



# Road Diets

## Fixing the Big Roads

By Dan Burden and Peter Lagerwey

# Road Diets

## Losing width and gaining respect

Can our nation's roads gain efficiency, mode share and safety by getting leaner? Many are doing just that.



### Turn Lanes Help Road Capacity

*Capacity remains the same. By keeping the full number of lanes at intersections, 4-lane to 2-lane conversions often keep the same high capacity of original 4-lane roadways. Turn lanes can be created at intersections.*

Nationwide, engineers are putting roads on “diets,” helping them lose lanes and width. In the process formerly “fat” streets often become leaner, safer, and more efficient. They become multi-modal and more productive. In many cases these former “warrior” roadways are tamed and turned into “angels.”

Often these changed roads set the stage for millions or megamillions of dollars in new commercial and residential development. The change can increase value of existing properties. In some cases costs of reconstructing roadways are repaid in as little as one year through increased sales tax or property tax revenue.

Roadway conversions discussed here may be just the ticket to start remaking unhealthy, unsafe city neighborhoods or commercial districts and turn them into more robust, vital, economically sound places. Road conversion may be undertaken to create safer, more efficient ways to provide access and mobility for pedestrians, bicycle riders and transit users, as well as motorists. They improve livability and quality of life for residents and shoppers. Just as with human diets, road diets without doctors’ (transportation planners and engineers) analyses and prescriptions, might be foolhardy.

**Mobility and Access Improve.** Four-lane roadways significantly discourage mobility and access of transit users (cannot cross these streets), pedestrians and bicyclists. Communities, interested in providing higher levels of service and broadening transportation choices, find street conversions essential to success. Cities like Toronto in Ontario, Canada; Santa Monica, Pasadena, Arcada and Mountain View in California; Seattle, Kirkland, Gig Harbor, University Place and Bellevue in Washington; and Portland, Eugene and Bend in Oregon; are finding funds to increase mobility and access by reducing the number of lanes and widths of arterial and collector streets.

**Conversions are Not New.** Transportation engineers and safety specialists have long known that overloaded two-lane or four-lane roads of any volume can be risky places to drive, conduct business, attempt to access transit, walk or bicycle. On such roadways, frequent turning movements into commercial and residential driveways can result in high crash levels. On multi-lane roadways lane swapping adds friction and reduces performance.

**Safety Improvements.** In the 1980’s Pennsylvania DOT engineers used FHWA safety monies to fully fund a study and to convert a one-mile section of Electric Avenue in Lewistown, Pennsylvania, from four lanes to three. The roadway was carrying 13,000 ADT. After reviewing hours of time-lapse video

and analyzing crash statistics and other data, the team concluded that more uniform flow, reduced conflicts and great reduction in crashes would result from four to three-lane conversion. The change was made facing 95% opposition from local residents, who felt that their trip times would increase.

Once the new roadway section was completed, new time-lapse photography and data collection began. Dangerous maneuvers and crashes dropped to nearly zero. Overall trip times were unaffected. Today nearly 95% of those fearing the change are openly thankful to PennDOT for making the roadway better for safety, mobility and access.



*Full roadway diets still move cars, but now the corridor moves people as well. Both Bellevue, Washington, and Mountain View, California, have converted formerly four-lane sections to pedestrian and bicycle friendly roads. Motorists benefit from more border width to fixed objects and are more comfortable with bicyclists and pedestrians.*

**Many Roadways Await Change.** America has a plethora of “leftover” four-lane roadways. Many bypasses and other road improvements leave four-lane roads ready for conversion. At the same time thousands of miles of new four-lane sections are proposed and built each year. Many of these roadways would be better designed with odd numbers of lanes or two lanes, plus medians with turning pockets.

During the past twenty years many new roadways have been constructed with three or five lanes. (Third or fifth lanes are scramble or two-way left turn lanes - TWLTLs.) These lanes add as much as 30 percent to efficiency of movement, and they often cut number of crashes in half. Significant bodies of research have

proven the value of shifting left turn movements from main through movement. Typically in these cases, however, roadways have been widened from two to three lanes or from four to five lanes.

This widening often converts sidewalks and paved shoulders or requires high cost, right-of-way acquisition. In many such cases “roadway improvements” only allow more cars into traffic streams, encouraging communities to become more car dependent. Increased congestion sends roadways’ *level of service* into long-term slide. Changes often generate more speed, noise and danger to people trying to walk, shop or live on main streets or neighborhood collectors. Property values can diminish, and towns lose their livability factors and competitive edges. This process of roadway widening can be thought of as fattening a patient. The belt is let out another notch, and the patient puts on a few more unhealthy pounds toward auto dependency.

**The Road Diet.** “Road dieting” is a new term applied to “skinnying up” patients (streets) into leaner, more productive members of society. The ideal roadway patient is often a four-lane road carrying 12-18,000 auto trips per day. Other roadway patients may be helped through this same process. Some especially sick four-lane patients may be carrying 19-25,000 cars per day, but still qualify for diets. What are the symptoms that scream for change? What roadways are ideal patients? And what are the upper limits?



### Spare Lanes Reward Speeders

*NW 8th Avenue in Gainesville, Florida. This four-lane roadway is an excellent candidate for "road dieting." Today, motorists race from the signal anticipating the merge to 2-lanes, 3000 feet ahead. Excessive speeds of 50 mph are common. School, park and bicycle trail crossing are located here. Two-lane roadway with bike lanes, medians and turning lane at the intersection is suggested by safety advocates as an alternative. The redesigned roadway would increase capacity by lowering speed.*

**Sick Road Patient Symptoms.** Four lane roadways often generate excessive speeds. These roadways also erode the ability for transit, walking and bicycling to succeed. How does this happen? Motorists using four-lane roadways, note that there are always spare lanes in their direction. They tend to drive faster than they should. Motorists using multi-lane roads seek to match speeds of other drivers. Imprudent, speeding drivers tend to set prevailing speeds. As traffic volumes increase, especially at rush hour, risk of high-speed driving increases. During peak volumes, right or left-turning movements occur. Also during these times, many motorists drive close to one another creating "screens" of impeded view. Last

minute, instant swapping of lane behavior to stay in motion leads to serious rear-end crashes. Motorists move from lanes of slowing vehicles directly into the backs of other motorists who have already slowed for their turns. The upper comfort range for arterial conversions appears to be between 20-25,000 ADT. Higher numbers have been achieved. Santa Monica officials feel most comfortable capping at 20,000, although they have hit 25,000.

**Pedestrians at Risk.** Pedestrians have rugged times finding gaps across four lanes. Crash rates and severity of conflicts with autos result in almost certain death (83% of pedestrians hit at 40 mph die). Many bicyclists find four-lane roads too narrow to ride comfortably. Transit users cannot safely cross streets at most locations. Thus, many people, who have formerly had mode choice, give up trying to cross streets converted to four lanes. Instead they join the daily traffic stream and add to the roadways' level of service drain.

**Typical Patient and Process.** Burcham Road in East Lansing, Michigan, was formerly a "fat road." Speeds were excessive. Pedestrians near the high school found it unsafe to cross the four-lane roadway. Neighbors complained about noise and danger. East Lansing's traffic engineer, John Matusik, P.E., felt that this roadway was a prime candidate for a road diet. The roadway carried 11-14,000 cars per day (AADT). Viewed from another perspective, 14,000 cars in four lanes over a ten hour period is only 3,500 per lane per day, or 350 per hour for a ten-hour period. Each lane is capable of carrying 1,900 cars per hour. Thus, cutting the number of lanes in half wouldn't affect traffic capacity.

**The Diet Begins.** The change on Burcham Road was made (see picture). With "leftover" road space John added turn lane (TWLTL) and bike lanes. The bike lanes give motorists more border width, moving them six feet further from fixed objects such as utility poles, hydrants and other fixed objects. Cars move today at more uniform speeds (prudent drivers set prevailing speeds). People are able to enter and exit driveways more easily.



### **Burcham Road's Four-Lanes to Three-Lanes**

*Pedestrians and motorists are more comfortable today. Motorists are easily 10 feet from fixed objects. As much as sixteen feet separate pedestrians from motorists.*

Pedestrians have six feet more separation from motorists. Comfort levels of all people using the corridor have markedly improved.

**Bigger Roads, Same Diet.** Once John had proven he could make a moderate volume, four lane into a healthier patient, he pushed Michigan DOT to use the same diet strategy on a higher volume road, the central artery through East Lansing, Grand River Boulevard. The 23,000 AADT roadway had been sluggish and risky for years. People did not enjoy living along it or driving, walking, using transit or bicycling this corridor. This roadway section was 1.1 miles in length. The roadway serves as a regional traffic distributor. It has minimal number of commercial driveways, thus turning movements are modest.

**Two Stage Implementation.** Michigan DOT staff took deep, uncertain breaths and made this higher volume road conversion in two safe, evaluative steps. As Michigan DOT resurfaced Grand River Boulevard, they wanted the option of going back to four lanes if the "experiment" didn't work. They painted new lane markings, using two-lanes, plus center turn lane (TWLTL). They omitted bike lanes in the first stage. Some drainage grates needed to be swapped before they added bike lanes. But they also wanted the chance to switch back. The conversion worked, but it was slightly shaky. With the loss of two lanes on the departure side of signalized intersections, traffic now merged into orderly, lower paced movement. Speeds came down to more preferred speed of around 35 mph (down from 40). Yet, some confusion remained. Resulting travel lanes were sixteen feet wide. Second stage markings were made six months later. Bike lanes were added, narrowing travel lanes to twelve feet. Speeds were reduced slightly more, and confusion ended. Today planners and engineers from both city and state report greater safety, efficiency, and more than adequate movement during peak hours. Again, people walking, using transit and bicycling find the area more comfortable and safe. Crash records are being kept. Potential conflicts and speeds are greatly reduced. Property owners are pleased with reduced speeding, noise and challenge of entering and exiting their driveways safely. Bike lanes give them more turning radius and improved sight triangles.

Today East Lansing is in the early stages of converting two to six more roadways. They find that they can make many of these conversions at no cost. They wait for lane markings to fade (easy with winter snow plow scraping), or they make changes with resurfacing projects.

**Other Cities, Higher Numbers.** East Lansing is not the first community to make these changes. Seattle, Portland and Santa Monica are three communities that have been making these lane

## High Volume Conversion in Kirkland



*For a short period during area road construction, Kirkland's Lake Washington Boulevard picked up additional load and was successfully carrying 30,000 ADT. This four-lane to three-lane conversion has been very successful. Note how much easier it is for motorists to enter and exit driveway., Added border width provides motorists safer conditions. Caution, this 30,000 figure is real for one portion of this roadway, but may be beyond the comfort range of many. For a more comfortable number 20-23,000 is achievable in most areas.*

reductions for years. Seattle made its first conversion (N 45th Street in 1972. Since then they have successfully converted 8 additional roadways. Many of these include commercial sections.

**Kirkland, Washington, Pushes Numbers to the Limit.** So far, the record for roadway conversion with highest traffic counts is Lake Washington Boulevard in Kirkland, Washington. This largely residential street travels by high priced homes with spectacular views of Lake Washington. When Lake Washington Boulevard was operated with four lanes, capacity problems were reached most evenings. Residents trying to enter or exit driveways on both sides of the road tended to constrain the flow on the 20,000 AADT roadway. Switching to three-lanes on the roadway was easy. The results were impressive not only to drivers, but to pedestrians, transit users and bicyclists as well. Motorists now had substantial added border width to fixed objects. Residents saw reduction in speeding and noise levels, and they could now enter and exit their driveways much more easily.

**Kirkland Tests Ceiling with Lake Washington Boulevard.** In 1995, Kirkland closed another roadway for reconstruction. They forced totals of 30,000 vehicles (ADT) onto the two + TWLTL roadway. The roadway never crashed. These extremely high numbers continue to astound researchers. What is the upper limit? This 30,000 ADT may be it. In most cases carrying capacity numbers must be lower.

Researchers do not have enough knowledge to say where and how peaks are reached, but many feel comfortable with 20-23,000 ADT's. Each community must set its own upper limits.

**Four-Lane to Two-Lane Conversions.** More aggressive diets drop four lanes down to two. Fewer roadways can undergo this more aggressive conversion. Roadway conversions in Toronto, Ontario, are proving safety and livability benefits of these changes, while holding to previous capacities. More than six formerly four-lane roadways have been converted to either two-lane roads with medians and turning pockets, or simply two lanes. St. George Street, a principal arterial through the University of Toronto Campus is perhaps the best known. This 16,000 ADT roadway owes its success to low number of driveways. The roadway holds its full capacity at intersections by keeping the previous number of storage lanes. The 1.1 mile roadway project was launched when a local benefactor to the University of Toronto challenged the city to the improvement by putting up her \$1 million in match money. The University contributed \$500,000 (Canadian), and the City of Toronto gave the additional \$2.5 million match for a total rebuild price of \$4 million. The road was totally reconstructed. New foundations, improved intersections, greatly widened sidewalks, bike lanes and full canopy of

## St. George Street in Toronto, Ontario



*(Right and Above) In 1997 this one-mile section of St. George Street was converted from four lanes to two lanes at a cost of \$4 M Canadian. The roadway carries the same capacity as before. Note capacity is well handled at each intersection. The project began when a benefactor to the University of Toronto pledged \$1M on the condition that the University and City would contribute the balance of \$3million.*

trees were placed. Today walking, transit and bicycling are pleasurable activities; speeding has dropped, and the center of campus has come alive with people.

**Other Four-Lane to Two-Lane Conversions.** Toronto has also converted five other roadways. In each case the same volume of auto traffic is serviced, always at lower, more appropriate speeds. As with four-lane to three-lane conversions, prudent drivers set the speed. Many of these additional roadways operate with 11-17,000 ADT. Some sections are reduced from four lanes to two lanes to incorporate critical pedestrian crossings; then they widened back out 1,000 feet further downstream. Many combinations of road diet techniques are practicable. Seattle, Washington; Portland, Oregon; Santa Monica and Mountain View, California; and dozens of other cities are making similar conversions. These streets are made more business, resident, transit, bicycle and pedestrian friendly by placing medians with turning pockets and bike lanes in the mix.

**What is the future?** In the past two years the principle author of this article, Walkable Communities Director, Dan Burden, has been to more than 500 cities in North America. Almost every town he visits has at least two or three streets ideal for conversion. In California, alone, more than 20 cities have made successful conversions. Dan's advice, "Elected officials, business leaders and engineers should look for easy conversions first." All but the most self-evident projects are likely to generate concern from business leaders and nearby residents who worry that traffic might back into their neighborhood streets. The public has come to believe that the only way to improve roadways is to widen entire sections. Model projects are needed.

**Best Model Projects.** First projects should include roadways with some of the following criteria:

- Ö Moderate volumes (8-15,000 ADT)
- Ö Roads with safety issues
- Ö Transit corridors
- Ö Popular or essential bicycle routes/links
- Ö Commercial reinvestment areas
- Ö Economic enterprise zones
- Ö Historic streets
- Ö Scenic roads
- Ö Entertainment districts
- Ö Main streets

**The Process of Change.** Street conversions are as much process as they are product. Due to the controversial nature of the first road diet conversions, it is essential to involve the public through highly interactive processes. As pointed out earlier in this article with Electric Avenue in Lewistown, Pennsylvania, 95 percent of the citizens were against the change.



Effective process often includes focus groups, and highly interactive workshops and designs. Citizens, residents and business owners should help design both process and product. Many cities are learning to conduct 3-6 day planning charrettes to gain input from a variety of people who then gain ownership of the results. Atlantic Boulevard in downtown Del Ray Beach, Florida, was converted from four-lane to two-lane roadway at the request of retailers. This request was the reverse of previous thinking. Merchants often feel that more traffic passing their doors is better for business. In Del Ray Beach the decaying downtown forced merchants to take another look. Retailers worked with the city manager, elected officials, and chamber of commerce to weigh their risks and suggest changes. The net result of this street conversion is one of the more successful downtowns in Florida, and significant increase in local sales and tax base for the town. Motorists did not leave Atlantic Boulevard to take advantage of two new lanes of travel on parallel streets. They come through the now attractive center, cruising at 15 mph.

<b>Lane Reductions of Select Street Conversions-- Volume Changes</b>				
<b>Roadway Section</b>	<b>Change</b>	<b>ADT (Before) (After)</b>		<b>Notes</b>
1. Lake Washington Blvd., Kirkland, Washington South of 83	4 lanes to 2 + TWLTL + bike lanes	23,000	25,913	
2. Lake Washington Blvd, Kirkland, Washington Near downtown	4 lanes to 2+ TWLTL + bike lanes	11,000	12,610	
3. Electric Avenue, Lewistown, Pennsylvania	4 lanes to 2 + TWLTL + bike lanes	13,000	14,500	
4. Burcham Road, East Lansing, Michigan	4 lanes to 2 + TWLTL + bike lanes	11-14,000	11-14,000	
5. Grand River Boulevard, East Lansing, Michigan	4 lanes to 2 + TWLTL + bike lanes	23,000	23,000	
6. St. George Street, Toronto, Ontario, Canada	4 lanes to 2 + bike lanes + wide sidewalks	15,000	15,000	
7. 120th Avenue, NE Bellevue, Washington	4 lanes to 2 + TWLTL	16,900	16,900	
8. Montana (commercial street) Bellevue, Washington	4 lanes to 2 lanes + TWLTL 4 lanes to 2 + median + bike lanes	18,500	18,500	
9. Main Street Santa Monica, California	4 lanes to 2 lanes + TWLTL 4 lanes to 2 + median + bike lanes	20,000	18,000	

## Lane Reductions of Select Street Conversions-- Volume Changes

Roadway Section	Change and Date	ADT (Before)	ADT (After)
9. Danforth Toronto, Ontario, Canada	4 lanes to 2 + bike lanes 4 lanes to 2+ turning pockets+ bike lanes	22,000	22,000
<b>Seattle, Washington</b>			
10. Greenwood Avenue N, from N. 80th St to N 50th	4 lanes to 2, plus TWLTL Plus Bike lanes April, 1995	11,872	11,2427
11. N 45th Street in Wallingford Area Seattle, Washington	4 lanes to 2 lanes plus TWLTL December, 1972	19,421	20,274
12. 8th Ave. NW in Ballard Area Seattle, Washington	4 lanes to 2 lanes plus planted median with turn pockets January, 1994	10,549	11,858
13. Martin Luther King Jr. Way, north of I-90	4 lanes to 2 lanes plus TWLTL, plus bike lanes Jan 1994	12,336	13,161
14. Dexter Avenue, N. East side of Queen Anne Area	4 lanes to 2 lanes plus TWLTL and bike lanes	13,606	14,949
15. 24th Ave. NW, from NW 85th St. to NW 65th St.	4 lanes to 2 lanes plus TWLTL	9,727	9,754
16. Madison St., from 7th Ave. to Broadway	4 lanes to 2 lanes plus TWLTL	16,969	18,075
17. W. Government Way/Gilman Ave. W., from W Ruffner St. to 31st Ave. W.	4 lanes to 2 lanes plus TWLTL plus bike lanes	12,916	14,286

**Dan Burden** served for sixteen years as state bicycle and pedestrian coordinator for the Florida Department of Transportation. In his new role as the director of Walkable Communities, Inc., Dan has promoted and helped the process for more than a dozen conversions of collector and arterial streets. Dan teaches courses for the Federal Highway Administration, National Highway Institute and the National Highway Traffic Safety Administration. Dan is the author of the Healthy Streets booklet which provides guidelines for building traditional neighborhood development (TND), published by the Local Government Commission, Center for Livable Communities. For more information contact webpage: [www.lgc.org/clc/](http://www.lgc.org/clc/)

**Peter Lagerwey** is the pedestrian/bicycle coordinator for the City of Seattle Engineering Department. Peter has overseen and monitored conversion of four street lane reduction projects. Peter recently spent a full year on assignment as pedestrian/bicycle planner for Perth, Australia. Peter is an instructor for FHWA's Pedestrian Road Show, as well as for a number of state agencies.

**Additional Article:** See Andrew G. MacBeth, P.E. Calming Arterials in Toronto, paper delivered to the 68th ITE Annual Meeting, August 10, 1998 (Accepted by ITE for 1999 publication in ITE Journal)

## Data on Street Conversions - Seattle, Washington

ROADWAY SECTION	DATE CHANGE	ADT (BEFORE)	ADT (AFTER)	CHANGE
Greenwood Ave. N, from N 80th St. to N 50th St.	April 1995	11872	12427	4 lanes to 2 lanes plus TWLTL plus bike lanes
N 45th Street in Wallingford Area	December 1972	19421	20274	4 lanes to 2 lanes plus TWLTL
8th Ave. NW in Ballard Area	January 1994	10549	11858	4 lanes to 2 lanes plus planted median with turn pockets as needed
Martin Luther King Jr. Way , north of I-90	January 1994	12336	13161	4 lanes to 2 lanes plus TWLTL plus bike lanes
Dexter Ave. N, East side of Queen Anne Area	June 1991	13606	14949	4 lanes to 2 lanes plus TWLTL plus bike lanes
24th Ave. NW, from NW 85th St. to NW 65th St.	October 1995	9727	9754	4 lanes to 2 lanes plus TWLTL
Madison St., from 7th Ave. to Broadway	July 1994	16969	18075	4 lanes to 2 lanes plus TWLTL
W Government Way/Gilman Ave. W, from W Ruffner St. to 31st Ave. W	June 1991	12916	14286	4 lanes to 2 lanes plus TWLTL plus bike lanes
12th Ave., from Yesler Way to John St.	March 1995	11751	12557	4 lanes to 2 lanes plus TWLTL plus bike lanes

			CAR & CAR		Sub total			S ub to tal	CAR & PED		S ub to tal	TO TAL	% CHA-NGE	FATAL		TO TAL	INJURIES		TO TAL	% CHAN-GE
			I	M-B		I	M-B		I	M-B				I	M-B		I	M-B		
1	Greenwood Ave N & N 80 Street	BEFORE	19	5	24	0	0	0	0	0	0	24	-58.3	0	0	0	10	5	15	-20.0
		AFTER	5	4	9	0	1	1	0	0	0	10		0	0	0	6	6	12	
2	N 45 Street & Wallingford Av N	BEFORE	6	37	43	0	0	0	1	1	2	45	-48.9	0	1	1	2	5	7	+14.3
		AFTER	11	12	23	0	0	0	0	0	0	23		0	0	0	3	5	8	
3	8 Ave NW & NW 65 Street	BEFORE	8	7	15	2	0	2	0	1	1	18	-61.1	0	0	0	6	2	8	-37.5
		AFTER	5	1	6	0	0	0	1	0	1	7		0	0	0	4	1	5	
4	ML King Jr Wy & Yesler Way	BEFORE	8	7	15	0	0	0	0	0	0	15	-60.0	0	0	0	4	6	10	-80.0
		AFTER	4	2	6	0	0	0	0	0	0	6		0	0	0	2	0	2	
5	Dexter Ave N & Roy Street	BEFORE	12	4	16	1	0	1	2	0	2	19	-15.8	0	1	1	6	1	7	+114.3
		AFTER	9	7	16	0	0	0	0	0	0	16		0	0	0	6	9	15	
6	24 Ave NW & NW 80 Street	BEFORE	11	3	14	0	0	0	0	0	0	14	-28.6	0	0	0	9	1	10	+60.0
		AFTER	5	4	9	0	0	0	1	0	1	10		0	0	0	10	6	16	
7	Madison Street & Boren Avenue	BEFORE	12	15	27	0	0	0	0	1	1	28	0	0	0	0	9	7	16	-37.5
		AFTER	9	18	27	0	0	0	1	0	1	28		0	0	0	5	5	10	
8	Gilman Ave W & W Emerson Pl	BEFORE	5	1	6	0	0	0	0	0	0	6	0	0	0	0	0	2	2	-100.0
		AFTER	3	3	6	0	0	0	0	0	0	6		0	0	0	0	0	0	
9	12 Avenue & Cherry Street	BEFORE	5	8	13	1	0	1	2	0	2	16	0	0	0	0	5	1	6	+16.7
		AFTER	4	11	15	1	0	1	0	0	0	16		0	0	0	3	4	7	
	TOTAL	BEFORE	86	87	173	4	0	4	5	3	8	185	-34.1	0	2	2	51	30	81	-7.4
		AFTER	55	62	117	1	1	2	3	0	3	122		0	0	0	39	36	75	

\*LEGEND: I = Intersection  
M-B = Mid-Block

# Additional Road Diets Experiences

## Santa Barbara

Over a decade ago, the City of Santa Barbara created bike lanes on two parallel one-way streets by removing one of the two existing traffic lanes. The City's original proposal was to remove parking from one side to keep two traffic lanes plus put in a bike lane. But since the streets are mostly residential, the people pressured the City to keep parking and lose a traffic lane instead. Just about everybody thinks that it's a good solution.

In the next two months, another street will change from 4 traffic lanes to three (middle turn lane) plus bike lanes on both sides.

*Ralph Fertig*

*Santa Barbara Bicycle Coalition*

*www.sbbike.org*

## Palo Alto

Palo Alto did so on two streets (University Ave. & East Meadow Drive) in 1974 as part of its overall bikeways plan. Since then Mountain View has done so on at least two streets, and just recently Sunnyvale has approved doing so on part of Mathilda.

*Ellen Fletcher*

## Sacramento

In Sacramento, on Auburn Boulevard, the city installed a bike lane by taking out on-street parking. After a few months of this, the businesses howled. The City Council decided that the viability of the businesses were more important, so they took the bike lane back out and put the parking back in.

This didn't happen that easily, though, since I put the question to the traffic engineers about taking the travel lane space and give it to bikeway space. We were lucky this time, since there were two travel lanes one direction and one travel lane going the other. When we challenged the staff to find out if they could shift the center line over so that it was one travel lane in each direction, they answered that, yes, indeed this was a possibility. So they did it, and we got our bike lanes back and the businesses had their parking! My only complaint was the time it took to get the final product. It took them less than a week to re-establish the on street parking, and over a year to re-adjust the lane striping. So, in a round-about way, we did get a travel lane removed for the installation of a bike lane. But it was with a lot of luck that this happened. It isn't that common to find a spare travel lane that has a low enough ADT to let the traffic engineers feel like giving it over to the bicycles. This incident is unusual for Sacramento, so I wouldn't necessarily consider it to be the result of progressive thinking--they still need some help in that department.

*Ed Cox*

*edcox@jps.net*

## Santa Cruz

Santa Cruz has proposed reducing Soquel Avenue from 4 lanes to 3 (two plus turn lane) in order to install bike lanes, but has not yet done so.

## Cambridge

A portion of Massachusetts Avenue, the main drag of Cambridge, MA (also a state numbered route) was redesigned, going from 4 lanes to 3, allowing not only bicycle lanes but also wider sidewalks and maintaining parking. ADT is approx. 21,000. There are a couple of turning lanes. The project was completed about a year ago.

*Cara Seiderman*

*City of Cambridge, MA*

## Mountain View and Sunnyvale

1) A few years ago Mountain View, CA restriped the section of Dana Street from Calderon to Pioneer (across Highway 85, the Stevens Creek Freeway), from 2 lanes each direction to 1 lane + bike lane in each direction, adding a planted median. Contact [rene.dalton@ci.mtnview.ca.us](mailto:rene.dalton@ci.mtnview.ca.us), their BAC staffer, for details.

2) Mountain View also restriped Cuesta (Drive?) west of Miramonte from 4 lanes down to 3 (i.e. center turn) with bike lanes. This was done during a sewer line upgrade that required tearing up that whole stretch anyway. That end of Cuesta abuts neighboring Los Altos, which never did 4-lane their collector streets back when Silicon Valley was rapidly building out its street network; I believe that stretch of Cuesta didn't really need 4-lane capacity anyway.

3) Sunnyvale, CA just decided to restripe Mary Avenue between Fremont Avenue and Homestead Road to add bike lanes. I don't know the details on before and after lane counts on that stretch, but believe it's currently 2 lanes with on-street parking and a center 2-way left turn lane. Contact [pubworks@ci.sunnyvale.ca.us](mailto:pubworks@ci.sunnyvale.ca.us) or BAC staffer Jack Witthaus <[jwitthaus@ci.sunnyvale.ca.us](mailto:jwitthaus@ci.sunnyvale.ca.us)>.

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<http://www-facilities.stanford.edu/transportation>*

## Greenbelt, MD

Glad you asked. The City of Greenbelt, MD eliminated two traffic lanes on Ivy Lane and Cherrywood Lane to make room for bicycle lanes to the new Greenbelt Metro Station. The objectives were to (1) improve bicycle access to the Metro Station (2) to calm traffic (3) to improve aesthetics and (4) to provide a median area for pedestrians crossing the road. We are very happy with the results. Eventually, we plan to landscape the median. The plans caused a tremendous uproar in 1996. The City received letters and complaints from the County Executive, the Governor and our Congressman. They called Cherrywood Lane crucial to development plans near the Greenbelt Metro Station.

The configuration was 12'-12'-12'-12'-12' narrowing to 12'-12' 12'-12' at an overpass. The configuration today is 8'-6'-11'-18' median-11'-6' narrowing to 6'-11'-14' median-11'-6' at the overpass. The 8' lane is a parking lane. The 6' lanes are marked and signed as bike lanes.

Greenbelt has a 60 year tradition of innovative planning and of making bicycle and pedestrian access a priority. Our City Council loves to talk about Greenbelt's bike lanes.

*Bill Clarke  
Chairman, Greenbelt Bicycle Coalition*

## Austin, TX

To date we have removed travel lanes from two streets to make bike lanes. These streets were operating below capacity as striped and we could demonstrate that the level of service would be acceptable after the changes. There has been serious opposition to one near a federal IRS/Treasury/Veteran's complex. The administrators were convinced that the roadway with bike lanes would make their lives miserable due to increased congestion. They continue to pressure the department and City Council so the final outcome is uncertain at this time.

We are considering several other streets to remove travel lanes in favor of bike lanes, but it will take some time to go through the political process to get this done.

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## Ottawa

We have a project in Ottawa where a bridge is being reconstructed. The original cross-section included two HOV (buses only) lanes and four car lanes (2 in each direction). The new cross-section includes two HOV (buses only) in the outside lanes, then two car lanes and two bicycle lanes (one in each direction). A median was also added. In essence, two car lanes were given over to bicycle lanes and a median. The bridge opens this spring - we can hardly wait!

*Daphne Hope*  
*Alternative Transportation Planner*

## Denver

In Denver, we are removing 2 lanes of traffic on a collector street for approximately 2000' alongside a city golf course so that we can build a 12' wide bikeway/multi use trail alongside the golf course frontage. The lanes on the street were very narrow (10' wide I think) and the center turn lane served little purpose. The bike route that we will sign runs the full width of the city - this was the major missing link. The process to do this was NOT FUN.

*James MacKay*

## Boulder

Last year, after significant public process, the City of Boulder also removed a traffic lane to add a bike climbing lane on Table Mesa Drive. The roadway was built in a era of different development expectations, and traffic counts indicated that this could easily be done. However there was still significant public concern, which was in part addressed by first doing a trial run where we blocked the lane with barricades for three weeks and collected data, and then by selecting a non-structural project design where the changes were made by paint rather than moving the curb face. This addition links several significant bike facilities and is working great.

*Randall Rutsch*  
*Transportation Planner*  
*City of Boulder, CO*

## Salem, OR

The city of Salem, Oregon reconfigured 4 lanes to two lanes plus center turn lane and bike lanes on 17th Street and possible others.

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## Portland & Corvallis

The cities of Corvallis and Portland removed a travel lane from one-way couplets that had 4 lanes in each direction (they now have 3). On top of bike lanes, motorists benefit from the reduced need to weave (getting from one side to the other in anticipation of having to turn left or right), and pedestrians benefit from easier crossing (Portland reduced pavement width and widened sidewalks and built curb extensions at sidewalks). ODOT bicycle and pedestrian program was instrumental in preventing a couplet project from going to four lanes in one direction, and keeping at 3 (Albany). So it's not uncommon. Seattle does it for traffic-calming.

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## Hamilton, Canada

Just to add a Canadian perspective: The City of Hamilton, Ontario converted Stone Church Road from 4 lanes to 3 lanes (center left turn lane) with bicycles being accommodated in wide curb lanes. A similar conversion will take place this spring on Lawrence Road, this time using painted bicycle lanes. We also converted 2 major five-lane streets to 4-lane with wide curb lanes in 1994, but Regional Council directed conversion back to the original configuration about six months into the trial.

*Hart Solomon*

*Manager of Traffic Engineering and Operations*

*City of Hamilton, Ontario*

## London, UK

I think it has been done here in London, England. For example, the London Borough of Ealing, has, I believe, removed some car lanes on the Uxbridge Road, the A4020, that heads west out of London, adding bike lanes instead. The current cry by bike activists here in England is 'reallocating road space' How much it is actually being done, though, I do not know. Bike lanes are somewhat new here in England, and all the fiascoes of a quarter a century ago in the USA seem to be being repeated here

*JeremyParker@compuserve.com*

*London, England*

## Toronto

In Toronto, we have removed traffic lanes on approximately 18 km (12 miles) of downtown streets (eight different streets) to provide bike lanes. These routes represent about two thirds of our existing bike lanes.

Typical downtown arterial widths are 12.8 to 14.0 meters wide and striped as four lane two way roads with both curb lanes accommodating parking in the off-peak hours. During peak hours parking is generally prohibited on both sides so the roads operate as four lane roads.

To incorporate bike lanes on a road 12.8 meters (42 feet) wide we permit 24-hour parking on one side (2.0 meters wide) , provide a bike lane (2.0 meters) next to parking, two general traffic lanes (3.5 meters) and a bike lane next to the curb (1.8 meters). Left turn lanes are provided at signalized intersections to maintain capacity. The length of the left turn slot is determined by the left turn demand, with a typical length being 15 meters. Curbside parking stops in advance of the intersection to accommodate the additional lane required for left turns and to make the transition between a bike lane adjacent to parking and a bike lane next to the curb. It is a fine balance because the longer the left turn slot the less parking we can provide. Parking is definitely the most politically sensitive issue when implementing bike lanes.

To incorporate a bike lane on a road 14.0 meters (46 feet) wide we permit 24-hour parking on both sides (2.0 meters wide), provide two bike lanes (1.8 meters) next to parking and two general traffic lanes (3.2 meters). Again, left turn lanes are provided at signalized intersections to maintain capacity.

Based on our experience in the past few years we have concluded that the two above designs can work well on roads with up to approx. 18,000 vehicles per day.

We have also provided bike lanes through three railway underpasses by, in each case, eliminating two general traffic lanes (from four to two lanes -one in each direction) in order to provide two bike lanes. One of these carried 22,000 vehicles per day.

On another 1.6 km stretch of roadway (55,000 vehicles per day) we reduced six general traffic lanes to five lanes to accommodate two bike lanes over a bridge connecting east end neighborhoods to the Central Area. Bicycle volumes on this route increased to approximately 3,000 bicycles per summer weekday; weekday average throughout the year is 1,800 bicycles per day). In another case we reduced a six lane road with 30,000 vehicles per day to four general traffic lanes (five at signalized intersections) to accommodate bicycle lanes in each direction.

## Greater Vancouver's experience:

"In the Greater Vancouver Region, two municipalities have removed a traffic lane for bikes. The City of Surrey along their East Whalley Ring Road and the City of Richmond along Williams Road. In both instances, four lanes of traffic (two in each direction) were reduced to three lanes to provide bike lanes. The third middle lane functions as a left turn lane for both directions of traffic. I can give contacts if anyone wants more details.

*Doug Louie, P.Eng.*

*City of Vancouver."*