III. SAFE ROUTES TO SCHOOL PLANS FOR EXISTING SCHOOLS

To improve children's ability to walk and bicycle to school, it is important to take into consideration the current roadway conditions at and around existing school campuses to arrive at possible strategies for creating safe opportunities for students to walk and bike to school. There are also considerations beyond roads and sidewalks, such as coordination with other jurisdictions, perceptions of parents and students of the school's immediate area, and funding availability. Safe Routes to School plans are developed to engage the local community, identify safety issues, propose solutions, identify implementation strategies, and plan for funding improvements. Completed SRTS plans additionally can make funding or grant applications more competitive compared to applications without a completed SRTS plan.

SRTS plan development includes community engagement; coordination with school and city staff; data collection, including an existing conditions review; walk audit/observations; plan development; recommendations and steps to implement the plan. SRTS plans benefit schools and their communities by identifying safety issues, listening to local experts in the community, and creating actionable steps and recommendations to improve the school area. SRTS plans can build momentum to create change and safer roadway conditions that are more difficult to achieve without a plan in place.

Developing a Safe Routes to School Plan

Community Engagement

The first step in developing a SRTS plan is to gather information from the most knowledgeable sources of the local traffic conditions, neighborhood, and travel habits: the community. School staff, crossing guards, parents, students, and other local community members observe and participate in the drop off and pick up process almost daily and will have a greater scope of knowledge than a city staff planner who is coming to the site. Engagement

can be done formally through surveys or events or can be done less formally through conversations with people during observation. A one-day site observation may not reveal the full scope of the problems that the SRTS plan should attempt to address, and the gaps in knowledge filled by the community will result in the most comprehensive recommendations possible.

Neighborhood Collaboration

Planners can tap into the community surrounding the school to explore establishing SRTS paths directly to schools to remediate circuitous routes created by the built environment around the school. Creating pedestrian- and bike-only paths to connect to schools can dramatically increase safety by eliminating dangerous roadway crossings and reducing travel time. Where a pedestrian path could be created though a residential area, easements may be explored. Neighborhood collaboration may also be needed regarding motorist behavior, pick up and drop off procedures, and landscape maintenance considerations.

Joint Coordination

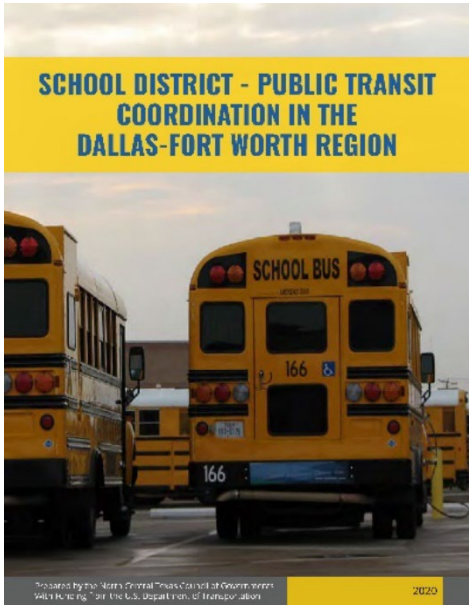
Schools/ISDs, cities, and other relevant parties should collaborate and share knowledge when creating SRTS plans to save time, effort, and money. These groups have different information that is both useful and relevant for a synergetic relationship and the most effective development and service to the groups they serve. Schools and ISDs hold knowledge about where students are traveling from to reach their respective schools, as well as growth of the student body and potential new campus expansions. Cities must approve site plans, master developments, and zoning changes, which are essential to new school construction and roadway improvements. If cities and their school/ISD counterparts do not communicate far enough in advance, there can be problems for transportation and development. For example, if an ISD were planning a new school campus but did not inform the city, there may not be enough time to retrofit the road or build new roads by the time the school needs them.

There are many types of data that are relevant to both ISDs and cities as they both look to best serve their individual populations and ensure the safest conditions possible. This discussion is targeted to SRTS efforts, but NCTCOG's *Planning for Community-Oriented*

Schools: A Guide to School Siting in North Texas[13] report provides a comprehensive list of topics for joint coordination.

Topics for joint coordination related to SRTS plans include joint planning for bicycle and pedestrian safety surrounding school campuses and along popular routes for walking and biking to school, sharing traffic counts on roadways, and communicating about new residential construction and/or demographic projections that may affect demand for schools. This is not a comprehensive list but can serve as a jumping-off point for further relevant discussions.

Public Transportation Coordination



Independent school districts and schools may also be able to coordinate with their local public transportation agencies to find mutually beneficial ways to reduce costs and resource overlap related to transporting students to and from school. This coordination may allow schools to use transportation resources to provide more options for students where school and public bus routes align. NCTCOG completed a study in 2020 titled *School District - Public Transit Coordination in the Dallas-Fort Worth Region*[14] that investigated opportunities for collaboration in the Dallas-Fort Worth region, including interviews with ISDs and transit agencies about current partnerships and future opportunities for resource sharing. Dallas Area Rapid Transit (DART) staff reviewed the report and have since implemented a program providing reduced fair bus passes to students aged 14 years or older with a valid school ID.

Built Environment Existing Conditions

SRTS plans first analyze the existing conditions of the public right-of-way surrounding the school and on routes used by students to travel from their homes to the school. Understanding the context of the school area is necessary to understand students' travel patterns. To understand the school context, planners can use a walk audit. Walk audit participants can assess the current condition of bicycle and pedestrian infrastructure,

[13] The Planning for Community-Oriented Schools: A Guide to School Siting in North Texas report is available online at https://nctcog.org/getmedia/65dfee6f-d689-4955-a614-193b49b2bc3a/SchoolSitingGuide_NCTCOG_2017.pdf

[14] https://www.nctcog.org/getmedia/701bbc0b-8915-4ada-9911-c6a419b1e46d/SchoolDistrict_PublicTransit_FINAL.pdf.aspx

including sidewalks, bike lanes, the conditions or existence of appropriate signage, signalization, and paint conditions; and can also identify unsafe behaviors. Planners can also observe student drop off and pick up procedures to understand how peak arrival and dismissal can affect the surrounding roadway conditions, and how drivers, pedestrians, and cyclists interact in the driveway and on the roadway.

Land Use Contexts

How land is used and development density are key factors in the feasibility of different travel modes. Urban areas with high density allow more students to live closer to school, making walking or biking more feasible. Older urban areas tend to have a more condensed street network, which allows for more direct routes to schools. These areas may already have some bicycle and pedestrian infrastructure such as sidewalks, crosswalks, and signage, so walk audits may be more focused on the condition of such infrastructure or filling network gaps.

Suburban schools may be more challenging to walk or bike to, depending on where the school is sited in relation to where students live. A school sited within a subdivision with short blocks and a high degree of street and sidewalk connectivity better enables students to walk and bike safely, comfortably, and efficiently (Figure 18). School placement and street connectivity in subdivisions are extremely important for walkability. In the DFW region, schools frequently are sited outside of the neighborhoods they serve, often along a higher traffic road with many lanes. In these cases, students may have unnecessarily long travel distances and routes to school that are uncomfortable and unsafe. A school that is sited inside a subdivision but on a street network characterized by long blocks and cul-de-sacs also may not be conducive to efficient, direct routes to schools (Figure 19). Walk audits and existing conditions analyses in suburban areas may be focused on identifying gaps in pedestrian infrastructure and any opportunities to more directly connect school grounds to the surrounding neighborhoods by walking or biking, as well as school driveway observations.

Figure 18: School Sited in Residential Area with High Connectivity

Image courtesy of Google Earth

Figure 19: School Sited in Residential Area with Low Connectivity

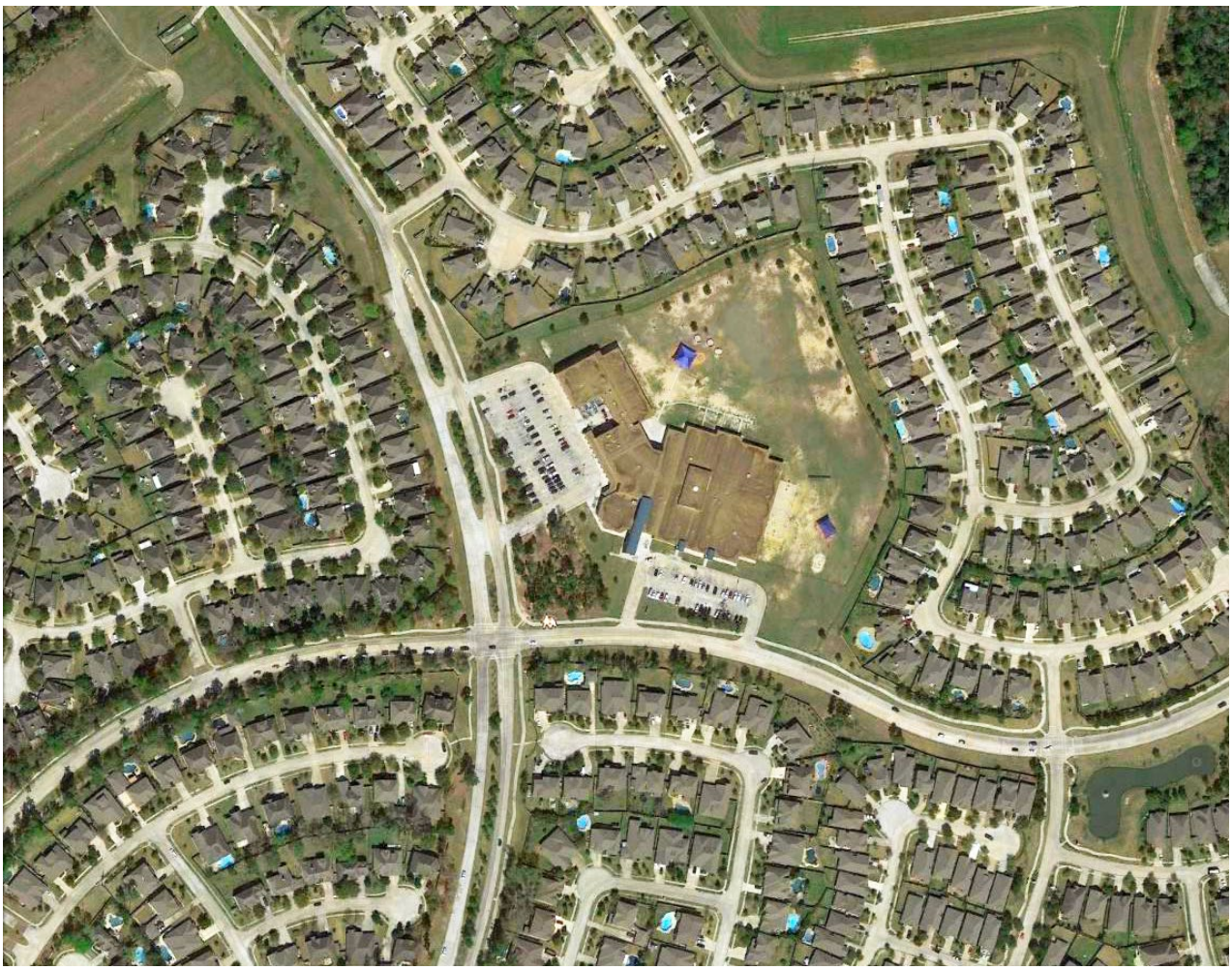


Image courtesy of Google Earth

Rural areas often have the lowest ability for students to walk or bike to school from their homes, as school attendance boundaries tend to be larger, and schools often are sited on roads with more traffic and higher speeds. Walk audits and existing conditions analyses may be more focused on driveway conditions and connecting residential areas within walking distance. The considerations for SRTS plans for schools in different land use contexts will be discussed further in this section.

Roadway Types

SRTS plans should assess the type of roadway along which a school is sited. Roads that have higher speeds and volumes may need more significant countermeasures to ensure the safety of students who must walk along it to reach the school. Roads with fewer lanes and lower traffic volumes will be more comfortable for students to walk along and may require different countermeasures.

Road User Behavior

Understanding the behavior of students and their families walking to school, as well as the behavior of drivers both traveling to the school and through the school zone will be important to recommend appropriate countermeasures to create a safe and comfortable environment for SRTS activities.

Targeting SRTS improvements along popular routes helps to ensure that students and their families can walk to their destinations as safely and comfortably as possible. Identifying these routes may indicate places where additional infrastructure is needed, such as a mid-block crossing or sidewalk.

Students, parents, staff at the schools, and the local community can be consulted to include local knowledge of traffic patterns, driver behaviors, student behaviors, and areas they identify where additional countermeasures could curb dangerous behavior. This firsthand information can be used to refine and identify SRTS plan recommendations. Behaviors such as speeding, failure to yield, and lane weaving can be addressed by physical countermeasure recommendations in the SRTS plan.

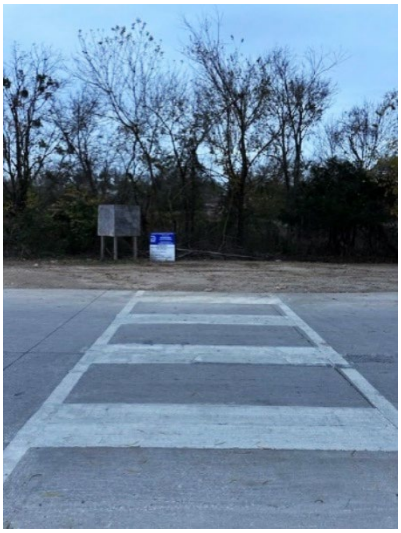
High schools may have additional considerations for bicycle and pedestrian safety, namely on and around their campuses because of the large number of teen drivers. Teen drivers, who have less experience, may not be as aware of bicyclists and pedestrians and may tend to speed. Increasing visibility for pedestrians and bicyclists, as well as ensuring that bike lanes and crosswalks remain well-marked and visible will increase awareness of those spaces and uses to all drivers. Employing vertical deflections such as speed bumps can help to maintain safe speeds in parking lots and driveway areas where possible conflict points may exist. SRTS plans for high schools may have additional considerations for pedestrian and/or cyclist activity if there is a nearby business such as a restaurant, convenience store, and/or retail store that is frequented by students before,

during, and/or after school. Popular routes and crossing locations from the school to these locations should be considered for additional infrastructure protection.

Current School Zone Support/Supervision

Crossing guards and other support staff near and within the school zone are important for traffic management and assisting students to safely walk and bike to school. It is important to strategically identify popular routes and intersections that students must cross to reach the school. If school crossing guards are not present at high-trafficked intersections, students may be at greater risk of harm. Crossing guards can additionally assist in managing high-traffic times during school arrival and dismissal to move vehicles from the school driveway as efficiently and safely as possible.

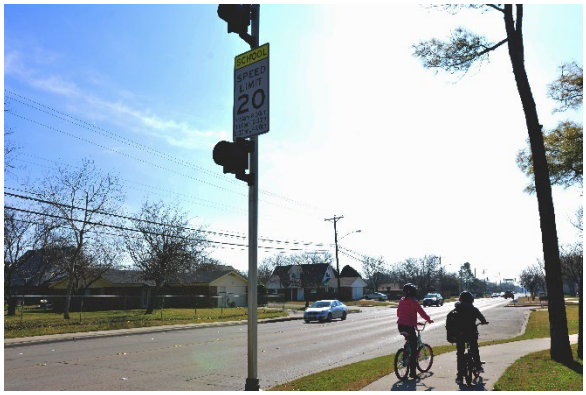
Understanding Barriers to Walking/Bicycling to School



Schools may have barriers that prevent or make it difficult and/or unsafe for students to walk or bike to school. These barriers could be physical, such as disconnected street networks or unsafe crossings; or they could be a grade-separated highway, roadway, or railroad tracks without any pedestrian access to cross. Barriers could also be mental, related to fears about safety. This could include traffic safety, which can be improved with physical infrastructure; or personal safety, related to real or perceived levels of crime. Discussing these issues with the community will help planners understand their concerns and how to address them.

The National Center for Safe Routes to School's 2010 report *Personal Safety and Safe Routes to School* is a resource available for SRTS teams to understand concerns related to students' journey to school. The Safe Routes Partnership additionally published a report in 2015 titled *Taking back the Streets and Sidewalks: How Safe Routes to School and Community Initiatives Can Overcome Violence and Crime*[15] as well as a companion fact sheet[16] that covers personal safety concerns of crime in neighborhoods and offers different strategies and solutions that planners may consider when addressing concerns from local residents.

Identifying Routes to School



Routes to school from neighborhoods should be as direct as safely possible to minimize travel time. Making walking or biking easy is the best way to convince students and their families to consider changing their school commuting habits from personal vehicles. When examining and planning for school trips, it is important to remember that the people who will be traveling along these routes are school-aged children, not adults. Children have lower levels of traffic safety awareness compared to adults, and routes must be planned to allow for a greater level of error.

[15] https://saferoutespartnership.org/resources/report/taking-back-streets-and-sidewalks
[16] https://saferoutespartnership.org/sites/default/files/resource_files/personal-safety-in-safe-routes-to-school_0.pdf

In many areas, the existing street layout may make direct, efficient access to schools a challenge for pedestrians and bicyclists. While existing street networks are not easily changed, SRTS plans can explore if there are other ways to increase connectivity for walking and biking, including off-street pedestrian pathways.

ISDs and local municipalities can analyze the best routes to school by examining current attendance zones overlayed over the local roadway network. It may also be useful to take into account the two-mile radius where students are not bused when considering where students may be walking or bicycling from.

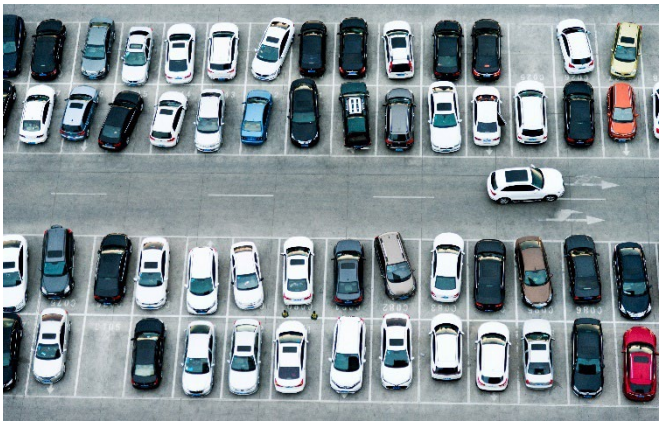
When looking at the roadway network, walking routes running along or crossing roads with higher speeds and/or traffic volumes should be avoided wherever possible. Routes should focus on interior residential roads, which typically have lower travel speeds and traffic volumes. In addition, routes should take advantage of existing sidewalk and crosswalk infrastructure to offer the most protection to pedestrians and bicyclists as possible.

Personal Vehicle Drop off and Pick up Considerations

Students' routes to school do not end at the edge of the school campus; students must also travel safely to the front door of the school. This may include interacting with concurrent personal vehicle drop offs at the start of the day and pick ups at the end of the day. SRTS recommendations can include considerations for safe entry and exit of school grounds by pedestrians and bicyclists. Routes for students should be safe and direct, intersecting the line of car traffic as little as possible. Driveways, drop off circulation patterns, and signage should be configured in a way that emphasizes these direct routes.

Drivers entering and exiting the school driveway can be a high conflict point with bicyclists and pedestrians. If the school driveway is part of a route students use while walking or biking to reach the school, crossing safety can be emphasized by staff members and high-visibility infrastructure to warn drivers of potential pedestrians. Maintaining a high level of visibility allows drivers to identify oncoming sidewalk and roadway traffic, then safely complete entering or exiting the driveway. Driveway considerations can include efforts to maintain the flow of traffic for the road the driveway connects to as much as possible.

Through-traffic on adjacent roadways during the arrival and dismissal period of school is also a consideration for congestion management and traffic safety purposes if students must cross the street to reach or leave school grounds.



High schools may need to consider parking needs and traffic patterns for any students who drive to school, which will increase traffic congestion during arrival and dismissal periods. Multiple points of access for school driveways and parking lots, if well-defined and controlled, are a tool to alleviate congestion that can be compounded with drop offs and pick ups during peak periods.

School drop offs and pick ups can cause traffic congestion during those short peak periods of the day. This large spike in traffic volumes may encourage planners and engineers to consider widening the roadways schools are sited alongside. This is one possible solution, but the utmost care needs to be taken to make sure that this solution is the best and only appropriate solution. Roadway widening increases crossing distances for pedestrians, and can increase speeds, both of which are unsafe for students walking or bicycling to school.

Identifying Bicycle and Pedestrian Safety Countermeasures

There are many kinds of countermeasures that can be implemented for existing schools, including crosswalk additions, roadway reconfiguration through restriping, signage, and other visibility improvements such as parking reconfiguration and tree pruning. Designating space for bicyclists and pedestrians through crosswalks and restriping will prioritize those road users around schools. Signage and visibility improvements will help ensure that drivers will be able to see pedestrians and bicyclists in school zones. The Federal Highway Administration (FHWA)'s Proven Safety Countermeasures[17] include tools for safer bicycle and pedestrian movement. Some of these countermeasures are identified in Figure 20.

[17] https://highways.dot.gov/safety/proven-safety-countermeasures

Figure 20: Selected FHWA Proven Safety Countermeasures to Consider for SRTS

Countermeasure Name	Countermeasure Benefit (FHWA)	Link to Countermeasure Page
Appropriate Speed Limits for All Road Users	"Traffic fatalities in the City of Seattle decreased 26 percent after the city implemented comprehensive, city-wide speed management strategies and countermeasures."	https://highways.dot.gov/safety/proven-safety-countermeasures/appropriate-speed-limits-all-road-users
Crosswalk Visibility Enhancements	"High-visibility crosswalks can reduce pedestrian injury crashes up to 40% Intersection lighting can reduce pedestrian crashes up to 42% Advance yield or stop markings and signs can reduce pedestrian crashes up to 25%"	https://highways.dot.gov/safety/proven-safety-countermeasures/crosswalk-visibility-enhancements
Medians and Pedestrian Refuge Islands in Urban and Suburban Areas	"Median with Marked Crosswalk: 46% reduction in pedestrian crashes. Pedestrian Refuge Island: 56% reduction in pedestrian crashes."	https://highways.dot.gov/safety/proven-safety-countermeasures/medians-and-pedestrian-refuge-islands-urban-and-suburban-areas
Walkways	"Sidewalks: 65-89% reduction in crashes involving pedestrians walking along roadways. Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways."	https://highways.dot.gov/safety/proven-safety-countermeasures/walkways
Bicycle Lanes	"Bicycle Lane Additions can reduce crashes up to: 49% for total crashes on urban 4-lane undivided collectors and local roads. 30% for total crashes on urban 2-lane undivided collectors and local roads."	https://highways.dot.gov/safety/proven-safety-countermeasures/bicycle-lanes
Lighting	"Lighting can reduce crashes up to: 42% for nighttime injury pedestrian crashes at intersections. 33-38% for nighttime crashes at rural and urban intersections. 28% for nighttime injury crashes on rural and urban highways."	https://highways.dot.gov/safety/proven-safety-countermeasures/lighting

Low-Cost Countermeasures vs. Reconstruction

SRTS projects do not always need to include multi-million-dollar roadway reconfigurations to be considered successful and make a difference in traffic conditions for pedestrians and bicyclists. Countermeasures such as restriping, signage, or cones are cheap and effective tools that can also serve as a pilot program to test before a more expensive permanent change is made. In addition, cheaper countermeasures can win the support of the community before the city and/or ISD commits to a larger investment in the roadway reconfiguration. Roadway improvements can signal that the city has bought into the neighborhood and is invested in the safety of its road users. “Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections” (Figure 21) is an FHWA Proven Safety Countermeasure and has found that the approach of deploying multiple low-cost countermeasures including enhanced signage and pavement markings improved driver awareness and recognition of intersections and potential conflicts.

Figure 21: FHWA Proven Safety Countermeasure for Stop-Controlled Intersections

Countermeasure Name	Countermeasure Benefit (FHWA)	Link to Countermeasure Page
Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections	"10% reduction of fatal and injury crashes at all locations/types/areas. 15% reduction of nighttime crashes at all locations/types/areas. 27% reduction of fatal and injury crashes at rural intersections. 19% reduction of fatal and injury crashes at 2-lane by 2-lane intersections. Average Cost-Benefit Ratio: 12:1"	https://highways.dot.gov/safety/proven-safety-countermeasures/systemic-application-multiple-low-cost-countermeasures-stop

SRTS Planning Recommendations for Different Land Use Contexts

As previously discussed, different land contexts will require different considerations for SRTS plans. Space availability, students within walking distance, and other factors will require different strategies. Planners creating SRTS plans may need to think differently about their recommendations, depending on the location of the school, student dispersal in the attendance boundary, street network connectivity, and other relevant local factors.

Urban SRTS Plan Considerations

Walking and Biking Access

Urban schools are characterized by a denser population and a more well-connected street grid, increasing the students' ability to walk or bike to school. SRTS plans should invest heavily in the walking and biking infrastructure around the schools and along popular travel routes. Plans can identify infrastructure such as sidewalks, crosswalks, and bike lanes that are missing, not up to standard or damaged. They can also focus on the ways students access the school via pedestrian infrastructure from the surrounding neighborhoods.

Space Constraints

Urban schools are typically characterized by smaller lot sizes compared to more suburban or rural schools. This means that school parking lots and driveways will be smaller, and traffic control during the pick up and drop off periods will be more important. Curb

management will be important to ensure students can safely enter and exit vehicles without entering oncoming traffic lanes. Schools should encourage families to forgo driving to the school to minimize traffic congestion and cars that need to use those limited spaces.

Rural SRTS Plan Considerations

Rural schools often have larger attendance boundaries and larger school lots than urban schools. Often schools are located on the fringe of communities on high-volume roads, which may mean that the school is either too far away for students to walk or bicycle to school, or the roadway is too dangerous to walk or bicycle along. In either case, a rural SRTS plan's focus should be primarily on managing pick ups and drop offs. This includes managing driveway movements, and congestion management on surrounding roads. Pedestrian considerations should focus on moving students as safely as possible from drop off points to the school doors.

Countermeasures that work best at rural schools include visibility improvements such as high-visibility crossings, building complete sidewalks along driveways, and limiting the number of crossings students must complete for the most direct route possible to school entrances.

Suburban SRTS Plan Considerations

Suburban schools may have characteristics of both rural and urban schools, depending on the development pattern of the areas surrounding the school as well as the geography of its attendance boundary. Every school is different, and planners will need to strongly consider the existing land use surrounding the school site when considering the best solutions. For schools sited within a subdivision, there may be opportunities to identify gaps in pedestrian infrastructure, especially if the subdivision does not have a well-connected roadway network, to create pedestrian-only connections to destinations such as schools. Suburban schools that are sited outside of the neighborhoods they primarily serve and that have a low population of students who are able to walk or bicycle to school may need to consider more rural strategies.

Conclusions

SRTS plans are a great first step when evaluating school safety for pedestrians and cyclists to understand the existing conditions of the school and create specific recommendations for infrastructure countermeasures and other school strategies. SRTS plans require collaboration from local stakeholders for opportunities such as joint coordination and taking advantage of public transportation. SRTS plans especially require collaboration with the local community, including school staff, school students, local residents, business owners, and any other local group with local wisdom on the problems and possible solutions to make the focus area safer for all road users.

Planners will need to examine the existing conditions in the built environment, such as land use context, the roadway types on which the school is sited, and roads that students travel on to reach the school. Road user behavior for pedestrians, cyclists, and drivers of all ages will also require consideration. Planners will also need to understand any local barriers to walking or bicycling to school, including safety hazards between the home and school campus, and separately, traveling safely from the edge of campus to the school door. Planners can consider low-cost countermeasures as a possible solution or pilot program when testing SRTS recommendations.

Next Steps

1. Parties interested in completing a SRTS plan:
    a. Read and use the SRTS Toolkit for Planning and Conducting a Walk Audit[18] and other resources related to walk audits in Appendix 2 when planning your own existing conditions analysis.
    b. Review existing SRTS plans on the NCTCOG website and elsewhere for ideas that are transferable locally.
2. NCTCOG will continue to offer technical assistance to cities and ISDs who wish to create SRTS plans.

[18] https://www.saferoutespartnership.org/sites/default/files/walk_audit_toolkit_2018.pdf