

# SOLANO SAFE ROUTES TO SCHOOL MAPPING AND ANALYSIS TRAINING MATERIAL



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Authority

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## INTRODUCTION

The Safe Routes to Schools mapping application is a GIS process that maps and analyzes the existing conditions, to help identify the safe routes to schools. The following material will explain the purpose of this application and explain the different tasks required to analyze the safe routes to schools. It is expected that the application users will have some basic understanding of GIS technology and are currently using or have used ArcGIS software. This application should never be used without engineering or transportation planning judgment when identifying the safe routes to schools.

## PURPOSE

The GIS process for analyzing the existing conditions is an automated task for identifying the safe routes to schools. The process utilizes multiple criteria such as sidewalk completeness to measure its effectiveness as part of a safe route. Each criteria is measured by using a suitability score and is compared to each other to create a combined suitability score for each route. The suitability score is measured from 0 to 100. The value of "100" represents the best possible score (Preferred Route) and the value of "0" represents the worst score (Not Preferred Route). The following table explains the different criteria and their scores:

Table 1: Criteria Value Assignment	
Criteria	Value Score
Presence of Sidewalk	Preference given to routes with complete sidewalks: <ul style="list-style-type: none"> <li>• Detached Sidewalk = 100</li> <li>• Attached Sidewalk = 50</li> <li>• No Sidewalk = 0</li> </ul>
Posted Speed Limit	Preference given to low speed limit streets (mph): <ul style="list-style-type: none"> <li>• 25 = 100</li> <li>• 30 = 75</li> <li>• 35 = 50</li> <li>• 40 = 25</li> <li>• 45 or greater = 0</li> </ul>
Number of Roadway Travel Lanes	Preference given to least number of lanes: <ul style="list-style-type: none"> <li>• 2 = 100</li> <li>• 3 = 75</li> <li>• 4 = 50</li> <li>• 5 = 25</li> <li>• 6 or greater = 0</li> </ul>
Traffic Control Devices	Preference given to controlled crossings: <ul style="list-style-type: none"> <li>• Signal and all-way stop controlled intersections = 100</li> <li>• Side-street stop controlled intersection = 50</li> <li>• Uncontrolled Intersection = 0</li> </ul>
Crosswalks	Preference given to traffic controlled marked crossing locations: <ul style="list-style-type: none"> <li>• Enhanced marked crosswalks at controlled intersections = 100</li> <li>• Marked crosswalks at controlled intersection = 75</li> <li>• Enhanced crosswalks at uncontrolled locations = 50</li> <li>• Marked crosswalks at uncontrolled intersections = 25</li> <li>• Locations without marked crosswalks = 0</li> </ul>
Intersections with Crossing Guards	Preference given to locations with crossing guards: <ul style="list-style-type: none"> <li>• Location with guard = 100</li> <li>• Location without guard = 0</li> </ul>

## BUILDING THE PROJECT GEODATABASE

A Geodatabase is a container for the different objects that make up the project base map and all the existing conditions. Using a Geodatabase not only allows data organization, but allows the user to efficiently create and modify data by building rules.

### Step 1: Creating a New Geodatabase

Open ArcCatalog and in the right "Contents" window, right-click and select "New" and "Personal Geodatabase" and provide name.

*Note: Before building a Dataset, make sure you have all the necessary County GIS shapefiles stored in a common location.*

Double-click to open the Geodatabase and right-click in the "Contents" window.

Select "New" and then "Feature Dataset..." and type in the name "Transportation".

*Note: For this project, create the following Dataset names:*

- Landuse
- Route
- Transportation

Select "Next".

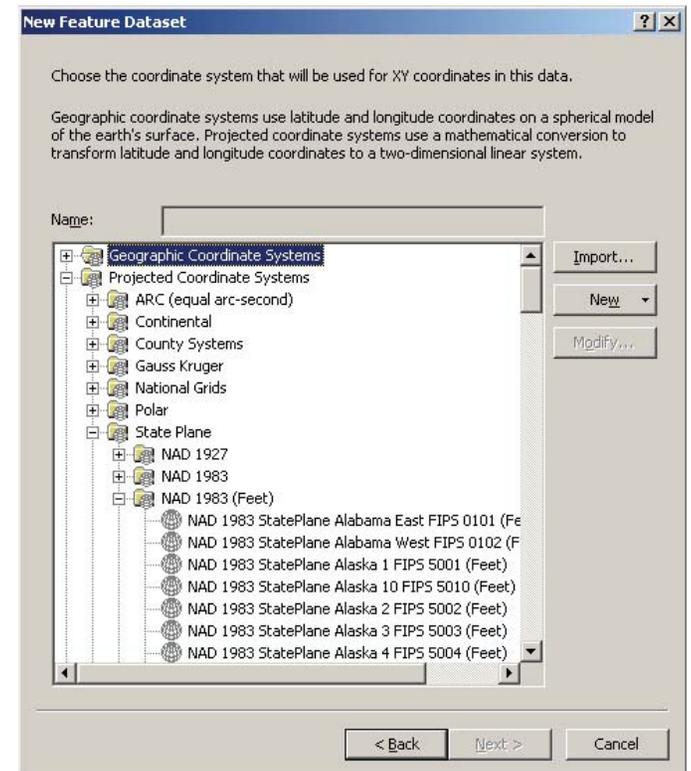
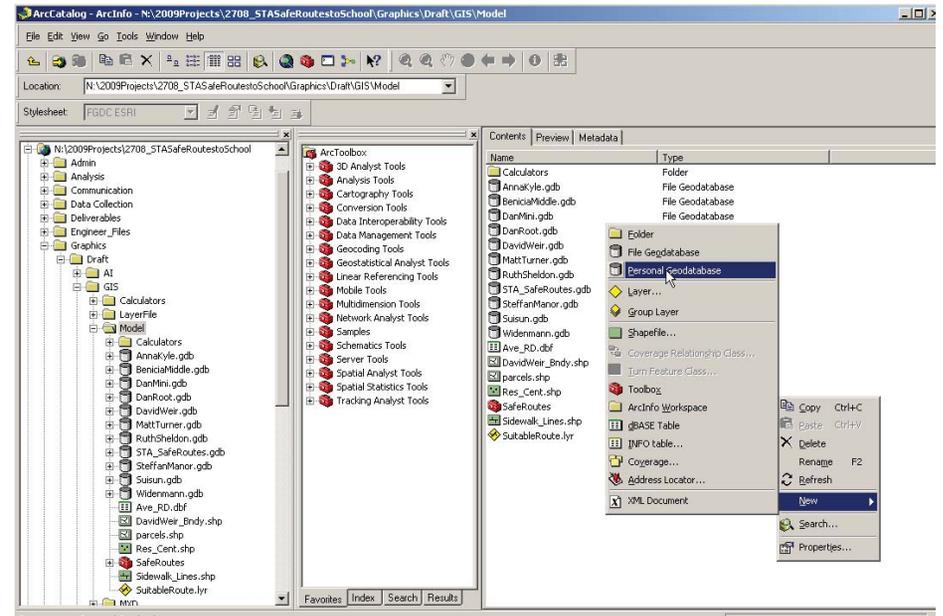
Choose the coordinate system that will be used for this project.

Select "Import" and navigate to one of the County shapefiles.

Highlight the shapefile and select "Add". The name of the coordinate system should appear in the "Name" window.

Select "Next" and accept the defaults. Select the "Finish" button to complete the new feature dataset.

[Click here to watch the video instructions for this lesson](#)



## Step 2: Importing Shapefiles

In the "Contents" window, double-click to open the "Transportation" dataset, right-click in the window and select "Import" and select "Feature Class (single)..."

Under the "Input Features" box, navigate and select the road shapefile...

Under the "Output Location" navigate to the Geodatabase and highlight the "Transportation" dataset...

Under the "Output Feature Class", enter the same shapefile name or provide a new name for the roadway layer.

Select "OK".

*Note: The County roadway centerline and parcel shapefiles will be the only imported files into the Geodatabase.*

[Click here to watch the video instructions for this lesson](#)

## Step 3: Creating a New Layer

Double-click on the "Routes" dataset...

Right-click in the "Contents" window and select "New" and "Feature Class..."

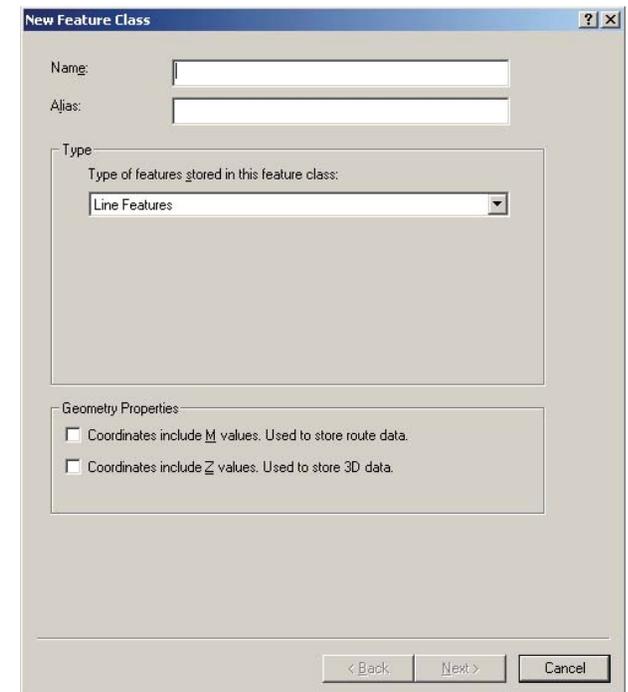
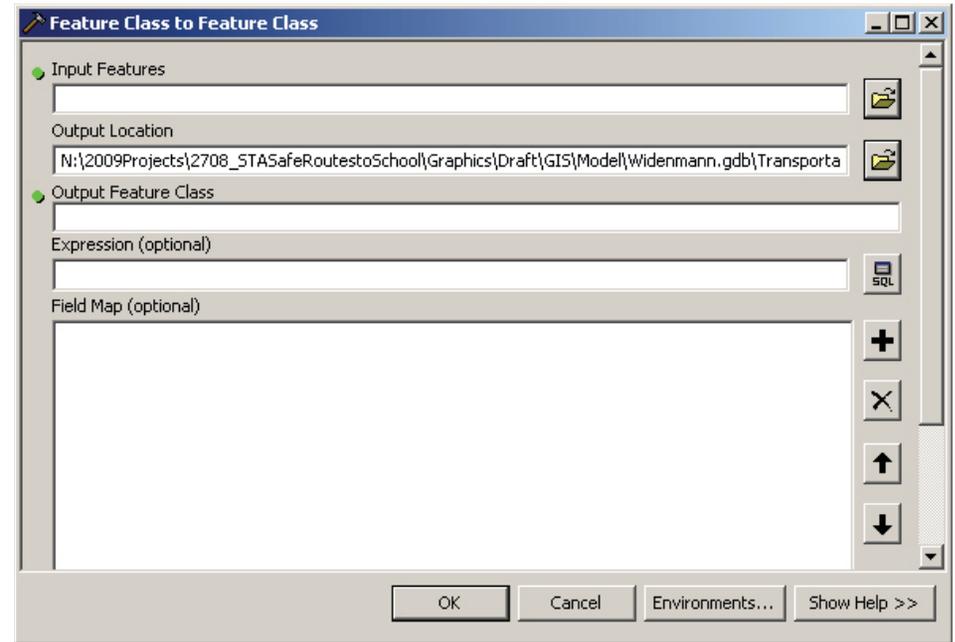
Under the "Name", type in "Sidewalk"...

Under the "Type of features stored in this feature class:", select "Line Features"... and select "Next"...

Select "Next" to accept the default...

Under the "Field Name" in the open space enter the following values and the "Data Type" using Table 2 on the following page:

[Click here to watch the video instructions for this lesson](#)





Perform the same steps for creating the following data layers:

<b>Dataset</b>	<b>Data Layers</b>	<b>Field Names</b>	<b>Field Type</b>
Transportation	StopControl	Type	Text
	XGuard	N/A	N/A
	BikePark	N/A	N/A
Landuse	Enrollment	Name	Text
	Landmark_Poly	Type	Text
		Description	Text
	Park_Poly	Name	Text
	School_Poly	Name	Text
School	N/A	N/A	
Routes	SchoolAccess	N/A	N/A

# CREATING A NEW NETWORK FOR NETWORK ANALYST

The following steps explain the process for building a new network for use in Network Analyst. This process will lead into how to develop a walk shed area.

## Step 1: Creating a Network

Right-click in the "Transportation" dataset and select "New" and "Network Dataset..."

Name the network.

Select the layer to build the network from.

Select "Next".

Check "No" to modify the connectivity with elevation field data.

Check "Yes" to model all turns in the network.

Select "Add"

Enter the Attribute name "Shape\_Length" and set the units to "Feet".

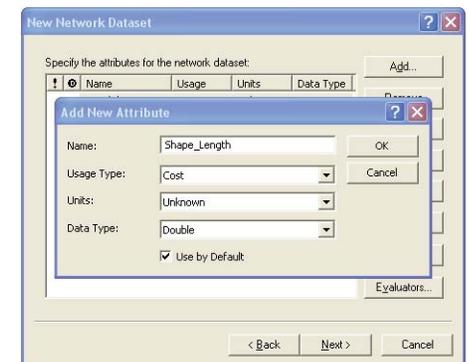
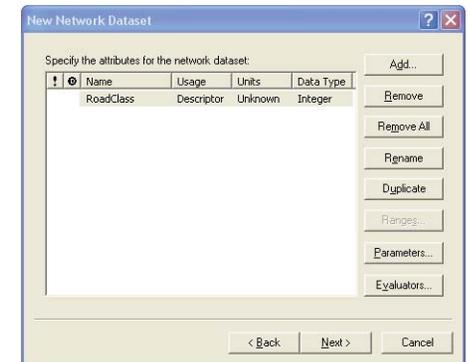
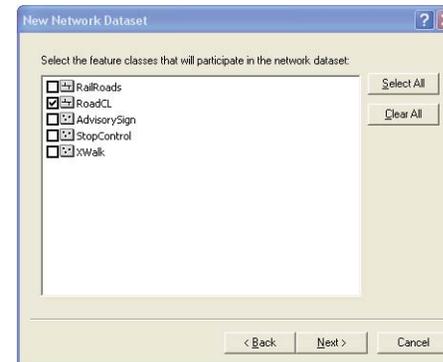
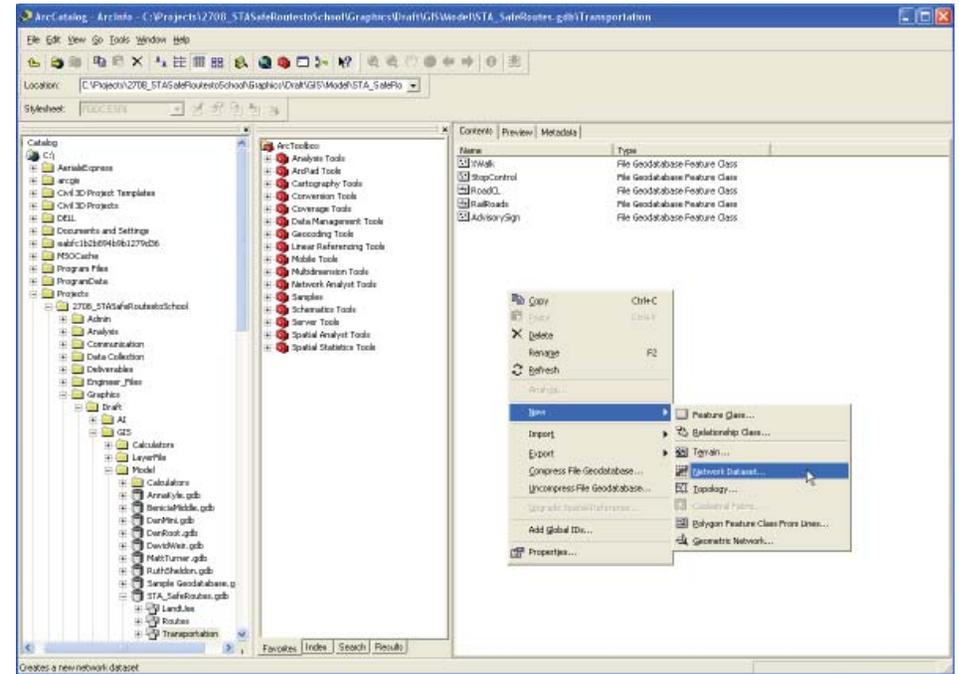
Select "Next".

Check "Yes" to establish driving directions and select "Next".

Select "Finish"

Select "Yes" to build network.

[Click here to watch the video instructions for this lesson](#)



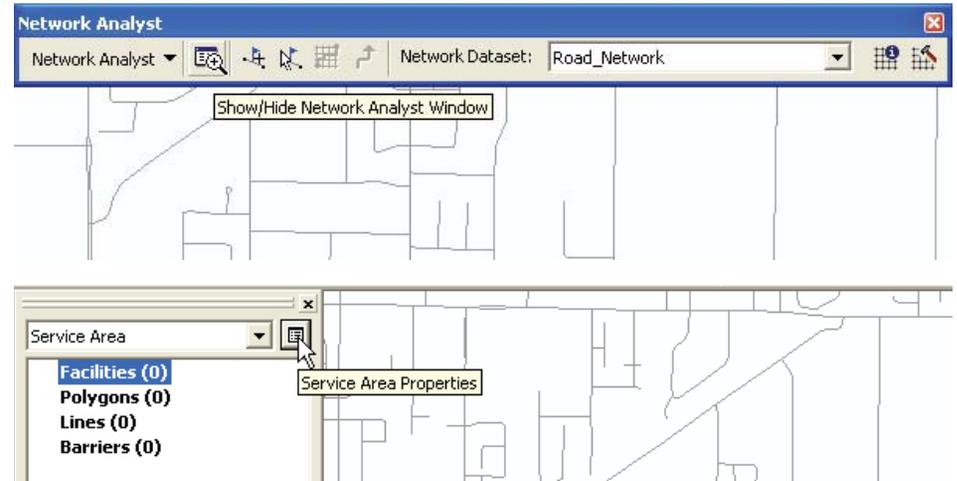
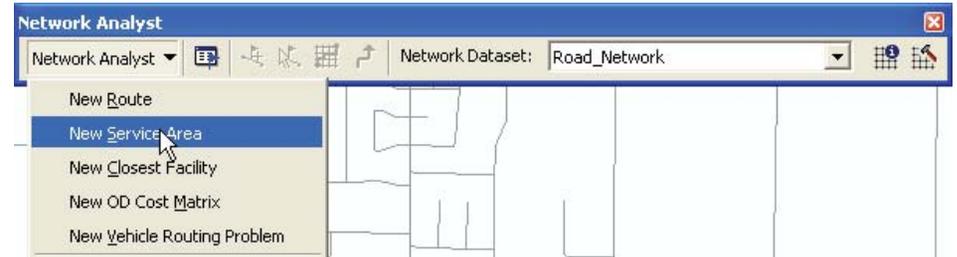
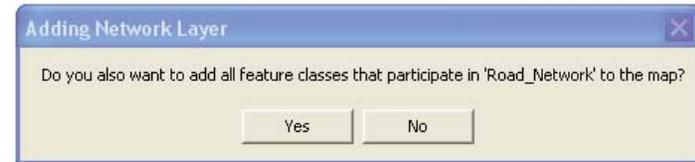
## CREATING A WALK SHED AREA

The following steps explain how to create a walk shed area using Network Analyst's "Service Area" tool.

### Step 1: Add the Network

Within ArcMap add the newly created network.

If you get the message to add all feature class participating..., select "Yes" if the roadway centerline layer is NOT part of your scene. If the roadway centerline IS part of your scene, then select "No".

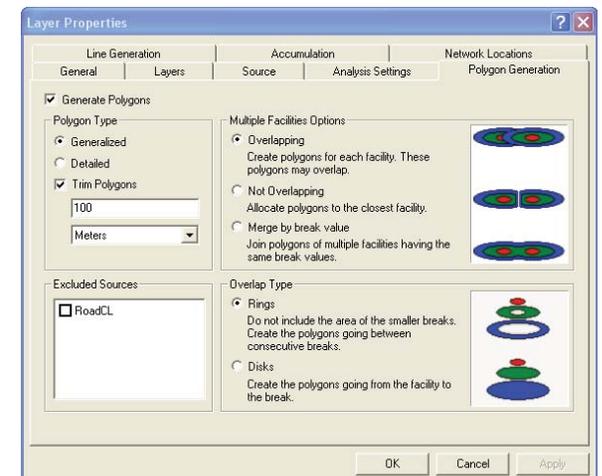


### Step 2: Setting up the Service Area Properties

Under the Network Analyst toolbar, select "New Service Area"

Select the Network Analyst window button.

Select the service area Properties button.



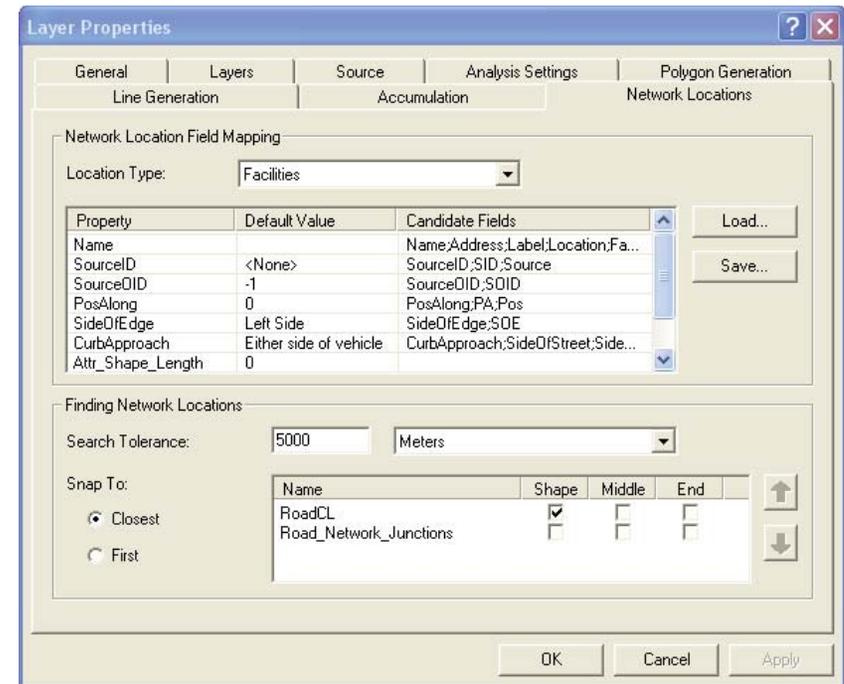
## Step 2: Setting up the Service Area Properties (cont.)

Network Analyst properties contains many options for how you want the analysis to proceed. The following will explain the different properties used specific to this project.

**Network Locations** - This tab displays the properties and the search tolerances for the network

Under the "Search Tolerance", enter 100 meters (The default unit is set for meters. You have the option to change this measurement)

Check the Snap to "Closest" button.



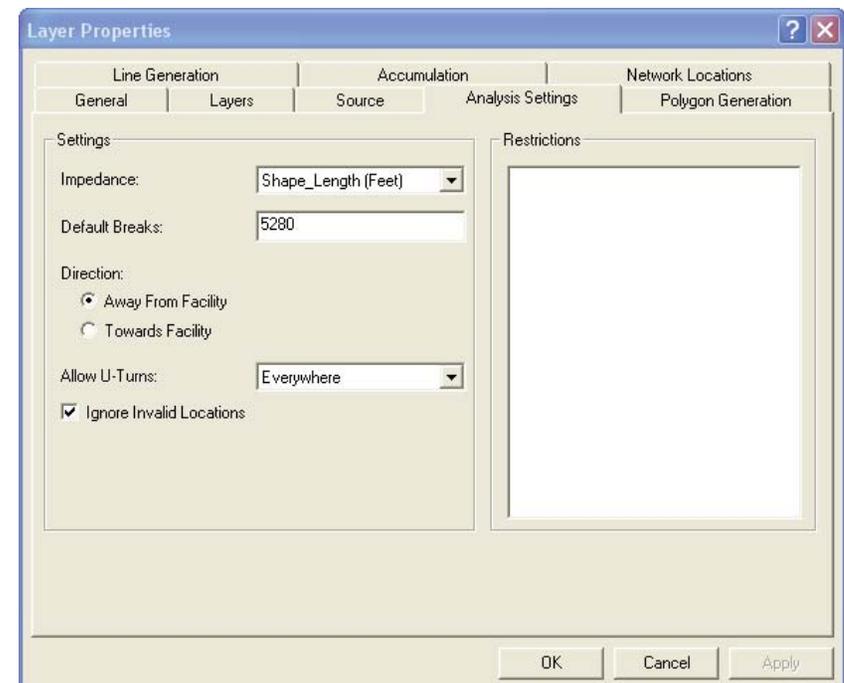
**Analysis Settings** - This tab is where you enter the impedance and define how the service area direction.

Under the "Impedance" menu, select "Shape\_Length".

In the default breaks, enter the following numbers in the following format: 1200, 2400, 3600, 4800 (1,200 ft. represents a 5 minute walk distance based on a 4 feet per second walk speed)

Select the "Away From Facility" button.

Select "Everywhere" under "Allow U Turns".



## Step 2: Setting up the Service Area Properties (cont.)

**Polygon Generation** - This tab displays how the polygon will be created and display.

Check the "Trim Polygon" button

Enter "30 meters" - This option forces the polygon boundary to offset from the network.

Check the "Merge by break value"

Check the "Rings" options to avoid overlap between the different polygons.

Select "OK".

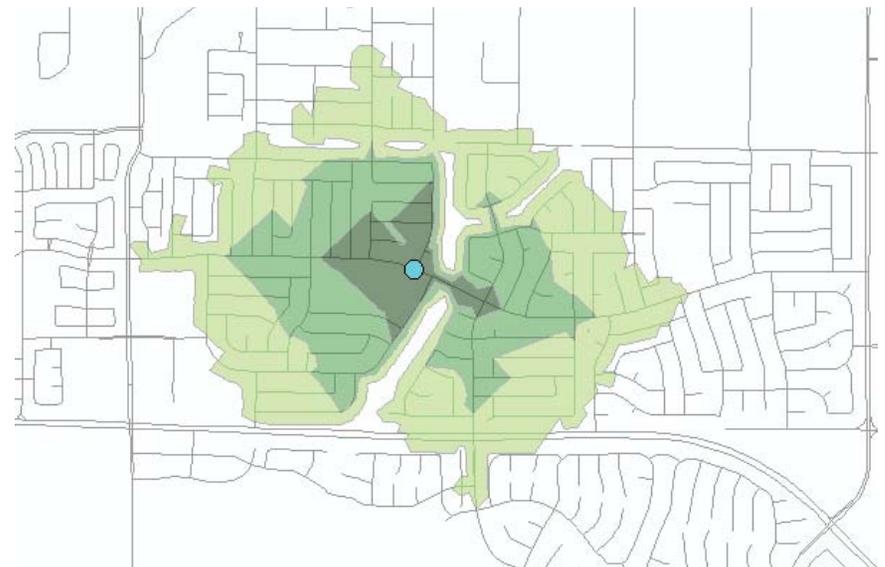
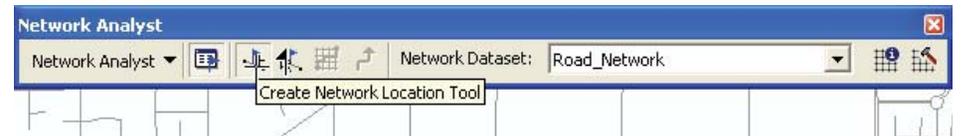
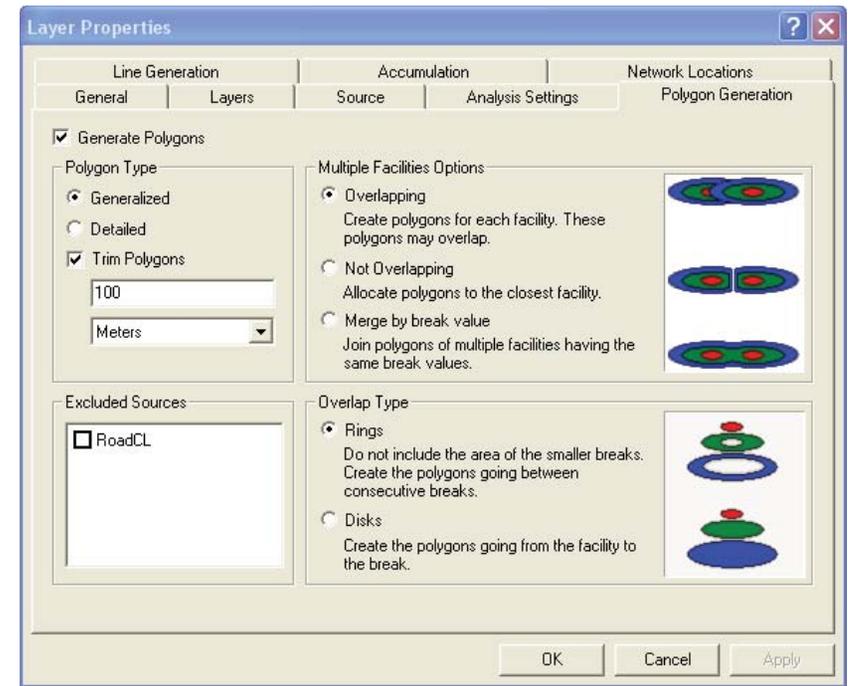
## Step 3: Adding the Walk Area Origin

Select the "Location Tool" and pick the point on the network where the starting point of the service area begins.

Select the "Solve" button.

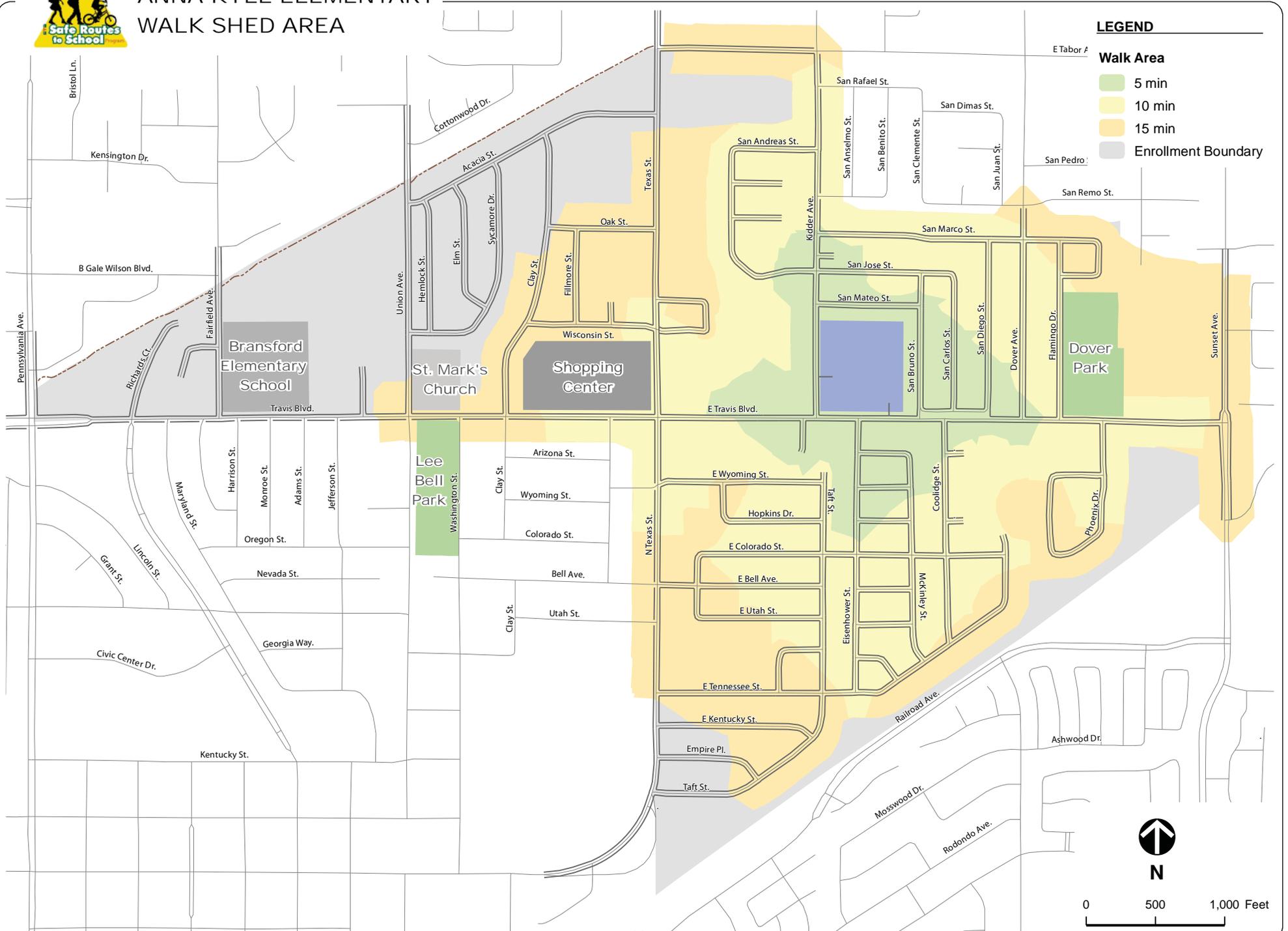
*Note: If the service area boundary does not satisfy the look you are wanting, open the network analyst properties and adjust the options from the previous steps. After the different parameters are updated, select the "Solve" button to update the polygons.*

[Click here to watch the video instructions for this lesson](#)





# ANNA KYLE ELEMENTARY WALK SHED AREA



### LEGEND

- Walk Area**
- 5 min
  - 10 min
  - 15 min
  - Enrollment Boundary



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## CRITERIA MAPPING

The following instructions will guide the user how to use drawing and advanced editing tools to build a complete pedestrian network, along with mapping other criteria used for the suitability analysis.

### Step 1: Creating the Sidewalk Layer

Review the following video instructions on creating the sidewalk layer:  
*"Creating a Sidewalk Layer"*

### Step 2: Editing the Linework

Review the following video instructions on editing the sidewalk layer:  
*"Advanced Editing"*

### Step 3: Creating and Editing Topology

Review the following video instructions on editing the sidewalk layer:  
*"Creating Topology"* *"Editing Topology"*

### Step 4: Assigning Values to the Sidewalk Layer

The following figure illustrates the features and the values used under the "Type" and "Description" Field. Refer to Table 2 for the different field values.

### Step 5: Adding Stop Controlled Devices

Add the "StopControl" layer to the scene. Using aerial photography and field observations, digitize and snap the point location to the roadway centerline intersection.

Under the "Type" field enter "Stop" for stop sign controlled intersections or "Signal" for signalized intersection.



## CRITERIA MAPPING (CONT.)

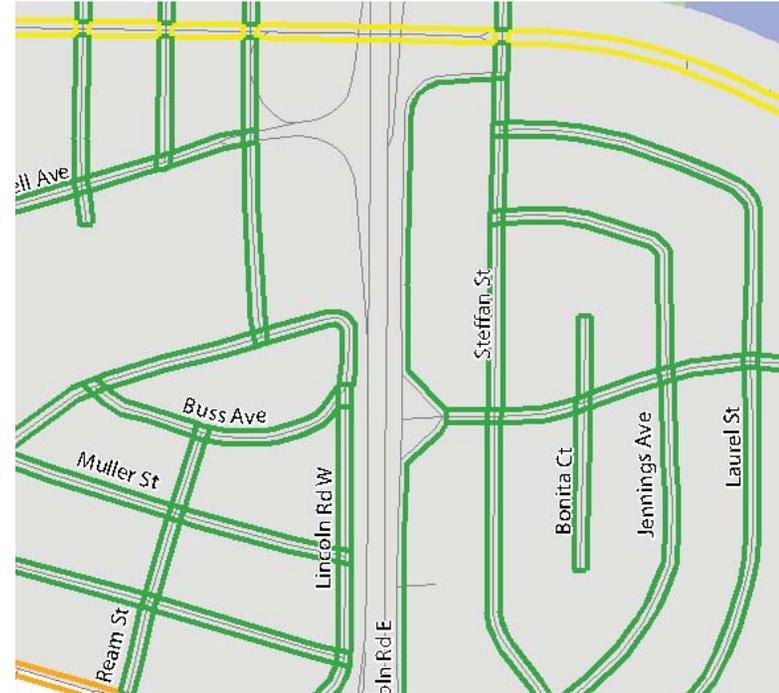
### Step 6: Adding Posted Speed Limit

The following exercise will demonstrate how to assign the posted speed to the sidewalk layer. The information provided about the posted speed is usually provided from field observations.

The speed is coded to all features part of the sidewalk layer. The example provided to left displays 3 speed categories:

- Green - 25
- Yellow - 30
- Orange - 35

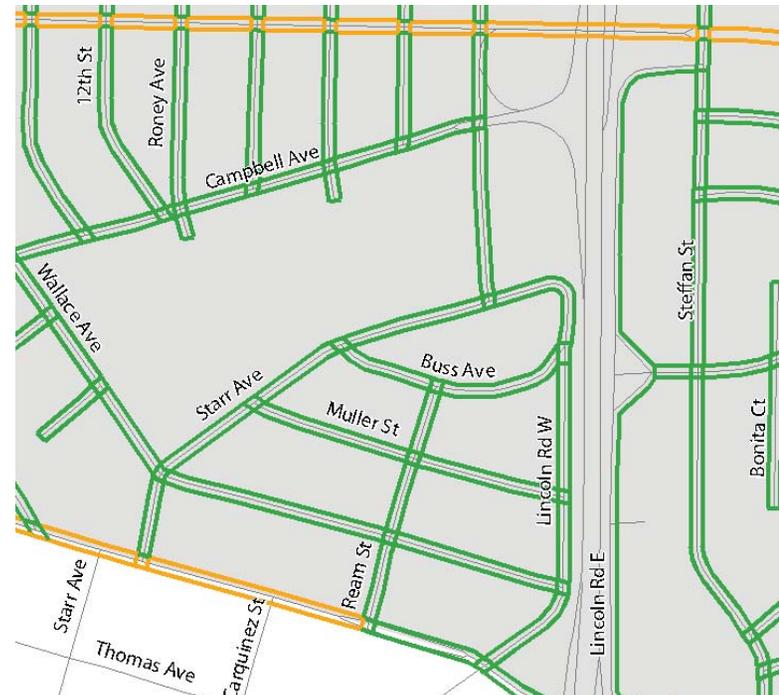
The parts of the sidewalk layer that are a network connection or crosswalk will be assigned the same speed value where they cross the posted speed limit direction.



### Step 7: Adding Number of Lanes

This step is usually performed with the assistance of aerial photography.

When assigning the number of lanes, use the same procedure as Step 6: Adding Posted Speed Limit.



## CRITERIA MAPPING (CONT.)

### Step 8: Adding Stop Controlled Values

The following exercise will demonstrate how to assign the type of stop control and which leg of the intersection is controlled. This process utilizes aerial photography and field observations.

If an intersection is stop controlled for one or all legs of an intersection, all crossings at the intersection are assigned a value of "1" under the "Stop" field.

If the intersection is a signalized intersection, all crossing at the intersection are assigned a value of "2" under the "Stop" field.

The crossings at an uncontrolled intersection are assigned a value of "0" under the "Stop" field.

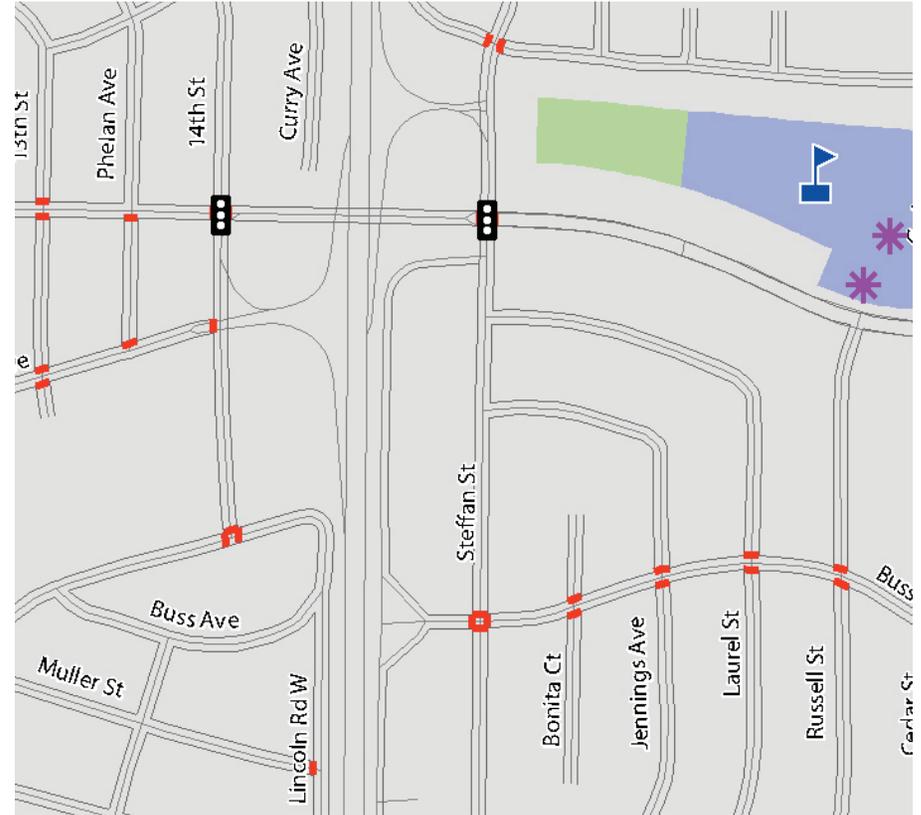
For all intersection types, under the "StopBar" field enter a "1" for the legs of the intersection that stop controlled.

If there is a stop bar for all intersection legs, each crossing and attached sidewalks get assigned a value of "1".

The figure to the left displays controlled intersections and indicated which intersection leg is stop controlled.

### Step 9: Adding Crossing Guard Location

Based on field observation and discussion with school administrators, select the intersection crossings and the attached sidewalks and assign a value of "1" to the "XGuard" field.



## MAPPING LANDMARKS

The following exercise will demonstrate how to copy polygon features from one feature class to another.

Add the parcel database to the scene.

Add the “Landmark\_Poly” layer to the scene.

Start “Editing” and make the target layer set for “Landmark\_Poly”.

Under the “Selection” tab, make sure to only have the parcels checked.

Using the “Edit” tool, select the parcel representing one of the key landmarks.

Right-click and select “Copy”.

Right-click again and select “Paste”.

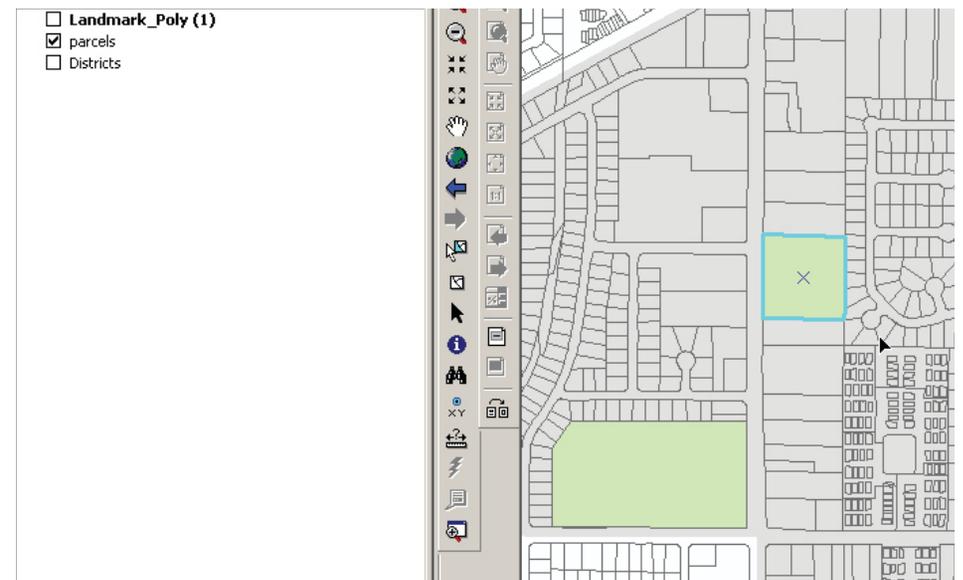
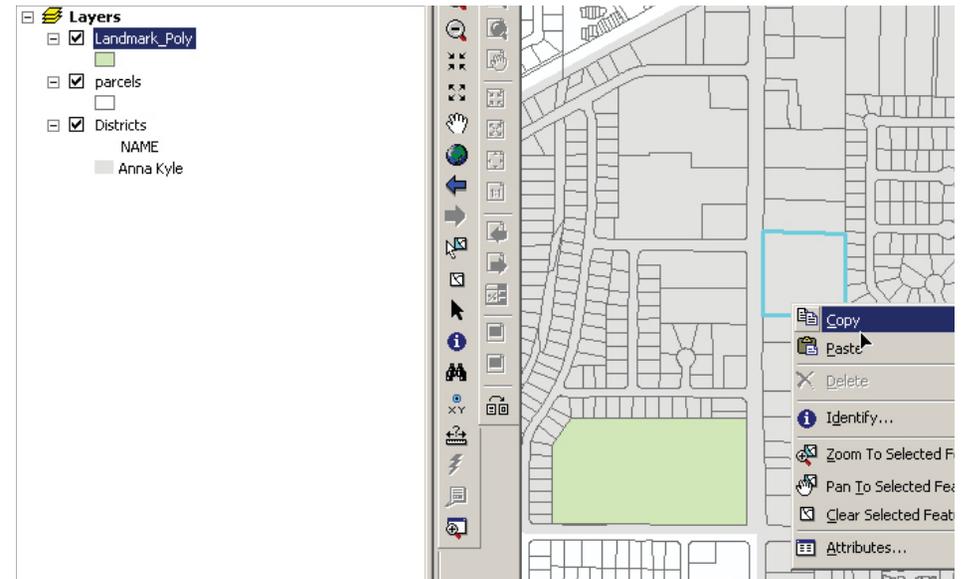
*Note: If the process worked correctly, the highlighted polygon will have transferred onto the target layer and taken on the color properties assigned to the Landmark\_Poly layer.*

Under the “Selection” tab, check the “Landmark\_Poly” layer and select the newly added polygons.

Under the “Type” field, enter the land use type for the landmark.  
i.e. commercial, church, school, etc.

Under the “Description” field, enter the landmark name if available.

Perform the same above steps for the “Park\_Poly” and “School” layers.





# ANNA KYLE ELEMENTARY

## LEGEND

- Sidewalk
- Trail
- Crosswalk
- Traffic Signal
- All-Way Stop
- Anna Kyle Elementary
- Enrollment Boundary
- 15 min. Walk Area
- Pedestrian Access Points
- Crossing Guard



## SUITABILITY ANALYSIS

The following section will demonstrate how to utilize the different field criteria to determine a score for each feature, and the calculation to determine the final suitability score.

Open the attribute table for the sidewalk layer. At this point, the following fields should be populated with specific values before a score is assigned to them.

- Type
- Description
- Speed
- Lanes
- Stop
- StopBar
- XGuard

### Step 1: Assigning a Score

Click the "Editor" and start editing. Make sure the target layer is set to the "Sidewalk".

Right-click on the "Speed\_SC" field, and select "Field Calculator..."

Select "Load" and navigate to "Speed Score.cal", and select "Open".

In the Pre-Logic VBA Script Code window, the code that assigns the score based on the "Speed" field will fill the window.

Select "OK"

Perform the same steps for the following fields:

- Lanes\_SC
- Xwalk\_SC
- Sidewalk\_SC
- XGuard\_SC
- Stop\_SC

Type	Description	Speed	Lanes	Speed_SC	XGuard_SC	Sidewalk_SC	Stop	StopBar	Shape_Length
Jewalk	0	25	2		0	0	50	0	673.392961
Jewalk	0	25	2		0	0	50	0	673.318182
Jewalk	0	25	2		0	0	50	0	417.730909
Jewalk	0	25	2		0	0	50	0	423.771677
Jewalk	0	25	2		0	0	50	0	215.251232
Jewalk	0	25	2		0	0	50	0	213.999031
Jewalk	0	25	2		0	0	50	0	1580.63068
Jewalk	0	35	2		0	0	50	0	602.347222
Jewalk	0	35	4		0	0	50	0	450.763744
Jewalk	0	25	2		0	0	50	0	1002.706996
Jewalk	0	25	2		0	0	50	0	1003.469427
Jewalk	0	30	4		0	0	50	0	788.024399
Jewalk	0	30	4		0	0	50	0	279.039838
Jewalk	0	30	4		0	0	50	0	363.337217
Jewalk	0	25	2		0	0	50	0	459.892876
Jewalk	0	25	2		0	0	50	0	489.321399
Jewalk	0	25	2		0	0	50	0	158.214384

Fields:

- OBJECTID
- Type
- Description
- Speed
- Lanes
- Speed\_SC
- Lanes\_SC
- Xwalk\_SC
- Stop\_SC
- XGuard\_SC
- Sidewalk\_SC
- Stop

Type:

- Number
- String
- Date

Functions:

- Abs ( )
- Atn ( )
- Cos ( )
- Exp ( )
- Fix ( )
- Int ( )
- Log ( )
- Sin ( )
- Sqr ( )

Pre-Logic VBA Script Code

```

Dim SCORE as Integer
SCORE = [Speed_SC]
If [Speed] = 25 then
SCORE = 100
Elseif [Speed] = 30 then
SCORE = 75

```

Speed\_SC =

SCORE

Calculate selected records only  
Data loaded.

## Step 1: Assigning a Score (cont.)

Right-click on the "Ave\_Score" field and select the "Field Calculator..."

Select the "Load" button and navigate to "Ave Score.cal" file.

This will calculate the average score of all 6 criteria ranging between 0 and 100.

Perform the same step for the "Net\_Score2" field. However, this field is only calculating the 4 criteria and is not including "Number of Lanes" and "Crosswalks".

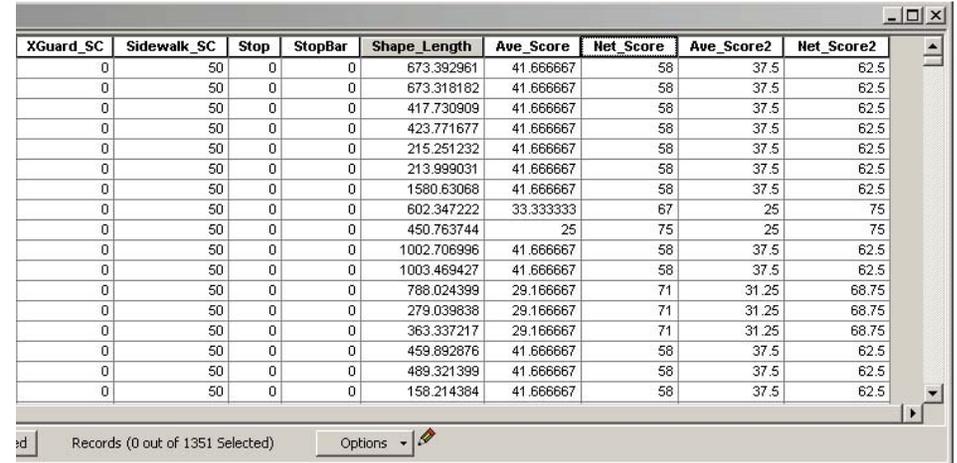
The next step is to calculate the network score, which specific to a Network Analyst.

Right-click on the "Net\_Score" field and select the "Field Calculator..."

Enter in the following calculation:  $100 - [\text{Ave\_Score}]$

This will calculate the opposite value for the "Ave\_Score".

Perform the same step for the "Net\_Score2" field.



XGuard_SC	Sidewalk_SC	Stop	StopBar	Shape_Length	Ave_Score	Net_Score	Ave_Score2	Net_Score2
0	50	0	0	673.392961	41.666667	58	37.5	62.5
0	50	0	0	673.318182	41.666667	58	37.5	62.5
0	50	0	0	417.730909	41.666667	58	37.5	62.5
0	50	0	0	423.771677	41.666667	58	37.5	62.5
0	50	0	0	215.251232	41.666667	58	37.5	62.5
0	50	0	0	213.999031	41.666667	58	37.5	62.5
0	50	0	0	1580.63068	41.666667	58	37.5	62.5
0	50	0	0	602.347222	33.333333	67	25	75
0	50	0	0	450.763744	25	75	25	75
0	50	0	0	1002.706996	41.666667	58	37.5	62.5
0	50	0	0	1003.469427	41.666667	58	37.5	62.5
0	50	0	0	788.024399	29.166667	71	31.25	68.75
0	50	0	0	279.039838	29.166667	71	31.25	68.75
0	50	0	0	363.337217	29.166667	71	31.25	68.75
0	50	0	0	459.892876	41.666667	58	37.5	62.5
0	50	0	0	489.321399	41.666667	58	37.5	62.5
0	50	0	0	158.214384	41.666667	58	37.5	62.5



# STEFFAN MANOR ELEMENTARY SUITABILITY SCORE - METHOD 1

Note: Based on 6 criteria (sidewalks, speed, traffic control, crossing guards, number of lanes, and crosswalks)

## LEGEND

- 1 (Not Preferred)
  - 2
  - 3 (Average)
  - 4
  - 5 (Preferred)
- Steffan Manor Elementary  
Enrollment Boundary





# STEFFAN MANOR ELEMENTARY SUITABILITY SCORE - METHOD 2

Note: Based on 4 criteria (sidewalks, speed, traffic control, and crossing guards)

## LEGEND

- 1 (Not Preferred)
  - 2
  - 3 (Average)
  - 4
  - 5 (Preferred)
- Steffan Manor Elementary
  - Enrollment Boundary



## ROUTE TESTING

The following procedure explains the process for identifying the safe routes based on the suitability score. This step is not to be considered the final decision making process for identifying the safe routes. This process is only a tool to aid the engineering and transportation planning process.

### Step 1: Creating the Sidewalk Network

Open ArcCatalog and navigate to the Geodatabase. Double-click on the "Route" dataset.

Follow the same instructions from page 6 - "Creating a New Network for Network Analyst" except for the following:

When entering the attributes, add the following:

Name: Net\_Score  
Usage Type: Cost  
Units: Unknown  
Data Type: Double

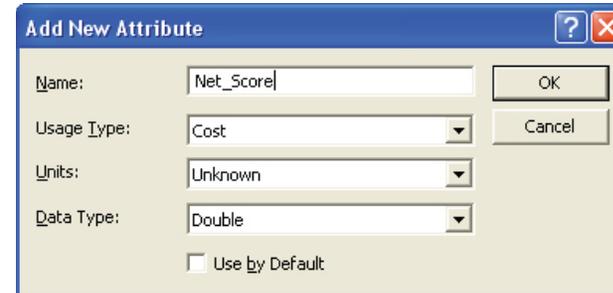
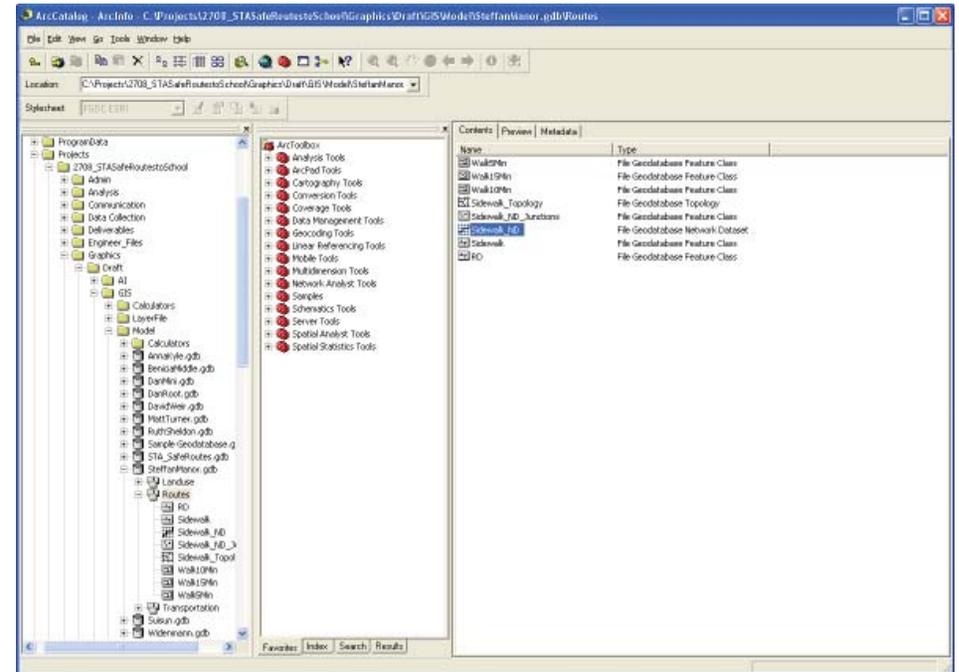
Select "OK".

Select "Add" and enter the following:

Name: Net\_Score2  
Usage Type: Cost  
Units: Unknown  
Data Type: Double

Select "OK".

Follow the remaining steps from page 6 to complete the network.



## ROUTE TESTING (CONT.)

### Step 2: Testing the Safe Route

Open ArcMap and add the network to the scene.

Under the Network Analyst toolbar, select "Network Analyst" and "New Route"

Select the "Route Properties" button

Select the "Analysis Settings" tab and under the "Impedance", select the "Net\_Score".

Select the "Network Locations" tab and enter "100" in the "Search Tolerance".

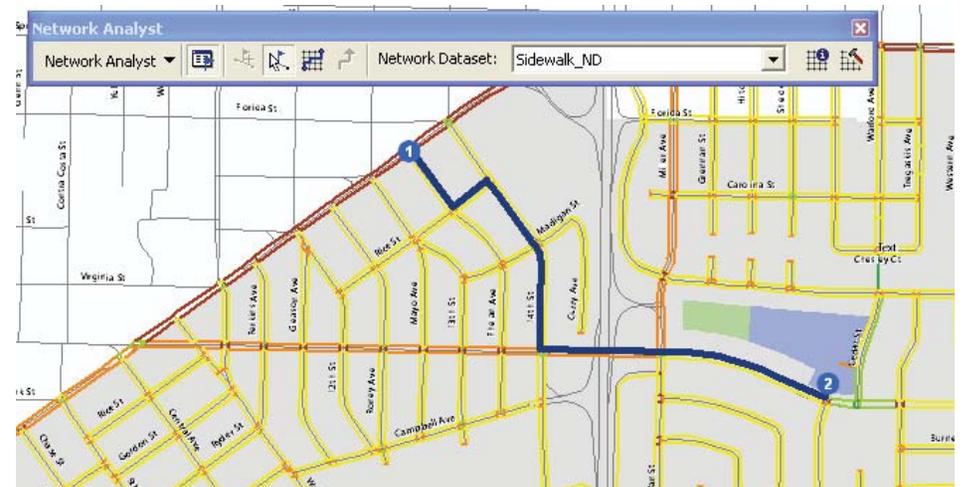
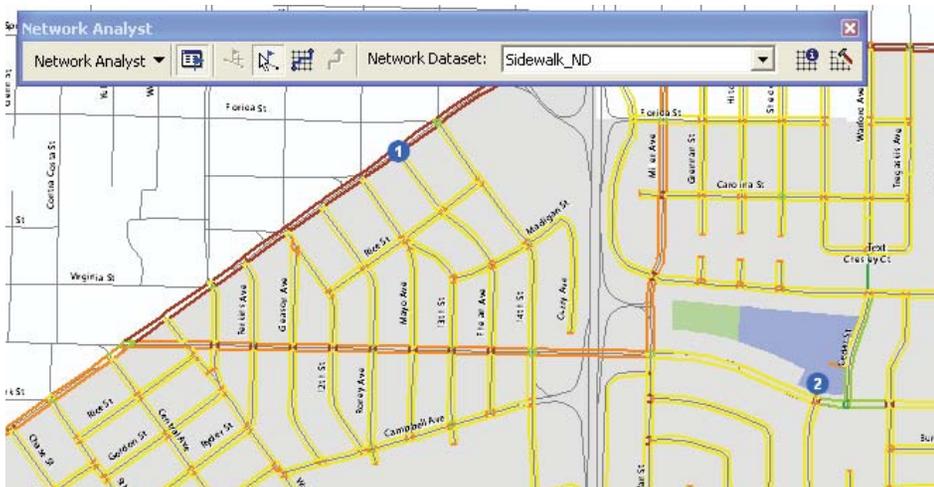
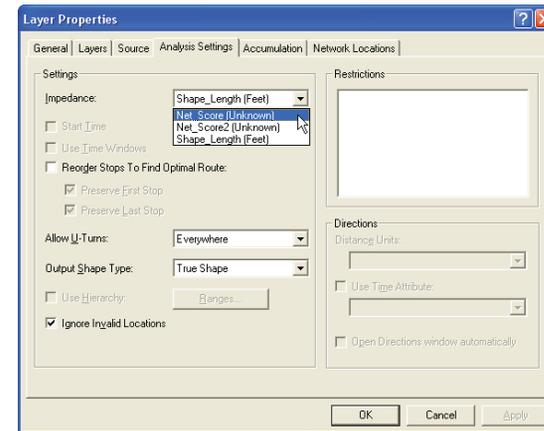
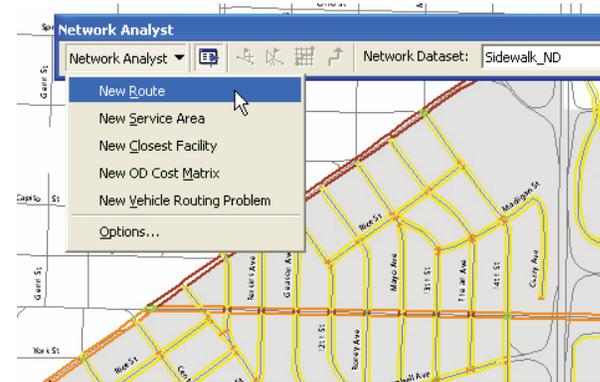
Select "OK".

On the Network Analyst toolbar, select the "Create Network Location Tool" and select a location on the network that represents a neighborhood block.

Next, select the access point at the school location.

Select the "Solve" button to draw the route based on the network score.

Repeat the process by moving the number "1" point location to another neighborhood block and re-solve the scenario to generate a new safe route path.



## VISUALIZE CRITERIA AND ANALYSIS

The following section will demonstrate how to visualize the different criteria as a means to double check data and to aid the process for identifying safe routes to schools.

### Step 1: Display Number of Lanes and Posted Speed Limit

Right-click the "Sidewalk" layer and select "Properties".

Select the "Symbology" tab and under the "Value Field" select the "Lanes" field and select the "Add All Values" button.

Assign specific colors for each number of lanes.

*Note: The fewer the lanes, the better it is from a walking perspective. Try to use cooler colors for items that are considered to be positive attributes, i.e. green, blue, etc. For items that are less positive, use warmer colors like orange and red.*

Perform the same steps for displaying the posted speed limit.

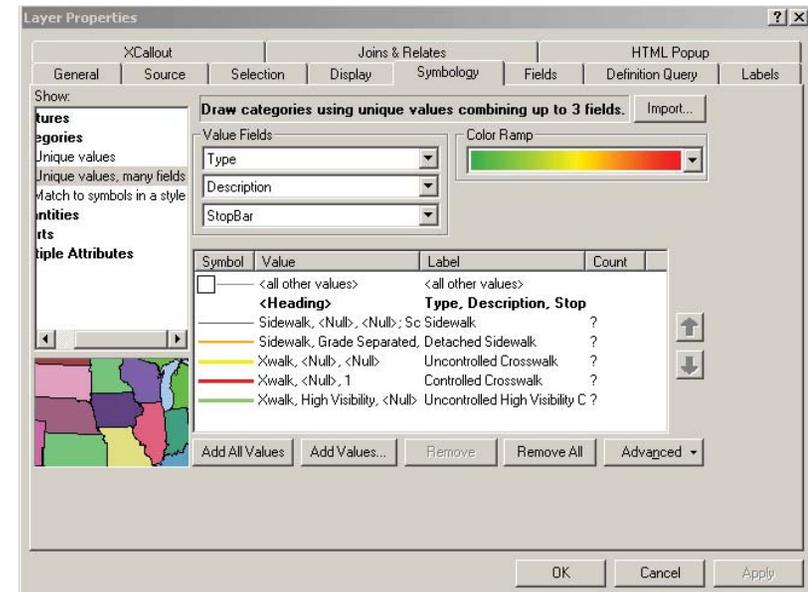
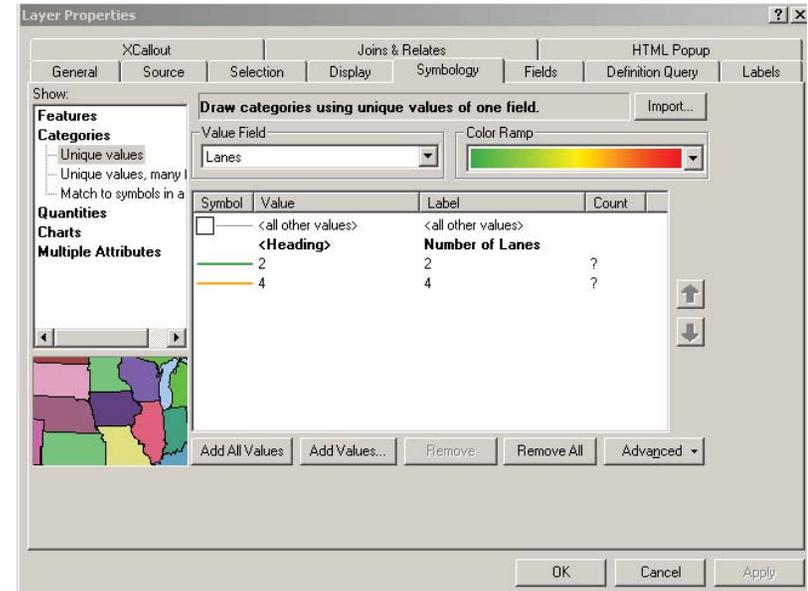
### Step 2: Displaying the Sidewalk and Pedestrian Crossings

Right-click on the "Sidewalk" layer and select "Properties".

Select the "Symbology" tab and under the "Categories" section, select "Unique values, many fields". Under the "Value Fields" select "Type", "Description", and "StopBar".

Select the "Add All Values" button.

This option will allow you to visualize the sidewalks, detached sidewalks, controlled and uncontrolled crosswalks, and enhanced controlled and uncontrolled crosswalks.



## VISUALIZE CRITERIA AND ANALYSIS (CONT.)

### Step 3: Display Stop Controlled Intersections

Right-click on the "Sidewalk" layer and select "Properties".

Select the "Symbology" tab and under the "Categories" section, select "Unique values, many fields". Under the "Values Fields" select "Type" and "StopBar".

Select the "Add All Values" button.

This option will allow you to visualize the sidewalks and the pedestrian network locations that are stop controlled.

### Step 4: Display Suitability Score

Right-click on the "Sidewalk" layer and select "Properties".

Select the "Symbology" tab and under the "Quantities" section, select "Graduated colors". Under the "Values Fields" select "Ave\_Score".

Select the "Add All Values" button.

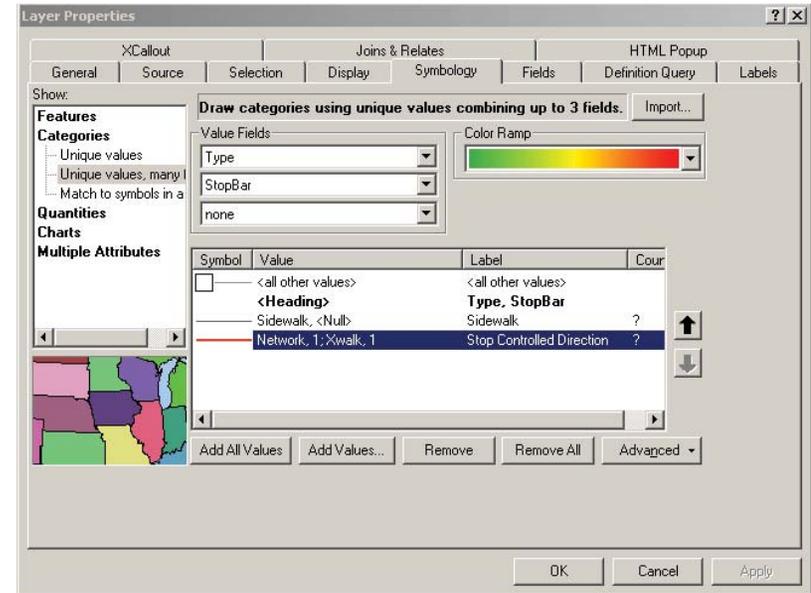
In the "Classification" section, make sure the "Classes" is set to 5 and it is showing the data as a Natural Break (Jenks).

In the "Label" section, rename the number range to the following:

Color Ramp: 

Symbol	Range	Label
	16.666667 - 29.166667	1 (Not Preferred)
	29.166668 - 37.500000	2
	37.500001 - 45.833333	3 (Average)
	45.833334 - 62.500000	4
	62.500001 - 100.000000	5 (Preferred)

Perform the same steps for the 4 criteria suitability score.



## PUBLISHING MAPS

This process explains the necessary steps to export the final basemap for use into Illustrator.

### Step 1: Export Basemap to an Illustrator File

Open the Final basemap containing the finished layers:

- Sidewalk
- Multiuse Trail
- Crosswalks
- Traffic Control
- School Boundary
- Enrollment Boundary
- Park Boundary
- Landmark Boundary
- Pedestrian Access Points
- Crossing Guards

Select "File" and then "Export".

Choose the "AI" file extension in the "Save as type" menu.

Choose location to save "AI" file.

Select "Save".

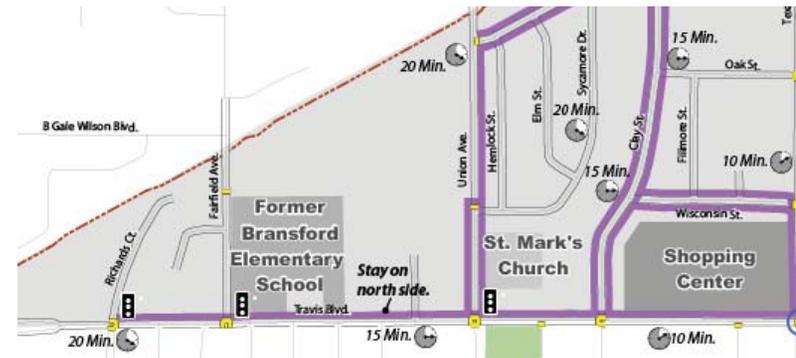
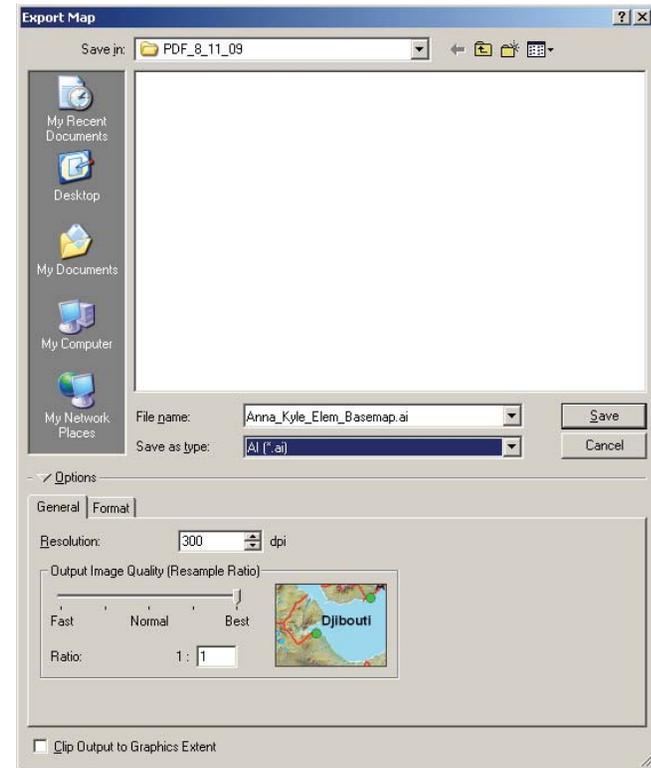
### Step 2: Add Safe Routes

Open the newly created "AI" file and add a "safe routes" layer to the map.

Using the different criteria, suitability analysis maps, and gathered information from the school visits, map the safe routes along the sidewalk layer. Be sure to create the lines offset far enough from the sidewalks to identify which side of the road is the preferred route.

Make the route line 3 point wide and use the following color palette:

- R - 170
- G - 102
- B205





## MEETING AGENDA

Date: Thursday, August 6, 2009  
Time: 1:30 PM  
Location: Anna Kyle Elementary  
**Subject: SR2S Mapping Project – Site Meeting #1**

---

1. Introductions
2. Goal: Produce a safe route to school map for use by parents and students to encourage walking and biking
3. Process:
  - a. Data collection
  - b. Criteria development
  - c. Network mapping
  - d. School site reviews and meetings
  - e. Map production
4. \* Site-specific barriers and issues that discourage walking and biking
5. \* Site-specific opportunities for walking and biking
6. \* Heavy demand corridors
7. \* Potential student gathering areas and bike parking
8. \* Influence of land use
9. \* Desired mapping features and information
  - a. Landmarks
  - b. Notes to students and parents
  - c. Phone numbers
  - d. Electronic logo
10. Next steps

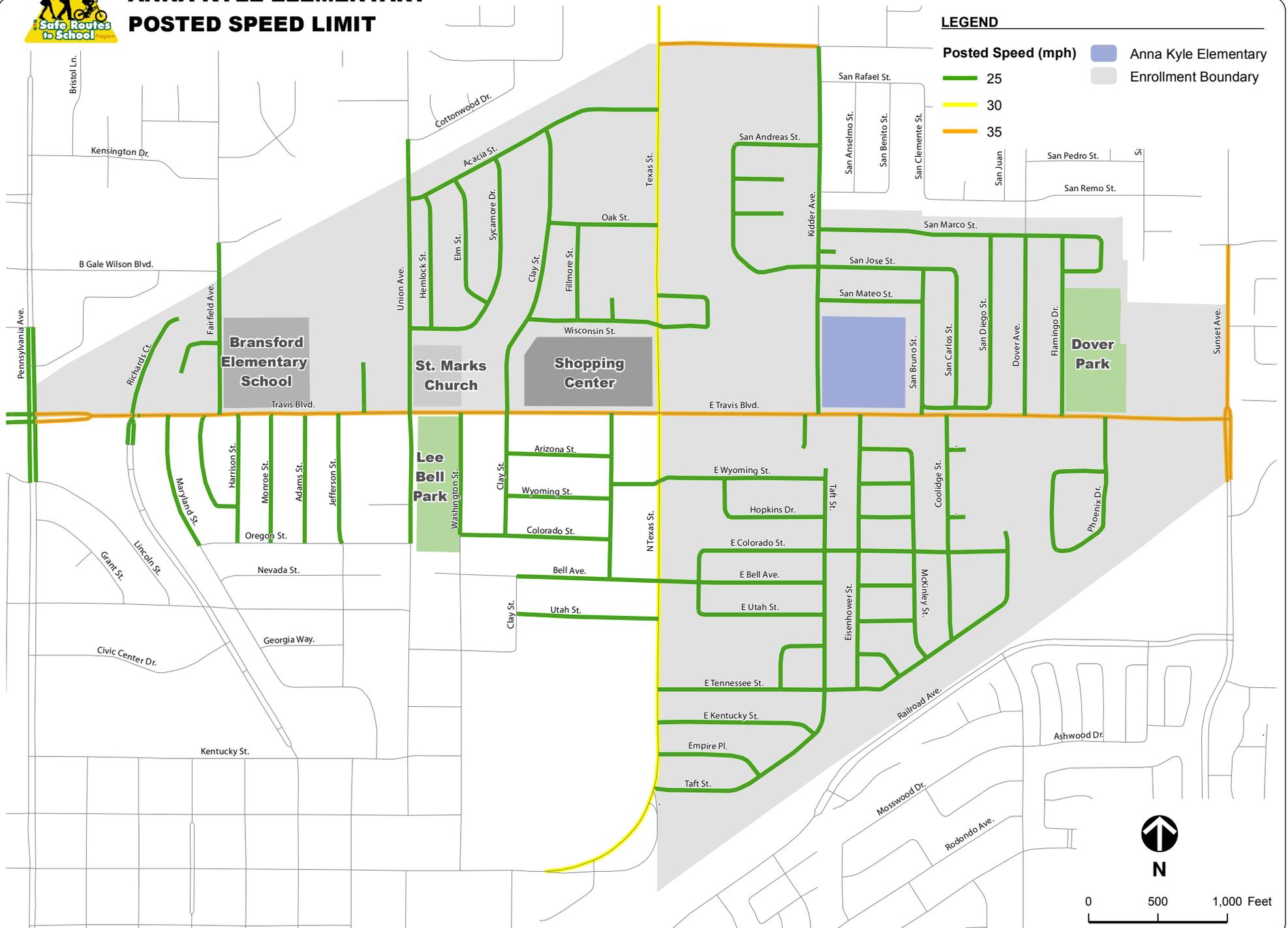




# ANNA KYLE ELEMENTARY POSTED SPEED LIMIT

## LEGEND

- Posted Speed (mph)**
- 25
  - 30
  - 35
- Anna Kyle Elementary  
■ Enrollment Boundary



0 500 1,000 Feet

### Step 3: Adding Notes and Additional Information

Add a "Notes" layer to the map.

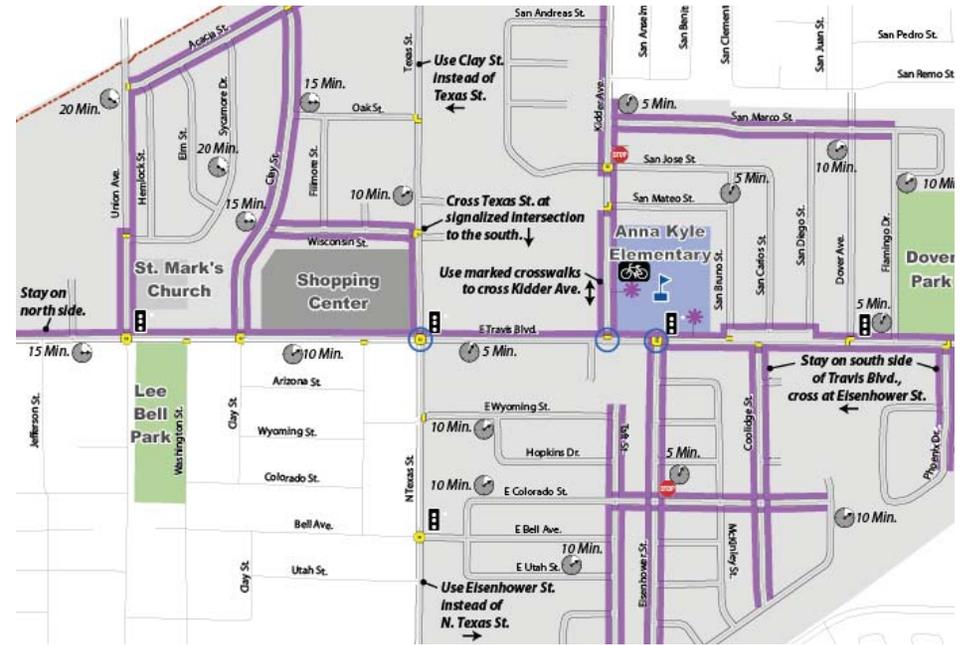
Add additional information that may be needed to further explain details along the safe route that may not be apparent from the map. This additional information may come from field observations or information provided from the school.

Add the "Time" symbols along the routes. Utilize the Walk Shed figure to identify symbol locations.

Create a "Landmark Label" layer and add labels for the school site name, parks, and landmark features.

Add the following note is best possible location without interfering with the safe routes:

*"The Solano Transportation Authority (STA) and project partners encourage parents to walk or bike with students and use this mapping tool to explore the safest way from home to school. This tool may also be used to form a walking school bus or bike train. It is the responsibility of each parent to find the most appropriate route based on the experience level of the child and knowledge of conditions on the route between home and school. For more information regarding this map, please contact the STA Safe Routes to School coordinator at 707.424.6075."*





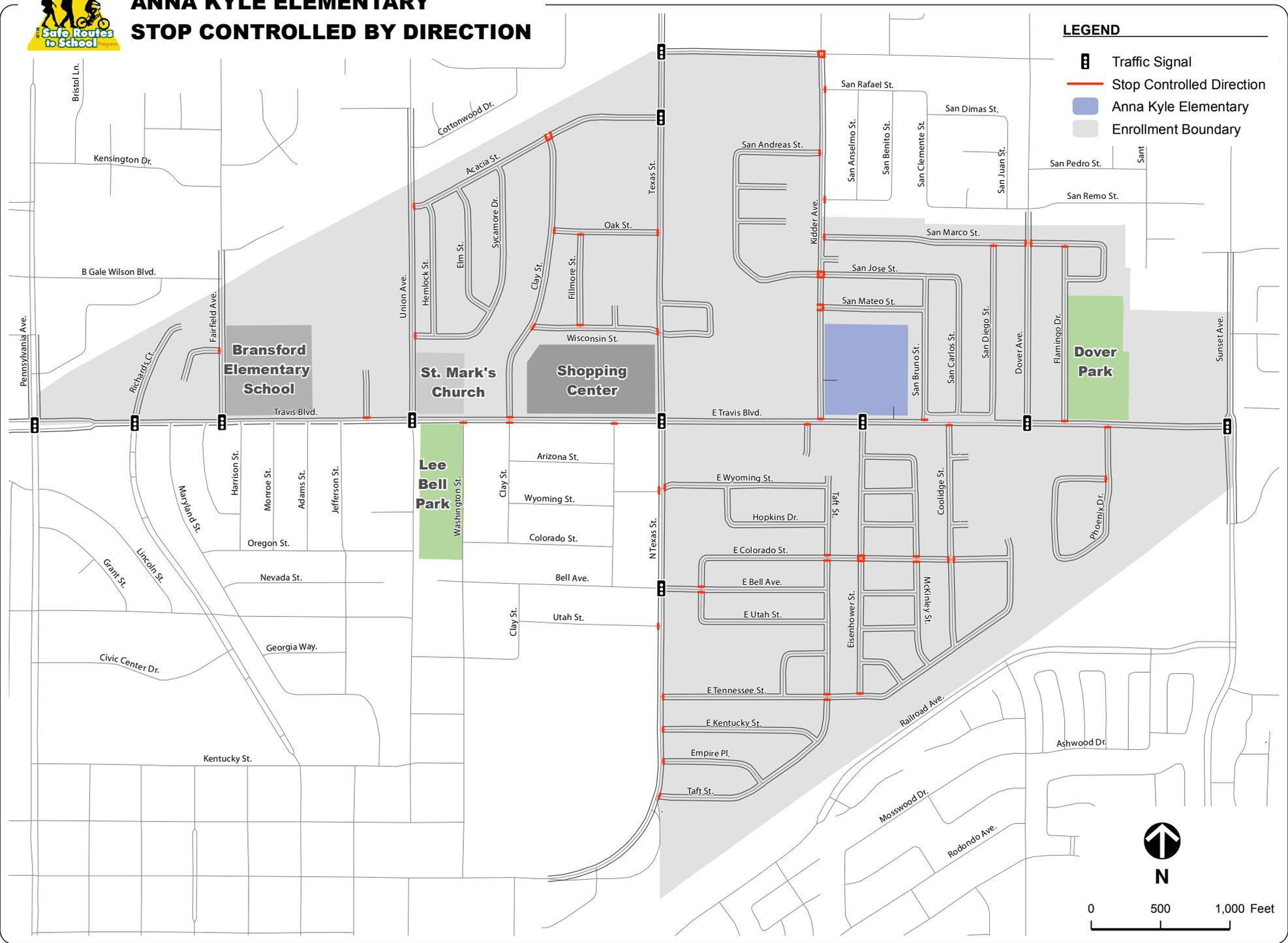
# ANNA KYLE ELEMENTARY

## NUMBER OF LANES





# ANNA KYLE ELEMENTARY STOP CONTROLLED BY DIRECTION



- LEGEND**
- Traffic Signal
  - Stop Controlled Direction
  - Anna Kyle Elementary
  - Enrollment Boundary

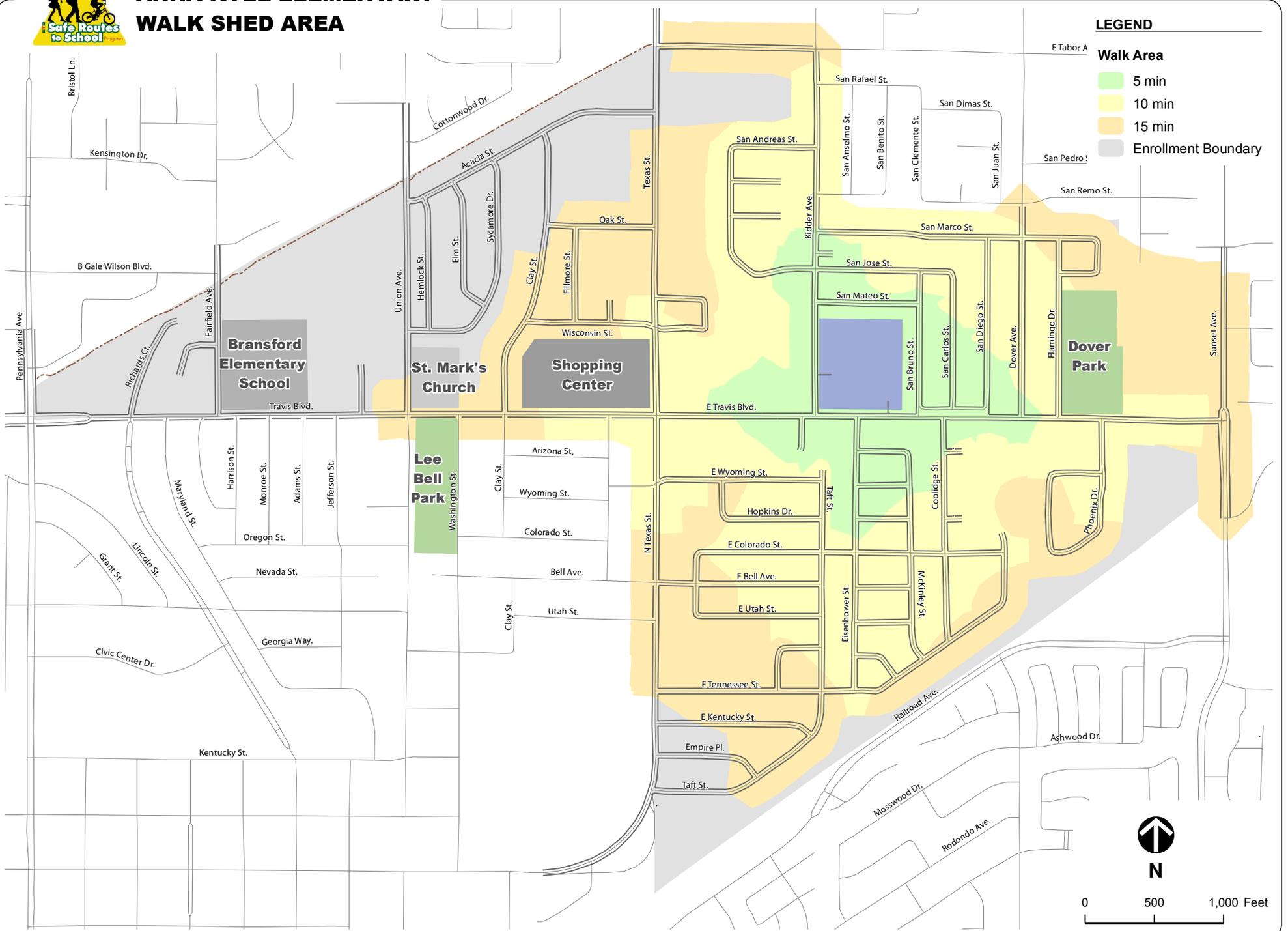


0 500 1,000 Feet





# ANNA KYLE ELEMENTARY WALK SHED AREA



**LEGEND**

**Walk Area**

- 5 min
- 10 min
- 15 min
- Enrollment Boundary



0 500 1,000 Feet



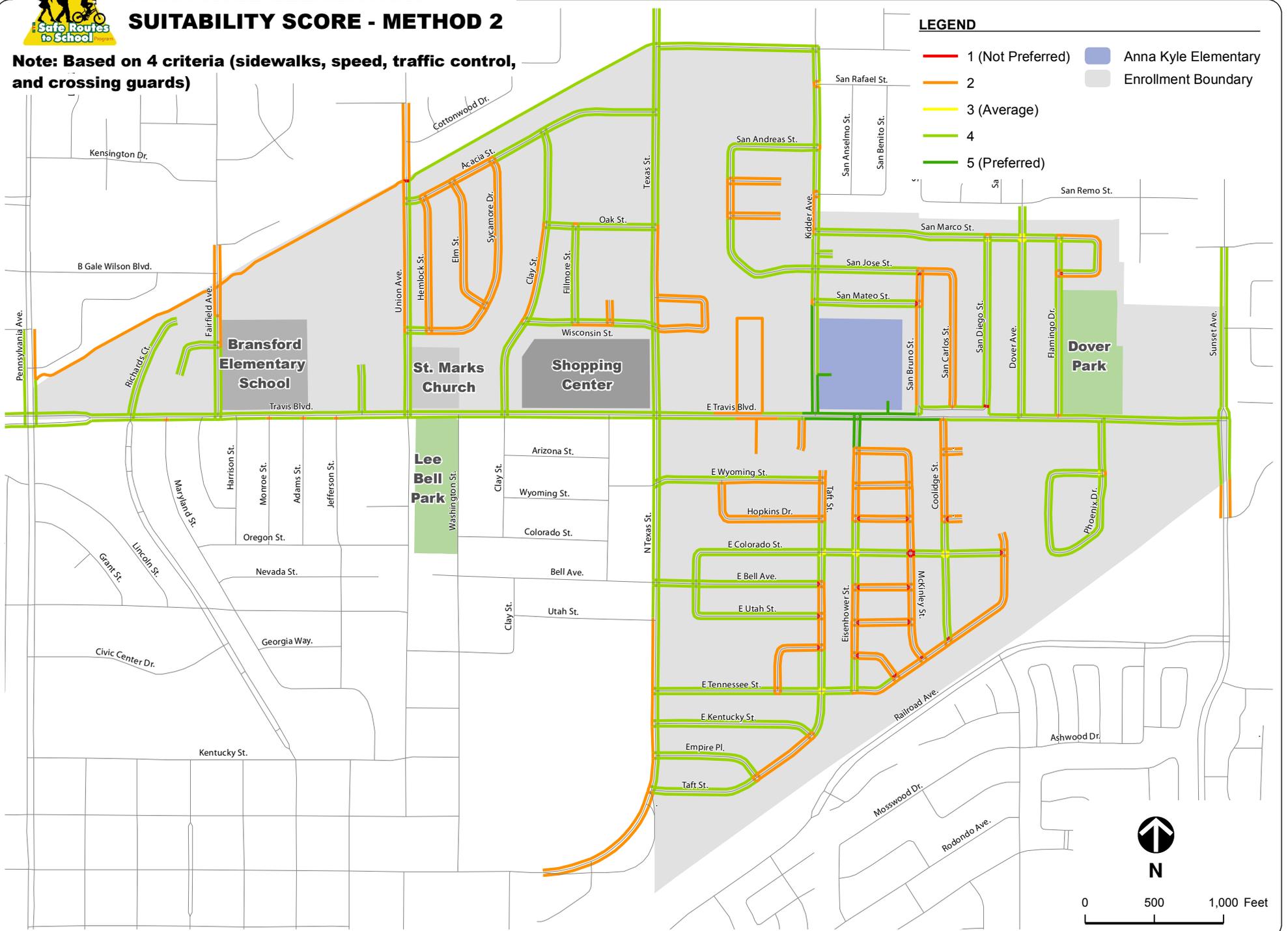


# ANNA KYLE ELEMENTARY SUITABILITY SCORE - METHOD 2

**Note: Based on 4 criteria (sidewalks, speed, traffic control, and crossing guards)**

## LEGEND

- 1 (Not Preferred)
- 2
- 3 (Average)
- 4
- 5 (Preferred)
- Anna Kyle Elementary
- Enrollment Boundary



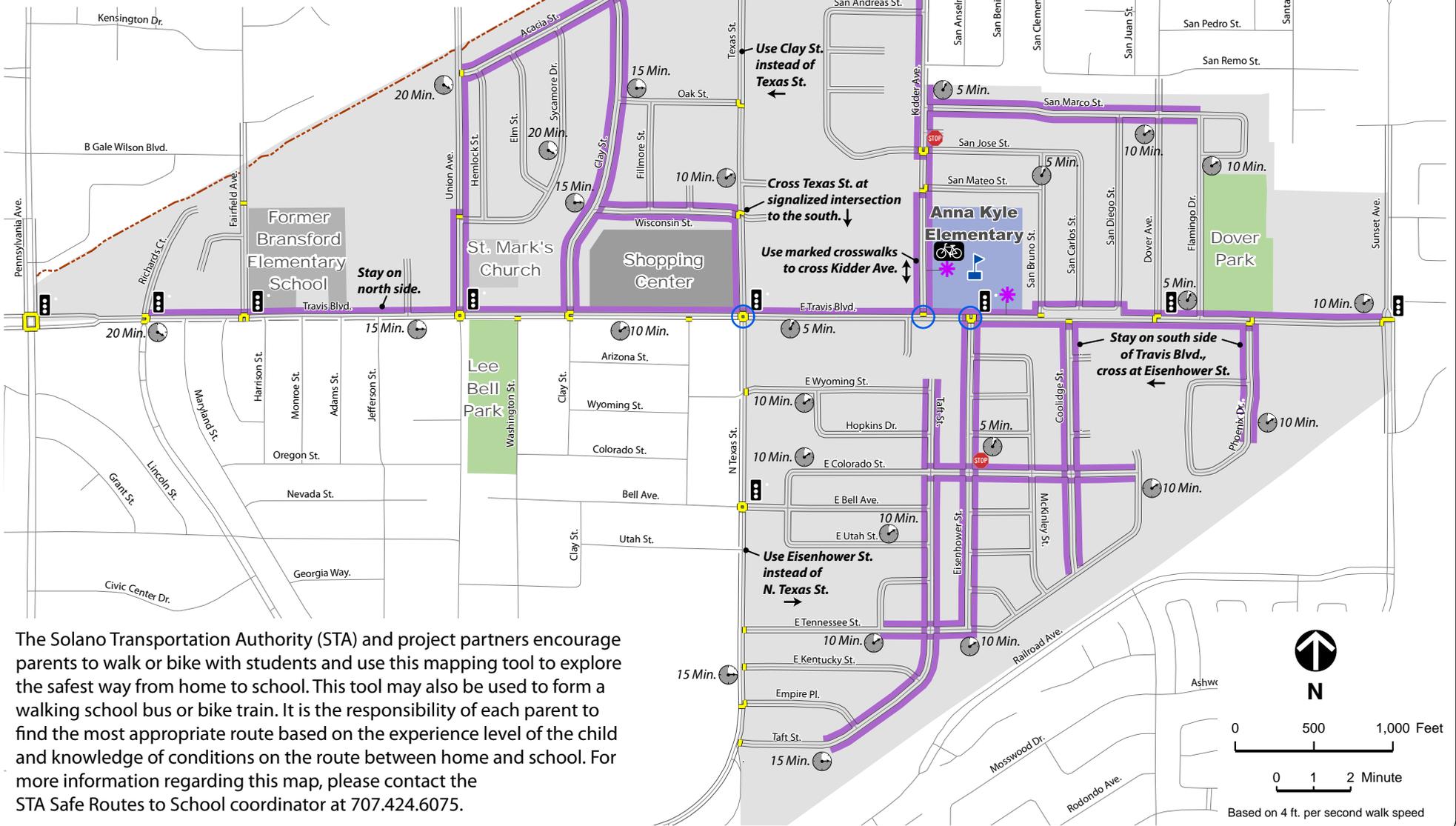
0 500 1,000 Feet



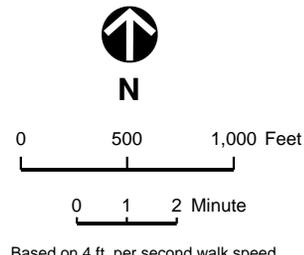
# ANNA KYLE ELEMENTARY RECOMMENDED ROUTES TO SCHOOLS

## LEGEND

- Recommended Walking Route
- Sidewalk
- Multiuse Trail
- Crosswalks (4, 3, 2, and 1 leg)
- Traffic Signal
- All-Way Stop
- Enrollment Boundary
- Pedestrian Access Points
- Crossing Guard
- Approximate Walk Time (Based on 4 ft. per second walk speed)
- Bicycle Parking



The Solano Transportation Authority (STA) and project partners encourage parents to walk or bike with students and use this mapping tool to explore the safest way from home to school. This tool may also be used to form a walking school bus or bike train. It is the responsibility of each parent to find the most appropriate route based on the experience level of the child and knowledge of conditions on the route between home and school. For more information regarding this map, please contact the STA Safe Routes to School coordinator at 707.424.6075.



## CHAPTER 7A. GENERAL

### **Section 7A.01 Need for Standards**

#### Support:

It is important to stress that regardless of the school location, the best way to achieve reasonably safe and effective traffic control is through the uniform application of realistic policies, practices, and standards developed through engineering judgment.

Pedestrian safety depends upon public understanding of accepted methods for efficient traffic control. This principle is especially important in the control of pedestrians, bicycles, and other vehicles in the vicinity of schools. Neither pedestrians on their way to or from school nor road users can be expected to move safely in school areas unless they understand both the need for traffic controls and how these controls function for their benefit.

Procedures and devices that are not uniform might cause confusion among pedestrians and road users, prompt wrong decisions, and contribute to crashes. To achieve uniformity of traffic control in school areas, comparable traffic situations need to be treated in a consistent manner. Each traffic control device and control method described in Part 7 fulfills a specific function related to specific traffic conditions.

A uniform approach to school area traffic controls assures the use of similar controls for similar situations (which promotes uniform behavior on the part of motorists, pedestrians, and bicyclists).

A school traffic control plan permits the orderly review of school area traffic control needs, and the coordination of school/pedestrian safety education and engineering activities.

#### Guidance:

A school route plan for each school serving elementary ~~to high school~~ students should be prepared in order to develop uniformity in the use of school area traffic controls and to serve as the basis for a school traffic control plan for each school.

#### Option:

A school route plan for each school serving middle school or high school students may be prepared.

#### Guidance:

The school route plan, developed in a systematic manner by the school, law enforcement, and traffic officials responsible for school pedestrian safety, should consist of a map (see Figure 7A-1) showing streets, the school, existing traffic controls, established school walk routes, and established school crossings.

The type(s) of school area traffic control devices used, either warning or regulatory, should be related to the volume and speed of vehicular traffic, street width, and the number and age of the students using the crossing.

School area traffic control devices should be included in a school traffic control plan.

#### Support:

Reduced speed limit signs for school areas and crossings are included in this Manual solely for the purpose of standardizing signing for these zones and not as an endorsement of mandatory reduced speed zones.

Parents, school administrators, traffic officials, civic leaders, and vehicle drivers share the responsibility of educating school pedestrians on the use of traffic control devices. Programs in the home and school to train the child as a responsible pedestrian are an important factor in improving their understanding of traffic control devices.

The words "School Pedestrians", "Children", and "Students" are used interchangeably and could include student bicyclists for the purpose of determining appropriate cross protection measures.

### **Section 7A.02 School Routes and Established School Crossings**

#### Support:

The planning criterion for school walk routes might make it necessary for children to walk an indirect route to an established school crossing located where there is existing traffic control and to avoid the use of a direct crossing where there is no existing traffic control.

#### Guidance:

School walk routes should be planned to take advantage of existing traffic controls.

The following factors should be considered when determining the feasibility of requiring children to walk a longer distance to a crossing with existing traffic control:

- A. The availability of adequate sidewalks or off-roadway sidewalk areas to and from the location with existing control;
- B. The number of students using the crossing;
- C. The age levels of the students using the crossing; and
- D. The total extra walking distance.

Support:

There is a need in each school district to establish an organization concerned with students enroute to and from school. Through such an organization, the school district can be responsibly involved in processing requests for traffic safety controls and for safety programs and can coordinate activities within and between the community and public agencies.

In order to provide a responsible administrative structure for the school area, each school district is encouraged to:

1. Assign student pedestrian responsibilities to a competent staff member and/or
2. Organize a school student pedestrian advisory committee to serve the needs of each public and private school.

Guidance:

When the advisory committee structure is used, the committee should include governmental and school district staff who has the responsibility and authority to initiate and provide programs and projects.

Representatives from the city and/or county superintendent of schools office should be the official members.

Advisors should include representatives of the local area Safety Council, traffic engineers, police authorities, the Parent-Teachers Association, Automobile Clubs (AAA), plus others as needed.

#### Staff and Committee Responsibility:

Guidance:

The duties of staff members and/or each committee should be to guide and coordinate all activities connected with the school traffic safety program, such as:

1. Establish traffic safety policies and procedures.
2. Recommend priorities for proposed improvement projects.
3. Notify the responsible agencies of school-pedestrian-traffic related issues.
4. Review and approve the various phases of the school student traffic safety program.
5. Review and process requests and complaints.
6. Promote good public relations.

The County Superintendent of School's office should coordinate all student pedestrian committees' actions in establishing and promoting uniform practices for school pedestrian safety throughout the county.

#### School Responsibility:

Guidance:

Traffic related issues about school pedestrians on the approaches to the school should be referred to the school district or local school principal for review and transmission to the appropriate staff person or to the school student pedestrian advisory committee.

Support:

Refer to CVC 21373 for school board request for traffic control devices.

#### Government Traffic Agency Responsibility:

Standard:

Upon request of the local school district, responsible traffic authorities shall investigate all locations along the school route and recommend appropriate traffic control measures. Refer to CVC 21373.

### **Section 7A.03 School Crossing Control Criteria**

Support:

Alternate gaps and blockades are inherent in the traffic stream and are different at each crossing location. For safety, students need to wait for a gap in traffic that is of sufficient duration to permit reasonably safe crossing. When the delay between the occurrence of adequate gaps becomes excessive, students might become impatient and endanger themselves by attempting to cross the street during an inadequate gap.