for each type of street based on application of principles discussed in the first sections of the guide and throughout the Davenport in Motion plan. They are intended to be flexible, with design elements tailored to fit the context and scale of each individual street based on these principles and on the designer's judgment. Particularly in the case of retrofits of existing streets, it is often both desirable and practical to work within existing curb-to-curb dimensions. Accordingly, the descriptions of specific retrofit projects provided in Chapter 8 may be useful guidance in understanding how the general dimensions of the SDG can be modified to fit actual street constraints.

3.4 STREET DESIGN: NEIGHBORHOOD ARTERIAL BRIDGE

Many creeks weave their way through Davenport, especially in newly-developed or future neighborhood areas. As these new areas fill in, it will be important to maintain network connectivity while recognizing the natural value that these creeks offer. Neighborhood bridges provide this connectivity, and, when placed at key locations, can enhance the network while maintaining the natural space. Bridges should respond to the natural topography and should not overpower the existing environment. Finally, bridges should be built where connectivity warrants them – not every roadway approaching a creek will be a good candidate for a bridge.

DESIGN FACTORS

LIVABILITY

Bridges are usually built to last much longer than a roadway. With this in mind, it is important to include space for all potential modes of travel, especially those that may not be as prevalent now as in the future. Bike lanes should be included when they are a part of the bike plan or when they fit with future expansions of that plan or street grid. Sidewalks should be built at least five feet wide on all bridges, not including the pedestrian and vehicle safety guardrail features.

ACCESS/ MOBILITY

Bridges are intended to link two areas on either side of a major natural or manmade impedence. There may be points of destination on either side of the bridge, but there is no need to address access when developing a new bridge. This cross-section should not contain more travel lanes than what the thru movements warrant. Typically, the creeks in Davenport are tucked into low-volume, low-speed neighborhoods, so most bridges will only need to provide one lane in each direction. Similarly, the lower speeds call for narrower 10-foot lanes on the crossing.

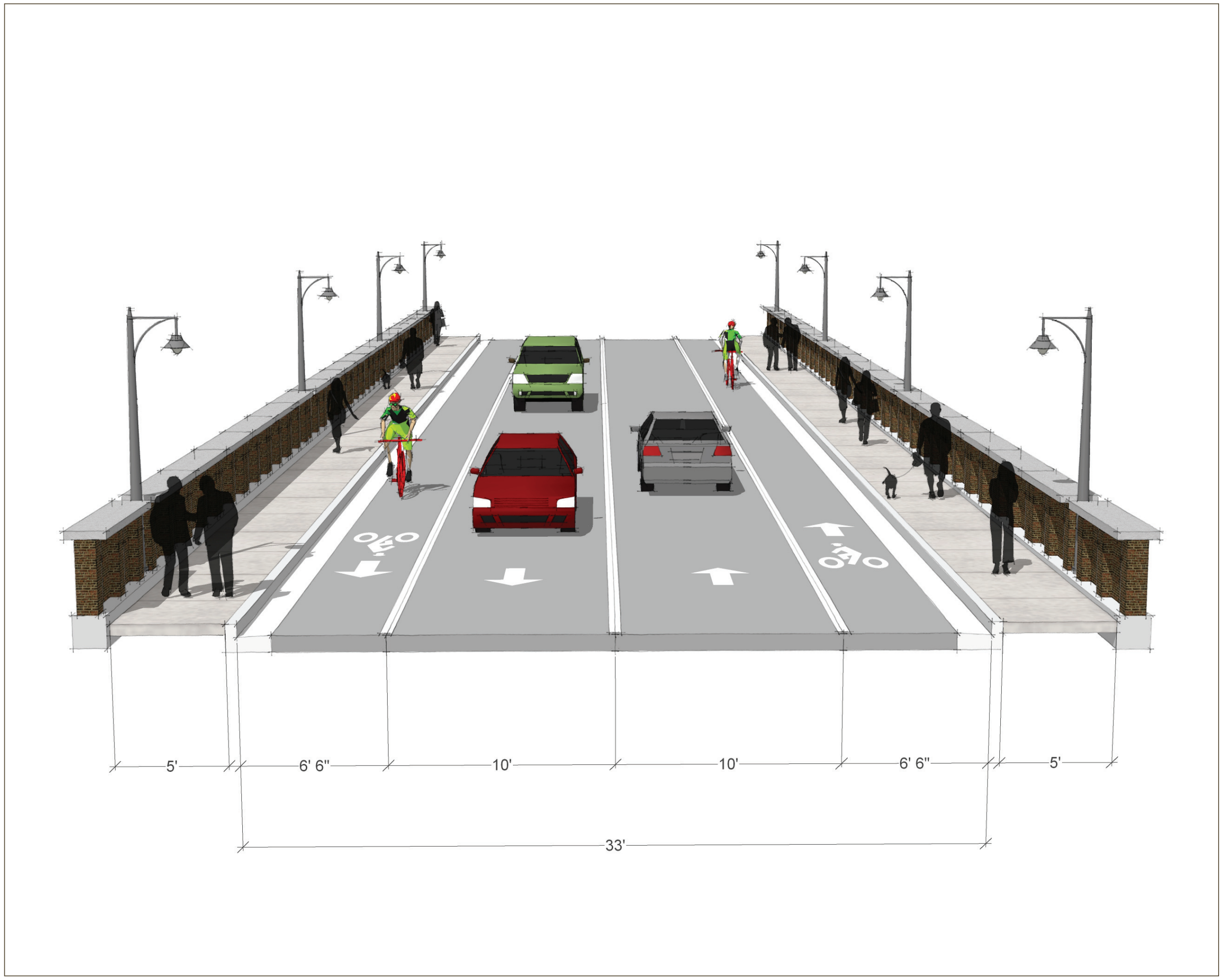
SAFETY

Since these bridges will typically be placed on neighborhood arterials and collectors, lower speed limits are justified, with a maximum of 25 mph. In the winter, the bridges will become icy more quickly than the roadways, so encouraging lower speeds when crossing bridges is important. The narrow 10-foot travel lanes coupled with the constrained feeling that bridges tend to create helps achieve this. However, this sense of containment requires extra safety features, such as a separating feature between the vehicle lanes and the bike lanes and wider usable walkspace for pedestrians.

CONTEXT & SCALE

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Land Use	Residential	Most creeks in Davenport are tucked into residential neighborhoods; bridges should respond to the nearby land uses through smaller scale bridge elements fitting of a low-volume neighborhood street
Vehicle Access Demand	Low	Depending on the location of the bridge, demand will be based on the number of surrounding residents and the connectivity that the bridge provides
On-Site Parking Feasibililty	Typical	Most homes will include garage or driveway parking, and context dictates that parking on the bridge itself is not warranted
Acceptable Driveway Density	Low	Driveways are not necessary on a bridge
Expected Vehicle Travel Speeds	Low	Residential streets anticipate slower traffic, particularly when small-scale elements are used, helping to reinforce low-speed atmosphere
Multimodal Access Demand	Moderate	If the bridge is nearer to a neighborhood node, demand could be high; because of bridge lifespans, alternative modes should always be considered in design

3.4 STREET DESIGN: NEIGHBORHOOD ARTERIAL BRIDGE *(Typically a design option for street retrofits)*



Design Element	Typical
Right-of-Way	**44'**
Design & Posted Speed	25 mph
Number of Travel Lanes (per direction)	maximum 1
Travel Lane Dimensions	10'
Turn Lane Dimensions	none
Medians	none
Median Openings	n/a
Bicycle Lanes	5' required; if not part of the Davenport in Motion Bicycle Plan, reserve 5' for future bike lanes. Refer to Section 4.2 for design details and options.
On-Street Parking	none
Curb	6" with 1' gutter pan
Planting and Furnishing Space	none
Sidewalk	5' minimum
Mid-block crossings	not needed
Intersection Control	signals, stops, or roundabouts
Lighting	Pedestrian and vehicle/street required. Minimum horizontal clearance should be 1.5'.
Block Length	dictated by length of crossing

3.5 STREET DESIGN: NEIGHBORHOOD COLLECTOR

Neighborhood collectors form the baseline connection between local streets and arterial roadways. These collectors enable more efficient vehicle movement on arterials by limiting the number of intersections through the use of organized traffic flow from local streets. Though new development may orient toward local streets, it is acceptable to provide driveway access along these collectors, especially at the neighborhood commercial nodes.

DESIGN FACTORS

LIVABILITY

These corridors will likely facilitate neighborhood travel to nearby businesses in addition to the vehicular travel into and out of the neighborhood. Therefore, the cross-section should reflect the potential for localized traffic, particularly non-motorized travel. Sidewalks at least 5 feet wide provide pedestrian passageways, while scaled lighting and street elements support pedestrian activity.

ACCESS/ MOBILITY

As mentioned, neighborhood collectors form the connection between higher-traffic neighborhood arterials and local residential streets. However, they still may contain driveways to private homes, so the mobility of traffic needs to compromise with the access demand. Where traffic volumes warrant, an 11-foot center turning area can provide space for those trying to turn into driveways while limiting the impedance of these turns to thru traffic. At the same time, 10-foot travel lanes allow for more efficient movement while controlling excessive traffic speeds through neighborhood areas.

SAFETY

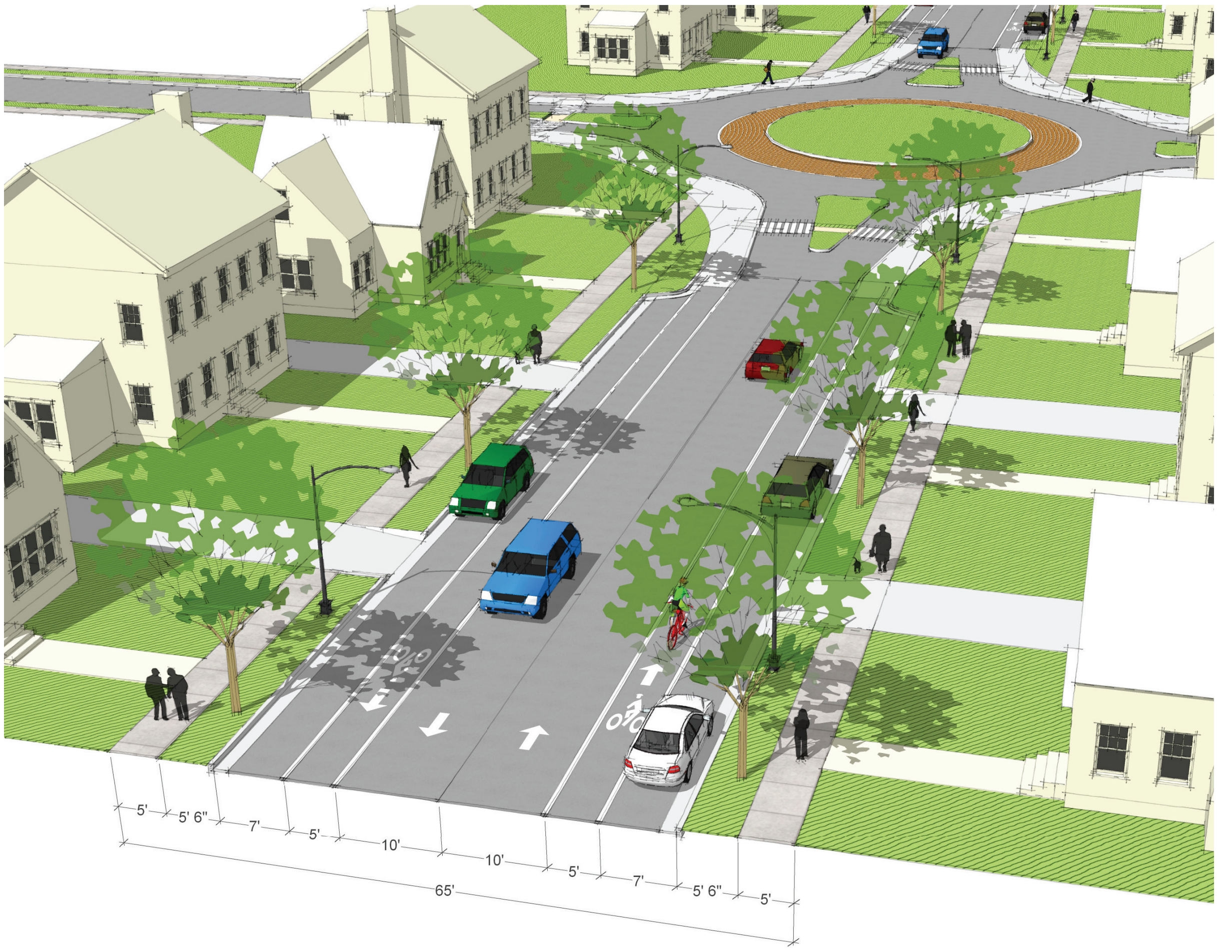
The potential for excessive speeds along these collectors still exist, especially when approaching an arterial roadway. Therefore, pedestrians should be given a five-foot buffer from the vehicle travel lanes. The street lighting will also improve visibility for both pedestrians and vehicles. Providing a center turning space along higher-volume collectors with many driveways can help prevent rear-end collisions when people slow down to turn.

CONTEXT & SCALE

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Land Use	Mixed; Mostly Residential	Most neighborhoods have a commercial node located along the arterial street, which quickly transitions to residential uses. The cross-section should respond to the current or anticipated presence of non-residential uses, while maintaining applicable elements for the residential areas.
Vehicle Access Demand	Moderate	Collectors connect residential neighborhoods to commercial nodes, either within the neighborhood of origin or another neighborhood; demand is directly relating to the desire to enter and exit the neighborhood
On-Site Parking Feasibililty	Typical	On-site parking is usually present, but on-street parking is preferable for neighborhood collectors
Acceptable Driveway Density	High	If commercial nodes are present, collectors typically provide the driveway access to them; when the area is more residential in nature, housing driveways are typically present
Expected Vehicle Travel Speeds	Moderate	Frequent intersection spacing and mid-block pedestrian crossings are acceptable.
Multimodal Access Demand	Very high	Neighborhood traffic has a higher likelihood to be non-motorized. Sidewalks in particular should be addressed to allow sufficient room for circulation, and bike lanes should be included where they may facilitate local traffic

3.5 STREET DESIGN: NEIGHBORHOOD COLLECTOR

In This Context: **NEW CONSTRUCTION - 29TH (EASTERN TO JERSEY RIDGE). RETROFITS - 29TH (FARNAM TO EASTERN WITH PARKING/SHARROWS OR BIKE LANES)**



Design Element	Typical
Right-of-Way	**65'**
Design & Posted Speed	25 mph
Number of Travel Lanes (per direction)	maximum 1
Travel Lane Dimensions	10'
Turn Lane Dimensions	none
Medians	none
Median Openings	n/a
Bicycle Lanes	necessary when part of Davenport in Motion Bicycle Map (5' when used). Dimensional constraints on existing streets may require shared lane design. Refer to Section 4.2 for design details and options.
On-Street Parking	7' parallel
Curb	6" with 1' gutter pan
Planting and Furnishing Space	5.5'
Sidewalk	5' minimum
Mid-block crossings	not needed
Intersection Control	signals, stops, or roundabouts
Lighting	Pedestrian and vehicle/street recommended. Minimum horizontal clearance should be 1.5'.
Block Length	dictated by intersecting streets, 500' suggested

The citywide street designs show typical dimensions for each type of street based on application of principles discussed in the first sections of the guide and throughout the Davenport in Motion plan. They are intended to be flexible, with design elements tailored to fit the context and scale of each individual street based on these principles and on the designer's judgment. Particularly in the case of retrofits of existing streets, it is often both desirable and practical to work within existing curb-to-curb dimensions. Accordingly, the descriptions of specific retrofit projects provided in Chapter 8 may be useful guidance in understanding how the general dimensions of the SDG can be modified to fit actual street constraints.

3.6 STREET DESIGN: NEIGHBORHOOD LOCAL

Local streets in neighborhood areas are among the most access-oriented of any streets in the transportation network, and travel speed expectations are usually low. While land development standards may require on-site parking, local residential streets should still have flexibility to accommodate parking on at least one side of the street.

DESIGN FACTORS

LIVABILITY

Ideally, these streets are the center of neighborhood activity, providing a space for interaction and leisure. Livability becomes an important factor in facilitating this activity. Providing sidewalks and ample walk-zone space provides both leisure and utilitarian travel areas. Travel speeds on these streets are low, and street design factors can help compliment and enforce slower speeds.

ACCESS/ MOBILITY

Neighborhood streets provide direct access to the driveways of residences, implying that as many cars will be entering and leaving the roadway as will be traveling on the street. Therefore, the mobility and movement of traffic is less of a concern than providing safe and efficient access to these driveways.

SAFETY

The concern for safety becomes highly significant as the street-level activity rises, particularly for children that frequently use the street for a play area or do not consider the presence of cars as readily as adults do. Therefore, the slower travel speeds need to be reinforced for safety reasons by way of narrower lanes. The street section should also consider the need for enhanced visibility for drivers as they traverse neighborhood streets by providing ample sight distance near frequent play areas or gathering places.

CONTEXT & SCALE

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Land Use	Residential	The street should reflect the nature of the neighborhood and the type of residential development present; for instance, single-family homes will have less intense traffic and driveway density than townhome areas
Vehicle Access Demand	Low	Demand for use of these local roads is determined by the number of housing units being serviced by them
On-Site Parking Feasibility	Typical	On-site parking in residential neighborhoods is highly feasible; if on-site parking is limited, as is the case in medium-density residential, then parking lanes should be provided on-street
Acceptable Driveway Density	High	Driveways are determined by the type and intensity of residential units; local neighborhood streets are the preferable location for most residential driveways
Expected Vehicle Travel Speeds	Low	Users are typically residents of the area; frequent entering and exiting from driveways usually lowers travel speeds
Multimodal Access Demand	High	Intra-neighborhood traffic has a higher likelihood to be non-motorized. Sidewalks in particular should be included to allow sufficient room for circulation.

3.6 STREET DESIGN: NEIGHBORHOOD LOCAL

Design Element	Typical
Right-of-Way	**50'**
Design & Posted Speed	25 mph
Number of Travel Lanes (per direction)	maximum 1
Travel Lane Dimensions	14.5'
Turn Lane Dimensions	none
Medians	none
Median Openings	n/a
Bicycle Lanes	low volume shared ROW
On-Street Parking	none
Curb	6" with 1' gutter pan
Planting and Furnishing Space	5.5'
Sidewalk	5' minimum
Mid-block crossings	not needed
Intersection Control	signals, stops, or roundabouts
Lighting	Pedestrian recommended. Minimum horizontal clearance should be 1.5'.
Block Length	dictated by intersecting streets, 500' suggested

Rural arterial highways may have the mobility characteristics of arterials in other parts of the county, but their context implies that there will be fewer constraints in their design. Though the case can be made for multi-lane rural arterial highways in connecting distinct developed parts of the county, a true rural context should not have the kind of development that would call for the addition of a center turn lane.

DESIGN FACTORS

LIVABILITY

By definition, rural arterials are not adjacent to development, so there is no necessity to consider a livability factor in current time. However, as rural arterials become encompassed in a developed area, livability should not be neglected. Preserving right-of-way space for multi-modal accommodation is a way to strategize for future livability considerations.

ACCESS/ MOBILITY

Typical traffic volumes on rural arterial roads warrant the use of one travel lane in each direction. The use of passing zones can provide an increased sense of mobility for faster-speed travelers. The traffic volumes are also generally not high enough to require right- or left-turn lanes at driveways or intersections.

SAFETY

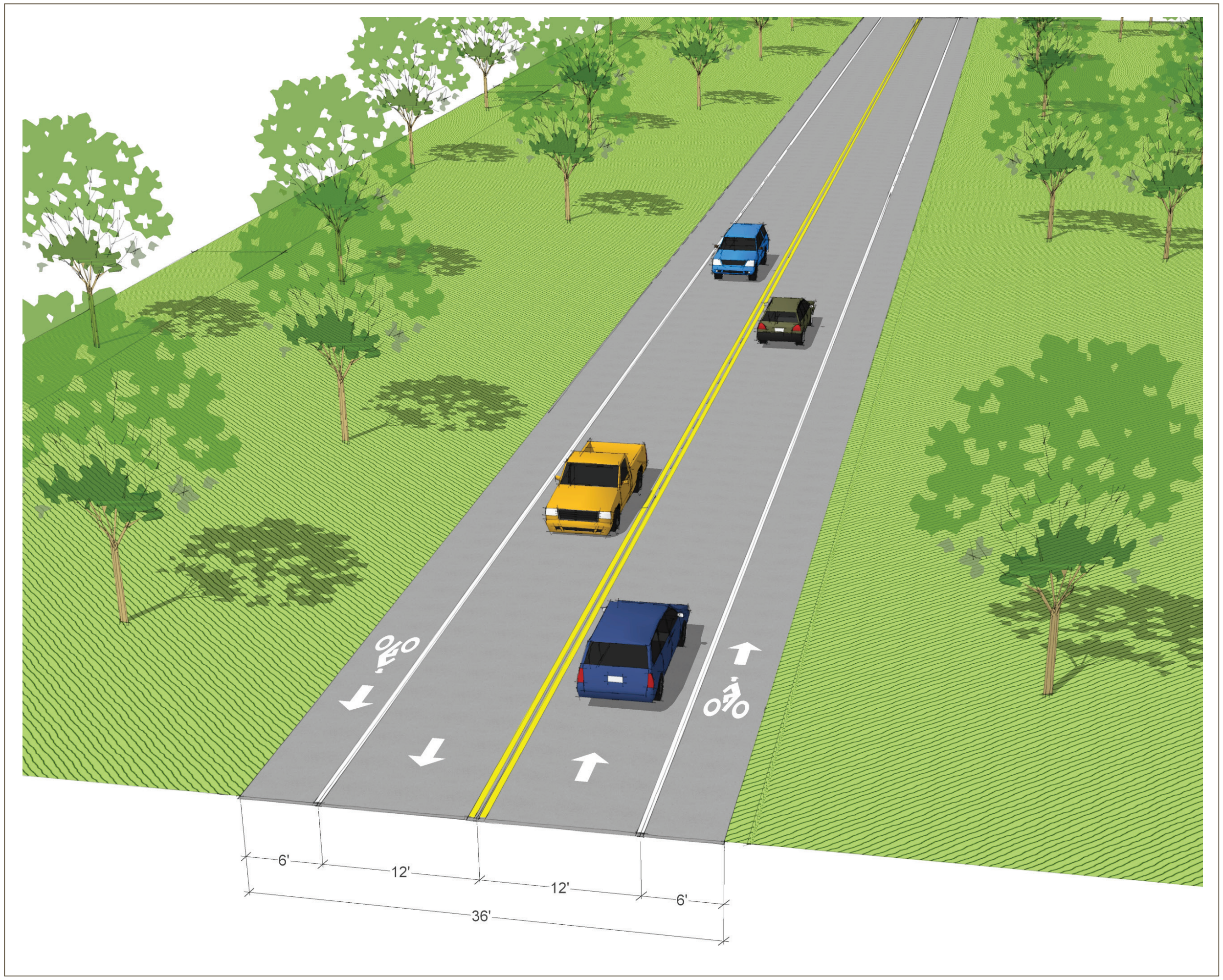
Shoulders are a necessary feature on rural arterials with a recommended width of 6 feet. They provide paved recovery space for drivers that may lose track of the roadway, thereby increasing the safety of the roadway, especially at night or in poor driving conditions. Check with AASHTO design standards for specific application of shoulders on rural highways.

CONTEXT & SCALE

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Land Use	Agriculture / Open Space	Very low intensity land uses draw little to no traffic; potential for redevelopment may require change in street classification type
Vehicle Access Demand	Low	Demand is usually regional in scale, where users are using this roadway to travel between two other places of interest. Access is rural in nature and is limited to those that farm or own very large residential parcels
On-Site Parking Feasibililty	Always	On-site parking is always available and typically set back far from the roadway
Acceptable Driveway Density	Low	Driveways are acceptable for private residences or rural paved or unpaved roads; on-street parking is not needed
Expected Vehicle Travel Speeds	High	Wider travel lanes and shoulders are needed for safety; parking and non-motorized travel is infeasible
Multimodal Access Demand	Low	Sidewalks are not necessary, as long as agricultural parcels are not being converted to neighborhoods

3.7 STREET DESIGN: RURAL ARTERIAL

In This Context: **TELEGRAPH ROAD, WISCONSIN AVENUE (north of Locust)**



Design Element	Typical
Right-of-Way	**36'**
Design & Posted Speed	45 mph
Number of Travel Lanes (per direction)	maximum 1
Travel Lane Dimensions	12' with 6' shoulders
Turn Lane Dimensions	none
Medians	none
Median Openings	n/a
Bicycle Lanes	shoulder space
On-Street Parking	none
Curb	no curb
Planting and Furnishing Space	n/a
Sidewalk	not needed
Mid-block crossings	not needed
Intersection Control	signals, stops, or roundabouts
Lighting	not needed
Block Length	not applicable

The citywide street designs show typical dimensions for each type of street based on application of principles discussed in the first sections of the guide and throughout the Davenport in Motion plan. They are intended to be flexible, with design elements tailored to fit the context and scale of each individual street based on these principles and on the designer's judgment. Particularly in the case of retrofits of existing streets, it is often both desirable and practical to work within existing curb-to-curb dimensions. Accordingly, the descriptions of specific retrofit projects provided in Chapter 8 may be useful guidance in understanding how the general dimensions of the SDG can be modified to fit actual street constraints.

Local streets in industrial areas are providing a clearer access function and may be designed with characteristics similar to rural streets. What is important is that street design decisions factor in heavy turning movements from trucks and that curb or corner radii are designed accordingly. This is one context where additional right-of-way to accommodate right turn lanes may be justified to preserve mobility along the street.

DESIGN FACTORS

LIVABILITY

This roadway is primarily intended to move industrial business traffic, but in the context of collectors and streets, consideration should be given to a variety of potential users. Sidewalks should be present, but can be narrowed to 5 feet and placed on only one side of the roadway if necessary.

ACCESS/ MOBILITY

Traffic within industrial areas is primarily composed of trucks and vehicles associated with the industrial businesses. Access is therefore not only for employees and customers of these businesses, but also for the larger portion of truck traffic. The wider 11-foot travel lanes provide extra movement space for trucks, and the 6-foot shoulder supplies added turning-movement and correction area, especially at intersections.

SAFETY

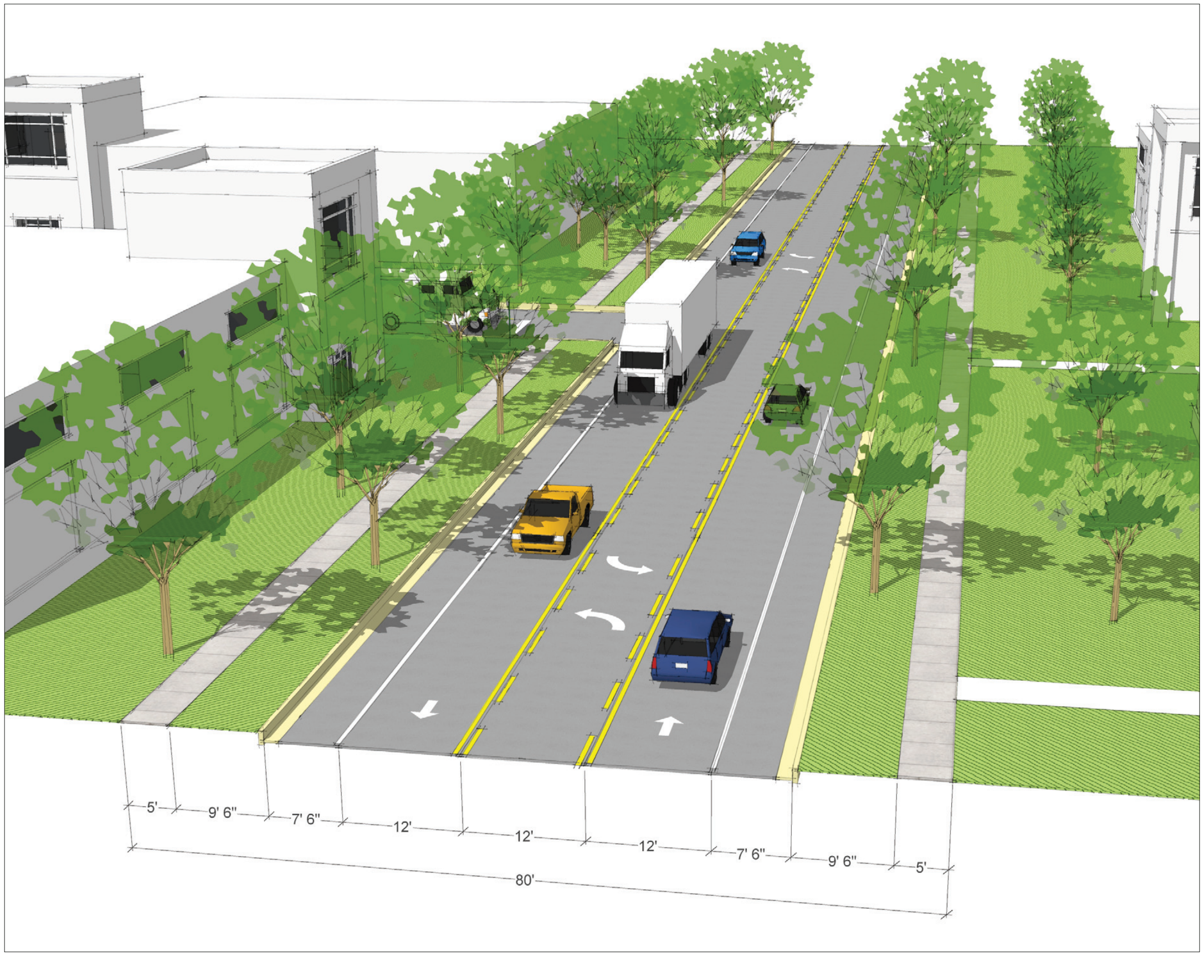
Presumably, trucks will constitute a high percentage of the traffic on industrial collectors and streets but will still be mixing with customer and employee traffic (i.e. smaller vehicles) as well. The cross-section for this type of roadway should be wide enough to accommodate the need for increased visibility for both small vehicles and trucks. Shoulders that are 5 to 6 feet wide provide extra movement and correction space for trucks. Sidewalks should be set back from the roadway at least five feet to provide a buffer space for pedestrians.

CONTEXT & SCALE

CRITERION	RELATIVE MEASURE	DESIGN IMPLICATIONS
Land Use	Industrial	Traffic for industrial uses tend to include a high percentage of trucks, and non-truck traffic is more polarized toward the peak periods of the day (when, for example, employees would be driving to and from work)
Vehicle Access Demand	Moderate	Again, traffic demand is caused by the typical industrial business. The high rate of truck traffic requires different access-based design parameters, including larger curb radii
On-Site Parking Feasibility	High	On-street parking is not needed; industrial areas tend to have high levels of on-site parking
Acceptable Driveway Density	Moderate	Depends on the intensity of the land use, typically infrequent and consolidated for large industrial buildings
Expected Vehicle Travel Speeds	Moderate	Speeds will generally be higher than other collectors because of the wider lanes and lower levels of congestion
Multimodal Access Demand	Low	Trucks reduce perceived safety, so bicycle lanes are typically not included in these areas; due to the polarized traffic demand, transit is relatively infeasible

3.8 STREET DESIGN: INDUSTRIAL COLLECTOR/STREET

In This Context: **TREMONT AVENUE, WEST 76th STREET**



Design Element	Typical
Right-of-Way	**80'**
Design & Posted Speed	35 mph
Number of Travel Lanes (per direction)	maximum 1
Travel Lane Dimensions	12' with 7.5' paved shoulder
Turn Lane Dimensions	12' TWLTL
Medians	none
Median Openings	n/a
Bicycle Lanes	If required, mark shoulders for bicycle lanes
On-Street Parking	none
Curb	6" F-type with 1' gutter pan
Planting and Furnishing Space	9.5', can accomodate utility zone of 2'
Sidewalk	5' on at least one side of the street
Mid-block crossings	none
Intersection Control	signals, stops, or roundabouts
Lighting	Vehicle/street only, recommended where visibility is low. Minimum horizontal clearance should be 1.5'.
Block Length	varies by land use needs

The citywide street designs show typical dimensions for each type of street based on application of principles discussed in the first sections of the guide and throughout the Davenport in Motion plan. They are intended to be flexible, with design elements tailored to fit the context and scale of each individual street based on these principles and on the designer's judgment. Particularly in the case of retrofits of existing streets, it is often both desirable and practical to work within existing curb-to-curb dimensions. Accordingly, the descriptions of specific retrofit projects provided in Chapter 8 may be useful guidance in understanding how the general dimensions of the SDG can be modified to fit actual street constraints.

Davenport In Motion

SECTION 4 IMPLEMENTATION

As street designs follow land use context, the placement of utilities should be considered in a way that does not impede the needs of buildings and their users or that complicates maintenance of the utility infrastructure itself. The diagram here shows a series of options that street designers can use in working with the utility providers on placement of infrastructure. These are intended to suggest ways to place utilities on streets in urban areas that allow land development patterns to bring buildings to the street without requiring additional right-of-way.

In the case of any streets using swale drainage, overhead utilities placed in the utility buffer at the right-of-way edge will generally not see change. The recommended street sections in industrial contexts in particular do not suggest contexts where building placement would be directly adjacent to the street.

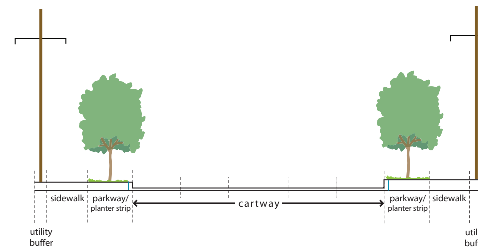
In the case of underground utilities, designers have two options: utilities can be placed either in a special buffer area on the outer edges of the right of way or in the planter strip. This is possible to do with trees in the planter strip, but it suggests a certain need for planter strip dimensions: typically, sufficient space must be provided for trees (a minimum of 5 feet) and additional space must be provided for the appropriate utility dimensions so that utility infrastructure may be accessed from above.

Traditionally providers of telecommunications and other fiber utilities have been the most resistant to underground placement within a planter strip, but the approach mentioned in the last paragraph has been used to help meet the concerns of these providers (namely, that root structures will not interfere with infrastructure and that access to cables is not restricted by landscaping).

DEFAULT CASE
Utilities built in buffer at edge of right-of-way

DESIGN IMPLICATIONS: *Utilities are placed at the edge of right-of-way. Individual pole placement needs to be coordinated with access points and other street design features.*

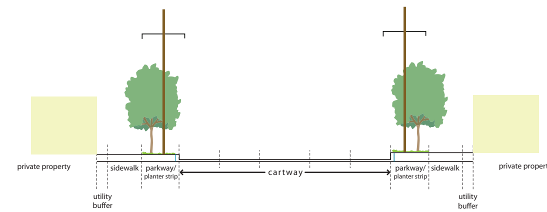
Many planning efforts so far have demonstrated the benefits of land uses that engage pedestrians along the street. As the City redefines land development standards to reflect this, transportation projects will need to reconsider utility placement.



Land development regulations change and bring building placement to right-of-way edge

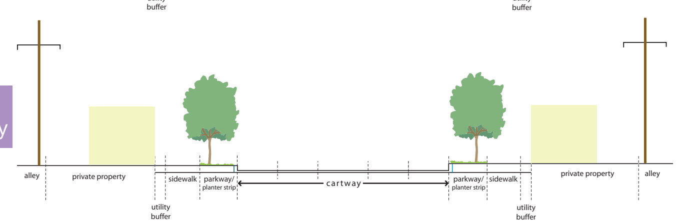
OPTION 1
Overhead utilities placed in planter strip

DESIGN IMPLICATIONS: *Tree placement and selection must keep in mind typical utility vertical clearance to avoid damage to trees from utility provider maintenance. Utility buffer can be hardscaped to add to pedestrian area as 'shy zone' against buildings (see Sections 2.5 and 2.6). Typical distance from back of curb to center of utility structure is 1.5'.*



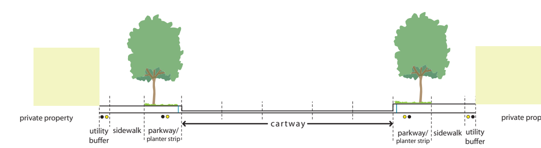
OPTION 2
Overhead utilities placed alley behind private property

DESIGN IMPLICATIONS: *Occurs when private alleys added as part of a street design or other easements are secured for utility placement behind buildings. Utility buffer can be hardscaped to add to pedestrian area as 'shy zone' against buildings.*



OPTION 3
Utilities placed underground in right of way, either in planter strip or in designated utility buffer

DESIGN IMPLICATIONS: *Though hardscaping is optional, utility buffer can remain grass or ground cover if utilities are placed there. If placed in the planter strip, use a duct bank or other form of separation between the planted area and the utility area to preclude root interference with utility access.*



OVERVIEW

The on-street bicycle route network recommended in Davenport in Motion is envisioned as a combination of striped bicycle lanes and shared-use streets with visual pavement markings. Because Davenport's streets vary in width and many serve multiple purposes, the construction of bicycle routes may need to use a variety of design features to fit within existing constraints.

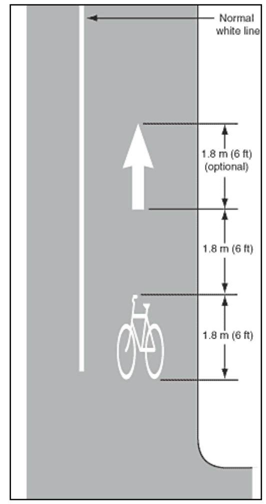
This section of the SDG details bicycle facilities and provides the City of Davenport with a broader design framework for constructing formalized bicycle routes. Although additions to the bicycle system are recommended in the Bicycle Master Plan Map, this section establishes broader guidance should changes be made to this map in later revisions of the Davenport in Motion plan or should the City wish to study individual route opportunities. This guidance is intended to be used as a toolkit, allowing a project designer to select facilities that are appropriate to the street's other uses and design elements, to the type of route being constructed, and to the surrounding land uses and community characteristics. These are specified in order of preference, with the most desirable design options listed first. Though more preferential design options should be used before less preferential options, each lists conditions that would restrict its use.

This guide will refer to the Manual on Uniform Traffic Control Devices (MUTCD) for pavement markings. Many designated bike routes in Davenport and other cities around the nation have relied solely on vertical signs for route indication. The most recent edition of the MUTCD has incorporated changes that suggest a lessened emphasis on signage, perhaps reflecting that in practice this system of route indication presents a variety of maintenance challenges: ensuring that signs are visible and not obscured by landscaping or other streetside objects, timely replacement of lost signs, and appropriate frequency of placement to guide users along the length of a route. Signs are certainly allowed and this guidance on bicycle facilities is not intended to discourage them, but it does suggest that proper pavement markings are a critical component of usable, reliable bicycle infrastructure. Each of the facilities recommended here is described next to an illustrative diagram showing proper placement of pavement markings relative to street edge and on-street parking.

That said, vertical signage is likely to remain an essential indicator of bicycle route designation in Davenport due to the seasonal weather conditions, namely snow accumulation. All types of markings present challenges in Davenport: typical paint markings tend to have a relatively short lifespan due to the cycles of freezing and thawing on streets and from the effects of salt scattered on streets to prevent ice, and thermoplastic markings are frequently damaged by snow plows.

One design option that these guidelines introduce to Davenport is the shared-use arrow, commonly referred to as a 'sharrow' and used widely in cities in the Western United States. Sharrows provide an advantage to unmarked shared bicycle streets in that they offer both visual cues to motorists that cyclists will be using a street and positioning guidance to cyclists on a safe riding distance from curbs and parked cars. Many of Davenport's streets have multiple uses, not least of which are vehicle movement and parking, and the use of a pavement marking on streets intended for bicycles helps to establish continuity along a route and indicate all of the users for whom the street is intended.

It is important to establish that bicycle lanes are well-branded and easily understood; for that reason they are recommended as a preferred design option. However, they are not always easy to apply to a street: in the majority of all cases, the existing street is simply not wide enough to accommodate its current uses and the added width of bicycle lanes. In these cases the shared street approach, complete with appropriate signage and pavement markings, can 'carry' a route along its alignment in places where the addition of bicycle lanes is not practical.

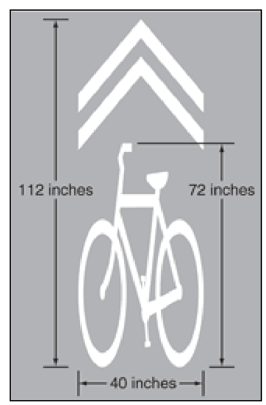


Bicycle Lane Marking

Bicycle lanes are the most common form of on-street delineation of bicycle space. Guidance on acceptable dimensions is provided in both the MUTCD and the AASHTO Green Book. Typically bicycle lanes are five (5) feet in width, although may be as narrow as four (4) feet when conditions are constrained and are often wider than 5 feet. Wider bicycle lanes are used most often when adjacent to on-street parking to provide cyclists ample space to avoid doors of opening cars.

Although guidance is given on pages 52 and 53, every attempt should be made to stripe bicycle lanes at least five (5) feet in width. On newly constructed streets, this dimension should be a required minimum.

Dimensions as shown here are provided in the MUTCD. Refer to the Davenport in Motion Bicycle Master Plan for a more detailed description of signage, also suggested in the 2009 MUTCD, to accompany the use of bicycle lanes.



Sharrow (Shared-Use Arrow)

Sharrows began to see widespread application in the early and mid-2000s, especially in cities in the Western United States. They are intended to provide markings to continue bicycle route designation when bicycle lanes cannot easily be fit into the cross-section (especially in established built environments where roadway width may be constrained.

The sharrow became an accepted form of pavement marking for traffic control in the 2009 MUTCD. Dimensions as shown here are provided in the MUTCD.

Refer to the Davenport in Motion Bicycle Master Plan for a more detailed description of signage, also suggested in the 2009 MUTCD, to accompany the use of sharrows.

FOLLOWING THE DAVENPORT IN MOTION PLAN

The guiding principle of the bicycle network in the Davenport in Motion Plan is providing connections between neighborhoods and recreational and community facilities that are often short trips. Davenport in Motion's intent is for the bicycle network to be a fundamental part of Davenport's transportation system, and this means ensuring that routes are continuous and connect to other routes inside the City or to key locations along the City boundaries.

Davenport in Motion's proposed bicycle network follows two basic types of routes: bicycle lanes where space for bicycle circulation is dedicated and striped adjacent to the drive lanes, and designated bicycle routes that do not feature bicycle lanes (usually because there is not sufficient space for them).

The bicycle lane streets are envisioned as the bicycle thoroughfares of Davenport and span the extent of the City. In many cases they have been selected on commercial corridors: these are seen as the principal 'challenges' to cycling as a more attractive mode choice. Cyclists and people interested in cycling perceive that many of these streets are unsafe or generally undesirable bicycle environments. Bicycle lanes are intended to address this concern by providing clearly demarcated space.

Bicycle routes allow the bicycle network to reach neighborhood destinations more closely and have primarily been selected along lower-speed, lower volume roads where flexibility in bicycle design is more appropriate. They correspond to a route network identified by advocates of the Davenport/Quad Cities bicycle community at the time of development of the Davenport in Motion plan. They designate the route and may feature the sharrow pavement marking to give guidance on proper riding location to cyclists as well as to raise motorists' awareness to cyclists on the street.

General dos and don'ts:

DO:

Construct **bicycle lanes where they fit before selecting shared-use arrows**. Shared-use arrows are a useful tool but they should not be viewed as a substitute for bicycle lanes.

Continue **both** recommended **vertical signage and pavement markings** for the length of a designated route.

Consider alternative streets where they exist and when they provide generally superior cycling conditions. Look in particular at the grade of a street, daily traffic volume and observed vehicle travel speeds.

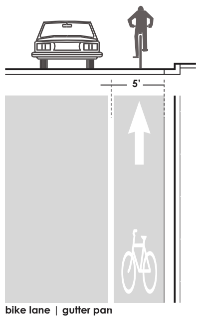
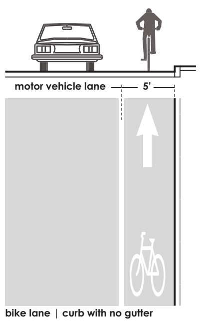
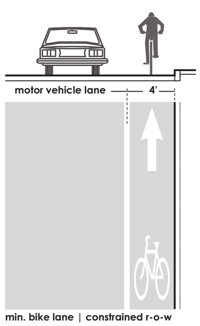
DON'T:

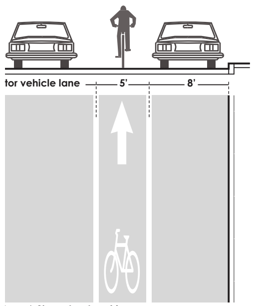
Remove or disallow on-street parking in order to add an on-street bicycle lane, especially in residential areas, without first having a discussion with neighborhood residents and businesses to determine if it is acceptable for a bicycle lane to replace parking.

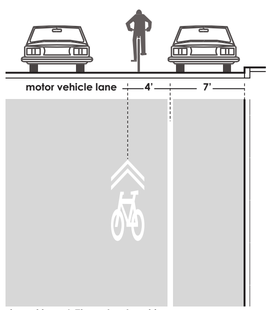
Use the diamond symbol in place of a bicycle lane or shared use arrow facility.

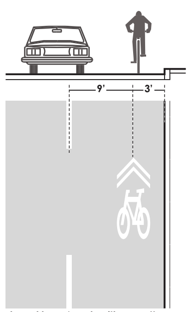
Place bicycle lanes between the curb and a dedicated right-turn lane. Chapter 9C, Section 4 of the MUTCD provides guidance on proper placement of bicycle lanes when right turn lanes are used at intersections.

Provide a bicycle lane or shared-use marking **for only one direction of travel** unless the street is one-way traffic.

	Where these should be used	Where they should NOT be used	Guidelines for placement
 **Design Option 1: Standard 5' Bicycle Lane** (Curb and Gutter)	• Used on curb-and-gutter street sections without on-street parking. • Can be striped when existing curb dimensions will allow five (5) feet of smooth surface for the bicycle lane and at least ten (10) feet of width remaining for the adjacent travel lane. • This (or Design Option 2, depending on curb construction) should be used as the base design for any reconstructed streets or roads where bicycle lanes are to be added and on-street parking will not be included. Five (5) feet should always be used as the base dimension for bicycle lane width when adjacent to a travel lane.	• Do not apply if this bicycle lane will replace permitted on-street parking without the Department of Public Works first working with neighborhood residents to determine if this is an acceptable design option. • Do not apply if existing curb-to-curb dimensions will not allow five (5) feet of bike lane in paved surface AND at least ten (10) feet of width in adjacent travel lane.	• Place one marking (bicycle symbol and arrow) immediately after a signalized intersection and at least one per block in urban areas, or one per 500 feet in areas outside of a regular block-based street network. • Refer to MUTCD (2009 edition) Chapter 9C, Figure 9C-6 for appropriate design and spacing of the bicycle symbol and arrow. • At intersections with dedicated right turn lanes, bicycle lanes should always be placed between the turn lane and the right-most through travel lane.
 **Design Option 2: Standard 5' Bicycle Lane** (Vertical Curb Only)	• Used on header curb sections (typically only in downtown Davenport) without on-street parking. • Can be striped when existing curb dimensions will allow five (5) feet of smooth surface for the bicycle lane and at least ten (10) feet of width remaining for the adjacent travel lane. • This (or Design Option 1, depending on curb construction) should be used as the base design for any reconstructed streets or roads where bicycle lanes are to be added and on-street parking will not be added. Five (5) feet should always be used as the base dimension for bicycle lane width when adjacent to parking.	• Do not apply if this bicycle lane will replace permitted on-street parking without the Department of Public Works first working with neighborhood residents to determine if this is an acceptable design option. • Do not apply if existing curb-to-curb dimensions will not allow five (5) feet of bike lane in paved surface AND at least ten (10) feet of width in adjacent travel lane.	• Place one marking (bicycle symbol and arrow) immediately after a signalized intersection and at least one per block in urban areas, or one per 500 feet in areas outside of a regular block-based street network. • Refer to MUTCD (2009 edition) Chapter 9C, Figure 9C-6 for appropriate design and spacing of the bicycle symbol and arrow. • At intersections with dedicated right turn lanes, bicycle lanes should always be placed between the turn lane and the right-most through travel lane.
 **Design Option 3: 4' Bicycle Lane** (For Constrained Street Sections)	• Used on header curb sections without on-street parking. • Should only be used when existing curb dimensions will allow only four (4) feet of smooth surface for the bicycle lane and at least ten (10) feet of width remaining for the adjacent travel lane (i.e. total width from centerline to curb is 14 feet). • May be used when centerline-to-curb width is up to 16 feet if travel lane widths up to 12 feet need to be preserved. If centerline-to-curb width is greater than 16 feet, a five (5) foot bicycle lane should be used. • When streets are reconstructed and bicycle lanes will be added, a five-foot width should always be used unless there are physical limitations or cost-related reasons that would make that width impractical.	• Do not apply if this bicycle lane will replace permitted on-street parking without the Department of Public Works first working with neighborhood residents to determine if this is an acceptable design option. • Do not apply if existing curb-to-curb dimensions will not allow four (4) feet of bike lane in paved surface AND at least ten (10) feet of width in adjacent travel lane.	• Place one marking (bicycle symbol and arrow) immediately after a signalized intersection and at least one per block in urban areas, or one per 500 feet in areas outside of a regular block-based street network. • Refer to MUTCD (2009 edition) Chapter 9C, Figure 9C-6 for appropriate design and spacing of the bicycle symbol and arrow.







	Where these should be used	Where they should NOT be used	Guidelines for placement
Design Option 4: Bicycle Lane with Parking	• Used on Bicycle Lane street sections with on-street parking. • Can be striped when existing centerline-to-curb dimensions will allow five (5) feet for the bicycle lane, 7.5 feet for on-street parking and at least ten (10) feet of width remaining for the adjacent travel lane. • This should be used as the base design for any reconstructed streets or roads where bicycle lanes are to be added and on-street parking is desired. Five (5) feet should be used as the base dimension for bicycle lane width when adjacent to parking.	• Do not apply if this bicycle lane will replace permitted on-street parking or cause parking dimensions to be less than seven feet (7′) in width. • Do not apply if existing curb-to-curb dimensions will not allow five (5) feet of bike lane in paved surface AND at least ten (10) feet of width in adjacent travel lane and 7.5 feet for on-street parking.	• Place one marking (bicycle symbol and arrow) immediately after a signalized intersection and at least one per block in urban areas, or one per 500 feet in areas outside of a regular block-based street network. • Refer to MUTCD (2009 edition) Chapter 9C, Figure 9C-6 for appropriate design and spacing of the bicycle symbol and arrow.
Design Option 5: Shared Street with Parking (Pavement Markings)	• Used on Bicycle Route street sections with on-street parking. • Can be striped when existing curb dimensions will allow at least four feet of separation between parking and the bicycle alignment with acceptable space for passing vehicles.	• Shared-use arrows should not be used unless Design Options 1-4 for bicycle lanes have been evaluated and are not practical. • Do not apply if posted speed on a roadway is 35 miles per hour or greater. • On multi-lane streets, do not place sharrows in lanes other than the right-most lane in the direction of travel.	• Place one marking (bicycle symbol and chevrons) immediately after a signalized intersection and repeat them along the length of a street. They should be 250 feet apart at most. • The centerline of the marking should be at least 11.5′ from the curb if a street has on-street parking, or four feet from the edge of a delineated parking area, whichever is greater. As sharrows are intended to provide guidance to cyclists on lateral positioning within the lane, they should not be placed in the center of a travel lane unless lane widths and other constraints (such as narrow on-street parking dimensions) make such a placement necessary. • Refer to MUTCD (2009 edition) Chapter 9C, Figure 9C-6 for appropriate design and spacing of the bicycle symbol and arrow.
Design Option 6: Shared Street without Parking (Pavement Markings)	• Used on Secondary Connection constrained street sections without on-street parking. • Used on Secondary Connection routes when the centerline-to-curb dimension is too narrow to accommodate both a minimum width of four feet (4′) for a striped bicycle lane and a minimum width of ten feet (10′) for adjacent travel lane. • These can be used on both one-way and two-way streets, but in the case of one-way streets should only be used if the street has a 'partner' street that carries traffic in the opposite direction.	• Shared-use arrows should not be used unless Design Options 1-4 for bicycle lanes have been evaluated and are not practical. • Do not apply if posted speed on a roadway is 35 miles per hour or greater. • Do not apply on one-way streets if parking is permitted on the right side of the street only. In these cases, use design option 5.	• Place one marking (bicycle symbol and chevrons) immediately after a signalized intersection and repeat them along the length of a street. They should be 250 feet apart at most. • The centerline of the marking should be 11.5′ from the curb. • Do not place the shared-use arrow marking in intersection approaches (within 100 feet behind a signalized intersection). • Refer to MUTCD (2009 edition) Chapter 9C, Figure 9C-6 for appropriate design and spacing of the bicycle symbol and arrow.

OVERVIEW

Road diets are techniques that are used to balance overall capacity and demand in the transportation system by reducing the number of travel lanes and/or the effective width of vehicular travel lanes.

Mobility and access to the overall transportation network are also improved. The gain in cross-sectional space allows for wider sidewalks and bicycle lanes (where planned) to be implemented. Not only does this assist those that do not own vehicles, it also improves the safety by reducing vehicle interaction with these modes. Other indirect benefits of road diets include improved driver attentiveness and reduced environmental and social impacts.

Of course, not all roads should be considered as candidates for road diets. The 4-to-3 conversion is most effective on roads with average daily traffic rates up to 15,000-20,000 vehicles per day and those that have a high potential to induce vehicular travel.

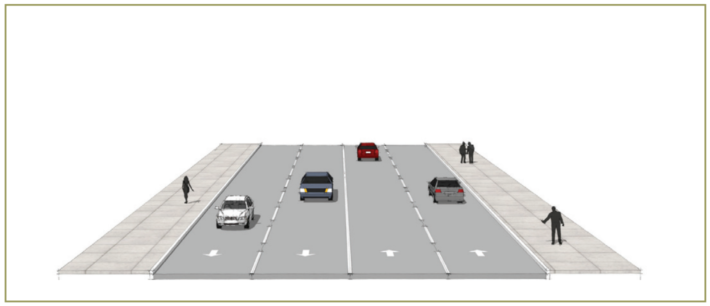
The diagrams to the right show how a four-lane road could be converted to a three-lane road. This type of reconfiguration keeps the existing curb line for the 55-foot travel space. The only major reconstruction depicted is creating tree wells that act as a buffer between the travel space and the effective sidewalk area.

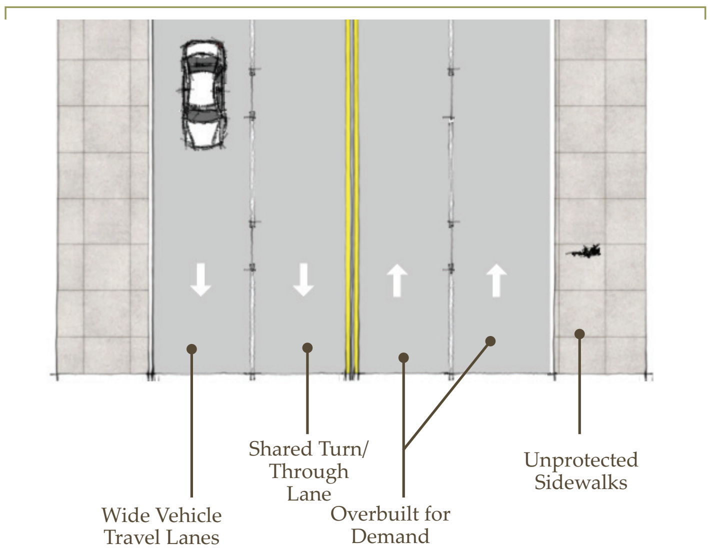
The Davenport in Motion Action Plan identifies several road diet project candidates, all based on 2006 volumes below 20,000 vehicles per day. These include (with project number as a reference):

- **Central Park Avenue** (S-5)
- **Hickory Grove Road** (S-58)
- **Lincoln Avenue** (S-59)
- **Pine Street** (S-60)

BEFORE

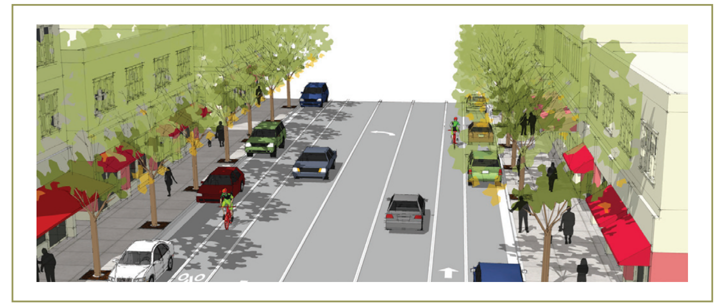
4 directional lanes

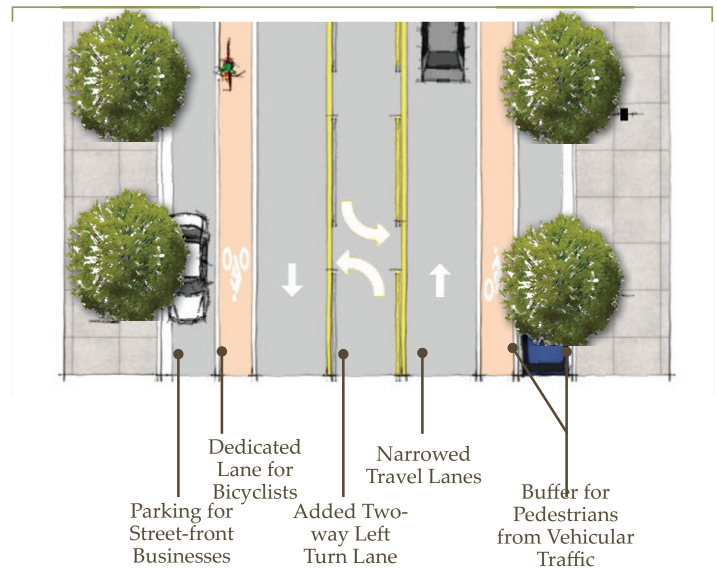




AFTER

2 directional lanes + TWLTL + Bike Lanes + Parallel Parking





OVERVIEW

Many of downtown Davenport's intersections were signalized in the past to control perceived volumes of traffic, many of which may have been higher than they are today. However, many intersections today do not carry volumes of traffic suggesting a need for a signal.

The Manual on Uniform Traffic Control Devices (MUTCD) specifies methodology for signal warrants, providing a variety of tests that traffic engineers use to determine whether signals should be added. Davenport should focus on applying those tests that best evaluate downtown conditions, especially balance of traffic volumes and the presence of pedestrian activity, to determine where signals are appropriate. The table to the right indicates the eight warrant tests and identifies those that should be used downtown. The 2009 edition of the MUTCD has added a ninth warrant for at-grade rail crossings, which are not a concern for downtown Davenport but may be used in other parts of the City as needed.

Refer to Chapter 4C of the MUTCD for more detailed standards and guidance on the use of these warrants. The table to the right shows how they are typically used to add signals. As they are conventionally used to justify the addition of signals, the guidance provided in the diagram to the right is intended to better identify which warrants could be used in which conditions to test if signals are no longer needed. Signals not meeting any of the conditions of the warrants specified in this table should in most cases be removed.

Removal of Signals - Use Warrant 2

As a basic rule, Warrant 2 should be used as a threshold for whether or not signals should remain. Any signal not meeting the basic minimum conditions under Warrant 2 as specified in the MUTCD should in most cases be removed. If the signal is adjacent to a major traffic generator (such as an exit from a parking structure), Warrant 3 should also be applied to make sure that peak hour operations are not compromised without it.

Signal Warrant	Description (How Typically Used to Add Signals)	Relevance to Downtown Davenport
1. Eight-Hour Vehicular Volume	Consideration of vehicles per hour on major approaches over an eight-hour period	Not likely to be relevant on minor streets where major movements are focused in peak hours.
2. Four-Hour Vehicular Volume	Consideration of vehicles per hour on major approaches over an eight-hour period	Not likely to be relevant on minor streets where major movements are focused in peak hours.
3. Peak Hour	Used to evaluate overall delay of a non-signalized minor street	Most relevant adjacent to parking garages and other major trip generators.
4. Pedestrian Volume	Consideration of pedestrians waiting to cross and the delay and potential conflicts they face	More relevant in key activity areas because of pedestrian delay and potential compromises to safety.
5. School Crossing	Used to improve pedestrian safety of children at school crossings	Low relevance; only to be used in areas immediately adjacent to schools.
6. Coordinated Signal System	Used to properly position vehicles to maintain traffic flow on coordinated signal systems (especially one-way couplets)	Low relevance; may be useful on streets contributing to one-way couplets or where adjacent intersections do not experience much delay.
7. Crash Experience	Used to control intersections where frequency and severity of crashes has been notable	Moderate relevance, though it is usually used to add signals and not to remove them as the signal is proposed to mitigate safety problems.
8. Roadway Network	Used to encourage entry and exit from major roadways at controlled points; less likely to be needed in dense network areas	High relevance. Intersections with poor visibility and clear sight triangles may need to keep signals, but many other intersections may be candidates for removal.

Source: Manual on Uniform Traffic Control Devices, 2009 Edition, Chapter 4c.

OVERVIEW

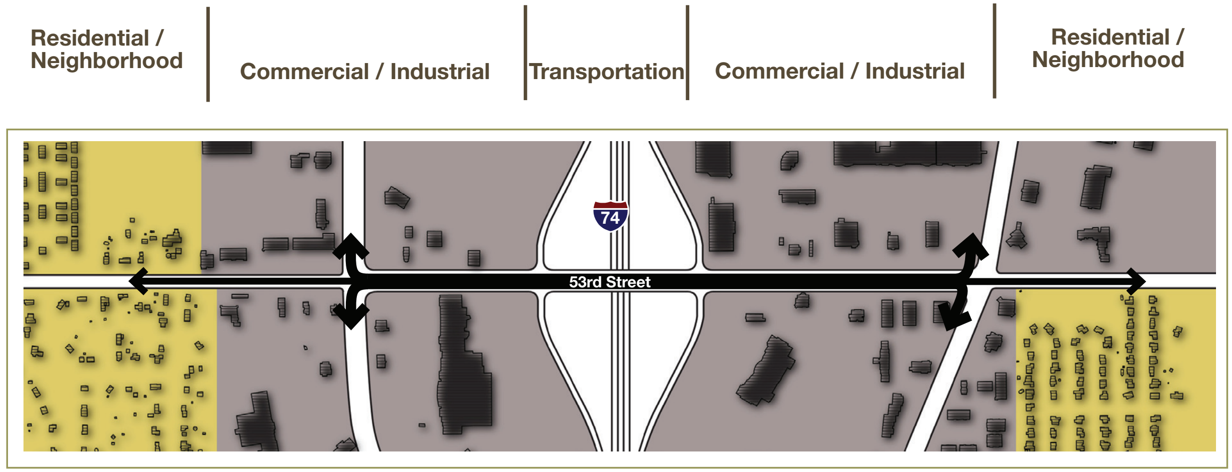
The typical cross-sections presented in this guidebook provide direction for corridors of relatively homogenous contexts. Inevitably, these contexts will change over the length of the corridor, requiring that the cross-sectional elements adjust to fit these changes. This results in the need for a transitional zone where one cross-section phases into the other.

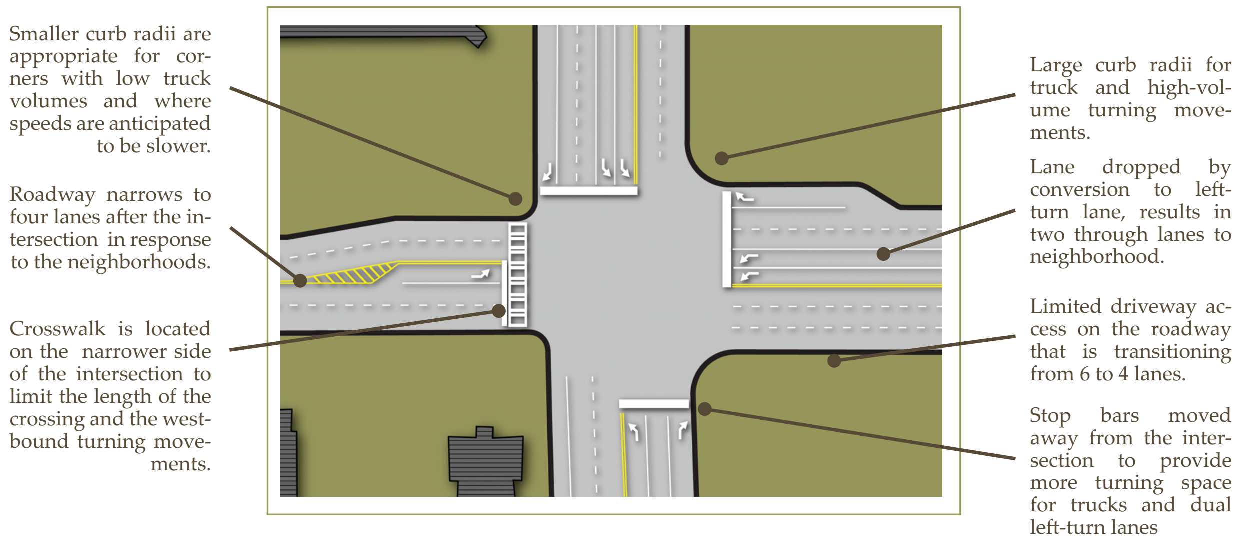
The most common obstacle on these transitional zones is driver expectancy, especially when dropping lanes at intersections. Without proper warning, for instance, of vehicle lanes ending, bicycle lanes beginning, or new medians, unconditioned drivers can create an unsafe transition zone for all users.

Oftentimes, transition points occur where there is a change in the land use resulting in a change in the traffic demand and composition. The most notable example of this is near interstate interchanges. Development immediately surrounding these areas is usually composed of high-intensity commercial-retail uses, responding to the existing high volumes of traffic and the available access to expressways. However, the commercial benefit of access only extends a few blocks away from the interchange, resulting in less intense neighborhood development beyond this area. Thus, the transition zone must efficiently change from servicing the mobility demands of high traffic generators to providing local neighborhood access and safety.

In Davenport, Interstates 74 and 80 intersect with many neighborhood arterials, with situations similar to the one described above ensuing. One such example is at Interstate 74 and 53rd Street where 53rd Street is quickly becoming a main access road for new development in northeastern Davenport and Scott County. Commercial, retail, and light industrial land uses are adjacent to the Interstate 74 corridor, but lower-density single-family neighborhoods begin just one or two blocks away. The diagrams at right provide visual examples of how the capacity demands in this area dictate the transition zones.

Important element to consider when designing a transition zone include: traffic volumes, traffic composition, points of access, primary land use, and expected travel speeds. Where high truck traffic is anticipated, curb radii should be larger, and stop bars for opposing traffic should be farther away from the intersection, providing necessary truck turning space. Crosswalks should be placed on the narrower side of the street, encouraging pedestrians to use the safest most logical crossing point. Driveway access near transitions should be limited in order to put the primary focus on the roadway changes.

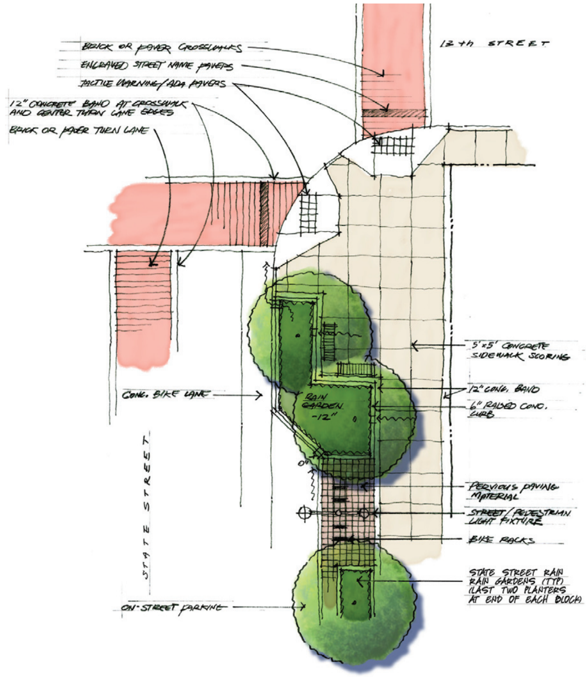




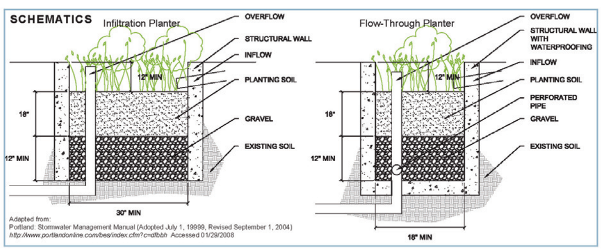
4.6 GUIDANCE ON GREEN STREETS

An emerging practice in urban street design is the concept of green streets, or the use of infrastructure elements that reduce environmental impact and the burden placed on supporting infrastructure such as stormwater collection. Green street design is also reconsidering how soils play a part in supporting tree and landscaping growth, suggesting that soil preparation for the cartway and sidewalk should differ from that used in the planting space of a street.

The diagrams to the right illustrate techniques for planter space configuration that allow stormwater collection and percolation, reducing the volume of stormwater that must enter into a distribution system. The principal components of such a design are that the ground level of the planter space is lower than the cartway surface, allowing stormwater runoff to drain into it, and is likewise also lower than the sidewalk. Raised curbs around the planter area protect pedestrians from walking or falling into this lower space, and periodic breaks in this curb along the cartway allow stormwater to enter and exit the space as needed.



Stormwater Planter



Adapted from:
Portland: Stormwater Management Manual (Adopted July 1, 19999, Revised September 1, 2004)
http://www.portlandonline.com/bes/index.cfm?c=dfbbh Accessed 01/29/2008

Structural Soil

Standard street construction practices heavily compact soil areas which typically result in poor urban tree growth.

Structural Soil consists of an angular aggregate and soil mixture that creates voids for air, water, and root growth

Chapter 8 DIM STREET NETWORK PLAN

The goal of Davenport in Motion is to provide a balanced transportation system and improve safety, access, and mobility for all street users. This chapter of Davenport in Motion identifies opportunities for adapting existing streets in Davenport to meet these goals and developing the street grid to improve citywide connectivity for all modes of travel. The chapter provides an overview of the existing street network, a street network plan for use in conjunction with the design principles and street designs contained in the DIM Street Design Guidelines (Chapter 7), and descriptions of recommended street projects.

EXISTING STREET NETWORK

Additional detail on existing conditions can be found in the Davenport in Motion Fact Book, Sections 2 and 3

As is typical of most U.S. cities, Davenport's street network is classified in a hierarchy according to the intended intensity of use, into major/minor arterial, collector, and local streets. These classifications focus on automobile carrying capacity and do not consider the needs of other modes of travel or other ways of measuring street usage, such as person-capacity. Arterial streets are the workhorse of the street system, providing access to and through neighborhoods and business districts, and connecting key activity centers and institutions, including schools, parks, hospitals, and major employment areas. A key principle emphasized in Davenport in Motion is that a network of many smaller streets has a greater capacity than a network comprised of a few larger streets. In a grid street system, a well-spaced network of major and minor arterial streets distributes traffic around the street system and provides alternative routes in case of an accident that disrupts traffic on one arterial. As shown in Figure 8-1, a grid of connected streets allows the most efficient travel routes for all modes, but is of particular importance for walking and walking access to transit. The map in Figure 8-2 highlights Davenport's existing arterial streets, along with the number of lanes and traffic volumes at key locations.

Figure 8-1 Alternative Street Patterns

A walking trip to a shopping center using the available route is 4,200 feet (over 3/4 of a mile) and would take about 16 minutes. Cul-de-sacs, curvilinear street patterns, discontinuous streets, and incomplete sidewalks are barriers to a convenient walk accessible to people of all ages and abilities.

A more desirable walking route is only 800 feet (much less than 1/4 of a mile) and would take about 3 minutes. A street grid offers direct walking paths and alternate routes to a destination.

Source: City of Davenport

STREET NETWORK PLAN

Network Improvements Approach

As discussed in the first several chapters of this plan, Davenport in Motion recommends that the City pursue a network strategy comprised of numerous smaller projects to address traffic congestion and roadway capacity issues. These projects would build out the street grid in newer parts of Davenport where the street grid is not well developed and expand opportunities for all modes of travel. This strategy has not only been proven effective in addressing congestion but has safety and livability benefits.

In contrast, the alternate scenario that many cities have tried is to expand the capacity of individual roadways through widening and adding lanes. The congestion-reduction benefits of this scenario are typically short-lived as the capacity attracts additional vehicle trips from other routes, times, and modes of travel. Such roadways become less attractive to walking and bicycling on or across them and can evolve into significant barriers within a community.

Downtown Street Designs

Davenport's downtown streets are among the City's most valuable resources, both functionally in moving people around and as public spaces. Investing in making the downtown core highly walkable and improving downtown streets to facilitate and balance travel by all modes – private vehicles, transit, pedestrians, and bicyclists – will encourage street life, foster the vitality of local businesses, and make downtown transportation more functional and efficient.

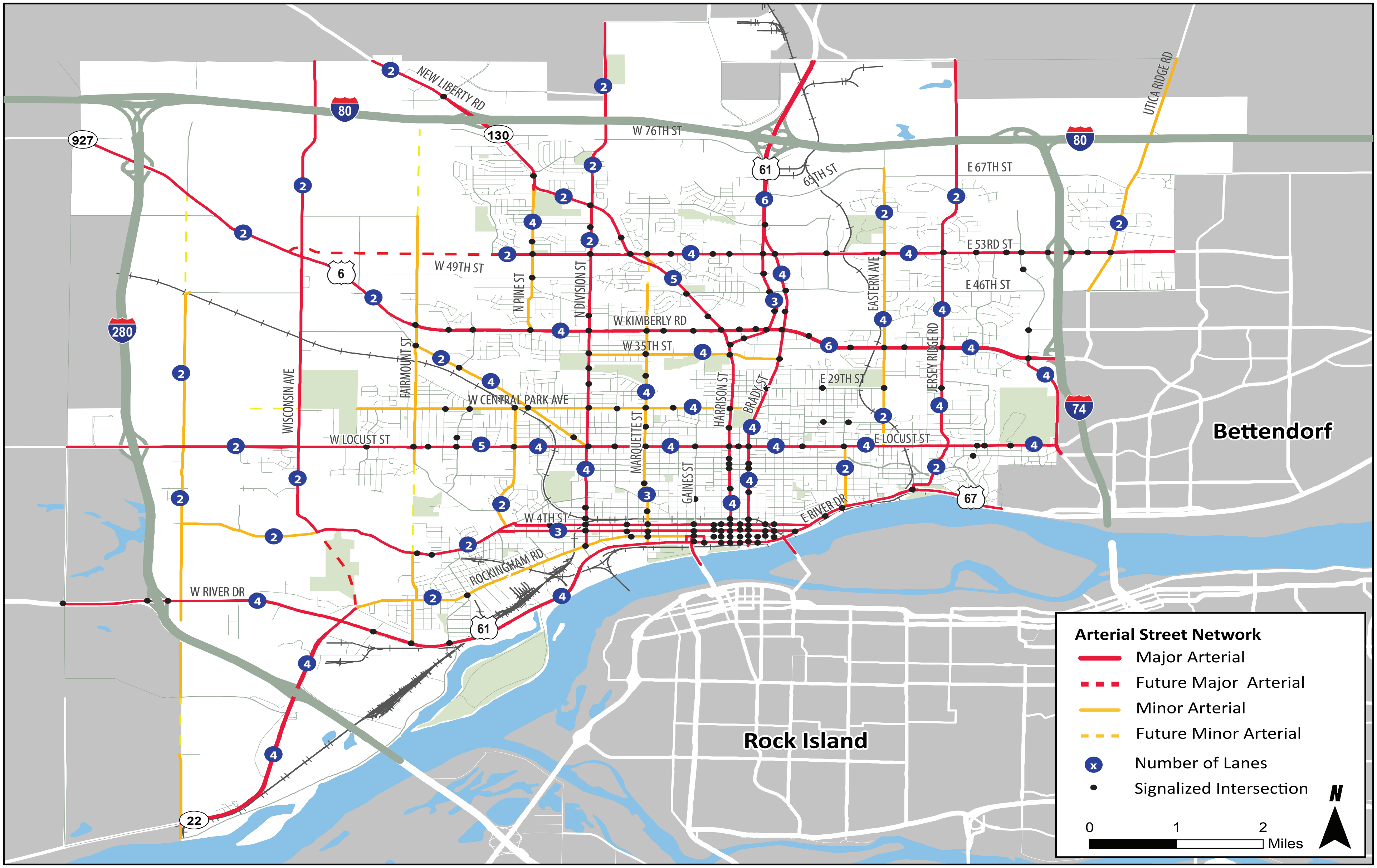
Section 2 of the Davenport in Motion Street Design Guide (Chapter 7) provides conceptual designs for each downtown street. The downtown street designs assume that limited funding is available for moving curbs and changing street dimensions, with the exception of Main Street, and focus on improvements that can be made in the short-term with relatively inexpensive restriping.

Citywide Street Designs

The DIM Street Design Guide provides a range of street designs for use citywide in the projects recommended in this plan – retrofits of existing streets, new street connections, and streets in newly developed parts of the City. The table in Figure 8-3 summarizes the characteristics of these citywide street designs, which are more fully described, including graphical illustrations, in Section 3 of the DIM Street Design Guide.

It should be emphasized that the design characteristics illustrated in the Street Design Guide are for new streets of each type and will need to applied to existing streets depending on specific street dimensions and context, such as whether a street has on-street parking and whether it is recommended as part of the Davenport Bicycle Network. When existing streets are retrofitted, these designs need to be adjusted to the existing street dimensions, which are usually more constrained than a newly built street. The project descriptions for retrofit projects include cross-

Figure 8-2 Existing Arterial Network Map



Nelson|Nygaard consulting associates

GIS Data Source: City of Davenport, IA

Figure 8-3 Davenport in Motion Citywide Street Designs (Typical)

Street Design Type / Design Element	Transitional Commercial Arterial	Commercial Collector	Neighborhood Arterial	Neighborhood Arterial Bridge	Neighborhood Collector
Potential Context: New Construction	N/A	Elmore Ave. (N. of 60th) 35th St. (E. of Brady)	46th St. (Tremont-Eastern)	E. 46th St. Bridge	29th (Eastern-Jersey Ridge)
Potential Context: Retrofit	W. Kimberly Rd., 53rd St.	Hickory Grove Rd. (Fairmount-Locust)	Central Park Ave. Pine (N. of Kimberly)		
Right-of-Way	100'	85'	78'	44'	65'
Design & Posted Speed	35 mph	30 mph	30 mph	25 mph	25 mph
Travel Lanes (per direction)	maximum 2	maximum 1	1	maximum 1	maximum 1
Travel Lane Dimensions	11'	11'	11'	10'	10'
Turn Lane Dimensions	12' left turn lane when incorporated into median; right turn lanes allowed for heavy turning movements or truck traffic	11' left turn lane at intersections	11' two-way left turn lane	none	none
Medians	12'	11'	11' (substitutes with turn lane, as needed or appropriate)	none	none
Median Openings	cross streets only	cross streets and major access points	cross streets and high left-turn demand	n/a	n/a
Bicycle Lanes	When part of Bicycle Network (6' when used). Shared-lane design should not be used on multi-lane arterial streets.	When part of Bicycle Network (5' when used). Dimensional constraints on existing streets may require shared lane design.		5' required; if not part of the Bicycle Network, reserve 5' for future bike lanes.	necessary when part of Bicycle Network (5' when used). Dimensional constraints on existing streets may require shared lane design.
On-Street Parking	none	7' parallel	7' parallel	none	7' parallel
Curb	6" with 1' gutter pan	6" with 1' gutter pan	6" with 1' gutter pan	6" with 1' gutter pan	6" with 1' gutter pan
Planting and Furnishing Space	5'	6'	5.5' suggested	none	5.5'
Sidewalk	10'	8'	5'	5' minimum	5' minimum
Mid-block crossings	when warranted by conditions (blocks longer than 600', unusually high pedestrian activity)	in conjunction with median breaks for access points, when warranted	not needed	not needed	not needed
Intersection Control	signals (cross streets only)	signals, stops, or roundabouts			
Lighting	Pedestrian and vehicle/street required. Minimum horizontal clearance should be 1.5'.				
Block Length	dictated by intersecting streets, not more than 500', mid-block curb cuts limited		dictated by intersecting streets, 500' suggested	dictated by length of crossing	dictated by intersecting streets, 500' suggested

Figure 8-3 Davenport in Motion Citywide Street Designs (Typical) - Continued

Street Design Type / Design Element	Neighborhood Local	Rural Arterial	Industrial Collector / Street
Potential Context: New Construction	Sturdevant (Lambs-W. 46th Extension)		Tremont Ave. (59th-Veterans Memorial)
Potential Context: Retrofit		Telegraph Rd. Wisconsin Ave.	
Right-of-Way	50’	36’	80’
Design & Posted Speed	25 mph	45 mph	35 mph
Travel Lanes (per direction)	maximum 1	maximum 1	maximum 1
Travel Lane Dimensions	14.5’	12’ with 6’ shoulders	12’ with 7.5’ paved shoulder
Turn Lane Dimensions	none	none	12’ TWLTL (Two-way left turn lanes)
Medians	none	none	none
Median Openings	n/a	n/a	n/a
Bicycle Lanes	low volume shared ROW	shoulder space	If required, mark shoulders for bicycle lanes
On-Street Parking	none	none	none
Curb	6” with 1’ gutter pan	no curb	6” F-type with 1’ gutter pan
Planting and Furnishing Space	5.5’	n/a	9.5’, can accomodate utility zone of 2’
Sidewalk	5’ minimum	not needed	5’ on at least one side of the street
Mid-block crossings	not needed	not needed	none
Intersection Control		signals, stops, or roundabouts	signals, stops, or roundabouts
Lighting	Pedestrian recommended. Minimum horizontal clearance 1.5’.	not needed	Vehicle/street only, recommended where visibility is low. Minimum horizontal clearance should be 1.5’.
Block Length	dictated by intersecting streets, 500’ suggested	not applicable	varies by land use needs

section illustrations that are more typical of street retrofits. As with the downtown streets, many retrofits can be made in the short-term with relatively inexpensive restriping.

Pedestrian Environment Design

Sections 2C and 3A of the Davenport in Motion Fact Book (Volume 4) discuss four conditions needed to create a favorable walking environment, each necessary but not sufficient.

Two of these conditions are a safe and comfortable walk.

The downtown and citywide streets designs in the DIM Street Design Guide (Chapter 7) integrate features for pedestrian safety and comfort into the overall design of each type street. These include:

- Ensuring that vehicles do not travel at excessive speeds, such as by ensuring travel lanes of the proper width (generally 10 to 11 feet)
- Creating buffers between the sidewalk and vehicle travel lanes, including continuous rows of street trees, on-street parking, and bicycle lanes
- Providing adequate lighting, crossings, and block lengths and limiting curb cuts

The remaining conditions are a reason to walk and an interesting walk.

Creating downtown complete streets that promote walking downtown is a particular focus of this plan – since all trips downtown end with a walking trip and these streets are the only ones truly shared by all residents. Citywide, walking routes can be prioritized to provide access to places where people want to go – schools, public facilities, and neighborhood commercial zones. An interesting walk is one where a variety of engaging uses are located along these routes, particularly retail storefronts built up to the sidewalk, and one which avoids blank walls and parking lot edges.

An interesting walk is an attractive walk

Source: Jeff Speck

WALKING ACCESS TO TRANSIT

Most transit trips begin and end with a walking trip. This makes the pedestrian environment along transit routes critical to encouraging use of transit, particularly for riders who have other options. In addition to the conditions and design principles for a safe and comfortable walk, described above, several important attributes of pedestrian access to transit include:

- Directness: walking routes to transit stops must be continuous and reasonably efficient for overall transit travel to be competitive. A direct path on a street grid contrasts with cul-de-sacs, curvilinear street patterns, and discontinuous streets, as shown in Figure 8-1 above. Creating pedestrian cut-throughs can improve pedestrian access in existing neighborhoods.
- Safety. Street crossings must serve transit stops on both sides of a street.
- Accessibility: Transit riders with mobility impairments need a clear sidewalk path from their front door to the bus stop.

Missing or incomplete sidewalks along both commercial and residential streets can make walking less attractive and transit inaccessible

Source: City of Davenport

The Davenport in Motion Primary Transit Network, described in the Transit Element (Chapter 10), identifies Davenport's most important transit corridors and is a means for prioritizing pedestrian access improvements.

SAFE ROUTES TO SCHOOL

Another means of prioritizing and funding pedestrian improvements is providing safe walking and bicycling environments along school access routes. Safe Routes to School (SRTS) is a federal program, administered through state departments of transportation, whose goals are to:

- Enable and encourage children to walk and bicycle to school
- Make walking and bicycling to school safer and more appealing, encouraging active and healthy lifestyles
- Improve safety and reduce traffic, fuel consumption, and air pollution around schools, through a range of projects and activities

SRTS programs typically follow a "5E" approach, incorporating Engineering, Education, Enforcement, Encouragement and Evaluation components. Over $180 million in federal funding was allocated to the SRTS program in the 2009 fiscal year, including nearly $1.7 million in Iowa.

As discussed in the DIM Fact Book, Section 7D, childhood obesity rates across all age groups have increased dramatically in the U.S. over the past several decades, including a more than three-fold increase for adolescents aged 12 to 19 years between 1976-1970 and 2003-2006. Over the same period, walking and bicycling to school has decreased dramatically. According to the Iowa Department of Transportation's SRTS website, about half of all children walked or biked to school in 1969, compared to about 15% today, and only 29% for trips less than one mile.[1]

According to a 2004 study by the U.S. Centers for Disease Control, the three most frequently cited barriers to walking and biking to school are long distances (62%), traffic safety concerns (30%), and weather (19%). Note: multiple responses were allowed

Source: Dan Burden

1 http://www.iowadot.gov/saferoutes/

Davenport in Motion Street Project Types

The primary categories of street improvement projects recommended by Davenport in Motion include:

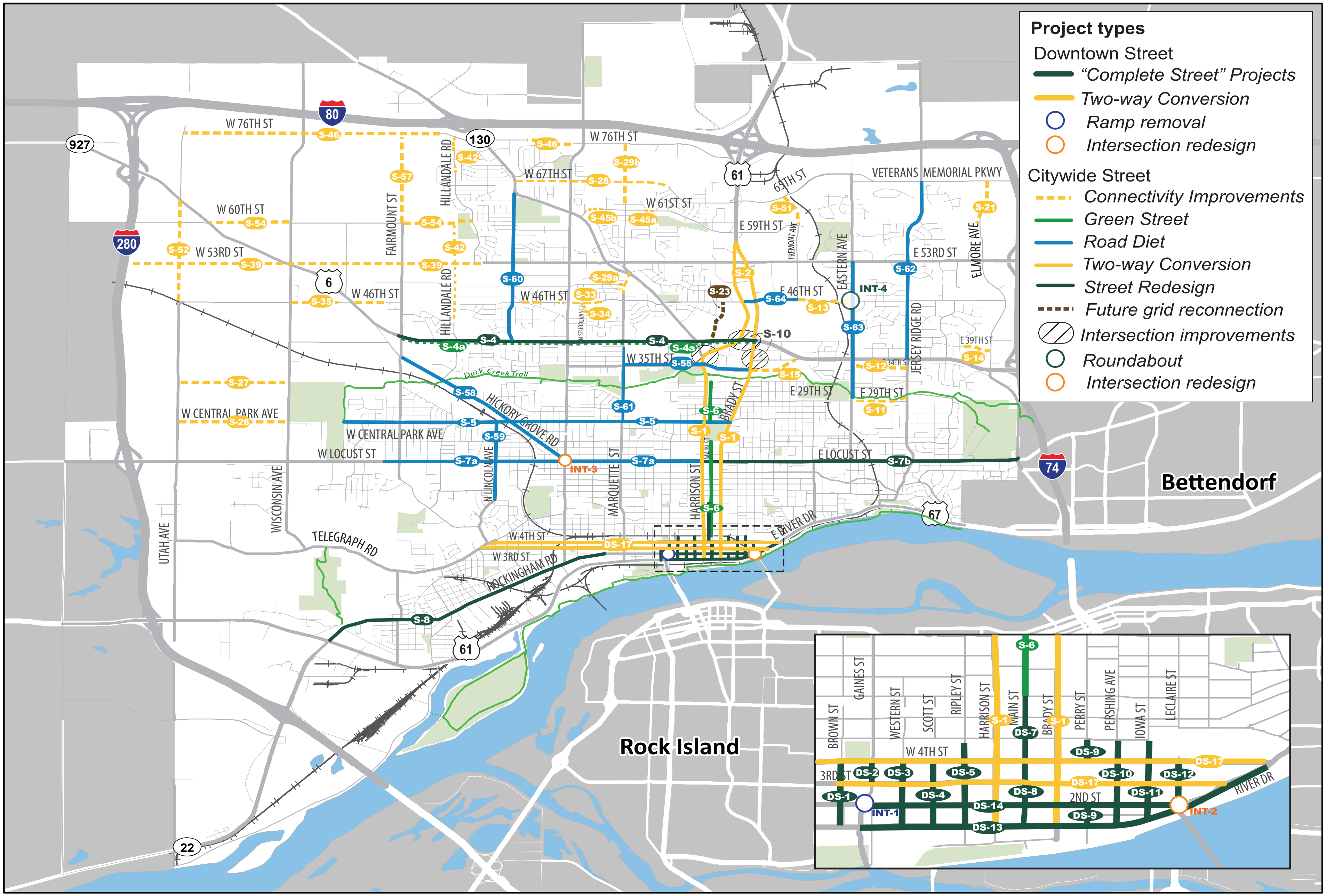
- **"Complete streets."** These are streets that accommodate multiple modes of travel, including bicycles, pedestrians, and transit, depending on the unique role and requirements of each street. Complete street projects are recommended for both downtown and citywide streets.
- **"Road diets."** A Road Diet is a technique for reconfiguring four-lane roadways with excess capacity, typically traffic volumes between 15,000 to 20,000 ADT (average daily traffic), to have three lanes – one travel lane in each direction with a two-way turn lane. The two-way turn lane increases safety and compensates for the loss on a through travel lane, since turning vehicles no longer block a travel lane of traffic, and turning drivers have better visibility of oncoming vehicles. Depending on the roadway function, the street can be restriped to have bicycles lanes or on-street parking and the reconfigured lanes may be narrower than existing lanes, all of which provides traffic calming.
- **Conversion of one-way streets to two-way operation.** Many cities implemented one-way streets several decades ago to ensure that new suburban residential areas would have fast commute travel times to downtown employment centers. However, this demand is only present at peak weekday commute times. One-way streets tend to increase travel speeds and to have a negative impact on businesses, since businesses are only visible and accessible from one direction of travel. Businesses may also be impacted by time-of-day travel patterns, such strong morning and afternoon commute demand in only one direction. A number of cities have been converting one-way streets back to two-way configurations in recent years.
- **Connectivity improvements and new street connections to reconnect the local and arterial street grid.** In parts of Davenport that have already been developed with cul-de-sacs or where creeks or railroad tracks create barriers to efficient travel, poor street connectivity increases walking times and distances, making it less attractive to walk to retail establishments or to access transit. This plan identifies street connections that expand travel options by all modes – car, bicycle, walking, and transit. A connection of particular importance is along E. 46th Street between Eastern and Tremont (project S-13 in Figure 8-4), which would begin to establish a continuous, traffic calmed street and bicycle connection north of Kimberly Road. A roundabout along Eastern Avenue (project INT-4) is an example of traffic calming techniques that would help ensure that traffic speeds on reconnected streets would remain safe and at a level suitable for neighborhood connections by all modes. In parts of Davenport that are still being developed or will be developed in the future, particularly the Northwest quadrant, the street connections identified in this plan are long-term in nature and would occur in conjunction with development.

Recommended Street Projects

The map in Figure 8-4 illustrates the Davenport in Motion recommended street projects. Downtown street projects are coded with a "DS" while citywide street projects use a "S." Intersection projects are denoted with an "INT" prefix. Chapter 5 of this plan recommends general time frame priorities for each project, and shows the overlap between recommended street and bicycle projects. The descriptions of each project provided in the following section list the recommended time frame for each project; some projects are funded and ready to proceed while others are extremely long-term and depend on future redevelopment. The priority categories are:

- **First year**: these are projects of utmost priority in meeting City goals, particularly economic and safety goals, and those projects that are funded and ready to proceed. The first year of this plan is considered to start in January 2011.
- **Short-term**: projects recommended for implementation in the 1 to 3 year timeframe.
- **Medium-term**: projects recommended for implementation in the 3 to 10 year timeframe.
- **Long-term**: projects likely to be implemented beyond 10 years from the time of this plan; these are projects that are important for the development of the City transportation network, but are unlikely to be funded in the next 10 years or depend on redevelopment.

Figure 8-4 Davenport in Motion Street Projects



GIS Data Source: City of Davenport, IA

Nelson|Nygaard consulting associates

STREET PROJECT DESCRIPTIONS

Davenport in Motion is a citywide comprehensive transportation plan. It is intended to be a guiding document for development of the City's transportation systems over the next 10 or more years. While recommended projects have been evaluated for feasibility based on physical conditions and traffic volumes, with a few exceptions, neither detailed design or traffic modeling were conducted for specific corridors or streets. These steps should be taken prior to project implementation, particularly in arterial corridors with higher traffic volumes.

This section provides descriptions for all street projects shown in Figure 8-4. The descriptions are organized into downtown and citywide streets categories, and then by project number within one of several subcategories:

- Conversion of one-way streets to two-way configuration, i.e. 3rd/4th and Brady/Harrison
- Complete streets (downtown) and related downtown intersection projects
- Road diets or complete street redesigns of major citywide streets, including related intersection projects
- Citywide connectivity improvements including related intersection projects, organized by geographic region of the city

The lists of project descriptions provided below can also be used to locate specific descriptions by project type or project number.

By Project Type / Geographic Area

By Project Number

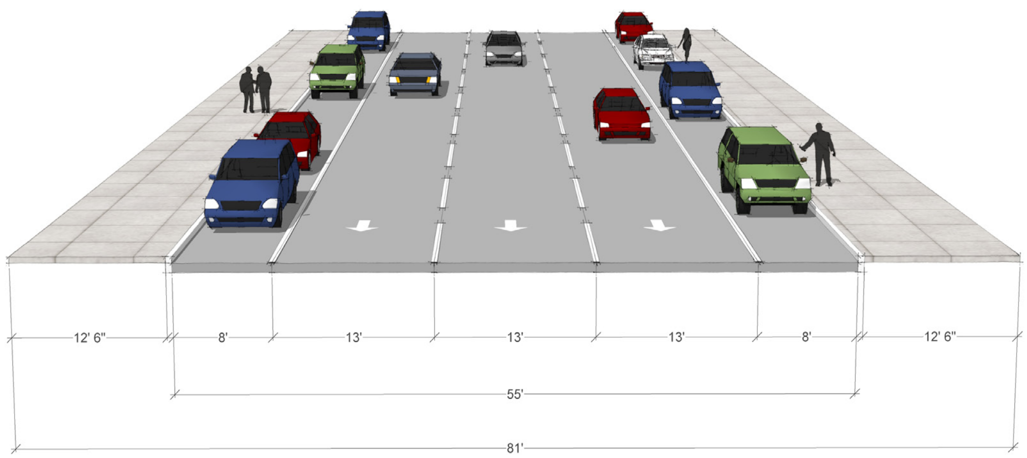
By Project Number (continued)

DOWNTOWN STREET PROJECTS

One- to Two-way Conversions

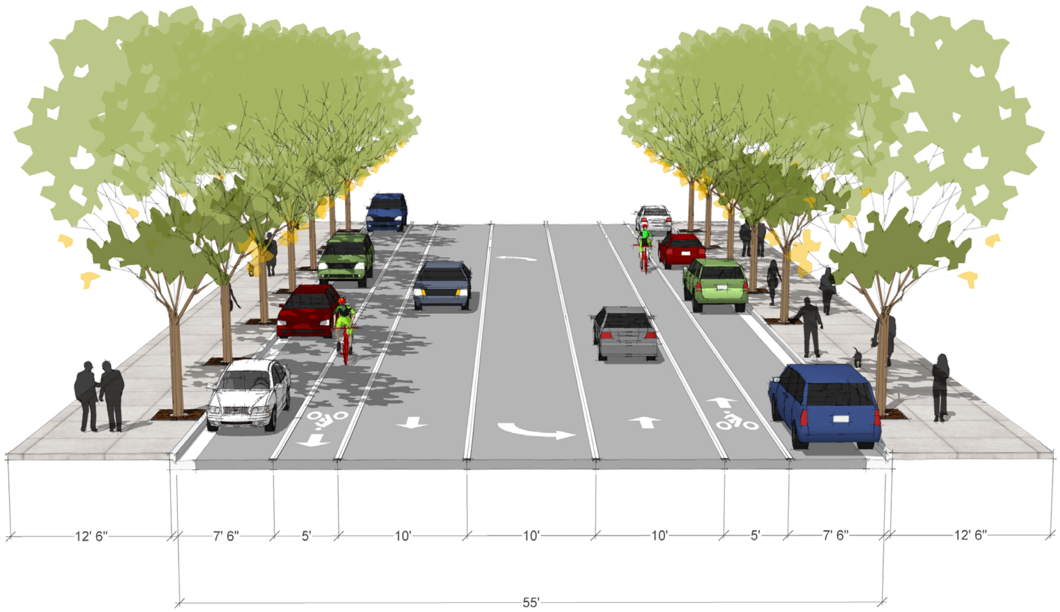
DS-17: 3rd and 4th Streets Two-Way Conversion			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Downtown Streets Two-Way Conversions	First Year	Telegraph Road to River Drive	$ 4,500,000 - $4,800,000

Project Description: Convert one-way eastbound 3rd Street and one-way westbound 4th Street to two-way operations, using three-lane sections (two travel lanes with a two-way left turn lane) with on-street bicycle lanes and parallel parking. This project scope incorporates street restriping (but not a full resurfacing) and modifications to existing traffic signals to allow for two-way control.

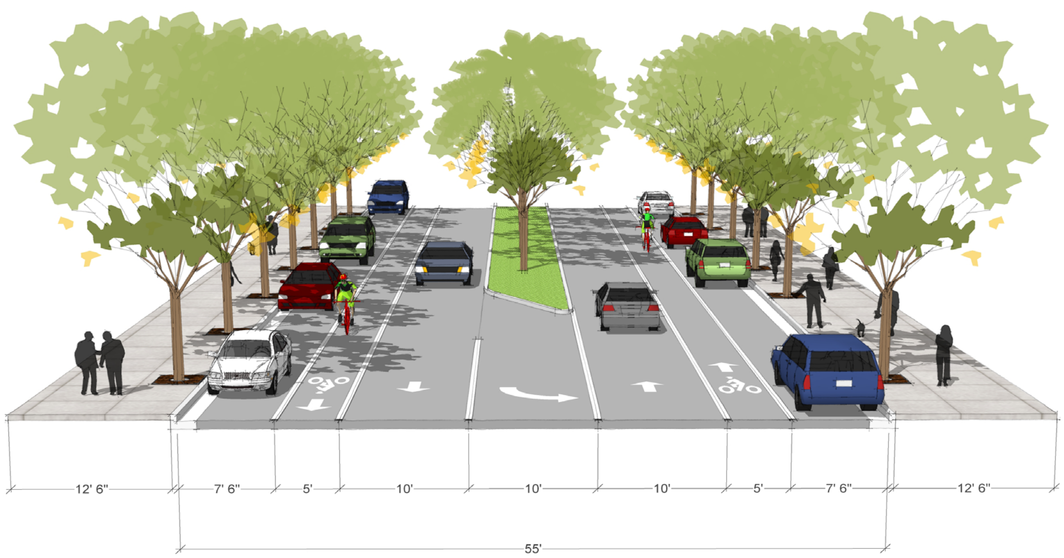


Proposed Cross-section: Two travel lanes (one per direction), two-way left turn lane, five-foot on-street bicycle lanes and on-street parking. Curb-to-curb dimensions do not change.

Short-term:



Long-term:



Traffic Analysis: Volume Reassignment

To gauge the effects of the two-way conversion of these streets, assumptions on traffic volume assignments on 3rd and 4th Streets were developed and applied to a modified traffic model. Traffic count data were not available for intersections along 3rd Street, so these volumes were estimated using the 4th Street volumes. Specifically, the following assumptions were taken:

Both 3rd and 4th Streets: 50 percent of traffic in each direction is transferred to the other street between Telegraph Road and River Drive. These streets form the bounds for both 3rd and 4th Streets, so this also assumes that drivers will automatically choose the desired street rather than having to transition between the two streets prior to reach their destination. Turning movement counts, such as the eastbound turn to the northbound direction, were divided into four parts and distributed among the four intersections of Brady, Harrison, 3rd, and 4th. As one-way links, these intersections provided only one location where a specific turning movement could occur. Therefore, this 25 percent assumption is based on the idea that conversion to two-way links will provide four locations for any one turning movement to occur.

3rd Street: Baseline volumes were estimated using the ratio between the 3rd and 4th Street average annual daily traffic volumes. Daily traffic volumes on 3rd Street are approximately 93 percent of daily volumes on 4th Street. Eastbound through and turning movements along 4th Street were multiplied by this ratio to get estimated volumes for 3rd Street.

4th Street: Traffic volumes were not available for the intersection of 4th Street and River Drive, so the performance of this intersection was assumed to be similar to the performance of 3rd Street and River Drive.

Intersection analysis

The one-way to two-way conversion projects were analyzed using the Synchro microsimulation software, developing scenarios for both the AM and PM peak hours based on the study year's traffic counts (2009), and a forecast year travel count (2030). This analysis included all intersections with Harrison Street, and Brady Street, and the intersection of 3rd Street & River Drive. The focus of this analysis was on the intersections with other streets that are planned for cross-sectional or directional changes.

Traffic growth rates were based on population forecasts in the Davenport Comprehensive Plan. This translated to an overall citywide growth rate of approximately 2.5 percent, and this rate was applied to all turning movements based on intersection counts.

To provide a brief comparison of the operations under each scenario, overall intersection level of service (based on HCM average control delay) is listed here for each of the intersections studied. As seen in the table, there are no intersections below a Level of Service B, and no intersections show a significant degradation in LOS after the modified configuration is implemented.

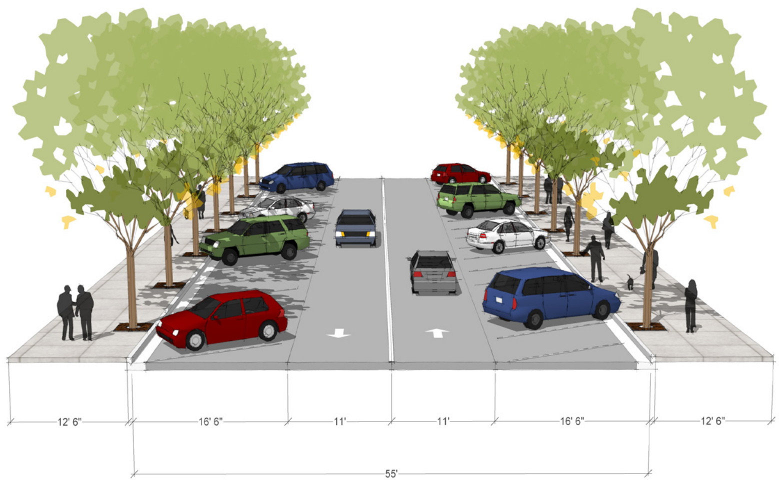
	Existing Configuration		Modified Configuration	
	2009 LOS (AM/PM)	2030 LOS (AM/PM)	2009 LOS (AM/PM)	2030 LOS (AM/PM)
3rd Street at Harrison	A/A	A/A	A/A	A/A
3rd Street at Brady	**A/A**	**A/A**	**A/A**	**A/A**
3rd Street at River	**A/A**	**A/A**	**B/A**	**B/A**
4th Street at Harrison	**A/A**	**A/A**	**A/A**	**A/A**
4th Street at Brady	**B/A**	**B/A**	**A/B**	**A/B**

DS-1: Brown Street Complete Street

Project Category	Priority	Project Location / Extent	Estimated Cost
Downtown Streets	Short-Term	River Drive to 4th Street	N/A

Project Description: Brown Street would be converted from the current two travel lanes in each direction with parallel parking on both sides of the street to one travel lane in each direction with angle parking on both sides of the street.

Proposed Cross-section: Urban 2-Lane Parking Street



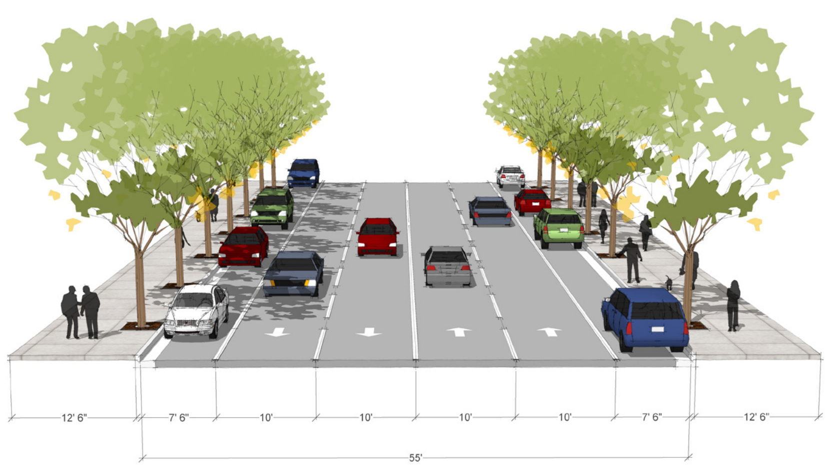
DS-2: Gaines Street Complete Street

Project Category	Priority	Project Location / Extent	Estimated Cost
Downtown Streets	First Year	3rd Street to 4th Street	N/A

Project Description: This one block segment of Gaines Street primarily involves redesigning the intersections at 3rd and 4th Streets in conjunction with the conversion of those streets to two-way operation. Therefore this is recommended as a first year project in conjunction with the 3rd/4th two-way to one-way conversion.

The street cross-section will remain similar to its current configuration, with two travel lanes in each direction and parallel parking on both sides of the street. Gaines Street transitions to two lanes in each direction north of 4th Street; one northbound lane would likely continue straight across 4th Street while the other lane would be a left-turn only lane onto westbound 4th Street.

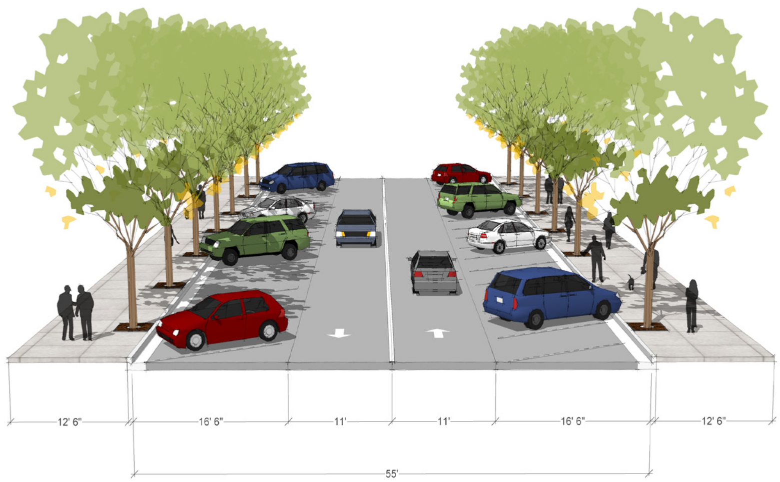
Proposed Cross-section: Urban 4-Lane Transition Street



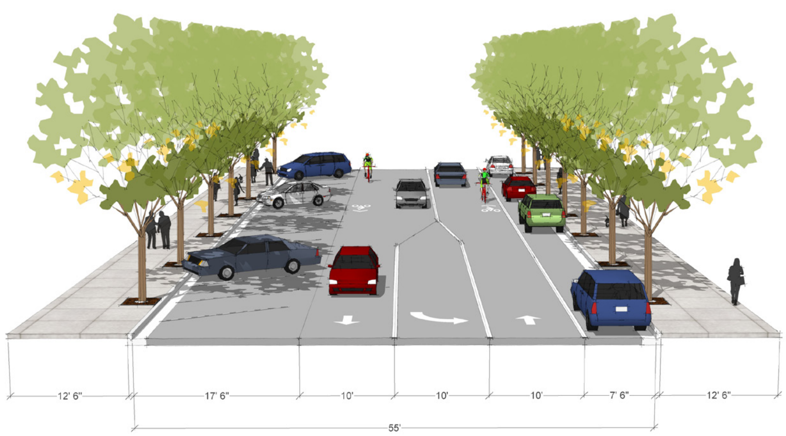
DS-3: Western Avenue Complete Street			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
Downtown Streets	Short-Term	River Drive to 2nd Street and 2nd Street to 5th Street	N/A

Project Description: Western Avenue would generally remain similar to its current configuration. In the block between River Drive and 2nd Street, there would be angle parking on one side of the street and parallel parking on the other side, to allow for left-turn lanes at the intersections. Between 2nd Street and 5th Street there would be angle parking on both sides of the street. The sidewalk zone would retain its current configuration, with a walk zone and landscaped curb zone separating it from the street. However, at the south block of Western Avenue, a different cross-section with a turn-lane would be used.

Proposed Cross-section: 2nd Street to 5th Street, Urban 2-Lane Parking Street



Proposed Cross-section: River Drive to 2nd Street, Urban 2-Lane Street

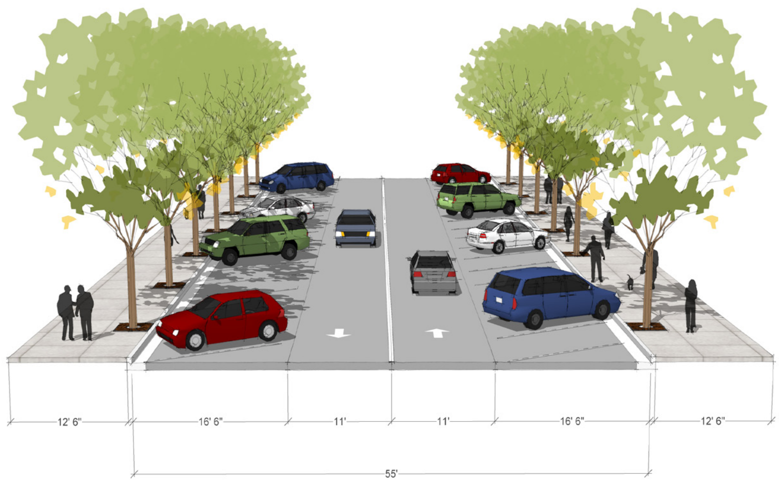


DS-4: Scott Street Complete Street

Project Category	Priority	Project Location / Extent	Estimated Cost
Downtown Streets	Short-Term	River Drive to 4th Street	N/A

Project Description: Scott Street would be converted to one travel lane in each direction with angle parking on both sides of the street; it currently has two lanes in each direction and parallel parking on both sides of the street. Scott Street does not currently have landscaping in its curb zones.

Proposed Cross-section: Urban 2-Lane Parking Street

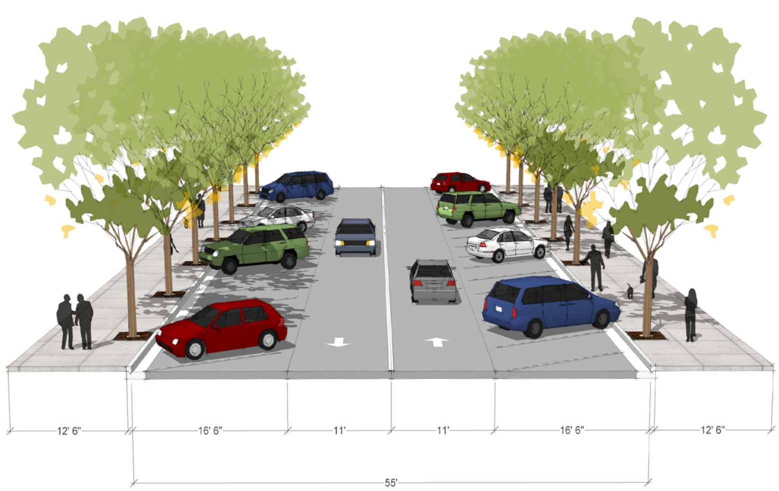


DS-5: Ripley Street Complete Street

Project Category	Priority	Project Location / Extent	Estimated Cost
Downtown Streets	Short-Term	River Drive to 5th Street	N/A

Project Description: Ripley Street would have one travel lane in each direction and angle parking on both sides of the street. It currently has angle parking on the west side of the street and parallel parking on the east side of the street, except between River Drive and 2nd Street where there is parallel parking on the west side and no parking on the east side.

Proposed Cross-section: Urban 2-Lane Parking Street

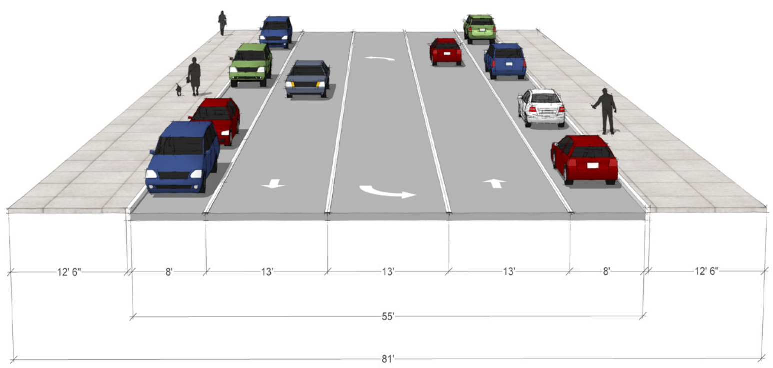


DS-7: Main Street Complete Street			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
Downtown Streets	First Year	4th Street to 7th Street	N/A

Project Description: This project would replace the center turn-lane on this key downtown segment of Main Street with a landscaped median and is identified as a first-year project since it has an existing funding source. There would be one 13-foot travel lane in each direction, with sharrow pavement markings to accommodate bicycle traffic (see bicycle project B-29). On-street parking would be retained on both sides of the street and would buffer pedestrians from vehicle traffic in conjunction with 5-foot sidewalks and a 7.5' planting strip.

Related Projects: DS-8 Main Street Complete Street, River Drive to 4th Street (Short Term); S-6 Main Street Green Street, N. of 7th Street (Short-term); B-29 Main Street Bicycle Route Markings (Short-term)

Existing Cross-section:



Proposed Cross-section: Urban 2-Lane Median High Street

DS-8: Main Street Complete Street

Project Category	Priority	Project Location / Extent	Estimated Cost
Downtown Streets	Short-Term	River Drive to 4th Street	N/A

Project Description: This project would remove the center turn lane from on this segment of Main Street and expand the sidewalk zone by 12.5 feet on both sides of the street into the existing street cartway. On-street parking would be retained on both sides of the street, however due to limited right-of-way, it is not possible to accommodate both parking and bike lanes. Main Street is an existing designated bicycle route; project B-29 would add "sharrow" pavement markings.

Related Projects: DS-7 Main Street Complete Street, 4th Street to 7th Street (First Year); S-6 Main Street Green Street, N. of 7th Street (Short-term); B-29 Main Street Bike Route Markings (Short-term)

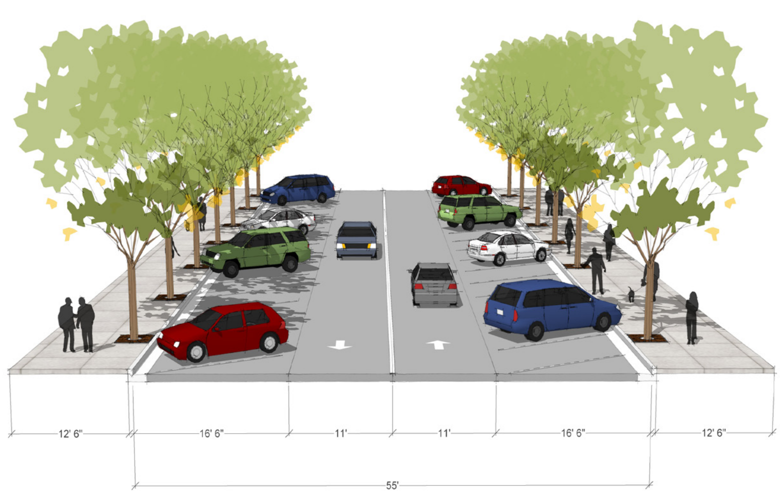
Proposed Cross-section: Urban 2-Lane High Street

DS-9: Perry Street Complete Street

Project Category	Priority	Project Location / Extent	Estimated Cost
Downtown Streets	Short-Term	River Drive to 2nd Street and 4th Street to 5th Street	N/A

Project Description: These segments of Perry Street would be converted from two travel lanes in each direction with parallel parking on both sides of the street, to one travel lane in each direction with angle parking on both sides of the street.

Proposed Cross-section: Urban 2-Lane Parking Street



DS-10: Pershing Avenue Complete Street

Project Category	Priority	Project Location / Extent	Estimated Cost
Downtown Streets	Short-Term	River Drive to 5th Street	N/A

Project Description: Pershing Avenue would be converted from angle parking on the west side and parallel parking on the east side to angle parking on both sides of the street. It would remain one travel lane in each direction.

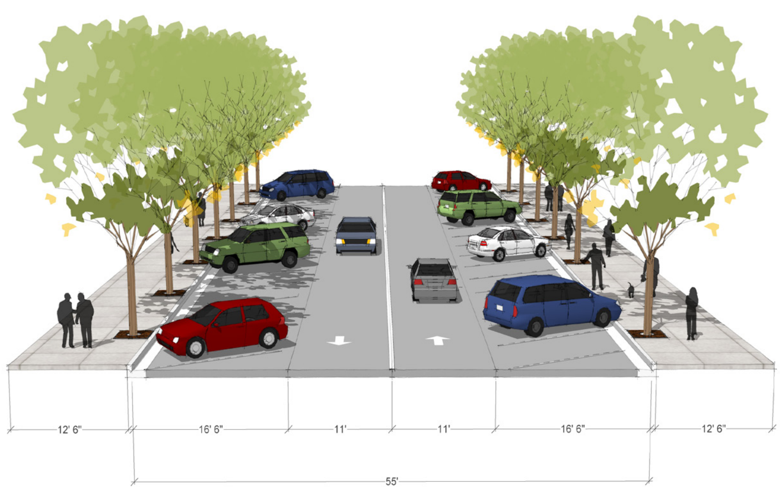
Proposed Cross-section: Urban 2-Lane Parking Street

DS-11: Iowa Street Complete Street

Project Category	Priority	Project Location / Extent	Estimated Cost
Downtown Streets	Short-Term	River Drive to 5th Street	N/A

Project Description: Iowa Street would continue to have one travel lane in each direction but turn lanes would be eliminated and parallel parking on both sides of the street on most blocks converted to angle parking on both sides of the street.

Proposed Cross-section: Urban 2-Lane Parking Street

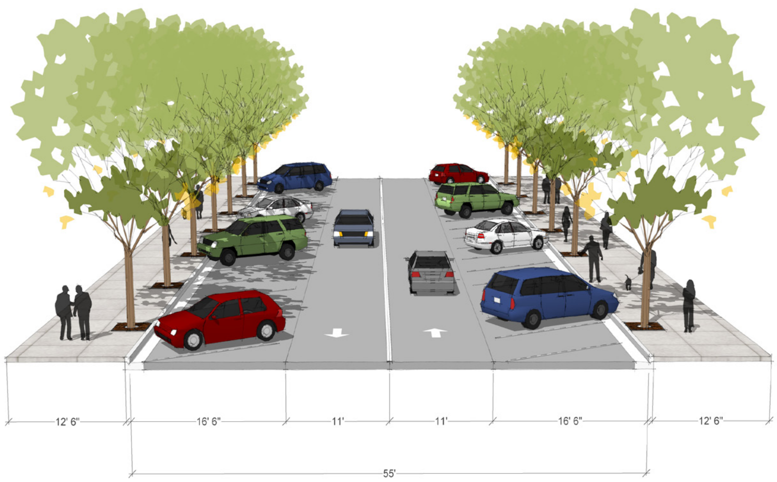


DS-12: Leclaire Street Complete Street

Project Category	Priority	Project Location / Extent	Estimated Cost
Downtown Streets	Short-Term	River Drive to 4th Street	N/A

Project Description: Leclaire Street would be converted from parallel parking on the both sides of the street to angle parking on both sides of the street. It would remain one travel lane in each direction.

Proposed Cross-section: Urban 2-Lane Parking Street

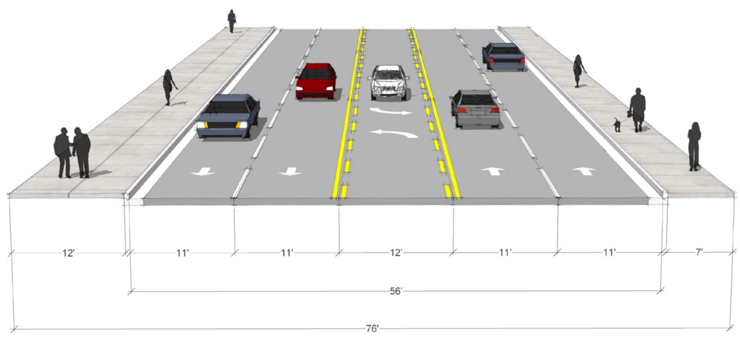


DS-13: River Drive Median Design and Construction

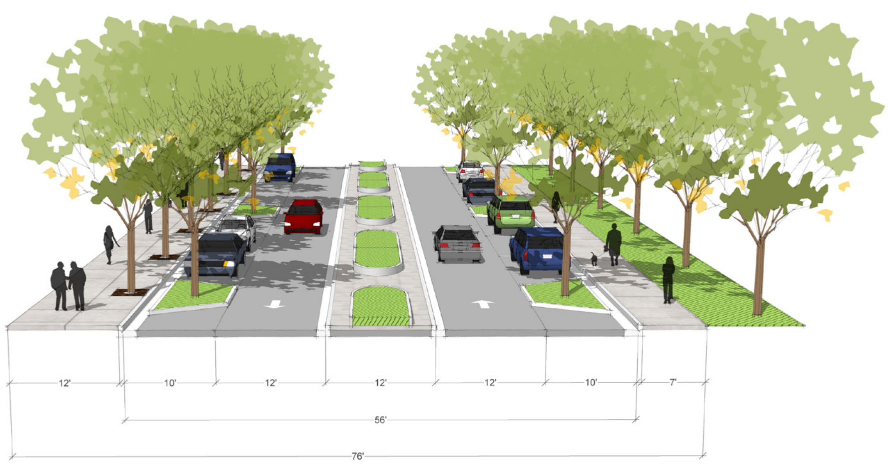
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Downtown Streets East-West Streets	Short-term	Gaines Street to Fourth Street	N/A

Project Description: Construct a raised median on River Drive, replacing the current two-way left turn lane and adding left-turn storage pockets as needed. Convert one travel lane in each direction to on-street parking articulated by planted bulb-out islands (these are not conventional curb extensions, but rather islands that allow a drainage channel to be maintained along existing curbs to facilitate stormwater distribution).

Existing Cross-section:



Proposed Cross-section: This section would keep current curb and drainage placement and coincides with the current project to construct a raised median in River Drive's current two-way left turn lane.



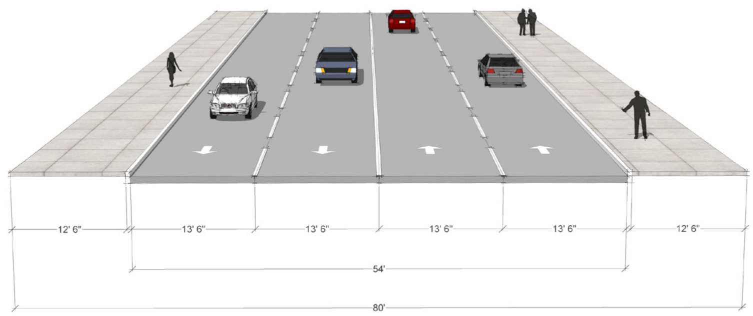
DS-14: 2nd Street Complete Street

Project Category	Priority	Project Location / Extent	Estimated Cost
Downtown Streets	Short-term	Gaines Street to River Drive	N/A

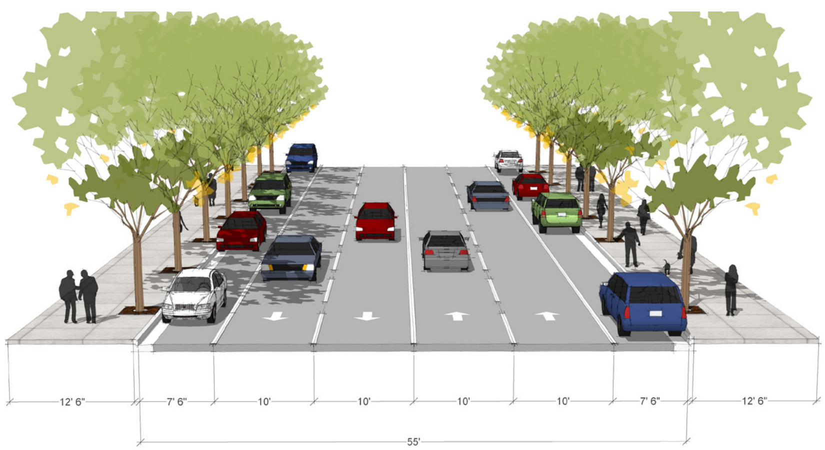
Project Description: This project would redesign 2nd Street between Gaines Street and River Drive. Between Gaines Street and Western Avenue, 2nd Street would transition from the current two travel lanes in each direction to one travel lane in each direction east of Western Avenue. There would be on-street parallel parking on both sides of the street but sidewalks would be similar to the current configuration – 12.5 feet with a minimum 8-foot walk zone and a curb zone for plantings and furnishings incorporated into the sidewalk. Between Western Avenue and River Drive, 2nd Street would have one 10-foot travel lane in each direction with a center turn lane. Angle street parking would be used on one side of the street and parallel parking on the other side. The sidewalk configuration would be similar to between Gaines Street and Western Street.

Related Projects: The redesign of the Gaines / 2nd intersection (INT-2) may be coordinated with this project.

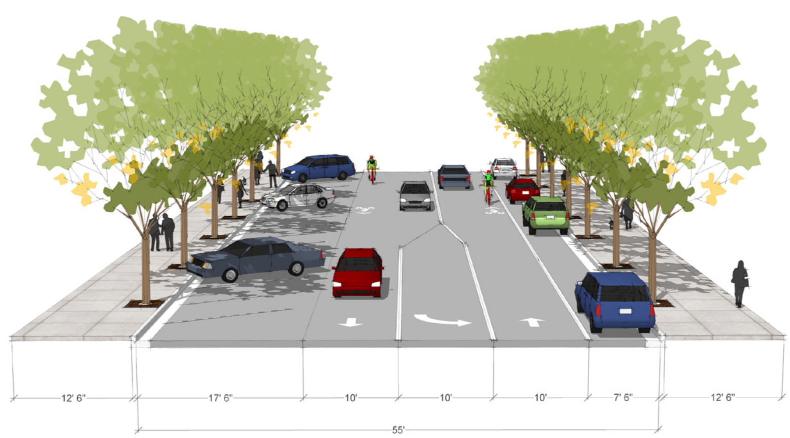
Existing Cross-section:



Proposed Cross-section, Gaines Street to Western Street: Urban 4-Lane Transition Street



Proposed Cross-section, Western Avenue to River Drive: Urban 2-Lane Street. Note that this is the existing cross-section on parts of 2nd Street (west of Gaines Street).



Downtown Intersection Projects

INT-1: River Drive & 2nd/LeClaire

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Short-term	2nd and LeClaire Streets at River Drive	N/A

Project Description: This project would redesign the intersection of 2nd and LeClaire Streets at River Drive, which would improve pedestrian safety and the walkability of eastern downtown. Of note, the City recently shut down LeClaire Street in this section as part of a maintenance project, with minimal traffic impact.

Related Projects: Project may be coordinated with S-14, a short-term complete street project along 2nd Street

Existing:

Source: Bing Maps

INT-2: Gaines Street & 2nd Street

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Short-term	Gaines / 2ndStreet Intersection	N/A

Project Description: This project would remove the channelized right-turn lanes to/from the Centennial Bridge at the intersection of Gaines and 2nd Street, which function as little ramps connecting to other downtown streets. The proposed intersection redesign would tighten those up into a single-point at-grade intersection with corner radii left suitable for truck and heavy vehicle movements. The redesign would improve walkability of this part of downtown.

Related Projects: Project may be coordinated with S-14, a short-term complete street project along 2nd Street

Existing:

Source: Bing Maps

CITYWIDE STREETS PROJECTS

One- to Two-way Conversions

S-1: BRADY AND HARRISON TWO-WAY CONVERSIONS: PHASE 1

Two alternative approaches are proposed for the converting Brady and Harrison Streets to two-way operation:

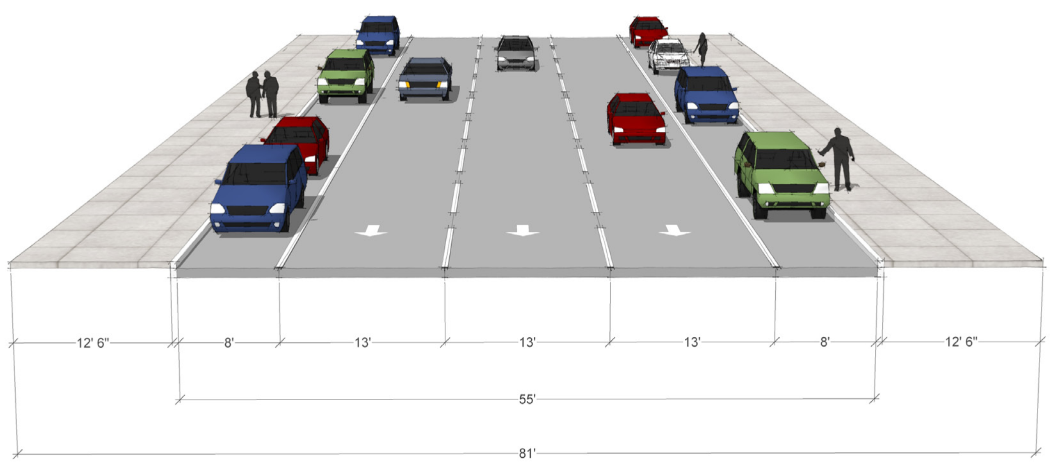
(a) Balanced: One travel lane in each direction with a center turn-lane

(b) Imbalanced: Two travel lanes in the current direction of travel, one travel lane in the opposing direction, and a center turn-lane

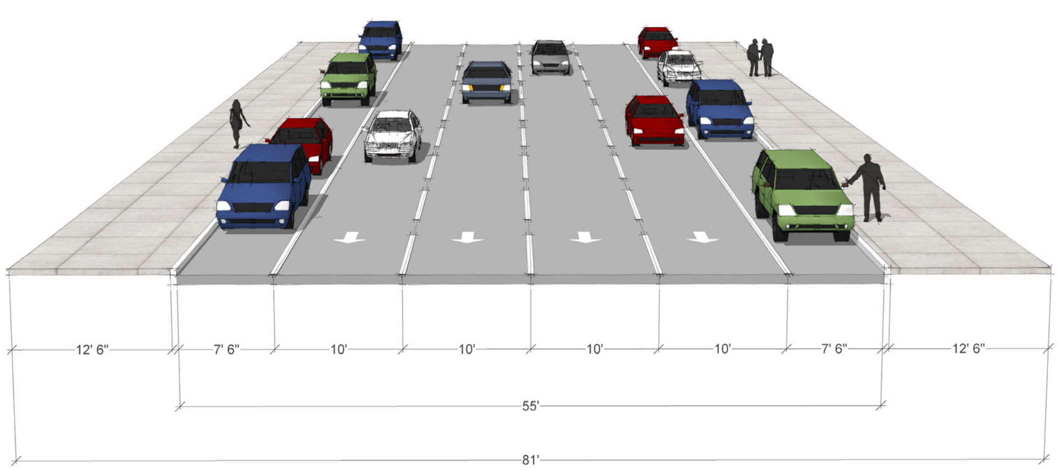
S-1(a) Brady and Harrison Two-Way Conversion (Phase 1), Balanced Approach			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets Two-Way Conversions	Short-Term	Brady and Harrison Streets, River Drive to Central Park Avenue	$ 2,600,000 - $2,800,000

Project Description: Convert one-way northbound Brady Street and one-way southbound Harrison Street to two-way operations utilizing a three-lane cross section (two travel lanes and a center two-way left turn lane) on each street. For phasing reasons, the northern end of the project would include transitions to enable each street to return to one-way operations (until possible implementation of Phase 2).

Existing Brady Street Cross-section (Downtown): Outside of downtown, typically a 4-lane section with no on-street parking



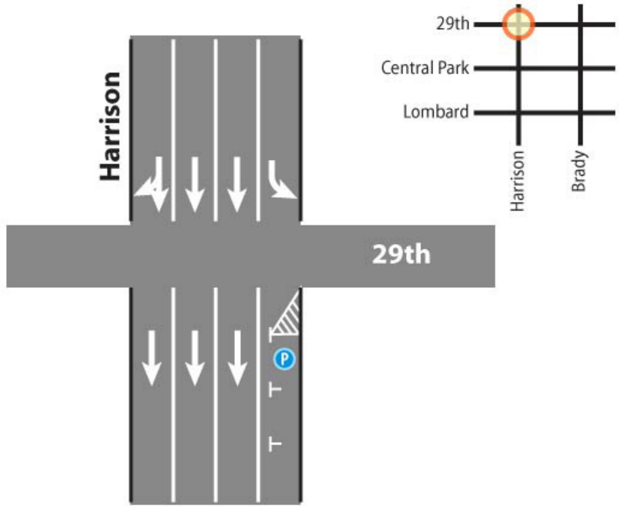
Existing Harrison Street Cross-section (Downtown): Outside of downtown, typically a 4-lane section with no on-street parking



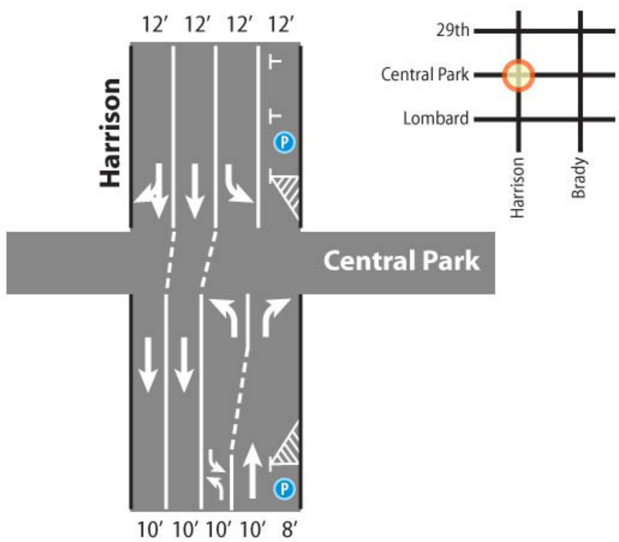
Harrison Transition:

Between Central Park and Lombard, Harrison would be two southbound lanes and one northbound lane. Where Harrison transitions from one- to two-way at the Central Park intersection (see second cross-section below),all traffic from the northbound lanes would be required to turn either left or right onto Central Park to avoid conflict with southbound lanes directly across the intersection. The cross-section graphics below illustrate the recommended transitions and geometric configurations, from north to south.

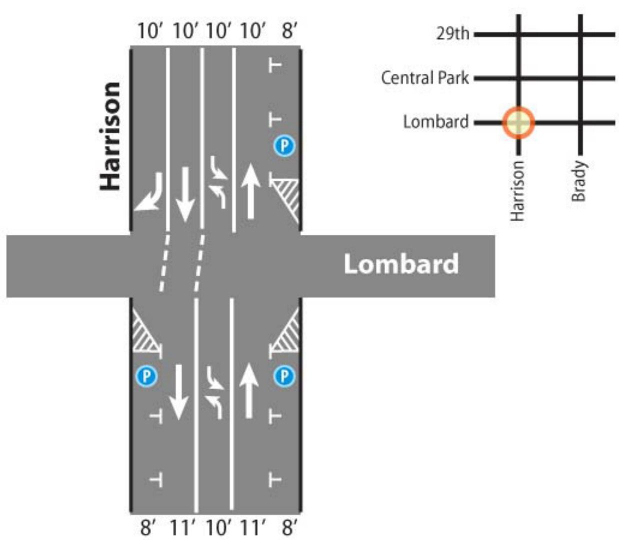
29th Street: Beginning at 29th Street, drop the easternmost travel lane on Harrison (the left lane in the direction of travel) with a southbound left turn lane and introduce on-street parking in the far side of this intersection. South of 29th, Harrison will be three southbound travel lanes with on-street parking.



Central Park Avenue: At Central Park, drop the left remaining travel lane with a southbound left turn lane. This opposes a northbound turn lane in the same space on the opposite side of the intersection. South of Central Park, Harrison becomes a two-way street with four 10-foot travel lanes and an 8-foot parallel parking envelope on the Vander Veer Park (east) side of the street. This configuration consists of one northbound through lane that is required to turn right at Central Park, a two-way left turn lane that is required to turn left at Central Park, and two southbound through lanes. Dashed line guides through the intersection should be used to adjust between the different southbound travel lane widths.



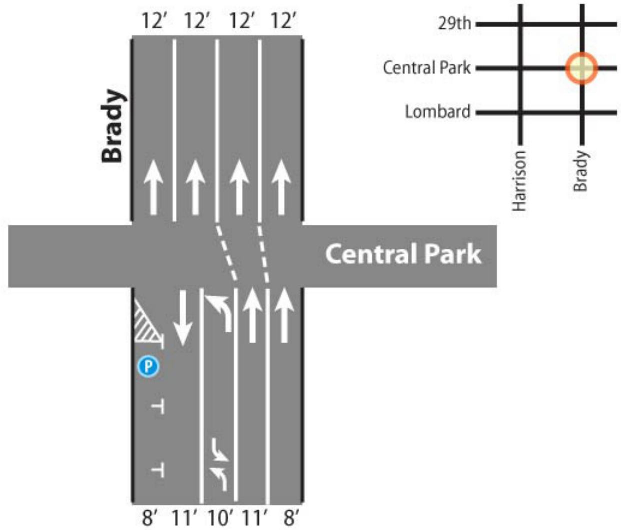
Lombard Street: At Lombard, drop the westernmost (right) southbound travel lane with a southbound right turn. This allows Harrison south of Lombard to take a two-way, three-lane section (one travel lane per direction and a continuous two-way left turn lane) with 8-foot on-street parking envelopes on each side of the street. This section south of Lombard continues south to 5th Street. Dashed line guides through the intersection should be used to adjust between the different southbound travel lane widths.



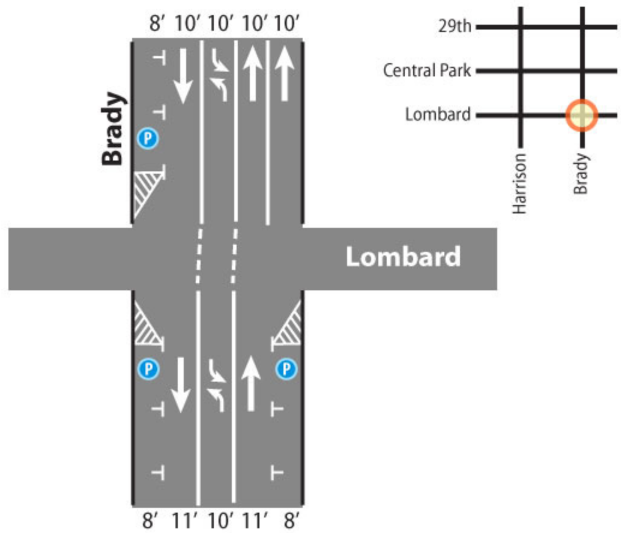
Brady Transition:

Because Brady is currently a four-lane street with northbound travel lanes, transitions are not needed but it may be appropriate to guide northbound motorists on the two-way section to correct positioning on the northbound lanes north of Central Park. Recommended geometric configurations are detailed in cross-section graphics below, shown from north to south.

Central Park Avenue: North of Central Park, Brady resumes its current section. Dashed line guides through the intersection should be used to adjust between the different southbound travel lane widths.



5th Street o Lombard Street: From 5th Street north to Lombard, apply a cross-section identical to the modified Harrison cross-section (two travel lanes, one two-way left turn lane, and on-street parking). North of Lombard, parking should end to introduce a second northbound travel lane. This is intended to begin adding northbound capacity for northbound Harrison vehicles who begin transitioning to Brady at Lombard (in Phase 1, the last point where these vehicles may transition is Central Park.



Cost Estimate

Cost estimate is based on a simple removal of existing paint and a restriping of paint and thermoplastic to define new lane configuration, as well as traffic signal reconstruction. It does not assume an overall resurfacing of the project. If the project is to be coordinated with a resurfacing, the cost of paint/thermoplastic removal (estimated at $135,000 for each street) can be removed from overall project cost estimate.

Traffic Analysis

This section provides documentation of traffic operations analysis at intersections along the Harrison/Brady corridor. Detailed traffic analysis results can be found in Appendix C.

Volume Reassignment

To gauge the effects of the two-way conversion of these streets, assumptions on traffic transfer between Harrison and Brady were taken and applied to existing turning movements at each of the intersections. As traffic count data were not available at the Lombard intersections with Harrison and Brady, the amount of transfer between Locust and Central Park is estimated to be evenly distributed among the intersections through that extent. Specifically, the following assumptions were taken:

Both Harrison and Brady: 50 percent of traffic in each direction is transferred to the other street between 5th Street and Locust Street. This assumption is based on the idea that approximately half of traffic generated in central Davenport will use the street closest to its origin or destination for at least part of the travel, then transition when needed. The other half will use the roadway that allows it to avoid the transition at the end of the two-way extents.

Harrison Street: 50 percent of all northbound traffic turns right at Locust and left at Brady.

By Central Park Avenue, 90 percent of all northbound traffic has turned onto side streets to transfer to Brady. This leaves 10 percent of northbound Harrison traffic from further south to turn right at Central Park.

Brady Street: 10 percent of southbound Harrison traffic transfers to Brady via Central Park, adding this amount to southbound left turns at Harrison and Central Park and to eastbound right turns at Brady and Central Park.

At Locust, another 40 percent of the original southbound volumes transfer to Brady.

Intersection analysis

The one-way to two-way conversion projects were analyzed using the Synchro microsimulation software, developing scenarios for both the AM and PM peak hours based on the study year's traffic counts (2009), and a forecast year travel count (2030). This analysis included all intersections with available traffic count data between Central Park Avenue and River Drive (inclusive of River Drive). The focus of this analysis was on the 'transition' intersections expected to handle a higher number of turning movements for traffic moving between the two-way streets and the one-way configuration that would remain north of Central Park.

Traffic growth rates were based on population forecasts in the Davenport Comprehensive Plan. This translated to an overall citywide growth rate of approximately 2.5 percent, and this rate was applied to all turning movements based on intersection counts.

To provide a brief comparison of the operations under each scenario, overall intersection level of service (based on HCM average control delay) is listed in the table on the following page for each of the intersections studied. In general, notable traffic operations issues at these intersections were observed in the PM peak hour only. One reason for this is that observed volumes from traffic counts are higher in the outbound direction (i.e. northbound on Brady).

TABLE S-1(a): Comparison of Intersection Levels of Service for Balanced Two-Way

AM Peak	Existing Configuration: One-Way Streets		Modified Configuration: Balanced Two-Way Streets	
	2009	2030	2009	2030
Harrison at River Drive	A (8 sec)	A (6 sec)	B (12 sec)	A (9 sec)
Harrison at 3rd Street	B (16 sec)	B (14 sec)	A (6 sec)	B (11 sec)
Harrison at 4th Street	B (18 sec)	C (23 sec)	A (5 sec)	A (8 sec)
Harrison at Locust Street	C (27 sec)	C (24 sec)	A (7 sec)	B (11 sec)
Harrison at Central Park Avenue	C (22 sec)	C (21 sec)	B (11 sec)	B (11 sec)
Brady at River Drive	A (9 sec)	A (9 sec)	A (8 sec)	A (7 sec)
Brady at 3rd Street	C (21 sec)	B (18 sec)	A (8 sec)	A (8 sec)
Brady at 4th Street	B (16 sec)	B (15 sec)	A (8 sec)	B (11 sec)
Brady at Locust Street	C (31 sec)	D (36 sec)	B (10 sec)	B (13 sec)
Brady at Central Park Avenue	C (23 sec)	C (20 sec)	B (12 sec)	B (11 sec)

PM Peak (Current Conditions Adjusted for Actual Signal Timing)	Existing Configuration: One-Way Streets		Modified Configuration: Balanced Two-Way Streets	
	2009	2030	2009	2030
Harrison at River Drive	C (20 sec)	B (20 sec)	B (11 sec)	B (11 sec)
Harrison at 3rd Street	B (12 sec)	B (11 sec)	B (10 sec)	B (12 sec)
Harrison at 4th Street	D (40 sec)	D (36 sec)	B (11 sec)	B (12 sec)
Harrison at Locust Street	C (22 sec)	C (27 sec)	C (31 sec)	C (33 sec)
Harrison at Central Park Avenue	C (23 sec)	C (24 sec)	B (17 sec)	B (13 sec)
Brady at River Drive	A (7 sec)	A (6 sec)	A (8 sec)	A (9 sec)
Brady at 3rd Street	B (17 sec)	B (17 sec)	B (12 sec)	B (11 sec)
Brady at 4th Street	B (14 sec)	B (15 sec)	A (9 sec)	B (11 sec)
Brady at Locust Street	D (38 sec)	D (38 sec)	C (20 sec)	C (24 sec)
Brady at Central Park Avenue	C (26 sec)	B (19 sec)	C (31 sec)	C (33 sec)

Notes on intersection analysis

HCM Intersection Levels of Service are shown here by letter rating and average intersection control delay. Actual intersection signal timing today is the basis for comparison between existing and proposed conditions, although for future conditions this analysis assumed that signals would be retimed based on an optimization of cycle lengths for the entire network. This also assumed changes in traffic signal phasing capability (and by extension, assumes that some signal infrastructure may be changed from what exists today).

In some cases the 2030 performance in a scenario is marginally better in terms of delay than the 2009 performance. It is due mostly to the average control delay measure that determines HCM LOS: if the movements with the most volume are moved through with minimal delay (as a result of signal timing favoring those movements), that can reduce average delay time for the entire intersection, even if there are higher volumes in the 2030 scenario overall.

In performing the analysis that optimized signal timing, the cycle lengths were computed automatically by Synchro with the objective of reducing overall system delay. No master reference timing was used, as it was assumed that existing cycle lengths would be reevaluated and that alternative lengths would be considered when two-way travel patterns were introduced. Synchro's optimization method evaluates all possible cycle lengths (typically in 10-second intervals) between a minimum and maximum length specified by the user and selects the optimal length to be applied throughout the system. The lengths selected by Synchro vary from one analysis scenario to another, but they are generally shorter than the 110-second cycle basis currently being used.

S-1(b) Brady and Harrison Two-Way Conversions (Phase 1), Imbalanced Lane Approach			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Streets Two-Way Conversions	Short-Term	Brady and Harrison Streets, River Drive to Central Park Avenue	$ 2,600,000 - $2,800,000

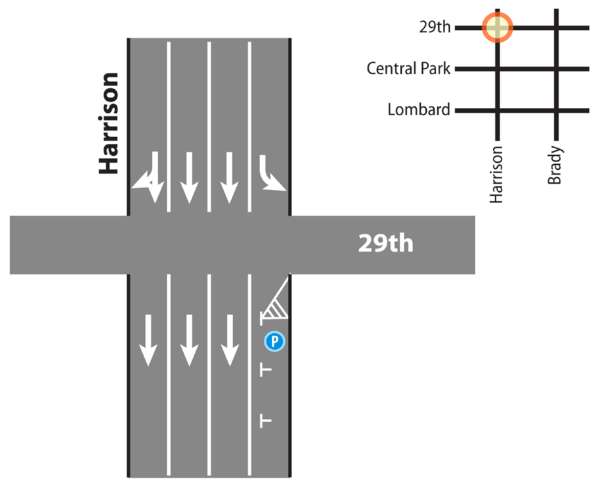
Project Description: Convert one-way northbound Brady Street and one-way southbound Harrison Street to two-way operations utilizing an imbalanced cross-section oriented to favor their current flow (two travel lanes in the direction that is currently one-way, a center two-way left turn lane and a single lane of traffic against the current direction of movement) on each street.

This alternative to Project S-1(a) has been developed in response to community concerns of capacity adequacy and traffic congestion that may result from the three-lane section developed in the balanced approach to this project. For phasing reasons, the northern end of the project would include transitions to enable each street to return to one-way operations (until possible implementation of Phase 2).

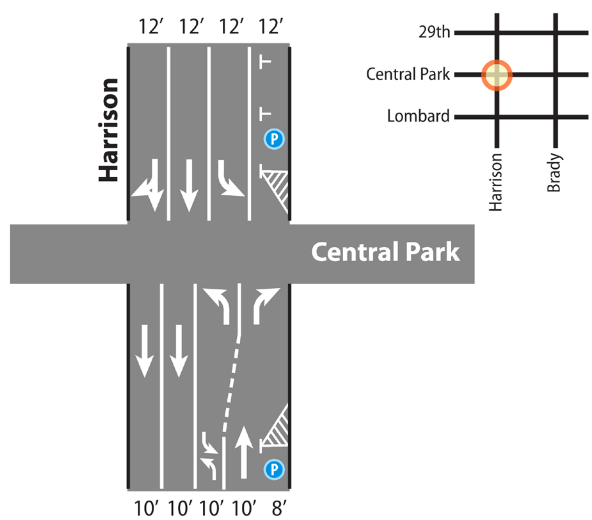
Harrison Transition:

Between Central Park and Lombard, Harrison is two southbound lanes and one northbound lane. The northbound approach to the Harrison/Central Park intersection requires that all traffic turn either left or right onto Central Park Avenue to avoid conflict with southbound lanes directly across the intersection. Recommended geometric configurations are detailed in cross-section graphics below, shown from north to south.

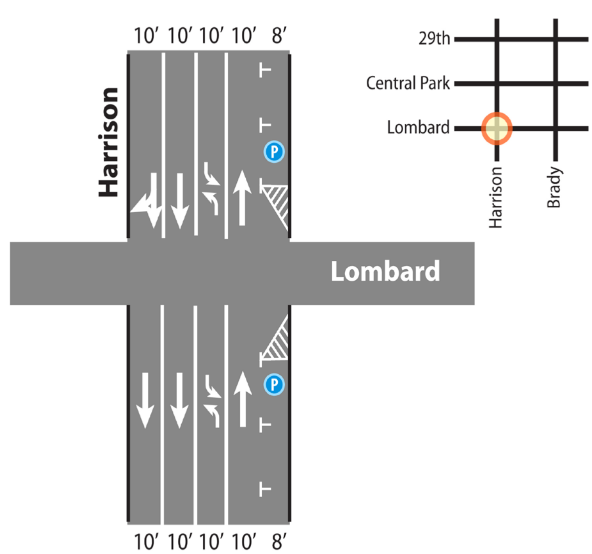
29th Street: Beginning at 29th Street, drop the easternmost travel lane on Harrison (the left lane in the direction of travel) with a southbound left turn lane and introduce on-street parking in the far side of this intersection. South of 29th, Harrison will be three southbound travel lanes with on-street parking.



Central Park Avenue: At Central Park, drop the left remaining travel lane with a southbound left turn lane. This opposes a northbound turn lane in the same space on the opposite side of the intersection. South of Central Park, Harrison becomes a two-way street with four 10-foot travel lanes and an 8-foot parallel parking envelope on the Vander Veer Park side of the street. This configuration consists of one northbound through lane that is required to turn right at Central Park, a two-way left turn lane that is required to turn left at Central Park, and two southbound through lanes. Dashed line guides through the intersection should be used to adjust between the different southbound travel lane widths.



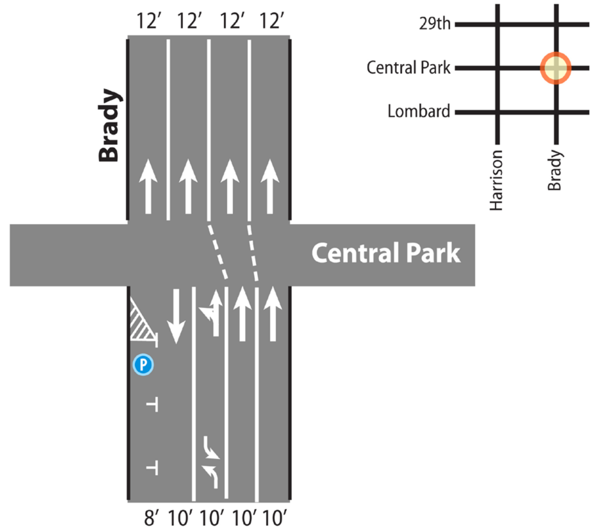
Lombard Street: At Lombard, this cross section configuration continues. The two-way left turn lane is important to keep to preserve through-moving capacity in the lanes next to it by providing left-turning vehicles room for storage. Parking is located adjacent to the single northbound travel lane to reduce parking friction on the southbound travel lanes.



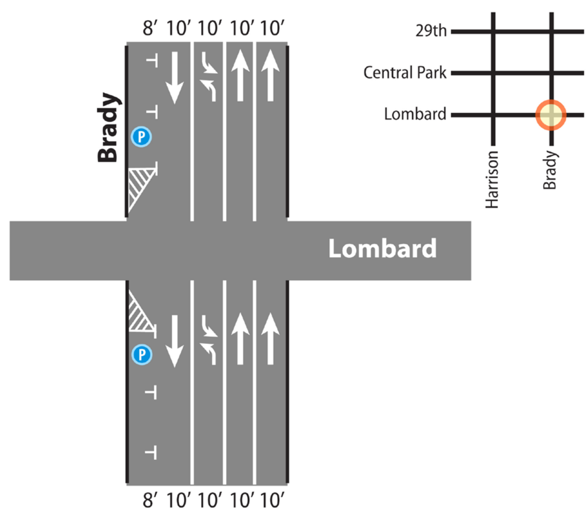
Brady Transition

Because Brady is currently a four-lane street with northbound travel lanes, transitions are not needed but it may be appropriate to guide northbound motorists on the two-way section to correct positioning on the northbound lanes north of Central Park Avenue. The cross-section graphics below, shown from north to south, illustrate the transition between one- and two-way operations.

Central Park Avenue: North of Central Park, Brady resumes its current section. Dashed line guides through the intersection should be used to adjust between the different northbound travel lane widths.



5th Street to Lombard Street: From 5th Street north to Lombard, apply a cross-section identical to the modified Harrison cross-section but favoring the current northbound one-way travel flow of Brady (two northbound travel lanes, one two-way left turn lane, one southbound travel lane and on-street parking). This section can continue through the Lombard intersection.



Cost Estimate

Cost estimate is based on a simple removal of existing paint and a restriping of paint and thermoplastic to define new lane configuration, as well as traffic signal reconstruction. It does not assume an overall resurfacing of the project. If the project is to be coordinated with a resurfacing, the cost of paint/thermoplastic removal (estimated at $135,000 for each street) can be removed from overall project cost estimate.

Traffic Analysis

This section provides documentation of traffic operations analysis at intersections along the Harrison/Brady corridor. Detailed traffic analysis results can be found in Appendix C.

Volume Reassignment

To gauge the effects of the two-way conversion of these streets, assumptions on traffic transfer between Harrison and Brady were taken and applied to existing turning movements at each of the intersections. As traffic count data were not available at the Lombard intersections with Harrison and Brady, the amount of transfer between Locust and Central Park is estimated to be evenly distributed among the intersections through that extent. Specifically, the following assumptions were taken:

Both Harrison and Brady: 20 percent of traffic in each direction is transferred to the other street between 5th Street and Locust Street. The remaining 10 percent is assumed to transition using Central Park Avenue. This assumption is based on the idea that one third of traffic generated in central Davenport will use the street closest to its origin or destination for at least part of the travel, then transition when needed. The other two-thirds will use the roadway that allows it to avoid the transition at the end of the two-way extents.

Harrison Street: 20 percent of all northbound traffic turns right at Locust and left at Brady.

By Central Park Avenue, 90 percent of all northbound traffic has turned onto side streets to transfer to Brady. This leaves 10 percent of northbound Harrison traffic from further south to turn right at Central Park.

Brady Street: 10 percent of southbound Harrison traffic transfers to Brady via Central Park, adding this amount to southbound left turns at Harrison and Central Park and to eastbound right turns at Brady and Central Park.

At Locust, another 20 percent of the original southbound volumes transfer to Brady.

Intersection analysis

The one-way to two-way conversion projects were analyzed using the Synchro microsimulation software, developing scenarios for both the AM and PM peak hours based on the study year's traffic counts (2009), and a forecast year travel count (2030). This analysis included all intersections with available traffic count data between Central Park Avenue and River Drive (inclusive of River Drive). The focus of this analysis was on the 'transition' intersections expected to handle a higher number of turning movements for traffic moving between the two-way streets and the one-way configuration that would remain north of Central Park.

Traffic growth rates were based on population forecasts in the Davenport Comprehensive Plan. This translated to an overall citywide growth rate of approximately 2.5 percent, and this rate was applied to all turning movements based on intersection counts.

To provide a brief comparison of the operations under each scenario, overall intersection level of service (based on HCM average control delay) is listed in the table on the following page for each of the intersections studied. In general, notable traffic operations issues at these intersections were observed in the PM peak hour only. One reason for this is that observed volumes from traffic counts are higher in the outbound direction (i.e. northbound on Brady).

TABLE S-1(b): Comparison of Intersection Levels of Service

AM Peak	Existing Configuration: One-Way Streets		Modified Configuration: Imbalanced Two-Way Streets	
	2009	2030	2009	2030
Harrison at River Drive	A (8 sec)	A (6 sec)	A (7 sec)	A (9 sec)
Harrison at 3rd Street	B (16 sec)	B (14 sec)	A (5 sec)	A (7 sec)
Harrison at 4th Street	B (18 sec)	C (23 sec)	A (9 sec)	B (10 sec)
Harrison at Locust Street	C (27 sec)	C (24 sec)	B (14 sec)	A (9 sec)
Harrison at Central Park Avenue	C (22 sec)	C (21 sec)	B (12 sec)	B (13 sec)
Brady at River Drive	A (9 sec)	A (9 sec)	A (7 sec)	A (8 sec)
Brady at 3rd Street	C (21 sec)	B (18 sec)	A (7 sec)	A (9 sec)
Brady at 4th Street	B (16 sec)	B (15 sec)	A (9 sec)	B (13 sec)
Brady at Locust Street	C (31 sec)	D (36 sec)	B (10 sec)	A (9 sec)
Brady at Central Park Avenue	C (23 sec)	C (20 sec)	B (11 sec)	B (10 sec)

PM Peak (Current Conditions Adjusted for Actual Signal Timing)	Existing Configuration: One-Way Streets		Modified Configuration: Imbalanced Two-Way Streets	
	2009	2030	2009	2030
Harrison at River Drive	C (20 sec)	B (20 sec)	A (9 sec)	A (9 sec)
Harrison at 3rd Street	B (12 sec)	B (11 sec)	A (9 sec)	A (7 sec)
Harrison at 4th Street	D (40 sec)	D (36 sec)	B (12 sec)	A (9 sec)
Harrison at Locust Street	C (22 sec)	C (27 sec)	C (34 sec)	B (19 sec)
Harrison at Central Park Avenue	C (23 sec)	C (24 sec)	B (15 sec)	B (17 sec)
Brady at River Drive	A (7 sec)	A (6 sec)	A (9 sec)	A (8 sec)
Brady at 3rd Street	B (17 sec)	B (17 sec)	B (14 sec)	A (9 sec)
Brady at 4th Street	B (14 sec)	B (15 sec)	B (14 sec)	A (8 sec)
Brady at Locust Street	D (38 sec)	D (38 sec)	C (33 sec)	D (41 sec)
Brady at Central Park Avenue	C (26 sec)	B (19 sec)	B (19 sec)	B (19 sec)

Notes on intersection analysis

HCM Intersection Levels of Service are shown here by letter rating and average intersection control delay. Actual intersection signal timing today is the basis for comparison between existing and proposed conditions, althoughfor future conditions this analysis assumed that signals would be retimed based on an optimization of cycle lengths for the entire network. This also assumed changes in traffic signal phasing capability (and by extension, assumes that some signal infrastructure may be changed from what exists today).

In some cases the 2030 performance in a scenario is marginally better in terms of delay than the 2009 performance. It is due mostly to the average control delay measure that determines HCM LOS: if the movements with the most volume are moved through with minimal delay (as a result of signal timing favoring those movements), that can reduce average delay time for the entire intersection, even if there are higher volumes in the 2030 scenario overall.

In performing the analysis that optimized signal timing, the cycle lengths were computed automatically by Synchro with the objective of reducing overall system delay. No master reference timing was used, as it was assumed that existing cycle lengths would be reevaluated and that alternative lengths would be considered when two-way travel patterns were introduced. Synchro's optimization method evaluates all possible cycle lengths (typically in 10-second intervals) between a minimum and maximum length specified by the user and selects the optimal length to be applied throughout the system. The lengths selected by Synchro vary from one analysis scenario to another, but they are generally shorter than the 110-second cycle basis currently being used.

S-1(a) and S-1(b) Comparison of Existing One-Way and Balanced/Imbalanced Two-Way Options

Table S-1(c) below compares intersection level-of-service for the existing one-way streets and both the balanced and imbalanced two-way options. Based on the volume transfer assumptions in each of the two conversion approach alternatives, there are relatively minor differences between performance of the fully-balanced and imbalanced intersections. As noted previously, in some cases the greater volumes of the future forecast year led to marginally lower average control delays at the same intersection because of optimized signal timing's ability to more efficiently accommodate the major movement through the intersection.

TABLE S-1(c): Comparison of Intersection Levels of Service Across Both Two-Way Conversion Approaches

AM Peak	Existing Configuration: One-Way Streets		Modified Configuration: Balanced Two-Way Streets		Modified Configuration: Imbalanced Two-Way Streets	
	2009	2030	2009	2030	2009	2030
Harrison at River Drive	A (8 sec)	A (6 sec)	B (12 sec)	A (9 sec)	A (7 sec)	A (9 sec)
Harrison at 3rd Street	B (16 sec)	B (14 sec)	A (6 sec)	B (11 sec)	A (5 sec)	A (7 sec)
Harrison at 4th Street	B (18 sec)	C (23 sec)	A (5 sec)	A (8 sec)	A (9 sec)	B (10 sec)
Harrison at Locust Street	C (27 sec)	C (24 sec)	A (7 sec)	B (11 sec)	B (14 sec)	A (9 sec)
Harrison at Central Park	C (22 sec)	C (21 sec)	B (11 sec)	B (11 sec)	B (12 sec)	B (13 sec)
Brady at River Drive	A (9 sec)	A (9 sec)	A (8 sec)	A (7 sec)	A (7 sec)	A (8 sec)
Brady at 3rd Street	C (21 sec)	B (18 sec)	A (8 sec)	A (8 sec)	A (7 sec)	A (9 sec)
Brady at 4th Street	B (16 sec)	B (15 sec)	A (8 sec)	B (11 sec)	A (9 sec)	B (13 sec)
Brady at Locust Street	C (31 sec)	D (36 sec)	B (10 sec)	B (13 sec)	B (10 sec)	A (9 sec)
Brady at Central Park	C (23 sec)	C (20 sec)	B (12 sec)	B (11 sec)	B (11 sec)	B (10 sec)

PM Peak (Current Conditions Adjusted for Actual Signal Timing)	Existing Configuration: One-Way Streets		Modified Configuration: Balanced Two-Way Streets		Modified Configuration: Imbalanced Two-Way Streets	
	2009	2030	2009	2030	2009	2030
Harrison at River Drive	C (20 sec)	B (20 sec)	B (11 sec)	B (11 sec)	A (9 sec)	A (9 sec)
Harrison at 3rd Street	B (12 sec)	B (11 sec)	B (10 sec)	B (12 sec)	A (9 sec)	A (7 sec)
Harrison at 4th Street	D (40 sec)	D (36 sec)	B (11 sec)	B (12 sec)	B (12 sec)	A (9 sec)
Harrison at Locust Street	C (22 sec)	C (27 sec)	C (31 sec)	C (33 sec)	C (34 sec)	B (19 sec)
Harrison at Central Park	C (23 sec)	C (24 sec)	B (17 sec)	B (13 sec)	B (15 sec)	B (17 sec)
Brady at River Drive	A (7 sec)	A (6 sec)	A (8 sec)	A (9 sec)	A (9 sec)	A (8 sec)
Brady at 3rd Street	B (17 sec)	B (17 sec)	B (12 sec)	B (11 sec)	B (14 sec)	A (9 sec)
Brady at 4th Street	B (14 sec)	B (15 sec)	A (9 sec)	B (11 sec)	B (14 sec)	A (8 sec)
Brady at Locust Street	D (38 sec)	D (38 sec)	C (20 sec)	C (24 sec)	C (33 sec)	D (41 sec)
Brady at Central Park	C (26 sec)	B (19 sec)	C (31 sec)	C (33 sec)	B (19 sec)	B (19 sec)

S-2: Brady and Harrison Two-Way Conversions: Phase 2			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Streets Two-Way Conversions	Medium- to Long-Term	Brady and Harrison Streets, Central Park Avenue north to 53rd Street	$ 3,200,000 - $3,400,000
Project Description: Convert one-way northbound Brady Street and one-way southbound Harrison Street to two-way operations utilizing a three-lane cross section (two travel lanes and a center two-way left turn lane) on each street. Where right of way and pavement width allow, lanes may be added on typical cross-sections and on intersection approaches as needed. An imbalanced approach can also be adopted, following the approach pursued in Phase 1 of the project (S-1). Cost estimate is based on a simple removal of existing paint and a restriping of paint and thermoplastic to define new lane configuration, as well as traffic signal reconstruction. It does not assume an overall resurfacing of the streets. If the project is to be coordinated with a resurfacing, the cost of paint/thermoplastic removal (estimated at $200,000 for Brady and $215,000 for Welcome-Harrison) can be removed from overall project cost estimate. See project S-1 (a) and (b) above for graphical illustrations of each approach			

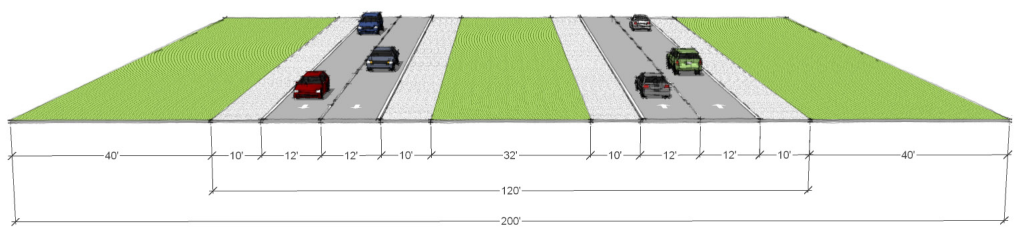
Citywide Street Redesigns / Road Diets on Major Streets

This section provides descriptions for citywide street and intersection redesign projects, including four- to three-lane (4-3) road diets.

S-4: US 6/West Kimberly Road Street Redesign			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Streets Street Redesign	Medium-Term	Kimberly Road west of Brady Street	N/A

Project Description: Incorporate recommended features of Davenport in Motion's Street Design Guide Transitional Commercial Arterial cross-section into reconstruction projects on Kimberly Road west of Brady Street.

Existing Cross-section



Proposed Cross-section: Transitional Commercial Arterial.

Note: Although the illustration above shows bicycle lanes, Kimberly Road is not included as part of the Davenport Bicycle Network, since bicycle lanes would need to be pursued as part of a comprehensive redevelopment or land use vision. As an alternative, project S-4a describes a proposed multi-use path along West Kimberly Road.

S-4a: U.S. 6/Kimberly Road Intersection Upgrades / Safety Improvements, including multi-use path

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets Street Redesign/Road Diets	Medium-Term	Fairmount Street to Brady Street	$4,600,000 – $4,800,000

Project Description: Intersection capacity improvements at select intersections to improve corridor capacity. The project as described here does not fundamentally alter the Kimberly typical cross section, based on the assumption that land redevelopment along the entire corridor is not likely to follow substantially different patterns. This project does assume an access management program, mostly through driveway consolidations, and adds an off-street multi-use path to increase bicycle and pedestrian use and improve safety. Additionally, pedestrian safety is enhanced by using crosswalks that extend through the median and provide refuge areas, and by removing right turn lanes to decrease the length of the pedestrian crossing.

The section below provides detailed analysis of intersections where turning traffic movement data were available. Generally, the analysis observed little overall change in intersection performance. Level of service was not affected.

Traffic Analysis

Traffic analyses were performed on Kimberly Road to gauge the effect of removing right turn lanes at the intersections with Division and Marquette. This project was analyzed using the Synchro microsimulation software, developing scenarios for both the AM and PM peak hours based on the study year's traffic counts (2009), and a forecast year travel count (2030). Detailed traffic analysis results can be found in Appendix C.

Traffic growth rates were based on population forecasts in the Davenport Comprehensive Plan. This translated to an overall citywide growth rate of approximately 2.5 percent, and this rate was applied to all turning movements based on intersection counts.

To provide a brief comparison of the operations under each scenario, overall intersection level of service (based on HCM average control delay) is listed here for intersections of Kimberly at Division and Kimberly at Marquette. As this table indicates, no Level of Service falls below C, and no significant change in LOS exists between the current configuration and the modified configuration.

TABLE S-4a: Comparison of Intersection Levels of Service

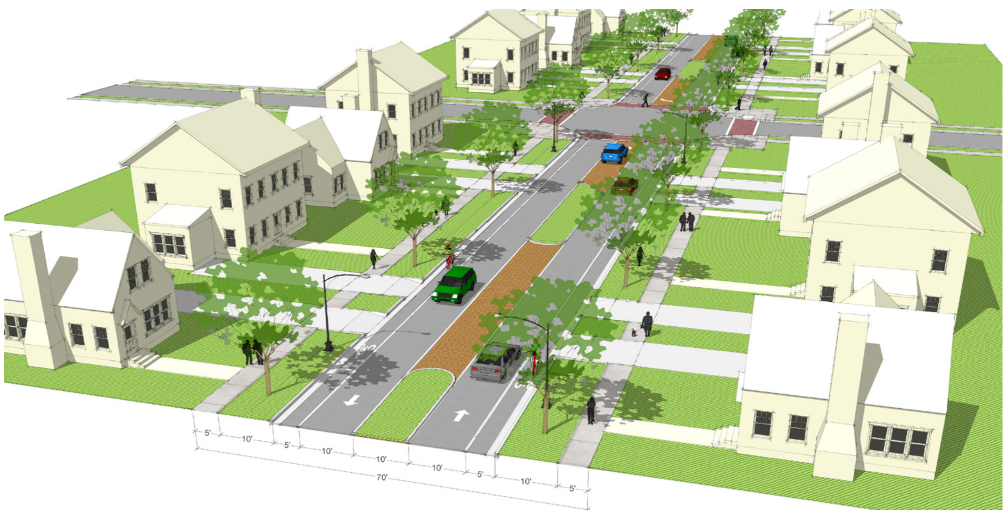
	Existing Configuration		Modified Configuration	
	2009 LOS (AM/PM)	2030 LOS (AM/PM)	2009 LOS (AM/PM)	2030 LOS (AM/PM)
Kimberly at Division	A/B	A/C	A/C	A/C
Kimberly at Marquette	B/B	B/B	B/B	B/B

S-5: Central Park Avenue (incorporates B-22, Bicycle Lanes)			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Streets Street Redesign/Road Diet	Short-term	Brady Street to Emeis Park	N/A

Project Description: This project would implement a 4-3 "Road Diet" on Central Park Avenue, converting it from two travel lanes in each direction between Brady Street and Emeis Park, to one lane in each direction with a center turn lane. The four-to-three lane conversion can be achieved with paint at a relatively low cost and will help to slow traffic speeds in this largely residential section of the city. In addition to traffic calming, the redesign would allow bike lanes to be provided on Central Park (as far east as Bridge Avenue). Central Park Avenue provides the best opportunity for a continuous cross-town bicycle route between Locust Street and Duck Creek Trail. Its intersections with existing and planned north-south routes would establish a network of bicycle connections north of downtown.

Related Projects: Bicycle project B-22 describes the bicycle aspect of the project in more detail.

Proposed Cross-section: Neighborhood Arterial. The illustration below, modified from the one provided in the DIM Street Design Guide, reflects Central Park Avenue's typical 40-foot curb-to-curb dimensions and 70-foot overall right-of-way.



S-6: Main Street Green Street			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Streets Green Street	Short-Term	7th Street to Vander Veer Park	N/A

Project Description: This project would provide stormwater management facilities on this section of Main Street that would filter stormwater runoff on-site. These features, such as curb extensions and stormwater planters, also have an important role in calming traffic and creating a pleasant walking environment along this key route for bicycles and pedestrians. Section 4.6 of the DIM Street Design Guide (Chapter 7) provides guidance for and examples of green street features.

S-7: Locust Street Sidewalk/Streetscape Improvements and Road Diet (West of Brady)			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Streets Street Redesign/Road Diet	Medium-Term	Kimberly Road to Fairmount Street: Sidewalk/streetscape improvements Brady Street to Fairmount Street: Road Diet	N/A

Project Description: This project recommends a road diet on Locust Street west of Brady Street to calm traffic, improve safety, and enable streetscape improvements. A three-lane cross-section in this part of Locust Street would allow protected left turns, and wider sidewalks and on-street parking around commercial nodes. Both west and east of Brady Street, reconstructed sidewalks and streetscape improvements focused around commercial nodes would improve the pedestrian environment. Detailed concepts for Locust Street are identified in the Davenport Traditional Corridors Plan.

Proposed Cross-section: The illustration below, modified from the Neighborhood Arterial cross-section from the DIM Street Design Guide, shows Locust Street's typical 44-foot curb-to-curb dimensions and approximately 60-foot overall right-of-way. A 70-foot right-of-way in commercial areas would allow for wider sidewalks on these parts of Locust Street.

S-8 – Rockingham Road Complete Street (incorporates B-16, Bicycle Lanes)			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Streets Street Redesign/Road Diets	Medium-Term	River Drive to Second Street/Fillmore Street	$ 550,000 - $600,000

Project Description: Restripe to allow for a three-lane section (two travel lanes with center two-way left turn lane), and on-street bicycle lanes between Marquette and John Fell Drive. In constrained sections, bicycle lanes may be replaced with shared use arrows to continue the bicycle route. This project does not propose to move existing curbs and drainage.

Cost estimate is based on pavement restriping and the replacement of one signal (at Concord). Detailed concepts for Rockingham Road are identified in the Davenport Traditional Corridors Plan.

S-55: W. 35th Road Diet			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Streets Street Redesign/Road Diet	Medium-Term	Marquette Street to Brady Street	N/A

Project Description: This project would implement a 4-3 “Road Diet” on W. 35th Street., converting it from two travel lanes in each direction between Brady Street and Marquette Street, to one lane in each direction with a center turn lane. Note that there is no on-street parking in this segment of 35th Street; between Marquette and Division Streets, 35th takes on a more residential character and has two-lanes in each direction, with on-street parking.

Related Projects: The redesign would allow bike lanes to be provided on 35th as far west as Division Street (see B-32, filling a gap in east-west bike connectivity north of Duck Creek and south of Kimberly Road. East of this project, S-15 would provide a new, traffic calmed street connection at approximately 35th Street east of Brady Street to Kimberly Road. Bike lanes would be provided on the combined extent of S-15 and S-55 (Kimberly Road to Division Street).

Proposed Cross-Section: The illustration below, modified from the Commercial Collector cross-section from the DIM Street Design Guide, shows 35th Street’s typical 40-foot curb-to-curb dimensions with 60’ overall right-of-way.

S-58: Hickory Grove Road Diet

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets Street Redesign/Road Diet	Medium-Term	Locust Street to Fairmount Street	N/A

Project Description: This project would implement a 4-3 "Road Diet" on Hickory Grove Road, converting it from two travel lanes in each direction between Locust Street and approximately Fairmount Street, to one lane in each direction with a center turn lane. Between Fairmount and Lombard Streets, bicycle lanes would be provided. Between Lombard and Locust Streets, on-street parking would be provided.

Related Projects: A road diet on Hickory Grove should be coordinated with INT-3, a redesign of the 5-points intersection of Locust, Hickory Grove, and Division Street. Bicycle lanes on Hickory Grove would connect to planned bicycle lanes/routes on Lombard Street (B-21) and Fairmount Street (B-3 and B-4).

Proposed Cross-Section: The illustrations below are based on the Commercial Collector cross-section from the DIM Street Design Guide and reflect Hickory Grove's typical 40' curb-to-curb dimensions and 60' overall right-of-way.

Between Fairmount and Lombard Streets, with bicycle lanes

Between Lombard Street and Locust, with on-street parking

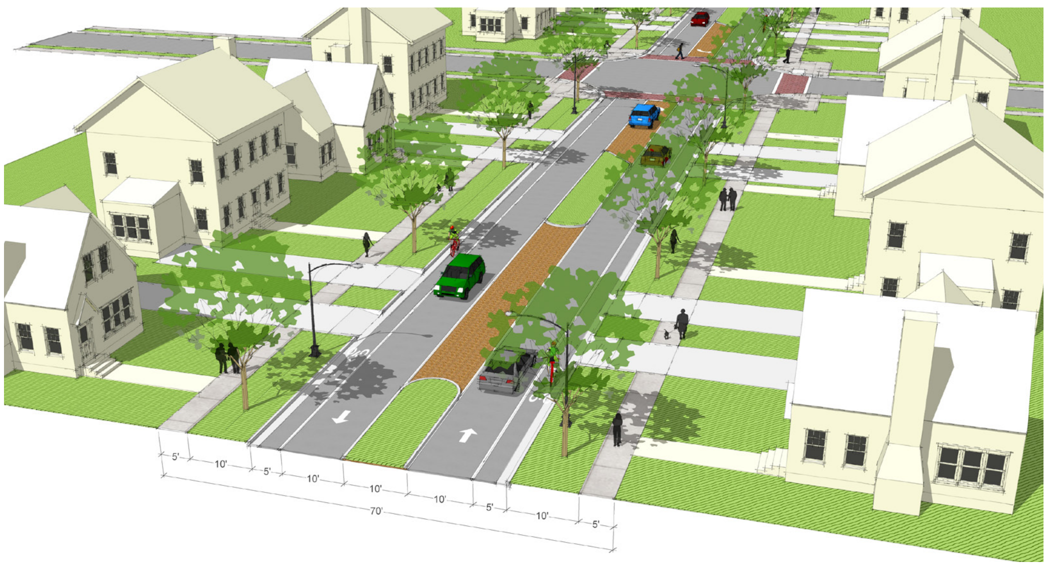
S-59: Lincoln Avenue Road Diet

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets Street Redesign/Road Diet	Medium-Term	Iroquois Drive to Central Park Avenue	N/A

Project Description: This project would implement a 4-3 "Road Diet" on the four-lane portions of Lincoln Avenue, converting it from two travel lanes in each direction to one lane in each direction with a center turn lane; this applies , between approximately Iroquois Drive and north of Locust Street. (Outside of this extent, Lincoln Avenue currently has one travel lane in each direction. It does not have on-street parking.) In addition to traffic calming, the redesign would allow bike lanes to be provided on Lincoln Avenue and facilitate a bicycle route between 3rd Street and Central Park Avenue (both south and north of the road diet extent).

Related Projects: Bicycle project B-35 describes the bicycle aspect of the project in more detail.

Proposed Cross-section: The illustration below is based on the Neighborhood Arterial cross-section from the DIM Street Design Guide and assumes a 40-foot curb-to-curb dimension with 10-foot travel lanes and 5-foot bike lanes. Where Lincoln Avenue has 36-foot curb-to-curb dimensions, the DIM Street Design Guide provides guidance on accommodating more constrained right-of-way, such as using 9-foot travel lanes (as are currently in place on some Davenport streets), minimum 4-foot bike lanes, or sharrows in narrow sections in place of bicycle lanes.



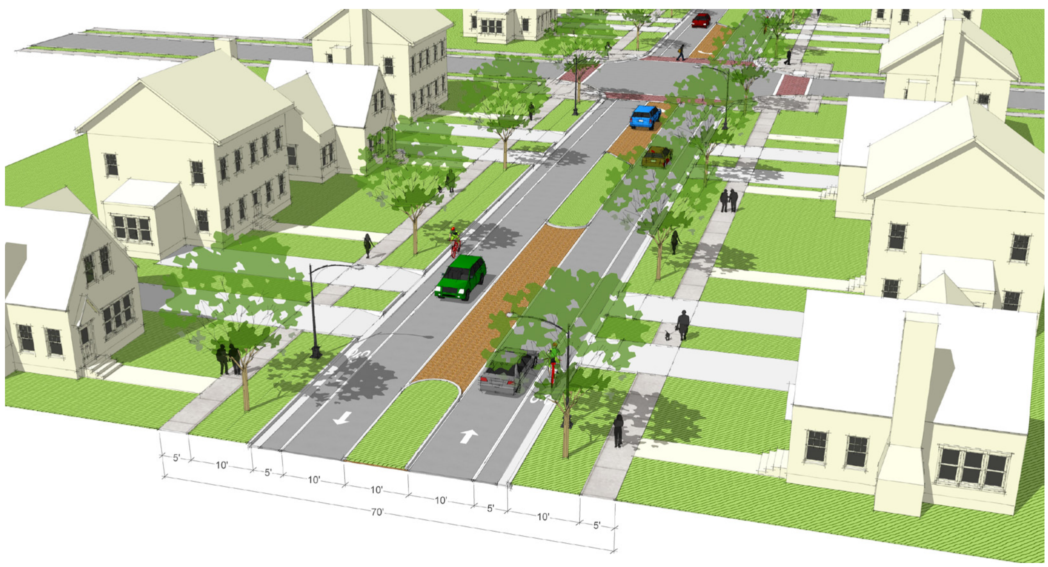
In residential sections, including those that are currently two-lane roadways, Lincoln Avenue would more closely reflect a Neighborhood Collector cross-section

S-60: Pine Street Road Diet			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Streets Street Redesign/Road Diet	Medium-Term	Kimberly Road to Northwest Blvd.	N/A

Project Description: This project would implement a 4-3 "Road Diet" on Pine Street, converting it from two travel lanes in each direction between Kimberly Road and Northwest Blvd., to one lane in each direction with a center turn lane. A road diet is specifically called for in the four-lane section north of 46th Street. In addition to traffic calming, the redesign would allow bike lanes to be provided on Pine Street and facilitate a north-south bicycle route north of the Duck Creek trail and west of Marquette Street.

Related Projects: Bicycle project B-37 describes the bicycle aspect of the project in more detail.

Proposed Cross-section: The illustration below is based on the Neighborhood Arterial cross-section from the DIM Street Design Guide and reflects Pine Street's typical 40-foot curb-to-curb dimensions, allowing for 10-foot travel lanes and 5-foot bike lanes. Note that south of the Road Diet project, i.e. south of Kimberly Road, Pine Street is residential in character with on-street parking, Pine Street would more closely reflect a Neighborhood Collector cross-section; following guidance in the DIM Street Design Guide sharrows can be used in more constrained right-of-way.

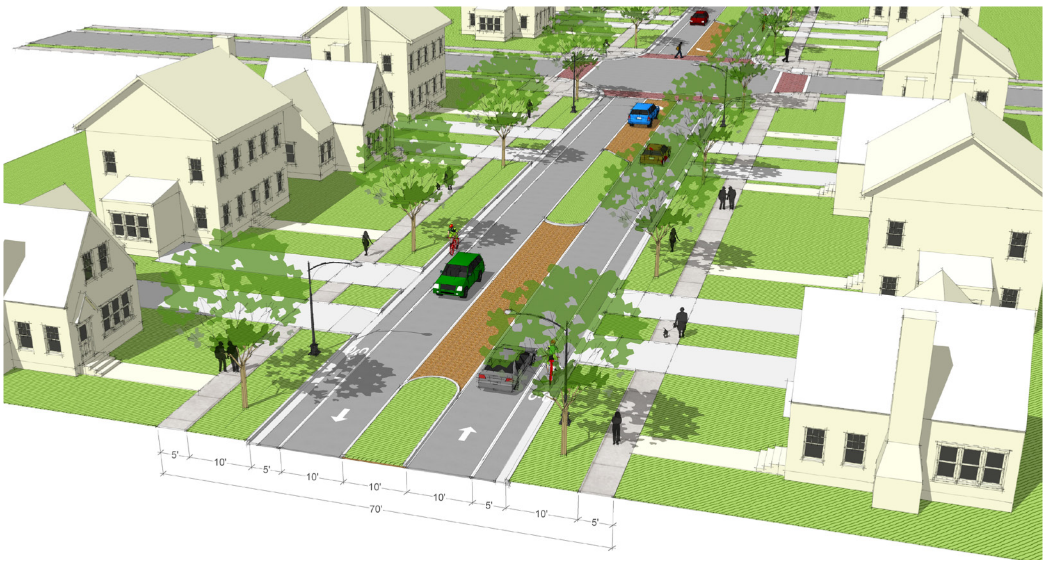


S-61: Marquette Street Road Diet			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Streets Street Redesign/Road Diet	First-Year	Central Park Avenue to Kimberly Road	See B-7a/b

Project Description: This project would implement a 4-3 "Road Diet" on a section of Marquette Street, converting it from two travel lanes in each direction between Central Park Avenue and Kimberly Road, to one lane in each direction with a center turn lane. Note that south of Central Park Avenue, Marquette currently has a two-lane undivided cross-section.

Related Projects: The redesign would be coordinated with extension of existing bike lanes on Marquette Street north of 14th Street. Bicycle project B-7a/b describes the bicycle aspect of the project in more detail.

Proposed Cross-section: The illustration below is based on the Neighborhood Arterial cross-section from the DIM Street Design Guide. The curb-to-curb dimensions of this part of Marquette range from 36 feet to 40 feet.



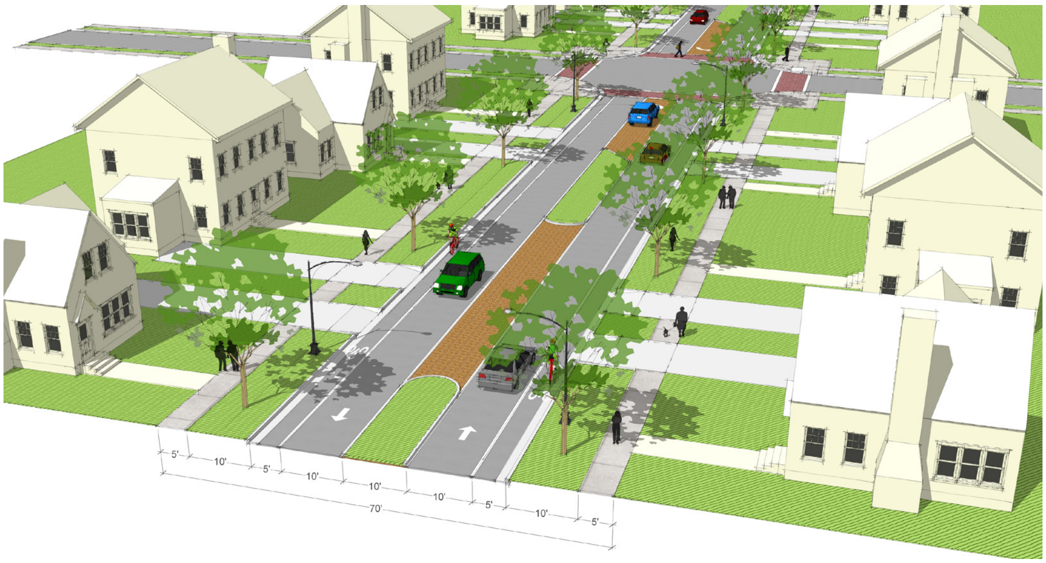
S-62: Jersey Ridge Road, Road Diet

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets Street Redesign/Road Diet	First Year	Kimberly Road to Veterans Memorial Pkwy	See B-14

Project Description: This project would implement a 4-3 "Road Diet" on Jersey Ridge Road north of Kimberly Road in order allow bicycle lanes to be extended beyond where they currently end.

Related Projects: Bicycle project B-14 includes the estimated cost for this project.

Proposed Cross-section: The illustration below is based on the Neighborhood Arterial cross-section from the DIM Street Design Guide.



S-63: Eastern Avenue Road Diet

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets Street Redesign/Road Diet	Medium-Term	29th Street to 53rd Street	See B-13

Project Description: This project would implement a 4-3 "Road Diet" on Eastern Avenue between 29th and 53rd Streets in order allow bicycle lanes to be provided on Eastern Avenue. There is no on-street parking on this section of Eastern Avenue.

Related Projects: Bicycle project B-13, providing bicycle lanes between Elm Street and Veterans Memorial Parkway and a shared street route south of Elm Street, includes the estimated cost of restriping.

Proposed Cross-section: The illustration below is based on the Commercial Collector cross-section from the DIM Street Design Guide.

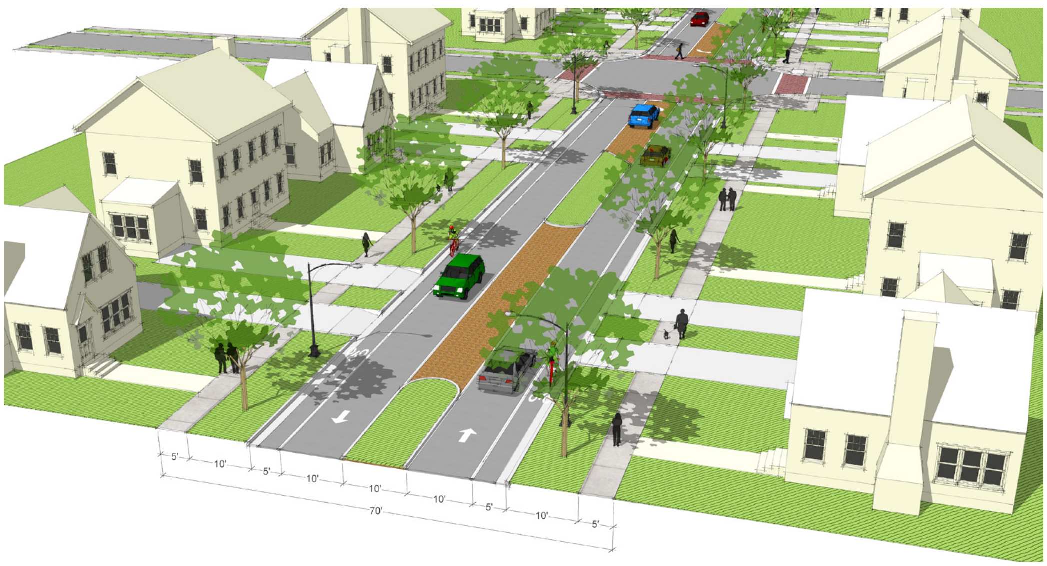
S-64: E. 46th Street Road Diet

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets Street Redesign/Road Diet	Short-Term	Welcome Way to current dead end east of Tremont Avenue	See B-24a

Project Description: This project would implement a 4-3 "Road Diet" on E. 46th Street between Welcome Way and the existing dead end west of Tremont Avenue, which is the eastern boundary of project S-13, which would extend E. 46th Street. This project would help establish 46th Street as a continuous, traffic calmed east-west arterial in the northern part of the City and support implementation of bicycle lanes.

Related Projects: Bicycle project B-24a would provide bicycle lanes on 46th Street, and includes the estimated cost of restriping.

Proposed Cross-section: The illustration below is based on the Neighborhood Arterial cross-section from the DIM Street Design Guide. This part of 46th Street has typical 44-foot curb-to-curb dimensions, slightly larger than illustrated below.



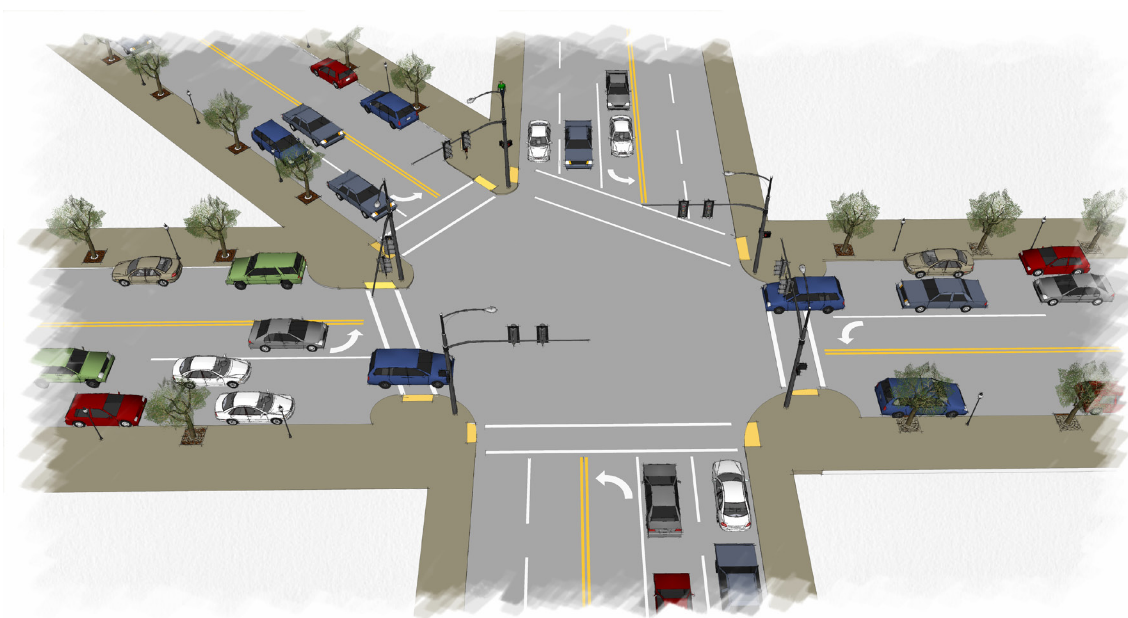
INT-3: Locust/Division 5-way Intersection			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Medium-Term	Intersection of Locust Street, Division Street, and Hickory Grove Road	N/A

Project Description: This project would redesign the "5-points" intersection In conjunction with road diets of Locust Street and Hickory Grove Road, on-street parking could be provided on Locust Street and Hickory Grove Road (north-side) at this intersection and curb extensions used to narrow the pedestrian crossings and pull the street crossings closer to the intersection to reduce crossing distances and calm traffic speeds.

Existing Intersection:

Source: Bing Maps

Graphical Illustration:



Citywide Connectivity Improvements

This section includes projects that would extend existing streets or connect missing segments of the street grid. It is organized by geographic area of the city:

- Northeast (North of Kimberly road, Brady Street to East City Limits)
- Southeast (South of Kimberly, Brady to East City Limits)
- Central (Brady Street to Northwest Quadrant Boundary)
- Northwest Quadrant

NORTHEAST (NORTH OF KIMBERLY ROAD, BRADY STREET TO EAST CITY LIMITS)

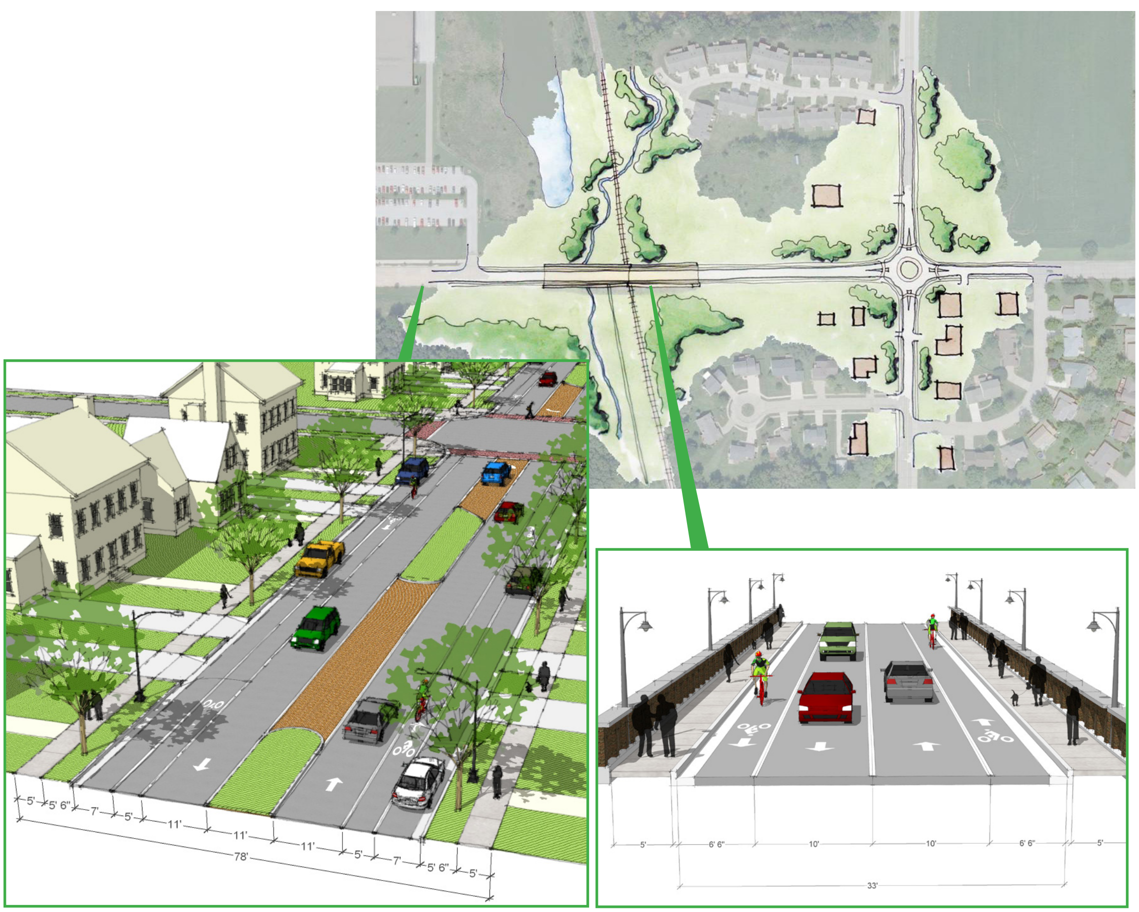
S-13: E.46th Street Grid Connection

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Short-term	E. of Tremont Avenue to Eastern Avenue	N/A

Project Description: 46th Street is located between two major east-west arterials (Kimberly Road and 53rd Street) and would provide a neighborhood-scale east-west connection between these streets, providing bicycle and neighborhood connectivity. This project would complete one of several missing segments of 46th Street citywide and begin to establish 46th as a continuous traffic calmed street. The street design would be modeled after the Neighborhood Arterial cross-section in the DIM Street Design Guide. A bridge segment over Deere Creek and the Dakota, Minnesota, and Eastern Railroad would follow the Neighborhood Arterial Bridge cross-section.

Related Projects: This plan recommends a roundabout at the intersection of E. 46th Street and Eastern Avenue (INT-4), coordinated with this project to control traffic speeds and volumes (an existing traffic calming strategy for the corridor can also be implemented to reduce concerns about cut-through traffic. This project is also essential to creating east-west bike lanes north of Kimberly Road. This plan recommends bike lanes on 46th from Elmore Avenue to Northwest Blvd (B-24) in coordination with to this project; a marked bike route would continue on 49th Street further east, however bike lanes would also be extended on 46th as additional grid connections are completed in the western part of the City.

Conceptual illustration and proposed cross-sections:



Neighborhood Arterial Street Design Type

Neighborhood Arterial Bridge Street Design Type

S-21: Elmore Avenue Grid Connection

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Medium-Term	E. 60th Street to Veterans Memorial Pkwy	N/A

Project Description: This project would extend Elmore Avenue north to Veterans Memorial Parkway (67th Street), following the Commercial Collector design type, and helping to establish the arterial street grid in the northeast quadrant of the City.

Related Projects: This project would support an extension of proposed bike facilities on Elmore (S-21).

Proposed Cross-section: Commercial Collector

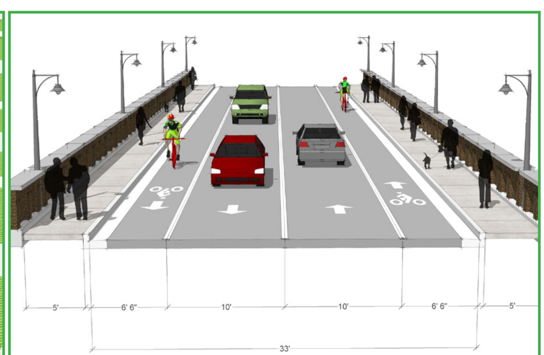
S-14: E. 39th New Street Connection

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Long-Term	Fernwood Court to Elmore Avenue	N/A

Project Description: This project would provide a connection between residential neighborhoods north of Kimberly Road and a retail area to the east. It would require a crossing of Pheasant Creek and resolution of private property issues at the retail development. The project would follow the Neighborhood Arterial Bridge design type and transition to a Neighborhood Local design type west of the creek.

Related Projects: The project would provide access to B-43, which would implement a multiuse path or bicycle lanes on Elmore, connecting to a future multi-use crossing on a replacement I-74 bridge.

Proposed Cross-section: Neighborhood Local and Neighborhood Arterial Bridge



Above: Neighborhood Arterial Bridge Street Design Type
Left: Neighborhood Local Street Design Type

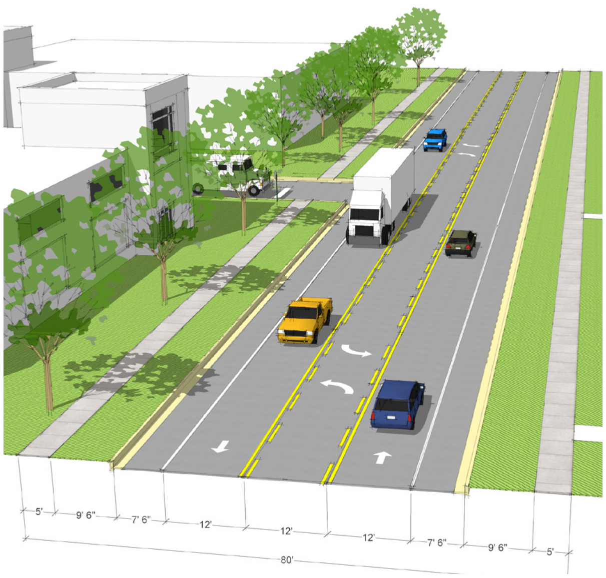
S-51: Tremont Avenue Grid Connection

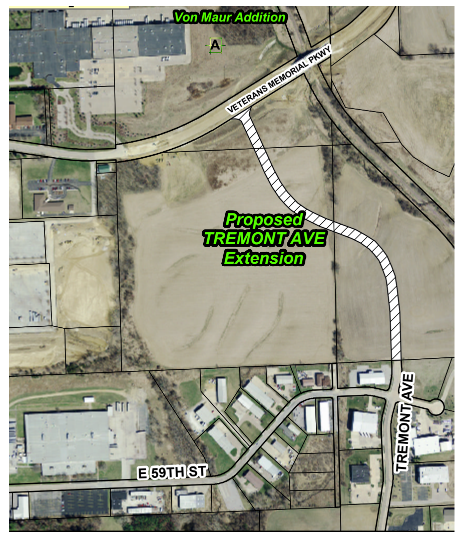
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	First-Year	59th Street to Veterans Memorial Pkwy (67th Street)	$2.33 M

Project Description: This project would extend Tremont Avenue north to Veterans Memorial Parkway, based on an industrial collector/street design type, providing an important north-south grid connection on the east side of Brady Street. This is a grant-funded project with the following detailed specifications: 2000-foot length with 41-foot pavement width and a 60-foot right-of-way. Tremont Avenue is a recommended bicycle route; sharrow pavement markings should be provided consistent with Project B-41 (see below).

Related Projects: B-41 would provide a marked bicycle route on Tremont Avenue south of this project (between 46th and just north of E. 59th Street. At the north end, this route would connect to existing bicycle lanes on Veterans Memorial Parkway, to bicycle lanes on 46th Street, and to a planned multiuse path along Goose Creek south of 46th Street south of 46th Street.

Map and Sample Cross-section: Industrial Collector/Street





Von Maur Expansion - RISE Application Roadway Project

Source: City of Davenport (Project Map)

INT-4: Eastern/46th Roundabout

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Short-term	Eastern Avenue at E. 46th Street	N/A

Project Description: Roundabout installation as a traffic calming measure in conjunction with Project S-13. For project illustrations, please see the description of S-13.

SOUTHEAST (SOUTH OF KIMBERLY, BRADY TO EAST CITY LIMITS)

S-11: E. 29th Street Grid Connection

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Medium-Term	Eastern Avenue to Belle Avenue/ Jersey Ridge Road	N/A

Project Description: This project would connect 29th Street between Eastern Avenue and Jersey Ridge Road, north of Oakdale Memorial Park. It would improve east-west street connectivity in the southeast part of the City and support a bike connection (B-50).

Related Projects: Bike project B-50 would provide a marked bike route from Farnam Street to Jersey Ridge Road

Proposed Cross-section: Neighborhood Collector

S-12: E. 34th Street, Grid Connection

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Very Long-Term	Eastern Avenue to Jersey Ridge Road	N/A

Project Description: This project would connect E. 34th Street between Eastern Avenue and Jersey Ridge Road, improving connectivity south of Kimberly Road. The project would adopt a Commercial Collector design type through commercial areas on the west and transition to a Neighborhood Collector design type on the east. Due to property ownership, this should be considered a very long-term opportunity that could be pursued with redevelopment.

S-15: E. 35th Street Extension – New Street Connections			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Streets New Street Connection	Medium-Term	Brady St. to Kimberly Rd.	N/A

Project Description: This project would extend 35th Street on the east side of Brady Street, providing a new street connection south of Kimberly Road, helping to provide alternative traffic calmed routes.

Related Projects: This project would extend bike project B-32, which follows 35th Street west of Brady Street.

Proposed Cross-section: Commercial Collector

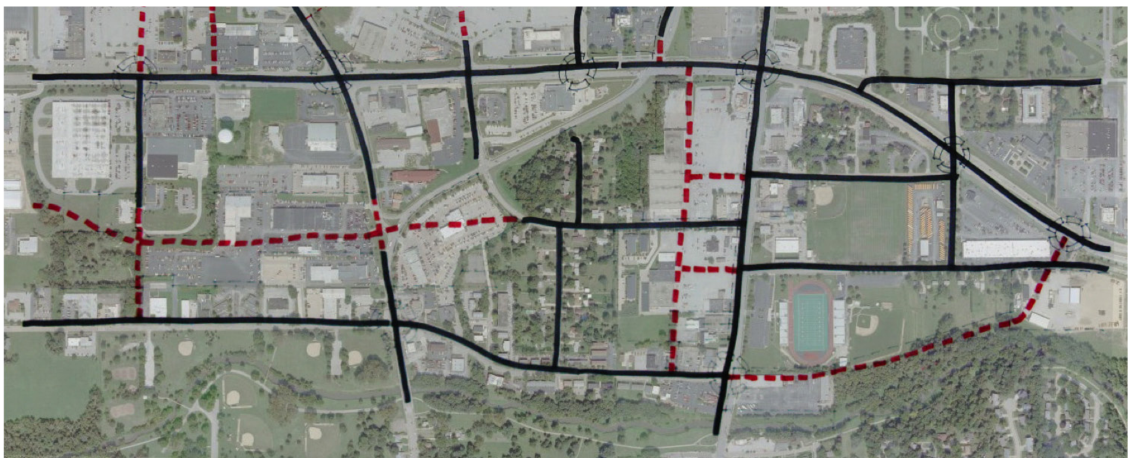
CENTRAL (BRADY STREET TO NORTHWEST QUADRANT BOUNDARY)

S-10: South of Kimberly Road Intersection/Connectivity Improvements			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Streets New Street Connection	Long-Term	Approximate area bounded by Kimberly Road, Harrison Street, Brady Street, and 35th Street	N/A

Project Description: This project stems from conceptual drawings from the public workshops for Davenport in Motion, conducted in September 2009, shown below. Dashed red lines indicate a conceptual restoration of the street grid that could occur in conjunction with future redevelopment. The illustration also calls out improvements to major street intersections that could be made in conjunction with a future street grid: Kimberly Road and Northwest Blvd, Brady Street, and Welcome Way, and the intersection of Northwest Blvd. and Welcome Way/Harrison Street.

Related Projects: S-15, extension of 35th street from Brady Street to Kimberly Road, is identified as a distinct project. Project S-23 identifies concepts for future grid restoration north of Kimberly Road and in Northpark Mall that could occur with future redevelopment.

Conceptual Illustration:



S-23: Northpark Mall Street Connection / Grid Restoration			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Streets New Street Connection	Long-Term	Northpark Mall / North of Kimberly Road	N/A

Project Description: This project proposes a long-term restoration of the street grid in NorthPark Mall with future redevelopment. A conceptual drawing from the public workshops for Davenport in Motion, conducted in September 2009, is included below.

Related Projects: Bicycle project B-10 reflects ongoing negotiations between the City of Davenport and NorthPark Mall to stripe of bicycle lanes (or providing multiuse paths) along the current private streets in NorthPark Mall. Bicycle project B-10a proposes a multiuse path along the eastern edge of the Mall, on the west side of Welcome Way.

Conceptual Illustration:

S-28: W. 67th Street, New Street Connection			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Streets New Street Connection	Long-Term	Northwest Blvd. to Brady Street	N/A

Project Description: This project would reconnect W. 67th Street east of Northwest Blvd., including a crossing of Goose Creek. It would follow the Neighborhood Arterial design type and provide a continuous east-west street and bicycle connection in the far northern part of the City. The western side of the project would connect to Brady Street as Hoover Road / 65th Street and continue across Brady Street as Veterans Memorial Parkway. Relocation of existing gas/electric infrastructure would be required.

Related Projects: The project would facilitate bike project B-26b on this segment of 67th Street, which would connect to the existing bicycle lanes on Veterans Memorial Pkwy, east of Brady Street. It would also connect to a recommended street extension and bicycle lanes on Marquette Street (S-29b / B-7c).

Proposed Cross-section: Neighborhood Arterial

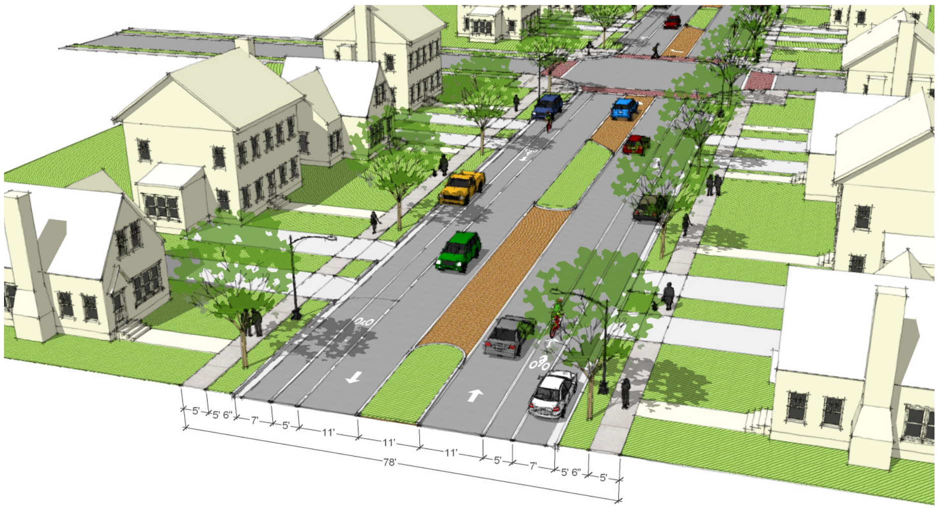
S-29a: N. Marquette Street Grid Connection

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Medium-Term	W 46th Street to Northwest Blvd	N/A

Project Description: This project would connect two segments of Marquette Street north of 46th Street, and allow extension of bicycle lanes on Marquette (B-7c) north to 60th Street. The street design would be based on the Neighborhood Arterial street design type. The recommended two travel lane cross-section should address concerns with traffic at the Northwest Blvd/53rd Street Triangle.

Related Projects: B-7c (Marquette Bike Lanes, 46th to 60th)

Proposed Cross-section: Neighborhood Arterial



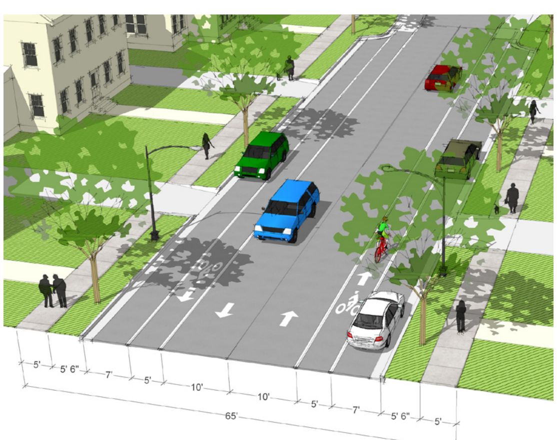
S-29b: Marquette Street, New Street Connection

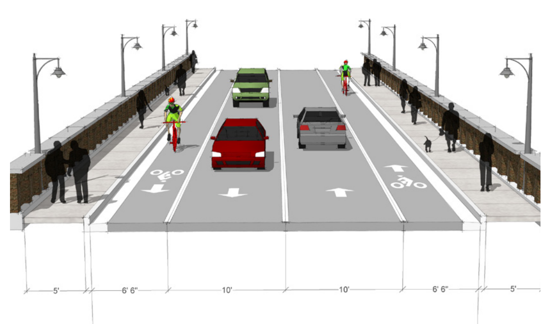
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Long-Term	61st Street to 76th Street	N/A

Project Description: This project would extend Marquette Street between 61st Street and 76th Street, including a crossing of Goose Creek, improving street connectivity to far northern Davenport. Bicycle lanes should be implemented on this segment of Marquette Street in conjunction with this project.

Related Projects: South of this project, 61st Street is the northern extent of bicycle lanes provided by bicycle project B-7c. This project would connect to a recommended new street segment of 67th Street (S-28), where bicycle lanes are also recommended in the Davenport in Motion Bicycle Master Plan.

Proposed Cross-section: Neighborhood Collector and Neighborhood Arterial Bridge





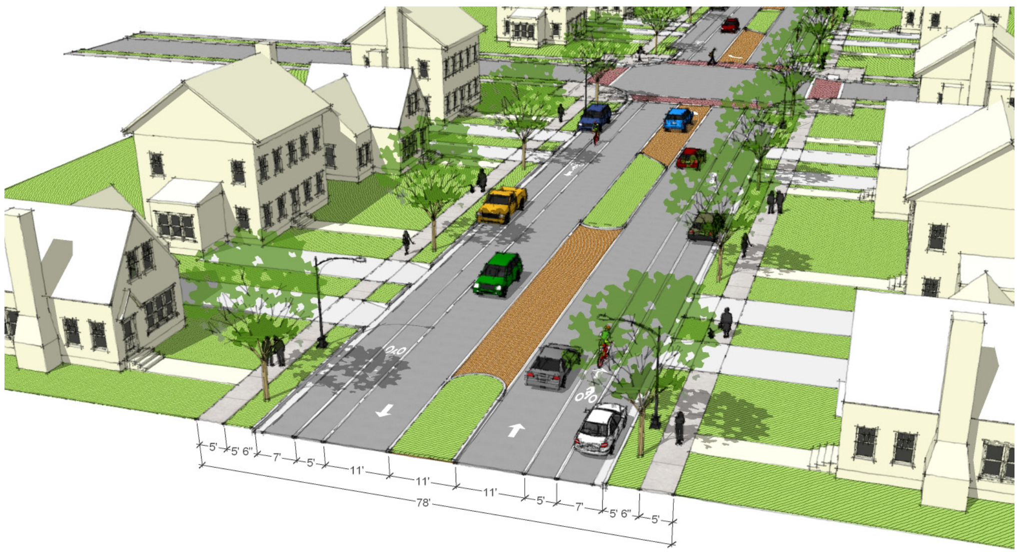
S-33: W. 46th New Street Connection

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Medium-Term	Fillmore Lane to Division Street and Division Street to Pine Street	N/A

Project Description: This project would complete several segments of W. 46th Street: one between Fillmore Lane and Division Street and two between Division and Pine (Divison to approximately Rodeo Court and west of El Rancho Drive) It may be desirable to use El Rancho Way to Cheyenne Avenue for the westernmost segment. City right-of-way dead-ends west of Pine Street at Ridge Court

Related Projects: The project would enable extending bicycle lanes west on 46th between Marquette and Pine (B-24b). Several other streets projects would extend 46th, with bicycle facilities, further west. In the very long term it would be desirable to connect these segments if feasible based on property ownership and possible redevelopment.

Proposed Cross-section: Neighborhood Arterial



S-34: N. Sturdevant Street, New Street Connection

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Medium-Term	Lambs Lane to W. 46th Street Extension	N/A

Project Description: This project would extend Sturdevant Street north from Lambs Lane to one of the proposed connections of W. 46th Street between Division Street and Fillmore Lane (S-33), improving north-south local neighborhood street connectivity.

Proposed Cross-section: Neighborhood Local

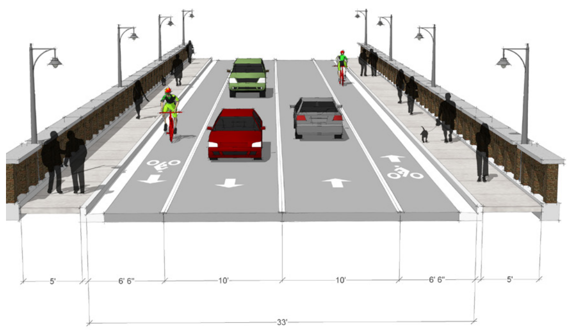
S-45a: W. 61st Street Grid Connection / Goose Creek Bridge

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Medium-Term	Appomattox Road to Marquette Street (over Goose Creek)	N/A

Project Description: This project would connect W. 61st Street across Goose Creek, following the Neighborhood Arterial Bridge design type.

Related Projects: The new street connection and bridge would directly support recommended bike route B-49a (W. 61st / E. 59th). It would facilitate connections to a recommended extension of bike lanes along Marquette Street, to a recommended bike route along Appomattox to Slattery Park and North Park Mall, and to a proposed trail along Goose Creek.

Proposed Cross-section: Neighborhood Arterial Bridge



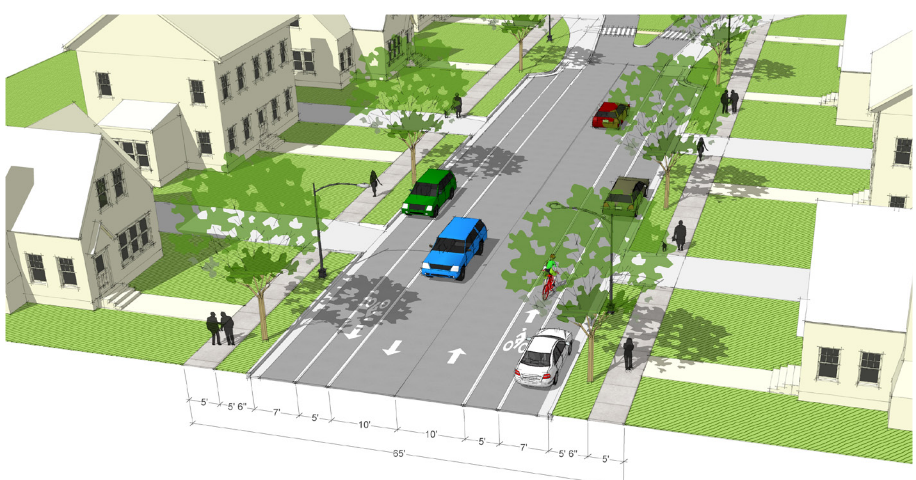
S-45b: W. 61st Street Grid Connection

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Long-Term	Marquette Street to Sturdevant Street / Northwest Blvd.	N/A

Project Description: This project would continue project S-45a and extend 61st Street to Sturdevant Street and Northwest Blvd.

Related Projects: The new street connection and bridge would directly support an extension of recommended bike route B-49b (W. 61st / E. 59th).

Proposed Cross-section: Neighborhood Collector

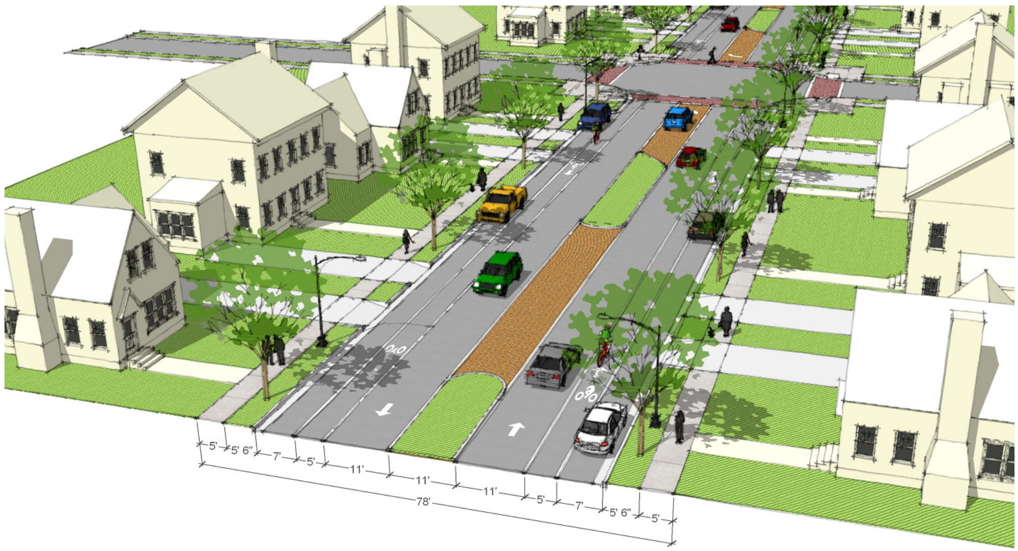


S-26: W. Central Park Avenue New Street Connection

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Long-Term	Utah Avenue to Emeis Park	N/A

Project Description: This project would build out the arterial street grid as called for in the concept plan for the Northwest Quadrant. It would create a new street connection between Utah Avenue and Wisconsin Avenue as an extension of Central Park Avenue west of Emeis Park.

Proposed Cross-section: Neighborhood Arterial



S-27: Next Major Grid North of Central Park, New Street Connection

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Long-Term	Utah Avenue to Emeis Park	N/A

Project Description: This project would build out the arterial street grid as called for in the concept plan for the Northwest Quadrant. It would create a new arterial street connection between Utah Avenue and Wisconsin Avenue, north of the recommended Central Park Avenue extension (S-26). The new street would be based on the Neighborhood Arterial street design type.

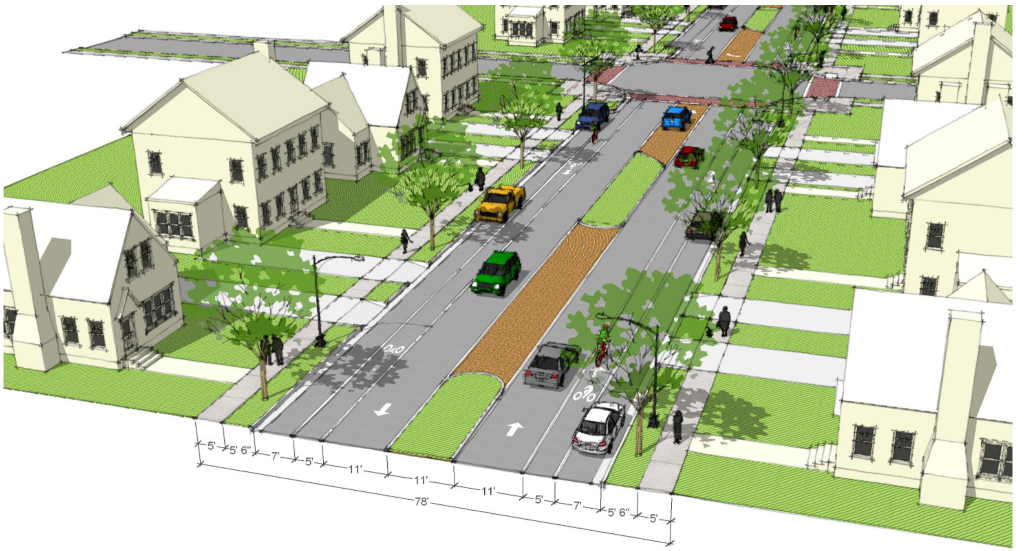
Proposed Cross-section: Neighborhood Arterial

S-35: W. 46th Street, New Street Connection

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Long-Term	Wisconsin Avenue to Fairmount Street	N/A

Project Description: This project would extend 46th Street based on the Neighborhood Arterial street design type and would build out the arterial street grid as called for in the concept plan for the Northwest Quadrant. Along with several other street connectivity projects, this extension aims for 46th Street to be a continuous east-west street in the long-term. This plan recommends that bicycle lanes be implemented in conjunction with the street extension.

Proposed Cross-section: Neighborhood Arterial



S-39: W. 53rd Street, New Street Connection

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Long-Term	Thornwood Avenue to I-280	N/A

Project Description: This project would extend 53rd Street from Thormwood Avenue west to I-280. The project would follow the Neighborhood Arterial street design type and would build out the arterial street grid as called for in the concept plan for the Northwest Quadrant.

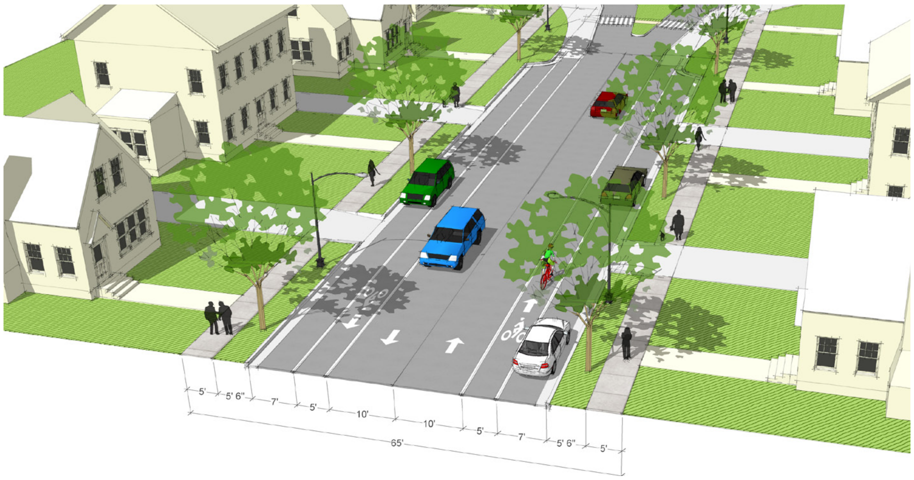
Proposed Cross-section: Neighborhood Arterial

S-42: Hillandale Road New Street Connection			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Streets New Street Connection	Long-Term	W. 40th St. to W. 60th St. Extension, W. 67th St. to W. 72nd St., W. 73rd to 76th St.	N/A

Project Description: This project would connect several segments of Hillandale Road. It would help build out the north-south street grid and enable a marked bicycle route.

Related Projects: S-35 would connect 46th Street to the western side of Hillandale Road. B-33 would implement bicycle route pavement markings on Hillandale Road.

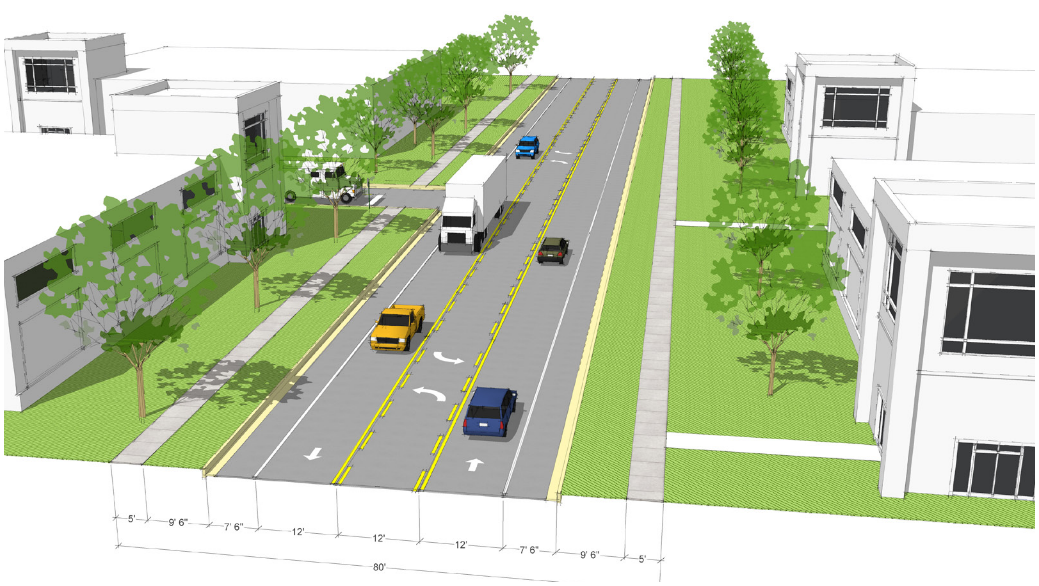
Proposed Cross-section: Neighborhood Collector



S-46: W. 76th Street, New Street Connection			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Streets New Street Connection	Long-Term	W. of Division Street to existing 76th Street and W. of Northwest Blvd. (at Silver Creek) to Utah Avenue	N/A

Project Description: This project would connect existing segments of 76th Street through the light industrial areas just south of I-80, based on the Industrial Collector/Street design type. 76th Street would be continuous from Brady Street to Utah Avenue. One missing segment is between Division Street and Northwest Blvd. through a generally developed area and the other is west of Northwest Blvd. through agricultural areas.

Proposed Cross-section: Industrial Collector/Street



S-52: N. Utah Avenue New Street Connection

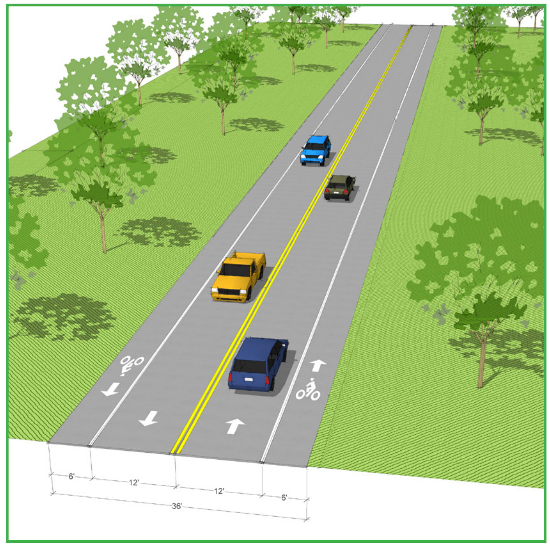
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Long-Term	Existing Kimberly Road to 46th Street	N/A

Project Description: This project would connect two segments of Utah Avenue to create a continuous north-south street along I-280. Bike lanes are recommended as part of the project.

Related Projects: Bicycle project B-1a calls for bicycle lanes to be striped on an existing segment of Utah Avenue between U.S. 61 and Locust Street; B-1b calls for bicycle lanes between Utah and 46th Street, coordinated with redevelopment or reconstruction.

Proposed Cross-section: The Neighborhood Arterial or Rural Arterial types from the DIM Street Design Guide may be appropriate, depending on the existing or envisioned development patterns along Utah Avenue at the time when this project is considered.

Neighborhood Arterial Street Design Type



Rural Arterial Street Design Type

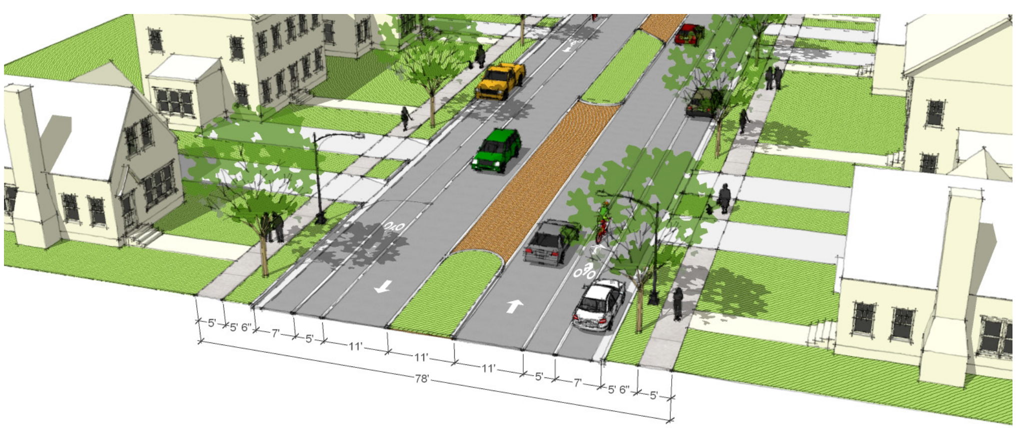
S-54: W. 60th Street, New Street Connections

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Long-Term	Fairmount Street to Hillandale Road / Wisconsin Avenue to Kimberly Road	N/A

Project Description: This project would connect several segments of 60th Street and would build out the arterial street grid as called for in the concept plan for the Northwest Quadrant. The missing segments are between Fairmount Street and Hillandale Road and between Wisconsin Avenue and Kimberly Road. Bicycle lanes should be implemented on new segments of 60th Street as part of this project.

Related Projects: B-25 recommends bike lanes on the existing segment of 60th Street between Wisconsin and Fairmount.

Proposed Cross-section: Neighborhood Arterial



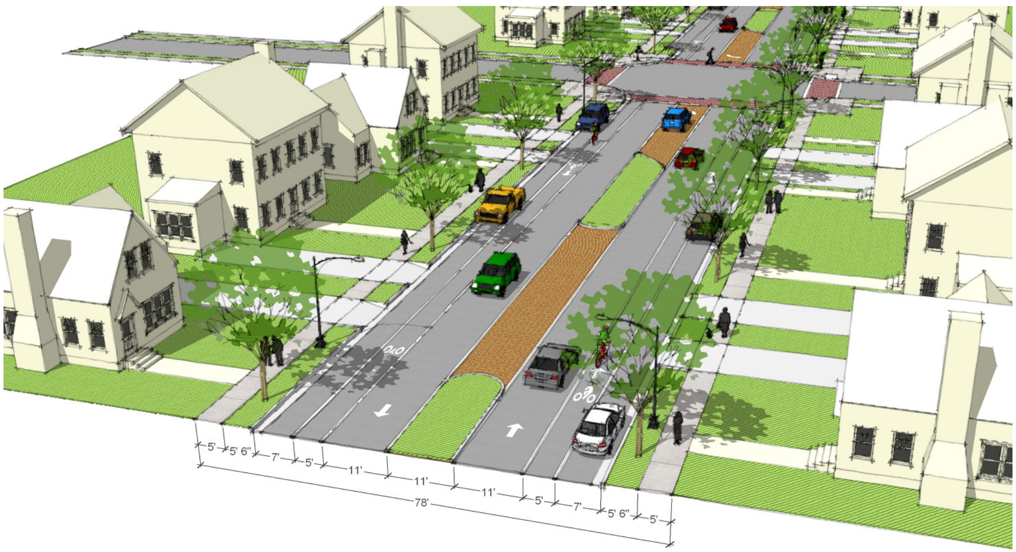
S-57: N. Fairmount Street, New Street Connection

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Streets New Street Connection	Long-Term	60th to 76th	N/A

Project Description: This project would extend Fairmount between 60th Street and 76th Street and help build out the north-south street grid in the Northwest Quadrant. Bicycle lanes should be implemented on this segment 60th Street as part of the project.

Related Projects: This extension of Fairmount Street would connect to the recommended extension of 76th Street (S-46). It would continue bicycle lanes on Fairmount south of 60th Street (B-3).

Proposed Cross-section: Neighborhood Arterial



Source: City of Davenport

Chapter 9 **DIM Bicycle Element**

The goals of Davenport in Motion include creating a balanced transportation system that provides safe and high quality access throughout the city for all modes of travel, as well as promoting public health and environmental quality. To enable bicycling as a primary mode of transportation, the Davenport in Motion Bicycle Element recommends a network of bicycle routes and related policies and programs that are designed to make cycling an attractive travel choice for a broad cross-section of Davenport residents. This chapter consists of three components:

- **Bicycle Master Plan:** This section identifies the central concerns related to bicycling that were identified in the planning process for Davenport in Motion and describes how the recommended projects help address those concerns.
- **Bicycle Master Plan Map:** The master plan map illustrates existing bicycle facilities in Davenport along with recommended bicycle projects throughout the City (lanes, shared roadway markings, and multi-use paths or trails).
- **Bicycle Project Descriptions:** This section provides more detailed descriptions and estimated costs for the recommended bicycle network projects.

DAVENPORT IN MOTION BICYCLE MASTER PLAN

As Davenport in Motion emphasizes establishing a new balance among users of the city's streets, this master plan of bicycle routes and facilities is intended to establish a clear, legible network for cyclists.

Based on ideas and feedback provided to the Davenport in Motion planning team through discussions with stakeholders and agency staff, the following central concerns emerged as guiding objectives in the development of this bicycle plan:

1. ***North-south connections are currently limited and need to be expanded.*** Davenport's historic growth patterns occurred further and further away from the Mississippi River. As a result, east-west streets and routes of movement are well established: downtown's principal streets, the Burlington Northern-Santa Fe railroad, and further from the river, Locust Street, Kimberly Road, and 53rd Street. North-south routes are not as well established.
2. ***Cycling facilities need to serve a broad cross-section of the community.*** This underscores that not all cyclists are comfortable exclusively on urban streets and may prefer a more recreational form of cycling on facilities that are separated from vehicular traffic. Davenport's Duck Creek and Mississippi River Trails are prime examples of such separated facilities, but Davenport's bicycle network needs to provide connections from these facilities into the city's neighborhoods.
3. ***Connect to the employment center of downtown Davenport.*** Enhanced bicycle connections to downtown are important not only because they formalize a means of travel for those who cannot or do not wish to drive, but also because they promote non-vehicular travel and reduce automobile trips into and out of downtown.
4. ***Give special attention to less-served parts of Davenport.*** Davenport's historic center is already a mostly cycling-accessible urban environment, but newer parts of the city will need more focused attention to provide meaningful bicycle connections. In particular, some streets are virtual barriers between older and newer parts of the city and therefore the plan should identify as many opportunities for safe, convenient crossings as possible.
5. ***Reconfigure and modernize Davenport's street infrastructure as appropriate to travel demand for all modes.*** Many of the City's streets are currently four-lane, undivided cross sections designed to maximize vehicle capacity and meet a greater travel demand. Data on actual traffic volumes, however, suggests that many of these roads do not carry traffic at or even near their capacity. As discussed in the Davenport in Motion Street Design Guide, conversion of such under utilized roadways from four to three lanes can enhance vehicular safety and provide an opportunity to add on-street bicycle lanes without expanding curb-to-curb roadway width.
6. ***Make sure the network expands along with the city.*** Although this bicycle master plan addresses a large number of street conversions and retrofits to enhance cycling conditions, it should also serve as guidance to add to the bicycle network should the urban footprint of Davenport expand, especially to the north and west of the historic center. As a general matter of policy, new street connections that are to be classified as collector and arterial roadways—or that will effectively serve a function of thoroughfare connection, regardless of their classification—should be equipped with on-street bicycle lanes.

BACKGROUND ON THE BICYCLE MASTER PLAN'S DEVELOPMENT

This work was guided primarily by input from Davenport's core cycling community, which included bicycle advocates, business owners and avid recreational cyclists. In partnership with the League of Illinois Bicyclists, area cyclists have produced a guidance map of cycling routes through the entire Quad Cities region that identifies preferred routes and 'caution' routes to be used with care. The route selections in this map are based on an array of roadway factors central to the cyclist's experience, such as traffic volume and speed, roadway surface conditions, grade change and the ability to cross through intersections safely and comfortably.

Using this previous effort and its collection of local knowledge as a starting point, the Davenport in Motion team worked with the Davenport cycling community to identify priority routes and likely street design types to be applied to them.

BICYCLE FACILITY TYPES IN THE PLAN

The Davenport in Motion Bicycle Master Plan focuses on retrofitting streets to feature a clear accommodation of bicycles. It does not emphasize street construction projects strictly to add bicycle lanes, instead seeking to fit bicycle facilities into the existing cross-sections of streets. For this reason, many streets that local cyclists perceive as poor cycling routes (such as Kimberly Road) do not have specific projects identified as part of the Bicycle Master Plan, although future 'complete street' conversions to such streets that would include bicycle space have been identified as other projects in Davenport in Motion.

On-street bicycle lanes. Bicycle lanes are the most visible and apparent means of encouraging cycling on-street, and they make up the bulk of the Davenport in Motion Bicycle Master Plan's recommendations. Striping bicycle lanes on roadways defines visible space for bicycle users separate from vehicle space. They are recommended in AASHTO roadway design guidance, especially the Guide for the Development of Bicycle Facilities, because they allow users of either mode to have more predictable movements with respect to the other. Bicyclists can be more confident that motorists will not drift into their travel space, and motorists are less likely to swerve outside of their lane to avoid bicycles traveling on the right side.

Striped bike lanes help novice and inexperienced bicyclists feel more comfortable biking, and therefore contribute to a greater acceptance of cycling among those would-be cyclists who do not currently consider it as an option for meeting their transportation needs.

Shared-use streets. While bicycle lanes delineate a separate space for primary use by cyclists, they constitute a space requirement that cannot be met on all streets, especially streets in established urban areas where modification to street dimensions would come at great cost and community impact. As a result, the Davenport in Motion Bicycle Master Plan recommends several shared-use streets to complement the on-street bicycle lane network. Technically speaking, cyclists are allowed to use the roadway of any street. However, cyclists want to know that the routes they select will connect and carry them to their destination. Thus, formal designation of a route, even if it cannot fit a bicycle lane, is important to strengthen the cycling network.

Existing on-street bicycle lanes on Jersey Ridge Road.

Multi-use paths. As mentioned previously, not all cyclists are likely to be comfortable using on-street facilities for the bulk of their cycling, and not simply because of the required interaction between vehicles and bicycles. Many cyclists prefer a recreational focus to their cycling, maintaining speeds without needing to worry about traffic control, and as such desire facilities that allow them to enjoy a cycling experience away from the street. Multi-use paths provide a recreational facility that allows interface with Davenport's natural amenities.

Davenport already has two popular examples of this type of facility: the Duck Creek Trail and the Mississippi River Trail. The Duck Creek Trail is well-used by Davenport cyclists and provides a long-range east-west connection through the city, connecting to six city parks.

Shared-use street with sharrow pavement markings, Portland.

While these off-street bicycle facilities contribute to the available options for cyclists and can provide important connections to the network, The bicycle network map included in this plan identifies a number of potential multi-use path projects, however Davenport in Motion recommends that the City of Davenport primarily focus its efforts and resources on creating the recommended network of on-street bicycle facilities. Path projects should be selected with input from advocacy groups, following careful study of engineering-related details of specific alignments, and in cooperation with the City of Davenport Parks and Recreation Department. Advocacy groups can also play an an important role in identifying private funding contributions and partnerships for path projects; the funding opportunities section of this chapter identifies several trail-specific funding sources.

MAJOR FOCUS AREAS: HOW THE PLAN ADDRESSES KEY CONCERNS

North-south connections. The plan recommends six primary north-south connecting corridors: a northward extension of existing bicycle lanes on Marquette Street; on-street bicycle lanes on Bridge Avenue that connect via the Duck Creek Trail to bicycle lanes on Eastern Avenue; a northward extension of existing lanes on Jersey Ridge Road; a designated shared street route on Gaines Street; a shared street and bridge over Duck Creek on Fair Avenue north of Vander Veer Park; and a combination of Iowa and Farnam Streets connecting to Duck Creek. Several additional north-south connections have been recommended outside of core areas of the city, such as a shared street and bicycle lane on Fairmount Street and on-street bicycle lanes (or designated shoulders) on Wisconsin Avenue.

As suggested previously, some streets, especially Kimberly Road, are considered to be barriers to cycling access through Davenport and as such merit special attention. The plan proposes four principal crossings of Kimberly: at Fairmount Street, Marquette Street, Eastern Avenue and Jersey Ridge Road. The north-south routes making these crossings connect to a larger network on either side of Kimberly that in turn connects to neighborhoods and special destinations.

Although not considered by the community to be an obstructive 'barrier' in the same sense as high-speed roadways, expressways and other man-made features such as railroad embankments, Duck Creek is nonetheless a feature with limited crossings, and many streets with bridges over the creek are high-volume (and often high-speed) roadways that cyclists perceive as poor choices for routes. The addition of these north-south routes identifies one new bridge crossing of the creek to carry a bicycle-pedestrian path across: at the north end of Fair Avenue. Along the remainder of Duck Creek's length, existing pedestrian bridges are tied into the on-street bicycle route network through the most direct connection possible to take advantage of these creek crossings.

Bicycle 'trunk' and 'feeder' routes. In much the same manner as Davenport's streets are assigned into different functional classifications, some existing and planned bicycle routes serve more of a long-distance movement function (such as Central Park Avenue and Jersey Ridge Road) and some provide more neighborhood-scale connections (such as Kelling Street and Lombard Street). The intent behind this is to provide as complete a network as possible to appeal to different cycling needs, especially commuting, connections to school and recreational cycling. This also focuses major investments in bicycle facilities on roads likely to undergo more frequent maintenance, namely collector and arterial roadway. Such a focus allows implementation of the bicycle plan to be coordinated with other maintenance or improvement projects on these streets, potentially addressing bicycle facility improvements at the same time and reducing the cost of adding a bicycle lane.

Southwest Davenport connections. Southwest Davenport needs additional connections to the central city. The plan proposes bicycle lane connections along Third Street to follow its conversion to two-way traffic, a restriping of Rockingham Road to add bicycle lanes, and a neighborhood route using Concord Street and Indian Road/Clark Street or McKinley/Elmwood Avenues. This latter route follows an established route preferred by local cyclists and follows Concord south along the Mississippi River to a planned bicycle-pedestrian bridge connection to Credit Island. In addition, the Iowa DOT has widened existing 6-foot shoulders on West River Drive to 10-feet between Concord and Fairmount Streets, which can be signed and stiped with bicycle lanes to provide a connection between other planned bicycle routes.

Future cycling routes. The plan also suggests areas where expansion of the city through development should take care to connect to the cycling network. These are not identified as projects as they are not associated with currently-existing roads, but rather mentioned as general guidance for where connections need to occur. Such expansions include trails along creeks and in floodplains, similar to the Duck Creek Trail, and potential street network connections in the event of redevelopment, such as in the area between Kimberly Road and 35th Street at Welcome Way and at the North Park Mall.

MATRIX OF PROJECT RECOMMENDATIONS

The tables on the following pages detail how individual projects respond to the primary concerns. Each concern is addressed with a series of approaches (for example, north-south routes focused on crossing Kimberly and others focused on crossing Duck Creek), and for each approach specific projects are listed that help address the concern. The “reconfiguring and modernizing streets” concern is not included in the table; these projects address other concerns and involve road diet projects that seek to reconfigure roadway capacity based on contextual need and actual travel demand. These projects, listed below along with the extent where the road diet is specified, all follow essentially the same model three-lane cross section - one travel lane in each direction with a two-way center turn lane.

- Lincoln Ave. from Iroquois to Central Park (B-35)
- Pine St. from Kimberly to Northwest (B-37)
- Marquette St. from Central Park to south of Kimberly (B-7)
- Eastern Ave. from 29th to 53rd (B-13)
- Jersey Ridge Rd. from Kimberly to Veterans Memorial (B-14)
- Central Park Ave. from Bridge to Emeis Park (B-22)
- 35th St. from Marquette to Brady (B-32)
- 46th St. from Tremont to Welcome Way (B-24a)
- Hickory Grove Rd. from Fairmount to Lombard (B-51)

Critical Bicycle Concern	Approach to Addressing the Concern	Specific Network Additions/Projects
North-south connections are currently limited and need to be expanded.	Find opportunities for crossing Duck Creek, taking advantage of existing pedestrian bridges.	**Kelling Street (B-30).** Pavement markings to connect the Central Park bicycle route to an existing pedestrian bridge over Duck Creek.
		Western Avenue (B-31). Connects through Junge Park at an existing pedestrian bridge.
		Fair Avenue (B-9). This would add a new bridge over Duck Creek and resume a pavement-marked, shared street bicycle route on Fair north of the creek.
	Find opportunities for crossing Kimberly Road, taking advantage of existing signalized intersections for protected pedestrian crossings.	**Fairmount Street (B-3 and B-4).** This project consists of a shared-street component south of Kimberly and a project adding bicycle lanes north of it.
		Marquette Street (B-7). Most of this project covers street sections that can be restriped to add bicycle lanes, although a short section between Central Park and 35th Street is constrained and utilizes a road diet to reconfigure the roadway.
		Eastern Avenue (B-13). Adds bicycle lanes north of Elm Street and connects to Prairie Heights Park. Uses a shared street route between 12th and Elm Streets.
		Jersey Ridge Road Bike Lane Extension (B-14). Continues bicycle lanes north of Kimberly.
Cycling needs to appeal to a broad cross-section of the community.	Look for long-range connections allowing commuters a direct path to and from the central city.	**Central Park Avenue (B-22).** Adds bicycle lanes from Emeis Park to Bridge Avenue.
		14th-15th Corridor (B-19) and **Kirkwood Boulevard (B-20).** On 14th-15th, adds one bicycle lane following traffic flow (on the right side of the street); Kirkwood adds shared-use arrow markings.
		3rd Street (B-17) and **Telegraph Road (B-18).** This corridor adds bicycle lanes to 3rd along with its two-way conversion (refer to project DS-17).
	Provide more connections to existing parks and open space, especially parks along Duck Creek.	**Washington Street (B-6).** Pavement markings for shared-use arrows.
		Main Street (B-29). Pavement markings for shared-use arrows with clear connections to and from Vander Veer Park and Junge Park.
		Marlo Avenue (B-15). Pavement markings for shared-use arrows; connects Middle Road Corridor and East Davenport commercial district to Duck Creek Park.

Critical Bicycle Concern	Approach to Addressing the Concern	Specific Network Additions/Projects
Connect to the employment center of downtown Davenport.	Look for long-range connections allowing commuters a direct path to and from the central city.	**Central Park Avenue (B-22).** Adds bicycle lanes from Emeis Park to Bridge Avenue.
		14th-15th Street Corridor (B-19) and **Kirkwood Boulevard (B-20).** On 14th-15th, adds one bicycle lane following traffic flow (on the right side of the street); Kirkwood adds shared-use arrow markings.
		3rd Street (B-17) and **Telegraph Road (B-18).** This corridor adds bicycle lanes to 3rd along with its two-way conversion (refer to project DS-17).
	Add bicycle lanes and routes on key downtown streets to increase cycling's reach and profile through downtown.	**3rd and 4th Streets (B-17).** This corridor adds bicycle lanes to 3rd and 4th along with their associated two-way conversion (refer to project DS-17). This project makes 3rd and 4th the bicycle spine of downtown Davenport, linking four different north-south routes that connect to the city's neighborhoods, college campuses and main hospitals.
		Gaines Street (B-8). Adds sharrows on Gaines from Central Park Avenue south to 4th Street.
		Main Street (B-29). Adds sharrows on Main Street to complement its enhancement projects (refer to projects DS-7 and DS-8).
		Iowa Street (B-11). Adds sharrows on Iowa Street from High Street to 2nd Street.

Critical Bicycle Concern	Approach to Addressing the Concern	Specific Network Additions/Projects
Give special attention to less-served parts of Davenport.	Extend bicycle network to the north of the city.	**Jersey Ridge Road Bike Lane Extension (B-14).** Continues bicycle lanes north of Kimberly.
		Marquette Street (B-7). North of Duck Creek, this extension of existing bicycle lanes also provides an important Kimberly Road crossing.
		46th-49th Corridor (B-23 and B-24). This provides a long east-west connection, with a need for turns in the route alignment through a residential neighborhood.
	Extend bicycle network to the southwest neighborhoods of the city.	**Rockingham Road (B-16).** Stripe bicycle lanes on wide two-lane street.
		3rd Street (B-17). Connects southwest Davenport to downtown via 3rd Street.
		Clark-Indian-Concord Route (B-27a). Neighborhood route from Telegraph through southwest Davenport, extending along Concord to planned Credit Island bicycle-pedestrian bridge. B-27b utilizes Elmwood and McKinley to Concord.
		John Fell Connector (B-28). Connects existing trail through Sunderbruch Park to Concord route and Credit Island bicycle-pedestrian bridge. Part of this route, between Fairmount and Concord, does not currently exist as a city right-of-way and may need to be constructed as a special off-street trail along the existing drainage canal.
Make sure the network expands along with the city.	Look for long-range connections allowing commuters a direct path to and from the central city.	**Central Park Avenue (B-22).** Adds bicycle lanes from Emeis Park to Bridge Avenue.
		14th-15th Corridor (B-19) and **Kirkwood Boulevard (B-20).** On 14th-15th, adds one bicycle lane following traffic flow (on the right side of the street); Kirkwood adds shared-use arrow markings.
		3rd Street (B-17) and **Telegraph Road (B-18).** This corridor adds bicycle lanes to 3rd along with its two-way conversion (refer to project DS-17).

PRIORITIZATION OF BICYCLE PROJECTS

Stakeholder participation in the Davenport in Motion planning process also helped the project team to understand the urgency of need for particular bicycle improvements, providing a foundation for how to define priorities of project implementation.

The team used the first four primary concerns guiding development of the master plan as a basis for prioritization and compared these to three general levels of project feasibility: projects where a simple restriping or pavement marking will accomplish the project, projects where bicycle lane delineation needs to occur from a more thorough restriping (including the removal of existing lane striping across the roadway), and reconstruction projects. In the case of the latter, these need to be coordinated with larger construction projects identified in the transportation improvement program (TIP) and long-range transportation plan (LRTP) to consolidate the bicycle projects with other objectives that are leading to the reconstruction.

The table on the following page describes how the first three primary concerns guiding the development of the route map compare to the three feasibility levels. Prioritization was based on where these intersect, identifying a small number of projects to be undertaken in the first year of implementation, and balancing the remainder among short-term time frames (1 to 3 years after plan adoption), medium-term time frames (3 to 10 years), and long-term time frames (projects to be implemented outside of the 10 year action plan period).

Generally, projects that could be completed easily were assigned to a short-term priority, where projects involving a more thorough coordination with street construction were assigned to longer term timeframes. In particular, identified bicycle routes with no existing pavement markings (such as Main and Washington Streets) were prioritized for very short timeframes, including the first year of implementation. Some projects that would typically be associated with a longer term time frame (such as reconstructions to add bicycle lanes) have been assigned to a shorter term period so that those projects can be added to the scope of improvements identified in the TIP and/or LRTP.

The focus of the plan implementation was on completing entire corridors at once, combining separate projects that constitute a single corridor into generally the same implementation timeframe. For example, both projects B-19 and B-20 (the 14th-15th Street couplet and the Kirkwood Boulevard bicycle route) respond to a need to mark designated routes that serve commuters and provide connections to and from Davenport’s major employment centers, although they are likely to take two different forms of route delineation (B-19 featuring one-way bike lanes on the two streets and B-20 featuring shared use arrows adjacent to on-street parking). These are both recommended as short-term projects due to the relative ease of establishing the route and the benefit from implementing both at the same time.

The overall Davenport in Motion project list specifies each of the recommended bicycle projects and their priority timeframe for implementation.

Primary Guiding Concern	Pavement Marking/ Bike Lane Striping in Existing Cross-Section Dimensions	Thorough restriping of roadway to fit bicycle lanes	Full reconstruction project (or construction component needed, such as ped bridge)
North-south connections are currently limited and need to be expanded.	• Washington (B-6) • Gaines (B-8) • Iowa-Farnam (B-11) • Main (B-29) • Kelling (B-30) • Western (B-31) • Hillandale (B-33) • Forest-Lorton (B-42)	• Fairmount (B-4) • Fejervary (B-5) • Marquette (B-7) • Bridge (B-12) • Eastern (B-13) • Jersey Ridge (B-14) • Lincoln (B-35) • Pine (B-37)	• Utah (B-1) • Wisconsin (B-2) • Fairmount (B-3) • Fair (B-9) • Elmore (B-43)
Cycling needs to appeal to a broad cross-section of the community.	• Marlo-Duck Creek Park (B-15) • Kirkwood (B-20) • 29th (B-50, select extent)	• 14th-15th (B-19) • Lombard (B-21) • Central Park (B-22) • 29th (B-50, select extent)	• 3rd-4th (B-17; involves signal replacement for two-way conversion)
Connect to the employment center of downtown Davenport.	• Gaines (B-8) • Iowa-Farnam (B-11) • Main (B-29)	• Marquette (B-7)	• 3rd-4th (B-17; involves signal replacement for two-way conversion)
Give special attention to less-served parts of Davenport.	• 46th-49th (B-23) • Concord (B-27) • Hillandale (B-33)	• Rockingham (B-16) • 46th (B-24a and b) • 60th (B-25) • 67th (B-26b) • Veterans Memorial - 67th (B-26a) • Pine (B-37)	• NorthPark Mall Multi-Use Path Connection (B-10) • Telegraph (B-18a and b) • John Fell (B-28; involves trail section between Fairmount and Concord)
Reconfigure and modernize street infrastructure for all travel modes.	(This guiding concern relates primarily to road diets that can add bicycle lanes)	• Marquette (B-7) • Eastern (B-13) • Jersey Ridge (B-14) • Central Park (B-22) • 35th (B-32) • Lincoln (B-35) • Pine (B-37)	(This guiding concern relates primarily to road diets that can add bicycle lanes)

FUNDING OPPORTUNITIES

The primary opportunities for funding bicycle enhancements are through federal assistance, which would be coordinated with the Bi-State Regional Commission. Iowa does not provide a state-level funding mechanism for bicycle projects, other than distribution of Transportation Enhancement grants (see below).

Federal Transportation Enhancements Program

The Transportation Enhancements (TE) program offers funding opportunities for projects that expand transportation choices and enhance the transportation experience. Proposed projects must meet one of twelve eligible activities, among which are the provision of pedestrian and bicycle facilities and the provision of pedestrian and bicycle safety and education activities. A local match of 20 percent is required for enhancement projects that have a regional impact such as those proposed in Davenport. For statewide-impact projects, a match of 30 percent is required. Eligible projects will either enhance an existing facility or implement a facility that is currently present in a plan.

Other Federal On-Street Funding Sources

In addition to TE funding, other federally-based funding sources may be available, and most of these funding sources stipulate that the bicycle project to which funding would be applied is for a transportation use (as opposed to a recreational use). In Davenport, these are administered through the Bi-State Regional Commission, and projects must be included in Bi-State's long-range transportation plan and transportation improvement program for the Quad Cities region. National Highway System funds may be used to construct bicycle transportation facilities and pedestrian walkways on land adjacent to any highway on the National Highway System. While little of Davenport's planned bicycle system is a part of this system, select projects (such as B-10, the planned off-street connection around the NorthPark Mall) may qualify for this funding. In addition, Surface Transportation Program-Urban (STPU) funds can be applied to the construction of bicycle facilities and can be used for the preparation of select educational and informational materials (such as printing bicycle maps for public distribution). In addition, Congestion Management and Air Quality (CMAQ) funds are often applied to transportation infrastructure projects intended to allow and improve non-motorized travel.

Federal Trails Recreation Program

The intent of this program is to provide and maintain recreational trails and trail-related infrastructure. Projects must conform to federal funding requirements, but are approved for funding by the Iowa Transportation Commission and funding is coordinated through the Iowa Department of Transportation. A minimum local match of 20 percent is required by the sponsoring local agency or entity. Trails that are built through this program must be maintained as a public facility for at least 20 years following construction.

Federal Safety Program Funds

The U.S. Department of Transportation (DOT) makes funding for creation of safety programs (refer to the next section on outreach and educational programs) available through its Section 402 Highway Safety funds. These are usually available through the Iowa Department of Transportation and applications are typically coordinated through the IDOT pedestrian/bicycle safety coordinator. Many of these funds are used for state-level programs, though they have also been applied to initiate bicycle safety programs at the MPO and local levels. Generally, these are start-up funds available for the first one to three years of a program's life and are typically used for development costs. Often, Section 402 funds are not sufficient to fully implement the program, depending upon the needs of the particular community and the objectives of the program.

State Recreational Trails Program

The intent of this state-level program is to fund the construction of public recreational trails. Under this program, a minimum of 25 percent local match is required, not including other state grants. Proposed projects must be part of a local, regional, or statewide trail plan, such as the Davenport Bicycle Master Plan. Projects that receive funding must be maintained as a public facility for at least 20 years following construction.

Local Funding Commitment

Perhaps the most common form of funding is local allocation to the bicycle plan. Bicycle implementation from local sources is usually incorporated into a city's capital improvement budget based on priority of projects and the level of political interest in advancing cycling as a key component to the city's transportation system. A city's governing board may choose to allocate a one-time amount or set aside an annual amount to be used to program projects.

Other local-level funding mechanisms may be available as well. Specific-area funding sources such as tax increment funding (TIF) districts and business improvement districts provide additional funding that, in the public right-of-way, is usually applied to streetscape and pedestrian improvements to enhance economic potential and increase adjacent property values. These funds may be applied to bicycle projects as well and especially help to address complementary infrastructure and facilities (such as street lighting and bicycle parking).

Coordination with Other DIM Projects

This chapter includes detailed bicycle project descriptions that identify where projects can be coordinated with other Davenport in Motion street projects. Chapter 5 also provides a listing of the Bi-State region's existing planned/programmed projects and addresses project phasing. Chapter 8 provides descriptions of street projects, including how these projects may include bicycle components in their scopes. In particular, many restriping projects can save the cost of lane striping removal if they are coordinated with a comprehensive re-striping of the entire street. Although this is not necessarily an opportunity for funding in implementing the bicycle plan, the purposeful combination of many projects in Davenport in Motion is intended to economize on the total project cost of the plan.

OUTREACH AND EDUCATIONAL OPPORTUNITIES

While the City of Davenport is the entity responsible for overseeing the implementation of the Bicycle Master Plan, its real success depends on how it is understood and used by the entire Davenport community. An important parallel effort in project implementation is the involvement of motorists and potential bicycle system users of all ages in learning about the benefits of cycling, how to cycle safely and responsibly, and how to drive on the street system in a way that acknowledges and respects cyclists sharing the street with vehicles.

Outreach Programs

The Quad Cities metropolitan area has three principal advocacy organizations: the League of Illinois Bicyclists, the Iowa Bicycle Coalition, and the Quad Cities Bicycle Club. Each of these is a membership-based organization focused on promoting bicycle access and educating the public on safety and good practices in on-road bicycling. In addition, the Quad Cities Transportation Advocacy Group focuses on advocacy for non-vehicular transportation options, especially walking, bicycling and transit use. These organizations have an active core membership and have been closely involved with governmental agencies and other public authorities in advancing multimodal transportation in Davenport.

The City of Davenport should establish a formalized relationship with one of these organizations, most likely either the Quad Cities Bicycle Club or the Quad Cities Transportation Advocacy Group, to assist in promoting outreach efforts. The City is eligible for funding assistance for the creation and distribution of informational materials

Enabling Cycling

To more fully realize the benefits of an expansive bicycle network, however, the City of Davenport and its partner organizations need to work to establish a stronger culture of bicycling in the city. Davenport has the natural advantages of relatively flat topography, a riverfront setting, and a solid grid of connected streets that allow multiple route alternatives through the city. The Davenport in Motion Bicycle Master Plan represents an ongoing pattern of enhancing existing street infrastructure to better accommodate cyclists. What remains is a commitment on the part of the city to reward cycling, not just to make it available as an option. The following actions are suggested possibilities for how this can be facilitated.

Establish a Bicycle and Pedestrian Advisory Committee. The City of Davenport should consider creating a Bicycle and Pedestrian Advisory Committee, or at least a formal subcommittee of its

Citizens Advisory Committee. The role of a dedicated committee would be to advise the Davenport City Council on funding and legislative action decisions to further the role of cycling in Davenport.

Formalize a System of Providing Bicycle Parking. One important step the City can take is to establish bicycle parking requirements and standards for different types of land uses. This helps to build an inventory of bicycle storage so that cyclists have secure parking convenient to destinations throughout the city. A combination of short-term and secure long-term bicycle parking will better support cycling in Davenport and make it an attractive, sensible mode choice.

In many cities that use such a practice, requirements are specified in zoning districts and relate a required number of bicycle parking spaces to a unit value of land use intensity, such as one parking space per 10 dwelling units in an apartment building. The discussion and table below outline general ranges of desired bicycle parking requirements for the city, but should be applied based on the degree of cycling activity to be expected:

- *Residential uses.* Typically single-family and townhouse residential will have garages or other spaces for bicycles to be stored on-site. Multi-family residential, where space and access to individual dwelling units are more constrained, benefit more from bicycle parking. In dense urban environments one space per unit is sometimes required; in less cycling-oriented cities there may be a less stringent requirement (such as one space per five units) or no requirement at all.
- *Commercial uses (primarily retail).* Neighborhood-serving retail tends to have higher demand for bicycle use, and these kinds of establishments generally occupy smaller leasable spaces. Ratios of one space to 3,000 square feet of leasable space are used in bicycle-heavy urban environments; a ratio of one space to 4,000 feet of space is a less strict requirement. Alternatively, Davenport may consider requiring each retail business below a certain floor area to provide one space or pay an in-lieu contribution that the City may combine with other such payments to provide consolidated parking (with higher-quality facilities).
- *Office.* Offices usually provide bicycle racks for workers commuting rather than for visitors needing short-term bicycle storage. For this reason, many office bicycle parking facilities are located inside of structured parking facilities or even inside of buildings. Typically one worker in an office is assumed to represent an average of 1,000 square feet of leasable space; a requirement of one space per 5,000 square feet assumes a demand of one in five workers commuting by bicycle.

Land Use	*Number of Bicycle Parking Spaces / Land Use Unit*	*Who would provide this?*
Residential (Multi-Family)	1 space per 3 units	Private Developer
Commercial/Retail	1 space per 4,000 square feet of leasable space	Private Developer
Office	1 space per 5,000 square feet of leasable space	Private Developer
School	1 space per 10 students	City/School Board
Park	2 spaces per acre	City
Recreation Center	1 space per 1,000 square feet of usable floor area	City

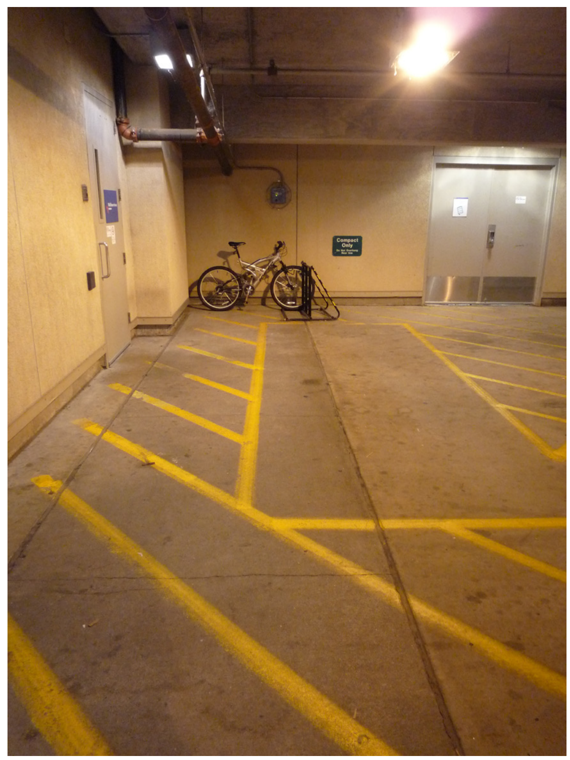
Safety Programs

Cyclist safety is almost always a primary concern in implementing bicycle plans and expanding the reach of cycling in a community, especially with regard to on-street bicycle facilities. Developing a meaningful, effective approach to safety involves expectations for both motorists and for cyclists. Motorists need to understand the basic rights and legal status of cyclists, where they can and cannot ride bicycles, and how they are likely to move when they ride along with traffic. Likewise, cyclists must understand their obligations as users of a street and how to make their presence known to other street users. With this, safety education programs are an important component of driver and would-be cyclist education.

Safety education programs are typically structured at three levels: education of young bicycle users, education of adult users, and training for how to conduct educational activities.

Policy Recommendations for the City of Davenport

- The City of Davenport should lead the organization of a bi-state, Quad Cities-wide safety and education organization that can be a central resource for grant application and funding of safety and outreach programs. One or more of the existing advocacy organizations in the Quad Cities area may fill this role.
- The City of Davenport should work with this organization, once identified, to facilitate information on available funding opportunities and on Davenport in Motion implementation progress.
- The City of Davenport should create a Bicycle-Pedestrian Advisory Committee to advise the Davenport City Council on bicycle policy, implementation of the Davenport in Motion Bicycle Master Plan, and distribution of funding for other bicycle-related programs and activities.
- The City of Davenport should require minimum levels of bicycle parking for certain land uses and zoning districts, based on the general guidance in the table above.



A combination of short- and long-term bicycle parking will better support cycling in Davenport and make it an attractive, sensible mode choice.

Source: Nelson\Nygaard

WAYFINDING, SIGNAGE AND THE MUTCD

The Davenport in Motion planning process coincided with the December 2009 release of an updated edition of the Manual on Uniform Traffic Control Devices (MUTCD) from the Federal Highway Administration. The new edition features several pavement marking, signage and traffic control instruments that had been practiced on an experimental basis in cities around the United States and, in some cases, applied in anticipation of their inclusion in the guide. That they are now standard features of the MUTCD makes them highly valuable in enhancing Davenport's bicycle network.

To this end, the Bicycle Master Plan is closely coordinated with the Davenport in Motion Street Design Guide, which details a series of design options for on-street bicycle lanes and marked bicycle routes. A key component of the design guide (and a new feature of the MUTCD) is the shared-use arrow marking, commonly referred to as a 'sharrow' and used generally where street cross-section width and demand for other uses of the street do not allow adequately-sized bicycle lanes to be striped. The Bicycle Master Plan uses the sharrow primarily on the basis of two principles:

- Sharrows are acceptable to designate bicycle routes on local streets with low traffic volumes and slow posted speeds.
- On other types of streets, sharrows may be used to fill in gaps between bicycle lanes for reasonably short extents.

A key complement to the use of bicycle lanes and sharrows is the use of signage, which has advanced considerably in the last three decades and has been updated in the current MUTCD. The following types of signage are to be used, with general guidelines given for the applicability of each. Note that the signs here are generalized and are NOT intended to serve as standards for appearance, layout or fabrication.

New Techniques and Design

Recently some cities have begun implementing pedestrian- and bicycle-scaled signage. Since pedestrians and cyclists travel at much lower speeds, smaller and more detailed signs can be used. While these signs can warn of an upcoming intersection or similar changes, they are particularly useful for providing wayfinding information.

These signs, as shown in the illustrations at the upper right, can include elements of direction (arrows), destination (place names), and distance (miles until destination). Based on travel speed, signs for cyclists are typically more concise, while pedestrian signs can be more detailed.

Pedestrian-scale signage is more appropriate for lower travel speeds, such as walkers, runners, or cyclists. Such signs can be typical warnings similar to highway signs, or they can provide wayfinding and directional information.

Custom wayfinding schemes are not only a way to give spatial guidance on key destinations in a localized area, they also offer a way to celebrate and enhance an existing sense of place by drawing on elements of the natural and built environments for design inspiration.

Sign Type	Description and Guidelines for Use

Bicycle Lane Sign. Accompanies on-street bicycle lanes. Should be placed after key intersections and combined with arrow directional signage to indicate when a bicycle lane moves to another street. Should also be used with 'ENDS' signage to indicate the end of a lane on street so that cyclists know that they may need to merge into a regular travel lane.

Bicycle Route Sign. Should be used to accompany designated bicycle routes per Davenport in Motion Plan, or streets carrying sharrows. On projects where short sharrow sections may be needed to fill in gaps between bicycle lanes, such as B-7 and B-18, signage indicating that bicycles may use the full travel lane should be used instead.

Bicycle May Use Full Lane Sign. Should be used to accompany designated bicycle lane streets where short sharrow sections may be needed to fill in gaps between bicycle lanes, such as B-7 and B-18. These may be used on designated bicycle routes as well, especially in constrained sections where sharrows may be placed in the middle of a travel lane.

Directional Signs. These are new introductions to the 2009 MUTCD and allow a standardized system of listing destinations at key intersections. They may be used as needed, but due to fabrication costs are likely only to be used at key intersections of bicycle routes and lanes that connect over long distances through Davenport.

Custom Wayfinding

Aside from standard signage in the MUTCD, many communities have developed custom wayfinding schemes that allow them to enhance aesthetics and celebrate sense of place as they provide spatial orientation and guidance to visitors. Such schemes take into account the key destinations of a place and focus more on these locations than standard MUTCD signage, which is intended to convey information on roadway conditions, users and decision points.

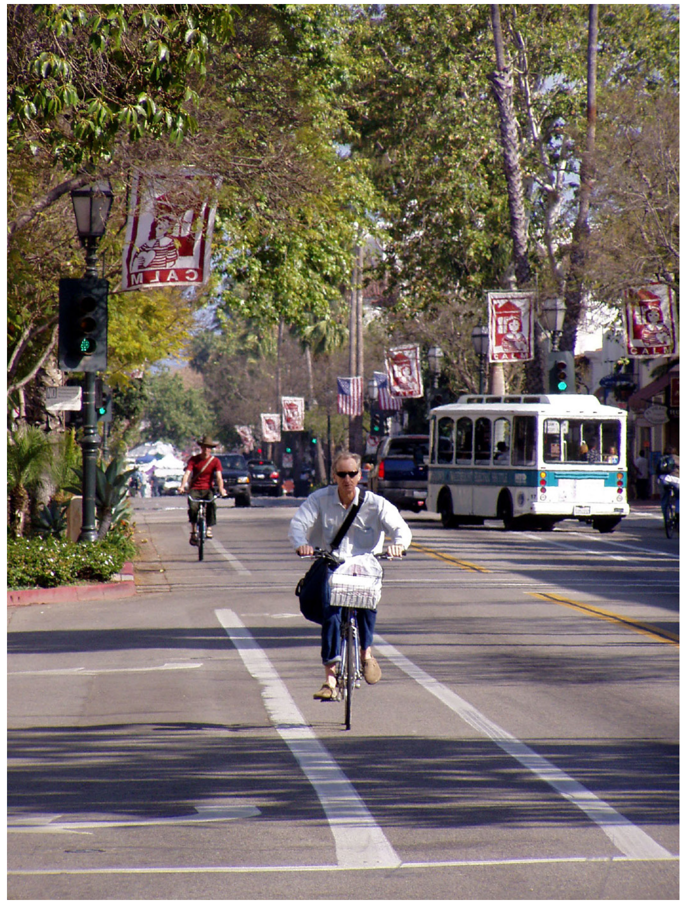
Though often incorporated in streetscape projects, wayfinding systems can be developed independently of street construction or rehabilitation projects, which typically include standard MUTCD signage in their project scope.

Intersections

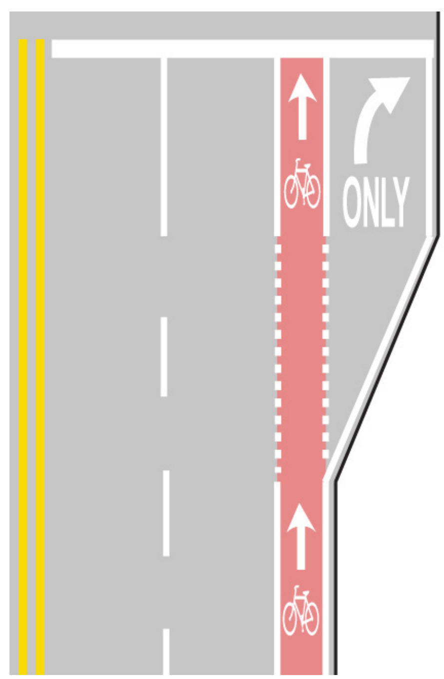
Bicycle and vehicle travel lane interactions are most complicated at intersections. The AASHTO guidelines are specific to the type of intersection. Bicycle lane striping, according to AASHTO, should not extend through an intersection, but should instead stop at the near-side stop bar and start again on the opposite side of the far crosswalk. Where vehicle or bus traffic is anticipated to travel into or through the bike lane, such as with the presence of right-turn lanes or bus stops, the bike lane striping should be dashed instead of solid, with proper "Begin Right Turn Lane - Yield to Bikes" signs.

There are several cases in Davenport where a right-turn only lane is added at busier intersections. These right turn lanes create conflicts between vehicles that are turning and the cyclists that continue straight, in which case the vehicles are required to yield. The pavement markings shown on the right display the proper markings for a continuing bike lane between a continuing vehicle lane and a right-turn lane and demonstrate a color treatment applied to the bike lane through the intersection approach.

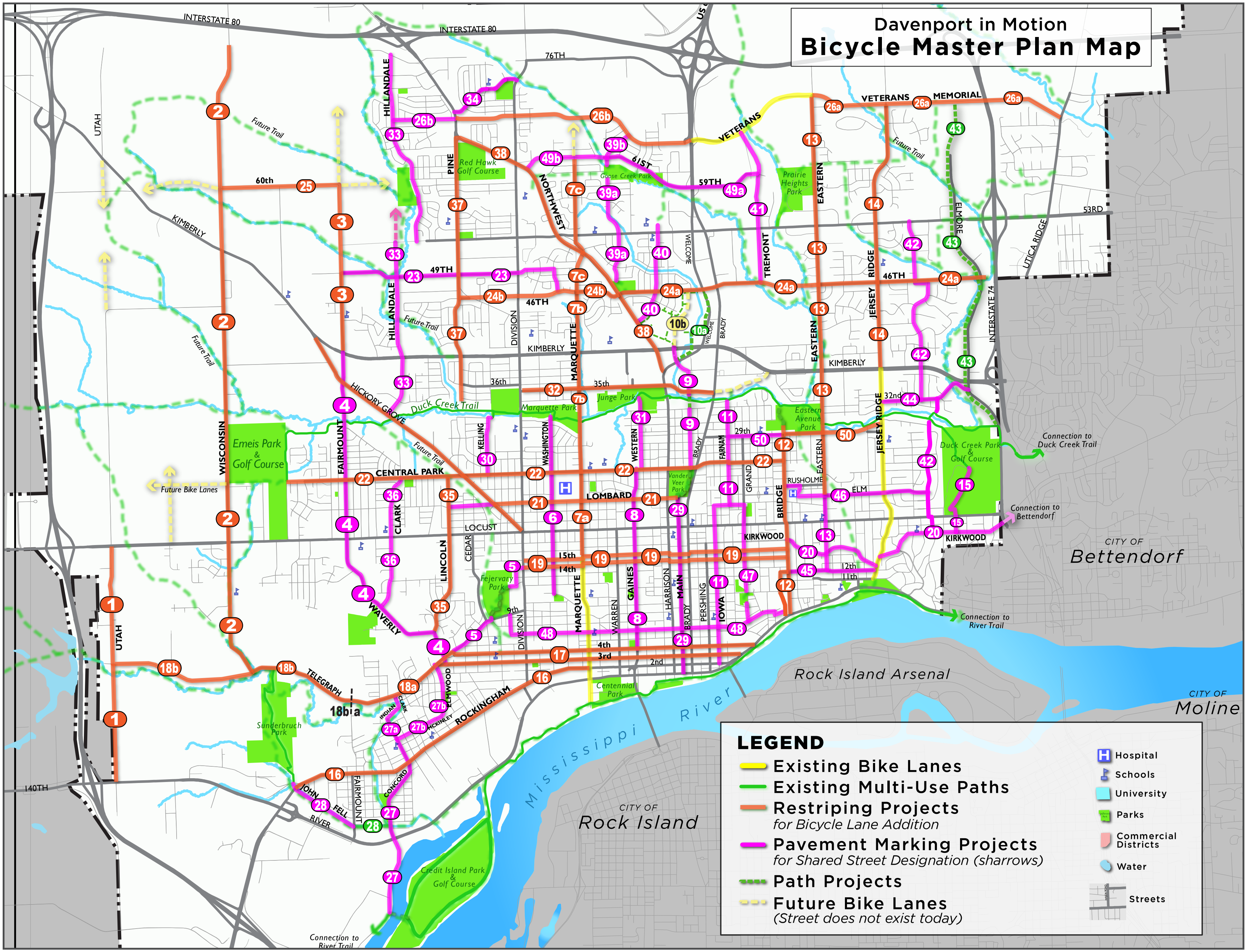
These are general rules for bicycle lane design, but the guide provides more detailed specifications that will be employed in the second phase of this research when needed.



Roadway intersections create increased interaction between cyclists and drivers - such is the case for this right turn lane pictured. Additional awareness measures should be taken when bike lanes are approaching or proceeding through an intersection.



Per the MUTCD, proper technique for continuing a bike lane through an intersection with a right-turn lane. The red pavement treatment is an additional (though optional) way to delineate the bike lane and make right-turning vehicles aware of cyclists at the intersection or along the entire corridor.


Davenport in Motion
Bicycle Master Plan Map
LEGEND
Existing Bike Lanes
Existing Multi-Use Paths
Restriping Projects
for Bicycle Lane Addition
Pavement Marking Projects
for Shared Street Designation (sharrows)
Path Projects
Future Bike Lanes
(Street does not exist today)
Hospital
Schools
University
Parks
Commercial Districts
Water
Streets
CITY OF Bettendorf
CITY OF Moline
CITY OF Rock Island
Rock Island Arsenal
Mississippi River
Connection to Duck Creek Trail
Connection to Bettendorf
Connection to River Trail
Emeis Park & Golf Course
Duck Creek Park & Golf Course
Credit Island Park & Golf Course
Red Hawk Golf Course
Prairie Heights Park
Eastern Avenue Park
Junge Park
Marquette Park
Vander Veer Park
Fejervary Park
Centennial Park
Sunderbruch Park
Goose Creek Park
Duck Creek Trail
Future Trail
Future Bike Lanes
INTERSTATE 80
INTERSTATE 74
VETERANS
MEMORIAL
EASTERN
JERSEY RIDGE
KIMBERLY
LOCUST
CENTRAL PARK
LOMBARD
KIRKWOOD
DIVISION
MARQUETTE
WISCONSIN
HILLANDALE
NORTHWEST
ROCKINGHAM
TELEGRAPH
UTAH

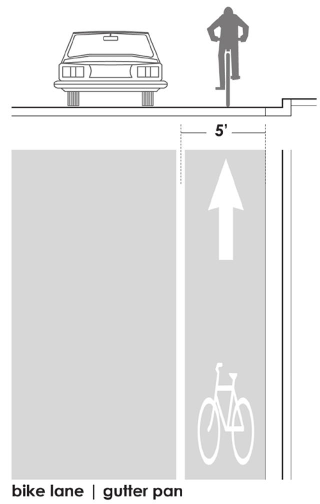
BICYCLE PROJECT DESCRIPTIONS

B-1 – Utah Avenue Bicycle Lanes

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Long-Term	(a) US 61 / West River Drive to Locust Street and (b) Locust Street to 46th Street	$175,000 - $205,000

Project Description: Stripe two bicycle lanes on Utah Avenue, one on each side of the street to the right of all vehicle lanes in the direction of travel. Signage would need to accompany the northbound bike lane near Locust Street to indicate that the bike lane does not continue. The cost estimate does not include bicycle lanes north of Locust Street. Due to a lack of shoulders, it is recommended that bicycle lanes be added as redevelopment occurs or as part of any reconstruction projects on this part of Utah Avenue.

Graphics / Cross-Section: Curb-and-gutter sections are shown per typical street recommendations in the Davenport in Motion Street Design Guide. If curbs are not used, bicycle lane should be 6' in width.

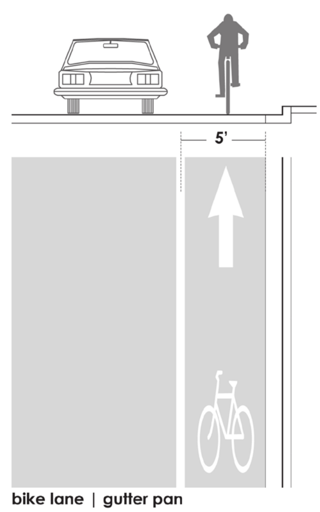


B-2 – Wisconsin Avenue Bicycle Lanes

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Long-Term	Telegraph Road to I-80	$475,000 - $550,000

Project Description: Stripe two bicycle lanes on Wisconsin Avenue, one on each side of the street to the right of all vehicle lanes in the direction of travel. Signage would need to accompany the northbound bike lane near the overpass on I-80 to indicate that the bike lane does not continue. This project can be considered in conjunction with TIP/LRTP-1, Wisconsin Avenue widening project, in which case the cost of striping would be a part of the widening project. Depending on the actual timing of execution of that project, this project may be advanced as appropriate.

Graphics / Cross-Section: Curb-and-gutter sections are shown per typical street recommendations in the Davenport in Motion Street Design Guide. If curbs are not used, bicycle lane should be 6' in width.

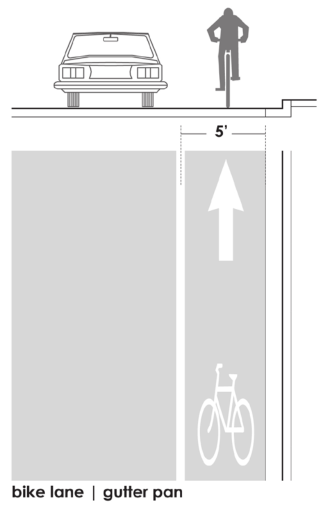


B-3 – Fairmount Street Bicycle Lanes			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Long-Term	Kimberly Road to 60th Street	$125,000 - $145,000

Project Description: Stripe two bicycle lanes on Fairmont Street, one on each side of the street to the right of all vehicle lanes in the direction of travel. Signage would need to accompany the southbound bike lane near Kimberly Road to indicate that the bike lane does not continue. This project can be considered in conjunction with TIP/LRTP-2 and TIP/LRTP-3, Fairmount Street widening project.

Curb-and-gutter sections are shown per typical street recommendations in the Davenport in Motion Street Design Guide. If curbs are not used, bicycle lane should be 6’ in width.

Related Projects: B-4 would provide a shared street route south of Kimberly.

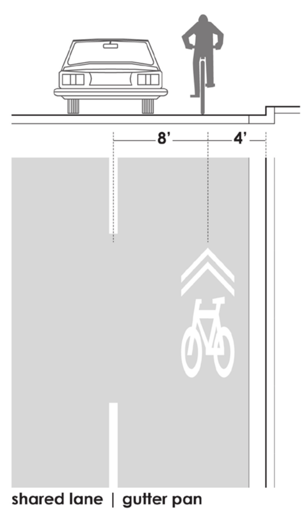


B-4 – Waverly Road / Fairmount Street Bicycle Route			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Short-Term	3rd Street to Kimberly Road	$15,000 - $25,000

Project Description: Demarcate a bicycle route on Waverly Road and Fairmont Street using street signage and sharrow pavement markings. Additional signage will be needed to indicate the transition from Waverly Road to 3rd Street.

Curb-and-gutter sections are shown per typical street recommendations in the Davenport in Motion Street Design Guide. If curbs are not used, sharrows should be placed no less than 4 feet from the roadway edge. Per MUTCD guidance, sharrows should be placed immediately after an intersection and spaced at intervals not greater than 250 feet thereafter.

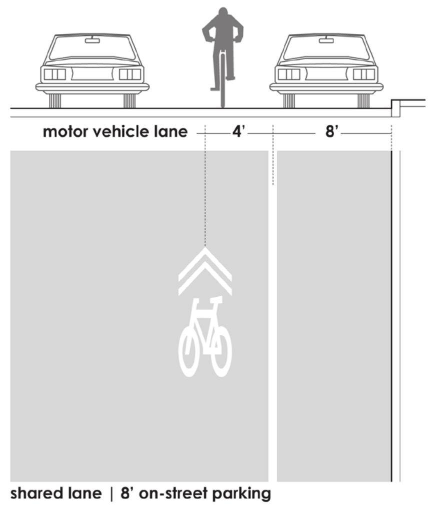
Related Projects: B-3 would provide bicycle lanes north of Kimberly.



B-5 – Cedar Street / Fejervary Park / Davie Street / 14th Street Bicycle Route			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Short-Term	3rd Street to Division Street	$10,000 - $15,000

Project Description: Demarcate a bicycle route through Fejervary Park via Cedar Street, Davie Street, and 14th Street, connecting the bike lanes on 3rd Street and 14th / 15th Streets. Street signage and sharrow pavement markings will be needed, in addition to signage indicating that the bike route will end at 3rd Street. Coordination with the Davenport Parks and Recreation Department is important to better understand condition of the internal park trail; although this project is listed as a short-term priority, its timing should be aligned with any planned improvements to internal park facilities.

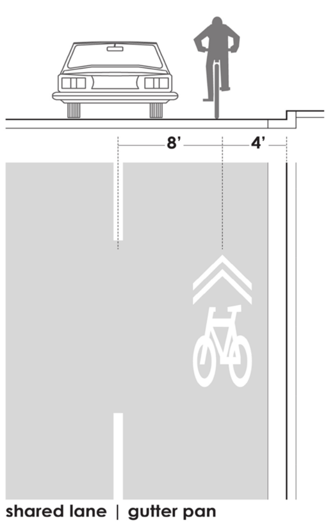
When parking is present, sharrow placement should take into consideration the proximity to car doors and should not guide cyclists directly through the path of their opening width. MUTCD guidance specifies only a minimum distance at which sharrow markings should be placed away from curbs or roadway edges; in constrained sections, placement of the sharrow in the middle of a travel lane is acceptable.

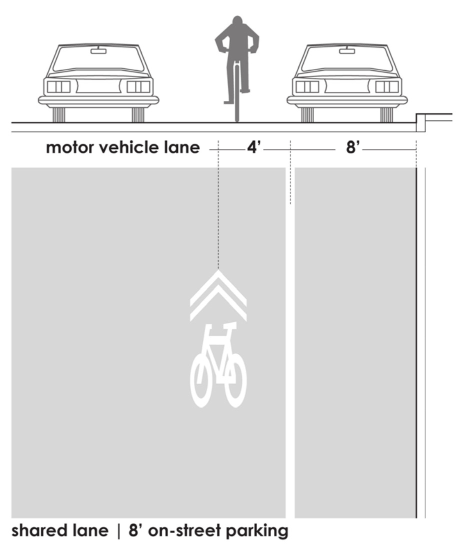


B-6 – Washington Street Bicycle Route			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Short-Term	Riverview Terrace Park to Duck Creek Trail	$15,000 - $25,000

Project Description: Enhance the existing bicycle route on Washington Street by adding sharrows and supplementary signage. Additional signage is needed to indicate that the route is ending when approaching 14th Street and the Duck Creek Trail.

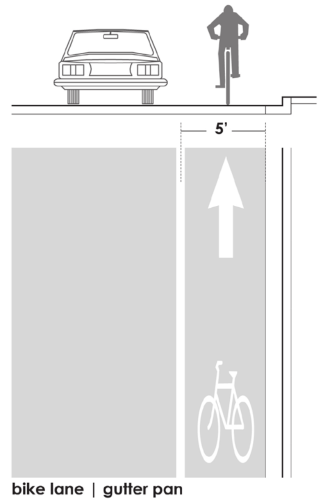
When parking is present, sharrow placement should take into consideration the proximity to car doors and should not guide cyclists directly through the path of their opening width. MUTCD guidance specifies only a minimum distance at which sharrow markings should be placed away from curbs or roadway edges; in constrained sections, placement of the sharrow in the middle of a travel lane is acceptable.





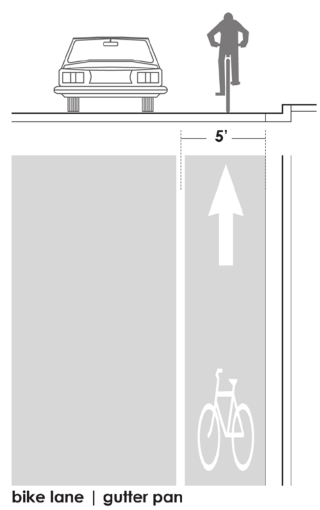
B-7a – Marquette Street Bicycle Lanes (Phase 1)			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	First Year	14th Street to 35th Street	$100,000 - $120,000

Project Description: Stripe two bicycle lanes on Marquette Street, one on each side of the street to the right of all vehicle lanes in the direction of travel. Project involves a full roadway restriping, including removal of 'painted median' space between north-bound and southbound travel lanes. In four-lane undivided sections between Central Park Avenue and 35th Street, this involves a four-lane to three-lane 'road diet' conversion per guidance in the Davenport In Motion Street Design Guide and to be coordinated with project S-61. These bike lanes and route mark-ings are a continuation of existing lanes on Marquette Street south of 14th Street. Between 14th Street and the Central Park Avenue approach, a bicycle lane may be used in two-lane sections.



B-7b – Marquette Street Bicycle Lanes (Phase 2)			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	First Year	35th Street to 46th Street	$60,000 - $80,000

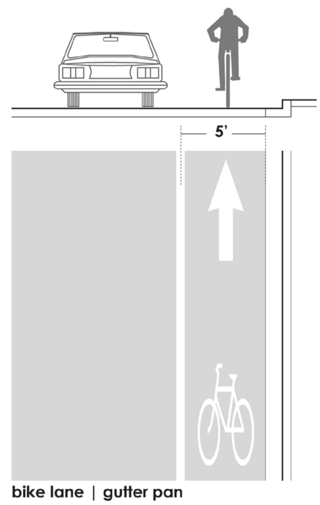
Project Description: Stripe two bicycle lanes on Marquette Street between 35th Street and 46th Street, one on each side of the street to the right of all vehicle lanes in the direction of travel. Between Kimberly Road and 35th Street, this project would involve a complete restriping to introduce a three-lane section (two travel lanes plus a two-way left turn lane) and on-street bicycle lanes. These lanes are a con-tinuation of lanes on Marquette Street south of 35th Street as defined in Project B-7a.



B-7c – Marquette Street Bicycle Lanes (Phase 3)			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Medium-Term	46th Street to 60th Street	$75,000 - $95,000

Project Description: Stripe two bicycle lanes on Marquette Street, one on each side of the street to the right of all vehicle lanes in the direction of travel. These bike lanes are a continuation of existing lanes on Marquette Street south of 46th Street.

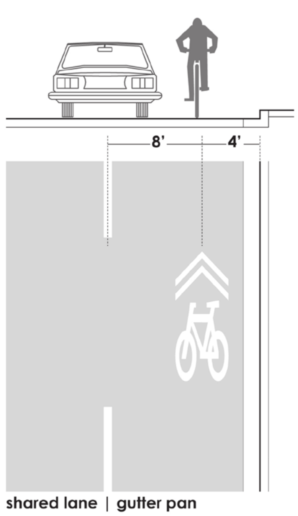
This project depends in part on a medium-term connector project to extend Marquette between 46th Street and Northwest Boulevard (S-47).

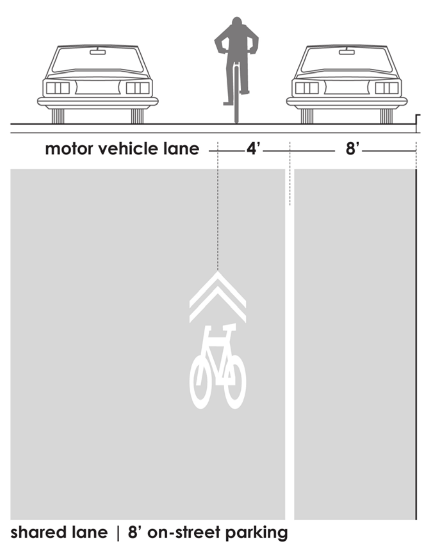


B-8 – Gaines Street Bicycle Route			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Short-Term	4th Street to Central Park Avenue	$15,000 - $25,000

Project Description: Demarcate a bicycle route on Gaines Street using sharrows and signage. Additional signage will be needed on the northbound approach to Central Park Avenue and the southbound approach to 3rd Street to indicate that the bike route is ending.

When parking is present, sharrow placement should take into consideration the proximity to car doors and should not guide cyclists directly through the path of their opening width. MUTCD guidance specifies only a minimum distance at which sharrow markings should be placed away from curbs or roadway edges; in constrained sections, placement of the sharrow in the middle of a travel lane is acceptable



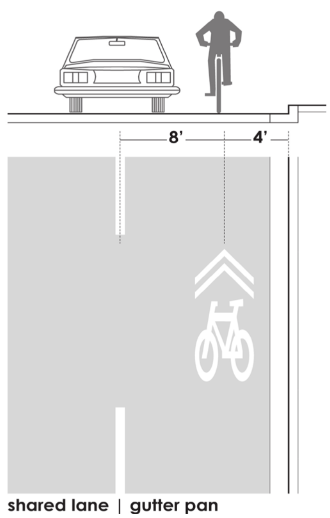


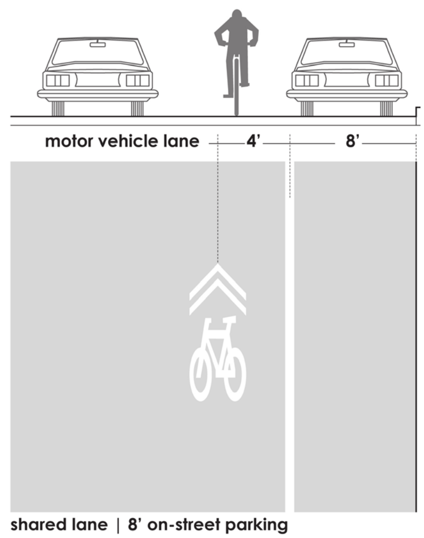
B-9 – Fair Avenue / 37th Street Bicycle Route (with Duck Creek Overpass)

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Short-Term	Central Park Avenue to Kimberly Road	$110,000 - $160,000

Project Description: Demarcate a bicycle route on Fair Avenue and 37th Street by adding sharrows and signage. Additional signage needed to indicate that the route is ending when approaching Kimberly Road, and to direct cyclists into Vander Veer Park when approaching Central Park Avenue. Add a pedestrian and cyclist bridge over Duck Creek to connect the portions of Fair Avenue that end on the north and south side of the creek. Cost of bridge assumes a simple, pre-fabricated wood and steel structure similar to pedestrian bridges currently crossing the creek and is included in overall cost.

When parking is present, sharrow placement should take into consideration the proximity to car doors and should not guide cyclists directly through the path of their opening width. MUTCD guidance specifies only a minimum distance at which sharrow markings should be placed away from curbs or roadway edges; in constrained sections, placement of the sharrow in the middle of a travel lane is acceptable.





B-10a – Northpark Mall Multi-Use Path Connection

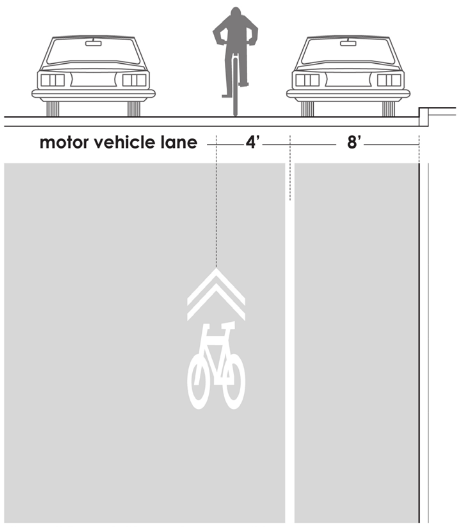
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Long-Term	Kimberly Road to 46th Street	$420,000 - $460,000

Project Description: Add a 10-foot off-street path on the north side of Kimberly Road between Fair Avenue and Welcome Way, then on the west side of Welcome Way between Kimberly Road and 46th Street.

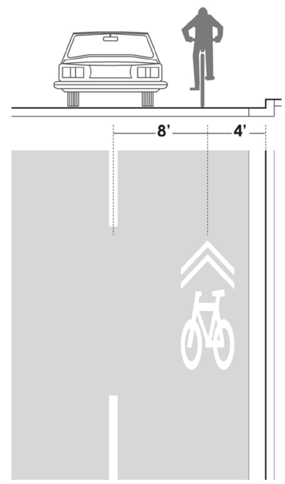
B-11 – Iowa Street / High Street / Farnam Street Bicycle Route			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Short-Term	2nd Street to Duck Creek Trail	$15,000 - $25,000

Project Description: Demarcate a bike route using sharrow pavement markings and signage on Iowa Street from 2nd to High Street, High from Iowa to Farnam Street, and Farnam from High to the Duck Creek Trail. Signage should indicate that the route is ending prior to 3rd Street in the southbound direction to allow cyclists to transition to the 3rd Street bike lanes.

When parking is present, sharrow placement should take into consideration the proximity to car doors and should not guide cyclists directly through the path of their opening width. MUTCD guidance specifies only a minimum distance at which sharrow markings should be placed away from curbs or roadway edges; in constrained sections, placement of the sharrow in the middle of a travel lane is acceptable.



shared lane | 8' on-street parking



shared lane | gutter pan

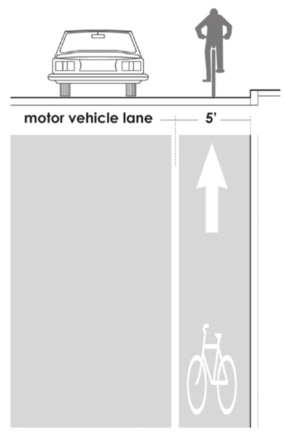
B-12 – Bridge Avenue Bicycle Lanes

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Medium-Term	River Drive to Garfield Park	$130,000 - $160,000

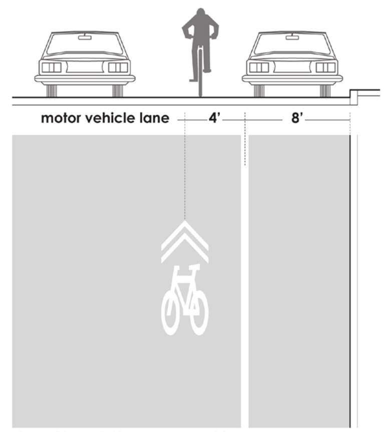
Project Description: Stripe two bicycle lanes on Bridge Avenue, one on each side of the street to the right of all vehicle lanes in the direction of travel. Bicycle connection to Garfield Park will exist at the Bridge Avenue entrance. Bicycle lanes will also be striped on Oneida Avenue where it is part of a one-way couplet with Bridge Avenue between River Drive and 12th Street. Additional signage should be provided at 12th Street to transition cyclists between the one- and two-way street sections.

Bicycle lanes are recommended in part due to the one-way sections of Bridge and Oneida and in part due to seemingly low demand for on-street parking. At present, street width of the two-way portions of Bridge Avenue north of 12th Street is not sufficient to accommodate two travel lanes, bicycle lanes and on-street parking on both sides of the street. Parking should not be removed unless the City has first developed consensus with neighborhood property owners and residents.

In the event that bicycle lanes cannot be pursued, sharrow markings may be used in their place on applicable segments.



bike lane | curb with no gutter



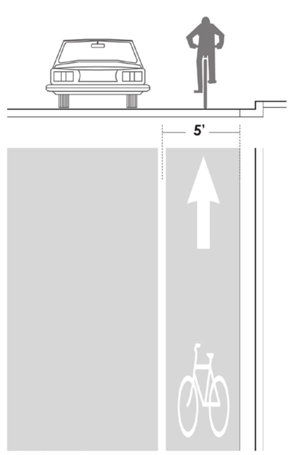
shared lane | 8' on-street parking

B-13 – Eastern Avenue Bicycle Lanes / Route

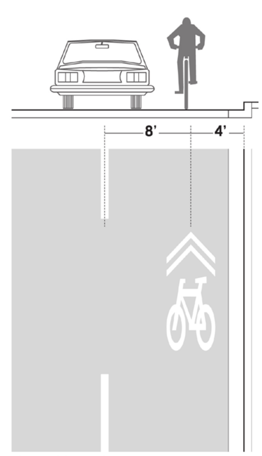
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Medium-Term	12th Street to Veterans Memorial Parkway	$280,000 – $310,000

Project Description: Stripe two bicycle lanes on Eastern Avenue between Elm Street and Veterans Memorial Parkway (67th Street), one on each side of the street to the right of all vehicle lanes in the direction of travel. Additional signage needed to indicate that the bike lanes turn from Eastern Avenue onto Veterans Memorial Parkway. Bicycle lanes should also connect to existing lanes on Veterans Memorial Parkway.

Between Elm Street and 12th Street, provide pavement markings to designate a shared street route.



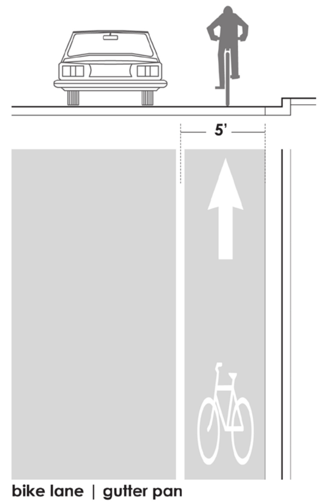
bike lane | gutter pan



shared lane | gutter pan

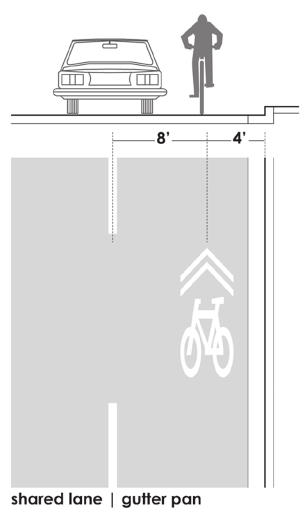
B-14 – Jersey Ridge Road Bicycle Lanes			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	First Year	Kimberly Road to Veterans Memorial Parkway	$200,000 - $230,000

Project Description: Stripe two bicycle lanes on Jersey Ridge Road north of Kimberly Road where existing lanes end, one on each side of the street to the right of all vehicle lanes in the direction of travel. Additional signage needed to indicate that the bike lanes end at Veterans Memorial Parkway (67th Street). This would correspond with a road diet (project S-62) and would constitute a restriping of the roadway surface to introduce a three-lane section (two travel lanes and a two-way left turn lane) with on-street bicycle lanes.



B-15 – Marlo Avenue / Duck Creek Park Bicycle Route			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Medium-Term	Middle Road to Duck Creek Trail	$15,000 - $25,000

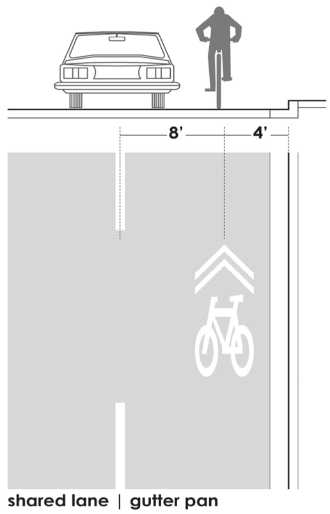
Project Description: Designate a bike route on Marlo Avenue using sharrow pavement markings and signage to connect the route on Middle Road to the Duck Creek Trail. Route will continue on existing roads that service the Duck Creek Golf Course. Signal timing should be set to a pre-timed phase to ensure a regular protected crossing of Locust for cyclists at the park/golf course entrance, or if it is set to an actuated cycle, should specify maximum green times of no longer than 60 seconds for Locust.



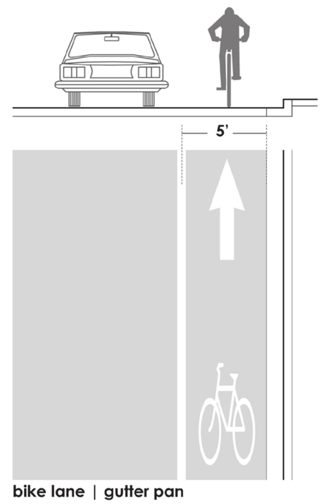
B-16 – Rockingham Road Bicycle Lanes

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Medium-Term	Marquette Street to John Fell Dr.	$45,000 - $60,000

Project Description: To be coordinated with Streets project S-8. This is intended to add bicycle lanes to Rockingham, but these will fit within existing curb-to-curb dimensions only in sections where a two-way left turn lane (per the Industrial Collector cross-section in the Davenport in Motion Street Design Guide) is not used. In sections where a two-way left turn lane is used, sharrow markings should be used if available roadway dimensions do not allow bike lanes at a minimum of 4 feet in width.



For use in sections with continuous two-way left turn lanes or intersection-specific left turns.

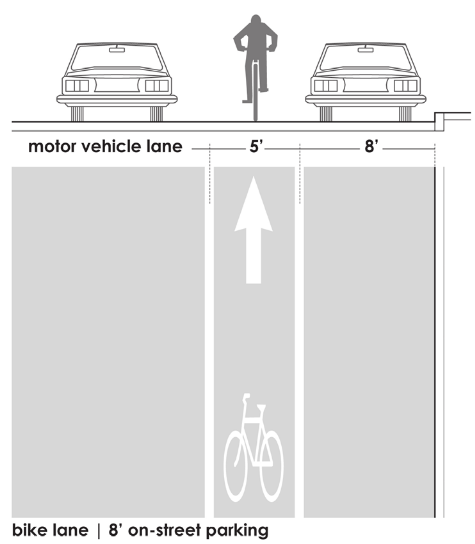


For use in typical two-lane sections without turn lanes.

B-17 – 3rd and 4th Street Bicycle Lanes

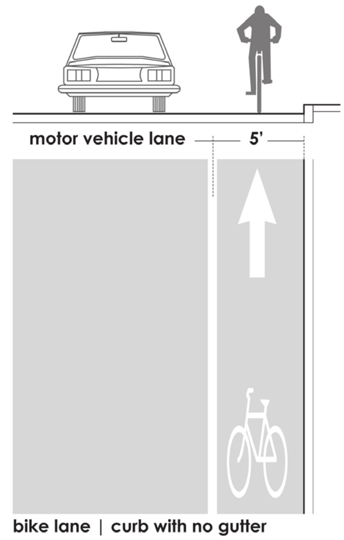
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	First Year	Telegraph Road to River Drive	$230,000 - $270,000

Project Description: Stripe two bicycle lanes on 3rd Street, one on each side of the street to the right of all vehicle lanes in the direction of travel. Cost and planning considered in conjunction with DS-17, 3rd Street and 4th Street two-way conversion and restriping; this cost may be incorporated into that of DS-17.



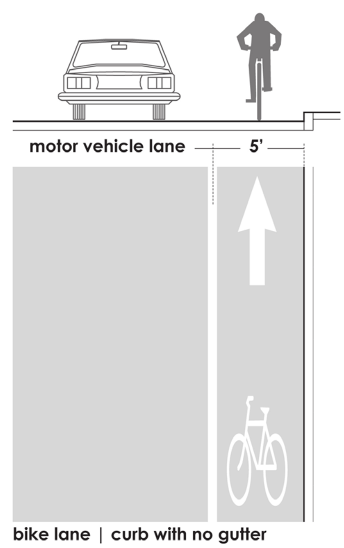
B-18a – Telegraph Road Bicycle Lanes (Phase 1)			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Medium -Term	3rd Street/Elmwood Avenue to Fairmount Street	$40,000 - $60,000

Project Description: Add bicycle lanes to Telegraph Road between Clark and Fairmount Streets. This project should be coordinated with reconstruction of Telegraph Road to add shoulders. Cost estimate included above only accounts for the cost of lane striping and bicycle lane symbol markings. It should be added to costs for reconstruction of Telegraph.



B-18b – Telegraph Road Bicycle Lanes (Phase 2)			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Long -Term	Fairmount Street to Utah Avenue	$80,000 - $100,000

Project Description: Add bicycle lanes to Telegraph Road between Fairmount Street and Utah Avenue. This project should be coordinated with reconstruction of Telegraph Road to add shoulders. Cost estimate included above only accounts for the cost of lane striping and bicycle lane symbol markings. It should be added to costs for reconstruction of Telegraph.

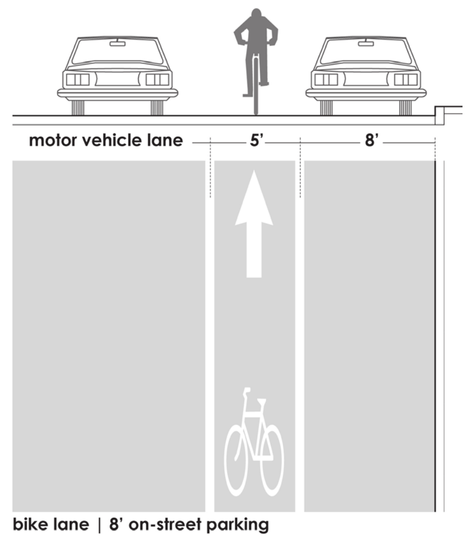


B-19 – 14th-15th Streets Bicycle Lanes

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Short-Term	Division Street to Bridge Avenue	$ 80,000 - $120,000

Project Description: Stripe one bicycle lane on each 14th and 15th Streets, on the right side of the street in the direction of travel and adjacent to parallel parking. Signage would need to accompany each bike lane to indicate slight directional changes through offset intersections (such as at Brady and Harrison), as well as to help cyclists transition to shared street routes on the east side of Bridge Avenue, on Kirkwood Blvd (B-20) and 12th Street (B-45). This project should include clearer delineation between travel lanes and parking, especially on the side where the bicycle lane will be striped on each street. Between Grand Avenue and Bridge Avenue, 14th and 15th Street may need to be reduced to one travel lane due to right-of-way constraints.

The bicycle lane on each of these one-way streets should be striped between the right-side travel lane and parallel parking.

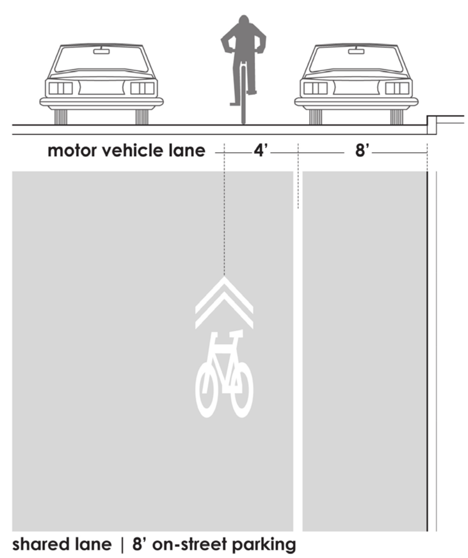


B-20 – Kirkwood Boulevard / Middle Road Bicycle Route

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Short-Term	Bridge Avenue to Kimberly Road	$15,000 - $25,000

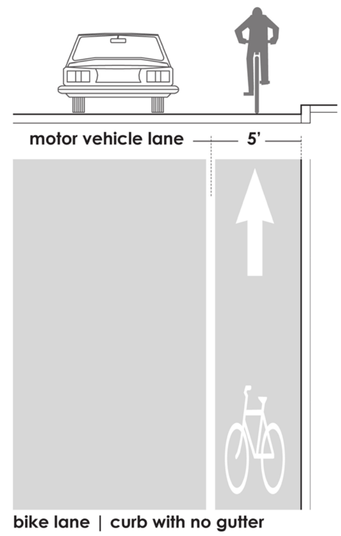
Project Description: Designate a bike route on Kirkwood Boulevard and Middle Road using sharrow pavement markings and signage. A portion of this route will utilize the existing Jersey Ridge Road bike lanes. Signage will be needed as the route approaches Jersey Ridge Road indicating to cyclists that the route is shifting, and along Jersey Ridge Road to indicate where the Kirkwood/Middle route turns.

Additional signage to help cyclists transition to bicycle lanes on14th/15th Streets west of Bridge Avenue (B-19) should also be provided.



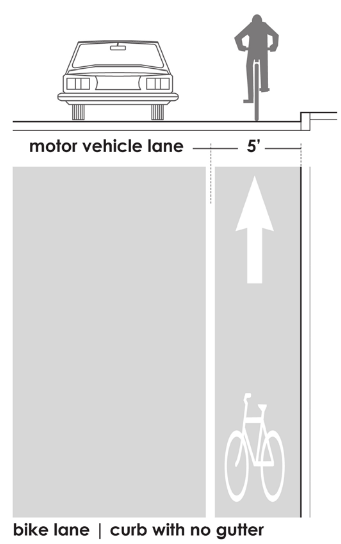
B-21 – Lombard Street Bicycle Lanes			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Medium-Term	Lincoln Avenue to Main Street	$140,000 - $180,000

Project Description: Stripe two bicycle lanes on Lombard Street, one on each side of the street to the right of all vehicle lanes in the direction of travel. Additional signage is needed as the eastbound bike lanes approach Main Street and the westbound bike lanes approach Lincoln Avenue to indicate that the bike lanes will be ending. Near Main Street, the bike lanes will connect to the existing Main Street bike route and the proposed bicycle connection through Vander Veer Park.



B-22 – Central Park Avenue Bicycle Lanes			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Short -Term	Emeis Park to Bridge Avenue	$375,000 - $425,000

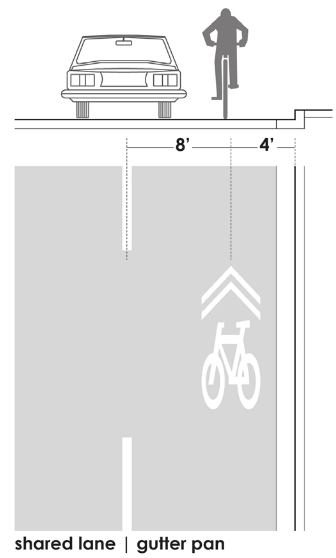
Project Description: Stripe two bicycle lanes on Central Park Avenue, one on each side of the street to the right of all vehicle lanes in the direction of travel. Additional signage is needed as the eastbound bike lanes approach Bridge Avenue and the westbound bike lanes approach Emeis Park to indicate that the bike lanes will be ending. Signage should also be provided to guide cyclists in making the transition between the Gaines Street (B-8) and Western Avenue (B-31) bicycle routes. At Bridge Avenue, the bike lanes will connect to the proposed Bridge Avenue bike lanes (B-12). Timing of this project should be coordinated with the Central Park Avenue road diet project (S-5).



B-23 – 46th Street / 49th Street Bicycle Route			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Short-Term	Fairmount Street to Northwest Boulevard	$15,000 - $25,000

Project Description: Delineate a bike route along 46th and 49th Streets by using sharrow pavement markings and signage. This route utilizes Filmore Lane to connect 49th Street to 46th Street between Division and Marquette Streets. Additional signage is needed as the route approaches Fairmount Street to indicate that the route on 49th Street ends, until completion of bike lanes on Fairmount Street (B-3), a long-term project.

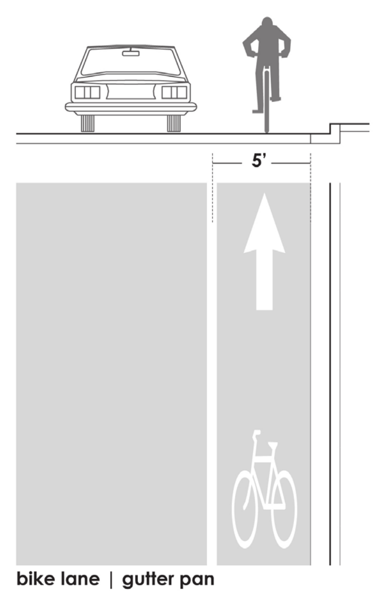
Related Projects: This project can optionally be coordinated with (but need not depend on) project S-29a, which connects Marquette Street between 46th Street and Northwest Blvd., to allow use of Marquette as the transition between 46th and 49th Streets. B-24a provides bicycle lanes on 46th Street east of Northwest Blvd.;B-24b provides bicycle lanes on 46th Street west of Marquette Street. Both B-24a and B-24b depend on the completion of street connectivity projects.



B-24a – 46th Street Bicycle Lanes			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Short-Term	Elmore Avenue to W. of Marquette Street (Fillmore Lane)	$240,000 - $280,000

Project Description: Stripe bicycle lanes on each side of 46th Street. This project relies on S-13, a new street connection between Tremont and Eastern Avenues, including a new bridge over the creek and railroad tracks. Between Welcome Way and Tremont Avenue, a 4-3 lane road diet (S-64) is recommended in conjunction with bicycle lane striping. Between Eastern Avenue and Elmore Avenue, there are 2-lane and 3-lane sections, with and without on-street parking. For example, between Eastern and Jersey Ridge Road the typical 40-foot curb-to-curb dimensions would allow for 9-foot travel, 7-foot parking, and 4-foot bikes. However, sharrow markings should be used if available roadway dimensions do not allow bike lanes that are a minimum of 4 feet in width. Approaching Elmore Avenue, signage is needed to indicate that the eastbound lanes will end at the connection to Pheasant Creek.

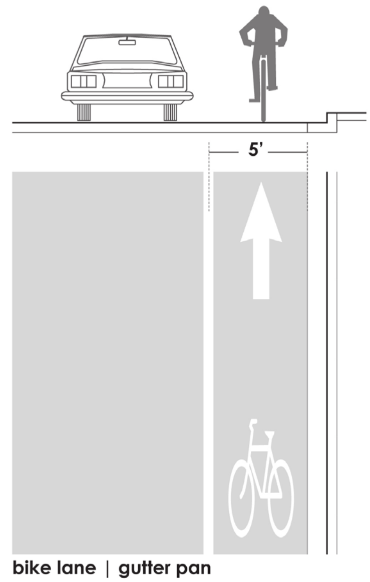
Related Projects: B-23 provides a shared street bicycle route on 46th/49th Street. See also B-24b.



B-24b – 46th Street Bicycle Lanes			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Medium-Term	W. of Marquette Street (Fillmore Lane) to Pine Street	$45,000 - $65,000

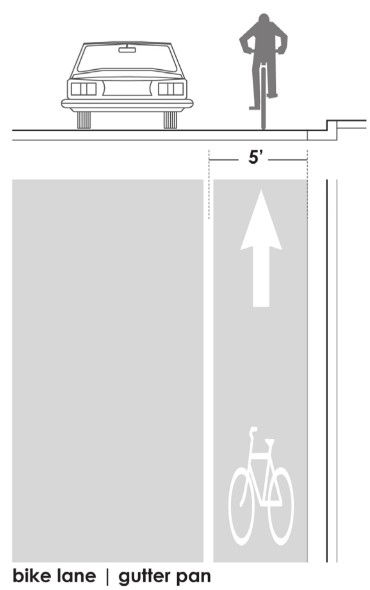
Project Description: Stripe two bicycle lanes on 46th Street, one on each side of the street to the right of all vehicle lanes in the direction of travel. This project relies on S-33, comprised of several new street connections on 46th Street, between Fillmore Lane and Division Street and between Division Street and Pine Street. Additional signage needed to transition cyclists to B-23 for travel west of Pine Street. Note that cost estimate provided here only accounts for lane striping and bicycle lane symbol markings on new roadway constructed as part of S-33.

Related Projects: B-23 provides a shared street bicycle route on 46th/49th Street. See also B-24a.



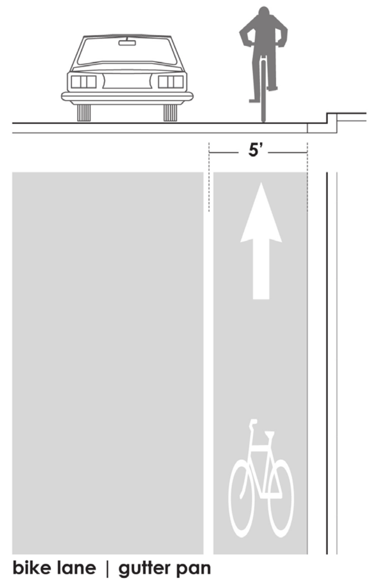
B-25 – 60th Street Bicycle Lanes			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Long-Term	Wisconsin Avenue to Fairmount Street	$80,000 - $110,000

Project Description: Stripe two bicycle lanes on 60th Street, one on each side of the street to the right of all vehicle lanes in the direction of travel. Currently, 60th Street ends to the west at Wisconsin Avenue and to the east at Fairmount Street, and bicycle lanes are planned on both of these roadways (B-2, B-3) in conjunction with future roadway resurfacing and improvements. As the street network develops in Northwest Davenport, the 60th Street bike lanes will be connected to other bike lanes and routes on new streets.



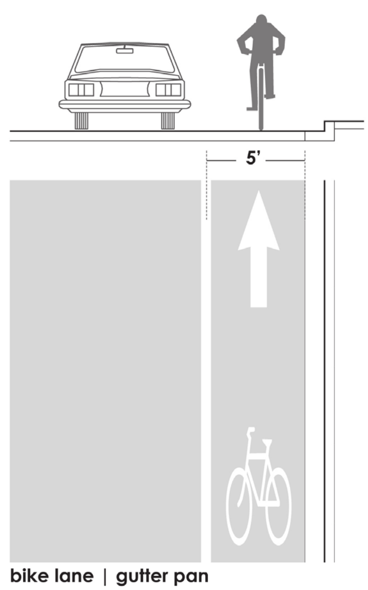
B-26a – Veterans Memorial Parkway (67th Street) Bicycle Lanes			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Medium-Term	Eastern Avenue to Utica Ridge Road	$180,000 - $220,000

Project Description: Stripe two bicycle lanes on Veterans Memorial Parkway (67th Street), one on each side of the street to the right of all vehicle lanes in the direction of travel. This project continues existing lanes on Veterans Memorial Parkway west of Eastern Avenue. Additional signage is needed to indicate that the bike lanes continue onto southbound Eastern Avenue, and to indicate that the bike facilities will end at Utica Ridge Road. Once the Pheasant Creek Trail is constructed, signage should also be included to inform cyclists on how to access this trail from the Veterans Memorial Parkway bike lanes.

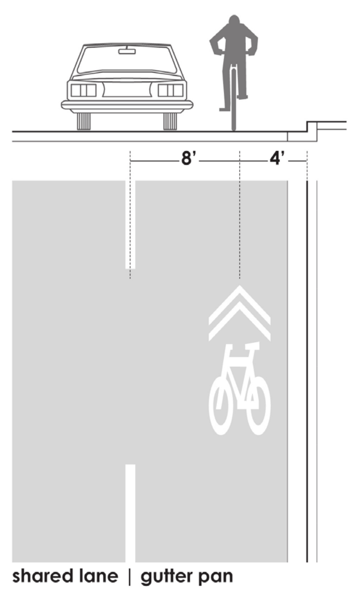


B-26b – 65th/67th Street Bicycle Lanes/Route			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Long-Term	Brady Street to Pine Street (Lanes) and Pine Street to Hillandale Road (Route)	$110,000 - $130,000

Project Description: Stripe two bicycle lanes on Veterans Memorial Parkway (67th Street), one on each side of the street to the right of all vehicle lanes in the direction of travel. This project continues existing lanes on Veterans Memorial Parkway west of Eastern Avenue. Additional signage is needed to indicate that the bike lanes continue onto southbound Eastern Avenue, and to indicate that the bike facilities will end at Utica Ridge Road. Once the Pheasant Creek Trail is constructed, signage should also be included to inform cyclists on how to access this trail from the Veterans Memorial Parkway bike lanes.



Brady Street to Pine Street (Lanes)

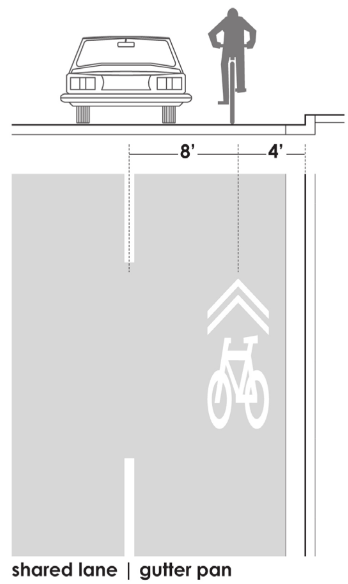


Pine Street to Hillandale Road (Route)

B-27a – Concord Street / Indian Road / Clark Street Bicycle Route			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Short -Term	Credit Island Park to Telegraph Road	$20,000 - $30,000

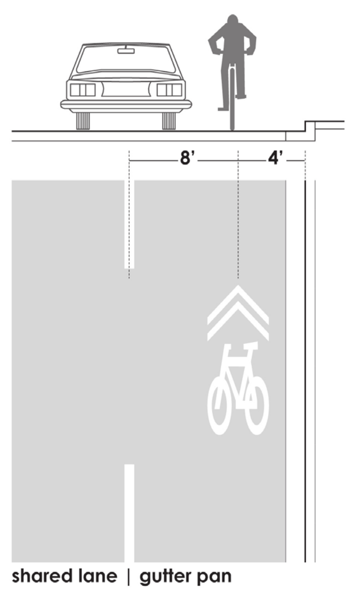
Project Description: Delineate a bicycle route using sharrow pavement markings and signage on Concord Street from the Credit Island Park Bridge to Indian, Indian Road from Concord to Clark, and Clark Street from Indian to Telegraph. Signage should be applied to indicate turns in the route alignment. Additional signage is needed to indicate that the bike route continues onto Telegraph Road and 3rd Street, and to indicate that the bike facilities will link to the Credit Island Trail. This project connects to Credit Island via a new bridge, funded separately from this project, that crosses the inlet of the Mississippi River.

As part of this project, it is recommended to install signage and stripe bicycle lanes on existing shoulders of River Drive between Fairmount Street and Concord Avenue, connecting to B-27. These shoulders were installed as part of an Iowa DOT reconstruction project, but are unmarked as of May, 2010. This segment helps provide access from neighborhoods north of River Drive to Credit Island and to Sunderbruch Park. It also relates to project B-28, John Fell Drive bicycle route.



B-27b – Concord Street / McKinley Street / Elmwood Avenue Bicycle Route			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Short -Term	Credit Island Park to Telegraph Road	$20,000 - $30,000 (full project); $3,000 - $5,000 (link only)

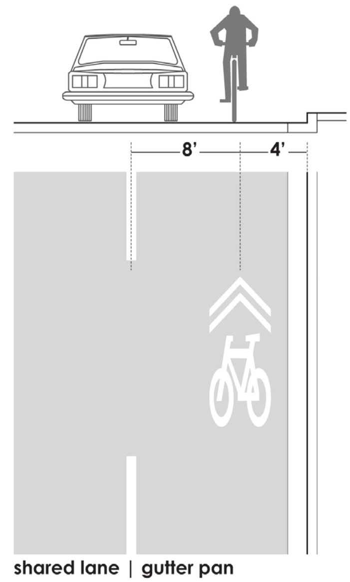
Project Description: Provides a complementary connection to B-27a, with the connection between Concord Street and Telegraph Road using McKinley Street and Elmwood Avenue. Cost estimate includes this entire alignment, but if B-27a is implemented first, only the link section of the cost estimate above would be applied. Signage should be applied to indicate turns in the route alignment.



B-28 – John Fell Drive Corridor Bicycle Route

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Long -Term	Rockingham Road to Concord Street	$15,000 - $25,000

Project Description: Delineate a bicycle route on John Fell Drive using sharrow pavement markings and signage. The City of Davenport has abandoned part of the right-of-way for this route (the section between Fairmount Street and Concord Street), but may consider purchasing an alternative right-of-way for flood mitigation purposes. Any newly-purchased right-of-way will need to be paved to accommodate safe bicycle travel, which will add to the cost of this facility. This route connects Credit Island park (via the new bridge over the Mississippi River) to the existing trail in Sunderbruch Park.

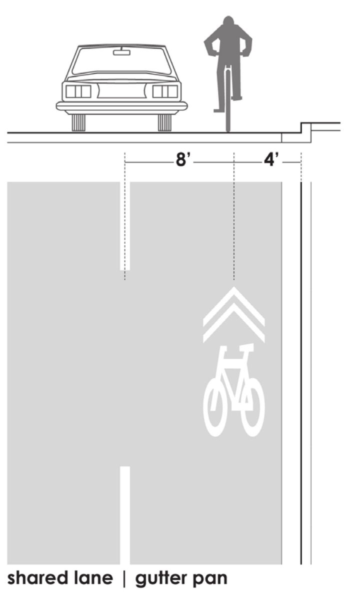


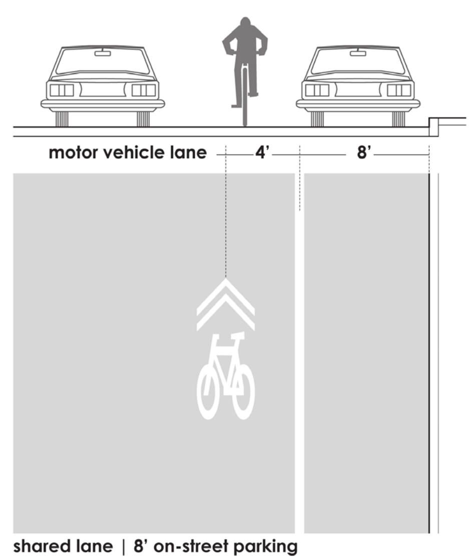
B-29 – Main Street Bicycle Route Pavement Markings

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Short Term	River Drive to Vander Veer Park	$15,000 - $25,000

Project Description: Enhance the currently-designated bicycle route on Main Street by adding sharrows and supplementary signage. Additional signage needed to transition cyclists to the Fair Avenue route (B-9) north of Vander Veer Park. Coordination with the Davenport Parks and Recreation Department is important to better understand condition of the internal park trail in Vander Veer Park and ongoing coordination should ensure that any planned improvements to internal park facilities can incorporate appropriate signage and wayfinding through the park.

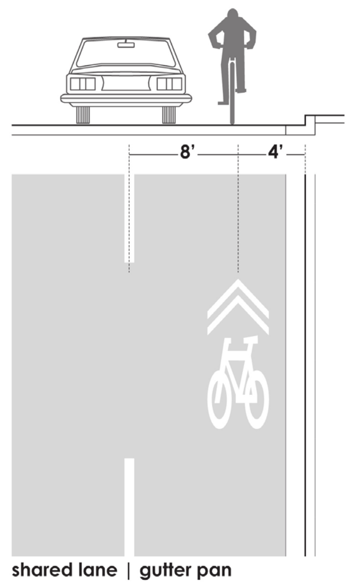
Related Projects: This project is identified as a short term project in coordination with planned street reconstruction.





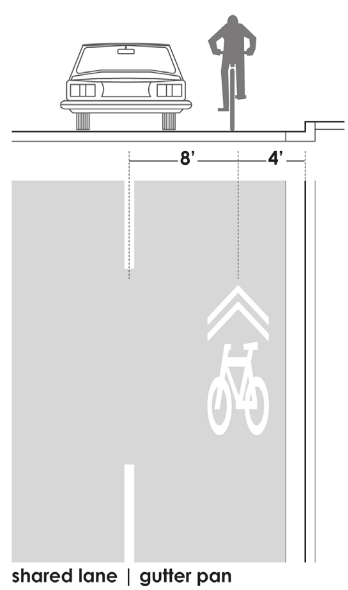
B-30 – Kelling Street Bicycle Route			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Medium-Term	Central Park Avenue to George Washington Boulevard	$15,000 - $25,000

Project Description: This project would provide a north-south connection with sharrow pavement markings from the Central Park Avenue bicycle lanes (B-22) to the Duck Creek Trail. Signage is required to indicate the direction of the trail connection, which is a dead-end stub of George Washington east of the Kelling intersection.



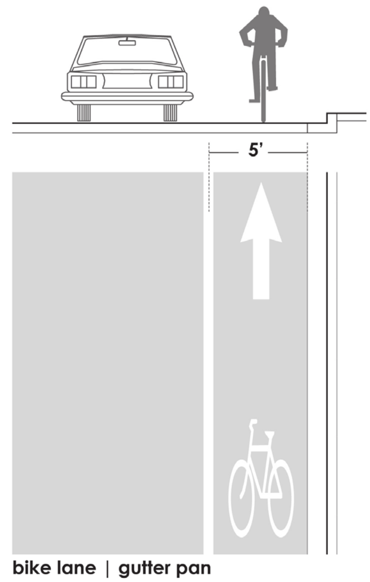
B-31 – Western Avenue Bicycle Route			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Short-Term	Central Park Avenue to Duck Creek Trail	$15,000 – $25,000

Project Description: This project connects the Central Park Avenue bicycle lanes (B-22) to the Duck Creek Trail using sharrow pavement markings. This should be coordinated with the Gaines Street bicycle route (B-8) south of Central Park Avenue. Signage should be provided on the one-block extent of Central Park Avenue between Gaines and Western to guide cyclists in the turning alignment of this route.



B-32 – 35th/37th Street Bicycle Lanes			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Medium-Term	Division Street to Brady Street	$150,000 - $170,000

Project Description: This project would provide an east-west connection south of Kimberly Road. It would connect with a recommended extension of 35th Street from Brady Street east to Kimberly Road (S-13) and would be coordinated with a road diet project on 35th between Marquette and Brady Streets. Between Marquette and Division Streets, sharrow pavement markings should be used given the residential character of this part of 35th Street, presence of on-street parking, and 30-foot curb-to-curb dimensions.

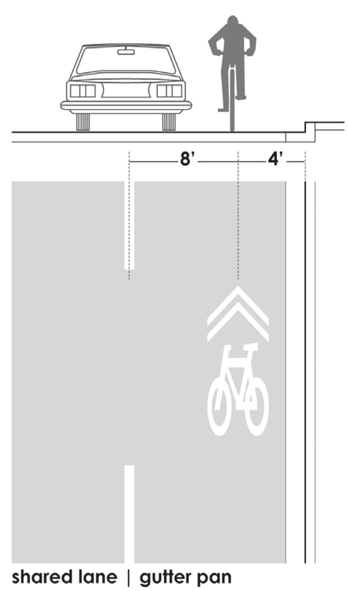


B-33 – Hillandale Road Bicycle Route			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Long-Term	Phase 1: 76th Street to 53rd Street; Phase 2: 53rd Street to Hickory Grove Road	$60,000 - $80,000

Project Description: This project is designated in two phases and relies on extension of a short section of 53rd Street to cross Silver Creek. It adds sharrow markings for a bicycle route on Hillandale Road from 76th Street to 53rd Street and would be coordinated with an extension of the southern section of Hillandale; this extended Hillandale would be marked with sharrows from 53rd Street south to Hickory Grove Road. An existing trail spur connects it to the Duck Creek trail next to the Hillandale/Hickory Grove intersection.

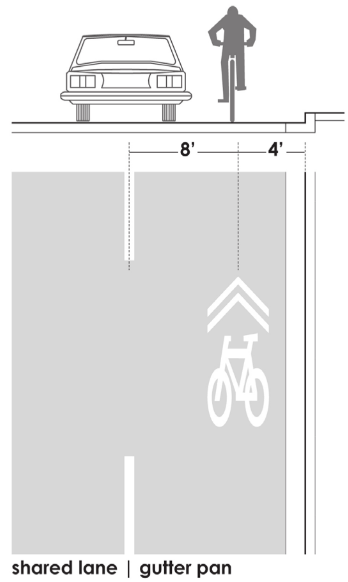
The street extension of Hillandale is described in project S-42 and the extension of 53rd Street that would connect the two parts of this project is described in S-39. Both are designated long-term priority projects.

Note that the cost estimate above does NOT include construction costs for S-39 or S-42, only marking and signage costs for the application of sharrows to existing sections of Hillandale Road.



B-34 – Ridgeview Drive Bicycle Route			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Long-Term	Northwest Boulevard to Division Street	$15,000 - $25,000

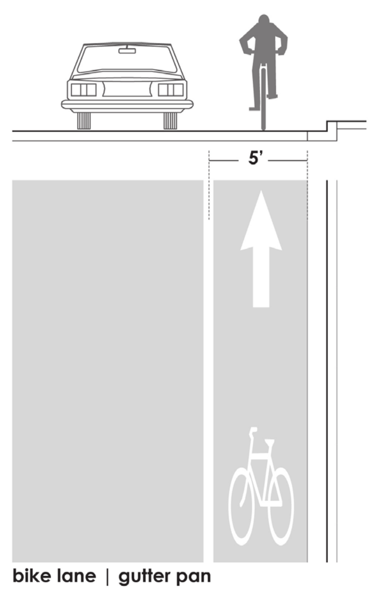
Project Description: This project connects Northwest Boulevard to Division Street along a neighborhood collector street, providing direct access to Ridgeview Park. It also connects to a potential future trail along Goose Creek.



B-35 – Lincoln Avenue Bicycle Lanes			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Medium-Term	Waverly Road to Central Park Avenue	$10,000 - $15,000

Project Description: This project adds bicycle lanes in conjunction with a road diet of the current four-lane Lincoln Avenue (project S-59) between approximately north of Locust Street and Iroquois Drive. Outside of this segment, Lincoln Avenue is a two-lane street. Sharrow markings should be used if available roadway dimensions do not allow bike lanes that are a minimum of 4 feet in width.

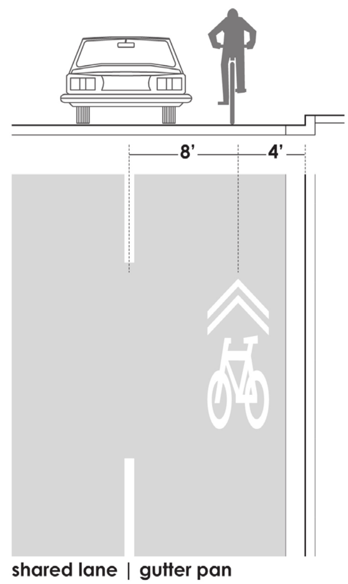
The cost estimate provided here only accounts for pavement markings. This project and its cost estimate should be implemented concurrently with S-59.



B-36 – Clark Street Bicycle Route

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Medium-Term	Waverly Road to current end of Clark Street north of Heatherton Drive	$30,000 - $45,000

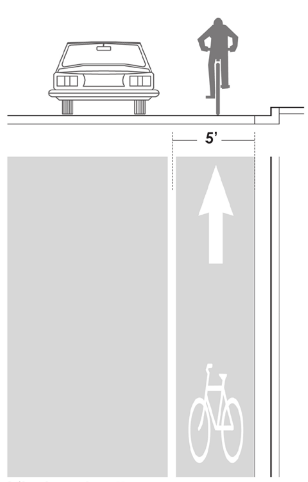
Project Description: This project adds sharrow markings to Clark Street, providing a north-south neighborhood connection from Waverly Road and providing access to Petersen Park and two east-west bicycle system routes. At its northern end, it can connect to a potential multi-use path alongside the Burlington Northern-Santa Fe railroad.

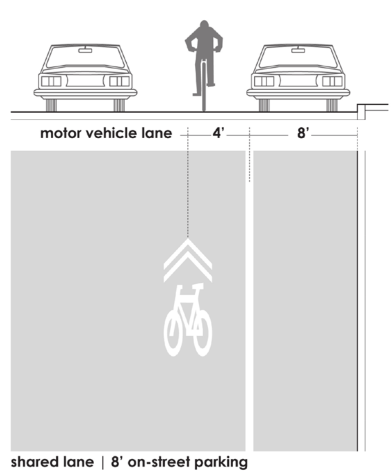


B-37 – Pine Street Bicycle Lanes

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Medium-Term	Duck Creek Trail to Northwest Boulevard	$20,000 - $25,000

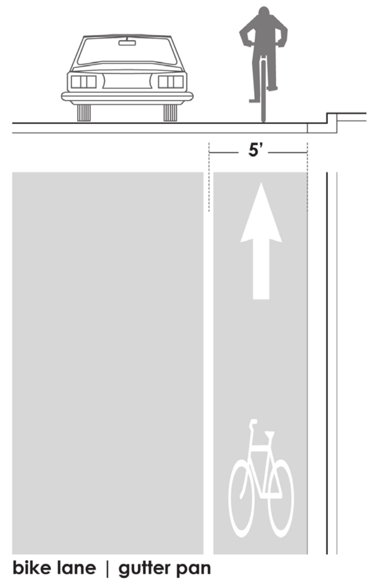
Project Description: This project adds bicycle lanes in conjunction with a road diet of the current four-lane Pine Street (project S-60). The cost estimate provided here only accounts for pavement markings. This project and its cost estimate should be implemented concurrently with S-60. Between the Duck Creek Trail and Kimberly Road, sharrow pavement markings should be used given the residential character of this part of Pine Street and presence of on-street parking on both sides of the street. Sharrow markings should be used if available roadway dimensions do not allow bike lanes that are a minimum of 4 feet in width.





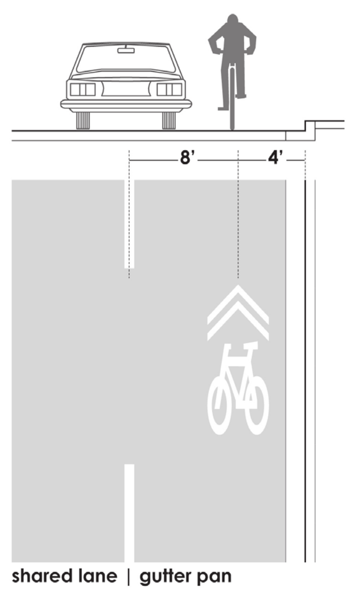
B-38 – Northwest Boulevard Bicycle Lanes			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Medium-Term	Harrison Street to Pine Street	$160,000 - $200,000

Project Description: This project adds bicycle lanes through a four-lane to three-lane road diet in applicable sections and through appropriate surfacing and marking of shoulders in others. This adds an important 'spine' connection from northern neighborhoods to the Duck Creek Trail and the central Davenport neighborhoods.



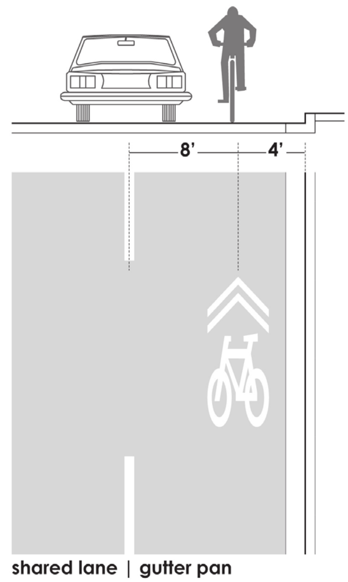
B-39a – Brown Street-Appomattox Road Bicycle Route (Phase 1)			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Short-Term	Goose Creek Park to Slattery Park	$15,000 - $25,000

Project Description: This project adds sharrow markings to Appomattox Road and Brown Street connecting Goose Creek Park and Slattery Park. This is part of a larger corridor that would use an existing multi-use path through Slattery Park to connect to 46th Street and would add a new multi-use path connection to connect the two parts of Appomattox with a bridge across Goose Creek. This would connect to the second phase of this project (B-39b).



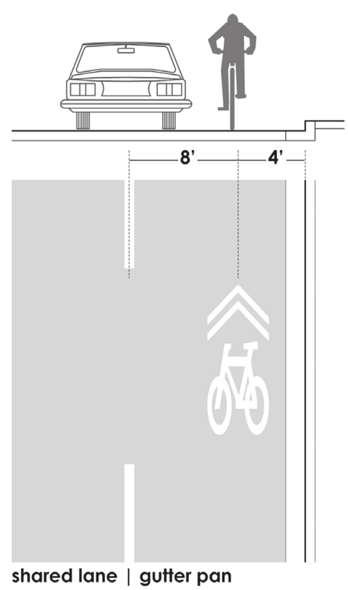
B-39b – Brown Street-Appomattox Road Bicycle Route (Phase 2)			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Medium-Term	Goose Creek Park to Hoover Road / 65th Street	$125,000 - $150,000

Project Description: This project adds sharrow markings to Appomattox Road and Brown Street connecting Goose Creek Park and Slattery Park. This is part of a larger corridor that would add a new multi-use path connection to connect the two parts of Appomattox with a bridge across Goose Creek. This phase provides the northern half and includes a pedestrian/bicycle bridge and multi-use connection through Goose Creek Park. This would connect to the first phase of this project (B-39a). The cost estimate above includes a prefabricated bridge structure similar to those estimated in other creek crossing projects and a multi-use path through Goose Creek Park.



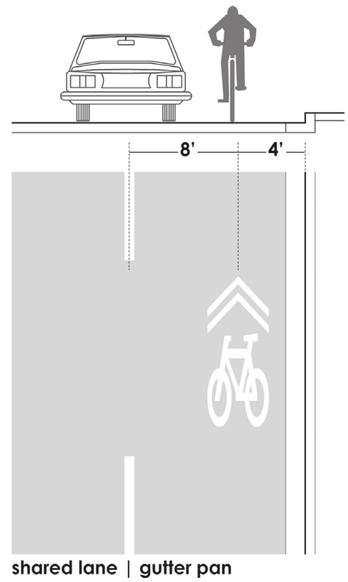
B-40 – Ripley Street Bicycle Route			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Short-Term	Northwest Boulevard to north of 53rd Street	$15,000 - $25,000

Project Description: This project adds sharrow markings to Ripley Street from Northwest Boulevard to north of 53rd Street, where Ripley Street currently ends. A potential connection to a future Goose Creek Trail could be made through coordination with Davenport Community Schools to connect through the North High School campus.



B-41 – Tremont Avenue Bicycle Route			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	First Year	46th Street to north of 59rd Street	$25,000 - $35,000

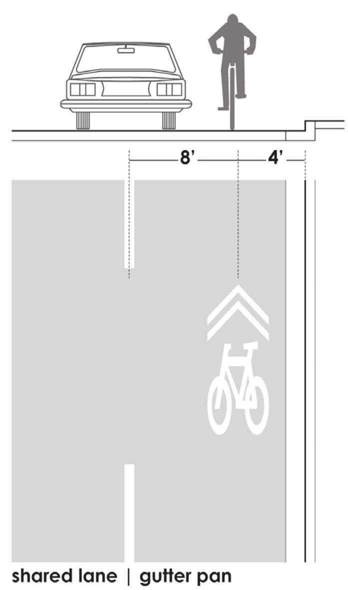
Project Description: This project adds sharrow markings to Tremont Avenue where it exists, from 46th Street to north of 59th Street. A proposed extension of Tremont to Veterans Memorial Parkway (project S-51) would continue this route, with an option of expanding the sharrow section to include on-street bicycle lanes per recommendations in the Davenport In Motion Street Design Guide. Note that the cost estimate given here only incorporates markings and signage for existing sections of Tremont. Costs for extension of the bicycle route through project S-51 should be incorporated in the scope and cost estimate for that project.



B-42 – Forest Road/Lorton Avenue Bicycle Route			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Medium-Term	Middle Road to 53rd Avenue	$30,000 - $40,000

Project Description: This project adds sharrow markings to Forest Road between Middle Road and 53rd Street. From the south, the Forest Road portion of the route runs from Middle Road to George Washington Blvd. A short segment of the route uses Locust Street to connect offset portions of Forest Road; there is a traffic signal where Forest Road intersects Locust Street from the north. The route crosses Duck Creek using an existing bridge and paths. North of Duck Creek, it uses Fernwood Avenue and 32nd Street (pavement markings added as part of project B-44), and follows Forest Road between 32nd and 46th Streets. The route then relies on a short section of 46th Street to connect to Lorton Avenue, which it follows between 46th Street and 53rd Street (46th Street has bicycle lanes added as part of project B-24a.).

Signage should indicate the offsets in alignment to users.



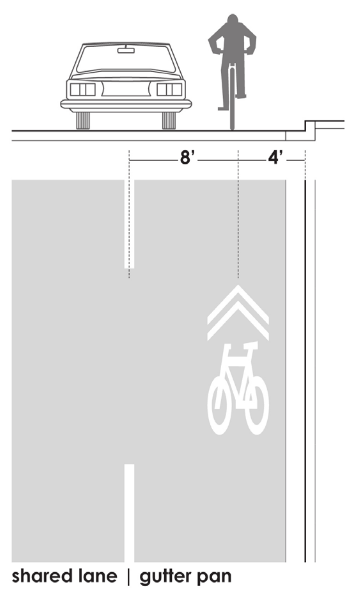
B-43 – Elmore Avenue Bicycle Route			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Medium-Term	Veterans Memorial Parkway to Davenport City Limits at East Kimberly	$1,200,000 - $1,400,000 (Davenport Only)

Project Description: This project adds a bicycle connection intended to provide a parallel connection to Interstate 74 that could also be integrated into a reconstructed I-74 bridge. Elmore Avenue is currently a major commercial arterial and this project proposes to add on-street bicycle lanes or a multi-use path on the west side of the street. This cost estimate is for construction of the multi-use path, noting that on-street lanes would require significant costs to reconstruct drainage and intersections in sections of Elmore between 46th and 53rd Streets.

Coordination with Bettendorf and the Iowa Department of Transportation would be required to ensure connection outside of the Davenport City Limits and across a future bridge.

B-44 – East 32nd Street Bicycle Route			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Medium-Term	Jersey Ridge Road to East Kimberly Road	$10,000 - $15,000

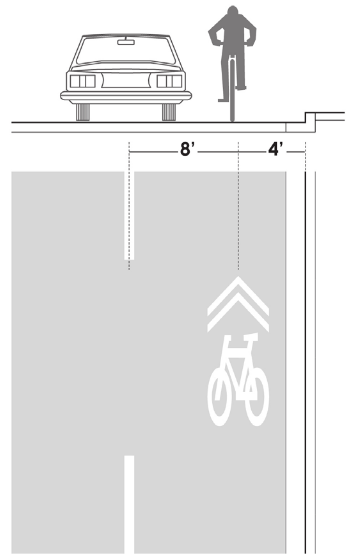
Project Description: This project adds sharrow markings to East 32nd Street between Jersey Ridge Road and East Kimberly Road. The project should also add markings to the short section of Fernwood Avenue to the south of 32nd Street to provide a formal connection to the Duck Creek Trail system, incorporating signage to indicate this connection to users.



B-45 – East 12th Street Bicycle Route

Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Medium-Term	Bridge Avenue to Jersey Ridge Road	$10,000 - $15,000

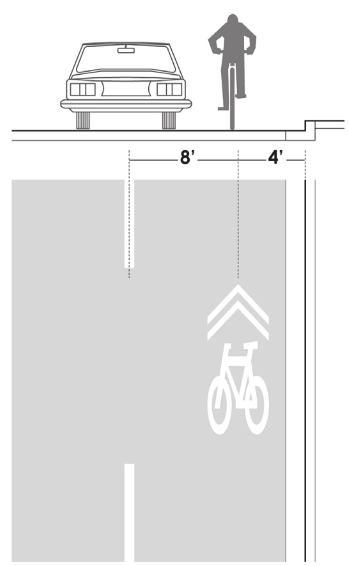
Project Description: This project adds sharrow markings and appropriate signage to East 12th Street between Bridge Avenue and Jersey Ridge Road. Signage should indicate intersecting routes, such as those in Projects B-12 and B-13, and adjacent attractions, especially the East Davenport Village.



B-46 – Rusholme Street-Elm Street Bicycle Route

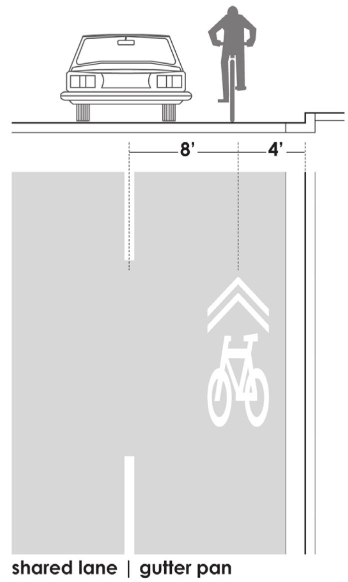
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Medium-Term	Bridge Avenue to Forest Road	$10,000 - $15,000

Project Description: This project adds sharrow markings and appropriate signage to Rusholme Street between Bridge Avenue and College Avenue, connecting to Elm Street via College Avenue and on Elm Street from College to Forest Road. Signage should indicate intersecting routes, such as those in Projects B-12 and B-13, and adjacent attractions, especially the east campus of Genesis Medical Center.



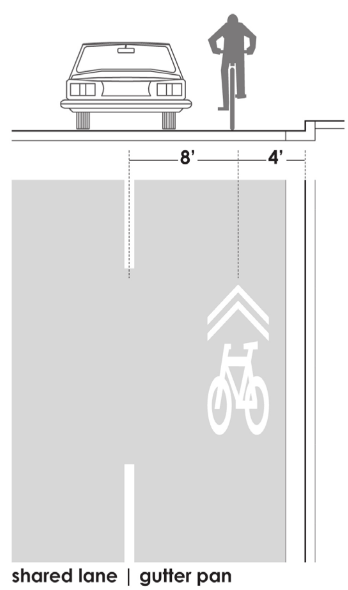
B-47 – Grand Avenue Bicycle Route			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Medium-Term	6th Street to High Street	$25,000 - $45,000

Project Description: This project adds sharrow markings and appropriate signage to Grand Avenue between 6th Street and High Street. It connects to the Iowa-High-Farnam route through two blocks of High Street west of Grand. This project includes the addition of a multi-use path through or along the perimeter of Leclaire Heights Park, to be coordinated with the Davenport Parks and Recreation Department.



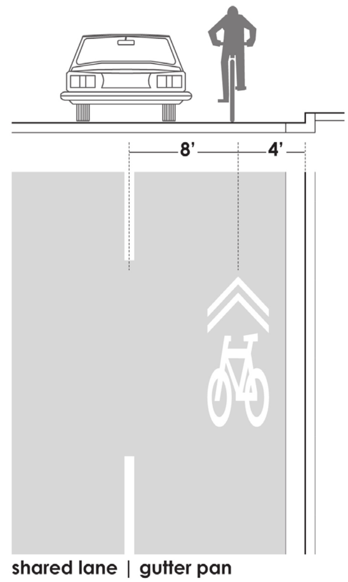
B-48 – 6th Street Bicycle Route			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Medium-Term	Fejervary Park to Oneida Ave.	$20,000 - $40,000

Project Description: This project adds sharrow markings and appropriate signage to 6th Street between Wilkes Avenue and River Drive. On the west end of this route, the route turns north on Wilkes Avenue to 9th Street, then west on 9th Street to connect to the proposed multi-use path entrance to Fejervary Park (see the description of Project B-5). On the east end of this route, the route turns south on Carey Avenue, then east on Charlotte Street, then joins the Oneida Avenue bicycle lane to connect to River Drive. Signage should be incorporated to indicate all of these turns in the route alignment.



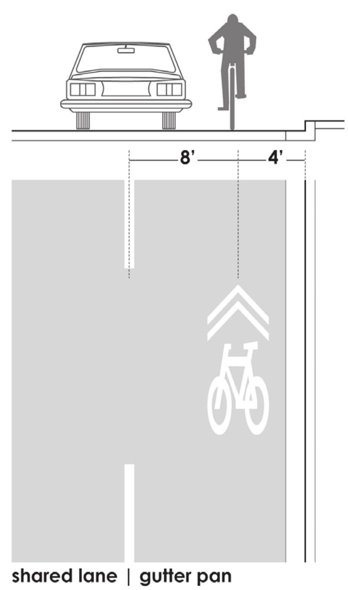
B-49a – 59th Street – 61st Street Bicycle Route (Phase 1)			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Medium-Term	Appomattox Road to Tremont Avenue	$15,000 - $25,000

Project Description: This project adds sharrow markings and appropriate signage to 59th Street and 61st Street between Appomattox Road north of Goose Creek Park to Tremont Avenue.



B-49b – 59th Street – 61st Street Bicycle Route (Phase 2)			
Project Category	Priority	Project Location / Extent	Estimated Cost
DIM Citywide Bicycle Network	Long-Term	Appomattox Road to Northwest Boulevard	$3,000 - $5,000

Project Description: This project adds sharrow markings to existing sections of 61st Street west of Goose Creek and proposes two street extensions: one providing a bridge over Goose Creek (S-61a) connecting to Appomattox Road (and the first phase of this project) and the other connecting to Northwest Boulevard at the current Sturdevant Street intersection. Note that this cost estimate only applies to markings on the existing sections of 61st Street. The extension of 61st to Northwest and Sturdevant is described in Project S-61b.

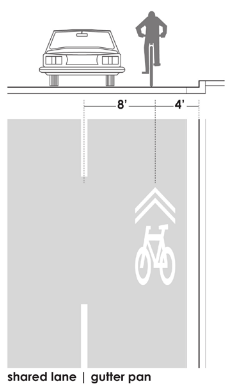


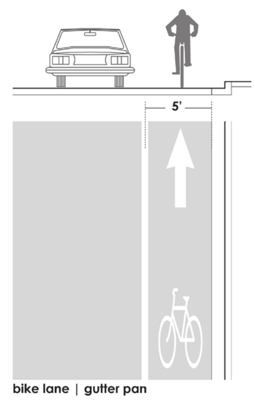
B-50 – 29th Street Bicycle Route and Lanes			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Medium-Term	Farnam Street to Eastern Avenue	$35,000 - $45,000

Project Description: This project adds sharrow markings and appropriate signage to 29th Street from Farnam Street to Bridge Avenue. East of Bridge Avenue, the street can be restriped to include on-street bicycle lanes to Eastern Avenue. Sharrow markings should be used if available roadway dimensions do not allow bike lanes that are a minimum of 4 feet in width, as may be the case where on-street parking exists.

This project also proposes an extension of 29th Street along the south side of Duck Creek and along the north side of Oakdale Memorial Park (S-11), intersecting with Jersey Ridge Road opposite the existing George Washington Boulevard.

The cost estimate provided here only incorporates treatments for existing sections of 29th Street. Costs for the extension of 29th should be included in cost estimates for Project S-11 and should include sufficient width for on-street bicycle lanes.



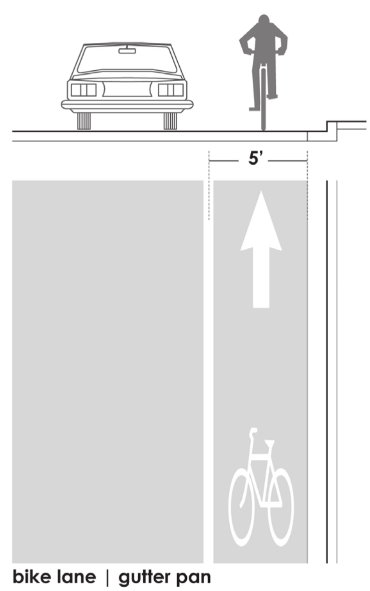


B-51 – Hickory Grove Road Bicycle Lanes			
Project Category	**Priority**	**Project Location / Extent**	**Estimated Cost**
DIM Citywide Bicycle Network	Medium-Term	Fairmount Street to Lombard Street	$25,000 – 30,000

Project Description: Stripe two bicycle lanes on Hickory Grove Road, one on each side of the street to the right of all vehicle lanes in the direction of travel. Signage would need to accompany the northbound bike lane near Fairmount Street and the southbound bicycle lane near Lombard Street to indicate that the bike lane does not continue beyond these streets and to transition cyclists to bicycle routes on these streets.

This project would correspond with a road diet (S-58) and would constitute a restriping of the roadway surface to introduce a three-lane section (two travel lanes and a two-way left turn lane) with on-street bicycle lanes. (Between Lombard and Locust Streets on-street parking would be provided instead of bicycle lanes.) The cost estimate shown here reflects only the cost of lane striping and marking for bicycle lanes; it does not include the cost of the overall road diet described in S-58.

Curb-and-gutter sections are shown per typical street recommendations in the Davenport in Motion Street Design Guide. If curbs are not used, bicycle lane should be 6' in width. Project implementation should pay close attention to the placement of drainage inlets and grates, seeking to replace and/or reorient these when possible in order to minimize safety hazards for cyclists.



Source: City of Davenport

Chapter 10 **DIM Transit Element**

SUMMARY

The intent of the Davenport in Motion long range planning effort is to develop a transportation system that, over time, will provide improved mobility choices throughout the community and support local economic development goals. The transit element will work in concert with other plan elements and regional short- and long-range planning initiatives to provide direction on how Davenport can achieve the transit system it needs to serve the travel needs of its residents and to allow the community to grow gracefully.

The following bullets provide a high level summary of findings and recommendations detailed in the DIM Transit Element:

- CitiBus primarily provides a social service function to transit dependent populations in the City of Davenport and neighboring communities. Very limited service hours and long headways make transit travel challenging and unreasonable for people who have other choices. Given limited resources, the City must choose whether to continue to provide limited service to a broad geographic area or provide high quality service in the most promising corridors. This is a values decision that has no right or wrong answer, but is one that should be taken on as part of a comprehensive system restructuring.
- The CitiBus route system has a number of circuitous, repetitive and inefficient routings. This is in part, the result of poor pedestrian facilities on and access to key arterials, forcing transit to operate on residential streets. It is also a typical result of years of minor system adjustments without a ground up service restructuring. Significant improvements in efficiency and service quality (headway and service span improvements) could be achieved by conducting a Comprehensive Operations Analysis).
- Transit mode split is likely to remain low until some level of infill densification is achieved along key corridors, parking supply is lowered, and parking is priced according to the market demand.
- Land use policy and zoning changes that provide opportunities and incentives for developers to construct mixed use projects with lowered parking requirements on key transit corridors are needed to ensure that transit supportive development is not excluded. Furthermore, it may take aggressive actions by the city to encourage a more transit oriented approach to development in Davenport.
- The City's provision of free or low cost parking supply in the downtown is counter to its goals to increase use of non-auto modes. Eliminating free public surface parking will help increase the value of transit investments and improve financing problems in city-owned parking ramps. The replacement of unsightly surface lots with active public space could also help to improve the pedestrian environment and encourage street life downtown.

DIM TRANSIT OBJECTIVES

The transit element of Davenport in Motion explains how the City can create a transit system that becomes a meaningful mobility option for a broader range of citizens' travel needs. It provides a review of current service and route structure and recommends actions for improving the quality and relevance of public transportation services. Implementation of this plan, in coordination with other modal efforts, should help make transit a more relevant element of the City's transportation system while helping to improve the City's economic competitiveness and minimize long-term environmental impacts for the city and the region.

A review of Davenport 2025 suggests that the City's transit and transportation system must:

- Keep Davenport moving and support economic growth. Davenport needs a transit plan that clearly shows how transit can support the Comprehensive Plan land use vision.
- Enable the City to be more proactive on the future of transit in Davenport. The plan will speak to how various transit services and programs work together in an integrated transit network.
- Link City transit strategies to specific connections or corridors, i.e. making City policies and strategies operational.
- Integrate transit service and expansion policy as part of a broader multimodal strategy for mobility in the City of Davenport and to and from neighboring communities. To this end a transit strategy is being developed as an integral element of Davenport in Motion.
- Help align future transit investment and funding needs by identifying the City's transit priorities and corridor development plans.

Purpose and Role of DIM Transit Strategy

This document analyzes:

1. The relationship between land use and transit
2. Current transit ridership patterns
3. Route design and efficiency
4. Capital facilities – where are deficiencies in the system and what are priorities for improvements
5. Supportive policies – The role of urban form, street design, right-of-way management, TDM and parking management and pricing policy on transit ridership and fare based revenue generation.
6. Recommended service, capital and funding strategies designed to implement transit's role in Davenport 2025

THE ROLE OF TRANSIT IN DAVENPORT'S FUTURE

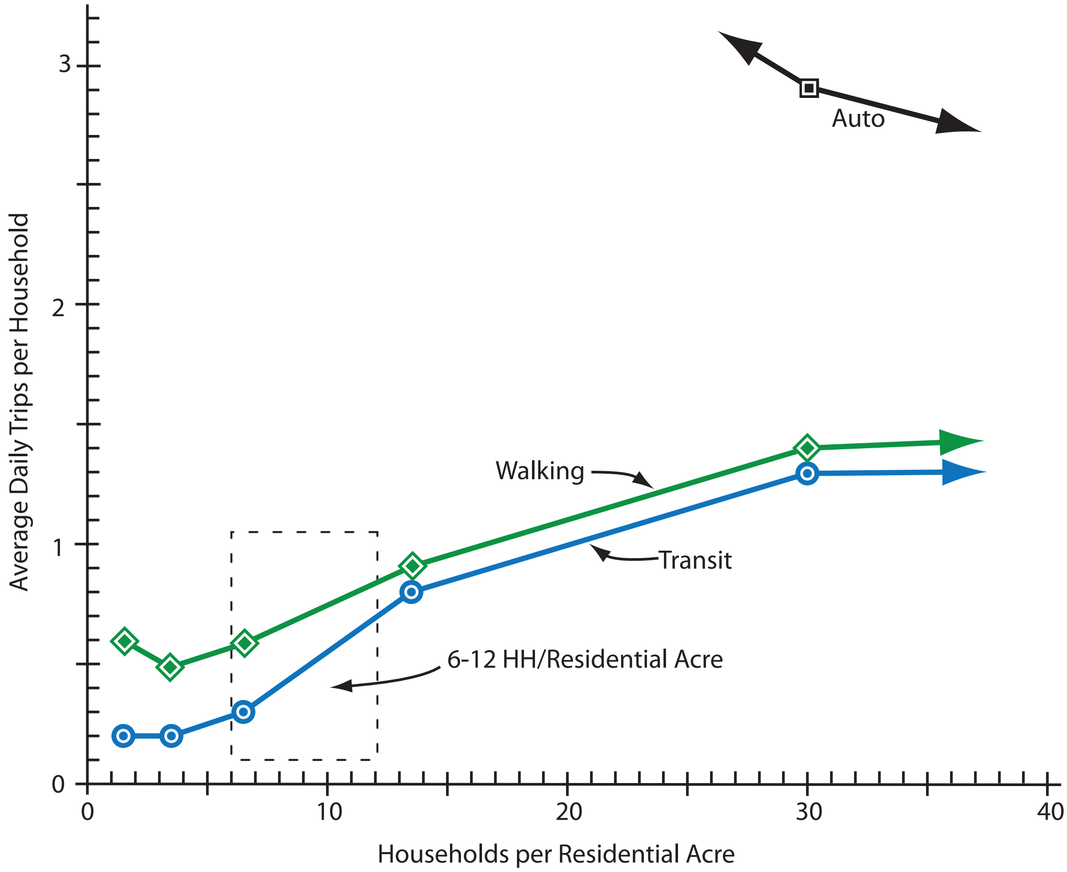
This section briefly outlines the relationship between transit service and land use, with an emphasis on how the City can leverage transit's role in advancing the Davenport 2025 Comprehensive Plan vision of a more compact, sustainable city. The section stresses that service design, local land use and transit system access must be addressed in concert to develop a transit system that will provide meaningful transport for a range of Davenport residents and employees.

TRANSIT – LAND USE RELATIONSHIP

Planners often talk about "transit-supportive density" or transportation efficient land uses." So how does population and employment density help to determine the level and type of service that should be provided on a street or in a specific corridor?

There is a strong correlation between land use density and transit demand. This relationship is not linear, and transit demand (and corresponding per capita VMT reduction) tends to increase most dramatically between about 6 and 12 households per acre. Average density in most Davenport neighborhoods outside the downtown is below this range today (4.5-5 units per acre in historic neighborhoods), but areas designated for transit supportive growth could reach this threshold quickly with modest infill development. ***This relationship illustrates that efforts to promote infill development, even at modest densities, could have exponential impact in reducing vehicle miles traveled and increasing transit and non-motorized travel. Figure 10-1 below*** provides a graphical illustration of the relationship.

Figure 10-1 Relationship between Density and Daily Trips by Mode



Source: MTC 1990 Household Travel Survey

An appendix to the Transit Element and the Davenport in Motion Fact Book (Section 6A – Land Use Best Practices, Figure 1) provide a more complete discussion of the relationship between density and transit demand.

However, land use is only one determinant of transit quality and the likely demand for service in a given environment. The following graphic illustrates how land use types, intensity of use, built environment and service quality all interact to support environmental, community and economic goals. Since Davenport is likely to remain a low- to moderate-density community even as infill development occurs, transit's success will rely heavily on service quality and access improvements.

Elements of Transit Demand

Clearly, density alone does not determine a service level. The level of service depends on several market factors: *density, headway (key element of service quality), market size, pedestrian and bicycle access (community design) and street design.*

- **Density**, for the purpose of this study, is described by the combination of population and employment per acre.
- **Headway**, frequency of service, or headway between buses, greatly affects ridership. Low frequency of service equates to long wait times for bus riders and becomes a deterrent to the use of public transportation, especially for those passengers with other travel options. A headway of 15 minutes or better is considered the point where riders do not need to rely on a schedule and are comfortable heading to the bus stop without consulting a schedule, knowing a bus will be along shortly. Studies have shown significant correlations between the frequency of service improvements and increases in ridership. Generally studies show that frequency of service elasticity of ridership can vary from -0.25 (indicating that for every 1% improvement in frequency, ridership increases by 0.25%) for urban systems with a significant level of service before the change to greater than –1.0 for suburban systems adding a substantial amount of new service.
- **Market size** must be considered together with density to determine the overall market that has been organized in a transit-oriented way, which in turn will determine the level of service that can be supported. An isolated, 50 unit apartment building surrounded by surface parking and/or open space could have a very high density rating if analyzed within a fine enough zone, but this alone would not mean it deserves the same level of service as downtown Davenport, because it is a much smaller market. A particular level of service will require a minimum density over a minimum area. A major challenge in Davenport is that much of the city's multifamily housing development has been developed on farmland on the periphery of the community. The auto-oriented form and poor location of these developments relative to other key transit demand generators makes them difficult to serve.
- **Pedestrian and bicycle access** is another crucial, but often unnoticed, element of transit demand. Primary Transit Network design (a concept introduced later) is especially important as it relates to pedestrian access and safety. Even at high densities, people will not use transit if it is difficult or dangerous to access a bus stop. Many of today's auto-oriented suburban apartment complexes, while very dense, have extremely poor access to major arterials or viable transit carrying streets. In our work throughout the country we have seen over and over that it is possible to configure density so that it is impossible to serve with transit.
- **Street network**, which is directly related to access, is also an important component of transit access and operational viability. Neighborhoods where all roads are designed to connect to arterials or collector streets allow transit customers to reach bus stops without walking out of direction and provide more efficient routing options that can support high frequency service.

The clear message for the City of Davenport is that, while the design of the service itself is important, zoning and community design decisions are fundamental to future success of transit. As CitiBus adjusts

Two to four story mixed use buildings inserted in existing urban fabric can increase density to rates supportive of high quality bus service.

Source: Nelson\Nygaard

Even low rise multifamily homes as pictured or encouragement of single family homes on narrow lots can lead to modest density increases.

Source: Nelson\Nygaard

Much denser suburban apartments built in "greenfield" areas can be very difficult to serve with transit and can strain local transit systems by spreading resources more thinly.

Source: Nelson\Nygaard

services to optimize ridership, city land use policies and ability to attract infill development will ultimately drive the quality and quantity of transit service in the City. Better transit will require denser, mixed-use corridors with excellent access to transit stations.

The Importance of Anchors

A transit line serves two different functions. It covers an area, and it also connects points. In planning transit services, especially major lines that will serve as the backbone of a primary fixed route network, the ends are especially critical. Along the middle of a line, people from many origins are on the bus, headed for the many destinations that the line serves. As a bus approaches the end of the line, however, it is useful to reach fewer and fewer destinations. Ridership tends to drop off toward the ends of the lines accordingly. If a line were placed on a uniformly developed area, without any special nodes of intense activity, we would expect the number of people on the bus to represent a bell curve, highest at the center of the line and lower toward the ends, until at the end of the line itself the bus is empty.

The amount of service that must be apportioned to a line is determined by the height of the curve at its highest point, called the peak load point. The rest of the area above the curve represents the capacity on the bus that has gone to waste, seats that are traveling empty.

Transit lines are much more efficient if they have anchors, major trip attractors at each end of the line. For example, CitiBus Route 4 has Downtown Davenport at one end of the line and a large concentration of retail (Northridge Shopping Center and WalMart) at the other, and these major destinations tend to keep ridership high near the ends of the line, where ridership would otherwise fall off. The result is a more even distribution of ridership over the entire line, which means less wasted capacity and a more efficient use of resources.

Integrating Transit into Street Design: A Case for Balance

The Complete Streets model has become a common approach to moving the use of our urban streets away from auto-domination and balancing the need for bicycle and pedestrian movement. The Complete Streets organization defines a complete street as one:

> *Designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and bus riders of all ages and abilities are able to safely move along and across a complete street.*

Many cities around the nation have adopted Complete Streets ordinances and are incorporating practices into planning and street design. Davenport In Motion offers a number of recommendations for reforming street design in Davenport, particularly in key arterial corridors and in the downtown, where pedestrian comfort and safety is critical to transit's success, since these are the streets where transit must operate to be efficient.

Complete Streets are important for transit because:

- The pedestrian network serves as the 'connective tissue' of the transit system. Every trip begins and ends as a pedestrian trip, and poorly planned access to bus stops are a real barrier for disabled travelers as well as a psychological barrier for all travelers. The U.S. Access Board sets minimum requirements for disabled access, but Complete Streets encourage quality pedestrian design that goes well beyond basic safety requirements.
- They encourage multiple jurisdictions to engage in important discussions about the quality of experience for all street users. A major challenge for pedestrian accessibility is the disconnect between transit operators, who are responsible for transit facilities, and departments of public works, who are generally responsible for the roadway and pedestrian facilities that provide access to transit facilities. It is important that the agencies move past the "not my problem" mentality and coordinate their activities carefully for accessible streets and sidewalks.
- Better street design encourages new and more intensive land uses and encourages developers to build in a more pedestrian-oriented fashion, which creates more demand for top-quality transit.

At the same time, Complete Streets policies can challenge transit operators because:

- Complete Streets recognize the need to accommodate transit vehicles, but overall policies are bicycle and pedestrian oriented. Bicycle and pedestrian facilities along transit routes can slow transit service if they are not carefully designed. Since a large percentage of regional trips are longer than most people will comfortably walk or bike, transit is critical in reducing use of private automobiles.

- The reduction of traffic controls in favor of very slow speeds and integration can negatively impact transit operating speed (competitiveness) and reliability. Sometimes segregating transit is the right thing to do, particularly in an urban core where a system converges and small amount of incremental delay can equate to significant operating cost and passenger delay over the course of time.

This plan addresses this inherent conflict by proposing a basic Primary Transit Network "overlay" that the City of Davenport can use in conjunction with its existing street classification system. Pedestrian and bicycle system improvements in and connecting to PTN corridors should be prioritized over secondary transit routes or non-transit carrying streets.

It is also important that pedestrian and bicycle advocates recognize transit's role in creating walkable, bikeable communities. Planners and advocates should keep in mind that:

- For many people transit is the most viable alternative for trips over 3 miles, which still comprise a large percentage of trips made all or in part within the City of Davenport.
- Most transit trips start with walk trips (a few start with a bicycle or personal auto), so more people on transit means more pedestrian activity which can in turn help to justify investment.
- For bike mode share to increase, good transit must be in place. Many avid cyclists use transit as a secondary mode or a last minute back-up when weather turns bad or a mechanical failure occurs. Thinking about how to align parallel transit and bicycle corridors is critical to enhancing the value of both modes and is a key consideration of the Davenport in Motion plan.
- People walk most frequently and farthest in places where they rely on transit for mobility. Manhattan has the highest transit mode share of any place in the United States; not coincidently it also has the highest rates of walking and greatest distance walked per capita of any place in the United States.
- Davenport doesn't have the density of Manhattan or even Minneapolis, nor does it aspire to. Nonetheless, land use policies focused on creating dense corridors and centers with a healthy mix of land uses will ultimately increase transit ridership and help to justify investment in the pedestrian environment. Land use patterns that encourage walking and are supported by transit allow people choices. Someone who wants to give up their car and start cycling to work may be more likely to do so if they know they can easily access transit as an alternative when the weather is poor or they have a large load to carry.

CITIBUS SYSTEM ANALYSIS

Existing Transit Service and Ridership Patterns

CitiBus operates a commute hour fleet of 20 buses, primarily within the city limits of Davenport although some routes serve Bettendorf and Rock Island. In addition, the City contracts with River Bend Transit to provide complementary demand-responsive ADA paratransit service. RBT provides this service regionally along with other demand responsive service programs. The CitiBus service area covers approximately 30 square miles of the City of Davenport. Though service hours vary by individual route, the system generally operates from 6 AM until 6:30 PM Monday through Friday, and from 9 AM to 6:30 PM on Saturday. There is no service on Sunday or major holidays. A major challenge for transit users, particularly commuters, is that the latest evening departures from downtown occur prior to the end of work hours or too close to provide confidence that transit will be available to get them home.

CitiBus has a total of twenty vehicles ranging in age from 5 to 15 years, and from 29 to 40 feet in length. All buses are ADA accessible and are equipped with bicycle racks.

The general fixed route fare is $1.00, with special fares available for seniors, unemployed persons and, persons with disabilities. CitiBus connects with both Bettendorf Transit and MetroLINK, and offers joint pass programs with those two systems. Figure 10-2 summarizes fixed route service and ridership trends, as well as revenues and expenses for the years 2005 through 2007.

Figure 10-2 CitiBus Key Operating Statistics

	2004	2005	2006	2007
Operating Expenses	$3,478,662	$3,693,911	$4,032,009	$4,228,223
Fare Revenues	$345,584	$332,049	$339,911	$349,880
Revenue Hours	52,508	53,354	55,590	55,670
Boarding Passengers	881,947	939,758	982,663	1,045,550
Peak Buses	20	17	17	17

Source: National Transit Database

Ridership has been growing, as illustrated in Figure 10-3, from an average of about 70,000 boardings per month in 2005 to more than 90,000 per month in the spring of 2009. Per passenger fare revenue has been steadily declining over the last five years. This may be due in part to a higher percentage of discount pass sales. It is likely that fare revenue as a percent of the total system operating budget declined even more steeply in 2008 when fare free Saturday service was implemented.

Figure 10-3 CitiBus Monthly Fixed Route Boardings, 2005-2009

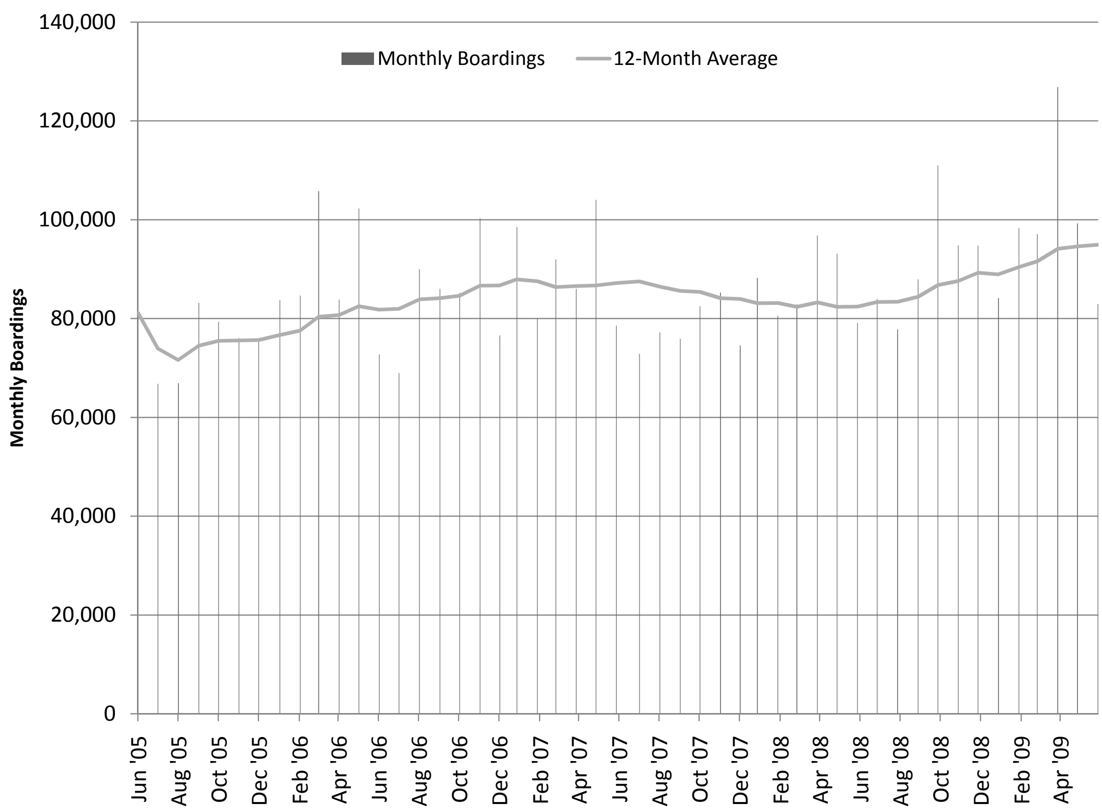
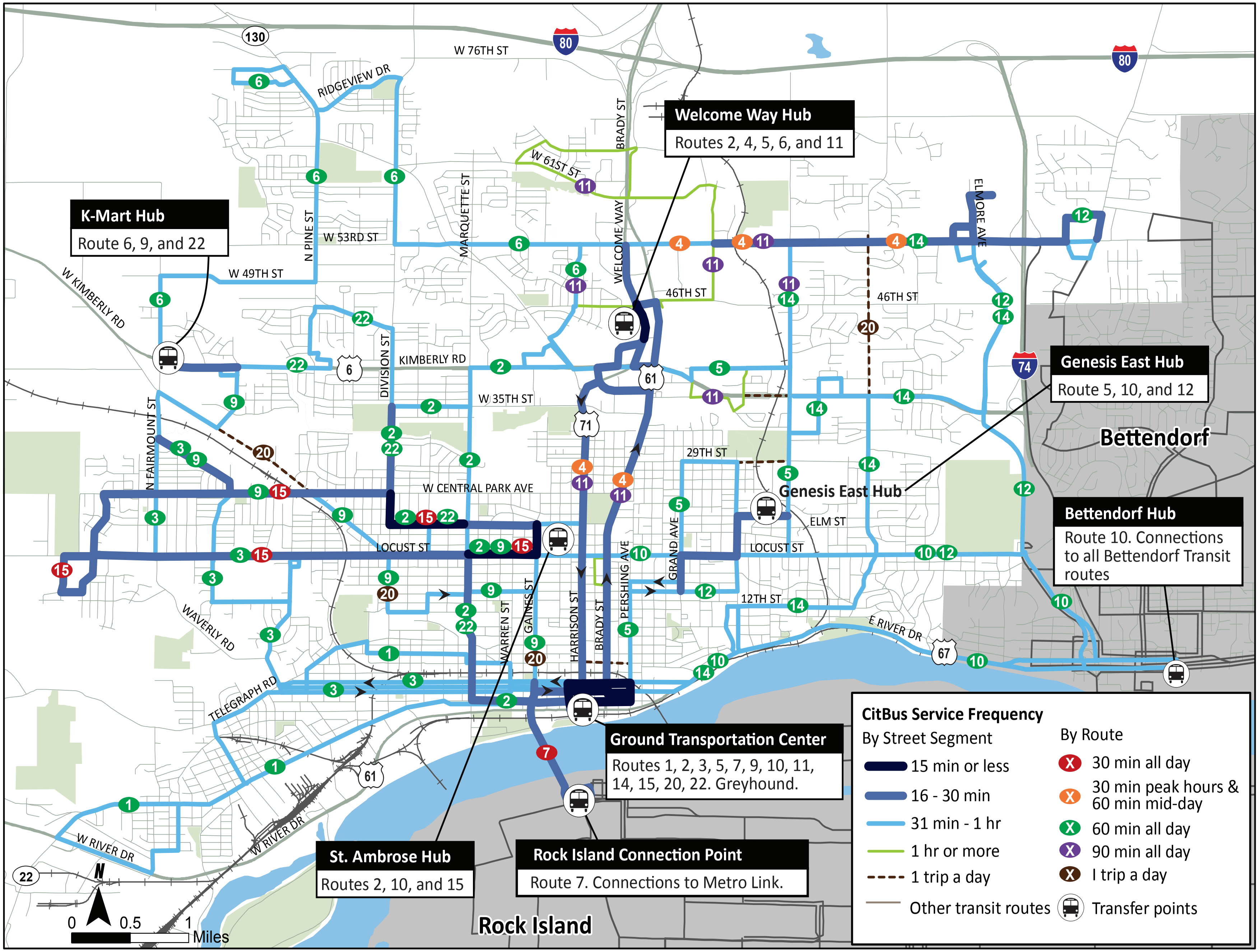


Figure 10-4 illustrates the CitiBus route network. The system operates sixteen fixed routes. Most radiate out of the Ground Transportation Center, which is located near the intersection of River and Harrison streets. Most routes are scheduled to operate hourly. Only routes 7 (Bridgeline) and 15 (West Loop) operate more frequently.

Figure 10-4 Davenport Existing Transit Service



GIS Data Source: City of Davenport, National Resources GIS Library, Iowa DOT

Nelson|Nygaard consulting associates

CitiBus does combine routes to provide more frequent service along key corridors, as illustrated in the system map above. The schedule treatment along key corridors is summarized below.

Harrison St./Brady St. Couplet

Times at the Ground Transportation Center

	Depart	Arrive
Rt. 4	5:30	6:15
Rt. 11	6:00	
Rt. 4	6:30	7:15
Rt. 4	7:00	7:45
Rt. 11	7:30	7:25
Rt. 4	8:00	8:45
Rt. 11	9:00	8:55
Rt. 4	9:30	9:15
Rt. 4	10:00	10:15
Rt. 11	10:30	10:25
Rt. 4	11:00	10:45

This pattern continues throughout the afternoon.

Note that outbound buses operate a consistent thirty minute schedule throughout the morning.

Marquette Street

Times at Ground Transportation Center

	Depart	Arrive
Rt. 2	0:05	0:55
Rt. 22	0:35	0:28

The same pattern is observed all day long, allowing effective 30 minute service between the Ground Transportation Center and Marquette at 18th St.

Routes are combined along shorter segments of several other streets in order to provide effective 30-minute headways, at least in one direction. Generally, schedules are not coordinated.

Figure 10-5 summarizes route level operating statistics. On average, CitiBus records about 15.9 boardings per hour of revenue service.[1] Route 7, which provides connecting service in Rock Island, is the system's most productive route, carrying almost 50 passengers per hour on weekdays.[2] Routes 14 (Jersey Ridge), 1 (Southwest to GTC Loop) and 3 (West Side to GTC Loop) all carry 10-11 passengers per hour, the least productive services in the system.

1 A revenue hour is time when a bus is capable of transporting passengers. It includes time the bus is traveling and 'recovery' time at the end of routes. It does not include time spent traveling to and from the garage.

2 Passengers per hour, the most common measure of performance for transit systems, is calculated by dividing the number of boarding passengers by the number of revenue hours.

Figure 10-5 Route Performance Summary
(Adjusted to be consistent with 2009 NTD Submittal)

Route	Headway	Out	In	Revenue Hours		Boardings	Pass per Hour
				Route	Route Group		
1	60	5:45	18:15	12.50	25.13	241	9.6
3	60	6:05	18:30	12.42			
13x	n/a	14:40	14:53	0.22			
2	60	6:45	18:30	11.75	23.63	348	14.7
22	60	6:05	17:58	11.88			
4	30/60	5:47	18:25	12.63	25.38	379	14.9
		5:30	18:15	12.75			
5	60	5:45	18:10	12.42	12.42	268	21.6
6	60	5:45	17:57	12.20	12.20	167	13.7
7	30	5:30	18:30	13.00	13.00	529	40.7
9	60	6:30	17:57	11.45	11.45	308	26.9
10	60	5:35	18:30	12.92	25.83	517	20.0
		5:30	18:25	12.92			
11	90	6:00	17:55	11.92	11.92	186	15.6
12	60	6:40	17:55	11.25	11.25	127	11.3
14	60	6:22	12:40	6.30	10.22	94	9.2
		14:45	18:40	3.92			
15	30	5:45	18:13	12.47	12.47	222	17.8
20	n/a	6:55	7:50	0.92	1.70	459	270.3
		15:35	16:22	0.78			
Route Unknown							
Total				196.60	196.60	3,845	19.6

Route 4 operates an odd headway. Two buses, scheduled 30 minutes apart are followed by two buses that are 60 minutes apart.
Route 10 is a loop route with buses operating every 60 minutes in each direction.

The Loop

Through a joint effort between Bettendorf Transit, Metro, and CitiBus, funded by the State of Iowa's "Iowa Clean Air Attainment Program," downtown Davenport is now served by a Quad Cities riverfront circulator called "the Loop." This is a unique regional transit program that provides limited service hours in the evening on weekend days. The service operates from 5 p.m. to 1:30 a.m. Thursday through Saturday and 11:30 a.m. to 6 p.m. Sunday. This type of recreation and nightlife focused service is rare in smaller Metro areas and is typically seen only in towns with large college populations. At the publishing of this plan it is too early to measure the success of the service. If after a year or more of service it is determined that ridership is too low to sustain the service, the jurisdictional partners should consider redeploying this service at commute times where demand may be higher.

Service Design

Transit Centers: As noted previously, most CitiBus routes serve the Ground Transportation Center. In addition, the system operates a network of transit centers, as summarized in Figure 10-6 below.

Figure 10-6 Routes That Serve Key Transit Centers

	Ground Transportation Center	St. Ambrose Hub	Welcome Way Hub	K-Mart Hub	Genesis East Hub	Bettendorf Hub	Rock Island Connection Point
1 – Southwest to GTC Loop	X						
2 – Marquette	X	X	X				
3 – West Side to GTC Loop	X						
4 – Brady-Harrison-53rd	X		X				
5 – GTC - Northpark Mall	X		X		X		
6 – K-Mart – Northpark Mall			X	X			
7 – Bridgeline	X						X
9 – Hickory Grove	X			X			
10 – River/Brady	X	X			X	X	
11 – Goose Creek Heights	X		X				
12 – Kimberly/Elmore/Bettendorf					X		
13X – West High School							
14 – The Jersey Ridge	X						
15 – West Loop		X					
20 – HDC Tripper	X						
22 – West Kimberly	X			X			

Some schedule coordination is practiced at the transit centers. Figures 10-7 and 10-8 illustrate the transfer connections at Ground Transportation Center and Welcome Way Hub. Note that most routes are scheduled to serve the Ground Transportation Center at either the top or bottom of the hour, allowing an array of transfer connections. The connections are less consistent at the Welcome Way Hub, where only the connection between routes 2 and 6 is scheduled throughout the day. This is a common problem experienced by transit agencies operating multiple transit centers. If travel times between centers vary, depending on the route taken, it is nearly impossible to design timed transfer connections at both facilities.

Figure 10-7 Connections at the Ground Transportation Center

	Arrive	Depart
1 – Southwest to GTC Loop	0:28	0:45
2 – Marquette	0:55	0:05
3 – West Side to GTC Loop	0:55	0:05
4 – Brady-Harrison-53rd	0:25 or 0:55	0:00 or 0:30
5 – GTC - Northpark Mall	0:40	0:45
7 – Bridgeline		0:15 & 0:45
9 – Hickory Grove	0:26	0:30
10 – River/Brady *Counterclockwise*	0:25	0:30
Clockwise	0:30	0:35
11 – Goose Creek Heights	0:25 or 0:55	0:00 or 0:30
14 – The Jersey Ridge	0:40	0:45
22 – West Kimberly	0:28	0:35

Figure 10-8 Connections at the Welcome Way Hub

	Arrive	Depart
2 – Marquette	0:30	
4 – Brady-Harrison-53rd	0:20 or 0:50	
5 – GTC - Northpark Mall	0:10	0:15
6 – K-Mart – Northpark Mall	0:28	0:30
11 – Goose Creek Heights - OB	0:20 or 0:50	
11 – Goose Creek Heights - IB	0:00 or 0:30	0:08 or 0:38

Route Design

The CitiBus system follows a radial design scheme. This means that most routes radiate out of the downtown, providing convenient travel between outlying residential neighborhoods and the central business district. This is the traditional way of designing and operating a transit system that was well suited to communities when nearly all business activity was conducted in the downtown. The emergence of suburban activity centers – both shopping centers and office parks – creates problems for pure radial systems. Customers may find that, in order to travel a relatively short distance from two locations in the suburbs, they are required to make an extended trip through the downtown, going inbound on one bus and transferring to another outbound route.

To compensate for evolving land uses, many transit systems operate cross-town routes, which connect suburban activity centers without ever going downtown. Route 6 is an example of such a cross-town route that operates in the CitiBus system. Typically, such solutions are only partially successful, attempting to adapt transit services to an auto-oriented transportation system. Because they operate through low-density suburban neighborhoods, cross-town routes typically have moderate productivities, even when solidly anchored on both ends. Route 6 exemplifies a moderately productive crosstown route, carrying under 16 passengers per revenue hour of service.

The CitiBus system also provides coverage, often at the expense of timeliness. For example, the Route 6 trip from Northpark Mall (Welcome Way Hub) to the K-Mart Hub is scheduled to take 30 minutes traveling a very indirect route that goes more than 30 blocks off the most direct route. An auto, traveling along Kimberly, can accomplish the same trip in about 10 minutes. Given this sort of time penalty, individuals with transportation options are unlikely to choose the bus instead of their private auto. Instead, the coverage afforded by CitiBus' indirect route structure facilitates travel for individuals without access to a car, allowing them to live in a variety of neighborhoods throughout the city. Travel may not be direct or fast, but it is broad-based.

RECOMMENDATIONS

The Davenport in Motion Transit Element delivers a series of recommendations designed to enhance the quality of transit service in Davenport, better integrate the transit system with other modal elements of the transportation system, and create a set of supportive land use, parking and demand management policies that will create an environment where transit is a viable transportation alternative for all populations and types of trips.

Recommendations are organized in five primary areas:

1. Develop a Service Allocation Policy: Weighing Local Values
2. Conduct a Comprehensive Service Restructuring
3. Develop and Implement a Davenport Primary Transit Network (PTN)
4. Improve Capital Facilities
5. Develop Transit Supportive Policies and Funding

Recommendation Area #1: Develop a Service Allocation Policy: Weighing Local Values

Every transit system, consciously or not, strikes a balance between two competing purposes: high frequency service along primary transit corridors (which we call the Frequency Goal) and providing service to all parts of the community (the Coverage Goal). This section describes the inherent value tradeoff (opposing goals) faced by every local transit agency. Making this tradeoff explicit helps transit managers and policy makers to make better decisions about service design and allocation.

The Frequency Goal – Run Transit Like A Business!

The CitiBus current Fixed Route system has 16 separate fixed routes serving most Davenport neighborhoods. Not surprisingly, not all were designed for the same purpose. No single route adheres completely to the principle of maximum ridership and many routes are designed to cover territory rather than optimize ridership. If CitiBus were a private unregulated business it would logically offer only those services that would carry the most people for the least cost. Like airlines, CitiBus would choose its markets based not on what is fair to each community or neighborhood, but on what would maximize the return on its investment in service. This approach defines one extreme of the "values spectrum" in service design.

This Frequency goal says:

> *"Deploy service to carry the maximum number of people within our fixed resources, even if it means some areas get no service."*

The Frequency goal tends to align closely with other goals such as:

- Maximizing farebox return (minimizing subsidy per passenger);
- Maximizing region-wide Vehicle Trip Reduction benefits;
- Supporting denser development at major hubs, and more transit oriented development patterns; and

Because it judges every service by its attractiveness to a wide range of passengers, an exclusive focus on this goal would likely result in no service at all in many currently served areas where ridership potential is lower – typically areas where population and/or employment densities are low.

The Coverage Goal – Serve Everyone!

Of course, CitiBus is a publicly funded agency with a mandate that requires it to appropriately serve residents throughout the community. So what balances the Frequency Goal? At the opposite end of the spectrum is what we call the Coverage goal. This goal says:

> *"Provide access to transit throughout all developed parts of the City, regardless of current or potential ridership."*

Coverage-oriented routes often serve isolated pockets of population within the city that lack access to a more productive transit corridor.

The Coverage goal tends to align with community desires to:

- Meet the needs of agencies and transit-dependent residents located in hard-to-serve areas;

- Meet the needs of the senior population, especially those who are less able to walk to the major, frequency-oriented transit corridors; and
- Reduce the number of revenue miles traveled;
- Distribute services equitably throughout all areas that support transit through sales tax dollars.

We suggest a policy approach that balances these two goals against each other. The City should consciously allocate a portion of its resources to address productivity, while also providing for coverage. Doing this provides a solid framework for the development and codification of a consistent approach to service allocation. Figure 10-9 illustrates the outcome of a values discussion we facilitated for the bus company in Whatcom County (Bellingham), Washington. The Board of Directors determined that 72% of their fixed route service should be directed toward a model designed to optimize ridership and farebox return and the remaining 28 percent dedicated to providing coverage to low-density areas that have higher levels of transit dependency due to income or age.

Figure 10-9 Example of Resource Allocation to Productivity- vs. Coverage-Oriented Services as adopted by Whatcom Transportation Authority, Washington

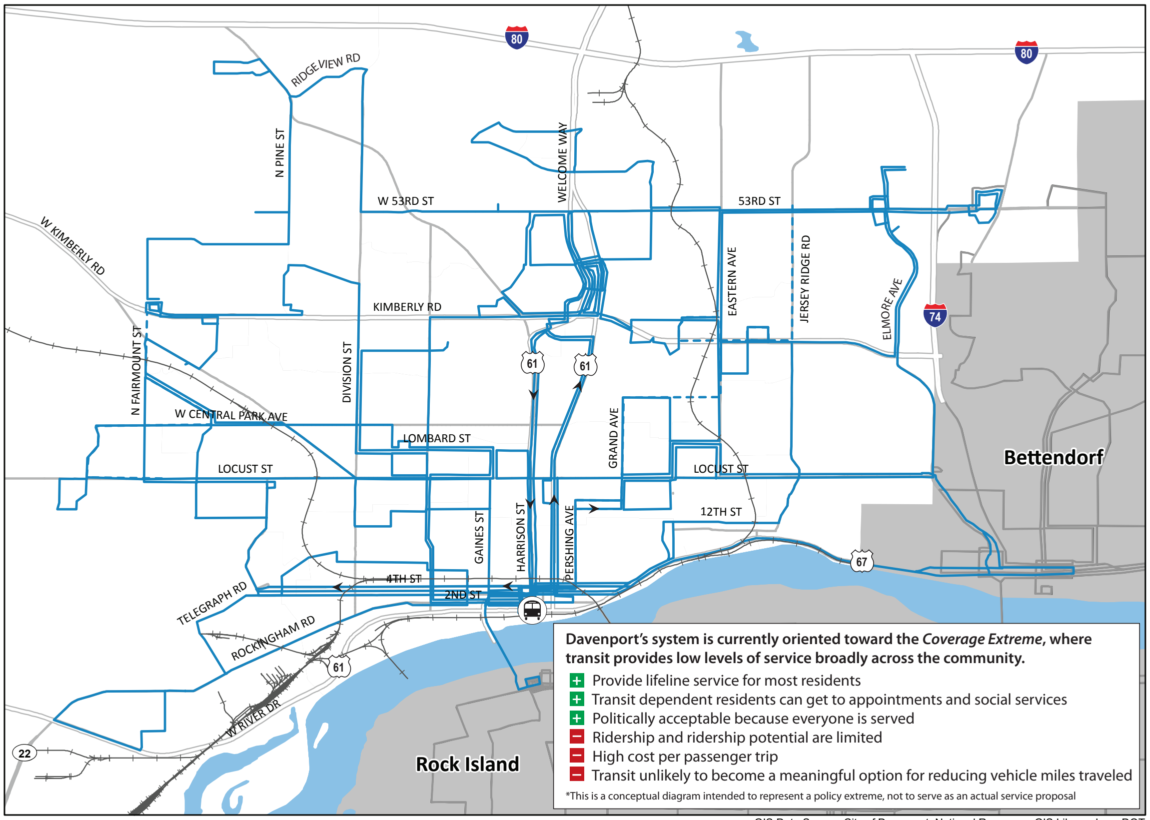
In Davenport today, the CitiBus system provides a service that is heavily oriented toward the coverage model, which follows a traditional social service approach to providing transit service. Figures 10-10 shows the existing system, which has a number of circuitous routes and deviations from primary arterials to serve low-density neighborhoods. These deviations provide highly accessible service to a few transit dependent residents, but make transit slow and limit its ability run at high frequencies, hence it has little appeal to people with other choices. Figure 10-11 illustrates an extreme example of what the system might look like if it allocated 100% of service to the Productivity model. This system would provide higher frequency, direct service on major arterials. Passengers may need to walk further to reach transit, but once they did they would have access to more frequent, fast and reliable service. It is not likely that either extreme is right for Davenport; however, if the City is serious about delivering transit service that is more useful to a broad range of people, it will need to move in the direction of the Productivity based model.

Recommendations:

1. Conduct a process (recommended as part of a COA) that allows community stakeholders and leaders to consider the right mix of values for CitiBus service.
2. Conduct a City Council workshop leading to an adopted service allocation and policy for implementation.

Cost implications: Limited if conducted by staff. Range from $15,000 to $25,000 if facilitated by outside expert.

Figure 10-10 Davenport Transit Coverage Model (Existing System)



GIS Data Source: City of Davenport, National Resources GIS Library, Iowa DOT

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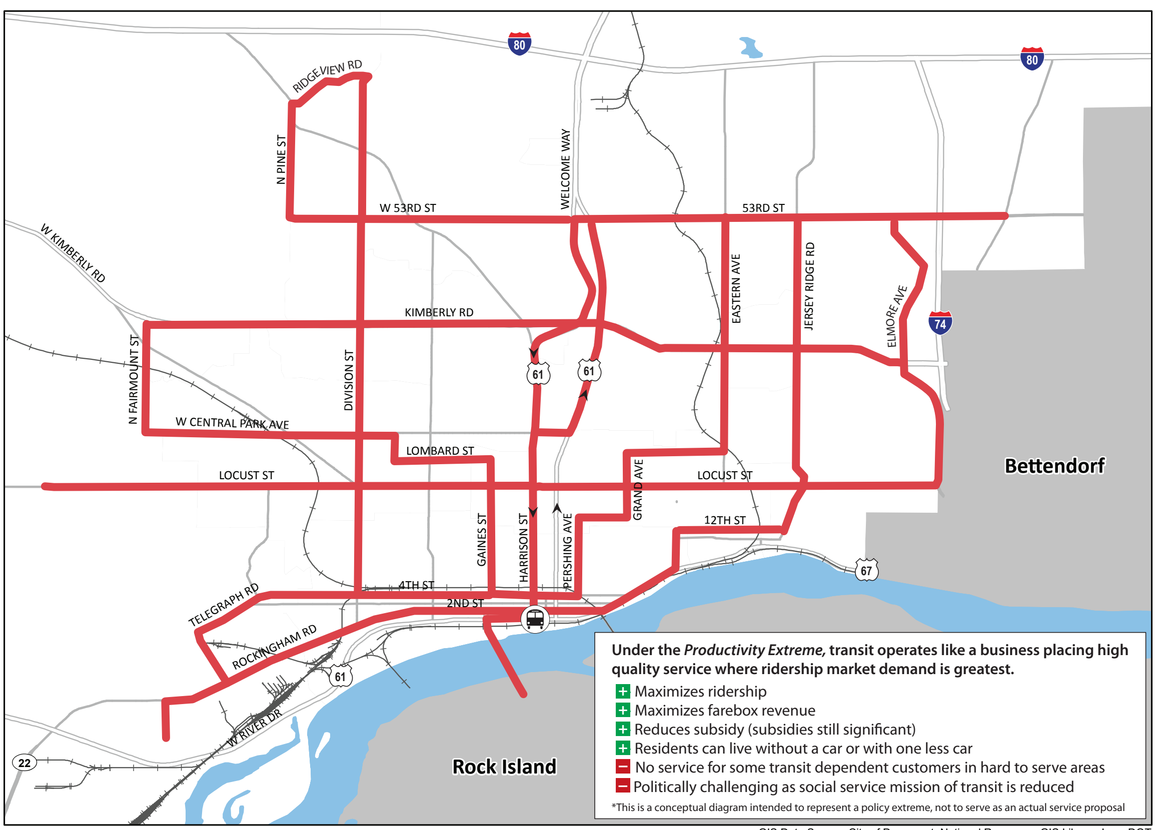
Figure 10-11 Davenport Transit Productivity Model (Illustrative Example)



GIS Data Source: City of Davenport, National Resources GIS Library, Iowa DOT

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Recommendation Area #2: Conduct a Comprehensive Service Restructuring

Based upon a review of the CitiBus network, we believe the system would hugely benefit from a system-wide review of the service design and operations. This evaluation will address system design issues that would require extensive data collection and are beyond the scope of this study. This "comprehensive operational analysis" (COA) would allow Davenport to systematically rebuild its transit system to meet market needs and to address local values. We believe the CitiBus system needs a complete overhaul, which is a major undertaking beyond the scope of the Davenport in Motion study. Conducting a COA every 5 to 8 years is common practice for transit agencies around the country; however, it appears it has been many years since such an effort was undertaken in Davenport.

The CitiBus system currently operates a network of routes that connect destinations throughout the City and neighboring jurisdictions with downtown. It's a classic radial system that concentrates most transfer activity in downtown. The system operates most of its lines on a 30- or 60-minute cycle going through downtown. Route duplication, numerous deviations, route variances, and one-way loop routings limit attractiveness of the system. There is significant opportunity for savings and re-allocation of service hours in the system to operate a system that is punctual, reliable and better meets the needs of the market.

The importance of this process to the city is multifold:

- **Align service to the most important transit markets:** transit markets change over time as a city develops and key services relocate. Transit providers make incremental adjustments to try to align service to meet new development or new market needs; however, a number of small incremental changes made over time can be very damaging to the efficiency of a transit system. Furthermore, municipal operators are often asked to make service adjustments to meet needs of special constituent groups, regardless of how those changes impact the productivity and efficiency of the system. The key purpose of a COA is to collect data that will allow CitiBus to understand the trip making habits, both of transit patrons and the broader population. With this information in hand, a redesign of the system can be undertaken to optimize productivity and adjust resources to meet to priority community needs. For example, eliminating a low productivity route serving a suburban area may provide an opportunity to provide evening service on one or more of the most productive downtown-service routes.
- **Increase transit speed and reliability:** these two factors are among the most important in trip decision making. If transit takes painfully longer than driving or cannot deliver service that is reliable, both in its ability to stay on schedule and to arrive often enough so that missing the bus does not eliminate the opportunity to use the bus, transit mode share simply will not grow. A COA should include a comprehensive assessment of run times for all major route segments, as well as a schedule adherence analysis. Combined with data about key markets, these travel times act as the basic building blocks for the restructuring of the route system.
- **Gain more service for the same funding:** the incremental approach to service design described above often leads to system designs that fail to optimize the return on investment in transit. While spending over $100,000 to restructure the transit system may seem like a large cost, the financial benefits could be substantial over the next five years. A more productive system will return more fare revenue, but more importantly an effective redeployment of service could return a 10%-20% improvement in operating efficiency. This is no small savings when one considers that the annual CitiBus operating budget is $4.2 million and has increased between 5% and 9% each of the last three years.

In general terms, a COA would consist of the following tasks:

- A detailed market analysis to determine current and short-term transit needs.
- A public participation process and discussion of community values (see Recommendation #1)
- A detailed evaluation of existing service on a route-by-route basis to determine what works well and what doesn't
- The development and analysis of potential service improvement options.
- Selection of an approved service alternative and development of detailed operating plans
- The development and implementation of recommendations

This sort of system-wide review is a good operating practice for all transit agencies, regardless of size or performance. It allows local administrators to 'fine tune' their service network to ensure it meets the community's expectations. It almost always includes substantial public input so that customers and other interested individuals have an opportunity to voice their concerns. This analysis can also provide a springboard for a more comprehensive review of the system that considers how public transportation services fit into the community's broader goals.

Recommendations #1 (Values Discussion) and #2 (Conduct Comprehensive Operations Analysis) should be implemented in tandem. The development and implementation of new service design developed via the COA is the vehicle for realizing the community values identified through the recommended community process.

Recommendation:

1. CitiBus should conduct a comprehensive operational analysis of its existing transit system.

   A successful COA can address other key system deficiencies including lack of evening service, and the need for more weekend service. With a fixed budget, a comprehensive system redesign will be needed to identify efficiencies or service reductions in other areas that could allow the system to address these needs.

Cost implications: This type of study would likely cost between $125,000 and $150,000, but could return substantial value in terms of increased operating efficiency on a year after year basis.

Recommendation Area #3: Develop and Implement a Davenport Primary Transit Network (PTN)

Citizens have a broad range of interests and needs when it comes to transit service, but when we to attempt to summarize the desires we most commonly hear from transit user and non-user opinion research into a brief statement, the common request might read:

> *A set of services that allows me to conveniently complete most of my daily activities without owning a car, or allows my household to save money by getting by with one less car, comfortable access to the system, and a high level of security at the stop and on-board.*

A primary intent of this plan is to help the City of Davenport and its partner agencies accomplish this customer vision, which ultimately supports higher level city goals relate to reducing harmful emissions, mitigating future traffic congestion and creating more vibrant neighborhoods. The establishment of a Davenport Primary Transit Network (PTN) policy is a tool toward this end.

What is the PTN?

The PTN is a policy network of top-quality transit services that connect key destinations in Davenport and to the region with service that meets basic needs critical to transit passengers. Ultimate implementation of the PTN, which is a long-range outcome, would allow local residents to answer all the following in the affirmative:

- **Route structure:** Does the service take you from where you begin your trip to your destination?
- **Hours of service:** Is the service available when you want to take your trip?
- **Frequency:** Is the service convenient so you do not have a long wait for the bus?
- **Speed and Reliability:** Is the service on-time and competitive with the private automobile in connecting key destinations?
- **Vehicles:** Are the vehicles inviting and user friendly?
- **Fares and pass programs:** Does the fare system encourage the efficient use of transit while generating sufficient revenue?

Since the operating and capital resources do not exist to implement the PTN in full today, its purpose is as a policy framework that ensures quality transit *will* be available *when* land use and street design take and use good transit-oriented forms.

The PTN is designed to guide:

- Transit service priorities (including service addition, reduction and restructuring)
- Transit preferences in street design and signalization
- Transit passenger facilities
- Land use planning and development
- Siting of future transit-oriented land uses.

To succeed, the PTN must be a commitment by both CitiBus and other city departments in charge of managing land use zoning and development, traffic and pedestrian systems. The City must agree to adopt the PTN as part of its street operations plan, not simply a service concept. The key role of the PTN is to reinforce, on the level of policy, that certain bus service corridors have a high level of permanence and can be the foundation for capital facility, service quality and access improvements.

The long term goal of the PTN is to provide high quality service on all corridors in the adopted network. In short, ***the service goals is service that operates every 15 minutes, at least 15 hours per day, has a high level of reliability and operates at speeds competitive with auto travel***. Clearly full implementation of the network is a long-term aspiration; however, it is none too early to begin implementation on a corridor at a time.

Ultimately cities with vibrant downtowns and strong economies realize that continued economic growth requires investment in fast, efficient transit. Rapid growth pressures often force communities to be more aggressive in prioritizing transit and coordinating with land use. In slower growing communities like Davenport, it can be challenging for policy makers to recognize the value of transit investments in managing congestion and enhancing urban places. The adoption of a PTN policy would be a dramatic achievement toward these ends.

Transit as City Infrastructure: The Primary Transit Network

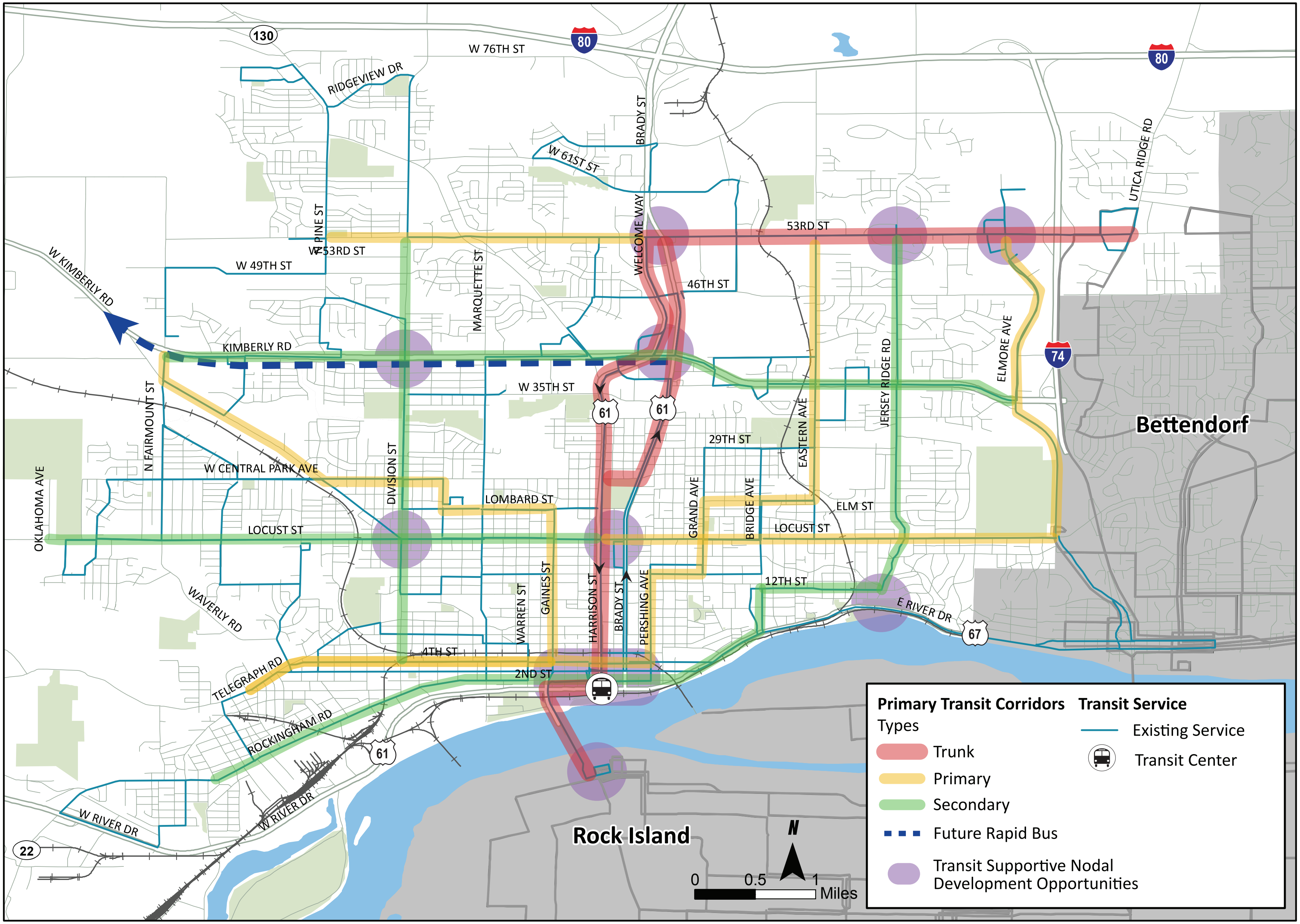
The Primary Transit Network is a policy tool to guide future service development and land use policy. It is not expected that the City will be able to implement the PTN in full in the near future or even in the next 20 years. However, just as we plan for long-term road networks, transit systems benefit from long-term planning that defines a desired level of capacity, reliability and directness.

PTN corridors are defined in three categories:

- **Trunk –** much of Davenport's most intense and historic land use is oriented around the Route 61 corridor. Significant suburban retail development has oriented on 53rd Street. Route 4 currently services this combined corridor. The PTN concept stresses the development of this corridor as a trunk element for the Davenport transit system. High quality, high frequency service in this corridor should encourage the City to oriented new development in the corridor and allow future CitiBus services to operate without going downtown, since passengers will be offered transfers to fast frequent service on the trunk line.
- **Priority Candidate Corridors –** these are corridors that don't yet have land uses supportive of PTN service, but are clearly critical components of the City's transit network. These corridors represent key opportunities for the City of Davenport to promote infill land use that will justify more intense service and higher levels of capital investment. Typically, zoning in these corridors is sufficient to accommodate PTN supportive densities if built to maximum allowable densities, although in most cases zoning changes could improve the market feasibility for dense, mixed-use development.
- **Future Candidate Corridors –** these are corridors that do not have current or zoned densities supportive of PTN service, but could form important future elements of the PTN. Most of these corridors are served by low-frequency collector bus routes and this level of service will continue to be appropriate until land use changes are put in place.

The PTN is not intended to be a route system or a service plan, rather it focuses on key corridor segments and connections that, no matter how they are served, will form a high-quality network of transit services in Davenport. The PTN is supported by other important transit services that include: lower frequency collector routes, regional express routes that enter Davenport from other parts of the region and non-scheduled transit services, such as CitiBus' paratransit service.

Figure 10-12 Proposed Davenport Primary Transit Network



GIS Data Source: City of Davenport, National Resources GIS Library, Iowa DOT

Nelson\Nygaard consulting associates

Figure 10-12 illustrates the proposed Davenport PTN. It is comprised of a number of separate corridors that are designed to support and reinforce transit-oriented activity centers throughout the community. Figure 10-13 summarizes the nature and orientation of each corridor.

Figure 10-13 Summary of PTN Corridors

Corridor	Type	Alignment	Length	Transit Nodes
1 – Brady/ Harrison	Trunk	US-67 from Centennial Exp, River Harrison/Brady Welcome Way 53rd to Utica Ridge Rd	8.2	Rock Island, Davenport CBD, Harrison/Brady @ Locust Welcome @ Kimberly Welcome @ 53rd 53rd @ Rail Crossing 53rd @ Elmore Ave
2 – Gaines/ West Central Park / Hickory Grove	Primary	W. 4th from Harrison Gaines Lombard Washington W. Central Park Hickory Grove to Fairmount End at Kimberly	5.0	CBD
3 – W. 4th St	Primary	W. 4th from Harrison Telegraph to 1st St.	2.3	CBD
4 – Locust	Primary E. of Harrison Secondary W. of Harrison	Locust from Oklahoma End at Elmore	6.3	N. Division @ Locust Harrison/Brady @ Locust
5 – 53rd	Primary	N. 53rd from Pine End at Brady	2.1	Welcome @ 53rd
6 – Pershing/ Grand/ Eastern	Primary	2nd St. Pershing 14th/15th Grand Rusholme Eastern	5.1	CBD
7 – Jersey Ridge Road	Secondary	Jersey Ridge from River to 53rd St.	3.0	Jersey Ridge @ River
8 – Elmore / Kimberly	Primary	Elmore from 53rd St Kimberly from Elmore intersection to Locust	2.7	53rd @ Elmore Ave
9 – Kimberly	Secondary	Kimberly from Fairmont End at Elmore to 53rd St	6.3	N. Division @ Kimberly Welcome @ Kimberly 53rd @ Elmore Ave
10 – N. Division	Secondary	N Division from 4th St End at 53rd St.	3.2	N. Division @ Locust N. Division @ Kimberly
11 – River	Secondary	Rockingham from Elsie 2nd St River Drive to Jersey Ridge	4.5	CBD Jersey Ridge @ River
12 – Bridge Ave.	Secondary	River from Jersey Ridge (Lindsey Park) Bridge Ave. Rusholme St. Eastern Ave to	3.1	Jersey Ridge @ River

Whether formed by bus or other modes (future) the PTN is a foundational element the City's infrastructure. For the high-density portions of the city, it is as essential as providing streets and sidewalks. Because it is designed to serve a large share of the city's population with a minimum of line miles, it can offer not just the best frequencies and spans of service, but also serve as a focus for investment in premium features, including:

- Low-floor, high-capacity coaches and any new coach technologies that expedite comfort or operations.
- Premium shelters with many of the amenities associated with rail stations.
- Information features, including real-time information in shelters (the number of minutes until the next bus comes) and informational displays within buses (such as the time and the next stop.)
- A distinct image that sets the PTN apart from the less-frequent supporting services.
- Reinforced street pavement for smooth travel and fewer maintenance interruptions.

Establishing a City of Davenport PTN helps the City to focus land use planning and zoning changes along identified corridors where future transit service capacity and quality is guaranteed. It also provides direction to City engineers and planners about how to manage street rights-of-way in a way that maintains minimum levels of operating speed and reliability. This means new transit resources can be spent to improve service, rather than simply maintain headways as traffic congestion increases.

Finally, the PTN is intended to influence local zoning and development policies to encourage intensification of land use around existing PTN services and discourage dense, transit intensive land uses elsewhere. Very few areas and no complete corridor in Davenport have the land use characteristics that would support PTN level service today. Therefore, it should be assumed that the adoption of the PTN is a statement to the community that changes will be made to land use plans in order to provide the ridership and access needed to support primary service. This element of the PTN strategy is critical for dealing with corridors that are not currently built to the necessary densities, but might be.

The PTN should become an organizing tool for both transit planning and land use, ensuring that each takes into account the intrinsic economics and logic of the other in the areas where the stakes are highest. The PTN has other uses as well. For example, if a planned land use, such as social service offices and senior facilities, is known to require transit, then the PTN is the best place to locate this use in order to be assured of transit service. Conversely, if an entity needing transit chooses not to locate on the PTN, they do so with the knowledge that they may not get the best transit service, or any at all.

The PTN will operate within the context of the more expansive network of services operated by CitiBus and its transit partners in Rock Island and Bettendorf. For example, a key connection of the recommended Trunk corridor reaches across the river into downtown Rock Island. In some cases a PTN service will serve a PTN corridor in its entirety, never operating outside its limits. In others, two or more local routes will share a corridor, with schedules coordinated to provide a uniform and frequent service levels along the corridor. These operational decisions should be based upon the travel habits of riders and the most efficient use of system resources.

Swift Bus Rapid Transit in Snohomish County, Washington offers high capacity service with level boarding.

Oran Viriyinicy, Flickr Creative Commons Attribution License 2.0

Bus shelters along the Portland, Oregon, Transit Mall offer seating, real-time information and rain guards.

Source: Nelson\Nygaard

Distinctive branding and stop beacons help to characterize Swift Bus Rapid Transit as a high capacity line. The stop marker lights up at night to enhance visibility and safety.

Source: Oran Viriyinicy, Flickr Creative Commons Attribution License 2.0

Role of the Primary Transit Network

Given near-term funding realities, Davenport's fixed route network will likely include only a minimum amount of service operating at 15-minute frequencies or better. Limited operational funding should not serve as an argument against long-range transit planning, rather it is an incentive to adopt a clear set of priorities for transit investment. The PTN sets groundwork for a future public transportation system designed to provide highly attractive alternatives to the private automobile and other single-occupancy modes. Notably, a few key things happen when PTN levels of service are met:

- **Ridership is optimized:** The 15-minute headway represents the point at which you no longer need to consult a schedule to use transit service. It also permits transfers to be made rapidly even without timing of connections. For these reasons, lines operating at this frequency or greater have the highest ridership potential. At a less technical level, many see an implemented PTN as the point which they can rely on transit for most daily uses and potentially live without a car or give up one car.
- **Effects of small investments are magnified:** On the PTN, CitiBus is likely to make its most concentrated investment in new service and facilities. Because of this, any changes that affect transit operations or attractiveness will be magnified. An amenity – such as a shelter – placed on the PTN will probably be used by more people, and will therefore have a greater positive impact, than the same shelter placed elsewhere. On the other hand, a delay imposed on a PTN line will cost more, in terms of both running time and ridership, than the same delay imposed on a less frequent service.[3]
- **A sense of permanence is gained:** Because the long-term success of the PTN will depend on the creation of transit oriented neighborhoods, and the compact development patterns that go with them, PTN routes should be based on future land-use projections. Lines on a map that identify PTN corridors will have little benefit unless supportive land use practices are adopted. This responsibility fall on both the city and the Bi-State Regional Commission. Local and regional land use policies that support the densification of these corridors need to be established. Many of the corridors identified in 12 are already among the densest corridors in the service area, but it is important they be zoned for even more high-density commercial, residential and/or institutional land uses.

  For example, the development of an auto-mall on an established PTN corridor would decrease the value of City investment there by eliminating potential for ridership growth. It is the City's role to ensure that zoning along these primary corridors allows for transit supportive density and a mix of uses. Land use coordination with neighboring jurisdictions that control land use on PTN corridors that extend beyond City boundaries is also critical.
- **Other modal alternatives become more viable:** The PTN is designed to provide a level of service that makes it possible, even convenient to live without a car, to have fewer cars than adults in a household, or for businesses to require fewer parking spaces. Transit can also provide an important back-up option for people who chose to bike or walk. Any city that has successfully increased bicycle and pedestrian mode share also has an excellent underlying transit network.

PTN Development and Implementation

The implementation of the PTN is more challenging than the adoption of the concept. The following are four priority areas for City action in implementing the PTN and making transit a meaningful element of the Davenport transportation network.

A. Develop a PTN Overlay Zoning Classification

The successful development of a PTN network will represent a profound investment in specific streets, expressed in both fixed capital costs and eternal operating costs. As CitiBus improves service in these corridors, other city departments must make a commitment to maximize the value of this investment.

There are two aspects to developing the PTN:

- Maximize ridership potential of the catchment area of PTN stops. PTN corridors should be selected, in part, for the presence of high-density development and other transit-oriented uses, such as commercial. Future development on these corridors should also be high-density and

3 One key exception is any line that makes timed-transfer connections. If running times on these routes deteriorate to the point that they can no longer cycle, a major increment in cost and inconvenience must be incurred to retain the timed connections on which much of the system relies.

transit oriented, so as to maximize the value of the PTN investment. This requires the City to examine and modify long-term land use plans and zoning policies.

- Avoid creating new transit demand away from the PTN. Like the transit network as a whole, the PTN's quality will always be inversely related to its size, so it is important to have the minimum necessary network mileage, but no more. Two important recommendations arise from this:
  - New transit-oriented development and any higher-density development in general, will not reach its potential if it is not on the PTN. If the market needs more such development than the PTN can support, then plans should be made to expand the PTN into new areas, but with the commitment to developing a PTN corridor in all its aspects.
  - Transit-dependent uses should locate on the PTN, or in other areas with established service. Sometimes, an agency will locate a transit-dependent function (such as a social service office, a disabled workshop, a new community college campus, etc.) in a place with no transit, and then demand that transit go there. There should be no such guarantee by the city. The best way to ensure quality transit service must be to locate on the PTN. The next best way is to locate on another existing transit route.

It is important to note that a critical role of the PTN is to provide developers confidence to invest in transit-oriented development forms. While rail tends to be more effective in this regard due to perceived permanence, rubber-tired transit can have the same effect.

An effective way for Davenport to promote transit-supportive land use is to update its zoning code to include a transit and pedestrian overlay zone for PTN corridors or key nodes along these corridors. Tools that can be applied in these areas include minimum average densities, mixed-use buildings and land use, and property tax exemptions for new transit supportive residential or mixed use.

- **Minimum average densities:** Minimum average densities should be highest around transit nodes and corridors. This promotes higher transit ridership and allows for convenient pedestrian access.
- **Mixed-use buildings:** Mixed-use buildings contain a multiple types of uses within one building, including residential, retail, office, etc. Office and residential uses should be located on the ground level, with retail on the ground floor. These buildings tend to be significant generators of pedestrian activity.
- **Mixed land use:** Mixed use generates significant transit usage and pedestrian activity.

In Portland, Oregon, a property tax exemption for new transit-supportive residential or mixed-use development was incorporated into its city code. The purpose of the property tax exemption is to encourage the development of high density housing and mixed use projects affordable to a broad range of the general public on vacant or underutilized sites within walking distance to transit service. Other types of developer incentives or programs that can help increase supportive land uses in PTN corridors include:

- Density bonuses for developers that build affordable housing as part of residential or mixed use projects
- Cost offset programs for developers that build affordable housing as part of residential or mixed use projects
- Reductions in parking requirements in exchange for provision of affordable housing units within residential or mixed use projects
- Development fee/impact fee waivers or reductions for affordable units
- Public land assembly which involves public purchase of properties to create a larger, more developable parcel for resale or long-term ground lease
- Public land value write downs on publicly-owned or assembled land to reduce developer risk

These requirements are best met through the development of a transit corridor or transit node overlay zone. The essential elements of transit overlay zones in Davenport include:

- Land Use and Building Footprint: Aimed at encouraging transit-supportive density and pedestrian-scale building design
  - Minimum Non-residential Floor-area Ratio (FAR)
  - Minimum Residential Density
  - Maximum building height

– Transitions to existing lower-density residential uses

- Mix of Uses
  - Permitted Uses: Uses explicitly permitted such as multi-family dwellings, retail and service establishments, etc. (principal vs. accessory)
  - Restricted Uses: Uses that are primarily oriented toward vehicular access such as heavy or light industry and auto oriented wholesale (i.e. car malls)
- Pedestrian Environment: Urban design to encourage an active pedestrian environment and connectivity
  - Internal and external pedestrian (and/or bicycle) connectivity
  - No minimum setback required and/or maximum setback
  - Active ground-floor uses
  - Building façade design, including entrance locations, street-level first floor windows, and limits on blank facades- to ensure presence of "eyes on the street"
  - Canopies and awnings
  - Sidewalk width
  - Parking: Reduced parking requirements and restrictions on location and/or amount of surface parking
  - Street furniture and amenities
- Bicycle Amenities: bicycle parking, bicycle network facilities
- Travel Demand Management (TDM): may be required for office or other uses
- Open Space and Other Amenities
  - Incentives (such as density, FAR, or height bonuses) provided to encourage transit-supportive practices, amenities, or other goals – parks or public space, affordable housing, public art, and sustainable design

Recommendations:

1. Adopt a PTN overlay to the City zoning code for Trunk and Priority PTN corridors. This overlay zone would support more transit friendly zoning by allowing increased density, providing developer incentives for more transit friendly uses, encouraging walkable urban form, and encouraging mixed use neighborhoods.
2. Revise zoning to increase density along PTN corridors (this can be done in addition to or instead of a PTN overlay zone). Residential densities should be at least 6 to 12 units per acre as a minimum threshold for high performing transit. Zoning along CTN corridors should be changed to reflect higher densities; for example, PTN corridors with R1 zoning types could be adjusted to R3-5, R5M or R6 or higher.
3. Encourage or require mixed uses within buildings and within land use zones. This should be a priority in PTN zones or along PTN corridors. The City should consider the development of a mixed-use zone category in the zoning code or the development of a PTN overlay that allows mixed use building types.
4. Provide incentives to local developers to build high density mixed use buildings within convenient walking distance to transit corridors.

B. Develop Highway 61/53rd Street Rapid Bus Trunk Line

Davenport does not currently have either the density or financial resources to implement all ten PTN corridors that have been identified. Implementing even one will be challenging in the short term. The Highway 61/53rd Street Corridor has the land use characteristics closest to being able to support the intensive transit service and good potential for more transit and pedestrian friendly infill or redevelopment. Even this will be a challenge and require identification of new resources. While continuing to encourage transit-supportive development in all the corridors, the city should make special efforts to encourage further development and densification of the Highway 61/53rd Street Corridor through its use of zoning, development incentives, and infrastructure improvements. At the same time CitiBus should place highest priority on service improvements within the corridor.

Transit and Pedestrian Overlay Examples

Palo Alto, CA –Pedestrian & Transit Oriented Development Overlay for California Avenue Caltrain Station

Palo Alto, a city of 61,200 (2006) with an average residential density of 2.4 units per acre, adopted a pedestrian and transit-oriented overlay zoning district around its California Avenue retail corridor, abutting a Caltrain commuter rail station and small bus transit center.

Resources:

- http://www.cityofpaloalto.org/civica/filebank/blobdload.asp?BlobID=13770
- http://www.kevingardiner.com/PTOD.pdf

Eugene, OR

Eugene, a city of 154,620 (2008) with an average residential density of 2.4 units per acre, has a /TD transit-oriented development zoning overlay district.

Resources:

- Code Language (2 pages): http://www.eugene-or.gov/portal/server.pt/gateway/PTARGS_0_2_356476_0_0_18/Chapter 9.pdf (see 9.45, p. 232 of PDF)
- Zoning Map: http://www.eugene-or.gov/portal/server.pt?open=512&objID=228&PageID=1473&mode=2

Bloomington, MN

Bloomington, a city of 80,869 (2006) with an average residential density of 1.5 units per acre, adopted a high-intensity mixed use zoning district in 2005 and applied it around the Hiawatha light-rail corridor which opened in 2004.

Resources:

- http://www.ci.bloomington.mn.us/cityhall/dept/commdev/planning/regs/zoneproject/zonedone.htm

Vancouver, WA

Vancouver, a city of 163,186 (2008) with an average residential density of 2.3 units per acre,has a transit-oriented overlay district.

Resources:

- http://www.cityofvancouver.us/MunicipalCode.asp?menuid=10462&submenuID=10478&title=title_20&chapter=550&VMC=index.html

Hillsboro, OR

Hillsboro, a city of 90,380 (2009) with an average residential density of 2.0 units per acre, has a number of zoning types for "station communities" within various distances of light rail lines.

Resources:

- http://www.ci.hillsboro.or.us/Planning/HTMLzoneVOL2/Vol2Section136-I-III.aspx#purpose

Olympia, WA

Olympia, a city of 42,514 people (2000) with an average residential density of 0.8 units per acre, has a pedestrian-oriented street overlay district for streets within its downtown.

Resources:

- http://olympiamunicipalcode.org (see Chapter 18.16)

We recommend the City set the development of a Rapid Bus service in the Hwy 61/53rd Street corridor as a 5 to 10 year goal. Rapid Bus is a common industry name for bus rapid transit type service that operates in mixed traffic with priority given to transit at congested intersections. Rapid Bus services typically have some or all of the following features:

- High end, low-floor BRT vehicles, which often have the look of a rail vehicle and offer higher ride quality and comfort than a standard bus
- Off-board fare payment to dwell time at stops
- In-line boarding platforms similar to rail station
- High-end stops or stations that have many of the features of a light rail station
- Signal priority systems and bypass lanes where intersection congestion might otherwise slow service.

To implement the Highway 61/53rd Street Rapid Bus service, the City will need to address corridor land uses to increase ridership potential and ultimately illustrate to funding bodies that corridor development can leverage more development and ridership potential. New operating funds will need to be identified to support the higher frequency service required to make such a line successful. Furthermore, the transit carrying streets will need to be redesigned to be more accommodating to pedestrians. For a Rapid Bus service to be successful, it will need to be fast and reliable. To do so, it will need to operate on the major arterial streets with few deviations. For example, rather than deviating to serve Wal-Mart, the stations will be on the primary arterial, meaning pedestrian connections will need to be enhanced and crossing improvements will be needed to allow for safe station access. In their current forms, all of the major arterials (Harrison, Brady, Welcome Way, and 53rd) identified would require substantial sidewalk and intersection improvements. All these improvements are still possible given current configurations. However, a decision to widen 53rd to six lanes would essentially render this service concept impossible.

The Hwy 61/53rd Rapid Bus concept would incorporate key elements of PTN service described above to provide a fast, reliable and frequent service that would serve as the spine for future system development. Two options are possible for the development of this service:

- *Incremental***:** The City could work to enhance services and facilities in the corridor over time as resources become available. We recommend against this as it will be difficult to develop a comprehensive set of capital facilities, a service program and marketing and branding scheme that service the community well.
- *Comprehensive***:** We recommend that the City prepare and pursue this project as a comprehensive capital program, seeking funds from the Federal Transit Administration or other funding bodies to build and implement a comprehensive service. Under current conditions it may be challenging for such a project to qualify for FTA Small Starts funding, but with a few years of land use preparation and service adjustments it may be a viable corridor. Furthermore, new partnerships between the FTA, HUD and EPA point to the possibility that funding for coordinated transit and land use projects could increase substantially in coming years.

Federal Funding Programs: In 2007, the Federal Transit Administration (FTA) introduced a new category of New Starts funding designed to fund smaller budget rail capital projects and corridor based bus projects. The program is titled Small Starts and provides capital development funds up to $75,000,000 per project for projects up to a magnitude of $250,000,000 in total capital cost. Corridor based bus projects applying for funds must be able to demonstrate community benefits in ridership, travel time and economic development categories. These projects must have a minimum set of features, similar to those proposed in the Highway 61/53rd Street Rapid Bus project:

- Substantial transit stations
- Traffic signal priority/pre-emption, to the extent, if any , that there are traffic signals on the corridor
- Low-floor vehicles or level boarding
- Branding of the proposed service
- 10 minute peak/15 minute off peak headways or better while operating at least 14 hours per weekday

Detailed guidance on the Small Starts program can be found on the FTA website: http://www.fta.dot.gov/documents/SS_Interim_Guidance_73106.pdf. Development of supportive land use and parking policies will be critical if the City wishes to develop a successful application for federal funding. The FTA currently requires that jurisdictions conduct a detailed Alternatives Analysis to select a locally preferred alignment and mode technology alternative to be eligible for a Small Starts funding grant. This could be conducted as an addition to the recommended Comprehensive Operations Analysis. Several mid-sized cities are currently embarking on similar processes including Baton Rouge and Tulsa. The FTA has a funding program that provides earmarks to jurisdictions to conduct Alternatives Analyses (FTA 5339 Program; see http://www.fta.dot.gov/funding/grants/grants_financing_7395.html).

Figure 10-14 provides a concept map of the proposed Highway 61/53rd Street Rapid Bus service design. Figures 10-15 and 10-16 illustrate the level of station development, vehicle type and intersection layout that might apply to a corridor Rapid Bus project.

A wide variety of tools are available to protect transit in this corridor from traffic delay. Given the very limited congestion in Davenport today, the tools are presented primarily for consideration as part of a Rapid Bus corridor implementation.

Bus bulbouts prevent delay caused when buses need to merge back into traffic after a stop.

Source: Nelson\Nygaard

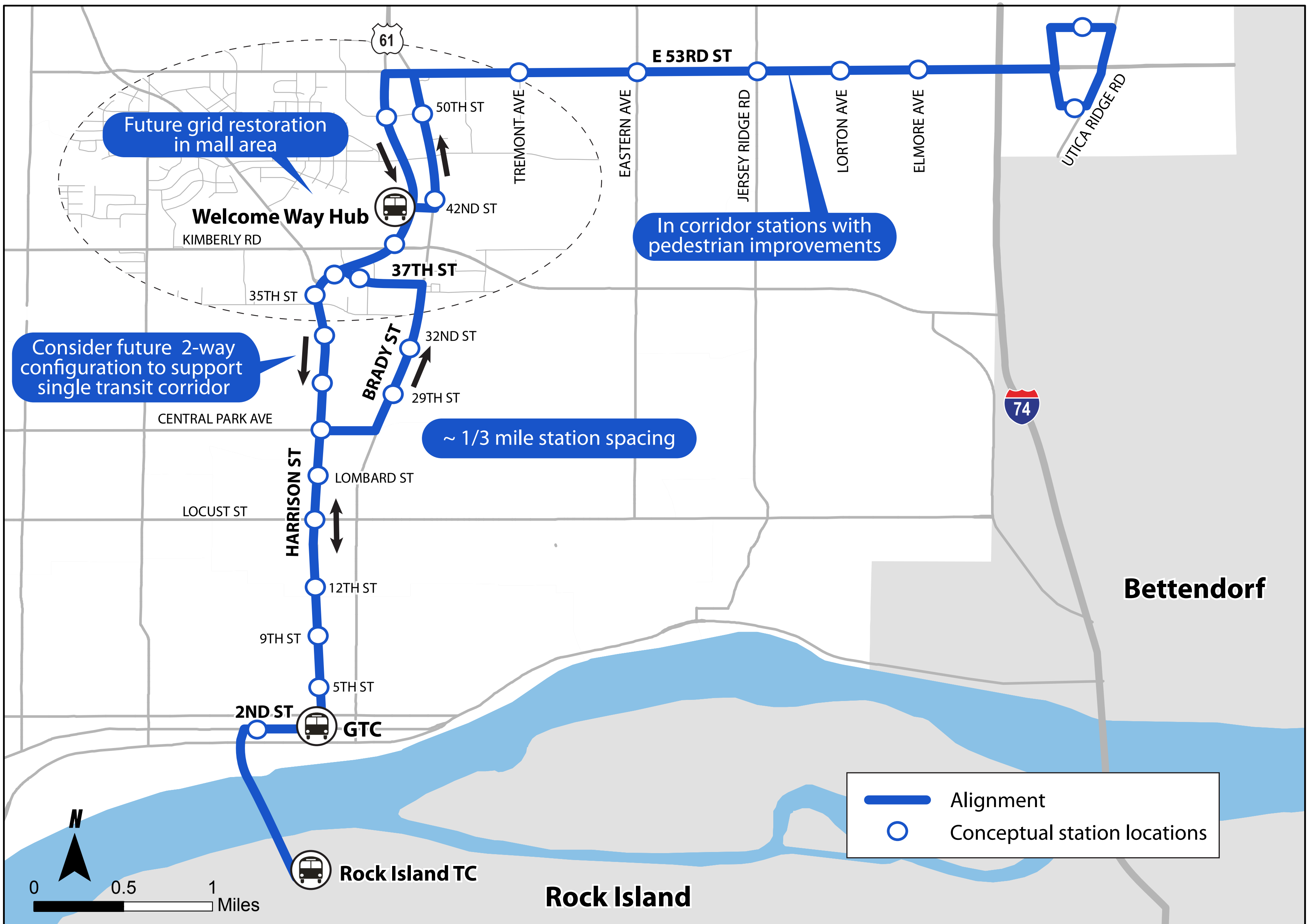
- **Tools to eliminate merging delay from stops.** Transit often loses significant time yielding to traffic as it exits bus zones. For this reason, many agencies discourage bus pullouts, preferring bulbs that extend the sidewalk out to the traffic lane. This permits transit to stop in the traffic lane, and eliminates the need to merge out of the stop. Many states have traffic laws requiring traffic to yield to a bus exiting a zone.
- **Minor signal pre-emption.** In many communities, signals along major arterials are not linked to the signal progressions of intersecting streets. These minor signals typically occur at intersections with minor collectors and pedestrian-activated crosswalks. While these signals are important to local mobility, the green-time offered to the intersecting street is typically a policy minimum, and there are few side effects from delaying it to prevent minor signals from delaying a bus.

  Minor signal pre-emption can be implemented with the same technology as a garage-door opener, where a driver simply presses a button to alert the signal of the bus's presence. Alternatively, it can use more sophisticated sensing devices based on Automatic Vehicle Location (AVL) systems. In either case, the purpose is simply to pre-empt the green-time of the intersecting street or crosswalk just long enough for the bus to get through. The result does not disrupt the signal progression of the main arterial, because it simply extends the green time of a minor signal; the minor signal would still be red for the arterial only when the progression dictates. Of course, the pre-emption should not interrupt pedestrian-activated crosswalks once the pedestrian has been given a WALK signal, but it can delay the WALK signal until the next logical point in the arterial's signal progression. While this may sometimes cause running passengers to miss a bus, this tool is for use only on high-frequency lines where the next bus will be coming soon. It can also be de-activated in the evenings when frequencies are poorer and rapid pedestrian access is a higher priority than to operating speed.
- **Queue Bypasses at Major Signals.** It is often not practical for transit to preempt signals at the intersection of two arterials, because the intersecting arterial may have its own signal progression that cannot be disrupted without unacceptable traffic impacts. At these intersections, a common tool is the queue bypass. In this arrangement, the right lane approaching the intersection is reserved for buses and right-turning traffic. A special brief signal phase gives a green light to this right lane only, while also giving a red light to the crosswalk to which right-turning traffic would otherwise yield. This permits the right lane to clear out and for the bus to cross the intersection prior to the parallel queued traffic on the arterial. Queue bypasses require careful study, but are often an effective solu-

Targeted queue bypasses improve service reliability and help buses maintain schedule adherence.

Source: Nelson\Nygaard

Figure 10-14 Trunk Concept



Nelson|Nygaard consulting associates

GIS Data Source: City of Davenport, IA

Figure 10-15 Illustrative Rapid Bus Station

Source: Nelson\Nygaard

Figure 10-16 Illustrative Station Development on Arterial Intersection

Source: Nelson\Nygaard

tion to moving transit through major intersections where delays can otherwise be severe.

- **Bus-Only Lanes and HOV Lanes.** The highest-benefit and highest-impact solution to bus operating speed problems is the bus-only lane. While there are currently no corridors in Davenport where bus throughput supports the elimination of auto capacity for bus only-lanes (at least not for significant segments), this will be an important consideration for long-range service options. (It should be noted that there are corridors in Davenport where dedicated transit lanes may be merited in coordination with land use or station area plans that promote higher density, mixed-use infill).

Dedicated transit lanes are the most effective solutions for operating speed problems. Some jurisdictions evaluate use of such lanes based on total person-carrying capacity.

Source: Nelson\Nygaard

It is notable that a number of recent rapid bus projects around the United States have shown that signal improvements focused on transit priority have succeeded in improving or at least maintaining general traffic levels of service, while reducing overall corridor delay. More importantly, higher transit speeds lead to mode shift which can dramatically increase the capacity of the facility (arterial) to move people at peak times and reduce delay measured on person, rather than vehicle, basis. In other words, the political kick-back such projects can create is often unmerited and can be addressed effectively with good modeling and peer case studies.

Recommendations:

1. CitiBus should initially focus on implementing the Highway 61/53rd Street PTN Trunk Corridor.
2. The City should consider the feasibility of Federal Transit funding (Small Starts) for the development of a Rapid Bus (on-street Bus Rapid Transit) project in this corridor.
3. Use transit priority treatments as needed to maintain competitive transit travel speeds in the Trunk corridor

C. Adopt Service Design Standards

CitiBus will benefit from the establishment of detailed criteria to screen and prioritize potential transit improvements. These criteria should consider a range of factors that lead to transit success. There are numerous examples of service design measures in the literature, mostly focused on routes' likely ability to generate new passenger trips. The example below illustrates a system that was developed for Community Transit, in Washington State. All other things being equal, we would expect PTN routes to rise to the top when such service design measures are employed. What they do is help planners prioritize individual PTN Corridors.

Community Transit's Service Design Criteria

Community Transit (Snohomish County, WA) employs nine separate criteria when evaluating a corridor's transit potential. In most cases these are used to evaluate proposed new routes and possible enhancements to existing services, generally by providing more frequent service. The goal is to place new services in areas where they have the greatest long-term potential to encourage growth in transit usage. These criteria include:

- Modeled current patronage (if no service exists) – This is heavily weighted and considers land use and connectivity.
- Modeled future patronage
- The presence of fees for Parking
- The presence of HOV or BAT (business-access transit, or right-hand turn) Lanes
- Existence of a collector street system allowing access from adjacent neighborhoods
- Existence of Park & Ride Lots

- Existence and condition of sidewalks
- Bike access and facilities
- Ridership in current transit services in the corridor

Recommendation:

1. CitiBus should adopt service design criteria to guide the placement of new and expanded services. This would be most effectively completed in conjunction with the recommended Comprehensive Operations Analysis.

D. Optimize Stop Spacing

Spacing of transit stops strikes many people as so mundane that it is often treated as a detail to be left to the operational department that installs bus stops. In fact, though, stop spacing requires a carefully thought-out policy that is then implemented consistently throughout the system. Running-time savings due to respacing of stops can be substantial on the busiest routes in the system, where operating speed issues are likely to be most costly.

Ideal stop spacing is close enough that everyone in the surrounding area can walk to a bus stop, but no closer. Two blocks, typically about 600 feet, is a common spacing standard in the industry; however, in a walkable environment with a well connected street grid such closely spaced stops slow transit down and provide little benefit to customers. The maximum tolerable spacing for local lines is usually in the range of 800-1000 feet, or about three city blocks. We recommend that as routes are restructured, stops spacing in this range be applied.

There is some debate in the industry about two-block vs. three-block spacing. Where the surrounding street pattern is a grid, the case for three-block spacing goes like this: Most passengers using the service arrive on the bus line on one of the intersecting streets. With two-block stop spacing, they are then at most one block from the stop – in fact, they are one block from two stops, one in each direction. But of course, a passenger doesn't need two stops. With three block spacing, everyone arriving on an intersecting street is still at most one block from one bus stop. Since three-block spacing requires 1/3 fewer stops per mile than two-block spacing, the resulting time savings can be substantial. Exceptions may need to be made in dense business districts where many trips are originating along the arterial itself, but even there, stops should never be less than 600 feet apart.

Recommendations:

1. CitiBus should maximize stop spacing on PTN routes and new route segments in the City. Maximum stop spacing encourages passengers to gather in larger numbers at fewer stops. It takes a bus only slightly longer to stop for two able-bodied passengers than to stop for one, so stops with more passengers mean a faster operation for everyone. We recommend 3 block stop spacing (roughly 1000 feet) be implemented, except where there is hilly terrain or poor connectivity to key developments.
2. The City should coordinate bicycle and pedestrian capital improvements to ensure that pedestrian and bicycle system improvement priorities match PTN stop and station locations.

Recommendation Area #4: Improve Capital Facilities

This section highlights capital elements of Davenport's transit system and provides recommendations for the City's role in implementation.

A. Develop Super Stops

The Primary Transit Network is designed to carry the heaviest passenger loads at the greatest level of convenience. This convenience should be marketed through good design and information.

High quality amenities and crossings should be prioritized at super stops.

Source: Nelson\Nygaard

The PTN classification system should serve as a guideline for transit facility investments. Points where the PTN routes meet will become the most important intersections for transit access and transfer activity as the system grows. These should be identified as "Super Stops," and treated with top quality stop amenities and pedestrian crossing facilities. Development of these stops, which may actually be four separate stops located at an intersection, should facilitate transfer activity outside of downtown and improve travel for those who are making cross town trips. DIM identifies the top 10 "Super Stops," which are locations where multiple transit services meet today and/or in the future. The City should prioritize investments in stop amenities (shelters, benches, schedule information, payment information, bicycle storage, supporting retail, etc) and pedestrian crossing improvements (crosswalks, curb bulbs, connections to pedestrian trails, signage and way-finding systems, etc) at these locations to provide for a pleasant and convenient transfer between transit services.

The following locations are recommended for development of Super Stops. This concept should be expanded to other parts of the City as streets are redeveloped and as transit intensity increases. Super Stop opportunities in the 4th Street corridor should be implemented as part of the recommended conversion of the street to a two-way corridor. The next level of priority are stops in the Brady/Harrison corridor where east-west and north-south services intersect.

- **4th Street @ Division, Marquette, Gaines, and Brady/Harrison –** Four Super Stops are proposed on 4th Street. This assumes that 4th has been changed to a 2-way formation and is the primary east-west transit carrying street in downtown. These stops would facilitate transfers and passenger boarding at key route junctions and would allow passengers to make transfers without traveling to the downtown transit center.
- **Locust @ Division, Gaines, Brady/Harrison, and Grand –** Locust is a historic arterial that spans the entire city in the east – west direction; it also serves a number of historic neighborhoods that have transit supportive land uses. The four proposed Super Stops provide opportunities for passengers to transfer along this corridor, changing direction of travel without coming downtown or continuing cross town at Brady and Harrison where most routes turn south to downtown. Stops at Division and Grand would be more important to implement as the PTN corridors are strengthened.
- **Central Park & Division –** This location is the intersection of three current transit routes and of two important PTN corridors. Pedestrian crossings at this intersection are currently difficult and intimidating and will require substantial enhancements.
- **Central Park & Brady/Harrison –** This Super Stop is suggested as an opportunity for bicyclists to access the best quality transit service operating on the Brady/Harrison couplet. Central Park is identified as a primary bicycle route and this stop should include infrastructure for bicycle storage that would allow residents to secure bicycles safely for extended periods while they travel to and from their destinations on transit.

Figure 10-17 shows the top 10 recommended Super Stop locations in Davenport.

Figure 10-18 illustrates the basic features of a Super Stop intersection. On a corridor scale, primary services should have a different "look and feel" than the rest of the system. While the buses may or may not be the same, many physical features of the bus stop can also help make the Primary network stand out and advertise its exceptional usefulness. The City should develop a special amenity and information program for PTN corridors, including:

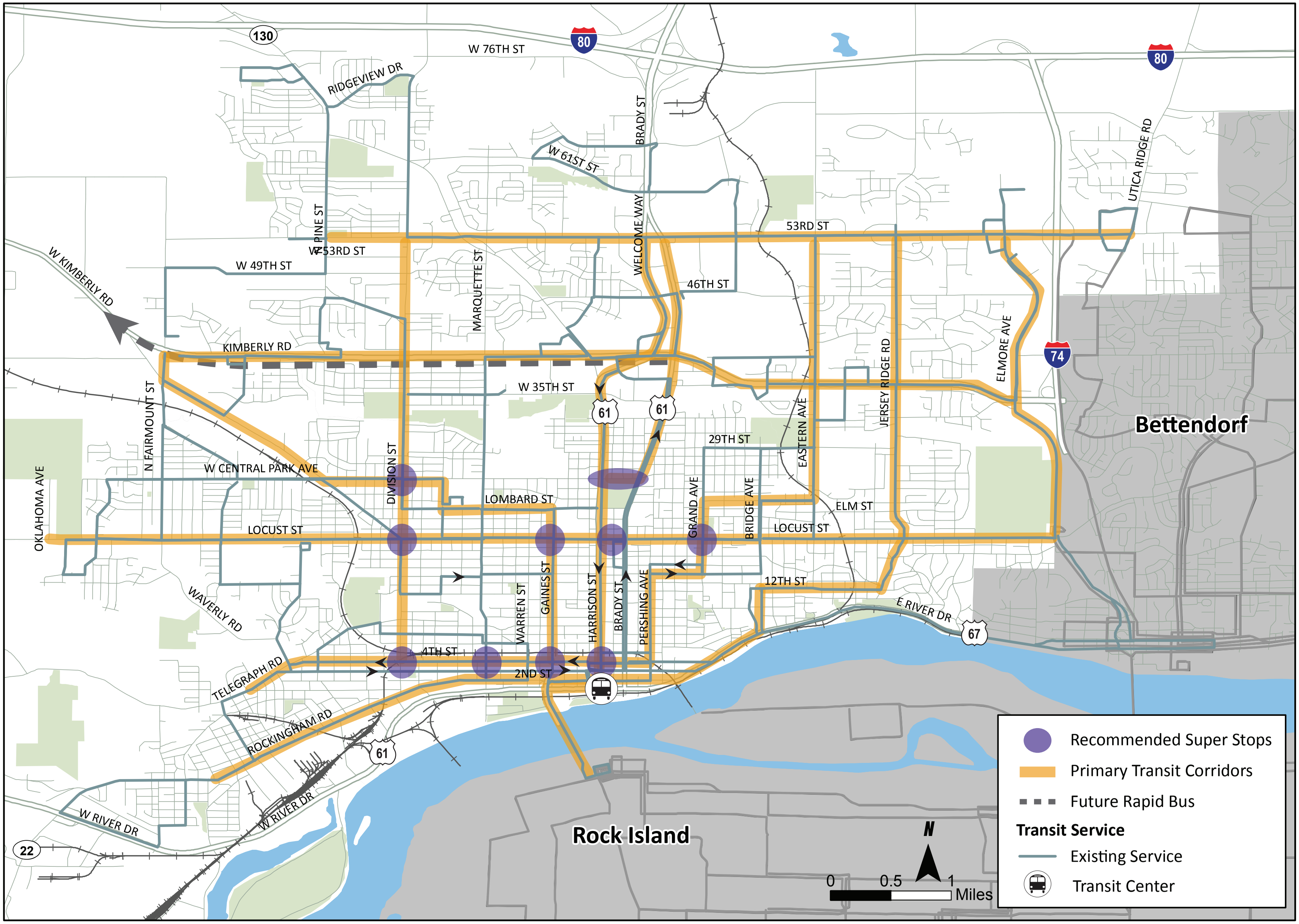
Heated bus shelter activated by cold temperatures and passengers entering the shelter (New Haven, Connecticut).

Source: Nelson\Nygaard

Shelters for high frequency "Go Line" advertise frequency of service (Bellingham and Whatcom County, Washington)

Source: Whatcom Transit Authority

Figure 10-17 Recommended Top 10 Super Stop Locations



GIS Data Source: City of Davenport, National Resources GIS Library, Iowa DOT

Nelson\Nygaard consulting associates

Figure 10-18 Super Stop Features

Source: Nelson\Nygaard

- Distinctive design for Primary Transit Network shelters, including fully enclosed shelters with heating and air conditioning where demand warrants. Signs on shelters identifying their location can also help passengers to orient themselves, and give the shelters more of a "station like" feel.
- Amenities at or near shelters that give value to waiting time, including information signs, newsracks, and other fast vending opportunities.
- Introduction of real-time passenger information via dynamic displays or PDA/phone accessible information.
- Distinctive signage for PTN lines, providing much more information than the current generic bus stop and advertising "15-minute service" or "the bus will be here soon!"
- Distinctive look for schedule information on high-frequency lines.
- Bicycle racks and storage systems.
- System mapping and information that emphasizes frequency and quality of service. A system map that does not differentiate between levels of transit service quality is analogous to a road map that doesn't distinguish between a freeway and a dirt road.

Recommendations:

1. Develop a Super Stop classification and develop identified top 10 Super Stops

2. Develop a set of facility design standards for the Primary Transit Network and prioritize stops for implementation by examining ridership levels at individual stops.

B. Conduct Bus Stop Inventory

It is challenging to effectively measure and monitor change in the quality of the transit passenger waiting environment without a comprehensive survey of each stop that includes a site visit. In the absence of a detailed survey, there are a few simple measures of available stop amenities:

- Percent of bus stops with shelters
- Percent of bus stops with benches
- Percent of bus stops with schedule information

A detailed stop inventory could be conducted in concert with a comprehensive operations analysis (COA) and should track the following additional measures:

- ADA accessibility
- Completion of the sidewalk network leading to the stop
- Quality of waiting environment (sidewalk space available, conflicts with other users, other amenities or services)
- Presence of transit information such as schedules and route maps

Case Study:

In Boulder, CO, the City has designated transit "Super Stops. These are locations where multiple transit services meet that provide for a pleasant and convenient transfer between transit services and that connect passengers with community activity centers. These key locations are designated for amenities than a normal bus stops, but do not require the level of investment of a BRT or light rail station. Super stops include amenities serving transferring passengers (such as shelter, seating, schedule information, fare payment systems, supporting retail, etc.) and quality connections to important community destinations (such as improved roadway crossings, multi-use paths, pedestrian connections, signage and wayfinding systems).

Recommendations:

Conduct a detailed stop inventory that tracks all the elements of stop condition and accessibility detailed above. Develop a stop improvement program based on this inventory that includes criteria for prioritizing stop improvements and a funding program to ensure capital dollars are available for priority enhancements.

Set aside a small annual budget for priority stop enhancements based on inventory (PTN stops should take top priority).

D. Support Transit Capital Improvements

There are a number of minor capital elements that are important in developing a top-quality transit system. As the City redevelops or redesigns transit carrying streets or works with developers who will be rebuilding streets and sidewalks, the following capital elements should be considered.

- Bus stop amenities: The comfort of transit passenger access and waiting environment is a critical element of the overall user experience and one that the City has a key role in improving. This should include better lighting, landscaping, and art work to improve public spaces in the vicinity of transit facilities.
- Improved bicycle parking: CitiBus vehicles all accommodate bikes on a front-end bicycle rack. Complementing these on-bus features, bicycle parking at PTN stops is a critical aspect to increasing bike and transit use.
  - Ashland and Portland, Oregon have removed on-street parking in strategic locations to provide higher-capacity bicycle parking opportunities that provide good access to local businesses and, in some cases, are located on high frequency bus stops.
  - Ashland and Bend, Oregon require new development to provide bicycle parking that is no less than 20% of auto parking. Minimum bicycle parking ratios could be implemented in downtown and other areas that do not have minimum auto parking requirements.
- Pedestrian access improvements: Most transit trips start or end with a walking trip. Improving/installing sidewalks, ensuring curbs and stops are ADA accessible, and enhancing the walking environment along key transit streets improves the attractiveness of transit. Quality pedestrian accessibility typically includes the following characteristics:
  - Continuous and connected network of sidewalks
  - Barrier free routes, crosswalks, and ramps
  - Good lighting
  - Seating and shelter from wind and rain at stops
  - Interesting visual environment and good line of sight (studies have shown that people are willing to walk farther on streets that have active street facing buildings and vital street life).
- Pavement overlay: A number of cities budget for broader pavement depth along streets that are subject to higher transit traffic volumes. This tends to reduce maintenance costs and required frequency of repaving over the long term.
- Plan for Long-term Relocation of the Ground Transportation Center: Davenport's Ground Transportation Center (GTC) is a functional transfer facility and is well located in relation to downtown employment core. The GTC has a large waiting room that serves both CitiBus and intercity bus passengers as well as an information and ticket counter, passenger restrooms, a driver

Bike corral (Portland, OR).

Source: Nelson\Nygaard

Covered bike parking (Portland, OR)

Source: Nelson\Nygaard

"Storefront" indoor waiting room along an on-street transit center along Superior Ave in downtown Duluth. The facility is open about 12 hours a day, seven days a week, and is staffed from 9 am to 5 pm on weekdays. Buses pick up passengers on both sides of the street.

Sources: Top photo: Nelson\Nygaard
Bottom photo: Duluth Transit Authority

break room and administrative offices. The block that houses the GTC is a prime development site in the downtown. While it may be years before the site is redeveloped, when it does, we recommend the City consider options for moving the bus transfer function to an on-street location to bring more pedestrian activity and life to downtown sidewalks. There are several locations where buses could layover and provide efficient transfers using on street curb space in the downtown.

Key site considerations for siting a future on-street downtown transfer and layover facility. include:

- Proximity to the downtown employment core comparable to that provided by the current Ground Transportation Center.
- Two full block faces or enough block length to accommodate 8-10 bus bays.
- Opportunity to develop or reuse ground floor space in an adjacent building for a small information center, waiting room and driver break facilities. No more than 2,000 to 3,000 square feet would be required for such a facility. This facility could also house intercity bus ticketing and passenger waiting facilities.
- Sufficient sidewalk space (or ability to expand sidewalks) to accommodate fully enclosed transit shelters and still allow a minimum of 8 feet for pedestrian passage.
- A low- to moderate-traffic volume on the street to minimize conflicts with buses entering and exiting the right of way.

Should the GTC block be redeveloped in the future, we recommend against the development of a new off-street transit center. While there is available land in the downtown, an off-street transit facility would likely require a full block. Such a development would restrict the opportunity to develop a valuable block of downtown real estate and could damage the walkability of downtown by interrupting the built form. Additionally, off-street facilities require buses to enter and exit the facility by crossing downtown sidewalks, which can be uncomfortable for pedestrians. While there are a number of successful examples of off-street transit centers in downtown environments, it would be difficult to argue that any improve the quality of the pedestrian environment or increase visibility of transit. Given the generous size of downtown streets and limited demand for on street parking, a well-designed downtown transit center could help to enhance street life and better integrate transit into the community mainstream.

Scott and Ripley are promising potential sites as those streets have lower traffic volumes and would allow transit vehicles to reverse direction downtown without making circuitous movements. The Scott segment is particularly interesting as the street does not provide important through circulation and could be considered for full closure to automobiles stressing the function of the street for pedestrians, transit and bicycles.

A detailed siting study and operational analysis would be needed to select a final site and develop an appropriate design to accommodate local and intercity bus needs.

Recommendations:

While the issues discussed in this section are broad, we recommend that the City consider the following actions:

1. Consider City or business community programs that help to enhance bus stop facilities and environment through concurrent streetscape improvements or direct provision of basic stop features or amenities.
2. Use the PTN as a tool for prioritizing pedestrian and bicycle system improvements and safety enhancements.
3. Consider a city program to expand bike parking and establish high-quality bike parking facilities at or near major PTN stops.
4. Consider changes to the municipal code to require more bicycle parking for new development, also helping to increase the overall supply.
5. Consider on-street options for replacement of the Ground Transportation Center if and when the current site is redeveloped.

Recommendation Area #5: Develop Transit Supportive Policies and Funding

This section discusses other ways that the City of Davenport can improve the environment within which transit operates and encourage ridership growth. A number of best practice examples for transit supportive policies related to TDM, parking, pricing and access are explored and basic framework recommendations provided. Policy support for many of the programs recommended in this section is already provided in the City's Comprehensive Plan.

A. Reduce Downtown Surface Parking Supply

The overabundance of cheap parking in downtown Davenport is a major barrier to implementing the recommendations of Davenport in Motion and the City's comprehensive plan. Of particular importance to transit is the ability to create a system that can compete with transit, particularly for commute trips to the City's urban core. Since parking supply vastly exceeds demand forcing the market rate value of surface parking to almost nothing, the apparent cost (in time and dollars) of using transit remains high. Further, the City is struggling to pay its bond debt on City-owned parking ramps since it must compete with abundant free or low-cost on-street and surface lot parking. The City owns and operates several large downtown surface parking lots and as such is essentially competing with its money-losing ramps.

Food carts provide an active street environment on the edges of many surface parking lots in Portland, Oregon.

Source: Nelson\Nygaard

A program to decommission downtown surface lots owned and operated by the City could lead to many positive outcomes:

1. Increase on street parking demand and raise the value of on street stalls. This could also move more people and activity onto downtown streets.
2. Improve the financial viability of downtown parking ramps by eliminating low-cost competition.
3. Increase public/greenspace in the downtown by implementing low-cost improvements that add grass, hardscape public space, trees, food vendors, and other civic amenities.
4. Increase the long-term viability of transit and other alternative modes of transportation, particularly for downtown commuters.

Recommendations:

1. Introduce pilot program to decommission a public surface lot and transform into an active public space.
2. Continue to decommission public surface parking supply.

B. Develop Transportation Demand Management Programs

Transportation Demand Management (TDM) refers to a variety of strategies aimed at reducing the demand for single occupant vehicle trips and thereby using transportation resources more efficiently. This section describes the programs or policies that might be most effective in reducing single-occupant vehicle travel in Davenport.

Transit Pass Programs

Universal or broad-based transit pass programs have proven to be among the most effective policy tools for increasing transit ridership. Programs are often established with major employers, universities, and other large institutions, as well as business improvement districts. Due to the large enrollment of these programs, transit agencies can provide the transit passes at a deep bulk discount. However, pass programs are also viable for business or commercial districts.

Case Study:

The Davenport in Motion Fact Book, page 7B-4, provides a case study of the Eco-Pass program in Boulder, CO. The Boulder program and the similar Passport program in the Lloyd District Transportation Management Association in Portland, OR, have led to double digit increases in transit mode share.

Commute Trip Reduction

Commute trip reduction programs provide encouragement, incentives and support for commuters to use alternative modes (such as walking, cycling, ridesharing, public transit and telework), alternative work hours, and other efficient transportation options. Commute trip reduction programs can be implemented at private businesses and institutions, or regulated at the state or municipal level.

> **Case Study:**
>
> In 1993, Bellevue, Washington passed an ordinance (14.40) that established municipal Commute Trip Reduction program goals and requirements. It requires certain employers to develop a commute trip reduction program, and establishes the following single occupant automobile commute reduction goals by 15% after two years, 20% after four years, 25% after six years, and 35% after 12 years.

Since there are no State mandates for employer transportation demand management in Iowa, a City program complemented by supporting services could encourage private employers to adopt more aggressive TDM measures, including:

- Alternative work schedules: Flextime, Compressed Work Weed, staggered shifts.
- Telework: Using telecommunications instead of traveling to work, including telecommuting, teleshopping, distance-learning, electronic government, video conferencing, etc.
- Bicycle parking: Bicycle parking, storage, and changing facilities.
- Guaranteed Ride Home: Commuting insurance gives a sense of security.
- Carsharing: Rental services that substitute for private vehicle ownership, such as Zipcar.
- Commuter financial incentives: Parking cash out, travel allowance, transit benefits and rideshare benefits.
- Parking management and pricing: Sharing, regulating and pricing of parking facilities.

TDM Marketing (Transportation Social Marketing)

TDM marketing refers to a variety of programs and strategies that seek to encourage the use of alternative modes by promoting transportation options. Often referred to as Social Marketing, these programs have become increasingly popular and have been very effective in changing travel habits, including shifting people to transit. Effective TDM marketing programs involve a range of partners within a community, including public officials, community organizations and individuals who support transportation alternatives. This approach, while more resource intensive, is less regulatory and therefore often more politically acceptable than new city-wide regulations requiring TDM. TDM marketing activities include:

> **Case Study:**
>
> The Davenport in Motion Fact Book provides case studies of two transportation social marketing programs – the getDowntown program in Ann Arbor, MI (page 6H-3) and the SmartTrips program in Portland, OR (page 7A-3)

- Surveying users and potential users to determine preferences, barriers and opportunities for changing travel behavior.
- Educating public officials and businesses about TDM strategies.
- Targeting the most likely consumers who would be willing to change their travel patterns.
- Promoting benefits of changing attitudes about alternative modes, such as being healthy, productive, and cost-effective.
- Encouraging transit ridership by making transit service more convenient and easy to use.

Transportation Management Association

Transportation Management Associations (TMAs) are typically non-profit business associations representing large and small employers in a central business district or employment center. TMA's are typically supported in part by business member dues, grant funds and often contributions from local governments or transit agencies interested in decreasing drive alone trips and or increasing transit ridership. TMA's often provide a storefront for transportation services where employees can buy transit passes, get information about carpooling or vanpooling, or learn more about bicycling or walking options for their commute. TMA's can leverage better transit fares by organizing group pass programs or buying bulk passes for resale Since the organizational framework of a TMA is similar to other downtown business groups, many groups develop a similar structure by adding transportation support services to an existing business organization. Davenport One is already highly involved in street infrastructure and parking management issues. It is possible that it could be expanded to provide support to businesses and employees interested in alternative commuting options.

Recommendations:

The following policies and programs should be considered by the City of Davenport to support its TDM efforts. Each recommendation in this section could require significant study and community process.

1. Consider developing a downtown Transportation Management Association. This could be structured as a separate organization or a branch organization of Davenport One.
2. Conduct a study to evaluate options for developing a Downtown transit pass program. Along with parking management, this may have the greatest potential to boost transit ridership in the City particularly amongst downtown employees.
3. Develop a City of Davenport Community Based Social Marketing (CBSM) program. This could begin with a small pilot program focused on one or two residential neighborhoods.

Case Study:

Boulder, Colorado has an exemplary local transit program. In Boulder, on-street meter revenue is used to provide all employees with benefits such as a free universal transit pass (Eco-Pass), a Guaranteed Ride Home program; ride-matching services; bicycle parking; and a number of other benefits. Boulder's Central Area General Improvement District (CAGID), which is a hybrid of a BID and TBD, the scenarios described above, manages this program. Shared public parking facilities are constructed and operated by CAGID and funded through CAGID's general obligation bonds. The debt is supported primarily by revenue from parking chargers (including meters) and by property and other taxes paid by property owners. Compared to many downtowns, where parking is heavily subsidized by public contributions of both dollars and land, much of the cost of the parking system paid for by those who park, resulting in lower drive alone rates.

As a result of this program and other aggressive multimodal transportation programs and improvements, Boulder has among the highest non-auto mode shares among small to mid-sized US cities. Since downtown Boulder baseline mode splits were established in 1995, the drive-alone rate has fallen almost 36% from 56% to 36% in 2005, while the transit rate has more than doubled from 15% to 34%. According to the City of Boulder, the drive alone rate dropped dramatically after 1999 because of an increase in transit service (17 different routes at 15 minute headways) and the emergence of an Eco-Pass "culture".

C. Develop Parking Policies that Support Transit

Parking management and pricing policies are among the most effective means that cities have to influence travel behavior and support a mode shift towards transit. Davenport's efforts to boost multi-modal transportation options may be supported by implementing additional parking controls and programs.

Parking Pricing

As the cost of driving increases, transit services become more attractive. To ensure high transit ridership, most public parking should be priced, and most employee parking should be either priced or cashed-out (explained more fully below). Revealing the true cost of parking to those who drive can decrease driving by 20-25% and increase transit ridership accordingly. A number of larger cities including San Francisco and Seattle as well as some smaller communities like Redwood City, CA have moved to demand based pricing of on-street (and in some cases off-street) parking. Demand-based pricing is accomplished by occasionally shifting meter prices to ensure that roughly 15% of parking is available at all times. This is beneficial for businesses as it promotes turnover; but is also good for the environment in congested areas as it reduces miles driven searching for parking. Demand-based pricing is recommended in the DIM Downtown Parking Management Plan element.

Parking Cash Out

Parking cash out programs allow employees the opportunity to receive cash in lieu of free parking. In 1993, the State of California enacted legislation requiring certain employers who provide subsidized parking for their employees to offer a cash allowance instead of a parking space. Studies showed that given the opportunity to cash out employees look for alternate means of commuting to work, such as public transit, carpooling, vanpooling, biking and walking. Bellevue, WA, is an example of a city that enacted policies requiring employer parking cash-out.

Minimum Parking Requirements

Minimum parking requirements, which are commonplace throughout the country, have been found to worsen traffic congestion. Many cities are deciding that minimum parking requirements are no longer needed and that developers do a better job of anticipating the parking market at their developments than zoning codes can. Davenport has no minimum parking requirements in the downtown area. Eliminating parking minimums in PTN overlay zones could help to promote future transit oriented uses in key transit corridors.

- **Residential parking ratios:** Families living near high capacity transit (HCT) demand less parking than those in auto-dependent neighborhoods. Many cities are moving to eliminate or lower minimum parking requirements where there is high quality transit, typically no more than 1.5 spaces per unit, and often less. In Olympia, a similar sized city in Washington State, the residential parking requirement in key transit corridors is set at one space per unit.
- **Commercial parking ratios:** Similarly, commercial parking ratios can be eliminated in corridors or centers that have excellent transit service. This will help to ensure that development is truly transit-oriented and not just transit-adjacent. (San Mateo, CA, allows up to 2.0 spaces per 1,000 square feet of TOD development) As stated above, many now believe that developers are better able to determine the demand for parking and that there should be no minimum parking requirements. In Olympia, WA, the municipal code stipulates that parking requirements be reduced by 10% for uses in high density transit corridors. The City of Davenport may want to consider a similar provision for PTN overlay districts.

Parking Maximums

Parking maximums restrict the total number of spaces that can be constructed. They can be introduced anywhere where there are or could be measures in place to combat overspill. Parking maximums have been adopted in cities such as Portland, OR; San Francisco, CA; Seattle, WA; Gresham, OR; Helena, MT; Redmond, WA; and San Antonio, TX.

Shared Parking

Shared parking can be encouraged or required. For example, Arlington County's (VA) Columbia Pike District Parking Strategy encourages sharing spaces by setting a limit on the number of reserved parking spaces allowed, while placing no limit on the amount of shared parking allowed on-site. The strategy also requires sharing spaces for sites over 20,000 square feet in land area.

In Olympia, WA, the municipal code (18.38.180) requires that an applicant provide proof that shared parking is feasible when adjacent land uses have different hours of operation. Mixed use and shopping center developments with similar operating hours may also be required to submit a parking demand study to determine if parking can be combined. When two or more land uses, or uses within a building, have distinctly different hours of operation, such uses may qualify for a shared parking credit.

Residential Parking Unbundling

Most housing arrangements provide parking as part of the lease or purchase cost. Unbundling this relationship by requiring that parking be purchased or leased separately may lead to reduced housing costs and makes clearer the cost of owning and storing a car. Households looking for a transit-oriented lifestyle are more likely to self-select into dense, mixed-use districts or on transit corridors when they do not have to buy more parking than they need. This strategy is also effective in providing developers with added financial incentive not to build parking for which there is not a paying market. Municipalities should require that developers "unbundle" the cost of parking from the cost of housing, particularly in rental units and multifamily condos (like San Francisco, CA).

Recommendations:

1. Eliminate minimum parking requirements in high priority PTN corridors. Adoption of a PTN overlay zone, as recommended in Chapter 1, should include reduction or elimination of minimum residential and commercial parking requirements.

D. Enhance Pedestrian and Bicycle Access

The level of pedestrian amenities and safety of pedestrian access to transit lines have a strong influence on mode choice. Almost all transit trips start and end with a walk or bicycle trip.

The pedestrian environment is critical for transit access and efforts should be made to ensure that the entire transit trip, including the walking portion, is safe, convenient, and comfortable. It is important to ensure that pedestrian improvements support existing or future transit systems and provide safe and direct connections between transit stops or stations and destinations in the neighborhood. Fewer people access transit on bicycles, but integrating bicycles with transit will help to increase use of both modes.

The following bullets briefly describe some policies that could be considered for PTN zones. These have been implemented effectively in other communities and some are already in play in Davenport:

- Require parking lot design standards that shield the pedestrian from parked cars with exterior landscaping/buffers (Eugene, OR)
- Restrict parking between building entrances and the street (Portland, OR)
- Require ground floor commercial uses to ensure the pedestrian environment is interesting and active (Vancouver, WA; Portland, OR; Seattle, WA)
- Mandate design requirements to reduce setbacks to bring buildings closer to streets (Portland, OR)
- Implement pedestrian-supportive zoning strategies including allowing for mixed use, higher densities and smaller residential lots (Olympia, WA)
- Provide allowances for sidewalk cafes and activities to increase vitality of the pedestrian environment (Portland, OR, Vancouver, WA)
- Mandate that bicycle parking be located in proximity to building entrances and with good visual access for security (Eugene, OR)
- Require weather protection for bicycle parking (King County, WA; Portland, OR)
- Specify minimum bicycle parking requirements tied to square footage of a new building or to the amount of auto parking provides. Many cities have adopted ratios of bike accommodation tied to square footage of uses or residential units. Some communities such as Bend and Ashland, Oregon require automobile parking be matched with bike parking that is at least 20% of auto spaces. These requirements help support bicycle mobility and boost bike mode shares for

local trips. Expanding this range can be very effective in filling in transit service gaps, and reducing parking demand tied to short- and medium range trips.

Recommendations:

1. When developing a PTN overlay zone, consider adding incentives or requirements for developers to deliver high quality pedestrian and bicycle facilities in exchange for opportunity to develop at higher floor to area ratios or to increase residential units.
2. Ensure that pedestrian-oriented design is considered during development review. This process allows the jurisdiction to ensure that the proper design treatments are applied to individual private development projects.

E. Increase Transit Funding

The following funding concepts are options that the City of Davenport could consider for increasing funding for transit:

- **Increased tax levy for transit:** At some point, the City of Davenport may decide to seek a modest tax increase to support transit service. It is recommended that this be done only after a comprehensive operations analysis (COA) is conducted, so the community can be presented with a complete vision of the role an enhanced transit system could plan in local mobility.
- **Business Improvement Districts:** Business Improvement Districts (BID)s, also known as Public Improvement Districts, are created by local governments to finance and manage public improvements that benefit a specific area in the government's jurisdiction, including "acquisition or construction of off-street parking" and other transportation infrastructure and services with a specified area. A special parking assessment can be levied on businesses to fund parking facilities in their area, as an alternative to each business supplying its own facilities. These assessments may include additional property taxes, ad valorem taxes, and/or sales and use taxes.
- **Local Improvement Districts:** A Local Improvement District (LID) is a method by which a group of property owners can share in the cost of transportation infrastructure improvements or other types of public improvements such as installing water and sanitary sewer lines. Most LIDs involve improving a street, building sidewalks, and installing a stormwater management system, but they can also be used for transit infrastructure. An LID can typically be used for major capital improvements only.
- **Parking Benefit District:** A Parking Benefit District (PBD) institutes a system where fees collected for parking, less any City expenses for operations, maintenance and enforcement, are used to the benefit of the business district or residential district in which the parking is located. A governing body for the district decides how the collected fees are spent. Most often these funds are used for street furniture and cleaning, plantings, bus shelters, and other amenities, which enhance the pedestrian experience in the immediate area. PBDs also reduce traffic by increasing parking fees. Neighborhood Permit Parking initiatives have been introduced to prevent overspill in neighboring communities from commuters trying to avoid parking restrictions and charges. Old Town Pasadena is a well-known example of a Parking Benefit District that makes a significant difference in the livability and economic vitality of a community. In this case, the District has applied funds to develop a park-once program, to improve the public realm and implement better security.
- **Transit Benefit District:** Transit Benefit Districts (TBD) refer to PBDs that charge fees to be used to increase transit service, thereby further reducing traffic by providing a wider range of transit choices for employees and visitors to the district.

It is difficult to imagine that any of these strategies are politically viable in the short-term, but all represent future opportunities to grow transit service and develop a system that is a more integral element of local mobility.

Recommendations:

1. In conjunction with a comprehensive operations analysis (COA), develop a transit funding strategy to increase service and improve facilities over time.

SUMMARY OF RECOMMENDATIONS

Category	Recommendation	Time Frame	Priority	Estimated Cost
Recommendation Area #1: Develop a Service Allocation Policy: Weighing Local Values				
-	Conduct a process that allows community stakeholders and leaders to consider the right mix of values for CitiBus service. This is recommended as part of a COA (Recommendation Area #2)	Short Term	⇧	$15,000 - $25,000 [1]
-	Conduct a City Council workshop leading to an adopted service allocation and policy for implementation	Short Term	⇧	
Recommendation Area #2: Conduct a Comprehensive Service Restructuring				
-	CitiBus should conduct a comprehensive operational analysis (COA) of its existing system. A COA could return substantial value in terms of increased operating efficiency on a year after year basis. Recommendations #1 and #2 should be implemented in tandem.	Short Term (initiate in First Year)	⇧⇧⇧	$125,000 - $150,000
Major Recommendation #3: Develop a Davenport Primary Transit Network (PTN)				
A. Develop a PTN Overlay Zoning Classification	Adopt a PTN overlay to the City zoning code for Trunk and Priority PTN corridors. This overlay zone would support more transit friendly zoning by allowing increased density, providing developer incentives for more transit friendly uses, encouraging walkable urban form, and encouraging mixed use neighborhoods.	First Year	⇧⇧⇧	
	Revise zoning to increase density along PTN corridors (this can be done in addition to or instead of a PTN overlay zone). Residential densities should be at least 6 to 12 units per acre as a minimum threshold for high performing transit. Zoning along PTN corridors should be changed to reflect higher densities; for example, PTN corridors with R1 zoning types could be adjusted to R3-5, R5M or R6 or higher.	Short Term	⇧⇧	
	Encourage or require mixed uses within buildings and within land use zones. This should be a priority in PTN zones or along PTN corridors. The City should consider the development of a mixed-use zone category in the zoning code or the development of a PTN overlay that allows mixed use building types.	First Year	⇧	
	Provide incentives to local developers to build high density mixed use buildings within convenient walking distance to transit corridors.	First Year	⇧	
B. Develop Highway 61/53rd Street Rapid Bus Trunk Line	Initially, focus on implementing the Highway 61/53rd Street PTN Trunk Corridor.	Short Term	⇧⇧	
	Consider the feasibility of Federal Transit funding (Small Starts or Very Small Starts) for the development of a Rapid Bus (on-street Bus Rapid Transit) project in this corridor.	Short-Medium Term		
	Use transit priority treatments as needed to maintain competitive transit travel speeds in the Trunk corridor	Short Term and Ongoing		
C. Adopt Service Design Standards	CitiBus should adopt service design criteria to guide the placement of new and expanded services. This would be most effectively completed in conjunction with the recommended Comprehensive Operations Analysis.	Short Term	⇧	
D. Optimize Stop Spacing	CitiBus should maximize stop spacing on PTN routes and new route segments in the City. Maximum stop spacing encourages passengers to gather in larger numbers at fewer stops. A bus stopping for two able-bodied passengers takes very little longer than stopping for one, so stops with more passengers mean a faster operation for everyone. We recommend 3 block stop spacing (roughly 1000 feet) be implemented, except where there is hilly terrain or poor connectivity to key developments.	Short Term	⇧⇧	
	The City should coordinate bicycle and pedestrian capital improvements to ensure that pedestrian and bicycle system improvement priorities match PTN stop and station locations.	Short Term	⇧	
Major Recommendation #4: Improve Capital Facilities				
A. Develop Super Stops	Develop a Super Stop classification and develop the identified top 10 Super Stops	Short Term	⇧⇧	
	Develop a set of facility design standards for the Primary Transit Network and prioritize stops for implementation by examining ridership levels at individual stops.	Short Term	⇧	

Category	Recommendation	Time Frame	Priority	Estimated Cost
B. Conduct Bus Stop Inventory	Conduct a detailed stop inventory that tracks all the elements of stop condition and accessibility. Develop a stop improvement program based on this inventory that includes criteria for prioritizing stop improvements and a funding program to ensure capital dollars are available for priority enhancements	First Year – Short Term	⇧⇧	
	Set aside a small annual budget for priority stop enhancements based on the inventory, giving priority to PTN stops.	Short Term	⇧	
C. Plan for Long-term Replacement of the Ground Transportation Center	Develop a design for an on-street transit facility in Downtown Davenport, anticipating the possible future redevelopment of the current site. Given the generous size of downtown streets and limited demand for on street parking, a well-designed downtown transit center could help to enhance street life and better integrate transit into the community mainstream. Second Street between Harrison and Ripley could serve as a viable location for an on-street facility. Other sites are also identified as having potential. A detailed siting study and operational analysis would be needed to select a final site and develop an appropriate design to accommodate local and intercity bus needs.	Medium Term		
D. Support Transit Capital Improvements	Consider City or business community programs to enhance bus stop facilities and environment through concurrent streetscape improvements or direct provision of basic stop features or amenities.	Short Term		
	Use the PTN as a tool for prioritizing pedestrian and bicycle system improvements and safety enhancements. Coordinate improvements to ensure that pedestrian and bicycle system improvement priorities match PTN stop and station locations	Short Term	⇧⇧	
	Consider a city program to expand bike parking and establish high-quality bike parking facilities at or near major PTN stops.	Short Term		
	Consider changes to the municipal code to require more bicycle parking for new development, also helping to increase the overall supply.	First Year		
Recommendation Area #5: Develop Transit Supportive Policies and Funding				
A. Reduce Downtown Surface Parking Supply	Introduce pilot program to decommission a public surface lot and transform into an active public space.	First Year	⇧⇧	
	Continue to decommission public surface parking supply.	Short Term	⇧	
B. Develop Transportation Demand Management (TDM) Program	Consider developing a downtown Transportation Management Association. This could be structured as a separate organization or a branch organization of Davenport One.	Short Term	⇧	
	Conduct a study to evaluate options for developing a Downtown transit pass program. Along with parking management, this may have the greatest potential to boost transit ridership in the City particularly amongst downtown employees.	Short Term		
	Develop a City of Davenport Community Based Social Marketing (CBSM) program. This could begin with a small pilot program focused on one or two residential neighborhoods.	Medium Term		
C. Develop Parking Policies that Support Transit	Eliminate minimum parking requirements in high priority PTN corridors. Adoption of a PTN overlay zone should include reduction or elimination of minimum residential and commercial parking requirements.	Short Term	⇧	
D. Enhance Pedestrian and Bicycle Access	When developing a PTN overlay zone, consider adding incentives or requirements for developers to deliver high quality pedestrian and bicycle facilities in exchange for the opportunity to develop at higher floor to area ratios or to increase residential units.	Short Term	⇧	
	Ensure that pedestrian-oriented design is considered during development review. This process allows the City to ensure that the proper design treatments are applied to individual private development projects.	First Year	⇧	
-E. Increase Transit Funding	In conjunction with a comprehensive operations analysis (COA), develop a transit funding strategy to increase service and improve facilities over time.	Short Term		

1 Assuming an outside expert facilitates; less if conducted by staff.

To inform the City of Davenport as it develops land use policies that support transit, a brief literature review was undertaken of existing research and work that illustrated a connection between land use/development factors and transit ridership.

Although there is no single, simple correlation, appropriate findings are outlined below.

Please note that for the purpose of comparison, the following conversions and assumptions are used:

- 1 dwelling unit /acre = 640 dwelling units/square mile
- 1 dwelling unit/acre = 2.5 persons/acre = 1600 persons/square mile

Density

Several studies point to a strong connection between density and transit ridership. In *Transit Metropolis*, Robert Cervero states, "It is widely agreed that higher urban densities will do more than any single change to our cityscapes in attracting people to trains and buses."

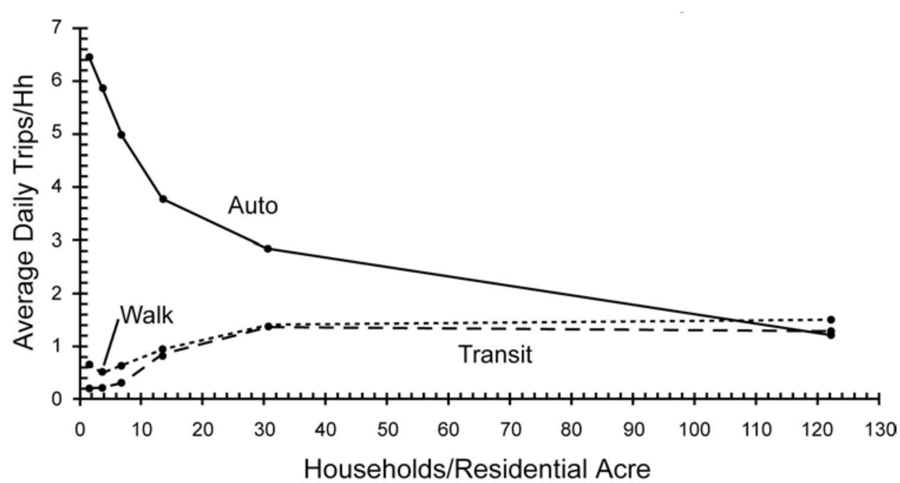
Some key sources, and their conclusions, are as follows:

- Every 10 percent increase in population and employment densities yields anywhere between a 5 and 8 percent increase in transit ridership, controlling for other factors (such as lower incomes, restricted parking, and better transit services generally associated with more compact settings). Note that this is an aggregate of studies of many densities, and is refined by other studies listed below.

Two studies cited a level of residential density at which point transit ridership per person or household levels out (at about 1.5 transit trips per household per day):

- A study by Spillar and Rutherford (1998) states, "Transit use per person grows with increasing density up to a ceiling at somewhere between 20 and 30 people per acre (about 19,000 people per square mile or 12 dwelling units/acre). In terms of income, in higher income neighborhoods (those with less than 18 percent low-income families) density has less of an effect on transit use than in low-income areas, but this could be due to the relatively small number of samples available."[1]
- Similarly, the San Francisco Bay Area region's Metropolitan Transportation Commission surveyed over 10,000 households throughout the metropolitan region in its 1990 Household Travel Survey, and showed that transit trip ridership per household flattens out at a density of about 30 households per acre, or roughly 48,000 people per square mile. (See Figure 10-19, below). The study also shows that transit need a base of at least 5 households per acre (8,000 people/sq mile) before ridership will grow, increasing noticeably at about 10 households per acre (16,000 people per sq. mile) and up.

Figure 10-19 Average Daily Trips per Household vs. Density



1 Spillar, Robert J., and G. Scott Rutherford. 1998. "The Effects of Population Density and Income on Per Capita Transit Ridership in Western American Cities." *Institute of Transportation Engineers' Compendium of Technical Papers:* 60th Annual Meeting. August 5-8, 1998. Pp. 327-331.

Figure 10-19 shows that when neighborhoods are more compact, trip lengths are shorter. Many destinations are close at hand. As a result, auto trips fall sharply, while more trips are taken by walking and transit.

A crucial point from Figure 10-19 is that up to about 12 households/acre, the relationship between density and transit use is parabolic – transit ridership/household rises faster than density. Transit ridership/acre (the real determinant of the market for a given transit service) thus rises extremely steeply against density up to this threshold, then gradually falls back to a linear relationship in which every new increment in population (and hence density) added to a fixed area generates new ridership at the same rate.

- Newman and Kenworthy (1989) found that at densities below 12 persons per acre (7,500 persons per square mile) the bus service becomes poor. They therefore recommend densities above 5 to 6.5 dwelling units/ acre (7,500 to 10,000 persons per square mile) for public transit-oriented urban areas.[2]
- Levinson and Kumar (1994) conclude that relationships between density and mode choice "are found only in densities greater than 10,000 persons per square mile," (6 dwelling units/acre) using data from the 1990/91 Nationwide Personal Transportation Survey (NPTS). The lower limit of 7,500 persons per square mile (4.5 dwelling units/acre) is also used in other sections of the paper.[3]
- For employment density, a study of travel behavior in the Seattle metropolitan area, Frank and Pivo (1994) concluded that a threshold exists at which transit work trips showed a significant increase, of 50 to 75 employees per acre, and nine to 13 persons per gross acre (5500 to 8500 persons per square mile). They found that there are thresholds of 75 employees per acre and over 18 persons per gross acre (11,500 persons per square mile) for the same phenomenon to occur for shopping trips.[4] Note: a more in-depth account of the Frank and Pivo study will be provided in the final report.
- The 1996 TCRP paper, Transit and Urban Form, reviewed several studies that all pointed to a correlation between density and transit trip generation.[5]
- In an analysis of transit demand in Portland, Oregon, Nelson\Nygaard (1995) found that "of 40 land use and demographic variables studied, the most significant for determining transit demand are the overall housing density per acre and the overall employment density per acre. These two variables alone predict 93 percent of the variance in transit demand among different parts of the region."[6]
- An unpublished TCRP analysis of travel behavior in 11 metropolitan areas surveyed in the 1985 Housing Survey suggests that both land use mix and residential densities contribute to transit mode choice decisions. It determines that the probability of choosing transit is better explained by the overall levels of density rather than by measures of land use.

Research conducted to establish the Location Efficient Mortgage program shows an indirect correlation between density and transit ridership, by illustrating an inverse impact on vehicle trips and miles traveled. The research included every neighborhood in the Los Angeles, San Francisco and Chicago metropolitan areas, and controlled for other potential explanatory variables such as household income and household size. As shown in Figure 10-20, in each of the three metropolitan areas, the compactness of the neighborhood was found to be the most important explanatory variable. As residential density in a neighborhood rises, the number of nearby destinations (such as shops, restaurants and other services) increases, and as a result, driving rapidly decreases.

2 Newman, P. and J. Kenworthy. Cities and Automobile Dependence: An International Sourcebook. Aldershot, Avebury Technical (1989).

3 Levinson, D. and A. Kumar. "The Rational Locator: Why Travel Times Have Remained Stable." *Journal of the American Planning Association*, 60, 3 (1994) pp. 319–332.

4 Frank, L. D. and Gary Pivo. *Relationship Between Land Use And Travel Behavior in the Puget Sound Region*. Olympia, WA: Washington State Department of Transportation, WA-RD 351.1 (1994).

5 Source: (http://transweb.sjsu.edu/publications/transitridership2/TransitRidership_7_16.pdf), The Mineta Transporta-tion Institute College of Business, 2002

6 Nelson/Nygaard Consulting Associates. "Land use and Transit Demand: The Transit Orientation Index," Chapter 3 of *Community Transit Network Study* (Draft). Portland, OR: Tri-Met (1995).

Figure 10-20 Driving vs. Residential Density

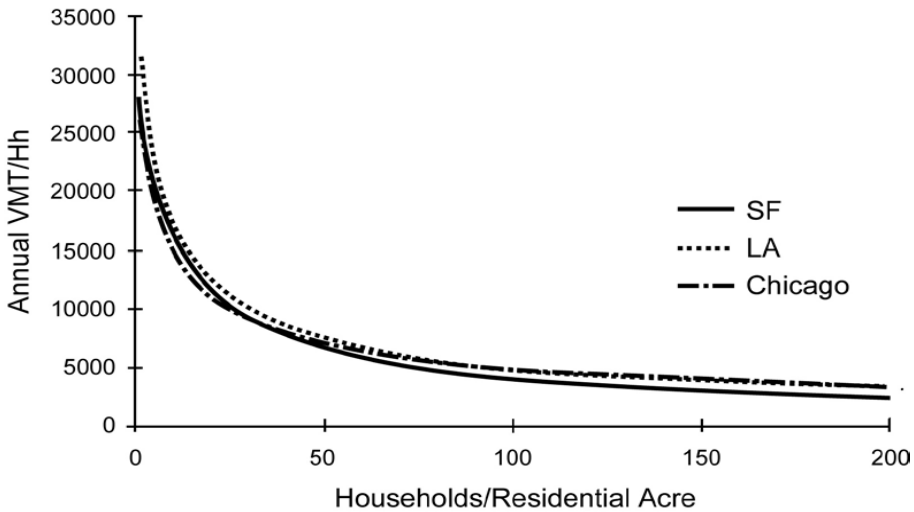


Figure 10-20 shows the reduction in vehicle miles traveled per household as residential density increases. In Los Angeles neighborhoods with a density of two households per acre, the average household drives nearly 25,000 miles per year. At 40 households per acre (the density of the Mission Meridian Station project), the average Los Angeles household drives approximately 8,000 miles per year. Note that the parabolic part of the transit ridership curve in Figure 10-19 corresponds to the steepest part of the curve in this figure, beginning to flatten at about 12 du/acre.