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Transportation Planners and Engineers

TECHNICAL MEMORANDUM

To:	City of Alexandria	Jennifer Slesinger, Principal Planner
From:	Drew Ackermann Daniel Solomon, AICP Robert B. Schiesel, P.E.	
Date:	May 7, 2020	
Subject:	Cut-Through Traffic Mitigation Research	

Introduction

Cut-through traffic, and notably cut-through traffic on neighborhood streets by regional drivers avoiding highway congestion, has become a concern across the country and in the City of Alexandria. Cut-through traffic has had numerous negative impacts on residents, including aggressive driving, air pollution, noise, and increased volumes and speeds on streets that weren't designed for them. Cut-through issues access the country appear to have been exacerbated by Waze and other navigation apps which route non-local traffic onto local streets to avoid congestion on highways or arterials.

Municipalities across the country have undertaken efforts to mitigate cut-through traffic, with strategies ranging from turn restrictions and traffic calming devices to signal modifications, roadway design changes, and highway ramp metering. This report reviews the cut-through mitigation programs of nine municipalities across the United States, including five in the Washington, DC region, highlighting their advantages, disadvantages, costs, and results, with the goal of helping Alexandria identify and implement a cut-through mitigation program that fits the needs of the City.

The following trends and key takeaways from this review are mentioned below and presented in further detail in the Summary section of the report:

- Turn restrictions can cause longer and more circuitous routes for residents, visitors, and deliveries to affected streets, except for residents who are eligible for exemption permits.
- Allowing meaningful public engagement is critical for programs being well-perceived and supported by residents.
- Technologies such as Bluetooth or StreetLight are sometimes used to identify cut-through traffic problems, but jurisdiction staff judgement and resident input are more common in identification of problems and development of solutions.
- Several jurisdictions have pivoted their initial street-specific cut-through mitigation efforts to jurisdiction-wide traffic calming after realizing that localized mitigations often simply pushed cut-through problems to other neighborhoods.
- Most cut-through programs are focused primarily on localized mitigations on certain streets, but some include more aggressive, corridor-scale measures that have resulted in substantial traffic reduction.

Overview of Cut-Through Programs

Over a dozen cut-through mitigation programs across the country were reviewed and considered for inclusion in this report. This list was ultimately narrowed down to nine jurisdictions, six of which were selected for interviews with staff to obtain insights that weren't available in public documents. A summary and comparison of these nine jurisdictions' programs is shown in Table 1.

Table 1: Summary of Jurisdictions

	Fremont, CA	Manhattan Beach, CA	Bellevue, WA	West Palm Beach, FL	Chevy Chase, MD	Falls Church, VA	Fairfax County, VA	Stafford County, VA	Rockville, MD
	NATIONAL CASE STUDIES				*LOCAL CASE STUDIES*				
Interviewed for report	✓	✓			✓	✓	✓		✓
Program elements									
Highway ramp metering	✓						✓		
Turn restrictions	✓	✓	✓	✓	✓	✓	✓	✓	✓
Traffic calming		✓	✓	✓				✓	✓
Resident exemption permits						✓	✓		
Traffic signal adjustments	✓	✓							
Use of StreetLight technology [1]	✓								
Use of Bluetooth technology [2]		✓							
Partnership with navigation apps	✓								

National Case Studies

Fremont, California

Note: An interview with Fremont staff was conducted for this section.

Fremont's traffic congestion program is aimed at mitigating the "Fremont funnel effect", which results from a jobs-housing imbalance between Silicon Valley (to Fremont's south/southwest) and the Tri-Valley, Contra Costa County, and Central Valley areas (to Fremont's east/northeast), leaving Fremont in the middle of traffic demand paths.

Many of Fremont's cut-through problems center on Mission Boulevard, an arterial running parallel to Interstate 680. This roadway has long been known by locals as a freeway alternative, but only with the recent advent of Waze and other navigation apps has Mission Boulevard and its connecting residential streets been burdened with substantial cut-through traffic not originating or ending in Fremont.

In response to increased complaints from residents about app-driven cut-through traffic, the City of Fremont began implementing mitigation measures in 2016. These measures include:

- Activating freeway on-ramp meters the California Department of Transportation (Caltrans) had already installed on I-680, which remove an incentive for through-traffic to divert to side streets by keeping the Interstate running more smoothly;
- New stop signs on Paseo Padre Parkway, a popular cut-through route running parallel to I-680;

[1] StreetLight Data is an interactive transportation data platform that provides access to Big Data resources and processing software, including customizable traffic analysis between user-selected zones. This can help differentiate between local and non-local (cut-through) traffic in given neighborhoods or streets, providing guidance on where cut-through mitigations may be desired.

[2] Bluetooth is a wireless technology standard used to exchange data between fixed and mobile devices. The recent inclusion of Bluetooth capability in both vehicles and mobile devices allows analysis of real-time travel data.

- Participation in Waze's Connected Citizens Program, an information exchange system between Waze and city governments;
- The Neighborhood Cut-Through Traffic Relief Project, administered by Fremont's Public Works and Police Departments, which includes peak-hour turn restrictions in four neighborhoods that have been severely impacted by cut-through traffic; and
- A new signal timing strategy on Mission Boulevard which adds delay at intersections, eliminating the benefits of using it as a cut-through route.

Fremont used StreetLight technology to identify the areas most affected by cut-through traffic, but didn't rely heavily on Bluetooth data.

Fremont participated in Waze's Connected Citizens Program, but found the program had limited efficacy in curtailing cut-through traffic. Rather, navigation apps' algorithms only stopped routing drivers to residential streets when city-initiated restrictions and signal modifications went into effect.

A map provided by the City of Fremont showing its cut-through countermeasures is shown in Figure 1.

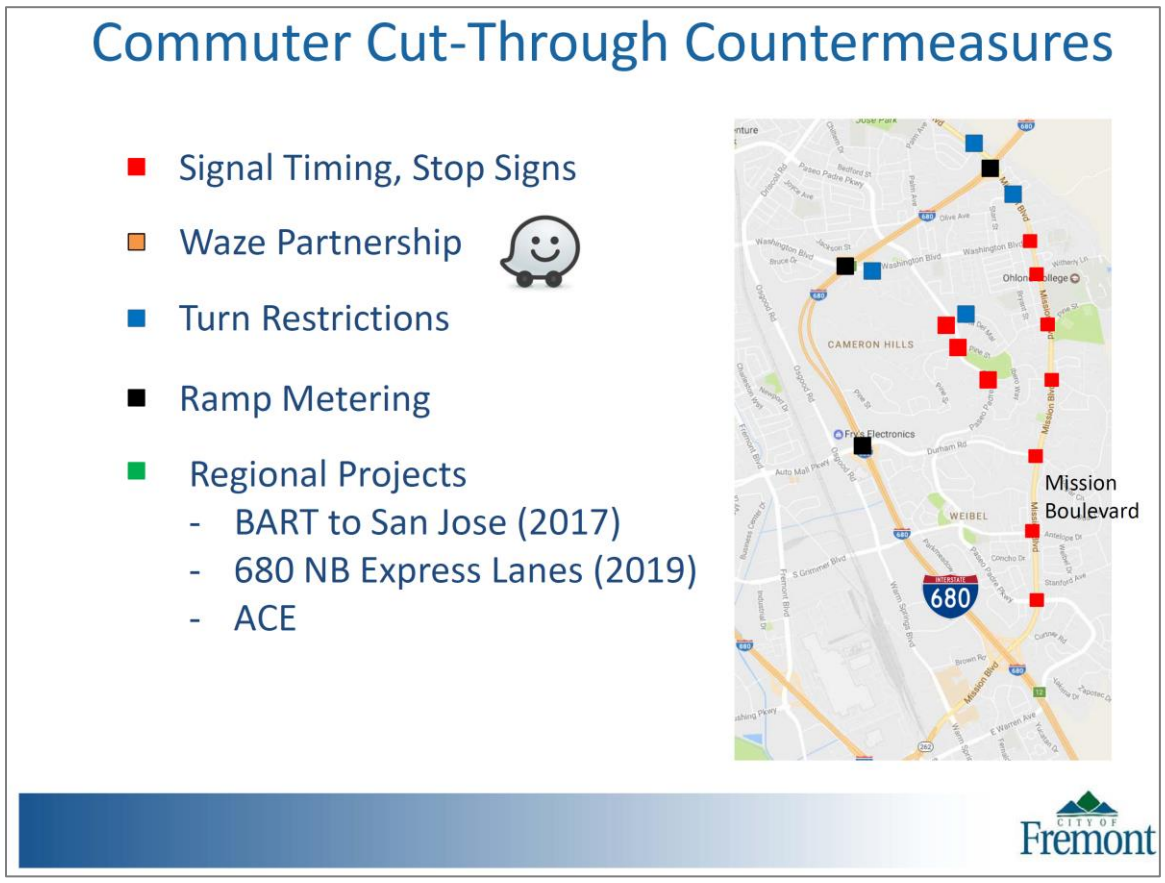

Figure 1: Fremont Commuter Cut-Through Countermeasures

Because these programs are not items in Fremont's Capital Improvement Program (CIP), their distinct costs are difficult to differentiate. Initial implementation of the signal timing, stops signs, and turn restrictions required a significant amount of City staff time, but capital costs were low as they generally only included new signs. (The ramp meters were already installed by Caltrans.)

The cut-through mitigations have affected Fremont residents and businesses differently, so community reactions have predictably been varied. For example, residents and businesses along Mission Boulevard now have longer travel times as the signals and turn restrictions apply to all motorists, local or non-local. Similarly, while cut-through relief has arrived for some residential streets along Mission Boulevard, those residential streets which were not previously impacted by cut-through now have longer travel times than before, since every street connecting to Mission Boulevard is affected by the changes. Some residents who weren't previously impacted have wanted Mission Boulevard to return to its previous state.

While Fremont did not set any specific targets to measure the projects' success, it has seen substantial localized results, including a 33% drop in traffic congestion on Mission Boulevard and a 70%-90% drop in cut-through traffic in neighborhoods where turn restrictions were implemented. The City found that after the Mission Boulevard adjustments, cut-through drivers who relied more on app-based navigation than on memory or habit did not return to Mission Boulevard once the apps stopped routing them there.

However, the City also found that some cut-through traffic simply rerouted to other local streets as the navigation apps adjusted their algorithms. Rather than pursuing similar localized mitigations elsewhere and pushing the problem from neighborhood to neighborhood, Fremont has since shifted its focus toward addressing the underlying regional issues that cause cut-through and other traffic congestion, like the Bay Area's housing imbalance and its need for more robust multimodal transportation options.

The City of Fremont is also pursuing a coalition with other Bay Area jurisdictions to advocate for state regulations preventing navigation apps from routing non-local trips onto local residential streets.

Manhattan Beach, California

Note: An interview with Manhattan Beach staff was conducted for this section.

The City of Manhattan Beach administers the Neighborhood Traffic Management Program (NTMP), whose goal is improving the safety and livability of neighborhood streets by assisting residents in addressing local traffic concerns. The NTMP has been in place since 2002.

The City has published a NTMP Handbook outlining both the process by which residents obtain consideration for traffic control measures, and a list of traffic control tools the City implements. These tools are categorized by level, with higher levels being costlier, more complex to implement, and more restrictive on vehicular movement. A list of tools is shown on Table 2.

Table 2: Manhattan Beach Traffic Control Tools

Level One tools	Level Two tools	Level Three tools
Enhanced police enforcement	Traffic signal adjustments to discourage cut-through traffic	Raised crosswalks
Speed monitoring trailers	Turn restrictions via signage	Raised intersections
Neighborhood Traffic Watch Program	Rumble strips/dots	Traffic circles
Higher visibility crosswalks	Raised median island	Restricted movement barriers
Pedestrian crossing signs	Entry island (neighborhood identification island)	Entrance barrier/half closures
Electronic speed limit signs/larger static speed limit signs	Mid-block narrowing	Diagonal diverters
	Chokers at intersections	
	Lane reduction/lane narrowing (restriping)	
	Stop signs as traffic control measures	
	Parking restrictions	

The Handbook includes a detailed description of each tool including its advantages, disadvantages, cost, problems it's meant to target, and criteria for implementation. More detailed information about implementation criteria can be found in Section B of the Appendix.

Manhattan Beach has implemented the NTMP in the form of neighborhood studies for various areas within the City. Study areas have included entire neighborhoods or clusters of neighborhoods, as well as a study for each public school in the City. Neighborhood studies are initiated by a written request from residents, after which City staff determine whether the request should be handled as part of normal traffic engineering or police functions, or if it qualifies for consideration as a NTMP project.

Once a NTMP project is established, the City takes an iterative approach, first implementing Level One tools and following up with Level Two tools only if City staff deem it necessary. As of 2020, the City has not advanced any NTMP project to Level Three tools. There are no quantifiable measures used to determine either an installation's success or need for further action. Rather, City staff use professional judgment to make that determination.

Recent technologies like Bluetooth data are generally not used for NTMP projects, but have been used for traffic flow studies on arterials, which the City tries to optimize to discourage cut-through traffic on residential streets.

The cost of the program varies year to year depending on how many studies the City is undertaking, but is generally low as signs and striping are already included in the City's public works budget for general maintenance.

The City has found the NTMP beneficial as it provides an orderly framework to concentrate traffic calming efforts, both as planned projects and as responses to residents' traffic concerns. The NTMP also emphasizes residents' ability to take ownership and provide input on plans, which has resulted in generally positive feedback.

However, the program is not without drawbacks. Since installations often include new signs, the City has received complaints from residents if a sign is placed directly in front of their property. The City has also found that cut-through mitigation measures sometimes create new traffic problems elsewhere.

Bellevue, Washington

In response to resident complaints about cut-through traffic on a particular road in Bellevue's Woodridge neighborhood, the City of Bellevue installed an all-way stop and crosswalk, "residential area" signs at all entrances to the Woodridge neighborhood, and implemented afternoon peak hour turn restriction signs along 128th Avenue SE, a local street which was being used as an alternative to nearby Richards Road, a major arterial.

The turn restrictions resulted in a 75-80% reduction in left-turning vehicles from 128th Avenue SE to SE 32nd Street, which was the direction of cut-through traffic the restrictions were meant to target. Routing apps stopped directing drivers through the area as a result of the turn restrictions, and evening and daily traffic volumes decreased on most streets in the Woodridge neighborhood. It should be noted, however, that this result may not apply universally. The Woodridge neighborhood has relatively few access points from the outside, making targeted turn restrictions more effective at determining overall neighborhood traffic volumes, especially if a large portion of neighborhood traffic is cut-through.

The program was funded by the City of Bellevue's Neighborhood Traffic Safety Program with a budget of $25,000. The Neighborhood Traffic Safety Program is an arm of the City's Transportation Department specifically tasked with mitigating unwanted parking and traffic problems. The program's cut-through mitigation and traffic calming measures include chicanes/slow points, full street closures (except for pedestrians, cyclists, and emergency vehicles), partial (one-way) street closures, neighborhood entrance islands, and other tools. Implementation criteria for these programs can be found in Section C of the Appendix.

West Palm Beach, Florida

The City of West Palm Beach's first traffic calming program was implemented in 1994 to address speeding, collisions, and cut-through traffic. It contained an elaborate evaluation, planning, and implementation process that burdened City staff and proved successful only in more affluent neighborhoods with established community organizations.

In 1996, the City adjusted its approach to traffic calming, creating Transportation Planner staff positions and keeping policies nonprescriptive, giving staff flexibility to use professional judgement in deciding which measures to implement.

The City's traffic calming program includes the following measures:

- Traffic circles;
- Chokers/chicanes; and
- Speed bumps.

While many of the City's traffic calming measures have the effect of reducing cut-through traffic, the City does not consider measures specifically designed to reduce cut-through (like diverters or turn restrictions) to inherently serve the goal of traffic calming. This is because cut-through measures can simply divert speeding and increased traffic volumes onto other streets, as well as lengthen vehicle trips and impede emergency access. In fact, the City discourages the use of route modifications, instead focusing on the goal of maintaining interconnected access, but with street designs citywide that mitigate the negative effects motor vehicles have on safety and livability.

Local Case Studies

Chevy Chase, Maryland

Note: An interview with Chevy Chase staff was conducted for this section.

The Town of Chevy Chase conducted a town-wide traffic assessment in 2002, which resulted in a traffic calming plan designed to limit cut-through traffic and reduce vehicle speeds. The resulting traffic restrictions, shown on the graphic below, have been unchanged since they went into effect following the 2002 traffic assessment.

After the initial study and installation of restriction signs, the Town's only costs for the program have been police enforcement of the restrictions. The Town did not use Bluetooth or other recently developed technologies in implementing the program.

Like other cut-through mitigation programs, the Town faces the trade-off of residents having to navigate turn restrictions in their own neighborhoods in exchange for less cut-through traffic.

A new town-wide traffic study is currently being developed that captures recent changes in Chevy Chase, including increased development in nearby Bethesda and construction of the Purple Line light rail line.

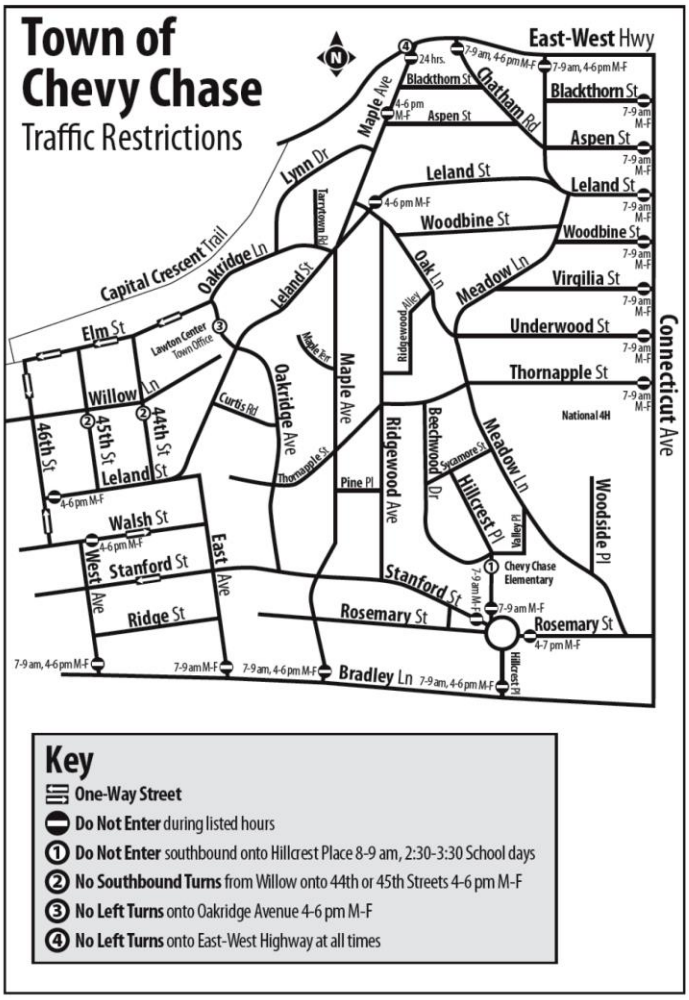

Figure 2: Chevy Chase Traffic Restrictions

Falls Church, Virginia

Note: An interview with Falls Church staff was conducted for this section.

The City of Falls Church has implemented peak hour access restrictions on three residential streets to combat cut-through traffic. The streets, located in the area between Hillwood Avenue and Broad Street, were chosen based on both resident complaints and traffic issues known to City staff.

Residents of these and certain adjacent streets are eligible for permits exempting them from the restrictions. Permit placards are not displayed on windshields but kept inside the vehicle for the driver to produce if asked. Enforcement is demand-driven and based on resident requests.

Falls Church does not currently intend to add more access restrictions to streets, but is instead focused on its Neighborhood Traffic Calming Program which seeks to reduce vehicle speeds and volumes citywide rather than targeting cut-through traffic specifically. The Neighborhood Traffic Calming Program began in 2005 and has since been updated twice to improve its efficiency and effectiveness. Residents initiate traffic calming projects by contacting the City, which then determines whether the issue can be handled administratively or if a more involved process is required. If the latter is true, the initiating resident distributes a petition to confirm community support. If 51% of study area residents sign the petition, the City asks for working group volunteers and collects traffic and other site-related data. Finally, the City assigns a priority level to the case and determines whether it can be addressed with light solutions like signage or heavy solutions like speed humps or curb extensions.

Fairfax County, Virginia

Note: An interview with Fairfax County staff was conducted for this section.

The Fairfax County Department of Transportation (FCDOT) administers the Residential Traffic Administration Program (RTAP), which encompasses cut-through mitigation among other goals. The cut-through element of the RTAP includes access restrictions, turn prohibitions, and traffic calming devices such as speed humps, raised crosswalks, speed tables, raised medians, and chokers. The program is based off VDOT's 1996 Cut-Through Policy.

For cut-through mitigations to proceed, the road in question must be of a certain type and speed limit, have a certain number of cut-through trips, and have a reasonable alternate route nearby. More detailed information about implementation criteria can be found in Section D of the Appendix. City consideration of a street is a resident-driven process and includes extensive coordination between community residents, FCDOT, and VDOT, and requires various approvals and/or ballot votes from these entities.

There are currently three cut-through restrictions in place in two districts within Fairfax County. One was established recently, while the other two have been in place since the 1990's. The limited number is due at least partly to the onerous process, which requires 150 trips in each direction, 75 percent of neighbors to support the mitigation, and VDOT to approve the measure based on their analysis of how it would impact local traffic. Staff note that one of the mitigations implemented in the 1990's that involved right in right outs, raised medians and diversions is seen by many residents as overly controlled, as residents are subject to the same restrictions.

In 2019, the Virginia General Assembly passed an ordinance allowing Fairfax County residents of an area with cut-through restrictions to apply for a permit exempting them from the restrictions. FCDOT is currently identifying funding to develop software to administer the program.

Enforcement of cut-through restrictions, including fraudulent use of the permit stickers once the program is implemented, is to be performed by the Fairfax County Police Department. Staff noted that some amount of peak hour enforcement restrictions is necessary with the existing program, but is often difficult to get.

Stafford County, Virginia

Stafford County's Residential Traffic Management Plan (RTMP) provides citizens and communities with tools to address traffic problems such as volume, speed, and cut-through traffic. The RTMP's Residential Cut-Through Traffic program is specifically tasked with mitigating cut-through through use of the following measures:

- Passive controls, including turn prohibitions and one-way streets; and
- Physical controls, including diverters, forced turn channelization, traffic circles, and other traffic calming/diversion elements.

In order for to qualify for the Residential Cut-Through Traffic program, the road in question must be of a certain type and speed limit, have a certain number of cut-through trips, have a certain number of homes per linear feet, not serve as primary commercial or industrial access, and have a signed petition of a minimum of 75% of residents.

Rockville, Maryland

Note: An interview with City of Rockville staff was conducted for this section.

The City of Rockville has published its Guidelines for Neighborhood Traffic Management, whose goal is to maintain livable residential neighborhoods by diverting or otherwise altering traffic flow through neighborhoods and calming traffic through reduced speed.

Rockville's neighborhood traffic management strategies include:

- Passive controls (signs), including turn prohibitions, one-way signs, increased moving violation fines, and others; and
- Physical controls, including diagonal diverters, traffic circles, chicanes, and other traffic calming elements.

Rockville has two categories for traffic management strategies: residential traffic diversion plans and residential speed control plans. The eligibility criteria for both categories are presented in Section E of the Appendix.

The program is mostly funded through Capital Improvements Program (CIP) funds, but it is sometimes necessary to request additional funds. Costs vary widely depending on which strategies are used, with signs and pavement markings costing several hundred dollars, and roadway/intersection reconfigurations costing several hundred thousand dollars.

Traffic diversion or speed control plans are generally left in place for two years after implementation, after which the City can reevaluate or review if changes are necessary. To monitor the success of the program, the City collects traffic data year-round to compare conditions before and after implementation. The City has generally found the program successful in meeting its goals, but in cases where it does not meet goals, it recommends more items from the passive controls and physical controls strategies listed above.

Rockville residents can submit concerns about excessive speeds or volumes on neighborhood streets online directly to City staff, or through involvement with the Rockville Pedestrian Advocacy Committee (RPAC), Rockville Bicycle Advisory Committee (RBAC), or other local associations that are open to the public.

The City has received both positive and negative feedback on the program from residents, but staff noted the importance of citizen involvement in traffic diversion and speed control plans since they are the end users.

Summary

This report has presented cut-through and traffic calming programs of various sizes and scopes across the country. Some are specifically dedicated to mitigating cut-through while for others, cut-through mitigation is one of many goals of a broader traffic calming program.

Despite the diversity of program types and scopes, several trends appear to apply broadly based on interviews with jurisdiction staff, and can offer guidance to the City of Alexandria.

- Turn restrictions can cause longer and more circuitous routes for residents, visitors, and deliveries to affected streets, except for residents who are eligible for exemption permits. Whether turn restrictions lead to increased traffic on adjacent streets likely depends on how porous and connected the neighborhood's street pattern is with the surrounding area, with more interconnected street layouts offering more alternate cut-through routes if one is restricted. The success

of Bellevue, Washington's turn restrictions in reducing traffic on adjacent streets was likely due to the how few access points existed between the neighborhood and the surrounding area.

- Allowing meaningful public engagement is critical for programs being well-perceived and supported by residents. For many programs reviewed for this report, it is residents who initiate contact with the jurisdiction to ask for cut-through or traffic calming measures. Jurisdiction staff who were interviewed also noted that involving residents not only at the outset, but throughout the process engendered a sense of community ownership and support for the programs.
- Technologies such as Bluetooth or StreetLight were used in some jurisdictions to identify and monitor cut-through traffic patterns but in most cases, problem areas were identified by residents, confirmed by staff, and mitigations proposed based on staff observations and judgement.
- Several jurisdictions reviewed for this report have pivoted their initial street-specific cut-through mitigation efforts to jurisdiction-wide traffic calming and/or broader regional efforts after realizing that localized mitigations often simply pushed cut-through problems to other neighborhoods.
- Compared with other jurisdictions reviewed for this report, Fremont, California's program includes more aggressive measures aimed at altering traffic patterns along an entire corridor as opposed to localized mitigations on certain streets. Modifying signal timing to disincentivize through traffic on a major arterial (Mission Boulevard) came with increased travel times for many residents and businesses, but yielded a substantial impact in effectively removing the corridor as a regional through-route recognized by routing apps. Fremont offers a unique and useful example if Alexandria is interested in pursuing this type of corridor-scale approach.