

Walking Routes to School Program

Creating Walking Routes to School
using the Network Analyst Extension

John Ritsko
GIS Analyst
City of Henderson
Public Works Engineering



Purpose of Program

- Create a WEB-based printable map for the public.
- Offer a web based interactive mapping tool
 - It would allow parents to visually see a walking route from their home to a proposed Elementary School.
 - Have the feel of other internet mapping utilities offered by the City of Henderson.
- GPS traffic infrastructure for Asset Management
- Prepare Work Orders for failing infrastructure within City Limits



Purpose of Program cont.

- Why is the City of Henderson doing this?
 - August 2005 President signed the: Safe, Accountable, Flexible Efficient Transportation Equity Act - A Legacy for Users
 - As part of the bill 612 Million was earmarked for establishing SAFE ROUTES to school programs for K-8 schools in every state.
 - Safe Routes to School program empower communities to make walking and bicycling to schools an attractive, routine and safe activity thereby building life-long habits of walking and bicycling.
 - The City of Henderson is ensuring these Safe Route Programs are possible by making sure that Walking and Bicycling Paths to school are safe and available to the public.



Creating the Database

- Database Design
 - Created a File Based Geodatabase using ArcCatalog 9.2
 - Created Feature Datasets
 - Paths, Signals, Signs, Streetlight Poles, Work Orders
 - PATHS (Backbone of the Network)
 - Concrete Sidewalk
 - Asphalt
 - Crosswalks
 - Dirt Paths
 - No Paths (Hazard Walking Zone)
 - Private Sidewalk
 - Unmarked Crosswalk at Stop Signs
 - Unmarked Crosswalks at Yield Signs



Creating the Database cont.

- Network Design for our Walking Route Program
 - Network Dataset was the way to go!!
 - We didn't need to show direction of flow so the Geometric Network was out of the question.
- Technical Difficulties
 - With Network Datasets you cannot have complex edges
 - Meaning you can't have the end of a line connect to another line unless it's at an end point.
 - So, we had to ensure that all connections were made at endpoints.
 - Drawback: TIME CONSUMING
 - ESRI stated that a process could be developed by a programmer to run a script that would break all complex edges and create end-point connectivity between all lines. (We have yet to do this)



File Geodatabase Structure

The screenshot displays the ArcCatalog interface for a File Geodatabase. The main window shows a tree view of the geodatabase structure. The selected geodatabase is **TRAFFIC_INFRASTRUCTURE_NETWORK**. The tree view shows the following structure:

- TRAFFIC_INFRASTRUCTURE_NETWORK
 - PATHS
 - ASPHALT
 - CROSSWALKS
 - DIRT_PATH
 - NO_PATH
 - PRIVATE_SIDEWALK
 - PRIVATE_SUBDIVISION_BDRY
 - SIDEWALK
 - UNMARKED_XWALK_R1_1
 - UNMARKED_XWALK_R1_2
 - WALKING_PATHS
 - WALKING_PATHS_Junctions
 - SIGNALS
 - SIGNALS
 - SIGNS
 - REGULATORY
 - SCHOOL
 - STREET_LIGHT_POLES
 - STREET_LIGHT_POLES
 - WORK_ORDERS
 - WORK_ORDERS

The right-hand pane shows the **Contents** tab, which lists the feature datasets and their types:

Name	Type
PATHS	File Geodatabase Feature Dataset
SIGNALS	File Geodatabase Feature Dataset
SIGNS	File Geodatabase Feature Dataset
STREET_LIGHT_POLES	File Geodatabase Feature Dataset
WORK_ORDERS	File Geodatabase Feature Dataset



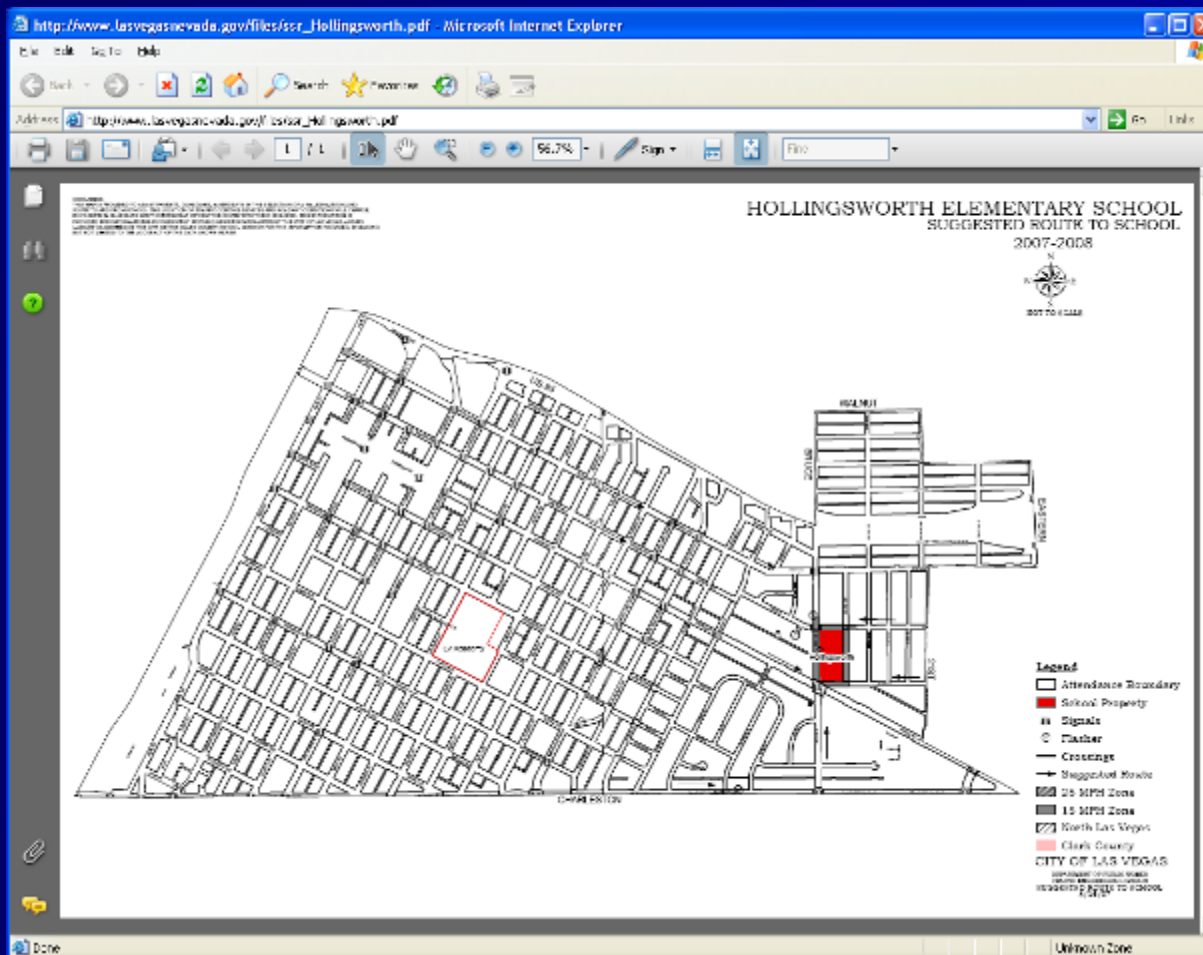
Developing Our Map

- Wanted to be similar to what is already out there
 - Didn't want to redevelop the wheel
- We researched not only local but national Safe Route / Walking Route maps.
- We decided that we wanted to show Hazard Zones
 - Areas where Children can or cannot walk safely according to the Clark County School District
- We were also going to show walking path types
 - Sidewalk, Asphalt, Dirt, No-Path (we'll explain later), Private Sidewalk
- We also wanted to show Traffic / School signs



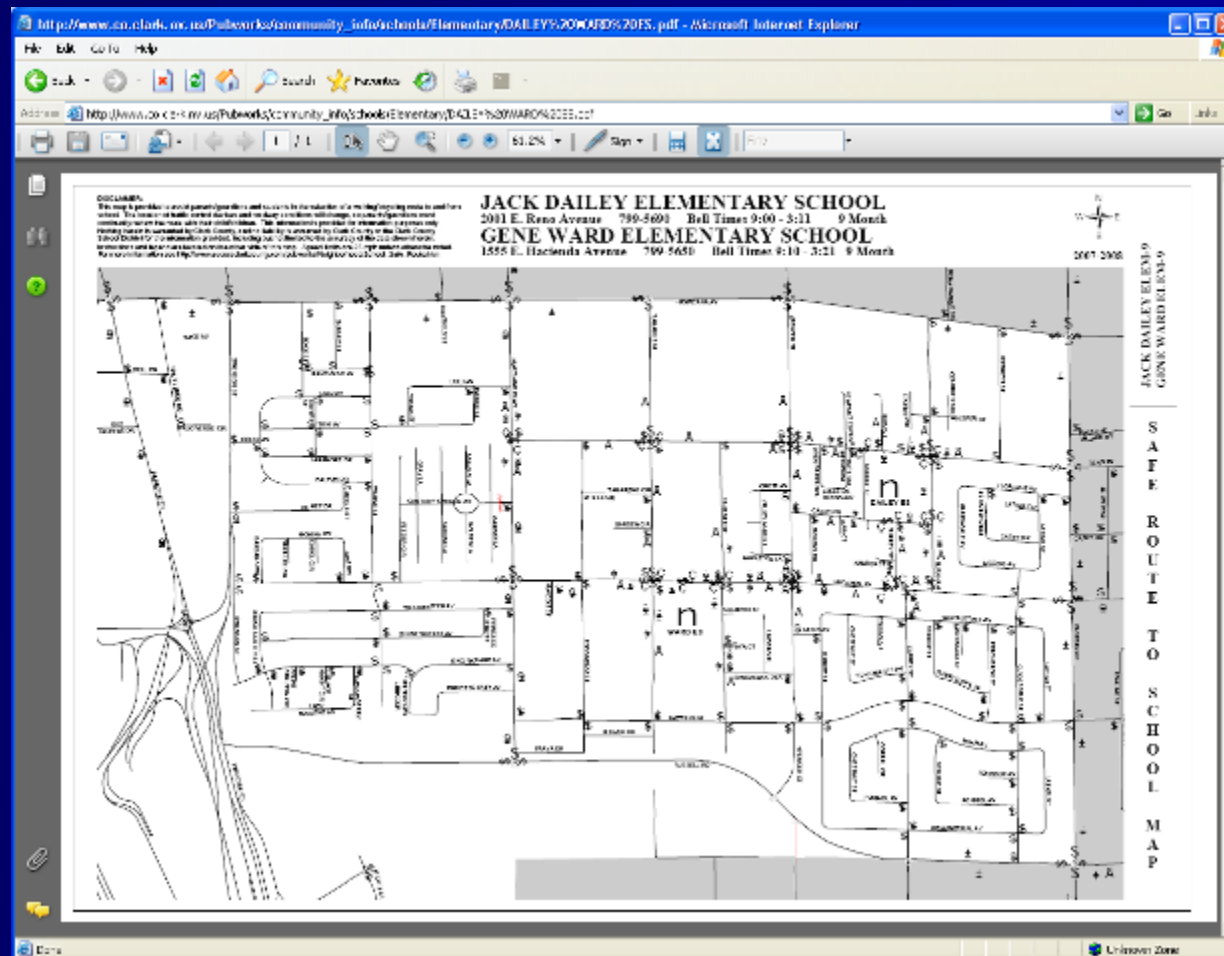
Other Entity Mapping Examples

City of Las Vegas Map



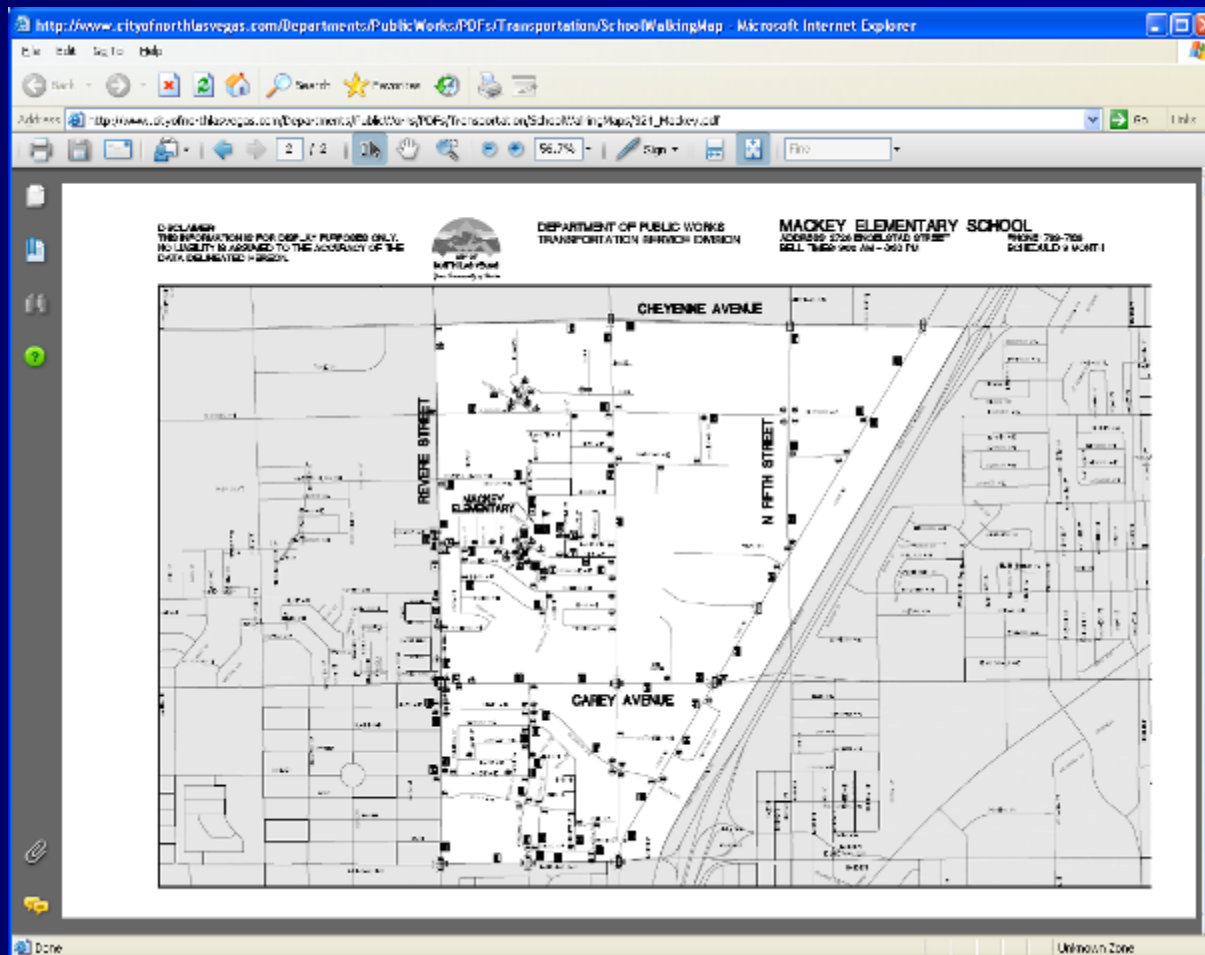
Other Entity Mapping Examples

Clark County Map



Other Entity Mapping Examples

City of North Las Vegas Map



City Of Henderson's Printable Map

Sue_Morrow_2.pdf - Adobe Acrobat Professional

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SUE MORROW ELEMENTARY SCHOOL
1070 FEATHERWOOD AVENUE 2006 - 2007 Phone: (702) 799-3550
Bell Time: 9:10 - 3:21 (North - Map 2 of 2) 12 Month

MAP LOCATION SCHOOL ZONE
Page: 400
0 120240 400 Feet

SUE MORROW ELEM 12
SCHOOL WALKING ROUTE MAP


City Of Henderson Map cont.

SAFE ROUTE LEGEND.pdf - Adobe Acrobat Professional

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City of Henderson Public Works

Public Works Engineering Division

SCHOOL WALKING ROUTE MAP


Dear Parents, Guardians, and Students:

This map indicates traffic control devices, such as stop signs, speed limit signs, school zones, traffic signals, and crosswalks, within the walking area of your school. Please use this map to select a safe route to school for your child/children.

Please review the selected route with your child/children. Become familiar with the route by walking the route together. It is suggested that you instruct your child/children on the appropriate conduct at intersections and at traffic control devices, such as traffic signals, stop signs, and crosswalks. The location of each traffic control device is indicated by a symbol on the map. Please instruct your child/children to use a designated school crossing whenever possible, whether or not it requires a longer walk.

The locations of adult school crossing guards are determined by the Henderson Police Department based on traffic conditions (phone number 702-267-4550).

	LEGEND		Speed Limit 25
			Speed Limit 30
			Speed Limit 35
			Speed Limit 40
			Speed Limit 45
			Speed Limit 55
			School Zone Flasher (15 MPH when flashing)
			School Crossing Zone Flasher (25 MPH when flashing)
			15 MPH School Zone
			25 MPH School Crossing Zone
			Crossing Guard Location
			Private Subdivision
			NO Path



La Ciudad Del Publico Del Henderson Trabaja

La Division Del Publico Trabaja

EDUQUE ANDAR MAPA DE RUTA

Estimados Padres, Tutores y Estudiantes:

Este mapa indica las señales de tránsito, tales como de alto, de limite de velocidad, de semáforos, y paso de peatones dentro del area de asistencia a la escuela. Por favor utilice el mapa para establecer una ruta a la escuela que propicie la seguridad de sus hijos.

Por favor familiarize a su hijo/hijos con una ruta. Pueden caminar esa ruta juntos para conocerla mejor. Se sugiere que enseñe a su hijo/hijos lo que deben hacer al cruzar las intersecciones, como respetar los señales de tránsito, tales como de alto, y paso de peatones. Las instalaciones de señales de tránsito estan indicadas con un simbolo en el mapa. Por favor enseñe a su hijo/hijos a utilizar el paso para peatones, aunque esto requiera caminar una distancia mas larga.

Las localidades de guardias adultos para cruces escolares son determinadas por el Departamento de Policia de Henderson en base a las condiciones de trafico (teléfono 702-267-4550).

	CLAVES		Limite De Velocidad 25
			Limite De Velocidad 30
			Limite De Velocidad 35
			Limite De Velocidad 40
			Limite De Velocidad 45
			Limite De Velocidad 55
			Zona Escolar Con Luz Intermitente (15 MPH Cuando Esta Prendida)
			Zona De Cruce Escolar Con Luz Intermitente (25 MPH Cuando Esta Prendida)
			15 MPH Zona Escolar
			25 MPH Zona De Cruce Escolar
			Protector De Travesía
			Subdivisión Privada
			Ningun Sendero

City Of Henderson Map cont.

SAFE ROUTE LEGEND.pdf - Adobe Acrobat Professional



























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The locations of adult school crossing guards are determined by the Henderson Police Department based on traffic conditions (phone number 702-267-4550).

LEGEND

	Traffic Signal		Speed Limit 25
	Stop Sign		Speed Limit 30
	Yield Sign		Speed Limit 35
	School Crossing Sign		Speed Limit 40
	Advance School Zone Sign		Speed Limit 45
	School Location		Speed Limit 55
	End School Zone		School Zone Flasher (15 MPH when flashing)
	SAFE Walking Zone		School Crossing Zone Flasher (25 MPH when flashing)
	HAZARD Walking Zone		15 MPH School Zone
	Crosswalk		25 MPH School Crossing Zone
	Sidewalk Path		Crossing Guard Location
	Dirt Path		Private Subdivision
	Asphalt Path		NO Path

17.00 x 11.00 in

Proposed Online Map

- Wanted to be similar to what is already out there

The screenshot displays a web browser window with the title "Elementary School Information - City Maps". The address bar shows the URL: <http://citymaps.cityofhenderson.com/info/asp?site=general&view=school>. The browser interface includes standard navigation buttons and a search bar.

The website header features the City of Henderson logo and the text "City of Henderson Nevada" and "Elementary School Info". Below the header are navigation tabs: "SEARCH", "LAYER", "LEGEND", "OVERVIEW", and "PRINT".

The main content area is dominated by a map of Henderson, Nevada, showing various colored zones representing elementary school districts. The map includes a scale bar, a north arrow, and a "Map center: 81.0250, 28706368" label. A red banner at the bottom left of the map area reads "All Locations Are Approximate".

To the right of the map is a "Zoom To Address" form. It contains the following text: "Enter the street address where you wish to center the map. If matching addresses are found, you will be shown a list of matching addresses for you to choose from." Below this text are two input fields labeled "Street Number" and "Street Name", and a "Submit" button.

At the bottom of the browser window, the status bar shows "Scale: 1:201,746", "Map Tool: Zoom In", and "Active Layer: 2006-2007 Elementary School Zones". The browser's taskbar at the very bottom shows "Done" and "Internet Explorer 100%".



Proposed Online Map cont.

Elementary School Information -- City Maps - Windows Internet Explorer

http://citymaps.cityofhenderson.com/inf/inf.jsp?site=generalElemSchool

City of Henderson Nevada Elementary School Info

SEARCH LAYER LEGEND OVERVIEW PRINT

TRAFFIC_INFRASTRUCTURE_NETWORK.mxd - ArcMap - ArcInfo

Zoom To Address

Enter the street address where you wish to center the map. If matching addresses are found, you will be shown a list of matching addresses for you to choose from.

Street Number

Street Name

Submit

All Locations Are Approximate

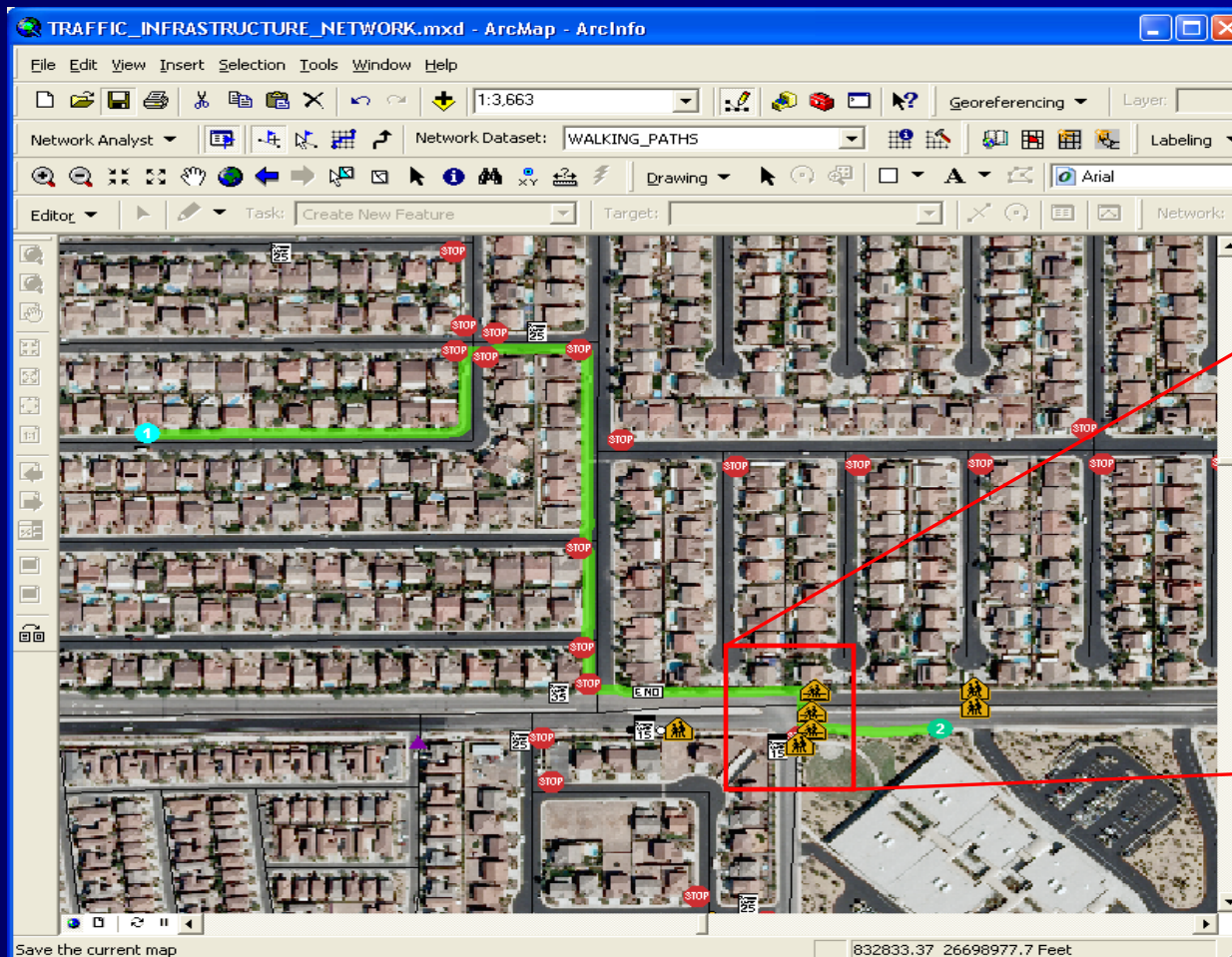
Scale: 1:638,415 Map Tool: Zoom In Active Layer: 2006-2007 Elementary School Zones

http://citymaps.cityofhenderson.com/inf/inf.jsp?site=generalElemSchool/ContentIndexMap.jsp

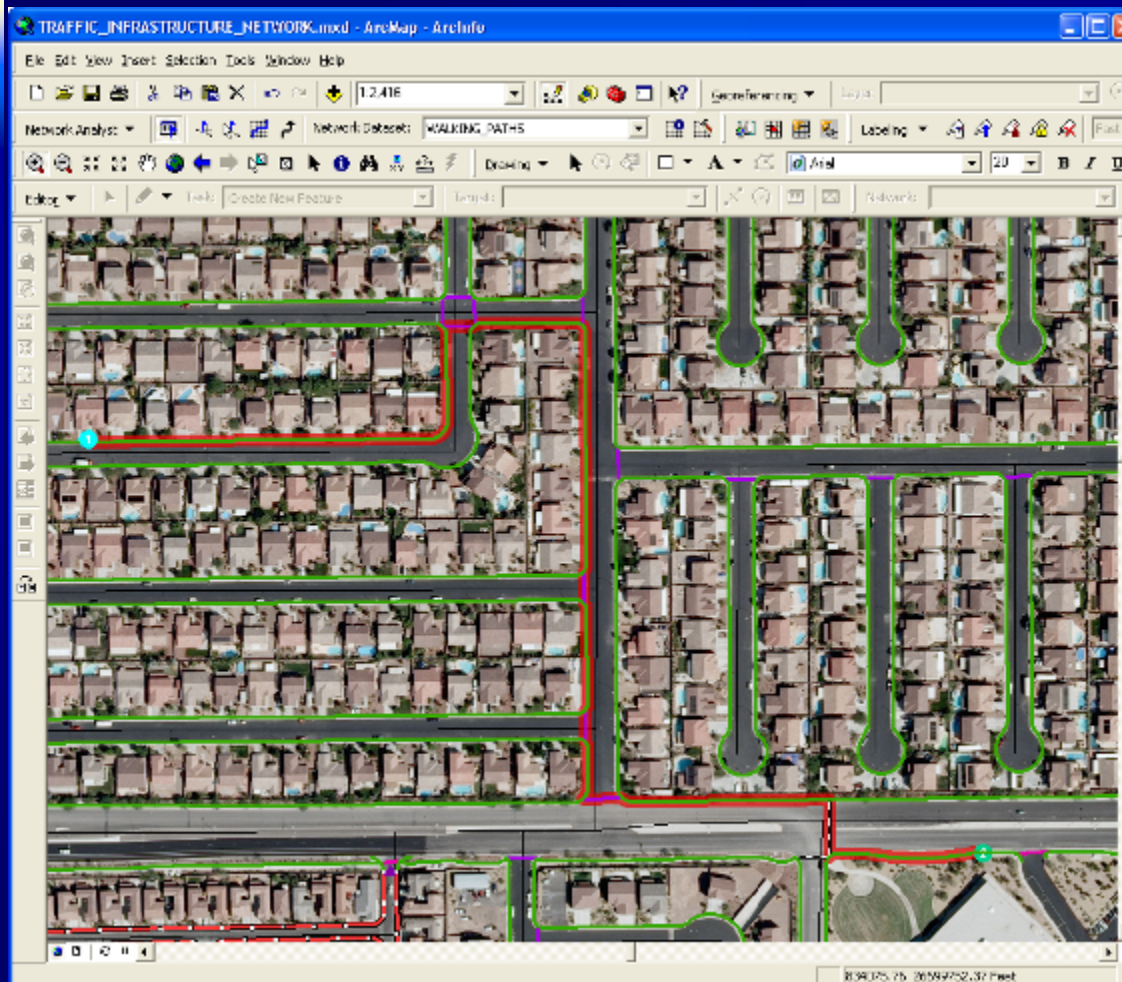
- This would be the outcome of the user input.
- ArcIMS Application that would prompt for user address and then allow user to pick an Elementary School from a drop down list. Hence, limiting the use of the application to only finding routes to schools.



Proposed Online Map cont.



Underlying Network of Map

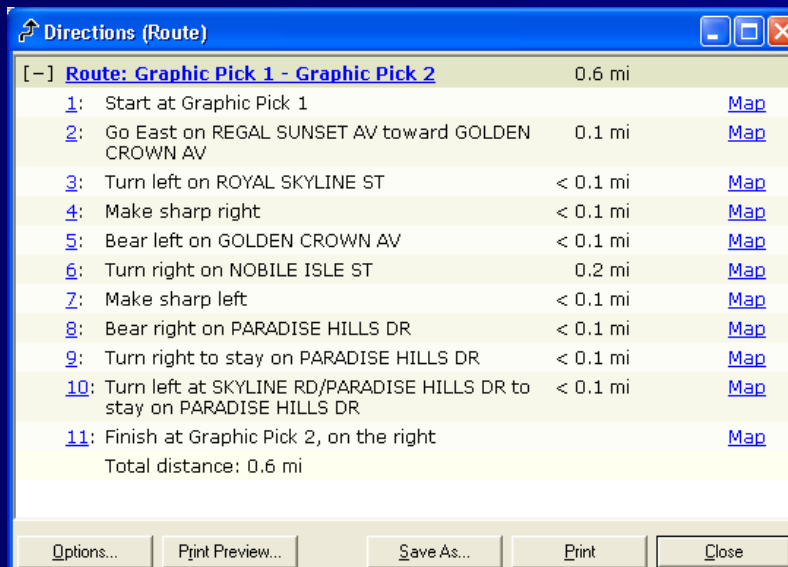


- Underlying Walking Path Network
 - Green – Sidewalk
 - Red/White – Private Neighborhood (Uncontrolled)
 - Purple – Unmarked Crosswalk (Stop)
 - Violet – Unmarked Crosswalk (Yield)
 - White/Black – Marked Crosswalk



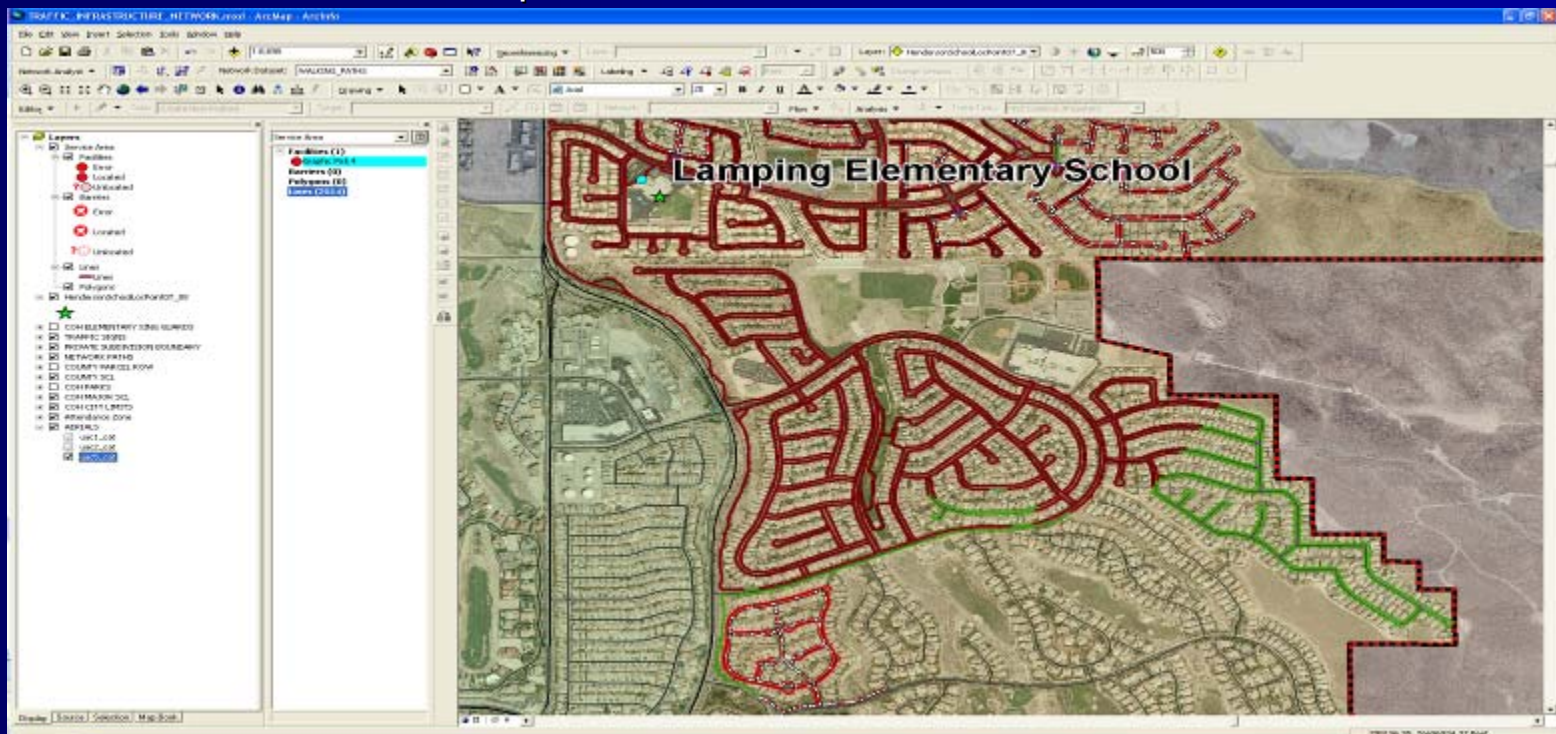
Legal Liability Issues

- Initial Thought was to provide walking directions such as those listed below
- We also were developing the Network taking walking SPEEDS into consideration
 - This was also stopped due to the liability issues of showing the directions.
- City of Henderson Attorneys denied the request
 - Liability is to high in showing actual directions.



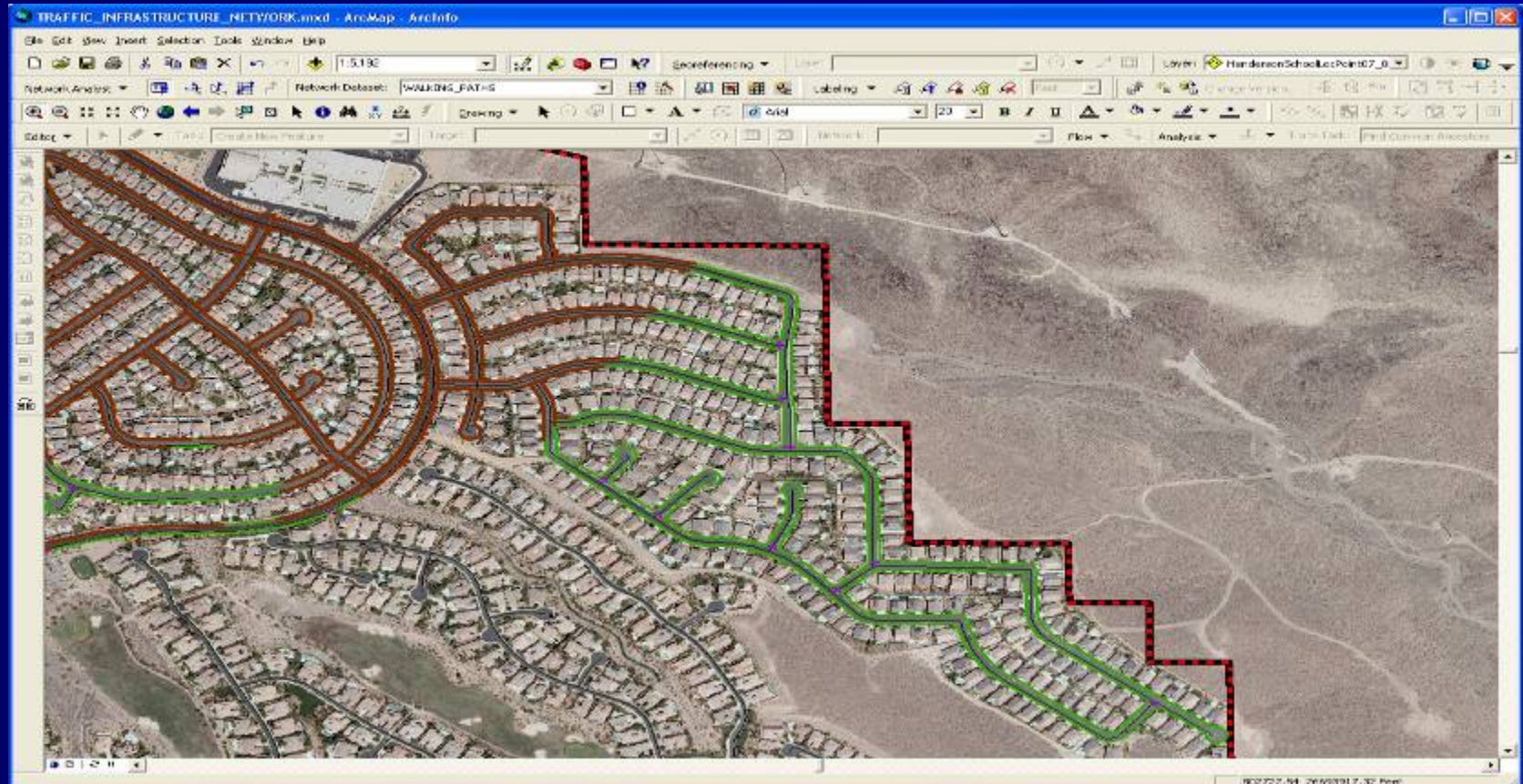
Walking Distance Issues

- Clark County School District (CCSD) (transportation.ccsd.net)
 - “Transportation is available for students residing two miles or more from their zoned school as stated in Clark County School District Regulation 3531, Student Transportation Guidelines”.



Walking Distance Issues cont.

- The “New Service Area” tool allows us to review areas outside of the two mile walking zone to analyze possible new crosswalk locations.



Conclusion

- Still Very Early in our Program
- 15 Schools now GPS
- Signs GPS
 - 4158 Regulatory Signs
 - 752 School Signs
 - Total of 4910 signs GPS with Northing and Easting points stored in our File Geodatabase
- Walking Paths Digitized

Sidewalk:	390.9	miles
Private Sidewalk:	40.8	miles
Dirt Paths:	113.1	miles
Asphalt Paths:	18	miles
No Path:	45.7	miles
<u>TOTAL:</u>	<u>608.5</u>	<u>Miles</u>



Conclusion cont.

■ WEBSITES:

- <http://lookoutkidsabout.org/>
- <http://www.bicyclenevada.com/>
- <http://www.walknevada.com/>
- <http://www.saferoutesinfo.org/>
- <http://www.walktoschool.org/>



QUESTIONS



Contact Information

John Ritsko

GIS Analyst

City of Henderson

Public Works Engineering

240 Water Street

Henderson, NV 89009

Work: 702-267-3056

Fax: 702-267-3051

John.Ritsko@cityofhenderson.com

Office Hours: Monday – Thursday 7:30 a.m. – 5:30 p.m.

